City Council Chamber
1515 6th Street, Coachella, California
(760) 398-3502 ◆ www.coachella.org

AGENDA

OF A REGULAR MEETING
OF THE
CITY OF COACHELLA
PLANNING COMMISSION

December 17, 2025
6:00 PM

In-Person Meeting Location: City Council Chamber 1515 6th Street, Coachella, CA	**If you would like to attend the meeting via Zoom, here is the link:** https://us02web.zoom.us/j/84544257915?pwd=VTdHWitpYVdOUk1NQW8vZ1pqUm0zQT09 Or One tap mobile : +16694449171,,84544257915#,,,,*380084# Or Telephone: US: +1 669 900 6833 **Webinar ID: 845 4425 7915** **Passcode: 380084** **Spanish:** El idioma español está disponible en Zoom seleccionado la opción en la parte de abajo de la pantalla

- Public comments may be received by 12:00 P.M. **either in person, via email, telephonically, or via Zoom** with a limit of **250 words, or three minutes:**
  - **In Real Time:**

    If participating in real time via Zoom or phone, during the Public Comment Period, use the **"raise hand"** function on your computer, or when using a phone, participants can raise their hand by pressing *9 on the keypad.
  - **In Writing:**

    Written comments may be submitted to the City Council electronically via email to **cityclerk@coachella.org**. Transmittal **prior to the start** of the meeting is required. All written comments received will be forwarded to the City Council and entered into the record.

- The **live stream** of the meeting may be **viewed online** by accessing the city's website at **www.coachella.org**, and clicking on the "**Watch Council Meetings**" tab located on the home page, and then clicking on the "live" button.

CALL TO ORDER:

PLEDGE OF ALLEGIANCE:

ROLL CALL:

APPROVAL OF AGENDA:

"At this time the Commission may announce any items being pulled from the agenda or continued to another date or request the moving of an item on the agenda."

APPROVAL OF THE MINUTES:

WRITTEN COMMUNICATIONS:

PUBLIC COMMENTS (NON-AGENDA ITEMS):

"The public may address the Commission on any item of interest to the public that is not on the agenda, but is within the subject matter jurisdiction thereof. Please limit your comments to three (3) minutes."

REPORTS AND REQUESTS:

NON-HEARING ITEMS:

1. A Public Hearing to Consider Resolution No. PC 2025-21 of the Planning Commission of the City of Coachella: Request for conditional approval for a fourth 12-Month Time Extension for Tentative Tract Map No. 37088 (Ravella) to allow a 115-unit single family residential subdivision on a total of 20 acres of vacant land in the CN-PD (Neighborhood Commercial – Planned Unit Development) zone located at the northwest corner of Avenue 50 and Calhoun Street (APN 612-280-027). Applicant: Mark Vasey, Tower Energy.

PUBLIC HEARING CALENDAR (QUASI-JUDICIAL):

2. A Public Hearing to Consider Resolution No. PC 2025-22, Resolution No. PC 2025-23, and Resolution No. PC 2025-24 of the Planning Commission of the City of Coachella: Request for Planning Commission recommendation of conditional approval to the City Council for Tentative Tract Map No. 39051 for the subdivision of 39.98 acres of land (Assessor's Parcel Number 612-260-010) into 257 lots and request for conditional approval of Conditional Use Permit No. 390 for a 257-lot single-family home planned unit development subdivision with associated improvements located at the southwest corner of Calhoun Street and Avenue 49 and certifying that the projects Initial Study with Mitigated Negative Declaration is in compliance with Section 15074 of the California Environmental Quality Act Guidelines. Applicant: Rod Vandenburg, Pacific Modern Builders, LLC.

INFORMATIONAL:

ADJOURNMENT:

Complete Agenda Packets are available for public inspection at the City Clerk's Office at 53-462 Enterprise Way, Coachella, California, and on the City's website www.coachella.org.

THIS MEETING IS ACCESSIBLE TO PERSONS WITH DISABILITIES

STAFF REPORT
12/17/2025

TO: Planning Commission Chair and Commissioners

FROM: Vanessa Sanchez-Meza, Planning Technician

SUBJECT: A Public Hearing to Consider Resolution No. PC 2025-21 of the Planning Commission of the City of Coachella: Request for conditional approval for a fourth 12-Month Time Extension for Tentative Tract Map No. 37088 (Ravella) to allow a 115-unit single family residential subdivision on a total of 20 acres of vacant land in the CN-PD (Neighborhood Commercial – Planned Unit Development) zone located at the northwest corner of Avenue 50 and Calhoun Street (APN 612-280-027). Applicant: Mark Vasey, Tower Energy.

STAFF RECOMMENDATION:

Staff recommends that the Planning Commission open the public hearing, receive public testimony, and recommend the conditional approve of Resolution No. PC2025-21 granting the fourth 12-Month Time Extension eligible for Tentative Tract Map No. 37088 with the findings and conditions of Resolution No. PC2025-21 and establishing a new expiration date of January 13, 2027.

BACKGROUND:

The project site has been the subject of three separate proposals including the current Tower Energy proposal. The following is a brief overview of the prior applications that have been submitted on the property:

- *Historically the site was utilized as agricultural land. Agricultural uses on the site declined in the 1990s and by 2004, there was no longer any evidence of agricultural growth on the property. The lot has remained vacant since that time. Prior ownership included a church entity that wanted to develop a religious assembly campus.*

- *In 2011, Tower Energy Group purchased the property and proposed to build a 240-unit apartment complex and a mini-mart/service station on-site that required a general plan amendment and a change of zone. At the time, the project was placed on hold due to the pending General Plan Update.*

- *The project was sold to LADCO in 2013, and in 2015, LADCO proposed a low-density residential project. After meeting with staff, the owner submitted Tentative Tract Map (TTM No. 36680) to develop a 115-lot residential gated subdivision and commercial site. The residential component was to include courtyard-style homes, community landscaped areas, a community*

park, and a clubhouse with a pool. That owner's estate later re-sold the property to back to Tower Energy Group (the current land owner).

- *Tower Energy Group submitted the above referenced applications to develop the 115-lot residential development and a 5-acre commercial site that is the subject of this staff report.*

On February 19, 2014, the Planning Commission reviewed conceptual plans for the LADCO version of the project which included a commercial center with service station and two drive-thru restaurant pads. At that time the Commission directed the owner to pursue the service station project, but remove the drive-thru restaurants as those were not consistent with the City's General Plan. There were some neighboring owners that spoke in opposition to the service station. However, the Commission stated that the owner could apply for the service station use and the Commission would review it on a case-by-case basis. The service station is currently existing and the fourth time extensions would be for Tentative Tract Map (TTM) No. 37088. The purpose of a Tentative Tract Map is to illustrate the design of a proposed subdivision, along with the existing conditions on and surrounding the site. It is a preliminary document and does not need to be based on an accurate or detailed final survey of the property.

On June 15, 2016, the Planning Commission recommended to the City Council, adoption of a Mitigated Negative Declaration and Mitigation Monitoring Program, pursuant to CEQA Guidelines for the project, as well approval of TTM No. 37088 and Change of Zone 16-01 for a planned unit development as part of the overall proposed development of the Ravella project consisting of 115 single family residential lots on 20 acres at the Northwest corner of Avenue 50 and Calhoun Street. The City Council approved TTM No. 37088 on July 13, 2016.

Pursuant to the Subdivision Map Act, and Chapter 16 of the Coachella Municipal Code, a tentative tract map expires after 24 months unless the final map is recorded. TTM No. 37088 was automatically extended by 36 months to July 13, 2021 from the original July 13, 2018 expiration under the Subdivision Map act due to the filing of the first final map recording the first 4 lots. Chapter 16.12.140 of the Coachella Municipal Code allows the Planning Commission to grant up to five 12-month time extensions if a timely request is submitted stating the reasons for the project delays. Due to Assembly Bill 1561, the project was automatically extended by the California Legislature 18 months from the original expiration of July 13, 2018 to January 13, 2023. Assembly Bill 1561 is a California law passed to help sustain housing development during the disruption caused by the COVID-19 pandemic that went into effect on September 28, 2020. TTM No. 37088 received approval from the Planning Commission on September 6, 2023 for the first 12-month extension. This time extensions approval extended the approval of TTM No. 37088 to January 13, 2024. On November, 15, 2023, the applicant received the approval from Planning Commission for the second time extension with an expiration date of January 13, 2025. The applicant previously submitted their third time-extension request on August 5, 2024, extending TTM No. 37088 expiration date to January 13, 2026. The applicant is now requesting a fourth one-year extension to January 13, 2027, due to the ongoing insufficient power availability within the city.

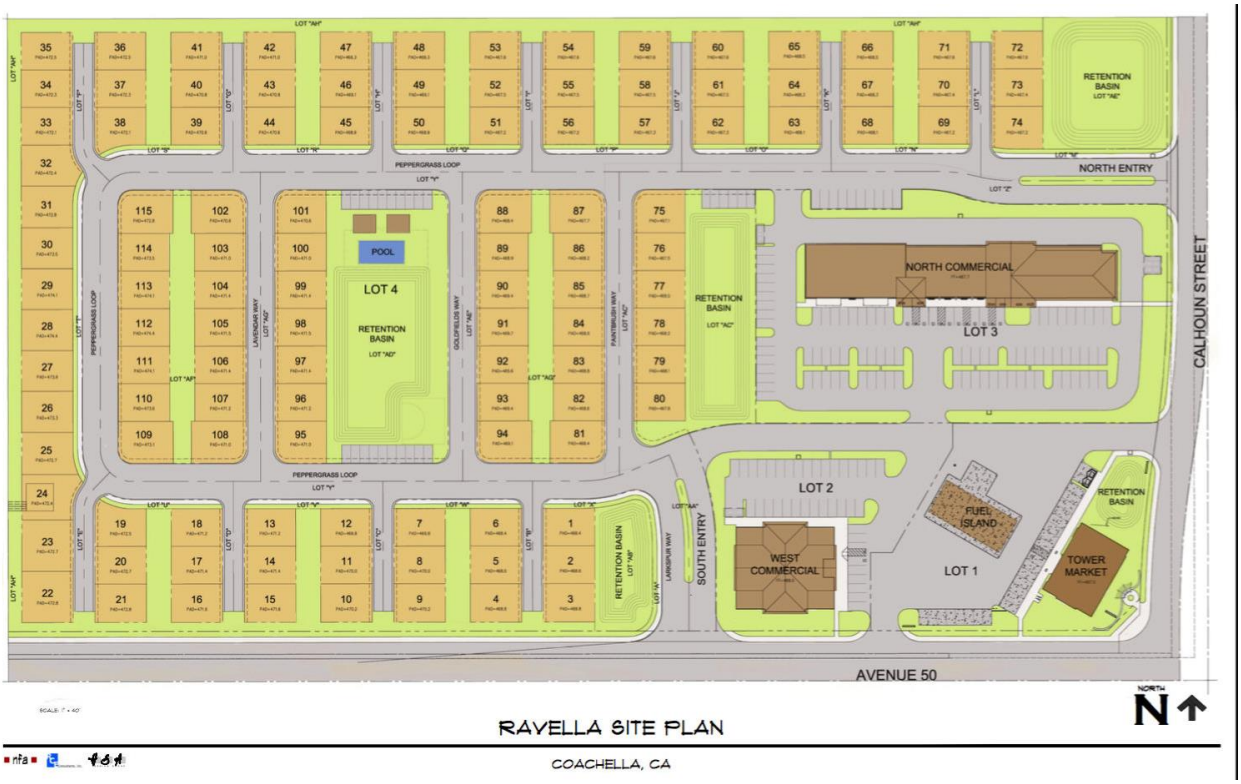
DISCUSSION/ANALYSIS:

As illustrated below, TTM No. 37088 proposes to subdivide approximately 20 acres of land into 115 single family residential lots with a minimum lot size of 2,373 square (sq.) feet (ft.) with a maximum

lot size of 3,789 sq. ft. Access to the residential project will be on Avenue 50 and Calhoun Street. The project will have private streets but will not be a gated community. All of the homes either front or back up to a passive open space area. The entire Ravella site currently consists of 4 lots for the project's 4 phases. Phase 1 includes the Tower Market service station at the corner of Avenue 50 and Calhoun Street. Phase 2 includes a proposed 20,000 square foot building for Borrego Health Clinic while Phase 3 includes a 9,350 square foot commercial building adjacent to Avenue 50, which remains vacant. Phase 4 includes the proposed 115 residential homes.

Consistency with Coachella General Plan and Zoning The proposed project is within the Neighborhood Center land use designation. The site is within Subarea 3 –Van Buren Corridor, which encourages the development of an appropriate and well-designed transition between retail and commercial development along the corridor and the adjacent residential area. The project site is currently zoned Neighborhood Commercial – Planned Unit Development (CN-PD) which implements the Neighborhood Center land use designation of the General Plan. The CN-PD zone permits. On June 15, 2016 the Planning Commission approved two conditional use permits to allow a service station in the CN-PD zone (CUP 267), and to establish land use regulations and minimum development standards for the Ravella Planned Development (CUP 268). The Ravella project meets all the requirements of the property development standards of the CN-PD zone. The proposed project is compliant with the General Plan and the Coachella Municipal Code.

Figure 1: Project Phasing Map



The residential component includes 3 retention basins, one of which includes a pool and shade structure and sport court.

Residential Layout/Architectural Theming

The proposed project utilizes a "green court" concept where the homes face a common open space area. In this project, the homes are provided access off common private alleys as illustrated on the exhibit below. These homes are situated on very small lots (2,300 square feet minimum) and will have very minimal yard space. The minimum front, site and rear yard setbacks will be 5 feet. The patio covers will be allowed to have supporting columns at 3.5 feet from the property lines, provided the eave is no less than 36 inches from the property line. The PD ordinance encourages clustered housing in exchange for general open space lots and amenities throughout the community, as proposed for this project. Fencing for the individual homes will be subject to HOA approval and subject to a separate building permit. All garden walls must be decorative masonry with decorative cap. However, the applicant has indicated they would like to allow vinyl fencing for the property lines between two homes.

Figure 2: Residential Cluster Example



One floor plan and elevation is proposed. Each home contains 4 bedrooms and 3 baths as illustrated below and complies with the base district minimum dwelling unit size of 1,200 square feet. The two-car garage has an interior enclosure for trash bins, and the front entry porch has an area designated for the A/C mechanical equipment in order to keep the side yards clear of obstructions. Additionally, staff is recommending the use of "decorative" garage doors, with windows on the upper 25% of the garage door.

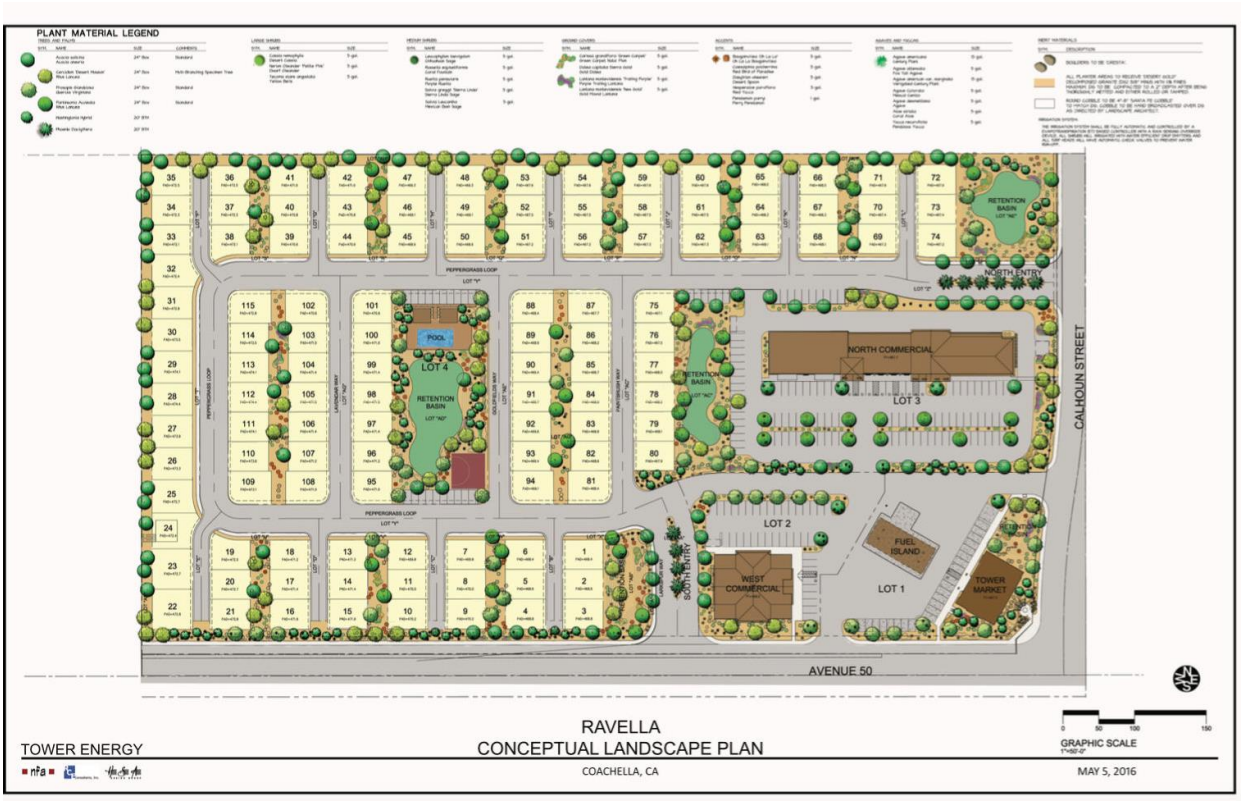
Figure 3: Sample Architecture



Landscaping:

The conceptual landscaping plan is illustrated below. Final landscaping plans will be submitted and approved prior to the issuance of grading/building permits for the project phase in consideration.

Figure 4: Landscape Plan



Staff recommends that the Planning Commission approve Resolution No. PC2025-21 for a fourth 12-month time extension for Tentative Tract Map No. 37088, subject to the findings and conditions of approval establishing a new expiration date of January 13, 2027.

Attachments:

1. Resolution No. PC2025-21 Approving a fourth 12-month extension of time for TTM No. 37088
   a. Exhibit A - Conditions of Approval
2. Planning Commission Resolution No. PC2024-22 Approving a third 12-month extension of time for Tentative Tract Map No. 37088
3. TTM No. 37088 Exhibit
4. Tower Energy Initial Study
5. Letter Head City of Coachella Ravella Extension

RESOLUTION NO. PC2025-21

A RESOLUTION OF THE CITY OF COACHELLA PLANNING COMMISSION APPROVING A FOURTH 12-MONTH EXTENSION OF TIME FOR TENTATIVE TRACT MAP NO. 37088 (RAVELLA) TO ALLOW A 115-UNIT SINGLE FAMILY RESIDENTIAL SUBDIVISION ON A TOTAL OF 20 ACRES OF VACANT LAND IIN THE CN-PD (NEIGHRBORHOOD COMMERCIAL – PLANNED UNIT DEVELOPMENT) ZONE LOCATED AT THE NORTHWEST CORNER OF AVENUE 50 AND CALHOUN STREET (APN 612-280-027). APPLICANT: MARK VASEY, TOWER ENERGY.

WHEREAS Tower Energy Group filed an application for a fourth 12-month time extension for Tentative Tract Map No. 37088 for a subdivision of 20 acres into 115 single family residential lots at the northwest corner of Avenue 50 and Calhoun Street at 86100 Avenue 54; and,

WHEREAS, the City has processed said application pursuant to the Subdivision Map Act (commencing with Section 64410, Title 7 of the Government Code), the City's Subdivision Ordinance, and the California Environmental Quality Act of 1970) as amended; and

WHEREAS, the City Council approved Tentative Tract Map at a public hearing on July 13, 2016 with findings and conditions; and

WHEREAS, Tentative Tract Map No. 37088 is in conformance with the Coachella Municipal Code, the land use pattern and development standards of Tower Energy Project and the Subdivision Ordinance when viewed in conjunction with the conditions that are imposed; and

WHEREAS, the Planning Commission of the City of Coachella finds that this subdivision is consistent with the goals, objectives, policies and implementation measures of the Coachella General Plan 2035 meets the findings required by the Municipal Code;

WHEREAS, the proposed project is Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

NOW, THEREFORE, BE IT RESOLVED, that the Planning Commission of the City of Coachella, California hereby resolve as follows:

Section 1. Incorporation of Recitals

The Planning Commission hereby finds that all of the facts in the Recitals are true and correct and are incorporated and adopted as findings of the Planning Commission as fully set forth in this resolution.

Section 2. CEQA Findings

Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative

Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

Section 3. Tentative tract Map No. 37088 Time Extension

With respect to Tentative Tract Map, the Planning Commission can make the findings for the proposed project which include:

1. That the proposed map is consistent with the goals, objectives, policies and implementation measures of the Coachella General Plan 2035. The site is within the City's Neighborhood Center land use designation and abuts Avenue 50 and Calhoun Street. Avenue 50 is designated as a Major Roadway with a bicycle lane and Calhoun Street is designated as a collector with a bicycle lane. The proposed phased subdivision map will allow for three lots as part of the 5-acre commercial development, and a 4th lot for the future subdivision of 115 residential homes with private streets and common area lots consistent with the submitted planned unit development and will promote the City's long-term economic development goals for the larger vicinity.

2. The site is physically suitable for the type of development and the proposed density. The proposed subdivision will provide small lots and generous open-space lots for a planned-unit development of new single-family residential lots, and lots for a 5-acre commercial center. All proposed lots comply with minimum lot area and dimension requirements of the base zoning districts of RM (for the residential community) and CN (for the commercial center). Additionally, the subdivision would have adequate ingress and egress, from Avenue 50 and Calhoun Street, to accommodate the proposed development.

3. The design of the subdivision is not likely to cause substantial environmental damage nor substantially and avoidable injure fish or wildlife or their habitat. There are no sensitive habitats or bodies of water in the immediate vicinity of the site. The initial environmental study prepared for this project did not identify any biological resources on the site or in the vicinity of the project.

4. The design of the subdivision is not likely to cause serious health problems. The proposed subdivision would allow for small single-family residential lots and generous open-space lots to provide a medium density residential development. The proposed retail, service station and office uses are not known to cause serious health concerns as proposed in the neighborhood commercial center.

5. The design of the subdivision will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision. The proposed subdivision is located on the northwest corner of Avenue 50 and Calhoun Street. As conditioned there will be independent and shared access into the neighborhood commercial center, and two pointes of access into the residential subdivision. There are no known conflicting existing or future easements and rights-of-way within the project site.

6. The design of the subdivision will provide, to the extent feasible, for future passive or

natural heating or cooling opportunities. The proposed lot configurations allow for east-west orientation of homes, and all future construction will be designed to the latest Building Codes and energy efficient design and construction will be required by the City's Building Department.

7. The Planning Commission, in light of the whole record before it, including but not limited to recommendation of the Development Services Director as provided in the Staff Report dated June 15, 2016 and documents incorporated therein by reference and any other evidence within the record or provided at the public hearing of this matter, hereby finds that Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

Section 4. Planning Commission Approval;

Based on the foregoing recitals and findings above, and the written and oral comments, facts and evidence presented, the City of Coachella Planning Commission approves a fourth 12-month time extension for Tentative Tract Map No. 37088 with a new expiration date of January 13, 2027 subject to the conditions of approval of Council Resolution No. 2016-18 as modified in Resolution No. PC2023-30 and as listed in "Exhibit A" of Resolution No. PC2025-21.

PASSED APPROVED and ADOPTED this 17th day of December 2025.

_____
Isela Murillo, Chairperson
Coachella Planning Commission

ATTEST:

_____
Kendra Reif
Planning Commission Secretary

APPROVED AS TO FORM:

_____
City Attorney

I HEREBY CERTIFY that the foregoing Resolution No. PC2025-21, was duly adopted at a regular meeting of the Planning Commission of the City of Coachella, California, held on the 17th day of December 2025, by the following roll call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____

Kendra Reif
Planning Commission Secretary

Exhibit A – Resolution No. PC2025-21

CONDITIONS OF APPROVAL FOR THE FOURTH 12-MONTH TIME EXTENSION FOR TTM NO. 37088 RAVELLA PROJECT

General Conditions

1. The applicant shall comply with all requirements and conditions of approval as included in TTM No. 37088, and any modifications or extensions thereof, as listed Reso. No. PC2024-22.

RESOLUTION NO. PC2024-22

A RESOLUTION OF THE CITY OF COACHELLA PLANNING COMMISSION APPROVING A THIRD 12-MONTH EXTENSION OF TIME FOR TENTATIVE TRACT MAP NO. 37088 TO JANUARY 13, 2026 FOR THE PHASED SUBDIVISION OF APPROXIMATELY 20 ACRES (TOWER ENERGY) INTO THREE COMMERCIAL LOTS AND A REMAINDER LOT FOR FUTURE SUBDIVISION INTO 115 LOTS, LOCATED AT THE NORTHWEST CORNER OF AVENUE 50 AND CALHOUN STREET. TOWER ENERGY, APPLICANT.

WHEREAS Tower Energy Group filed an application for a third 12-month time extension for Tentative Tract Map No. 37088 for a subdivision of 20 acres into 115 single family residential lots at the northwest corner of Avenue 50 and Calhoun Street at 86100 Avenue 54; and,

WHEREAS, the City has processed said application pursuant to the Subdivision Map Act (commencing with Section 64410, Title 7 of the Government Code), the City's Subdivision Ordinance, and the California Environmental Quality Act of 1970) as amended; and

WHEREAS, the City Council approved Tentative Tract Map at a public hearing on July 13, 2016 with findings and conditions; and

WHEREAS, Tentative Tract Map No. 37088 is in conformance with the Coachella Municipal Code, the land use pattern and development standards of Tower Energy Project and the Subdivision Ordinance when viewed in conjunction with the conditions that are imposed; and

WHEREAS, the Planning Commission of the City of Coachella finds that this subdivision is consistent with the goals, objectives, policies and implementation measures of the Coachella General Plan 2035 meets the findings required by the Municipal Code;

WHEREAS, the proposed project is Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

NOW, THEREFORE, BE IT RESOLVED, that the Planning Commission of the City of Coachella, California hereby resolve as follows:

Section 1. Incorporation of Recitals

The Planning Commission hereby finds that all of the facts in the Recitals are true and correct and are incorporated and adopted as findings of the Planning Commission as fully set forth in this resolution.

Section 2. CEQA Findings

Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative

Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

Section 3. Tentative tract Map No. 37088 Time Extension

With respect to Tentative Tract Map, the Planning Commission can make the findings for the proposed project which include:

1. That the proposed map is consistent with the goals, objectives, policies and implementation measures of the Coachella General Plan 2035. The site is within the City's Neighborhood Center land use designation and abuts Avenue 50 and Calhoun Street. Avenue 50 is designated as a Major Roadway with a bicycle lane and Calhoun Street is designated as a collector with a bicycle lane. The proposed phased subdivision map will allow for three lots as part of the 5-acre commercial development, and a 4th lot for the future subdivision of 115 residential homes with private streets and common area lots consistent with the submitted planned unit development and will promote the City's long-term economic development goals for the larger vicinity.

2. The site is physically suitable for the type of development and the proposed density. The proposed subdivision will provide small lots and generous open-space lots for a planned-unit development of new single-family residential lots, and lots for a 5-acre commercial center. All proposed lots comply with minimum lot area and dimension requirements of the base zoning districts of RM (for the residential community) and CN (for the commercial center). Additionally, the subdivision would have adequate ingress and egress, from Avenue 50 and Calhoun Street, to accommodate the proposed development.

3. The design of the subdivision is not likely to cause substantial environmental damage nor substantially and avoidable injure fish or wildlife or their habitat. There are no sensitive habitats or bodies of water in the immediate vicinity of the site. The initial environmental study prepared for this project did not identify any biological resources on the site or in the vicinity of the project.

4. The design of the subdivision is not likely to cause serious health problems. The proposed subdivision would allow for small single-family residential lots and generous open-space lots to provide a medium density residential development. The proposed retail, service station and office uses are not known to cause serious health concerns as proposed in the neighborhood commercial center.

5. The design of the subdivision will not conflict with easements, acquired by the public at large, for access through or use of, property within the proposed subdivision. The proposed subdivision is located on the northwest corner of Avenue 50 and Calhoun Street. As conditioned there will be independent and shared access into the neighborhood commercial center, and two pointes of access into the residential subdivision. There are no known conflicting existing or future easements and rights-of-way within the project site.

6. The design of the subdivision will provide, to the extent feasible, for future passive or

natural heating or cooling opportunities. The proposed lot configurations allow for east-west orientation of homes, and all future construction will be designed to the latest Building Codes and energy efficient design and construction will be required by the City's Building Department.

7. The Planning Commission, in light of the whole record before it, including but not limited to recommendation of the Development Services Director as provided in the Staff Report dated June 15, 2016 and documents incorporated therein by reference and any other evidence within the record or provided at the public hearing of this matter, hereby finds that Tentative Tract Map 37088 is within the scope of the project analyzed in the Mitigated Negative Declaration and Initial Study Prepared for the Tower Energy Projects (Environmental Assessment 16-02), and the Commission hereby finds adequacy in the environmental assessment documents including the Mitigation Monitoring Program.

Section 4. Planning Commission Approval;

Based on the foregoing recitals and findings above, and the written and oral comments, facts and evidence presented, the City of Coachella Planning Commission approves a third 12-month time extension for Tentative Tract Map No. 37088 to January 13, 2026 subject to the conditions of approval of Council Resolution No. 2016-18 as modified in Resolution No. PC2023-30 and as listed in "Exhibit A" of Resolution No. PC2024-22.

PASSED APPROVED and ADOPTED this 18th day of September 2024.

Jason Hernandez, Chairperson
Coachella Planning Commission

ATTEST:

Gabriel Perez
Gabriel Perez (Sep 23, 2024 11:07 PDT)

Gabriel Perez
Planning Commission Secretary

APPROVED AS TO FORM:

Carlos Campos (Sep 23, 2024 13:19 CDT)

Carlos Campos
City Attorney

I HEREBY CERTIFY that the foregoing Resolution No. PC2024-22, was duly adopted at a regular meeting of the Planning Commission of the City of Coachella, California, held on the 18th day of September 2024, by the following roll call vote:

AYES: Chair Hernandez, Vice Chair Gonzalez, Commissioner Ramirez, Commissioner Arvizu.

NOES: None.

ABSENT: Commissioner Murillo, Alternate Commissioner Fonseca.

ABSTAIN: None.

Gabriel Perez
Gabriel Perez (Sep 23, 2024 11:07 PDT)

Gabriel Perez
Planning Commission Secretary

Exhibit A - Resolution No. PC2024-22
CONDITIONS OF APPROVAL FOR
TENTATIVE TRACT MAP NO. 37088
RAVELLA PROJECT

*Modifications pursuant to Resolution No. PC 2023-30 Time Extension #2 shown in **Bold** text and strikeout

Conditions of Approval for Tentative Tract Map No. 37088

Mitigation Measures – Air Quality:

1. As required by SCAQMD for all development projects in the Salton Sea Air Basin that would disturb one-acre or greater, Best Available Control Measures will be incorporated into a PM-10 Dust Control Plan prepared for the project prior to commencement of site grading or other construction activity where soil disturbance or other fugitive dust may be generated. BACMs are listed at the end of the MMRP.

Mitigation Measures – Biological Resources:

2. Prior to any land disturbance, including grading or construction, the applicant shall have a focused biological survey conducted at the project site to determine presence/absence of burrowing owl (*Athene cunicularia*). If the site survey determines the presence of burrowing owl, mitigation in accordance with the California Department of Fish and Wildlife (CDFW) shall be implemented as follows: If burrowing owls are identified as being resident on-site outside the breeding season (February 1 through August 31) they may be relocated to other sites by a permitted biologist (permitted by CDFW), as allowed in the department's *Staff Report on Burrowing Owl Mitigation* (March 2012). If an active burrow is found during the breeding season, the burrow shall be treated as a nest site and temporary fencing shall be installed at a distance of 550 yards from the active burrow to prevent disturbance during grading or construction. This is the maximum buffer distance recommended in the *Staff Report on Burrowing Owl Mitigation*. Installation and removal of the fencing shall be done with a biological monitor present.

Mitigation Measures – Cultural Resources:

3. A qualified archaeological monitor, as well as a Native American monitor shall be present during at least the initial phases of site grading, and shall also inspect any trenches and proposed water quality basins, to ensure that if any buried cultural resources are discovered during construction activities, all work shall be halted in the vicinity of the find. The archaeologist shall determine whether the find is an isolated example or part of a more complex resource. Upon determining the significance of the resource, the consulting archaeologist, in coordination with the City, shall determine the appropriate actions to be taken. The appropriate measures may include as little as recording the resource with the California Archaeological Inventory database or as much as excavation, recording, and preservation of the sites that have outstanding cultural or historic significance.

4. A qualified paleontological monitor shall be present during at least the initial phases of renewed site grading, and shall also inspect all trenches and proposed water quality basins, to ensure that if any paleontological resources are discovered during construction activities, all work shall be halted in the vicinity of the find. The paleontologist shall determine whether the find is an isolated example or part of a more complex resource. Upon determining the significance of the resource, the consulting paleontologist, in coordination with the City, shall determine the appropriate actions to be taken. The appropriate measures may include as little as recording the resource with the San Bernardino County Museum or as much as excavation, recording, and preservation of the sites that have outstanding paleontological significance.

5. Should human remains be uncovered, the Riverside County Coroner's Office shall be immediately contacted and all work halted until final disposition by the Coroner. State Health Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made necessary findings as to the origin and disposition pursuant to Public Resources Code Section 5097.98. Shall the remains be determined to be of Native American descent, the Native American Heritage Commission shall be consulted to determine the appropriate disposition of said remains.

6. If the coroner determines that the remains are not recent and may be Native American, in accordance with Public Resource Code 5097.94, the coroner will notify the Native American Heritage Commission (NAHC) within 24 hours of the find. The NAHC will then determine the Most Likely Descendant (MLD). The City will work with the designated MLD to determine the final disposition of the human remains.

Mitigation Measures – Geology and Soils:

7. Development of the project as proposed shall comply with recommendations for design and construction identified in the following documents: 1)"Geotechnical Investigation Proposed Residential Development Tentative Tract 36680 APN 612-280-018, Coachella California. Prepared by Sladden Engineering, December 31, 2013; 2) Geotechnical Investigation, Proposed Apartment Complex and MiniMart, Prepared by Sladden Engineering, February 12, 2012.

Mitigation Measures – Traffic and Transportation:

8. The applicant shall contribute to the City a fair share contribution for future traffic signals to be installed by the City at the intersection of Avenue 50 and Calhoun Street and at Avenue 50 and Jackson Street. Said contribution may be satisfied through full payment or with a letter of credit prior to the issuance of a building permit, or as otherwise approved by the City Engineer.

9. The applicant shall pay applicable City of Coachella Development Impact Fees (DIF) and County of Riverside Transportation Uniform Mitigation Fees (TUMF) in effect at that time.

10. Five (5) sets of copies of check prints. The applicant shall pay all necessary plan check, permit, and inspection fees. Fees will be determined when plans are submitted to the City Engineering Department for plan check.

11. The applicant shall pay plan check fees. $750.00 per sheet of improvement plans, and $350.00 for PM 10 plan.

Engineering – Grading and Drainage:

12. A preliminary geological and soils engineering investigation shall be conducted by a registered soils engineer, and a report submitted for review with the grading plan and shall include pavement recommendations (on-site & off-site). The report recommendations shall be incorporated into the grading plan design prior to grading plan approval. The soils engineer and/or the engineering geologist shall certify to the adequacy of the grading plan. Paving for public and private streets shall be constructed per City Standard unless more stringent standards are recommended by the geotechnical investigation.

13. A precise grading plan, prepared by a California Registered Civil Engineer, shall be submitted for review and approval by the City Engineer prior to issuance of any permits. A final soils report, compaction report and rough grading certificate shall be submitted and approved prior to issuance of any building permits.

14. A Drainage Report, prepared by California Registered Civil Engineer, shall be submitted for review and approval by the City Engineer prior to issuance of any permits. The report shall contain a Hydrology Map showing on-site and off-site tributary drainage areas and shall be prepared in accordance with the requirements of the Riverside County Flood Control District. Adequate provisions shall be made to accept and conduct the existing tributary drainage flows around or through the site in a manner which will not adversely affect adjacent or downstream properties. If the design of the project includes a retention basin, it shall be sized to contain the runoff resulting from a 10-year storm event and the runoff from a 100-year storm event shall be contained within basin with shallow ponding (3.5' max.). The basin shall be shall be designed to evacuate a 10-year storm event within 72 hours. The size of the retention basin(s) shall be determined by the hydrology report and be approved by the City Engineer. Retention basin shall be provided with a minimum of 2.00 feet sandy soil if determined to contain silt or clay materials. Maximum allowable percolation rate for design shall be 10 gal./s.f./day unless otherwise approved by the City Engineer. A percolation test for this site is required to be submitted. A combination drywell vertical drain field shall be constructed at all points where runoff enters the retention basin. Drywell & vertical drain field design shall be constructed at all points where runoff enters the retention basin. Drywell & vertical drain field design shall be based on soils borings made at the proposed drywell locations after the retention basins have been rough graded. Minimum depth shall be as required by the approved geotechnical investigation recommendations. A log that includes sieve analysis for each strata of the borings, shall be submitted to the City Engineer for confirmation of depth of the vertical drain fields.

15. Site access improvements shall be in conformance with the requirements of Title 24 of the California Administrative Code. This shall include access ramps for off-site and on-site streets as required.

16. Applicant shall obtain approval of site access and circulation from Fire Marshall.

17. Separate permits shall be required for all perimeter walls for the residential project. The maximum height of any wall shall be limited to six (6) feet as measured from the higher elevation of grade on either side.

Engineering – Street Improvements:

18. Street improvement plans prepared by a California Registered Civil Engineer shall be submitted for engineering plan check prior to issuance of encroachment permits. All street improvements including street lights shall be designed and constructed in conformance with City Standards and Specifications. Street flow line grade shall have a minimum slope of 0.35 percent.

19. Applicant shall construct all off-site and on-site improvements including street pavement, curb, gutter, sidewalk, street trees, perimeter walls, perimeter landscaping and irrigation, storm drain, street lights, and any other incidental works necessary to complete the improvements. Driveways shall conform to City of Coachella standard for commercial driveways with a minimum width of 24.00 feet and curbed radius entrances. New sidewalks shall be installed on the existing site along Avenue 50 and Calhoun Street. **The Avenue 50 sidewalk shall be installed from the main project entry driveway westward with a minimum 5-foot landscape parkway.**

20. An additional dedication of land will be required along the north half of Avenue 50 and the west half of Calhoun Street as shown on the 2035 City of Coachella General Plan. Calhoun Street will be constructed as a 88 foot "Collector Street with Enhanced Bicycle Facility". Avenue 50 will be constructed as a 118 foot "Major Arterial Street with Enhanced Bicycle Facility" with landscaped median, as approved by the City Engineer.

21. Applicant shall contribute its fair share contribution for the cost of future traffic signals to be installed by the City at the intersection of Avenue 50 and Calhoun Street.

22. Applicant shall obtain an encroachment permit for any improvements constructed within public right-of-way including alleys.

23. Sewer and Water service is available to the site. The applicant shall plot location of existing service mains on the existing grading plan.

Engineering – General:

24. Prior to issuance of any encroachment permits by the City of Coachella, the applicant shall resolve CVWD issues related to existing tile drains or irrigation mains located within the project boundary or along the streets adjacent to the property. If necessary tile drains and irrigation lines shall be relocated, and easement document prepared for the new location of any such lines. Plans for the tile drain or irrigation relocation shall be submitted to the City for evaluation regarding possible conflict with City facilities. The applicant shall submit to the City approved copies of any relocation plans.

25. The developer shall submit a Fugitive Dust Control and Erosion Control plan in accordance with Guidelines set forth by CMC and SCAQMD to maintain wind and drainage erosion and dust control for all areas disturbed by grading. Exact method(s) of such control shall be subject to

review and approval by the City Engineer. No sediment is to leave the site. Additional securities in amount of $2,000 per acre of gross area, and a one-time cash deposit of $2,000.00 are required to insure compliance with this requirement. No work may be started on or off site unless the PM-10 plan has been approved and the original plans are in the engineering department at the City of Coachella.

26. "As-built" plans shall be submitted to and approved by the City Engineer prior to acceptance of the improvements by the City. All off-site and on-site improvements shall be completed to the satisfaction of the City Engineer prior to acceptance of improvements for maintenance by the City.

27. Applicant shall comply with the valley wide NPDES permit requirements including but not limited to submittal of a preliminary WQMP for plan review accompanied by a $3,000 plan check deposit and a Final WQMP for final approval including executed maintenance agreement. All unused plan check fees will be refunded to the applicant upon approval of the Final WQMP.

28. Prior to the issuance of a certificate of occupancy, all public improvements, including landscaping and lighting of retention basins, and landscaped areas along the exterior streets, shall be completed to the satisfaction of the City Engineer.

29. An amount of $9,112.28 shall be paid to the City to reimburse the cost of previously constructed water services under approval of "Reimbursement Agreement with Rilington Canyon LLC" for the extension of Water Main in Avenue 50.

Development Services – Landscaping:

30. Final landscaping and irrigation plans shall be submitted to the Development Services Department for review and approval. Said plans shall conform to the landscaping plan submitted as part of the subject Architectural Review, and as conditioned herein.

31. Prior to the issuance of building permits, the applicant shall submit detailed landscaping and irrigation plans for review and approval by the City's Engineering Department and Development Services Department. **Perimeter landscaping shall include a lighting plan**.

32. Landscaping and irrigation shall be provided in accordance with Section 17.54.010(J) of the Municipal Code and in accordance with the State Model Water Efficient Landscape Ordinance (AB 1881). Water budget calculations, including the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU) shall be provided as part of the landscaping and irrigation plan.

33. The landscape plan shall provide for a minimum 5-gallon groundcover plants, 5-gallon shrubs, and 22-inch box trees. The plants and trees shall be irrigated with an automatic and durable drip irrigation system.

34. Landscaped areas shall be dressed with a minimum 2-inch layer ~~of compacted and/or glue-bonded~~ **of ¾ inch** ~~decomposed granite~~ **decorative gravel** that cannot be wind driven. A weed barrier underlayment shall be placed under the **decorative gravel** ~~decomposed granite~~.

35. Plant materials selection should be represented by symbols that show the plants at 75% of their mature size.

36. The applicant shall obtain written clearance from the County Agricultural Commissioner's Office regarding the type of landscaping to be planted. The clearance letter shall be included as a note on the landscape plans. The applicant shall utilize only plants that were listed on the landscape plan submitted to the Commissioner's office. Any substitutions must be approved by both the Commissioner's office as well as the City's Development Services Department.

37. Six-inch concrete bands shall be used as mow strip borders for planting areas where separating turf areas or synthetic turf areas.

38. All landscape planter beds in interior parking areas shall be not less than five (5) feet in width and bordered by a concrete curb not less than six (6) inches nor more than eight (8) inches in height adjacent to the parking surface.

39. All non-landscaped and undeveloped areas of the site shall be kept free of weeds and debris and shall be treated with a dust-preventative ground coating.

Development Services – Project Design:

40. Prior to the issuance of building permits, all exterior architectural features and treatments shall be consistent with the submitted Architectural Review No. 16-05 elevations and color/material board samples and shall be included and noted on all construction plans and elevations, subject to review and approval.

41. All exposed metal flashing, downspouts, or utility cabinets shall be painted to match the building prior to final inspection.

42. Trash enclosures installed for the project shall be compatible architecturally with the building and include storage areas for recycling containers. The enclosure shall be constructed to Burrtec Waste Management Standards. The location of the trash enclosure shall be approved by both Burrtec Waste Management and the City Engineer.

43. All roof mounted mechanical equipment shall be view obscured by a parapet wall greater in height than the equipment installed. Ground mounted mechanical equipment shall be view obscured by landscaping or enclosure.

44. Outdoor storage areas shall be obscured from public view and specifically shall not be visible from Avenue 50 and Calhoun Street.

Riverside County Fire Department:

45. The applicant shall submit building plans for review and approval by the Riverside County Fire Department and pay any applicable fees prior to the issuance of a building permit by the City.

46. A final inspection and clearance of the building shall be required from the Fire Department prior to occupancy of the building.

47. For any buildings with public access, provide or show a water system capable of delivering a fire flow 3250 gallons per minute for 3 hours duration at 20 psi residual operating pressure, which must be available before any combustible material is placed on the construction site. CFC 2013 Edition Section Table B105.1. *50% reduction has been applied for the proposed sprinklered building provision.*

48. For any building with public access, including all having one or two dwelling units of less than 3,600 square feet - provide or show a water system capable of delivering a fire flow of 1,000 gallons per minute for 1 hour duration at 20 psi residual operating pressure. **50% reduction has been applied for the proposed sprinklered building provision*

49. Prior to building plan approval and construction, applicant/developer shall furnish two copies of the water system fire hydrant plans to Fire Department for review and approval. Plans shall be signed by a registered civil engineer, and shall confirm hydrant type, location, spacing, and minimum fire flow. Once plans are signed and approved by the local water authority, the originals shall be presented to the Fire Department for review and approval.

50. Prior to issuance of building permits, the water system for fire protection must be provided as approved by the Fire Department and the local water authority.

51. Blue dot retro-reflectors pavement markers shall be provided on private streets, public streets and driveways to indicated location of the fire hydrant. 06-05 (located at www.rvcfire.org)

52. Fire Apparatus access road shall be in compliance with the Riverside County Fire Department Standard number 06-05 (located at www.rvcfire.org). Access lanes will not have an up, or downgrade of more than 15%. Access lanes will be designed to withstand the weight of 60,000 pounds over 2 axles. Access will have a turning radius capable of accommodating fire apparatus. Access lane shall be constructed with a surface so as to provide all weather driving capabilities.

53. Any turn-around shall require a minimum 38-foot turning radius.

54. All structures shall be accessible from an approved roadway to within 150 feet of all portions of the exterior of the first floor.

55. The minimum dimensions for access roads and gates is 20 feet clear and unobstructed width and a minimum vertical clearance of 13 feet 6 inches in height.

56. Roadways may not exceed 660 feet without secondary access. This access may be restricted to emergency vehicles only however public egress must be unrestricted.

57. The applicant or developer shall prepare and submit to the Fire Department for approval, a site plan designating required fire lanes with appropriate lane printing and/or signs.

Imperial Irrigation District:

58. Any construction or operation on IID property or within its existing and proposed right-of-way or easements will require an encroachment permit, including but not limited to: surface improvements such as proposed new streets, driveways, parking lots, landscape; and all water, sewer, storm water, or any other above ground or underground utilities (e.g. power lines).

59. Any and all mitigation necessary as a result of the construction, relocation and/or upgrade of IID facilities is the responsibility of the project proponent.

Utilities:

60. Water and sewer plans outside the buildings and interior plumbing or mechanical plans (i.e. floor drains and sinks, equipment which discharges to the sewer system, chemical storage and spill containment measures) shall be provided to the City Utilities Department for review and approval.

61. A Source Control "Short Form" (and the Source Control application if required) shall be completed and turned into Source Control (Utilities Department) by the applicant.

62. Based on findings of the Source Control application, all modifications shall be completed prior to issuance of a certificate of occupancy.

63. Adequate fire protection shall be included and the public water supply shall be protected with a DCDA or greater on all fire water lines to commercial/industrial facilities.

64. An RP shall be correctly installed within 12" of all water meters servicing domestic usage, landscape, commercial and/or industrial facilities.

65. All landscaping shall be on a separate water meter with an RP ensuring the establishment is not assessed sewer fees for water used on landscape.

66. All mechanical and plumbing plans shall be submitted to the Utilities Department for review to determine if pretreatment and/or a sample location is required.

67. All facilities and landscape plumbing which have water or wastewater (sewer) services shall obtain approval from the Environmental Compliance (Source Control), Water and Sanitary Sewer Divisions prior to receipt of the Certificate of Occupancy.

68. Fire hydrants must be at the end of each dead end for flushing.

69. RPZ Style Backflow devices shall be installed on commercial and landscape meters.

70. Above ground DCDA backflows must be installed for all fire line services.

71. Master-metered, radio-read water meters shall be utilized for the project.

Fees:

72. Prior to the issuance of a building permit, the applicant shall pay all Development Fees to the City; this also includes school fees and outside agency fees such as sewer water and utilities. Copies of receipts shall be provided to the Development Services Department prior to permit issuance.

73. The applicant shall be responsible for paying all applicable development and processing (plan check, inspection, etc.) fees associated with this project.

74. The applicant shall pay all applicable school impact fees to the Coachella Valley Unified School District prior to the issuance of a building permit.

75. The applicant shall pay all required water connection fees.

76. The applicant shall be required to pay the Multiple Species Habitat Conservation (MSHCP) fees for commercial and residential development prior to issuance of building permits.

77. The applicant shall comply with the City's Art in Public Places Ordinance. If the applicant elects to pay in-lieu art fees, then the fees shall be deposited into the Public Arts Fund at an amount of (1) One-half (1/2) of one percent (1%) for new commercial and industrial construction.

78. The project is subject to payment of all commercial development impact fees whether or not explicitly stated in other conditions of approval or the environmental mitigation measures for the subject project.

Miscellaneous:

79. Installation of sidewalks along Avenue 50 and Calhoun Street may be satisfied by an improvement agreement subject to review and approval by the City Engineer. The 1st phase of development shall include completion of all off-site improvements on Calhoun Street and the service station portion of the commercial frontage on Avenue 50.

80. Final design plans for proposed landscaping and fencing along the project street frontages shall be presented as an administrative item before the Planning Commission for final review and approval.

81. The floor plans for the single family residential dwellings shall incorporate a trash bin storage area within the enclosed garages, and an A/C and mechanical equipment area in the covered porch area in order to avoid obstructions in the side yards.

82. The City Engineer or designee shall review the hydrology plans to mitigate drainage impacts of occasional large-storm rain events.

83. The applicant shall submit a comprehensive Sign Program for review by the Planning Commission through a non-hearing review, prior to the issuance of a certificate of occupancy for the first commercial buildings.

84. The applicant shall submit a photometric lighting plan for review and approval by the Development Services Director prior to the issuance of a building permit for exterior lighting fixtures within the commercial center.

85. The sub-divider or successor in interest shall annex the subject property into City of Coachella Community Facilities District (CFD) 2005-01 for City police, fire and paramedic services, prior to recordation of Tentative Tract Map 37088 and prior to the issuance of any building permits for construction of off-site improvements or residential buildings. The sub-divider shall submit an assessment plat map exhibit prepared by a licensed design professional, along with the petition and ballot, and any other documents necessary to annex the subject property into the City of Coachella CFD 2005-01.

86. Prior to recordation of the final map, the sub-divider or successor in interest shall pay the City of Coachella a Supplemental Water Supply Charge fee, based on the signed Memorandum of Understanding (MOU) between the City of Coachella and CVWD, to ensure sufficient water supplies for the new residential lots created as part of Tentative Tract Map 37088. The amount paid for supplemental water supplies shall not exceed CVWD's Supplemental Water Supply Charge for similar development types and water requirements in effect at the time paid. Alternatively, this condition of approval may be deemed satisfied, prior to recordation of the final map, if the City adopts a standardized development impact fee to collect the Supplemental Water Supply Charge fee collected at the time of issuance of a building permit for new homes, consistent with the MOU between CVWD and the City of Coachella.

87. The developer shall submit a Fugitive Dust Control and Erosion Control plan in accordance with Guidelines set forth by CMC and SCAQMD to maintain wind and drainage erosion and dust control for all areas disturbed by grading. Exact method(s) of such control shall be subject to review and approval by the City Engineer. No sediment is to leave the site. Additional securities, in bond form, in amount of $2,000.00 per acre of gross area, and a one time cash deposit of $2,000.00 are required to insure compliance with this requirement. No work may be started on or off site unless the PM-10 plan has been approved, the original plans, and executed dust control agreement, are filed in the engineering department at the City of Coachella.

88. "As-built" plans shall be submitted to and approved by the City Engineer. Prior to acceptance of the improvements by the City, such plans, once approved, shall be given to the city on compact disk in AutoCad format. All off-site and on-site improvements shall be completed to the satisfaction of the City Engineer prior to acceptance of improvements for maintenance by the City.

89. Applicant shall comply with the valley wide NPDES permit requirements including but not limited to submittal of a Preliminary WQMP for plan review accompanied by a $3,000 plan check deposit and a Final WQMP for final approval including executed maintenance agreement. All unused plan check fees will be refunded to the applicant upon approval of the Final WQMP.

90. Prior to issuance of a Certificate of Occupancy, the applicant shall dedicate artwork for display in common space(s) such as project entryways, perimeter to the development; the specific artwork to be dedicated shall be approved by the City of Coachella Development Services Director prior to installation.

Additional Utilities Conditions as modified by Planning Commission November 15, 2023:

91. **Submit water and sewer plans to Engineering for approval from Utilities Manager –project required to connect to City public sewer and water system.**

92. **A deposit of $5,000 is required to perform a hydraulic analysis to determine impacts of the project, deposit and analysis shall need to be complete before 1st submittal of water and sewer plans.**

93. **Public infrastructure on site shall require easements before water and sewer plans are approved.**

94. **Water & Sewer impact fees to be paid prior to final approval of plans.**

95. **Project to install 4G AMI master meters.**

96. **Backflows required on all nonresidential meters.**

97. **Water service line Type K Soft Copper Tubing Polywrap-C Blue (6Mil, use applicable size).**

98. **Additional requirements subject to water and sewer plan checking process.**

99. **Water and Sewer plans shall not be combined with grading plans.**

100. **Don't show new meters on Landscaping plans, show all service connections on water improvement plans.**

Building Division:

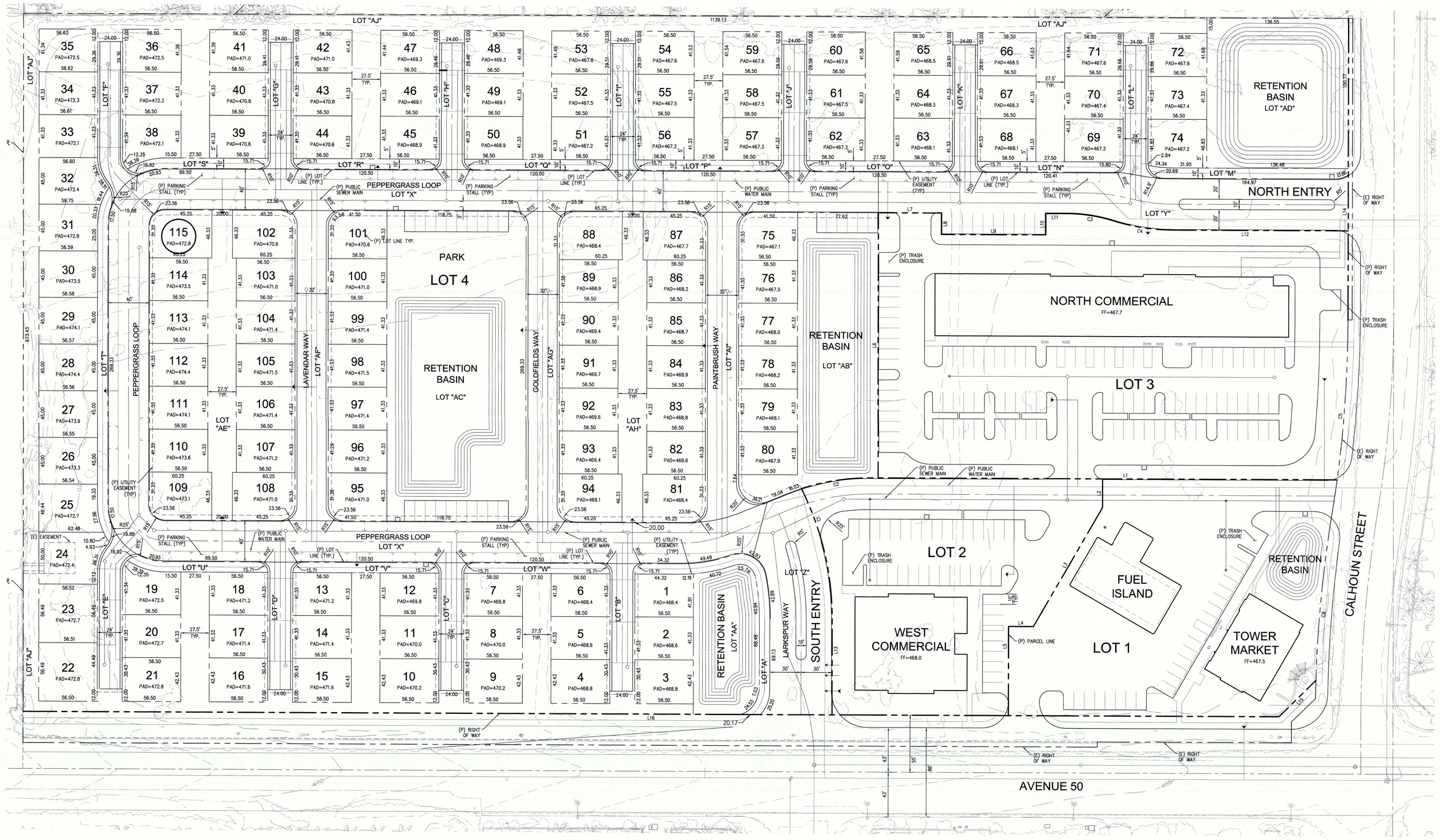
101. **Applicant must submit plans that comply with the 2022 California Building Code. Prior approvals have expired and the plans must adhere to current code requirements.**

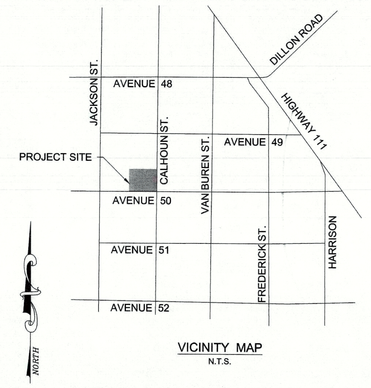
102. **All site amenities must be positioned along an accessible path of travel and improved in a manner accessible for the handicap community per chapter 11B of the California Building Code.**

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO. 37088

SOUTHWEST QUARTER OF SECTION 36, TOWNSHIP 5 SOUTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN





VICINITY MAP
N.T.S.

OWNER/APPLICANT:
MARK VASEY
TOWER ENERGY GROUP
1983 WEST 190TH STREET
TORRANCE, CA 90504
(310) 538-8000

SURVEYOR:
GUIDA SURVEYING INC.
9241 IRVINE BLVD.
IRVINE, CA 92618
(949) 777-2000

CIVIL ENGINEER:
RCE CONSULTANTS
24422 AVENIDA DE LA CARLOTA
SUITE 300
LAGUNA HILLS, CA 92653
(949) 453-0111

SOILS ENGINEER:
BRETT ANDERSON
SLADDEN ENGINEERING
45290 GOLF CENTER PKWY
SUITE
INDIO, CA 92201
(760) 772-3883

LEGAL DESCRIPTION:
LOT 14 OF COACHELLA LAND & WATER COMPANY, IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP FILED IN BOOK 4, PAGES 53-A THROUGH 53-D, INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ASSESSORS PARCEL NUMBER:
612-280-018

DEVELOPER:
TOWER ENERGY GROUP
1983 WEST 190TH STREET
TORRANCE, CA 90504
(310) 538-5000

I (WE) HEREBY CERTIFY THAT I (WE) ARE THE RECORD OWNER OF THE PROPERTY SHOWN ON THE TENTATIVE SUBDIVISION MAP AND THAT SAID MAP SHOWS ALL MY (OUR) CONTIGUOUS OWNERSHIP IN WHICH I (WE) HAVE ANY DEED OR TRUST INTEREST. I (WE) UNDERSTAND THAT MY (OUR) PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREET, UTILITY EASEMENTS, OR RAILROAD RIGHTS-OF-WAY.

SIGNATURE

UTILITIES

COACHELLA WATER AUTHORITY	(760) 398-2702
COACHELLA VALLEY WATER DISTRICT	(760) 398-2651
IMPERIAL IRRIGATION DISTRICT (IID)	(800) 303-7756
SOUTHERN CALIFORNIA EDISON	(800) 655-4555
THE GAS COMPANY	(800) 427-2200
VERIZON	(800) 483-5000
TIME WARNER	(760) 340-2225
UNDERGROUND SERVICE ALERT	1-800-227-2600

PROJECT:
PROJECT NAME: RAVELLA
TOTAL NUMBER OF LOTS: 115
GROSS ACREAGE: 19.57 AC
EXISTING LAND USE: UNDEVELOPED
PROPOSED LAND USE: RESIDENTIAL COMMERCIAL
GENERAL PLAN DESIGNATION: NEIGHBORHOOD CENTER
ZONING: GENERAL COMMERCIAL
NORTH COMMERCIAL: 20,000 SQ. FT.
WEST COMMERCIAL: 9,750 SQ. FT.
TOWER MARKET: 5,200 SQ. FT.
FUEL ISLAND: 5,900 SQ. FT.
FUTURE RESIDENTIAL LOT NUMBER MINIMUM: 2,335 SQ. FT.
FUTURE RESIDENTIAL LOT NUMBER MAXIMUM: 3,193 SQ. FT.
FUTURE RESIDENTIAL LOT NUMBER AVERAGE: 2,668 SQ. FT.
LOT 1 AREA: 1.37 AC
LOT 2 AREA: 1.13 AC
LOT 3 AREA: 2.52 AC
LOT 4 AREA: 14.56 AC
LOT 1 PARKING STALLS: 23
LOT 2 PARKING STALLS: 39
LOT 3 PARKING STALLS: 94
LOT 4 PARKING STALLS: 118

0 20 40 80
1 in = 40 ft

LOT INFORMATION

LOT #	AREA (S.F.)
1	2,337
2	2,335
3	2,397
4	2,397
5	2,335
6	2,335
7	2,335
8	2,335
9	2,397
10	2,397
11	2,335
12	2,335
13	2,335
14	2,335
15	2,397
16	2,397
17	2,335
18	2,335
19	2,500
20	2,335
21	2,397
22	3,192
23	3,193
24	3,013
25	2,678
26	2,545
27	2,545
28	2,545
29	2,546
30	2,546
31	2,567
32	2,765
33	2,340
34	2,340
35	2,341
36	2,337
37	2,335
38	2,500
39	2,335
40	2,335
41	2,339
42	2,340
43	2,335
44	2,335
45	2,335
46	2,335
47	2,342
48	2,343
49	2,335
50	2,335
51	2,335
52	2,335
53	2,345
54	2,346
55	2,335
56	2,335
57	2,335
58	2,335
59	2,347
60	2,349

LOT INFORMATION

LOT #	AREA (S.F.)
61	2,335
62	2,335
63	2,335
64	2,335
65	2,350
66	2,352
67	2,335
68	2,335
69	2,335
70	2,335
71	2,353
72	2,354
73	2,335
74	2,627
75	2,570
76	2,335
77	2,335
78	2,335
79	2,335
80	2,335
81	2,743
82	2,335
83	2,335
84	2,335
85	2,335
86	2,335
87	2,743
88	2,742
89	2,337
90	2,335
91	2,335
92	2,335
93	2,335
94	2,743
95	2,571
96	2,334
97	2,335
98	2,335
99	2,335
100	2,335
101	2,570
102	2,743
103	2,335
104	2,335
105	2,335
106	2,335
107	2,335
108	2,743
109	2,743
111	2,335
112	2,335
113	2,335
114	2,335
115	2,743

LETTERED LOT INFORMATION

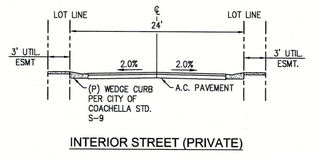
LOT #	AREA (S.F.)
LOT A	2,679
LOT B	2,997
LOT C	2,997
LOT D	2,997
LOT E	3,523
LOT F	3,497
LOT G	2,973
LOT H	2,974
LOT I	2,975
LOT J	2,976
LOT K	2,978
LOT L	3,058
LOT M	1,885
LOT N	1,363
LOT O	1,362
LOT P	1,362
LOT Q	1,362
LOT R	1,362
LOT S	1,298
LOT T	3,320
LOT U	1,298
LOT V	1,362
LOT W	1,362
LOT X	64,224
LOT Y	22,527
LOT Z	13,814
LOT AA	8,678
LOT AB	21,385
LOT AC	39,939
LOT AD	19,784
LOT AE	7,537
LOT AF	9,772
LOT AG	9,772
LOT AH	7,537
LOT AI	9,790
LOT AJ	67,246

LOT LINE DATA

LINE No.	BEARING	DISTANCE
L1	N89°55'57"E	449.46'
L2	N0°04'03"W	27.48'
L3	N29°55'57"E	133.09'
L4	N89°55'57"E	23.82'
L5	N0°04'03"W	85.96'
L6	N0°04'03"W	255.72'
L7	N89°55'57"E	60.62'
L8	N0°04'03"W	20.63'
L9	N89°55'57"E	100.63'
L10	N0°04'03"W	20.63'
L11	N89°55'57"E	20.70'
L12	N89°55'57"E	168.57'
L14	N0°05'18"W	290.92'
L15	N45°14'15"E	50.08'
L16	N89°55'57"E	1209.73'

LOT CURVE DATA

CURVE No.	DELTA	LENGTH	RADIUS
C1	26°43'39"	130.62'	280.01'
C2	18°04'40"	68.03'	215.63'
C3	171°41'15"	45.13'	150.00'
C4	171°41'15"	58.67'	195.00'
C5	91°31'03"	185.97'	1156.00'
C6	7°31'25"	163.35'	1244.00'



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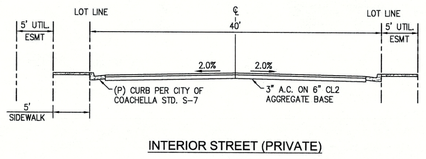

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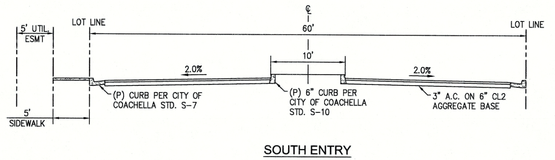

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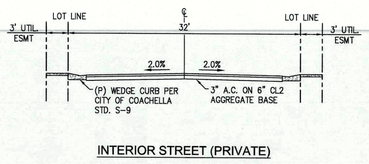

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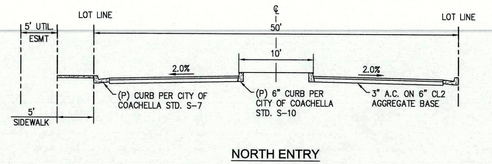

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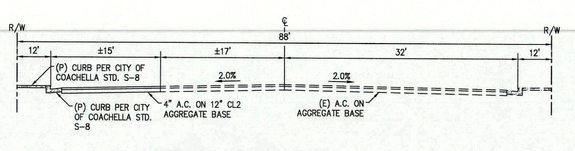
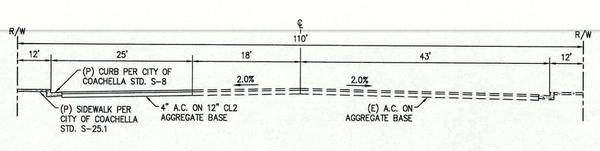


CALHOUN STREET



AVENUE 50

STREET SECTIONS

NTS

REVISIONS	DATE	NO.

RCE CONSULTANTS, INC.
SIGNATURE
C46559 P.E. 06.30.17 EXP.
24422 Avenida de la Carlota Suite 300 Laguna Hills, Ca. 92653 Phone: 949.453.0111

DESIGNED BY: | CHECKED BY:
DRAWN BY: | DATE:
SCALE:
FILE No.

STAMP: REGISTERED PROFESSIONAL ENGINEER RICHARD L. CLARK JR. NO. C46559 EXP. 6-30-17 CIVIL STATE OF CALIFORNIA

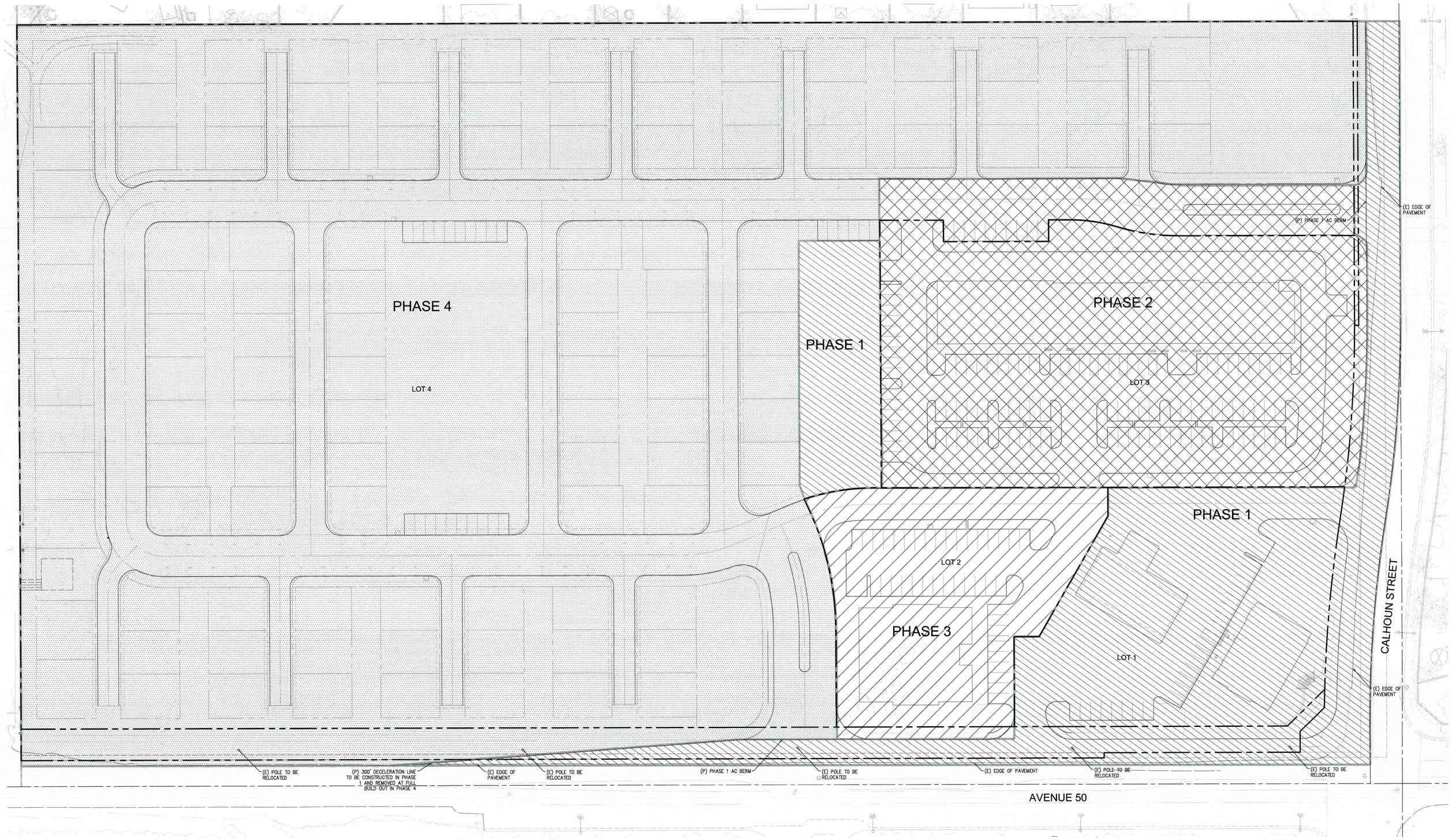
BASIS OF BEARINGS: SOUTHERLY LINE OF SECTION 36, TAKEN AS NORTH 89°55'02" EAST, AS SHOWN IN MAP OF COACHELLA LAND & WATER COMPANY, RECORDED IN MAP BOOK 4, PAGES 53-A THROUGH 53-D, O.R.

BENCH MARK: CITY OF COACHELLA BM 1003 AS ELEVATION 459.227' (NAVD 88+500)

APPROVED BY:

TENTATIVE TRACT MAP NO. 37088
IN THE COUNTY OF RIVERSIDE, CA
IN THE CITY OF COACHELLA

DRAWING NAME: TTM Ravella 01 SP
PROJECT No. Tower En
SHEET 1 OF 3



LEGEND

SYMBOL	DESCRIPTION
	PHASE 1
	PHASE 2
	PHASE 3
	PHASE 4
	PHASE BOUNDARY
	PARCEL LINES

REVISIONS	DATE	NO.

RCE CONSULTANTS, INC.
SIGNATURE
C46559 P.E.
06.30.17 EXP.
24422 Avenida de la Carlota
Suite 300
Laguna Hills, Ca. 92653
Phone: 949.453.0111

DESIGNED BY: | CHECKED BY:
DRAWN BY: | DATE:
SCALE:
FILE No.

STAMP
REGISTERED PROFESSIONAL ENGINEER RICHARD L. CLARK NO. C46559 EXP. 6-30-17 CIVIL STATE OF CALIFORNIA

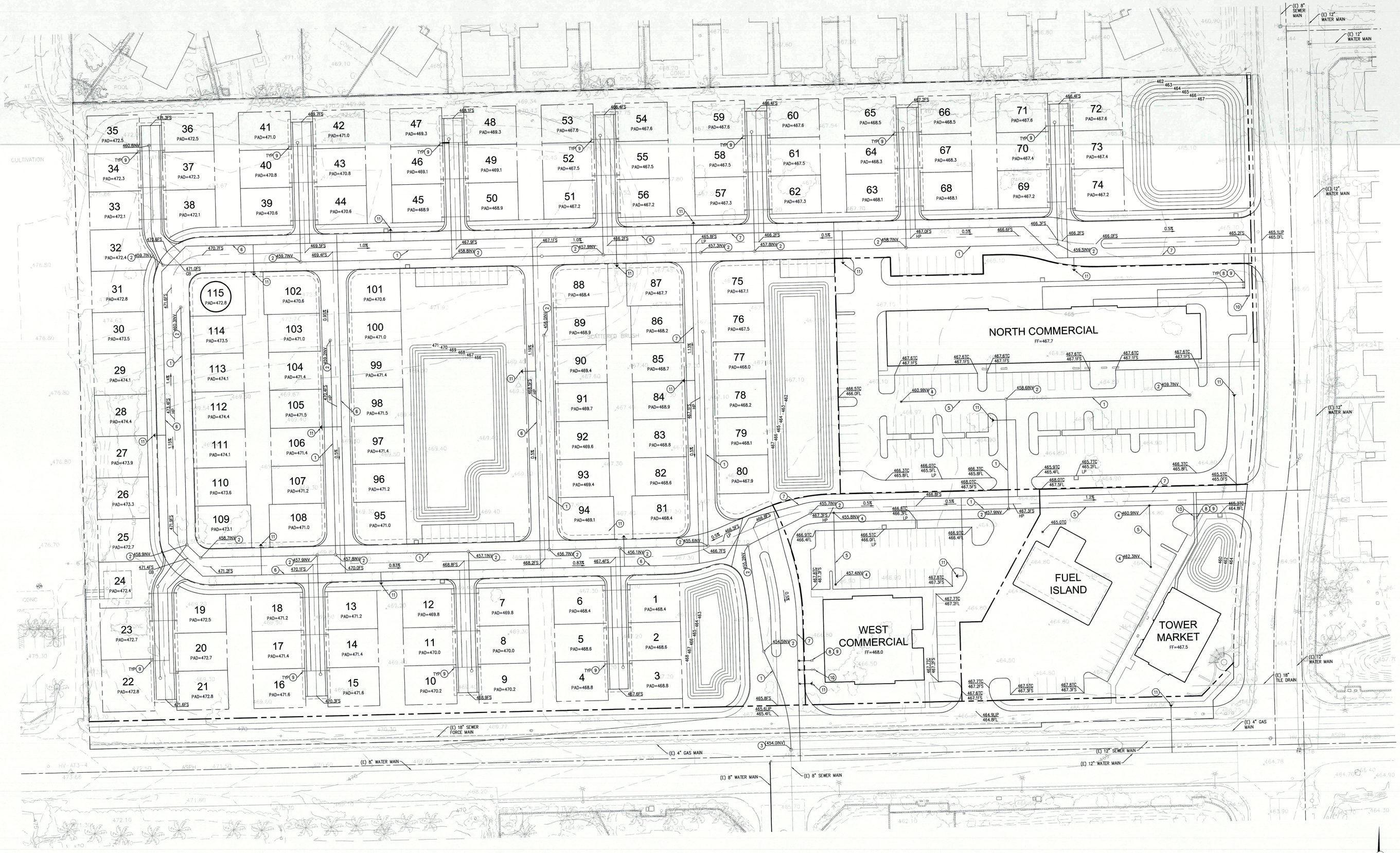
BASIS OF BEARINGS
SOUTHERLY LINE OF SECTION 36, TAKEN AS NORTH 89°58'00" EAST, AS SHOWN IN MAP OF COACHELLA LAND & WATER COMPANY, RECORDED IN MAP BOOK 4, PAGES 53-A THROUGH 53-D, O.R.

BENCH MARK
CITY OF COACHELLA
BM 1003 AS ELEVATION 459.227'
(NAVD 88+500)

APPROVED BY:

TENTATIVE TRACT MAP NO. 37088
IN THE COUNTY OF RIVERSIDE, CA
IN THE CITY OF COACHELLA

DRAWING NAME:
TTM Ravella 02 PM
PROJECT No.
Tower En
SHEET 2 OF 3



CONSTRUCTION NOTES

1. INSTALL 8" SDR 21 PVC SEWER MAIN PER CITY OF COACHELLA STD. D-4.
2. CONSTRUCT 48" SEWER MANHOLE PER CITY OF COACHELLA STD. D-2.
3. CONNECT TO EXISTING SEWER MANHOLE
4. INSTALL 6" SEWER CLEANOUT PER CITY OF COACHELLA STD. D-7.
5. INSTALL 4" SCH 40 PVC SEWER MAIN PER CITY OF COACHELLA STD. D-11.
6. INSTALL 8" C-900 CLASS 200 PVC WATER MAIN PER CITY OF COACHELLA STD. W-5.
7. INSTALL 12" C-900 CLASS 200 PVC WATER MAIN PER CITY OF COACHELLA STD. W-5.
8. INSTALL REDUCED PRESSURE BACKFLOW PREVENTION DEVICE PER CITY OF COACHELLA STD. W-6.
9. INSTALL STANDARD WATER SERVICE METER PER CITY OF COACHELLA STD. W-8.
10. INSTALL FIRE DETECTOR CHECK ASSEMBLY PER CITY OF COACHELLA STD. W-10.
11. INSTALL 6" FIRE HYDRANT PER CITY OF COACHELLA STD. W-4.

0 20 40 80
1 in = 40 ft

REVISIONS	DATE	NO.

RCE CONSULTANTS, INC.
SIGNATURE
C46559 P.E.
06.30.17 EXP.
24422 Avenida de la Carlota
Suite 300
Laguna Hills, Ca. 92653
Phone: 949.453.0111

DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE:
SCALE:
FILE No.

STAMP
REGISTERED PROFESSIONAL ENGINEER
RICHARD L. CLARK
NO. C46559
EXP. 6-30-17
CIVIL
STATE OF CALIFORNIA

BASIS OF BEARINGS
SOUTHERLY LINE OF SECTION 36, TAKEN AS NORTH 89°58'00" EAST, AS SHOWN IN MAP OF COACHELLA LAND & WATER COMPANY, RECORDED IN MAP BOOK 4, PAGES 53-A THROUGH 53-D, O.R.

BENCH MARK
CITY OF COACHELLA
BM 1003 AS ELEVATION 459.227'
(NAVD 88+500)

APPROVED BY:

PRELIMINARY GRADING & UTILITY IN THE COUNTY OF RIVERSIDE, CA IN THE CITY OF COACHELLA

DRAWING NAME:
TTM Ravella 03 PG UT
PROJECT No.
Tower En
SHEET 3 OF 3

Initial Study and Notice of Intent to Adopt a Mitigated Negative Declaration

for

Tower Energy

Avenue 50 and Calhoun Street



Lead Agency:

City of Coachella

Development Services Department

1515 Sixth Street

Coachella, CA 92236

Applicant:

Tower Energy Group

1983 West 190th Street, Suite 100

Torrance, CA 90504

Prepared by:

The Altum Group

73-710 Fred Waring Drive, Suite 219

Palm Desert, CA 92260

May 16, 2016

TABLE OF CONTENTS

Chapter 1 Introduction 1

1.1 Overview 1

1.2 Authority 2

1.3 Scope of Environmental Review 2

1.4 Impact Assessment Terminology 2

1.5 Organization of the Initial Study 3

1.6 Documents Incorporated by Reference 4

Chapter 2 Project Description 5

2.1 Project Location 5

2.2 General Plan and Zoning Designation 5

2.3 Project Description 5

Chapter 3 Environmental Evaluation 27

3.1 Aesthetics 28

3.2 Agriculture and Forestry Resources 33

3.3 Air Quality 35

3.4 Biological Resources 69

3.5 Cultural Resources 73

3.6 Geology/Soils 77

3.7 Greenhouse Gas Emissions 81

3.8 Hazards and Hazardous Materials 86

3.9 Hydrology and Water Quality 92

3.10 Land Use and Planning 96

3.11 Mineral Resources 100

3.12 Noise 101

3.13 Population and Housing 122

3.14 Public Services 124

3.15 Recreation 128

3.16 Traffic and Transportation 130
3.17 Utilities and Service Systems 144
3.18 Mandatory Findings of Significance 147
Chapter 4 Report Preparers 154
Chapter 5 References 156

List of Exhibits

Exhibit 1 Regional Location 9
Exhibit 2 Project Site and Vicinity 11
Exhibit 3 Photo Locations 13
Exhibit 4 Existing General Plan Designations 21
Exhibit 5 Existing and Proposed Zoning Designations 23
Exhibit 6 Site Plan 25
Exhibit 7 Landscape Plan 27
Exhibit 8 Market Elevations 29
Exhibit 9 North Commercial Elevations 31
Exhibit 10 West Commercial Elevations 33
Exhibit 11 Typical Housing Mix 35
Exhibit 12 A Residence Elevations 37
Exhibit 13 B Residence Elevations 39
Exhibit 14 Typical Housing Site Section 31
Exhibit 15 Noise Measurement Location- Residential 103
Exhibit 16 Noise Measurement Location- Commercial 105
Exhibit 17 Modeled Receptor Locations 119
Exhibit 18 Study Area Intersections 131

List of Tables

Table 1 Federal and State Ambient Air Quality Standards 41
Table 2 Salton Sea Air Basin Attainment Status by Pollutant 43
Table 3 Screening Threshold for Criteria Pollutants 53

Table 4 Three-Year Ambient Air Quality Summary near the Project Site 54
Table 5 Estimated Daily Regional Construction Emissions Summary – Residential..... 58
Table 6 Estimated Daily Regional Construction Emissions Summary – Commercial 59
Table 7 Expected Construction Equipment – Residential 60
Table 8 Expected Construction Equipment – Commercial..... 61
Table 9 5-Acre LST Emission Thresholds..... 61
Table 10 LST Modeling Results During Construction - Residential (Unmitigated) 63
Table 11 LST Modeling Results During Construction – Residential (Mitigated)..... 63
Table 12 LST Modeling Results During Construction – Commercial (Unmitigated)..... 64
Table 13 Regional Operational Pollutant Emissions – Residential 65
Table 14 Regional Operational Pollutant Emissions – Commercial 65
Table 15 Expected Annual Construction CO2e Emissions Summary MT/Year - Residential..... 84
Table 16 Expected Operational Emissions Summary MT/Year - Commercial..... 84
Table 17 Operational Greenhouse Gas Emissions -Residential..... 85
Table 18 Operational Greenhouse Gas Emissions - Commercial 85
Table 19 Ambient Noise Levels - Residential..... 107
Table 20 Ambient Noise Levels - Commercial 107
Table 21 Noise Decibel Limits..... 109
Table 22 Land Use- Noise Compatibility Guidelines[1] 111
Table 23 Noise Decibel Limits..... 113
Table 24 Construction Noise Levels- Residential..... 115
Table 25 Construction Noise Levels- Commercial 116
Table 26 Future Exterior Noise Levels 117
Table 27 Existing and Existing Plus Project Noise Levels..... 117
Table 28 Existing Plus Near-Term Plus Project Plus Cumulative Noise Levels 121
Table 29 HCM-LOS and Delay Ranges – Signalized Intersections..... 133
Table 30 Intersection Analysis – Existing Conditions 134
Table 31 Roadway Segment Analysis – Existing Conditions..... 135

Table 32 Intersection Analysis Existing Plus Ambient Plus Project Conditions – Commercial..... 137

Table 33 Intersection Analysis Existing Plus Ambient Plus Project Conditions - Residential..... 137

Table 34 Intersection Analysis – EAP Conditions with Improvements..... 138

Table 35 Intersection Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions - Commercial..... 139

Table 36 Intersection Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions - Residential..... 140

Table 37 Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions-Residential .. 140

Table 38 Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions-Commercial. 141

Table 39 Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions - Residential..... 141

Table 40 Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions – Commercial..... 142

Appendices

Appendix A-1 Air Quality Assessment, Avenue 50 and Calhoun Street

Appendix A-2 Air Quality Assessment (TTM 36680), Residential Development

Appendix B-1 Cultural Resources Assessment

Appendix B-2 Paleontological Resources Assessment

Appendix C-1 Greenhouse Gas Assessment Residential

Appendix C-2 Greenhouse Gas Assessment Commercial

Appendix C-1 Geotechnical Investigation

Appendix C-2 Soils Report

Appendix E Phase I Environmental Site Assessment

Appendix F-1 Preliminary Hydrology and Drainage Report 2015

Appendix F-2 Preliminary Hydrology and Drainage Report 2016

Appendix F-3 Preliminary Water Quality Management Plan

Appendix G-1 Noise Study - Residential

Appendix G-2 Noise Study Commercial

Appendix H-1 Traffic Impact Analysis

TABLE OF CONTENTS

Acronyms Used in the Initial Study

AQMP	Air Quality Management Plan
BMPs	Best Management Practices
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CH4	Methane
CMP	Congestion Management Plan
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2EQ	carbon dioxide equivalent
dBA	A-weighted decibel
DPM	Diesel Particulate Matter
GHG	Greenhouse Gasses
EPA	Environmental Protection Agency
GWP	Global Warming Potential
HAPs	Hazardous Air Pollutants
HCR	hydrofluorocarbons
H2S	Hydrogen Sulfide
IRC	International Residential Code (IRC)
LCFS	Low Carbon Fuel Standard
LOS	Level of Service
LST	Localized Significance Threshold

Mgd	million gallons per day
MMT	million metric tons
MND	Mitigated Negative Declaration
MRZ	Mineral Resources Zone
MS4	Municipal Separate Storm Sewer Systems
msl	mean sea level
N_2O	nitrous oxides
NAAQS	National ambient air quality standards
NAASQ	National Ambient Air Quality Standards
NOx	nitrogen oxides
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OAQPS	EPA Office of Air Quality Planning and Standards
O_3	ozone
Pb	lead
PFC	perfluorocarbons
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
RAQS	Regional Air Quality Strategy
RCPG	Regional Comprehensive Plan and Guide
RHNA	Regional Housing Allocation Needs
ROG	Reactive Organic Gasses
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SCAQMD	Southern California Air Quality Management District
SF_6	sulfuR hexafluoride
SIP	State Implementation Plan
SOx	Sulfur oxides

SPA	Specific Plan Area
SSAB	Salton Sea Air Basin
SWPPP	Stormwater Pollution Prevention Plan
TACs	Toxic Air Contaminants
$\mu g/m^3$	micrograms per cubic meter
USEPA	US Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WQMP	Water Quality Management Plan

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Chapter 1 Introduction

1.1 Overview

Tower Energy is proposing to subdivide an approximately 20-acre parcel (net 19.57acres) into four lots consisting of three commercial lots totaling approximately five acres and one lot for the development of 115 dwelling units on approximately 14.50 acres. The project site (APN 612-280-018) is located at the northwest corner of Avenue 50 and Calhoun Street in the City of Coachella, in Riverside County.

The project site is a vacant former agricultural site surrounded by residential development with intermittent vacant parcels zoned for residential use. Over time, the site has been sparsely revegetated with some ruderal (weed) vegetation.

Tower Energy is requesting approval of the following procedural entitlements with the City of Coachella:

- Tentative Tract Map 37088 to subdivide the property into 4 parcels and furthermore to subdivide Parcel 4 into 115 residential lots.
- Change of Zone from R-S to C-N-PD for the commercial portion of the site
- Change of Zone from R-S to R-M-PD (Residential Medium Planned Development) for the residential portion of the site
- Conditional Use Permit 267 for Service Station in the C-N-PD.
- Conditional Use Permit 268 for Residential Planned Development Overlay Zone
- Mitigated Negative Declaration for the project

1.1.1 Project Site History

The project site has been the subject of three separate proposals including the current Tower Energy proposal. The following is a brief overview:

- Historically the site was utilized as agricultural land. Agricultural use on the site declined in the 1990s and by 2004, there was no longer any evidence of agricultural growth (Appendix E, *Environmental Site Assessment).* The lot has remained vacant.
- In 2013, Tower Energy Group proposed to build a 240-unit apartment complex and a mini-mart/service station on-site that required a general plan amendment and a change of zone. At the time, the project was withdrawn because the City planned for the site to be community commercial space and did not want residential development onsite.
- The project was sold to LADCO in 2013, and in 2015, LADCO proposed a general plan amendment, change of zone, and Tentative Tract Map (TTM No. 36680) to develop a 115-lot residential

subdivision and commercial site. The residential component was to include courtyard-style homes, community landscaped areas, a community park, and a clubhouse with a pool. The applicant opted to sell the project site and associated entitlements to Tower Energy Group (the current land owner).

- Tower Energy Group submitted the above referenced applications to develop the 115-lot residential development and a 5-acre commercial site that are being analyzed in this Initial Study.

1.2 Authority

The City of Coachella is the lead agency for the proposed Tower Energy project. Because the aforementioned entitlements are all discretionary actions, the project is subject to the California Environmental Quality Act (CEQA). This Initial Study has been prepared in accordance with CEQA (Statute) and the State's Guidelines for Implementation of CEQA (Guidelines) (as amended, 2015); and the City of Coachella's CEQA Guidelines for preparation of an Initial Study. This Initial Study, when combined with the Notice of Intent to Adopt a Mitigated Negative Declaration serves as the environmental document for the proposed project pursuant to the provisions of CEQA (Public Resources Code 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Section 15000, et seq.). Other agencies may also issue permits including the State Water Resources Control Board for the issuance of a Waste Discharge Identification Number (WDID) for the Stormwater Pollution Prevention Plan (SWPPP) for each phase of the project. A summary of discretionary actions is included in Chapter 2, *Project Description*.

1.3 Scope of Environmental Review

The Initial Study evaluates the proposed project's potential environmental effects on the following topics:

• Aesthetics	• Land Use/Planning
• Agricultural Resources	• Mineral Resources
• Air Quality	• Noise
• Biological Resources	• Population/Housing
• Cultural Resources	• Public Services
• Geology and Soils	• Recreation
• Greenhouse Gas Emissions	• Transportation/Traffic
• Hazards/Hazardous Materials	• Utilities/Service Systems
• Hydrology/Water Quality	

1.4 Impact Assessment Terminology

The Environmental Checklist identifies impacts using four levels of significance as follows:

- No Impact. A finding of no impact is made when it is clear from the analysis that the project would not affect the environment.
- Less than significant. A finding of less than significant is made when it is clear from the analysis that a project would cause no substantial adverse change in the environment and no mitigation is required.
- Less than significant with mitigation incorporated. A finding of less than significant with mitigation incorporated is made when it is clear from the analysis that a project would cause no substantial adverse change in the environment when mitigation measures are successfully implemented by the project proponent.
- Potentially Significant. A finding of potentially significant is made when the analysis concludes that the proposed project could have a substantially adverse impact on the environment related to one or more of the topics listed in the previous section, *Scope of the Initial Study*.

1.5 Organization of the Initial Study

The content and format of the Initial Study meet the requirements of CEQA. The Initial Study contains the following sections:

- Chapter 1 Introduction. This chapter provides a brief summary of the proposed project, identifies the lead agency, summarizes the purpose and scope of the Initial Study, and provides a discussion of the impact terminology used to assess potential environmental impacts of the proposed project.
- Chapter 2 Project Description. This chapter provides a project overview including a description of the regional location and project vicinity, including exhibits; summarizes Tower Energy's decision to move forward with the proposed project; and provides a description of the project elements, i.e. dimensions of the project, area of disturbance, schedule for completion, etc.
- Chapter 3 Environmental Evaluation. This chapter provides a copy of the City's Environmental Checklist, revised to include the latest amendments to the CEQA Guidelines Appendix G, and responses to each question posed in the checklist. This chapter also provides a brief description of existing conditions for each topic and an analysis of potential environmental impacts. Mitigation measures are also identified where necessary.
- Chapter 4 Report Preparers. This chapter lists all reports used, websites accessed, and persons consulted to prepare the Initial Study.
- Chapter 5 References. This chapter identifies City of Coachella staff, consultants, and other individuals who were responsible for the preparation of the IS and implementation of the project.

1.6 Documents Incorporated by Reference

As allowed by CEQA Guidelines Section 15150, a Mitigated Negative Declaration may incorporate by reference all or portions of another document that is generally available to the public. The document used must be available for public review for interested parties to access during public review of the Initial Study and Notice of Intent to Adopt a Mitigated Negative Declaration for this proposed project. The City of Coachella's General Plan and the City's Municipal Code were used in the evaluation of the proposed project. These documents are available at the Development Services Department, located at 1515 Sixth Street. Public hours are between 7:00 am and 6:00 pm, Monday through Thursday.

The findings of the Initial Study were also based on field observations and reports prepared for the proposed project. These reports are included in the Appendices to the Initial Study.

Chapter 2 Project Description

2.1 Project Location

The City of Coachella is located on the easterly end of the Coachella Valley in Riverside County. Exhibit 1, *Regional Location*, shows the location of project within the larger Coachella Valley. As shown in Exhibit 2, *Project Site and Vicinity,* the project site is located at the northwest corner of Avenue 50 and Calhoun Street within a largely residential area. Exhibit 3, *Photo Locations,* provides an aerial view of the project site and vicinity; photos taken from these locations follow Exhibit 3. As seen in the aerial photo and project photos, the site is a vacant disturbed site.

The project site (APN 612-280-018) is a vacant former agricultural site located on the northwest corner of Avenue 50 and Calhoun Street and is surrounded by residential development with intermittent vacant parcels zoned for residential use. Over time, the site has been sparsely revegetated with some ruderal (weed) vegetation.

The 20-acre project site is located at northwest corner of Avenue 50 and Calhoun Street, addressed as 82266 Avenue 50. After required street dedications on Calhoun Street and Avenue 50, the site will be 19.57 acres. The project site is further defined as a portion of the southwest quarter of Section 36, Township 5 South, Range 7 East of the Indio 7.5 minute quad. Finally, the site is located at approximately Latitude 33°41" 11.40" North and Longitude 116° 12' 35.54" West at the approximate geographic center of the site.

2.2 General Plan and Zoning Designation

The current General Plan designation is Neighborhood Center. The existing General Plan Designation is shown in Exhibit 4, *Existing General Plan Designations.* The Neighborhood Center designation allows for a concentration of commercial businesses and civic amenities, mixed with multi-family housing, within convenient walking distance of nearby neighborhoods.

The existing Zoning Designation for the site, shown in Exhibit 5, *Existing and Proposed Zoning Designations* is Residential Single Family (R-S). The applicant is proposing a change of zone to allow the proposed uses on the project site.

2.3 Project Description

The applicant, Tower Energy, is seeking a number of entitlements in order to develop an approximately 20-acre site into two separate projects, an approximately 5-acre commercial plaza at the northeast

corner of Avenue 50 and Calhoun Street, and an approximately 15-acre residential subdivision. Exhibit 6, *Site Plan* shows the layout of the proposed residential and commercial elements.

Tentative Tract Map 37088

Tentative Tract Map (TTM) 37088 would create four lots. Lots 1 through 3 would contain a 5-acre commercial site to be located in the southeast portion of the project site at the corner of Avenue 50 and Calhoun Street. Lot 4 is the residential element of the project as shown in Exhibit 6. Exhibit 7, *Landscape Plan* shows the proposed landscape theme for the project.

Change of Zone

Commercial Area

The applicant is pursuing a Change of Zone from R-S (Residential Single Family) ~~from~~ to Neighborhood Commercial-Planned Development (C-N-PD) to accommodate development of three commercial lots, the Tower Energy Market and Fueling Station (Lot 1) and two additional commercial pads (Lots 2 and 3). The commercial portion of the project is illustrated in relation to the residential portion of the project in Exhibit 6. The Commercial potion will include the following:

- Lot 1 is a 1.37-acre lot containing a 5,200 square foot market, a 5,076 square foot fuel station area with a canopy structure, and 23 parking spaces in front of the market.
- Lot 2 is a 1.12-acre lot containing a 9,750 square foot commercial building on the southwest side of the property and 42 parking spaces around the east and north sides of the building.
- Lot 3 is a 2.58-acre lot containing a 20,000 square foot building on the north side of the commercial property to be used as a professional office and/or retail, and 94 parking spaces around the south and west side of the building.

Exhibit 8, *Market Elevations,* Exhibit 9, *North Commercial Elevations*, and Exhibit 10, *West Commercial Elevations,* show the architecture of the proposed commercial elements. Access to the commercial site will be from Avenue 50 and Calhoun Street and will be separate from the access drives into the residential neighborhood.

Residential Area

Lot 4 will require a Change of Zone from R-S to R-M-PD (Residential Medium-Planned Development) establishing a Planned Development Overlay Zone to allow the development of 115 dwelling units and related uses (roads, 4 retention basins, open space, and a park site). Existing and proposed zoning designations are shown in Exhibit 5. The maximum residential lot size within Lot 4 will be 3,789 square feet and the minimum lot size will be 2,373; with an average lot size of 2,668.

The interior roads will be developed at 40 feet along the main road, and 32 feet wide for other interior roads. Residences will include parking spaces in garages/driveways. A total of 89 guest parking spaces will be available on both sides of the 40-foot wide streets, on one side of the 32-foot wide streets, 6 parking spaces along the north side of the retention basin referred to as Lot AB, and 10 parking spaces along the north side Lot 3 (north commercial site). Exhibit 11, *Typical Housing Mix,* Exhibit 12, *A Residence Elevations* and Exhibit 13, *B Residence Elevations* show the architecture of the proposed residential elements.

Access to the residential portion of the site will be from one entrance on Avenue 50, west of the commercial site, and a second entrance on Calhoun Street, north of the commercial site. Access to the residential area will not be gated.

Conditional Use Permits

Both the residential and commercial components require a Conditional Use Permit (CUP). CUP 267 would allow a Service Station use within the R-M–PD zoning area. CUP 268 would allow residential uses in the R-M-PD zoning area.

Surrounding Land uses and setting:

North of site	Las Plumas (Residential Single Family)
South of site	La Colonia (Residential Single Family); vacant land zoned R-M
East of site	Bella Canto (Residential Single Family)
West of site	Church on Medium Density Residential land in the City of Indio

Other public agencies whose approval is required:

Agency	Permit/Approval Required
FEDERAL	
No Federal Agency identified	
STATE	
State Water Resources Control Board	Construction Stormwater General Permit Notice of Intent to Comply with Section 402 of the Clean Water Act Construction Stormwater Pollution Prevention Plan (SWPPP)
REGIONAL	
South Coast Air Quality Management District (SCAQMD)	Permit to Construct and Permit to Operate a Fuel Storage and Dispensing Station PM-10 Plan for compliance with Rule 403.1, Dust Control in the Coachella Valley
Regional Water Quality Control Board	Water Quality Management Plan

Coachella Valley Association of Governments (CVAG)	Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (Payment of fees); Transportation Uniform Mitigation Fee (TUMF)
LOCAL	
County of Riverside Fire Department	Approval of a Hazardous Materials Business Plan Permit to Construct/Operate underground storage tanks



1 inch = 2 miles

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Regional Location
Tower Energy Project Initial Study

Exhibit 1

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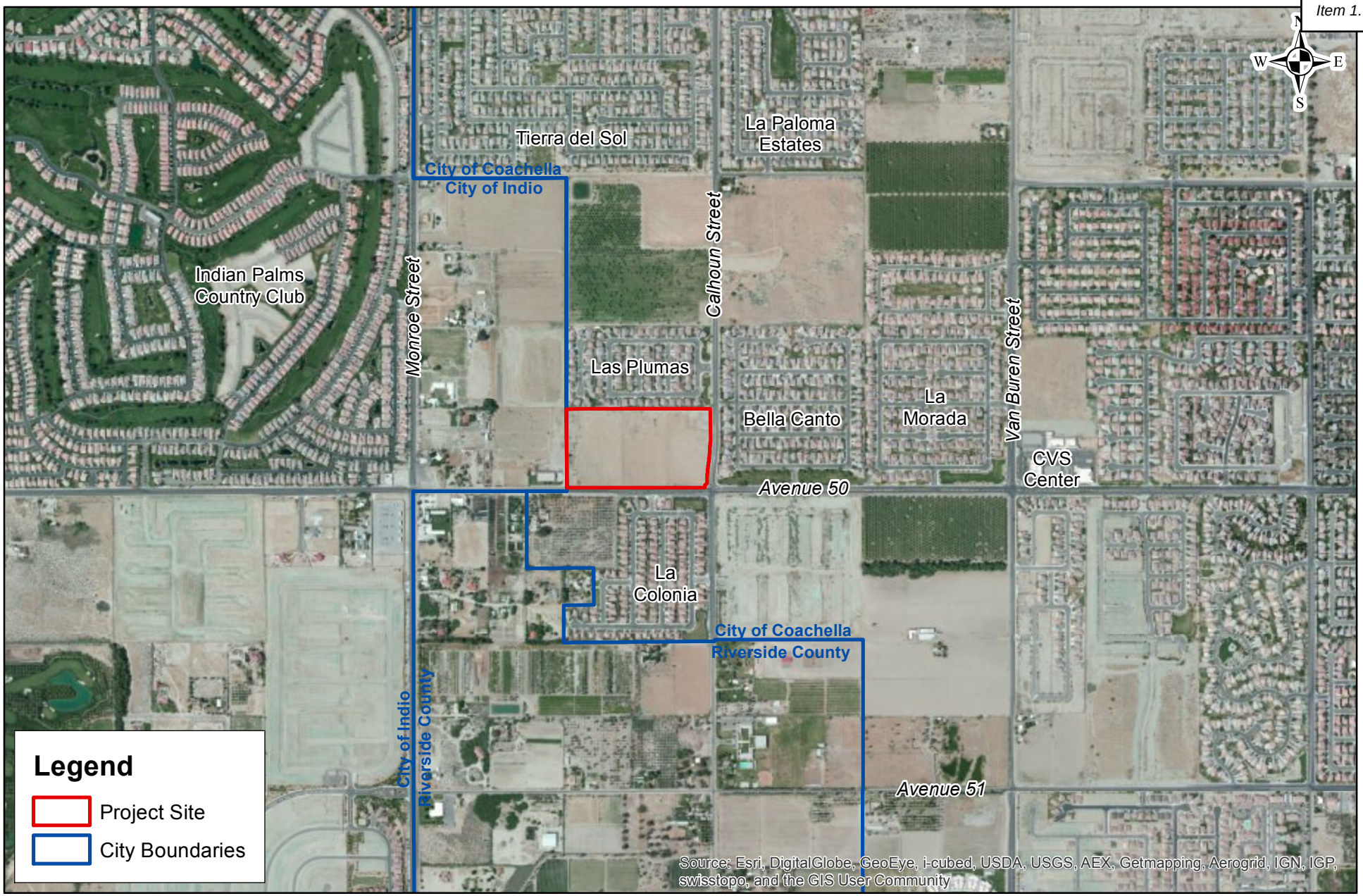

1 inch = 1,200 feet

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Project Site and Vicinity
Tower Energy Project Initial Study

Exhibit 2

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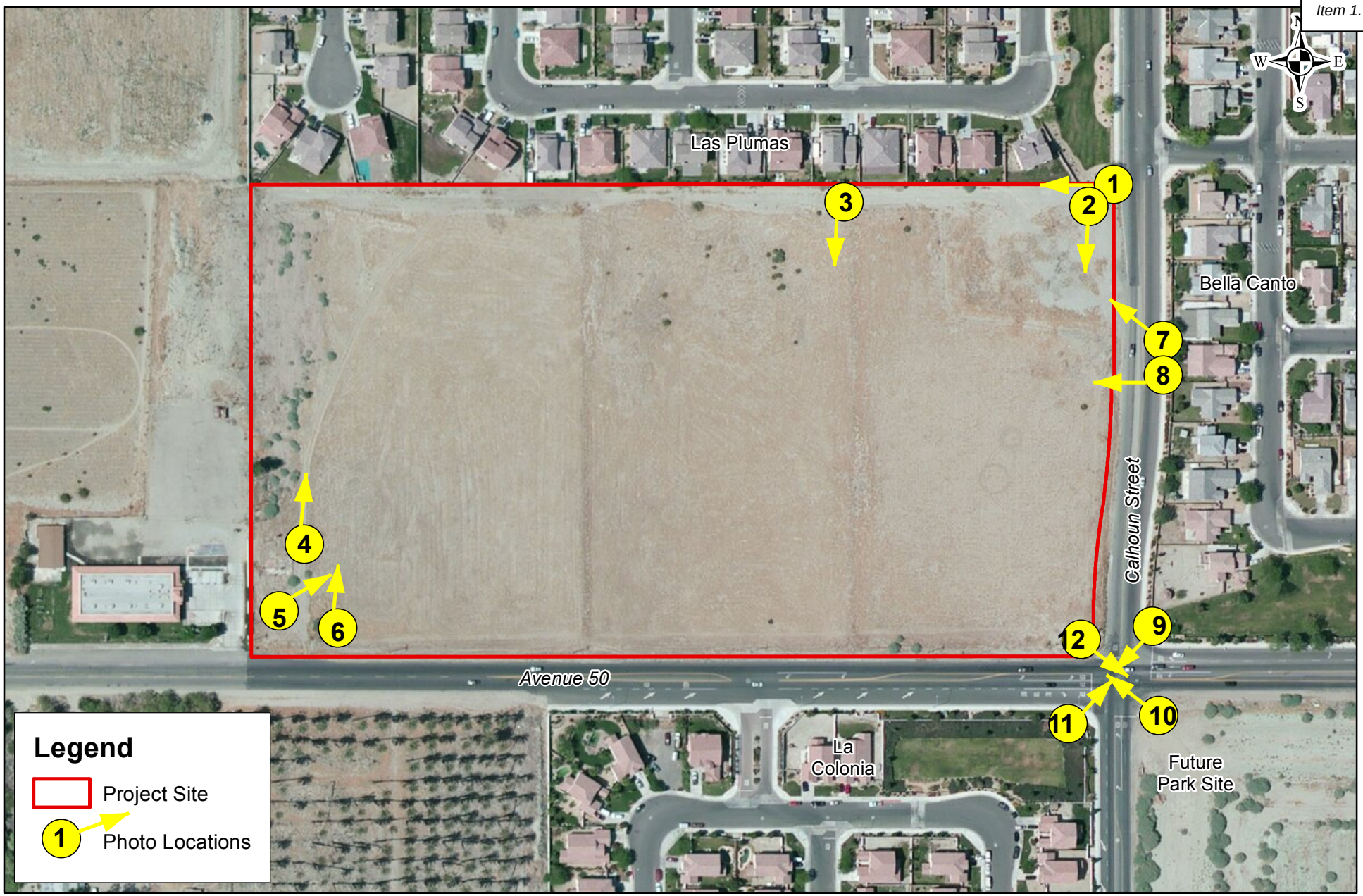

1 inch = 200 feet

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Photo Locations
Tower Energy Project Initial Study

Exhibit 3

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Photo 1: View to the west along the northern boundary of the project site



Photo 2: View to the south along the eastern boundary of the project site



Photo 3: View of the project site facing south



Photo 4: View of the project site facing north along the western property boundary



Source: Site Visit, 2015

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Photo 5: View of the project site facing northeast



Photo 6: View to the north along the western boundary of the project site



Photo 7: View of the project site facing west



Photo 8: Homes in the Las Plumas community to the north of the project site



Source: Site Visit, 2015

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Photo 9: View of the La Colonia community south of Avenue 50 south of the project site



Photo 10: View of the project site facing northwest



Photo 11: View of the Bella Canto community east of the project site



Photo 12: View of vacant land southeast of the project site



Source: Site Visit, 2015

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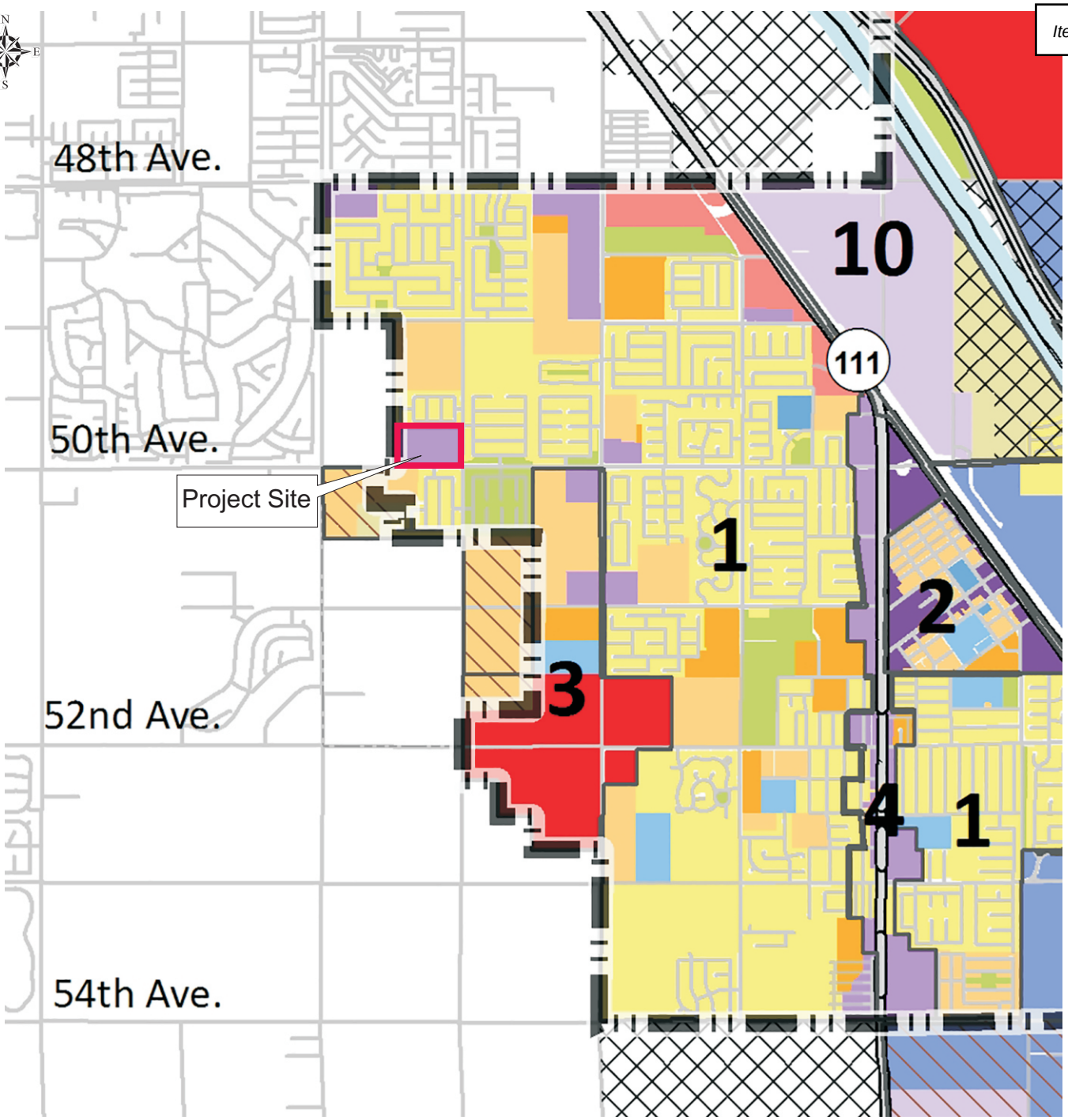

Legend

- Coachella City Limits
- Tribal Land
- Sphere of Influence
- General Plan Planning Area

Land Use Designation

- Downtown Center
- Urban Employment Center
- Neighborhood Center
- Regional Retail District
- Suburban Retail District
- Industrial District
- Urban Neighborhood
- General Neighborhood
- Suburban Neighborhood
- Open Space
- School
- Public Facilities

Sources: City of Coachella General Plan Update 2035

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General Plan Designations
Tower Energy Project Initial Study

Exhibit 4

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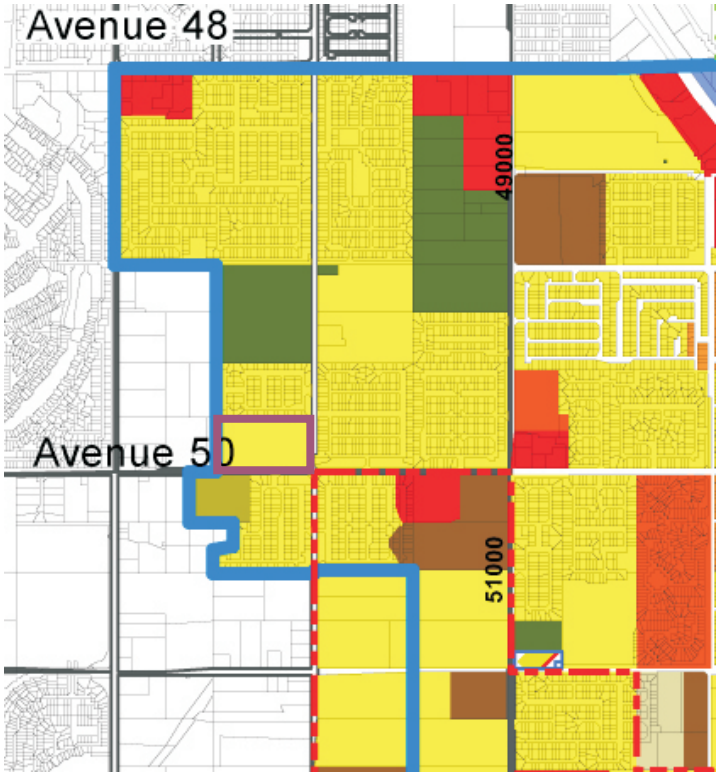
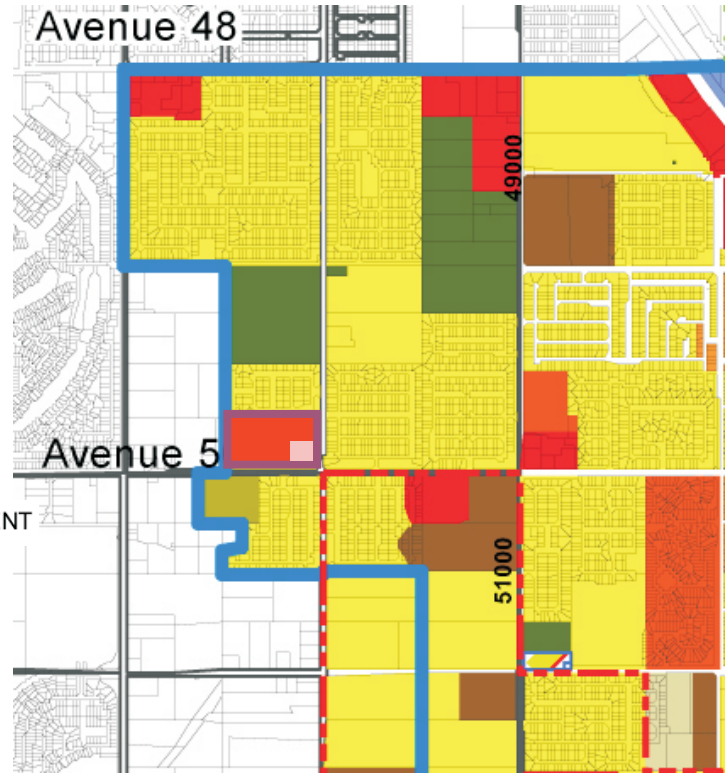


Existing Zoning Designations

- A-T, AGRICULTURAL TRANSITION
- C-G, GENERAL COMMERCIAL
- R-E, RESIDENTIAL ESTATE
- R-S, RESIDENTIAL SINGLE FAMILY
- R-M, RESIDENTIAL MULTIPLE FAMILY
- R-M-4300, RESIDENTIAL MULTIPLE FAMILY, 4300
- R-O-6000, RESIDENTIAL OVERLAY 6000
- R-PUD, RESIDENTIAL PLANNED UNIT DEVELOPMENT
- Specific Plan Boundary
- City Boundary
- Project Site

Proposed Zoning Designations

- A-T, AGRICULTURAL TRANSITION
- C-G, GENERAL COMMERCIAL
- C-N, NEIGHBORHOOD COMMERCIAL
- R-E, RESIDENTIAL ESTATE
- R-S, RESIDENTIAL SINGLE FAMILY
- R-M, RESIDENTIAL MULTIPLE FAMILY
- R-M-4300, RESIDENTIAL MULTIPLE FAMILY, 4300
- R-O-6000, RESIDENTIAL OVERLAY 6000
- R-PUD, RESIDENTIAL PLANNED UNIT DEVELOPMENT
- Specific Plan Boundary
- City Boundary
- Project Site



Sources: City of Coachella Zoning Map, 2013

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Existing and Proposed Zoning Designations
Tower Energy Project Initial Study

Exhibit 5

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Source: Fullerton Architects, 2016

The Altum Group

Site Plan
Tower Energy Project Initial Study

Exhibit 6

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PLANT MATERIAL LEGEND

TREES AND PALMS

SYM.	NAME	SIZE	COMMENTS
	Acacia salicina Acacia anuera	24" Box	Standard
	Cercidium 'Desert Museum' Rhus Lancea	24" Box	Multi-Branching Specimen Tree
	Prosopis Glandulosa Quercus Virginiana	24" Box	Standard
	Parkinsonia Aculeata Rhus Lancea	24" Box	Standard
	Washingtonia Hybrid	20' BTH	
	Phoenix Dactylifera	20' BTH	

LARGE SHRUBS

SYM.	NAME	SIZE
	Cassia nemophylla Desert Cassia	5 gal.
	Nerium Oleander 'Petite Pink' Dwarf Oleander	5 gal.
	Tecoma stans angustata Yellow Bells	5 gal.

MEDIUM SHRUBS

SYM.	NAME	SIZE
	Leucophyllum laevigatum Chihuahuan Sage	5 gal.
	Russelia equisetiformis Coral Fountain	5 gal.
	Ruellia peninsularis Purple Ruellia	5 gal.
	Salvia greggii 'Sierra Linda' Sierra Linda Sage	5 gal.
	Salvia Leucantha Mexican Bush Sage	5 gal.

GROUND COVERS

SYM.	NAME	SIZE
	Carissa grandiflora 'Green Carpet' Green Carpet Natal Plum	5 gal.
	Dalea capitata Sierra Gold Gold Dalea	5 gal.
	Lantana montevidensis 'Trailing Purple' Purple Trailing Lantana	5 gal.
	Lantana montevidensis 'New Gold' Gold Mound Lantana	5 gal.

ACCENTS

SYM.	NAME	SIZE
	Bougainvillea 'Oh La La' Oh La La Bougainvillea	5 gal.
	Caesalpinia pulcherrima Red Bird of Paradise	5 gal.
	Dasylirion wheeleri Desert Spoon	5 gal.
	Hesperaloe parviflora Red Yucca	5 gal.
	Penstemon parryi Perry Penstamon	1 gal.

AGAVES AND YUCCAS

SYM.	NAME	SIZE
	Agave americana Century Plant	15 gal.
	Agave attenuata Fox Tail Agave	5 gal.
	Agave american var. marginata Variigated Century Plant	15 gal.
	Agave Colorata Mescal Cerizo	5 gal.
	Agave desmettiana Agave	5 gal.
	Aloe striata Coral Aloe	5 gal.
	Yucca recurvifolia Pendulous Yucca	5 gal.

INERT MATERIALS

SYM.	DESCRIPTION
	BOULDERS TO BE 'CRESTA'.
	ALL PLANTER AREAS TO RECEIVE 'DESERT GOLD' DECOMPOSED GRANITE (DG) 3/8" MINUS WITH 11% FINES MAXIMUM. DG TO BE COMPACTED TO A 2" DEPTH AFTER BEING THOROUGHLY WETTED AND EITHER ROLLED OR TAMPED.
	ROUND COBBLE TO BE 4"-8" 'SANTA FE COBBLE' TO MATCH DG. COBBLE TO BE HAND BROADCASTED OVER DG AS DIRECTED BY LANDSCAPE ARCHITECT.

IRRIGATION SYSTEM.

THE IRRIGATION SYSTEM SHALL BE FULLY AUTOMATIC AND CONTROLLED BY A EVAPOTRANSPIRATION (ET) BASED CONTROLLER WITH A RAIN SENSING OVERRIDE DEVICE. ALL SHRUBS WILL IRRIGATED WITH WATER EFFICIENT DRIP EMITTERS AND ALL TURF HEADS WILL HAVE AUTOMATIC CHECK VALVES TO PREVENT WATER RUN-OFF.



Source: Fullerton Architects, 2016

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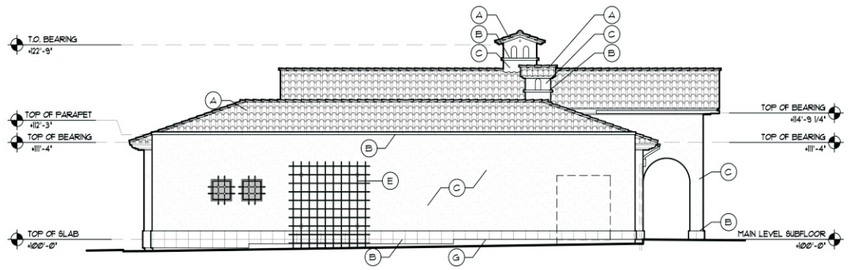
CHARACTER SKETCH



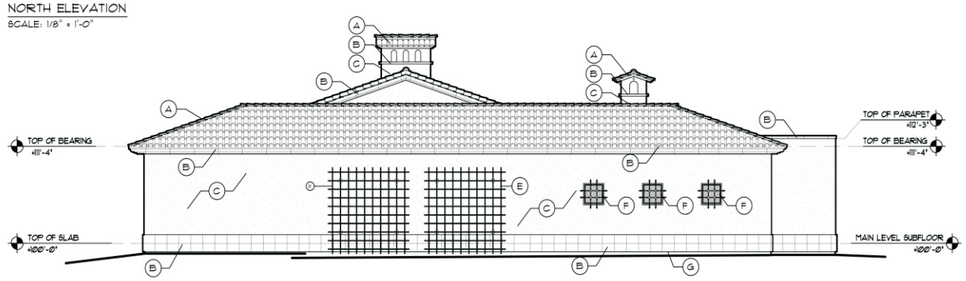
FLOOR PLAN
SCALE: 1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE

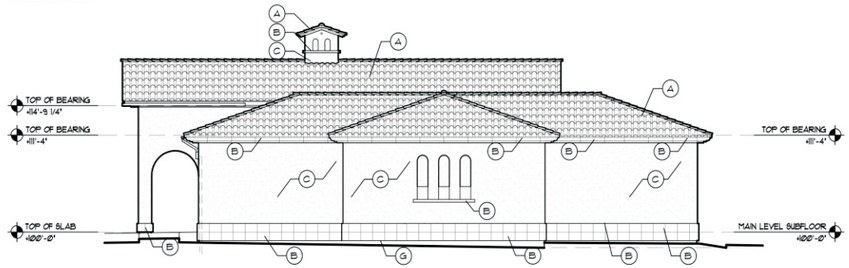
A	REDLAND, TWO-PIECE CLAY, FOUR COLOR BLEND - COLOR SANDCAST, MEDIUM MORTAR, 20% BOOST, RANDOM SET HORIZONTAL AS WELL AS VERTICAL
B	PRE-CAST COLORED CONCRETE
C	PAINTED EXTERIOR 3 COAT CEMENT PLASTER
D	HOLLOW METAL DOOR PAINTED TO MATCH WALL
E	METAL TRELLIS
F	HAMMERED IRON WORK
G	26-GAUGE MINIMUM GALVANIZED WEEP SCREED



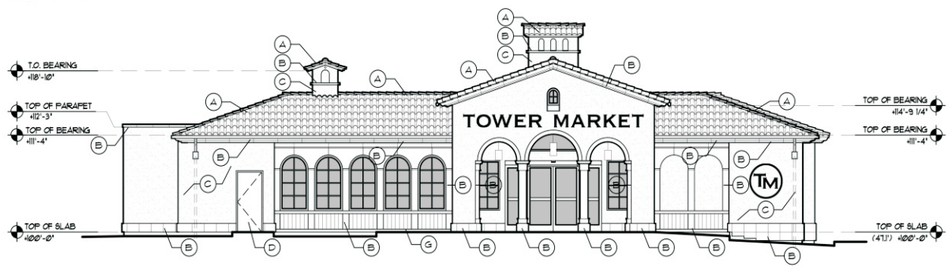
NORTH ELEVATION
SCALE: 1/8" = 1'-0"



EAST ELEVATION
SCALE: 1/8" = 1'-0"



SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



WEST ELEVATION
SCALE: 1/8" = 1'-0"

Source: Fullerton Architects, 2016

The Altum Group

Market Elevations
Tower Energy Project Initial Study

Exhibit 8

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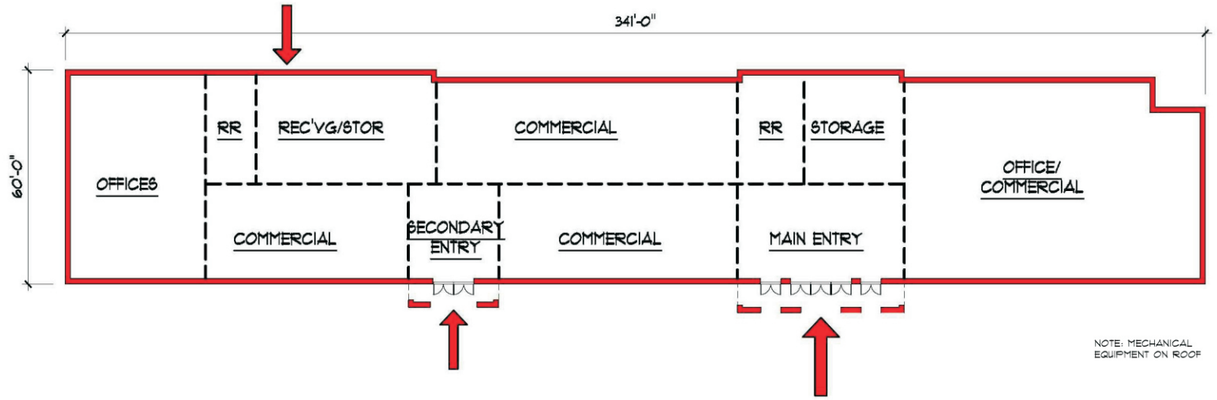
CHARACTER SKETCH



CHARACTER SKETCH



FLOOR PLAN
SCALE: 1" = 20'



NORTH ELEVATION
SCALE: 1" = 20'



EAST ELEVATION
SCALE: 1" = 20'



WEST ELEVATION
SCALE: 1" = 20'



SOUTH ELEVATION
SCALE: 1" = 20'

Source: Fullerton Architects, 2016

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North Commercial Elevations
Tower Energy Project Initial Study

Exhibit
9

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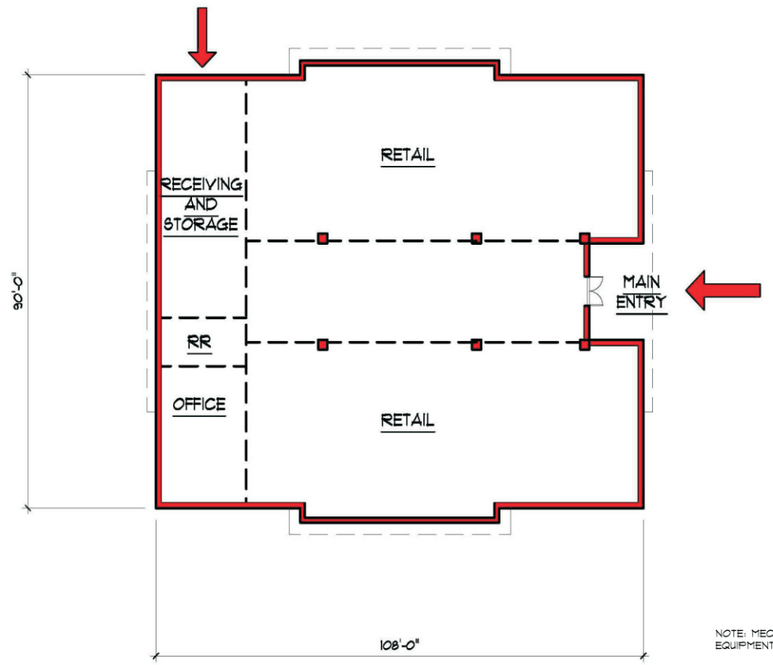
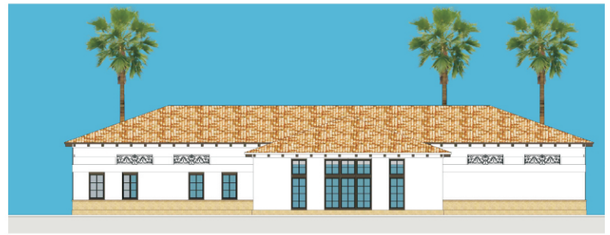
CHARACTER SKETCH



NOTE: MECHANICAL EQUIPMENT ON ROOF

FLOOR PLAN
SCALE: 1/16" = 1'-0"



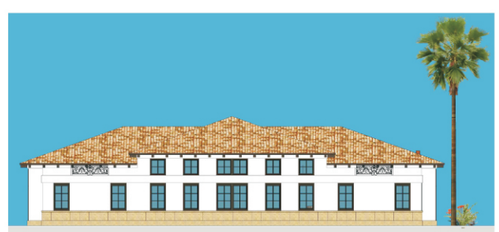
NORTH ELEVATION
SCALE: 1/16" = 1'-0"



EAST ELEVATION
SCALE: 1/16" = 1'-0"



SOUTH ELEVATION
SCALE: 1/16" = 1'-0"



WEST ELEVATION
SCALE: 1/16" = 1'-0"

Source: Fullerton Architects, 2016

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Source: Fullerton Architects, 2016

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Typical Housing Mix
Tower Energy Project Initial Study

Exhibit 11

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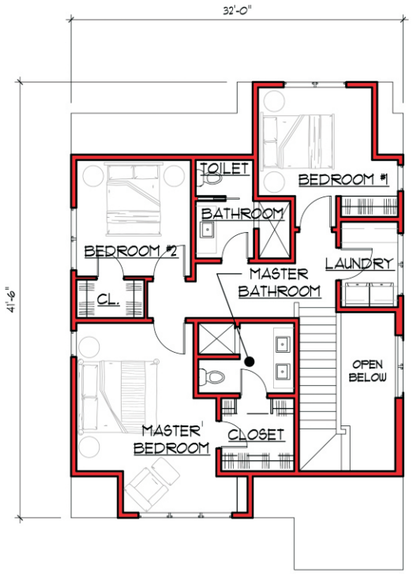


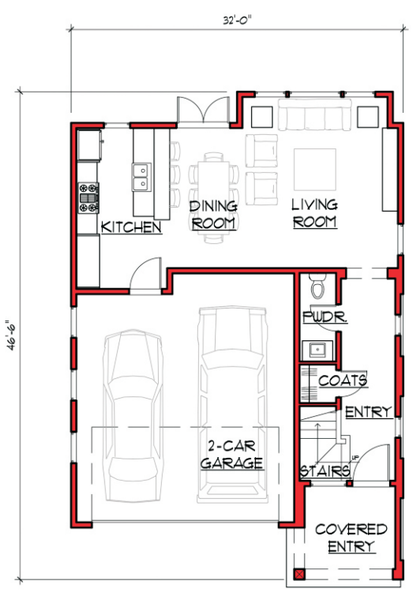
A RESIDENCE UPPER FLOOR
SCALE: 1/8" = 1'-0"



A RESIDENCE ELEVATION
SCALE: 1/8" = 1'-0"



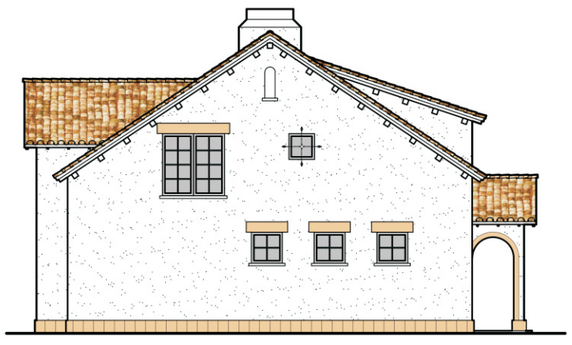
A RESIDENCE ELEVATION
SCALE: 1/8" = 1'-0"



A RESIDENCE MAIN FLOOR
SCALE: 1/8" = 1'-0"



A RESIDENCE ELEVATION
SCALE: 1/8" = 1'-0"



A RESIDENCE ELEVATION
SCALE: 1/8" = 1'-0"

Source: Fullerton Architects, 2016

The Altum Group

A Residence Elevations
Tower Energy Project Initial Study

Exhibit 12

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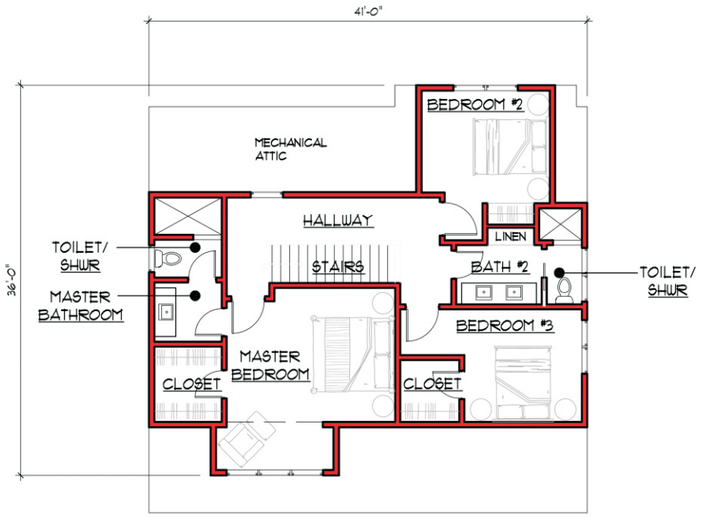


B RESIDENCE UPPER FLOOR

SCALE: 1/8" = 1'-0"



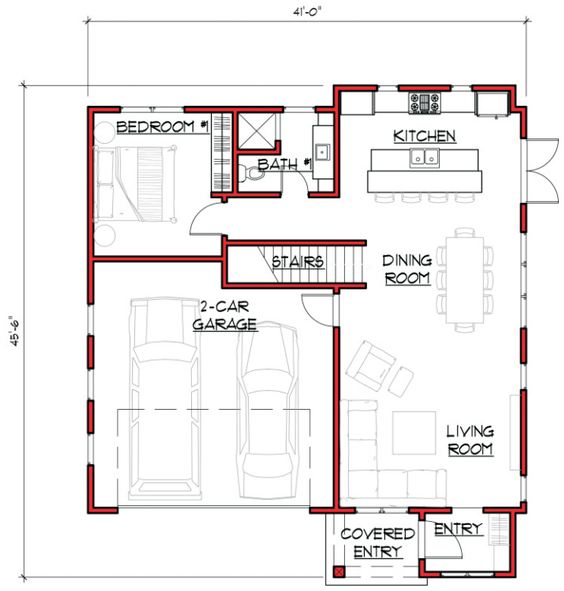
B RESIDENCE ELEVATION

SCALE: 1/8" = 1'-0"



B RESIDENCE ELEVATION

SCALE: 1/8" = 1'-0"



B RESIDENCE MAIN FLOOR

SCALE: 1/8" = 1'-0"



B RESIDENCE ELEVATION

SCALE: 1/8" = 1'-0"



B RESIDENCE ELEVATION

SCALE: 1/8" = 1'-0"

Source: Fullerton Architects, 2016

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B Residence Elevations
Tower Energy Project Initial Study

Exhibit 13

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Chapter 3 Environmental Evaluation

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials	☐ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities and Service Systems	☐ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as describe on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

3.1 Aesthetics

3.1.1 Sources

The following sources were utilized to support the conclusions made in this section:

- City of Coachella General Plan Update Existing Conditions Report, January 2015.

3.1.2 Environmental Setting

The project site is located in an area that is mostly developed with residential uses and is not located in an area with identified scenic resources or trees, rock outcroppings, or historic buildings and is not within a state scenic highway viewshed.

3.1.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a-b) **Less Than Significant Impact.** The applicant is proposing to build a residential neighborhood with 115 lots, and a commercial plaza with a gas station, a market, and two additional commercial buildings on the northwest corner of Calhoun and Avenue 50. The residential project is similar to the surrounding residential neighborhoods in that it will be two stories (maximum 30 feet in height) in a residential area of one- and two-story homes. The project would serve many nearby residents with commercial uses.

Since there are no identified scenic resources in the area of the project, the proposed apartment complex and mini-mart does not have the potential to impact these resources. In addition, there are no identified scenic vistas or scenic highways in the area of the project. The commercial part of the project consists of a convenience store with fuel pumps to serve an existing residential area with no similar uses nearby. This use will not exceed 30 feet in height.

c) **Less Than Significant Impact.** The existing visual character of the site itself is of a vacant site; there are no structures on site, the site is relatively flat, and there are no distinguishing features such as rock outcroppings or vegetation. The previously disturbed land is clear of natural resources that could be considered aesthetically pleasing. The surrounding areas are being utilized primarily for residential neighborhoods. The adjacent property to the west is developed with a church and parking lot, and other vacant land is nearby to the west located in the City of Indio. The proposed project is consistent and complementary with existing nearby uses in that the project will add new dwelling units and a commercial component where currently commercial uses are not available, but nevertheless it will change the existing visual character of the site. However, the change in the character of the site would be less than significant because the new residential development will provide landscaping and open space throughout the site to provide recreation uses for residents and break up the bulk of the project. In addition, the commercial uses are appropriate ancillary uses to residential uses especially in this neighborhood where no similar uses are located.

Regarding views from the existing neighborhood to the east, views of the mountains to the west from most of the residences are blocked by the existing row of 14 two story residences along the westerly boundary of that neighborhood. These residences, in turn have views of the mountains in the distance from second story windows that would be partially blocked by the proposed new residential neighborhood. Exhibit 14, *Typical Housing Site Section*, shows the relationship between existing and proposed residences. The views would be partially blocked because, although the new residences would also be two stories, the configuration of the lots includes driveways that would provide view corridors (see Exhibit 6). Exhibit 7 shows that the open space lots between residences would be landscaped to provide green space for the new residents but also provide a break between the new residences so existing residents to the east would have alternating views between residences and vegetation. However because some of the landscaping will be trees, views through the new neighborhood to the mountains would not be ensured. Because the proposed neighborhood would be of similar character as the existing neighborhood to the east, maintain some intermittent views of the mountains in the distance, and because the evaluation of views under CEQA is limited to public views of scenic resources from designated open space areas, roads, or parks this impact would be less than significant.

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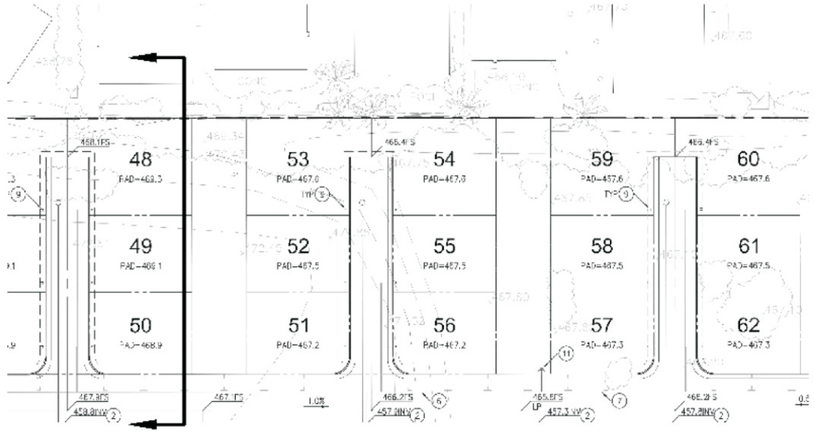

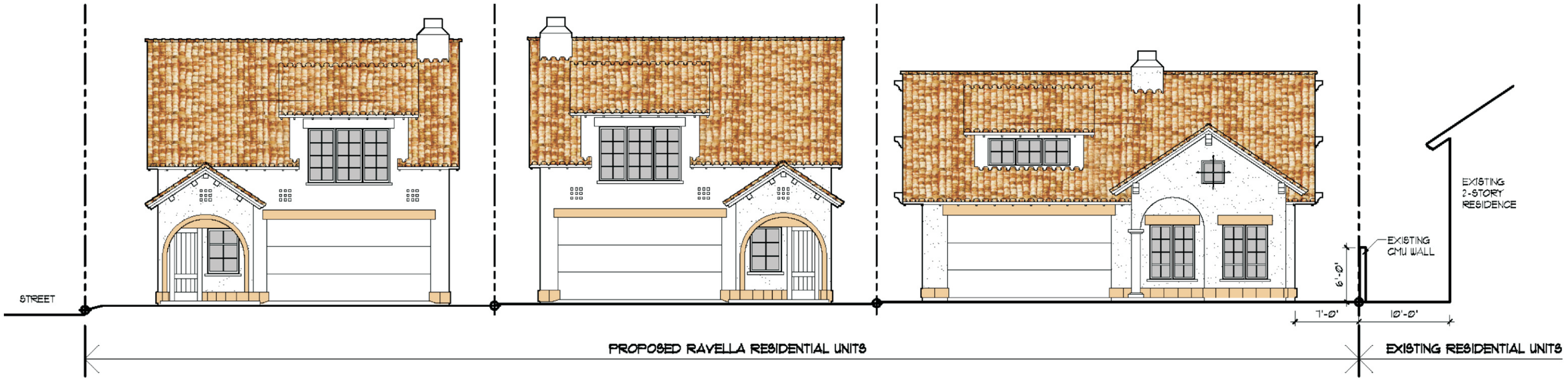

Source: Fullerton Architects, 2016

The Altum Group

Typical Housing Site Section
Tower Energy Project Initial Study

Exhibit 14

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d) **Less Than Significant Impact.** The proposed project would introduce new sources of light and glare to the area. There will be safety lighting that will be utilized for the residential buildings and nighttime lighting will be installed for commercial area. It is important to note that the area surrounding the proposed project is mostly developed with residential uses that provide existing sources of light and glare. The proposed project will incrementally add to this existing light and glare on a small scale. The placement of the market and service station, and other future retail or small office space is proposed for the corner of the intersection of Calhoun and Avenue 50 in an area where street lighting already exists. It also is separated from the residential portion of the site by new dwelling units and a retention basin. This will isolate this source of light from the existing residential areas. The applicant will submit a lighting plan with the building plans for review and approval by City staff to ensure that new light and glare will be controlled and would not adversely impact adjacent existing residential uses. Placement of new two story dwelling units proximate to existing two story dwelling units would have a less than significant impact on the existing residents because the proposed new units would be placed on lots with a 7-foot rear yard setback, similar to the existing homes on the north that have varying rear yard setbacks (10 to 20 feet). Therefore, this impact would be less than significant.

3.1.4 Mitigation Measures

The applicant will be required to submit a lighting plan with the submittal of building plans for each element of the project showing where lighting will be located and how lighting will not spill over onto adjacent property, therefore no mitigation measures are necessary.

3.1.5 Level of Significance After Mitigation

Impacts on Aesthetics would be less than significant.

3.2 Agriculture and Forestry Resources

3.2.1 Sources

The following sources were utilized to support the conclusions made in this section:

- Riverside County Important Farmland 2010 map. California Department of Conservation website http://www.conservation.ca.gov/dlrp/fmmp/Pages/Index.aspx, accessed June 2012.
- Williamson Act Lands for Riverside County 2008 map. California Department of Conservation website http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx, accessed June 2012.
- City of Coachella 2010 Zoning and General Plan Maps. City of Coachella website http://coachella.org/DocumentCenter/Index/38, accessed June 2012 and November 2015.

3.2.2 Environmental Setting

The project site is located in an area that is mostly developed with residential uses, with an existing church/parking lot located on the adjacent property to the west. According to Riverside County Important Farmland 2010 map, the site is designated as Farmland of Local Importance. Lands in this category have the potential to have soils that would be classified as lands of prime and statewide importance but lack available irrigation water; are lands producing major crops for Riverside County but that are not listed as unique crops; are dairy lands including corrals, pasture, milking facilities, hay and manure storage; are lands identified by city or county ordinance as agricultural zones or contracts; or are lands planted to jojoba which are under cultivation and are of producing age. The site is vacant and not currently being used for any type of agriculture and is not zoned for agricultural use. The site is not under a Williamson Act Contract as shown on the 2008 Williamson Act Lands map for Riverside County.

3.2.3 Impacts

AGRICULTURAL AND FORESTRY RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526) or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

a) **No Impact.** Although this land is designated as Farmland of Local Importance in the Riverside County Important Farmland Map from 2010, the land has been designated for residential use on the Coachella General Plan Land Use Map. The environmental impacts of a residential land use designation for the project site were previously evaluated in the City's General Plan Environmental Impact Report (EIR). The EIR concluded that the use of the project site and surrounding sites in this portion of the City would have a less than significant impact to farming and farmland. In addition, because the site has not been designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there is no impact from the project on these types of farmland.

b) **No Impact.** The project would not conflict with any agricultural zoning or Williamson Act contracts since the site is not zoned for agricultural use and is not under Williamson Act contract.

c-d) **No Impact.** There are no forest lands on or near the site; therefore the project would not impact any forest or timberlands.

e) **Less Than Significant Impact.** The conversion of the site from vacant land to residential and commercial uses will permanently remove the potential for the land to be farmed in the future. However, this change is consistent with the land use planned for the site in the General Plan. Therefore there is no impact.

3.2.4 Mitigation Measures

No mitigation measures are required.

3.2.5 Level of Significance After Mitigation

The project would have no impact on Agricultural and Forestry Resources.

3.3 Air Quality

3.3.1 Sources

The following source was utilized to support the conclusions made in this section.

- Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting.

- Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California, April 17, 2015, Ldn Consulting.

3.3.2 Environmental Setting

The project site is located in the Coachella Valley Planning Area of the Salton Sea Air Basin (SSAB). The project site is in the hottest and driest parts of California, with a climate is characterized by hot, dry summers and relatively mild winters. Rainfall is scant in all seasons, so differences between the seasons are characterized principally by differences in temperature. Average annual precipitation in the SSAB ranges from 2 to 6 inches per year. Seasonal temperature differences in the SSAB are large, confirming the absence of marine influences due to the blocking action of the mountains to the west. Average monthly maximum temperatures in the project vicinity range from 108°F in July to 57°F in January. The average monthly minimal temperature range is from about 40°F in January to about 80°F in July.

During much of the year, California is covered by a moderately intense high-pressure system. The Pacific High is well developed to the west of California, and a thermal trough overlies the SSAB. The intensity and orientation of the trough varies from day to day. Although the rugged mountainous country prevents a normal circulation, the influence of this trough does permit some inter-basin exchange with coastal locations through the passes. Summer is also the season with occasional moisture influx from the Gulf of Mexico or California which causes isolated thundershowers and flash flooding (the summer "monsoon"). Fall is the transition period from the hot summer back to the season of frontal activity, but it is still very dry and temperatures are still mild.

Desert regions tend to be windy, since little friction is generated between the moving air and the low, sparse vegetation cover. In addition, the rapid daytime heating of the lower air over the desert leads to strong convection activity. This exchange of lower and upper air accelerates surface winds during the warm part of the day when convection is at a maximum. During winter, however, the rapid cooling in the surface layers at night retards this exchange of momentum, and the result is often a high frequency of nearly calm winds, especially at night.

During all seasons, the prevailing wind direction is predominantly from the west to east. The Banning Pass is an area where air is squeezed through a narrow opening with accelerated airflow that supports wind farms. The strong winds also occasionally lead to blowing sand that sandblasts painted surfaces and makes driving unsafe. As the west to east winds fan out into the Coachella Valley, they slow down quickly. By the time the onshore flow reaches the project site, it has again returned to its normal speed.

The mixing depth (i.e., the height available for dispersion of airborne pollutants emitted near the surface) is limited by the occurrence of temperature inversions. A temperature inversion is a layer of air in which the temperature increases with height. The temperature inversion conditions of the SSAB are quite different from those of the coastal regions of California. In coastal environments, warm, subsiding air aloft creates a lid above the shallow marine layer at the surface. The base of this subsidence inversion is

perhaps 1,500 feet above the surface in coastal portions of the Los Angeles Basin. When a subsidence inversion exists over the desert, the height of the inversion base lies some 6,000 to 8,000 feet above the surface. Nighttime surface inversions in the desert are common, especially during the cooler months. Mixing heights are predominantly 1,000 feet or less. These inversions are caused by nighttime radiation cooling of the land surface in contact with overlying air that cools more slowly. They tend to be destroyed early in the day in summer, due to intense solar radiation and heating of the land surface. In winter, however, these radiation inversions tend to persist until mid-morning, limiting mixing in the lower atmosphere to heights of 200 to 2000 feet above the surface. Nuisance air quality problems in the Coachella Valley, such as dust near mining operations or odors near feedlots or wastewater plants, occur mainly late at night or early in the morning when such radiation inversions are strongest.

Regional Air Quality

The project site is located in the Coachella Valley region of Riverside County and is part of the Salton Sea Air Basin (SSAB) which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

Federal Standards and Definitions

The federal Clean Air Act (FCAA) provides the basis for the national air pollution control effort. An important element of the act includes the development of national ambient air quality standards (NAAQS) for major air pollutants. The FCAA established two types of air quality standards otherwise known as primary and secondary standards. Primary standards set limits for the intention of protecting public health, which includes sensitive populations such as asthmatics, children and elderly. Secondary standards set limits to protect public welfare to include the protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The US Environmental Protection Agency (USEPA) has set National Ambient Air Quality Standards (NAAQS) for principal pollutants, which are called "criteria" pollutants. These are defined as follows:

1. *Carbon Monoxide (CO)*: is a colorless, odorless, and tasteless gas and is produced from the partial combustion of carbon-containing compounds, notably in internal-combustion engines. Carbon monoxide usually forms when there is a reduced availability of oxygen present during the combustion process. Exposure to CO near the levels of the ambient air quality standards can lead to fatigue, headaches, confusion, and dizziness. CO interferes with the blood's ability to carry oxygen.
2. *Lead (Pb)*: is a potent neurotoxin that accumulates in soft tissues and bone over time. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Because lead is only slowly excreted, exposures to small amounts of lead from a variety of sources can accumulate to harmful levels. Effects from inhalation of lead near the level of the ambient air quality standard include impaired blood formation and nerve conduction. Lead can adversely affect the nervous, reproductive, digestive, immune, and blood-forming

systems. Symptoms can include fatigue, anxiety, short- term memory loss, depression, weakness in the extremities, and learning disabilities in children.

3. *Nitrogen Dioxide (NO2)*: is a reactive, oxidizing gas capable of damaging cells lining the respiratory tract and is one of the nitrogen oxides emitted from high-temperature combustion, such as those occurring in trucks, cars, power plants, home heaters, and gas stoves. In the presence of other air contaminants, NO2 is usually visible as a reddish-brown air layer over urban areas. NO2 along with other traffic-related pollutants is associated with respiratory symptoms, respiratory illness and respiratory impairment. Studies in animals have reported biochemical, structural, and cellular changes in the lung when exposed to NO2 above the level of the current state air quality standard. Clinical studies of human subjects suggest that NO2 exposure to levels near the current standard may worsen the effect of allergens in allergic asthmatics, especially in children.

4. *Particulate Matter (PM10 or PM2.5)*: is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary in shape, size and chemical composition, and can be made up of multiple materials such as metal, soot, soil, and dust. PM10 particles are 10 microns (µm) or less and PM2.5 particles are 2.5 (µm) or less. These particles can contribute significantly to regional haze and reduction of visibility in California. Exposure to PM levels exceeding current air quality standards increases the risk of allergies such as asthma and respiratory illness.

5. *Ozone (O3)*: is a highly oxidative unstable gas capable of damaging the linings of the respiratory tract. This pollutant forms in the atmosphere through reactions between chemicals directly emitted from vehicles, industrial plants, and many other sources. Exposure to ozone above ambient air quality standards can lead to human health effects such as lung inflammation, tissue damage and impaired lung functioning. Ozone can also damage materials such as rubber, fabrics and plastics.

6. *Sulfur Dioxide (SO2)*: is a gaseous compound of sulfur and oxygen and is formed when sulfur-containing fuel is burned by mobile sources, such as locomotives, ships, and off-road diesel equipment. SO2 is also emitted from several industrial processes, such as petroleum refining and metal processing. Effects from SO2 exposures at levels near the one-hour standard include bronchoconstriction accompanied by symptoms, which may include wheezing, shortness of breath and chest tightness, especially during exercise or physical activity. Children, the elderly, and people with asthma, cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) are most susceptible to these symptoms. Continued exposure at elevated levels of SO2 results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality.

State Standards and Definitions

The State of California Air Resources Board (CARB) sets the laws and regulations for air quality on the state level. The California Ambient Air Quality Standards (CAAQS) are either the same as or more restrictive then the NAAQS and also restrict four additional contaminants. Table 1, *Ambient Air Quality Standards* identifies both the NAAQS and CAAQS. The additional contaminants as regulated by the CAAQS are defined below:

1. *Visibility Reducing Particles*: Particles in the Air that obstruct the visibility.
2. *Sulfates*: are salts of Sulfuric Acid. Sulfates occur as microscopic particles (aerosols) resulting from fossil fuel and biomass combustion. They increase the acidity of the atmosphere and form acid rain.
3. *Hydrogen Sulfide (H2S)*: is a colorless, toxic and flammable gas with a recognizable smell of rotten eggs or flatulence. H2S occurs naturally in crude petroleum, natural gas, volcanic gases, and hot springs. Usually, H2S is formed from bacterial breakdown of organic matter. Exposure to low concentrations of hydrogen sulfide may cause irritation to the eyes, nose, or throat. It may also cause difficulty in breathing for some asthmatics. Brief exposures to high concentrations of hydrogen sulfide (greater than 500 ppm) can cause a loss of consciousness and possibly death.
4. *Vinyl Chloride*: also known as chloroethene and is a toxic, carcinogenic, colorless gas with a sweet odor. It is an industrial chemical mainly used to produce its polymer, polyvinyl chloride (PVC).

Agency Oversight

Environmental Protection Agency

The USEPA is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. The USEPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives.

State Implementation Plan

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas for criteria pollutants to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The SIP must integrate federal, state, and local components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP.

CARB also administers CAAQS, the State standards, for the 10 air pollutants designated in the California Clean Air Act. The 10 state air pollutants are the six criteria air pollutants – Ozone, Nitrogen dioxide (NO2), Lead (Pb), PM10, PM2.5, and Sulfur dioxide (SO2), as well visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride.

Attainment Status

The USEPA and CARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or "form" of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the 3-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard. The current attainment designations for the Salton Sea Air Basin are shown below in Table 2, *Salton Sea Air Basin Attainment Status by Pollutant.*

Table 1 Federal and State Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	Average Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m3)	Ultraviolet Photometry	-	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m3)		0.070 ppm (137 µg/m3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m3	Gravimetric or Beta Attenuation	150 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m3		-		
Fine Particulate Matter (PM2.5)[9]	24 Hour	No Separate State Standard		35 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m3	Gravimetric or Beta Attenuation	12.0 µg/m3	15 µg/m3	
Carbon Monoxide (CO)	8 hour	9.0 ppm (10mg/m3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m3)	-	Non-Dispersive Infrared Photometry
	1 hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m3)		-	-	-
Nitrogen Dioxide (NO_2)[10]	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m3)[8]	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m3)		0.100 ppm[8] (188/ µg/m3)	-	
Sulfur Dioxide (SO_2)[11]	Annual Arithmetic Mean	-	Ultraviolet Fluorescence	0.030 ppm[10] (for Certain Areas)	-	Ultraviolet Fluorescence; Spectrophotometry (Pararoosaniline Method)[9]
	24 Hour	0.04 ppm (105 µg/m3)		0.14 ppm[10] (for Certain Areas) (See Footnote 9)	-	
	3 Hour			-	0.5 ppm (1300 µg/m3)	
	1 Hour	0.25 ppm (655 µg/m3)		75 ppb (196 µg/m3)	-	
Lead[12,13]	30 Day Average	1.5 µg/m3	Atomic Absorption	-		-
	Calendar Quarter	-		1.5 µg/m3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	-		0.15 µg/m3		
Visibility Reducing Particles	8 Hour	See footnote 13				
Sulfates	24 Hour	25 µg/m3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m3)	Gas Chromatography			

Source: Ldn Consulting*, Air Quality Assessment Avenue 50 and Calhoun Street, City of Coachella,* January 11, 2016, Ta**ble 2.1.** California Air Resources Board, (10/1/15).

Notes:

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24- hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

As indicated in Table 2, the Coachella Valley-portion of the SSAB has been designated by the EPA as a non-attainment area for ozone (O3) and suspended particulates (PM10). Currently, the SSAB is in attainment with the ambient air quality standards for carbon monoxide (CO), lead, sulfur dioxide (SO2), nitrogen dioxide (NO2), and particulate matter (PM2.5).

Table 2 Salton Sea Air Basin Attainment Status by Pollutant

Pollutant	Average Time	California Standards	Federal Standards
Ozone (O_3)	1 Hour	Non-attainment	No Federal Standard
	8 Hour		Basic Non-attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	Non-attainment	No Federal Standard
	24 Hour	Non-attainment	Unclassified[1]
	Annual Arithmetic Mean	No State Standard	Unclassified[2]
Fine Particulate Matter $PM_{2.5}$	24 Hour	No State Standard	Attainment
	Annual Arithmetic Mean	Non-attainment	Attainment
Carbon Monoxide (CO)	8 Hour	Attainment	Maintenance Area[3]
	1 Hour		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	No State Standard	Attainment
	1 Hour	Attainment	No Federal Standard
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	No State Standard	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	No Federal Standard
Pollutant	**Average Time**	**California Standards**	**Federal Standards**
Lead	30 Day Average	Attainment	No Federal Standard
	Calendar Quarter	No State Standard	Attainment
Visibility Reducing Particles	8 Hour (10AM to 6PM, PST)	Unclassified	No Federal Standard
Sulfates	24Hour	Attainment	No Federal Standard
Hydrogen Sulfide	1 Hour	Unclassified	No Federal Standard

Source: Ldn Consulting*, Air Quality Assessment Avenue 50 and Calhoun Street, City of Coachella,* January 11, 2016, Table 2.2.

Notes:

1. Data reflects status as the year 2009.
2. Unclassified; indicates data are not sufficient for determining attainment or nonattainment.
3. Maintenance Area (defined by U.S. Department of Transportation) is any geographic region of the United States previously designated nonattainment pursuant to the CAA Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA, as amended.

South Coast Air Quality Management District

The SCAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines, when necessary. SCAQMD is responsible for controlling emissions primarily from stationary sources and maintaining air quality monitoring stations throughout the South Coast Air Basin and a portion of the Salton Sea Air Basin. SCAQMD is also responsible for developing, updating, and implementing the AQMP for the region, in coordination with SCAG. SCAQMD also has roles under CEQA.

2003 AQMP

One of the purposes of the 2003 AQMP is to lead the basin and portions of the Salton Sea Air Basin under SCAQMD jurisdiction into compliance with the 1-hour ozone and PM_{10} federal standards (SCAQMD 2003). One of the purposes of the 2007 AQMP is to lead the basin into compliance of the federal 8-hour ozone and $PM_{2.5}$ standards.

The 2003 AQMP also replaced the 1997 attainment demonstration for the federal CO standard and provided a basis for a maintenance plan for CO for the future, and updated the maintenance plan for the federal nitrogen dioxide standard that the South Coast Air Basin has met since 1992.

The 2003 AQMP also incorporated new scientific data in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The 2003 AQMP used complex modeling to show that with the control measures, the basin would be in compliance with the federal and state standards for all pollutants by 2010, except for the state ozone and PM_{10} standards and the state ozone and PM_{10} standard after 2010 or by the earliest practicable date, as mandated by the California Health and Safety Code Section 40462. CARB approved the 2003 AQMP on August 1, 2003. The USEPA's adequacy finding on the emissions budgets for conformity determination in the basin was published in the Federal Register (69 FR 15325-15326).

2007 AQMP

The 2007 AQMP was adopted by the SCAQMD in June 2007 and forwarded it to CARB for its approval and subsequent submittal to the USEPA. In September 2007, CARB adopted the State Strategy for the 2007 State Implementation Plan and the 2007 AQMP as part of the SIP. In January 2009 the USEPA's regional administrator signed a final rule to approve in part and disapprove in part the SCAQMD 2003 1-hour ozone plan and the nitrogen dioxide maintenance plan. The parts of the plan that were approved strengthen the SIP. The Clean Air Act does not require the disapproved portions of the plan, and the disapprovals do not start sanctions clocks.

The 2007 AQMP outlines a detailed strategy for meeting the federal health-based standards for PM2.5 by 2015 and 8-hour ozone by 2024 while accounting for and accommodating future expected growth. The 2007 AQMP incorporates significant new emissions inventories, ambient measurements, scientific data, control strategies, and air quality modeling. Most of the reductions will be from mobile sources,

which are currently responsible for about 75 percent of all smog and particulate forming emissions. The 2007 AQMP includes 37 control measures proposed for adoption by the SCAQMD, including measures to reduce emissions from new commercial and residential developments, more reductions from industrial facilities, and reductions from wood burning fireplaces and restaurant charbroilers.

2012 AQMP

The 2012 AQMP was adopted in December 2012. The purpose of the 2012 AQMP is to set forth a comprehensive and integrated program that will lead the South Coast Air Basin into compliance with the federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update of the Basin's projections in meeting the federal 8-hour ozone standards. The 2012 AQMP will be submitted to the USEPA as the SIP once it is approved by the SCAQMD Governing Board and CARB. Specifically, the AQMP will serve as the official SIP submittal for the federal 2006 24-hour $PM_{2.5}$ standard, for which USEPA has established a due date of December 14, 2012. In addition, the AQMP updates specific elements of the previously approved 8-hour ozone SIP: 1) an updated emissions inventory and, 2) new control measures and commitments for emissions reductions to help fulfill the Section 182(e)(5) portion of the 8-hour ozone SIP.

The 2012 AQMP proposes Basin-wide $PM_{2.5}$ measures that will be implemented by the 2014 attainment date, episodic control measures to achieve air quality improvements (would only apply during high $PM_{2.5}$ days), Section 182(e)(5) implementation measures (to maintain progress towards meeting the 2023, 8-hour ozone national standard), and transportation control measures. Most of the control measures focus on incentives, outreach, and education. Proposed $PM_{2.5}$ reduction measures in the 2012 AQMP include the following:

- Further NO_X reductions from RECLAIM;
- Further reductions from residential wood burning devices;
- Further reductions from open burning;
- Emission reductions from under-fired charbroilers;
- Further ammonia reductions from livestock waste;
- Backstop measures for indirect sources of emissions from ports and port-related sources; and,
- Further criteria pollutant reductions from education, outreach and incentives.

There are multiple Volatile Organic Compounds (VOC) and NOx reductions in the 2012 AQMP to attempt to reduce ozone formation, including further VOC reductions from architectural coatings, miscellaneous coatings, adhesives, solvents, lubricants, mold release products, consumer products. The 2012 AQMP also contains proposed mobile source implementation measures for the deployment of zero- and near-zero emission on-road heavy-duty vehicles, locomotives, and cargo handling equipment. There are measures for the deployment of cleaner commercial harbor craft, cleaner ocean-going marine vessels, cleaner off-road equipment, and cleaner aircraft engines.

The 2012 AQMP proposes the following mobile source implementation measures:

- On-road mobile sources:
  - Accelerated penetration of partial zero-emission and zero-emission vehicles and light heavy and medium-heavy duty vehicles through funding assistance for purchasing the vehicles;
  - Accelerated retirement of older light-, medium-, and heavy-duty vehicles through funding incentives; and,
  - Further emission reductions from heavy-duty vehicles serving near-dock railyards through a proposed control measure that calls for a requirement that any cargo container moved between the Ports of Los Angeles and Long Beach to the nearby railyards by with zero- emission technologies.
- Off-road mobile sources:
  - Extension of the Surplus Off-Road Opt-In for NOx (SOON) provision for construction/industrial equipment, which provides funding to repower or replace older Tier 0 and Tier 1 equipment;
  - Further emission reductions from freight and passenger locomotives calls for an accelerated use of Tier 4 locomotives in the Basin;
  - Further emission reductions from ocean-going marine vessels while at berth; and,
  - Emission reductions from ocean-going marine vessels.

The 2012 AQMP also relies upon the Southern California Association of Governments regional transportation strategy, which is in its adopted 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and 2011 Federal Transportation Improvement Program, which contains the following sections:

1. Linking regional transportation planning to air quality planning: making sure that the regional transportation plan supports the goals and objectives of the AQMP/SIP.
2. Regional transportation strategy and transportation control measures: the RTP/SCS contains improvements to the regional multimodal transportation system including the following: active transportation (non-motorized transportation—biking and walking); transportation demand management; transportation system management; transit; passenger and high- speed rail; goods movement; aviation and airport ground access; highways; arterials; and operations and maintenance.
3. Reasonably available control measure analysis.

Coachella Valley State Implementation Plan

The Southern California Association of Governments (SCAG) and the Coachella Valley Association of Governments (CVAG) are key participants in local and regional air quality improvement efforts. CVAG has also been instrumental in initiating programs that address regional air quality issues and shortcomings. The 2003 Coachella Valley State Implementation Plan (2003 CVSIP) was prepared by SCAQMD, local Coachella Valley jurisdictions, agencies, and stakeholders. The CVSIP includes control measures and attainment demonstrations and an analysis of the most stringent measures. SCAQMD also employs a Coachella Valley PM_{10} air quality inspector, who works closely with CVAG, local jurisdictions, and developers to implement effective, site-specific PM10 mitigation measures.

SCAQMD Rules

The AQMP for the basin establishes a program of rules and regulations administered by SCAQMD to obtain attainment of the state and federal standards. During construction and operation, the project must comply with applicable rules and regulations. The following are rules the project may be required to comply with, either directly, or indirectly:

SCAQMD Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off-site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM10 component). Compliance with these rules would reduce impacts on nearby sensitive receptors. Rule 403 measures may include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).

- Water active sites at least three times daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving).
- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meters (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code section 23114.
- Reduce traffic speeds on all unpaved roads to 15 miles per hour (mph) or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- During all construction activities, construction contractors shall sweep on-site and off-site streets if silt is carried to adjacent public thoroughfares, to reduce the amount of particulate matter on public streets. All sweepers shall be compliant with SCAQMD Rule 1186.1, Less Polluting Sweepers.

SCAQMD Rule 403.1 is supplemental to Rule 403 requirements and shall apply only to fugitive dust sources in the Coachella Valley. The general requirements for Rule 403.1 are as follows:

1. Any person who is responsible for any active operation, open storage pile, or disturbed surface area, and who seeks an exemption pursuant to Rule 403, paragraph (g)(2) shall be required to determine when wind speed conditions exceed 25 miles per hour. The wind speed determination shall be based on either District forecasts or through use of an on-site anemometer as described in subdivision (g).

2. Any person involved in active operations in the Coachella Valley Blowsand Zone shall stabilize new man-made deposits of bulk material within 24 hours of making such bulk material deposits. Stabilization procedures shall include one or more of the following: (A) Application of water to at least 70 percent of the surface area of any bulk material deposits at least 3 times for each day that there is evidence of wind driven fugitive dust; or (B) Application of chemical stabilizers in sufficient concentration so as to maintain a stabilized surface for a period of at least 6 months; or

    a. (3)Installation of wind breaks of such design so as to reduce maximum wind gusts to less than 25 miles per hour in the area of the bulk material deposits. (3) Any person involved in active operations in the Coachella Valley Blowsand Zone shall stabilize new deposits of bulk material originating from off-site undisturbed natural desert areas within 72 hours.

i. Stabilization procedures shall include one or more of the following: (A) Application of water to at least 70 percent of the surface area of any bulk material deposits at least 3 times for each day that there is evidence of wind driven fugitive dust; or (B) Application of chemical stabilizers in sufficient concentration so as to maintain a stabilized surface for a period of at least six months.

3. A person who conducts or authorizes the conducting of an active operation shall implement at least one of the control actions specified in Rule 403, Table 2 for the source category "Inactive Disturbed Surface Areas" to minimize wind driven fugitive dust from disturbed surface areas at such time when active operations have ceased for a period of at least 20 days.

4. Any person involved in agricultural tilling or soil mulching activities shall cease such ties when wind speeds exceed 25 miles per hour. The wind speed determination shall be based on either District forecasts or through use of an on-site anemometer as described in subdivision (g).

In addition, Fugitive Dust Control Plan and other requirements for construction projects including earth moving activities are listed herein:

1. Any person who conducts or authorizes the conducting of an active operation with a disturbed surface area of more than 5,000 square feet shall not initiate any earth- moving activities unless a fugitive dust control plan is prepared and approved by the Executive Officer in accordance with the requirements of subdivision (f) and the Rule 403.1 Implementation Handbook. These provisions shall not apply to active operations exempted by paragraph (i)(4).

2. Any operator required to submit a fugitive dust control plan under paragraph (e)(1) shall maintain a complete copy of the approved fugitive dust control plan on-site in a conspicuous place at all times and the fugitive dust control plan must be provided upon request.

3. Any operator required to submit a fugitive dust control plan under paragraph (e)(1) shall install and maintain signage with project contact information that meets the minimum standards of the Rule 403.1 Implementation Handbook prior to initiating any type of earth-moving activities.

4. Any operator required to submit a fugitive dust control plan under paragraph (e)(1) for a project with a disturbed surface area of 50 or more acres shall have an Dust Control Supervisor that: (A) is employed by or contracted with the property owner or developer; and (B) is on-site or is available to be on-site within 30 minutes of initial contact; and (C) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 and 403.1 requirements; and (D) has completed the AQMD Coachella Valley Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class.

5. Failure to comply with any of the provisions of an approved fugitive dust control plan shall be a violation of this rule.

SCAQMD Rule 445 prohibits permanently installed wood burning devices into any new development. A wood burning device means any fireplace, wood burning heater, or pellet-fueled wood heater, or any similarly enclosed, permanently installed, indoor or outdoor device burning any solid fuel for aesthetic or space-heating purposes, which has a heat input of less than one million British thermal units per hour.

SCAQMD Rule 481 applies to all spray painting and spray coating operations and equipment. The rule states that a person shall not use or operate any spray painting or spray coating equipment unless one of the following conditions is met:

1. The spray coating equipment is operated inside a control enclosure, which is approved by the Executive Officer. Any control enclosure for which an application for permit for new construction, alteration, or change of ownership or location is submitted after the date of adoption of this rule shall be exhausted nor greater than 300 feet per minute, or through a water wash system designed to be equally effective for the purpose of air pollution control.
    - Coatings are applied with high-volume low-pressure, electrostatic and/or airless spray equipment.
    - An alternative method of coating application or control is used which has effectiveness equal to or greater than the equipment specified in the rule.

SCAQMD Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the project must comply with SCAQMD Rule 1108.

SCAQMD Rule 1113 governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the project must comply with SCAQMD Rule 1113.

SCAQMD Rule 1143 governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

SCAQMD Rule 1186 limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide

sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

SCAQMD Rule 1303 governs the permitting of re-located or new major emission sources, requiring Best Available Control Measures and setting significance limits for PM_{10} among other pollutants.

SCAQMD Rule 1401, New Source Review of Toxic Air Contaminants, specifies limits for maximum individual cancer risk, cancer burden, and non-cancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants.

SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options, is to provide employers with a menu of options to reduce mobile source emissions generated from employee commutes, to comply with federal and state Clean Air Act requirements, Health & Safety Code Section 40458, and Section 182(d)(1)(B) of the federal Clean Air Act. It applies to any employer who employs 250 or more employees on a full or part- average.

City of Coachella General Plan 2035

The City of Coachella General Plan 2035 Sustainability and Natural Environment Element, *establishes the City's long-term goals and policies for managing and protecting its natural resources and open spaces.* The following goals and policies found in this element are applicable to the project:

Goal 11 Air Quality. Healthy indoor and outdoor air quality through reduced, locally generated pollutant emissions.

Policies

11.1 Sources of Pollutants. Minimize the creation of new sources of air pollutants within the City.

11.2 Land use patterns. Promote compact, mixed-use, energy efficient and transit oriented development to reduce air pollutants associated energy and vehicular use.

11.4 Public transit. Ensure that, wherever feasible, public transit is a viable and attractive alternative to the use of single occupant motor vehicles.

11.6 Neighborhood electric vehicles. Encourage developments and street systems that support the use of Neighborhood Electric Vehicles (NEV).

11.7 Active transportation. Support infrastructure and programs that encourage children to safely walk or ride a bicycle to school.

11.8 Construction-related emissions. Require construction activities, including on-site building and the transport of materials, to limit emissions and dust.

11.9 Project mitigation. The City shall utilize the CEQA process to identify and mitigate potentially significant air quality impacts associated with new development.

11.10 Traffic congestion. Design new intersections to function in a manner that reduces air pollutant emissions from stop and start and idling traffic conditions.

11.12 Indoor air quality. Require new development to meet the state's Green Building Code for indoor air quality performance.

11.14 Alternative energy sources. Promote the development of energy sources, such as solar, wind, and geothermal, that do not emit pollution which has an adverse impact on local air quality.

11.15 Transportation demand management. Encourage employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting, work-at-home programs, employee education and preferential parking for carpools/vanpools.

11.16 Transportation management associations. Encourage commercial, retail and residential developments to create and participate in transportation management associations.

11.17 Deliveries. Encourage business owners to schedule deliveries at off-peak traffic periods.

Methodology and Analysis

Table 3*, Screening Threshold for Criteria Pollutants*, lists the thresholds for determining the significance of an air quality impact. Typical emission rates from construction activities were obtained from CalEEMod Version 2013.2.2 CalEEMod is a computer model published by the SCAQMD for estimating air pollutant emissions. The CalEEMod program uses the EMFAC2011 computer program to calculate the emission rates specific for the eastern portion of Riverside County for construction-related employee vehicle trips and the OFFROAD2011 computer program to calculate emission rates for heavy truck operations. EMFAC2011 and OFFROAD2011 are computer programs generated by CARB that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile or grams per running hour. Using CalEEMod, the peak daily air pollutant emissions during each phase was calculated and presented below. These emissions represent the highest level of emissions for each of the construction phases in terms of air pollutant emissions.

Table 3 Screening Threshold for Criteria Pollutants

Pollutant	Total Emissions (Pounds per Day)
Construction Emissions	
Respirable Particulate Matter (PM10 and PM2.5)	150 and 55
Nitrogen Oxide (NOx)	100
Sulfur Oxide (SOx)	150
Carbon Monoxide (CO)	550
Volatile Organic Compounds (VOCs)	75
Operational Emissions	
Respirable Particulate Matter (PM10 and PM2.5)	150 and 55
Nitrogen Oxide (NOx)	55
Sulfur Oxide (SOx)	150
Carbon Monoxide (CO)	550
Lead and Lead Compounds	3.2
Volatile Organic Compounds (VOCs)	55

Source: Ldn Consulting, Air Quality Assessment Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Table 2.3.

Local Air Quality

Measured data of criteria pollutants are continuously monitored in the SSAB by the SCAQMD at ten monitoring sites within the SSAB. The nearest SCAQMD-operated monitoring station in which criteria pollutant data was collected is the Jackson Street monitoring station in Indio and Palm Springs Fire Station. Table 4, *Three-Year Ambient Air Quality Summary near the Project Site*, shows monitoring data for a three-year period (2012 -2014

Project Construction Description

The project area totals 19.57 acres and involves two land uses that will be evaluated in this section. The residential portion of the project site is situated on 14.5 acres and would provide for the construction of single-family residential homes on 115 lots. The commercial component of the project carves out a 5-acre portion from the overall project area and is situated at the northwest corner of Avenue 50 and Calhoun Street. The commercial portion would provide for a 2,400 square-foot self-serve gas station and 5,200 square-foot market, a freestanding 9,750 square feet single-tenant commercial building, and a 20,000 square feet multiple-tenant retail/medical office building. Total vehicular trips generated for the residential development upon project completion would be approximately 1,095 trips per day and a total of 1,365 trips generated from commercial plaza. The overall total for both projects combined would be 2,460 trips per day.

Table 4 Three-Year Ambient Air Quality Summary near the Project Site

Pollutant	Ambient Monitoring Site	Averaging Time	CAAQS	NAAQS	2012	2013	2014
O3 (ppm)	Indio	1 Hour	0.09 ppm	-	0.102	0.105	0.095
	Indio	8 Hour	0.070 ppm	0.075 ppm	0.089	0.087	0.091
PM10 ($\mu g/m^3$)	Indio	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$	270.6	255.2	322.3
	Indio	Annual Arithmetic Mean	20 $\mu g/m^3$	-	33.4	38.6	44.8
PM2.5 ($\mu g/m^3$)	Indio	24 Hour	-	35 $\mu g/m^3$	18.4	25.8	26.5
	Indio	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	7.6	8.3	-
NO2 (ppm)	Palm Springs	Annual Arithmetic Mean	0.030 ppm	0.053 ppm	0.007	0.007	-
	Palm Springs	1 Hour	0.18 ppm	-	0.045	0.052	0.046
CO (ppm)	Palm Springs	8 Hour	9 ppm	9 ppm	0.45	-	-

Source: Ldn Consulting, Air Quality Assessment Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Table 2.4.

Notes: All ambient emissions reported are assumed to be taken by the district in compliance with both the NAAQS and CAAQS. Methodologies for those measurements are discussed in Table 1 Notes above.

3.3.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

a) **Less than Significant Impact With Mitigation Incorporated.**

Criterion1: Increase the Frequency or Severity of Violations

SCAQMD considers a project to be consistent with the AQMP if it would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP. As shown in Section 3.3.3(b) below, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation when best available control (BAC) technology is implemented.

If a project's emissions exceed the SCAQMD regional thresholds for NOX, VOC, PM_{10}, or $PM_{2.5}$, it follows that the emissions could cumulatively contribute to an exceedance of a pollutant for which the SSAB is in nonattainment (see Table 2, *Salton Sea Air Basin Attainment Status by Pollutant,* for status) at a monitoring station in the basin. An exceedance of a nonattainment pollutant at a monitoring station would not be consistent with the goals of the AQMP, to achieve attainment of pollutants. As analyzed and discussed in Section 3.3.3(b) and 3.3.3(c) below, the project area would exceed the regional significance thresholds before mitigation measures are implemented in regard to NOX emissions if both the residential and commercial components were constructed at the same time, but would not exceed regional thresholds for operational emissions. Construction emissions would be contained below regional significance thresholds as shown in Tables 5 and 6 below. Therefore, with implementation of Mitigation Measures outlined in Section 3.3.5 below, the project would meet Criterion 1 and by reducing impacts to less than significant.

Criterion 2: Exceed Assumptions in AQMP

Consistency with the AQMP assumptions is determined by performing an analysis of the proposed project with the assumptions in the AQMP. The emphasis of this criterion is to ensure that the

analyses conducted for the proposed project are based on the same forecasts as the AQMP. The 2012-2035 Regional Transportation/Sustainable Communities Strategy, prepared by SCAG, 2012, consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA. For this project, the City of Coachella General 2035 Land Use Plan defines the assumptions that are represented in the AQMP. The project would be consistent with the applicable AQMP if it would not exceed the growth assumptions in the AQMP. The primary method of determining consistency with the AQMP growth assumptions is by determining the project's consistency with the General Plan land use designation.

Control Measures

The proposed project would also comply with all applicable rules and regulations of the AQMP. Because of the nature of the project, which includes earth-moving activity, SCAQMD 403 applies. Rule 403 governs emissions of fugitive dust during construction and operation activities. The rule requires that fugitive dust be controlled with best available control measures (BACMs) so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Compliance with this rule is achieved through application of standard Best Management Practices (BMPs), such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Compliance with SCAQMD Rules 403 and 403.1, as implemented through Mitigation Measure AQ-1, would result in a consistency with the applicable AQMP Best Available Control Measures (BACM). As such, emissions of fugitive dust during construction would be minimal. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plans, and the impact would be less than significant.

City of Coachella

Both proposed land uses would not increase population or vehicle miles traveled above that anticipated buildout of the General Plan 2035.

b) **Less than Significant Impact With Mitigation Incorporated.**

Short Term Construction Impacts

Construction-Related Regional Impacts

The project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rules 403 and 403.1 establish these procedures. Compliance with these rules is achieved through application of standard BMPs in construction and operation activities, such as application of water or chemical stabilizers to disturbed soils, managing haul road dust by application of water, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 mph, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph and establishing a permanent and stabilizing ground cover on finished sites.

In addition, any operator applying for a grading permit, or a building permit for an activity with a disturbed surface area of more than 5,000 square feet, shall not initiate any earth-moving operations unless a Fugitive Dust Control Plan has been prepared pursuant to the provisions of the *Coachella Valley Fugitive Dust Control Handbook* and approved by the City. The applicant for each phase of the project will be required to prepare a Fugitive Dust Control Plan prior to issuance of grading plans.

SCAQMD's Rule 403 and 403.1 minimum requirements require that the application of the best available dust control measures are used for all grading operations and include the application of water or other soil stabilizers in sufficient quantity to prevent the generation of visible dust plumes. Compliance with Rules 403 and 403.1 would require the use of water trucks during all phases where earth moving operations would occur.

The construction activities for both project components have been analyzed for: 1) site preparation, 2) grading, 3) building construction, 4) paving, and 5) application of architectural coatings.

Project Residential Construction Emissions

The construction dates for the project residential land use component were based on an estimated construction kickoff starting in August 2016. Site Preparation and Grading are expected to last just over two months and would include all utility installation. Once underground utilities are completed, paving would begin and is expected to last no longer than one month to complete. Finally building construction would begin just after paving and would be expected to last through February 2018. A summary of the construction emissions is shown in Table 5, *Estimated Daily Regional Construction Emissions Summary – Residential.*

Table 5 Estimated Daily Regional Construction Emissions Summary – Residential

Project Residential Component (Tract Map 37088)										
Year	**ROG**	**NOx**	**CO**	**SO2**	**PM10 (Dust)**	**PM10 (Exhaust)**	**PM10 (Total)**	**PM2.5 (Dust)**	**PM2.5 (Exhaust)**	**PM2.5 (Total)**
2016 (lb/day) Unmitigated	7.59	85.28	55.19	0.07	14.34	4.17	16.63	6.89	3.84	9.00
Significance Threshold (lb/day)	75	100	550	150	-	-	150	-	-	55
Exceeds Screening Threshold	No	No	No	No	-	-	No	-	-	No
2016(lb/day) Mitigated	7.59	85.28	55.19	0.07	6.52	4.17	8.81	3.12	3.84	5.40
Exceeds Screening Threshold	No	No	No	No	-	-	No	-	-	No
2017 (lb/day) Unmitigated	68.91	35.74	29.21	0.05	0.47	2.40	2.87	0.13	2.29	2.42
Exceeds Screening Threshold	No	No	No	No	-	-	No	-	-	No
2017 (lb/day) Mitigated	68.91	35.74	29.21	0.05	0.47	2.40	2.87	0.13	2.29	2.42
Exceeds Screening Threshold	No	No	No	No	-	-	No	-	-	No

Source: Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California. April 17, 2015, Ldn Consulting, Table 4.1.

Table 5 shows that emissions for the project residential land use component with mitigation implemented (AQ-1) would reduce PM_{10} and $PM_{2.5}$ emissions and would not exceed SCAQMD air quality standards during grading and construction.

Project Commercial Construction Emissions

The construction dates for the project commercial land use component were based on an estimated construction kickoff starting in August, 2016. Site Preparation and Grading are expected to last just over two months and would include all utility installation. Once underground utilities are completed, paving would begin and is expected to last no longer than one month to complete. Finally, building construction would begin just after paving and would be expected to last through August 2018. The first commercial project will be the Tower Market and Fueling Station followed by development of the other two commercial lots. A summary of

the construction emissions is shown in Table 6, *Estimated Daily Regional Construction Emissions Summary – Commercial.*

Table 6 Estimated Daily Regional Construction Emissions Summary – Commercial

Project Commercial Component (n/w corner Avenue 50 and Calhoun Street)										
Year	**ROG**	**NOx**	**CO**	**SO2**	**PM10 (Dust)**	**PM10 (Exhaust)**	**PM10 (Total)**	**PM2.5 (Dust)**	**PM2.5 (Exhaust)**	**PM2.5 (Total)**
2016 (lb/day) Unmitigated	2.39	22.55	17.12	0.02	4.78	1.35	6.14	2.53	1.27	3.80
2017 (lb/day) Unmitigated	4.10	15.22	11.01	0.02	0.12	1.04	1.16	0.03	0.97	1.00
Significance Threshold (lb/day)	75	100	550	150	-	-	150	-	-	55
Exceeds Screening Threshold	No	No	No	No	-	-	No	-	-	No

Source: Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting, Table 4.1.

Table 6 shows that, emissions for the project commercial land use component with would not exceed SCAQMD air quality standards during grading and construction.

Construction Equipment Emissions

SCAQMD has published a Fact Sheet for Applying CalEEMod to Localized Significance Thresholds (South Coast Air Quality Management District 2011b). CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily disturbance activity possible for each piece of equipment. In order to compare CalEEMod reported emissions against the localized significance threshold lookup tables, the CEQA document should contain in its project design features or its mitigation measures the following parameters:

1. The off-road equipment list (including type of equipment, horsepower, and hours of operation) assumed for the day of construction activity with maximum emissions.
2. The maximum number of acres disturbed on the peak day.
3. Any emission control devices added onto off-road equipment.
4. Specific dust suppression techniques used on the day of construction activity with maximum emissions.

Table 7, *Expected Construction Equipment – Residential*, and 8, *Expected Construction Equipment – Commercial,* show typical equipment that would be used for each phase of the project and the projected construction schedule.

Table 7 Expected Construction Equipment – Residential

Equipment Identification[1]	Proposed Dates	Quantity
Site Preparation	08/01/2016 - 08/14/2016	
Rubber Tired Dozers		2
Tractors/Loaders/Backhoes		4
Mass Grading	08/15/2016 - 10/09/2016	
Excavators		2
Graders		2
Rubber Tired Dozers		1
Scrapers		2
Tractors/Loaders/Backhoes		2
Paving	10/10/2016 - 11/06/2016	
Pavers		2
Paving Equipment		2
Rollers		2
Tractors/Loaders/Backhoes		2
Building Construction	11/09/2016 - 02/01/2018	
Cranes		1
Forklifts		2
Generator Sets		2
Tractors/Loaders/Backhoes		2
Welders		2
Architectural Coating	8/10/2017 - 02/01/2018	
Air Compressors		2

Source: Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California. April 17, 2015, Ldn Consulting, Table 3.1.

Notes:

1. The equipment list is based upon equipment inventory within CALLEEMOD 2013.2.2. The quantity and types are based upon assumptions from Projects of similar size and scope.

Localized Significance Thresholds

Per the requirements of SCAQMDs LSTs methodology, emissions for gases in attainment such as NO_2 and CO are calculated by adding emission impacts from the project development to the peak background ambient NO_2 and CO concentrations and comparing the total concentration to the most stringent ambient air quality standards. Also, according to SCAQMD Rule 403, emissions for non-attainment particulate matter such as PM 10 and PM 2.5 can produce no more than 10.4 $\mu g/m^3$. The LSTs derived by SCAQMD differentiated by Source Receptor area for which the proposed project is would be represented by SRA #30 within the Coachella Valley area. Based on the lookup tables, thresholds are listed in Table 9, *5-Acre LST Emission Thresholds*.

Table 8 Expected Construction Equipment – Commercial

Equipment Identification	Proposed Dates	Quantity
Site Preparation	08/01/2016 -	
Graders		1
Tractors/Loaders/Backhoes		1
Grading	08/16/2016 -	
Concrete/Industrial Saws		1
Graders		1
Rubber Tired Dozers		1
Tractors/Loaders/Backhoes		2
Paving	010/01/2016 -	
Cement and Mortar Mixers		4
Pavers		1
Rollers		1
Tractors/Loaders/Backhoes		1
Building Construction	10/21/2016 -	
Cranes		1
Forklifts		2
Tractors/Loaders/Backhoes		2
Architectural Coating	08/10/2018 -	
Air Compressors		1
This equipment list is based upon equipment inventory within CALLEEMOD 2013.2.2. The quantity and types are based upon assumptions from Projects of similar size and scope.		

Source: *Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016,* Ldn Consulting, Table 3.1.

Table 9 5-Acre LST Emission Thresholds

Pollutant	LST @ 25 meters (lb/day)
CO	2,292
PM_{10} (Construction)	14
PM_{10} (Operation)	4
NO_2 (Corrected utilizing NO_2/NO_x Ratio) Construction and Operation	304

Source: *Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016,* Ldn Consulting, Table 2.5.

LST Construction – Residential

Based upon the CalEEMod air quality modeling as shown in CalEEMod annual outputs, worst-case CO, NOx and PM_{10} would cumulatively produce 5.86, 7.81 and 0.65 tons respectively over the construction duration of 389-days. The average rate for the respective emissions are 30.13, 40.15 and 3.34 lbs/day or 0.47, 0.63 and 0.05 grams per second for each pollutant during the construction day and is was modeled as such within ISCST3.

Based on these calculations, it was found that PM_{10} would marginally exceed ambient air quality thresholds at roughly 300 Meters from the project site and would therefore require mitigation to comply with LST methodology. It was found that these impacts could be fully mitigated through wetting the site twice daily during grading. Both the unmitigated and mitigated LST results for the project residential land use component are shown in Table 10, *LST Modeling Results during construction - Residential (Unmitigated)* and Table 11, *LST Modeling Results during construction - Residential (Mitigated)* respectively.

LST Construction – Commercial

SCAQMD also recommends using LST methodology which incorporates background ambient air quality data. However, based on the project size (5-acres) and the recommended methodologies utilized in the commercial land use component, mobile offsite emissions were excluded from the analysis. Table 12, *LST Modeling Results during construction – Commercial (Unmitigated)*, shows the modeled estimates for both construction and operations excluding offsite mobile emissions. Furthermore, the worst case LST is at 25 meters from the project centroid and will be utilized for this project. Based on the modeling results, no LST impacts are expected. However, even though without mitigation, construction emissions would be less than significant, the construction contractor for the commercial project will still be obligated to comply with SCAWMD Rules for dust control and utilize BMPs for dust control.

Table 10 LST Modeling Results During Construction - Residential (Unmitigated)

Pollutant	Averaging Time	Threshold	Worst Case Background Ambient Air Quality Data		LST (µg/m3)	Project Contribution (µg/m3)						Significant?
			Data	(µg/m3)		100 (m)	300 (m)	500 (m)	800 (m)	1,000 (m)	2,000 (m)	
CO	8 Hour	9 ppm (10,000 µg/m3)	0.65 ppm	722	9,278	80	151	118	83	70	36	No
PM10	24 Hour	10.4 µg/m3	106.0 µg/m3	106.0	10.4	5.7	11.4	7.5	5.4	2.9	2.3	Yes
NO2 (Corrected utilizing NO2/NOx Ratio)	1 Hour	0.18 ppm (339 µg/m3)	.050 ppm	94	245	113	218	179	140	125	84	No

Source: Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California. April 17, 2015, Ldn Consulting, Table 4.2.

Table 11 LST Modeling Results During Construction – Residential (Mitigated)

Pollutant	Averaging Time	Threshold	Worst Case Background Ambient Air Quality Data		LST (µg/m3)	Project Contribution (µg/m3)						Significant?
			Data	(µg/m3)		100 (m)	300 (m)	500 (m)	800 (m)	1,000 (m)	2,000 (m)	
CO	8 Hour	9 ppm (10,000 µg/m3)	0.65 ppm	722	9,278	80	151	118	83	70	36	No
PM10	24 Hour	10.4 µg/m3	106.0 µg/m3	106.0	10.4	5.7	9.7	7.5	5.4	2.9	2.3	No
NO2 (Corrected utilizing NO2/NOx Ratio)	1 Hour	0.18 ppm (339 µg/m3)	.050 ppm	94	245	113	218	179	140	125	84	No

Source: Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California. April 17, 2015, Ldn Consulting, Table 4.3.

Table 12 LST Modeling Results During Construction – Commercial (Unmitigated)

Pollutant	Project without Offsite mobile emissions (lb/day)	LST SRA-26 5-Acre (lb/day)	Significant?
CO (Construction)	17.12	2,292	No
CO (Operation)	61.99	2,292	No
PM10 (Construction)	6.14	14	No
PM10 (Operation)	0.01	4	No
NOx (Construction)	22.55	304	No
NOx (Operation)	12.25	304	No

Source: Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting, Table 4.2.

Long Term Regional Operational Impacts

The on-going operation of both project land use components would result in a long-term increase in air quality emissions without mitigation. This increase would be due to emissions from the project generated vehicle trips and through operational emissions from the on-going use of the proposed project.

Long Term Regional Operational Impacts – Residential

Based on the project's *Traffic Impact Assessment* (Appendix H), the proposed residential phase could add as many as 1,095 daily trips once fully operational by the year 2018. The daily pollutants calculated in CalEEMod are shown in Table 13, *Regional Operational Pollutant Emissions - Residential*. Based on these calculations, there would be no significant ROG, NOx, CO and PM10 impacts expected to occur during the lifetime of the residential project and mitigation measures are required.

Long Term Regional Operational Impacts – Commercial

Based on the project's TIA the proposed project commercial land use component could add as many as 1,365 daily trips once the project is fully operational sometime in the year 2018. The daily pollutants calculated are shown in Table 14, *Regional Operational Pollutant Emissions – Commercial.* Based upon these calculations, there would be no significant ROG, NOx, CO and PM10 impacts would be expected and that no mitigation measures are necessary.

Table 13 Regional Operational Pollutant Emissions – Residential

	ROG	NOx	CO	SOx	PM10	PM2.5
Summer Scenario						
Area Source Emission Estimates	14.97	0.33	26.26	0.03	2.69	2.69
Energy Source Emissions (Lb/Day)	0.11	0.98	0.42	0.01	0.08	0.08
Operational Vehicle Emissions	3.95	9.94	39.60	0.08	5.39	1.56
Total (Lb/Day)	19.04	11.25	66.28	0.12	8.15	4.32
SCAQMD Thresholds	55	55	550	150	150	55
Significant?	No	No	No	No	No	No
Winter Scenario						
Area Source Emission Estimates	14.97	0.33	26.26	0.03	2.69	2.69
Energy Source Emissions (Lb/Day)	0.11	0.98	0.42	0.01	0.08	0.08
Operational Vehicle Emissions	3.34	10.58	40.82	0.08	5.39	1.56
Total (Lb/Day)	18.42	11.89	67.51	0.11	8.16	4.32
SCAQMD Thresholds	55	55	550	150	150	55
Significant?	No	No	No	No	No	No

Source: Air Quality Assessment (TTM 36680), Residential Development, City of Coachella, California. April 17, 2015, Ldn Consulting, Table 4.4.

Table 14 Regional Operational Pollutant Emissions – Commercial

	ROG	Nox	CO	Sox	PM10	PM2.5
Summer Scenario						
Area Source Emission Estimates (Lb/Day)	0.71	0.00	0.00	0.00	0.00	0.00
Energy Source Emissions (Lb/Day)	0.02	0.17	0.14	0.00	0.01	0.01
Operational Vehicle Emissions (Lb/Day)	7.28	11.49	54.43	0.07	4.27	1.24
Total (Lb/Day)	8.01	11.66	54.58	0.07	4.28	1.25
SCAQMD Thresholds	55	55	550	150	150	55
Significant?	No	No	No	No	No	No
Winter Scenario						
Area Source Emission Estimates (Lb/Day)	0.71	0.00	0.00	0.00	0.00	0.00
Energy Source Emissions (Lb/Day)	0.02	0.17	0.14	0.00	0.01	0.01
Operational Vehicle Emissions (Lb/Day)	6.07	12.08	61.84	0.06	4.27	1.24
Total (Lb/Day)	6.80	12.25	61.99	0.07	4.28	1.26
SCAQMD Thresholds	55	55	550	150	150	55
Significant?	No	No	No	No	No	No

Source: Air Quality Assessment, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting, Table 4.3.

As shown in tables above, regional construction emissions and regional operational emissions for both project phases will not exceed SCAQMD regional significance thresholds. However, in

regard to localized significance thresholds, only the project residential phase (Table 10), would exceed PM_{10} LST emissions. Despite this exception, both project phases would be required to comply with SCAQMD Rules 403 and 403.1 in applying Best Available Control Measures (BACMs) to be incorporated and adjusted into a *PM-10 Dust Control Plan* in addressing all phases of construction and grading activities (Mitigation Measure AQ-1) and thereby reducing impacts to less than significant.

c) **Less than Significant Impact with Mitigation Incorporated**. This impact is related to regional criteria pollutant impacts and the project's contribution to these impacts. As shown in Table 2 in Section 3.3.2 (Environmental Setting) above, the non-attainment regional pollutants of concern in the Coachella Valley portion of the SSAB are ozone and PM_{10}. Ozone is not emitted directly into the air but is a regional pollutant formed by a photochemical reaction in the atmosphere. Ozone precursors, VOC and NO_X, react in the atmosphere in the presence of sunlight to form ozone. Therefore, SCAQMD does not have a recommended ozone threshold, but it does have thresholds of significance for VOC and NO_X.

If an area is in nonattainment for a criteria pollutant, then the background concentration of that pollutant has historically exceeded the ambient air quality standard. It follows that if a project exceeds the regional threshold for that nonattainment pollutant, then it would result in a cumulatively considerable net increase of that pollutant and result in a significant cumulative impact.

As stated previously and shown in Table 2 in Section 3.3.2 above, the project area is in nonattainment for ozone and PM_{10}. Therefore, if the project exceeds the regional thresholds for PM_{10}, then it would contribute to a cumulatively considerable impact for those pollutants. If the project exceeds the regional threshold for NOX or VOC, then it follows that the project would contribute to a cumulatively considerable impact for ozone. If the project exceeds the NOX threshold, it could contribute cumulatively to nitrogen dioxide concentrations.

Regional emissions include those generated from all onsite and offsite activities. SCAQMD has established regional significance thresholds because emissions from projects in the area can potentially contribute to the existing emission burden and possibly affect the attainment and maintenance of ambient air quality standards.

The project's TIA identified twenty-one (21) cumulative projects which are generally located near to the project site. The two projects nearest to the proposed residential site are the proposed commercial site which is located directly adjacent to and southeast of the site at the corner of Avenue 50 and Calhoun Street and the proposed Villa Palmeras residential development located directly south of the site along the south side of Avenue 50. The two projects nearest to the proposed commercial site are the proposed residential site (TTM 37088) located directly adjacent

to and northwest of the site and the Villa Palmeras residential development located directly southwest of the site along the south side of Avenue 50.

In order to reduce cumulative impacts, both proposed project phases would be conditioned so as not to conduct grading activities simultaneously, and as a result, have different scheduling as discussed in 3.3.3(b) above. However, this does not exclude the possibility of Villa Palmeras development (TTM 35523) in scheduling grading activities simultaneously with scheduled grading activities of one or both project land use components. Because such a scenario would create a cumulative construction impact to the immediate vicinity, a coordinated effort would have to be demonstrated between the City and the project grading contractors for both project land use components and the Villa Palmeras development in order to assure that grading schedules do not occur at the same time (Mitigation Measure AQ-2).

d) **Less than Significant Impact With Mitigation Incorporated.** Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for 24 hours, such as residences, hospitals, or convalescent facilities. Commercial and industrial facilities are not included in the definition because employees do not typically remain onsite for 24 hours. However, when assessing the impact of pollutants with 1-hour or 8-hour standards (such as NOx and CO, commercial and/or industrial facilities would be considered sensitive receptors for those purposes. The closest sensitive receptors are the existing residences located directly along the project's northern boundary and on the east side of Calhoun Street directly across from the project site.

Localized Significance Threshold Analysis

The LST construction analysis uses thresholds that represent the maximum emissions for a project that would not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. The thresholds are based on the ambient concentrations of that pollutant for each source receptor area and on the location of the sensitive receptors. If a project would result in emissions under the thresholds, it follows that the project would not cause or contribute to an exceedance of the standard. The standards are set to protect the health of sensitive individuals.

As shown in discussion 3.3.3(b) above, regional construction emissions and regional operational emissions from both project land use components will not exceed the SCAQMD regional significance thresholds. As discussed above, only the project residential land use component would exceed PM_{10} LST emissions. Despite this exception, compliance with SCAQMD Rules 403 and 403.1 in applying Best Available Control Measures (BACMs) will be required for both project phases and

during all phases of construction and grading activities (Mitigation Measure AQ-1). Therefore, both project land use components would not result in cumulatively considerable health impacts.

Toxic Air Pollutants - Onsite Workers

A variety of state and national programs protect workers from safety hazards, including high air pollutant concentrations. Onsite workers are not required to be addressed through this health risk assessment process. A document published by the California Air Pollution Control Officers Association (CAPCOA 2009), *Health Risk Assessments for Proposed Land Use Projects*, indicates that onsite receptors are included in risk assessments if they are persons not employed by the project. Persons not employed by the project would not remain onsite for any significant period. Therefore, a health risk assessment for onsite workers is not required or recommended.

Toxic Air Pollutants – Construction

The construction equipment would emit Diesel Particulate Matter (DPM), which is a carcinogen. However, the DPM emissions are short-term in nature. Determination of risk from DPM is considered over a 70-year exposure time. Guidance published by the CAPCOA (2009) Health Risk Assessments for Proposed Land Use Projects does not include guidance for health risks from construction projects addressed in CEQA; risks near construction projects are expected to be included later when the toxic emissions from construction activities are better understood. The distances between areas of project construction activity and the nearest relative sensitive receptors are existing residential homes to the north, south and east of both project land use component sites. Therefore, considering the dispersion of the emission and the short timeframe for both project land use components, exposure to DPM is anticipated to be less than significant.

e) **Less Than Significant Impact.** Odor impacts from construction operations would be considered short-term events and would not be considered an impact. Long term operations will not create offensive odors and would not create any operational odor impacts to any sensitive receptors. Therefore, no odor impact would occur on or off-site.

3.3.4 Mitigation Measures

AQ-1 Both commercial and residential elements of the project shall adhere to SCAQMD Rules 403 and 403.1 and follow and incorporate all Best Available Control Measures into a PM-10 Dust Control Plan and to be prepared for the both project land use component prior to commencement of site grading or other construction activity where soil disturbance or other fugitive dust may be generated. Sample BACMs that would be used during construction are included here.

Best Available Control Measure	Associated Measure in CalEEMod
Clearing and Grubbing	
02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing. 02-2 Stabilize soil during clearing and grubbing activities. 02-3 Stabilize soil immediately after clearing and grubbing activities.	Water exposed surfaces three times per day Soil stabilizers for unpaved roads
Earth Moving Activities	
08-1 Pre-apply water to depth of proposed cuts 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction 08-3 Stabilize soils once earth-moving activities are complete.	Pre-water to 12%
Landscaping	
10-1 Stabilize soils, materials, slopes Guidance: Apply water to materials to stabilize; maintain materials in a crusted condition; maintain effective cover over materials; stabilize sloping surfaces using soil until vegetation or ground cover can effectively stabilize the slopes; hydroseed prior to rain season.	Replace ground cover in disturbed areas when unused for more than 10 days

Sources: SCAQMD Rule 403 and CalEEMod Output (See Appendix A of the Air Quality Assessment).

AQ-2 A coordinated effort shall be demonstrated between the City and the project grading contractors for any grading projects in the vicinity in order to minimize PM-10 dust emissions. Level of Significance Compliance with an approved PM-10 Dust Control Plan that sets forth the required Best Available Control Measures to be utilized during all phases of grading/construction of Project would ensure that impacts associated with emissions of criteria pollutants would be less than significant.

3.3.5 Level of Significance After Mitigation

Compliance with SCAQMD, federal, and State regulations reduces the potential for emissions associates with construction and operation of the commercial and residential elements of the project to a less than significant impact.

3.4 Biological Resources

3.4.1 Sources

The following sources were utilized to support the conclusions made in this section:

- *City of Coachella General Plan 2035 Draft EIR*, July 2014.

- *City of Coachella General Plan 2035*, adopted April 2015.
- Altum Group field visits November 10, 2012 and January 2016.

3.4.2 Environmental Setting

The project site is a vacant 20-acre parcel of land located on the northwest corner of Avenue 50 and Calhoun Street. There are no trees onsite and only sparse ruderal vegetation is present. The site has been heavily impacted by former agriculture land use. In addition, according to the Phase 1 Environmental Site Assessment (Appendix E), there are areas of the site where debris piles have been left, including an area with used tires. Finally, as shown in a recent aerial photograph (Exhibit 2), there appears to be site disturbance from off-road use.

A database search for plant and wildlife species was conducted as part of the General Plan update. A review of the data shows that it is unlikely that any listed plant species would occur on the project site, due to its disturbed condition as a former agricultural site. However, because, over time, the site has become partially revegetated with a variety of ruderal (weed) species, it likely provides habitat for common urban desert wildlife and avian species including a variety of insects as well as mice, rabbits, roadrunners and coyotes. Because the project site likely provides habitat for common species, it also may provide foraging habitat for a variety of avian species that may be listed including burrowing owl (*Athene cunicularia*), a State of California Species of Concern.

3.4.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the	☐	☐	☐	☒

California Department of Fish and Game or U.S. Fish and Wildlife Service?				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

a) **Less Than Significant Impact With Mitigation Incorporated.** The project site is a vacant parcel of land located on the northwest corner of Avenue 50 and Calhoun Street. There are no trees on the site and there is sparse ruderal vegetation that has on the site over time since the cessation of farming activities. Site photos included in Chapter 1, Introduction, show existing conditions on the site. Under existing conditions, the site likely provides habitat for a variety of urban desert wildlife, including insects, rodents, common birds such as ravens and roadrunners, as well as coyotes. The project site may provide foraging habitat for some avian species as well as foraging and nesting habitat for burrowing owl (*Athene cunicularia*), a State of California Species of Concern. Therefore, mitigation measures BIO-1 shall be implemented, requiring the applicant to conduct a biological survey prior to any site disturbance associated with grading or construction. If burrowing owls are encountered during the biological survey, mitigation measure BIO-2 shall be implemented.

b) **No Impact.** There is no riparian habitat on the site.

c) **No Impact.** There are no wetlands as defined by Section 404 of the Clean Water Act located on or near the project site.

d) **Less Than Significant Impact.** The project site is a vacant former agricultural site surrounded by residential development with intermittent vacant parcels zoned for residential use. Although there is a patchwork of intermittent contiguous and noncontiguous vacant parcels in the area that may allow movement for some wildlife species such as coyotes, there is no established corridor. Due to its degraded condition and location within a large urban area, it does not support native wildlife nursery sites. See discussion in Item 3.4.3(a) for potential burrowing owl to use the site.

e-f) **Less Than Significant Impact.** The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) provides a comprehensive regional plan that balances growth projected in the Coachella Valley with the requirements of federal and state endangered species laws. The CVMSHCP area includes approximately 1.2 million acres in the Coachella Valley and the surrounding mountains and calls for the creation of an MSHCP Reserve System consisting of existing conservation areas and new additional conservation areas to provide habitat to protect 27 sensitive plant and animal species.

The CVMSHCP is divided into 21 Conservation Areas. The nearest Conservation Areas to the project site are the Santa Rosa and San Jacinto Mountains Conservation Area, southwest of the City. Although the City of Coachella is located within the MSHCP Plan Area it is not within a Conservation Area. The City, along with other cities in the Valley have agreed to adopt local development mitigation fees that apply to new construction to generate revenue to be used to acquire approximately 89,000 acres of land in the designated Conservation Areas. The City of Coachella has adopted its Local Development Mitigation Fee which is applicable to development projects such as the proposed residential development, market, gas station, and commercial buildings. For residential development, the fee is based on units per acre. If the development is 0-8 units per acre, the current fee is $1301 per unit. For 8-14 units per acre, the current fee is $541 per unit and for 14+ units per acre, the current fee is $239 per unit. Commercial development is subject to the current fee in the amount of $5,809 per acre. The applicant will be responsible for the payment of development fees based on the amounts listed above, or the most current CVMSHCP fee schedule. The fee schedule is updated at the beginning of each fiscal year. Therefore, this impact would be less than significant.

3.4.4 Mitigation Measures

BIO-1 Prior to any land disturbance, the applicant shall have a pre-construction survey conducted at the project site to determine presence/absence of burrowing owl. Results of the survey may determine whether focused surveys for the species must be conducted.

BIO-2 If the site survey determines the presence of burrowing owl, mitigation in accordance with the California Department of Fish and Wildlife (CDFW) shall be implemented as follows:

- If burrowing owls are identified as being resident on-site outside the breeding season (February 1 through August 31) may be relocated to other sites by a permitted biologist (permitted by CDFG), as allowed in the CDFG *Staff Report on Burrowing Owl Mitigation* (March 2012).
- If an active burrow is found during the breeding season, the burrow shall be treated as a nest site and temporary fencing shall be installed at a distance of 550 yards from the active burrow to prevent disturbance during grading or construction. This is the maximum buffer distance recommended in the CDFW *Staff Report on Burrowing Owl Mitigation*. Installation and removal of the fencing shall be done with a biological monitor present.

3.4.5 Level of Significance After Mitigation

With implementation of the mitigation measures BIO-1 and BIO-2, the project would have a less than significant impact on biological resources

3.5 Cultural Resources

3.5.1 Sources

- *City of Coachella General Plan 2035 Draft EIR, July 2014*. Prepared by Raimi & Associates.
- *82266 Avenue 50 Cultural Resources Assessment, City of Coachella, Riverside County, California.* Prepared by Cogstone Resource Management, Inc., June 2012.
- *Paleontological Resources Assessment of 82266 Avenue 50 Project, City of Coachella, Riverside County, California, June 2012*. Prepared by Cogstone Resource Management, Inc., June 2012.

3.5.2 Environmental Setting

The Coachella Valley, now one of the hottest and driest places in North America, once contained an enormous freshwater lake teaming with fish and wildlife. Prior to dam construction on the Colorado River, the slower flow of the river meanderings resulted in the deposition of a great deal of sediment in the lower channels of the Colorado River delta. Accumulating silts raised the overall height of the delta and lowered stream channel margins to form an artificial dam. River channels near the delta crest occasionally broke through their natural levees and the full flow of the Colorado River poured down the steeper northern slope of the delta into the low-lying Salton Trough in eastern Riverside and Imperial Counties. During large flood events, extensive head cutting and enlargement of the channel prevented the Colorado River from reestablishing a route back through the newly reworked surface of the delta and an immense freshwater lake formed in the Salton Trough—Lake Cahuilla. There have been many fluctuations of the lake levels over time. Believed to have had at least five high stands in the past 2000 years, at its maximum, Lake Cahuilla was 110 miles long (roughly north-south), 32 miles wide (roughly

east-west) and more than 300 feet deep at the center, three times the area and six times the depth of the present Salton Sea.

By the Late Prehistoric period, the Coachella Valley was home to affiliated peoples known as the Cahuilla. They occupied the San Gorgonio Pass, San Jacinto and Santa Rosa Mountains, and the Coachella Valley and the northern end of the Imperial Valley. The project site is located within the Cahuilla Territory.

In the past, the area was used for farming and the project site was farmed in the past. Beginning around the 1980's agricultural uses began to be supplanted by residential subdivisions including neighborhoods to the north and east of the project site.

3.5.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

a) **Less than Significant Impact with Mitigation Incorporated.** The project site is an undeveloped tract of land that has been highly disturbed over the years by agricultural pursuits that appear to have ceased operation in 2004. According to the project's *Phase 1 Environmental Site Assessment* (Appendix E), historic aerial photo inventory and historic USGS topo maps, the site was brought into agricultural production sometime between 1939 and 1953. The site had large rectangular building located near the southwest portion of the project site by 1953. By 2004, while nearby properties were being converted from agricultural to residential use, and farming

also ceased at the project site. The building located at the southwest corner of the site was removed and by 2006 a storage yard was located along the northeast corner of the project site, which was later removed by 2009. The western boundary where most of the trees were formerly located appeared to have a lot of vehicle tracks, suggesting that this area had been flattened out. The site has been generally unchanged from 2009 to present with only one mature tree left along the project site's western boundary. Based on the chronological time-line information provided from project site aerial photographs, there are no historic resources located on the project site.

b) **Less than Significant with Mitigation Incorporated.** A field survey of the project site was also completed as part of the cultural resources assessment. Sparse vegetation such as creosote and brittle bush, cholla cactus and non-Native introduced grasses were found on the site. Also found in the southwestern corner of the site were two small cement slabs, a stand pipe associated with the previous agricultural use, and widely scattered late 20th century refuse. There is no evidence of intact historical hollow features present at this location that might indicate the presence of potentially significant historical deposits. This location corresponds to a former structure location that is depicted on the 1960 and 1977 U.S.G.S. topographic map for the area. Based on surface observations of the historical structural remains and scattered refuse, these deposits do not appear to be significant deposits eligible for listing on the California Register of Historical Resources.

c) **Less than Significant with Mitigation Incorporated.** The cultural resources assessment prepared for the project site included a search of archaeological and historical records encompassing a one-mile radius around the approximate 20-acre project site. The records search indicated that 55 cultural resources investigations have been completed within the one-mile radius of the site. No investigation was previously completed within the project boundaries until 2012. Results of these studies indicate that there are a total of 33 cultural resources sites known in the vicinity. Of these, two are immediately adjacent to the project site, seven are within a ¼-mile radius, nine are within a ½-mile radius and 15 have been documented within a ½ mile to one mile radius. Most of these resources are prehistoric in nature. Two sites containing Native American human cremations were also identified within a one-mile radius of the project site and there is a remote possibility that human cremations may be present in subsurface contexts within the project site. Based on the results of the records search, the project site is considered to be highly sensitive for prehistoric archaeological deposits in subsurface contexts. The potential for the project site to contain intact historical archaeological deposits is considered to be low-to-moderate. Therefore, mitigation is required and is listed in Section 3.5.4 below.

d) **Less than Significant Impact with Mitigation Incorporated.** A paleontological records search was completed at the San Bernardino County Museum. The project area and a ten-mile radius

were searched for resources. No fossil localities have been previously collected from the project area or within a one-mile radius of the target property.

The project is located within Holocene Lake Cahuilla beds that are considered to have a high paleontological sensitivity and has been confirmed by the SBCM. Paleontologically significant fossils dating from 6,000 to 1,000 years old have been previously recovered from nearby La Quinta. These fossils provided previously unknown information on the distribution and associations of fossil vertebrates in the Holocene. The maximum depth of those excavations was 13 feet.

Those sediments that are more than three feet deep are considered sensitive. Mini-mart gas tanks and potentially the proposed retention basin and utility lines, or any grading activities performing excavations greater than three feet will require paleontological monitoring. See the mitigation measures included in Section 3.5.4 below.

e) **Less than Significant Impact with Mitigation Incorporated.** The discovery of human remains is always a possibility during ground disturbances. State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the Riverside County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The Riverside County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. This requirement is also listed as a mitigation measure in order to ensure that it is included in the Mitigation Monitoring and Reporting Program.

3.5.4 Mitigation Measures

CR-1 Because the project site is considered to be highly sensitive for containing prehistoric archaeological deposits in subsurface contexts and Native American human cremation have been found in the vicinity, a qualified archaeological monitor shall be present during all phases of construction grading and trenching activities related to project implementation. The amount of monitoring shall be determined by the archaeologist through the preparation of a monitoring plan to be prepared prior to commencement of grading.

CR-2 A qualified vertebrate paleontologist shall be retained prior to the start of construction, but after final depths of impacts are known (grading plans), to develop a paleontological mitigation plan limited to the proposed deep impact areas (greater than 3 feet) of the project only. In particular, the plan shall (1) clearly define that test trenches that would be dug to the maximum depth of proposed impacts, (2) permit the use of heavy equipment to perform the trenching as all samples

will be taken from sidewalls after a stratigraphic profile is developed, (3) require recording of each strata revealed, (4) require radiocarbon dates for each strata, (5) require samples of about 10 kilogram (kg) for each strata with collection of additional samples up to 100 kg for layers rich in vertebrate fossils, (6) require identification and analysis by recognized experts, (7) require an interpretive report, (8) require curation of significant specimens recovered and (9) encourage publication of results. The plan would identify the amount of monitoring required.

CR-3 In the event that human remains are uncovered, no further disturbance shall occur until the Riverside County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The Riverside County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

3.5.5 Level of Significance After Mitigation

With implementation of the mitigation measures listed above, the project would have a less than significant impact on cultural resources.

3.6 Geology/Soils

3.6.1 Sources

- *Geotechnical Investigation Proposed Residential Development Tentative Tract Map 36680 APN 612-280-018, Coachella California.* Prepared by Sladden Engineering, December 31, 2013.
- *Geotechnical Investigation, Proposed Apartment Complex and MiniMart.* Prepared by Sladden Engineering, February 12, 2012.
- *City of Coachella General Plan 2035 Draft EIR,* July 2014. Prepared by Raimi & Associates.

3.6.2 Environmental Setting

The project site is located within the Colorado Desert Physiographic Province (also referred to as the Salton Trough) that is characterized as a northwest-southeast trending structural depression extending from the Gulf of California to the Banning Pass. The Salton Trough is dominated by several northwest trending faults, most notably the San Andreas Fault system. The Salton Trough is bounded by the Santa Rosa-San Jacinto Mountains on the southwest, the San Bernardino Mountains on the north, the Little San Bernardino –Chocolate-Orocopia Mountains on the east, and extends through the Imperial Valley into the Gulf of California on the south.

A relatively thick sequence (20,000 feet) of sediment have been deposited in the Coachella Valley portion of the Salton Trough from Miocene to present times. These sediments are predominately terrestrial in nature with some lacustrian (lake) and minor marine deposits. The major contributor of these sediments has been the Colorado River. The mountains surrounding the Coachella Valley are composed primarily of Precambrian metamorphic and Mesozoic "granitic" rock.

The site has been mapped and found to be immediately underlain by undifferentiated Quaternary-age lake deposits (Ql) and alluvium (Qal). The project site is located in the Coachella Valley, which is a seismically active area located in the northern part of the Salton Trough, a topographic depression formed from seismic activity along the San Andreas Fault. The project site is relatively flat at an elevation of approximately 28-36 feet below mean sea level.

The San Andreas Fault system is located to the north of the project site. The Coachella Valley is surrounded by the Little San Bernardino Mountains to the northeast, the foothills of the San Bernardino Mountains to the northwest, and the San Jacinto and Santa Rosa Mountains to the southwest.

Subsurface conditions were investigated by drilling five exploratory boreholes as part of project geology study between 21 and 51 feet in order to observe the subsurface soil conditions. The locations of these boreholes can be found in the Geotechnical Investigation in Appendix D. The native soils consist of primarily silty sand, sandy silt, and poorly graded sand. Groundwater was encountered at a depth of 48 feet.

There is potential for moderate to strong seismic shaking and it is likely to occur during the design life of the project. There are highly seismically active faults in the region but the site is not located within any State of California or County of Riverside designated fault zones.

3.6.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				

i) Rupture of a known fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

a.i) **Less than Significant Impact.** Surface rupture can be expected to occur along preexisting, known active fault traces. However, there are no known faults in the area of or projecting towards the site. There are also no signs of active surface faulting on the site or in the vicinity of the site. Risks associated with surface rupture are low. Therefore, no impact is expected to occur.

a.ii) **Less than Significant with Mitigation Incorporated.** The site has been subjected to ground shaking in the past due to the seismically active faults throughout the region. There is a potential for strong seismic shaking on the site during the design life of the project. Implementation of mitigation measure GS-1 requires that, structurally, the buildings shall be designed per seismic requirements in the California Building Code. This will reduce the impact to a less than significant level.

a.iii) **Less than Significant with Mitigation Incorporated.** Liquefaction, or the process in which loose, saturated granular soil loses strength and a result of cyclical loading, is likely to occur at the site during a seismic event. Mitigation Measure GS-2, including proper preparation of the building areas and proper compaction will ensure that the liquefaction potential is reduced to a less than significant level. See Section 3.6.4 below.

a.iv) **No Impact.** Because the site is relatively flat and not immediately adjacent to any slopes or hillsides, there is no potential impact to future residents from landslides.

b) **Less than Significant With Mitigation Incorporated.** No signs of flooding or erosion were observed by the geotechnical specialists during their site visit. There is a negligible risk of soil erosion or loss of topsoil with the proposed project once it is constructed as the site will be developed with residences and a commercial plaza with heights limited to 2 stories. As shown in Exhibit 6, the residential portion will provide 115 dwelling units, common open space areas, a small park and four retention basins, and up to 105 guest parking spaces. During construction, undeveloped areas of the site would be treated with soil stabilizing agents and BMPS (i.e., silt fencing, fiber rolls, sandbagging, etc.) to prevent wind and water erosion from leaving the site. These would all be included in the applicant's Stormwater Pollution Prevention Plan (SWPPP) described in detail in Section 2.9, Hydrology and Water Quality. During construction, mitigation measures for the control of fugitive dust (Section 2.3 Air Quality) and water erosion (Section 2.8 Hydrology and Water Quality) will be implemented to reduce the potential for erosion to occur.

c) **Less than Significant Impact With Mitigation Incorporated.** There is evidence that the site could be exposed to risk of subsidence, liquefaction, and settlement due to the composition of the on-site soils. However, Mitigation Measure GS-2 as recommended in the Geotechnical Investigation for the grading process will reduce the risk by preparing the site properly for the building loads expected. These measures will reduce the impact to a less than significant level.

d) **Less than Significant Impact.** Generally, the site soil consists of silty sand and sandy silt. Based on the results of the laboratory testing (EI=5), the materials underlying the site are considered to have a "very low" expansion potential and the risk of structural damage caused by volumetric changes in the subgrade soil is considered negligible.

e) **No Impact.** The proposed project will be connected to a sanitary sewer system and no septic system or any alternative wastewater treatment is proposed.

3.6.4 Mitigation Measures

There following recommendations in the geotechnical investigation (Appendix D) will ensure there are less than significant impacts regarding geology and soils:

GEO-1 structurally, the buildings shall be designed per seismic requirements in the California Building Code.

GEO-2 All earthwork including excavation, backfill and preparation of the subgrade soil, shall be performed in accordance with the geotechnical recommendations presented in *Geotechnical Investigation, Proposed Residential Development, Tentative Tract Map 36680, APN 612-280-018, Coachella California*, December 2013, prepared by Sladden Engineering, and portions of the local regulatory requirements, as applicable.

3.6.5 Level of Significance After Mitigation

With the implementation of the mitigation measures listed above, the project would have a less than significant impact regarding Geology and Soils.

3.7 Greenhouse Gas Emissions

3.7.1 Sources

- *Global Climate Change, Avenue 50 and Calhoun Street, City of Coachella*, California, January 11, 2016, Ldn Consulting.
- *Global Climate Change (TTM 36680), Residential Development, City of Coachella, California*, April 17, 2015, Ldn Consulting.
- *City of Coachella Climate Action Plan*, Adopted April 2015.

3.7.2 Environmental Setting

Gases that trap heat in the atmosphere are referred to as greenhouse gases. The effect is analogous to the way a greenhouse retains heat. The six most important greenhouse gases are carbon dioxide, methane, nitrous oxide (N_2O), sulfur hexafluoride, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs), followed by water vapor, ozone, and aerosols. Individual greenhouse gas compounds have varying global warming potential and atmospheric lifetimes. Community-wide greenhouse gas emissions increased from 312,628 metric tons in 2005 to 355,956 metric tons in 2010. The City's intent is to establish long-term goals and policies for managing and protecting its natural resources and open spaces with the 2035 General Plan Update and maintain, implement, and update the Climate Action Plan.

3.7.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

a) **Less than Significant.** SCAQMD is in the process of preparing recommended significance thresholds for greenhouse gases for local lead agency consideration (SCAQMD draft local agency threshold); however, the SCAQMD Board has not approved the thresholds as of the date of this analysis.

The current draft thresholds consist of the following tiered approach:

Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. If a project's emissions are under one of the following screening thresholds, then the project is less than significant:

- All land use types: 3,000 $MTCO_2e$ per year
- Based on land use type: residential: 3,500 $MTCO_2e$ per year; commercial: 1,400 $MTCO_2e$ per year; industrial: 10,000 $MTCO_2e$; or mixed use: 3,000 $MTCO_2e$ per year.

Tier 4 has the following options:

a. Option 1: Reduce emissions from business as usual by a certain percentage; this percentage is currently undefined;

b. Option 2: Early implementation of applicable AB 32 Scoping Plan measures;

c. Option 3: 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO2e/SP/year for projects and 6.6 MTCO2e/SP/year for plans; and,

d. Option 3: 2035 target: 3.0 MTCO2e/SP/year for projects and 4.1 MTCO2e/SP/year for plans.

Section 15064.4(b) of the CEQA Guideline amendments for greenhouse gas emissions state that a lead agency may take into account the following three considerations in assessing the significance of impacts from greenhouse gas emissions:

- Consideration #1: The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
- Consideration #2: Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- Consideration #3: The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Project Greenhouse Gas Inventory

This analysis is restricted to greenhouse gases identified by AB 32, which include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The project would generate a variety of greenhouse gases during construction and operation, including several defined by AB 32 such as carbon dioxide, methane, and nitrous oxide.

Certain greenhouse gases defined by AB 32 would not be emitted by the project. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the project. Therefore, it is not anticipated that the project would emit perfluorocarbons or sulfur hexafluoride.

Construction

Both project phases would emit greenhouse gases from upstream emission sources and direct sources (combustion of fuels from worker vehicles and construction equipment). The emissions modeling represents a conservative analysis, and was used to assess the projects' potential greenhouse gas impacts.

Residential

As shown below in Table 15, *Expected Annual Construction CO2e Emissions Summary MT/Year*, construction equipment and worker vehicles for the project residential component are estimated

to generate a total of approximately 514.42 $MTCO_2e$ for year 2016 and 251.30 $MTCO_2e$ for year 2017. The emissions are from grading and construction during this timeframe which total out at 765.72 $MTCO_2e$.

Table 15 Expected Annual Construction CO2e Emissions Summary MT/Year - Residential

Year	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
2016	0.00	511.97	511.97	0.12	0.00	514.42
2017	0.00	250.33	250.33	0.05	0.00	251.30
Total						765.72
Yearly Average Construction Emissions (MT/year over 30 years)						25.52

Source: Global Climate Change (TTM 36680), Residential Development, City of Coachella, California, January 11, 2016, Ldn Consulting, Table 5.1.

Notes:

Expected Construction emissions are based upon CalEEMod modeling assumptions for equipment and durations listed in Table 4.1 of the Report (Appendix G).

The estimate shown in Table 15 is lower than the projected SCAQMD threshold of 10,000 $MTCO_2e$; therefore impacts due to construction of the residential component would be less than significant.

Commercial

As shown below in Table 16, *Expected Annual Construction CO2e Emissions Summary MT/Year*, construction equipment and worker vehicles for the project commercial component are estimated to generate a total of approximately 115.58 $MTCO_2e$ for year 2016 and 87.57 $MTCO_2e$ for year 2017. The emissions are from grading and construction during this timeframe which total out at 203.15 $MTCO_2e$.

Table 16 Expected Operational Emissions Summary MT/Year - Commercial

Year	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
2016	0.00	114.96	114.96	0.03	0.00	115.58
2017	0.00	87.12	87.12	0.02	0.00	87.57
Total						203.15
Yearly Average Construction Emissions (MT/year over 30 years)						6.77
Expected Construction emissions are based upon CalEEMod modeling assumptions for equipment and durations listed in Table 4.1 of the Study.						

Source: Global Climate Change, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting, Table 5.1.

The estimate shown in Table 15 is lower than the projected SCAQMD threshold of 10,000 $MTCO_2e$; therefore impacts due to construction of the commercial component would be less than significant.

Operations

Operational or long-term emissions occur over the life of the projects. The operational emissions for the commercial and residential land use components are shown in Tables 16, *Expected Operational Emissions Summary MT/Year - Commercial* and 17, *Operational Greenhouse Gas Emissions - Residential*. Based on the estimates, both project land use components without mitigation would maintain emissions below the projected SCAQMD threshold and would result in a less than significant impact.

Table 17 Operational Greenhouse Gas Emissions -Residential

Emissions Sources	Emissions ($MTCO_2e$ / Year)
Area	86.95
Energy	208.48
Waste	61.36
Water	9.29
Mobile	1,093.18
Total Project Emissions	1,459.27
SCAQMD Threshold	3,500
Significant?	No

Source: Global Climate Change (TTM 36680), Residential Development, City of Coachella, California, January 11, 2016, Ldn Consulting, Table 5.2.

Notes:

MTCO2e=metric tons of carbon dioxide equivalent Source of emissions: CalEEMod Output

Table 18 Operational Greenhouse Gas Emissions - Commercial

Emissions Sources	Emissions ($MTCO_2e$ / Year)
Area	0.00
Energy	297.75
Waste	104.35
Water	48.40
Mobile	779.81
Total Project Emissions	1,230.32
SCAQMD Threshold	3,500
Significant?	No

Source: Global Climate Change, Avenue 50 and Calhoun Street, City of Coachella, January 11, 2016, Ldn Consulting, Table 5.2.

Notes:

MTCO2e=metric tons of carbon dioxide equivalent Source of emissions: CalEEMod Output

b) **Less than Significant.** The City of Coachella Climate Action Plan (CAP) outlines the City's commitment in reducing greenhouse gas emissions. The Climate Action Plan's emission reduction goal of 15 percent below 2010 levels by 2020 is consistent with AB 32 reduction goals and CARB's

Scoping Plan. Therefore, project consistency with the City's Climate Action Plan was utilized for this analysis. Consistency with the City's Climate Action Plan would also demonstrate consistency with the State's adopted Climate Change Scoping Plan. The project's 2010 and 2020 emissions were modeled using CalEEMod 2013.2.2 modeling results.

The City of Coachella CAP estimates that the Service Population GHG emission in 2010 was 8.2 MTCO2e. Given that the Service Population emission for the project's commercial component upon generated build out will be 6.77 MTCO2e, a 17.4 percent reduction over 2010 Service Population emissions would be expected. Lastly, given that the SP emission for the project's residential component upon generated build out will be 4.5 MTCO2e, a 44.8 percent reduction over 2010 Service Population emissions would be expected. Therefore, both of the project elements, commercial and residential would be compatible with the City's Climate Action Plan.

One way the project would meet the City's intent to lower vehicle trips, and thus greenhouse gas emissions is to provide alternatives such as walking or biking by providing shopping opportunities near residential neighborhoods where new residents and those in existing adjacent neighborhoods can take advantage of the close proximity of new commercial center.

In addition, the project must comply with Title 24 of the California Building Code which requires energy efficient building materials and appliances to be used in all new residential and commercial projects.

3.7.4 Mitigation Measures

No mitigation measures are required.

3.7.5 Level of Significance After Mitigation

Both project land use elements would have a less than significant impact on greenhouse gas emissions.

3.8 Hazards and Hazardous Materials

3.8.1 Sources

The following sources were utilized to support the conclusions made in this section:

- *Report of Phase I Environmental Site Assessment with Pesticide Sampling APN 612-280-018 Northwest Corner Avenue 50 and Calhoun Street Coachella, Riverside County, California,* prepared by Earth Systems Southwest, November 15, 2011 (Appendix E).
- *State of California Hazardous Waste and Substances Site* List, www.envirostor.dtsc.ca.gov. Accessed April 2015.

- *Riverside County Airport Land Use Compatibility Plan Policy Document, Jacqueline Cochran Regional Airport chapter*, Amended September 2006.
- CAL Fire Resources Wildland Hazard & Building Codes Riverside County (West) FHSZ Map http://frap.fire.ca.gov/webdata/maps/riverside_west/fhszl_map.60.jpg. Accessed April 2015.
- *City of Coachella General Plan Update Draft EIR 2035*, July 2014. Prepared by Raimi & Associates.

3.8.2 Environmental Setting

There are no schools located within 0.25 miles of the project site. The nearest school to the project site is the Jordan Christian Academy, a small, private school, located approximately 0.48 miles south of the site on Calhoun Street at Avenue 51.

The project site is not on the State of California Hazardous Waste and Substances Site List pursuant to Government Code Section 65962.5.

The project site is located near the Jacqueline Cochran Regional Airport; however, according to the Riverside County Airport Land Use Compatibility Plan, the project site is not within its Airport Influence Area Boundary. The site is also not in the vicinity of any private airstrips.

The Phase I Environmental Site Assessment (ESA) was conducted for the project site in November 2011. The following is a summary of existing site conditions.

- The site was observed to consist of vacant, formerly agricultural land. The site appeared to have been used for agriculture for several years. Dry, low grass covered the site. The vegetation showed normal signs of seasonal stress. Minor windblown trash was noted across the site.
- A dirt berm/slope was along the west boundary of the site.
- A dirt road was on-site parallel to a block wall along the northern boundary of the site.
- Tires and landscaping debris were along this road.
- Woody debris, wood chips, tires and minor solid trash were near the northwest corner of the site.
- Scattered gravel was near the northeast corner of the site.
- Concrete slabs were observed near the southwest corner of the site.
- Portions of the slabs were painted red.
- Irrigation junction boxes, vents and standpipes were located at the northwest and southwest corners of the site. What appeared to be a dismantled well was adjacent to the standpipe in the southwest corner.

- A transformer was on a pole near the west boundary of the site, in proximity to the dismantled well. Staining was not noted in association with the transformer.
- A telecom cable paralleled Avenue 50 along the south boundary of the site.
- Evidence of the on-site manufacture, storage, or disposal of hazardous materials was not observed.

The ESA also identified the potential presence of pesticide residues as a recognized environmental condition (REC) for agricultural land.

The proposed project includes a vehicle fuel station with underground storage tanks. Construction and operation of a vehicle fueling station requires a number of permits from multiple agencies.

South Coast Air Quality Management District requires permits to construct and operate focused on Vapor Recovery Systems (per California Air Resources Board) during both fuel delivery into the ground storage tanks and fuel storage and vehicle fueling.

Riverside County Fire Department as the State Certified Unified Program Agency (CUPA) in the Coachella Valley is responsible for issuing its own permits to construct and operate a vehicle fueling station including review and approval of a site specific Hazardous Materials Business Plan (HMBP) that sets forth operational procedures, emergency contact information, emergency response plan for containment spills or release of vapors and other information required in HMBP.

3.8.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident condition involving the release of hazardous materials into the environment?	☐	☒	☐	☐

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas of where residences are intermixed with wildlands?	☐	☐	☐	☒

a/b) **Less than Significant Impact with Mitigation Incorporated.** The project site was surveyed in 2011 for a previous project that was not developed. However, the findings of the Phase I ESA are still applicable to the proposed project because both projects proposed a residential neighborhood and a commercial plaza. Soil samples were taken to evaluate the potential for the presence of pesticide residues from historical farming activities. The samples were collected independently and before the ESA review of the property was completed. The sample locations could not be selected to evaluate suspect areas identified during the ESA. The sample locations are identified as SS1 through SS8, depicted in Exhibit 2 in Appendix A of the Phase I ESA (included in Appendix E).

The regulatory status of pesticide residues is dependent upon how the residue was formed. Pesticide residues that result from legal use of the product are not subject to hazardous waste regulations, even as the property is developed for other uses, because the material is present as

a result of its intended use. Residues from spills are subject to hazardous waste regulations, because spills are not an intended use and that a spilled material is considered a "waste" if it can no longer be used. In addition, if a soil containing pesticide residues is disposed of, then the hazardous waste regulations apply because the soil has become a waste. Regardless of whether the hazardous waste regulations apply, adverse health effects can result from exposure to pesticide residues. Mitigation of the adverse health effects may be warranted, even if the material is not classified as a hazardous waste.

Residue from three pesticides were detected at the site: DDT; DDE (by-product of the breakdown of DDT); and Dieldrin. The concentrations of these pesticides in the soil were found to be below the State's thresholds (values). The relatively uniform and low concentrations across the site suggest that these pesticides are present as a result of normal agricultural use. Based on the concentrations detected, pesticides do not appear to be a concern at the site.

Summary of Potential Recognized Environmental Conditions

The purpose of the ESA was to evaluate the site for the presence of Recognized Environmental Conditions [REC] related to the current or past use, handling, storage, or disposal of hazardous materials or petroleum products on or near the subject property. Although the presence of low concentrations of pesticide residue was found in the soil samples and therefore is not considered to be a REC, the ESA did identify a number of potential RECs in connection with this property as follows:

- The northern portion of the western site boundary contains debris and tree remnants. A stand of trees was present along that boundary of the site for many years and was removed between 2006 and 2009. Vehicle tracks in that area suggest that this area was flattened in the last few years (berms of wind-blown sand often build up under trees), and it is possible that debris observed in historical photos from onsite or the adjacent site is buried in that area. Debris by itself is not considered a hazardous material (though it can increase development costs), but the debris may contain hazardous materials. The potential presence of buried debris in the northwest corner of the site is considered an REC.
- Concrete slabs were observed near the southwest corner of the site. The slabs are located where a small building was located prior to 1974. Rural residences and farms often have on-site fuel storage tanks, either above-ground or underground (ASTs and USTs, respectively). Evidence of these features was not observed during the site visit. The concern with USTs is that a release can occur and not be noticed until the UST is removed. USTs are commonly found abandoned in place on older farm properties. The potential presence of USTs is an REC.

- What appears to be a dismantled well is located in proximity to the concrete slabs. An electric power pole is adjacent to the feature. If the feature is a former well, then it was likely powered electrically and the presence of a UST to power the well is less likely. Wells no longer in active use are required to be properly abandoned according to applicable State and County regulations. This potential well is an REC for the site.
- Building areas formerly used to store pesticides can contain pesticide residues at elevated concentrations due to spillage during mixing and loading activities. The presence of pesticides in the field areas indicates that pesticides were used on the site, and they may have been stored in the building formerly located in the southwest corner of the site. The potential presence of pesticide residues in the vicinity of the former building is an REC for the site.

Vehicle Fueling Station

Regarding the proposed vehicle fueling station, as outlined in Section 3.8.2, Environmental Setting, the applicant will be required to apply for permits to construct and operate the facility and will be subject to ongoing oversight by SCAQMD and Riverside County Fire Department throughout the life of the project (vehicle fueling station).

c) **No Impact.** There are no schools located within 0.25 miles of the project site. The nearest school to the project site is the Jordan Christian Academy, a small, private school, located approximately 0.4 miles south of the site on Calhoun Street at Avenue 51. As such, the project would result in no impact to schools due to hazardous materials handling or emissions.

d) **No Impact.** The project site is not located on the State of California Hazardous Waste and Substances Site List pursuant to Government Code Section 65962.5, according to the State Department of Toxic Substances Control Envirostor website (www.envirostor.dtsc.ca.gov/), accessed April 23, 2015. The project would have no impact in this regard.

e - f) **No Impact.** The project site is located four miles northwest of Jacqueline Cochran Regional Airport and is not within its Airport Influence Area Boundary. The site is also not in the vicinity of any private airstrips. The project would not result in safety hazards from proximity to airports for people living in the project area.

g) **Less than Significant.** The project would not interfere with any emergency response or evacuation plans. The residential and commercial components of the project will be designed with adequate ingress/egress in compliance with City of Coachella Fire Department requirements.

h) **No Impact.** The project area is not near any wildlands and is not susceptible to wildland fires; therefore, the project would not expose people or structures to significant injury, loss or death due to wildfires.

3.8.4 Mitigation Measures

RECs were identified for the project site that require remediation prior to commencement of grading and construction of the project.

HAZ-1 Further investigation of the vicinity of the slabs in the southwest corner of the site is recommended to evaluate the potential for USTs and pesticide residues. This would include a geophysical survey to look for buried objects and the collection of soil samples to test for pesticide residues.

HAZ-2 Abandon the existing well on site in accordance with applicable regulations.

HAZ-3 The potential exists for buried hazardous materials to be present in the northern portion of the western boundary of the site. Prior to commencement of grading, a geophysical survey shall be conducted to look for buried metallic objects, and a backhoe shall be used to dig into the debris field at representative locations to evaluate how much debris is present (if any) and whether hazardous materials appear to be present. If suspect materials are observed, soil samples should be collected and analyzed to evaluate whether hazardous materials are actually present.

HAZ-4 Prior to Certificate of Occupancy of the Vehicle Fueling Station, the applicant shall apply for and show proof of permits to construct and operate, including an approved HMBP.

3.8.5 Level of Significance After Mitigation

Adherence to existing State regulations regarding RECs, and the remediation of the site in accordance with the mitigation measures identified in the Phase I ESA would ensure that potential impacts would be less than significant levels.

3.9 Hydrology and Water Quality

3.9.1 Sources

The following sources were utilized to support the conclusions made in this section:

- Flood Insurance Rate Maps (FIRM), panel 06065C2262G retrieved from FEMA Map Service Center Website accessed April 2015.
- *Preliminary Hydrology Report (Ravella NWC Avenue 50 and Calhoun Street) Located in the City of Coachella, County of Riverside, California*, Prepared by RCE Consultants, Inc., February 2016.
- *Project Specific Preliminary Water Quality Management Plan for Tract No. 36680, Coachella, California,* Prepared by HEITEC, February 20, 2015.

3.9.2 Environmental Setting

The project site is relatively flat with no vegetation on the site aside from a few bushes near the northern boundary of the site. FIRM Panel 06065C2262G shows that the project site is located within Zone X, areas of 0.2 percent annual chance flood, areas of one percent annual chance flood with average depths of one foot, or with drainage areas less than one square mile, and areas protected by levees from one percent annual chance flood.

3.9.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantially additional sources of polluted runoff?	☐	☐	☐	☒

f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☒	☐
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a) **Less than Significant Impact.** Construction activities could expose soils to erosion from rainfall, runoff, and wind. Wind erosion could result in the generation of fugitive dust which is addressed in Section 3.3 Air Quality. Erosion from rainfall and runoff is more problematic because pollutants from heavy equipment or construction related materials, such as diesel, gasoline, oils, grease, solvents, lubricants, or other petroleum products could mix with the water and run offsite.

Prior to site disturbance, the applicant for both the residential and commercial components of the site must apply to the State Water Resources Control Board for coverage under the Construction General Permit (Order No. 99-08-DWQ) (CAS000002), which applies to all stormwater discharges from projects where clearing, grading, and excavation result in soil disturbance of at least one acre or more. The proposed project includes the disturbance of the approximately 20.4-acre site. The Construction General Permit requires an applicant to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP includes a list of the BMPs that would be implemented to prevent soil erosion and the discharge of construction-related pollutants that could contaminate nearby water resources. The SWPPP may include, but is not limited to, the following BMPs:

- *Temporary Soil Stabilization:* sandbag barriers, straw bale barriers, sediment traps, and fiber rolls;
- *Temporary Sediment Control:* hydraulic mulch and geotextiles;
- *Wind Erosion Control:* water of the construction site, straw mulch;
- *Tracking Control:* staging/storage area and street sweeping;
- *Non-stormwater Management:* clear water diversion and dewatering; and

- *Waste Management and Materials Pollution Control:* vehicle and equipment cleaning, concrete waste management, and contaminated soil management.

The proposed project must also prepare and implement a Water Quality Management Plan (WQMP) for both the residential and commercial components of the site that includes Best Management Practices (BMPs) to be implemented during post construction operations at the project site to ensure compliance with Regional Water Quality Control Board (RWCQB) water quality standards. Because the two components are different land uses, the WQMP for each site will include site specific BMPs. Such WQMP BMP protocol applicable to the project would include the following:

- Education for Property Owners, Operators, Tenants, Occupants, or Employees;
- Activity Restrictions;
- Irrigation System and Landscape Maintenance;
- Street Sweeping Private Streets and Parking Lots; and
- Drainage Facility Inspection and Maintenance

A WQMP must also include Structural Source Control BMPs specific towards landscape and Irrigation system design, MS4 stenciling and signage and protection of slopes and channels. Finally, the proposed residential portion of the project includes four stormwater basins located (see Exhibit 6) that will be developed with structural BMPs to capture and control pollutants that runoff the site into the basin prior to being released into the storm drain system. The basins will be designed to be five feet deep with an average 4h:1v (horizontal:verticle) slope. The commercial element of the project includes a retention basin on the north side of the Tower Market site, five feet deep with an average 4:1 slope. Therefore, with the project's compliance with SWPPP and WQMP requirements, impacts will be less than significant.

b) **Less than Significant Impact.** The project consists of a 14.5-acre residential component and a 5-acre commercial component on the site which will increase water demand and potentially increase demand on groundwater. Various conservation methods such as low flow toilets and other fixtures are state mandated and will help lower the demand from the project. Additionally, Coachella Valley Water District (CVWD) maintains groundwater recharge programs in the Valley which have been successful in helping to offset overpumping of groundwater. Therefore, adherence to said conservation methods will reduce impacts to less than significant.

c) **No Impact.** The project would not alter any streams or rivers but could alter the drainage pattern of the area by introducing impervious surfaces to the site. This could result in erosion offsite as well as increase the rate of runoff from the site. A SWPPP, including Best Management Practices (BMPs) would be implemented, retention system, etc.

d) **No Impact.** See response to "3.9.3 (c) above.

e) **No Impact.** Runoff water from the site is not expected to exceed the capacity of stormwater drainage systems as the residential component includes four retention basins, and the future commercial site would also be required to treat and retain stormwater onsite. A SWPPP and WQMP containing BMPs applicable to the project development would be implemented to reduce the potential for polluted runoff.

f) **Less than Significant Impact.** See response to 3.9.3 (a) above.

g) **Less than Significant Impact.** The Federal Emergency Management Agency (FEMA) produces maps (Flood Insurance Rate Map) that identify areas that are located in flood zones. The map that addresses this portion of the City of Coachella is FIRM Panel 06065C2262G which shows that the project site is located within Zone X. This zone designates areas of 0.2 percent annual chance flood, areas of one percent annual chance flood with average depths of one foot or with drainage areas less than one square mile, and areas protected by levees from one percent annual chance flood.

   To protect the site from potential flooding during storm events, the site will be graded so that it drains to four (4) on-site water quality (retention) basins located within the parks developed throughout the residential portion of the site (Refer to Exhibit 4). The commercial site would also be required to treat and retain stormwater onsite. Therefore, with installation of said retention basins, impacts in this regard are considered less than significant.

h) **No Impact.** See response to 3.9.3 (g) above.

i) **No Impact.** There are no levees or dams near the site.

j) **No Impact.** The project site is located too far inland to be inundated by a tsunami. Additionally, the project site is not near any bodies of water and is not near any substantial slopes; therefore the project site would not be inundated by seiche or mudflow.

3.9.4 Mitigation Measures

With implementation and compliance to standard operating procedures of the SWPPP and WQMP no mitigation measures are required.

3.9.5 Level of Significance After Mitigation

Impacts on hydrology and water quality would be less than significant.

3.10Land Use and Planning

3.10.1Sources

The following sources were utilized to support the conclusions made in this section:

- 2010 City of Coachella Zoning Map
- 2009 City of Indio Zoning Map; 2004 City of Indio General Plan Map
- 2011 Riverside County Progress Report for Coachella prepared by the Riverside County Center for Demographic Research http://www.rctlma.org/rcd/content/progress.aspx, accessed April 2015.
- Land Use Element p. 17, City of Coachella General Plan 2035

3.10.2 Environmental Setting

The project site is located in an area that is mainly developed with residential uses. The current General Plan and Zoning designations for the site are as follows:

General Plan: Current designation is Neighborhood Center (C-N).

Zoning: Current designation is Residential Single Family (R-S).

The project site (APN 612-280-018) is a vacant former agricultural site located at the northwest corner of Avenue 50 and Calhoun Street and is surrounded by residential neighborhoods to the north, east and south, and by vacant land and a church site to the west; vacant parcels in the vicinity are also designated for residential uses.

3.10.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) **No Impact.** The proposed project would not physically divide an established community. The project site is currently vacant and surrounded by residential neighborhoods. Each neighborhood is self-contained behind perimeter walls with access from public streets. Exhibit 2 in Chapter 2, *Project Description*, shows the communities near the project site.

b) **Less than Significant Impact.** The applicant is seeking a number of entitlements in order to develop an approximately 20-acre site into two separate projects, an approximately 5-acre commercial plaza at the northeast corner of Avenue 50 and Calhoun Street, and an approximately 14.5-acre residential subdivision.

Tentative Tract Map 37088

Tentative Tract Map (TTM) 37088 would create four parcels. Parcels 1 through 3 would contain a 5-acre commercial plaza to be located in the southeast portion of the project site at the corner of Avenue 50 and Calhoun Street and Parcel 4 would contain the proposed 115 residential dwelling units and associated infrastructure.

Change of Zone

Commercial Area

The applicant is pursuing a Change of Zone from R-S to Neighborhood Commercial (C-N NC-PD) to accommodate development of three commercial lots, the Tower Energy Market and Fueling Station (Lot 1) and two additional commercial pads (Lots 2 and 3). The commercial element of the project is illustrated in relation to the residential element of the project in Exhibit 6. The Commercial element will include the following:

- Lot 1 is a 1.37-acre lot containing a 5,200 square foot market, a 5,076 square foot fuel station area with a canopy structure, and 23 parking spaces in front of the market.
- Lot 2 is a 1.12-acre lot containing a 9,750 square foot commercial building on the southwest side of the property and 42 parking spaces around the east and north sides of the building.
- Lot 3 is a 2.58-acre lot containing a 20,000 square foot building on the north side of the commercial property to be used as a professional office and/or retail, and 94 parking spaces around the south and west side of the building.

Access to the commercial site will be from Avenue 50 and Calhoun Street and will be separate from the access drives into the residential neighborhood.

Residential Area

Lot 4 will require a Change of Zone from R-S to R-M-PD Residential Medium-Planned Development), establishing a Planned Development Overlay Zone to allow the development of 115 dwelling units and related uses (roads, 4 retention basins, open space, and a park site). Existing and proposed zoning designations are shown in Exhibit 6. The maximum residential lot size within Lot 4 will be 3,789 square feet and the minimum lot size will be 2,373; with an average lot size of 2,668.

The interior roads will be developed at 40 feet along the main road, and 32 feet wide for other interior roads. The residences will all include garages and driveways for resident parking. A total of 105 guest parking spaces will be available on both sides of the 40-foot wide streets, on one side of the 32-foot wide streets, and 6 parking spaces along the north side of the Lot AB (retention basin), and 10 spaces along the north side of Lot 3 (commercial site..

Access to the residential portion of the site will be from one entrance on Avenue 50, west of the commercial site, and a second entrance on Calhoun Street, north of the commercial site. Access to the residential area will not be gated.

Conditional Use Permits

Both the residential and commercial components require a Conditional Use Permit (CUP). CUP 267 would allow a Service Station use within the C-N-PD zoned area. CUP 268 would allow residential uses in the R-M-PD zoned area.

The residential component would assist in the demand for housing during present economic conditions. The area is currently developed with only single-family neighborhoods. The applicant proposes to develop homes on smaller lot sizes than other neighborhoods in the area. The project would still be compatible with these neighborhoods by providing single-family lots and would meet the goals of the General Plan to provide for a diversity of residential densities and housing types for Coachella residents.

Additionally, there are few commercial amenities in the immediate vicinity, aside from CVS Pharmacy at Van Buren Street and Avenue 50 and the Desert Store in Indio at Jackson Street and Avenue 50. The nearest gas station to this area is nearly two miles to the east, either at the Food For Less Shopping Center or at the intersection of Avenue 48 and Grapefruit Boulevard, but the commercial component of the project will develop a market and gas station adjacent to the residential development at the corner of Avenue 50 and Calhoun Street. Having a 5-acre neighborhood commercial site at this intersection would serve the residents of the existing residential in this area, as well as serve future residential developments proposed for this area.

Upon approval of the entitlements, TTM, Zone Change and CUPs, the project would be consistent with the City's Zoning and General Plan and no land use impacts would occur.

c) **No Impact.** The project is not located within any conservation areas of the CVMSHCP and would not conflict with this plan. The applicant will be responsible for the payment of the local development mitigation fee for the CVMSHCP. For residential development, the fee is based on units per acre. If the development is 0-8 units per acre, the current fee is $1301 per unit. For 8-14 units per acre, the current fee is $541 per unit and for 14+ units per acre, the current fee is $239 per unit. Commercial development is subject to the current fee in the amount of $5,809 per acre. These are the most current CVMSHCP fees. The fee schedule is updated at the beginning of each fiscal year.

3.10.4 Mitigation Measures

No mitigation measures are required.

3.10.5 Level of Significance After Mitigation

The project would have a less than significant impact on land use.

3.11 Mineral Resources

3.11.1 Sources

The following sources were utilized to support the conclusions made in this section:

- City of Coachella General Plan 2020

3.11.2 Environmental Setting

The project is located in the MRZ-1 zone, as shown in the City's General Plan, which includes areas where adequate information indicates that no significant aggregate deposits are present or where it is judged that little likelihood exists for their presence.

3.11.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
MINERAL RESOURCES – Would the project:				

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a-b) **No Impact.** Since the project is located in the MRZ-1 zone, it would not result in the loss of availability of known mineral resources or locally-important mineral resource recovery sites.

3.11.4 Mitigation Measures

No mitigation measures are required.

3.11.5 Level of Significance After Mitigation

The project would not impact mineral resources.

3.12 Noise

3.12.1 Sources

The following sources were utilized to support the conclusions made in this section:

- City of Coachella Noise Control Ordinance, Chapter 7.04 of the City of Coachella Municipal Code, http://library.municode.com/index.aspx?clientId=16080, accessed Nov 2012.
- *Noise Study, Avenue 50 and Calhoun Street, City of Coachella,* Prepared by Ldn Consulting, Inc., January 12, 2016. See Appendix G-1
- *Noise Study Ravella (TTM 36680) Residential Development City of Coachella*. Prepared by Ldn Consulting Inc. April 17, 2015. See Appendix G-2

3.12.2 Environmental Setting

The project site is located in an area that is mainly developed with single family residential uses. There are single family communities to the north, south and east of the site. The project site itself is currently vacant and a vacant parcel is located southeast of the site, on the southeast corner of Calhoun Street and Avenue 50. The main noise sources in the area would be associated with traffic along Calhoun Street and Avenue 50 and noise associated with residences, such as air conditioning units and various maintenance activities including landscaping or home improvement. The project is a mixed-use project that proposes to develop 20 acres with a 115-lot residential subdivision and a commercial plaza.

Noise Studies were performed by Ldn Consulting for the residential and commercial portions of the project. See Appendix G-1. The ambient measurements were conducted on March 6, 2015. Exhibit 15, *Noise Measurement Location-Residential,* and Exhibit 16, *Noise Measurement Location- Commercial*, show the locations where noise measurements were taken. Noise levels associated with the residential site are shown in Table 19*, Ambient Noise Levels-Residential,* and noise levels associated with the commercial plaza are shown in Table 20, *Ambient Noise Levels- Commercial.* Due to proximity to the roadway, the overall sound level for both sites was found to be 58.1 dBA under existing conditions.



Source: Ldn Consulting, 2015

The Altum Group

Noise Measurement Location - Residential
Tower Energy Project Initial Study

Exhibit 15

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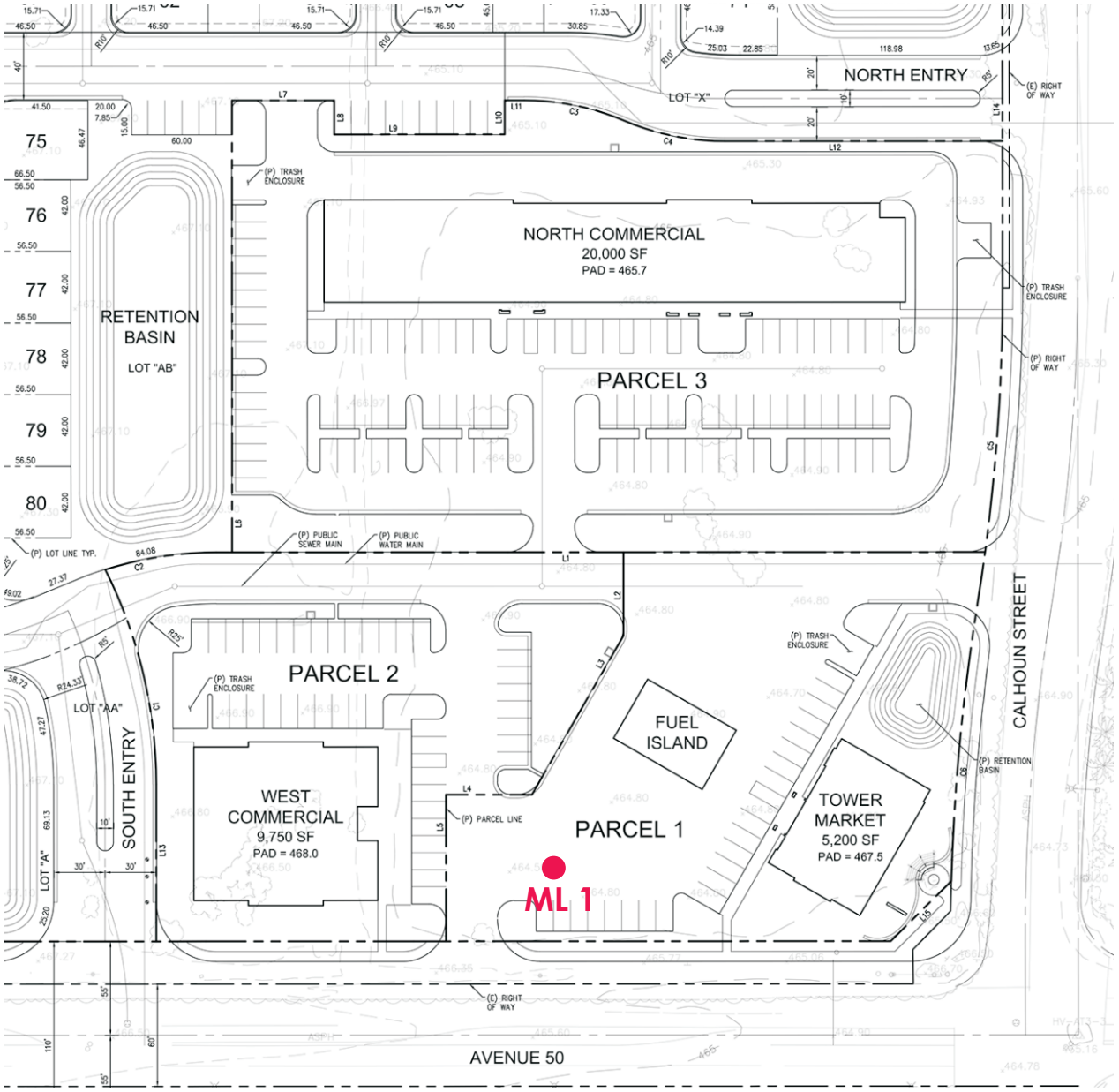

Source: Ldn Consulting, 2015

The Altum Group

Noise Measurement Location - Commercial
Tower Energy Project Initial Study

Exhibit 16

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Table 19 Ambient Noise Levels - Residential

Name	Source	Time	Noise Levels (dBA)					
			Leq	Lmax	Lmin	L10	L50	L90
ML1	Avenue 50	2:30 PM - 3:00 PM	58.1	71.4	45.4	56.4	55.6	50.8

Source: Table 4-1, Noise Study, Avenue 50 and Calhoun Street, City of Coachella, Ldn Consulting, Inc. January 12, 2016.

Table 20 Ambient Noise Levels - Commercial

Name	Source	Time	Noise Levels (dBA)					
			Leq	Lmax	Lmin	L10	L50	L90
ML1	Avenue 50	2:30 PM - 3:00 PM	58.1	71.4	45.4	56.4	55.6	50.8

Source: Table 4-1, Noise Study, Ravella (TTM 36680) Residential Development, Ldn Consulting, Inc. April 13, 2015.

Noise Terminology

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs, and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Community Noise Equivalent Level (CNEL) is the 24-hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

A vehicles noise level is a combination of the noise produced by a vehicle's engine, exhaust, and tires. The cumulative traffic noise levels along a roadway segment are based on three primary factors: the amount of traffic, the travel speed of the traffic, and the vehicle mix ratio or number of medium and heavy trucks.

Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt, and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas, and vegetation. Alternately, fixed/point sources radiate outward uniformly as it travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance.

Noise Standards

State Standards

California Code of Regulations, Title 24

California Noise Insulation Standards established an interior noise standard of 45 dBA for single unit, multiple unit and hotel/motel structures. Acoustical studies must be prepared for single unit residential structures that are proposed to be located within the Community Noise Equivalent Level (CNEL) noise contours of 60 dBA or greater. The study must demonstrate that the building is designed to reduce interior noise to 45 dBA or lower (CNEL).

Local Standards

City of Coachella General Plan

Table 22, *Land Use - Noise Compatibility Guidelines,* provides a land use compatibility matrix for community noise from the City of Coachella General Plan for evaluating land use noise compatibility when reviewing proposed land use development projects. A “clearly compatible” land use indicates that standard construction methods will attenuate exterior noise to an acceptable indoor noise level and people can carry out outdoor activities with minimal noise interference. Evaluation of land use that falls into the “normally compatible” or “normally incompatible” noise environment should have an acoustical study prepared. The acoustical study should include, with consideration of the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source may interfere with speech, sleep, or other activities characteristic of the land use. For land uses indicated as “normally compatible” or “normally incompatible”, structures must be capable of attenuating exterior noise to the indoor noise level as shown in Table 22, land uses indicated as “clearly incompatible”, new construction should generally not be undertaken.

City of Coachella Municipal Code

A noise ordinance is designed to control unnecessary, excessive and annoying sounds from stationary (non-transportation) noise sources. Noise ordinance standards typically apply to industrial and

commercial noise sources impacting residential areas. They are also applicable to noise generated at parks and schools impacting residential areas and residential uses impacting other residential uses. Noise ordinance requirements cannot be applied to mobile noise sources such as heavy trucks when traveling on public roadways. Federal and State laws preempt control of mobile noise sources on public roads. City of Coachella Municipal Ordinances applicable to the evaluation of the proposed project in this analysis are presented below.

Chapter 7.04.030 (A)

It shall be unlawful for any person to make, continue, or cause to be made or continued, within the city limits any disturbing excessive or offensive noise or vibration which causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area or that is plainly audible at a distance greater than fifty (50) feet from the sources point for any purpose. Table 21, Noise Decibel Limits, lists the ten-minute average sound level limits, unless otherwise specifically indicated, shall apply as indicated in the following table as it relates to a fixed noise source or leaf blowers pursuant to Section 7.04.075.

Table 21 Noise Decibel Limits

Zone	Time	Applicable Ten-Minute Average Decibel Limit (A-weighted)
All residential zones	6:00 a.m. to 10:00 p.m. 10:00 p.m. to 6:00 a.m.	55 45
All commercial zones	6:00 a.m. to 10:00 p.m. 10:00 p.m. to 6:00 a.m.	65 55

Source: Section 7.04.075, Coachella Municipal Code.

Chapter 7.04.070

No person shall perform, nor shall any person be employed, nor shall any person cause any other person to be employed to work for which a building permit is required by the city in any work of construction, erection, demolition, alteration, repair, addition to or improvement of any building, structure, road or improvement to realty except between the hours as set forth as follows:

October 1st through April 30th

Monday—Friday: 6:00 a.m. to 5:30 p.m.
Saturday: 8:00 a.m. to 5:00 p.m.
Sunday: 8:00 a.m. to 5:00 p.m.
Holidays: 8:00 a.m. to 5:00 p.m.

May 1st through September 30th

Monday—Friday: 5:00 a.m. to 7:00 p.m.
Saturday: 8:00 a.m. to 5:00 p.m.

Sunday: 8:00 a.m. to 5:00 p.m.
Holidays: 8:00 a.m. to 5:00 p.m.

Chapter 7.04.075(A)

Noise sources associated with property maintenance activity and all portable blowers, lawnmowers, edgers or similar devices shall be prohibited except during the following hours:

October 1st through April 30th

Monday—Sunday: 9:00 a.m. to 5:30 p.m.

Holidays: Not allowed.

May 1st through September 30th

Monday—Friday: 8:00 a.m. to 5:30 p.m.

Saturday and Sunday: 9:00 a.m. to 5:30 p.m.

Holidays: Not allowed."

Significance Threshold

In accordance with CEQA, a project should not have a noticeable adverse impact on the surrounding environment. Noise level changes greater than 3 dBA, or a doubling of the acoustic energy, are often identified as audible and considered potentially significant, while changes less than 1 dBA are not discernible. In the range of 1 to 3 dBA, humans who are very sensitive to noise may perceive a slight change. For the purposes for this analysis, a direct and cumulative roadway noise impact would be considered significant if the project increases noise levels at a noise sensitive land use 3 dBA CNEL and if the noise level increases above an unacceptable noise level per the City's General Plan.

Table 22 Land Use- Noise Compatibility Guidelines[1]

LAND USE CATEGORIES		CNEL						
CATEGORIES	USES	55	60	65	70	75	80	
RESIDENTIAL	Single Family, Duplex, Multiple Family							
RESIDENTIAL	Mobile Homes							
COMMERCIAL - Regional, District	Hotel, Motel, Transient Lodging							
COMMERCIAL - Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater							
COMMERCIAL INDUSTRIAL	Office Building, Research and Development, Professional Offices, City Office Building							
COMMERCIAL - Recreation INSTITUTIONAL - Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall							
COMMERCIAL - Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club							
COMMERCIAL - General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities							
INSTITUTIONAL - General	Hospital, Church, Library, School Classroom							
OPEN SPACE	Parks							
OPEN SPACE	Golf Couse, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat							
AGRICULTURE	Agriculture							

INTERPRETATION

ZONE A (GREEN) CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.
ZONE B (YELLOW) NORMALLY COMPATIBLE	New construction or development should be undertaken only after an analysis of the noise reduction requirements is made and needed noise insulation features included in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning will normally suffice.
ZONE C (ORANGE) NORMALLY INCOMPATIBLE	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D (RED) CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

* Construction of new residential uses will not be allowed within the 65 dBA CNEL contour for airport noise.

Source: Table 4-1, Noise Study, Avenue 50 and Calhoun Street, City of Coachella, Ldn Consulting, Inc. January 12, 2016.

Notes:

1. City of Coachella Noise Element (2014).

3.12.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a/d) **Less Than Significant Impact**. The two project elements (residential and commercial land uses) potential to generate excessive noise due to construction and operation. The Noise Studies prepared by Ldn Consulting evaluated potential impacts from construction as well as operational traffic noise that the project could have on sensitive receptors within the vicinity.

Operational Noise Impacts

Both project phases will be required to comply with the Noise Control Ordinance for the City of Coachella, which gives sound level limits for fixed noise sources (Refer to Chapter 7.04.030 of the City's Municipal Code) Table 23, *Noise Decibel Limits*, lists these levels.

Table 23 Noise Decibel Limits

Zone	Time	Applicable Ten-Minute Average Decibel Limit (A-weighted)
All residential zones	6:00 a.m. to 10:00 p.m. 10:00 p.m. to 6:00 a.m.	55 45
All commercial zones	6:00 a.m. to 10:00 p.m. 10:00 p.m. to 6:00 a.m.	65 55

Source: Section 7.04.030, Coachella Municipal Code.

Additionally, "Noise sources associated with property maintenance activity and all portable blowers, lawnmowers, edgers or similar devices shall be prohibited except during the following hours:

October 1st through April 30th
Monday—Sunday: 9:00 a.m. to 5:30 p.m.
Holidays: Not allowed.

May 1st through September 30th
Monday—Friday: 8:00 a.m. to 5:30 p.m.
Saturday and Sunday: 9:00 a.m. to 5:30 p.m.
Holidays: Not allowed."

The Noise Ordinance also requires installation of new air conditioning, refrigeration and pool equipment to be certified and to be within the provisions of the ordinance for night and day operation noise levels as shown in Table 23 above.

Since the project is required to comply with the City's Noise Ordinance, the project would have a less than significant impact.

Commercial Site Analysis

A review of the proposed project indicates that noise sources such as deliveries, parking lot activities and mechanical ventilation system (HVAC) are the primary sources of stationary noise sources for non-residential projects. This section provides a detailed description of the reference noise level measurement results. It is important to note that the following projected noise levels assume the worst-case noise environment with roof-top mounted mechanical

ventilation (HVAC) all occurring at the same time. In reality, these noise levels will vary throughout the day. The mechanical ventilation may operate during nighttime hours and the operational hours of the deliveries and parking lot activities may be limited.

Deliveries

The proposed project includes professional office uses plus a small market and fueling station that would involve occasional truck deliveries. Typically, trucks used to make deliveries can generate a maximum noise level of 70-75 dBA at a distance of 50 feet depending on the size of the truck. The proposed project is not anticipated to require a significant number of truck deliveries or the need for larger trucks with the exception of the fuel transport trucks, the deliveries for the proposed project would consist of smaller deliveries in smaller trucks and/or step side vans and would be somewhat infrequent. The noise associated with one large truck delivery and smaller truck would not result in a significant number of truck trips to significantly increase noise within the project area. Therefore, truck deliveries would not be intrusive or result in substantially greater noise levels than currently exist and impacts would be less than significant.

Parking Lots

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale. However, the instantaneous sound levels generated by a car door slamming and engine starting up may be an annoyance to adjacent sensitive receptors. The estimated maximum noise levels associated with parking lot activities typically range from 60-65 dBA and are short term. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards in the CNEL scale, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower. Therefore, the proposed parking would not result in substantially greater noise levels than currently exist at the project site and impacts would be less than significant.

Construction Noise Impacts

Construction activities could cause short-term impacts to adjacent land uses. Grading activities typically represent one of the highest potential sources of noise impacts, with anticipated equipment including: dozers, scrapers, graders, pavers, a roll compactor, loaders, and a water truck.

Residential Site Analysis

Due to physical constraints and normal site preparation operations, most of the construction equipment will be spread out over the site from distances adjacent to occupied property lines to distances of 600 feet or more away. Estimating an average distance of 140 feet from the property line, the point source from the construction activities is 75 dBA or below. Table 24, *Construction Noise Levels- Residential,* shows the anticipated noise levels from construction equipment onsite.

The City does not have a specific construction noise level threshold, but Table 23 lists the applicable operational noise levels. Because noise levels would be short term and intermittent during construction, the impact would be less than significant.

Table 24 Construction Noise Levels- Residential

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA)*	Duty Cycle (Hours/Day)	Cumulative Noise Level @ Property
Scrapers	2	75	8	78.
Dozer	2	74	8	77.
Grader	2	73	8	76.
Roller Compactor	1	74	8	74.
Water Truck	2	70	8	70.
Blade	2	75	8	78.
Cumulative Noise Levels @ 50-Feet (dBA)				**84.0**
Average Distance (Feet)				**140**
Anticipated Property Line Noise Level (dBA)				**75.1**

Source: Table 4-1, Noise Study, Ravella (TTM 36680) Residential Development, Ldn Consulting, Inc. April 13, 2015.

Commercial Site Analysis

Due to physical constraints and normal site preparation operations, most of the construction equipment will be spread out over the site from distances adjacent to occupied property lines to distances of 600 feet or more away. Estimating an average distance of 140 feet from the property line, the point source from the construction activities is 75 dBA. Table 25, *Construction Noise Levels - Commercial,* shows the anticipated noise levels from construction equipment onsite. The City does not have a specific construction noise level threshold, and as a result, no impacts are anticipated.

b) **Less Than Significant Impact.** During construction, nearby residents may experience some groundborne vibration due to the use of various construction equipment. However, construction hours are limited to daytime hours and construction would last only a few months. Impacts would be less than significant.

Table 25 Construction Noise Levels- Commercial

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA)*	Duty Cycle (Hours/Day)	Cumulative Noise Level @ Property
Dozer	1	74	8	74
Grader	1	73	8	73
Roller Compactor	1	74	8	74
Water Truck	1	70	8	70
Blade	1	75	8	75
Cumulative Noise Levels @ 50-Feet (dBA)				**81**
Average Distance (Feet)				**100**
Anticipated Property Line Noise Level (dBA)				**75**

Source: Table 4-1, Noise Study, Avenue 50 and Calhoun Street, City of Coachella, Ldn Consulting, Inc. January 12, 2016.

c) **Less Than Significant impact With Mitigation Incorporated.** During the life of the project, noise associated with traffic in the area would be the main source of noise associated with the project.

Residential Noise Analysis

Onsite Traffic Noise

A total of ten modeled receptor locations were performed along the perimeter of the residential portion of the project. Exhibit 17, *Modeled Receptor Locations*, shows the receptor locations onsite. The four locations along Avenue 50 (Receptors 4-7) exceeded the City of Coachella 65 dBA CNEL exterior noise level standards, with a maximum noise level of 68 dBA CNEL as shown in Table 26, *Future Exterior Noise Levels*. The applicant is proposing to construct a six-foot high noise barrier (wall) along Avenue 50 in front of the residential element of the project. This has been reviewed by the project's Noise Specialist and found to be adequate for sound attenuation for rear yards. The barrier shall be constructed of a non-gapping material consisting of masonry, ½-inch thick glass, earthen berm or any combination of these materials. Furthermore, as a result of facades noise levels exceeding the 60 dBA CNEL threshold (see Table 26), Mitigation Measure N-2 will require a final noise study be prepared prior to the issuance of the first building permit for all lots, to ensure a 45 dBA CNEL interior noise level per the City of Coachella noise guidelines.

Off-Site Traffic Noise

To determine if direct offsite noise level increases associated with the development of the project will create noise impacts, the noise levels for the existing conditions were compared with the noise levels once the project is built. Table 27, *Existing and Existing Plus Project Noise Levels,* shows the direct noise level comparison. The overall roadway segment noise levels are expected to increase by 0.2 dBA CNEL with the development of the project.

Table 26 Future Exterior Noise Levels

Receptor Number/Lot #	Unmitigated Noise Level (dBA CNEL)	Barrier Heights (Feet)	Mitigated Noise Level (dBA CNEL)*	Second Floor Noise Level (dBA CNEL)*
1	58	0	5	5
2	60	0	6	6
3	63	0	6	6
4	68	4	6	6
5	68	4	6	6
6	68	4	6	6
7	68	4	6	6
8	62	0	6	6
9	62	0	6	6
10	60	0	60	60
* Interior Noise Assessment required if façade noise level is above 60 dBA CNEL.				

Source: Table 5-2, Noise Study, Ravella (TTM 36680) Residential Development, Ldn Consulting, Inc. April 13, 2015.

Table 27 Existing and Existing Plus Project Noise Levels

Roadway Segment	Existing Noise Level @ 50-feet (dBA CNEL)	Existing + Project Noise Level @ 50-feet (dBA CNEL)	Difference (dBA CNEL)
Avenue 50			
Between Jackson & Colonia	68.1	68.4	0.2
Between Colonia & Calhoun	68.3	68.4	0.1
Calhoun Street			
North of Avenue 50	68.4	68.6	0.2

Source: Table 5-5, Noise Study, Ravella (TTM 36680) Residential Development, Ldn Consulting, Inc. April 13, 2015.

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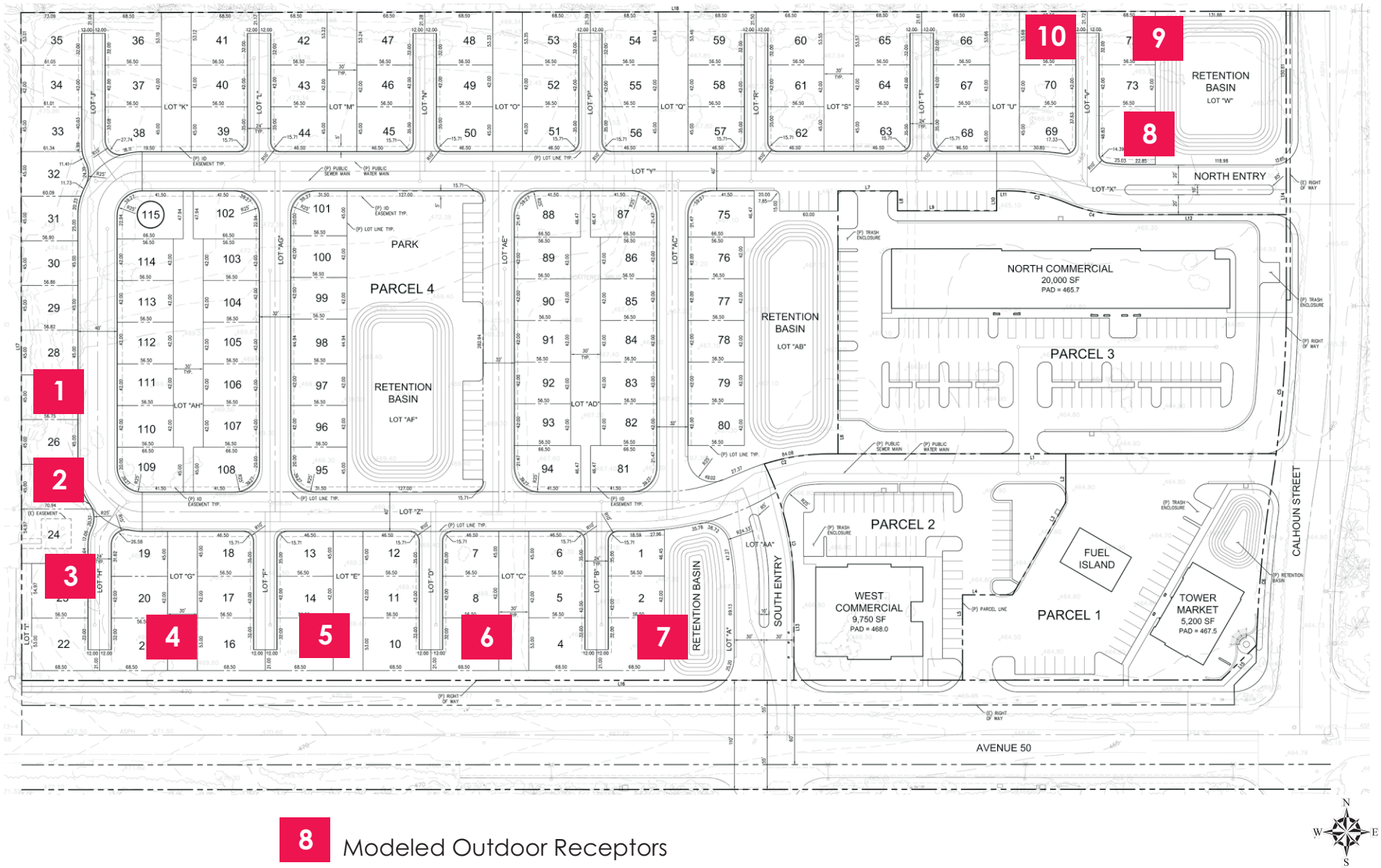

8 Modeled Outdoor Receptors

Source: Ldn Consulting, 2015

The Altum Group

Modeled Receptor Locations
Tower Energy Project Initial Study

Exhibit 17

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To determine if cumulative offsite noise level increases associated with the development of the project and other planned or permitted projects in the vicinity will create noise impacts, the noise levels for the near-term Project Buildout and other planned and permitted projects were compared with existing conditions. Table 28, *Existing Plus Near-Term Plus Project plus Cumulative Noise Levels*, shows the cumulative noise level comparison. The overall roadway segment noise levels will increase by a maximum of 2.0 dBA CNEL with the development of the project and other planned/permitted projects.

Table 28 Existing Plus Near-Term Plus Project Plus Cumulative Noise Levels

Roadway Segment	Existing Noise Level @ 50-feet (dBA CNEL)	Existing + Project Noise Level @ 50-feet (dBA CNEL)	Difference (dBA CNEL)
Avenue 50			
Between Jackson & Colonia	68.1	70.1	2.0
Between Colonia & Calhoun	68.3	70.2	1.9
Calhoun Street			
North of Avenue 50	68.4	69.8	1.3

Source: Table 5-7, Noise Study, Ravella (TTM 36680) Residential Development, Ldn Consulting, Inc. April 13, 2015.

Since the project does not create a direct or cumulative noise increase of more than 3 dBA CNEL on any roadway segments, off-site roadway noise increases will not cause any significant effects.

Commercial Noise Analysis

Traffic Noise

To determine if direct or cumulative off-site noise level increases associated with the development of the proposed project would create noise impacts, the traffic volumes for the existing conditions were compared to the traffic volume increase of existing plus project conditions. The proposed project site generates 1,365 daily trips with a worst case peak hour volume of 134 trips. The existing average daily traffic (ADT) volumes are 8,295 to 10,432 along adjacent roadway segments. If the project caused traffic volumes to double, then the project would have a direct impact of 3 dBA CNEL or more, causing significant impacts. According to Traffic models analyzed in Section 2.16, Transportation/Traffic, the project would only increase traffic volume on adjacent roadways by less than 20%, and therefore, increased project-related traffic noise would be minimal and there would be no significant impact.

e-f) **No Impact.** The project site is not located within any airport land use plans or near any private airstrips; therefore, residents or workers would not be exposed to excessive airport noise levels.

3.12.4 Mitigation Measures

N-1 The project's Noise Study evaluated a four-foot high barrier on top of a manufactured berm. However in redesigning the site, the applicant is proposing a six-foot high barrier (wall) to be constructed along Avenue 50 in front of the residential component of the project. This has been reviewed by the project's Noise Specialist and found to be adequate for sound attenuation for rear yards. The barrier shall be constructed of a non-gapping material consisting of masonry, ½-inch thick glass, earthen berm or any combination of these materials.

N-2 Prior to issuance of the first building permit for the residential element of the project, a final noise study shall be prepared to ensure a 45 dBA CNEL interior noise level in the locations where noise levels are above 60 dBA CNEL, at the locations indicated in Exhibit 5-1 *Modeled Receptor Locations* and Table 5-3 *Future Exterior Noise Levels* in Appendix G.

3.12.5 Level of Significance After Mitigation

The project would have a less than a significant impact on noise level with implementation of Mitigation Measures N-1 and N-2.

3.13 Population and Housing

3.13.1 Sources

The following sources were utilized to support the conclusions made in this section:

- Report E-5 City/County Population and Housing Estimates 1/1/2014, retrieved from California Department of Finance Website, http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/view.php, accessed April 2015.
- Report E-1 Estimates for Cities, Counties, and the State, January 1, 2013 and 2014 http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/view.php, accessed April 2015.
- *Monthly Labor Force Data for Cities and Census Designated Place (CDP) September 2014 – Preliminary Data Not Seasonally Adjusted*, October 17, 2014, http://www.labormarketinfo.edd.ca.gov, State of California Employment Development Department, Labor Market Information Division. Accessed April 2015.
- *Building Area Per Employee by Business Type*, United States Green Building Council Website. http://www.usgbc.org/Docs/Archive/General/Docs4111.pdf. Accessed April 2015.

3.13.2 Environmental Setting

The estimated population of Coachella for 2014 is 43,633 and has an estimated 4.63 persons per household (California Department of Finance Report E-5, 2014) and a vacancy rate of 9.1 percent. Although the County unemployment rate is 6.9 percent, Coachella's is above the county average at 10.7 percent.

3.13.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) **Less than Significant Impact**. The project consists of the construction of a 115-lot residential neighborhood on approximately 14.57 acres, which would potentially result in the addition of approximately 526 new residents to the City. Under the current zoning designation (R-S), 4.6 dwelling units per acre are allowed. At this density, approximately 72 dwelling units could be developed on the 14.57-acre site. This would result in the addition of approximately 329 new residents. The Change of Zone to R-M-PD and a Conditional Use Permit, would net an additional 43 dwelling units and could introduce approximately 200 more residents to the City than if the project were developed under the R-S zone. This represents a maximum residential density for the 14.57-acre site. Under the proposed project, the site will include a 5-acre commercial site that will provide employment. The commercial element will include a market (5,200 square feet) with eight gas pumps (Lot 1), a 20,000 square feet medical/retail office (Lot 3), and a 9,750 square foot commercial building (Lot 2). It is anticipated that most employees would come from the

local population so that the commercial component of the project would not generate a substantial increase in the City's population. Therefore, this impact would be less than significant.

b-c) **No Impact.** The project is proposed to be located on a vacant parcel within the City; therefore, development of the project would not displace any homes or persons.

3.13.4 Mitigation Measures

No mitigation measures are required.

3.13.5 Level of Significance After Mitigation

The proposed project would not have an impact on population or housing.

3.14 Public Services

3.14.1 Sources

The following sources were utilized to support the conclusions made in this section:

- Coachella General Plan 2035 Draft EIR, (Pending Adoption as of April 2015).
- City of Coachella Municipal Code Section 4.45
- Riverside County Fire Department website, http://www.rvcfire.org/stationsAndFunctions/Pages/default.aspx, accessed Marc 2015.
- Riverside County Fire Department Annual Report, 2013.
- Riverside County Sheriff's Department website, http://www.riversidesheriff.org/stations/thermal.asp, accessed March 2015.
- Coachella Police Department website, http://www.coachella.org/departments/police-department/patrol, accessed March 2015.
- Coachella Valley Unified School District Facilities Department website, http://www.coachella.k12.ca.us/district/business_services/facilities , accessed March 2015.
- Riverside County Library website, http://rivlib.info/coachella-library/, accessed March 2015.

3.14.2Environmental Setting

3.14.2.1 Fire Protection

The City of Coachella contracts with the Riverside County Fire Department (RCFD) to provide a full range of fire protection services to the citizens of Coachella. The contract includes fire suppression, fire

prevention, emergency medical response, hazardous materials response team, urban search and rescue response team, and all other related public services.

The City of Coachella has one Fire Station, Battalion 6 Coachella Fire Station No. 79, located at 1377 Sixth Street in the City of Coachella, which serves the incorporated portions of the City. Surrounding areas outside the City limits are served by RCFD stations located in the City of Indio, La Quinta, and Thermal as part of a Regional Fire and Emergency Medical Response plan.

Station No. 79 is staffed by 18 full time personnel (with a minimum of six firefighters on duty at all times), 10 volunteer firefighters, and 10 explorer cadets. Station No. 79 is a full service Fire Department Station, with an apparatus of two Type 1 fire engines that provide 24-hour, year round service. Fire engine staffing includes three persons per engine per day, which includes a Company Officer/Operator, one firefighter and one firefighter/paramedic. The common national standard for fire service is one firefighter staff person per 1,000 City residents. Coachella currently has a ratio of 0.4 firefighter people per 1,000 residents. During the year 2013, the department responded to 2,271 calls for service in the City, which represents a 1.52% increase from 2012.

3.14.2.2 Police Protection

The City of Coachella contracts with the Riverside County Sheriff's Department for law enforcement services. The Coachella Police Department operates out of the Thermal Sheriff's station located at 86625 Airport Boulevard in Thermal. The Coachella Police Department Contract consists of 36 sworn officer positions. Twenty four (24) of these positions are dedicated to the patrol division with the remaining officers dedicated to special assignments such as the Community Action Team (C.A.T.), School Resource Officers, along with Gang and Narcotics Enforcement.

3.14.2.3 Schools

The project is located within the Coachella Valley Unified School District. The District currently charges School/Developer Fees, to mitigate for influx of students from new developments, in the amounts of $3.36 per square foot for residential development and $0.54 per square foot for commercial development.

3.14.2.4 Parks

See Section 3.15 for discussion on parks.

3.14.2.5 Other Public Facilities

The Riverside County Library System provides library services to the City of Coachella. Participation in the Riverside County Library System enables library users to access all libraries within the system, which includes 35 libraries and two bookmobiles including one serving Coachella. The Coachella Library branch is the only library within the City limits and is located at 1538 Seventh Street.

3.14.3Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire Protection?	☐	☐	☒	☐
Police Protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

3.14.3.1 Fire Protection

Less than Significant Impact. The project would have an impact on the Fire Department's ability to provide fire protection services to the project site as the site is currently vacant. Applicable local regulations related to fire protection for the City is contained in the City's Municipal Code Chapter 8.28, which addresses storage of flammable hazardous and potentially flammable materials and Chapter 4.45, which requires Development Impact Fees for Public safety capital improvement facilities. Compliance with the City's Municipal Code would result in less than significant impacts to fire protection services. In addition, the Fire Department will review and comment on the site plans, at such time as an application for the development of the residential and commercial components of the project are submitted. At this time, the Fire Department would require conditions of approval regarding adequate emergency access, street widths/turning radii, etc. IN addition, the fueling station component of the project will require additional scrutiny from the Fire Department which is the Certified Unified Program Agency for Hazardous Materials, including the operation of fueling stations. The applicant must prepare and implement a Hazardous Materials Business Plan (HBMP) which includes an Emergency

Response Plan. The HBMP is subject to review and approval by the Fire Department. (Also, see discussion in Section 3.8 Hazards and Hazardous Materials). Therefore, with compliance of the Fire Department's requirements for the development of the residential and commercial components the impact would be less than significant.

3.14.3.2 Police Protection

Less than Significant Impact. The project design or location does not present any special security problems. The residential component of the project will be a gated community with a wall around the perimeter of the site, and to points of entry, one on Avenue 50 and one on Calhoun Street. The commercial center will be developed with a mix of restaurant, retail and office uses and will also have two points of access, one on each street. The project would be required to pay Development Impact Fees according to Municipal Code Section 4.45, which requires developer fees for Public safety capital improvement facilities. Compliance with the City's Municipal Code would result in less than significant impacts to police protection services. In addition, the Police Department will review and comment on the site plans submitted with the application for the development of the residential and commercial components of the project. At this time, the Police Department would require conditions of approval regarding adequate emergency access, lighting and landscaping, etc. Therefore, with compliance of the Police Department's requirements for the development of the residential and commercial components the impact would be less than significant.

3.14.3.3 Schools

Less than Significant Impact. The project is located within the Coachella Valley Unified School District. Student Generation Rates broken down by housing type are found in the District's latest *School Facilities Needs Analysis*. Based on these rates, the project could generate 226 students in the District. These students may or may not be totally new to the District; families may relocate to the proposed development from other parts of the District, merely shifting the student population from other areas of the District. Additionally, the District currently charges Level I School/Developer Fees, to mitigate for influx of students from new developments, in the amounts of $3.36 per square foot for residential development and $0.54 per square foot for commercial development. Development fees would be paid to the District prior to occupancy of the project; therefore, this impact would be less than significant.

3.14.3.4 Parks

Less than Significant Impact. See Section 3.15 for discussion on parks.

3.14.3.5 Other Public Facilities

Less than Significant Impact. Section 4.45 of the City's Municipal Code sets forth development impact fees to accommodate the need for public facilities and mitigate the financial and

physical impacts for all development projects within the City (Municipal Code Section 4.45.030). Currently, for library services, fees are $298 per dwelling unit for residential developments. The project would be required to pay the library fee for its residential component. The project would have a less than significant impact upon payment of the required development impact fees.

3.14.4 Mitigation Measures

No mitigation measures are required.

3.14.5 Level of Significance After Mitigation

The project would have a less than significant impact on public services.

3.15 Recreation

3.15.1 Sources

The following sources were utilized to support the conclusions made in this section:

- *List of Parks*, City of Coachella website http://coachella.org/departments/public-works/parks-maintenance/list-of-parks, accessed March 2015.

3.15.2 Environmental Setting

The City operates eight public parks around the City. The nearest park to the site is Ye'we'vichem Park, located approximately 0.5 miles north of the site within the Tierra Del Sol community. This park is an open grass area, approximately 0.6 acres, with benches. The City's largest park is Bagdouma Park, located approximately 1.5 miles southeast of the site, which consists of 34 acres and has the following amenities; baseball/softball fields, tennis courts, a swimming pool, restrooms, a pavilion and playground, tables and benches, bleachers, parking, open grass, soccer/football fields, basketball courts, and drinking fountains. The City also operates a skate park at the southwest corner of Bagdad Avenue and Shady Lane, approximately 3 miles southeast of the site.

3.15.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a-b) **No Impact.** The residential component of the project consists of a 115 single-family units, which would increase the amount of residents in the area by approximately 526 people. This may increase the use of existing neighborhood and regional parks or other recreational facilities; however, the residential component itself includes a small park within the neighborhood, along with an additional 1.63 acres in four on-site retention basins that could be used for passive recreation. Finally, because the relatively small neighborhood is in close proximity to future commercial uses on the adjacent site, residents will be encouraged to walk rather than drive. The construction of these facilities would have a less than significant effect on the environment. In addition, the project would be required to pay development impact fees for park improvements within the City in the amount of $3,541 per dwelling unit. The project would have a less than significant impact on parks and recreational facilities.

3.15.4 Mitigation Measures

No mitigation measures are required.

3.15.5 Level of Significance After Mitigation

The project would have a less than significant impact on parks and recreational facilities.

3.16 Traffic and Transportation

3.16.1 Sources

The following sources were utilized to support the conclusions made in this section:

- TJW Engineering Inc*., Avenue 50 and Calhoun Street Project Traffic Impact Analysis*, November 13, 2015. (Appendix H)

3.16.2 Environmental Setting

The project site is a 19.57-acre site located north of Avenue 50 and west of Calhoun Street in the City of Coachella. Currently the site is bounded by a residential subdivision to the north, Calhoun Street to the East, Avenue 50 to the south, and an existing church building and vacant land to the west. The project consists of two components: a residential development and a commercial plaza. Exhibit 18, *Study Area Intersections*, shows the area studied in the *Traffic Impact Analyses*.

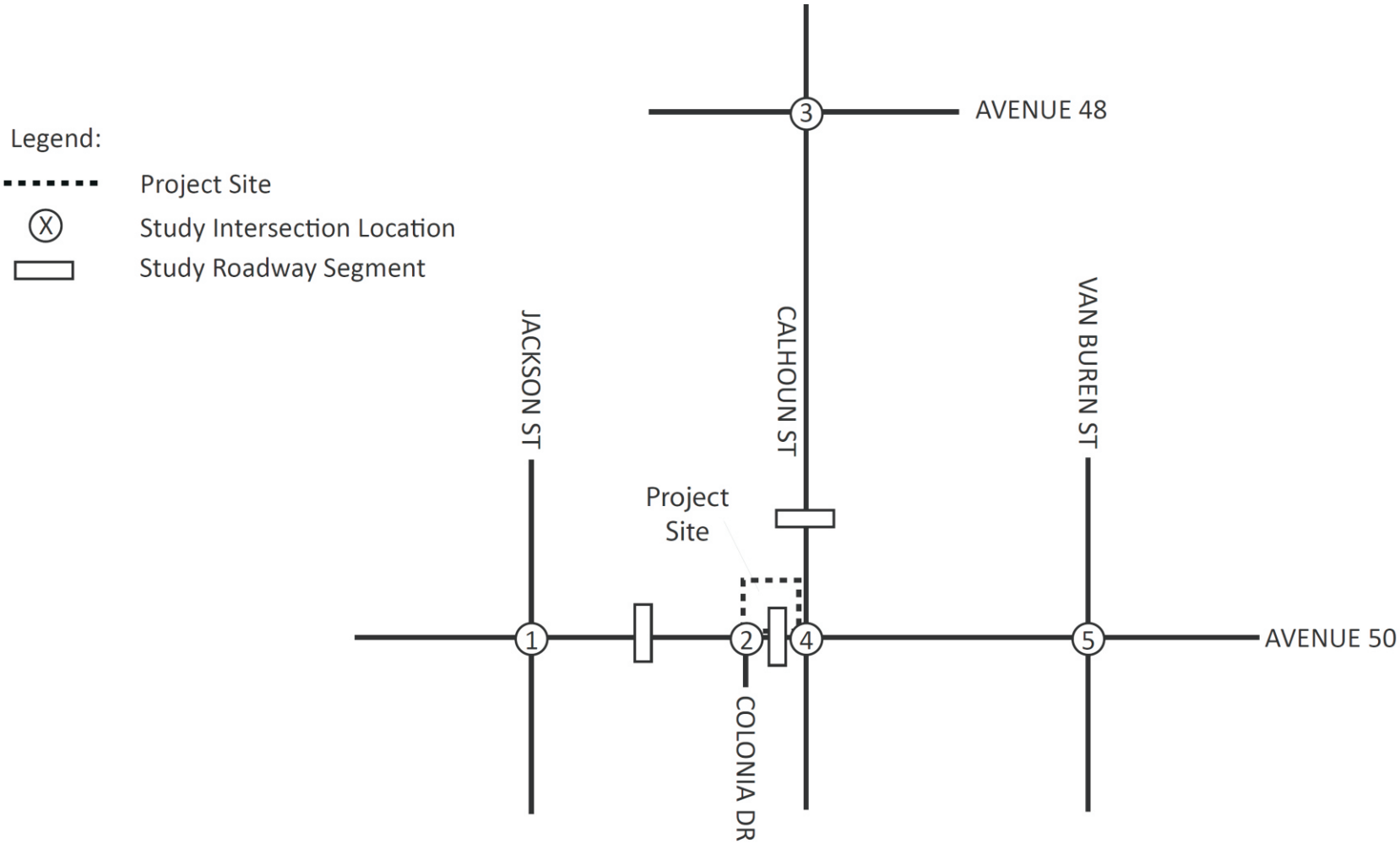
The residential component consists of 115 dwelling units covering 14.5 acres of the site. Site access for the proposed project will include one full ingress/egress on Calhoun Street and one full access ingress/egress on Avenue 50 aligned with Colonia Drive to the south. The residential component of the project is expected to generate a net total of 1,095 daily trips with approximately 86 AM peak trips and 115 PM peak trips.

The commercial component covers five acres of the site, consisting of a market at the corner of Avenue 50 and Calhoun Street accompanied by an 8-pump gas filling station with a canopy structure, a 20,000 square feet retail/medical office, a 9,750 square foot commercial building and 144 parking spaces for commercial use. The commercial component of the project is expected to generate 2,133 daily trips with approximately 144 AM peak hour trips and 194 PM peak hour trips.

Analysis Methodology

The analysis of impacts from the proposed project was based on an evaluation of the existing and forecast traffic conditions in the vicinity of the site “with” and “without” the project. The following analyses are considered in this report:

- Existing Conditions
- Existing Plus Ambient (2017) Growth Plus Project Conditions
- Existing Plus Ambient (2017) Growth Plus Project Cumulative Conditions



Source: TJW Engineering, 2015

The Altum Group

Study Area Intersections
Tower Energy Project Initial Study

Exhibit 1

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The roadway elements analyzed were dependent on both the analysis year and project generated trips. The identification of the study area, and the intersections requiring analysis were based on an estimate of the two-way traffic volumes on the roadway segments near the project site.

Thresholds of Significance

The City of Coachella General Plan Circulation Element states that the City will maintain a minimum citywide LOS D at all City intersection and roadways. Portions of the study lie within the City of Indio. The City of Indio General Plan states that the City will maintain a minimum citywide LOS D at intersection. Therefore, for all study intersections in this analysis, LOS D or better is considered an acceptable LOS, while LOS E or F is considered unacceptable. Table 28, *HCM-LOS and Delay Ranges Signalized Intersections,* shows the general characteristics of traffic flow and accompanying delay ranges at signalized intersections.

Table 29 HCM-LOS and Delay Ranges – Signalized Intersections

Level of Service	Description	Delay (In Seconds)
A	Very favorable progression; most vehicles arrive during green signal and do not stop. Short cycle lengths.	0 - 10.00
B	Good progression, short cycle lengths. More vehicles stop than for LOS A.	10.01 – 20.00
C	Fair progression; longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, though many vehicles still pass through without stopping.	20.01 – 35.00
D	Progression less favorable, longer cycle length and high flow/capacity ratio. The proportion of vehicles that pass through without stopping diminishes. Individual cycle failures are obvious.	35.01 – 55.00
E	Severe congestion with some long standing queues on critical approaches. Poor progression, long cycle lengths and high flow/capacity ratio. Individual cycle failures are frequent.	55.01 – 80.00
F	Very poor progression, long cycle lengths and many individual cycle failures. Arrival flow rates exceed capacity of intersection.	> 80.01

Source: Table 1, TJW Engineering, Ravella Project (TTM 36680) Traffic Impact Analysis, March 27, 2015.

Existing Roadway and Traffic Conditions

The existing roadways and traffic conditions are based on the Intersection Delay and level of Service (LOS) for intersections in the vicinity of the project area as shown in Table 25, *Existing Intersection Delay and Level of Service*. The County of riverside traffic study guidelines requires signalized intersection operations to be analyzed utilizing the HCM 2010 methodology. Intersection LOS for signalized

intersections is based on the intersections average control delay for all movements at the intersection during the peak hour.

Table 29, *Intersection Analysis- Existing Conditions* shows that existing study area intersections are currently operating at acceptable Levels of Service during the peak hours for Existing Traffic Conditions (without the project) except for the following study area intersections operating at unacceptable Levels of Service during the AM and PM peak hours:

- Jackson Street (NS) at Avenue 50 (EW)
- Calhoun Street (NS) at Avenue 50 (EW)

Traffic signal warrants for Existing Conditions were prepared based on existing peak hour intersection volumes at all unsignalized study intersections. Currently, a traffic signal is warranted at the following study area intersection for Existing Traffic Conditions (without the project):

- Jackson Street (NS) at Avenue 50 (EW)
- Calhoun Street (NS) at Avenue 50 (EW)

Table 30 Intersection Analysis – Existing Conditions

Intersection	Control Type	AM Peak Hour Delay - LOS	PM Peak Hour Delay - LOS
Jackson Street/Avenue 50	AWSC	47.5 – E	57.1 – F
Colonia Drive/Avenue 50	TWSC		
Overall Intersection		1.6 – A	0.8 – A
Westbound Left-Turn		7.9 – A	8.4 – A
Northbound Right/Left-turn		14.8 - B	13.7 – B
Calhoun Street/Avenue 48	Signal	15.5 – B	16.0 – B
Calhoun Street/Avenue 50	AWSC	55.9 – F	63.8 – F
Van Buren Street/Avenue 48	Signal	23.1 – C	26.8 – C

Source: Table 4, TJW Engineering, Ravella Project (TTM 36680) Traffic Impact Analysis, March 27, 2015.

Note: AWSC = All-Way Stop-Control, TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle

Table 31 *Roadway Segment Analysis – Existing Conditions* summarizes the existing conditions for the roadway segment analysis and is based on the LOS D capacities provided in the City of Coachella General Plan Traffic Impact Study Final Report. As shown in Table 30, the study area roadway segments are currently operating at an acceptable LOS (LOS D or better) for existing conditions.

Table 31 Roadway Segment Analysis – Existing Conditions

Roadway Segment	Existing Cross Section	LOS D Capacity	Existing		
			ADT	V/C	LOS
Avenue 50 between Jackson and Colonia	2U	12,000	10,044	0.75	C
Avenue 50 between Colonia and Calhoun	2U	12,000	10,432	0.78	C
Calhoun between Avenue 49 and Project Drwy	2U	12,000	8,295	0.62	B
Calhoun between Project Drwy and Avenue 50	2U	12,000	8,295	0.62	B

Source: Table 5 Roadway Segment Analysis – Existing Conditions; TJW Engineering Inc., 2015.

Notes: 2U = two-lane undivided roadway. V/C = volume to capacity ratio.

Existing Transit Service

The City of Coachella is served by the Sunline Transit Agency which provides bus service to the desert cities. There are no Sunline Transit routes directly serving the project site. The closest bus stop is for Route 90 at the intersection of Avenue 50 and Van Buren Street approximately 0.5 miles east of the proposed project site. Bus route 90 provides service between the City of Coachella and the Highway 111 and Flower transit center with headways of 25-35 minutes in weekdays and 35 minutes on weekends and holidays.

3.16.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
TRANSPORTATION/TRAFFIC – Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☒	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other	☐	☒	☐	☐

standards established by the county congestion management agency for designated roads or highways?				
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
e) Result in inadequate emergency access?	☐	☒	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☒	☐	☐

a-b) Less Than Significant With Mitigation Incorporated. Traffic impacts from the proposed Tower Energy residential and commercial development and the assessment determination of the required mitigation measures were based on the Traffic Impact Analyses' evaluation of the existing and forecast traffic conditions in the vicinity of the site with, and without the project.

Existing Plus Ambient Growth Plus Project (EAP) Conditions

Table 31, *Intersection Analysis - Existing Plus Ambient Plus Project Conditions-Commercial,* and Table 32*, Intersection Analysis - Existing Plus Ambient Plus Project Conditions-Residential,* provides data on the Study Area intersections during peak hours for Existing Conditions With Ambient Growth Included for the project's opening year, 2017, and the project. Under this scenario, Study Area intersections are projected to operate within acceptable Levels of Service (LOS D or better) during peak hours for both residential and commercial phases, except for the following Study Area intersections that are projected to operate at unacceptable Levels of Service during peak hours without improvements:

- Jackson Street (NS) at Avenue 50 (EW)
- Calhoun Street (NS) at Avenue 50 (EW)

Traffic signal warrants for EAP conditions have been prepared based on existing peak hour intersection volumes at all unsignalized study intersections. A traffic signal is warranted at the following study area intersection for EAP traffic conditions and TJW Engineering recommends the improvements in the Traffic Impact Analysis for both residential and commercial components without improvements:

- Jackson Street (NS) at Avenue 50 (EW)

- Calhoun Street (NS) at Avenue 50 (EW)

Table 32 Intersection Analysis Existing Plus Ambient Plus Project Conditions – Commercial

Intersection	Control Type[1]	Existing (2015)				EAP (2017)			
		Delay[2]		LOS		Delay[2]		LOS	
		AM	PM	AM	PM	AM	PM	AM	PM
Jackson Street/Avenue 50	AWSC	47.5	57.1	E	F	49.2	61.9	E	F
Colonia Drive/Avenue 50	TWSC	14.8	13.7	B	B	18.4	18.6	C	C
Calhoun Street/Avenue 48	Signal	15.5	16.0	B	B	15.8	17.4	B	B
Calhoun Street/Avenue 50	AWSC	55.9	63.8	F	F	59.1	67.5	F	F
Van Buren Street/Avenue 48	Signal	23.1	26.8	C	C	24.1	28.4	C	C
Driveway 1/Avenue 50	TWSC	Not Applicable				11.2	11.3	B	B
Calhoun Street/Driveway 2	TWSC	Not Applicable				14.3	14.6	B	B

Source: Table 9, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Note:

1. AWSC = All-Way Stop-Control, TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle, 1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections.
2. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

Table 33 Intersection Analysis Existing Plus Ambient Plus Project Conditions - Residential

Intersection	Control Type[1]	Existing (2015)				EAP (2017)			
		Delay[2]		LOS		Delay[2]		LOS	
		AM	PM	AM	PM		AM	PM	AM
Jackson Street/Avenue 50	AWSC	47.5	57.1	E	F	49.1	61.9	E	F
Colonia Drive/Avenue 50	TWSC	14.8	13.7	B	B	19.0	19.4	C	C
Calhoun Street/Avenue 48	Signal	15.5	16.0	B	B	15.8	17.4	B	B
Calhoun Street/Avenue 50	AWSC	55.9	63.8	F	F	59.8	67.4	F	F
Van Buren Street/Avenue 48	Signal	23.1	26.8	C	C	24.3	28.0	C	C
Calhoun Street/Driveway 2	TWSC	Not Applicable				14.1	14.2	B	B

Source: Table 10, TJW Engineering, Ravella Project (TTM 36680) Traffic Impact Analysis, March 27, 2015.

Note:

1. AWSC = All-Way Stop-Control, TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle, 1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections.
2. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

Table 34, *Intersection Analysis- EAP Conditions with Improvements,* shows the intersection LOS with and without improvements. With recommended improvements to add a traffic signal at

the Jackson Street/Avenue 50 intersection and the Calhoun Street/Avenue 50 intersection, impacts on these intersections would be reduced to less than significant impacts. Transportation improvements, including intersection signalization, are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs such as the City's adoption of the Transportation Uniform Mitigation Fee (TUMF) program and the City's Development Impact Fee (DIF) program. The proposed project is subject to both the TUMF and the City's DIF. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

Table 34 Intersection Analysis – EAP Conditions with Improvements

Intersection	Control Type[1]	EAP (2017)			
		Delay[2]		LOS	
		AM	PM	AM	PM
Jackson Street/Avenue 50					
Without Improvement	AWSC	49.2	61.9	E	F
With Improvement	Signal	10.8	13.2	B	B
Calhoun Street/Avenue 50					
Without Improvement	AWSC	59.1	67.5	F	F
With Improvement	Signal	11.9	15.9	B	B

Source: Table 12, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Notes:

1. AWSC = All-Way Stop-Control, Delay shown in seconds per vehicle.
2. Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

Existing Plus Ambient Growth Plus Project Plus Cumulative (EAPC) Conditions

Table 35, *Intersection Analysis - Existing Plus Ambient Plus Project Plus Cumulative Conditions Commercial,* and Table 36, *Intersection Analysis - Existing Plus Ambient Plus Project Plus Cumulative Conditions – Residential,* provide the study area intersection during peak hours for existing conditions with ambient growth included for the project's opening year, 2017, the project, and projects in the study area that are either approved or currently being processed. Under this scenario, study area intersections are projected to operate within acceptable levels of service (LOS D or better) during peak hours, except for the following study area intersections that are projected to operate at unacceptable Levels of Service during AM peak hours without improvements for the residential component:

- Calhoun Street (NS) and Avenue 50 (EW)
- Colonia Drive (NS) and Avenue 50 (EW)

Table 35 Intersection Analysis –
Existing Plus Ambient Plus Project Plus Cumulative Conditions - Commercial

Intersection	Control Type[1]	EAPC (2017)			
		Delay[2]		LOS	
		AM	PM	AM	PM
Jackson Street/Avenue 50	Signal	13.9	21.6	B	C
Colonia Drive/Avenue 50	TWSC	29.5	25.8	D	D
Calhoun Street/Avenue 48	Signal	16.6	19.5	B	B
Calhoun Street/Avenue 50	Signal	11.3	16.1	B	B
Van Buren Street/Avenue 48	Signal	30.9	47.7	C	D
Driveway 1/Avenue 50	TWSC	12.0	12.9	B	B
Calhoun Street/Driveway 2	TWSC	15.9	17.3	C	C

Source: Table 13, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Notes:
1. AWSC = All-Way Stop-Control, TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
2. Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

The signal warrant analysis showed that a signal was not warranted at the Colonia Drive/Avenue 50 intersection, based on the thresholds of significance for EAPC conditions. Based on the more recent traffic study for the commercial component a traffic signal is warranted at the Calhoun/Avenue 50 intersection and the Jackson/Avenue 50 intersection. With the addition of traffic signals at the Calhoun Street/Avenue 50 and Jackson Street/Avenue 50 intersections, platooning of vehicles on Avenue 50 will result in adequate gaps being available from Colonia Drive onto Avenue 50, and cumulative impacts will be less than significant. Furthermore, implementation of Mitigation Measure TIA-3 involving installation of stop control improvements would assist in providing safe entry and merging of vehicles onto Avenue 50 from Colonia Drive.

Table 36 Intersection Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions - Residential

Intersection	Control Type[1]	EAPC (2017)			
		Delay[2]		LOS	
		AM	PM	AM	PM
Jackson Street/Avenue 50	Signal	16.8	29.8	B	C
Colonia Drive/Avenue 50	TWSC	48.8	34.8	E	D
Calhoun Street/Avenue 48	Signal	16.9	20.0	B	B
Calhoun Street/Avenue 50	AWSC	71.6	66.6	F	F
Van Buren Street/Avenue 48	Signal	35.8	54.2	D	D
Calhoun Street/Driveway 2	TWSC	16.5	17.6	C	C

Source: Table 14, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Notes:
1. AWSC = All-Way Stop-Control, TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
2. Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

Roadway Segment Analysis

Table 37, *Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions- Residential and* Table 38, *Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions-Commercial,* summarizes EAP conditions for the roadway segment analysis based on the LOS D capacities provided in the Coachella General Plan Traffic Impact Study Final Report.

As shown in Tables 36 and 37, the study roadway segments are projected to operate at an acceptable LOS (LOS D or better) for EAP conditions.

Table 37 Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions-Residential

Roadway Segment	EAP Cross Section[1]	LOS D Capacity	EAP		
			ADT	V/C[2]	LOS
Avenue 50 between Jackson and Colonia	4D	28,900	10,998	0.34	A
Avenue 50 between Colonia and Calhoun	4D	28,900	11,182	0.35	A
Calhoun between Avenue 49 and Project Driveway	4D	28,900	8,959	0.28	A
Calhoun between Project Driveway and Avenue 50	4D	28,900	8,959	0.28	A

Source: Table 11, TJW Engineering, Ravella Project (TTM 36680) Traffic Impact Analysis, March 27, 2015.

Notes:
1. 4D = four-lane divided roadway.
2. V/C = volume to capacity ratio.

Table 38 Roadway Segment Analysis – Existing Plus Ambient Plus Project Conditions- Commercial

Roadway Segment	EAP Cross Section	LOS D Capacity	EAP		
			ADT	V/C[1]	LOS
Avenue 50 between Jackson and Colonia	4D	28,900	11,133	0.35	A
Avenue 50 between Colonia and Calhoun	4D	28,900	11,263	0.35	A
Calhoun between Avenue 49 and Project Driveway	4D	28,900	9,040	0.28	A
Calhoun between Project Driveway and Avenue 50	4D	28,900	9,040	0.28	A

Source: Table 10, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Notes:
1. V/C = volume to capacity ratio.

Table 39, *Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions- Residential* and Table 39, *Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions- Commercial*, summarizes EAPC conditions roadway segment analysis based on the LOS D capacities provided in the Coachella General Plan Traffic Impact Study Final Report.

Table 39 Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions - Residential

Roadway Segment	EAPC Cross Section	LOS D Capacity	EAP		
			ADT	V/C	LOS
Avenue 50 between Jackson and Colonia	4D	28,900	15,998	0.50	D
Avenue 50 between Colonia and Calhoun	4D	28,900	16,182	0.50	D
Calhoun between Avenue 49 and Project Driveway	4D	28,900	11,259	0.35	D
Calhoun between Project Driveway and Avenue 50	4D	28,900	11,259	0.35	D

Source: Table 11, TJW Engineering, Ravella Project (TTM 36680) Traffic Impact Analysis, March 27, 2015.

Notes:
4D = four-lane divided roadway.

As shown in Tables 38 and 39, the study roadway segments are projected to operate at an acceptable LOS (LOS D or better) for *EAPC* conditions for both components of the project and there will be no significant impacts to roadway level of service in the project area.

Table 40 Roadway Segment Analysis – Existing Plus Ambient Plus Project Plus Cumulative Conditions – Commercial

Roadway Segment	EAPC Cross Section	LOS D Capacity	EAP		
			ADT	V/C[1]	LOS
Avenue 50 between Jackson and Colonia	4D	28,900	14,138	0.44	A
Avenue 50 between Colonia and Calhoun	4D	28,900	13,948	0.43	A
Calhoun between Avenue 49 and Project Driveway	4D	28,900	10,520	0.33	A
Calhoun between Project Driveway and Avenue 50	4D	28,900	10,520	0.33	A

Source: Table 14, TJW Engineering, Avenue 50 and Calhoun Street Project Traffic Impact Analysis, March 27, 2015.

Note:

V/C = volume to capacity ratio.

c) **No Impact.** The proposed project is for a 115-lot residential development with a commercial plaza covering five acres at the corner of Avenue 50 and Calhoun Street. The project is located approximately four miles northwest of Jacqueline Cochran Regional Airport and will not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

d-e) **Less than Significant Impact With Mitigation Incorporated.** The project will not increase hazards due to a roadway design feature. Wherever necessary, roadways adjacent to a proposed project site along with project site access points shall be constructed in compliance with roadway classifications and respective cross-sections as adopted in the Coachella 2035 General Plan Circulation Element.

The project's Tentative Map (Tract Map No. 37088) is bordered by Avenue 50 and Calhoun Street. The applicant is required to provide half-street improvements on both streets to be designed per City engineering standards and Fire code standards for safe accessibility. Therefore, as recommended in the Traffic Impact Analysis and as incorporated through Mitigation Measures TIA-2 through TIA-4, impacts with regard to increased hazards due to design features and inadequate emergency access will be reduced to less than significant.

f) **Less Than Significant Impact With Mitigation Incorporated.** The existing Sunline Transit Agency routes are within close proximity to the project site and could potentially serve future residents within the project. As described below, implementation of Mitigation Measure TIA-2 will provide ultimate half section improvements to Avenue 50 and Calhoun Street, which will include installation of sidewalks for bicycle and pedestrian access along the project site exterior. Therefore, impacts regarding access to public transit and availability for bike or pedestrian facilities will be less than significant.

3.16.4 Mitigation Measures

TIA-1 The project applicant shall pay a fair share of the cost to signalize the following intersections recommended for *EAP* conditions to reduce peak hour delay and improve intersection and roadway segment LOS to LOS D or better:

- Install a traffic signal at Jackson Street/Avenue 50
- Install a traffic signal at Calhoun Street/Avenue 50

TIA-2 The applicant shall construct the north side of Avenue 50 along the project's frontage to its ultimate half section width as a Major Arterial with Bicycle Facility (118-foot cross section) in compliance with applicable City standards. The applicant shall also construct the west side of Calhoun Street along the project's frontage to its ultimate half section width as a Collector with Bicycle Facility (90-foot cross section) in compliance with applicable City standards.

TIA-3 *Driveway 1/Colonia Drive and Avenue 50* – The Project shall install a stop control on the southbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through-right turn lane.
- Southbound Approach: One shared left-through-right turn lane.
- Eastbound Approach: One left turn lane (within painted median), two through lanes and one defacto right-turn lane.
- Westbound Approach: One left turn lane, one through lane and one shared through-right turn lane.

Calhoun Street and Driveway 2 – The Project shall install a stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One left-turn lane and one through lane.
- Southbound Approach: One shared through-right turn lane.
- Eastbound Approach: One shared left-right turn lane.

TIA-4 Prior to the issuance of building permits for each component of the project, the applicant shall pay applicable City of Coachella Development Impact Fees (DIF) and County of Riverside Transportation Uniform Mitigation Fees (TUMF) in effect at that time.

3.16.5 Level of Significance After Mitigation

With the implementation of the aforementioned mitigation measures, project-specific and cumulative impacts on Traffic and Circulation will be less than significant.

3.17 Utilities and Service Systems

3.17.1 Sources

The following sources were utilized to support the conclusions made in this section:

- *City of Coachella Urban Water Management Plan*, prepared by TKE Engineering and Planning, July 13, 2011, retrieved from City of Coachella website, http://www.coachella.org/services/document-central/-folder-109, accessed March 2015
- Burrtec Waste and Recycling Services website http://www.burrtec.com/coachella, accessed March 2015.
- Jurisdiction Landfill tonnage reports, Riverside County Waste Management Department website http://www.rivcowm.org/opencms/ab939/ab939.html, accessed April 2015.

3.17.2 Environmental Setting

Water

The Coachella Water Authority (CWA) serves the incorporated area with potable water. The CWA operates a water supply, storage, and delivery system consisting of wells, reservoirs, booster stations, and distribution lines. Currently, groundwater wells supply the City with all of the potable water. The City's wells draw from the Coachella Valley Groundwater Basin. The six groundwater wells that currently supply water to the City are capable of providing 1,200 to 2,500 gallons per minute (gpm) each. The well water production reports recorded 7,330 acre-feet pumped in 2010, or approximately 11 million gallons per day (mgd) on average.

Wastewater

The Valley Sanitary District (VSD) provides wastewater service to areas within the project site. The VSD maintains approximately 340,000 linear feet of wastewater conveyance pipeline, powered by two pump stations. The VSD also operates a Wastewater Treatment Plant located on Avenue 54, east of Polk Street in Coachella. In 2008, the City upgraded the capacity of the Coachella Water Reclamation Facility to 4.5 MGD and current average daily discharge is 2.7 MGD. The plant remains a full secondary treatment facility with oxidation ditches for denitrification. The immediate service area encompasses approximately a 32-square mile City boundary and an approximate 64-square mile sphere of influence. The VSD currently serves 6,500 Equivalent Dwelling Units (EDUs) and approximately 3,500 customers via its wastewater conveyance network.

Solid Waste Disposal

Burrtec provides the City with solid waste collection services. Burrtec provides curbside pickup for regular trash, green waste and recyclables and offers bulky Item Pick-up, Christmas Tree Recycling, Electronic Waste, and Used Motor Oil Collection upon request. Solid waste that is collected from the

City is routed to the Coachella Transfer Station, operated by Burrtec, located north of Interstate 10 and east of Dillon Road on Landfill Road. Waste is then routed to one of the County's six landfills which are operated by the Riverside County Waste Management Department.

3.17.3 Impacts

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes, and regulations related to solid waste?	☐	☐	☒	☐

a) **Less than Significant Impact.** The project would be served by the VSD for wastewater treatment (sewer). The project would add wastewater from additional residences and a commercial area to the City's existing wastewater system. Water conservation features, such as low flow plumbing, would direct less wastewater into the system. Additionally, VSD is required to comply

with the applicable Regional Water Quality Control Board requirements. The project would have a less than significant impact regarding wastewater treatment requirements.

With regard to stormwater runoff, the proposed project includes implementation of a SWPPP (see Section 3.9, *Hydrology and Water Quality*) for the evaluation of construction and operations impacts. Prior to site disturbance, the applicant must apply to the State Water Resources Control Board for coverage under the Construction General Permit (Order No. 99-08-DWQ) (CAS000002), which applies to all stormwater discharges from projects where clearing, grading, and excavation result in soil disturbance of at least one acre or more. Likewise, during operation of both the residential and commercial components of the project, the operator(s) must comply with an approved WQMP that sets forth the requirements for capturing, retaining and treating stormwater and nuisance water from the site.

b) **Less than Significant Impact.** The project will require the construction of new water and wastewater lines in order to serve the residences and commercial area with water and wastewater service. These lines will tie into the City's existing water and wastewater lines. The City has planned for the long term development of a variety of future residential and commercial uses.

c) **Less than Significant Impact.** To protect the site from potential flooding during storm events, the residential component of the site will be graded so that runoff drains into three on-site water quality (retention) basins to be situated around the site. Exhibit 6, *Site Plan,* in the project description shows where the park and retention basins will be placed. The basins will be designed to retain a 100-year flood event. See Section 3.9, Hydrology and Water Quality for additional discussion of this issue. The applicant for the commercial component will also be required to grade the site so that storm flows are retained on site to the satisfaction of the City Engineer. The central retention basin on Lot AB of the TTM (Exhibit 6) will be designed to accept flows from both the commercial and residential phases. Therefore, this impact would be less than significant.

d) **Less than Significant Impact.** (See a and b) The project is currently served by Coachella Valley Water Authority (CWA) for water services. The project's residential and commercial uses are projected to use an average of 679,000 gallons per month over a 12 month period. This amount, however, is considered non-substantial and would not necessitate the need for new or expanded water services or entitlements, as such uses are assumed on the CWA Urban Water Management Plan, based on the General Plan. The project would have a less than significant impact.

e) **Less than Significant Impact.** See response 3.18.3 (a).

f) **Less than Significant Impact.** The proposed project would generate solid waste such as cardboard, food waste, and other materials associated with packaging as well as construction and demolition waste. Most solid waste construction materials can be recycled, composted or

otherwise diverted out of landfills. Trash, recyclables, and construction and demolition waste will be sent to the Coachella Valley Transfer Station (CVTS) for sorting and processing. Some of this material such as dimensional lumber and wall board can be diverted to the Coachella Valley Compost (CVC) facility, near the CVTS, for composting. During operation of the residential and commercial components of the project, solid waste and recyclables will be collected and hauled to CVTS, where they will be transferred to a Material Recovery Facility or Landfill. Greenwaste from the residential component of the project, in the form of lawn clippings, palm fronds, tree trimming, etc., would be transported to the CVC, along with food waste and grease trap liquids that may be generated at future restaurants in the commercial component of the project. These feedstock materials are all used to produce soil amendment products, including compost that can be used in the community.

According to *Jurisdiction Landfill Tonnage Reports* from Riverside County Waste Management Department, 5,441.76 total tons of solid waste was hauled to County landfills from Coachella. Jurisdictions from all over the State contribute 777,473.51 tons of solid waste to County landfills. Coachella contributes approximately 0.7 percent of solid waste to this total. The proposed project would not significantly increase this amount and a less than significant impact is expected.

g) **Less than Significant Impact.** The project is required to comply with the State mandates regarding solid waste and recycling and will comply therefore there would be a less than significant impact.

3.17.4 Mitigation Measures

No mitigation measures are required.

3.17.5 Level of Significance After Mitigation

The project would have a less than significant impact on utilities and service systems.

3.18 Mandatory Findings of Significance

3.18.1 Sources

All sources previously listed were used to support the conclusion made in this sections.

3.18.2 Environmental Setting

The environment setting for the project site is summarized within Section 3.1 through 3.17 of the Initial Study for each environmental issue.

3.18.3 Impacts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

a) **Less than Significant Impact with Mitigation Incorporated.** *Biological Resources and Habitat.* The project site is a vacant parcel of land located on the northwest corner of Calhoun Street and Avenue 50. Although generally void of vegetation, the project does contain one mature tree located near the western boundary and could be suitable for nesting birds. Furthermore, the project site may also provide foraging habitat for some avian species as well as foraging and nesting habitat for burrowing owl, a State of California Species of Concern. Therefore, with implementation of Mitigation Measures BIO-1 and BIO-2, impacts in regard to project having the potential to degrade the environment will be reduced to less than significant.

Cultural Resources. The cultural resources assessment prepared for the project site included a search of archaeological and historical records encompassing a one-mile radius around the approximate 20-acre project site. Results of these studies indicate that there are a total of 33

cultural resources known in the vicinity with fifteen (15) sites that have been documented within a ½ mile to 1 mile radius. Most of these resources are prehistoric in nature. Two sites containing Native American human cremations were also identified within a one-mile radius of the project site and therefore may pose a remote possibility that human cremations may be present in subsurface contexts within the project site.

Additionally and based on the results of the records search, the project site is considered to be highly sensitive for containing prehistoric archaeological deposits in subsurface contexts. The potential for the project site to contain intact historical archaeological deposits is considered to be low-to-moderate. Therefore, to reduce potential impacts to Cultural Resources, Mitigation Measures CR-1 through CR-3 shall be implemented prior to any site disturbance associated with grading or construction.

b) **Less than Significant Impact.** The proposed project would result in a number of potentially significant impacts on the environment that can be mitigated to less than significant levels with the implementation of mitigation measures. When reviewed along with other related projects in the area, the project would not result in impacts that are cumulatively considerable. This is because the project site is located in an area of the City that is designated for residential development and the City has planned for such development in its General Plan. When considered in conjunction with other planned residential developments in the City of Coachella and neighboring City of Indio as well as the County of Riverside, the net increase of 115 dwelling units is considered negligible.

c) **Less than Significant Impact with Mitigation Incorporated.** The proposed project could result in both direct and indirect environmental effects on humans. However, with compliance with regulatory requirements (air quality, water quality, etc.) and implementation of mitigation measures identified herein, the effects will be able to be reduced to less than significant levels.

3.18.4 Mitigation Measures

AQ-1 Both Project land use components shall adhere to SCAQMD Rules 403 and 403.1 and follow and incorporate all Best Available Control Measures into a PM-10 Dust Control Plan and to be prepared for the both project land use component prior to commencement of site grading or other construction activity where soil disturbance or other fugitive dust may be generated.

Best Available Control Measure	Associated Measure in CalEEMod
Clearing and Grubbing	
02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing. 02-2 Stabilize soil during clearing and grubbing activities. 02-3 Stabilize soil immediately after clearing and grubbing activities.	Water exposed surfaces three times per day Soil stabilizers for unpaved roads
Earth Moving Activities	
08-1 Pre-apply water to depth of proposed cuts 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction 08-3 Stabilize soils once earth-moving activities are complete.	Pre-water to 12%
Landscaping	
10-1 Stabilize soils, materials, slopes Guidance: Apply water to materials to stabilize; maintain materials in a crusted condition; maintain effective cover over materials; stabilize sloping surfaces using soil until vegetation or ground cover can effectively stabilize the slopes; hydroseed prior to rain season.	Replace ground cover in disturbed areas when unused for more than 10 days
Sources: SCAQMD Rule 403 and CalEEMod Output (See Appendix A of the Air Quality Assessment).	

AQ-2 A coordinated effort shall be demonstrated between the City and the project grading contractors for both project land use components and the Villa Palmeras development (TTM 35523) in order to assure that grading schedules will not occur at the same time, which may result in short-term construction impacts on Air Quality. Level of Significance Compliance with an approved PM-10 Dust Control Plan that sets forth the required Best Available Control Measures to be utilized during all phases of grading/construction of Project would ensure that impacts associated with emissions of criteria pollutants would be less than significant.

BIO-1 Prior to any land disturbance, the applicant shall have a biological survey conducted at the project site to determine presence/absence of listed species. Results of the survey may determine whether focused surveys for listed species must be conducted. Of particular interest is the presence/absence of burrowing owl.

BIO-2 If the site survey determines the presence of burrowing owl, mitigation in accordance with the California Department of Fish and Wildlife (CDFW) shall be implemented as follows:

- If burrowing owls are identified as being resident on-site outside the breeding season (February 1 through August 31) may be relocated to other sites by a permitted biologist (permitted by CDFG), as allowed in the CDFG *Staff Report on Burrowing Owl Mitigation* (March 2012).

- If an active burrow is found during the breeding season, the burrow shall be treated as a nest site and temporary fencing shall be installed at a distance of 550 yards from the active burrow to prevent disturbance during grading or construction. This is the maximum buffer distance recommended in the CDFW *Staff Report on Burrowing Owl Mitigation*. Installation and removal of the fencing shall be done with a biological monitor present.

CR-1 Because the project site is considered to be highly sensitive for containing prehistoric archaeological deposits in subsurface contexts and Native American human cremation have been found in the vicinity, a qualified archaeological monitor shall be present during all phases of construction grading and trenching activities related to project implementation. The amount of monitoring shall be determined by the archaeologist through the preparation of a monitoring plan to be prepared prior to commencement of grading.

CR-2 A qualified vertebrate paleontologist shall be retained prior to the start of construction, but after final depths of impacts are known (grading plans), to develop a paleontological mitigation plan limited to the proposed deep impact areas (greater than 3 feet) of the project only. In particular, the plan shall (1) clearly define that test trenches that would be dug to the maximum depth of proposed impacts, (2) permit the use of heavy equipment to perform the trenching as all samples will be taken from sidewalls after a stratigraphic profile is developed, (3) require recording of each strata revealed, (4) require radiocarbon dates for each strata, (5) require samples of about 10 kilogram (kg) for each strata with collection of additional samples up to 100 kg for layers rich in vertebrate fossils, (6) require identification and analysis by recognized experts, (7) require an interpretive report, (8) require curation of significant specimens recovered and (9) encourage publication of results. The plan would identify the amount of monitoring required.

CR-3 In the event that human remains are uncovered, no further disturbance shall occur until the Riverside County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The Riverside County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

GEO-1 Structurally, the buildings shall be designed per seismic requirements in the California Building Code.

GEO-2 All earthwork including excavation, backfill and preparation of the subgrade soil, shall be performed in accordance with the geotechnical recommendations presented in *Geotechnical Investigation, Proposed Residential Development, Tentative Tract Map 36680, APN 612-280-018, Coachella California*, December 2013, prepared by Sladden Engineering, and portions of the local regulatory requirements, as applicable.

HAZ-1 Further investigation of the vicinity of the slabs in the southwest corner of the site is recommended to evaluate the potential for USTs and pesticide residues. This would include a geophysical survey to look for buried objects and the collection of soil samples to test for pesticide residues.

HAZ-2 Abandon the existing well on site in accordance with applicable regulations.

HAZ-3 The potential exists for buried hazardous materials to be present in the northern portion of the western boundary of the site. A geophysical survey shall be conducted to look for buried metallic objects, and a backhoe shall be used to dig into the debris field at representative locations to evaluate how much debris is present (if any) and whether hazardous materials appear to be present. If suspect materials are observed, soil samples should be collected and analyzed to evaluate whether hazardous materials are actually present.

HAZ-4 Prior to Certificate of Occupancy of the Vehicle Fueling Station, the applicant shall apply for and show proof of permits to construct and operate, including an approved HMBP.

N-1 The Project's Noise Study evaluated a four-foot high barrier on top of a manufactured berm. However in redesigning the site, the applicant is proposing a six-foot high barrier to be constructed along Avenue 50 in front of the residential component of the project. This has been reviewed by the Noise Specialist and found to be adequate for sound attenuation for rear yards. Said barrier shall be constructed of a non-gapping material consisting of masonry, ½-inch thick glass, earthen berm or any combination of these materials.

N-2 Prior to issuance of the first building permit for all residential lots, a final noise study shall be prepared to ensure a 45 dBA CNEL interior noise level in the locations where noise levels are above 60 dBA CNEL, at the locations indicated in Exhibit 5-1 *Modeled Receptor Locations* and Table 5-3 *Future Exterior Noise Levels* in Appendix G.

TIA-1 The project applicant shall pay a fair share of the cost to signalize the following intersections recommended for *EAP* conditions to reduce peak hour delay and improve intersection and roadway segment LOS to LOS D or better:

- Install a traffic signal at Jackson Street/Avenue 50
- Install a traffic signal at Calhoun Street/Avenue 50

TIA-2 The applicant shall construct the north side of Avenue 50 along the project's frontage to its ultimate half section width as a Major Arterial With Bicycle Facility (118-foot cross section) in compliance with applicable City standards. The applicant shall also construct the west side of Calhoun Street along the project's frontage to its ultimate half section width as a Collector With Bicycle Facility (90-foot cross section) in compliance with applicable City standards.

TIA-3 *Driveway 1/Colonia Drive and Avenue 50* – The Project shall install a stop control on the southbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through-right turn lane.
- Southbound Approach: One shared left-through-right turn lane.
- Eastbound Approach: One left turn lane (within painted median), two through lanes and one defacto right-turn lane.
- Westbound Approach: One left turn lane, one through lane and one shared through-right turn lane.

Calhoun Street and Driveway 2 – The Project shall install a stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One left-turn lane and one through lane.
- Southbound Approach: One shared through-right turn lane.
- Eastbound Approach: One shared left-right turn lane.

TIA-4 Prior to the issuance of building permits for each component of the project, the applicant shall pay applicable City of Coachella Development Impact Fees (DIF) and County of Riverside Transportation Uniform Mitigation Fees (TUMF) in effect at that time.

3.18.5 Level of Significance After Mitigation

The project would result in a less than significant impact with mitigation measures incorporated.

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Traffic Impact Analysis

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Chapter 5 References

Aesthetics

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Tower Energy Group
1983 W. 190th Street. Torrance, CA 90504
Tel: (310) 538-8000. Fax: (310) 878-8480

October 30, 2025

City of Coachella
Development Services Department
Kendra Reif
1515 Sixth Street
Coachella, CA. 92236

RE: TTM-370088- 1 year Time Extension-Ravella Residential

Please accept this letter request to extend Tentative Track Map No. 37088 for the fourth, 1-year time extension, as we continue to wait for IID to provide sufficient power for the development of the 115 single family residences. Per City ordinance 1227, approved by City Council on October 22, 2025, amending Section 16.12.140 of the Coachella Municipal Code regarding extensions for the filing of a final map, applicants may now request up to five (5) one year time extensions for the filing of the final map

Sincerely,
Mark Vasey

Mark Vasey
Tower Energy Group
(310) 878-8425

Cc:

STAFF REPORT
12/17/2025

TO: Planning Commission Chair and Commissioners

FROM: Kendra Reif, Community Development Director

Adrian Moreno, Associate Planner

SUBJECT: A Public Hearing to Consider Resolution No. PC 2025-22, Resolution No. PC 2025-23, and Resolution No. PC 2025-24 of the Planning Commission of the City of Coachella: Request for Planning Commission recommendation of conditional approval to the City Council for Tentative Tract Map No. 39051 for the subdivision of 39.98 acres of land (Assessor's Parcel Number 612-260-010) into 257 lots and request for conditional approval of Conditional Use Permit No. 390 for a 257-lot single-family home planned unit development subdivision with associated improvements located at the southwest corner of Calhoun Street and Avenue 49 and certifying that the projects Initial Study with Mitigated Negative Declaration is in compliance with Section 15074 of the California Environmental Quality Act Guidelines. Applicant: Rod Vandenburg, Pacific Modern Builders, LLC.

STAFF RECOMMENDATION

Staff recommends that the Planning Commission open the public hearing and receive public testimony and recommend the conditional approval to the City Council for Tentative Tract Map No. 39051 for the subdivision of 39.98 acres of land (Assessor's Parcel Number 612-260-010) into 257 lots and request for conditional approval of Conditional Use Permit No. 390 for a 257-lot single-family home planned unit development subdivision with associated improvements located at the southwest corner of Calhoun Street and Avenue 49 and certifying that the projects Initial Study with Mitigated Negative Declaration is in compliance with Section 15074 of the California Environmental Quality Act Guidelines.

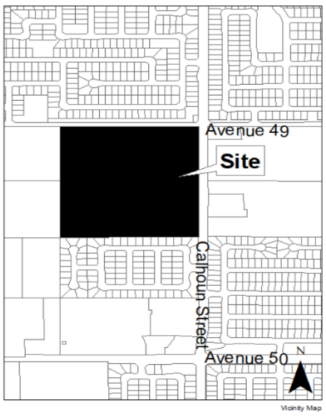

Figure 1 - Vicinity Map

EXECUTIVE SUMMARY:

The applicant, Rod Vandenburg on behalf of Pacific Modern Builders, LLC., requests that the Planning Commission recommend to the City Council approval of:

- **TTM No. 39051** proposes to subdivide 39.98 acres into 257 single family lots with 144 lots each encompassing a minimum of 3,400 square feet (sf), and 113 lots each encompassing a minimum of 4,050 sf;

- **CUP No. 390** proposes to utilize the provisions of Section 17.38 (Planned Unit Developments) of the Coachella Municipal Code;

- **EA No. 25-02** was prepared to address the direct, indirect, and cumulative environmental effects of the proposed project on a 39.98-acre site located at the southwest Calhoun Street and Avenue 49, (APN 612-260-010).

The Architectural style of the homes will be determined through an architectural review application at a later date. The Initial Study assumes the houses proposed will conform to the minimum standards established in the Project PUD.

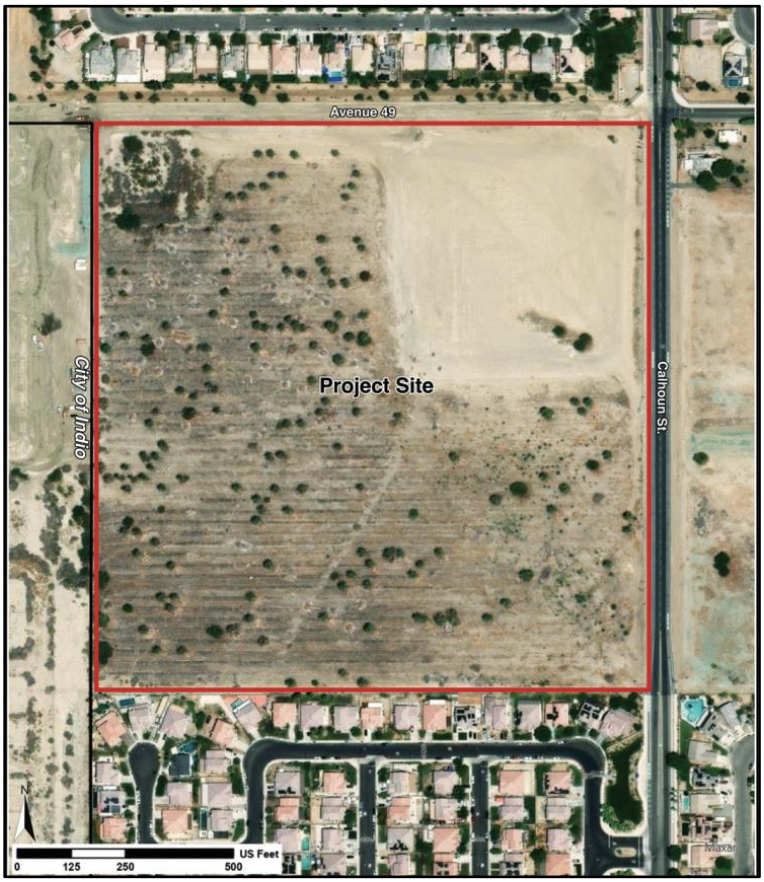

Figure 2 - Vicinity Map

BACKGROUND:

On March 25, 2025, applicant Rod Vandenburg on behalf of Pacific Modern Builders, LLC., submitted an application for a Conditional Use Permit (Planned Unit Development), Tentative

Tract Map, and Environmental Assessment, proposing the subdivision of 39.98 acres of land for a gated residential neighborhood consisting of 257 single-family homes and associated improvements located east of Calhoun Street and south of Avenue 49 (APN 612-260-010).

The Project site currently has a land use and zoning designation of "General Neighborhood" in the City's General Plan 2035 Update (General Plan) which allows for single- and multi-family residences. Multi-family residences are to be constructed in a "house-form" such as duplexes, rowhouses, and garden apartments. Residential neighborhoods encourage small blocks, parks and green spaces, and walkability or short drives to services such as schools and shopping. Between 7 and 25 dwelling units per acre are permitted in General Neighborhood areas. The applicant proposes a Planned Unit Development (PUD) that would permit flexible standards for smaller lot sizes and a higher density for a private gated community. The PUD requires the completion of a conditional use permit (CUP), which will establish the land use regulations and minimum development standards for the development, to be approved by the City's Planning Commission.

Table 1

General Plan, Zoning, and Surrounding Existing Uses

	General Plan	Zoning	Surrounding Existing Uses
Site:	General Neighborhood	(G-N) General Neighborhood	Vacant Lot
North:	Suburban Neighborhood	(S-N) Suburban Neighborhood	Single-Family Residences
South:	Suburban Neighborhood	(S-N) Suburban Neighborhood	Single-Family Residences
East:	Suburban Neighborhood	(S-N) Suburban Neighborhood	Vacant Lot
West:	City of Indio	City of Indio	Single-Family Residences

The gross acreage for the Project parcel is 39.98 acres. With approximately 1.21 acres of right of way dedications, the net parcel area is 35.24 acres. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres – 3.13 acres for recreational open space and a 0.40-acre landscaped retention basin.

The residential use consists of 144 lots each encompassing a minimum of 3,400 square feet (sf), and 113 lots each encompassing a minimum of 4,050 sf. The lots will be eligible for Accessory Dwelling Units (ADU) and Junior Dwelling Units (JADU).

The 3.13-acre recreational area of the park includes a tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a small parking lot. Connected to the south side of the park is a 0.40-acre retention basin that is partially landscaped with turf grass for recreational use and encircled by a decomposed granite trail. The public can access the park from Calhoun Street by either entering the parking lot at the north end or the trail at the south end. A security fence surrounding the park will prevent public access to the residential section of the Project.

Two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street. The proposed Project would include right-of-way allowances for future road improvements. Currently, Avenue 49 east of Calhoun is designated as a Primary Arterial, but west of Calhoun to Jackson Street Avenue 49 is an unimproved path. For 1,300 linear feet from Calhoun Street to the Project's northwest corner, the applicant proposes 84-foot-wide full-street improvements including curbs, gutters, and sidewalks on both sides. At buildout, Avenue 49 street improvements would include 46 feet of travel lanes with curbs and gutters, six-foot sidewalks on both sides, and a 26-foot-wide landscaped area along the Project site Avenue 49 frontage.

Along 1,300 linear feet of Calhoun Street from the intersection of Avenue 49 to the southeast corner of the Project, the applicant proposes half-width improvements consisting of new pavement, curb, gutter, undergrounding of existing overhead utilities, new streetlights, a six-foot-wide sidewalk, and a 26-foot-wide landscape setback along the Project site frontage. Figure 3 shows the site plan Tentative Tract Map No. 39051 and Figure 4 provides the Conceptual Landscape Plan for the development.

Four retention basins will accept all on-site flows from a 100-year storm event. A fifth basin located at the northwest corner of the Project would accept off-site flows from Avenue 49. The basins will be landscaped to maintain openness and reduce visual massing of the development.

Table 2

Project Information

Total Project Area	39.98 ac (gross), 35.24 (net), 1,688,821 sf
Residential Lots	257 lots
144 lots	40 ft wide (3,600 sf)
113 lots	45 ft wide (4,050sf)
Landscaped Common Areas	
Public Park	3.213 ac (136,343 sf including parking lot)
Five Retention Basins	2.82 ac (122,839 sf)

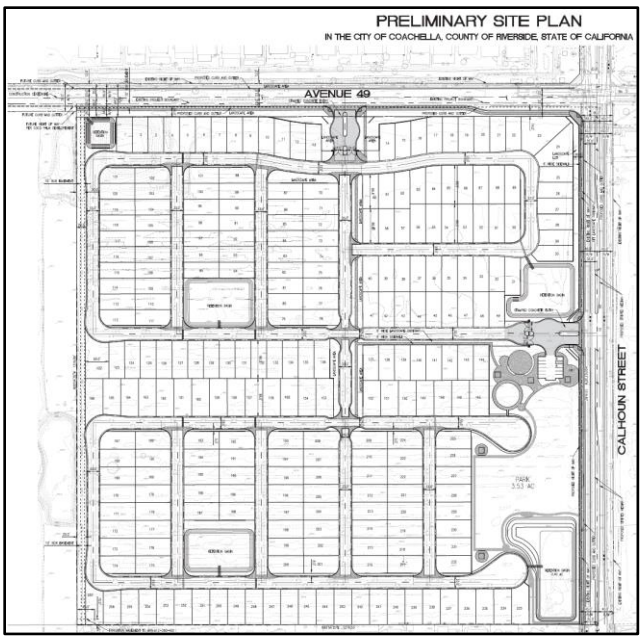

Figure 3 - Site Plan TTM 39051

LANDSCAPE DESIGN:

The landscape plan for the Calhoun Subdivision Project addresses the proposed landscaping along Avenue 49, project entries, the overall project wall and fence plan, and park and retention area landscaping.

As required by Section 17.14.030(K), a minimum 20-foot landscape frontage area is provided on Calhoun Street and Avenue 49, with the addition of a 6-foot sidewalk to provide a minimum 26-foot total common area frontage for the project on Calhoun Street and Avenue 49. On Avenue 49, the common area frontage is reduced to a total of 14 feet to accommodate a right-hand turn lane as required by the City Engineering Department. On Calhoun Street there is significant landscape along the frontage common area provided by the proposed retention basin and public park. Along both perimeter streets, a 4-foot curb adjacent landscape planter is provided in compliance with General Plan Mobility Element guidelines. Shade Trees are provided along Avenue 49 and Calhoun Street to provide ample shade tree coverage. The project includes completion of street improvements for the northern portion of Avenue 49 along project frontage to be compatible with the street improvements completed on Avenue 49 between Jackson Street and the proposed project.

Tree uplighting is implemented along the project perimeter streets, internal streets, and project retention basins. All palm trees in the community will provide palm ring lights, and entry sign lighting is also provided. The public park will include bollard lighting.



Figure 4 - Conceptual Landscape Plan

The project entry includes enhanced pavement, an entry monument sign at each project entry and landscaping on either side of the project entry. The project entry also includes a landscaped median that will include date palm trees and a variety of shrubs and ground cover.

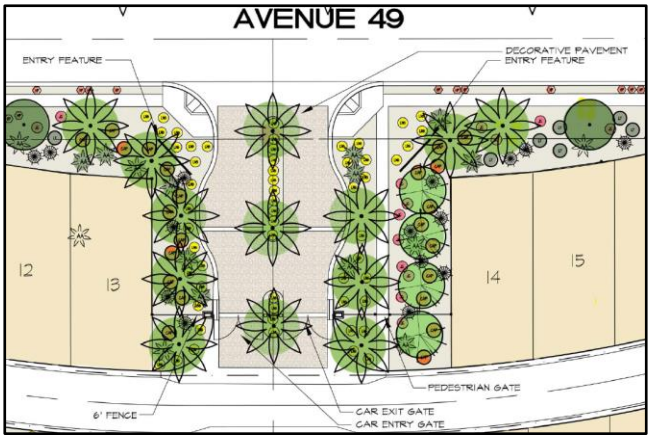

Figure 5 – Avenue 49 Entry

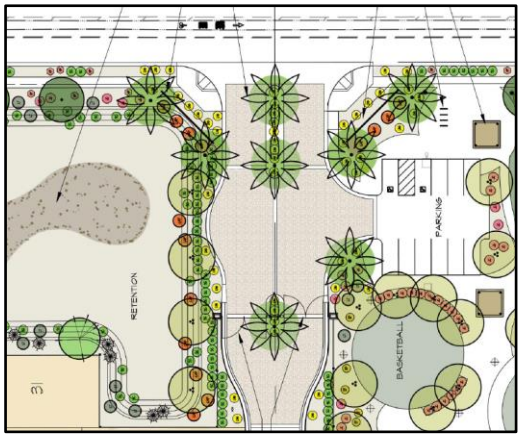

Figure 6 – Calhoun Street Entry

The project includes a separated sidewalk design center north-south street, and the center east-west street connecting the two community entrances as seen in Figure 4 above. The project includes landscape areas along internal streets, landscaped retention basin, and a landscape CVWD easement along the western portion of the project. The community will be landscaped

with drought tolerant plants and ¾ inch California Gold decorative gravel. See example images of landscape plant list below.

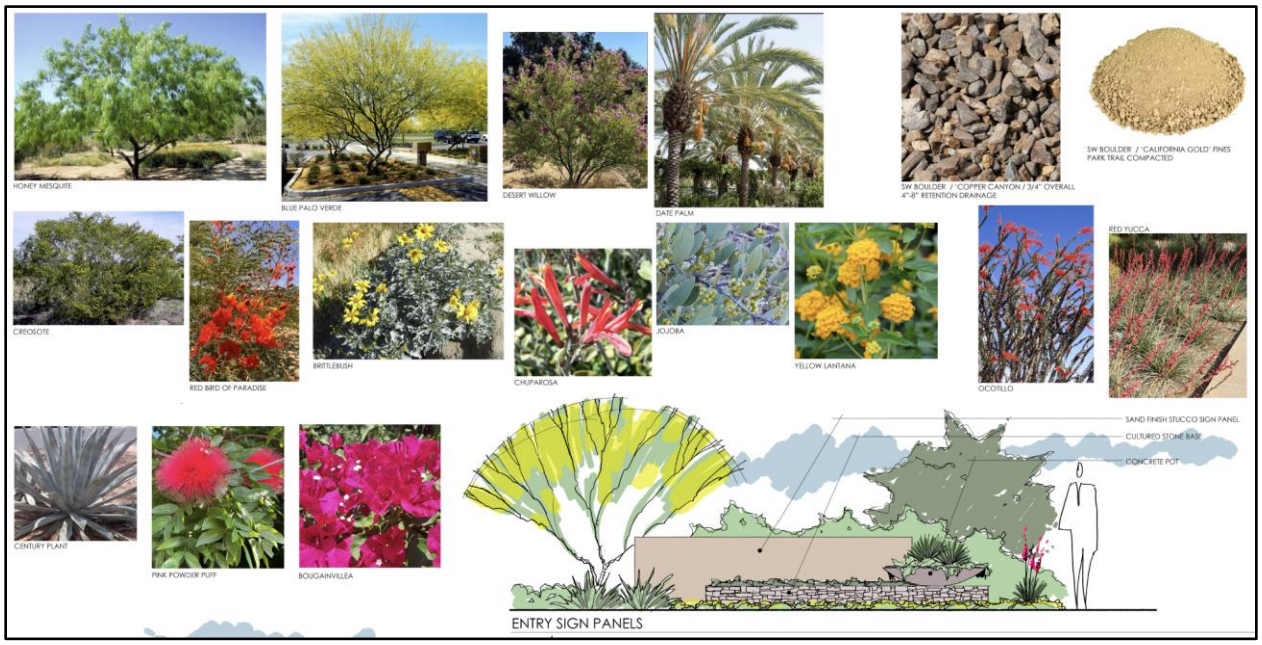

Figure 7 - Landscape Plant List

PARK:

The Project is proposing an approximate 3.13-acre public park that will be maintained by the Landscape and Lighting Maintenance District. The park will include both active and passive uses including a half-court basketball court, lawn area, picnic tables, tot lot and desert garden. Staff has conditioned that the park be installed prior to the issuance of the 101st occupancy permit. A site plan for the park and plant palette are provided in the exhibits below.



Figure 8 - Public Park

WALL AND FENCE PLAN:

A copy of the proposed wall and fence plan is illustrated on Figure 9 below. A 6 ft high smooth face block wall with a center score will be constructed with stone veneer panels and stone veneer columns placed in strategic areas along the perimeter streets and all street facing fencing within the community. Interior fencing not visible from the public R.O.W will be vinyl fencing. Adjacent to retention basins and the public park along perimeter streets, there will be metal facing with stone veneer columns.

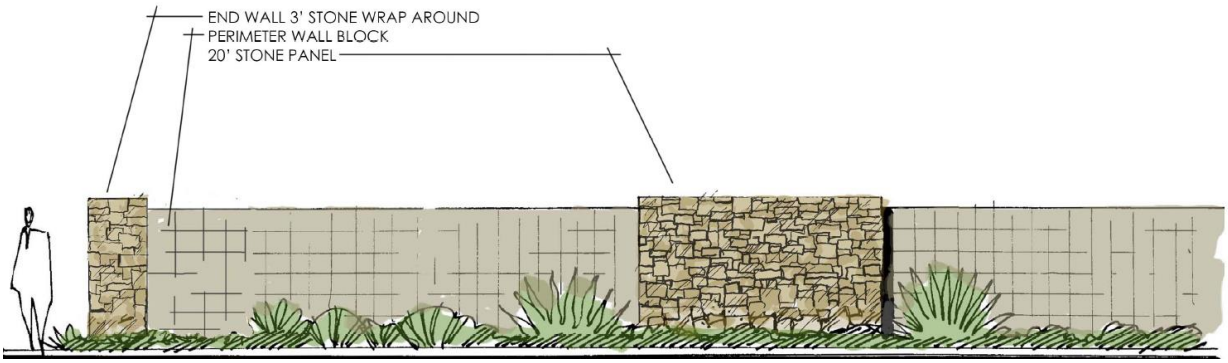

Figure 9 Fence and Wall Plan



Figure 10 Block Wall Detail

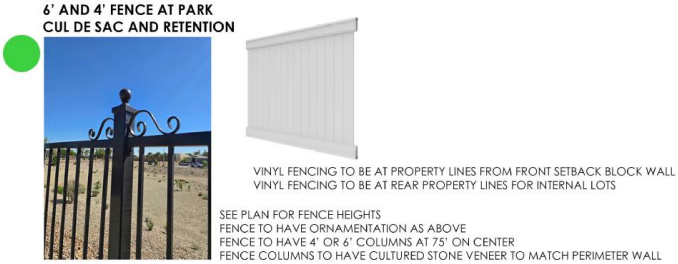

Figure 11 - Fencing Details

CONSISTENCY WITH GENERAL PLAN

The project site is within the General Neighborhood land use designation. General Neighborhoods are intended to provide a diversity of housing that meets the needs of the city's many household sizes, incomes, and lifestyle preferences. General Neighborhoods include a range of single family and multi-family housing options within a green, walkable neighborhood that offers parks and playgrounds for their residents and access to schools and basic shopping needs within a comfortable walk, bike ride or short drive.

The fundamental character of these neighborhoods is defined by tree-lined streets and small blocks, well-landscaped front yards and welcoming entries to each residence. Vehicular access and parking on each lot should not intrude into the front yards, primarily places for children to play and neighbors to meet. Although most of the residences are single-family detached houses, multi-family housing is also provided in "house-form" building types – such as duplexes, garden apartments and rowhouses – that are compatible in scale and character with houses. Large apartment buildings or complexes are not compatible with this sort of neighborhood setting

Allowed land uses include residential land uses at a development intensity of 7-25 DU/AC. The general plan also includes standards for network and connectivity, street design, parks and open space and urban form guidelines.

The Calhoun Subdivision project proposes 257 single family homes on a 39.98-acre site that equates to a net density of 7.29 DUA. The calculation for net density does not include acreage for the public park (includes retention basin), Avenue 49 and Calhoun Street dedications, and CVWD USBR easement on the west side of the property. The project meets the general plan density requirements and meets the design standards for network connectivity, street design, parks and open space and urban form guidelines.

CONSISTENCY WITH ZONING

The project site is currently zoned General Neighborhood (G-N) which implements the General Neighborhood land use designation of the General Plan. The G-N zone permits detached single family detached subdivisions with a minimum density of 7 dwelling units per acre on lots with a on minimum lot size of 4,000 square feet with a minimum interior lot width of 40 feet and minimum lot depth of 75 feet. The minimum width of corner lots is 45 feet. The minimum front yard requirement is 15 feet and the minimum side yard requirement for interior and corner lots is

10% of the lot width, but not less than 5 feet. A rear yard setback of 20 feet is required in the G-N zone.

The applicant proposes a Planned Unit Development (PUD) that would permit flexible standards for smaller lot sizes and a higher density for a private gated community. The applicant

The Sevilla II Project meets all the requirements of the G-N zone, except that the single story, Plan 1 homes include a 15-foot rear yard setback. Of the 68 Plan 1 homes, 30 lots have a setback of less than 20 feet which is why the Applicant is using the Planned Unit Development provisions (Section 17.38) of the Municipal Code that allows for a 15-foot rear yard setback. In addition, two lots adjacent to the project entryways (a total of 4 lots) may require a reduction in the 10-foot side yard setback to five feet as the project entryways were expanded to meet the requirements of Fire Department Riverside County Technical Policy 22-002 that requires that one of the travel lanes be 24 feet in width.

The project is consistent with Section 17.19 of the Municipal Code, Supplemental Standards for Single-Family Residential recently adopted by the City Council.

Table 3 – General Neighborhood Development Standards

	Zoning Ordinance	**Proposed**	**Complies with Code**
Density	7-25 du/acre	7.29 du/ac	Yes
Parking (Minimum)	Two spaces per dwelling unit, both to be in an enclosed garage	Two spaces per dwelling unit, both to be in an enclosed 400 square foot garage	Yes. Each unit includes a 2-car garage
Lot Requirements	4,000 sq. ft. Minimum Lot width 40’ Minimum Lot width (corner lot) 45’ Minimum Lot depth 75’	3,400 sq. ft. Minimum Lot width 40’ Minimum Lot width (corner lot) 40’ Minimum Lot depth 85’	No. However, the proposal is consistent with PUD flexible design standards
Minimum Yard Requirement	Front Yard: 15 feet Side Yard: 5 feet Rear Yard: 20 feet	Front Yard: 15 feet Side Yard: 5 feet Rear Yard: 15 feet	No. However, the proposal is consistent with PUD flexible design standards
Height (maximum)	45 feet	45 feet	Yes. The maximum height proposed is less than 45 feet

PROPOSED FINDINGS:

Tentative Map

Pursuant to Coachella Municipal Guidelines Chapter 16.12, Tentative Map, subject to the provisions of this chapter, the Planning Commission must make the following findings for a recommendation of approval to the City Council for a Tentative Map approval:

The Planning Commission shall deny approval of a tentative map, as required by the Subdivision Map Act, if it makes the following findings:

1. That the proposed map is not consistent with applicable general and specific plans;

The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac. The project further proposes the development of community amenities such as a community park with tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a partially landscaped retention basis with passive walking trails. The open-space parks planned within the project area fulfill the Planned Unit Development and General Neighborhood open space requirements. For the foregoing reasons, the Tentative Map is consistent with the General Plan and is not inconsistent with any element of its General Plan designation.

2. That the design or improvement of the proposed subdivision is not consistent with applicable general and specific plans;

The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac and is consistent with the General Plan. The project is proposing a PUD that would permit flexible standards for smaller lot sizes. The PUD is proposing 257 units in total with 144 lots each encompassing a minimum of 3,400 sf lots and 113 lots each encompassing a minimum of 4,050 sf. If the PUD is approved, the Tentative Map would be consistent with the applicable PUD development standards.

3. That the site is not physically suitable for the type of development;

The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. As such, the Tentative Tract Map is

consistent with the permitted land use designation and zoning designation of single-family homes, as it is proposing 7.29 du/ac. In addition to meeting the proposed density requirements, two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the Riverside County Office of the Fire Marshal. Infrastructure to serve the proposed parcels have been assessed and determined to be available from the water and electrical utilities. Furthermore, the site has no topographical constraints and the proposed uses are consistent with that has been analyzed in the General Plan, the Coachella Municipal Code, and Planned Unit Development. Therefore, it can be determined that the proposed subdivision is physically suitable for the site.

4. That the site is not physically suitable for the proposed density of development;

The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation and zoning designation of single-family homes, as it is proposing 7.29 du/ac. Therefore, it can be determined that the proposed subdivision is physically suitable for the proposed density of development.

5. That the design of the subdivision or the proposed improvements are likely to cause substantial environmental damage or substantially and unavoidably injure fish or wildlife or their habitat;

An Initial Study with Mitigated Negative Declaration (IS/MND) was completed to address the potential impacts from the implementation of the project. The environmental analysis includes but is not limited to the analysis of environmentally sensitive areas, potential impacts to natural vegetation and significant trees, watercourses, historic buildings and places, and other features of value to the community. The proposed project will develop currently vacant highly disturbed land in west Coachella. The existing setting does not contain any significant trees, watercourses, or historic buildings or places. The parcel has minimal natural vegetation, and what is there is common to many vacant parcels within the City of Coachella and the greater Coachella Valley. The scarce natural vegetation will be removed during the preliminary grading phase of the development of the site, and the IS/MND found that with the adoption of mitigation measures, any potential impact will be mitigated to have a less than significant impact. The project will adopt a Mitigation and Monitoring Reporting Program (MMRP) that will certify mitigation measures to protect environmentally sensitive land uses and species within the project area.

6. That the design of the subdivision or the type of improvements is likely to cause serious public health problems; and

Tentative Tract Map No. 39051 proposes the subdivision of a net acreage of 35.24-acre parcels into 257 parcels. As reviewed and conditioned by the City of Coachella Public Works Department and Coachella Water Authority and Sanitation District, adequate sewer and water systems are currently available and will be accessible to the resultant parcels. As conditioned by the City of Coachella Public Works Department, Coachella Water Authority and Sanitation District, and Imperial Irrigation District, the project has the necessary infrastructure to adequately serve the resultant parcels and all proposed uses as allowed by the City of Coachella General Plan and the Coachella Municipal Code.

7. That the design of the subdivision or the type of improvements will conflict with easements, acquired by the public at large, for access through or use of property within the proposed subdivision. In this connection, the governing body may approve a map if it finds that alternate easements, for access or for use, will be provided, and that these will be substantially equivalent to ones previously acquired by the public.

As proposed, TTM No. 39051 will not conflict with any public easements acquired for access or use by the public at large within the proposed subdivision. The Riverside County Office of the Fire Marshal and Engineering Department/Public Works Department have reviewed and approved the access points to the site. The subdivision of land will not conflict with easements for access through or use of property and as such, the subdivision's design is confirmed to be in harmony with existing public easements.

Conclusion:

Staff concludes that the findings set forth in Government Code Section 66474 and Coachella Municipal Code Chapter 17.14.030 can affirmatively be made for the proposed Tentative Tract Map No. 39051. The proposed parcel subdivision is consistent with the City of Coachella General Plan and the Coachella Municipal Code. The parcel subdivision will not conflict with easements acquired by the public at large, for access through or use of property within the proposed parcel subdivision, and it will not cause substantial environmental damage or substantially avoidably injure fish, wildlife, or their habitat. The required conditions of approval ensure the Project will not be detrimental to the public health, safety, or welfare, and the conditions prevent material injury to properties or improvements in the vicinity.

Planned Unit Development

Pursuant to Coachella Municipal Guidelines Chapter 17.38, Planned Unit Development, subject to the provisions of this chapter, the Planning Commission must make the following findings for Planned Unit Development approval:

1. The proposed use will not be in conflict with, but will be in harmony with and in accordance with the objectives of the general plan.

The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac. The project further proposes the development of community amenities such as a community park with tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a partially landscaped retention basis with passive walking trails. The open-space parks planned within the project area fulfill the Planned Unit Development and General Neighborhood open space requirements. For the foregoing reasons, the Tentative Map is consistent with the General Plan and is not inconsistent with any element of its General Plan designation.

2. The proposed use will be located, designed, constructed, operated and maintained so as to be compatible with the existing or intended character of the general vicinity and shall not change the essential character of the same area.

The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. The project complies with Chapter 17.14 General Neighborhood zoning standards and complies with Chapter 17.38 PUD Planned Unit Development standards. The project will be operated and maintained by an HOA, and the community CC&R's shall be submitted for City review and the City shall be a third-party beneficiary to the CC&R's. The perimeter landscaping, park, and the retention basin adjacent to Calhoun Street will be maintained by the City LLMD. As a result, the project will be compatible with the existing or intended character of the general vicinity and shall not change the essential character of the same area.

3. Consideration is to be given to harmony in scale, bulk, coverage and density, to the availability of public facilities and utilities, to harmful effect, if any, upon desirable neighborhood character, to the generation of traffic and the capacity of surrounding streets, and to any other relevant impact of the development.

The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. In addition to meeting the proposed density requirements, two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the Riverside County Office of the Fire Marshal. The project will include the completion of street

improvements on both sides of Avenue 49 adjacent to the northern permitter of the project and determined to be suitable by the City Engineer. Infrastructure to serve the proposed parcels have been assessed and determined to be available from the water and electrical utilities. Furthermore, the site has no topographical constraints and the proposed uses are consistent with that has been analyzed in the General Plan, the Coachella Municipal Code, and Planned Unit Development. Therefore, it can be determined that the proposed subdivision is physically suitable for the site.

4. Where the proposed use may be potentially hazardous or disturbing to existing or reasonably expected neighboring uses, it must be justified by the common public interest as a benefit to the community as a whole.

The intent and purpose of the General Neighborhood designation, as described in the City of Coachella General Plan, is to provide a diversity of housing that meets the needs of Coachella's many household sizes, incomes and lifestyle preferences. General Neighborhoods integrate a range of single- and multi-family housing options within a green, walkable neighborhood environment that offers parks and playgrounds for their residents and access to schools and basic shopping needs within a comfortable walk, bike ride or short drive. The project proposes the development of community amenities such as a community park, and shaded sidewalks along the perimeter and interior of community with a separated sidewalk design per the guidance of the City of Coachella General Plan Mobility Element. The project will be operated and maintained by an HOA, and the community CC&Rs shall be submitted for City review and the City shall be a third-party beneficiary to the CC&R's. An Initial Study with Mitigated Negative Declaration (IS/MND) was completed to address the potential impacts from the implementation of the project. The environmental analysis includes but is not limited to the analysis of environmentally sensitive areas, potential impacts to air quality, watercourses, historic buildings and places, noise, hazards and hazardous materials and other features of value to the community. The proposed project will develop currently vacant highly disturbed land in west Coachella. The IS/MND found that with the adoption of mitigation measures on Biological Resources, Cultural Resources, Transportation, and Tribal Cultural Resources, any potential impact will be mitigated to have a less than significant impact. The project will adopt a Mitigation and Monitoring Reporting Program (MMRP) that will certify mitigation measures to protect environmentally sensitive land uses and species within the project area. Therefore, it can be determined that the project is not anticipated to be potentially hazardous or disturbing to existing or reasonably expected neighboring uses, and it can be determined that the project is a benefit to the community as a whole.

5. The proposed use will include vehicular approaches to the property designed for reasonable minimal interference with traffic on surrounding public streets or roads.

The project will include two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the

Riverside County Office of the Fire Marshal. The project will include the completion of street improvements on both sides of Avenue 49 adjacent to the northern permitter of the project and determined to be suitable by the City Engineer. As a result, the proposed project is designed to provide reasonable minimal interference with traffic on surrounding public streets or roads.

Conclusion:

Staff concludes that the findings set forth in Coachella Municipal Code Chapter 17.74.020 can affirmatively be made for the proposed Tentative Tract Map No. 39051. The proposed parcel subdivision is consistent with the City of Coachella General Plan and the Coachella Municipal Code. The parcel subdivision will be compatible with the existing or intended character of the general vicinity and shall not change the essential character of the same area, and consideration was given to the potential impacts of the development. It is determined that the project is justified by the common public interest as a benefit to the community as a whole. The proposed use will include vehicular approaches to the property designed for reasonable minimal interference with traffic on surrounding public streets or roads. The required conditions of approval ensure the Project will not be detrimental to the public health, safety, or welfare, and the conditions prevent material injury to properties or improvements in the vicinity.

PUBLIC HEARING NOTICE:

A notice of public hearing to consider the Project was published in the Desert Sun, the newspaper of record, on December 7, 2025, and a public hearing notice was mailed to property owners within a radius of 300- feet of the subject property on December 2, 2025, pursuant to Section 17.74.010G of the Coachella Municipal Code. At the time of issuance of this staff report, staff had not received public comments on this application.

ENVIRONMENTAL REVIEW:

Chapter 8.24 of the Coachella Municipal Code states that all projects shall be reviewed for compliance with or exemption from the California Environmental Quality Act (CEQA). Pursuant to CEQA Guidelines Section 15063, the applicant's consultant, Terra Nova Planning & Research Inc., completed an Initial Study with Mitigated Negative Declaration (IS/MND) in compliance with the California Environmental Quality Act (CEQA) to adequately analyze the Project's potential impacts on the environment for the Calhoun Street Subdivision Project. The Initial Study concluded that the project would result in less than significant impacts to Aesthetics, Air Quality, Energy, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Population and Housing, Public Services, Recreation, Utilities and Service Systems.

The Initial Study concluded that the project would result in a less than significant impact with mitigation incorporated to Biological Resources, Cultural Resources, Transportation, and Tribal Cultural Resources.

Terra Nova Planning & Research, Inc. has developed appropriate mitigation measures to address the potentially significant impacts, and with the implementation and adherence to the mitigation measures, the Project will have a less than significant impact on Biological Resources, Cultural Resources, Transportation, and Tribal Cultural Resources. The mitigation measures will be listed as a condition of Project approval.

A 20-day public review period ran from November 18, 2025, to December 8, 2025. 3 comment letters were submitted during the comment period. Responses to comments have been prepared for the comments received and are included in Resolution No. PC2025-24 Exhibit C.

A Mitigation Monitoring and Reporting Program (MMRP) has been prepared and is attached in Resolution No. PC2025-24 Exhibit B.

TTM NO. 39051 ALTERNATIVES:

1) Approve Resolution No. PC2025-22 recommending that the City Council approve TTM No. 39051 with the findings and conditions as recommended by Staff.

2) Approve Resolution No. PC2025-22 recommending that the City Council approve TTM No. 39051 with the findings and conditions as recommended by Staff, with modifications as proposed by the Planning Commission.

3) Deny Resolution No. PC2025-22.

4) Continue this item and provide staff and the applicant with direction.

CUP NO. 390 ALTERNATIVES:

1) Approve Resolution No. PC2025-23 recommending that the City Council approve CUP No. 390 with the findings and conditions as recommended by Staff.

2) Approve Resolution No. PC2025-23 recommending that the City Council approve CUP No. 390 with the findings and conditions as recommended by Staff, with modifications as proposed by the Planning Commission.

3) Deny Resolution No. PC2025-23.

4) Continue this item and provide staff and the applicant with direction.

EA NO. 25-02 ALTERNATIVES:

1) Approve Resolution No. PC2025-24 recommending that the City Council adopt a mitigated negative declaration for EA No. 25-02 with the findings and conditions as recommended by Staff.

2) Approve Resolution No. PC2025-24 recommending that the City Council adopt a mitigated negative declaration for EA No. 25-02 with the findings and conditions as recommended by Staff. with modifications as proposed by the Planning Commission.

3) Deny Resolution No. PC2025-24.

4) Continue this item and provide staff and the applicant with direction.

RECOMMENDED ALTERNATIVE(S):

Staff recommends Alternative #1 for TTM. No 39051, CUP No. 390, and EA No. 25-02.

Attachments:

1. Resolution No. PC2025-22 (TTM)
    a. Exhibit A – Conditions of Approval
    b. Exhibit B – Tentative Tract Map
    c. Exhibit E – Development Plan Set
2. Resolution No. PC2025-23 (PUD)
    a. Exhibit A – Conditions of Approval
    b. Exhibit B – Planned Unit Development
3. Resolution No. PC2025-22 (EA)
    a. Exhibit A – Conditions of Approval
    b. Exhibit B – Initial Study Mitigated Negative Declaration (ISMND)
    c. Exhibit C – ISMND Response to Comments
4. Calhoun Street PUD Justification Statement
5. Calhoun Street LLMD_CCR Exhibit
6. Calhoun Street Park Area Exhibit
7. Preliminary Grading
8. Preliminary Site plan
9. Density Exhibit

RESOLUTION NO. PC 2025-22

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF COACHELLA RECOMMENDING TO THE CITY COUNCIL OF THE CITY OF COACHELLA THE CONDITIONAL APPROVAL OF TENTATIVE TRACT MAP NO. 39051, FOR THE PROPOSED 257-LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION PROJECT LOCATED ON THE 39.98 ACRES SITE AT THE SOUTHWEST CORNER OF CALHOUN STREET AND AVENUE 49, APN 612-260-010; AND DETERMINING THAT THE PROJECT IS COMPLIANT WITH SECTION 15073 OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GUIDELINES. APPLICANT: ROD VANDENBURG, PACIFIC MODERN BUILDERS LLC.

WHEREAS, on April 15, 2025, the applicant, Rod Vandenburg on behalf of Pacific Modern Builders, LLC., submitted a Tentative Tract Map application, Conditional Use Permit application, and associated environmental documentation for the subdivision of 39.98 acres of land for the development of a 257 single family home planned unit development and associated improvements on the southwest corner of Calhoun Street and Avenue 49 ("the Project"); and,

WHEREAS, the Site is located within the City of Coachella off of Calhoun Street and Avenue 49 within Riverside County, California (Assessor Parcel Numbers 612-260-010) ("Property"); and,

WHEREAS, the site has a zoning designation of General Neighborhood and a General Plan 2035 land use designation of General Neighborhood; and,

WHEREAS, the Project is consistent with and intended to implement the vision of the Coachella Municipal Code and the General Plan 2035 pertaining to land use patterns, building and site design, and public right-of-way improvements; and

WHEREAS, pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., and CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), a public agency shall prepare or have prepared a proposed negative declaration or a mitigated negative declaration for a project subject to CEQA when the initial study identifies potentially significant impacts but revisions in the project plan or proposals made by or agreed to by the applicant would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and,

WHEREAS, pursuant to CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), an initial study with mitigated negative declaration was prepared for the Proposed Project ("Initial Study/Mitigated Negative Declaration), and mitigation measures have been incorporated into the Mitigated Negative Declaration and will be imposed on the Proposed Project through the City's adoption of a Mitigation Monitoring and Reporting Program ("MMRP") in compliance

with CEQA Guidelines Section 15070(d); and,

WHEREAS, pursuant to CEQA Guidelines Section § 15073 (Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration), comments were received pertaining to the Initial Study/Mitigated Negative Declaration and added to the administrative record; and,

WHEREAS, the Subdivision Map Act also requires that, prior to any map approval, the City must find that the proposed subdivision, together with the provisions for its design and improvement of any tentative map or a parcel map, is consistent with the general plan and any applicable specific plan, and that the site is physically suitable for that type of development and the proposed density, and that the design of the subdivision is not likely to cause serious public health problems, conflict with easements, or cause substantial environmental damage or substantially and avoidably injure fish, wildlife, or their habitat (Government Code Section 66473.5); and

WHEREAS, the Tentative Tract Map is consistent with the General Plan 2035 and meets the General Neighborhood land use designation requirements and is consistent with the requirements outlined in the Coachella Municipal Code; and

WHEREAS, the Tentative Tract Map will not conflict with easements acquired by the public at large, for access through or use of property within the proposed parcel subdivision as all such improvements will be constructed to be adequate for the Project, and it will not cause substantial environmental damage or substantially avoidably injure fish, wildlife, or their habitat; and

WHEREAS, the proposed design of the subdivision improvements contemplated by the proposed parcel subdivision is not likely to be detrimental to public health, safety, or welfare as adequate sewer and water systems will be available to the two resultant parcels. The parcels have the necessary infrastructure to adequately serve the proposed development and all proposed uses as allowed by the zoning ordinances that regulate the Project Site; and

WHEREAS, a notice of a public hearing to consider Tentative Tract Map No. 39051, Conditional Use Permit No. 390, and Environmental Assessment 2025-02 was issued in accordance with Coachella Municipal Code Section 17.74.010G, inclusive of the publication on December 7, 2025, of a legal public hearing notice which was published in the Desert Sun, the City's newspaper of record and mailing of a public hearing notice to a certified list of property owners within 300 feet of the subject properties on December 2, 2025; and,

WHEREAS, on December 17, 2025, the Planning Commission held a duly noticed public hearing to consider the application for the Project during which evidence, both written and oral, including the staff report and supporting documents, was presented at said hearing; and,

WHEREAS, at the conclusion of the public hearing and following discussion, the

Planning Commission approved this Resolution for the conditional approval of the Calhoun Subdivision Project as conditioned with the motion vote outcome specified in the meeting minutes for the December 17, 2025, Planning Commission meeting.

NOW, THEREFORE, BE IT RESOLVED, THE PLANNING COMMISSION OF THE CITY OF COACHELLA, CALIFORNIA DOES HEREBY FIND DETERMINE AND RESOLVE AS FOLLOWS:

SECTION 1. Incorporation of Recitals. The Planning Commission hereby specifically finds that all of the facts set forth in the recitals of this Resolution are true and correct and are incorporated into this Resolution by reference and constitute a material part of this Resolution.

SECTION 2.Environmental Findings. The Planning Commission has independently reviewed the Initial Study with Mitigated Negative Declaration and the administrative record for the proposed project, including all oral and written comments received during the document circulation period, public hearing, the staff report, and all attachments thereto, which are all incorporated herein by reference and are on file with the Community Development Department for the City of Coachella, and the Planning Commission finds that:

A. The Initial Study with Mitigated Negative Declaration (EA 2025-02) has been completed in compliance with CEQA and reflects the agency's independent judgment and analysis.

B. All environmental impacts of the Proposed Project are either insignificant or can be mitigated to a level of insignificance pursuant to the mitigation measures outlined in the Mitigated Negative Declaration and the Mitigation Monitoring Reporting Program.

C. There is no substantial evidence in the administrative record supporting a fair argument that the Proposed Project, as revised, may result in significant environmental impacts.

D. The Planning Commission hereby approves and adopts the Initial Study with Mitigated Negative Declaration (EA 2025-02) pursuant to Public Resources Code section 21080(c)(2).

E. Pursuant to Public Resources Code section 21081.6, the Planning Commission approves and adopts the MMRP prepared for the Project, which shall be fully complied with as specified in this Resolution and the Conditions of Approval set forth herein.

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SECTION 3. Tentative Tract Map Findings. Based upon the evidence presented at the hearing, including the staff report, the Planning Commission hereby finds and determines the Project complies with the necessary findings as required by Coachella Municipal Code Section 16.12 and the Subdivision Map Act. The Subdivision Map Act, in Government Code Section 66474, sets forth the findings required for tentative maps and are summarized as follows:

1. The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac. The project further proposes the development of community amenities such as a community park with tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a partially landscaped retention basis with passive walking trails. The open-space parks planned within the project area fulfill the Planned Unit Development and General Neighborhood open space requirements. For the foregoing reasons, the Tentative Map is consistent with the General Plan and is not inconsistent with any element of its General Plan designation.

2. The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac and is consistent with the General Plan. The project is proposing a PUD that would permit flexible standards for smaller lot sizes. The PUD is proposing 257 units in total with 144 lots each encompassing a minimum of 3,400 sf lots and 113 lots each encompassing a minimum of 4,050 sf. If the PUD is approved, the Tentative Map would be consistent with the applicable PUD development standards.

3. The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation and zoning designation of single-family homes, as it is proposing 7.29 du/ac. In addition to meeting the proposed density requirements, two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the Riverside County Office of the Fire Marshal. Infrastructure to serve the proposed parcels have been assessed and determined to be available from the water and electrical utilities. Furthermore, the site has no

topographical constraints and the proposed uses are consistent with that has been analyzed in the General Plan, the Coachella Municipal Code, and Planned Unit Development. Therefore, it can be determined that the proposed subdivision is physically suitable for the site.

4. The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation and zoning designation of single-family homes, as it is proposing 7.29 du/ac. Therefore, it can be determined that the proposed subdivision is physically suitable for the proposed density of development.

5. An Initial Study with Mitigated Negative Declaration (IS/MND) was completed to address the potential impacts from the implementation of the project. The environmental analysis includes but is not limited to the analysis of environmentally sensitive areas, potential impacts to natural vegetation and significant trees, watercourses, historic buildings and places, and other features of value to the community. The proposed project will develop currently vacant highly disturbed land in west Coachella. The existing setting does not contain any significant trees, watercourses, or historic buildings or places. The parcel has minimal natural vegetation, and what is there is common to many vacant parcels within the City of Coachella and the greater Coachella Valley. The scarce natural vegetation will be removed during the preliminary grading phase of the development of the site, and the IS/MND found that with the adoption of mitigation measures, any potential impact will be mitigated to have a less than significant impact. The project will adopt a Mitigation and Monitoring Reporting Program (MMRP) that will certify mitigation measures to protect environmentally sensitive land uses and species within the project area.

6. Tentative Tract Map No. 39051 proposes the subdivision of a net acreage of 35.24-acre parcels into 257 parcels. As reviewed and conditioned by the City of Coachella Public Works Department and Coachella Water Authority and Sanitation District, adequate sewer and water systems are currently available and will be accessible to the resultant parcels. As conditioned by the City of Coachella Public Works Department, Coachella Water Authority and Sanitation District, and Imperial Irrigation District, the project has the necessary infrastructure to adequately serve the resultant parcels and all proposed uses as allowed by the City of Coachella General Plan and the Coachella Municipal Code.

7. As proposed, TTM No. 39051 will not conflict with any public easements acquired for access or use by the public at large within the proposed subdivision. The Riverside County Office of the Fire Marshal and Engineering Department/Public Works Department have reviewed and approved the access points to the site. The subdivision of land will not conflict with easements for access through or use of property and as such, the subdivision's design is confirmed to be in harmony with existing public easements.

SECTION 4. Location and Custodian of Records. The documents and materials that constitute the record of proceedings on which these findings are based are located at Coachella Civic Center. The Development Services Director is the custodian of the record of proceedings.

SECTION 5. Execution of Resolution. The Chairman shall sign this Resolution and the City Clerk shall attest and certify to the passage and adoption thereof.

SECTION 6. Planning Commission Approval Based on the foregoing recitals and findings above, and the written and oral comments, facts and evidence presented, the City of Coachella Planning Commission hereby recommends to the City Council approval of Tentative Tract Map No. 39051, for the proposed 257-lot single family residential subdivision project located on the 39.98 acres site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010; and determining that the project is compliant with Section 15073 Of The California Environmental Quality Act (CEQA) Guidelines. The applicant shall demonstrate compliance with ALL Conditions of Approval, as set forth in Exhibit "A", Tentative Tract Map in "Exhibit B", and Development Plan Set in "Exhibit C" of this Resolution. Failure to demonstrate compliance with these conditions of approval may result in the delay of the Proposed Use or the rescinding of the City of Coachella's conditional use permit approval. Where the term "Applicant" is used in any condition of approval, this term shall also apply to the Property Owner, any developer, or any successor in the interest of the Applicant. It is the Applicant's or Applicant's successor in interest responsibility to fully comply with the conditions of approval unless subsequently modified in accordance with the City's required processes and procedures.

PASSED APPROVED and ADOPTED this 17th day of December 2025.

_____
Isela Murillo, Chairperson
Coachella Planning Commission

ATTEST:

_____
Kendra Reif
Planning Commission Secretary

APPROVED AS TO FORM:

_____
City Attorney

STATE OF CALIFORNIA)
COUNTY OF RIVERSIDE) ss.
CITY OF COACHELLA)

I HEREBY CERTIFY that the foregoing Resolution No. PC-2025-22, was duly adopted at a regular meeting of the Planning Commission of the City of Coachella, California, held on the 17th day of December 2025, by the following roll call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Kendra Reif
Planning Commission Secretary

Exhibit A – Resolution No. PC2025-22

CONDITIONS OF APPROVAL FOR TENTATIVE TRACT MAP NO. 39051

General Conditions

1. Tentative Tract Map 39051 with a minimum lot size of 3,400 square feet, for the proposed 257-lot single family residential subdivision project located on the 39.98-acres site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010, and the determination that the proposed project is compliant with California Environmental Quality Act (CEQA) Guidelines Section 15073 - Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration.

2. The applicant shall defend, indemnify and hold harmless the City of Coachella, its officials, officers, employees, and agents from and against any claim, action, or proceeding against the City, its officials, officers, employees or agents to attack, set aside, void or annul any project approval or condition of approval of the city concerning this project, including but not limited to any approval or condition of approval or mitigation measure imposed by the City Council or Planning Commission. The City shall promptly notify the applicant of any claim, action, or proceeding concerning the project and the City shall cooperate fully in the defense of the matter. The City reserves the right, at its own option, to choose its own attorney to represent the City, its officials, officers, employees and agents in the defense of the City Attorney, within five days of the effective date of this approval.

3. The working drawings shall include within the first four pages a list of all conditions of approval included in this resolution.

4. CFD. The applicant shall be subject to further requirements that it participate in the Community Facilities District for residential lots within Tentative Tract Map 39051 that the City proposed to establish under the Mello-Roos Community Facilities Act of 1982, Section 13311 of the California Government Cod, as amended, for all undeveloped property within the boundaries of the City, including the subject property subject to this development approval (Tentative Tract Map No. 39051), to finance police and fire services for such property. The applicant shall do everything necessary for inclusion of the property subject to this development approval within such District upon its establishment. This development approval is subject to such requirement as a condition, unless such District is established prior to the effectiveness of this development approval in which case, it shall be a condition precedent. The Community Facilities District shall be established before issuance of the first certificate of occupancy.

5. LLMD. The owner shall agree to the formation of a Landscape and Lighting Maintenance District(LLMD) for the maintenance of the lighting, landscaping and irrigation. The owner shall prepare the improvement plans, Engineer's Report, Estimated Costs, and submit to the City Engineer as required for the formation of the LLMD. The funds to be deposited shall be a minimum of $1,000. Costs over $1,000 shall be billed by the City to the owner for payment prior to the recordation of the Final Map. The LLMD shall be formed before issuance of the first certificate of occupancy.

6. CC&R's. The owner shall agree to the formation of a Homeowner's Association for maintenance of all common areas including streets, retention basins, block walls, fencing, and on-site amenities.

7. CC&R's. The Homeowner's Association shall adopt Conditions, Covenants and Restrictions (CC&R's), and act as a liaison to the City for review of the placement, type, architectural style, materials, and landscaping of all units and lots. The proposed CC&Rs shall be submitted for City and Riverside County Fire review prior to recordation of final map and the City shall be a third-party beneficiary to the CC&Rs.

8. The neighborhood park shall complete construction and be open to the public prior to the issuance of the 101st occupancy permit and shall be constructed in accordance with the conceptual landscape plans contained in the attached Development Set to the satisfaction of the Community Development Director.

9. Prior to the recordation of the final map the applicant shall submit detailed landscaping irrigation plans and sign plans for review, including plans for the neighborhood park and retention basin for approval by the City Engineer and Development Services Director.

10. The proposed subdivision shall be improved with a decorative masonry perimeter wall consisting of a smooth face CMU block that includes stone veneer, tan slumpstone, splitface block, or precision with smooth stucco finish wall, and a decorative cap, and/or equivalent high-quality design approved by the City Engineer and Community Development Director. The entire block perimeter wall on Calhoun Street and Avenue 49 shall be a smooth face CMU block with a stone veneer and/or equivalent design added at certain sections of the perimeter wall to be approved by the City Engineer and Community Development Director. A minimum of one 12-inch square masonry pilaster at every 75 feet along Calhoun Street and Avenue 49 shall be used along any fencing facing a public street as shown on the conceptual landscape plans.

11. Interior fencing for single family lots shall utilize block wall with metal view obscured access gates. Any street visible block shall be decorative block including a smooth CMU block and/or equivalent approved by the City Engineer and Community Development Director.

12. Identification signs for the subdivision shall include high quality and durable design with accent lighting. A detailed sign plan shall be submitted to the Community Development Director for review and the final design shall be approved by the Community Development Director.

13. All street names and addressing shall be consistent with City and USPS policies.

14. The applicant shall submit, and must obtain approval from the Community Development Director, a letter from a registered landscape architect confirming that landscaping and irrigation have been installed in accordance with the approved plans prior to issuance of a certificate of occupancy. Any damaged, dead or decayed landscape areas shall be replaced per approved landscape plans upon landscape inspection by the Community Development Director and prior to issuance of a certificate of occupancy.

15. Stamped concrete or decorative pavers shall be provided at the surface of both project entryways with a terracotta color or equivalent and identified on both Civil and Landscape Plans. Pavers types shall be approved by the Community Development Director and City Engineer.

16. Landscaping and irrigation shall be provided in accordance with Section 17.54.010(J) of the Municipal Code and in accordance with the State Model Water Efficient Landscape Ordinance (AB 1881). Water budget calculations, including the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU) shall be provided as part of the landscaping and irrigation plan.

17. The applicant shall work with the Development Services Department to provide utility stub outs to enable the development of community garden plots for the park, at the direction and feasibility as determined by the Community Development Director. The implementation of the community garden is at the discretion of the Community Development Director.

18. The internal open space landscape plan for the park shall be revised to incorporate native landscaping for both groundcover, shrubs, and trees, at the direction and feasibility as determined by the Community Development Director. The implementation of the community garden is at the discretion of the Community Development Director.

19. Soil sampling results for agricultural chemicals shall be provided with the submittal of grading permits.

20. The landscape improvements on the northern portion of Avenue 49 shall match the landscaping on the northern portion of Avenue 49 between Jackson Street and the proposed project, to the satisfaction of the Community Development Director. This may include a requirement to provide metal edging to match the northern portion of Avenue 49.

21. Shade tree plantings shall be installed to provide shade of thirty (30) percent of landscape area within ten (10) years. California native species shall be incorporated in at least forty (40) percent of required landscape areas. Compliance with these requirements shall be identified on project landscape plans to the satisfaction of the Community Development Director.

22. The Community Development Director may request landscape plans to be revised to incorporate street trees within the landscape parkway separating the sidewalk from the street curb line, unless determined unfeasible due to utility easements. The applicant may relocate existing proposed shade trees to accomplish this condition. This condition shall be met to the satisfaction and discretion of the Community Development Director.

23. All street and internal street facing fence and walls shall be block wall per the attached development plan set. Vinyl fencing is only allowed for internal property lines not visible from the street.

Building

24. Recommend providing a shade structure over the playground.

25. Proposed bench shall be equipped with an area for a wheelchair user.

26. All features all be in an accessible path of travel.

27. Trail must be accessible propose a walkable surface. The proposed ¼" gravel does not meet the requirement. CBC11B-302

28. Passing space shall be provided on the proposed trail. CBC11B-403.5.3

29. Provide verification that shade trees are proposed in compliance with California Green Building Standards Code section 5.106.12 Shade Trees.

Utilities

30. The project is located within the service area of the City's Coachella Water Authority and Coachella Sanitary District.

31. The applicant shall submit water and sewer plans for approval.

32. The first submittal shall not be accepted without the completion of the hydraulic model.

33. A $5,000 deposit is required to initiate hydraulic modeling.

34. The City of Coachella may need additional facilities to provide for the orderly expansion of its domestic water and sanitation systems. These facilities may include pipelines, wells, reservoirs, booster pumping stations, lift stations and other facilities. The developer may be required to install these facilities and provide land and/or easements on which some of these facilities will be located.

35. New water and sewer connections are subject to the collection of impact fees.

36. All fire lines require the installation of Double Check Detector Assemblies.

37. Backflow devices are required on all non-residential connections installed within 12" of the meter box.

38. All buildings may require individual meters.

39. Irrigation may require its own meter.

40. All water connections shall install 4G AMI master meters.

41. All service lines shall be copper tubing per the approved list of materials.

42. All materials shall be per the approved list of materials provided by the Engineering Department or the Utilities Department.

43. No new water connections shall be shown on landscaping plans, all connections shall be in the water improvement plans.

44. Trees/shrubs must have a minimum of 15’ separation distance from the Utilities water/sewer laterals. Or minimum 10’ separation distance from water/sewer laterals with root barrier.

45. Provide plumbing blueprints depicting sanitary, industrial, and/or grease waste line. (all lines that are applicable)

46. Illustrate domestic water and sewer point of connection to the City’s utilities.

47. Provide plumbing code fixture schedule with total DFU’s listed.

48. Business establishments must complete Utilities Department’s wastewater discharge survey and submit to Development Services.

    a. For tenant improvements, current and proposed plumbing code fixture schedule must be provided

49. Pretreatment equipment/Sample box: (if applicable) Provide manufacture specifications and sizing chart.
    a. Pretreatment Equipment Minimum Requirements:
        i. 750 gal minimum

        ii. Clean outs and vents before and after pretreatment equipment

        iii. Sample box immediately downstream of the pretreatment equipment

        iv. Multi suite buildings requesting pretreatment installation require separate sewer lateral connection per pretreatment device

        v. Made from precast concrete form

50. Outside drains connected to the sanitary sewer are prohibited unless drains are protected from rain water by having a permanent berm within a shade structure. Storm water is prohibited from entering the sanitary sewer.

Engineering

PRIOR TO APPROVAL OF ENGINEERING PLANS or ISSUANCE OF ENGINEERING PERMITS:

Tentative Map

51. A focused Traffic Impact Analysis (TIA) shall be prepared for the project by an appropriately licensed professional engineer. Prior to the preparation of the TIA, the engineer shall submit a scoping letter for the TIA for the City Engineer’s approval. The TA shall include but not limited to identification of trip generation, traffic distribution and impact on existing transportation facilities and at time of General Plan build-out, all relevant, ingress and egress movements, lines of sight, queuing analysis, and alignment studies (preliminary signing and striping plan). Applicant shall obtain approval of site access and circulation from the Fire Marshall.

52. A preliminary soils report shall be prepared for the project by an appropriately licensed professional engineer. At a minimum, the soils report shall provide specific analyses and recommendations for grading, pavement structural sections, and infiltration.

53. A comprehensive drainage report, prepared by California Registered Civil Engineer, shall be submitted for review and approval by the City Engineer prior to issuance of any permits. The report shall contain pre- and post-development hydrology maps showing on-site and off-site tributary drainage areas and shall be prepared in accordance with the requirements of the Riverside County Flood Control District. Adequate provisions shall be made to accept and conduct the existing tributary drainage flows around or through the site in a manner which will not adversely affect adjacent or downstream properties. If the design of the project includes a retention basin, it shall be sized to contain the runoff resulting from a 10-year storm event and the runoff from a 100-year storm event shall be contained within basin with shallow ponding (3.5' max.). The basin shall be designed to evacuate a 10-year storm event within 72 hours. The size of the retention basin(s) shall be determined by the hydrology report and be approved by the City Engineer. Retention basin shall be provided with a minimum of 2.00 feet sandy soil if determined to contain silt or clay materials. Maximum allowable percolation rate for design shall be 10 gal./s.f./day unless otherwise approved by the City Engineer. A percolation test for this site is required to be submitted. A combination drywell vertical drain field shall be constructed at all points where runoff enters the retention basin. Drywell & vertical drain field design shall be based on soils borings made at the proposed drywell locations after the retention basins have been rough graded. Minimum depth shall be 45-feet. A log that includes sieve analysis for each strata of the borings shall be submitted to the City Engineer for confirmation of depth of the vertical drain fields. Underground retention under the proposed parking area will be considered as an alternative to surface retention subject to the approval of the City Engineer.

54. Identify and clearly show all necessary drainage easements to implement the project in accordance with drainage law.

55. Applicant shall submit for review and approval by the City Engineer all documents related to any existing and proposed on-site and off-site easements that may affect the development of the site. All easements shall be identified on the engineering plans.

56. Applicant shall obtain approval of site access and circulation from Fire Marshall.

Final Map

57. The Final Map shall comply with the Subdivision Map Act and City of Coachella Subdivision Ordinance.

58. All public streets shall be dedicated to City of Coachella.

59. Prior to submittal of the final map to the City Council for approval, the applicant shall post securities (Bonds) to guarantee the installation of required improvements and a Subdivision Improvement Agreement shall be submitted to Engineering Division for City Engineer and City Attorney approval.

60. Prior to approval of the Final Map, the applicant shall resolve potential CVWD issues related to existing tile drains or irrigation mains located within the tract boundary or along the streets adjacent to the tract. If necessary, tile drains and irrigation lines shall be relocated and easement documents prepared for the new location of any such lines. The easement shall be shown on the final map. Plans for the tile drain or irrigation relocation shall be submitted to CVWD for approval and a copy of the plans shall be submitted to the City for evaluation regarding possible conflict with City facilities. The applicant shall submit to the City approved copies of any such relocation plans.

61. All Primary streets, including 49nd Avenue, Calhoun Street and Residential street shall be completed prior to final occupancy for the first structure at the Tract.

62. Prepare and record necessary drainage easements, access easements and utility easements to implement the project in accordance with drainage law and site conditions to the satisfaction of the City Engineer prior to approval of the Final Maps.

63. Full Street Improvements plans, Street Improvements Bonds and Monument Bonds shall be approved prior to Approval of the Final Maps. Street improvement plans shall be in conformance with recommendations outlined in an approved Traffic Impact Analysis and may include off site intersection improvements, engineering analysis of fair share off site improvements and fully executed agreements for phasing of fair share payments if needed per the Traffic Impact analysis.

64. Internal roads shall be complete prior to final occupancy of any adjacent house.

General:

65. All proposed development shall conform to the approved engineering studies and environmental migration measures as identified in the approved traffic, drainage, soils, hydrology, etc. studies developed under the tentative and final map process.

66. A storm water quality management plan shall be prepared for the project by California Registered Civil Engineer in compliance with NPDES and State Water Quality Control Board regulations. The project shall be designed to specify preferential use of Low Impact Development Best Management Practices that reduce pollutants and runoff volume.

67. Applicant shall comply with the valley wide NPDES permit requirements including but not limited to submittal of a WQMP for plan review accompanied by a $3,000 plan check deposit for approval including executed maintenance agreement. All unused plan check fees will be refunded to the applicant upon approval of the Final WQMP.

68. The developer shall submit a Fugitive Dust Control and Erosion Control plan in accordance with Guidelines set forth by CMC and SCAQMD to maintain wind and drainage erosion and dust control for all areas disturbed by grading. Exact method(s) of such control shall be subject to review and approval by the City Engineer. No sediment is to leave the site. Additional securities, in bond form, in amount of $2,000.00 per acre of gross area, and a one-time cash deposit of $2,000.00 are required to insure compliance with this requirement. No work may be started on or off site unless the PM-10 plan has been approved, the original plans, and executed dust control agreement, are filed in the engineering department at the City of Coachella.

69. Site access improvements shall be in conformance with the requirements of Title 24 of the California Administrative Code. This shall include access ramps for off-site and on-site streets as required.

70. The applicant shall provide necessary utility easements for IID and underground overhead distribution lines within the project boundaries. Applicant shall submit to the City a letter from IID that satisfies this requirement.

71. The applicant shall pay all necessary plan check, permit and inspection fees. Fees will be determined when plans are submitted to the City Engineering Department for plan check.

ROUGH GRADING:

72. Prepare and submit rough grading and erosion control plans for the project.

73. The project's soils engineer shall certify to the adequacy of the grading plan.

74. All projects developing one (1) acre or more of total land area, or which are part of a larger phased development that will disturb one acre of land, are required to obtain coverage under the State Water Resources Control Board's (SWRCB) General Permit for storm water discharges associated with construction activity. Proof of filing a Notice of Intent (NOI) with the SWRCB for coverage under this permit is required. The Waste Discharger's Identification Number (WDID), issued by the SWRCB, must be shown on the grading plans. The project's Storm Water Pollution Prevention Plan shall be submitted for the City's review and approval.

PRECISE GRADING:

75. A precise grading/improvement plan, prepared by a California Registered Civil Engineer, showing building footprints, pad elevations, finished grades, drainage routes, retaining walls, erosion control, slope easements, and all other pertinent information shall be submitted for review and approval by the City Engineer.

76. Rough grading shall be certified by the project soils engineer prior to issuance of a permit for precise grading or building construction.

77. Provide and record a reciprocal use and maintenance agreement to assure common ingress and egress and joint maintenance of all common access, parking areas and drives.

78. If applicant is planning to build a wall, separate permits shall be required for wall construction. The maximum height of any wall shall be limited to six (6) feet as measured from an average of the ground elevations on either side.

STREET IMPROVEMENTS:

79. Street improvement plans prepared by a California Registered Civil Engineer shall be submitted for review and approval by the City Engineer. All street improvements including street lights shall be designed and constructed in conformance with City Municipal Code, General Plan, and Standards and Specifications. Street flow line grade shall have a minimum slope of 0.35 %.

80. Applicant shall construct all off-site and on-site improvements including street pavement, curb, gutter, sidewalk, street trees, perimeter walls, perimeter landscaping and irrigation, storm drain, street lights, and any other incidental works necessary to complete the improvements. Driveways

shall conform to City of Coachella standards for commercial driveways with a minimum width of 24.00 feet and curbed radius entrances.

81. Applicant shall construct and dedicate the following streets and street improvements to conform to the General Plan and/or requirements of Traffic Study.

    1. 49th Avenue- Public Roadway as shown on the RAC and per these comments shall include the following:

        a. Dedication of land within project limits is required. This street will be required to be dedicated to the ultimate General Plan width as a Primary Arterial with Bicycle Lanes with 94 feet of right-of-way as per City of Coachella General Plan.
        b. Ultimate right-of-way improvements shall not be required at this time. Street improvements along the westerly portion of the project shall include full street pavement of both east and west bound lanes and a painted median with a measured street width of 46-foot from curb to curb. Curb, gutter, sidewalk and landscape parkway improvements shall be required on both the north and south side of Ave 49 including all necessary relocations and appurtenances as needed to complete the work. Improvements shall match existing modified Ave 49 cross section improvements that exist between the proposed project and Jackson Street on the east of the proposed development.

        c. The eastern portion of Ave 49 shall include intersection improvements, turn lanes and fair share contributions towards future signalized intersections as determined by an approved Traffic Impact Analysis.

        d. Applicant shall construct all appurtenant roadway components within project limits such as, but not limited to: sidewalk, ADA ramps, Traffic control striping, legends, Traffic control signs, turn left or right pocket, Street Lights, street name signs, full improvements for street median and Traffic Signal Light to the satisfaction of the City Engineer.

        e. Applicant shall install curb and gutter transitions to uniformly connect to existing adjacent improvements and coordinate installation and/or relocation of fire hydrants, water meters, storm drains, wells, street lights, any kind of tree and all other appurtenances as required to the satisfaction of the City Engineer.

        f. Applicant shall underground all existing dry utilities if existing within project limits such as, but not limited to: power poles, telecommunication poles and all other existing dry utilities.

g. Additional offsite improvements, such as intersection improvements, installation of turning lanes, lane widening, etc. shall be installed to the Satisfaction of the City Engineer and per the requirements of an approved Traffic Impact Analysis.

2. Calhoun Street- Public Roadway as shown on the RAC and per these comments shall include the following:

   a. Dedication of land along southbound lane within the entire project limits is required. This street is classified as Collector with Bicycle Lanes with 90 feet of right-of-way as per City of Coachella General Plan.

   b. Street measured at Center line to Westerly curb shall have a width of 35-foot.

   c. Applicant shall construct all appurtenant roadway components within project limits such as, but not limited to: sidewalk, ADA ramps, Traffic control striping, legends, Traffic control signs, Street Lights, street name signs, full improvements for Street median and Traffic signal light to the satisfaction of the City Engineer.

   d. Applicant shall construct transition street lanes south of the property limits as required to the satisfaction of the City Engineer and per the requirements of an approved Traffic Impact Analysis.

   e. Applicant shall install curb and gutter transitions to uniformly connect to existing adjacent improvements and coordinate installation and/or relocation of fire hydrants, water meters, storm drains, wells, street lights, any kind of tree and all other appurtenances as required to the satisfaction of the City Engineer.

   f. Applicant shall underground all existing dry utilities if existing at southbound lane within project limits such as, but not limited to: power poles, telecommunication poles and all other existing dry utilities.

   g. Additional offsite improvements, such as intersection improvements, installation of turning lanes, lane widening, etc. shall be installed to the Satisfaction of the City Engineer and per the requirements of an approved Traffic Impact Analysis.

3. Interior Street - Private Roadway as shown on the RAC and per these comments shall include the following:

a. Interior streets within project limits shall be maintained by Homeowners association and classified as Private Streets. These streets are classified as Suburban Residential with Parking with 56 feet of right-of-way as per City of Coachella General Plan.

b. Applicant shall construct all appurtenant roadway components within project limits such as, but not limited to: sidewalk, ADA ramps, Traffic control striping, legends, Traffic control signs, Street Lights and street name signs to the satisfaction of the City Engineer.

c. Applicant shall install curb and gutter transitions to uniformly connect to existing adjacent improvements and coordinate installation and/or relocation of fire hydrants, water meters, storm drains, wells, street lights Traffic signal, and all other appurtenances as required to the satisfaction of the City Engineer.

d. Applicant shall underground all existing dry utilities within project limits such as, but not limited to: power poles, telecommunication poles and all other existing dry utilities.

SEWER and WATER IMPROVEMENTS:

82. Sewer & Water Improvement Plans prepared by a California Registered Civil Engineer shall be submitted for engineering plan check and City Engineer approval.

83. Applicant shall construct all off-site and on-site water improvements and any other incidental works necessary to complete the improvements. Size and location of sewer and water improvements shall be approved by the City Engineer.

PRIOR TO ISSUANCE OF BUILDING PERMITS:

84. A final soils report, compaction report and rough grading certificate shall be submitted and approved prior to issuance of any building permits.

85. Provide a set of proposed Covenants, Conditions and Restrictions (CC&R) for review and approval. The proposed CC&Rs shall contain the Association's/Owner's maintenance obligations with respect to various facilities including, but not limited to, right-of-way and private landscaping, private streets, sidewalks, utilities, street lights, and Water Quality Management Plan (WQMP) features. This document must be submitted to and approved by the City before it is submitted to any other governmental entity.

86. Prior to issuance of building permits, all required public improvements, including landscaping and lighting of the retention basins, and landscaped areas along the exterior streets, shall be completed or secured with appropriate sureties to the satisfaction of the City Engineer. An engineering final

inspection is required. "As-built" plans shall be submitted to and approved by the City Engineer. Prior to acceptance of the improvements by the City, such plans, once approved, shall be given to the city on compact disk in AutoCad format. All off-site and on-site improvements shall be completed to the satisfaction of the City Engineer prior to acceptance of improvements for maintenance by the City.

87. The applicant's Civil Engineer shall field verify and certify that all BMPs are designed, constructed, and functional in accordance with the approved WQMP.

PRIOR TO RELEASE OF OCCUPANCY PERMITS/ACCEPTANCE OF PUBLIC IMPROVEMENTS:

88. Prior to issuance of certificate of occupancy, all public improvements, including landscaping and lighting of the retention basins, and landscaped areas along the exterior streets, shall be completed to the satisfaction of the City Engineer. An engineering final inspection is required. "As-built" plans shall be submitted to and approved by the City Engineer. Prior to acceptance of the improvements by the City, such plans, once approved, shall be given to the city on compact disk in AutoCad format. All off-site and on-site improvements shall be completed to the satisfaction of the City Engineer prior to acceptance of improvements for maintenance by the City.

Fire

89. The applicant shall address all fire conditions of approval for the project pursuant to all letters issued by the Riverside County Office of the Fire Marshall for this project, and shall make all modifications necessary to the tentative tract map or project in accordance with Riverside County Office of the Fire Marshall. This includes, but is not limited to Fire Permit Number: FPCUP2500010 & FPTRC2500012

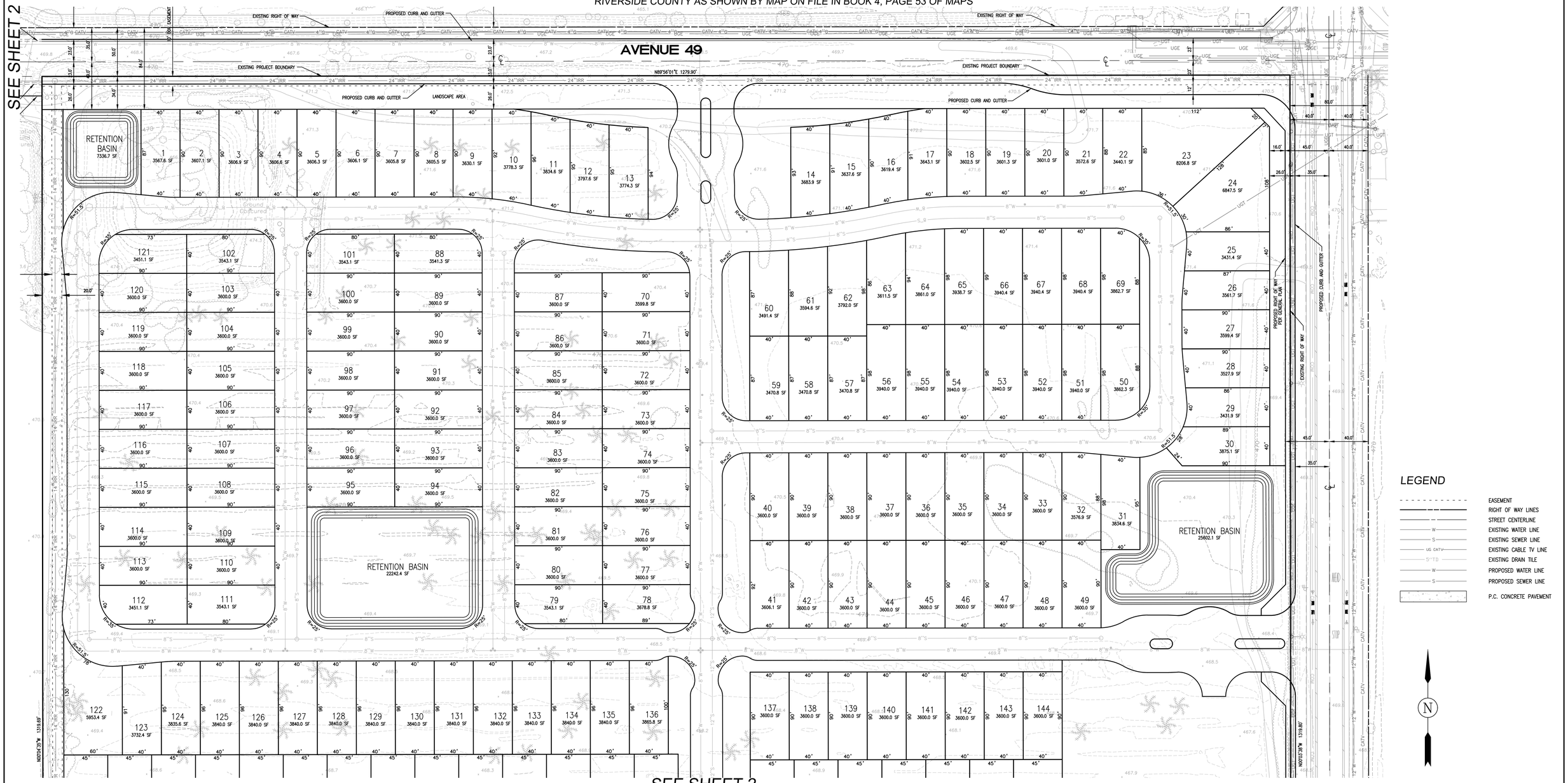
CEQA

90. The applicant shall comply with all mitigation measures and the mitigation monitoring reporting program of the project Initial Study Mitigated Negative Declaration as adopted and attached to the Resolution approval for EA No. 25-02.

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT MAP NO. 39051

LOT 11 OF THE SUBDIVISION OF SECTION 36, TOWNSHIP 5 SOUTH, RANGE 7 EAST, IN THE RIVERSIDE COUNTY AS SHOWN BY MAP ON FILE IN BOOK 4, PAGE 53 OF MAPS

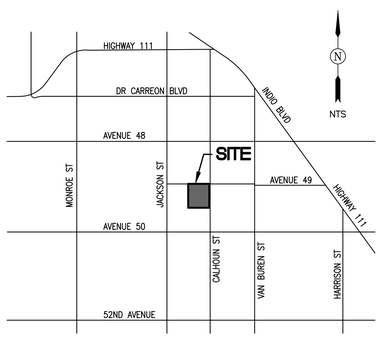


LEGEND

- EASEMENT
- RIGHT OF WAY LINES
- STREET CENTERLINE
- W — EXISTING WATER LINE
- S — EXISTING SEWER LINE
- UG CATV — EXISTING CABLE TV LINE
- STD — EXISTING DRAIN TILE
- W — PROPOSED WATER LINE
- S — PROPOSED SEWER LINE
- P.C. CONCRETE PAVEMENT

GRAPHIC SCALE
SCALE 1"=40'
0 20 40 80 120 160

VICINITY MAP



EASEMENT NOTES

1. THE EFFECT OF AN EASEMENT 30 FEET ON EACH SIDE OF SECTION LINES IN FAVOR OF THE PUBLIC FOR PUBLIC HIGHWAYS, AS EVIDENCED BY PETITION DATED JANUARY 9, 1901 AND RECORDED APRIL 17, 1959 AS INSTRUMENT NO. 1959-32692 OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
2. RIGHTS OF WAY AND RESERVATIONS, AFFECTING LOT 7, HEREIN DESCRIBED, REFERRED TO IN DEEDS FROM THE COACHELLA VALLEY COUNTY WATER DISTRICT TO THE DISTRICT BOND COMPANY, DATED SEPTEMBER 27, 1940 AND RECORDED OCTOBER 30, 1941 IN BOOK 518, PAGE 586 OFFICIAL RECORDS. (NOT PLOTTABLE)
3. AN EASEMENT FOR FOR WATER LINES AND MAINTENANCE OF SAID WATER LINES PURPOSES IN FAVOR OF DAVID H. MITCHELL AND CONSTANCE ANN COWAN, TRUSTEES OF THE DONALD H. AND CATHERINE H. MITCHELL FAMILY TRUST DATED JUNE 6, 1979 RECORDED SEPTEMBER 04, 1998, AS INSTRUMENT NO. 1998-377990 OFFICIAL RECORDS.
4. PROPOSED LANDSCAPE EASEMENT

GENERAL NOTES

1. *TOTAL AREA – 38.72 AC± ACRES, GROSS.*
2. *EXISTING SITE – VACANT.*
3. *SEWAGE DISPOSAL AND WATER SUPPLY TO BE PROVIDED BY CITY OF COACHELLA.*
4. *FEMA FLOOD ZONE– FLOOD ZONE X: AREA OF MINIMAL FLOOD HAZARD PER FIRM MAP NO. 06065C2254H EFFECTIVE DATE MARCH 6, 2018.*
5. *TENTATIVE TRACT MAP NO. 39051 CONTAINS 255 RESIDENTIAL LOTS.*

SERVICES

SEWER AND WATER:	
CITY OF COACHELLA	PHONE: (760) 398-3502
GAS:	
THE GAS COMPANY	PHONE: (909) 335-7706
ELECTRIC:	
IMPERIAL IRRIGATION DISTRICT	PHONE: (760) 335-3640
TELEPHONE:	
FRONTIER COMMUNICATIONS	PHONE: (760) 778-3620
CABLE TV:	
SPECTRUM	PHONE: (760) 340-2225
USA:	
UNDERGROUND SERVICE ALERT	PHONE: (800) 422-4133
SCHOOL:	
COACHELLA VALLEY UNIFIED SCHOOL DISTRICT	PHONE: (760) 399-5137

OWNER/DEVELOPER

ROD VANDENBURG, MANAGING PARTNER
PACIFIC MODERN BUILDERS, LLC
43584 VIA MAGELLAN DRIVE
PALM DESERT, CA 92211
ROD4REAL@AOL.COM
TEL: (760) 799-8227

ENGINEER/SURVEYOR

TUNG HSIEH, PE, PLS
THE ALTUM GROUP
44600 VILLAGE COURT, SUITE 100
PALM DESERT, CA 92260
TEL: (760) 346-4750

APN

612-260-010

ZONING

EXISTING: GENERAL NEIGHBOUR (G-N)
PROPOSED: PUD, PLANNED UNIT DEVELOPMENT

GENERAL PLAN

EXISTING: LOW DENSITY RESIDENTIAL (R-L)
PROPOSED: LOW DENSITY RESIDENTIAL (R-L)

LAND USE

EXISTING: VACANT
PROPOSED: SINGLE FAMILY DWELLING

LEGAL DESCRIPTION

LOT 11 OF COACHELLA LAND AND WATER COMPANY'S SUBDIVISION OF SECTION 36, TOWNSHIP 5 SOUTH, RANGE 7 EAST, SBM, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 4 PAGE 53 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THAT PORTION WITHIN THE PUBLIC HIGHWAY ALONG THE EAST SIDE OF SAID LOT 11.

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATION "P600" AND "DHLG" NAD 83(NSRS 2011) EPOCH 2010.00 AS PER NGS DATE SHEET.
BEING N 36°49'01" W

BENCH MARK

CITY OF INDIO BM 127
RIVERSIDE COUNTY BRASS DISC ON A CONCRETE POST NEAR THE INTERSECTION OF AVE. 48 & VAN BUREN ST.

ELEVATION= 464.82' NGVD 29 + 500'
THE ELEVATION LISTED ABOVE IS ACTUAL ELEVATION PLUS 500'

AERIAL TOPOGRAPHY

AEROTECH MAPPING, INC.
200 SPECTRUM CENTER DRIVE, SUITE 300
IRVINE CA 92618 (619) 606-5020 INFO@ATMLV.COM
AERIAL PHOTOGRAPHY DATED: 10-27-2021

PREPARED BY:
• Engineering • Planning
• Survey • Environmental
The Altum Group
44-600 Village Court, Suite 100, Palm Desert, CA 92260
t. 760.346.4750 TheAltumGroup.com f. 760.340.0089

SHEET NO. 1 OF 2

Dec 05, 2025 – TENTATIVE TRACT MAP NO. 39051 SUBMITTAL

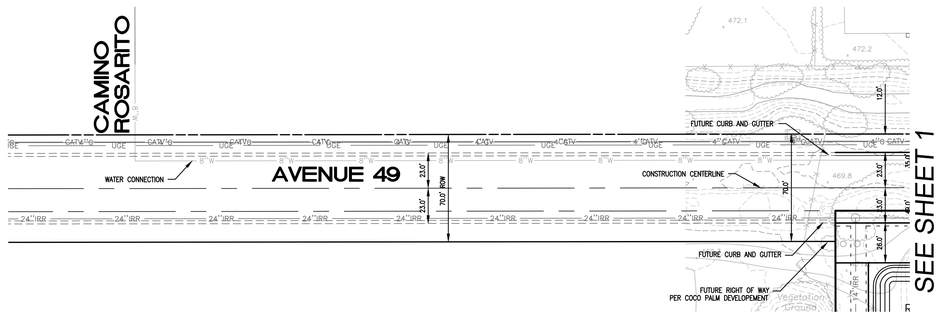
IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

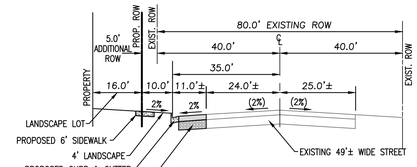
TENTATIVE TRACT MAP NO. 39051

LOT 11 OF THE SUBDIVISION OF SECTION 36, TOWNSHIP 5 SOUTH, RANGE 7 EAST, IN THE RIVERSIDE COUNTY AS SHOWN BY MAP ON FILE IN BOOK 4, PAGE 53 OF MAPS

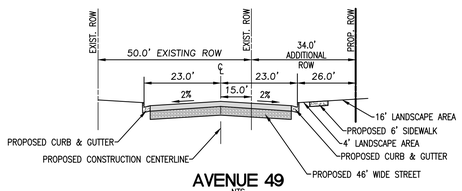
SEE SHEET 1



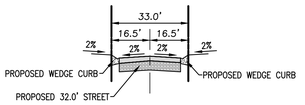




CALHOUN STREET
NTS



AVENUE 49
NTS



PRIVATE ON-SITE STREETS
(ONE SIDED STREET PARKING ONLY)
NTS

LEGEND

- EASEMENT
- RIGHT OF WAY LINES
- STREET CENTERLINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING CABLE TV LINE
- EXISTING DRAIN TILE
- PROPOSED WATER LINE
- PROPOSED SEWER LINE
- P.C. CONCRETE PAVEMENT

N

GRAPHIC SCALE
SCALE 1"=40'
0 20 40 80 120 160

AERIAL TOPOGRAPHY

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IRVINE CA 92618 (619) 606-5020 INFO@ATMLV.COM
AERIAL PHOTOGRAPHY DATED: 10-27-2021

PREPARED BY:
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• Survey • Environmental
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t. 760.346.4750 TheAltumGroup.com f. 760.340.0089

SHEET NO. 2 OF 2

Dec 05, 2025 - TENTATIVE TRACT MAP NO. 39051 SUBMITTAL

CALHOUN STREET SUBDIVISION
CONCEPTUAL LANDSCAPE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

OWNER:
PACIFIC MODERN BUILDERS LLC
P.O. BOX 3075, RANCHO MIRAGE, CA 92270
760.799.8227
rod4real@AOL.com

APPLICANT:
RODNEY VANDENBURG, MANAGING MEMBER
PACIFIC MODERN BUILDERS
P.O. BOX 3075, RANCHO MIRAGE, CA 92270
760.799.8227
rod4real@AOL.com

ENGINEER/PLANNER:
THE ALTUM GROUP
JAMES BAZUA PE
james.bazua@the altumgroup.com

MR. RICH MALACOFF
rich.malacoff@thealtumgroup.com

44-600 VILLAGE COURT, SUITE 100
PALM DESERT,CA 92260
T/760.346.4750
F/760.340/0089



VICINITY MAP/N.T.S.

ENTRY SIGN LIGHTING

MODEL **1045** | Specification Sheet
Commercial Series • Floodlight • LED

TYPE: MODEL: PROJECT:

PRODUCT FEATURES

Wattage	14 – 26 W
Voltage	120 – 277 VAC
Lumens	1100 – 2400 Delivered Lumens
Distribution	17° (VNS), 18° (NSL), 30° (MF), 50° (WF)
CCT	2700K, 3000K, 3500K, 4000K, 5000K
CRI	80 CRI min.
Dimming	0-10V or Phase Cut (TRIAC/ELV-120VAC only) available
Driver	Multi-Volt 120-277VAC with tri-modal dimming capabilities
Dimensions	4½" DIA x 10⅛" D



Click on image for alternate shields
(within Adobe Acrobat or Acrobat Reader)

TREE UPLIGHTING

MODEL **1185TG** | Specification Sheet
Commercial Series • In-Grade • LED

TYPE: MODEL: PROJECT:

PRODUCT FEATURES

Wattage	15 – 26 W
Voltage	120 – 277 VAC
Lumens	917 – 1766 Delivered Lumens
Distribution	NEMA type (W x V): 2x2 (NNL), 2x2 (NSL), 3x3 (MF), 4x4 (WF), 5x5 (WW)
CCT	2700K, 3000K, 3500K, 4000K, 5000K
CRI	80 CRI min.
Dimming	0-10V or Phase Cut (TRIAC/ELV-120VAC only) available
Driver	Multi-Volt 120-277VAC with tri-modal dimming capabilities
Dimensions	8 ⅞" DIA x 8" D



PALM LIGHTING RINGS





SEE PARK ELECTRICAL PLANS FOR LIGHTING THIS AREA
TREE UPLIGHTS TO BE PROVIDED THIS AREA AFTER DRIVEWAYS AND UTILITIES ARE LOCATED

AVENUE 49

CALHOUN STREET

NORTH

12.1.2025

RUSSELL MACDONALD RLA
PALM SPRINGS, CALIFORNIA
760.898.3969
RUSS@MACDONALDLA.COM

4/5
LANDSCAPE LIGHTING PLAN

CALHOUN STREET SUBDIVISION
CONCEPTUAL LANDSCAPE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

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MR. RICH MALACOFF
rich.malacoff@thealtumgroup.com

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HALF COURT BASKETBALL



BASKETBALL HOOP
AMERICAN SUPERSPORTS
RUFFNECK MODEL
QTY 1

CLASSIC RECREATION SYSTEMS / TOT LOT SHADE





RAMADAS / CLASSIC RECREATION SYSTEMS /MESA MODEL / QTY 5



TOT LOT / WILLYGOAT / GRANITE MOUNTAIN PLAY SYSTEM
KEEGANS CASTLE / QTY 1



RAMADA PICNIC TABLES / GLOBAL INDUSTRIAL 6'
MODEL #WB694553GN / QTY 5



BARCO WHEELCHAIR ACCESSABLE PICNIC TABLE
07SA2614-GN /QTY 1



CONCRETE AREA AROUND TOT LOT AND RAMADAS
BROOM FINISH WITH ALTERNATING PANELS



BIKE RACKS / MONMADE / A2 TRANSITION BIKE RACK / QTY 4



VICINITY MAP/N.T.S.

PLANT LIST

SYM.	NAME	SIZE	WATER USAGE	QUANTITY
	Neltuma odorata Honey Mesquite	24" Box Low Branch	L .2	51
	Parkinsonia floridum Blue Palo Verde	24" Box Low Branch	L .2	70
	Chilopsis linearis Desert Willow	24" Box	L .2	55
	Phoenix dactylifera Date Palm	Site Salvage	M .5	27
	Larrea tridentata Creosote	5 gal.	L .2	209
CAP	Caesalpinia pulcherrima Red Bird of Paradise	5 gal.	M .5	38
EF	Encilia farinosa Chuparosa	5 gal.	L .2	220
JC	Justicia californica Chuparosa	5 gal.	L .2	211
SC	Simmondsia chinensis Jojoba	5 gal.	M .5	407
LM	Lantana x. 'New Gold' New Gold Lantana	1 gal.	M .5	226
	Fouquieria splendens Ocotillo	6-8 Canes	L .2	94
	Hesperaloe parviflora Red Yucca	5 gal.	L .2	136
	Agave americana Century Plant	15 gal.	L .2	19
	Calliandra haematocephala Pink Powder Puff	5 gal.	M .5	24
	Bougainvillea 'Barbara Karst' Barbara Karst Bougainvillea	5 gal.	M .5	21

NORTH 40°

12.1.2025

RUSSELL MACDONALD RLA
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CALHOUN STREET SUBDIVISION
CONCEPTUAL LANDSCAPE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

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PALM DESERT,CA 92260
T/760.346.4750
F/760.340/0089



VICINITY MAP/N.T.S.

AVENUE 49 PLANT LIST ONLY

SYM.	NAME	SIZE	WATER USAGE	QUANTITY
Y	Acacia aneura Mulga	24" Box	L .2	12
	Phoenix dactylifera Date Palm	Site Salvage	M .5	13
	Agave americana Century Plant	15 gal.	L .2	9
CAP	Caesalpinia pulcherrima Red Bird of Paradise	5 gal.	M .5	3
	Dasylirion wheeleri Desert Spoon	5 gal.	L .2	27
CO	Cordia boissieri Texas Olive	5 gal.	L .2	18
EF	Encilia farinosa Chuparosa	5 gal.	L .2	24
LM	Lantana montevidensis Purple Trailing Lantana	1 gal.	M .5	58
LW	Lantana x. 'New Gold' New Gold Lantana	1 gal.	M .5	16
	Yucca rostrata Beaked Yucca	15 gal.	L .2	11
	Calliandra haeqvilatera Pink Powder Puff	5 gal.	M .5	39

NOTES:

THERE ARE NO ANNUALS IN THIS STREETSCAPE DESIGN.

ALL DECOMPOSED GRANITE TO BE 3/4" DECORATIVE GRAVEL 3" THICK TO MATCH EXISTING ON "TIERRA DEL SOL" AND APPLY EVENLY OVER WEED FABRIC.

RUBBLE ROCK TO BE 2"-4" TO MATCH EXISTING ON "TIERRA DEL SOL", APPLY OVER TAN WEED FABRIC.

BOULDERS/QUANTITY 57
SIZES VARY TO MATCH EXISTING ON "TIERRA DEL SOL"
BOULDERS ARE TO VARY IN SIZE FROM 2'X2'X2' TO 1'X2'X1' WITH 70% BEING THE LARGER.

PLANT LIST

SYM.	NAME	CALIFORNIA NATIVE	SIZE	WATER USAGE	QUANTITY
	Neltuma odorata Honey Mesquite	YES	24" Box Low Branch	L .2	51
	Parkinsonia floridum Blue Palo Verde	YES	24" Box Low Branch	L .2	70
	Chilopsis linearis Desert Willow	YES	24" Box	L .2	55
	Phoenix dactylifera Date Palm	NO	Site Salvage	M .5	27
LT	Larrea tridentata Creosote	YES	5 gal.	L .2	209
CAP	Caesalpinia pulcherrima Red Bird of Paradise	NO	5 gal.	M .5	38
EF	Encilia farinosa Brittlebush	YES	5 gal.	L .2	220
JC	Justicia californica Chuparosa	YES	5 gal.	L .2	211
SC	Simmondsia chinensis Jojoba	YES	5 gal.	M .5	407
LW	Lantana x. 'New Gold' New Gold Lantana	NO	1 gal.	M .5	226
	Fouquieria splendens Ocotillo	YES	6-8 Canes	L .2	94
HP	Hesperaloe parviflora Red Yucca	NO	5 gal.	L .2	136
AC	Agave americana Century Plant	NO	15 gal.	L .2	19
	Calliandra haematocephala Pink Powder Puff	NO	5 gal.	M .5	24
BC	Bougainvillea 'Barbara Karst' Barbara Karst Bougainvillea	NO	5 gal.	M .5	21

CALIFORNIA NATIVE PLANT TOTALS:

TOTAL PLANTS FOR PROJECT EXCLUDING NORTH SIDE OF AVENUE 49: 1808

TOTAL NATIVE CALIFORNIA PLANTS:
1317

PERCENTAGE OF CALIFORNIA NATIVE PLANTS PROJECT-WIDE
72%

NOTES:
ALL PLANTS TO RECEIVE DRIP IRRIGATION.
IRRIGATION SHALL BE DESIGNED IN ACCORDANCE WITH CVWD REQUIREMENTS.
ALL RETENTION AREA WATER SPILLWAY GOBBLE TO BE 4"-8" "COPPER CANYON".
ALL PLANTING AREAS TO BE 3/4" GRAVEL COPPER CANYON.
1/4" DECOMPOSED GRANITE ON PARK TRAIL ONLY SEE PARK ENLARGEMENT PLAN.

NORTH

12.1.2025

RUSSELL MACDONALD RLA
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CALHOUN STREET SUBDIVISION
CONCEPTUAL LANDSCAPE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

OWNER:
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APPLICANT:
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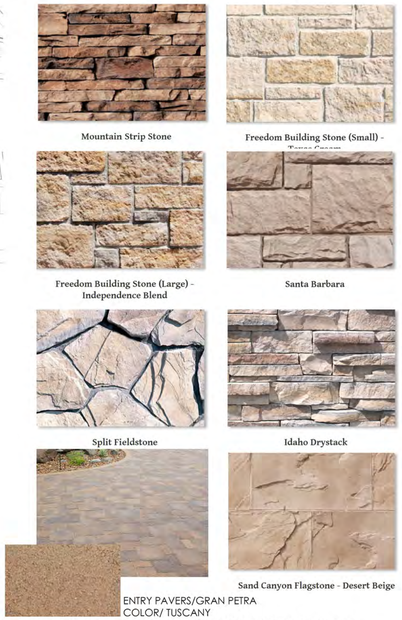
VICINITY MAP/N.T.S.



Mountain Strip Stone

Freedom Building Stone (Small) - Stone Canyon

Freedom Building Stone (Large) - Independence Blend

Santa Barbara

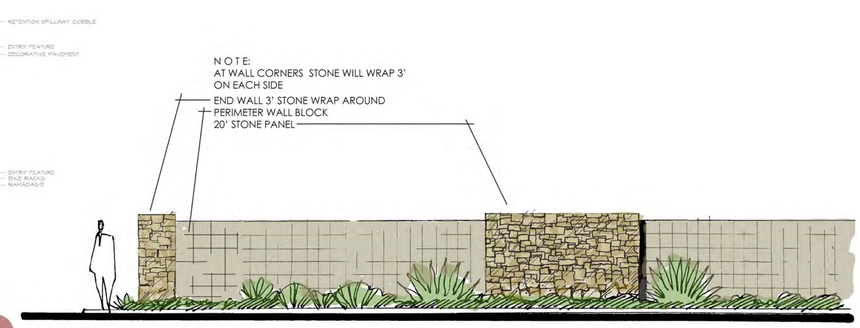
Split Fieldstone

Idaho Drystack

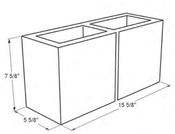
Sand Canyon Flagstone - Desert Beige

ENTRY PAVERS/GRAN PETRA
COLOR/ TUSCANY

STONE VENEER OPTIONS FOR PANELS AND COLUMNS



STONE PANELS AND END WALL DESIGN

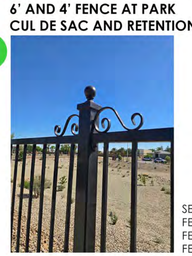


6x8x16 Vertical Score



PERIMETER WALL BLOCK / SMOOTH FACE CENTER SCORE/COLOR TAN

6' AND 4' FENCE AT PARK CUL DE SAC AND RETENTION





VINYL FENCING TO BE AT PROPERTY LINES FROM FRONT SETBACK BLOCK WALL
VINYL FENCING TO BE AT REAR PROPERTY LINES FOR INTERNAL LOTS

SEE PLAN FOR FENCE HEIGHTS
FENCE TO HAVE ORNAMENTATION AS ABOVE
FENCE TO HAVE 4' OR 6' COLUMNS AT 75' ON CENTER
FENCE COLUMNS TO HAVE CULTURED STONE VENEER TO MATCH PERIMETER WALL

ENTRY FEATURE SIGNAGE
ENTRY FEATURES TO BE STUCCO PAINTED WITH CULTURED STONE BASE
LETTERING TO BE POP-OUT
SIGNAGE TO BE LIT BY LOW VOLTAGE LIGHTING

EXISTING WALL BY OTHERS

NORTH

12.1.2025

RUSSELL MACDONALD RLA
PALM SPRINGS, CALIFORNIA
760.898.3969
RUSS@MACDONALDLA.COM

CALHOUN STREET SUBDIVISION
CONCEPTUAL LANDSCAPE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

OWNER:
PACIFIC MODERN BUILDERS LLC
P.O. BOX 3075, RANCHO MIRAGE, CA 92270
760.799.8227
rod4real@AOL.com

APPLICANT:
RODNEY VANDENBURG, MANAGING MEMBER
PACIFIC MODERN BUILDERS
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ENGINEER/PLANNER:
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HONEY MESQUITE


BLUE PALO VERDE


DESERT WILLOW


DATE PALM


SW BOULDER / 'COPPER CANYON / 3/4" OVERALL
4"-8" RETENTION DRAINAGE


SW BOULDER / 'CALIFORNIA GOLD' FINES
PARK TRAIL COMPACTED


CREOSOTE


RED BIRD OF PARADISE


BRITTLEBUSH


CHUPAROSA


JOJOBA


YELLOW LANTANA


OCOTILLO

RED YUCCA





VICINITY MAP/N.T.S.

PLANT LIST

SYM	NAME	SIZE	WATER USAGE	QUANTITY
	Neltuma odorata Honey Mesquite	24" Box Low Branch	L .2	51
	Parkinsonia floridum Blue Palo Verde	24" Box Low Branch	L .2	70
	Chilopsis linearis Desert Willow	24" Box	L .2	55
	Phoenix dactylifera Date Palm	Site Salvage	M .5	27
	Larrea tridentata Creosote	5 gal.	L .2	209
	Caesalpinia pulcherrima Red Bird of Paradise	5 gal.	M .5	38
	Encilia farinosa Brittlebush	5 gal.	L .2	220
	Justicia californica Chuparosa	5 gal.	L .2	211
	Simmondsia chinensis Jojoba	5 gal.	M .5	407
	Lantana x. 'New Gold' New Gold Lantana	1 gal.	M .5	226
	Fouquieria splendens Ocotillo	6-8 Canes	L .2	94
	Hesperaloe parviflora Red Yucca	5 gal.	L .2	136
	Agave americana Century Plant	15 gal.	L .2	19
	Calliandra haematocephala Pink Powder Puff	5 gal.	M .5	24
	Bougainvillea 'Barbara Karst' Barbara Karst Bougainvillea	5 gal.	M .5	21

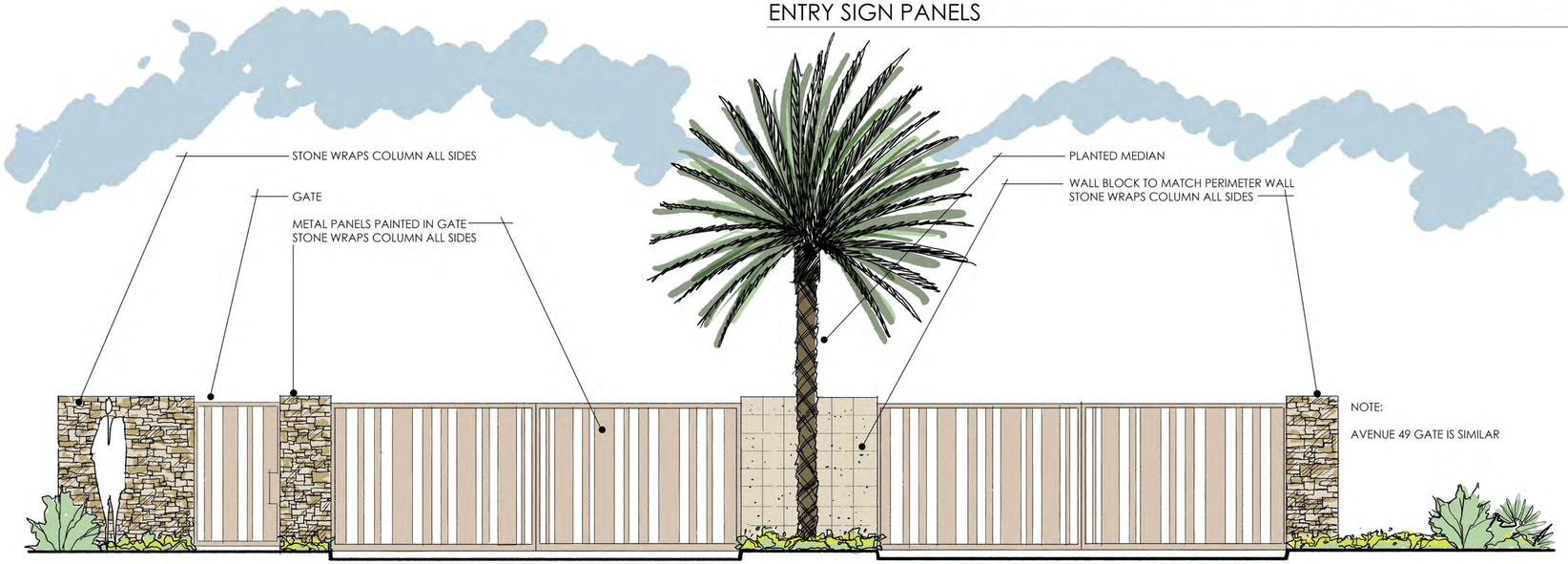

CENTURY PLANT


PINK POWDER PUFF


BOUGAINVILLEA



ENTRY SIGN PANELS



CALHOUN ENTRY GATE

RESOLUTION NO. PC 2025-23

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF COACHELLA RECOMMENDING TO THE CITY COUNCIL OF THE CITY OF COACHELLA THE CONDITIONAL APPROVAL OF CONDITIONAL USE PERMIT NO. 390 FOR A PLANNED UNIT DEVELOPMENT ALLOWING FLEXIBLE STANDARDS FOR SMALLER LOT SIZES AND A HIGHER DENSITY FOR A PRIVATE GATED COMMUNITY, FOR THE PROPOSED 257-LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION PROJECT LOCATED ON THE 39.98 ACRES SITE AT THE SOUTHWEST CORNER OF CALHOUN STREET AND AVENUE 49, APN 612-260-010; AND DETERMINING THAT THE PROJECT IS COMPLIANT WITH SECTION 15073 OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GUIDELINES. APPLICANT: PACIFIC MODERN BUILDERS LLC

WHEREAS, on April 15, 2025, the applicant, Rod Vandenburg on behalf of Pacific Modern Builders, LLC., submitted a Tentative Tract Map application, Conditional Use Permit application, and associated environmental documentation for the subdivision of 39.98 acres of land for the development of a 257 single family home planned unit development and associated improvements on the southwest corner of Calhoun Street and Avenue 49 ("the Project"); and,

WHEREAS, the Site is located within the City of Coachella off of Calhoun Street and Avenue 49 within Riverside County, California (Assessor Parcel Numbers 612-260-010) ("Property"); and,

WHEREAS, the site has a zoning designation of General Neighborhood and a General Plan 2035 land use designation of General Neighborhood; and,

WHEREAS, the Project is consistent with and intended to implement the vision of the Coachella Municipal Code and the General Plan 2035 pertaining to land use patterns, building and site design, and public right-of-way improvements; and

WHEREAS, pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., and CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), a public agency shall prepare or have prepared a proposed negative declaration or a mitigated negative declaration for a project subject to CEQA when the initial study identifies potentially significant impacts but revisions in the project plan or proposals made by or agreed to by the applicant would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and,

WHEREAS, pursuant to CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), an initial study with mitigated negative declaration was prepared for the Proposed Project ("Initial Study/Mitigated Negative

Declaration), and mitigation measures have been incorporated into the Mitigated Negative Declaration and will be imposed on the Proposed Project through the City's adoption of a Mitigation Monitoring and Reporting Program ("MMRP") in compliance with CEQA Guidelines Section 15070(d); and,

WHEREAS, pursuant to CEQA Guidelines Section § 15073 (Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration), comments were received pertaining to the Initial Study/Mitigated Negative Declaration and added to the administrative record; and,

WHEREAS, the project site has a General Plan land use designation and CMC zoning designation of General Neighborhood; and,

WHEREAS, the General Neighborhood zoning designation has a density of 7 to 24 dwelling units per acre; and,

WHEREAS, the General Neighborhood zoning designation has a density of 7.29 dwelling units per acre; and,

WHEREAS, a notice of a public hearing to consider Tentative Tract Map No. 39051, Conditional Use Permit No. 390, and Environmental Assessment 2025-02 was issued in accordance with Coachella Municipal Code Section 17.74.010G, inclusive of the publication on December 7, 2025, of a legal public hearing notice which was published in the Desert Sun, the City's newspaper of record and mailing of a public hearing notice to a certified list of property owners within 300 feet of the subject properties on December 2, 2025; and,

WHEREAS, on December 17, 2025, the Planning Commission held a duly noticed public hearing to consider the application for the Project during which evidence, both written and oral, including the staff report and supporting documents, was presented at said hearing; and,

WHEREAS, at the conclusion of the public hearing and following discussion, the Planning Commission approved this Resolution for the conditional approval of the Calhoun Subdivision Project as conditioned with the motion vote outcome specified in the meeting minutes for the December 17, 2025, Planning Commission meeting.

NOW, THEREFORE, BE IT RESOLVED, THE PLANNING COMMISSION OF THE CITY OF COACHELLA, CALIFORNIA DOES HEREBY FIND DETERMINE AND RESOLVE AS FOLLOWS:

SECTION 1. **Incorporation of Recitals.** The Planning Commission hereby specifically finds that all of the facts set forth in the recitals of this Resolution are true and correct and are incorporated into this Resolution by reference and constitute a material part of this Resolution.

SECTION 2. **Environmental Findings.** The Planning Commission has independently reviewed the Initial Study with Mitigated Negative Declaration and the administrative record for the proposed project, including all oral and written comments received during the document circulation period, public hearing, the staff report, and all attachments thereto, which are all incorporated herein by reference and are on file with the Community Development Department for the City of Coachella, and the Planning Commission finds that:

A. The Initial Study with Mitigated Negative Declaration (EA 2025-02) has been completed in compliance with CEQA and reflects the agency's independent judgment and analysis.

B. All environmental impacts of the Proposed Project are either insignificant or can be mitigated to a level of insignificance pursuant to the mitigation measures outlined in the Mitigated Negative Declaration and the Mitigation Monitoring Reporting Program.

C. There is no substantial evidence in the administrative record supporting a fair argument that the Proposed Project, as revised, may result in significant environmental impacts.

D. The Planning Commission hereby approves and adopts the Initial Study with Mitigated Negative Declaration (EA 2025-02) pursuant to Public Resources Code section 21080(c)(2).

E. Pursuant to Public Resources Code section 21081.6, the Planning Commission approves and adopts the MMRP prepared for the Project, which shall be fully complied with as specified in this Resolution and the Conditions of Approval set forth herein.

SECTION 3. Conditional Use Permit Findings. Based upon the evidence presented at the hearing, including the staff report and written and verbal testimony, which are all incorporated herein by reference, the Planning Commission hereby finds that:

1. The location of the project site has a General Plan land use designation of General Neighborhood which permits the development of single-family residential homes and community amenities. Further, the General Neighborhood land use designations allow for the development of 7-25 dwelling units per acre. As such, the Tentative Tract Map is consistent with the permitted land use designation of single-family homes, as it is proposing 7.29 du/ac. The project further proposes the development of community amenities such as a community park with tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a partially landscaped retention basis with passive walking trails. The open-space parks planned within the project area fulfill the Planned Unit Development and General Neighborhood open space requirements. For the foregoing reasons, the Tentative Map is consistent with the General Plan and is

not inconsistent with any element of its General Plan designation.

2. The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. The project complies with Chapter 17.14 General Neighborhood zoning standards and complies with Chapter 17.38 PUD Planned Unit Development standards. The project will be operated and maintained by an HOA, and the community CC&R's shall be submitted for City review and the City shall be a third-party beneficiary to the CC&R's. The perimeter landscaping, park, and the retention basin adjacent to Calhoun Street will be maintained by the City LLMD. As a result, the project will be compatible with the existing or intended character of the general vicinity and shall not change the essential character of the same area.

3. The proposed project has a General Plan land use designation and zoning designation of General Neighborhood which permits the development of single-family residential homes and community amenities of 7-25 dwelling units per acre. In addition to meeting the proposed density requirements, two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the Riverside County Office of the Fire Marshal. The project will include the completion of street improvements on both sides of Avenue 49 adjacent to the northern permitter of the project and determined to be suitable by the City Engineer. Infrastructure to serve the proposed parcels have been assessed and determined to be available from the water and electrical utilities. Furthermore, the site has no topographical constraints and the proposed uses are consistent with that has been analyzed in the General Plan, the Coachella Municipal Code, and Planned Unit Development. Therefore, it can be determined that the proposed subdivision is physically suitable for the site.

4. The intent and purpose of the General Neighborhood designation, as described in the City of Coachella General Plan, is to provide a diversity of housing that meets the needs of Coachella's many household sizes, incomes and lifestyle preferences. General Neighborhoods integrate a range of single- and multi-family housing options within a green, walkable neighborhood environment that offers parks and playgrounds for their residents and access to schools and basic shopping needs within a comfortable walk, bike ride or short drive. The project proposes the development of community amenities such as a community park, and shaded sidewalks along the perimeter and interior of community with a separated sidewalk design per the guidance of the City of Coachella General Plan Mobility Element. The project will be operated and maintained by an HOA, and the community CC&Rs shall be submitted for City review and the City shall be a third-party beneficiary to the CC&R's. An Initial Study with Mitigated Negative Declaration (IS/MND) was completed to address the potential impacts from the implementation of the project. The environmental analysis includes but is not limited to the analysis of environmentally sensitive areas, potential impacts to air quality, watercourses, historic buildings and

places, noise, hazards and hazardous materials and other features of value to the community. The proposed project will develop currently vacant highly disturbed land in west Coachella. The IS/MND found that with the adoption of mitigation measures on Biological Resources, Cultural Resources, Transportation, and Tribal Cultural Resources, any potential impact will be mitigated to have a less than significant impact. The project will adopt a Mitigation and Monitoring Reporting Program (MMRP) that will certify mitigation measures to protect environmentally sensitive land uses and species within the project area. Therefore, it can be determined that the project is not anticipated to be potentially hazardous or disturbing to existing or reasonably expected neighboring uses, and it can be determined that the project is a benefit to the community as a whole.

5. The project will include two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street would provide access to the project that has been determined to be suitable by the City Engineer/ Public Works Director and the Riverside County Office of the Fire Marshal. The project will include the completion of street improvements on both sides of Avenue 49 adjacent to the northern permitter of the project and determined to be suitable by the City Engineer. As a result, the proposed project is designed to provide reasonable minimal interference with traffic on surrounding public streets or roads.

Staff concludes that the findings set forth in Coachella Municipal Code Chapter 17.74.020 can affirmatively be made for the proposed Tentative Tract Map No. 39051. The proposed parcel subdivision is consistent with the City of Coachella General Plan and the Coachella Municipal Code. The parcel subdivision will be compatible with the existing or intended character of the general vicinity and shall not change the essential character of the same area, and consideration was given to the potential impacts of the development. It is determined that the project is justified by the common public interest as a benefit to the community as a whole. The proposed use will include vehicular approaches to the property designed for reasonable minimal interference with traffic on surrounding public streets or roads. The required conditions of approval ensure the Project will not be detrimental to the public health, safety, or welfare, and the conditions prevent material injury to properties or improvements in the vicinity.

SECTION 4. Location and Custodian of Records. The documents and materials that constitute the record of proceedings on which these findings are based are located at Coachella Civic Center. The Development Services Director is the custodian of the record of proceedings.

SECTION 5. Execution of Resolution. The Chairman shall sign this Resolution and the City Clerk shall attest and certify to the passage and adoption thereof.

SECTION 6. Planning Commission Approval Based on the foregoing recitals and findings above, and the written and oral comments, facts and evidence presented, the City of Coachella Planning Commission hereby recommends to the City Council approval of Conditional Use Permit No. 390 for a planned unit development allowing flexible standards

for smaller lot sizes and a higher density for a private gated community, for the proposed 257-lot single family residential subdivision project located on the 39.98 acres site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010; And determining that the project is compliant with Section 15073 Of The California Environmental Quality Act (CEQA) Guidelines. The applicant shall demonstrate compliance with ALL Conditions of Approval, as set forth in Exhibit "A", and Planned Unit Development in "Exhibit B" of this Resolution. Failure to demonstrate compliance with these conditions of approval may result in the delay of the Proposed Use or the rescinding of the City of Coachella's conditional use permit approval. Where the term "Applicant" is used in any condition of approval, this term shall also apply to the Property Owner, any developer, or any successor in the interest of the Applicant. It is the Applicant's or Applicant's successor in interest responsibility to fully comply with the conditions of approval unless subsequently modified in accordance with the City's required processes and procedures.

PASSED APPROVED and ADOPTED this 17th day of December 2025.

_____
Isela Murillo, Chairperson
Coachella Planning Commission

ATTEST:

_____
Kendra Reif
Planning Commission Secretary

APPROVED AS TO FORM:

_____
City Attorney

STATE OF CALIFORNIA)
COUNTY OF RIVERSIDE) ss.
CITY OF COACHELLA)

I HEREBY CERTIFY that the foregoing Resolution No. PC-2025-23, was duly adopted at a regular meeting of the Planning Commission of the City of Coachella, California, held on the 17th day of December 2025, by the following roll call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____
Kendra Reif
Planning Commission Secretary

Exhibit A – Resolution No. PC2025-23

CONDITIONS OF APPROVAL FOR CONDITIONAL USE PERMIT NO. 390

General Conditions

1. Conditional Use Permit No. 390 is approved for a planned unit development allowing flexible standards for smaller lot sizes and a higher density for a private gated community located on a 39.98-acre site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010, and the determination that the proposed project is compliant with California Environmental Quality Act (CEQA) Guidelines Section 15073 - Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration.

2. The applicant shall defend, indemnify and hold harmless the City of Coachella, its officials, officers, employees, and agents from and against any claim, action, or proceeding against the City, its officials, officers, employees or agents to attack, set aside, void or annul any project approval or condition of approval of the city concerning this project, including but not limited to any approval or condition of approval or mitigation measure imposed by the City Council or Planning Commission. The City shall promptly notify the applicant of any claim, action, or proceeding concerning the project and the City shall cooperate fully in the defense of the matter. The City reserves the right, at its own option, to choose its own attorney to represent the City, its officials, officers, employees and agents in the defense of the City Attorney, within five days of the effective date of this approval.

3. The applicant shall comply with all requirements and conditions of approval as included in Tentative Tract Map No. 39051, Conditional Use Permit No. 390, Environmental Assessment No. 25-02, and any modifications or extensions thereof, as listed in those Notice of Actions or Resolutions for each respective approval, and Resolution No. PC2025-22, Resolution No. PC2025-23, and Resolution No. PC2025-24 unless otherwise modified per the requirements and conditions of approval per this resolution.

CALHOUN STREET HOUSING DEVELOPMENT

Planned Unit Development

Prepared for: City of Coachella

December 2025

Prepared for:

Pacific Modern Builders

Prepared by:

Rich Malacoff, AICP
760.346.4750
Rich.Malacoff@TheAltumGroup.com

Madeline Luke
760.346.4750
Madeline.Luke@TheAltumGroup.com

Table of Contents

1. Introduction 4
1.1 Purpose and Intent 4
1.2 Project Location 4
1.3 Project Summary 4
2. Modifications to the Planned Unit Development 4
3. Administration 5
3.1 Planned Unit Development 5
3.2 Interpretation 5
3.3 Implementation Program 5
3.4 Environmental Review and Mitigation Monitoring Program 5
3.5 Adoption of the Calhoun Street Development and Approval of the Planned Unit Development 6
4. Project Setting 6
4.1 Existing Site Characteristics 6
4.2 Surrounding Land Use 6
4.3 General Plan and Zoning 6
5.Project Description 6
6. Development Regulations 7
6.1 Purpose and Intent 7
6.2 Permitted Uses 7
6.3 Accessory Uses 7
6.4 Conditional Uses 8
6.5 Site Development Standards 8
7. Design Standards 11
7.1 Open Space Plan 11
7.2 Signs 12
8. Operational Guidelines 12
8.1 Maintenance 12
8.2 Other Rules and Guidelines 13
8.3 PUD Justification 13
9. List of Preparers 14

List of Exhibits

Exhibit 1 - Regional Location Map
Exhibit 2 - Vicinity Map
Exhibit 3 - Site Plan
Exhibit 4 - Surrounding Land Uses
Exhibit 5 - Existing General Plan Land Use and Zoning
Exhibit 6 - Conceptual Landscape Plan
Exhibit 7 - Conceptual Plant List and Community Elements
Exhibit 8 - Conceptual Wall Plan
Exhibit 9 - Conceptual Park Plan
Exhibit 10 - Street Sections

List of Tables

Table 1 – Site Development Standards

1. Introduction

1.1 Purpose and Intent

The purpose of this Planned Unit Development (PUD) document is to set the use regulations, development standards, and design guidelines for the Calhoun Street Development Project. It also covers the applicable General Plan and Zoning Designations, which are General Neighborhood (G-N) for both. The PUD will provide the necessary development criteria to guide the developer and homebuilders in the design and construction of the residential structures, open space, and associated amenities. It will also provide the City of Coachella with review criteria for the approval of entitlements and permits.

The PUD serves to implement the City of Coachella's General Plan and Zoning by specifying specific land uses, intensity of use, and development standards which are consistent with General Plan goals, objectives, and policies and protocols of the City of Coachella.

The proposed development plan has been derived from studies prepared by the applicant's civil engineer, architect, traffic engineer, land planners, and other consultants; and has been reviewed by the City of Coachella. As a result, the plan addresses development related to issues in the form of proposed physical improvements, guidelines for future development, technical data, and implementation procedures and regulations.

1.2 Project Location

The project area is located in the Coachella Valley within the incorporated city limits of Coachella, as shown in Exhibit 1, Regional Location Map. Locally, the project site is bounded by a residential single-family housing community to the north and south, a vacant lot to the east of Calhoun Street, and a currently vacant parcel to the west that has been approved for a future single-family housing development that is within the City of Indio, as shown in Exhibit 4, Surrounding Land Uses. The project site is further depicted in Exhibit 2, Vicinity Map.

1.3 Project Summary

The project consists of 257 lots in the City of Coachella located at Calhoun Street and Avenue 49, Assessor's Parcel Number (APN) 612-260-010. The development will include 3.13 acres of open space dedicated as a public park, including a parking lot accessible to the public outside the proposed housing development. The public area does not include the retention areas in the project. The 257 lots will be for single family dwellings, however they will be eligible for additional Dwelling Units (ADU) and Junior Dwelling Units (JADU).

The architecture of the units will be determined at a later date through an architectural review application.

2. Modifications to the Planned Unit Development

Calhoun Street Development is required to substantially conform to the physical characteristics and design concepts set forth in this Planned Unit Development (PUD). The City has the discretion to determine if implementing actions substantially conform to the development standards in this document. If an implementing action does not substantially conform, a formal modification to this PUD may be required. The process required to modify the PUD will require modification to the Conditional Use Permit (CUP) associated with the PUD. The process to modify a CUP is outlined in Section 17.74.020 of the City of Coachella Development Code.

3. Administration

3.1 Planned Unit Development

Upon its approval/adoption, the Calhoun Street Development, as approved by the City of Coachella City Council, will become the primary document governing land use regulations. The Calhoun Street Housing Development PUD has development standards and land use regulations that will replace the corresponding standards in the City of Coachella's Municipal Code. Where the Planned Unit Development (PUD) does not address a standard or subject, the applicable City code and/or ordinance shall apply. The Conditional Use Permit (CUP) for the Calhoun Street Development will remain valid after construction and is transferable to future property owners.

Per section 17.74.050, the Conditional Use Permit shall expire and shall become void two years following the date on which the conditional use became effective, unless prior to the expiration of one year a building permit is issued and construction is commenced and diligently pursued toward completion, or a certificate of occupancy is issued.

Per section 17.74.050, prior to the expiration of the Conditional Use Permit, the property owner may renew the CUP for three one-year time extensions only if an application stating reasons for renewal is filed prior to one year after the effective date of the conditional use approval by the planning commission. In the event that the planning commission acts to approve a time extension for the conditional use permit, the planning commission may impose any reasonable conditions on the conditional use permit as a condition of the time extension, provided a modification to the conditional use permit is processed. In the event that such additional conditions are not acceptable to the applicant and/or owner, the planning commission shall deny the time extension request.

3.2 Interpretation

Unless otherwise provided, should ambiguities occur concerning the content and appropriate application of the Calhoun Street Development, said ambiguities shall be resolved by the Development Services Director or equivalent of the City of Coachella or their designee, in a manner most consistent with the intent, goals and policies set forth in the Calhoun Street Development PUD and the City's General Plan as outlined in Section 17.70.080.

3.3 Implementation Program

According to Government Code 65451 of the California Planning Law, the Calhoun Street Housing Development PUD shall include a program for implementation including regulations, conditions, programs, and additional measures as necessary to carry out the plan. In response to this requirement, the Implementation Program for the PUD and Mitigated Negative Declaration consists of the following:

3.4 Environmental Review and Mitigation Monitoring Program

The Planned Unit Development has been subjected to Environmental Review pursuant to the provisions of CEQA for a Mitigated Negative Declaration.

Environmental studies that have been prepared for this plan include:

- Air Quality, Greenhouse Gas and Energy Impact Study
- Biological Resources Assessment
- Cultural Resource Investigation
- Noise Impact Study
- Paleontological Resource Assessment
- Preliminary Hydrology Report

- Preliminary Water Quality Management Plan
- Traffic Analysis

The Mitigation Measures adopted for this project shall comply during all stages and phases of the project's construction and operation of the facility.

3.5 Adoption of the Calhoun Street Development and Approval of the Planned Unit Development

The Calhoun Street Housing Development PUD shall be processed per Section 17.38 which outlines the requirements of the PUD. The Conditional Use Permit will be processed concurrently with the PUD and be approved by the Planning Commission. Detailed architectural and/or artist renderings of allowable building types, architectural themes, and typical front yard landscaping shall be provided by the builder and approved by the Planning Commission prior to the plan check process.

4. Project Setting

4.1 Existing Site Characteristics

The subject property is currently undeveloped and generally flat. Information regarding soil type, groundwater levels, earthquake faults in the region and other pertinent environmental conditions are evaluated in the project Initial Study. The Initial Study concludes that the project will not have significant impact on the environment with the recommended mitigation measures.

4.2 Surrounding Land Use

As shown in Exhibit 4, The surrounding land uses to the Calhoun Street Development are the following:

- Parcel west of the project site has an approved for a single family housing Project called Dolfina in the City of Indio.
- Vacant land and one single family residence to the east of Calhoun Street.
- Single family residential to north of Avenue 49 and West of Calhoun Street in the Tierra Del Sol Housing project.
- Single Family Residential south of the project along Pluma Azul Court in the Las Plumas Housing project.

4.3 General Plan and Zoning

The Project site is designated as General Neighborhood (G-N) under the City of Coachella's General Plan Land Use (Exhibit 5, Existing General Plan Land Use and Zoning). The G-N is intended to provide medium to high-density residential neighborhoods consisting of single family and multifamily residential units within a neighborhood environment that offers parks and playgrounds for their residents and access to schools and basic shopping needs within a comfortable walk, bike ride, or short drive.

5. Project Description

The Calhoun Street Housing located at south of Avenue 49 and west of Calhoun Street (APN 612-260-010) in the City of Coachella, Riverside County, California The Project site consists of a single parcel totaling 39.98 gross acres. The proposed Project will subdivide the existing 39.98-acre parcel into 257 residential single family lots are either 3,600 or 4,050 square feet in size, lot dimensions proposed vary from 40' x 90' and 45' x 90' minimum, with landscaping and on-site retention basins. Setbacks are proposed to be 15' front setback, 5' side yard setback, and 15' rear setback. The subdivision will be a private gated residential community with a 3.13-acre public park accessible from the inside of the community as well as access to the public through the public parking lot outside of the gated community. The public will not have access

to the gated community through the public park, residents within the development will be provided access through locked pedestrian gates. The proposed Project will contain a public park to adhere to the parkland dedication requirements of the Project.

The proposed Project is designated as General Neighborhood (G-N) under the City of Coachella's General Plan Land Use (Exhibit 5, Existing General Plan Land Use and Zoning). The G-N is intended to provide medium to high-density residential neighborhoods. The Applicant proposes a Planned Unit Development that would allow for the use of flexible standards for smaller lots for higher density as proposed for the gated single family residential community. The Planned Unit Development requires the Applicant to complete a conditional use permit for approval through the City's Planning Commission to establish the land use regulations and minimum development standards for the Project.

The final architecture will be determined through a future Architectural Review Application with Planning Commission approval and is not discussed within this PUD.

6. Development Regulations

6.1 Purpose and Intent

The development regulations contained herein provide specific standards relative to permitted land use in addition to site design and construction regulations to be applied within the developed area. They are intended to protect the public health, safety and welfare and to create a harmonious relationship with the surrounding land. In general, the proposed development is consistent with the development standards of the City's Planned Unit Development Ordinance Section 17.38 of the City of Coachella Municipal Code (CMC) and General Neighborhood zoning districts unless a different standard is identified below. Should a development standard contained in this PUD conflict with an equivalent standard contained in the City of Coachella City Zoning Code, the provisions of the PUD shall take precedence. In instances where the PUD is silent, the applicable portion of the City of Coachella Zoning Code shall govern. The Development Service's Director shall have the authority to approve minor adjustments during the Development Permit Review, so long as it's determined such adjustments are consistent with the PUD Land Use Plan. Any decision made by the Development Services Director can be appealed, subject to the procedures outlined in City of Coachella Municipal Code Section 17.70.080.

6.2 Permitted Uses

The following identifies specific uses which are permitted in the underlying General Neighborhood zoning district as prescribed in Section 17.14.020 of the City of Coachella Municipal Code and are considered appropriate uses within the Planned Unit Development.

6.3 Accessory Uses

The following identifies specific uses which are permitted accessory uses in the underlying General Neighborhood zoning district as prescribed in Section 17.14.020 of the City of Coachella Municipal Code and are considered appropriate incidental uses within the Planned Unit Development.

1. Accessory Dwelling Units or Junior Dwelling Units Subject to Section 17.60.010 of the City of Coachella Municipal Code or applicable changes in State Law;
2. Utility and recreational uses including garages, carports, pool cabana, storage shed, laundry room, electrical equipment room, shade structure, and similar uses subject to the provisions of Chapter 17.60;
3. Swimming pools and related equipment, outdoor kitchen countertops and gas-fired pits/barbeque grills, subject to the provisions of Chapter 17.60;
4. Outdoor play courts with lighting up to ten (10) feet in height;

5. Greenhouses, date orchards, and other fruit and vegetable gardens for private use;
6. Home occupations, and Cottage Food Operations, subject to the provisions of Section 17.58 and 17.89 of the City of Coachella Municipal Code;

6.4 Conditional Uses

The following identifies specific uses which are conditional uses in the underlying General Neighborhood zoning district as prescribed in Section 17.14.020 of the City of Coachella Municipal Code and are considered appropriate uses within the Planned Unit Development. Conditional uses are subject to the issuance of a Conditional Use Permit by the City of Coachella in accordance with the procedures established by the City including but not limited to

1. All conditional uses listed in Section 17.16.020(C) of the S-N (Suburban Neighborhood) zone.
2. Boarding and lodging houses.
3. Child nurseries, day care centers.
4. Hospitals, convalescent homes, rest homes, and sanitaria, excepting animal hospitals; subject to the following:
    a. Minimum lot size shall be five acres.
    b. All buildings shall be at least fifty (50) feet removed from any lot lines.
5. Professional offices and uses accessory thereto, including medical and dental laboratories; subject to the following:
    a. Minimum lot size shall be twenty thousand (20,000) square feet.
    b. Access on arterial or collector.
6. Parks, playgrounds, court games and community centers;
7. Public utility distribution substations and public service facilities;
8. Private lighted or unlighted tennis courts and such other similar uses not to include swimming pools and spas;

6.5 Site Development Standards

The following Site Development Standards are intended to be guidelines. Since all projects must be submitted and reviewed through the Architectural Review process, consistent with the requirements of this PUD, creative planning and design is encouraged.

The City's Planning Director shall determine if final plans are in general conformance with these guidelines and shall have the authority to allow deviations at their discretion for proposed developments that are in conformance with the CMC and general Plan. Modification of or deviations from these standards may be granted by the City through the procedures described in Section 2 of this PUD. Any development standard not covered by the Planned Unit Development shall use the standards specified in Chapters 17.14 & 17.19 of the CMC.

Table 1. Site Development Standards

	Proposed Standard	Existing Zone General Neighborhood
Minimum Lot Size	3,400 square feet	4,000 square feet
Minimum Lot Width Interior Lot	40'	40'
Minimum Lot Width Corner Lot	40'	45'
Lot Depth	85'	75'

Front Yard Setback	15’	15’
Side Yard Setback	5’	10’
Rear Yard Setback	15’	20’
Maximum Lot Coverage	50% (Building, ADU and garage area divided by the lot area). This calculation excludes all porches, outdoor rooms, covered patios and trellis areas.	
Garage Size	Must be a minimum of 400 square feet.	
Perimeter Setback	26 feet to include 6-foot sidewalk and landscape buffer	

Energy Efficient Design and Heat Island Reduction Strategies

The project shall incorporate landscape and building design strategies to help reduce effects of urban heat island and building heat gain, strategies should consist, but not limited to the following:

1. Place buildings and architectural massing to minimize direct sun exposure on east and west sides.
2. Locate larger windows on the north façade and minimize west-facing glazing. Encourage use of high-performance window glazing.
3. Providing architectural shading devices (awnings, covered porches, deeper eaves) on south and west facades.
4. Allow natural breeze to penetrate buildings. Requiring cross-ventilation through operable windows on at least two sides of primary living areas.
5. Use well-insulated walls and roofs.
6. Encourage light-colored, high-reflectance roofing materials meeting Cool Roof Rating Council (CRRC) standards.
7. Encourage ENERGY STAR–rated roofing options.
8. Require homes to incorporate natural daylighting through window placement and optional skylights/light wells to reduce electrical demand.
9. Use and maintain trees with large canopies to provide adequate shading.
10. Choose architectural colors that are light and non-reflective for exterior walls and concrete.
11. Use permeable paving wherever practical.

These strategies should be consistent with the California Building Code.

Minimum Off-Street Parking

Each dwelling unit will be required to provide an enclosed 2-car garage.

Circulation and Internal Streets

The Project incorporates a connected street and pedestrian network consistent with the City’s Planned Unit Development requirements. The internal street system is designed to provide clear, walkable links to

both Calhoun Street and Avenue 49 through a separated 6-foot sidewalk and landscaped parkway, with street trees located between the sidewalk and perimeter wall to create a shaded, comfortable pedestrian environment. Typical roadway diagrams and cross-sections illustrate the proposed 32-foot curb-to-curb section, and the configuration of parkways, sidewalks, and landscape setbacks. Along project frontages, the design provides perimeter landscape setbacks, including a 26-foot landscaped setback along Calhoun Street and Avenue 49, ensuring enhanced visual quality and a generous streetscape along both perimeter roadways. See Exhibit 10 – Street Sections for illustrations.

1. Internal Street ROW should be a maximum of 33ft.
2. Internal streets shall have a minimum curb-to-curb width of 32 feet, providing a 24-foot clear fire access lane with parking permitted on one side only.
3. Primary internal intersections as identified by the City Engineer shall have bulb-outs for traffic calming to be approved by City Engineer.
4. Public streets shall accommodate a separated 6ft sidewalk that connects gate entrances on Ave. 49 and Calhoun Street.

Accessory Dwelling Units (ADU) and Junior Accessory Dwelling Units (JADU)

Development of Accessory Dwelling Units and Junior Accessory Dwelling Units are subject to Section 17.60.010 of the City of Coachella Municipal Code or applicable changes in State Law. Accessory Dwelling Units and Junior Accessory Dwelling Units: Allowed per State and/or City regulations. The architectural character is to be consistent with the primary dwelling unit.

Fencing

The function of walls and/or fences in the Calhoun Street Development will be to provide safety, security, and privacy to all the tenants. All fencing needs to complement the architecture and landscaping surrounding the site. Block walls and fencing in the Calhoun Street Housing Development shall comply with Section 17.16.030 of the City of Coachella Municipal Code.

To ensure cohesive neighborhood character, future builders shall incorporate architectural accent stone on residential units that is compatible with the accent stone used on the project's perimeter walls and entry monuments. While builders shall maintain material compatibility and color harmony with the perimeter walls, flexibility is provided to allow variation in stone type, profile, and application to support diverse architectural styles within the community.

Representative examples of accent stone materials, perimeter wall stone treatments, and block wall finishes are provided in Exhibit 8 – Conceptual Wall Plan. These examples illustrate the intended design character but do not limit the builder to a single product; substitutions of equal or higher quality may be permitted subject to review and approval by the Community Development Director or designee.

1. Maximum height of 6-feet.
2. Block walls and accent stone walls are the preferred barrier along the perimeter of the Planned Unit Development Area. Wrought iron or tubular steel fencing is also appropriate.
3. Stone Veneer Panels 20ft in length along Calhoun Street and Avenue 49 to be spaced every 75ft on center. CMU end wall shall incorporate a 3ft stone wrap around, see Stone Panels and End Wall Design shown in Exhibit 8-Conceptual Wall Plan.

4. Wrought iron or tubular steel fencing shall have rungs facing inward. Metal fencing shall have decorative elements and ornamentation at posts.
5. Provide 24-inch square decorative columns wrapped with stone veneer at all metal fence locations, spaced approximately 75 feet on center.
6. Vinyl fencing is permitted along interior side and rear lot lines. Vinyl fencing is prohibited along any lot line that is visible from the public right-of-way or from interior private streets.
7. Block walls shall be composed of masonry block with matching grout. Rolled concrete is specifically prohibited.
8. Side yard fencing that faces internal streets to be block, vinyl fencing is prohibited.
9. Gates shall be aesthetically pleasing and be automatic as opposed to manual and have a Knox Box or other means of access for Police and Fire emergencies as approved by the Riverside County Fire Department.
10. The use of wood, mesh, wire, chain link, serpentine, and barbed wire fences are strictly prohibited and shall not be used anywhere within the Planned Unit Development.

Landscaping

1. The project shall install landscaping along the north side of Avenue 49. Landscape design and sidewalks shall be consistent with the adjacent Dolfina housing development located west of the project.
2. A minimum 14-foot landscape area shall be provided to accommodate the right-turn lane.
3. A minimum 26-foot perimeter landscape setback shall be provided along Calhoun Street and Avenue 49.
4. Perimeter landscape setback to include a separated 6-foot wide sidewalk with a 4-foot wide landscape parkway between the sidewalk and curb.
5. Vehicular entrances on Calhoun Street and Avenue 49 shall incorporate decorative pavers or stamped concrete, separated from travel lanes by a concrete buffer strip.
6. All planting areas to be ¾" gravel "Copper Canyon" or equivalent.
7. All retention area water spillway cobble to be 4"-8" "Copper Canyon" or equivalent.

Refer to Exhibit 6 (Conceptual Landscape Plan) for the location of entry features, pavers, plantings and groundcovers, site furnishings, and public park shade structures.

7. Design Standards

The design standards for the Calhoun Street Housing Development are intentionally broad to allow builders flexibility in creating unique architecture, while remaining consistent with Section 17.19 – Supplemental Standards for Single-Family Residential. The future developer will submit architectural elevations, building massing plan, color/material boards, floor plans, and typical front yard landscaping to the Planning Commission who will ensure that the project has high quality architecture and color scheme harmonious with surrounding development. Future Architectural submittals shall be in compliance with Section 17.38.020 – Design Guidelines of the Coachella Municipal Code.

7.1 Open Space Plan

The Planned Unit Development will provide 3.13 acres of public parkland to satisfy the project's open space requirement. The park will include a mix of active and passive recreation areas, with the final program subject to City Council approval. Conceptual exhibits are provided in Exhibit 6 (Conceptual Landscape Plan), Exhibit 7 (Conceptual Plant List and Community Elements), and Exhibit 9 (Conceptual Park Plan).

The park will be centrally located along Calhoun Street and fully accessible to the public. Planned amenities include a tot lot, basketball court, shade structures, bike racks, seating areas, pedestrian lighting, and landscaped open spaces for both active and passive use. A combination of CMU and decorative metal fencing will separate the park from adjacent private residences, with multiple secured pedestrian gates providing resident access to the park.

For safety purposes, a 4-foot-tall decorative metal fence shall be installed along the park frontage on Calhoun Street. The fence will be located within the landscaped parkway between the sidewalk and curb. This design ensures the park remains visible and inviting to passersby and pedestrians while providing a defined and safe edge along Calhoun Street.

A walking trail will connect the north-side public parking lot and resident access points to the southern portion of the park, looping around the retention basin. The retention basin will be designed with a gradual slope along its north edge, allowing the space to be visually integrated with the park, maximizing recreational usability, and reducing the appearance of the basin as a standalone utility feature.

USBR and CVWD Easement

There is a 10-foot easement along the west property line for an existing CVWD irrigation line, which will remain in place. Unless the existing irrigation line is replaced per CVWD standards, the line cannot be built over with permanent structures, CMU walls, concrete, or asphalt, nor can the line be relocated. Additionally, CVWD requires another 10 feet for access and maintenance between the existing easement and the western property line. The easement will be landscaped with decorative ground cover such as decomposed granite and crushed rock. Trees are not permitted in this area due to the potential for root interference with the irrigation lines, which could hinder CVWD's ability to maintain the system.

7.2 Signs

Signage will be submitted to the Community Development Director or their designee for final approval and will provide the specifics to include the following:

Signage should be designed with appropriate scale and proportion and should relate visually to buildings and surroundings.

- Signs colors, materials, and lighting should be restrained and harmonious with the building and site to which it principally relates.
- The number of graphic elements on a sign should be limited to the necessary minimum and should be composed in proportion to the area of the sign face.
- It is recommended that entry signs be precast monument signs with individual recessed letters or pop-out letters of the highest quality.
- Each sign should be compatible with signs on adjoining premises and should not compete for attention.
- The type, location, height and size of signs shall be determined as a part of the permit and shall relate to the location and design of the PUD.

Exhibit 7 (Conceptual Plant List and Community Elements) shows the conceptual list of plants to be used as well as the location of the Entry Sign Panels.

8. Operational Guidelines

8.1 Maintenance

The proposed Project is a private gated community. Open space and retention basin areas shall be maintained by the community's Homeowners Association (HOA). Open space will be a 3.13-acre public

park that is fully accessible to the community with a public parking lot. The retention basin will not be gated, nor will the basin's slopes have any irrigation that would cause erosion to the basins lining over time.

8.2 Other Rules and Guidelines

Asphalt and artificial turf: Use of asphalt or artificial turf will not be permitted for the purpose of surfacing driveways, sidewalks or other walkways.

Front Yard Paving: The front yard area between the front of building line of the home and the street shall not be paved more than sixty (60) percent of the total front yard area.

Building Permits: No improvement requiring a permit or approval of any kind from any state or local governmental agency, department, bureau, or officer, may be constructed, installed, or used anywhere in the project unless the required permit(s) or approval(s) are obtained.

Codes, Covenants, and Restrictions: To be submitted to the City prior to recordation of the final map.

Clothes Lines: Exterior Clothes lines are prohibited.

Fire Sprinklers: In accordance with City of Coachella Code Section 15.08.030, one- and two-family dwellings shall have an automatic fire sprinkler system regardless of square footage in accordance with the California Residential Code.

Lighting: All exterior lighting shall be consistent with the Coachella Municipal Code and be completely shielded so that there is no spillover onto adjacent properties.

Gated Development: This will be a gated development with the maintenance of the gates be handled through the HOA.

8.3 PUD Justification

Per Section 17.38.035 Public Benefit Required, a PUD shall include a public benefit of one or more of the following:

1. *Affordable Housing. The construction of affordable housing on the site or off-site affordable housing.*

   While the project is not restricted to income-qualified affordable housing, it will provide market-rate homes at a price point that is attainable for local families. Relative to nearby jurisdictions such as Indio, La Quinta, and Palm Desert, these homes are expected to be more affordable and accessible to a broader range of households in Coachella.

2. *On-Site Public Amenities. The provision of on-site amenities that benefit the general public such as parks, community spaces, civic spaces, childcare facilities, preservation of historic structures or places, agricultural preservation, open space preservation, or similar amenities.*

   The project includes a 3.13-acre public park located within the subdivision. This park will serve both residents and the wider community, offering much-needed open space, recreation opportunities, and neighborhood gathering areas without requiring residents to travel to existing City facilities.

3. *Off-site Improvements. The provision of off-site amenities and dedications including traffic enhancements, traffic calming improvements, bikeways and trails, park lands, recreation facilities, or other public improvements that proportionally offset the additional impacts specifically created by the exception requested for the PUD.*

   The project will dedicate 3.13 acres for a public park, which includes a parking lot, tot lot, basketball court, shade structure, seating areas, bike racks, recreational open space, sidewalks, trails, and site lighting. Unlike typical subdivision parks reserved primarily for residents, this park will be fully accessible to the broader public, providing a high-quality recreation space within walking distance of surrounding neighborhoods.

   The project will also construct approximately 1,300 linear feet of half-street improvements along Calhoun Street, including new pavement, curb, gutter, undergrounding of overhead power lines, new streetlights, and a 26-foot landscaped setback with a 6-foot sidewalk and parkway. These improvements will significantly enhance the visual character and safety of Calhoun Street, well beyond the baseline requirements of a standard frontage improvement.

   In addition, the project will deliver approximately 1,300 linear feet of full-street improvements along Avenue 49, which is currently undeveloped. These improvements will complete the roadway by constructing curb, gutter, and landscaping on both the north and south sides. Because Avenue 49 presently lacks storm drain infrastructure, the project will also provide an above-ground retention basin along the right-of-way to capture and retain 100% of off-site stormwater. This represents a substantial infrastructure contribution to the City that will serve not only the project but also future growth in the area.

   Collectively, these investments will improve traffic circulation and safety, establish a high-quality streetscape, and provide public amenities that extend benefits beyond the project site. These improvements go beyond the minimum requirements of the subdivision code and represent the type of public benefit envisioned by the City's PUD ordinance.

9. List of Preparers

Madeline Luke
Associate Planner
The Altum Group

Rich Malacoff, AICP
Principal Planner
The Altum Group



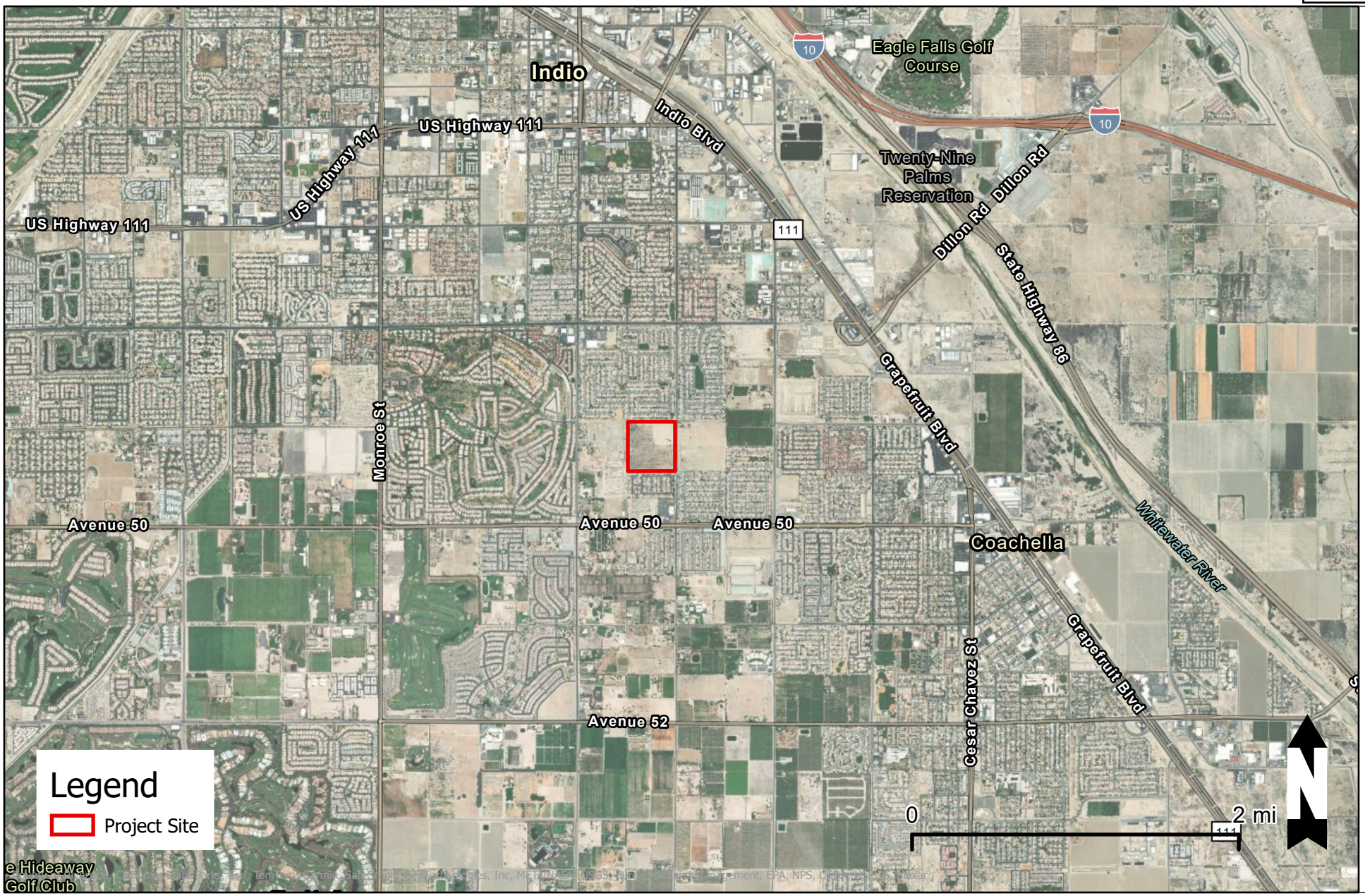
The Altum Group

Regional Location

Calhoun Street Subdivision

Exhibit

287

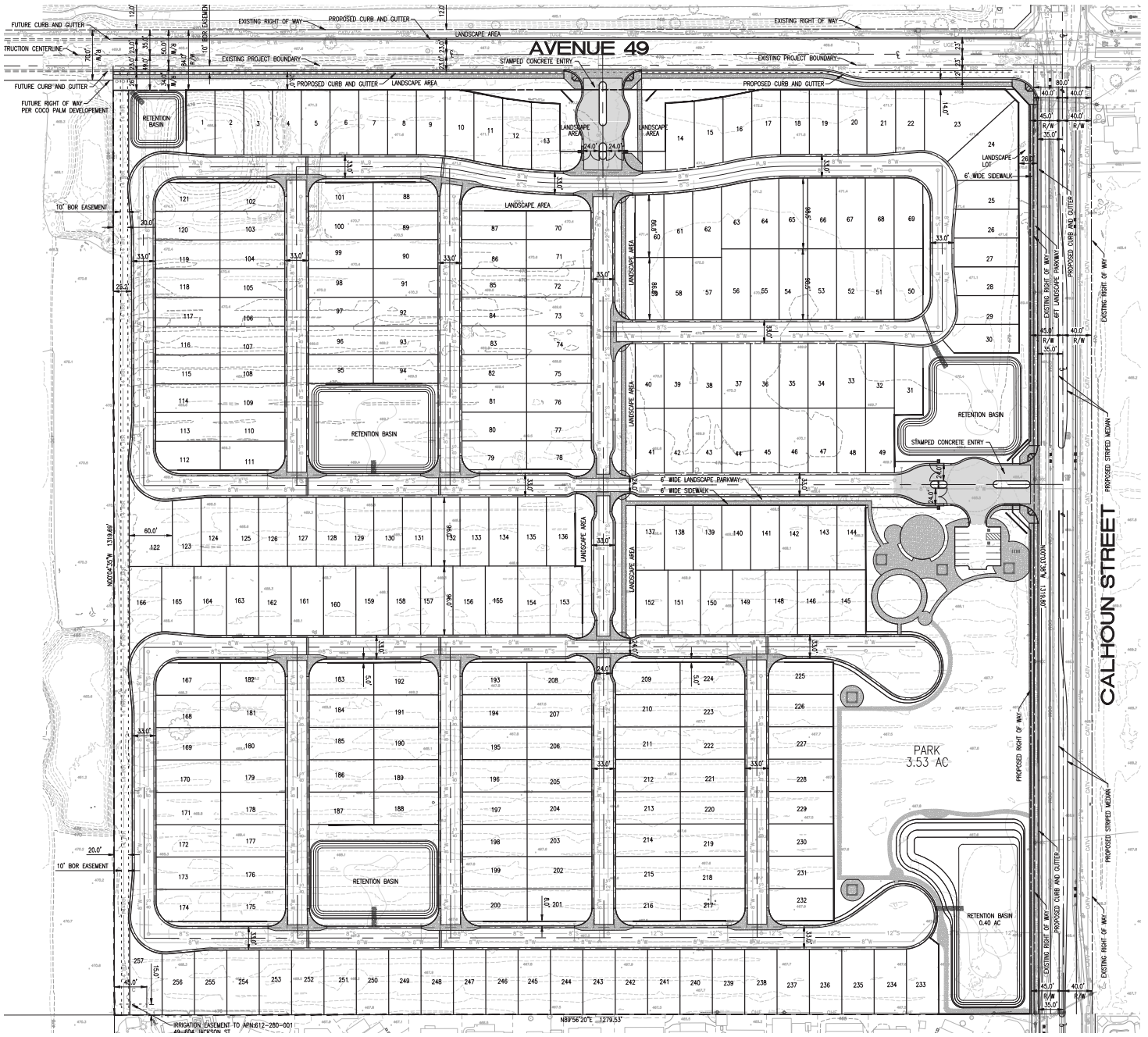


The Altum Group

Proposed Planned Unit Development Overlay

Calhoun Street Subdivision

Exhibit



Not to Scale

The Altum Group

Preliminary Site Plan

Calhoun Street Subdivision

Exhibit


Camino Bahia
Single Family Homes
Puerto Escondido
Single Family Homes
an Mateo Ave
Avenue 49
Avenue 49
City of Indio Jurisdiction
Future Single Family Homes
APN: 612-260-010
Vacant Lot
Calhoun St
Legend
City of Coachella Boundary
Project Site
Single Family Homes
Single Family Homes
0
0.05 mi
N
Esri Community Maps Contributors, County of Riverside, California State Parks, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, Maxar

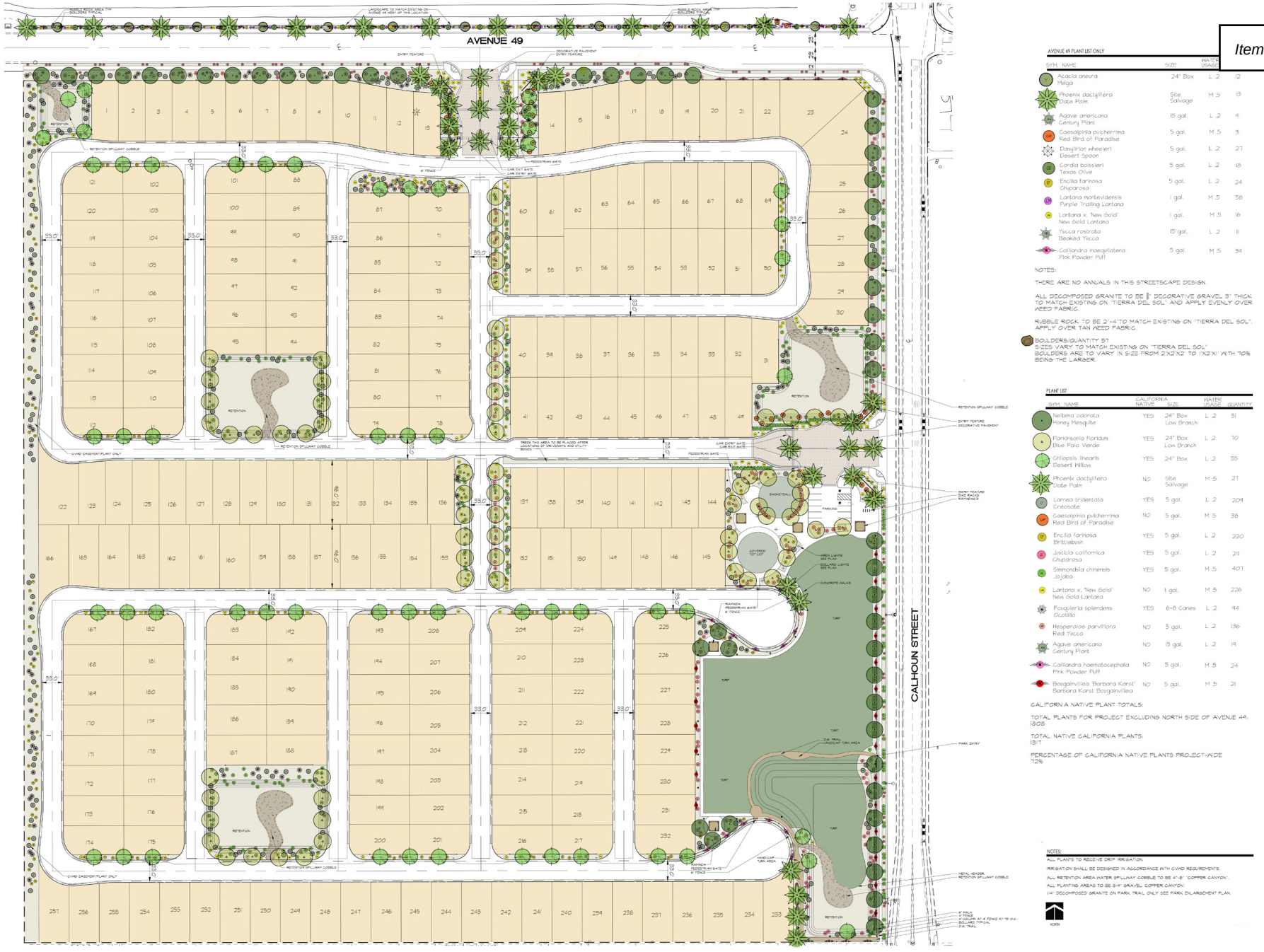


The Altum Group

Existing General Plan Land Use and Zoning

Calhoun Street Subdivision

Exhibit



Not to Scale

The Altum Group

Conceptual Landscape Plan

Calhoun Street Subdivision

Exhibit


HONEY MESQUITE


BLUE PALO VERDE


DESERT WILLOW


DATE PALM


SW BOULDER / "COPPER CANYON / 3/4" OVERALL
4"-8" RETENTION DRAINAGE


SW BOULDER / "CALIFORNIA GOLD" FINES
PARK TRAIL COMPACTED


CREOSOTE


RED BIRD OF PARADISE


BRITTLEBUSH


CHUPAROSA

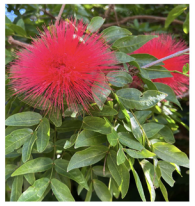

JOJOBA


YELLOW LANTANA

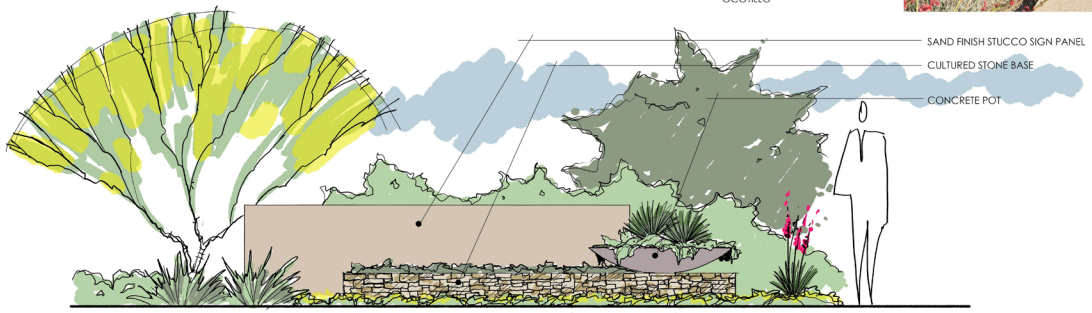

OCOTILLO


RED YUCCA

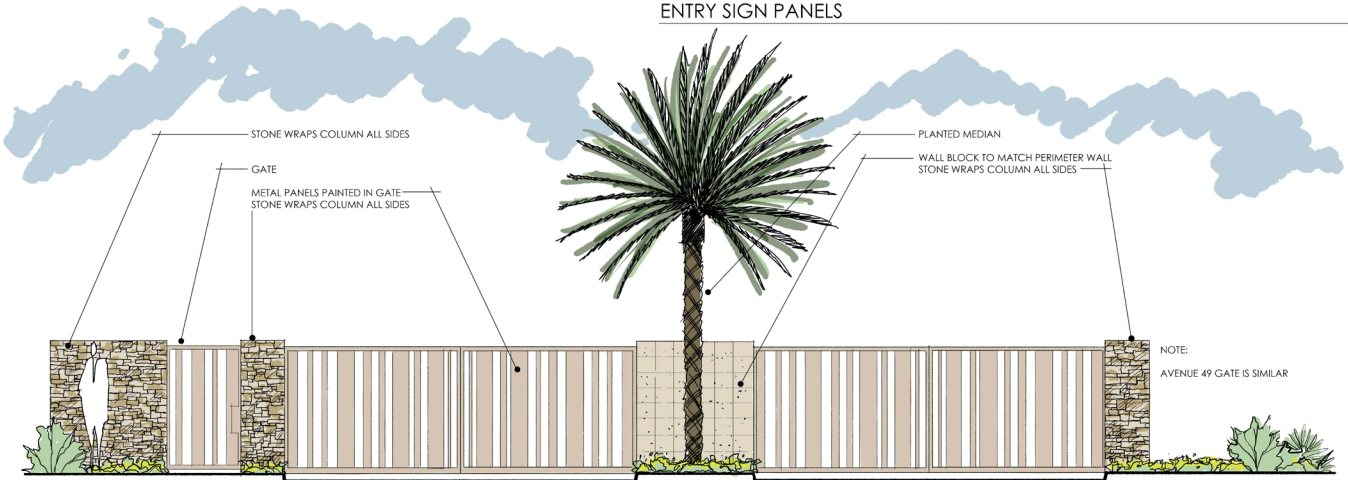

CENTURY PLANT


PINK POWDER PUFF


BOUGAINVILLEA



ENTRY SIGN PANELS



PLANT LIST

SYM	NAME	SIZE	WATER USAGE	QUANTITY
	Neltuma odorata Honey Mesquite	24" Box Low Branch	L .2	51
	Parkinsonia floridum Blue Palo Verde	24" Box Low Branch	L .2	10
	Chilopsis linearis Desert Willow	24" Box	L .2	55
	Phoenix dactylifera Date Palm	Site Salvage	M .5	27
	Larrea tridentata Creosote	5 gal.	L .2	209
	Caesalpinia pulcherrima Red Bird of Paradise	5 gal.	M .5	38
	Encilia farinosa Brittlebush	5 gal.	L .2	220
	Justicia californica Chuparosa	5 gal.	L .2	211
	Simmondsia chinensis Jojoba	5 gal.	M .5	407
	Lantana x. 'New Gold' New Gold Lantana	1 gal.	M .5	226
	Fouquieria splendens Ocotillo	6-8 Canes	L .2	44
	Hesperaloe parviflora Red Yucca	5 gal.	L .2	136
	Agave americana Century Plant	15 gal.	L .2	19
	Calliandra haematocephala Pink Powder Puff	5 gal.	M .5	24
	Bougainvillea 'Barbara Karst' Barbara Karst Bougainvillea	5 gal.	M .5	21

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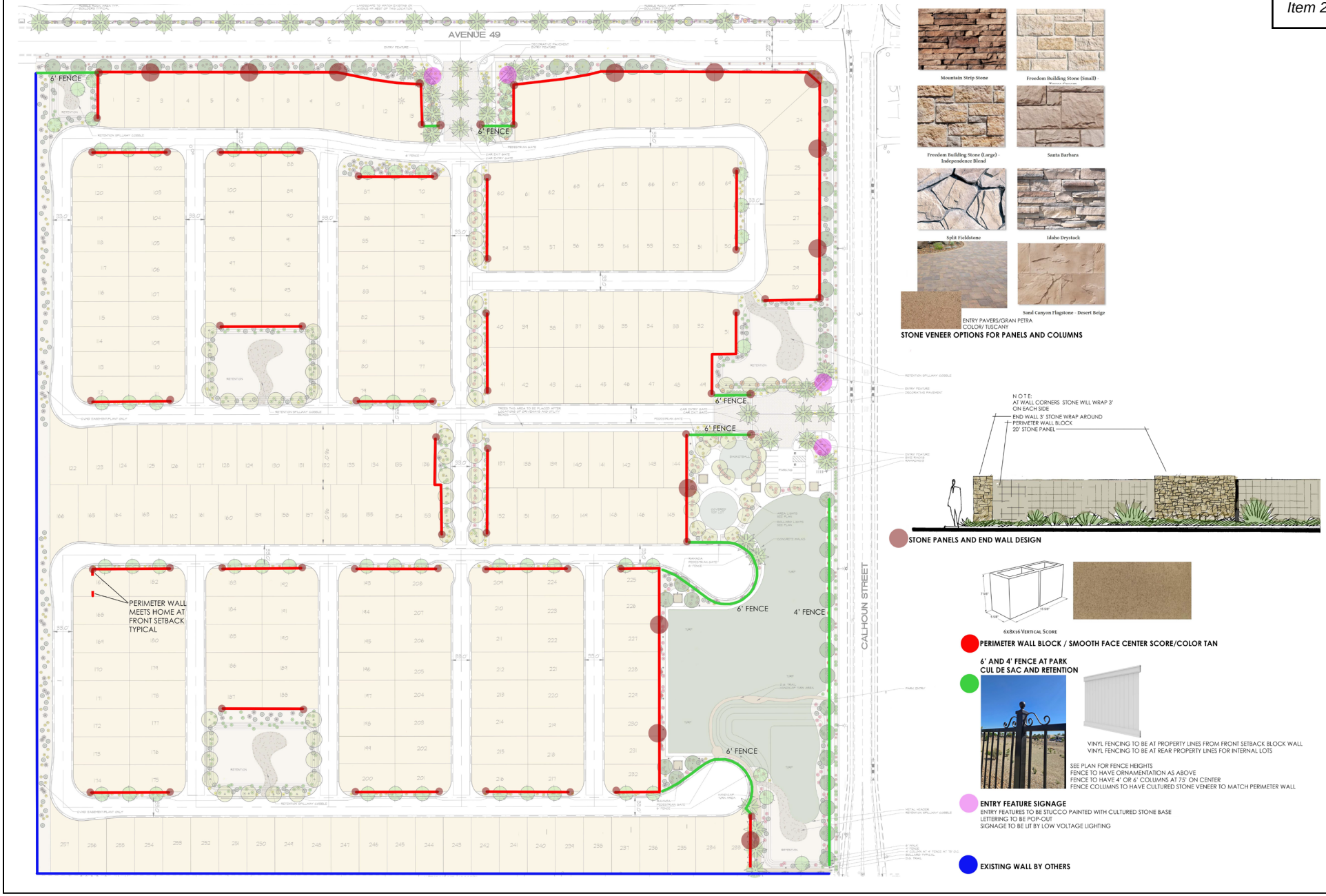


Not to Scale

The Altum Group

Conceptual Wall Plan

Calhoun Street Subdivision

Exhibit



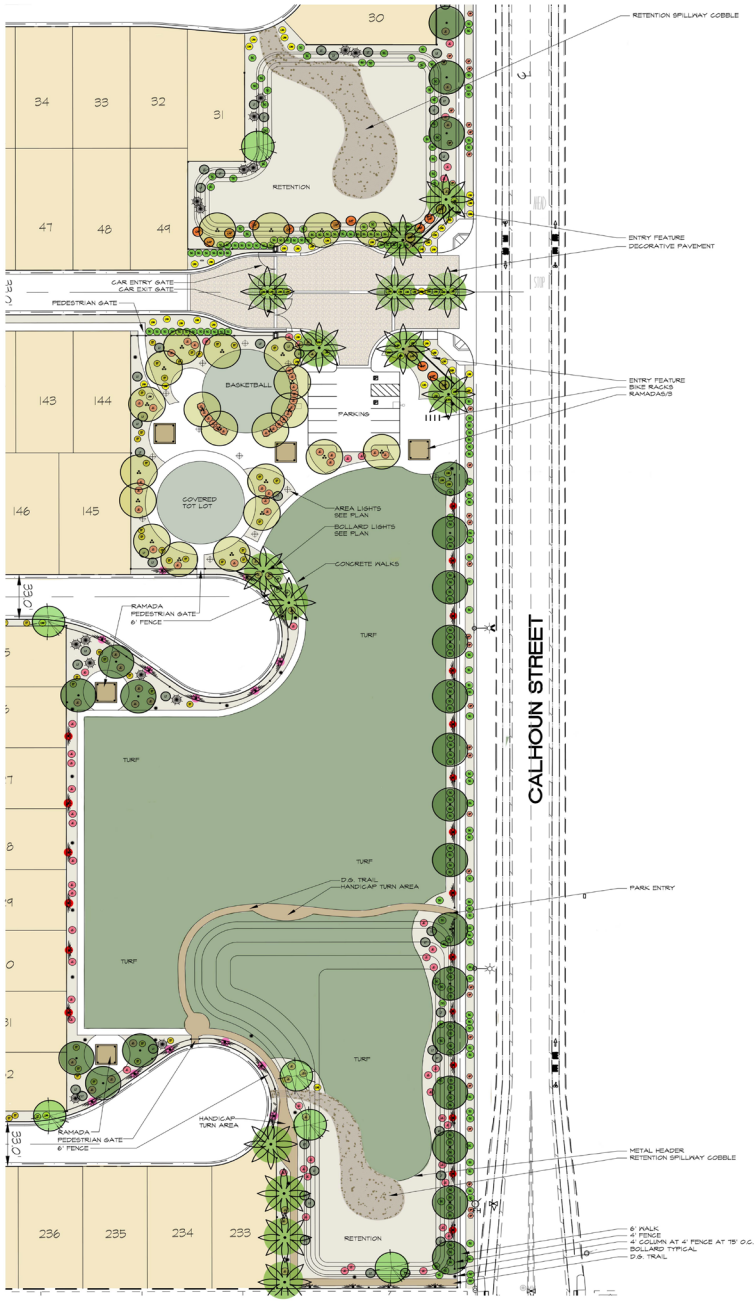
HALF COURT BASKETBALL



BASKETBALL HOOP
AMERICAN SUPERSPORTS
RUFFNECK MODEL
QTY 1



CLASSIC RECRUATION SYSTEMS / TOT LOT SHADE





RAMADAS / CLASSIC RECREATION SYSTEMS /MESA MODEL / QTY 5



TOT LOT / WILLYGOAT / GRANITE MOUNTAIN PLAY SYSTEM
KEEGANS CASTLE / QTY 1



RAMADA PICNIC TABLES / GLOBAL INDUSTRIAL 6'
MODEL #WB694553GN / QTY 5



BARCO WHEELCHAIR ACCESSABLE PICNIC TABLE
07SA2614-GN /QTY 1



CONCRETE AREA AROUND TOT LOT AND RAMADAS
BROOM FINISH WITH ALTERNATING PANELS



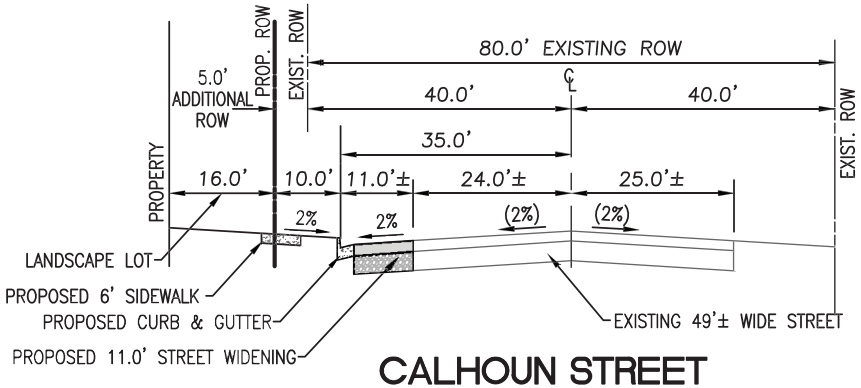
BIKE RACKS / MONMA

Not to Scale

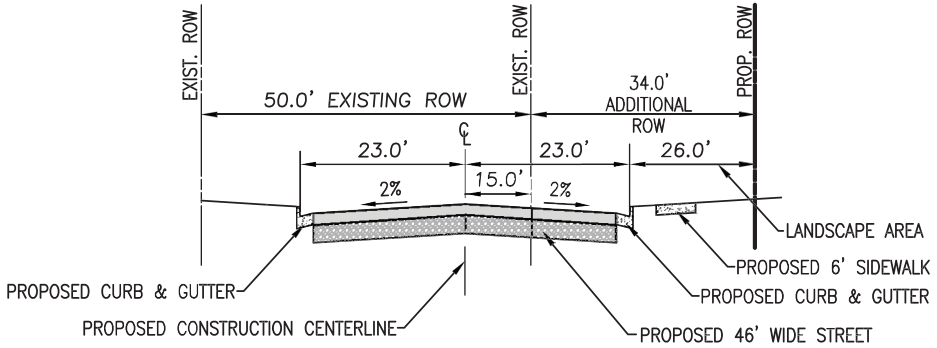
The Altum Group

Conceptual Park Plan
Calhoun Street Subdivision

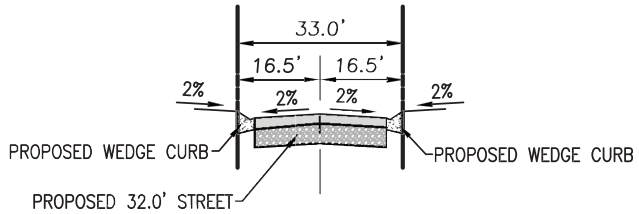
Exhibit



CALHOUN STREET
NTS



AVENUE 49
NTS



PRIVATE ON-SITE STREETS
NTS

Not to Scale

The Altum Group

Street Sections

Calhoun Street Subdivision

Exhibit

RESOLUTION NO. PC 2025-24

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF COACHELLA RECOMMENDING TO THE CITY COUNCIL OF THE CITY OF COACHELLA THE CONDITIONAL APPROVAL OF ENVIRONMENTAL ASSESSMENT NO. 25-02 ASSESSMENT NO. 25-02 FOR THE ADOPTION OF AN INITIAL STUDY WITH MITIGATED NEGATIVE DECLARATION, FOR THE PROPOSED 257-LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION PROJECT LOCATED ON THE 39.98 ACRES SITE AT THE SOUTHWEST CORNER OF CALHOUN STREET AND AVENUE 49, APN 612-260-010; AND DETERMINING THAT THE PROJECT IS COMPLIANT WITH SECTION 15063 OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GUIDELINES. APPLICANT: PACIFIC MODERN BUILDERS LLC

WHEREAS, on April 15, 2025, the applicant, Rod Vandenburg on behalf of Pacific Modern Builders, LLC., submitted a Tentative Tract Map application, Conditional Use Permit application, and associated environmental documentation for the subdivision of 39.98 acres of land for the development of a 257 single family home planned unit development and associated improvements on the southwest corner of Calhoun Street and Avenue 49 ("the Project"); and,

WHEREAS, the Site is located within the City of Coachella off of Calhoun Street and Avenue 49 within Riverside County, California (Assessor Parcel Numbers 612-260-010) ("Property"); and,

WHEREAS, the site has a zoning designation of General Neighborhood and a General Plan 2035 land use designation of General Neighborhood; and,

WHEREAS, the Project is consistent with and intended to implement the vision of the Coachella Municipal Code and the General Plan 2035 pertaining to land use patterns, building and site design, and public right-of-way improvements; and

WHEREAS, pursuant to the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., and CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), a public agency shall prepare or have prepared a proposed negative declaration or a mitigated negative declaration for a project subject to CEQA when the initial study identifies potentially significant impacts but revisions in the project plan or proposals made by or agreed to by the applicant would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and,

WHEREAS, pursuant to CEQA Guidelines Section § 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), an initial study with mitigated negative declaration was prepared for the Proposed Project ("Initial Study/Mitigated Negative Declaration), and mitigation measures have been incorporated into the Mitigated Negative Declaration and will be imposed on the Proposed Project through the City's

adoption of a Mitigation Monitoring and Reporting Program ("MMRP") in compliance with CEQA Guidelines Section 15070(d); and,

WHEREAS, pursuant to CEQA Guidelines Section § 15073 (Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration), comments were received pertaining to the Initial Study/Mitigated Negative Declaration and added to the administrative record; and,

WHEREAS, a notice of a public hearing to consider Tentative Tract Map No. 39051, Conditional Use Permit No. 390, and Environmental Assessment 2025-02 was issued in accordance with Coachella Municipal Code Section 17.74.010G, inclusive of the publication on December 7, 2025, of a legal public hearing notice which was published in the Desert Sun, the City's newspaper of record and mailing of a public hearing notice to a certified list of property owners within 300 feet of the subject properties on December 2, 2025; and,

WHEREAS, on December 17, 2025, the Planning Commission held a duly noticed public hearing to consider the application for the Project during which evidence, both written and oral, including the staff report and supporting documents, was presented at said hearing; and,

WHEREAS, at the conclusion of the public hearing and following discussion, the Planning Commission approved this Resolution for the conditional approval of the Calhoun Subdivision Project as conditioned with the motion vote outcome specified in the meeting minutes for the December 17, 2025, Planning Commission meeting.

NOW, THEREFORE, BE IT RESOLVED, THE PLANNING COMMISSION OF THE CITY OF COACHELLA, CALIFORNIA DOES HEREBY FIND DETERMINE AND RESOLVE AS FOLLOWS:

SECTION 1. **Incorporation of Recitals.** The Planning Commission hereby specifically finds that all of the facts set forth in the recitals of this Resolution are true and correct and are incorporated into this Resolution by reference and constitute a material part of this Resolution.

SECTION 2. **Environmental Findings.** The Planning Commission has independently reviewed the Initial Study with Mitigated Negative Declaration and the administrative record for the proposed project, including all oral and written comments received during the document circulation period, public hearing, the staff report, and all attachments thereto, which are all incorporated herein by reference and are on file with the Community Development Department for the City of Coachella, and the Planning Commission finds that:

A. The Initial Study with Mitigated Negative Declaration (EA 2025-02) has been completed in compliance with CEQA and reflects the agency's independent judgment

and analysis.

B. All environmental impacts of the Proposed Project are either insignificant or can be mitigated to a level of insignificance pursuant to the mitigation measures outlined in the Mitigated Negative Declaration and the Mitigation Monitoring Reporting Program.

C. There is no substantial evidence in the administrative record supporting a fair argument that the Proposed Project, as revised, may result in significant environmental impacts.

D. The Planning Commission hereby approves and adopts the Initial Study with Mitigated Negative Declaration (EA 2025-02) pursuant to Public Resources Code section 21080(c)(2).

E. Pursuant to Public Resources Code section 21081.6, the Planning Commission approves and adopts the MMRP prepared for the Project, which shall be fully complied with as specified in this Resolution and the Conditions of Approval set forth herein.

SECTION 3. Location and Custodian of Records. The documents and materials that constitute the record of proceedings on which these findings are based are located at Coachella Civic Center. The Development Services Director is the custodian of the record of proceedings.

SECTION 4. Execution of Resolution. The Chairman shall sign this Resolution and the City Clerk shall attest and certify to the passage and adoption thereof.

SECTION 5. Planning Commission Approval Based on the foregoing recitals and findings above, and the written and oral comments, facts and evidence presented, the City of Coachella Planning Commission hereby recommends to the City Council conditional approval of Environmental Assessment No. 25-02 for the adoption of an Initial Study with Mitigated Negative Declaration, for the proposed 257-lot single family residential subdivision project located on the 39.98 acres site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010; And determining that the project is compliant with Section 15063 Of The California Environmental Quality Act (CEQA) Guidelines. The applicant shall demonstrate compliance with ALL Conditions of Approval, as set forth in Exhibit "A", and Planned Unit Development in "Exhibit B" of this Resolution. Failure to demonstrate compliance with these conditions of approval may result in the delay of the Proposed Use or the rescinding of the City of Coachella's conditional use permit approval. Where the term "Applicant" is used in any condition of approval, this term shall also apply to the Property Owner, any developer, or any successor in the interest of the Applicant. It is the Applicant's or Applicant's successor in interest responsibility to fully comply with the conditions of approval unless subsequently modified in accordance with the City's required processes and procedures.

PASSED APPROVED and ADOPTED this 17th day of December 2025.

_____
Isela Murillo, Chairperson
Coachella Planning Commission

ATTEST:

_____
Kendra Reif
Planning Commission Secretary

APPROVED AS TO FORM:

_____
City Attorney

STATE OF CALIFORNIA)
COUNTY OF RIVERSIDE) ss.
CITY OF COACHELLA)

I HEREBY CERTIFY that the foregoing Resolution No. PC-2025-24, was duly adopted at a regular meeting of the Planning Commission of the City of Coachella, California, held on the 17th day of December 2025, by the following roll

call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

_____

Kendra Reif
Planning Commission Secretary

Exhibit A – Resolution No. PC2025-24

CONDITIONS OF APPROVAL FOR ENVIRONMNETAL ASSESSMENT NO. 25-02

General Conditions

1. Environmental Assessment No. 25-02 is for the adoption of an Initial Study with Mitigated Negative Declaration EA 25-02, for the proposed 257-lot single family residential subdivision project located on the 39.98-acres site at the southwest corner of Calhoun Street and Avenue 49, APN 612-260-010, and the determination that the proposed project is compliant with California Environmental Quality Act (CEQA) Guidelines Section 15073 - Public Review of a Proposed Negative Declaration or Mitigated Negative Declaration.

2. The applicant shall defend, indemnify and hold harmless the City of Coachella, its officials, officers, employees, and agents from and against any claim, action, or proceeding against the City, its officials, officers, employees or agents to attack, set aside, void or annul any project approval or condition of approval of the city concerning this project, including but not limited to any approval or condition of approval or mitigation measure imposed by the City Council or Planning Commission. The City shall promptly notify the applicant of any claim, action, or proceeding concerning the project and the City shall cooperate fully in the defense of the matter. The City reserves the right, at its own option, to choose its own attorney to represent the City, its officials, officers, employees and agents in the defense of the City Attorney, within five days of the effective date of this approval.

3. The applicant shall comply with all requirements and conditions of approval as included in Tentative Tract Map No. 39051, Conditional Use Permit No. 390, Environmental Assessment No. 25-02, and any modifications or extensions thereof, as listed in those Notice of Actions or Resolutions for each respective approval, and Resolution No. PC2025-22, Resolution No. PC2025-23, and Resolution No. PC2025-24 unless otherwise modified per the requirements and conditions of approval per this resolution.

	INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Project Title:	Calhoun Street Housing Development
Case No.	Environmental Assessment EA 25-02 Tentative Tract Map TTM 39051 Conditional Use Permit 390 Planned Unit Development
Assessor's Parcel No.	612-260-010
Lead Agency Name and Address:	City of Coachella – Planning Division 53990 Enterprise Way Coachella, CA 92236
Project Location:	Southwest corner of Calhoun Street and Avenue 49
Project Sponsor's Name and Address:	Rod Vandenburg Pacific Modern Builders LLC P.O. Box 3075 Rancho Mirage, CA 92270
General Plan Designation(s):	General Neighborhood
Zoning:	General Neighborhood (G-N)
Contact Person:	Adrian Moreno, Associate Planner City of Coachella 53990 Enterprise Way Coachella, CA 92236
Phone Number:	(760) 398-3502 EXT. 118
Date Prepared	November 2025

Table of Contents

CHAPTER 1: INTRODUCTION 4
CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION 17
I. AESTHETICS 20
II. AGRICULTURAL AND FORESTRY RESOURCES 23
III. AIR QUALITY 26
IV. BIOLOGICAL RESOURCES 35
V. CULTURAL RESOURCES 42
VI. ENERGY 47
VII. GEOLOGY AND SOILS 55
VIII. GREENHOUSE GAS EMISSIONS 63
IX. HAZARDS AND HAZARDOUS MATERIALS 68
X. HYDROLOGY AND WATER QUALITY 73
XI. LAND USE AND PLANNING 80
XII. MINERAL RESOURCES 82
XIII. NOISE 83
XIV. POPULATION AND HOUSING 89
XV. PUBLIC SERVICES 91
XVI. RECREATION 95
XVII. TRANSPORTATION 97
XVIII. TRIBAL CULTURAL RESOURCES 107
XIX. UTILITIES AND SERVICE SYSTEMS 110
XX. WILDFIRE 118
XXI. MANDATORY FINDINGS OF SIGNIFICANCE 120
CHAPTER 3: MITIGATION MONITORING & REPORTING PROGRAM 123

LIST OF EXHIBITS

Exhibit 1 Regional Location Map 7
Exhibit 2 Project Vicinity Map 8
Exhibit 3 Project Location Map 9
Exhibit 4a Tentative Tract Map No. 39051 – North Section 10
Exhibit 4b Tentative Tract Map No. 39051 – South Section 11
Exhibit 5a Conceptual Landscape Plan – North Section 12
Exhibit 5b Conceptual Landscape Plan – South Section 13
Exhibit 5c Conceptual Landscape Plan – Park 14
Exhibit 5d Conceptual Landscape Plan – Plants & Community Elements 15
Exhibit 6 Liquefaction Susceptibility 58

LIST OF FIGURES

Figure II-1 California Important Farmland Finder, California Department of Conservation, accessed July 2024. 24
Figure XIII-1 General Plan CNEL Levels 84

LIST OF TABLES

Table 1-1 Project Information 5
Table III-1 Ambient Air Quality Criteria Pollutants and Health Impacts 27
Table III-2 South Coast AQMD Air Quality Significance Thresholds 28
Table III-3 Project Land Use Assumptions for CalEEMod 29
Table III-4 Maximum Daily Construction-Related Emissions (pounds per day) 30
Table III-5 Maximum Daily Operational-Related Emissions (pounds per day) 31
Table III-6 Localized Significance Thresholds Emissions (pounds per day) 33
Table IV-1 Special Status Species Potentially Occurring on the Project Site 37
Table VI-1 Imperial Irrigation District Generation Resource Portfolio 47
Table VI-2 Project Construction Equipment Fuel Consumption Estimates 49
Table VI-3 Construction Worker Fuel Consumption Estimates 50
Table VI-4 Project Operational Annual Electricity Consumption 51
Table VI-5 Project Operational Annual Natural Gas Consumption 51
Table VI-6 Project Operational Annual Transportation Gasoline Consumption 52
Table VIII-1 Description of Major Greenhouse Gases 63
Table VIII-2 Projected GHG Emission Summary 66
Table X-1 Project Water Demand 77
Table X-2 Project Wastewater Generation 77
Table XIII-1 Noise Levels from Construction Equipment and Phases 86
Table XIII-2 Hours for Construction Activities 87
Table XIII-3 Hours for Property Maintenance Activities 87
Table XIII-4 Permitted Sound Levels for Fixed Noise Sources 87
Table XV-1 Project Student Generation 93
Table XVII-1 Intersection Analysis Locations 99
Table XVII-2 Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions 99
Table XVII-3 Intersection Analysis for Existing (2024) Conditions 100
Table XVII-4 Project Daily Trip Generation 101
Table XVII-5 Intersection Analysis for EAP (2026) Conditions 102
Table XVII-6 Intersection Analysis for EAPC (2026) Conditions 102
Table XVII-7 Project Fair Share Contributions to Impacted Intersections 105
Table XIX-1 Project Water Demand 114
Table XIX-2 Project Wastewater Generation 115
Table XIX-3 Project Estimated Solid Waste Generation 116

APPENDICES

Appendix A Calhoun Street Housing Development CalEEMod Report ..... A
Appendix B Calhoun Street Housing Development Biological Resources Report ..... B
Appendix C Calhoun Street Housing Development Cultural Resources Report C
Appendix D Calhoun Street Housing Development Preliminary Hydrology Report ..... D
Appendix E Calhoun Street Housing Development Preliminary Water Quality Management Plan E
Appendix F Calhoun Street Housing Development Traffic Impact Analysis ..... F
Appendix G Calhoun Street Housing Development Vehicle Miles Traveled Screening Assessment ..... G

CHAPTER 1: INTRODUCTION

Project Location

The proposed Calhoun Street Housing Development is a Planned Unit Development (PUD) for a single-family residential project (referred to hereafter as Project and/or proposed Project). The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, Riverside County, California (Exhibits 1- 3), and is bounded along the west perimeter by lands within the City of Indio. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. Single-family residential land uses occur to the north, south and west of the Project site. Across Calhoun Street on the east side, there is vacant lot of a similar size to the proposed Project. The new residential neighborhood to the west occurs in the City of Indio.

Throughout much of the 20th century, the Project site and surrounding lands were under agricultural use, with the Project site serving as a date grove. As the population has grown along with the need to diversify the economy, the City has transitioned certain agricultural areas to other uses and has established 17 Subareas to guide future planning. The Project site is located in the City's Subarea 1, West Coachella Neighborhoods, where the current land use designations include General Neighborhood and Suburban Neighborhood.[1] The site has been partially cleared, although many date palms remain scattered throughout 75% of the parcel while the northeast corner of the parcel is graded and barren.

Project Description

The Project site currently has a land use and zoning designation of "General Neighborhood" in the City's General Plan 2035 Update (General Plan) which allows for single- and multi-family residences. Multi-family residences are to be constructed in a "house-form" such as duplexes, rowhouses, and garden apartments. Residential neighborhoods encourage small blocks, parks and green spaces, and walkability or short drives to services such as schools and shopping. Between 7 and 25 dwelling units per acre are permitted in General Neighborhood areas.[2] The applicant proposes a PUD that would permit flexible standards for smaller lot sizes and a higher density for a private gated community. The PUD requires the completion of a conditional use permit (CUP), which will establish the land use regulations and minimum development standards for the development, to be approved by the City's Planning Commission.

The gross acreage for the Project parcel is 39.98 acres. With 1.21 acres of right of way dedications, the net parcel area is 38.77 acres. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres – 3.13 acres for recreational open space and a 0.40-acre landscaped retention basin.

The residential use consists of 144 lots each encompassing a minimum of 3,400 sf, and 113 lots each encompassing a minimum of 4,050 sf. The lots will be eligible for Accessory Dwelling Units (ADU) and Junior Dwelling Units (JADU).

1 City of Coachella General Plan Update 2035, Land use and Community Character, updated April 2015.

2 City of Coachella General Plan Update 2035, Land Use, Compatible Uses and Designations, Table 4-1, General Plan Designations Summary, updated April 2015.

The Architectural style of the homes will be determined through an architectural review application at a later date. This Initial Study assumes that the houses proposed will conform to the minimum standards established in the Project PUD.

The 3.13-acre recreational area of the park includes a tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a small parking lot. Connected to the south side of the park is a 0.40-acre retention basin that is partially landscaped with turf grass for recreational use and encircled by a decomposed granite trail. The public can access the park from Calhoun Street by either entering the parking lot at the north end or the trail at the south end. A security fence surrounding the park will prevent public access to the residential section of the Project.

Two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street. The proposed Project would include right-of-way allowances for future road improvements. Currently, Avenue 49 east of Calhoun is designated as a Primary Arterial, but west of Calhoun to Jackson Street Avenue 49 is an unimproved path. For 1,300 linear feet from Calhoun Street to the Project's northwest corner, the applicant proposes 84-foot-wide full-street improvements including curbs, gutters, and sidewalks on both sides. At buildout, Avenue 49 street improvements would include 46 feet of travel lanes with curbs and gutters, six-foot sidewalks on both sides, and a 26-foot-wide landscaped area along the Project site Avenue 49 frontage.

Along 1,300 linear feet of Calhoun Street from the intersection of Avenue 49 to the southeast corner of the Project, the applicant proposes half-width improvements consisting of new pavement, curb, gutter, undergrounding of existing overhead utilities, new streetlights, a six-foot-wide sidewalk, and a 26-foot-wide landscape setback along the Project site frontage. Exhibits 4a and 4b show the Tentative Tract Map No. 39051 and Exhibits 5a – 5d provide the Conceptual Landscape Plan for the development. Full details of the street improvements are discussed in the Section XVII Transportation.

Four retention basins will accept all on-site flows from a 100-year storm event. A fifth basin located at the northwest corner of the Project would accept off-site flows from Avenue 49. The basins will be landscaped to maintain openness and reduce visual massing of the development.

Table 1-1
Project Information

Total Project Area	39.98 ac (gross) 38.77 (net), 1,688,821 sf
Residential Lots	257 lots
144 lots	40 ft wide (3,600 sf)
113 lots	45 ft wide (4,050 sf)
Landscaped Common Areas	
Public Park	3.13 ac (136,343 sf includes parking lot)
Five Retention Basins	2.82 ac (122,839 sf)

Utilities and Service Providers

The following agencies and companies will provide service to the project site:

1. Sanitary Sewer: Coachella Water Authority and Sanitary District
2. Water: Coachella Water Authority and Sanitary District
3. Electricity: Imperial Irrigation District (IID)
4. Gas: Southern California Gas Company
5. Telephone: AT&T, MCI, SBC, Frontier, Sprint
6. Trash Disposal: Burrtec Waste and Recycling Services

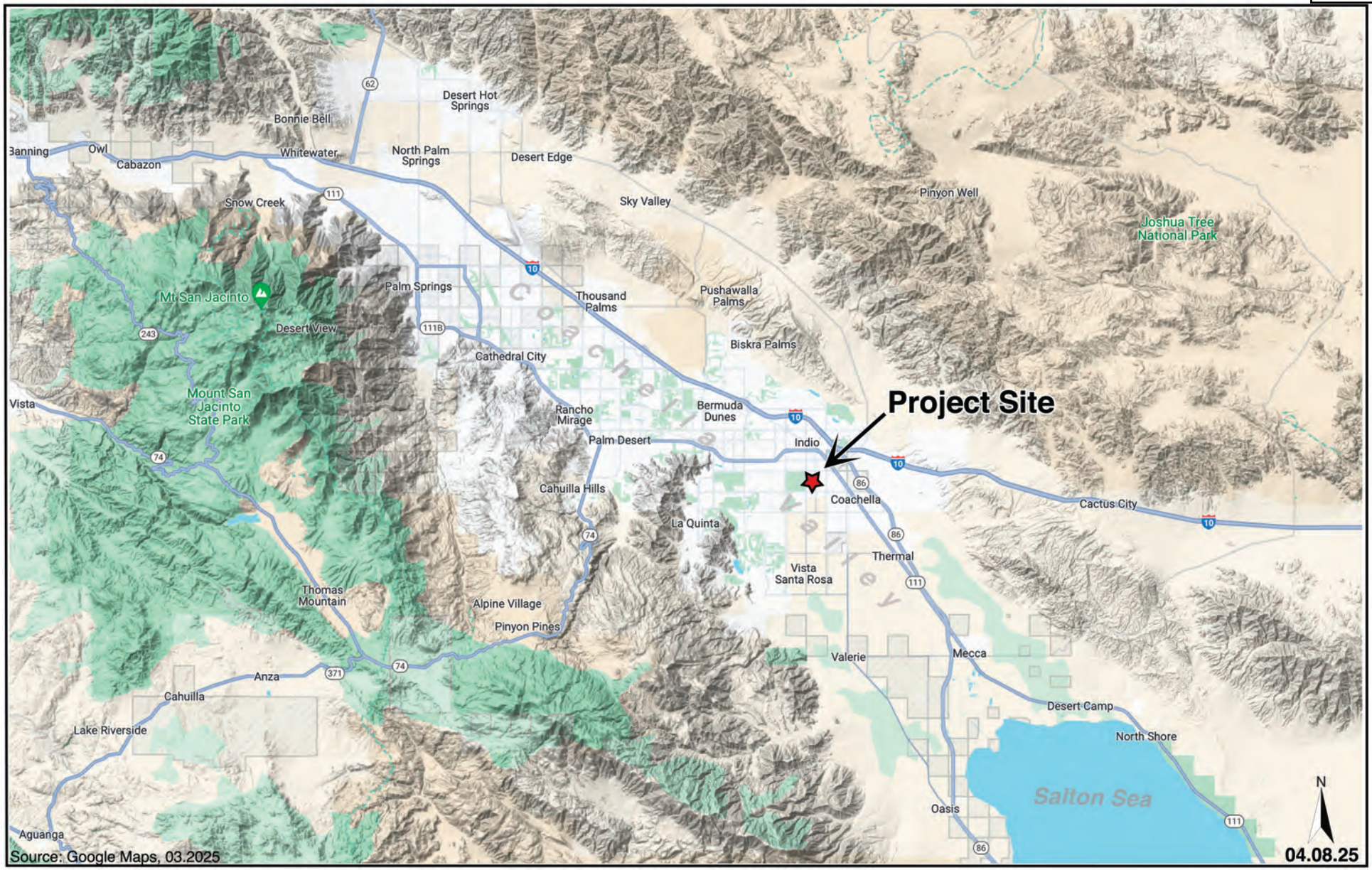
Existing facilities for these utilities occur adjacent to the Project site as there are developed neighborhoods north and south of the parcel. Extensions from the Project site to these facilities would be constructed in existing, disturbed rights-of-way and therefore would not impact the native environment.

Surrounding Land Uses:

North: Avenue 49 (unimproved), Suburban Neighborhood – single-family residences
South: Suburban Neighborhood – single-family residences
East: Suburban Neighborhood – vacant lot
West: City of Indio, Suburban Neighborhood – single-family residences

Other public agencies whose approval is required.

None.



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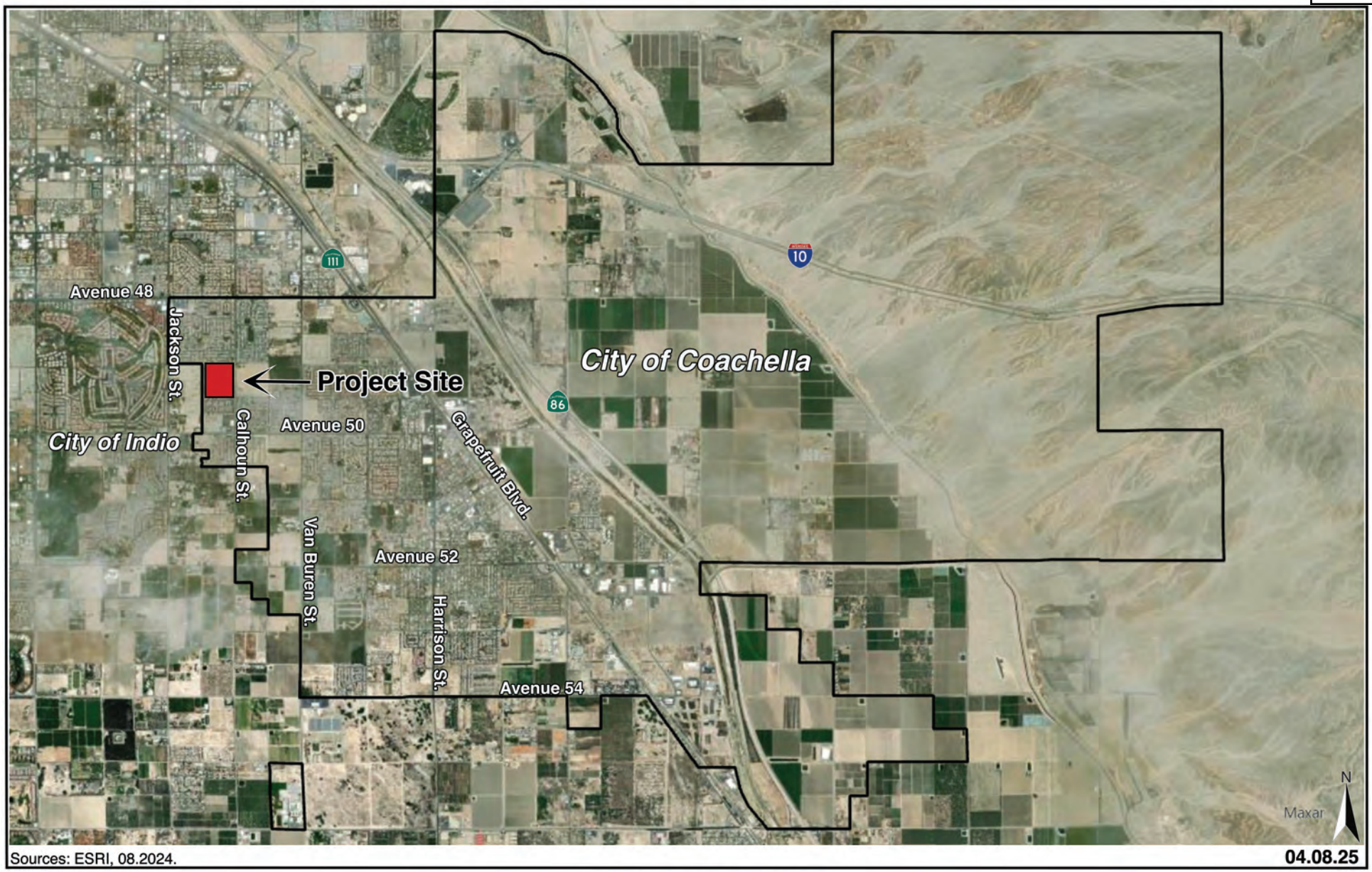
Regional Location Map
Calhoun Street Housing Development
Coachella, California

Exhibit
1



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Project Vicinity Map
Calhoun Street Housing Development
Coachella, California

Exhibit
2



TERRA NOVA®
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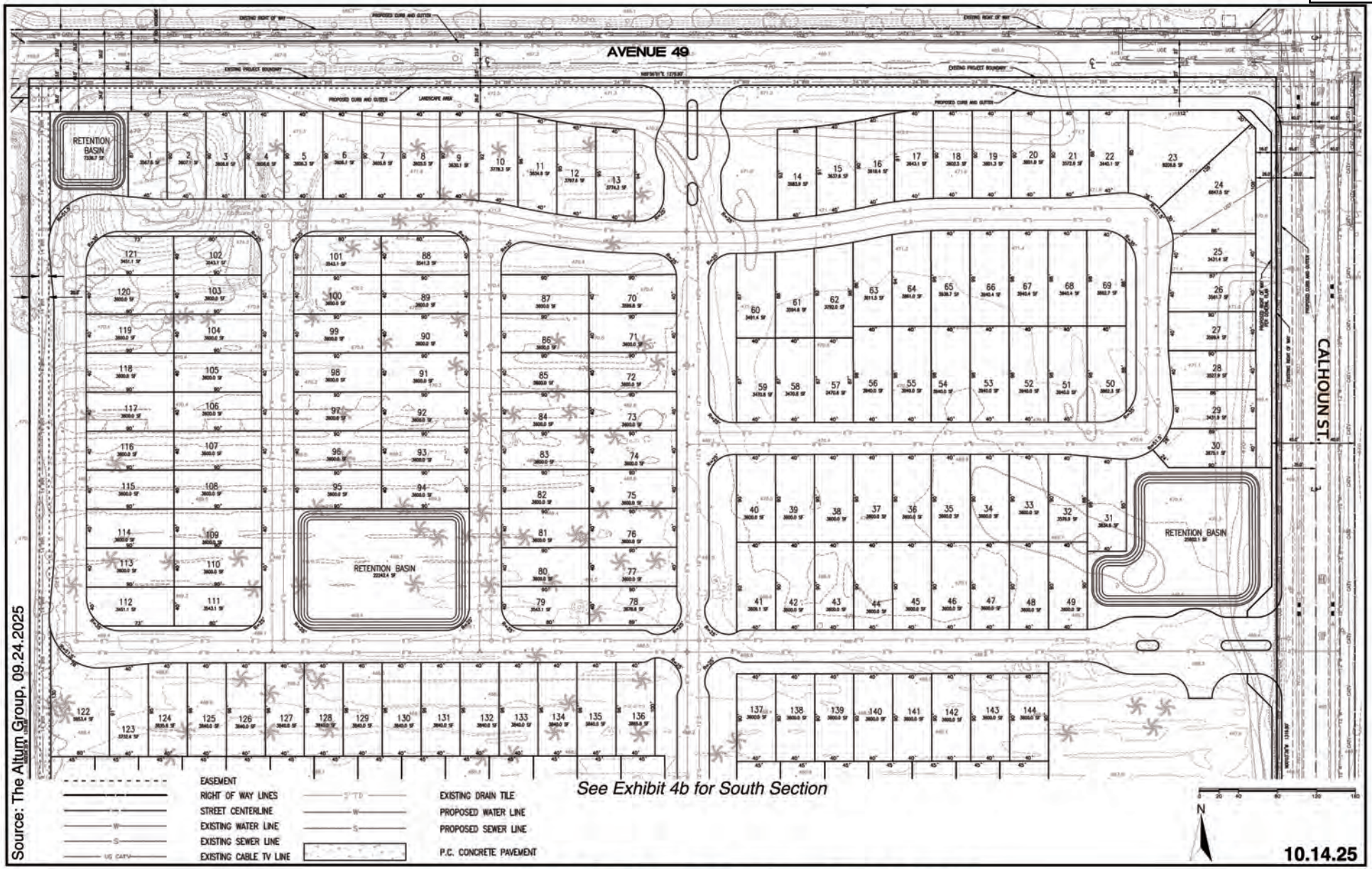
Project Location Map
Calhoun Street Housing Development
Coachella, California

Exhibit
3



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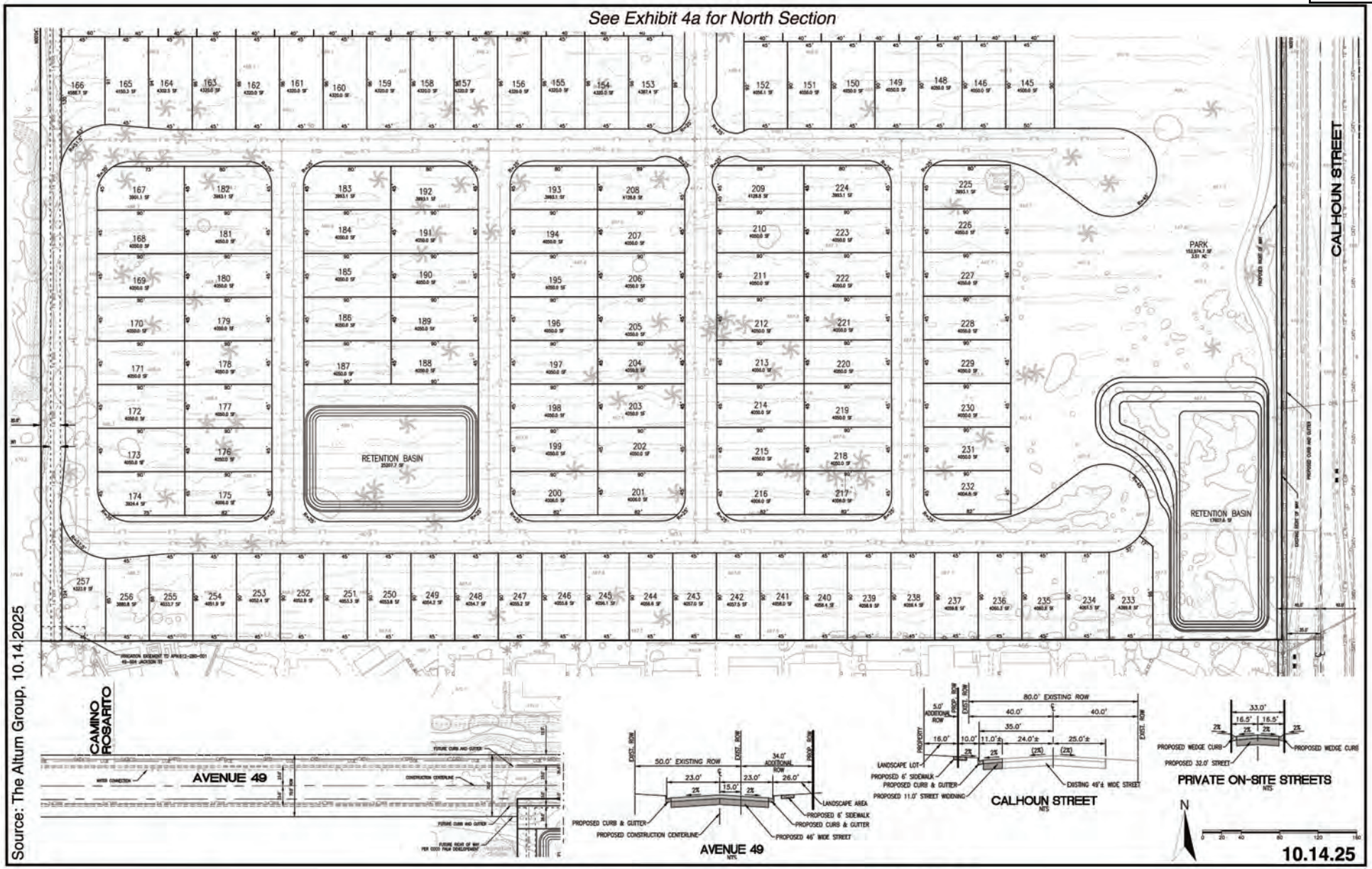
Tentative Tract Map No. 39051 - North Section
Calhoun Street Housing Development
Coachella, California

Exhibit
4a



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Tentative Tract Map No. 39051 - South Section
Calhoun Street Housing Development
Coachella, California

Exhibit
4b



Source: Russell MacDonald, RLA, 10.01.2025

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Conceptual Landscape Plan - North Section
Calhoun Street Housing Development
Coachella, California

Exhibit
5a

See Exhibit 5a for North Section



- Neltuma odorata — Honey Mesquite
- Parkinsonia floridum — Blue Palo Verde
- Chilopsis linearis — Desert Willow
- Phoenix dactylifera — Date Palm
- Larrea tridentata — Creosote
- Caesalpinia pulcherrima — Red Bird of Paradise
- Encilia farinosa — Chuparosa
- Justicia californica — Chuparosa
- Simmondsia chinensis — Jojoba
- Lantana x. 'New Gold' — New Gold Lantana
- Fouquieria splendens — Ocotillo
- Hesperaloe parviflora — Red Yucca
- Agave americana — Century Plant
- Calliandra haematocephala — Pink Powder Puff
- Bougainvillea 'Barbara Karst' — Barbara Karst Bougainvillea

NOTES:

ALL PLANTS TO RECEIVE DRIP IRRIGATION.

IRRIGATION SHALL BE DESIGNED IN ACCORDANCE WITH CVWD REQUIREMENTS.

ALL RETENTION AREA WATER SPILLWAY COBBLE TO BE 4"-8" "COPPER CANYON".

ALL PLANTING AREAS TO BE 3/4" GRAVEL 'COPPER CANYON'.

1/4" DECOMPOSED GRANITE ON PARK TRAIL ONLY SEE PARK ENLARGEMENT PLAN.

N

Source: Russell MacDonald, RLA, 10.01.2025

10.14.25

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Conceptual Landscape Plan - South Section
Calhoun Street Housing Development
Coachella, California

Exhibit
5b



RAMADAS / CLASSIC RECREATION SYSTEMS /MESA MODEL



TOT LOT / WILLYGOAT /
GRANITE MOUNTAIN PLAY SYSTEM / QTY 1



RAMADA PINIC TABLES / GLOBAL INDUSTRIAL 6'
MODEL #WB694553GN / QTY 5



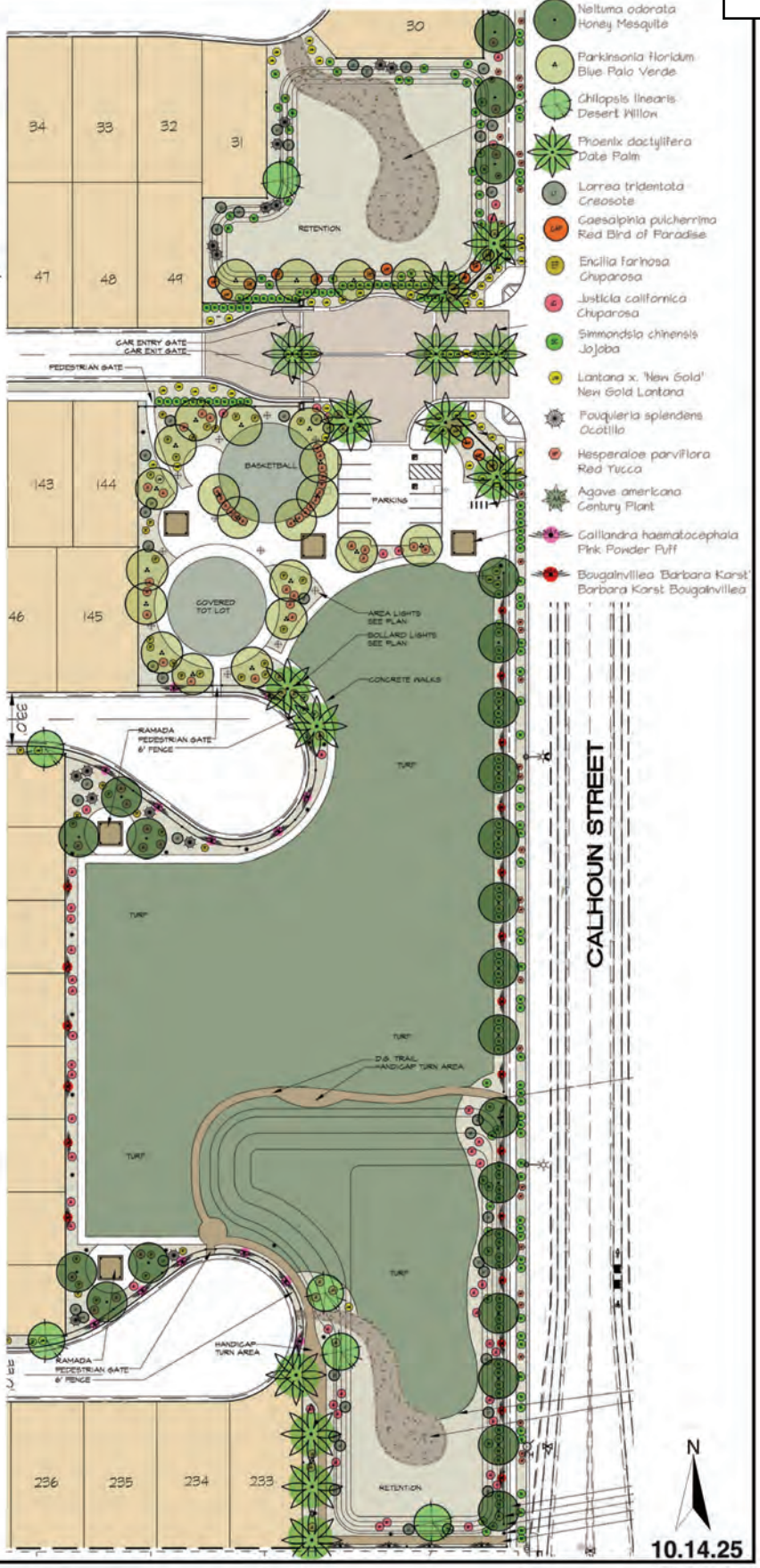
BIKE RACKS / MONMADE / A2 TRANSITION BIKE RACK



CONCRETE AREA AROUND TOT LOT AND RAMADAS
BROOM FINISH WITH ALTERNATING PANELS



HALF COURT BASKETBALL



10.14.25

Source: Russell MacDonald, RLA, 10.01.2025

Exhibit

5c

TERRA NOVA®
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Conceptual Landscape Plan - Park
Calhoun Street Housing Development
Coachella, California


HONEY MESQUITE


BLUE PALO VERDE


DESERT WILLOW


DATE PALM


CENTURY PLANT


PINK POWDER PUFF


BOUGAINVILLEA


CREOSOTE


RED BIRD OF PARADISE


BRITTLEBUSH

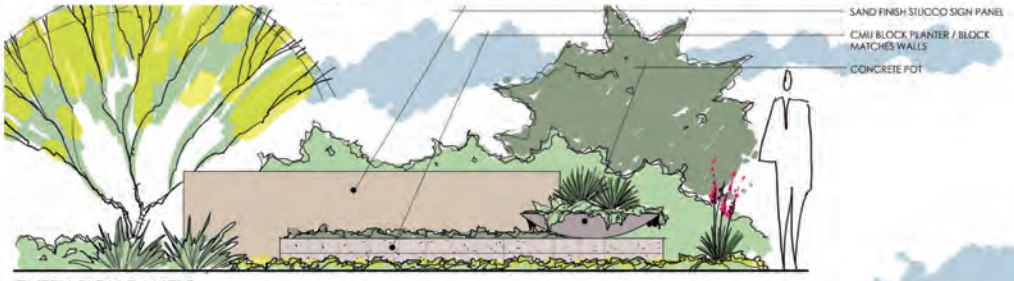

CHUPAROSA


JOJOBA


YELLOW LANTANA


OCOTILLO

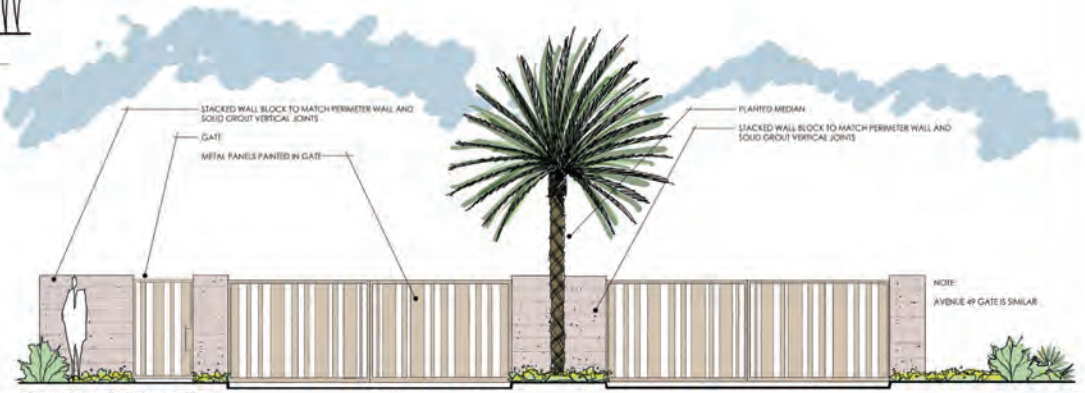

RED YUCCA



ENTRY SIGN PANELS


SW BOULDER / 'COPPER CANYON / 4"-8" and 1"-3"


SW BOULDER / 'CALIFORNIA GOLD' FINES PARK TRAIL TO HAVE SAME AND COMPACTED



CALHOUN ENTRY GATE

Source: Russell MacDonald, RLA, 10.01.2025

10.14.25

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Conceptual Landscape Plan - Plants & Conceptual Entry Design
Calhoun Street Housing Development
Coachella, California

Exhibit
5d

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/ Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology/ Water Quality	☐ Land Use/ Planning	☐ Mineral Resources
☐ Noise	☐ Population/ Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/ Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION

DETERMINATION: The City of Coachella Planning Department finds

On the basis of this initial evaluation: Adjust check box as appropriate

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the proposed project could have a significant effect on the environment there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Adrian Moreno

Adrian Moreno
Associate Planner
City of Coachella

11/12/25

Date

PURPOSE OF THIS INITIAL STUDY

This Initial Study has been prepared consistent with CEQA Guidelines Section 15063, to determine if the project, as proposed, may have a significant effect upon the environment. Based upon the findings contained within this report, the Initial Study will be used in support of the preparation of a Mitigated Negative Declaration.

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impacts to less than significance.

I. AESTHETICS Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓	

Environmental Setting

The City of Coachella lies in the low desert region of central Riverside County at the eastern end of the Coachella Valley. The City sits sixty-eight feet below sea level in a geographic feature known as the Salton Basin. Mountain ranges surrounding the Coachella Valley include the San Jacinto and Santa Rosa Mountains to the west and southwest with the highest peaks from 8,000 feet to over 10,800 feet; and the Little San Bernardino Mountains, including Joshua Tree National Park, along the northeast boundary with peaks ranging from 5,000 feet to over 11,000 feet. The Salton Sea, California's largest inland body of water, lies in the Salton Basin just south of the City. Major transportation corridors such as the I-10 freeway, State Highway 86S and Highway 111 connect the City of Coachella to nearby cities and communities. The City is undergoing a transition from a primarily agricultural-based economy to a medium-sized city that hosts an array of commercial and retail services, industrial activity, and residential neighborhoods all surrounded by productive agricultural lands.

The Project site is located in the City's General Plan Subarea 1, West Coachella Neighborhoods, which is a region of the City that has been transitioning from agricultural use to residential use. Residential subdivisions and vacant lots are interspersed with active agricultural parcels, as is the case immediately surrounding the Project site. To the north, west and south of the Project site are single-family neighborhoods. The new Dolfina residential project abutting the west side is located in the City of Indio, and is nearing the end of construction. Finally, on the east side of Calhoun Street

there is a vacant lot of a similar size to the Project site, which is also surrounded by single-family residential uses and a date palm grove.

The Project site had previously been the site of a date palm grove as evidenced by the remnant date palms remaining on the property along with scattered ruderal vegetation. The northeast corner has been and graded and cleared of all vegetation. Ultimately, build out of the project site will result in a single-family residential development consisting of 257 homes, common landscaped areas, and a 3.13-acre park. The Aesthetic impacts of the project are discussed in the following paragraphs.

Discussion of Impacts

a) Less Than Significant Impact. From the Project site, the lower foothills of the Santa Rosa Mountains to the southwest are approximately 5.5 miles away, and the lower foothills of the Little San Bernardino Mountains are about 9 miles to the northeast. Views of these mountain vistas are currently partially obstructed by existing development. From a distance, viewers on the site can see the middle and upper slopes of both ranges over the rooftops of the surrounding homes and nearby date palm groves, however, at close range, the homes and sound walls block these scenic vistas.

The General Neighborhood land use designation for the Project site allows for single- and two-story homes with heights not to exceed 17 and 35 feet respectively, as does the Suburban Neighborhood land use encircling the Project site. Three-story residential structures are permitted in Neighborhood Center land uses and cannot exceed 45 feet.[3] At buildout, the Project's footprint would align with neighboring residential standards in height, structure, and design. As described above, from a distance, the southwestward facing views of the Santa Rosa Mountains from north and east of the subject property would be partially impeded where viewers would retain sight of the middle to upper slopes, but the lower foothills would be obstructed. Similarly, northeast views of the lower foothills of the Little San Bernardino Mountains from south and west of the subject property would be obstructed, but viewers south of the Project site would still be able to see the upper slopes. Views directly to the south and to the east would not be affected, since the Project would be behind these viewsheds. The City's height restrictions for single-family homes would restrict the impacts to scenic vistas so that scenic vistas would not be completely blocked by viewers from a distance.

The Project's potential impacts to scenic vistas are in line with viewshed impediments from existing neighboring development. Scenic vistas of the Santa Rosa Mountains to the southwest and of the Little San Bernardino Mountains to the northeast would be partially obstructed by the Project, but not completely removed, therefore the impacts to scenic vistas would be less than significant.

b) No Impact. The proposed site is not located along a state scenic highway and does not contain any scenic resources, including trees, rock outcroppings or historic buildings. No impact to these resources will occur.

c) Less Than Significant Impact. The Project is planned within an area of the City that has been undergoing a transition from agricultural use to residential use, and the current Zoning designation for the Project parcel is General Neighborhood, while surrounding properties are designated as Suburban Neighborhood zoning. The future buildout, including 257 single-family

[3] Property and Development Standards, Coachella Municipal Code §17.13.030 and 17.14.030, June 26, 2024.

residences with landscaped drainage areas, and a 3.13-acre park are consistent with the City's zoning designations for this parcel and the surrounding parcels. Buildings, landscaping, pathways, streets, and sounding walls will align with City development standards, as modified by the PUD, that include appropriate setbacks, drought-tolerant landscaping, and elevated design elements which will assimilate with existing residential development.

Proposed street improvements for the quarter-mile extents along Calhoun Street and Avenue 49 will improve existing conditions, and add parkway landscaping to the viewshed

The Project would comply with the City's residential development standards and would not conflict with the scenic quality of nearby residential neighborhoods. Impacts to the visual character of the surrounding environment would be less than significant.

d) Less than Significant Impact. The gradual transition from agricultural use to residential use in this Subarea of the City has resulted in an overall increase in nighttime light from sources such as interior home lighting emitting from windows, exterior home security lighting, landscape lighting, automobile headlights, and street lighting.

Construction-Related Impacts
Construction activities would occur during the day and there would be no need to apply nighttime security lighting on the Project site. Construction activities would not introduce new sources of light or glare.

Operational-Related Impacts
While the subject property currently contains no light sources, the Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Daytime glare may also be expected from windows. However, the Project's sources of lighting and glare would be consistent with and not exceed light and glare emissions from existing nearby development. The Project would adhere to the City's lighting requirements and would not produce light and glare upward into the sky. Project impacts from additional sources of light and glare would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources: City of Coachella General Plan 2035 Update; Coachella Municipal Code, June 2024.

II. AGRICULTURAL AND FORESTRY RESOURCES				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				✓

Environmental Setting

Agriculture lies at the heart of Coachella's historic identity and will continue to be a contributor to the local economy far into the future. As the City grows, certain agricultural areas have been protected from future development while other areas have been converted to residential, commercial and industrial uses. Today, the protected agricultural designations, Agricultural Rancho and Rural Rancho, are found outside the City limits in the City's eastern sphere of influence. The Project site has been designated as a General Neighborhood land use and zone, and sits within the City's Subarea 1, West Coachella Neighborhoods, an area on the west side that has gradually been converted from agricultural use to residential use. Impacts to agricultural resources are discussed here.

Discussion of Impacts

a-e) No Impact.
Conversion of Farmland:
According to Google Earth Imagery, the subject property had been graded and unused between 1985 and 2002. By 2002, rows of date palms had been planted on 75% of the site, with the northeast corner remaining barren. By 2019, irrigation and cultivation of the palms appear to have ceased, leaving leftover palms dispersed across the parcel. This change of land use on the Project site is consistent with the City's economic expansion and the transition of certain agricultural lands to residential, commercial and industrial uses.

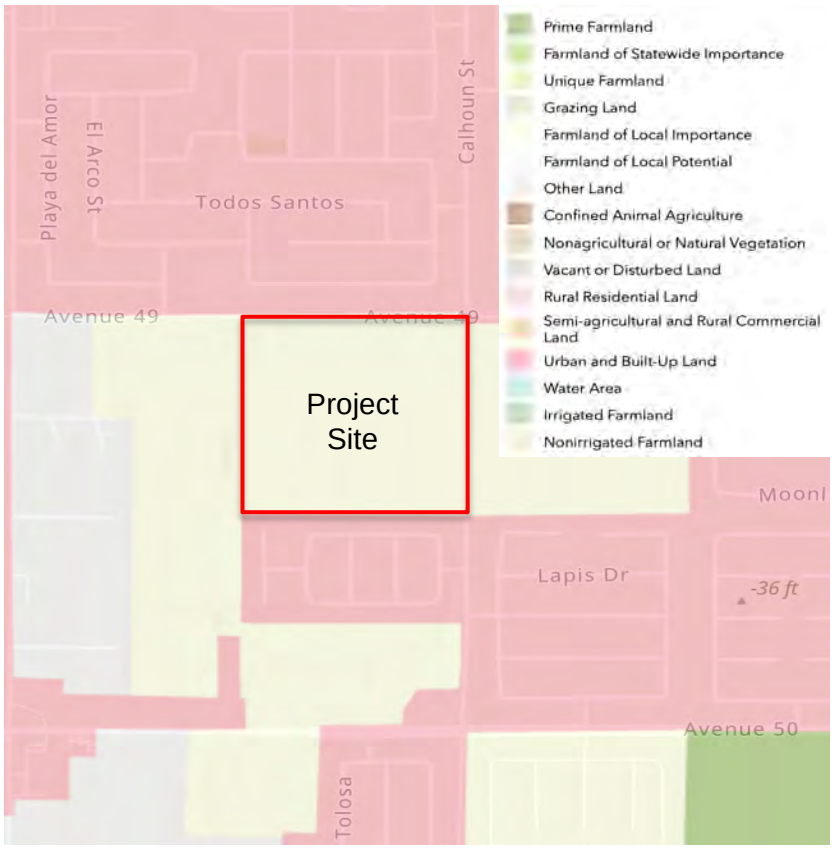


Figure II-1 California Important Farmland Finder, California Department of Conservation, accessed July 2024.

The California Important Farmland Finder identifies the Project site as Farmland of Local Importance, which the County of Riverside classifies as an area that would be Prime or Statewide Important Farmland, but lacks irrigation water, and also as an area that produces major crops, but not Unique crops. The vacant lots to west and east of the Project site are also classified as Farmland of Local Importance, and lands north and south of the subject site are classified as Urban and Built-Up Land. Figure II-1 shows the Project site on the California Important Farmland Finder in relation to adjacent properties. The Project would not impact the ability to cultivate crops on neighboring parcels, nor would the Project convert any Prime, Unique or Statewide Important farmland to non-agricultural use.

Williamson Act: As previously stated, the Project site is zoned for single-family residential development under the General Neighborhood zoning designation and is not under a Williamson Act contract. Therefore, the proposed development would not conflict with any agricultural designation. No impact is anticipated.

Timberland Production:
Neither the General Plan nor the Zoning map for the City of Coachella includes any Forestry or Forest Production designations. The City is located 68 feet below sea level in an arid desert region that does not support the growth of forests, and as such, there would be no conversion of timberland zones.

Loss of Forest:
Again, the City has no Forestry or Forest Production designations or areas. Therefore, the Project would not impact or cause the loss of any forest lands.

Other Changes in the Existing Environment:
Buildout of the Project includes 257 homes and street improvements to Avenue 49 on the north and Calhoun Street on the east which would not impact neighboring uses or cause any conversion of agricultural activity in the vicinity. No additional impacts to the existing environment would result to nearby agricultural uses.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan 2035 Update

City of Coachella Zoning Map

California Department of Conservation Farmland Mapping and Monitoring Program

III. AIR QUALITY				
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?				✓
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

Environmental Setting

The state of California is divided into fifteen air basins, each defined by local topography, climate, and regional air quality issues. The City of Coachella lies within the Coachella Valley Planning Area, which is an air quality management district (AQMD) subregion within the topographic boundary of the Salton Sea Air Basin (SSAB). The SSAB encompasses all Imperial County and the central portion of Riverside County, where the Coachella Valley and the City lie.



Source: South Coast Air Quality Management District, Draft Final 2022

In the State of California, there are 35 air quality regulatory agencies that establish emission thresholds and monitor air quality the air basins. The South Coast Air Quality Management District (SCAQMD) is the regulatory agency that controls and monitors emissions from stationary sources within most of Riverside County, portions of San Bernardino County and Los Angeles County, and all of Orange County. The SCAQMD monitors emissions via 37 permanent monitoring stations, conducts inspections, and drafts air quality management plans to guide governments and businesses in reducing emissions. The Coachella Valley Planning Area is subject to the 2022 SCAQMD Air Quality

Management Plan. Three local monitoring stations in Palm Springs, Indio, and Mecca provide daily and annual emissions data throughout the Coachella Valley.

Ambient air quality standards (AAQS) are a set of emissions thresholds that are designed to protect human health and environmental factors. An ambient air quality standard specifies the maximum amount of a pollutant that can be present in the air during a specific period of time and not cause harmful effects on the most sensitive members of the community and natural resources. If that pollutant's concentration in the air is at or below the threshold, then the area is said to be in attainment, while non-attainment areas experience pollution levels above the AAQS thresholds.

According to the Environmental Protection Agency, the Coachella Valley Planning Area is classified as a nonattainment zone for ozone (O_3) and particulate matter (PM_{10}). Ozone pollution in the Coachella Valley Planning Area can be traced primarily to the flow of photochemical smog contaminants from the South Coast Air Basin to the west. High levels of PM_{10} pollution result from the arid environment, the ubiquitous presence of sand and dust combined with agricultural activity which is concentrated in the southeastern end of the Coachella Valley where the City of Coachella resides. Due to the nonattainment status, the Coachella Valley Planning Area is subject to the 2003 Coachella Valley PM_{10} State Implementation Plan (CV PM_{10} SIP), in order to bring the Planning Area into compliance with the National Ambient Air Quality Standards (NAAQS) PM_{10} threshold.

Ambient air quality standards for the SCAQMD are subject to federal guidelines known as National Ambient Air Quality Standards (NAAQS), as well as state guidelines referred to as California Ambient Air Quality Standards (CAAQS). Each set of AAQS focuses on certain criteria pollutants which together include the following list of pollutants. Table III-1 explains properties of each criteria pollutant.

Table III-1
Ambient Air Quality Criteria Pollutants and Health Impacts

Criteria Pollutant	Emissions Sources	Health Effects
Oxides of Nitrogen (NO_x)	A yellow-brown colored gas that forms when nitric oxide, emitted primarily from burning of petroleum gas, combines with atmospheric oxygen.	- Lung damage - Breathing difficulties
Reactive/Volatile Organic Compounds (ROG/VOC)	Primary pollutants that form secondary pollutants such as Ozone, or photochemical smog, when they react with ultraviolet sunlight in the atmosphere.	- Eye, nose and throat irritation - Headaches - Dizziness, fatigue - Allergic skin reaction
Ozone (O_3)	A secondary pollutant resulting from hydrocarbons and oxides of nitrogen, emitted by cars, solvents, factories and pesticides, reacting in the presence of sunlight.	- Difficulty breathing, chest pains, aggravate lung diseases such as asthma, emphysema, and chronic bronchitis. - Shortness of breath, coughing, and lung damage with prolonged and chronic exposure.

Table III-1
Ambient Air Quality Criteria Pollutants and Health Impacts

Criteria Pollutant	Emissions Sources	Health Effects
Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)	Fugitive dust particles with a width of 10 microns down to 2.5 microns. Emitted from construction activity, vehicles driving on unpaved roads, industrial smokestacks, wildfires. Particles may occur as liquids or solids.	- Cause damage to the respiratory system. - Aggravate respiratory illnesses. - Symptoms: Coughing, asthma, heart attacks, premature death.
Oxides of Sulfur (SO_x)	Colorless and pungent gas emitted from coal and oil power plants, refineries, and diesel engines.	- Irritates eyes, nose, and airways. - Causes shortness of breath, tightness of chest. - Asthma patients are at high risk of developing more severe issues.
Carbon Monoxide (CO)	Colorless and odorless gas emitted from the incomplete combustion of all fossil fuels including oil, coal, and natural gas.	- Interrupts the delivery of oxygen to the brain. - Causes dizziness, headaches, and nausea.
Lead (Pb)	Emitted from metals processing facilities, combustion of leaded fuel, manufacturing of lead-acid batteries.	- Damages the nervous system, and kidneys. - Interferes with developmental and reproductive systems.
Hydrogen Sulfide (H_2S)	A rotten egg-smelling gas emitted from geothermal power plants, petroleum production, and sewage treatment plants.	- Causes headaches and skin irritation. - Damages the respiratory system.

Sources: South Coast AQMD CEQA Handbook (1993), updated March 2023; SCAQMD Final 2022 Air Quality Management Plan, Appendix 1: Health Effects (2022)

Table III-2 below provides the maximum daily emissions thresholds for a project's construction and operation per the SCAQMD CEQA Handbook.

Table III-2
South Coast AQMD Air Quality Significance Thresholds

Criteria Pollutant	Construction	Operation
Oxides of Nitrogen (NO_x)	100 lbs/day	55 lbs/day
Reactive/Volatile Organic Compounds (ROG/VOC)	75 lbs/day	55 lbs/day
Particulate Matter (PM_{10})	150 lbs/day	150 lbs/day
Fine Particulate Matter ($PM_{2.5}$)	55 lbs/day	55 lbs/day
Oxides of Sulfur (SO_x)	150 lbs/day	150 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Lead (Pb)	3 lbs/day	3 lbs/day

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023

Forecast modeling of construction and operational emissions for the Project was calculated using the California Emissions Estimator Model (CalEEMod) Version 2022.1, a modeling software application used in quantifying emissions associated with land development projects in California. The model calculates criteria pollutant emissions, including CO, PM_{10}, $PM_{2.5}$ and the ozone precursors ROG and $NO_{x,}$ in addition to greenhouse gas equivalent emissions.

A CalEEMod analysis was conducted in November 2025 and was based on the most recent Project site plan which included 257 units on a net area of 37.28 acres, a 3.53-acre park with retention basin, common landscaped areas, four additional landscaped retention basins, asphalt streets, and 2,517 daily trips. CalEEMod accounts for landscaping and driveway hardscape for residences. Table III-3 provides a summary of the Project's land use data that was applied to the model. The detailed CalEEMod report for the Project is available in Appendix A.

Table III-3
Project Land Use Assumptions for CalEEMod

Project Land Use	Area Data
Total Project Area	39.98 ac (gross) 37.28 ac (net), 1,623,916.8 sf
Residential Lots	257 lots, 976,050 sf
Landscaped Areas (Park + Retention Basins)	5.95 acres 259,182 sf
Hardscape (Streets + Parking Lot)	397,247 sf (390,048 sf + 7200 sf)
Daily Trips[1]	2,517

1. Daily Residential Trips are based on the ITE Land Use Code 223. See Calhoun Street Traffic Analysis prepared by Urban Crossroads, September 6, 2024.

Discussion of Impacts

a) No Impact. A project's impacts on air quality would be significant if the project does not conform to, or if it obstructs, an applicable Air Quality Management Plan. Within the Coachella Valley Planning Area, projects are subject to the 2022 SCAQMD Air Quality Management Plan (AQMP). SCAQMD works closely with local governments and actively cooperates with federal and state agencies to establish pollution emissions thresholds and guidelines for controlling emissions. The 2022 SCAQMD AQMP defines strategies to control and reduce air pollution emissions from stationary and mobile sources. The 2022 AQMD was prepared with cooperation between SCAQMD, the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG) and is based in part on regional land use planning, population growth forecasting, and transportation modeling. In conformance with SB 375, SCAG prepares a Regional Transportation Plan/Sustainable Communities Strategy every four years to analyze regional development patterns and integrate policies and programs to reduce emissions. The most current report, Connect SoCal 2024, includes the most recent regional land use planning and forecast analyses, and projects that are consistent with these analyses are also consistent with the AQMP.

The City's land use and zoning designation for the Project site is "General Neighborhood," which permits single- and multi-family residential projects with densities between 7 and 25 units per acre. Residential neighborhoods encourage small blocks, parks and green spaces, and walkability or short drives to area services such as schools and shopping. The proposed subdivision conforms to these

land use requirements and is consistent with the City's General Plan. Furthermore, the proposed uses have been factored into SCAG's Connect SoCal 2024 report and the 2022 AQMP.

In conclusion, although the Proposed Project would result in air emissions, as discussed below, it would not conflict with or obstruct the implementation of an applicable air quality plan because its residential characteristics were included in the development of regional plans. No conflicts with or obstructions to the implementation of the applicable air quality plan are expected.

b) Less Than Significant Impact. The Project will have a significant impact if it causes a considerable net increase of any criteria pollutant for which the Coachella Valley Planning Area is in nonattainment per federal or state ambient air quality standards.

Currently, the Coachella Valley is designated as extreme nonattainment for the 2008 and 8-hour ozone standard, severe for the 2015 8-hour ozone standard, and serious for the 1987 PM_{10} standard.[4] In response to these designations the SCAQMD adopted a series of attainment plans beginning in 1987. The most current attainment plans are:

- Coachella Valley Attainment Plan for the 2008 8-Hour Ozone Standard, October 2024
- 2003 Coachella Valley PM_{10} State Implementation Plan

Construction Emissions:

For purposes of analysis, it is assumed that construction will occur over a three-year period with completion in early 2029. The construction period includes all aspects of project development, including site preparation, grading, building construction, paving, and application of architectural coatings. Applicable standard requirements and best management practices include, but are not limited to, the implementation of a dust control and management plan in conformance with SCQAMD Rule 403.1, proper maintenance and limited idling of heavy equipment, phased application of architectural coatings and the use of low-polluting architectural paint and coatings per SCAQMD Rule 1113.

As shown in Table III-4, given that criteria pollutant thresholds will not be exceeded, and standard best management practices will be applied during construction, impacts associated with air emissions during construction will be less than significant.

Table III-4
Maximum Daily Construction-Related Emissions (pounds per day)

Construction Emissions	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Daily Maximum[1]	71.4	29.3	29.7	0.07	9.15	5.14
SCAQMD Thresholds	75	100	550	150	150	55
Exceeds?	No	No	No	No	No	No

1. Standard dust control measures have been applied to the PM emissions.
2. All other emissions are maximum daily unmitigated estimates.

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023.

[4] EPA Greenbook, California Nonattainment/Maintenance Status for Each County by Year, April 2025.

Operational Emissions:

Operational emissions are ongoing emissions that will occur over the life of the project. They include area source emissions, emissions from energy demand (electricity), and mobile source (vehicle) emissions. According to the September 2024 Traffic Analysis prepared for the Project (Appendix F), typical single-family detached units generate an average of 9.43 trips per day. The Traffic Analysis analyzed the potential for 259 units, marginally higher than the currently proposed Project, and determined that they would generate 2,442 daily trips. The public park could potentially generate up to 75 trips per day. Total daily trips would be 2,517. Table III-5 provides a summary of forecasted emissions during the operation of the Calhoun Street Housing Development. As shown below, operational emissions will not exceed daily SCAQMD thresholds of significance for any criteria pollutants for operations. Impacts related to operational emissions are expected to be less than significant.

Table III-5
Maximum Daily Operational-Related Emissions (pounds per day)

Operational Emissions	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Daily Maximum[1]	32.4	4.7	67.0	0.1	10.1	2.7
SCAQMD Thresholds	75	100	550	150	150	55
Exceeds?	No	No	No	No	No	No

1. Standard dust control measures have been applied to the PM emissions.
2. All other emissions are maximum daily unmitigated estimates.

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023.

Cumulative Contribution: Non-Attainment Criteria Pollutants

If a project indirectly ushers in additional criteria pollution emissions by encouraging an increase in the number of vehicles traveling along a new roadway, for example, and thus causes a cumulative net increase in emissions, then the project may cause a significant cumulative impact. Given the dispersing nature of pollutant emissions and aggregate impacts from nearby jurisdictions, cumulative air quality is evaluated on a regional scale. As previously mentioned, the Coachella Valley Planning Area is a nonattainment zone for PM_{10} and ozone. Any development resulting in emissions of PM_{10}, ozone, or ozone precursors will, to some extent, contribute to the existing regional non-attainment.

The SCAQMD does not currently provide thresholds of significance for the cumulative emissions of multiple projects. A project's potential cumulative contributions can instead be analyzed using the criteria for project-specific impacts. Assuming an individual development generates less than significant construction and operational emissions, then the project would not generate a cumulatively considerable increase in non-attainment criteria pollutants and its impacts would be considered to be less than significant. As shown in Tables III-4 and III-5, emissions resulting from the proposed Project's construction and operational phases are expected to be below the thresholds of what SCAQMD considers to be cumulatively considerable.

Mandatory standard best practices will be applied during construction, including dust control measures in accordance with SCAQMD Rule 403, as well as the use of low VOC content in architectural coatings per SCAQMD Rule 1113. California Building Code requirements for energy efficiency, and improving technology for automobiles will also reduce air emissions in the future.

Therefore, while the Project will contribute to incremental increases in emissions, the impacts on regional PM_{10} and ozone levels are not anticipated to be cumulatively considerable.

Summary:
As shown above, both construction and operation of the proposed Project will result in criteria emissions that are below the SCAQMD significance thresholds, and neither would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Overall, impacts related to construction and operation will be less than significant and are not cumulatively considerable from a non- attainment standpoint.

c) Less Than Significant Impact. A Project will have a significant impact if it exposes sensitive receptors to substantial pollutant concentrations. Sensitive receptors are defined as members of the population who are potentially more sensitive to air pollutants due to age and health condition. Sensitive receptors include schools, playgrounds, childcare centers, retirement homes, hospitals and residences. SCAQMD provides a Localized Significance Thresholds (LST) analysis to determine whether a project will pose significant air quality impacts on nearby sensitive receptors. LST thresholds are provided for distances of 25, 50, 100, 200 and 500 meters between a project site and a sensitive receptor. Per the SCAQMD, LST analysis is designed for projects up to five acres in size or projects that involve up to five acres of daily disturbance during construction. While the proposed the Project contains 39.98 acres, fewer than five acres would be disturbed on any given day during construction.[5]

The nearest receptors include two adjacent residential neighborhoods; one occurs on the east side of the Project site, and the other slightly closer receptor, is approximately 12 meters from the south perimeter. Based on the Project's size and proximity to the nearest sensitive receptor, the 5-acre site tables at a 25-meter distance (nearest measurement option in LST table) were used for air quality analysis. Table III-6 shows on-site emission concentrations for Project construction will not exceed LST thresholds for carbon monoxide, nitrogen oxides, and particulate matter. Overall, the impacts will be less than significant.

[5] South Coast AQMD, "Fact Sheet for Applying the CalEEMod to Localized Significance Thresholds," https://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf, accessed April 4, 2025.

Table III-6
Localized Significance Thresholds Emissions (pounds per day)

Pollutant	CO	NOx	PM_{10}	$PM_{2.5}$
Construction				
Maximum Emissions	**29.7**	**29.3**	**9.15**	**5.14**
SCAQMD LST Threshold	2,292.00	304.00	14.00	8.00
Exceed?	**No**	**No**	**No**	**No**
Operation[1]				
Maximum Emissions	**14.5**	**0.136**	**0.0067**	**0.0051**
SCAQMD LST Threshold	2,292.00	304.00	4.00	2.00
Exceed?	**No**	**No**	**No**	**No**

Source: CalEEMod model, version 2022.1
LST Threshold Source: LST Mass Rate Look-up Table, SCAQMD.
1. Operational emissions that affect sensitive receptors are limited to on-site area emissions. Energy and mobile emissions occur off-site and are excluded from the total.

Health Impacts

The SCAQMD is the local implementing and enforcing agency for the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (commonly known as AB 2588), which established a statewide program for the inventory of air toxic emissions from specifically identified individual facilities as well as requirements for risk assessment and public notification of potential health risks. The SCAQMD requires the preparation of an operational HRA for “facilities” associated with high levels of toxic air contaminants. The eight categories of identified sources of TACs include high-traffic freeways and roads, distribution centers, rail yards, ports, refineries, chrome plating facilities, perchloroethylene dry cleaners, and large gas stations. The Project neither proposes the development of any such facilities, nor is it situated in proximity to any such facility.

As shown in Tables III-4 and III-5, construction and operation of the Proposed Project will result in criteria emissions that are below the SCAQMD significance thresholds, and would neither violate any air quality standard nor contribute substantially to an existing or projected air quality violation. In addition, localized emissions will be less than significant.

With today’s technology, it is not scientifically possible to calculate the degree to which exposure to various levels of criteria pollutant emissions will impact an individual’s health. There are several factors that make predicting a Project-specific numerical impact difficult:

- Not all individuals will be affected equally due to medical history. Some may have medical pre-dispositions and diet and exercise levels tend to vary across a population.
- Due to the dispersing nature of pollutants, it is difficult to locate and identify which group of individuals will be impacted, either directly or indirectly.
- There are currently no approved methodologies or studies to base assumptions on, such as baseline health levels or emission level-to-health risk ratios.

Due to the limitations described above, the extent to which the Project poses a health risk is uncertain but unavoidable. It is anticipated that impacts associated with carbon monoxide, nitrogen oxides and particulate matter will be less than significant overall, and that health effects will also be less than significant.

d) Less Than Significant Impact. If the Project results in the emissions of objectionable odors that adversely affect a substantial number of people, then the Project would have a significant impact. Land uses which are likely to generate odors, other than agricultural operations, which are exempted, include chemical plants, composting operations, dairies, fiberglass molding, landfills, refineries, rail yards, and wastewater treatment plants.[6]

Short term odors associated with paving and construction activities could be generated by the Project's construction; however, any such odors would be quickly dispersed below detectable levels as distance from the construction site increases, and would occur for short time periods during the construction phase only.

At buildout, the residential units and park will generate typical odors, including cooking odors, but will not generate objectionable odors. Therefore, impacts from objectionable odors are expected to be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

CalEEMod Version 2022.1

City of Coachella General Plan Update 2035, April 2015

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024

EPA Greenbook

South Coast AQMD, "Fact Sheet for Applying the CalEEMod to Localized Significance Thresholds"

South Coast AQMD Air Quality Significance Thresholds, revised March 2023

[6] SCAQMD Guidance Document, Chapter 2: Air Quality Issues Regarding Land Use.

IV. BIOLOGICAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?				✓
c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			✓	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?			✓	

Environmental Setting

The Coachella Valley occurs within the Colorado Desert, a warmer and drier ecological subregion of the larger Sonoran Desert ecoregion. The Colorado Desert subregion is bounded by the Colorado River to the east, the Mojave Desert ecoregion to the north, and the Little San Bernardino, San Jacinto, and Santa Rosa Mountain ranges to the west. The majority of the Colorado Desert sits between -275 feet and 3,000 feet in elevation, while the highest elevations are found at the top of Mt. San Jacinto (10,835 feet) and Mt. San Gorgonio (11,499 feet). The City of Coachella is situated in the lower elevation range of the Valley at approximately -68 feet. Average daytime temperatures in

the Project area range from 107 degrees Fahrenheit in the summer down to 71 degrees in January and average annual rainfall is two inches. The environmental extremes have led to the evolution of highly specialized desert species, some of which are endemic to the region. Development throughout the Coachella Valley is guided by regulations meant to protect remaining habitats for diminishing and endangered biological resources.

Coachella Valley Multiple Species Habitat Conservation Plan

The City of Coachella and the Project site are located within the boundaries of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), a regional plan that allows for economic development in a manner that also preserves twenty-seven different natural communities and protects twenty-seven endangered native species across 1.2 million acres of Riverside County. The CVMSHCP establishes specific conservation areas where habitat, ecological processes, and/or wildlife corridors are protected from development activity. The Project site is 3.5 miles from the East Indio Hills Conservation Area, and the Santa Rosa and San Jacinto Mountains Conservation Area is 4.6 miles southwest.

The following discussion of impacts is based on the March 2024 Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report by WSP USA Environment and Infrastructure, Inc. (referred to as "Report") for the Project site.[7] Biologists conducted an exhaustive literature review to ascertain special status species that are known to occur within a five-mile radius of the Project site. A field assessment of the Project site and the Project vicinity, a 500-foot radius around the site, was conducted on foot on February 29, 2024. All site conditions including weather, topography and soil, signs of animal activity, and resident plant species were recorded. A full copy of the Report is available in Appendix B.

Discussion of Impacts

a) Less Than Significant Impact With Mitigation Incorporated. Beginning approximately in 1932, the Project site hosted a date palm grove, which was replaced by different row crops in the early 1950s. Subsequently, date palms were again planted on the site by 1959 and again removed between 1984 and 1996. The site remained fallow until just prior to 2002 when date palms were replanted, but the northeast corner remained fallow. A small irrigation reservoir was installed at the northwest corner. The General Plan land use had changed to General Neighborhood and the date palm garden was once again abandoned by 2019.

Rows of leftover untended palms remain on the south and western portion of the site along with underground piping, and the northeast corner, which was never planted, remains graded, scraped and completely barren. Sparse perennial vegetation has colonized intermittently throughout 75% of the parcel, particularly under the remnant palms and in the northwest corner where the irrigation pond was located. Trash from minor dumping and off-road vehicle tracks are visible. Residential neighborhoods north and south of the Project site are separated by walls. West of the site is a vacant lot that may soon be developed as a residential area, and east, across Calhoun Street, there is a vacant lot with one single-family residence.

[7] "Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report for Calhoun Street and Avenue 49 Residential Development Project," WSP USA Environment & Infrastructure, Inc., March 19, 2024.

Plants Observed

The subject site was inspected for plant communities and species. Native perennial vegetation observed on the site includes quailbush (*Atriplex lentiformis*), arrow-weed (Pluchea sericea), common sunflower (*Helianthus annuus*) and blue palo verde (*Parkinsonia florida*). Non-native and invasive species mixed in with the native vegetation that were noted include puncture vine (*Tribulus terrestris*), amaranth (*Amaranthus sp.*), cheeseweed (Malva parviflora), Sahara mustard (*Brassica tournefortii*), Mexican palo verde (*Parkinsonia aculeata*), saltcedar (*Tamarisk ramosissima*), and Bermuda gras (*Cynodon dactylon*). The presence of the above listed species does not represent a special-status vegetation community. Moreover, the Project site contains no natural wetlands, or riparian vegetation communities.

Vertebrates Observed

Wildlife and signs of wildlife (such as tracks, scats, feathers, burrows, owl pellets) observed on the Project site during the site survey included 14 birds, two mammals, and one reptile. None of species observed are considered to be special status species and all commonly occur in the region as either residents or migrants. Several of the representative bird species observed were mourning dove (*Zenaida macroura*), Eurasian collard dove (*Streptopelia decaocto*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*), and white-crowned sparrow (*Zonotrichia leuscophrys*).

Mammal species noted were Botta's pocket gopher (*Thomomys bottae*) and California ground squirrel (*Otospermophilus beecheyi*). The one reptile species recorded was the side-blotched lizard (*Uta stansburiana*).

Special Status Species

The literature review of the Project vicinity, which includes the Project site and a five-mile radius, generated a list of 68 special status species that have the potential to occur in the vicinity. Twenty of these 68 special status species have the potential to occur on the Project site, many of which would occur during foraging and therefore would not be directly impacted by the Project. See Table IV-1 for summaries of these 20 species, and see the Report in Appendix B for the full list.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Abrams' Spurge (*Euphorbia abramsiana*)	• **Very Low:** Remnant marginally suitable habitat is very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present. Site just below/at edge of elevational range of species. • Not covered by MSHCP.
• Cooper's Hawk (Accipiter cooperii)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging:** Occurs and was observed. • Not covered by MSHCP.
• Golden Eagle (Aquila chrysaetos)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** Marginally suitable habitat present. • Not covered by MSHCP.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Burrowing Owl (Athene cunicularia)	• **Nesting: Low.** Marginally suitable habitat intermittently present. Suitable California Ground Squirrel burrow detected. • **Foraging: Low.** If present onsite or on other suitable lands to the east of the subject site. • Fully covered by CVMSHCP
• Ferruginous Hawk (Buteo regalis)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** During winter migration only. • Not covered by MSHCP.
• Costa's Hummingbird (Calypte costae)	• **Nesting: Moderate.** Suitable nesting habitat present (palo verde). • **Foraging: Occurs.** Observed. • Not covered by MSHCP.
• Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very low.** Occurs in many habitats during migration. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Prairie Falcon (Falco mexicanus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Moderate.** May nest or winter nearby and forage over site.
• Loggerhead shrike (*Lanius ludovicianus*)	• **Nesting: Very Low.** Suitable nesting habitat very limited. • **Foraging: Moderate.** May nest or winter nearby and forage onsite. • Not covered by CVMSHCP
• Black-tailed Gnatcatcher (Polioptila melanura)	• **Nesting: Moderate.** Suitable nesting habitat present (palo verde). • **Foraging: Low.** May forage or move through site from nearby areas. • Not covered by CVMSHCP
• Vermilion Flycather (Pyrocepalus rubinus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** If nesting nearby. • Not covered by CVMSHCP
• Crissal Thrasher (Toxostoma crissale)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very Low.** If nesting nearby. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Le Conte's Thrasher (Toxostoma lecontei)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very Low.** If nesting nearby, but suitable habitat not observed on adjacent lands. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Least Bell's Vireo (Vireo bellii pusillus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** Migration only. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Western Mastiff Bat (Eumops perotis californicus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Fully covered by CVMSHCP.
• Western Yellow Bat (Lasiurus xanthinus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Fully covered by CVMSHCP.
• Pocketed Free-tailed Bat (Nyctinomops femorosaccus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Not covered by CVMSHCP.
• Palm Springs pocket mouse (*Perognathus longimembris bangsii*)	• **Very low:** Only small, remnant patches of marginal potentially suitable habitat present. Site disturbance and past agricultural practices further reduce the likelihood of occurrence. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Coachella Valley round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*)	• **Very low**: Preferred habitat lacking. Species has beenknown to occur in disturbed and converted habitats. • Fully covered by CVMSHCP
• American Badger (Taxidea taxus)	• **Very Low**: Although disturbed, site potentially suitable. No burrows or signs observed. • Not covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.

The Report determined that due to the grading and cultivation of date palms in the past, and the more recent off-road vehicular activity and dumping of trash, the Project site has been greatly altered from its natural state, and thus the probability for special status species to occur on the site is significantly reduced. Further reducing the likelihood that special status species may reside there are the neighboring residential developments to the north and south, and the grading of the vacant lots to the east and west.

Existing vegetative scrub and date palms found on the Project site could potentially be used by both resident and migratory nesting birds, many of which are not special status species, but all are protected under the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code (FGC). The MBTA prohibits the taking of migratory birds which includes killing, capturing, selling, trading, and transport. "Under the MBTA, it is illegal to destroy a nest that has eggs or chicks in it, or if there are young birds still dependent on the nest for survival.[8] Similarly, California Fish and Game Code section 3503 stipulates that, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Section 3503.5 states, "It is unlawful to take, possess, or destroy any birds in the orders Falconiformes

[8] Bird Nests, US Fish and Wildlife Service, accessed July 2024, https://www.fws.gov/story/bird-nests#:~:text=This%20law%20says%3A%20"No%20person,has%20eggs%20or%20chicks%20in.

or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."[9] Since nesting habitat occurs on the Project site, impacts to nesting birds would be significant. To avoid potentially significant impacts to nesting birds, a nesting bird survey is required, and explained below in BIO-1.

Western burrowing owls are protected under the MBTA and by the US Fish and Wildlife Service as a Bird of Conservation Concern (BCC). Additionally, as of October 10, 2024, the California Fish and Game Commission designated the western burrowing owl as a candidate species for listing. While the candidacy is under review by the CDFW, the species receives full California Endangered Species Act (CESA) protections which prohibit the "taking" of individuals. Although the species is covered by the CVMSHCP, taking of this species is not permitted. No burrowing owls, or signs of burrowing owls were observed during the site survey, however, suitable habitat and burrows suitable for burrowing owls were observed on the Project site. Burrowing owls could potentially relocate to the Project site between the time of the site survey and the start of construction due to their attraction to open dry areas and agricultural sites. As the species roosts and nests underground, burrowing owls are particularly sensitive to ground disturbance, therefore the Project presents a potentially significant impact to the species, which would require mitigation as described below in BIO-2.

With implementation of mitigation measures BIO-1 and BIO-2 to protect potentially occurring nesting birds and burrowing owls, impacts to potentially occurring candidate, sensitive, or special status species would be reduced to less than significant levels.

b, c) No Impact. The Project site has been graded and cultivated with date palms for 20+ year followed by approximately five years of fallowing. There are no riparian habitats, wetlands, marshes, vernal pools, or other sensitive communities that are protected by US Fish and Wildlife Service or the California Department of Fish and Wildlife occurring on the Project site. There would be no impacts to any such natural community by this Project.

d) Less Than Significant Impact With Mitigation Incorporated. The Project site is in a residential suburban area isolated from other undeveloped natural areas by residential development to the north and south, the graded, vacant lots to the east and west, and Calhoun Street forming the east boundary. The leftover date palms and intermittent ruderal vegetation may provide nesting habitat for birds moving through the area. Take avoidance surveys, explained below as BIO-1 and BIO-2, would be required to reduce potential impacts to nesting birds and burrowing owls to less than significant levels.

e, f) Less Than Significant Impact. The Project would not conflict with any with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Likewise, the Project would not conflict with an adopted habitat conservation plan, natural community conservation plan, or any other approved local, regional, or state habitat conservation plan.

The City of Coachella is a signatory to the CVMSHCP and therefore the Project is required to pay a Development Mitigation Fee, which would reduce potential Project impacts to CVMSHCP-covered species. Neither CVMSHCP modeled habitats for covered species, nor designated wildlife corridors or biological linkages occur on the Project site. Two CVMSHCP Conservation Areas occur near the City, but not adjacent to the Project site. The East Indio Hills Conservation Area is approximately 3.5

[9] California Code, Fish and Game Code 3503 and 3503.5, last updated January 1, 2023.

miles east of the site, and the Santa Rosa and San Jacinto Mountains Conservation Area is 4.6 miles southwest. Aside from the Development Mitigation Fee, no additional mitigation measures are required to comply with the CVMSHCP. With the implementation of the City's fee payment requirement, potential impacts would be less than significant.

Mitigation Measures:

BIO-1 Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.

BIO-2 To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.

Mitigation Monitoring:

BIO-A The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.

Responsible Parties: Project applicant, Project biologist, Planning Department, City Engineer

Sources:

"Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report for Calhoun Street and Avenue 49 Residential Development Project," WSP USA Environment & Infrastructure, Inc., March 19, 2024

Bird Nests, US Fish and Wildlife Service, accessed July 2024

California Code, Fish and Game Code 3503 and 3503.5, last updated January 1, 2023

V. CULTURAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?		✓		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?		✓		
c) Disturb any human remains, including those interred outside of formal cemeteries?				✓

Environmental Setting

Under CEQA, the term, "cultural resources," encompasses a broad range of artifacts spanning prehistoric and historic eras that are comprised of traces or remains of humans and human cultures who lived in California. Sites may contain archaeological artifacts, belonging to indigenous and non-indigenous cultures. Archaeological resources may include items such as tools, carvings, structures, and sites, that are associated with a scientifically recognized important prehistoric or historic event or culture and that contain important scientific research value. Cultural resources also include "historic" resources, which are associated with the more recent built environment such as old houses, structures, roads, walls, etc. In addition, cultural resources include traditional cultural places, objects, records and manuscripts. "Tribal resources" refer to a specific class of cultural resources that are significant to California Native American Tribes. These resources are discussed further in Section XVIII, Tribal Cultural Resources.[10]

Per CEQA, cultural resources that are significant are then labeled as "historical" resources and warrant a certain level of protection from a project's impacts. An historical resource may be prehistoric or historic in age and may be archaeological and/or significant to a California Native American Tribe. The lead agency may consider resources to be historically significant if they meet criteria for listing in the California Register of Historical Resources, which contains all resources listed in the National Register of Historic Resources. Section 15064.5 of the CEQA Guidelines defines a historical resource as the following[11]:

1) A resource that is listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources is historically significant.

2) A resource is considered to be historically significant if is included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code.

[10] "Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources," Society for California Archaeology, April 2020.

[11] "Determining the Significance of Impacts to Archaeological and Historical Resources," California Code of Regulations, Title 14 §15064.5

3) Any object, building, structure, site, place, record, or manuscript which a lead agency determines to be historically significant in the architectural engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be a significant historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

4) Finally, a lead agency may determine that a resource is historically significant even if it has not been previously listed in or determined to eligible for listing in the California Register of Historical Resources and is not already included in a local register of historical resources, or previously identified in a historical resources survey.

The following discussion of Project area and impacts is based on the "Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared in May 2024 by CRM TECH (referred to as "Report"). Appendix C contains a complete copy of the Report. Researchers conducted an historical and archaeological records search, historical background research, an intensive site survey, and contacted local Native American representatives.

Records Search

A records search at the Eastern Information Center (EIC) at the University of California, Riverside for previously documented resources was conducted on February 26, 2024 by a CRM TECH archaeologist. The records search found that that no cultural resources had been discovered or recorded on and adjacent to Project site. However, within a one-mile radius of the Project site, 59 previous studies on tracts of lands were completed between 1980 and 2020. These studies noted 42 historical/archaeological resources, 21 of which were prehistoric and of Native American origin. None of these previously recorded resources were found on or adjacent to the Project site and therefore are not pertinent to this discussion.

Native American Consultation

The Native American Heritage Commission (NAHC) stated on March 11, 2024 that the results of the Sacred Lands File search found no Native American resources at the Project site, but noted that the absence of data does not preclude the presence of artifacts on the site that have yet to be discovered.

Project archaeologists contacted representatives of the Torres Martinez Desert Cahuilla Indians and the Cabazon Band of Mission Indians. The Cabazon Band has not responded to the consultation request. Gary Wayne Resvaloso, Jr. of the Torres Martinez Desert Cahuilla Indians requested additional archaeological field work on the Project site with Torres Martinez participation due to the possibility that buried cultural remains may occur beneath the surface of the Project site. A copy of the letter is provided in Appendix 2 of the Report.

Field Survey

Project archaeologists in tandem with a Native American monitor from the Torres Martinez Desert Cahuilla Indian tribe conducted an intensive-level field survey of the Project site. The team walked parallel northeast-southwest transects spaced 50 feet apart to complete a visual inspection of the Project site surface. No historical resources of prehistoric or historic eras were identified during the site survey. Past repeated excavation of the soil and cultivation of date palms and other row crops indicated that the Project site has been extensively disturbed.

Prehistoric Setting

The City and the surrounding Coachella Valley are the central home of the Desert Cahuilla People. The Cahuilla People have inhabited the Coachella Valley and surrounding mountains for thousands of years. Earliest evidence of prehistoric human activities dates from the Paleoindian Era (10,000 to 8,000 years ago) and consists of "very simple stone tools, 'cleared circles, rock rings, [and] some geoglyph types.'" The Early Archaic Period (8,000 to 4,000 years ago), and Late Archaic Period (4,000 to 1.500 years ago) are identified by "groundstone artifacts." The Late Prehistoric Era (1,500 to 250 years ago) provides the most materials from early human civilization. Ceramics are frequently recorded from this era.

Cahuilla life in the Coachella Valley during the Holocene Epoch, a geologic timeframe beginning at the end of the last ice age about 11,700 years ago, was influenced by the intermittent presence of Ancient Lake Cahuilla, followed by its desiccation and absence. The lake filled in the Salton Basin, the southeast end of the Coachella Valley and the Imperial Valley, when the Colorado River would temporarily turn from its usual course to the Gulf of California north toward the Salton Basin. Lakeshore mineral deposits along the lower Santa Rosa foothills up to 42 feet above sea level suggest that the Project site would have been underwater during these periodic Colorado River inundations, but may also have aligned with the receding shoreline. Artifacts from Cahuilla presence around the ancient lakeshore include "brown and buff ware ceramics, groundstone and projectile point types, ornaments, and cremation remains."[12]

Ethnohistoric Setting

Traditional Cahuilla territory shares a border with that of the Serrano in present-day Joshua Tree National Park to the north, stretches from the Colorado River to the east over to the San Jacinto Mountains and the San Gorgonio Pass to the west and includes the Santa Rosa Mountains to the south. Three distinct areas – the low desert of the Coachella Valley, the higher desert of the San Gorgonio Pass area, and the higher elevation mountains – separated the Cahuilla nation into three geographically distinct groups: Desert Cahuilla, Western (or, Pass), and Mountain Cahuilla. While actual population data is difficult to establish, the Cahuilla may have numbered between 3,600 to 10,000 living in many villages throughout the Coachella Valley, Pass area, and the mountain ranges. Today, nine bands of Cahuilla are officially recognized across these three groups.

Cahuilla family groups associated with one of two moieties, the Tuktum (Wildcat) or the Istam (Coyote), and were organized along patrilineal lines. Cahuilla are a Takic-speaking people who traditionally relied on hunting and gathering. Local wildlife and plants provided food, medicine, and materials needed for clothing, cooking, shelter, and hunting. Acorns, mesquite beans, cacti, pinyon nuts, yucca, agave, and fan palms were commonly used.

The Spanish Mission System began in California in 1776, however, due to the remoteness of their territories in the mountains and deserts, many of the Cahuilla remained out of reach of the Mission System until 1819 when an outpost, or Asistencia, of the San Gabriel Mission was built in the Redlands area. Thus began the forced transition of many Cahuilla from their traditional homelands and lifestyles to Spanish Mission lifestyle and labor. The late 1800s saw the arrival of the railroad and non-Native agriculturalists who were given traditional Cahuilla lands by the federal government to convert into farmland.

[12] "Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," CRM TECH, May 2024.

Historic Setting

The earliest European explorers arrived to the Coachella Valley in 1823 seeking a route to Yuma, Arizona. The hot and arid desert climate precluded most non-Native people from exploring the low desert until more established trails, and eventually the Southern Pacific Railroad (1876), were established. During the 1870s, the railroads brought farmers and other land prospectors to the West to claim land under the Homestead Act of 1862 and the Desert Land Act of 1877. The availability of land and the presence of plentiful groundwater launched agriculture as the dominant economic engine of eastern Riverside County and Imperial County.

Discussion of Impacts

a, b) Less Than Significant Impact with Mitigation Incorporated. During the most recent inundation of Ancient Lake Cahuilla in the 1730s, when the high stand of the shoreline is documented as being 42 feet above sea level, the Project site would have been under water for a time, but eventually would have been exposed and become part of the shoreline as the lake dried. In this region, many recorded Native American resources are associated with the receding Ancient Lake Cahuilla lakeshore.

At the beginning of the 20th century, a north-south road connecting Indio to the village of Toro, currently part of the Torres Martinez Reservation, ran through the middle of the Project site. By 1932, the road disappeared, and a date palm garden covered the Project site, and by the 1950s, the date palms had been replaced by other row crops. Between 1953 and 1959, date palms were again planted on the site only to be again removed between 1984 and 1996. The site remained fallow until before 2002, when date palms were replanted, but the northeast corner remained fallow. A small irrigation reservoir was installed at the northwest corner. The date palm garden was once again abandoned by 2019.

The above-described results of the Historical/Archaeological Resources Report state the records search, the historical background research and the field survey found that neither historical nor archaeological resources of any type were previously recorded or recently identified on the Project site. The surface of the site has been extensively graded and cultivated since the 1930s which indicates that there is a low probability of discovering cultural resources on the surface. However, the subsurface has not been researched for historical and archaeological cultural resources. CRM Tech recommended that an archaeologist monitor grading and excavation activities to assure that subsurface resources would not be impacted. In addition, as described in Section XVIII, the Torres Martinez requested the presence of a Tribal monitor. As a result, CUL-1 Mitigation Measure as described below will be implemented.

The implementation of this mitigation measure would ensure that potentially significant impacts to buried historical and archaeological resources would be reduced to less than significant levels. Please also see Section XVIII, Tribal Cultural Resources for further discussion of Tribal concerns.

c) No Impact. No human remains or cemeteries were identified as occurring on the Project site. The grading and agricultural activities since the 1930s reduce the likelihood of discovering human remains at this location. Should any human remains be found during the construction phase, California Health and Safety Code § 7050.5 requires that all excavation activity must stop, and the County Coroner must inspect the site. If the remains are identified as those of a Native American individual by the Coroner, the NAHC is informed and required to contact the Most Likely Descendant.

The descendant will recommend the appropriate next step. This state law requirement would ensure that the Project would not impact any human remains.

Mitigation Measures:

CUL-1 Tribal Resource Discovery and Documentation

A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property.

The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required.

If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.

Monitoring:

CUL-A The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project archaeologist shall provide the City with a report of monitoring activities.
Responsible Parties: Project Archaeologist, City Planning Department, City Engineer.

Sources:

"Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared by CRM TECH, May 21, 2024.

"Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources," Society for California Archaeology, April 2020.

"Determining the Significance of Impacts to Archaeological and Historical Resources," California Code of Regulations, Title 14 §15064.5.

"The Cahuilla People," Augustine Band of Cahuilla Indians, 2018, accessed March 28, 2024.

VI. ENERGY Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			✓	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			✓	

Environmental Setting

Imperial Irrigation District: Electricity is supplied to the eastern portion of the Coachella Valley, including the City of Coachella, by the Imperial Irrigation District (IID). IID is the sixth largest electric utility in California, as measured by peak load of 1,152 megawatts in 2023, and provides power to over 163,000 customers in Imperial County and portions of Riverside and San Diego counties.[13] Electricity is purchased from various power generators and distributed along IID's transmission corridors to customers. As of 2018 IID has phased out coal from its energy portfolio, has increased its reliance on renewable energy and is planning for greater storage capacity. Table VI-1 shows the most current energy source portfolio for IID.

Table VI-1
Imperial Irrigation District Generation Resource Portfolio

Energy Source	Power Plant Type	Number of Generation Facilities	Mega Watts (MW)
Natural Gas & Diesel	gas turbine and steam turbine	16	655.3
Solar	photovoltaic farms	15	188
Geothermal	steam turbine	4	117
Hydroelectric	hydropower turbine	11	106
Biomass	steam turbine	1	45
Nuclear	steam turbine	1	14
Battery Storage	from hydroelectric power	2	60
Total			**1,185.3**
Source: 2024 Integrated Resource Plan, Imperial Irrigation District, April 2024			

Southern California Gas: Natural gas is provided to the City by Southern California Gas (SoCalGas) and is used for home heating, water heating, laundry dryers and gas stoves. More than 90% of the natural gas consumed in California is sourced from Texas and New Mexico, and the SoCalGas transmission network consists of storage facilities and pipelines. Southern California Gas is

[13] Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

committed to reducing greenhouse gas emissions by supporting the development of renewable natural gas (RNG) resources. Unused methane that is released from landfills, composted food waste, dairies, and wastewater treatment plants can be captured and transported along existing SoCalGas gas pipelines. SoCalGas offers assistance to individual consumers, such as a wastewater treatment plant, to convert its by-products into methane for use at its own site.

California State Standards: To reduce energy consumption and pollution emissions, the State of California has enacted several laws and building codes to guide the construction and operations of commercial and residential development. The California Code of Regulations (CCR) Title 24, Part 6, "California's Energy Efficiency Standards for Residential and Nonresidential Buildings," (Energy Code, or Title 24) was established in 1978 and is updated regularly. In 2007, Title 24, Part 11, also known as the Green Building Standards Code (CALGreen) was added to the CCR. Together the Energy Code and CALGreen address all stages of building construction from the planning process to the end use, and set standards for reducing energy and water use, for materials recovery and conservation, and reducing construction and operational impacts on the local environment.

The Renewable Portfolio Standard required electricity providers to derive 33% of their electricity from renewable sources by 2020. Senate Bill 100 furthered this target by requiring 60% of electricity to be derived from renewable sources by 2030 and 100% by 2045.

Senate Bill 375 established new planning processes to facilitate coordination between land use planning, regional transportation plans and funding priorities with the goal of reducing regional vehicle miles traveled (VMT) and thus reducing transportation energy use and greenhouse gas emissions.

City of Coachella Climate Action Plan

In April 2015 the City adopted a Climate Action Plan (CAP) to help implement General Plan policies and programs aimed at reducing greenhouse gas emissions via the reduction of energy consumption, vehicle miles traveled, resource consumption and the generation of waste. In order to meet the State AB 32 GHG reduction target in effect at that time, the CAP estimated that the City would need to reduce greenhouse gas emissions by 5.1 metric tons of carbon dioxide equivalent ($MTCO_2e$) per person, or a total of 786,993 $MTCO_2e$ citywide.[14] Emissions reductions would stem from sectors including, but not limited to greater energy efficiency achievements, reduction of solid waste, installation of renewable energy systems, increases in the amount of open space and shade vegetation, and the growth of alternative transportation systems. The City's CAP has not been updated since its initial adoption.

The analysis of energy consumption impacts is based on the CalEEMod detailed report generated in November 2025 (see Appendix A). Details of the Project parameters are provided in Table III-3 of the Air Quality Section. The Calhoun Street Subdivision Traffic Analysis dated September 2024 (see Appendix F) was also used to estimate impacts from energy consumption during the operational phase. The Traffic Analysis accounted for daily trips from 259 homes, which provides a more conservative estimate than the daily trips resulting from the current 257 homes.

[14] Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

Discussion of Impacts

a) Less Than Significant Impact. Energy would be used during the approximately three-year construction phase and the long-term operational phase.

Construction Phase

During construction, the Project would use energy during site preparation, grading, building construction, paving, and architectural coating. Electricity would be used to operate a temporary construction office which would require lighting, climate control, and electricity to power office equipment. To operate construction equipment and worker transportation, the primary sources of energy would consist of petroleum fuels including gasoline and diesel fuels. Table VI-2 provides fuel consumption estimates for the construction phasing timeline of the Project. Construction equipment schedules, equipment power ratings, and load factors were programmed into CalEEMod. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), per the California Air Resource Board's (CARB's) Carl Moyer Program Guidelines (2017).[15] CalEEMod assumes all construction equipment is diesel powered. Total fuel consumption for construction activities is estimated to be 81,147 gallons of diesel fuel.

Table VI-2
Project Construction Equipment Fuel Consumption Estimates

Phase	Duration (Days)	Equipment	HP Rating	Qty	Usage Hours	Load Factor	HP-hrs/day	Fuel Consumption
Site Preparation	35	Rubber Tired Dozers	367	3	8	0.4	3,523	6,666
		Tractors/Loaders/Backhoes	84	4	8	0.37	995	1,882
Grading	100	Graders	148	1	8	0.41	485	2,624
		Excavators	36	2	8	0.38	219	1,183
		Tractors/Loaders/Backhoes	84	2	8	0.37	497	2,688
		Rubber Tired Dozers	367	1	8	0.4	1,174	6,348
Building Construction	500	Forklifts	82	3	8	0.2	394	10,638
		Generator Sets	14	1	8	0.74	83	2,240
		Cranes	367	1	7	0.29	745	20,135
		Welders	46	1	8	0.45	166	4,476
		Tractors/Loaders/Backhoes	84	3	7	0.37	653	17,640
Paving	60	Pavers	81	2	8	0.42	544	1,764
		Paving Equipment	89	2	8	0.36	513	1,664
		Rollers	36	2	8	0.38	219	710
Architectural Coating	85	Air Compressors	37	1	6	0.48	107	490
							TOTAL Construction Equipment Fuel Demand (Gallons Diesel Fuel)	**81,147**

- The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), per the California Air Resource Board's (CARB's) Carl Moyer Program Guidelines (2017), Table D-21 Fuel Consumption Rate Factors. (The Carl Moyer Program Guidelines Volume I: Program Overview, Program Administration and Project Criteria, approved by the California Environmental Protection Agency Air Resource Board on April 27, 2017. https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf)
- CalEEMod outputs provide Phase, Duration, Equipment, HP Rating, Quantity (number of equipment), Usage Hours, and Load Factor.
- Fuel consumption = [(Usage Hours x Qty.) x Load Factor] x HP Rating/18.5 x Number of Days

[15] "Fuel Consumption Rate Factors, Table D-21," Carl Moyer Program Guidelines, Volume I: Program Overview, California Environmental Protection Agency Air Resources Board, June 20, 2017, https://ww2.arb.ca.gov/sites/default/files/classic/msprog/moyer/guidelines/2017/2017_cmpgl.pdf.

The estimated amount of fuel consumed by construction worker trips is provided below in Table VI-3. Construction phase duration, trip type, number of worker trips per day and average trip lengths are provided by the CalEEMod model. The U.S. Department of Energy Alternative Fuels Data Center provides the average vehicle fuel economy estimates.[16] For this analysis, it is assumed that the majority of worker trips would be by car (24.4 mpg), hauling trips would be by Class 8 trucks (6.45 mpg, diesel), and vendor trips would be by delivery trucks (7.7 mpg, diesel). The total amount of fuel that will potentially be consumed by construction workers, vendors, and haulers traveling to the Project site during construction is 57,012 gallons.

Table VI-3
Construction Worker Fuel Consumption Estimates

Phase	Duration (Days)	Trip Type	Worker Trips/ Day	Trip Length (Miles)	VMT	Avg. Fuel Economy (mpg)	Fuel Consumption (gallons)
Site Preparation	35	Worker	18	18.5	11,655	24.4	478
		Vendor	1	10.2	357	7.7	46
Grading	100	Worker	20	18.5	37,000	24.4	1,516
		Vendor	1	10.2	1,020	7.7	132
Building Construction	500	Worker	92	18.5	851,000	24.4	34,877
		Vendor	27	10.2	137,700	7.7	17,883
Paving	60	Worker	15	18.5	16,650	24.4	682
		Vendor	3	10.2	1,836	7.7	238
Architectural Coating	85	Worker	25	18.5	28,305	24.4	1,160
TOTAL Construction Worker Vehicle Fuel Demand (Gallons of Gasoline)							**38,713**
TOTAL Construction Vendor Vehicle Fuel Demand (Gallons of Diesel)							**18,299**
Total							**57,012**

- The average vehicle fuel economy estimates were derived from the U.S. Department of Energy Alternative Fuels Data Center. For purposes of this analysis, it is assumed that the majority of worker trips are by cars (24.4 miles per gallon (mpg), gasoline), hauling trips are by Class 8 trucks (6.4 mpg, diesel), and vendor trips are by delivery trucks (7.7 mpg, diesel). (Average Fuel Economy by Major Vehicle Category, last updated January 2024. U.S. Department of Energy. https://afdc.energy.gov/data/10310)
- CalEEMod outputs provide Phase, Duration, Trip Type, Worker trips/day, Trip Length.

In total, the Project is estimated to use 138,159 gallons of fuel during the construction phase. The construction phase is temporary, the fuel demand represents a "single-event" and does not pose an on-going demand. Compliance with CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation will help to reduce impacts on energy consumption by the Project's construction activities.[17] The Regulation aims to reduce idling, retire older less fuel-efficient equipment, encourage greater use of renewable diesel, and standardize additional fuel reduction tactics. The temporary duration of the construction phase and mandatory compliance with California Air Resources Board's (CARB) Off-Road Regulation of diesel-fueled equipment ensures that the Project will have a less than significant impact on energy consumption relating to the wasteful use of resources.

16 U.S. Department of Energy, "Average Fuel Economy by Major Vehicle Category," Alternative Fuels Data Center, updated January 2024, https://afdc.energy.gov/data/10310?page=2.

17 California Air Resources Board, In-Use Off-Road Diesel-Fueled Fleets Regulation, 2024.

Operational Phase

Energy consumption during the operational phase would stem from the use of appliances, electronics, lighting, HVAC systems, and exterior systems such as and irrigation and outdoor lighting. The homes would be constructed in compliance with the 2022 California Building Energy Efficiency Standards (or the Building Code in effect at the time that building permits are issued) which include mandatory guidelines per the California Energy Code, Title 24, Part 6. The California Green Building Code, Title 24, Part 11, defines voluntary energy efficiency standards. Requirements include the installation of rooftop solar for all new single-family homes, double-paned windows, light-colored building materials, and the use of the most effective wall and ceiling insulation, and the highest-rated air conditioning systems, and many other standards. The State's Energy Code also includes water efficiency standards. Title 20 of the California Energy Code, Appliance Efficiency Regulations, defines minimum efficiency levels for household appliance, electronics, and plumbing equipment. The Project would be subject to these regulations.

The population of the City of Coachella is approximately 43,173,[18] and by the year 2045, the population could potentially expand to 129,300.[19] This growth will increase the demand for electricity, natural gas, and transportation fuels. According to the City's 2035 General Plan Update EIR, on an annual basis, the Project could potentially account for 0.68% of the City's electricity demand for residential/commercial/industrial uses, and 1.67% of the City's single-family residential demand for natural gas. Tables VI-4 and VI-5, compare the proposed Project's estimated annual electricity and natural gas demand to the City's forecasted 2035 energy demand as detailed in the City's 2035 General Plan Update EIR.

Table VI-4
Project Operational Annual Electricity Consumption

Land Use	Electricity Use (kWh/yr)
Single Family Housing – Project Annual Demand	2,381,507
City's 2035 Demand for Residential/Commercial/Industrial Uses	348,918,091
Project's % of City's 2035 Demand	**0.68%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. City of Coachella General Plan Update EIR, Table 4.14-3, Electricity and Natural Gas Use Projections.

Table VI-5
Project Operational Annual Natural Gas Consumption

Land Use	Natural Gas (Therms/yr)
Single Family Housing – Project Annual Demand	90,689
City's 2035 Demand for Residential Single Family Use	5,444,162
Project's % of City's 2035 Demand	**1.67%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. City of Coachella General Plan Update EIR, Table 4.14-3, Electricity and Natural Gas Use Projections.

[18] California Department of Finance Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, May 2024.

[19] Southern California Association of Governments, "Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS.

Transportation Energy Demand

To model the number of daily trips generated by the Project and vehicle miles traveled (VMT), the Institute of Transportation Engineers (ITE) estimation was applied. Per ITE, the residential land use (210) is expected to generate 9.43 trips per residence per day, and the park would generate approximately 75 trips per day.[20] The Project could generate a total of 2,499 trips per day. Based on the number of residences, the ITE land use code, and the daily park trips, the CalEEMod analysis estimates that 911,957 total annual trips could result in 5,188,049 VMT annually.

For purposes of analysis, the 24.4 mpg figure is applied to the Project's annual VMT, which calculates to a total of 126,588,396 gallons of fuel that could be consumed annually by Project residents and park users.

The Project's forecasted VMT and fuel demand are compared to the total 2024 VMT generated within the South Coast Air Quality Management District's Salton Sea Air Basin as provided by California Air Resources Board Emission Factor (EMFAC). The Project's operational annual gasoline demand would equate to 0.143% of the Air Basin's most current annual gasoline consumption. Table VI-6 provides a comparison of the Project's estimated annual gasoline consumption and the Salton Sea Air Basin 2024 annual consumption.

Table VI-6
Project Operational Annual Transportation Gasoline Consumption

Land Use	Annual VMT	Gasoline (gallons/yr)
ITE Residential Land Use (210) – 257 units + Park	5,073,042	123,782,225
Park	115,007	2,806,171
Project Total Annual Demand	5,188,049	126,588,396
SCAQMD Salton Sea Air Basin Demand	3,628,036,125	88,524,081,450
Project's % of Air Basin Annual Demand	**0.14%**	**0.143%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. CARB EMFAC, Scenario Analysis, 2025 Total Daily VMT for SCAQMD Salton Sea Air Basin – 9,939,825 VMT

The operational phase would result in increased vehicle trips by residents and park users, but the increase compared to the surrounding region is incremental. The Project is within two miles of the City's downtown area where shopping and many other services are located. The City's commitment to providing more alternative, non-motorized transportation routes, as outlined in the Mobility Element of the General Plan, would help ensure that the Project's increase in transportation would reduce potential impacts to energy use.[21]

Energy efficiency standards have demonstrated a net savings of billions of dollars, and millions of metric tons of carbon emissions.[22] The above-described State building and appliance efficiency standards along with the City's alternative transportation policies ensure that the Project would not

20 Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

21 City of Coachella General Plan 2035 Update, Mobility Element, April 22, 2015.

22 Office of Energy Efficiency and Renewable Energy, "Why Building Energy Codes?", Building Energy Codes Program, accessed June 12, 2024, https://www.energycodes.gov/why-building-energy-codes#:~:text=Building%20energy%20codes%20represent%20a,of%20avoided%20CO2%20emissions .

result in wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

b) Less Than Significant Impact. In addition to the California Building Energy Efficiency Standards, and the City's Mobility goals and policies, the City's General Plan includes a Sustainability and Natural Environment element which prescribes goals and policies for new and existing development to ensure that as the City grows, the energy and water use do not exceed available resources.[23]

Goal 2 discusses policies for harnessing more renewable energy, efficient building orientation to reduce western sun exposure, and Title 24 construction standards.

Goal 3 addresses the need to conserve water resources through drought tolerant landscaping, technologies, the use of recycled water, retention basins, and more to benefit both the community and the environmental.

Goal 4 specifically addresses need for energy efficiency through green building design for existing and new buildings.

In 2015, the City of Coachella adopted a Climate Action Plan (CAP) to ensure that its General Plan and future growth would comply with state and regional GHG reduction targets. The CAP designated greenhouse gas emissions targets of 49% below 2010 emissions by 2035. Achieving this goal would require continual increases in energy efficiency for all buildings and lighting, increasing renewable energy use, adding more shade and shade trees, and upgrading transportation corridors to provide non-motorized vehicle routes. The Project will be reviewed to assure compliance with CAP measures for residential development, and will be required to comply with the Building Code, including energy efficiency standards, to assure compliance with energy reduction strategies. These requirements will assure that the Project's energy impacts remain less than significant.

The City of Coachella in partnership with the Coachella Valley Association of Governments (CVAG) developed the "Eastern Coachella Valley's Action Plan for Climate Resilience" (Action Plan) in 2019. The Action Plan identifies strategies where Eastern Coachella Valley communities can seek funding to pay for climate resilience projects. Many of these projects would lead to a reduction of energy use by increasing energy efficiency of buildings, providing additional shade, boosting area active transportation plans, offering home weatherization programs for low-income communities, installing water efficient appliances, and more.[24]

The Project would comply with local, regional, and state renewable energy and energy efficiency plans The City's General Plan and Climate Action Plan, the Eastern Coachella Valley's Action Plan for Climate Resilience, and the commitments by SoCalGas and Imperial Irrigation District to bolster sources of renewable energy, would all restrict the potential impacts on energy use by the Project. The Project's impacts would be less than significant.

[23] Sustainability and Natural Environment Element, General Plan Update, City of Coachella, April 22, 2015.

[24] "Eastern Coachella Valley Action Plan for Climate Resilience," prepared by Dudek, June 2019.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
CalEEMod 2022.1

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024
California Air Resources Board, In-Use Off-Road Diesel-Fueled Fleets Regulation, 2024

California Department of Finance, Table E-5 Population and Housing Estimates for Cities, Counties and the State, 2020-2024 with 2020 Census Benchmark, May 2024

California Energy Commission, Title 20 and Title 24

City of Coachella General Plan 2035 Update

City of Coachella General Plan 2035 Update EIR

Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

"Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS, Southern California Association of Governments

Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024
Southern California Gas

U.S. Department of Energy, "Average Fuel Economy by Major Vehicle Category," Alternative Fuels Data Center, updated January 2024

VII. GEOLOGY AND SOILS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				✓
ii) Strong seismic ground shaking?			✓	
iii) Seismic related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				✓
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				✓

Environmental Setting

Seismicity and Faulting

The Coachella Valley lies within the northwestern portion of a larger topographic feature known as the Salton Trough (also referred to as the Salton Sink, and the Salton Basin), which is a northwest-southeast trending structural depression extending from the Banning Pass to the Gulf of California. The Salton Trough is approximately 130 miles long by 70 miles wide and is dominated by the underlying Southern San Andreas Fault (SSAF) system running along the eastern/northeastern edge of the Coachella Valley and through the east edge of the City of Coachella. For several million years, the Salton Trough has been subsiding while sediment eroding from the adjacent mountain ranges which form the northeast and the southwest Valley boundaries fills in the Coachella Valley floor. From the west toward the east, the San Bernardino Mountains, Little San Bernardino Mountains and the Indio Hills form the north/northeast boundary of the Coachella Valley. The San Jacinto Mountains and the Santa Rosa Mountains extend along the south/southwest side of the Valley.

Most earthquakes that occur in southern California result from the strike-slip motion between the North American and Pacific tectonic plates. At a rate of about two inches per year, the North American plate is sliding southwest while the Pacific plate is sliding northwest. The San Andreas Fault, an 800-mile fault extending from Bombay Beach on the east shore of the Salton Sea to Cape Mendocino on the northern California coast, facilitates about 70% of this tectonic movement. The San Andreas Fault zone is made up of multiple fault strands splintering off the main tectonic fault, and in the Coachella Valley, the SSAF zone splits into strands known as the Banning Fault, the Mission Creek Fault, and the San Jacinto Fault Zones. According to a 2023 paper by the Scripps Institution of Oceanography, the SSAF experienced a major earthquake approximately every 180 years over the last 1,000 years. However, the last major earthquake in the Coachella Valley region of the SSAF was 300 years ago, leading analysts to assume that accumulated stress between the plates could result in a magnitude 7.8 earthquake.[25]

Soils

Soils in the City of Coachella are comprised of a mix of eroded sediments from the surrounding mountain ranges that have filled in the Valley floor over several million years. Presently, sediments deposited by water drainage (alluvial), or carried by wind (aeolian) are made up of fine silts, clay, gravel, and sand. Toward the southeast end of the Coachella Valley, soils contain higher amounts of very fine-grained lake (lacustrine) deposits and salts from repeated cycles of Colorado River inundation forming Ancient Lake Cahuilla.[26]

Liquefaction

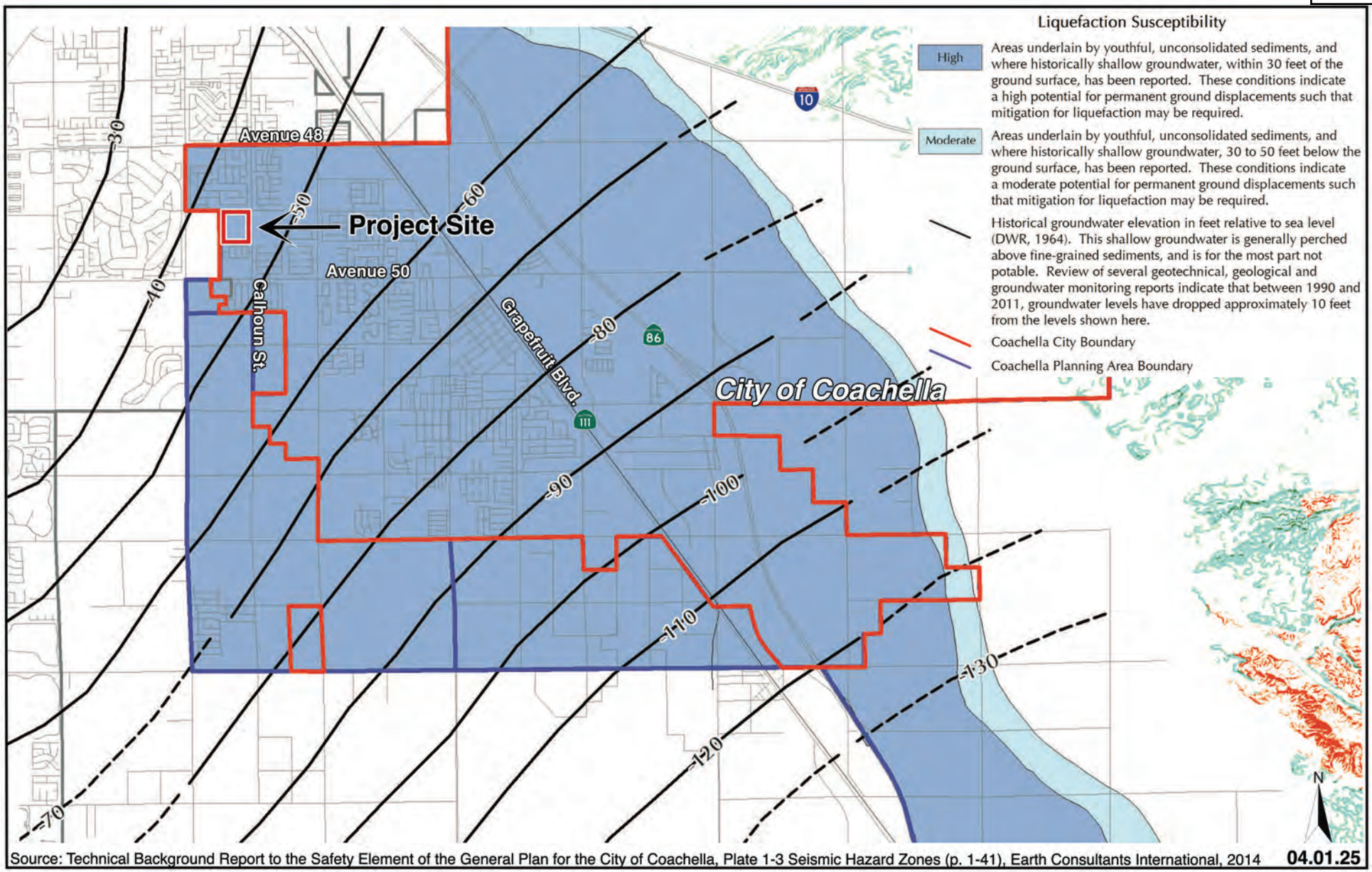
Liquefaction occurs when seismic ground shaking causes groundwater pressure to increase and fully saturate the the upper layers of soil causing the soil to become a fluid-like mass and lose stability or bearing strength. This occurs within the upper 50 feet of the ground surface in loose fine-grained to medium-grained sandy/silty soils. Ramifications can include damage to buildings and structures and subsurface infrastructure. Liquefaction leads to other ground failure conditions such as lateral spreading, flow failure, ground oscillation, and ground lurching.

[25] "California's Salton Sea May Be Staving off Earthquakes As It Disappears," Scripps Institutions of Oceanography, University of California San Diego, June 7, 2023.

[26] Existing Conditions, City of Coachella General Plan 2035 Update, April 2015.

Three geologic conditions need to be met for liquefaction to occur: long duration of ground shaking; the presence of young, loose, unconsolidated sediments; and the presence of groundwater within 50 feet of the surface. All three conditions may potenitally be met in the City of Coachella. Nearby active faults such as the Southern San Andreas or San Jacinto may experience earthquake events. Soils in the City west of the Whitewater River/Coachella Valley Stormwater Channel are made up of young unconsolidated sand, silt with clay and gravel. Although the water table fluctuates depending on the rate of extraction versus the rate of recharge, it is within 50 feet of the surface in portions of the City. Also, perched water, which is non-potable groundwater that occurs between the surface and an impermeable layer of clay that sits above the deeper aquifer can contribute to liquefaction. The east end of the Coachella Valley contains the clay layer and perched water. Exhibit 6 of this report shows Plate 1-3 from the Background Technical Report for the General Plan Safety Element, which describes the portion of the City that is highly susceptible to liquefaction.[27] The Project site is located within this area.

[27] Technical Background Report to the Safety Element of the General Plan for the City of Coachella, Plate 1-3 Seismic Hazard Zones (p. 1-41), Earth Consultants International, 2014.



Source: Technical Background Report to the Safety Element of the General Plan for the City of Coachella, Plate 1-3 Seismic Hazard Zones (p. 1-41), Earth Consultants International, 2014

04.01.25

TERRA NOVA®
PLANNING & RESEARCH, INC.

Liquefaction Susceptibility
Calhoun Street Housing Development
Coachella, California

Exhibit
6

Ground Subsidence

The gradual settling or sinking of the ground surface can occur as smaller local collapses or broader regional lowering of the ground occurs. A diverse range of causes commonly stem from both natural phenomenon such as earthquakes, and human activities such as construction, water and mineral extraction, as is common in southern California. Ground subsidence in the Coachella Valley has been associated with excessive groundwater pumping and the greatest extent has occurred in the central portions of the valley between Indian Wells and the Lake Cahuilla reservoir. The Coachella Valley Water District and the Desert Water Agency are primarily responsible for addressing the over-pumping and overdraft condition that has caused ground subsidence. A program of groundwater recharge has been underway for several decades and has slowed or overdraft and has slowed or stopped subsidence in most areas where it had occurred. The replenishment sites have seen an increase groundwater in storage.

Paleontological Resources

Paleontological resources are the fossilized remains of prehistoric plant and animal life dating more than 10,000 years ago, near the end of the last Pleistocene glaciation period and the beginning of the Holocene epoch. Fossil remains including bones, teeth, shells, and plant leaves are typically discovered in the geologic deposits where they were buried, although erosion can expose fossils to the surface.

The City's Planning Area contains four different rock types with varying levels of paleontological sensitivity: Ocotillo Conglomerate (low sensitivity), Palm Springs Formation (high sensitivity), Lake Cahuilla Sediments (high and undetermined sensitivity), Holocene Alluvium (low sensitivity).

Discussion of Impacts

a, i) No Impact. A fault rupture occurs when movement on a fault breaks through the surface of the Earth. Fault ruptures can range from one inch to fifty miles or more. While the City Planning Area is near the SSAF, which could potentially generate a magnitude 7.8 earthquake, there are no active faults on or near the Project site. According to the California Department of Conservation's Earthquake Hazards Zone Application (EQ Zapp), the Project site is located 3.18 miles southwest of the SSAF. Since there are no active faults on the Project site or in the near vicinity, no impacts from fault ruptures are expected.

a, ii) Less Than Significant Impact. The City's General Plan estimates that the City could be severely impacted if a major earthquake event occurred along the section of the SSAF that extends through the City's eastern planning area. The Project site is located 3.18 miles southwest of the fault zone and would be susceptible to considerable ground shaking should a major earthquake occur. The San Jacinto Fault Zone, approximately 17.6 miles southwest, is considered to be more active and could produce a magnitude 6.6 earthquake along certain segments, which could cause ground shaking in the City.

Buildings can be engineered to withstand a certain intensity of ground shaking. The Project is subject to the City's Municipal Code §15.66 Seismic Hazard Mitigation.[28] The General Plan also requires all new structures to designed with the most current California Building Code including provisions for

[28] Coachella, California Code of Ordinances §15.66, "Seismic Hazard Mitigation."

seismic loads, lateral forces and grading.[29] These standard requirements are designed to reduce the impacts of ground shaking to structures and people. Compliance with the most current state and local design standards would ensure that the impacts associated with ground shaking would be less than significant.

a, iii) Less Than Significant Impact. Liquefaction of soil may occur when a site contains soils that are particularly susceptible to liquefaction such as unconsolidated sandy and silty soil. Liquefaction also requires strong seismic shaking and the presence of groundwater within 50 feet of the surface. The California Department of Water Resources monitors groundwater wells in the Coachella Valley and provides data via a Current Groundwater Levels interactive map application. On March 7, 2024 the groundwater depth was recorded as 78.80 feet at a well located approximately 1.5 miles southwestof the Project site near the corner of Monroe Street and Avenue 50. On March 12, 2024 groundwater depth of 31.00 feet was recorded at a well located approximately 2.5 miles northeast of the Project site at Tyler Street and Avenue 48.[30] As discussed above, the region of the City of Coachella west of the Whitewater River/Coachella Valley Stormwater Channel is susceptible to liquefaction. The 2014 Technical Background Report to the Safety Element provides exhaustive research detailing the soil, groundwater and seismic conditions that lead to potential liquefaction in the City and provides an official Seismic Hazards Map that may be applied to projects in the City (see Exhibit 6).[31]

The General Plan Safety Policy 1.6 requires a liquefaction assessment study for any project located within the defined liquefaction susceptibility area "to be conducted in accordance with the provisions in the Seismic Hazards Mapping Act and the most recent version of the California Geological Survey's Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazards in California." Furthermore, Policy 1.7 requires the implementation of mitigation measures to "all habitable structures, bridges, roadways, major utility lines and park improvements as a condition of approval" in areas where the geotechnical studies determine that the soil is susceptible to liquefaction.[32] The City will require the submittal of a geotechnical analysis concurrent with building plans, to address site- and project-specific conditions. This analysis will include recommendations, including over-excavation and soil compaction, foundation design and structure, to assure that liquefaction, if it occurs, is mitigated.

As the geotechnical assessment, soil mitigation and Project design requirements are met, the potential impacts resulting from seismic activity which result in liquefaction or associated ground failure will be less than significant.

a, iv) No Impact. The Project site is located on a relatively flat, low-lying central region of the Salton Trough where the soil consists of fine sand, silt and clay. The nearest hillside is the Santa Rosa Mountains foothills, 4.5 miles to the southeast. The Project site is not susceptible to landslides and no impacts from landslide events are anticipated.

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29 Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015.

30 California's Groundwater Live: Current Groundwater Levels, California Department of Water Resources, accessed July 2024.

31 "Plate 1-3 Seismic Hazard Zones," Technical Background Report to the Safety Element, City of Coachella, Earth Consultants International, 2014.

32 Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015.

b) Less Than Significant Impact. Development of residential neighborhoods including site preparation, grading, construction of building structures can cause soil erosion via wind and water. To control fugitive dust emitted from the Project site, the applicant must prepare a fugitive dust control plan to be approved by the City prior to obtaining grading and construction permits.[33] The fugitive dust control plan will implement one or more best available control measures as defined by the Coachella Valley Fugitive Dust Control Handbook.[34] To control erosion resulting from stormwater, the applicant must provide proof that the Project complies with State permitting for stormwater discharges from construction activities prior to obtaining the grading or construction permits from the City.[35] To implement this requirement, the City will require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) concurrent with submittal of grading and improvement plans.

Post construction, the Project site will be stabilized by landscaping, roadways, and structures which will control dust and soil erosion from storm events. Stormwater flows will be controlled by the Project design which will have incorporated Best Management Practices as defined by the Project WQMP (Appendix E) to prevent soil erosion during storms.

With implementation of the fugitive dust control measures and stormwater best management practices, impacts from soil erosion during construction and operational phases will be reduced to less than significant levels.

c) Less than Significant Impact. The surface soil of the Project site is composed mainly of fine-grained sand, silt and clay that resulted from lacustrine deposits of Ancient Lake Cahuilla and distal fan deposits carried by streams bringing eroded material from upper elevations. The soil type is not prone to lateral spreading or collapse, nor is this soil type susceptible to on- or off-site landslide events.

However, as discussed above in impacts section (a.iii), the Project site occurs in an area that is susceptible to liquefaction due to the proximity to an earthquake fault zone, the soil type, and potentially also due to the perched groundwater level should it rise to at least 50 feet below the surface. Plate 1-3 of the Background Technical Report for the Safety Element should be regarded as the official liquefaction susceptibility map. Pursuant to the State's Seismic Hazards Mapping Act, projects occurring withing a State-delineated Seismic Hazard Zone for liquefaction must be evaluated by a Certified Engineering Geologist and/or a Registered Geotechnical Engineer. Furthermore, the project review conducted by the City must be performed by geologists and engineers with the same credentials and experience.

As described above, the City will review the geotechnical analysis and the required remediation prior to issuing construction permits. The engineering analysis and subsequent steps to prevent liquefaction would ensure that impacts resulting from potentially unstable soils would be less than significant.

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33 Coachella, California Code of Ordinances, §13.16.340, "Stormwater Quality Management Plan and BMPs."

34 "Rule 403.1 Supplement Fugitive Dust Control Requirement for Coachella Valley Sources," South Coast Air Quality Management District, April 2004.

35 Coachella, California Code of Ordinances, Chapter 8.20, "Fugitive Dust Control."

d) No Impact. Clay minerals can expand in size as the amount of moisture increases in the soil. Expansion can cause the ground to swell which can result in damage to buildings, structures, roadways, and other surface features. The soil found on the Project site contains a mix of fine- to medium-grained sand, silt and clays that have been deposited by wind and by periodic river flooding as well as remnant lakebed sediment. The soil composition of the Project site is not prone to expansion and, therefore, associated impacts are not expected to occur.

e) No Impact. The Project site will be served by the City of Coachella Sanitation Division, and as such, there are no plans to install septic systems. The area is currently served by 8-inch and 12-inch wastewater effluent lines on Calhoun Street. The infrastructure will be extended to serve the proposed residential community. Therefore, there will be no Project impacts from the use of septic tanks or alternative wastewater systems.

f) No Impact. The potential for discovery of paleontological resources on the Project site is low as there are no records of any such discoveries in the nearby vicinity of the City's Planning Area. The Project occurs within an area of the City designated as an area of undetermined sensitivity. The Project is not expected to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. There would no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella General Plan 2035 Update, April 2015

City of Coachella General Plan 2035 Update, Technical Background Report to the Safety Element "Plate 1-3 Seismic Hazard Zones," Earth Consultants International, 2014

City of Coachella General Plan 2035 Update EIR, June 2014

Coachella, California Code of Ordinances §15.66, "Seismic Hazard Mitigation"

Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015

California Geological Survey
"California's Salton Sea May Be Staving off Earthquakes As It Disappears," Scripps Institutions of Oceanography, University of California San Diego, June 7, 2023.

California's Groundwater Live: Current Groundwater Levels, California Department of Water Resources.

VIII. GREENHOUSE GAS EMISSIONS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				✓

Environmental Setting

The lower troposphere of the Earth's atmosphere contains a mix of gases that sustain life. Greenhouse gases (GHGs) comprise a small percentage, 0.04%, of these tropospheric gases and trap just enough heat to maintain a relatively constant and livable air temperature. Even small alterations in this composition are well documented via proxy and direct climate measurements.

Human activities including the burning of fossil fuels, clearing native vegetation, altering landscapes to accommodate hardscapes and built environments all emit additional GHGs and reduce the Earth's ability to cycle and sequester carbon resulting in exponential net increase in atmospheric GHG levels. While no one development project can have a globally significant impact on greenhouse gas increases, the cumulative impacts of regional development can result in locally significant environmental changes, which in turn contribute to wider climatic changes. Hence, the state and local jurisdictions have adopted policies and thresholds that cap GHG emissions and mandate mitigations when needed to ensure new land uses minimize their impacts.

The major greenhouse gases present in the atmosphere and increased by human activities are described in Table VIII-1.

Table VIII-1
Description of Major Greenhouse Gases

Greenhouse Gas	Emissions Sources	Global Warming Potential	Atmospheric Lifetime
Carbon Dioxide (CO_2)	Next to water vapor, carbon dioxide is the most abundant GHG. Human activities emit CO_2 when burning fossil fuels and burning and removing forests and other vegetation. Looking back 800,000 years prior to the Industrial Revolution, the level of CO_2 in the atmosphere never climbed above 300 parts per million. Today we measure CO_2 at 419.81 parts per million.	1	1,000s of years

Table VIII-1
Description of Major Greenhouse Gases

Greenhouse Gas	Emissions Sources	Global Warming Potential	Atmospheric Lifetime
Methane (CH_4)	Methane is the third most abundant GHG in the atmosphere. It is released during the extraction, refining, and burning of fossil fuels, and the burning and clearing of native vegetation. Raising of livestock, decay of organic waste, and landfills also emit methane.	25	About 10 years
Nitrous Oxide (N_20)	Like carbon dioxide and methane, nitrous oxide naturally occurs in the atmosphere. It is also released by agricultural activities and agricultural chemicals, fossil fuel combustion, wastewater treatment and industrial processes.	298	More than 100 years
Fluorinated Greenhouse Gases	Chlorofluorocarbons (CFCs), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF_6) Together these 30 different gases are referred to as fluorinated GHGs. F-GHGs are solely emitted as by-products of industrial processes such as aluminum and semi-conductor manufacturing and used as refrigerants and aerosol propellants.	Between 12 and 22,800	Tens to thousands of years

Sources: Overview of Greenhouse Gases, Environmental Protection Agency, accessed March 2025, https://www.epa.gov/ghgemissions/overview-greenhouse-gases; Global Warming Potentials, IPCC Fourth Assessment Report, 2007.

The 2016 Senate Bill 32 (SB 32) requires California to reduce overall greenhouse gas emissions by 40% below 1990 levels by the year 2030. This bill furthers the mandates of the prior 2006 Assembly Bill 32 which required the state the reduce GHG emissions to 1990 levels by 2020. Going beyond SB 32 is the 2022 Scoping Plan proposed by the California Air Resources Board (CARB) which sets forth a plan to achieve statewide 100% carbon neutrality by 2045.

The City of Coachella is under the jurisdiction of the SCAQMD, the local agency that determines pollution emissions standards from stationary sources. The CARB determines emissions standards for mobile sources for the entire state. In 2015 the City of Coachella adopted a Climate Action Plan (CAP) to ensure that its General Plan and future development would comply with the original 2006 AB 32 goals, CARB's 2022 Scoping Plan, and SCAQMD's GHG emissions thresholds.

City of Coachella Climate Action Plan

In April 2015 the City adopted a Climate Action Plan (CAP) to help implement General Plan policies and programs aimed at reducing greenhouse gas emissions via the reduction of energy consumption, vehicle miles traveled, resource consumption and the generation of waste. In order to meet the State AB 32 GHG reduction target in place at the time, the CAP estimated that to achieve a target of 49% below 2010 by 2035, the City would need to reduce greenhouse gas emissions by 5.1 metric tons of carbon dioxide equivalent ($MTCO_2e$) per person, resulting in a per person emission rate of 4.2 $MTCO_2e$, or a total of 786,993 $MTCO_2e$ citywide.[36] Emissions reductions would stem from sectors including, but not limited to greater energy efficiency achievements, reduction of solid waste,

[36] Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

installation of renewable energy systems, increase the amount of open space and shade vegetation, and the growth of alternative transportation systems. The City's CAP has not been updated since its initial adoption.

Greenhouse Gas Thresholds

Since each GHG affects the atmosphere differently, for purposes of project analysis, GHG emissions are converted to carbon dioxide equivalencies and measured in metric tons ($MTCO_2e$). When evaluating potential GHG emissions from proposed non-industrial projects, SCAQMD applies a tiered approach. If a project does not conform to at least one of the tiers described below, the project's impacts would be considered significant.

Tier 1: Consider whether the project qualifies for any applicable exemption under CEQA. If the project qualifies for an exemption, then the project is not significant and no other action is required.

Tier 2: Consider whether the project complies with a local greenhouse gas reduction plan that is at minimum consistent with AB 32.

Tier 3: Consider whether the project is below an absolute threshold of either 10,000 $MTCO_2e$/year for industrial projects or 3,000 $MTCO_2e$/year for residential projects.

Tier 4: Consider whether the project is below a set performance threshold. This threshold is yet to be set and is not recommended for analysis at this time.

Tier 5: Consider whether off-site mitigation would reduce the project's GHG emission impacts to less than the proposed screening level.

Discussion of Impacts

a) Less Than Significant Impact. If the Project generates greenhouse gas emissions in excess of the established thresholds, either directly or indirectly, then the Project's impact would be significant. As stated above, project-based impacts are compared against the SCAQMD tiered greenhouse gas emissions thresholds. Emissions generated by the proposed Project are measured against Tier 3, 3,000 $MTCO_2e$/year for residential and commercial projects.

A CalEEMod analysis was conducted in November 2025 and was based on the most recent Project site plan which included 257 units on a net area of 37.28 acres, a 3.53-acre park with retention basin, common landscaped areas, four additional landscaped retention basins, asphalt streets, and 2,517 daily trips. CalEEMod accounts for landscaping and driveway hardscape for residences. Table III-3 provides a summary of the Project's land use data that was applied to the model. The detailed CalEEMod report for the Project is available in Appendix A.

The CalEEMod analysis that forms the basis for this discussion was generated in November 2025 For analysis purposes, a three-year build out timeframe was assumed for the construction of 257 homes, the 3.13-acre park, streets, retention basins, and common area landscaping. CalEEMod accounts for landscaping and driveway hardscape for single family residences. Table III-3 in the Air Quality section provides details of the CalEEMod inputs, and a full copy of the report is provided in Appendix A.

Construction and Operation

Since SCAQMD does not provide GHG construction thresholds for projects, the total amount of CO_2e emissions from the construction phase of the Project is amortized over 30 years to estimate the CO_2e emissions over a one-year operational cycle. Upon buildout, six emissions source categories would contribute either directly or indirectly to operational greenhouse gas emissions including area emissions (pavement and architectural coating off-gassing) building energy usage, mobile energy usage, solid waste disposal, water usage, and refrigeration. Table VIII-2 summarizes annual construction and operational greenhouse gas emissions and then compares the Project's total annual emissions, 2,683 $MTCO_2e$, to the SCAQMD Tier 3 threshold. The Project would not exceed the 3,000 MT/YR CO2e standard for residential and commercial projects. Therefore, Project construction and operation activities would have a less than significant impact on greenhouse gas emissions.

Table VIII-2
Projected GHG Emission Summary
(Metric Tons per Year)

Construction	CO_2e (MT/YR rounded)
3 Years	1,548
30-Year Amortized*	52
Operation	**CO_2e (MT/YR rounded)**
Area	3.2
Energy	986
Mobile	1,291
Waste	344
Water	34
Refrigeration	1.2
Total Operational	2,659
Total Annual Operational (30-Year amortized + Operational)	**2,711**
SCAQMD Annual Threshold	3,000
Exceeds?	No

*Buildout construction emissions were amortized over 30 years then added to buildout operational GHG emissions.
Source: CalEEMod 2022.1

b) Less than Significant Impact. A project is considered to have a significant impact if it conflicts with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. As described above, the City of Coachella adopted a Climate Action Plan (CAP) in 2015 to ensure that its General Plan and future growth would comply with state and regional GHG reduction targets. According to the City's 2015 CAP, the total direct and indirect 2010 GHG emissions emitted by the City was 382,787 $MTCO_2e$. Of the seven community sectors evaluated

for this figure, the Transportation sector, which included gas and diesel fueled vehicles, accounted for 54% of the City's total emissions, or 206,909 $MTCO_2e$. If the City continues with business as usual (BAU), and implements no GHG reduction strategies, by 2035 the total Coachella emissions would reach 1,543,672 $MTCO_2e$. The 2015 CAP proposes emissions reductions of 49% below 2010 emissions, which would reduce annual emissions to 756,679 $MTCO_2e$ by 2035. The City's greatest reduction potential relies on various strategies to reduce Land Use and Transportation emissions.

Per the most current Project site plan, the development could potentially add 1,077 residents to the City based on an estimated average household size of 4.19.[37] This would result in a Project-per capita GHG emission rate of 2.49 $MTCO_2e$. Again, as described above, the CAP found that in order to achieve the GHG reduction target of 49% below 2010 by 2035, City residents would need to emit no more than 4.2 $MTCO_2e$ by 2035. The per capita GHG emissions impacts resulting from the build out of the Project comply with this goal and are therefore consistent with the emissions reduction targets established by the CARB 2022 Scoping Plan for Achieving Carbon Neutrality and SCAG's 2024 RTP/SCS, which are all consistent with California's AB 32 and SB 32. Based on this analysis, the proposed Project subdivision and future build out will not conflict with and would not significantly impact an applicable plan, policy or regulation with the purpose of reducing GHG emissions.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan 2035 Update, April 2015

Coachella Climate Action Plan, April 2015

California Emissions Estimator Model (CalEEMod) Version 2022.1

South Coast Air Quality Management District, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, December 2008.

[37] E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

IX. HAZARDS AND HAZARDOUS MATERIALS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			✓	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				✓

Environmental Setting

As the human population grows, so grows our use of hazardous substances for industrial, agricultural, and domestic activities. Likewise, our exposure to myriad forms of hazards increases. Prior to the 1970s, federal and state laws governing the transportation, application and disposal of toxic and hazardous substances were either lax, insufficient, or non-existent. Past and current landmark

investigations have led to numerous legislative actions to control and properly manage hazardous materials. Today, development is subject to requirements ranging from local ordinances to federal laws.

The City of Coachella has historically been a major agricultural hub for the Coachella Valley and despite recent land use conversions to urban and industrial uses, 33% of the City's land, in the south and east regions of the City's Planning Area, remains under agricultural use, and nearly 30% of the jobs are still in the agricultural sector.[38] Fertilizer and pesticide applications can pose public health risks via air transport and infiltration into surface and groundwater sources.

There are hazardous materials producers, waste generators, disposal sites, and clean-up sites in the City of Coachella. The majority, not all, of these business and sites are located along Grapefruit Boulevard and Harrison Street and in the Downtown area. Small waste generators may be smaller businesses such as dry cleaners, auto repair shops, stores, hospitals, or metal plating shops that generate between 100 and 1,000 kilograms of waste per month. Large generators produce more than 1,000 kilograms per month and can include chemical manufacturers, gas stations, military installations and munitions manufacturing plants. The three large waste generators, Armtec Defense Products, Inc. on Avenue 53 and Tyler Street, Peter Rabbit Farms on Grapefruit Boulevard and the Chevron Station on Dillon Road, are located between two and three miles from the Project site.

The discussion of impacts from hazards and hazardous materials is based on the 2014 Technical Background Report for the Safety Element, California Office of Environmental Health Hazard Assessment (OEHHA), Department of Toxic Substances Control (DTSC), the State Water Resource Control Board GeoTracker, and the Riverside County Department of Environmental Health. According to these sources, there are no large hazardous materials generators or clean-up sites within two miles of the Project site.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project proposes to construct 257 single-family residences, a community pool, a community park, and landscaped open spaces on a currently vacant parcel.

Construction Phase: Construction would necessitate the transporting of potentially hazardous materials such as paints, solvents, concrete and asphalt. The use of heavy equipment that would consume limited quantities of diesel fuel and oil would be required. During construction, a staging area would be identified where equipment and construction supplies would be stored, pursuant to City and Cal OSHA standards. Should any spillage or leakage of hazardous substances occur, it would occur in this staging area where it could be contained and cleaned. The construction phase is temporary, and the use of hazardous materials would not be in quantities that would pose risks to public health or environmental health. Impacts from the transport, handling and disposal of hazardous materials related to construction are expected to be less than significant. The containment of construction-related hazardous materials to a staging area where an accidental release of a hazardous substance to the environment would be quickly remediated reduces potential impacts to less than significant levels.

[38] City of Coachella General Plan 2035 Update, April 2015.

Operational Phase: As a residential community, a certain limited amount of toxic or hazardous chemicals may be used to maintain the community pool, landscaping, or to clean public areas. The amount of chemicals stored on site by the community facilities operators would be in small quantities and would not pose a public or an environmental health risk. For purposes of proper disposal, businesses must comply with federal and state laws by classifying their waste products and follow guidelines for the appropriately sized very small or small quantity generator.

Residential units are anticipated to use and dispose of toxic and hazardous materials such as cleaners, landscaping chemicals, paints, oil, batteries, lightbulbs and electronic waste, collectively known as household hazardous waste (HHW). Residents may store small quantities of potentially hazardous materials at their homes, and the disposal of HHW would be subject to State and County guidelines and carried out by Burrtec, Inc., the waste management company contracted by the City. Burrtec, Inc. provides educational materials online regarding residential hazardous waste disposal and offers curbside pick-up of certain materials. Residents may also drop-off anti-freeze, batteries, oil and paint (ABOP) at the Burrtec Coachella Valley Transfer Station on Landfill Road in Coachella.

State and County regulatory oversight regarding the transport, handling, and disposal of hazardous materials ensure that the construction and operational phases of the Project would generate less than significant impacts. The use of hazardous materials in small quantities during construction and operational phases and the use of a construction staging area would contain potential accidental releases to the environment and reduce their impacts to less than significant levels.

c) No Impact. The Project development will result in 257 single-family homes, retention basins and a park. This type of development is not expected to generate or emit hazardous materials or acutely hazardous substances or produce waste that would jeopardize a school.

The two schools closest to the Project site are the Imagine Dual Language Charter School, 0.71 miles south on Calhoun Street, and Cesar Chavez Elementary School, located 1.75 miles east on Avenida De Oro. Since neither school is within a quarter mile of the Project and the Project will not emit or release hazardous materials and waste that would pose a health risk to a school, there will be no impacts from the Project.

d) No Impact. Government Code Section 65962.5 is also known as the Hazardous Waste and Substances Sites, or Cortese List. The California Environmental Protection Agency (CalEPA) annually compiles this list of hazardous materials release sites based on data from the DTSC, the California Department of Health Care Services (DHCS), and the State Water Resources Control Board (WRCB). In the City of Coachella, there is one state response site, Foster-Gardener, Inc., located 1.75 miles east of the Project site. Foster-Gardener produces pesticides, herbicides, and fertilizers for agricultural application. The site has been remediated, the groundwater has been tested with acceptable levels of contaminants being present, and residential use of the site has been prohibited.

One other Cortese Listed site in the City is US Auto Salvage, a scrap metal recycling facility located 1.14 miles northeast of the Project site. The soil surface was determined to contain unhealthy levels of contaminants including lead, copper, zinc, and PCB. The site is under review.

There are no hazardous materials or waste sites on or near the proposed Project site. The Project site is not included in the Cortese List. Thus, the Project site would not pose any impacts associated with hazardous materials sites.

e) No Impact. The Project site is located 3.66 miles northwest of the Jacqueline Cochran Regional Airport, and 1.9 miles northwest of the Airport Influence Area boundary. Due to this distance, the Project area is not in an airport safety hazard zone and no excessive noise for people living or working at the Project site would occur. There would be no impacts associated with the nearby airport.

f) No Impact. The Project site is located at the southwest corner of Avenue 49 and Calhoun Street. One driveway access point will occur on the north side of the Project at Avenue 49, and another driveway access point will be located on the east side at Calhoun Street. Calhoun Street is a north-south Collector route which connects Avenue 49 and Avenue 50. Avenue 49 is designated as a Primary Arterial, and Avenue 50, which is 0.4 miles south of the proposed east driveway, is a Major Arterial.[39] Presently, Avenue 49 west of Calhoun to Jackson Street is an unimproved path. The Project proposes improvements to the 0.25-mile section of Avenue 49 between Calhoun and the Project site's west boundary in order to convert this section of the street to a Primary Arterial. Project access points on Avenue 49 and Calhoun Street will not alter the City's current circulation pattern or interfere with the City's emergency response and evacuation plans, since both are planned City roadways, and their improvement will expand the City's roadway system.

Project review by the Police and Fire Departments will be necessary to assure that the Project's driveways and streets would accommodate emergency vehicles. Traffic management during the Project's construction will be implemented so that the Project will not interfere with the City's emergency response plan or emergency evacuation plan. The Project is not expected to impact the implementation of or physically interfere with the City's emergency response plan or emergency evacuation plan.

g) No Impact. The City of Coachella is not at risk of experiencing wildland fires and does not contain any fire hazard severity zones.[40] Likewise, the proposed Project, being in an urban residential area of the City, is not susceptible to wildfires. No impacts from exposing people or structures to wildfires in the Project area are expected. Wildland fire is discussed more thoroughly below in Section XX, Wildfire.

Mitigation Measure: None required.

Monitoring: None required.

Sources:
City of General Plan 2035 Update, April 2015

Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update, Earth Consultants International, 2014.

[39] City of Coachella General Plan 2035 Update, Mobility Element, April 2015.

[40] Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection, updated April 1, 2024.

California Office of Environmental Health Hazard Assessment (OEHHA)

Envirostor, California Department of Toxic Substances Control (DTSC)

State Water Resource Control Board GeoTracker

Riverside County Department of Environmental Health

CalFire Fire Hazard Severity Zones Map Viewer

X. HYDROLOGY AND WATER QUALITY **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:			✓	
i) result in substantial erosion or siltation on- or off-site;			✓	
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			✓	
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			✓	
iv) impede or redirect flood flows?			✓	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				✓

Environmental Setting

Domestic Water

The Coachella Valley Groundwater Basin is the main source of municipal, or domestic, water for the entire Coachella Valley and is managed by six different water agencies: Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), Indio Water Authority (IWA), Mission Springs Water District (MSWD), and the Myoma Dunes Mutual Water Company (MDMWC). Local rainwater and snowmelt have filled the basin with water over a period of several million years, but human activities continue to pump more water than can be naturally

recharged. CVWD and DWA have supplemented recharge efforts by importing and percolating Colorado River water into the basin. Both agencies also supplement irrigation water with recycled wastewater.

The Coachella Valley Groundwater Basin is comprised of several subbasins which are divided by faults. Fresh water for the City's residential, commercial and industrial uses is sourced from the East Indio Subbasin, which is part of the larger Indio Subbasin. CVWD, IWA and CWA collectively manage the East Indio Subbasin.

Currently, the CWA serves the area west of Grapefruit Boulevard and smaller industrial/commercial corridor north of Avenue 48, while the largely agricultural use to the east is served by the Coachella Canal and privately owned wells. CWA delivers municipal freshwater, collects wastewater, and manages local drainage. Six wells with a total pumping capacity of 11,400 gpm, or 16.5 MGD are owned and operated by the City. Three storage reservoirs provide a total storage capacity of 10.5 MG (million gallons). The distribution network includes 120 miles of pipeline with pipe diameters of 4 inches to 36 inches.

Water Quality

As water naturally flows over the land in rivers, streams, springs, and lakes, and collects in groundwater basins, both naturally occurring contaminants and those emitted from human activity can end up in water supply systems. Thus, water districts and regulatory agencies regularly test water for contaminant levels and mitigate as needed. Contaminants include microorganisms, inorganics (salts, metals), pesticides and herbicides, organic chemicals, and radioactive particles. The CWA publishes water quality test results in an annual Water Quality Consumer Confidence Report (CCR). As of 2023, the City's water supply has had no contamination violations and levels of contaminants are well below the allowable limits as set by the federal Environmental Protection Agency and the State Water Resources Control Board.[41]

Wastewater Treatment

The City of Coachella Sanitation Division (CSD)treats wastewater at its 4.5 MGD (million gallons per day) wastewater reclamation plant (WRP) located at the east end of Avenue 54. Wastewater is treated to a secondary level and discharged into the adjacent Whitewater River/Coachella Valley Stormwater Channel. During the 2023-2024 Water Year, the CSD WRP treated 3,082 af of wastewater.[42]

The CSD collects and treats water from residential, commercial and industrial areas. The collection system consists of 90 miles of pipeline ranging in diameter of 4 inches to 54 inches, 1,580 manholes and two pump stations. The Project would be able to connect to the existing pipeline on Calhoun Street that extends north of Avenue 50.[43]

41 2023 Water Quality Consumer Confident Report, Coachella Water Authority and Sanitary District, issued July 2024.

42 Indio Subbasin Annual Report for Water Year 2023-2024, Table 5-10 WY 2023-2024 Wastewater Treatment, Reuse, and Disposal in the Indio Subbasin, March 2025.

43 City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Floodplain Management

The Coachella Valley lies within the Whitewater River Watershed, the regional drainage feature that extends from the slopes of Mount San Gorgonio to the Salton Sea. The Whitewater River is the main drainage feature and is fed by mountain streams along its course. In the higher elevation of the Whitewater River, water runs generally year-round, but is ephemeral in the low desert, and has been channelized at the eastern end of the Valley to control stormwater. The CVWD maintains major tributary facilities that guide floodwater into the Coachella Valley Stormwater Channel, but drainage throughout the Coachella Valley generally falls under the supervision of the local cities or the county where it occurs.

Historically the City of Coachella has not constructed extensive infrastructure to control stormwater flows. The 2021 City of Coachella Stormwater Master Plan lays out plans to identify and construct stormwater drainage infrastructure in partnership with the CVWD. Self-contained residential neighborhoods, such as the proposed Project, are required to contain their own drainage basins which manage stormwater flows within their properties, and prevent off-site flooding.

Discussion of Impacts

a) Less Than Significant Impact. The Calhoun Street Housing Development is located in the Whitewater River watershed which drains into the Salton Sea and is part of the larger Colorado River Watershed. Development such as the proposed Project is required to comply with the Clean Water Act, Porter-Cologne Water Quality Control Act, Regional Water Quality Control. Plans, Safe Drinking Water Act, and recycled water regulations. The proposed Project impacts would be significant if the Project were to violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. In compliance with the National Pollutant Discharge Elimination System (NPDES) regulations to minimize the pollutant load associated with urban and development activities, a Project-Specific Preliminary Water Quality Management Plan (WQMP) dated January 17, 2025 was prepared for the Project by The Altum Group (see the full WQMP in Appenidx E).[44]

Pollutants potentially discharged from the Project site may include bacteria/viruses, heavy metals, nutrients, toxic organic compounds, sediment, trash and debris, oil and grease. Per local requirements, the Project will implement permanent Site Design Best Management Practices (BMPs), Source Control, LID Site Design (Low Impact Development), and Treatment Control BMPs where necessary. On-site retention and filtration facilities such as landscape swales and strips, biofiltration capability, an extended retention basin, a sand filter basin, an infiltratration basin, permeable pavement, and a bioretention basin will be implemented to address the pollutants of concern. The Infiltration Basin system is designed to capture 100% of a 100-year storm event and meets the City's standards.

For construction drainage, the Project would be required to implement a SWPPP to ensure that construction activities do not contaminate surface or ground water quality. The SWPPP would affirm the potential for pollutant discharge, as well as practical monitoring and reporting processes and other strategies to ensure pollutant discharge does not adversely impact water quality.

[44] Project-Specific Preliminary Water Quality Management Plan, Calhoun Street Subdivision, prepared by The Altum Group, January 17, 2025.

Adherence to these water quality requirements ensures that the Project will not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or ground water quality. Any potential impacts will remain at less than a significant levels.

b) Less Than Significant Impact. In compliance with the 2014 Sustainable Groundwater Management Act and to forecast the water demand on the Indio Subbasin, CWA along with three other local water agencies prepared a water management framework known as the Indio Subbasin Water Management Plan (CVWMP). The most recent 2022 update (Alternative Plan Update) includes forecasted water demand calculations for current and potential future customers within the Indio Subbasin Plan Area, which includes the East Indio Subbasin. The 2022 Alternative Plan Update relies on population growth forecasts supplied by the 2020 SCAG Regional Growth Forecast, SCAG Land Use Inventories, housing and employment analyses. Additionally, the water agencies have prepared a series of Indio Subbasin Annual Reports, the most recent of which explains that the actual total water use for the 2023-2024 Water Year was lower than the forecasted water use described in the 2022 Alternative Plan Update.

To estimate the Project's annual water demand for indoor use, a calculation was made based on an average household size of 4.19 people in the City of Coachella.[45] Using the California State standard for indoor residential water use of 47 gallons per capita daily (gpcd), the Project's 257 housing units would consume approximately 56.71 acre-feet per year (afy).[46]

Total Project outdoor water use for household and common area landscaping, based on CVWD outdoor irrigation factors, would be 23.83 afy.[47] The total daily water demand for all 257 homes and common area landscaping would be 80.54 af/y. Table X-1 below provides details regarding estimated indoor and outdoor water demand upon build out of the Project.

According to the Indio Subbasin Annual Report for Water Year 2023-2024, the total amount of groundwater extractions amounted to 267,495 af. Of this total amount, the urban water use sector accounted for 224,479 af.[48] The urban water use sector includes municipal, residential, commercial, golf courses and other uses. The impacts of increased urban water use on the Indio Subbasin were accounted for in the 2022 Alternative Plan Update. The Project's water demand for both indoor and outdoor uses would account for 0.036% of the urban groundwater extraction from the Indio Subbasin. To comply with the regional Sustainable Groundwater Management Plan, the Project would remain consistent with the City's water resource conservation policies outlined the General Plan and install drought tolerant landscaping and low water-use appliances. [49] Water demand by the Project would be less than significant. Table X-1 summarizes the Project's estimated domestic demand compared to the most recent groundwater extraction data for the Indio Subbasin.

45 E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

46 Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

47 Calculations based on Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

48 Indio Subbasin Annual Report for Water Year 2023-2024, Table 4-1 WY 2023-2024 Groundwater Extractions by Water Use Sector in the Indio Subbasin, March 2025.

49 City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

Table X-1
Project Water Demand

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home	Gallons per Day (gpd) per Occupant[2]	gpd/DU	Project Daily Water Demand (gpd)	Project Annual Water Demand acre-feet/year (af/y)
HH Indoor Water Use	257	4.19[1]	47[2]	197	50,629	56.71 af/y
HH Outdoor Water Use[3]	257			14.52	3,732.48	4.18 af/y
Landscaping (Common Areas acreage)	303,533 sf				17,540.65	19.65 af/y
					TOTAL	**80.54 af/y**
					2023-2024 Indio Subbasin Urban Water Use	**224,479 af**
					Project's Percentage of 2023-2024 Indio Subbasin Water Use	**0.036%**

1. California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2025.
2. CA Indoor Residential Water Use Standards, 2025-2030.
3. 250 sf per DU, City of Coachella Code of Ordinances §17.14.030.
4. Common open space includes: the park (minus parking lot), retention basins, decorative landscaped areas.
5. Outdoor water demand calculations based on CVWD Evapotranspiration (ETo), Evapotranspiration Adjustment Factor (ETAF), and Conversion Factor (CVWD Landscape Ordinance §3.15, Appendices C and D). Each residence has 250 sf of open space = 64,250 sf. Common open space = 303,533 sf.
6. DU = Dwelling Unit, HH = Household

The Project's wastewater demand was also calculated, based on an assumption that approximately 90% of domestic water use would enter the wastewater treatment system. As described above, the 2023-2024 Annual Report provides wastewater treatment data for water agencies that manage the Indio Subbasin. During 2023-2024, the City of Coachella Wastewater Reclamation Plant (WRP) treated 3,082 af of wastewater. Based on the 2023-2024 data, the Project would comprise 1.65% of the CWA total wastewater treatment. Table X-2 provides a summary of the Project's estimated wastewater demand compared to the most recent treatment data for the CSD WRP.

Table X-2
Project Wastewater Generation

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home[1]	Gallons per Day (gpd) per Occupant[1]	gpd/DU	Project Daily Wastewater Flow (gpd)	Project Annual Wastewater acre-feet/year (af/y)
Wastewater Flow	257	4.19	42.3	177.2	45,540	51
					Total 2023-2024 Acre-Feet Treated at CSD WRP	**3,082 af**
					Project's Percentage of 2023-2024 CSD WRP	**1.65%**

1. Between 60% and 90% of potable water may be sent to wastewater treatment. This estimate is based on 90%.

ci-civ) Less Than Significant Impact. The Project site is undeveloped, relatively flat, and contains no rivers or streams. The parcel slopes slightly from north to south as the elevation is -27 feet at the northeast corner and -33 feet at the southeast corner. Construction of the 39.98-acre parcel will entail the removal of mature palms, clearing, grubbing, rough and precise grading, roadway construction, the construction of 257 homes with landscaping for each lot and within common areas, and the addition of a recreational 3.13-acre park on the east side along Calhoun Street.

Proposed Drainage System

A Preliminary Hydrology Report was prepared by The Altum Group (Appendix D) which describes the Project's drainage system as it complies with the design criteria required by the City and the Riverside County Flood Control District.[50] The impermeable surfaces of the Project will increase on-site storm flows. However, the Project will direct storm runoff to flow across the surface via streets toward five different on-site retention basins. The basins will be designed to collectively retain 100% of flows from a 100-year storm event. Flows that exceed this capacity will be directed to exit the Project site and flow north on Calhoun Street to Avenue 48. Then storm water would flow eastward to the MS4 storm drain inlet facility on Van Buren Street where it would flow underground for one mile and empty into the Coachella Valley Storm Channel. On-site retention of 100-year storm flows would contain the increased runoff and prevent the Project from contributing runoff that exceeds the capacity of existing City storm drainage systems.

Compliance with Required Erosion and Pollution Mitigation

The proposed Project will be required to comply with the City's Code of Ordinances, Chapter 13.16, Water Quality Control. Included in the requirements are the approvals of a SWPPP, a project-specific final hydrology study, and a final WQMP prior to the issuance of building permits. In compliance with the National Pollutant Discharge Elimination System (NPDES) the Project will mitigate silt runoff from Project-induced erosion through the implementation of BMPs prescribed in the WQMP (Appendix E). Implementation of required BMPs will also reduce pollutants of concern that may enter nearby receiving waters and help reduce short and long-term water quality impacts caused by the construction and operation of the proposed Project. Approval of the WQMP, SWPPP, and the required BMPs will reduce impacts to surface waters by reducing erosion, siltation, and eliminating pollutants in storm flows. With the implementation of these standard requirements, the impacts to downstream water bodies associated with surface water pollution will be less than significant.

d) No Impact. According to the FEMA National Flood Hazard Layer Viewer, the Project site occurs in a flood zone X, an area of minimal flood hazard and low flood risk. The Whitewater River/Coachella Valley Stormwater Channel flows through the City 1.7 miles northeast/east of the Project site. The Stormwater Channel is the backbone of the Coachella Valley stormwater flood control system and is constructed to control as much as 80,000 cubic feet of water per second, which is greater than a 100-year storm event. Given the Project's distance from the Stormwater Channel and the flood zone X designation, impacts from flood hazards and seiches are not expected to occur. The City of Coachella is also not located near the coast and there will be no impacts from tsunami hazards.

[50] SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

e) No Impact. The Project will comply with all applicable water quality standards and will implement a SWPPP and a WQMP approved by the City of Coachella and the Regional Water Quality Control Board for both construction activities and the long-term operation of the site.

The Project will implement the City's drought-tolerant landscaping requirements and adhere to water conservation strategies established in the General Plan. Estimated operational annual water demand will be 0.036% of the total urban use groundwater extraction from the Indio Subbasin, which will be an incremental portion of the local water supply. Also, the water demand by the Project was included in the 2022 Alternative Plan Update forecasted water demand calculations for the years 2020-2045, since the Project is consistent with the land use designation for the site. As documented by the 2023-2024 Annual Water Report for the Indio Subbasin, the actual water demand on the Indio Subbasin between 2020 and 2024 was lower than the forecasted demand by 50,000 af. Water demand for the region has not expanded as quickly as previously forecasted, meaning the Project's water use impacts on the groundwater source will be less significant given the groundwater savings that have occurred over the past five years.

In summary, the Project would not obstruct the implementation of the City's water quality control plan or the region's sustainable groundwater management plan. There would be no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

2020 Coachella Valley Regional Urban Water Management Plan, June 30, 2021

2023 Water Quality Consumer Confidence Report, Coachella Water Authority and Sanitary District, issued July 2024

City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.
City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

Indio Subbasin Annual Report for Water Year 2023-2024, Tables 4-1, 5-10 WY 2023-2024, March 2025.

Project-Specific Preliminary Water Quality Management Plan, Calhoun Street Subdivision, prepared by The Altum Group, January 17, 2025.

E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2024.

Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

Fuel Consumption Rate Factors, Table D-21," Carl Moyer Program Guidelines, Volume I: Program Overview, California Environmental Protection Agency Air Resources Board, June 20, 2017

XI. LAND USE AND PLANNING **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				✓

Environmental Setting
The City's General Plan 2035 Update governs the development of this Project site. The City established Subareas to guide land uses and zoning as the City continues to grow. The Project is in the West Coachella Neighborhoods Subarea 1; the land use and zoning designations for the subject parcel are both "General Neighborhood," and the surrounded land use and zoning designations are "Suburban Neighborhood."[51]

The City participates in the regional Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), and the subject parcel is within a fee area and is subject to development impact fees associated with the CVMSHCP.

The planning and construction of the proposed Calhoun Street Housing Development is guided by a Planned Unit Development (PUD) document which establishes specific land uses, intensity of use, and development standards for the Project while remaining consistent with the City's General Plan and Zoning regulations.

a) No Impact. The adjacent residential neighborhoods to the north and south are independently operated communities and will not be divided by the proposed Project. The 38-acre parcel to the east on the other side of Calhoun Street contains one single-family residence. The neighboring 35-acre parcel to the west is in the City of Indio and is currently being developed as a single-family residential use. Development on these parcels will be unaffected by development on the Project site, since each parcel will be, or has been developed as an independent community. The Project will not divide an established community. No impact will occur.

b) No Impact. The General Neighborhood land use and zoning designations for the Project site as established by the City's General Plan 2035 Update permit the development of both single- and multi-family housing units with a density of 7 to 25 dwelling units per acre. The proposed Project is consistent with these stipulations and supports the City's General Plan. The location of the Project site is not in a designated conservation area per the CVMSHCP and will not impact this environmental plan. There are no environmental conflicts with respect to the land use policy or adopted environmental mitigation policy. No Project impacts are expected.

[51] General Land Use Designations, City of Coachella General Plan Update 2035, updated April 2015.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan Update 2035, updated April 2015

City Land Use Map, City Zoning Map

XII. MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				✓
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				✓

Environmental Setting
Mineral resources in City's Planning Area include gravel, clay, oil, gas and geothermal commodities. Subarea 17, known as Eastern Coachella, contains two mineral resource zones designated as MRZ 2a, where mineral resources are significant. Two permitted mining operations occur in these zones.

Discussion of Impacts

a, b) No Impact. According to Figure 4.5-9 of the General Plan Update 2035 Environmental Impact Report, much of the City west of the Whitewater River/Coachella Valley Stormwater Channel is designated as an MRZ 1, an area where there the presence of significant mineral resources is unlikely due to the geologic formation. Since there are no mineral resources of value to the state, region or the local area in the MRZ 1, and the Project is located in this zone, the Project will not result in any loss of availability of valuable mineral resources. There will be no impacts.

Mitigation Measures: None required.

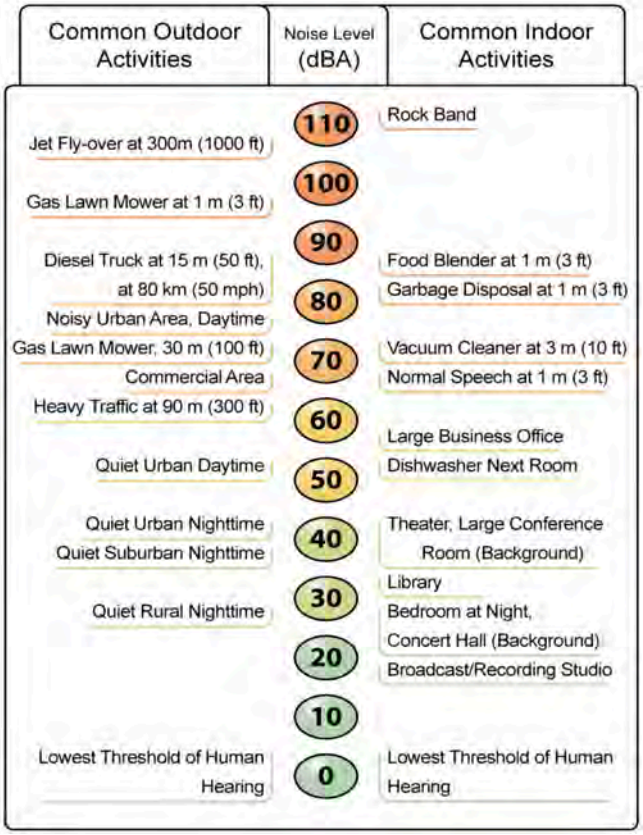
Monitoring: None required.

Sources:
City of Coachella General Plan Update Final EIR, October 2014

XIII. NOISE **Would the project result in:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓

Environmental Setting

Ambient noise are background sounds emitted from a variety of sources and can either be unintrusive sounds from wind, wildlife, and neighborhood activity, or intrusive sounds from construction equipment, traffic, landscaping equipment, mechanical equipment such as HVAC systems, barking dogs, radios and stereo systems, and so forth. Noise levels are expressed as decibels (dB). The A-weighted decibel scale (dBA) filters out very high and very low frequencies such that the scale correlates to the sound a human ear would detect. 25 dBA is a very quiet sound such as a rural nighttime environment, 50 dBA would be the noise level of a refrigerator running, 80 dBA is the noise level of a tractor idling, and 105 dBA would be a louder sound such as a jet flying overhead. Exposure to 70 dBA noise level and higher over certain periods of time can damage a person's hearing.



Source: Standard Environmental Reference, CalTrans, February 2018.

To measure noise for city planning purposes, the Community Noise Equivalent Level (CNEL) scale is applied as it measures the average intensity of a sound over a 24-hour period. CNEL scale measures sound levels by assigning heavier dBA weights, or adding decibel "penalties," to existing sound dBA levels if those sounds occur in either certain sensitive zones or during unpermitted times. Figure XIII-1 provides the City's acceptable CNEL for residential land uses.

Figure XIII-1
General Plan CNEL Levels

LAND USE CATEGORIES		CNEL						
CATEGORIES	USES	55	60	65	70	75	80	
RESIDENTIAL	Single Family, Duplex, Multiple Family							
RESIDENTIAL	Mobile Homes							
COMMERCIAL - Regional, District	Hotel, Motel, Transient Lodging							
COMMERCIAL - Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater							
COMMERCIAL INDUSTRIAL	Office Building, Research and Development, Professional Offices, City Office Building							
COMMERCIAL - Recreation INSTITUTIONAL - Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall							
COMMERCIAL - Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club							
COMMERCIAL - General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities							
INSTITUTIONAL - General	Hospital, Church, Library, School Classroom							
OPEN SPACE	Parks							
OPEN SPACE	Golf Couse, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat							
AGRICULTURE	Agriculture							

INTERPRETATION

ZONE A (GREEN) CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.
ZONE B (YELLOW) NORMALLY COMPATIBLE	New construction or development should be undertaken only after an analysis of the noise reduction requirements is made and needed noise insulation features included in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning will normally suffice.
ZONE C (ORANGE) NORMALLY INCOMPATIBLE	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D (RED) CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

* Construction of new residential uses will not be allowed within the 65 dBA CNEL contour for airport noise.

Groundborne vibrations can be characterized as rumbling sounds which travel through the ground. Typically groundborne vibrations from human activity such as construction activity, heavy traffic, or jet planes flying overhead are felt indoors and are rarely a problem outdoors. Construction equipment may be categorized as either continuous vibration (excavation and grading equipment), low-rate repeated impact vibration (blasting, drop balls, impact pile drivers), or high-rate repeated impact vibration (jackhammers, hoe rams). The duration and amplitude of groundborne vibration from construction equipment varies. A blast would emit a high amplitude over a short duration, but grading equipment would emit a low amplitude over a longer duration.[52] Groundborne vibration as it relates to disturbance to people is measured in vibration decibels (VdB). Vibration veloctiy level of 65 VdB is considered to be barely perceptible by humans and a lower vibration velocity would be undetectable.

"Sensitive receptors" is a CEQA label granted to land uses where there are people in the community who may be particularly sensitive to noise such as residential areas, schools, libraries, churches, nursing homes, health care facilities. Four sensitive receptors are in proximity to the Project site. Two residential neighborhoods occur on adjacent properties; one single-family neighborhood is immediately south and the other single-family neighborhood is to the west in the City of Indio. Both are separated from the Project site by 6-foot block walls. A third single-family community occurs to the north across Avenue 49, and is also is bounded by a six-foot concrete block wall. Finally, the fourth sensitive receptor is a single residence to the east on the opposite side of Calhoun Street approximately 68 feet from the Project boundary.

The City's Noise Element of the General Plan provides goals and policies for ensuring that noises are maintained at appropriate levels for the various land uses. Within single- and multi-family residential land uses, 55-70 CNEL dBA are compatible exterior noise levels for the land use, but noise levels above 70 CNEL dBA are incompatible noise levels. The City Noise Ordinance provides guidance for controlling incidents of incompatible noise levels. Construction activities are exempted from the Noise Ordinance with the condition that they occur within acceptable hours of the day.[53]

Discussion of Impacts

a, b) Less Than Significant Impact. The addition of 257 new homes will increase ambient noise levels for the surrounding neighborhoods during the construction period and during the on-going operational phase. As described above, two residential communities immediately border the Project site and are separated by a six-foot block wall. The third community is further from the Project site on the north side of Avenue 49, and the single residence on the east side of Calhoun is the furthest from the Project site.

Construction Phase Impacts:
The construction equipment may generate intermittent noise as well as mild groundborne vibration. At a distance of 25 feet, a large bulldozer may produce 87 VdB, and a loaded truck could generate 86 VdB.[54] However, construction equipment moves across a site during grading, and the construction phase is temporary and all impacts related to vibration will stop when construction is complete. Table XIII-1 provides typical Equivalent Energy Levels (L_{eq}) for construction equipment and construction

[52] Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020.

[53] City of Coachella Code of Ordinances, Title 7.04 Noise Control.

[54] "Transit Noise and Vibration Impact," Federal Transit Administration, May 2006.

phases from a 50-foot distance away from the piece of equipment or the loudest piece of equipment during a phase. L_{eq} is understood as the average sound pressure level over a period of time, usually one hour. If the sound level varies, the L_{eq} is a calculation of the average sound level over one hour.

Table XIII-1
Noise Levels from Construction Equipment and Phases

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Generator	76
Portable air compressor	81
Concrete mixer	85
Backhoe	85
Dozer	87
Dump truck	88
Scraper	88
Jackhammer	88
Paver	89
Rock drilling	98
Construction Phase	**Noise Level (dBA, Leq at 50 feet)**
Foundations	78
Ground clearing	84
Erection	85
Excavation	89
Finishing	89
Rock blasting	115

Source: "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," US Environmental Protection Agency, December 1971.

A noise level decreases by 6 dBA as the distance from the sound source doubles. If a noise from a generator produces 76 dBA at a distance of 50 feet, then the sound level would decrease to 70 dBA at 100 feet away, and 64 dBA at a distance of 200 feet. During construction, the noise would not emanate from one fixed location, but rather, as the equipment moves, nearby receptors would not be exposed to construction noise from a fixed location during the entire construction period. The homes located to the south of the Project site could experience unmitigated noise levels of 78-89 dBA during construction, as equipment moves across the site. The existing perimeter wall, which is made of solid masonry construction, would reduce the noise levels by at least 6 dBA, which would further attenuate construction noise on adjacent lots. As the construction completes, the noise would no longer occur.

As stated above, construction activities are exempt from the Noise Ordinance with the condition that they occur within acceptable hours of the day.[55] The City's Municipal Code §7.04.070 specifies days and hours when construction activity is permitted. These hours are confined to less sensitive daytime hours, which reduces impacts from noise. Table XIII-2 provides the permitted days and times for construction activities.

[55] City of Coachella Code of Ordinances, Title 7.04 Noise Control.

Table XIII-2
Hours for Construction Activities

Construction Activities	October 1 – April 30	May 1 – September 30
Monday - Friday	6:00am – 5:30pm	5:00am – 7:00pm
Saturday	8:00am – 5:00pm	8:00am – 5:00pm
Sunday	8:00am – 5:00pm	8:00am – 5:00pm
Holidays	8:00am – 5:00pm	8:00am – 5:00pm

The temporary nature of construction, the existence of the perimeter wall for the subdivision to the south, and the City's time restrictions on when construction may occur would confine the increases in ambient noise levels and groundborne vibration from construction activity to less than significant impacts.

Operational Phase Impacts:
Noise produced by residents would be consistent with noise produced from neighboring residential communities and would be subject to the City's Noise Control Ordinance §7.04.

The Project is subject to the City's Municipal Code §7.04.075 which defines permitted times for on-going property maintenance activities, including landscaping, as shown in Table X-III3. Tables XIII- 4 below provides the permitted hours for fixed noise sources which include stationary pieces of equipment such as air conditioners, pumps, fans, and refrigerators.

Table XIII-3
Hours for Property Maintenance Activities

Property Maintenance Activities	October 1 – April 30	May 1 – September 30
Monday - Sunday	9:00am – 5:30pm	8:00am – 5:30pm
Holidays	Not permitted	Not permitted

Table XIII-4
Permitted Sound Levels for Fixed Noise Sources

Zone	Time	Applicable 10-Minute Avg CNEL dBA (Exterior)
All Residential Zones	6:00am – 10:00pm	55
All Residential Zones	10:00pm – 6:00am	45
All Commercial Zones	6:00am – 10:00pm	65
All Commercial Zones	10:00pm – 6:00am	55

The City's General Plan Update EIR reports the CNEL dBA for existing roadway noise. The Project is located at the intersection of Avenue 49 and Calhoun Street. Calhoun Street north of Avenue 48 where it extends between two single-family residential neighborhoods, is rated as a 65 dBA CNEL at a distance of 50 feet from centerline. At the Project build out, a similar condition may be expected for Calhoun Street south of Avenue 49 to Avenue 50. Since the City's standard for residential units is 65 dBA CNEL, the Project's residents will not experience noise levels in excess of the City's standard, and impacts from roadway traffic will be less than significant.

The location of the Project in the West Coachella Neighborhoods Subarea aligns with the City's General Plan and would not introduce noise that is unexpected or inappropriate for the land use. During the operational phase, residential land use would not generate groundborne vibration. The City's Noise Control Ordinance also ensures that all receptors are protected from inappropriate or excessive noise. The operational phase would result in less than significant impacts.

c) No impact. The Jacqueline Cochran Regional Airport is located 3.66 miles southeast of the Project, and the Airport Influence Area boundary is 1.9 miles southeast. Due to this distance, people residing and working in the Project area would not be exposed to excessive noise from the airport. No impact is expected to occur from airport noise.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella Code of Ordinances, Title 7.04 Noise Control

"Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," US Environmental Protection Agency, December 1971.

Standard Environmental Reference, CalTrans, February 2018.

Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020

"Transit Noise and Vibration Impact," Federal Transit Administration, May 2006

XIV. POPULATION AND HOUSING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			✓	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

Environmental Setting

The population of the City of Coachella is approximately 44,384,[56] and by the 2045, the population could potentially expand to 129,300.[57] The number of households are also expected to increase from 9,600 households in 2019 to an estimated 35,600 households by 2050. Furthermore, the number of jobs in Coachella is expected to expand from 8,900 in 2019 to 17,200 in 2035 and up to 23,200 by 2050.[58] To accommodate this growth, the City requires an increase in housing opportunities. By 2035, the City plans to provide approximately 45% of its housing with single-family units and 55% with multi-family units.[59]

Discussion of Impacts

a) Less Than Significant Impact. The City uses a system of Subareas to guide growth and development to minimize environmental impacts by concentrating residential growth in areas closer to the downtown area rather than expanding outward into remote Subareas. This strategy increases access to alternative transportation corridors and reduces commute time to City employment areas. The Project would be located in Subarea 1, West Coachella Neighborhoods, an area specifically positioned to accommodate more housing.

According to the 2025 Population and Housing Estimates from the California Department of Finance, the average persons per household in Coachella is 4.19. The Project proposes to build 257 homes, which would result in an additional 1,077 people. If the City's population increases by 129,300 people by 2045 as described above, then the Project would contribute 0.83% of that growth. Also, using the household estimates provided above, the City could see a growth of 36,500 households by 2050, and

[56] Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, Department of Finance, May 2025.

[57] "Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS, Southern California Association of Governments.

[58] "Demographics and Growth Forecast Technical Report," 2024-2050 RTPSCS, Southern California Association of Governments.

[59] Final EIR for the City of Coachella General Plan 2035 Update, April 2015.

the Project's 257 units could represent 0.7% of that growth. The City has projected the population to grow and has planned to accommodate this growth by setting aside specific areas where residential growth could reasonably occur. The City's population growth has been accounted for and planned, the Project complies with those plans, and Project impacts to population growth would be less than significant.

The Project proposes to improve Avenue 49 to allow residents to access one of the driveways on the north side. This would reduce potential congestion on Calhoun Street where the second driveway access would be placed. Improving Avenue 49 would also provide additional east-west road access to Jackson Street, which would improve circulation in this section of the City.

The Project's new homes would be located in an area where existing utility infrastructure has already been installed for residential neighborhoods immediately north and south of the Project site. The Project would not necessitate the expansion of new infrastructure. Impacts to City infrastructure would be less than significant.

b) No Impact. The Project site is currently vacant. The proposed homes would not displace existing residents or require the construction of replacement housing in another location. The Project would result in no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella General Plan Update 2035 Environmental Impact Report, 2014.

Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, Department of Finance, May 2024

"Demographics and Growth Forecast Technical Report," from 2020-2045 & 2024-2050 RTPSCS, Southern California Association of Governments.

XV. PUBLIC SERVICES Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?			✓	
b) Police protection?			✓	
c) Schools?			✓	
d) Parks?			✓	
e) Other public facilities?			✓	

Environmental Setting

The 257 new residences proposed by the Project could potentially add 1,077 people to the City, which would pose a minor increase in the demand for public services. The City imposes a development impact fee of $267 per dwelling unit for new residential developments to support the additional costs associated with increased demand for fire, police, street facilities, parks, and library services and general government facilities.[60]

Fire Protection

The City of Coachella contracts with the Riverside County Fire Department (RCFD) to receive fire protection services including fire suppression, fire prevention, and hazardous materials response. The RCFD also provides emergency medical services including paramedic services and urban search and rescue. RCFD Station 79 is currently the only station in the City. Located at 1377 6th Street, the station is 2.53 miles southeast of the Project site. The station is staffed by 18 full-time personnel including six firefighters on duty, ten volunteer firefighters, and 10 explorer cadets. The national standard for fire service is one firefighter staff per 1,000 residents, and the City has 0.4 staff per 1,000 residents according to the 2014 General Plan EIR. Recommendations have been made to add another station and increase the number of personnel.[61]

Police Protection

The Riverside County Sheriff's Department is contracted by the City to provide police services. The police station is located at 86625 Airport Boulevard, in the community of Thermal, 6.6 miles southeast from the Project site. As of the 2014 General Plan EIR, there are 26 sworn positions and five non-sworn support staff serving the City, which at the time, equated to a ratio of 0.64 sworn officers per

60 City of Coachella Code of Ordinances, §4.45.130, updated June 26, 2024.

61 City of Coachella General Plan 2035 Update EIR, June 2014.

1,000 residents. The ratio recommended by the Riverside County Sheriff's Department is 1.3 staff per 1,000 residents.

In addition to patrol and enforcement activities, police protection services provided by contract to the City include: SWAT, Hostage Negotiations Team, Forensic Services Team, Traffic Reconstructions, Canine Units, Hazardous Device Team, Coachella Valley Narcotics Task Force, Coachella Valley Violent Crime Gang Task Force, Central Homicide Unit-East, Aviation Unit, Dive Team, Desert Search and Rescue, Sheriff's Mounted Posse, and Explorer Post #503.

Schools

Coachella Valley Unified School District (CVUSD) serves the City with K-12 educational services. As of 2022, the school district's student capacity was 21,004 students, and the 2022-23 enrollment was 16,497. The school district operates 14 elementary schools, 3 middle schools, four high schools, and one adult school. College of the Desert is the local community college serving all Coachella Valley cities.

Parks

The City of Coachella has a total of nine parks comprising 60.2 acres. The park facilities include community parks with a full range of recreational amenities, mini parks and tot lots. From the Project site, Rancho Las Flores is the nearest public park at 1.22 miles away.

The Proposed Project will have limited impact on Public Services, as discussed below.

Discussion of Impacts

a) Less Than Significant Impact. In cooperation with the RCFD, the City proposes to increase the ratio of firefighters to residents to 2.0 personnel per 1,000 residents and construct more fire stations such that fire protection would be within a 1.5-mile radius and the response times would be no more than five minutes.[62]

The Fire Planning Division with in the RCFD reviews all proposed developments to guarantee compliance with standards, codes and regulations. Response times, fire station locations and equipment availability, and the increase of calls are assessed. In addition, access to, from and throughout the Project development would be reviewed by the fire department.

The City has planned to accommodate the increased need for fire protection services, and the Project would be required to comply with the City and RCFD safety standards and pay the development impact fee to mitigate costs associated with providing fire protection. Due to these requirements and on-going planning for growth, the Project would result in a less than significant impact on the City's fire protection services.

b) Less Than Significant Impact. The Project would potentially increase the number of calls for police service, but the increase would be minor. To maintain adequate protection for a growing population, the City proposes to raise the ratio of police officers per 1,000 people to 1.3.[63] Emergency

[62] Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015.

[63] Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015.

police access to the Project could be facilitated by Avenue 49 and Calhoun Street locally, both of which connect to larger streets, Jackson Street and Avenue 50.

The Project would comply with all Riverside County Sheriff's Department procedures, regulations and policies. The development impact fee required for each dwelling unit would mitigate the associated costs of providing police protection services. Impacts to police protection services would be less than significant.

b) Less Than Significant Impact. As new dwelling units are built and the population increases, the school district plans future expansion needs by applying a student generation rate calculation to estimate the number of new students added to the district. The Project proposes to construct 257 new single-family homes. Using the CVUSD's most recent student generation rates, the Project could potentially add 143 students to the school district. This would not be a significant impact considering the school district enrollment is lower than its capacity at this time.

To meet the costs of accommodating additional students, the Project would be subject to CVUSD developer fees, which are calculated on a square foot basis. As of January 16, 2023, new residential construction is required to pay $4.79 per square foot. The school developer fee would mitigate any impacts associated with the Project's student generation. The estimated total square feet for the Project's 257 homes would be approximately 460,913 x 4.79 = $2,207,773. With the implementation of the fee, the Project would offset the costs of the additional enrollments and impacts to educational services would be less than significant.

Table XV-1
Project Student Generation

School Level	Student Generation Rate	Students Generated by Project (rate x 257 rounded)
Elementary School (TK-6)	0.2942	76
Middle School (7-8)	0.0849	22
High School (9-12)	0.1742	45
Total		**143**

Source: Coachella Valley Unified School District Fee Justification Study for New Residential and Commercial/Industrial Development, November 2, 2022.

d, e) Less Than Significant Impact. The applicant proposes to construct a 3.13-acre public park as part of the Project. The park would include a walking trail, playground equipment, basketball court, and a small parking lot which will be available to the public. While the public can access the park via the parking lot, pedestrian gates would allow residents to access the park from the Project. More information regarding the City's park facilities is provided in Section XVI Recreational Resources. The Project would not result in substantial adverse physical impacts or create the need for new park facilities.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella Code of Ordinances, §4.45.130, updated June 26, 2024

City of Coachella General Plan 2035 Update EIR, June 2014.

Coachella Valley Unified School District Fee Justification Study for New Residential and Commercial/Industrial Development, November 2, 2022

Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015

XVI. RECREATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			✓	
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			✓	

Environmental Setting

The City of Coachella maintains nine parks comprising a total of 60.2 acres. The park facilities include a range of amenities from Bagdouma Park, which encompasses 46 acres and provides a full suite of amenities such as a swimming pool, tennis courts, sports fields, and a playground to Dateland Park which provides skateboarding features, and mini parks and tot lots. The newest city park, Rancho Las Flores, is the nearest public park to the Project at 1.22 miles away.

The City is also located within the Desert Recreation District (DRD) boundary, the largest park and recreation district in California. The DRD offers services, programs and classes across 1,800 square miles of the Coachella Valley extending from Cathedral City to the communities of Mecca and Oasis. In the City of Coachella, the DRD operates programs at Bagdouma and Rancho Las Flores parks.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project would not significantly increase the use of existing neighborhood park facilities, nor would it result in the expansion of public recreational facilities. At buildout, the Project would include approximately 257 single family residences, which could potentially house 1,077 people.[64] As described in the Section XV, Public Services, the Project proposes to construct a 3.13-acre public park. Included in the park design is a walking trail, playground equipment, basketball court, ramadas with picnic tables, and a small parking lot which would be available to the public.

All new development is required to pay the City's development impact fee, a percentage of which is dedicated to maintaining the City's public parks. The required development impact fee and the Project's proposed park facility would mitigate potential impacts of additional park goers affecting City recreation facilities and reduce impacts to less than significant levels.

Mitigation Measures: None required.

64 California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2024.

Monitoring: None required.

Sources:
City of Coachella Parks and Recreation

Desert Recreation District

California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2024

XVII. TRANSPORTATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?		✓		
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			✓	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
d) Result in inadequate emergency access?				✓

Environmental Setting

The transportation system throughout the City of Coachella is comprised of roadways from two-lane country roads to six-lane major arterials with bicycle facilities. Higher capacity corridors such as Hwy 111, State Highway 86 and Interstate 10 provide regional access to and from the City. Multiple jurisdictions including the federal government, California Department of Transportation, Riverside County Transportation Department, and the City manage different components of the transportation system. The City's Mobility Element of the General Plan Update emphasizes goals of developing more alternative transportation routes to increase accessibility throughout the City including bicycle routes, pedestrian trails and low-speed electric vehicles.

The City applies a Level of Service (LOS) metric when assessing the performance of the transportation network and intersection delays. LOS provides a ranked measurement of roadway operating conditions, that ranges from "A" (free flow, best conditions) to "F" (worst conditions, serious delays, and system failure). The General Plan establishes LOS D as the minimum acceptable level of service for Coachella.

Senate Bill 743 (2013) updates the methodology for analyzing transportation impacts by projects to more accurately measure transportation-related air pollutants and greenhouse gas emissions, and to more effectively reduce emissions via the development of multimodal transportation networks and diversification of land uses. CEQA Guidelines section 15064.3 describes the use of Vehicle Miles Traveled (VMT) as the metric by which to measure project transportation impacts. However, certain projects are exempt from preparing a VMT analysis.

Urban Crossroads prepared a Traffic Analysis for the Project in September 2024 based on a total of 259 dwelling units. A copy of the Traffic Analysis is provided in Appendix F.[65] Since then, the number of dwelling units has been reduced to 257, which means the Traffic Analysis data represents a marginally more conservative analysis of Project conditions. The opening year for the Proposed Project is assumed to be 2026. The Traffic Analysis evaluates potential deficiencies in the City's circulation system that may result from the Project and recommends improvements to the Project and the City's circulation system to achieve the acceptable LOS. A VMT letter was also prepared, and is included in Appendix G.

Discussion of Impacts

a) Less Than Significant Impact with Mitigation Incorporated. If a project conflicts with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, then its impacts would be significant. The Project's land uses are consistent with the City's General Neighborhood land use and zoning for the parcel. The applicant proposes to build a 257-unit single-family residential neighborhood with a 3.13-acre park. Access to the Project will be facilitated by two driveways allowing vehicle entry and exit from Calhoun Street, a Collector Roadway, and Avenue 49, a Primary Arterial Roadway. Pedestrian access will be provided by new sidewalks and 26-foot landscaped setbacks along the north and east Project boundaries.

Proposed Site-Adjacent Street Improvements

The applicant proposes to construct the following improvements to assure compliance with City standards:

- Avenue 49 Improvements:
  - For 1,300 linear feet between Calhoun Street and the Project's northwesterly site boundary, the Project will provide full-width street improvements as a Primary Arterial roadway including curbs, gutters, six-foot sidewalks and landscaping on both sides. Along the Project frontage, a 26-foot landscaped setback will be provided.
- Calhoun Street Improvements:
  - For 1,300 feet from the Project's northerly site boundary to the southerly site boundary, the Project will widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with a landscaped parkway and a bicycle lane, Also, a six-foot sidewalk and a 26-foot landscaped setback will be included.
  - At the Calhoun Street / Avenue 49 (#3) intersection, the Project will install a new traffic signal with potential future reimbursement contingent upon cumulative development activity.
  - On the Project's easterly boundary, public pedestrian access to the 3.13-acre public park from Calhoun Street will be provided. In addition, to a small parking lot will be publicly accessible from the Calhoun Street community entrance. subject to park development access and parking plans (to be determined).

These improvements are consistent with the City's standards, and will assure that adjacent roadways are developed consistent with their General Plan roadway classification.

[65] Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

The City requires that all intersections achieve at least an LOS D during morning and evening peak hours. The following scenarios were analyzed for the purpose of assessing the impact of the Project on intersection Level of Service (LOS):

- Existing (2024) Conditions
- Existing plus Ambient plus Project (EAP) (2026)
- Existing plus Ambient plus Cumulative (EAPC) (2026)

Table XVII-1 provides a list of intersections that were analyzed in the Traffic Analysis study area.

Table XVII-1
Intersection Analysis Locations

ID	Intersection Location
#1	Calhoun St. / Dr. Carreon Blvd.
#2	Calhoun St. / Avenue 48
#3	Calhoun St. / Avenue 49
#4	Calhoun St. / Avenue 50
#5	Jackson St. /Avenue 49-Odlum Dr.
#6	Calhoun St. / Access 1
#7	Access 2 / Avenue 49

The City's standards provide that a project's traffic impact is significant if the project degrades intersection level of service to an unacceptable level below LOS D, or if a project causes an intersection already at LOS E to degrade to LOS F. At intersections, an increase in delay of 2 seconds or more at existing LOS E intersections, or 1 second or more at LOS F intersections caused by a project would also be considered a significant impact.

Table XVII-2 provides an overview of intersection LOS during existing (2024), EAP (2026), and EAPC (2026) conditions. Below, these sets of conditions are discussed in more detail.

Table XVII-2
Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions

Intersection	Existing (2024)		EAP (2026)		EAPC (2026)	
	AM	PM	AM	PM	AM	PM
#1 Calhoun St. / Dr. Carreon Blvd.						
• Without improvements	🔴	🟢	🔴	🟡	🔴	🔴
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#2 Calhoun St. / Avenue 48	🟢	🟢	🟢	🟢	🟢	🟢
#3 Calhoun St. / Avenue 49						
• Without improvements	🔴	🟢	🔴	🟡	🔴	🔴
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#4 Calhoun St. / Avenue 50	🟢	🟢	🟢	🟢	🟢	🟢
#5 Jackson St. / Avenue 49-Odlum Dr.						
• Without improvements	🔴	🟢	🔴	🟢	🔴	🟡
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#6 Calhoun St. / Access 1	N/A	N/A	🟢	🟢	🟢	🟢

Table XVII-2
Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions

Intersection	Existing (2024)		EAP (2026)		EAPC (2026)	
	AM	PM	AM	PM	AM	PM
#7 Avenue 49 / Access 2	N/A	N/A	●	●	●	●

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
Legend: ● LOS A-D ● LOS E ● LOS F

Existing (2024) Traffic Conditions

Existing traffic conditions offer a baseline against which the proposed Project's impact may be measured. The Project site is currently vacant and generates no traffic. Adjacent roads include Calhoun Street, a north-south Collector with Bicycle Facility and Avenue 49, an east-west unimproved path. Nearby roads include Jackson Street, a north-south Collector, and Avenues 48 and 50, which are east-west roadways classified as Major Arterial with Bicycle Facility. To measure existing (2024) traffic counts, data was collected in January and July 2024 during two peak hour timeframes: 7:00 and 9:00 AM, and 4:00 and 6:00 pm.

For Existing (2024) traffic conditions, three unsignalized study area intersections operate at unacceptable LOS of E or F: Calhoun St. / Dr. Carreon Blvd. (#1); Calhoun St. / Avenue 49 (#3); and Jackson St. / Avenue 49-Odlum Dr. (#5). All three intersections currently meet the traffic volume warrants for installation of a traffic signal based on existing traffic counts. Table XVII-3 summarizes existing traffic conditions for each study area intersection.

Table XVII-3
Intersection Analysis for Existing (2024) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs)		Level of Service	
		AM	PM	AM	PM
#1 Calhoun St. / Dr. Carreon Blvd.	AWS	>80	28.7	F	D
#2 Calhoun St. / Avenue 48	TS	32.2	28.6	C	C
#3 Calhoun St. / Avenue 49	AWS	51.2	20.3	F	C
#4 Calhoun St. / Avenue 50	TS	33.1	28.5	C	C
#5 Jackson St. / Avenue 49-Odlum Dr.	AWS	51.9	23.0	F	C
#6 Calhoun St. / Access 1	Future Intersection				
#7 Avenue 49 / Access 2	Future Intersection				

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control.

Project Trip Generation

The Traffic Analysis applied two land use codes to calculate the potential number of trips generated by the Project. The first code was derived from the Institute of Transportation Engineers (ITE) Land Use Code for Single Family Detached housing, and the second was supplied by the San Diego Association of Governments (SANDAG) for City Park. At the time that the Traffic Analysis was prepared, the Project included a 1.5-acre park with a dog run, which would have generated more trips

than a park without dog run. SANDAG provided a more appropriate land use code to account for the higher number of park trips. Additionally, as explained above, the number of dwelling units was changed from 259 to 257 after the Traffic Analysis was prepared. Hence, the Traffic Analysis provides a more conservative trip generation calculation. On a daily basis, the residential units and the park are anticipated to generate 2.517 trips. Table XVII-4 shows the total daily trips and the total AM and PM peak hour trips that the Project may generate as estimated by ITE and SANDAG.

Table XVII-4
Project Daily Trip Generation

Land Use	Land Use Code	Quantity	Total Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Single Family Detached	210[1]	259 units[2]	2,442	182	244
Park (with Dog Run)	---	1.5 acres[3]	75	10	6
		Project Total	**2,517**	**192**	**250**

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024
1. Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).
2. In September 2024, the Traffic Analysis assumed 259 dwelling units. The Project currently includes 257 units.
3. In September 2024, the Traffic Analysis assumed a 1.5-acre park with a dog run, which would've generated more trips than a park without a dog run. SANDAG provided the trip generation estimate for a city park with a higher volume of trips to account for the dog run.

Existing Plus Ambient Plus Project (EAP) (2026) Conditions

EAP (2026) includes Existing (2024) volumes, ambient growth traffic calculated at an increase of 4.04% over two years, and the Project traffic. Per the Traffic Analysis, no additional intersections are expected to operate at unacceptable LOS during peak hours beyond the above-described three intersections which currently operate with deficiencies without the Project. Traffic signal installation at each of the three intersections would sufficiently address the deficiencies, and result in acceptable operations, as shown in Table XVII-2, above.

Intersection #6 Calhoun Street / Access 1 currently operates at an acceptable LOS for EAP conditions, however, it meets the volume warrants for installation of a traffic signal. At this time, the installation of a traffic signal at intersection #6 is not recommended because the intersection is expected to operate at an acceptable LOS for EAP (2026) and EAPC (2026) conditions with cross-street stop control. Also, access to the Project is provided at the Access 2 / Avenue 49 (#7) intersection, which is anticipated to operate at LOS "A" during peak hours for both EAP (2026) and EAPC (2026) conditions. See Table XVII-5 for a summary of the EAP (2026) conditions.

Table XVII-5
Intersection Analysis for EAP (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	Delay[2] (secs) PM	Level of Service AM	Level of Service PM
#1 Calhoun St. / Dr. Carreon Blvd.					
• With existing All Way Stop	AWS	>80	41.7	F	E
• *With traffic signal improvement*	*TS*	*39.0*	*31.9*	*D*	*C*
#2 Calhoun St. / Avenue 48	TS	33.7	30.3	C	C
#3 Calhoun St. / Avenue 49					
• With existing All Way Stop	AWS	>80	46.2	F	E
• *With traffic signal improvement*	*TS*	*10.4*	*7.9*	*B*	*A*
#4 Calhoun St. / Avenue 50	TS	34.3	29.3	C	C
#5 Jackson St. / Avenue 49-Odlum Dr.					
• With existing All Way Stop	AWS	74.2	35.0	F	D
• *With traffic signal improvement*	*TS*	*12.4*	*9.2*	*B*	*A*
#6 Calhoun St. / Access 1	CSS	27.3	25.1	D	D
#7 Avenue 49 / Access 2	CSS	8.7	8.8	A	A

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross-Street Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control. For intersections with cross street stop control, the delay and LOS for the worst individual movement (or movement sharing a single lane) are shown.

Existing Plus Ambient Plus Project Plus Cumulative (EAPC) (2026) Conditions

EAPC (2026) includes existing (2024) volumes, ambient growth traffic calculated at an increase of 4.04% over two years, the Project traffic, and traffic from cumulative development proposed in the area. No additional intersections are expected to operate at unacceptable LOS levels during peak hours for the EAPC 2026 traffic conditions. As described in the previous paragraphs, installation of traffic signals at the currently deficient intersections would address the deficiencies and improve the LOS for the three intersections. The installation of a traffic signal at intersection #6 Calhoun Street / Access 1 is not recommended as the intersection is expected to operate an acceptable LOS with a cross-street stop control under EAPC (2026) conditions.

Table XVII-6 summarizes future EAPC (2026) traffic conditions for each study area intersection.

Table XVII-6
Intersection Analysis for EAPC (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	Delay[2] (secs) PM	Level of Service AM	Level of Service PM
#1 Calhoun St. / Dr. Carreon Blvd.					
• With existing All Way Stop	AWS	>80	>80	F	F
• *With traffic signal improvement*	*TS*	*43.6*	*32.6*	*D*	*C*
#2 Calhoun St. / Avenue 48	TS	34.7	31.0	C	C

Table XVII-6
Intersection Analysis for EAPC (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	PM	Level of Service AM	PM
#3 Calhoun St. / Avenue 49					
• With existing All Way Stop	AWS	>80	75.4	F	F
• *With traffic signal improvement*	*TS*	*10.9*	*7.8*	*B*	*A*
#4 Calhoun St. / Avenue 50	TS	37.8	30.5	D	C
#5 Jackson St. / Avenue 49-Odlum Dr.					
• With existing All Way Stop	AWS	>80	47.9	F	E
• *With traffic signal improvement*	*TS*	*15.7*	*11.9*	*B*	*B*
#6 Calhoun St. / Access 1	CSS	32.2	30.6	D	D
#7 Avenue 49 / Access 2	CSS	8.7	8.8	A	A

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross-Street Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control. For intersections with cross street stop control, the delay and LOS for the worst individual movement (or movement sharing a single lane) are shown.

Traffic signals are recommended to improve the level of service at study area intersections #1, #3, and #5, where the LOS is currently deficient and will continue to decline after the Project is constructed and with the cumulative development conditions. Although the Project has not contributed to the current unacceptable LOS for these three intersections, it will add to the deficiencies unless the traffic signals are installed. In order to assure that the Project's impact on these intersections is reduced to acceptable levels, Project "fair share" contribution was calculated and is included in Mitigation Measure TRA-1.

Build out of the 257 residential units and the public park will contribute additional traffic to adjacent streets. To reduce the impacts of this traffic increase, the Project will be responsible for installing on-site and site-adjacent improvements. Mitigation Measure TRA-2 provides a list of the necessary on-site and site-adjacent street improvements which will ensure that Project traffic impacts are less than significant.

Public Transit

SunLine Transit Agency provides bus routes throughout the Coachella Valley extending from Desert Hot Springs at the far west end to the North Shore Community near the Salton Sea. Route 8 is operated through the City of Coachella along Dr. Carreon Blvd, Van Buren Street, and passes the Project site along Calhoun Street between Avenue 48 and Avenue 50. The nearest bus stop to the Project is located 2.4 miles southeast at the intersection of Cesar Chavez and 4th Street. SunLine Transit service is periodically updated to keep pace with the growing demand for service throughout the region. The Project will not have direct access to bus service, but will not interfere with SunLine's ability to provide service.

Pedestrian and Bicycle Facilities

Bike lanes are available along Calhoun Street, Avenue 48 and Avenue 50. Sidewalks occur on Avenue 48 and Avenue 50, and portions of sidewalks occur on Calhoun Street, Jackson Street, Dr. Carreon Boulevard, and Odlum Drive and Avenue 49. The Project will build out adjacent street half-widths to General Plan standards, including sidewalks and parkways. The proposed Project will not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. No project related impacts to alternative transportation are anticipated.

Summary

Based on the Traffic Analysis, the project site may generate up to 2,517 daily vehicle trips. To reduce the impacts of additional traffic in the study area, the Project will contribute to traffic signal installation at three intersections and will be responsible for implementing on-site and site-adjacent street improvements. All improvements, detailed in the Mitigation Measures section, will keep the study area intersections operating at acceptable levels of service. With implementation of Mitigation Measures TRA-1 and TRA-2, impacts associated with traffic will be reduced to less than significant levels.

b) Less Than Significant Impact.

Exemptions from VMT Analysis

The City uses the County of Riverside's Transportation Analysis Guidelines to analyze VMT. As provided in the Guidelines, projects meeting certain criteria are exempt from preparing VMT analyses, thus, detailed CEQA assessments are not required for land uses associated with exempt project types.[66] Exempting certain projects avoids unnecessary analyses as these projects are deemed to have less than significant impacts due to project size, proximity to high quality transit, whether local services are provided, and whether affordable housing is provided. To determine if a project is exempt, the County's Guidelines provide a set of Screening Criteria for Development Projects.

As described in the VMT letter prepared by Urban Crossroads in September 2024 (Appendix G), the proposed Project meets two of the County's Screening Criteria:

- Map-Based Low VMT Screening
- Local Essential Service Screening

The map-based screening criteria uses the sub-regional Riverside Transportation Analysis Model (RIVTAM) to gauge the amount of personal motorized trips within particular regions against the average number of personalized trips for the Countywide population. The Project site occurs within RIVTAM Zone "TAZ 4787" where residents make fewer trips and generate VMTs below the County's established significance threshold.

The local essential service screening criteria considers the Project's public park to be a net benefit because it is sited such that Project residents and nearby City residents will not need to travel far to access the park and thus reduce overall VMTs spent on non-discretionary trips to the park.

Given that the Project meets these two Screening Criteria, the Project is consistent with CEQA Guideline section 15064.3 (b) and impacts with regard to VMTs would be less than significant.

[66] Figure 3 "Screening Criteria for Development Projects," Transportation Analysis Guidelines for Level of Service, Vehicle Miles Traveled, County of Riverside, December 2020.

c, d) No Impact. As described above, access to the Proposed Project will be provided through Calhoun Street and Avenue 49. The Project does not propose to alter the City's roadway system or change traffic patterns. Regional access to the site will be provided via I-10 freeway, Major Arterials, Collectors, and a variety of local roads. Prior to construction, both the Fire Department and Police Department will review the site plan to ensure safety measures are addressed, including emergency access and geometric design. Therefore, the Proposed Project will not result in inadequate emergency access or increase hazards due to a geometric design feature.

Mitigation Measures:

TRA-1 Traffic Signal Installation

Traffic signal control will address the operational deficiencies at three intersections that presently experience unacceptable levels of service. Although the Project is not currently contributing to the deficiencies, traffic conditions upon build out will impact these intersections and further degrade the level of service at each intersection. The Project Fair Share Contributions listed in Table XVII-7 show the Project's percentage of the total traffic volume and deficiency. To reduce the Project's expected impacts to less than significant levels, the Project will be responsible for paying its share as shown in the table.

Table XVII-7
Project Fair Share Contributions to Impacted Intersections

Intersection	Existing (2024) Traffic	EAPC (2026) Traffic[1]	Project-Only Traffic	Total New Traffic[2]	Project Fair Share (%)[3]
#1 Calhoun St. / Dr. Carreon Bl.					
• AM Peak Hour	2,002	2,357	58	355	16.3%
• PM Peak Hour	1,585	1,962	75	377	**19.9%**
#3 Calhoun St. / Avenue 49					
• AM Peak Hour	1,159	1,403	96	244	39.3%
• PM Peak Hour	1,050	1,350	125	300	**41.7%**
# 5 Jackson St. / Avenue 49 – Odlum Dr.					
• AM Peak Hour	1,209	1,413	38	204	18.6%
• PM Peak Hour	1,253	1,505	50	252	**19.8%**

1. Existing Plus Ambient Plus Project Plus Cumulative (2026) Conditions
2. Total New Traffic = (EAPC 2026 - Existing Traffic)
3. Project Fair Share % = (Project Only Traffic / Total New Traffic)

TRA-2 On-Site and Site-Adjacent Improvements

The recommendations listed here are the minimum improvements required to accommodate site access and maintain acceptable peak hour operation for the Project. Installation of these improvements will ensure that impacts related to traffic entering and exiting the Project will be reduced to less than significant levels.

#3 – Calhoun Street / Avenue 49

- Provide a separate northbound left turn lane.
- Modify southbound approach striping to provide a separate southbound right turn lane.
- Provide a shared eastbound left/thru/right lane.

#6 – Calhoun Street / Access 1

- Provide a separate northbound left turn lane.
- Provide a shared eastbound left/thru/right turn lane.

#7 – Avenue 49 / Access 2

- Provide a shared northbound left/right turn lane.
- Provide a shared eastbound thru/right turn lane.
- Provide a shared westbound left/thru lane.

Monitoring:

TRA.A The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed prior to the occupancy of any portion of the Project.

Responsible Parties: Project applicant, project engineer, City Engineer.

Sources:

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

Figure 3 “Screening Criteria for Development Projects,” Transportation Analysis Guidelines for Level of Service, Vehicle Miles Traveled, County of Riverside, December 2020.

XVIII. TRIBAL CULTURAL RESOURCES a) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or			✓	
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		✓		

Environmental Setting

California state law requires a government-to-government consultation process between project lead agencies and California Native American tribes who have an interest in protecting cultural resources in a project area. The consultation process must begin prior to the release of an environmental impact report, mitigated negative declaration, or negative declaration. Native American tribes participating in the consultation process are those who have requested notice of all proposed projects within the jurisdiction of the lead agency.

Assembly Bill 52

Public Resources Code (PRC) 21074(a) states that if a project has the potential to cause a substantial adverse change or impairment to a tribal cultural resource (TCR), then the project may cause an adverse effect on the environment. The passage of Assembly Bill 52 in 2014 created a new CEQA category of resources called, Tribal Cultural Resources, whereby a formal consultation process was established between lead agencies and impacted California Native American tribes to address concerns regarding a project's potential impacts to tribal cultural resources. Tribal Cultural Resources include California Native American archaeological sites, cultural landscapes and sacred places.[67]

[67] Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources, Society for California Archaeology, April 2020.

CRM TECH prepared an "Historical/Archaeological Resources Survey Report for Assessor's Parcel Number 612-260-010," (Report) which included a consultation with the Torres Martinez Desert Cahuilla Indian tribe and the Cabazon Band of Mission Indians to obtain their input and recommendations regarding the Project site. Due to previously recorded historical resources in the Coachella area and the history of Cahuilla activity around the lakeshore of Ancient Lake Cahuilla, the Torres Martinez recommend that a tribal archaeological monitor be present during construction related ground disturbance. The details of the Report and consultation are detailed in above in Section V, Cultural Resources. The complete Report is attached as Appendix C. The consultation response letter from the Torres Martinez tribe is provided in Appendix 2 of the Report. A complete description of Tribal lifeways is provided in the Report and summarized in Section V.

In addition, the City conducted Tribal consultation consistent with AB 52. The City's letters to consulting tribes were sent in June of 2025. The Agua Caliente Band of Cahuilla Indians requested consultation, and worked with City staff to develop modifications to the mitigation measures contained in Section V. With inclusion of these mitigation measures, the Tribe concluded consultation.

Discussion of Impacts

a, i) Less Than Significant Impact. The Historical/Archaeological Resources Report for the Project site describes the results of records search at the Eastern Information Center (EIC) at the University of California, Riverside, an historical background research, and a field survey of the subject site. Per the Report, the Project site contains no historical nor archaeological resources that are listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources identified on the Project site, thus there would be no impacts to any such resources.

a, ii) Less Than Significant Impact with Mitigation Incorporated. While the surface of the subject site has been extensively graded and cultivated since the 1930s, the subsurface has not been researched for historical and archaeological cultural resources, hence, the presence of such artifacts under the surface cannot be precluded. During the most recent inundation of Ancient Lake Cahuilla in the 1730s, when the high stand of the shoreline is documented as being 42 feet above sea level, the Project site would have been under water for a time, but eventually would have been exposed and become part of the shoreline as the lake dried. In this region of the Salton Basin, many recorded Native American resources are associated with the receding Ancient Lake Cahuilla shoreline.

Based on the recommendation of the Report, and the City's consultation with…, Mitigation Measure CUL-1 will assure that impacts to Tribal Cultural Resources will be reduced. The implementation of this mitigation measure would ensure that newly identified and potentially significant historical/archaeological artifacts would be protected, and impacts would be reduced to less than significant levels.

Mitigation Measures: See CUL-1, Section V.

Monitoring: See CUL-A, Section V.

Sources:
"Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared by CRM TECH, May 21, 2024.

“Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources,” Society for California Archaeology, April 2020.

“Determining the Significance of Impacts to Archaeological and Historical Resources,” California Code of Regulations, Title 14 §15064.5.

“The Cahuilla People,” Augustine Band of Cahuilla Indians, 2018, accessed March 28, 2024.

XIX. UTILITIES AND SERVICE SYSTEMS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			✓	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			✓	
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			✓	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			✓	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			✓	

Environmental Setting

Domestic Water

As described above in Section X, Hydrology, the primary source of domestic water for the City is the Indio Subbasin, which is one of four subbasins within the Coachella Valley Groundwater Basin. The Coachella Water Authority (CWA) along with the Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and the Indio Water Authority (IWA) manage the Indio Subbasin. CVWD and DWA have supplemented recharge efforts by importing and percolating Colorado River water into the basin. These two agencies also supplement irrigation water with recycled wastewater.

The Coachella Water Authority (CWA) delivers potable, municipal domestic water, collects wastewater, and manages local drainage control. Six wells with a total pumping capacity of 11,400 gpm, or 16.5 MGD are owned and operated by the City. Three storage reservoirs provide a total

storage capacity of 10.5 MG (million gallons). The distribution network includes 120 miles of pipeline with pipe diameters of 4 inches to 36 inches.

Currently, the CWA mainly serves the area west of Grapefruit Boulevard and smaller industrial/commercial corridor north of Avenue 48, while the largely agricultural land to the east is served by the Coachella Canal and privately owned wells.

The 2020 Coachella Valley Regional Urban Water Management Plan forecasted a growth in water demand for the Coachella Valley through the year 2045. However, the Indio Subbasin Annual Report for water year 2023-2024 found that actual water demand within the Indio Subbasin was 50,000 acre-feet less than the forecasted demand.[68] Neither the City's population growth nor the demand for domestic water grew at the rates that had been planned.

Wastewater Treatment

The Coachella Sanitation Division (CSD), also managed by the City, treats wastewater at its 4.5 MGD WRP located at the east end of Avenue 54. Wastewater is treated to a secondary level and discharged into the adjacent Whitewater River/Coachella Valley Stormwater Channel. During the 2023-2024 Water Year, the CSD WRP treated 3,082 af of wastewater.[69]

The CSD collects and treats water from residential, commercial and industrial areas. The collection system consists of 90 miles of pipeline ranging in diameters of 4 inches to 54 inches, 1,580 manholes and two pump stations. The Project would be able to connect to the existing pipeline in Calhoun Street that extends north of Avenue 50.[70]

Floodplain Management

The Coachella Valley lies within the Whitewater River Watershed, the regional drainage feature that extends from the slopes of Mount San Gorgonio to the Salton Sea. The Whitewater River is the main drainage feature and is fed by mountain streams along its course. In the higher elevation of the Whitewater River, water runs generally year-round, but is ephemeral in the low desert, and has been channelized at the eastern end of the Valley to control stormwater. The CVWD maintains major tributary facilities that guide floodwater into the Coachella Valley Stormwater Channel, but drainage throughout the Coachella Valley generally falls under the supervision of the local cities or the county where it occurs.

Historically the City of Coachella has not constructed extensive infrastructure to control stormwater flows. The 2021 City of Coachella Stormwater Master Plan lays out plans to identify and construct stormwater drainage infrastructure in partnership with the CVWD. Self-contained residential neighborhoods, such as the proposed Project, contain their own drainage basins which manage stormwater flows within their properties.

68 2020 Coachella Valley Regional Urban Water Management Plan, prepared by Water Systems Consulting, Inc., May 25, 2021.

69 Indio Subbasin Annual Report for Water Year 2023-2024, Table 5-10 WY 2023-2024 Wastewater Treatment, Reuse, and Disposal in the Indio Subbasin, March 2025.

70 City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Electricity
As discussed above in Section VI, Energy, Imperial Irrigation District (IID) will provide electricity to the Project site. IID is the sixth largest electric utility in California, as measured by peak load of 1,152 megawatts in 2023 and provides power to over 163,000 customers in Imperial County, and portions of Riverside and San Diego counties.[71] Electricity is purchased from various power generators and distributed along IID's transmission corridors to customers.

Natural Gas
Natural gas is provided to the City by Southern California Gas and is used for home heating, water heating, laundry dryers and gas stoves. More than 90% of the natural gas consumed in California is sourced from Texas and New Mexico, and the SoCalGas transmission network consists of storage facilities and pipelines.

Solid Waste Management
The City contracts with Burrtec Waste and Recycling Services to provide solid waste, recycling, and green waste disposal services. Pursuant to the State's recycling and landfill diversion regulations, Burrtec processes recyclable materials and green waste separately from solid waste. Recyclable materials will be sorted at a Burrtec MRF. Green waste may be composted or applied as alternative daily landfill cover. Solid waste will be taken to the Coachella Valley Transfer Station where it will then be transferred to the Lamb Canyon Landfill in Beaumont. Lamb Canyon Landfill has a remaining capacity of 14,540,000 cubic yards (36.64% of total capacity) with a maximum daily throughput of 5,000 cubic yards.

Communications Systems
Frontier and Spectrum provide phone, internet and cable television connectivity in the City of Coachella and facilities are currently available under Calhoun Street. Existing Spectrum cable facilities are also under Avenue 49. DIRECTV is also available in the City for television service.

Discussion of Impacts

a) Less Than Significant Impact. Surrounding residential land uses on the south and north sides of the Project have facilitated the installation of utility infrastructure throughout the surrounding vicinity.

Water and Sewer Infrastructure
Under Calhoun Street, a 12-inch water line and 8-inch sewer line extend along the entire east side of the Project site. The Project would connect to each line at the east entrance of the development, just south of the retention basin and north of the park. Another 8-inch water line would be installed under Avenue 49 from Jackson Street and enter the Project at the north entrance. The Project would not require the relocation or significant extension of water and sewer facilities.

Project Proposed Drainage System
According to the Preliminary Hydrology Report, (Appendix D) the Project would construct a self-contained drainage system comprised of five retention basins on-site which would retain 100% of flows from a 100-year storm event. Flows that exceed this capacity will be directed to exit the Project site and flow north on Calhoun Street to Avenue 48. Then storm water would flow eastward to the

[71] Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

MS4 storm drain inlet facility on Van Buren Street where it would flow underground for one mile and empty into the Coachella Valley Storm Channel. On-site retention of 100-year storm flows would contain the increased runoff and prevent the Project from contributing runoff that exceeds the capacity of existing City storm drainage systems.[72]

Electricity Infrastructure

The Imperial Irrigation District distributes power via overhead and underground transmission lines throughout the City. Along Calhoun Street, IID provides overhead transmission along the entire length of the Project's east boundary. At the intersection of Avenue 49 and Calhoun Street, underground electricity lines also occur and extend west along Avenue 49 to Jackson Street. The Project would connect to existing electricity distribution lines and would not result in the relocation or significant extension of this service.

Telecommunications Service

As with other utility services, cable television lines occur under Calhoun Street along the east side of the Project and under Avenue 49 along the north side of the Project. Frontier facilities are available in the vicinity although the location of the infrastructure is unknown. Given the occurrence of nearby residential neighborhoods, all telecommunications services are likely in close proximity and would not require extensive relocations or extensions of utilities.

In summary, the location of the Project adjacent to existing residential neighborhoods assures that utility services are available to the site without the need to construct significant extensions or relocate infrastructure. The impacts resulting from the Project would not cause significant environmental effects. Impacts would be less than significant.

b) Less Than Significant Impact. In compliance with the 2014 Sustainable Groundwater Management Act and to forecast the water demand on the Indio Subbasin, CWA along with three other local water agencies prepared a water management framework known as the Indio Subbasin Water Management Plan (CVWMP). The most recent 2022 update (Alternative Plan Update) includes forecasted water demand calculations for current and potential future customers within the Indio Subbasin Plan Area, which includes the East Indio Subbasin. The 2022 Alternative Plan Update relies on population growth forecasts supplied by the 2020 SCAG Regional Growth Forecast, SCAG Land Use Inventories, housing and employment analyses. Additionally, the water agencies have prepared a series of Indio Subbasin Annual Reports, the most recent Report explains that the actual total water use for the 2023-2024 Water Year was lower than the forecasted water use described in the 2022 Alternative Plan Update.

To estimate the Project's annual water demand for indoor use, a calculation was made based on an average household size of 4.19 people in the City of Coachella.[73] Using the California State standard for indoor residential water use of 47 gpcd, the Project's 257 dwelling units would consume approximately 56.71 afy for indoor uses.[74]

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72 SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

73 E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

74 Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

Calculations for the outdoor water use are based on outdoor irrigation factors provided by CVWD Landscape Ordinance §3.15.[75] The average yard size for each dwelling unit is estimated to be 250 sf. The common landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought- tolerant trees and bushes. The total estimated outdoor use for the Project is 23.83 afy. Annually, the Project is expected to demand approximately 80.54 af, which would increase the most recently reported Indio Subbasin annual urban use extraction by 0.036%. Table XIX-1 below provides details regarding estimated indoor and outdoor water demand upon buildout of the Project.

Table XIX-1
Project Water Demand

Land Use: Single-Family Residential	No. of Dwelling Units (DU)[6]	Estimated Occupants per Home	Gallons per Day (gpd) per Occupant[2]	gpd/DU	Project Daily Water Demand (gpd)	Project Annual Water Demand acre-feet/year (af/y)
HH Indoor Water Use	257	4.19[1]	47[2]	197	50,629	56.71 af/y
HH Outdoor Water Use[3]	257			14.52	3,732.48	4.18 af/y
Landscaping (Common Areas acreage)	303,533 sf				17,540.65	19.65 af/y
					TOTAL	**80.54 af/y**
					2023-2024 Indio Subbasin Urban Water Use	**224,479 af**
					Project's Percentage of 2023-2024 Indio Subbasin Water Use	**0.036%**

1. California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2025.
2. CA Indoor Residential Water Use Standards, 2025-2030.
3. 250 sf per DU, City of Coachella Code of Ordinances §17.14.030.
4. Common open space includes: the park (minus parking lot), retention basins, decorative landscaped areas.
5. Outdoor water demand calculations based on CVWD Evapotranspiration (ETo), Evapotranspiration Adjustment Factor (ETAF), and Conversion Factor (CVWD Landscape Ordinance §3.15, Appendices C and D). Each residence has 250 sf of open space = 64,250 sf. Common open space = 303,533 sf.
6. DU = Dwelling Unit, HH = Household

According to the Indio Subbasin Annual Report for the Water Year 2023-2024, the total amount of groundwater extractions amounted to 267,495 af. Of this total amount, the urban water use sector accounted for 224,479 af.[76] The impacts of the region's increased urban water use through the year 2045 on the Indio Subbasin were accounted for in the 2022 Alternative Plan Update. The Project's water demand for both indoor and outdoor uses and would account for 0.036% of the groundwater extraction for urban uses. To comply with the regional Sustainable Groundwater Management Plan, the Project would comply with the City's water resource conservation policies outlined the General Plan and install drought tolerant landscaping and low water-use appliances.[77] Domestic water

75 Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

76 Indio Subbasin Annual Report for Water Year 2023-2024, Table 4-1 WY 2023-2024 Groundwater Extractions by Water Use Sector in the Indio Subbasin, March 2025.

77 City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

demand by the Project would cause an incremental increase in local water demand resulting in impacts that would be less than significant, because the Project has been accounted for in water planning, since it is consistent with the General Plan land use assigned to the property.

c) Less Than Significant Impact. The Coachella WRP has a daily capacity of 4.5 million gallons, which equates to 5040.65 afy. During 2023-2024, the CSD WRP treated a total of 3,082 af of wastewater, which was 1,958.65 af under the annual capacity. Based on this recent actual wastewater demand, the Project's anticipated wastewater demand would increase the CSD's current demand by 1.63%. The Project's wastewater demand would account for 1.0% of the CSD's total annual capacity. Table XIX-2 provides a summary of the Project's estimated wastewater demand compared to the most recent treatment data for the CSD WRP. The Calhoun Street Housing Development would provide 257 single-family for the City and contribute an incremental increase to the City's wastewater demand, particularly given that the CSD does not treat wastewater at full capacity. Impacts would be less than significant.

Table XIX-2
Project Wastewater Generation

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home[1]	Gallons per Day (gpd) per Occupant[1]	gpd/DU	Project Daily Wastewater Flow (gpd)	Project Annual Wastewater acre-feet/year (af/y)
Wastewater Flow	257	4.19	42.3	177.2	45,540	51
					Total 2023-2024 Acre-Feet Treated at CSD WRP	**3,082 af**
					Project's Percentage of 2023-2024 CSD WRP	**1.65%**

1.Between 60% and 90% of potable water may be sent to wastewater treatment. This estimate is based on 90%.
2.CSD 2023-2024 Water Year wastewater demand = 3082 af.
3.CSD total annual wastewater capacity – 5040.65 af.

d, e) Less than Significant Impact. As described above, Burrtec Waste and Recycling Services provides solid waste, recycling, and green waste disposal services to the City of Coachella. Burrtec processes recyclable materials and green waste separately from solid waste and helps the City achieve the mandatory 50% diversion rate. Recyclable materials would be sorted at a Burrtec MRF. Green waste may be composted or applied as alternative daily landfill cover. The remaining solid waste would be delivered to the Coachella Valley Transfer Station where it will then be transferred to the Lamb Canyon Landfill in Beaumont. Lamb Canyon Landfill has a remaining capacity of 14,540,000 cubic yards (36.64% of total capacity) with a maximum daily throughput of 5,000 cubic yards. See Table XIX-3 for a summary of the Project's impacts on the local landfill.

Table XIX-3
Project Estimated Solid Waste Generation

Land Use	Generation Rate	Proposed Development	Daily Total (lbs)	Annual Total (US tons)
Residential Single Family	11.4 lb/dwelling unit/day[1]	257 DU	2,930	534.73
		With 50% solid waste diversion	**1,465**	**267.4**
		Conversion to cubic yards[2]	**9.77 c.y.**	**3,565.3 c.y.**
		Percent of landfill capacity[3]	**0.2% of daily throughput**	**0.025% of remaining cap.**

1. Estimated Solid Waste Generation Rates for Manufacturing/Warehouse (May 1997), CalRecycle, accessed April 2025, https://www2.calrecycle.ca.gov/wastecharacterization/general/rates.
2. National Recycling Coalition Measurement Standards and Reporting Guidelines, 2006. Estimates that 150 pounds of uncompacted municipal solid waste material is equal to 1 cubic yard of waste.
3. Landfill daily throughput (or intake) is 5,000 cubic yards, and remaining capacity is 14,540,000 cubic yards, CalRecycle SWIS Facility/Site Activity Details, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2246?siteID=2368, accessed April 2025.

At buildout, the Project's daily solid waste generation will contribute less than 1% of the Lamb Canyon daily capacity of 5,000 cubic yards, and less than 0.1% of the remaining capacity on an annual basis. Commingled recyclable materials (e.g., paper, plastic, glass, cardboard, aluminum) will be transported to Burrtec's material recovery facilities for recycling and reuse.

Burrtec is responsible for maintaining standards that assure that all waste is handled in a manner that meets local, state and federal standards. These requirements will assure that impacts associated with solid waste disposal remain less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

2020 Coachella Valley Regional Urban Water Management Plan, prepared by Water Systems Consulting, Inc., May 25, 2021.

Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Coachella Valley Water District, Landscape Ordinance §1302.5.

E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2024.

Indio Subbasin Annual Report for Water Year 2023-2024, March 2025.

Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

XX. WILDFIRE If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				✓
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				✓

Environmental Setting

Wildfires are natural events that promote ecosystem regeneration, and ecosystems throughout much of the western United States including California are naturally susceptible to wildfires. In southern California, the winter rains lead to spring germination, then by the fall, the vegetation dries up as the high summer temperatures and lack of rainfall dominate the weather. Wildfire is fed by vegetative fuel load, slope and lack of precipitation. However, wildfires become hazards when they spread into human development areas, or when the built environment encroaches upon wildfire zones. Areas where wilderness and urban land uses meet are referred to as the wildland-urban interface (WUI), and these areas pose an elevated risks of fire hazards to human health and property. In particular, WUI areas near wilderness areas that have not burned for 30+ years are poised for higher risks of burning in the near future due to the buildup of vegetative fuels.

The California Department of Forestry and Fire Protection (Cal Fire) maintains the Fire Hazard Severity Zone Viewer (FHSZ Viewer), a State map of fire hazard zones that are ranked as either moderate, high, or very high. The FHSZ Viewer also shows geographic responsibility areas that are protected with either federal, state or local financial resources.

The City of Coachella lies within the low desert ecosystem of the Colorado Desert section of the Sonoran Desert Bioregion where the fuel load is sparse, and the slope of the terrain is minimal compared to the higher elevations of the surrounding mountain ranges. The sparse desert vegetation and relatively flatter landscape greatly reduce the risk of wildfire in the City. The urban areas of the City have replaced much of the native Colorado Desert vegetation with development and landscaping while agricultural activity is the predominant condition of the southern and eastern regions of the Coachella Planning Area. Due to these conditions, the risk of wildfire in the City is extremely low. The Project site is approximately seven miles northeast from a moderate fire zone area within a state responsibility area (SRA) in the Santa Rosa Mountains.[78]

Discussion of Impacts

a) No Impact. The Primary Evacuation routes for the City of Coachella include Interstate 10, Avenue 48, Avenue 50, Avenue 52, Harrison Street, Highway 111/Grapefruit Boulevard, and State Route 86S.[79] The Project is on the southeast corner of Calhoun Street and Avenue 49, and Calhoun Street connects to both Avenue 48 to the north and Avenue 50 to the south. The Project also proposes to improve Avenue 49, which would grant additional access from the Project site to the primary evacuation routes. The Project does not propose to alter any of the existing evacuation routes and would not substantially impair the City's adopted emergency evacuation and response plans. No impacts would result from the Project.

b, c) No Impact. The Project site and surrounding area are not located within a wildfire hazard severity zone, nor are they located within a WUI. The Project is over seven miles northeast from the nearest wildfire severity zone, which is rated as a moderate severity. The Project, surrounded by urban land uses, would not expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. The Project would not require any installation or maintenance of wildfire emergency infrastructure. There would be no impacts.

d) No Impact. The City of Coachella lies at the far southeastern end of the Coachella Valley, a low desert, low-elevation and relatively flat area within of the Colorado Desert ecoregion. The terrain mildly slopes downward toward the southeast. There is low to no risk of wildfire in the low desert region of the Coachella Valley or the City, and no risk of post-wildfire flooding, landslide, or hillside instability. The Project would not expose residents, workers or structures to such post-fire hazards. No impacts are expected.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection
Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update

78 Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection, accessed July 2024.

79 Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update, September 2014.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

NOTE: If there are significant environmental impacts which cannot be mitigated and no feasible project alternatives are available, then complete the mandatory findings of significance and attach to this initial study as an appendix. This is the first step for starting the environmental impact report (EIR) process. **Does the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			✓	
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

a) Less Than Significant Impact with Mitigation Incorporated.

Biological Resources:
The Project site is not located within a CVMSHCP-designated conservation area and does not contain any wildlife corridors or biological linkage areas. However, the vegetative scrub and date palms on the Project site could potentially be used by both resident and migratory nesting birds, many of which are not special status species, but all are protected under the Migratory Bird Treaty Act (MBTA) and

the California Fish and Game Code (FGC). Therefore, a pre-construction survey will be required to avoid impacts to nesting birds covered by the MBTA. Mitigation Measure BIO-1 provides details for conducting the nesting bird survey.

Western burrowing owls are protected under the MBTA, the US Fish and Wildlife Service as a Bird of Conservation Concern (BCC) and receives protection under the California Endangered Species Act (CESA). Neither burrowing owls nor signs of burrowing owls were observed during the site survey, however, because suitable habitat is present on the Project site, burrowing owls could potentially relocate to the Project site prior to the start of construction. Mitigation Measure BIO-2 describes the required pre-construction burrowing owl survey.

Finally, as the City is a signatory to the CVMSHCP, the Project is subject to payment of the Development Mitigation Fee to mitigate potential impacts to covered species under the CVMSHCP.

The Proposed Project will not significantly reduce fish or wildlife habitat or otherwise adversely impact a fish or wildlife species. The construction of the Project has the potential to impact nesting birds, but the mitigation measures included in this document and payment of the CVMSHCP Development Mitigation Fee will reduce those impacts to less than significant levels.

Cultural Resources

The Project site was evaluated by qualified non-Tribal and Tribal archaeologists and was found to have a low potential for resources as no surface deposits were discovered during the field survey. However, the potential for buried resources, including Tribal resources, requires the implementation of mitigation to reduce impacts to less than significant levels. The CUL-1 Mitigation Measure requires the monitoring of earth moving activities, which will reduce these impacts.

b) Less Than Significant Impact. The Project will result in less than significant impacts to the environment, apart from biological and cultural resources, and the transportation network surrounding the Project. The Project is consistent with the City's General Plan Update land use designation assigned to the property, and would therefore not generate any greater impacts than those expected from the build out of the General Plan Update. Cumulative impacts are expected to be less than significant with the implementation of the prescribed mitigation measures.

c) Less Than Significant Impact with Mitigation. The proposed Project will generally not significantly impact people. It will provide additional housing opportunities to existing and future residents, as well as a public park facility for the City. Air quality, GHG, hazardous materials and noise impacts have been determined to be less than significant in the discussions above.

Transportation

At the present time, three intersections within the Traffic Analysis study area operate at unacceptable levels of service (LOS E and F) during peak traffic hours, and the Traffic Analysis finds that traffic signals would adequately address these deficiencies. Although the Project is not contributing to these current deficiencies, traffic conditions upon build out will impact these intersections and further degrade the level of service at each intersection. Therefore, the Project will contribute its fair share towards the installation of traffic signals at these three intersections. Mitigation Measure TRA-1 provides information regarding the Fair Share Contribution.

Along Avenue 49 and Calhoun Street, traffic will be impacted by vehicles entering and exiting the Project's two driveways. To reduce impacts to less than significant levels, several on-site and site adjacent street improvements are recommended in Mitigation Measure TRA-2.

CHAPTER 3: MITIGATION MONITORING & REPORTING PROGRAM
City of Coachella / Calhoun Street Housing Development
Environmental Assessment 25-02 / SCH No.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
Biological Resources	Less than Significant	**BIO-1** Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.	Project applicant, Project biologist, Planning Department, City Engineer	The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
Biological Resources continued	Less than Significant	**BIO-2** To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.	Project applicant, Project biologist, Planning Department, City Engineer	The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.
Cultural Resources	Less than Significant	**CUL-1** <u>Tribal Resource Discovery and Documentation</u> A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property. The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the	Project Archaeologist, City Planning Department, City Engineer	The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project archaeologist shall provide the City with a report of monitoring activities.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required. If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.		
Transportation	Less than Significant	**TRA-1** **Traffic Signal Installation** Traffic signal control will address the operational deficiencies at three intersections that presently experience unacceptable levels of service. Although the Project is not currently contributing to the deficiencies, traffic conditions upon build	Project applicant, Project engineer, City Engineer	The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed prior to the occupancy of any portion of the Project.

<table>
<tr><th>Resource Topic</th><th>Level of Impact After Mitigation</th><th>Mitigation Measures</th><th>Responsible Party/ Monitoring Party</th><th>Implementation Timing</th></tr>
<tr><td></td><td></td><td>out will impact these intersections and further degrade the level of service at each intersection. The Project Fair Share Contributions listed in Table XVII-7 show the Project's percentage of the total traffic volume and deficiency. To reduce the Project's expected impacts to less than significant levels, the Project will be responsible for paying its share as shown in the table.

Table XVII-8
<table><tr><th>Intersection</th><th>Project Fair Share (%)</th></tr><tr><td>#1 Calhoun St. / Dr. Carreon Bl.</td><td></td></tr><tr><td>• AM Peak Hour</td><td>16.3%</td></tr><tr><td>• PM Peak Hour</td><td>19.9%</td></tr><tr><td>#3 Calhoun St. / Avenue 49</td><td></td></tr><tr><td>• AM Peak Hour</td><td>39.3%</td></tr><tr><td>• PM Peak Hour</td><td>41.7%</td></tr><tr><td># 5 Jackson St. / Avenue 49 – Odlum Dr.</td><td></td></tr><tr><td>• AM Peak Hour</td><td>18.6%</td></tr><tr><td>• PM Peak Hour</td><td>19.8%</td></tr></table></td><td></td><td></td></tr>
<tr><td>Transportation continued</td><td>Less than Significant</td><td>TRA-2
On-Site and Site-Adjacent Improvements
The recommendations listed here are the minimum improvements required to accommodate site access and maintain acceptable peak hour operation for the Project.</td><td>Project applicant,

Project engineer,

City Engineer</td><td>The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed</td></tr>
</table>

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		Installation of these improvements will ensure that impacts related to traffic entering and exiting the Project will be reduced to less than significant levels. **#3 – Calhoun Street / Avenue 49** • Provide a separate northbound left turn lane. • Modify southbound approach striping to provide a separate southbound right turn lane. • Provide a shared eastbound left/thru/right lane. **#6 – Calhoun Street / Access 1** • Provide a separate northbound left turn lane. • Provide a shared eastbound left/thru/right turn lane. **#7 – Avenue 49 / Access 2** • Provide a shared northbound left/right turn lane. • Provide a shared eastbound thru/right turn lane. • Provide a shared westbound left/thru lane.		prior to the occupancy of any portion of the Project.
Tribal Cultural Resources	Less than Significant	**See CUL-1** <u>Tribal Resource Discovery and Documentation</u> A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property.	Project Archaeologist, City Planning Department, City Engineer	The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required. If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.		archaeologist shall provide the City with a report of monitoring activities.

Appendix A
Calhoun Street Housing Development CalEEMod Report

Calhoun Street Housing Development Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year, Unmitigated

2.3. Construction Emissions by Year, Mitigated

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

2.6. Operations Emissions by Sector, Mitigated

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

3.2. Site Preparation (2026) - Mitigated

3.3. Grading (2026) - Unmitigated

3.4. Grading (2026) - Mitigated

3.5. Building Construction (2026) - Unmitigated

3.6. Building Construction (2026) - Mitigated

3.7. Building Construction (2027) - Unmitigated

3.8. Building Construction (2027) - Mitigated

3.9. Building Construction (2028) - Unmitigated

3.10. Building Construction (2028) - Mitigated

3.11. Paving (2028) - Unmitigated

3.12. Paving (2028) - Mitigated

3.13. Architectural Coating (2028) - Unmitigated

3.14. Architectural Coating (2028) - Mitigated

3.15. Architectural Coating (2029) - Unmitigated

3.16. Architectural Coating (2029) - Mitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.1.2. Mitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.2. Electricity Emissions By Land Use - Mitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.2.4. Natural Gas Emissions By Land Use - Mitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.3.2. Mitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.4.2. Mitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.5.2. Mitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.6.2. Mitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.7.2. Mitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.8.2. Mitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.9.2. Mitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.10.4. Landscape Equipment - Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.14.2. Mitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.15.2. Mitigated
5.16. Stationary Sources
5.16.1. Emergency Generators and Fire Pumps
5.16.2. Process Boilers
5.17. User Defined
5.18. Vegetation
5.18.1. Land Use Change
5.18.1.1. Unmitigated
5.18.1.2. Mitigated
5.18.1. Biomass Cover Type
5.18.1.1. Unmitigated
5.18.1.2. Mitigated
5.18.2. Sequestration
5.18.2.1. Unmitigated
5.18.2.2. Mitigated
6. Climate Risk Detailed Report
6.1. Climate Risk Summary
6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Calhoun Street Housing Development
Construction Start Date	1/6/2026
Operational Year	2029
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	7.60
Location	33.691743355835385, -116.21030862160973
County	Riverside-Salton Sea
City	Coachella
Air District	South Coast AQMD
Air Basin	Salton Sea
TAZ	5695
EDFZ	19
Electric Utility	Imperial Irrigation District
Gas Utility	Southern California Gas
App Version	2022.1.1.30

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Single Family Housing	257	Dwelling Unit	22.4	976,050	0.00	0.00	1,058	—

440

City Park	5.95	Acre	5.95	0.00	5.95	0.00	—	—
User Defined Parking	9.12	User Defined Unit	9.12	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads
Energy	E-2	Require Energy Efficient Appliances
Water	W-5	Design Water-Efficient Landscapes

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	71.5	71.4	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
Mit.	71.5	71.4	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	71.4	71.4	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
Mit.	71.4	71.4	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280

% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	14.1	14.0	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.84	4,122
Mit.	14.1	14.0	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.84	4,122
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.57	2.55	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.30	682
Mit.	2.57	2.55	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.30	682
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.77	3.16	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
2027	1.72	1.46	10.6	20.9	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,550	4,550	0.12	0.17	5.95	4,611
2028	71.5	71.4	10.1	20.4	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,506	4,506	0.12	0.17	5.40	4,566
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.82	3.21	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
2027	1.65	1.39	10.7	17.6	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,355	4,355	0.12	0.17	0.15	4,410
2028	71.4	71.4	10.2	17.3	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,315	4,315	0.12	0.17	0.14	4,370
2029	71.4	71.4	0.87	1.87	< 0.005	0.01	0.24	0.25	0.01	0.06	0.07	—	350	350	0.01	0.01	0.02	353
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.90	1.60	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.30	4,122
2027	1.19	1.01	7.62	13.4	0.02	0.25	1.03	1.28	0.23	0.25	0.48	—	3,166	3,166	0.09	0.12	1.84	3,207
2028	14.1	14.0	4.99	8.87	0.01	0.16	0.61	0.77	0.15	0.15	0.29	—	1,979	1,979	0.06	0.07	0.98	2,003
2029	3.35	3.35	0.04	0.10	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	17.1	17.1	< 0.005	< 0.005	0.01	17.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.35	0.29	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.21	682
2027	0.22	0.18	1.39	2.44	< 0.005	0.05	0.19	0.23	0.04	0.05	0.09	—	524	524	0.01	0.02	0.30	531
2028	2.57	2.55	0.91	1.62	< 0.005	0.03	0.11	0.14	0.03	0.03	0.05	—	328	328	0.01	0.01	0.16	332
2029	0.61	0.61	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.84	2.84	< 0.005	< 0.005	< 0.005	2.86

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.77	3.16	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
2027	1.72	1.46	10.6	20.9	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,550	4,550	0.12	0.17	5.95	4,611
2028	71.5	71.4	10.1	20.4	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,506	4,506	0.12	0.17	5.40	4,566
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.82	3.21	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
2027	1.65	1.39	10.7	17.6	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,355	4,355	0.12	0.17	0.15	4,410
2028	71.4	71.4	10.2	17.3	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,315	4,315	0.12	0.17	0.14	4,370
2029	71.4	71.4	0.87	1.87	< 0.005	0.01	0.24	0.25	0.01	0.06	0.07	—	350	350	0.01	0.01	0.02	353
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.90	1.60	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.30	4,122
2027	1.19	1.01	7.62	13.4	0.02	0.25	1.03	1.28	0.23	0.25	0.48	—	3,166	3,166	0.09	0.12	1.84	3,207
2028	14.1	14.0	4.99	8.87	0.01	0.16	0.61	0.77	0.15	0.15	0.29	—	1,979	1,979	0.06	0.07	0.98	2,003
2029	3.35	3.35	0.04	0.10	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	17.1	17.1	< 0.005	< 0.005	0.01	17.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.35	0.29	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.21	682
2027	0.22	0.18	1.39	2.44	< 0.005	0.05	0.19	0.23	0.04	0.05	0.09	—	524	524	0.01	0.02	0.30	531
2028	2.57	2.55	0.91	1.62	< 0.005	0.03	0.11	0.14	0.03	0.03	0.05	—	328	328	0.01	0.01	0.16	332
2029	0.61	0.61	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.84	2.84	< 0.005	< 0.005	< 0.005	2.86

2.4. Operations Emissions Compared Against Thresholds

Item 2.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,599	15,232	60.4	0.39	25.9	16,882
Mit.	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,520	15,152	60.4	0.39	25.9	16,802
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	< 0.5%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,251	13,883	60.4	0.40	7.48	15,520
Mit.	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,172	13,804	60.4	0.40	7.48	15,440
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	1%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,785	14,417	60.4	0.39	15.1	16,057
Mit.	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,706	14,338	60.4	0.39	15.1	15,978
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	< 0.5%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,282	2,387	10.00	0.06	2.51	2,658
Mit.	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,269	2,374	10.00	0.06	2.51	2,645
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	< 0.5%	—	< 0.5%
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	445

Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,000
Unmit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No
Mit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Area	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,599	15,232	60.4	0.39	25.9	16,882

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Area	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,251	13,883	60.4	0.40	7.48	15,520
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.63	7.22	2.25	42.3	0.08	0.04	9.80	9.84	0.03	2.47	2.50	—	7,700	7,700	0.47	0.27	8.15	7,800
Area	23.2	23.2	0.07	7.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	19.2	19.2	< 0.005	< 0.005	—	19.3
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,785	14,417	60.4	0.39	15.1	16,057
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291
Area	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19
Energy	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	982	982	0.08	0.01	—	986
Water	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6
Waste	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,282	2,387	10.00	0.06	2.51	2,658

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Area	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,520	15,152	60.4	0.39	25.9	16,802
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Area	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,172	13,804	60.4	0.40	7.48	15,440
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.63	7.22	2.25	42.3	0.08	0.04	9.80	9.84	0.03	2.47	2.50	—	7,700	7,700	0.47	0.27	8.15	7,800
Area	23.2	23.2	0.07	7.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	19.2	19.2	< 0.005	< 0.005	—	19.3
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	448

Total	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,706	14,338	60.4	0.39	15.1	15,978
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291
Area	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19
Energy	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	969	969	0.08	0.01	—	972
Water	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6
Waste	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,269	2,374	10.00	0.06	2.51	2,645

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.80	2.76	< 0.005	0.12	—	0.12	0.11	—	0.11	—	508	508	0.02	< 0.005	—	510
Dust From Material Movement	—	—	—	—	—	—	0.74	0.74	—	0.38	0.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	—	84.1	84.1	< 0.005	< 0.005	—	84.4
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.09	0.88	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	217	217	< 0.005	0.01	0.02	219
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.2	22.2	< 0.005	< 0.005	0.03	450

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.98	2.98	< 0.005	< 0.005	< 0.005	3.11
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.68	3.68	< 0.005	< 0.005	0.01	3.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.51
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.80	2.76	< 0.005	0.12	—	0.12	0.11	—	0.11	—	508	508	0.02	< 0.005	—	510

Dust From Material Movement	—	—	—	—	—	—	0.74	0.74	—	0.38	0.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	—	84.1	84.1	< 0.005	< 0.005	—	84.4
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.09	0.88	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	217	217	< 0.005	0.01	0.02	219
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.2	22.2	< 0.005	< 0.005	0.03	22.5
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.98	2.98	< 0.005	< 0.005	< 0.005	3.11
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.68	3.68	< 0.005	< 0.005	0.01	452

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.51
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Off-Roa Equipment	0.99	0.83	7.46	7.55	0.02	0.31	—	0.31	0.28	—	0.28	—	1,808	1,808	0.07	0.01	—	1,814
Dust From Material Movement	—	—	—	—	—	—	0.98	0.98	—	0.39	0.39	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.18	0.15	1.36	1.38	< 0.005	0.06	—	0.06	0.05	—	0.05	—	299	299	0.01	< 0.005	—	300
Dust From Material Movement	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.77	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	291	291	0.01	0.01	0.93	295
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	0.08	32.4
Hauling	0.04	0.03	1.46	0.34	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,312	1,312	0.01	0.21	2.73	1,377
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.10	1.00	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.04	0.03	1.56	0.35	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,314	1,314	0.01	0.21	0.07	1,375
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.34	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	72.5	72.5	< 0.005	< 0.005	0.11	454

Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.52	8.52	< 0.005	< 0.005	0.01	8.88
Hauling	0.01	0.01	0.42	0.09	< 0.005	0.01	0.10	0.10	0.01	0.02	0.03	—	360	360	< 0.005	0.06	0.32	377
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.02	12.2
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.41	1.41	< 0.005	< 0.005	< 0.005	1.47
Hauling	< 0.005	< 0.005	0.08	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.6	59.6	< 0.005	0.01	0.05	62.4

3.4. Grading (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621

Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	0.83	7.46	7.55	0.02	0.31	—	0.31	0.28	—	0.28	—	1,808	1,808	0.07	0.01	—	1,814
Dust From Material Movement	—	—	—	—	—	—	0.98	0.98	—	0.39	0.39	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	0.15	1.36	1.38	< 0.005	0.06	—	0.06	0.05	—	0.05	—	299	299	0.01	< 0.005	—	300
Dust From Material Movement	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.77	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	291	291	0.01	0.01	0.93	295
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	0.08	32.4
Hauling	0.04	0.03	1.46	0.34	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,312	1,312	0.01	0.21	2.73	456

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.10	1.00	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.04	0.03	1.56	0.35	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,314	1,314	0.01	0.21	0.07	1,375
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.34	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	72.5	72.5	< 0.005	< 0.005	0.11	73.4
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.52	8.52	< 0.005	< 0.005	0.01	8.88
Hauling	0.01	0.01	0.42	0.09	< 0.005	0.01	0.10	0.10	0.01	0.02	0.03	—	360	360	< 0.005	0.06	0.32	377
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.02	12.2
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.41	1.41	< 0.005	< 0.005	< 0.005	1.47
Hauling	< 0.005	< 0.005	0.08	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.6	59.6	< 0.005	0.01	0.05	62.4

3.5. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.37	0.31	2.85	3.76	0.01	0.11	—	0.11	0.10	—	0.10	—	694	694	0.03	0.01	—	697
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.07	0.06	0.52	0.69	< 0.005	0.02	—	0.02	0.02	—	0.02	—	115	115	< 0.005	< 0.005	—	115
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.46	0.42	0.44	8.20	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,345	1,345	0.05	0.05	4.30	1,364
Vendor	0.04	0.03	0.88	0.38	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	2.24	891
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.48	4.65	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,145	1,145	0.02	0.05	0.11	1,159
Vendor	0.04	0.03	0.95	0.39	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	0.06	890
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.12	0.11	0.13	1.68	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	354	354	< 0.005	0.01	0.54	359
Vendor	0.01	0.01	0.27	0.11	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	247	247	< 0.005	0.03	0.28	258
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.7	58.7	< 0.005	< 0.005	0.09	59.4
Vendor	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.0	41.0	< 0.005	0.01	0.05	42.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.37	0.31	2.85	3.76	0.01	0.11	—	0.11	0.10	—	0.10	—	694	694	0.03	0.01	—	697
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.52	0.69	< 0.005	0.02	—	0.02	0.02	—	0.02	—	115	115	< 0.005	< 0.005	—	115
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.46	0.42	0.44	8.20	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,345	1,345	0.05	0.05	4.30	1,364
Vendor	0.04	0.03	0.88	0.38	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	2.24	891
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.48	4.65	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,145	1,145	0.02	0.05	0.11	1,159
Vendor	0.04	0.03	0.95	0.39	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	0.06	890
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.13	1.68	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	354	354	< 0.005	0.01	0.54	359
Vendor	0.01	0.01	0.27	0.11	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	247	247	< 0.005	0.03	0.28	258
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.7	58.7	< 0.005	< 0.005	0.09	59.4
Vendor	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.0	41.0	< 0.005	0.01	0.05	460

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	0.16	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.40	0.40	7.63	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,318	1,318	0.01	0.04	3.89	1,336
Vendor	0.04	0.03	0.84	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	835	835	0.01	0.11	2.07	870
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.33	0.44	4.33	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,123	1,123	0.02	0.04	0.10	1,136
Vendor	0.04	0.03	0.90	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	836	836	0.01	0.11	0.05	869
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.87	0.00	0.00	0.86	0.86	0.00	0.20	0.20	—	857	857	0.01	0.03	1.20	868
Vendor	0.03	0.02	0.63	0.26	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	596	596	0.01	0.08	0.64	621
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.71	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	142	142	< 0.005	0.01	0.20	144
Vendor	0.01	< 0.005	0.11	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	98.7	98.7	< 0.005	0.01	0.11	103
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.40	0.40	7.63	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,318	1,318	0.01	0.04	3.89	1,336
Vendor	0.04	0.03	0.84	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	835	835	0.01	0.11	2.07	870
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.33	0.44	4.33	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,123	1,123	0.02	0.04	0.10	1,136
Vendor	0.04	0.03	0.90	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	836	836	0.01	0.11	0.05	869
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.87	0.00	0.00	0.86	0.86	0.00	0.20	0.20	—	857	857	0.01	0.03	1.20	868
Vendor	0.03	0.02	0.63	0.26	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	596	596	0.01	0.08	0.64	621
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.71	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	142	142	< 0.005	0.01	0.20	144
Vendor	0.01	< 0.005	0.11	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	98.7	98.7	< 0.005	0.01	0.11	103
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.43	0.36	3.27	4.73	0.01	0.11	—	0.11	0.10	—	0.10	—	877	877	0.04	0.01	—	880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.60	0.86	< 0.005	0.02	—	0.02	0.02	—	0.02	—	145	145	0.01	< 0.005	—	146
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.43	0.38	0.36	7.13	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,293	1,293	0.01	0.04	3.50	1,310
Vendor	0.04	0.03	0.80	0.35	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	815	815	0.01	0.11	1.91	850
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	465

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.32	0.40	4.01	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,102	1,102	0.02	0.04	0.09	1,116
Vendor	0.03	0.02	0.87	0.36	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	816	816	0.01	0.11	0.05	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.12	0.13	1.84	0.00	0.00	0.44	0.44	0.00	0.10	0.10	—	431	431	0.01	0.02	0.55	436
Vendor	0.01	0.01	0.31	0.13	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	298	298	< 0.005	0.04	0.30	311
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	71.3	71.3	< 0.005	< 0.005	0.09	72.2
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.4	49.4	< 0.005	0.01	0.05	51.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.43	0.36	3.27	4.73	0.01	0.11	—	0.11	0.10	—	0.10	—	877	877	0.04	0.01	—	880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.08	0.07	0.60	0.86	< 0.005	0.02	—	0.02	0.02	—	0.02	—	145	145	0.01	< 0.005	—	146
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.43	0.38	0.36	7.13	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,293	1,293	0.01	0.04	3.50	1,310
Vendor	0.04	0.03	0.80	0.35	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	815	815	0.01	0.11	1.91	850
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.32	0.40	4.01	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,102	1,102	0.02	0.04	0.09	1,116
Vendor	0.03	0.02	0.87	0.36	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	816	816	0.01	0.11	0.05	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.12	0.12	0.13	1.84	0.00	0.00	0.44	0.44	0.00	0.10	0.10	—	431	431	0.01	0.02	0.55	436
Vendor	0.01	0.01	0.31	0.13	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	298	298	< 0.005	0.04	0.30	311
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	71.3	71.3	< 0.005	< 0.005	0.09	72.2
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.4	49.4	< 0.005	0.01	0.05	51.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.82	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.40	0.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.09	1.63	< 0.005	0.04	—	0.04	0.04	—	0.04	—	248	248	0.01	< 0.005	—	249
Paving	0.07	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.1	41.1	< 0.005	< 0.005	—	41.3
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.16	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	210	210	< 0.005	0.01	0.57	212
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	148	148	< 0.005	0.02	0.35	155
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.4	31.4	< 0.005	< 0.005	0.04	31.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.4	24.4	< 0.005	< 0.005	0.02	25.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.20	5.20	< 0.005	< 0.005	0.01	5.26
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.04	4.04	< 0.005	< 0.005	< 0.005	4.21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Paving (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.82	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.40	0.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.09	1.63	< 0.005	0.04	—	0.04	0.04	—	0.04	—	248	248	0.01	< 0.005	—	249
Paving	0.07	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.1	41.1	< 0.005	< 0.005	—	41.3
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.16	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	210	210	< 0.005	0.01	0.57	212
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	148	148	< 0.005	0.02	0.35	155
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.4	31.4	< 0.005	< 0.005	0.04	31.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.4	24.4	< 0.005	< 0.005	0.02	25.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.20	5.20	< 0.005	< 0.005	0.01	5.26
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.04	4.04	< 0.005	< 0.005	< 0.005	4.21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134

Architectural Coating	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.8	24.8	< 0.005	< 0.005	—	24.9
Architectural Coatings	13.2	13.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.11	4.11	< 0.005	< 0.005	—	4.12

Architectural Coatings	2.42	2.42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.43	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	259	259	< 0.005	0.01	0.70	262
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.08	0.80	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	220	220	< 0.005	0.01	0.02	223
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	43.8	43.8	< 0.005	< 0.005	0.06	44.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.25	7.25	< 0.005	< 0.005	0.01	7.34
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Architectural Coating (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

473

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.8	24.8	< 0.005	< 0.005	—	24.9
Architectural Coatings	13.2	13.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.11	4.11	< 0.005	< 0.005	—	4.12
Architectural Coatings	2.42	2.42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.43	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	259	259	< 0.005	0.01	0.70	262
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.08	0.80	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	220	220	< 0.005	0.01	0.02	223
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	43.8	43.8	< 0.005	< 0.005	0.06	44.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.25	7.25	< 0.005	< 0.005	0.01	7.46

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Architectural Coating (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.27	6.27	< 0.005	< 0.005	—	6.29
Architectural Coatings	3.35	3.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.04	1.04	< 0.005	< 0.005	—	1.04
Architectural Coatings	0.61	0.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.07	0.76	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	217	217	< 0.005	0.01	0.02	219
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.9	10.9	< 0.005	< 0.005	0.01	11.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.80	1.80	< 0.005	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Architectural Coating (2029) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.27	6.27	< 0.005	< 0.005	—	6.29
Architectural Coatings	3.35	3.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.04	1.04	< 0.005	< 0.005	—	1.04

Architectural	0.61	0.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.07	0.76	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	217	217	< 0.005	0.01	0.02	219
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.9	10.9	< 0.005	< 0.005	0.01	11.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.80	1.80	< 0.005	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	8.55	8.14	2.14	50.1	0.08	0.04	9.63	9.67	0.03	2.43	2.46	—	8,303	8,303	0.45	0.26	18.5	8,410
City Park	0.25	0.24	0.06	1.23	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	191	191	0.01	0.01	0.42	194
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	7.04	6.63	2.33	38.5	0.07	0.04	9.63	9.67	0.03	2.43	2.46	—	7,023	7,023	0.48	0.27	0.48	7,117
City Park	0.21	0.20	0.06	0.98	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	162	162	0.01	0.01	0.01	164
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.35	1.28	0.40	7.53	0.01	0.01	1.75	1.76	0.01	0.44	0.45	—	1,246	1,246	0.08	0.04	1.32	1,262
City Park	0.04	0.04	0.01	0.19	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	28.7	28.7	< 0.005	< 0.005	0.03	29.1
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	480

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	8.55	8.14	2.14	50.1	0.08	0.04	9.63	9.67	0.03	2.43	2.46	—	8,303	8,303	0.45	0.26	18.5	8,410
City Park	0.25	0.24	0.06	1.23	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	191	191	0.01	0.01	0.42	194
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	7.04	6.63	2.33	38.5	0.07	0.04	9.63	9.67	0.03	2.43	2.46	—	7,023	7,023	0.48	0.27	0.48	7,117
City Park	0.21	0.20	0.06	0.98	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	162	162	0.01	0.01	0.01	164
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.35	1.28	0.40	7.53	0.01	0.01	1.75	1.76	0.01	0.44	0.45	—	1,246	1,246	0.08	0.04	1.32	1,262
City Park	0.04	0.04	0.01	0.19	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	28.7	28.7	< 0.005	< 0.005	0.03	29.1

User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	497	497	0.04	< 0.005	—	499
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	497	497	0.04	< 0.005	—	499

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	483

User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	484	484	0.03	< 0.005	—	486
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	484	484	0.03	< 0.005	—	486

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
																		484

Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

485

Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00

Consumer	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.34	1.26	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	—	39.0	39.0	< 0.005	< 0.005	—	39.1
Total	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	3.82	3.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.30	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.12	0.11	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.18	3.18	< 0.005	< 0.005	—	3.19
Total	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.34	1.26	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	—	39.0	39.0	< 0.005	< 0.005	—	39.1
Total	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural Coating	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	3.82	3.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.30	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.12	0.11	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.18	3.18	< 0.005	< 0.005	—	3.19
Total	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	489

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	6.42	18.7	25.1	0.02	0.01	—	29.9
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	3.66	3.66	< 0.005	< 0.005	—	3.68
Total	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	6.42	18.7	25.1	0.02	0.01	—	29.9
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	3.66	3.66	< 0.005	< 0.005	—	3.68
Total	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.81	0.00	—	343
City Park	—	—	—	—	—	—	—	—	—	—	—	0.05	0.00	0.05	< 0.005	0.00	—	0.16
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	492

User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.81	0.00	—	343
City Park	—	—	—	—	—	—	—	—	—	—	—	0.05	0.00	0.05	< 0.005	0.00	—	0.16
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

495

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	501

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	1/29/2026	3/18/2026	5.00	35.0	—
Grading	Grading	3/19/2026	8/5/2026	5.00	100	—
Building Construction	Building Construction	8/6/2026	7/5/2028	5.00	500	—
Paving	Paving	7/6/2028	9/27/2028	5.00	60.0	—
Architectural Coating	Architectural Coating	9/28/2028	1/24/2029	5.00	85.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	1.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	1.00	10.2	HHDT,MHDT
Grading	Hauling	19.7	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	92.5	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	27.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	5.00	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	18.5	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	1.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	1.00	10.2	HHDT,MHDT
Grading	Hauling	19.7	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	92.5	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	27.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	5.00	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	18.5	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

506

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	1,959,188	653,063	0.00	0.00	23,403

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	0.00	30.0	0.00	—
Grading	15,749	0.00	300	0.00	—
Paving	0.00	0.00	0.00	0.00	12.0

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	2.83	0%
City Park	0.00	0%
User Defined Parking	9.12	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	457	0.03	< 0.005
2027	0.00	457	0.03	< 0.005
2028	0.00	457	0.03	< 0.005
2029	0.00	457	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	2,424	2,424	2,424	884,581	13,899	13,899	13,899	5,073,042
City Park	75.0	75.0	75.0	27,376	315	315	315	115,007
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	2,424	2,424	2,424	884,581	13,899	13,899	13,899	5,073,042
City Park	75.0	75.0	75.0	27,376	315	315	315	115,007
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	100

5.10.1.2. Mitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	100

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
1959187.5	653,063	0.00	0.00	0.00

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	2,400,186	457	0.0330	0.0040	9,140,029
City Park	0.00	457	0.0330	0.0040	0.00
User Defined Parking	0.00	457	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	2,336,876	457	0.0330	0.0040	9,140,029
City Park	0.00	457	0.0330	0.0040	0.00
User Defined Parking	0.00	457	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	18,153,156	1,352,281
City Park	0.00	5,493,847

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	18,153,156	1,352,281
City Park	0.00	5,493,781

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	1,100	—
City Park	0.51	—
User Defined Parking	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	1,100	—
City Park	0.51	—
User Defined Parking	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	22.4	annual days of extreme heat
Extreme Precipitation	0.10	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	88.7

AQ-PM	9.65
AQ-DPM	36.6
Drinking Water	50.4
Lead Risk Housing	18.7
Pesticides	0.00
Toxic Releases	3.34
Traffic	10.5
Effect Indicators	—
CleanUp Sites	11.8
Groundwater	0.00
Haz Waste Facilities/Generators	50.1
Impaired Water Bodies	0.00
Solid Waste	0.00
Sensitive Population	—
Asthma	36.0
Cardio-vascular	46.2
Low Birth Weights	57.4
Socioeconomic Factor Indicators	—
Education	80.7
Housing	79.3
Linguistic	98.8
Poverty	55.7
Unemployment	70.0

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—

516

Above Poverty	50.68651354
Employed	83.80597973
Median HI	47.77364301
Education	—
Bachelor's or higher	5.851405107
High school enrollment	100
Preschool enrollment	3.849608623
Transportation	—
Auto Access	98.98626973
Active commuting	15.30861029
Social	—
2-parent households	61.19594508
Voting	7.891697677
Neighborhood	—
Alcohol availability	97.0101373
Park access	2.194276915
Retail density	10.94572052
Supermarket access	29.03888105
Tree canopy	4.427049917
Housing	—
Homeownership	91.53086103
Housing habitability	90.19633004
Low-inc homeowner severe housing cost burden	20.18478121
Low-inc renter severe housing cost burden	97.81855511
Uncrowded housing	47.26036186
Health Outcomes	—
Insured adults	27.75567817
Arthritis	88.7

Asthma ER Admissions	63.7
High Blood Pressure	71.3
Cancer (excluding skin)	87.6
Asthma	83.3
Coronary Heart Disease	63.8
Chronic Obstructive Pulmonary Disease	81.8
Diagnosed Diabetes	51.3
Life Expectancy at Birth	33.9
Cognitively Disabled	94.6
Physically Disabled	49.3
Heart Attack ER Admissions	72.3
Mental Health Not Good	44.5
Chronic Kidney Disease	45.1
Obesity	19.9
Pedestrian Injuries	67.6
Physical Health Not Good	42.2
Stroke	80.6
Health Risk Behaviors	—
Binge Drinking	4.8
Current Smoker	40.7
No Leisure Time for Physical Activity	31.1
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	10.6
Elderly	98.7
English Speaking	4.3
Foreign-born	75.2

Outdoor Workers	9.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	65.7
Traffic Density	21.2
Traffic Access	23.0
Other Indices	—
Hardship	70.8
Other Decision Support	—
2016 Voting	17.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	31.0
Healthy Places Index Score for Project Location (b)	41.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	- 967,500 - Total single family home lot square footage (22.2107438 acres) - Landscaping for single family units is already included in CaleeMod, so the landscape area is zeroed out to avoid double counting it. - Recreational City Park accounts for the Park, retention basins, and other landscaped common areas in the subdivision (259,169sf, 5.94970156). - User Defined Parking accounts for the subdivision streets (390,047 sf) and parking area for the Park (86,775 for park - 7,200 sf parking lot approx).
Construction: Construction Phases	Grading extended to 100 days. Arch Coating extended to 85 days. No demolition phase.
Construction: Demolition	No demolition phase
Construction: Dust From Material Movement	There will be 15,749 cy of material imported per the grading plan.
Construction: Architectural Coatings	Parking refers to streets within the subdivison. No paint will be applied.
Operations: Vehicle Data	Traffic Scope estimates housing the residential units could generate up 2,404.65 trips per day (LU Code 210). If each unit generate 9.43 trips per day, the total trips = 2423.51. 2423.51 divided by 257 = 9.43 The park could generate up to 75 trips per day. Since the park was included in the acreage all landscaped areas, 75 trips is divided by 5.94970156.
Operations: Fleet Mix	Passenger cars and motorcycles would be the primary vehicles used in the residential and park uses.
Operations: Hearths	No wood stoves No fireplaces
Operations: Architectural Coatings	No coatings or paint applied to parking (streets).
Operations: Refrigerants	Park will not contain refrigeration.
Operations: Water and Waste Water	Water calculations from CVWD worksheet were input here to be consistent with the IS water use analysis.
Operations: Solid Waste	Applied the CalRecycle estimated solid waste generation rate for single family home of 11.4 pounds per unit per day. 4,161.2 pounds of solid waste. Divide in half (50% diversion rate) = 2,080.5. convert to tons.
Construction: Trips and VMT	Paving trips - 397,247 sf of asphalt for streets and parking lot. x .33333 foot depth of asphalt (4 inches) = 132,414.34125 cubic feet. / 27 = 4904.235 cubic yards of asphalt. / 16 (each truck carries 16 cy of asphalt) = 306 trucks. / 60 days in paving phase - 5.1 trips per day
Construction: Paving	no off gassing from landscaped areas

Appendix B
Calhoun Street Housing Development Biological Resources Report

DRAFT BIOLOGICAL RESOURCES ASSESSMENT & COACHELLA VALLEY MULTIPLE SPECIES HABITAT CONSERVATION PLAN CONSISTENCY ANALYSIS REPORT

CALHOUN STREET & AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

Assessor's Parcel Number 612-260-010 (38.80 acres)

Coachella
Riverside County
California

Submitted to:
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19 March 2024

TABLE OF CONTENTS

PAGE

1.0 INTRODUCTION 1
2.0 PROJECT SITE / PROJECT DESCRIPTION 1
3.0 REGULATORY FRAMEWORK 1
3.1 Federal Endangered Species Act 1
3.2 Federal Migratory Bird Treaty Act 2
3.3 Clean Water Act 2
3.3.2 California Environmental Quality Act 4
3.3.3 Section 2081 of the State Fish and Game Code 5
3.3.4 Sections 3503, 3505.5, & 3513 of the State Fish and Game Code 5
3.4 Regional 5
3.4.1 Coachella Valley Multiple Species Habitat Conservation Plan 5
4.0 METHODS 6
4.1 Literature Review 6
4.2 Field Assessment 6
5.0 RESULTS 7
5.1 Coachella Valley Multiple Species Habitat Conservation Plan 7
5.2 Weather Conditions 7
5.3 Topography, Soils and Waters 8
5.4 Vegetation 9
5.5 Wildlife 9
5.6 Special Status Biological Resources 10
6.0 DISCUSSION 24
6.1 Discussion of the Special Status Biological Resources Tables 24
6.1.1 Species Covered Under the CVMSHCP 26
6.1.2 Plant Species Not Covered Under the CVMSHCP 27
6.1.3 Wildlife Species Not Covered Under the CVMSHCP 28
6.1.4 Additional Bird Species Protected by the Migratory Bird Treaty Act 29
6.1.5 Jurisdictional Areas 30
7.0 CONCLUSION 30
8.0 LITERATURE CITED AND REFERENCES 32

LIST OF TABLES

Table 1. Special Status Plants 11
Table 2. Special Status Vegetation Communities 15
Table 3. Special Status Invertebrates 15
Table 4. Special Status Fish 16
Table 5. Special Status Reptiles 16
Table 6. Special Status Birds 17
Table 7. Special Status Mammals 20

LIST OF APPENDICES

Appendix A. Species List: Vascular Plants
Appendix B. Species List: Vertebrate Animals
Appendix C. Figures
Appendix D. Photographic Exhibits

1.0 INTRODUCTION

At the request of Terra Nova Planning & Research, this biological resources assessment report (BRAR) and Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) consistency analysis was prepared by WSP USA Environment & Infrastructure, Inc. (WSP) for the proposed residential development (project) of a 38.80-acre site in Coachella, Riverside County, California (Figure 1). Information contained herein is intended to be used for compliance with the CVMSHCP, the California Environmental Quality Act (CEQA) and other relevant environmental regulations.

2.0 PROJECT SITE / PROJECT DESCRIPTION

The 38.80-acre project site is located at the southwest junction of Calhoun Street and Avenue 49 in Coachella, Riverside County, California. The Assessor's Parcel Number (APN) is APN 612-260-010. The project site is currently zoned as "Vacant Land – Predominate Agriculture Use" by the Riverside County Assessor, County Clerk and Recorders website (Riverside County Information Technology 2024). The project site is located within Section 36, Township 5 South, Range 7 East, United States Geological Survey (USGS) 7.5' Indio, Calif. Quadrangle. Elevations range between approximately -7.6 to -9.1 meters (m) (-25 to -30 feet [ft]) below mean sea level (Figure 2).

The proposed project includes the development of new residential dwellings on the 38.80-acre vacant lot.

3.0 REGULATORY FRAMEWORK

3.1 Federal Endangered Species Act

The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service are the designated federal agencies accountable for administering the federal Endangered Species Act (FESA). The FESA defines species as "endangered" or "threatened" and provides regulatory protection at the federal level.

- Section 9 of the FESA prohibits the "take" of listed (i.e., endangered or threatened) species. The FESA definition of take is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct." Recognizing that take cannot always be avoided, Section 10(a) includes provisions for take that is incidental to, but not the purpose of, otherwise lawful activities. Specifically, Section 10(a)(1)(A) permits (authorized take permits) are issued for scientific purposes Section 10(a)(1)(B) permits (incidental take permits) are issued for the incidental take of listed species that does not jeopardize the species.
- Section 7 (a)(2) requires federal agencies to evaluate the proposed project with respect to listed or proposed listed, species and their respective critical habitat (if applicable). Federal

agencies must employ programs for the conservation of listed species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its "critical habitat." As defined by the FESA, "individuals, organizations, states, local governments, and other nonfederal entities are affected by the designation of critical habitat only if their actions occur on federal lands, require a federal permit, license, or other authorization, or involve federal funding.

- Section 10(a) of the FESA authorizes the issuance of incidental take permits and establishes standards for the content of habitat conservation plans (HCP). The CVMSHCP is an HCP, see discussion below.

3.2 Federal Migratory Bird Treaty Act

Treaties signed by the United States, Great Britain, Mexico, Japan and the countries of the former Soviet Union make it unlawful to pursue, capture, kill, and/or possess, or attempt to engage in any such conduct to any migratory bird, nest, egg or parts thereof listed in this document. The Secretary of the Interior can issue permits for incidental take of migratory bird species. The Migratory Bird Treaty Act (MBTA) also allows the Secretary of the Interior to grant permits for specific actions for the incidental take of these protected migratory bird species, but this rarely occurs.

3.3 Clean Water Act

Waters of the United States

On August 29, 2023, the U.S. Environmental Protection Agency and the Department of the Army issued a final rule amending the "Revised Definition of 'Waters of the United States," initially published in the Federal Register on January 18, 2023. This amendment aligns the definition of "waters of the United States" (WOTUS) with the U.S. Supreme Court's decision in the case of Sackett v. Environmental Protection Agency on May 25, 2023. The Supreme Court deemed certain parts of the January 2023 Rule invalid based on its interpretation of the CWA in the Sackett decision. Consequently, the agencies have modified key elements of the regulatory text to comply with the Court's ruling. The conforming rule, titled "Revised Definition of 'Waters of the United States'; Conforming," was published in the Federal Register and became effective on September 8, 2023.

Furthermore, due to ongoing litigation, the January 2023 Rule is currently not in effect in certain states and for certain parties. The agencies are applying the January 2023 Rule, as amended by the conforming rule, in 23 states, the District of Columbia, and the U.S. Territories. In the remaining 27 states and for specific parties, the agencies are interpreting WOTUS in accordance with the pre-2015 regulatory framework and the Supreme Court's decision in Sackett until further notice. To summarize some of the most applicable highlights, the agencies' new rule defines WOTUS as:

Categories of Jurisdictional Waters

1) Waters which are:

(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) The territorial seas; or

(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:

(i) Waters identified in paragraph (a)(1) of this section; or

(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section.

Eight exclusions from the definition of WOTUS are codified at paragraph (b), and key terms are defined at paragraph (c). "Adjacent" is defined at (c)(2) as "having a continuous surface connection."

3.3.1 Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) regulates activities pursuant to Section 401(a)(1) of the CWA. Section 401 of the CWA specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities that may result in any discharge into navigable waters. Through the Porter Cologne Water Quality Control Act, the RWQCB asserts jurisdiction over Waters of the State of California (WSC) which is generally the same as WUS but may also include isolated waterbodies. The Porter Cologne Act defines WSC as “surface water or ground water, including saline waters, within the boundaries of the state.”

3.3.2 California Environmental Quality Act

The basic goal of the CEQA is to maintain a high-quality environment now and in the future and the specific goals are for California's public agencies to:

1) Identify the significant environmental effects of their actions; and, either

2) Avoid those significant environmental effects, where feasible; or

3) Mitigate those significant environmental effects, where feasible.

The CEQA applies to "projects" proposed to be undertaken or requiring approval by State and local government agencies. Projects are activities which have the potential to have a physical impact on the environment and may include the enactment of zoning ordinances, the issuance of conditional use permits and the approval of tentative subdivision maps. Where a project requires approvals from more than one public agency, the CEQA requires one of these public agencies to serve as the "lead agency."

A "lead agency" must complete the environmental review process required by the CEQA. The most basic steps of the environmental review process are:

1) Determine if the activity is a "project" subject to the CEQA;

2) Determine if the "project" is exempt from the CEQA;

3) Perform an Initial Study to identify the environmental impacts of the project and determine whether the identified impacts are "significant". Based on its findings of "significance", the lead agency prepares one of the following environmental review documents:

   a) Negative Declaration if it finds no "significant" impacts;

   b) Mitigated Negative Declaration if it finds "significant" impacts but revises the project to avoid or mitigate those significant impacts;

   c) Environmental Impact Report (EIR) if it finds "significant" impacts.

While there is no ironclad definition of "significance", Article 5 of the CEQA Guidelines provides criteria to lead agencies in determining whether a project may have significant effects.

The purpose of an EIR is to provide State and local agencies and the general public with detailed information on the potentially significant environmental effects which a proposed project is likely to have and to list ways in which the significant environmental effects may be minimized and indicate alternatives to the project.

3.3.3 Section 2081 of the State Fish and Game Code

Under Section 2081 of the California Fish and Game Code (FGC), the California Department of Fish and Wildlife (CDFW) authorizes individuals or public agencies to import, export, take, or possess state endangered, threatened, or candidate species in California through permits or memoranda of understanding. These acts, which are otherwise prohibited, may be authorized through permits or "memoranda of understanding" if (1) the take is incidental to otherwise lawful activities, (2) impacts of the take are minimized and fully mitigated, (3) the permit is consistent with regulations adopted in accordance with any recovery plan for the species in question, and (4) the applicant ensures suitable funding to implement the measures required by the CDFW. The CDFW shall make this determination based on the best scientific information reasonably available and shall include consideration of the species' capability to survive and reproduce.

3.3.4 Sections 3503, 3505.5, & 3513 of the State Fish and Game Code

Section 3503 of the FGC makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3505.5 makes it unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds-of-prey, i.e.: owls, hawks, eagles, etc.) or to take, possess, or destroy the nest or eggs of any bird-of-prey. Section 3513 makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA.

3.4 Regional

3.4.1 Coachella Valley Multiple Species Habitat Conservation Plan

Finalized in October 2008, the CVMSHCP is a comprehensive, regional plan that addresses the conservation needs of 27 species of native flora and fauna and 24 natural vegetation communities occurring throughout the Coachella Valley region of western Riverside County, California. Permits for the CVMSHCP were issued by the CDFW on September 9, 2008 and the United States Fish and Wildlife Service (USFWS) on October 1, 2008 (TE104604-0). The CVMSHCP serves two primary purposes: Balancing environmental protection and economic development objectives in the CVMSHCP area and simplifying compliance with endangered species related laws. The CVMSHCP accomplishes this by conserving unfragmented habitat to permanently protect and secure viable populations of the covered species. The covered species include those plants and animals that are either currently listed as threatened or endangered, are proposed for listing, or are believed by an appointed Scientific Advisory Committee, USFWS and CDFW, to have a high probability of being proposed for listing in the future if not provided protection by the CVMSHCP. The goal of the CVMSHCP is to meet the requirements of the state and federal endangered species acts, while at the same time allowing for the economic growth (land development) within the plan area without significant delay or hidden costs. Under the CVMSHCP, land development/mitigation fees are

collected from all new development projects occurring in the plan area. The purpose of this fee is to support the assembly of a preserve system for the covered species and natural vegetation communities within areas identified as having high conservation value.

4.0 METHODS

4.1 Literature Review

In preparation for the field surveys, a literature search was conducted to identify special status biological resources known from the vicinity of the project site. In the context of this report, and for the purpose of this assessment, vicinity is defined as areas within a 5-mile radius of the project site.

The literature search included a review of the following documents:

- California Natural Diversity Data Base (CNDDB) RareFind 5 (CDFW 2024a)
- Special Animals List (CDFW 2024b)
- California Native Plant Society's (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2024a)
- Information for Planning and Consultation (IPaC) Resources List (USFWS 2024)
- CVMSHCP (Coachella Valley Conservation Commission "CVCC" 2024)
- United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2024. Web Soil Survey
- USGS 7.5' *Indio, La Quinta, Myoma, Valerie* and *West Berdoo Canyon, Calif.* quadrangles (USGS 2015a, USGS 2015b, USGS 2015c, USGS 2015d, USGS 2021)

Scientific nomenclature for this document follows standard reference sources: For plant communities, CVMSHCP (CVCC 2024); for flora, Jepson eFlora (2024) and the USDA NRCS PLANTS Database (2024); for amphibians, reptiles, and mammals, CDFW (2016); and for birds, California Bird Records Committee (2024).

4.2 Field Assessment

The field assessment was conducted between the hours of 1040 and 1240 on 29 February 2024 by WSP senior biologist Michael D. Wilcox. Onsite suitable habitat was assessed based on the presence of constituent habitat elements (e.g., soils, vegetation and topography) characteristic of the potentially occurring special status biological resources determined by the literature review. The entire site and adjacent properties (where accessible) were assessed on foot to record pertinent field data and current site conditions. Where present, adjacent undeveloped areas within an approximate 150-meter (m) (~500-foot [ft]) buffer zone were also assessed visually, from the project site, for burrowing owl (*Athene cunicularia*). All onsite flora and fauna observed or otherwise detected (e.g., vocalizations, presence of scat, tracks, and/or bones) during the

assessment were recorded in field notes and are included in Appendices A and B. General weather and site conditions were also recorded at the beginning and end of the survey. Temperatures and wind speeds were recorded with a handheld Kestrel 3500 anemometer. Percent cloud cover was visually estimated.

5.0 RESULTS

The fenced, 38.8-acre project site currently consists of a combination of an abandoned, remnant date palm farm, intermittent disturbed/ruderal areas and a largely barren area that has been cleared of nearly all vegetation and graded/scraped. With the exception of a few areas, primarily along the western edge of the site, vegetation is relatively sparse. Soils are largely stabilized, compacted and disturbed. Existing site disturbances observed onsite included abandoned, fallow agricultural practices (rows of remnant date palms and associated irrigation and/or farming structures), vegetation clearance, grading/scraping, dumping, offroad vehicular activity (minor), minor dumping and accumulation of roadside trash (minor).

Existing residential (tract home) developments occur to the north and south. The lands to the west are fenced and currently being graded and under construction, likely for future residential development (tract homes), while the lands to the east are largely vacant, undeveloped and disturbed.

5.1 Coachella Valley Multiple Species Habitat Conservation Plan

The project site is located within Coachella, which is a signatory to the CVMSHCP. The site is not within any CVMSHCP-designated conservation areas. The closest is the East Indio Hills Conservation Area which is located approximately 5.5 kilometers (km) (3.4 mi) to the northeast and the Santa Rosa and San Jacinto Mountains Conservation Area, which is located approximately 7.4 km (4.6 mi) to the southwest of the site (Figure 3). The site does not contain CVMSHCP modeled habitats for any covered or special status species. The site is not within a fluvial sand transport area as illustrated on CVMSHCP Figure 4-5: Essential Ecological Processes Conserved Through General Plan Land Use Designations and Flood Control Standards (CVCC 2024). The site is not within any of the Coachella Valley Fringe-toed Lizard Preserves as illustrated on CVMSHCP Figure 6-2 (CVCC 2024). No CVMSHCP-designated wildlife corridors or biological linkages are mapped on the project site.

5.2 Weather Conditions

Weather conditions during the assessment included clear skies with no cloud cover. The temperatures ranged from 72 to 78 degrees Fahrenheit (°F). Winds were calm with speeds ranging 0 to 2 miles per hour (mph).

5.3 Topography, Soils and Waters

Existing topography is largely flat, sloping slightly to the south. Slight relief occurs only in the form of a manufactured linear embankment (edge of dirt perimeter road) along the northern site boundary and around a small, currently dry irrigation pond located in the northwestern corner of the site. Mapped soils (USDA NRCS 2024) include: Coachella fine sand, 0-2% slopes (CpA); Gilman fine sandy loam, 0-2% slopes (GbA) and Indio fine sandy loam (Ip) (Figure 4).

Coachella series soils are well-drained soils that are moderately rapidly permeable and occur in lacustrine basins at elevations from 230 feet below sea level to 800 feet above sea level. Although well drained, perched water tables are common in areas that are irrigated. Sediments originate largely from igneous rocks. Slopes are nearly level to gently sloping. The climate is arid with average annual rainfall ranging from 2 to 4 inches, occurring in light winter rains and/or high intensity summer monsoon thunderstorms (USDA NRCS 2024).

Gilman series soils are very deep, well drained soils with slow runoff and moderate permeability that were formed in stratified stream alluvium. This series generally occur at elevations from 75 to 2,500 feet above sea level. They are known to occur on flood plains and alluvial fans and have slopes of 0 to 3 percent. Gilman series soils generally range from non-saline to strongly saline. Mean annual rainfall is 2 to 10 inches (USDA NRCS 2024).

Indio series soils are very deep, well to moderately well drained soils that were formed in alluvium and are derived from mixed rock sources. Runoff is generally slow and permeability is moderate. This soil series generally occur at elevations from 230 feet below sea level to 1,400 feet above sea level on alluvial fans, lacustrine basins and flood plains. Slopes are usually gentle at 0 to 3 percent with the exception of where they occur on low stream or wash embankments. Mean annual precipitation ranges from 3 to 10 inches (USDA NRCS 2024).

Onsite soils are highly disturbed, a result of past date farming practices and grading in at least one area (the northeastern ¼ of the site). Prior to the planting of the date palms, the entire site was very likely scraped, cleared and graded. A former irrigation pond; evident by manufactured embankments, dried cracked substrates and remnant cement/concrete irrigation structures; is located in the northwest corner of the site. This irrigation pond was completely dry at the time of the assessment and exhibited no evidence of having recently held water or contained moisture (other than the dried, cracked substrate observed in the bottom). Irrigation furrows and underground piping is evident throughout the southern and western 2/3 of the site. No streams, washes, springs, active drifts, sand dunes, rock outcrops, rocky areas, or natural clay lenses were observed.

5.4 Vegetation

According to CVMSHCP Figure 3-1: Natural Communities and Development, onsite vegetation community is mapped as "ruderal" (CVCC 2023). Historic aerial imagery indicates that by 2002, the southern and western ¾ of the site was being used to grow dates. The northeastern ¼ of the site appears to have been cleared of vegetation and has remained vacant, undeveloped and not used to grow dates since 2002 at least. Although Sawyer et. al. (2009) does not provide a description for agricultural and/or disturbed areas, perhaps the best way to describe the current vegetation present onsite would likely be abandoned/fallow agricultural lands with sparse, remnant patches of *Atriplex lentiformis* shrubland alliance (quailbush scrub), ruderal/disturbed and largely barren areas (primarily in the northeastern ¼ of the site) occurring intermittently throughout (Figure 5). The dominant plant species onsite is the formerly cultivated date palm (*Phoenix dactylifera*) that intermittently remain in east/west linear rows throughout the western and southern ¾ of the site. Although relatively sparse and primarily located along the perimeter and in linear rows, in between and beneath the rows of date palms, native perennial plant species observed included quailbush (*Atriplex lentiformis*), arrow-weed (*Pluchea sericea*), common sunflower (*Helianthus annuus*) and blue palo verde (*Parkinsonia florida*). Other plant species observed primarily included a mixture of non-native, invasive and/or ruderal species. These included puncture vine (*Tribulus terrestris*), amaranth (*Amaranthus* sp.), cheeseweed (*Malva parviflora*), Sahara mustard (*Brassica tournefortii*), Mexican palo verde (*Parkinsonia aculeata*), saltcedar (*Tamarisk ramosissima*) and Bermuda grass (*Cynodon dactylon*). A complete list of the plant species observed onsite is included in Appendix A.

No natural wetland, riparian or otherwise special-status vegetation communities were observed on-site. A full list of the plant species observed during the surveys, including common and scientific names, is appended to this report (Appendix A).

5.5 Wildlife

Vertebrate wildlife directly observed and/or detected otherwise (e.g., scat, bones, tracks, feathers, burrows, etc.) during the surveys was not diverse or abundant, limited to 17 species common to the region. This included one reptile, 14 birds and two mammals (Appendix B).

The one reptile species observed onsite include the side-blotched lizard (*Uta stansburiana*). Representative bird species observed onsite included but were not limited to: Eurasian collared dove (*Streptopelia decaocto*), mourning dove (*Zenaida macroura*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*) and white-crowned sparrow (*Zonotrichia leucophrys*). The two mammals observed and/or detected onsite included Botta's pocket gopher (*Thomomys bottae*) and

California ground squirrel (*Otospermophilus beecheyi*). A complete list of the vertebrate species observed or detected onsite is included as Appendix B.

It should be noted that relatively short-term biological studies of this nature are often limited by the seasonality of annual plants, the migratory habits of many birds, the fossorial and nocturnal habits of many mammals and reptiles, as well as the timing of field visit. A complete inventory of the wildlife on the site would require extensive year-round surveys for birds, amphibians, and reptiles, and additional surveys, such as placement of scent stations or tracking stations, for the detection of nocturnal mammals. Knowledge of habitat associations, natural history, seasonality, and distribution is essential in the assessment of the potential for occurrence of the various special status plants and animals known to occur throughout the Coachella Valley. For these reasons, other common and special status species that were not observed onsite may also have the potential to occur based on their geographic distribution, habitat preferences and the regional location of the site. The following section summarizes information on special status biological resources known to occur in the vicinity of the project site.

5.6 Special Status Biological Resources

Plant or animal taxa may be considered "sensitive" or as having “special status” due to declining populations, vulnerability to habitat change, or because they have restricted ranges. Some are listed as threatened or endangered by the USFWS or by the CDFW and are protected by the federal and state Endangered Species acts. Others have been identified as sensitive or as special-status species by the USFWS, the CDFW, or by private conservation organizations, including the CNPS. Unlisted sensitive species do not have formal state or federal status but may nevertheless be considered significant under the CEQA. The CVMSHCP provides conservation for twenty-seven (27) imperiled plant and animal species (5 plants, 2 insects, 1 amphibian, 3 reptiles, 11 birds, and 5 mammals). These include federal and state-listed species, federal and California Species of Concern, and species on the CNPS sensitive species lists. CVMSHCP covered species are designated on the tables below. The site is not within designated critical habitat for any special status plants or wildlife.

The review of the CNDDB, CNPS Online Inventory of Rare Plants and IPaC Resources List resulted in the identification of 68 special status biological resources known to occur in the vicinity (within an approximate 5-mile radius) of the project site. The 68 special status biological resources known from the vicinity included 33 plants, one vegetation communities, five invertebrates, one fish, four reptiles, 14 birds and 10 mammals. Tables 1 through 7 provide a complete list of the special status biological resources, their associated legal status, and their respective onsite occurrence potentials.

Tables 1 through 7 summarize information on all special status species that have been reported within the vicinity (5-mile radius) or that occur or are considered to have some potential to occur onsite based on geographic distribution, elevational parameters and/or presence of potentially suitable habitat. Occurrence probability is based on the best available information and the collective expertise of WSP biologists. These tables provide the names, legal or conservation status, general habitat associations, and the probability of occurrence for each of these species.

Table 1. Special Status Plants

Species	Status	Habitat	Probability
Abronia villosa var. *aurita* **chaparral sand-verbena**	F: None C: None CNPS: List 1B.1 State Rank: S2 CVMSHCP: No	Sandy areas in chaparral, coastal sage scrub & desert dune habitats. 80-1,600 m. (262-5,249 ft.); B: (Jan) Mar-Sept.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus lentiginosus var. borreganus **Borrego milk-vetch**	F: None C: None CNPS List: 4.3 State Rank: S4 CVMSHCP: No	Mojavean desert scrub, Sonoran Desert scrub; sandy. 30-895 m. (100-2,935 ft.); B: Feb-May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus lentiginosus var. *coachellae* **Coachella Valley milk-vetch**	F: **END** C: None CNPS: 1B.2 State Rank: S1 CVMSHCP: **Yes**	Sonoran desert scrub; sandy flats, washes, outwash fans, sometimes on dunes. 40-665 m. (131-2,182 ft.); B: Jan–Sept.	**Absent** Suitable habitat lacking. Site below known elevational range of species. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Astragalus preussii var. *laxiflorus* **Lancaster milk-vetch**	F: None C: None CNPS: 1B.1 State Rank: S1 CVMSHCP: No	Chenopod scrub. 700 m. (2,295 ft.); B: Mar–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus subulonum **gravel milk-vetch**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub; dunes; -60-930 m. (195-3,050 ft.); B: Feb–Jun.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus tricarinatus **triple-ribbed milk-vetch**	F: **END** C: None CNPS: 1B.2 State Rank: S2 CVMSHCP: **Yes**	Joshua tree woodland & Sonoran desert scrub on hot, rocky slopes in canyons & along edge of boulder-strewn desert washes with *Larrea* and *Encelia*. 455-1,525 m. (1,492-5,000 ft.); B: Feb–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Bursera microphylla **little-leaf elephant tree**	F: None C: None CNPS: 2B.3 State Rank: S3	Sonoran desert scrub, hillsides, canyon sides and washes; rocky. 195-700 m. (640-2,297 ft.); B: Jun-Jul.	**Absent** Suitable habitat lacking. Site below known elevational range of species.

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	CVMSHCP: No		
Chorizanthe leptotheca **Peninsular spineflower**	F: None C: None CNPS: 4.2 State Rank: S3 CVMSHCP: No	Chaparral, coastal scrub, lower montane coniferous forest. 300-1,900 m. (985-6,230 ft.); B: May-Aug.	**Absent** Suitable habitat lacking. Site below known elevation range of species.
Ditaxis claryana **glandular ditaxis**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Mojavean & Sonoran desert scrub. 0-465 m. (0-1,526 ft.); B: Oct–Mar.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Ditaxis serrata var. *californica* **California ditaxis**	F: None C: None CNPS: 3.2 State Rank: S2? CVMSHCP: No	Sonoran desert scrub. 30 to 1,000 m. (98-3,281 ft.); B: Mar-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Eremothera boothii var. *boothii* **Booth's evening primrose**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Joshua tree woodland, pinyon & juniper woodland. 815-2,400 m. (2,674-7,874 ft.); B: Apr-Sep.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Eschscholtzia androuxii **Joshua Tree poppy**	F: None C: None CNPS: 4.3 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Joshua tree woodland. 585-1,685 m. (1,920-5,530 ft.); B: Feb-May (Jun).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Euphorbia abramsiana **Abrams' spurge**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Sandy sites in Mojave and Sonoran desert scrub. -5–1,450 m. (-16-4,757 ft.). B: (Aug) Sept- Nov.	**Very Low** Remnant marginally suitable habitat very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present. Site just below/at edge of elevational range of species.
Euphorbia arizonica **Arizona spurge**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Sandy soils in Sonoran desert scrub; 50-300 m. (200-1,000 ft); B: Mar-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Euphorbia platysperma **flat-seeded spurge**	F: None C: None CNPS: 1B.2 State Rank: S1 CVMSHCP: No	Sandy Sonoran desert scrub, shifting dunes. In CA, potentially a waif; more common in AZ and MX. 65-100 m. (215-330 ft.); B: Feb-Sep.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Horsfordia alata **pink velvet-mallow**	F: None C: None CNPS: 4.3 State Rank: S4	Sonoran desert scrub (rocky). 100-500 m. (330-1,640 ft); B: Feb-Dec.	**Absent**

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	CVMSHCP: No		Suitable habitat lacking. Site below known elevational range of species.
Horsfordia newberryi **Newberry's velvet-mallow**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Sonoran desert scrub (rocky). 8-300 m. (26-984 ft); B: Feb-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Johnstonella costata **ribbed cryptantha**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Desert dunes, Mojavean desert scrub, Sonoran desert scrub; -60-500 m (-195-1,640 ft); B: Feb-May.	**Very Low** Remnant marginally suitable habitat very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present.
Johnstonella holoptera **winged cryptantha**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Sonoran desert scrub, Mojavean desert scrub; sandy or rocky canyons. 100-1,690 m. (328-5,545 ft); B: Mar-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Juncus acutus ssp. leopoldii **southwestern spiny rush**	F: None C: None CNPS: 4.2 State Rank: S4 CVMSHCP: No	Coastal dunes (mesic), coastal scrub, meadows & seeps (alkaline), marshes & swamps (coastal salt) Mojavean desert scrub, Sonoran desert scrub; -3-900 m (-10-2,955 ft). B: Mar-Jun.	**Absent** Suitable habitat lacking. Former irrigation pond located in NW corner of site and irrigation rows for date palms currently dry. Site just below/at edge of elevational range of species.
Juncus cooperi **Cooper's rush**	F: None C: None CNPS: 4.3 State Rank: S3 CVMSHCP: No	Meadows & seeps (mesic, alkaline or saline). -260-1,700 m (-855-5,805 ft); B: Apr-Aug.	**Absent** Suitable habitat lacking. Former irrigation pond located in NW corner of site and irrigation rows for date palms currently dry.
Leptosiphon floribundus **Santa Rosa Mountains leptosiphon**	F: None C: None CNPS: 1B.3 State Rank: S1S2 CVMSHCP: No	Sonoran desert scrub, pinyon juniper woodland; 1,000-2,000 m (3,280–6,560 ft); B: May-Jul (Nov).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Lycium torreyi **Torrey's box-thorn**	F: None C: None CNPS: 4.2 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub; -50 - 1220 m (-165–4,005 ft); B: (Jan-Feb) Mar-Jun (Sep-Nov).	**Absent** Remnant marginally suitable habitat very limited and disturbed. Conspicuous perennial species would likely have been detected if present.
Marina orcuttii var. *orcuttii* **California marina**	F: None C: None CNPS: 1B.3	Chaparral, pinyon and juniper woodland, Sonoran desert scrub, rocky. 1,050-1,160 m (3,445–3,806 ft); B: May-Oct.	**Absent**

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	State Rank: S2? CVMSHCP: No		Suitable habitat lacking. Site below known elevational range of species.
Matelea parvifolia **spear-leaf matelea**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub, rocky. 440-1,095 m. (1,445–3,595 ft.); B: Mar-May (Jul).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Nemacaulis denudata var. *gracilis* **slender cottonheads**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Sandy places in coastal dunes, desert dunes & Sonoran desert scrub. 50-400 m. (164-1,315 ft.); B: Mar–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Petalonyx linearis **narrow-leaf sandpaper-plant**	F: None C: None CNPS: 2B.3 State Rank: S3? CVMSHCP: No	Sandy or rocky canyons in Mojavean desert scrub and Sonoran desert scrub; -25-1115 m. (-80-3,660 ft.); B: Mar-May (sometimes Jan-Dec).	**Absent** Suitable habitat lacking. Perennial sandpaper-plant (*Petalonyx* spp.) not observed.
Phaseolis filiformis **slender-stem bean**	F: None C: None CNPS: 2B.1 State Rank: S1 CVMSHCP: No	Sonoran desert scrub. 125 m (410 ft.); B: Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Pseudorontium cyanthiferum **Deep Canyon snapdragon**	F: None C: None CNPS: 2B.3 State Rank: S1 CVMSHCP: No	Sonoran desert scrub in rocky washes and on rocky slopes in the immediate vicinity of Deep Canyon. 0-800 m. (0-2,625 ft.); B: Feb-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Selaginella eremophila **desert spike-moss**	F: None C: None CNPS: 2B.2 State Rank: S2S3 CVMSHCP: No	Chaparral, Sonoran Desert scrub; shaded sites, gravelly soils, crevices or among rocks. 200-900 m. (656-2,953 ft.); B: May–Jul.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Senna covesii **Cove's cassia**	F: None C: None CNPS: 2B.2 State Rank: S3 CVMSHCP: No	Sonoran Desert scrub, dry, sandy desert washes & slopes. 225-1,295 m. (740-4,250 ft.); B: Mar–Jun (Aug).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Stemodia durantifolia **purple stemodia**	F: None C: None CNPS: List 2B.1 State Rank: S2.1? CVMSHCP: No	Mesic sites on sandy soils in Sonoran desert scrub. 180-300 m. (590–980 ft.); B: (Jan) Apr-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Xylorhiza cognata **Mecca-aster**	F: None C: None CNPS: List 1B.2 State Rank: S2 CVMSHCP: **Yes**	Grows on steep canyon slopes on sandstone and clay substrates, 20-305 m (65–1,000 ft); B: Jan-Jun.	**Absent** Suitable habitat lacking. Site below known elevational range of species.

Table 2. Special Status Vegetation Communities

Community	Status	Habitat	Probability
desert fan palm oasis woodland	F: None C: S3.2 State Rank: S3.2 CVMSHCP: **Yes**	Natural California fan palm (*Washingtonia filifera*) stands	**Absent** Only small, sapling fan palms and cultivated date palms (*Phoenix dactilifera*) observed onsite.

Table 3. Special Status Invertebrates

Community	Status	Habitat	Probability
Dinacoma caseyi **Casey's June beetle**	F: END C: None State Rank: S1 CVMSHCP: No	Appears to be entirely restricted to the mouth and alluvial floodplain of Palm Canyon Wash and Tahquitz Creek in Palm Springs, in association with deposits of fine silts, sands and gravels	**Absent** Suitable habitat lacking. Site outside of known range of species. Site is not within designated critical habitat or USFWS recommended survey area for this species.
Danaus plexippus **monarch butterfly**	F: FC C: None State Rank: S2S3 CVMSHCP: No	Western winter roost sites primarily occur along the coast from northern Mendocino to Baja California, Mexico, located in wind-protected tree groves (*Eucalyptus* species, Monterey pine (*Pinus radiata*), cypress), with nectar and water sources nearby. During breeding season, adults widespread but scarce in the desert. Larvae require milkweed	**Absent** Suitable habitat lacking. Larval host plants (milkweeds) not observed. Winter roost sites not present. Adults may, however, occasionally fly through site.
Macrobaenetes valgum **Coachella giant sand treader cricket**	F: None C: None State Rank: S1S2 CVMSHCP: **Yes**	Active sand dune hummocks and ridges, sites favorable to permanent habitation include spring-moistened sand.	**Absent** Suitable habitat lacking. Sand dunes and hummocks not present. Site is not within CVMSHCP modeled habitat for this species.
Oliarces clara **cheeseweed owlfly**	F: None C: None State Rank: S2 CVMSHCP: No	Known from lower Colorado River drainage, associated with creosote bush (*Larrea tridentata*) in desert scrub; creosote is suspected larval host. Found under rocks or in flight over streams.	**Absent** Suitable habitat lacking. No drainages or washes on the site.

Table 3. Special Status Invertebrates

Euparagia unidentate **Algodones Dunes Euparagia**	F: None C: None State Rank: S1S2 CVMSHCP: No	Desert dunes.	**Absent** Suitable habitat lacking. Dune habitats not present.

Table 4. Special Status Fish

Community	Status	Habitat	Probability
Cyprinodon macularius **desert pupfish**	F: **END** C: **END** State Rank: S1 CVMSHCP: **Yes**	Desert ponds, springs, marshes and streams.	**Absent** Suitable aquatic habitat lacking. Former irrigation pond in NW corner of site currently dry. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 5. Special Status Reptiles

Species	Status	Habitat	Probability
Crotalus ruber ruber **northern red diamond rattlesnake**	F: ND C: SSC State Rank: S2? CVMSHCP: No	Favors rocky areas and dense vegetation, shelters in rodent burrows, rock cracks, or surface cover. Known from the eastern slopes of the Peninsular Ranges, desert floor up to 5,000 feet	**Absent** Suitable habitat lacking.
Gopherus agassizi **desert tortoise**	F: **THR** C: **THR** State Rank: S2 CVMSHCP: **Yes**	Creosote bush scrub, Joshua tree woodland, saltbush scrub); washes, arroyos, bajadas, rocky hillsides, open flat desert.	**Absent** Suitable habitat lacking. Site formerly agricultural (date palm farm). Sign (burrows, scat, remains, etc.) not observed. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Phrynosoma mcallii **flat-tailed horned lizard**	F: None C: SSC State Rank: S2 CVMSHCP: **Yes**	Sandy and gravelly areas in desert washes, edges of dunes and desert flats; requires vegetative cover, ants & fine sand.	**Absent** Suitable habitat lacking. Site disturbed with only small, remnant patches of sandy soils and native plant species. Site not within CVMSHCP modeled habitat for this species.

Table 4. Special Status Fish

Community	Status	Habitat	Probability
Cyprinodon macularius **desert pupfish**	F: **END** C: **END** State Rank: S1 CVMSHCP: **Yes**	Desert ponds, springs, marshes and streams.	**Absent** Suitable aquatic habitat lacking. Former irrigation pond in NW corner of site currently dry. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 5. Special Status Reptiles

Species	Status	Habitat	Probability
Uma inornata **Coachella Valley fringe-toed lizard**	F: **THR** C: **END** State Rank: S1 CVMSHCP: **Yes**	Requires fine, loose, windblown sand (dunes) interspersed with hardpan & widely spaced desert shrubs. Known only from the Coachella Valley.	**Absent** Suitable habitat lacking. Site disturbed, primarily stabilized with only small, remnant patches of sandy soils and native plant species. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Accipiter cooperii **Cooper's hawk**	F: MBTA C: Watch List State Rank: S4 CVMSHCP: No	Woodland, chiefly of open, interrupted or marginal type, including residential areas. Nests in trees.	**Nesting: Absent** Suitable nesting habitat lacking. **Foraging: Occurs** Observed.
Aquila chrysaetos **golden eagle**	F: BGEPA, MBTA, BCC C: FP, WL State Rank: S3 CVMSHCP: No	Forages over rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons used for nesting, sometimes large trees in open areas.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Low** Marginally suitable habitat present.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Athene cunicularia **burrowing owl**	F: MBTA, BCC C: SSC (burrows), FGC State Rank: S2 CVMSHCP: **Yes***	Open, dry annual or perennial grassland, deserts & scrublands characterized by low-growing vegetation. Burrow sites essential.	**Nesting: Low** Marginally suitable habitat intermittently present. Suitable California ground squirrel burrows detected. **Foraging: Low** If present onsite or on other suitable lands to the east of the site.
Buteo regalis **ferruginous hawk**	F: MBTA, BCC C: WL State Rank: S3S4 CVMSHCP: No	Great Basin grassland, Great Basin scrub, pinon & juniper woodland, valley & foothill grassland.	**Nesting**: **Absent** Suitable habitat lacking. **Foraging**: **Low** During winter and migration only.
Calypte costae **Costa's hummingbird**	F: MBTA, BCC C: None State Rank: S4 CVMSHCP: No	Desert and semi-desert, arid brushy foothills and chaparral, in migration and winter also in adjacent mountains and in open meadows and gardens	**Nesting**: **Moderate** Suitable nesting habitat (sparse palo verde) present. **Foraging**: **Occurs** Observed.
Empidonax traillii extimus **southwestern willow flycatcher**	F: **END**, MBTA C: **END** State Rank: S1 CVMSHCP: **Yes***	Breeds in dense riparian areas.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Very Low** Occurs in many habitats during migration. Site is not within designated critical habitat for this species.
Falco mexicanus **prairie falcon**	F: MBTA, BCC C: SSC (nesting), FGC State Rank: S3 CVMSHCP: No	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs, but forages far afield.	**Nesting**: **Absent** Suitable habitat lacking. **Foraging: Moderate** May nest or winter nearby & forage over site.
Haliaeetus leucocephalus **bald eagle**	F: BGEPA, MBTA, BCC C: END, FP State: S3 CVMSHCP: No	Margins of lakes, rivers, and other bodies of water. In Southern California, nests at Big Bear Lake and Lake Silverwood in the San Bernardino Mountains and Lake Hemet in the San Jacinto Mountains.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Absent** Suitable habitat lacking.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Lanius ludovicianus **loggerhead shrike**	F: MBTA, BCC C: SSC (nesting), FGC State Rank: S4 CVMSHCP: No	Open fields with scattered trees or shrubs, open country with short vegetation, pastures, old orchards, cemeteries, golf courses, riparian areas & open woodlands.	**Nesting: Very Low** Suitable nesting habitat very limited. **Foraging: Moderate** May nest or winter nearby & forage onsite.
Polioptila melanura **black-tailed gnatcatcher**	F: ND C: ND State rank: S3S4 CVMSHCP: No	Nests in wooded desert wash habitat containing mesquite, palo verde, ironwood, and acacia. May also occur in areas with salt cedar, especially when adjacent to native wooded desert wash habitat. Also occurs in desert scrub habitat in winter.	**Nesting: Very Low** Suitable nesting habitat (palo verde) limited. **Foraging: Low** May forage or move through site from nearby areas.
Pyrocephalus rubinus **vermilion flycatcher**	F: MBTA C: SSC (nesting) State Rank: S2S3 CVMSHCP: No	During nesting, inhabits desert riparian adjacent to irrigated fields, irrigation ditches, pastures, & other open, mesic areas with nests in cottonwood, willow, mesquite, or other large desert riparian trees. Also known to nest in landscaped areas such as commercial and residential developments, golf courses and parks.	**Nesting: Absent** Suitable nesting habitat lacking. **Foraging: Low** If nesting nearby.
Toxostoma crissale **crissal thrasher**	F: None C: SSC State Rank: S3 CVMSHCP: **Yes***	Resident of SE deserts in desert riparian and wash habitats, nests in dense mesquite, ironwood, catclaw, arrowweed.	**Nesting**: **Absent** Suitable nesting habitat lacking. **Foraging**: **Very low** If nesting nearby. Site is not within CVMSHCP modeled habitat for this species.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Toxostoma lecontei **Le Conte's thrasher**	F: **MBTA**, BCC C: SSC (nesting), FGC State Rank: S3 CVMSHCP: **Yes***	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Nest in dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	**Nesting**: **Absent** Suitable nesting habitat lacking. **Foraging**: **Very Low** If nesting nearby. Suitable habitat not observed on adjacent lands, however. Site is not within CVMSHCP modeled habitat for this species.
Vireo bellii pusillus **least Bell's vireo**	F: END C: END State rank: S2 CVMSHCP: **Yes**	Riparian woodland habitats along the riverine systems of Southern California, primarily in San Diego, Santa Barbara, and Riverside Counties. Needs dense shrub cover within 1 to 2 meters (3 to 6 feet) off the ground for nesting, and stratified canopy for foraging	**Nesting: Absent** Suitable habitat lacking. **Foraging: Low** Migration only Site is not within designated critical habitat for this species.

* Species conserved under the CVMSHCP, but is still protected by the MBTA and FGC

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Chaetodipus fallax pallidus **pallid San Diego pocket mouse**	F: None C: SSC State Rank: S3S4 CVMSHCP: No	Desert border areas in desert wash, desert scrub, desert succulent scrub, pinon-juniper, etc. Sandy herbaceous areas usually in association with rocks or coarse gravel.	**Absent** Suitable habitat lacking. Site largely disturbed former date palm farm.
Dipodomys merriami collinus **Earthquake Merriam's (Aguanga) kangaroo rat**	F: None C: SSC State Rank: S1S2 CVMSHCP: No	Known only from San Diego & Riverside Counties. Associated with Riversidean sage scrub, chaparral, & non-native grassland. Needs sandy loam substrates for digging of burrows.	**Absent** The CNDDB records near site out of range and habitat for this subspecies. Presumably these records are in error and refer to a different subspecies.

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Eumops perotis californicus **western mastiff bat**	F: ND C: CSC State Rank: S3S4 CVMSHCP: No WBWG: M (Region 8)	Many open, semi-arid to arid areas including conifer and deciduous forests, grasslands, chaparral, and coastal scrubs. Roosts in crevices in cliff faces, buildings, trees, and tunnels.	**Roosting: Absent** Roosting habitat lacking. **Foraging: Low** May forage over site if roosting nearby.
Lasiurus xanthinus **western yellow bat**	F: None C: SSC State Rank: S3 WBWG: H CVMSHCP: **Yes**	Found in a variety of habitats: Valley foothill riparian, desert riparian, desert wash, and palm oasis habitats	**Roosting: Absent** Roosting habitat lacking. **Foraging: Low** May forage over site if roosting nearby.
Neotoma lepida intermedia **San Diego desert woodrat**	F: None C: SSC State Rank: S3S4 CVMSHCP: No	Coastal scrub of southern California. Moderate to dense canopies preferred. Particularly abundant in rock outcrops & rocky cliffs & slopes.	**Absent** Habitat lacking. Middens not detected. Site heavily disturbed.
Nyctinomops femorosaccus **pocketed free-tailed bat**	F: None C: SSC State Rank: S2S3 WBWG: M CVMSHCP: No	Rocky areas with high cliffs in a variety of arid areas in southern California.	**Roosting: Absent** Suitable habitat lacking **Foraging: Low** May roost in vicinity and forage over site.
Peninsular bighorn sheep DPS *Ovis canadensis nelsoni* (Pop. 2)	F: END C: THR State Rank: S1 MSHCP: **Yes**	Eastern slopes of the Peninsular Ranges below 4,600 feet. Optimal habitat includes steep-walled canyons/ridges bisected by rocky or sandy washes w/ available water	**Absent** Suitable habitat lacking. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Perognathus longimembris bangsi **Palm Springs pocket mouse**	F: None C: SSC State Rank: S2 CVMSHCP: **Yes**	Inhabits flat or gently sloping areas with sparse vegetative cover and packed or sandy soils.	**Very Low** Only small, remnant patches of marginal potentially suitable habitat present. Site disturbance and past agricultural practices further reduce the likelihood of occurrence. Site not within CVMSHCP modeled habitat for this species.
Taxidea taxus **American badger**	F: ND C: CSC State Rank: S3 CVMSHCP: No	Widespread, occurring in a wide variety of usually open habitats.	**Very Low** Although disturbed, site potentially suitable. No burrows or sign observed.

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Xerospermophilus tereticaudus chlorus **Coachella Valley (Palm Springs) round-tailed ground squirrel**	F: None C: SSC State Rank: S1S2 CVMSHCP: **Yes**	Prefers open, flat, grassy areas in fine-textured, sandy soil in desert succulent scrub, desert wash, desert scrub, alkali scrub, & levees.	**Very Low** Preferred habitat lacking. Species has been known to occur in disturbed and converted habitats. Site not within CVMSHCP modeled habitat for this species.

Definitions of status designations and occurrence probabilities for Tables 1-7

Definitions for Species

Italics – Scientific name (*i.e., Genus species subspecies*)
Bold – Standard common name
[*Genus*] – Previous genus, relatively recent taxonomic revision
var. – variety (plants only)
DPS – Distinct Population Segment

Definitions of occurrence probability:

Occurs*:* Observed or detected onsite by WSP or recently reported by another reliable source.
High*:* Observed in similar habitat in region by qualified biologists, or habitat onsite is a type often utilized by the species and the site is within the known range of the species.
Moderate*:* Reported sightings in surrounding region, or site is within the known range of the species and habitat onsite is a type occasionally used by the species.
Low*:* Site is within the known range of the species but habitat onsite is rarely used by the species
Very Low: Habitat is of marginal suitability and/or site is at the edge of species known range or distribution.
Absent*:*A focused study failed to detect the species, suitable habitat not present, or site is outside the geographic distribution of the species.
Unknown*:* No focused surveys have been performed in the region, & the species' distribution & habitat are poorly known.

CVMSHCP designations

Yes: Conserved by the CVMSHCP
No: Not Specifically Conserved by the CVMSHCP

Federal designations: (F = federal Endangered Species Act or USFWS designations)
END: Federally listed, Endangered
THR: Federally listed, Threatened
CAN: Candidate for Federal listing
MBTA: Migratory Bird Treat
BEPA: Bald Eagle Protection Act (also protects Golden Eagles)
BCC: Birds of Conservation Concern
None: No designation

State designations: (C = California Endangered Species Act or CDFG designations)
END: State listed, Endangered
THR: State listed, Threatened
CAN: Candidate for State listing
RARE: State listed, Rare
FP: Fully Protected Species
SSC: Species of Special Concern
FGC: Fish and Game Code

WL: Watch List Species

CDFW state rankings are a reflection of the overall condition of an element throughout its California range. The number after the decimal point represents a threat designation attached to the rank:

S1 = Critically Imperiled. Less than (<) 6 Element Occurrences (EOs) OR < 1,000 individuals OR < 2,000 acres
- **S1.1** = very threatened
- **S1.2** = threatened
- **S1.3** = no current threats known

S2 = Imperiled. 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres
- **S2.1** = very threatened
- **S2.2** = threatened
- **S2.3** = no current threats known

S3 = Vulnerable. 21-80 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres
- **S3.1** = very threatened
- **S3.2** = threatened
- **S3.3** = no current threats known

S4 =

S5 = Secure. Common, widespread, and abundant in the state.

SH = All known California sites are historical, not extant

? = Qualifier: Inexact or Uncertain - A question mark represents a rank qualifier, denoting an inexact or uncertain numeric rank.

California Native Plant Society (CNPS) designations:

Primary Categories
LIST 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
LIST 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
LIST 2A: Plants Presumed Extirpated in California, But Common Elsewhere
LIST 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
LIST 3: Plants About Which More Information is Needed - A Review List
LIST 4: Plants of Limited Distribution - A Watch List
Subdivisions within Categories
0.1: Seriously threatened in California
0.2: Moderately threatened in California
0.3: Not very threatened in California

Western Bat Working Group (WBWG) designations:

The Western Bat Working Group is comprised of agencies, organizations and individuals interested in bat research, management and conservation from the 13 western states and provinces. Its goals are (1) to facilitate communication among interested parties and reduce risks of species decline or extinction; (2) to provide a mechanism by which current information on bat ecology, distribution and research techniques can be readily accessed; and (3) to develop a forum to discuss conservation strategies, provide technical assistance and encourage education programs.

- **H**: High: Species which are imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats.
- **M**: Medium: Species which warrant a medium level of concern and need closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat.
- **L**: Low: Species for which most of the existing data support stable populations, and for which the potential for major changes in status in the near future is considered unlikely. There may be localized concerns, but the overall status of the species is believed to be secure. Conservation actions would still apply for these bats, but limited resources are best used on High and Medium status species.
- **P**: Periphery: This designation indicates a species on the edge of its range, for which no other designation has been determined.

6.0 DISCUSSION

The proposed development of the project site would result in the loss/conversion of 38.8 acres of fallow, vacant, abandoned agricultural lands (date palm farm) and the biological resources, sensitive and otherwise, that occur, or potentially occur, onsite. The likelihood of occurrence for the special status species reported from the vicinity has either been eliminated or significantly reduced by the former conversion of the site to agricultural uses and past farming practices, which included removal of nearly all native vegetation, grading and may have also included use of herbicides and/or pesticides. Small, unmapped, remnant or successional patches of what is best described as quailbush scrub are, however, present intermittently throughout portions of the site, primarily along the western and southern-most areas. Other existing site disturbance (i.e., compaction of soils, offroad vehicular activity, dumping and accumulation of roadside trash) also reduces the likelihood of occurrence of many special status species. Furthermore, the presence of existing adjacent residential development to the north and south of the site and the vegetation removal, active grading of the lands to the west have largely isolated the site from other undeveloped open space. The only undeveloped, vacant open space occurs to the east. The adjacent vacant lands appear to the east appear to have also been rough graded and cleared of most native vegetation in the past. As a result, connectivity of the site to other undeveloped open space has been eliminated, or at least significantly diminished, for many terrestrial species.

The CVMSHCP was designed to streamline the permitting process and to mitigate potential impacts resulting from covered projects and the lawful activities of permittees through payment of the requisite development fee and participation in plan's requirements. A few species, which are not covered by the CVMSHCP and/or are not yet adequately conserved by the CVMSHCP (e.g., burrowing owl, nesting birds) require additional consideration and/or actions, which are detailed below.

6.1 Discussion of the Special Status Biological Resources Tables

A review of the CNDDB, CNPS and IPaC Resources List resulted in a total of 68 special status biological resources that have been reported from the vicinity (Tables 1-7). These include: 33 plants, one vegetation communities, five invertebrates, one fish, four reptiles, 14 birds and 10 mammals. Of these, 59 are considered to be absent from the site due to a combination of factors including a lack of suitable habitat, the elevation of the site outside of elevational parameters and/or in the case of flying animals (birds and bats), they may only occur onsite to forage and will therefore not be directly impacted. The special status biological resources that are considered to be absent from the site include: chaparral sand-verbena (*Abronia villosa* var. *aurita*), Borrego milk-vetch (*Astragalus lentiginosus var. borreganus*), Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*), Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*), gravel milk-vetch (*Astragalus subulonum*), triple-ribbed milk-vetch (*Astragalus tricarinatus*), little-leaf elephant

tree (*Bursera microphylla*), Peninsular spineflower (*Chorizanthe leptotheca*), glandular ditaxis (*Ditaxis claryana*), California ditaxis (*Ditaxis serrata* var. *californica*), Booth's evening primrose (*Eremothera boothii* var. *boothii*), Joshua Tree poppy (*Eschscholtzia androuxii*), Arizona spurge (*Euphorbia arizonica*), flat-seeded spurge (*Euphorbia platysperma*), pink velvet-mallow (*Horsfordia alata*), Newberry's velvet-mallow (*Horsfordia newberryi*), winged cryptantha (*Johnstonella holoptera*), southwestern spiny rush (*Juncus acutus ssp. leopoldii*), Cooper's rush (*Juncus cooperi*), Santa Rosa Mountains leptosiphon (*Leptosiphon floribundus*), Torrey's box-thorn (*Lycium torreyi*), California marina (*Marina orcuttii* var. *orcuttii*), spear-leaf matelea (*Matelea parvifolia*), slender cottonheads (*Nemacaulis denudate* var. *gracilis*), narrow-leaf sandpaper-plant (*Petalonyx linearis*), slender-stem bean (*Phaseolis filiformis*), Deep Canyon snapdragon (*Pseudorontium cyanthiferum*), desert spike-moss (*Selaginella eremophila*), Cove's cassia (*Senna covesii*), purple stemodia (*Stemodia durantifolia*), Mecca-aster (*Xylorhiza cognata*), desert fan palm oasis woodland, Casey's June beetle (*Dinacoma caseyi*), monarch butterfly (*Danaus plexippus*), Coachella giant sand treader cricket (*Macrobaenetes valgum*), cheeseweed owlfly (*Oliarces clara*), Algodunes Dunes Euparagia (*Euparagia unidentate*), desert pupfish (*Cyprinodon macularius*), northern red diamond rattlesnake (*Crotalus ruber ruber*), desert tortoise (*Gopherus agassizi*), flat-tailed horned lizard (*Phrynosoma mcallii*), Coachella Valley fringe-toed lizard (*Uma inornata*), nesting Cooper's hawk (*Accipiter cooperii*), nesting golden eagle (*Aquila chrysaetos*), nesting ferruginous hawk (*Buteo regalis*), nesting southwestern willow flycatcher (*Empidonax traillii extimus*), nesting prairie falcon (*Falco mexicanus*), nesting bald eagle (*Haliaeetus leucocephalus*), nesting vermilion flycatcher (*Pyrocephalus rubinus*), nesting crissal thrasher (*Toxostoma crissale*), nesting Le Conte's thrasher (*Toxostoma lecontei*), nesting least Bell's vireo (*Vireo bellii pusillus*), pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*), Earthquake Merriam's (Aguanga) kangaroo rat (*Dipodomys merriami collinus*), roosting western mastiff bat (*Eumops perotis californicus*), roosting western yellow bat (*Lasiurus xanthinus*), San Diego desert woodrat (*Neotoma lepida intermedia*), roosting pocketed free-tailed bat (*Nyctinomops femorosaccus*) and Peninsular bighorn sheep DPS (*Ovis canadensis nelsoni* [Pop. 2]). These special status biological resources will not be discussed further.

Three of the remaining nine species are fully (or partially) covered, conserved (or partially conserved) under the CVMSHCP. Participation in the CVMSHPS and payment of the requisite CVMSHCP development fee and participation in the plan is expected to fully mitigate project related impacts (if any) to these species. These include burrowing owl (*Athene cunicularia*), Palm Springs pocket mouse (*Perognathus longimembris bangsi*) and Coachella Valley (Palm Springs) round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*). The site is not within CVMSHCP modeled habitat for Coachella Valley milk-vetch, Coachella giant sand-treader cricket, flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Palm Springs pocket mouse and Coachella Valley (Palm Springs) round-tailed ground squirrel. It should be noted that due to the current, highly disturbed condition and/or past agricultural conversion of the site, the likelihood for the occurrence for these species is considered to be very low to low. Regardless of whether

these species occur on the project site or not, participation in the CVMSHCP and payment of the development fee is designed and intended to provide full coverage of potential project-related impacts. One of these species, burrowing owl, however, requires additional considerations and/or actions for full CVMSHCP compliance, which is discussed below. Although desert tortoise is considered to be absent from the site, due to an overall lack of suitable habitat, it will also be discussed below for further clarification.

6.1.1 Species Covered Under the CVMSHCP

The desert tortoise is federally and state listed as threatened by the CDFW and USFWS. Although desert tortoise is covered under the CVMSHCP, further actions are required (where suitable habitat is present) to ensure that take is entirely avoided and/or minimized to the greatest extent possible. No live desert tortoises or sign thereof (i.e., burrows, scat, tracks, carcass remains, courtship rings, drinking depressions) were observed onsite during the assessment. Furthermore, the site is the location of a former date palm farm/plantation and contains very little remnant and sparse native vegetation (i.e., quailbush scrub). The site is not located within designated critical habitat or CVMSHCP modeled habitat for desert tortoise. For these reasons, habitat suitable for desert tortoise is not present onsite. Additionally, surrounding lands (with the exception of lands to the east) have been developed or are currently in the process of being developed. The land to the east is vacant, undeveloped and disturbed but also does not appear to support habitat suitable for desert tortoise. For these reasons, although a very limited amount of remnant vegetation community (i.e., quailbush scrub) that might otherwise technically be suitable for the desert tortoise, existing site conditions (i.e., nearly 100% conversion to former agricultural practices, existing and past site disturbance, existing adjacent development, etc.) have resulted in an area that is currently unsuitable for this conspicuous and wide-ranging species. For these reasons, it is the opinion of WSP that desert tortoise is absent from the project site and that focused surveys are not warranted or recommended. Project implementation is anticipated to have no impact on the desert tortoise.

The burrowing owl is not listed as threatened or endangered by the USFWS or CDFW. It is, however, managed as a BCC by the USFWS and designated as a SSC by the CDFW. It is also protected from take by the MBTA and FGC. The burrowing owl is a covered species under the CVMSHCP, however the federal permit for the CVMSHCP does not allow take of this species under the MBTA. Any impacts to burrowing owl would be considered significant under the CEQA. Although no burrowing owls, or sign thereof, were observed or detected onsite during the assessment, potentially suitable habitat (i.e., sparsely vegetated vacant lands; disturbed, remnant and sparse saltbush scrub) is, however, present on the site (Appendix D). California ground squirrel burrows of sufficient size to be suitable for burrowing owl were also observed onsite (Appendix D). The CNDDB reported burrowing owl occurring in the vicinity of the site, including a 2004 record

from 0.5 mile north of the site (CDFW 2024a). For these reasons, WSP considers there to be at least a low potential for the occurrence of burrowing owl onsite. Because the site is not located within or adjacent to a CVMSHCP conservation area, it is the opinion of WSP that at a minimum, a preconstruction (take avoidance) survey for burrowing owl is warranted and is therefore recommended to be conducted immediately prior to initial site clearance to ensure that burrowing owl does not occur on the site and that no direct take of burrowing owl result from project implementation. If burrowing owl is found to be present onsite, scheduled project activities would need to be temporarily halted or delayed and the CVCC and other resource agencies contact for further guidance.

Although there is a very low potential for Palm Springs pocket mouse and/or Coachella Valley (Palm Springs) round-tailed ground squirrel to occur onsite, both are fully covered species under the CVMSHCP, therefore payment of the development fee and participation in the plan is expected to fully mitigate any potential impacts to these species. Neither of these species are listed by USFWS or CDFW but are designated as SSCs by the CDFW. The site is not within CVMSHCP modeled habitat for either of these species.

The remaining six species, which are not covered, or not fully covered, under the CVMSHCP are discussed separately below.

6.1.2 Plant Species Not Covered Under the CVMSHCP

Abram's spurge is considered to have a very low potential of occurrence as it is associated with sandy soils in Mojavean and Sonoran desert scrub within the elevational parameters of the site and is known from the vicinity. It should be noted that due to the sparse and disturbed nature of the remnant native vegetation remaining and soils onsite, the potential occurrence of this species is considered highly unlikely, however, not impossible. This species was not detected during the field assessment as the assessment was conducted outside of this species blooming period (September-November). Abram's spurge is not listed as threatened or endangered but is designated as S2 by the CDFW and List 2B.2 by the CNPS meaning that it is considered to be "imperiled" by the CDFW and "rare, threated or endangered in California but more common elsewhere" and "moderately threatened in California". Abram's spurge is not covered under the CVMSHCP; thus, development fees and participation offer no mitigation for impacts (if any). Impacts (if any) to Abrams spurge potentially resulting from the implementation of the proposed project would not likely be considered significant, as there is almost no potential for the occurrence of a significant population of this species onsite. If present, this species would very likely only be in the form of a very limited number of individual plants. The site offers little to no conservation value for this, or any other special status species. For these reasons, unmitigated impacts to Abram's spurge (if any) would not likely be considered significant under the CEQA. For

these reasons, a focused survey for Abram's spurge is not considered to be warranted and thus is not recommended for this site.

Ribbed cryptantha is considered to have a very low potential of occurrence onsite as it is associated with sandy soils in Sonoran desert scrub, has been reported from the Cathedral City quadrangle. This species was not detected during the field assessment as the assessment was conducted outside of this species blooming period (February-May), however the sparse, remnant and disturbed quailbush scrub and somewhat sandy soils that are intermittently remnant onsite may nevertheless provide potentially suitable (albeit low quality) habitat for the occurrence of this species. Ribbed cryptantha is not listed as threatened or endangered but is designated as S4 by the CDFW and List 4.3 by the CNPS meaning that it is considered to be "Apparently Secure; but some cause for long-term concern" by the CDFW and "Plant of limited distribution, a Watch List species" and "not very threatened in California". Ribbed cryptantha is not covered under the CVMSHCP, thus development fees and participation offer no mitigation for impacts to this species. Impacts (if any) to ribbed cryptantha potentially resulting from the implementation of the proposed project would not likely be considered significant, as there is almost no potential for the occurrence of a significant population onsite. If present, this species would very likely only be in the form of a very limited number of individual plants. The site offers little to no conservation value for this, or any other special status species. Potential impacts to a few individuals (again, in the unlikely event that this species was present) would not be expected to cause the population to drop to a less than self-sustaining level. For these reasons, unmitigated impacts to ribbed cryptantha (if any) would not likely be considered significant under the CEQA. For these reasons, a focused survey for ribbed cryptantha on this site is not considered to be warranted and thus is not recommended.

6.1.3 Wildlife Species Not Covered Under the CVMSHCP

A single Cooper's hawk was observed onsite during the assessment. This species is not federally or state listed by the USFWS or CDFW. It is, however, managed as a Bird of Conservation Concern (BCC) and protected by Fish and Game Code (FGC) and the MBTA while nesting. Although observed occurring onsite, nesting habitat (i.e., riparian and/or deciduous communities, live oaks, etc.) is not present onsite. For these reasons, despite the detection of Cooper's hawk onsite, impacts to nesting Cooper's hawk are not anticipated to occur as a result of project implementation. As a result, surveys for nesting Coopers hawk are not considered to be warranted and are therefore not recommended for this site.

Costa's hummingbird was observed onsite during the assessment. This species is not federally or state listed by the USFWS or CDFW, however is managed as a BCC and protected by FGC and the MBTA while nesting. Limited nesting habitat for Costa's hummingbird is present onsite in the blue palo verde trees, Mexican palo verde trees and saltcedar trees intermittently present throughout

the site. In order to avoid potentially impacting nesting Costa's hummingbird, avoidance of any project-related disturbance (i.e., grading, vegetation removal, landscaping, operation of heavy equipment, construction, etc.) during the nesting season (1 February through 31 August) is recommended. If initial project disturbance cannot be scheduled to occur outside of the nesting season, a clearance survey for nesting Costa's hummingbird conducted by a qualified ornithologist or biologist immediately prior to onsite disturbance is recommended. If nesting Costa's hummingbirds are found, 100% avoidance of impacts is required and no work buffer zones would need to be established and observed where no work would be permitted until young have fledged. While there is no established protocol for nest avoidance, when consulted the CDFW generally recommends avoidance buffers of about 100–300 feet for unlisted songbirds.

American badger was not observed or detected on-site during the assessment. This species is not listed as threatened or endangered by either the USFWS or CDFW, however, it is designated as a SSC by the CDFW. American badger is a wide-ranging species and occurs in many habitats from below sea level to alpine habitats in the western and midwestern US, southcentral Canada and much of Mexico. No potential badger burrows were observed on-site, however lands on and adjacent to (to the east of) the site are otherwise potentially suitable. The American badger is known from the vicinity (CDFW 2024a). For these reasons, WSP considers there to be at least a low potential for American badger to occur on-site. Project-related impacts (if any) to American badger would not likely be considered significant under the CEQA as implementation of the proposed project is not anticipated to result in: 1) a substantial reduction of habitat for these this species, 2) a drop in self-sustaining population levels, 3) an elimination of these this species population levels, or 4) substantially reduce these this species numbers or reduce their its geographic range. For these reasons, despite considered to have a low potential of occurrence, presence/absence survey(s) for American badger are not recommended for this site.

6.1.4 Additional Bird Species Protected by the Migratory Bird Treaty Act

Excluded from coverage under the CVMSHCP are a variety of common bird species that are protected by the MBTA and FGC. This includes virtually all native migratory and resident bird species, including birds observed onsite and/or known to occur in the vicinity. Avoidance of impacts to these nesting migratory and resident birds is a requirement of the federal permit issued for the CVMSHCP. In order to avoid potentially impacting nesting birds, avoidance of any project-related disturbance (i.e., grading, vegetation removal, landscaping, operation of heavy equipment, construction, etc.) during the nesting season (1 February through 31 August) is recommended. If initial project disturbance cannot be scheduled to occur outside of the nesting season, a nesting bird clearance survey conducted by a qualified ornithologist or biologist immediately prior to onsite disturbance is recommended. If nesting birds are found, no work buffer zones would need to be established and observed where no work would be permitted until young have fledged.

While there is no established protocol for nest avoidance, when consulted the CDFW generally recommends avoidance buffers of about 100–300 feet for unlisted songbirds and 500 feet for listed songbirds and raptors.

6.1.5 Jurisdictional Areas

No natural streams, creeks, rivers, lakes, ponds or pools are located on the project site. A man-made, abandoned and dry irrigation pond and old irrigation structures (i.e., presumed derelict pumps, machinery, cement or concrete pipes and linear earthen furrows) are present in the approximate western and southern 2/3 of the site. These irrigation features, including the dry irrigation pond, are not anticipated to fall under the jurisdiction of either the USACE or CDFW.

7.0 CONCLUSION

The City of Coachella is a signatory to the CVMSHCP (CVCC 2024). Therefore, payment of the required development fees for approved projects are anticipated to mitigate the impacts and/or potential impacts (if any) to covered species potentially resulting from the development of the site, whether those covered species occur there or not. Covered species that are considered to have at least some (very low to low) potential of onsite occurrence include: burrowing owl, Palm Springs pocket mouse and Coachella Valley (Palm Springs) round-tailed ground squirrel. Impacts to these species (if any) and their respective habitat, would be fully covered and mitigated under the CVMSHCP with the payment of the requisite development fee and participation in the requirements of the plan.

Because the site contains suitable habitat and burrows suitable for burrowing owl were observed onsite, WSP recommends a preconstruction (take avoidance) survey for burrowing owl to ensure that burrowing owls do not occur onsite immediately prior to initial site clearance and or construction activities. Conducting a preconstruction (take avoidance) survey immediately prior to the commencement of proposed construction would ensure that impacts to burrowing owl do not result from project implementation. If burrowing owls are detected onsite, the CDFW would need to be contacted for guidance. If burrowing owls are detected onsite, relocation may be required, in coordination with the CVCC and CDFW.

Impacts to other bird species protected by the MBTA and FGC, including but not limited to Costa's hummingbird, mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*) and lesser nighthawk (*Chordeiles acutipennis*), require avoidance. If project activities (i.e., site grading, vegetation removal/trimming, earthwork in undisturbed areas, etc.) are conducted during the nesting season (i.e., generally between 1 February and 31 August), a nesting bird clearance survey is recommended to ensure impacts to nesting birds are avoided. If project activities are conducted outside of the nesting season, a nesting bird clearance survey could likely be avoided. If active

bird nests are found, at any time, proposed project activities would need to be halted and postponed until young have fledged the nest and impacts to nesting birds are entirely avoided.

With participation in and compliance with the requirements of the CVMSHC and implementation of the recommendations above, impacts to special status biological resources are anticipated to be mitigated to a less than significant level.

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USGS. 2015d. *Valerie, Calif.* 7.5-Minute Topographic Quadrangle.

APPENDIX A

SPECIES LIST: VASCULAR PLANTS

APPENDIX A
Species List: Vascular Plants

This list reports only plants observed by WSP on the site during the field assessment. Other species may have been overlooked or undetectable due to their growing season. [† = *special status species,* * = non-native species, sp. = identified only to genus, *cf*= compares favorably with]

Amaranthaceae	**Amaranth family**
Amaranthis cf. *albus**	tumbleweed*
Asteraceae	**Sunflower family**
Dicoria canescens	desert dicoria
Helianthus annuus	common sunflower
*Lactuca serriola**	prickly lettuce*
cf. *Lepidospartum squamatum*	scalebroom
Palafoxia arida	Spanish needles
Pluchea sericea	arrow-weed
Brassicaceae	**Mustard family**
*Brassica tournefortii**	Saraha mustard*
*Sisymbrium irio**	London rocket*
Chenopodaceae	**Goosefoot family**
Atriplex canescens	four-wing saltbush
Atriplex lentiformis	quailbush
*Salsola tragus**	Russian thistle*
Fabaceae	**Pea family**
cf. Acacia sp.*	Unidentified non-native acacia*
*Parkinsonia aculeata**	Mexican palo verde*
Parkinsonia florida	Mexican palo verde*
Malvaceae	**Saltcedar family**
*Malva parviflora**	cheeseweed*
Solanaceae	**Nightshade family**
Datura wrightii	jimsonweed
Solanum cf. *xanti*	purple nightshade
Tamaricaceae	**Saltcedar family**
Tamarix cf. *ramosissima*	*cf.* saltcedar
Zygophyllaceace	**Caltrop family**
*Tribulus terrestris**	Puncture vine*
Arecaceae	**Palm family**
*Phoenix dactylifera** (remnant agriculture)	date palm (remnant agriculture)
Washingtonia sp. (sapling)	fan palm (sapling)
Poaceae	**Grass family**
*Cynodon dactylon**	Bermuda grass*
*Schismus cf. barbatus**	Mediterranean grass*

APPENDIX B

SPECIES LIST: VERTEBRATE ANIMALS

APPENDIX B

Species List: Vertebrate Animals

This list reports only the vertebrate animals observed or detected by WSP during the field assessment. Other species may have been overlooked or undetectable due to their activity patterns or weather conditions. [† = *special status species,* * = non-native species, sp. = identified only to genus, *cf* = compares favorably with]

VERTEBRATES	
REPTILIA	**REPTILES**
Phrynosomatidae	**Spiny Lizards & Allies**
Uta stansburiana	side-blotched lizard
AVES	**BIRDS**
Columbidae	**Pigeons & Doves**
*Columba livia**	rock pigeon*
*Streptopelia decaocto**	Eurasian collared dove*
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte costae†	Costa's hummingbird†
Accipitridae	**Hawks, Kites, Eagles & Allies**
Accipiter cooperii†	Cooper's hawk†
Buteo lineatus	red-shouldered hawk
Buteo jamaicensis	red-tailed hawk
Falconidae	**Caracaras & Falcons**
Falco sparverius	American kestrel
Remizidae	**Penduline Tits & Verdins**
Auriparus flaviceps	verdin
Mimidae	**Mockingbirds & Thrashers**
Mimus polyglottos	northern mockingbird
Corvidae	**Crows & Ravens**
Corvus corax	common raven
Fringillidae	**Fringilline & Cardueline Finches**
Haemorhous mexicanus	house finch
Passerellidae	**New World Sparrows**
Zonotrichia leucophrys	white-crowned sparrow
MAMMALIA	**MAMMALS**
Geomyidae	**Pocket Gophers**
Thomomys bottae (burrows & tailings)	Botta's pocket gopher
Scuiridae	**Squirrels**
Otospermophilus beecheyi	California ground squirrel

APPENDIX C

FIGURES



FIGURE 1

Regional Map
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

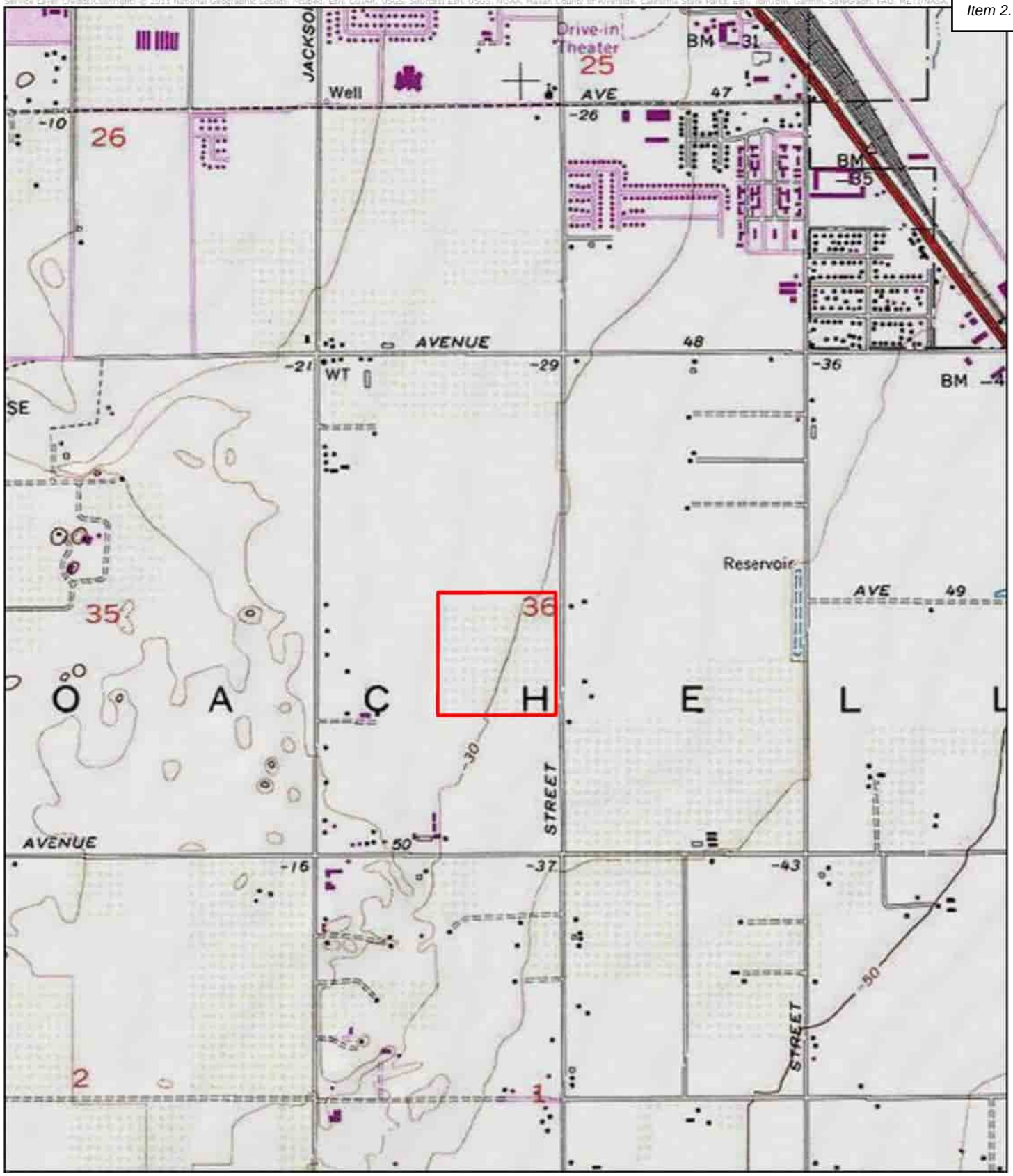

FIGURE 2

Location/Vicinity (USGS Topo)
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA



FIGURE 3
CVMSHCP Plan Area
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits: Esri, CGIAR, USGS, Sources: Esri, USGS, NOAA, Maxar, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS



FIGURE 4
USDA Soils
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits: Esri, CGIAR, USGS, Source: Esri, USGS, NOAA, Maxar, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS



FIGURE 5
Vegetation
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

APPENDIX D

PHOTOGRAPHIC EXHIBITS

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG



Photo 1: Representative condition of the largely barren, highly disturbed area of the site. Boundary of existing residential development visible to right (perimeter wall). View facing west-southwest from the northeastern corner of the site.



Photo 2: Representative condition of some of the remnant quailbush scrub onsite. Dry, abandoned irrigation pond visible to left. View facing south-southeast from northwestern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG



Photo 3: Representative condition of a remnant quailbush scrub portion of the site. Dry, abandoned irrigation pond visible in center. View facing east-southeast from northeast corner of site.



Photo 4: Representative condition of the remnant, fallow date palm farm portion of the site. View facing north from vicinity of the southwestern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG



Photo 5: Representative condition of the remnant, fallow date palm farm portion of the site. Existing adjacent residential development visible to right. View facing east from a south-central portion of site.



Photo 6: View of highly disturbed portion of site. Off-road vehicular activity and dumping evident. Calhoun Street and adjacent undeveloped open space visible to right. View facing north from southeastern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

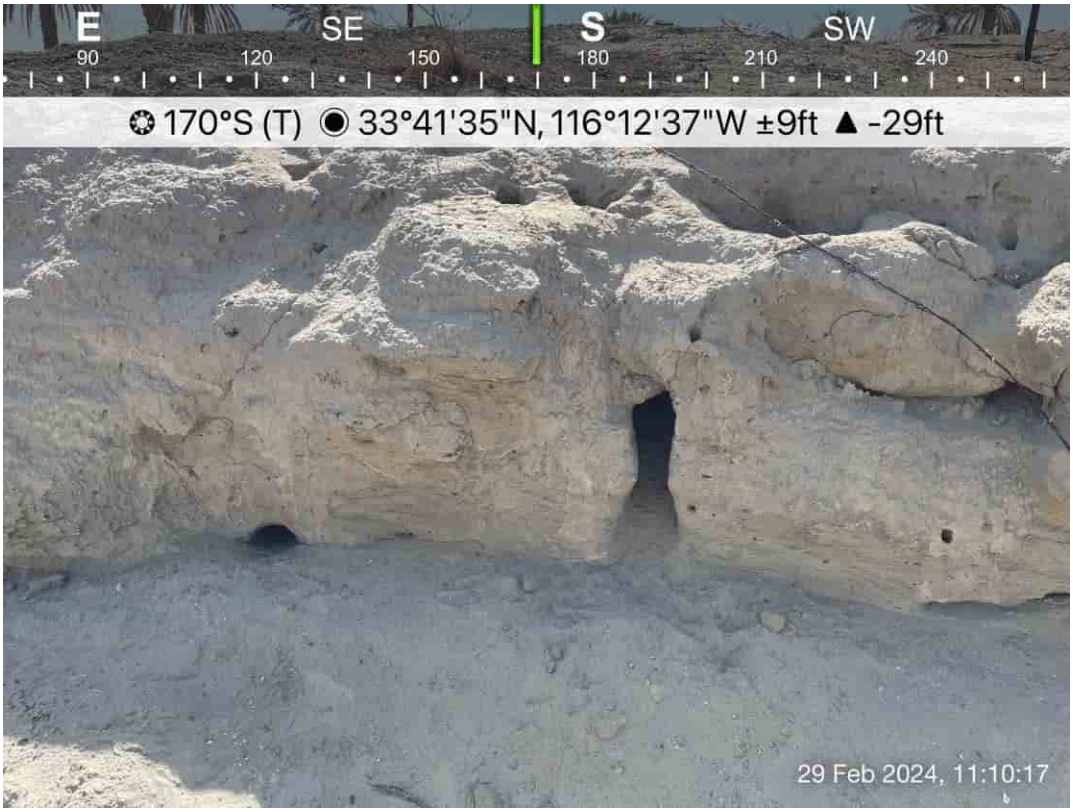

Photo 7: Representative example of burrows suitable for burrowing owl present onsite. View facing south from north-central portion of site.



Photo 8: Another representative example of an onsite burrow suitable for burrowing owl. View facing south from north-central potion of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG



Photo 9: Another representative example of burrow suitable for burrowing owl present onsite. View facing south from south-central portion of site.

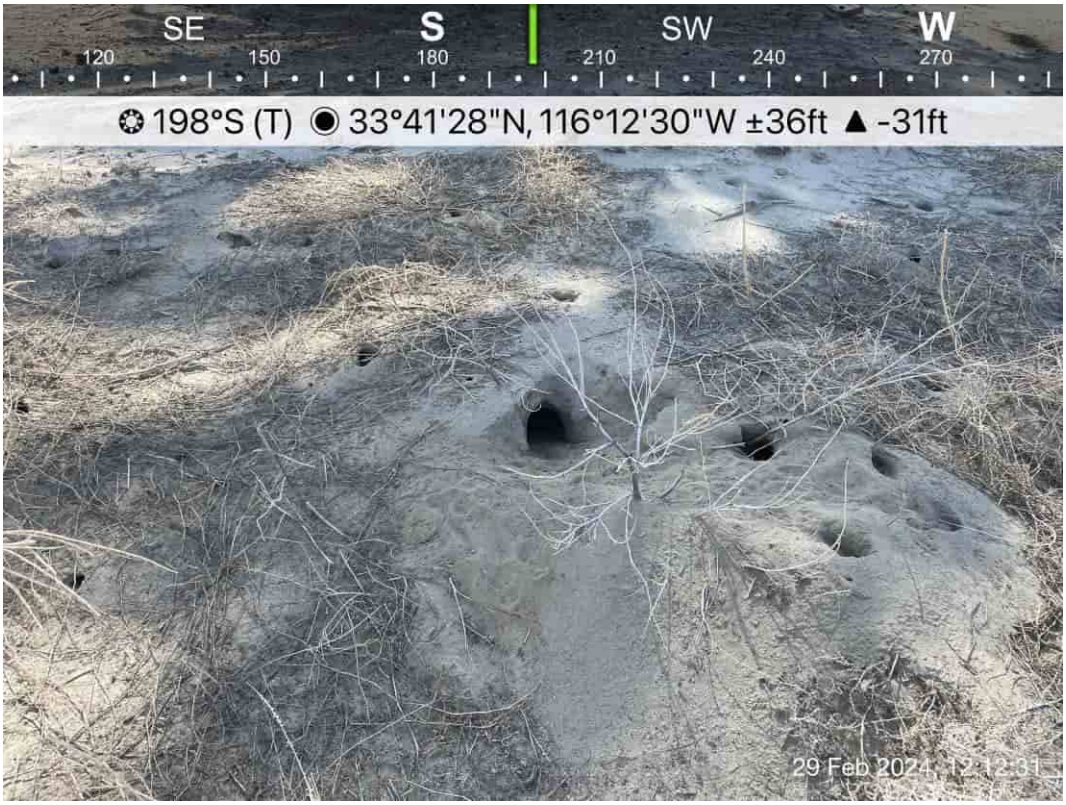

Photo 10: Another representative example of an onsite burrow suitable for burrowing owl. View facing south-southwest from a central location of site.

Appendix C
Calhoun Street Housing Development
Historical/Archaeological Resources Survey Report

CONFIDENTIAL
Available upon request to qualified professionals

Appendix D
Calhoun Street Housing Development Preliminary Hydrology Report

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

COACHELLA, CA

PRELIMINARY HYDROLOGY REPORT

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January 17, 2025

Prepared Under the Supervision of:

James Bazua, PE
R.C.E. 58394
Expiration Date: December 31, 2026



SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

PRELIMINARY HYDROLOGY REPORT

TABLE OF CONTENTS:

I PURPOSE AND SCOPE

II DESIGN METHODOLOGY

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

IV STREET FLOWRATE CAPACITY

V APPENDIX – REFERENCE MATERIAL

I. PURPOSE AND SCOPE

This report was prepared in support of the Calhoun Street at 49th Avenue Subdivision entitlement package submittal. The purpose of this preliminary report is to analyze the existing and proposed drainage patterns, discuss the on-site drainage design and size the proposed on-site drainage facilities to meet the City of Coachella drainage ordinance requirements.

The existing project site is an undeveloped lot at the southwesterly corner of the intersection of Calhoun Street and 49th Avenue in Coachella, CA. The proposed project improvements include the addition of residential lots with an interior access drive serving the lots on a 38.76 acre parcel. The site is bound to the north and east with fully improved public streets, to the east by a residential subdivision under development and to the south by an existing residential subdivision. The project proposes to obtain access to the site from Calhoun Street to the east, and from 49th Avenue to the north. The site will be drain via street surface flow to a series of on-site retention basins designed to capture and and store the storm run off generated during the 100 year design storm event. In general, the existing site is not subject to offsite storm flows.

II. DESIGN METHODOLOGY AND CALCULATIONS

The Calhoun Street project will provide five (5) on-site storm drain infiltration retention basin systems designed to capture and store the runoff generated from the "worst case" 100 year design storm based on City of Coachella requirements. The five retention basins have a combined volume capacity designed to store the runoff generated on-site during the 100 year design storm as well as runoff from the Calhoun Street half street project frontage and the 49 Avenue full width street frontage within the public right of way. The low point on the existing project site occurs on the project's easterly frontage. Runoff that exceeds the capacity of the on-site retention basin storage systems in an emergency overflow condition is designed to overflow onto interior surface streets and exit via surface flow onto Calhoun Street following the historical drainage pattern toward the south.

Riverside County Flood Control District Synthetic Unit Hydrograph methods are used to quantify the runoff volume generated and stored on-site during the 100 year "worst case" design storm return period. The program data and results prepared for this project are included in the Appendix of this report. The program model typically accounts for the volume of runoff lost due to infiltration in the basins and the allowable design retention basin infiltration rate of 10 gal./s.f./day (0.67 in/hr) established by City of Coachella will be applied over the surface area of the basin bottoms. The combined capacity of all five on-site basins will be compared to the total design runoff volume calculated for the Calhoun Street project to show that runoff generated during the 100 year design storm can be stored within the basins at a depth not to exceed 3ft and the runoff generated during the 10 year storm event can be stored within the on-site basins at a depth not to exceed 1.5 feet in accordance with City of Coachella retention basin criteria.

City of Coachella requires that runoff water stored on-site must be evacuated completely via infiltration within a period of 72 hours in order to comply with vector control concerns. In order to help facilitate this requirement, City of Coachella has limited the maximum depth of

stored runoff within any basin to 1.5' during the 10 year storm event and the maximum depth of any on-site retention basin must not exceed 3.5 feet.

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 10 year storm is contained below the top of the proposed street curbs and runoff generated during the 100 year storm event is contained within street right of way. Street flowrates (Q) will be calculated by applying the Rational Method using CivilD software.

DESIGN CRITERIA

The following Riverside County Flood Control District (RCFCD) parameters were used in the preparation of the analyses:

- 2 year – 1 hour Precipitation 0.35" (NOAA)
- 10 year – 1 hour Precipitation 0.70" (NOAA)
- 10 year – 3 hour Precipitation 1.04" (NOAA)
- 10 year – 6 hour Precipitation 1.36" (NOAA)
- 10 year – 24 hour Precipitation 1.04" (NOAA)
- 100 year – 1 hour Precipitation 1.37" (NOAA)
- 100 year – 3 hour Precipitation 2.12" (NOAA)
- 100 year – 6 hour Precipitation 2.78" (NOAA)
- 100 year – 24 hour Precipitation 4.47" (NOAA)
- Hydrologic Soil Type "B" US Dept. of Agriculture, SCS
- Runoff Index Number 56 (RCFC&WCD Plate E-6.1)
- Assumed Design Percolation Rate 0.67 in/hr
- Slope Intensity Duration Curve 0.59 (RCFC&WCD Plate D-4.6)

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATED RETENTION VOLUMES

SUBAREA	100 YR. VOLUME REQUIRED (CU.FT.)	BASIN VOLUME PROVIDED (CU.FT.)	100 YR. BASIN STORAGE DEPTH	10 YR. BASIN STORAGE DEPTH
1	9,580	12,250	2.45	0.72
2	57,661	64,193	3.19’	0.99’
3	53,709	62,528	3.07’	0.94’
4	51,654	57,236	3.20	0.99
5	41,999	72,828	2.14’	0.54

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	2.010	1.00	1.04	1.36	2.010	1.00	1.36	2.23	2.010	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	1.04	SUM [9]	2.01	SUM [11]	1.36	SUM [13]	2.01	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.40	0.39	0.26
FLOOD VOLUME	(cu-ft)	2,906	2,880	1,903
	(acre-ft)	0.07	0.07	0.04
REQUIRED STORAGE	(cu-ft)	2,439	2,140	370
	(acre-ft)	0.06	0.05	0.01
PEAK FLOW	(cfs)	1.56	1.34	0.19
MAXIMUM WSEL	(ft)	465.72	465.64	465.10

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866
C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.25	0.15	0.02	0.03	0.00
2	10	0.17	1.3	0.162	0.25	0.15	0.02	0.03	0.00
3	15	0.25	1.1	0.137	0.25	0.12	0.01	0.03	0.00
4	20	0.33	1.5	0.187	0.25	0.17	0.02	0.04	0.00
5	25	0.42	1.5	0.187	0.25	0.17	0.02	0.04	0.00
6	30	0.50	1.8	0.225	0.25	0.20	0.02	0.05	0.00
7	35	0.58	1.5	0.187	0.25	0.17	0.02	0.04	0.00
8	40	0.67	1.8	0.225	0.25	0.20	0.02	0.05	0.00
9	45	0.75	1.8	0.225	0.25	0.20	0.02	0.05	0.00
10	50	0.83	1.5	0.187	0.25	0.17	0.02	0.04	0.00
11	55	0.92	1.6	0.200	0.25	0.18	0.02	0.04	0.00
12	60	1.00	1.8	0.225	0.25	0.20	0.02	0.05	0.00
13	65	1.08	2.2	0.275	0.25	0.25	0.03	0.06	3.60
14	70	1.17	2.2	0.275	0.25	0.25	0.03	0.06	3.60
15	75	1.25	2.2	0.275	0.25	0.25	0.03	0.06	3.60
16	80	1.33	2.0	0.250	0.25	0.22	0.00	0.01	0.00
17	85	1.42	2.6	0.324	0.25	0.29	0.08	0.16	33.70
18	90	1.50	2.7	0.337	0.25	0.30	0.09	0.18	41.22
19	95	1.58	2.4	0.300	0.25	0.27	0.05	0.11	18.65
20	100	1.67	2.7	0.337	0.25	0.30	0.09	0.18	41.22
21	105	1.75	3.3	0.412	0.25	0.37	0.17	0.33	86.38
22	110	1.83	3.1	0.387	0.25	0.35	0.14	0.28	71.33
23	115	1.92	2.9	0.362	0.25	0.33	0.12	0.23	56.28
24	120	2.00	3.0	0.374	0.25	0.34	0.13	0.26	63.80
25	125	2.08	3.1	0.387	0.25	0.35	0.14	0.28	71.33
26	130	2.17	4.2	0.524	0.25	0.47	0.28	0.56	154.11
27	135	2.25	5.0	0.624	0.25	0.56	0.38	0.76	214.31
28	140	2.33	3.5	0.437	0.25	0.39	0.19	0.39	101.43
29	145	2.42	6.8	0.849	0.25	0.76	0.60	1.21	349.77
30	150	2.50	7.3	0.911	0.25	0.82	0.67	1.34	387.39
31	155	2.58	8.2	1.023	0.25	0.92	0.78	1.56	455.12
32	160	2.67	5.9	0.736	0.25	0.66	0.49	0.99	282.04
33	165	2.75	2.0	0.250	0.25	0.22	0.00	0.01	0.00
34	170	2.83	1.8	0.225	0.25	0.20	0.02	0.05	0.00
35	175	2.92	1.8	0.225	0.25	0.20	0.02	0.05	0.00
36	180	3.00	0.6	0.075	0.25	0.07	0.01	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2906.38
REQUIRED STORAGE (acft)	0.06
REQUIRED STORAGE (cuft)	2438.86
PEAK FLOW RATE (cfs)	1.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.25	0.07	0.01	0.02	0.00
2	10	0.17	0.6	0.098	0.25	0.09	0.01	0.02	0.00
3	15	0.25	0.6	0.098	0.25	0.09	0.01	0.02	0.00
4	20	0.33	0.6	0.098	0.25	0.09	0.01	0.02	0.00
5	25	0.42	0.6	0.098	0.25	0.09	0.01	0.02	0.00
6	30	0.50	0.7	0.114	0.25	0.10	0.01	0.02	0.00
7	35	0.58	0.7	0.114	0.25	0.10	0.01	0.02	0.00
8	40	0.67	0.7	0.114	0.25	0.10	0.01	0.02	0.00
9	45	0.75	0.7	0.114	0.25	0.10	0.01	0.02	0.00
10	50	0.83	0.7	0.114	0.25	0.10	0.01	0.02	0.00
11	55	0.92	0.7	0.114	0.25	0.10	0.01	0.02	0.00
12	60	1.00	0.8	0.131	0.25	0.12	0.01	0.03	0.00
13	65	1.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
14	70	1.17	0.8	0.131	0.25	0.12	0.01	0.03	0.00
15	75	1.25	0.8	0.131	0.25	0.12	0.01	0.03	0.00
16	80	1.33	0.8	0.131	0.25	0.12	0.01	0.03	0.00
17	85	1.42	0.8	0.131	0.25	0.12	0.01	0.03	0.00
18	90	1.50	0.8	0.131	0.25	0.12	0.01	0.03	0.00
19	95	1.58	0.8	0.131	0.25	0.12	0.01	0.03	0.00
20	100	1.67	0.8	0.131	0.25	0.12	0.01	0.03	0.00
21	105	1.75	0.8	0.131	0.25	0.12	0.01	0.03	0.00
22	110	1.83	0.8	0.131	0.25	0.12	0.01	0.03	0.00
23	115	1.92	0.8	0.131	0.25	0.12	0.01	0.03	0.00
24	120	2.00	0.9	0.147	0.25	0.13	0.01	0.03	0.00
25	125	2.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
26	130	2.17	0.9	0.147	0.25	0.13	0.01	0.03	0.00
27	135	2.25	0.9	0.147	0.25	0.13	0.01	0.03	0.00
28	140	2.33	0.9	0.147	0.25	0.13	0.01	0.03	0.00
29	145	2.42	0.9	0.147	0.25	0.13	0.01	0.03	0.00
30	150	2.50	0.9	0.147	0.25	0.13	0.01	0.03	0.00
31	155	2.58	0.9	0.147	0.25	0.13	0.01	0.03	0.00
32	160	2.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
33	165	2.75	1.0	0.163	0.25	0.15	0.02	0.03	0.00
34	170	2.83	1.0	0.163	0.25	0.15	0.02	0.03	0.00
35	175	2.92	1.0	0.163	0.25	0.15	0.02	0.03	0.00
36	180	3.00	1.0	0.163	0.25	0.15	0.02	0.03	0.00
37	185	3.08	1.0	0.163	0.25	0.15	0.02	0.03	0.00
38	190	3.17	1.1	0.180	0.25	0.16	0.02	0.04	0.00
39	195	3.25	1.1	0.180	0.25	0.16	0.02	0.04	0.00
40	200	3.33	1.1	0.180	0.25	0.16	0.02	0.04	0.00
41	205	3.42	1.2	0.196	0.25	0.18	0.02	0.04	0.00
42	210	3.50	1.3	0.212	0.25	0.19	0.02	0.04	0.00
43	215	3.58	1.4	0.228	0.25	0.21	0.02	0.05	0.00
44	220	3.67	1.4	0.228	0.25	0.21	0.02	0.05	0.00
45	225	3.75	1.5	0.245	0.25	0.22	0.02	0.05	0.69
46	230	3.83	1.5	0.245	0.25	0.22	0.02	0.05	0.69
47	235	3.92	1.6	0.261	0.25	0.24	0.02	0.03	0.00
48	240	4.00	1.6	0.261	0.25	0.24	0.02	0.03	0.00
49	245	4.08	1.7	0.277	0.25	0.25	0.03	0.06	5.33
50	250	4.17	1.8	0.294	0.25	0.26	0.05	0.10	15.17
51	255	4.25	1.9	0.310	0.25	0.28	0.06	0.13	25.02
52	260	4.33	2.0	0.326	0.25	0.29	0.08	0.16	34.86
53	265	4.42	2.1	0.343	0.25	0.31	0.10	0.20	44.70
54	270	4.50	2.1	0.343	0.25	0.31	0.10	0.20	44.70
55	275	4.58	2.2	0.359	0.25	0.32	0.11	0.23	54.54
56	280	4.67	2.3	0.375	0.25	0.34	0.13	0.26	64.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.25	0.35	0.15	0.29	74.22
58	290	4.83	2.4	0.392	0.25	0.35	0.15	0.29	74.22
59	295	4.92	2.5	0.408	0.25	0.37	0.16	0.33	84.06
60	300	5.00	2.6	0.424	0.25	0.38	0.18	0.36	93.90
61	305	5.08	3.1	0.506	0.25	0.46	0.26	0.52	143.11
62	310	5.17	3.6	0.588	0.25	0.53	0.34	0.69	192.31
63	315	5.25	3.9	0.636	0.25	0.57	0.39	0.79	221.83
64	320	5.33	4.2	0.685	0.25	0.62	0.44	0.88	251.36
65	325	5.42	4.7	0.767	0.25	0.69	0.52	1.05	300.56
66	330	5.50	5.6	0.914	0.25	0.82	0.67	1.34	389.13
67	335	5.58	1.9	0.310	0.25	0.28	0.06	0.13	25.02
68	340	5.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
69	345	5.75	0.6	0.098	0.25	0.09	0.01	0.02	0.00
70	350	5.83	0.5	0.082	0.25	0.07	0.01	0.02	0.00
71	355	5.92	0.3	0.049	0.25	0.04	0.00	0.01	0.00
72	360	6.00	0.2	0.033	0.25	0.03	0.00	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.39
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2879.82
REQUIRED STORAGE (acft)	0.05
REQUIRED STORAGE (cuft)	2139.79
PEAK FLOW RATE (cfs)	1.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.433	0.016	0.002	0.00	0.00
2	30	0.50	0.3	0.027	0.428	0.024	0.003	0.01	0.00
3	45	0.75	0.3	0.027	0.423	0.024	0.003	0.01	0.00
4	60	1.00	0.4	0.036	0.418	0.032	0.004	0.01	0.00
5	75	1.25	0.3	0.027	0.413	0.024	0.003	0.01	0.00
6	90	1.50	0.3	0.027	0.408	0.024	0.003	0.01	0.00
7	105	1.75	0.3	0.027	0.403	0.024	0.003	0.01	0.00
8	120	2.00	0.4	0.036	0.399	0.032	0.004	0.01	0.00
9	135	2.25	0.4	0.036	0.394	0.032	0.004	0.01	0.00
10	150	2.50	0.4	0.036	0.389	0.032	0.004	0.01	0.00
11	165	2.75	0.5	0.045	0.384	0.040	0.004	0.01	0.00
12	180	3.00	0.5	0.045	0.379	0.040	0.004	0.01	0.00
13	195	3.25	0.5	0.045	0.375	0.040	0.004	0.01	0.00
14	210	3.50	0.5	0.045	0.370	0.040	0.004	0.01	0.00
15	225	3.75	0.5	0.045	0.365	0.040	0.004	0.01	0.00
16	240	4.00	0.6	0.054	0.361	0.048	0.005	0.01	0.00
17	255	4.25	0.6	0.054	0.356	0.048	0.005	0.01	0.00
18	270	4.50	0.7	0.062	0.352	0.056	0.006	0.01	0.00
19	285	4.75	0.7	0.062	0.347	0.056	0.006	0.01	0.00
20	300	5.00	0.8	0.071	0.343	0.064	0.007	0.01	0.00
21	315	5.25	0.6	0.054	0.338	0.048	0.005	0.01	0.00
22	330	5.50	0.7	0.062	0.334	0.056	0.006	0.01	0.00
23	345	5.75	0.8	0.071	0.330	0.064	0.007	0.01	0.00
24	360	6.00	0.8	0.071	0.325	0.064	0.007	0.01	0.00
25	375	6.25	0.9	0.080	0.321	0.072	0.008	0.02	0.00
26	390	6.50	0.9	0.080	0.317	0.072	0.008	0.02	0.00
27	405	6.75	1.0	0.089	0.312	0.080	0.009	0.02	0.00
28	420	7.00	1.0	0.089	0.308	0.080	0.009	0.02	0.00
29	435	7.25	1.0	0.089	0.304	0.080	0.009	0.02	0.00
30	450	7.50	1.1	0.098	0.300	0.088	0.010	0.02	0.00
31	465	7.75	1.2	0.107	0.296	0.096	0.011	0.02	0.00
32	480	8.00	1.3	0.116	0.292	0.104	0.012	0.02	0.00
33	495	8.25	1.5	0.134	0.288	0.120	0.013	0.03	0.00
34	510	8.50	1.5	0.134	0.284	0.120	0.013	0.03	0.00
35	525	8.75	1.6	0.143	0.280	0.128	0.014	0.03	0.00
36	540	9.00	1.7	0.152	0.276	0.136	0.015	0.03	0.00
37	555	9.25	1.9	0.169	0.272	0.153	0.017	0.03	0.00
38	570	9.50	2.0	0.178	0.268	0.161	0.018	0.04	0.00
39	585	9.75	2.1	0.187	0.264	0.169	0.019	0.04	0.00
40	600	10.00	2.2	0.196	0.260	0.177	0.020	0.04	0.00
41	615	10.25	1.5	0.134	0.256	0.120	0.013	0.03	0.00
42	630	10.50	1.5	0.134	0.253	0.120	0.013	0.03	0.00
43	645	10.75	2.0	0.178	0.249	0.161	0.018	0.04	0.00
44	660	11.00	2.0	0.178	0.245	0.161	0.018	0.04	0.00
45	675	11.25	1.9	0.169	0.242	0.153	0.017	0.03	0.00
46	690	11.50	1.9	0.169	0.238	0.153	0.017	0.03	0.00
47	705	11.75	1.7	0.152	0.235	0.136	0.015	0.03	0.00
48	720	12.00	1.8	0.161	0.231	0.145	0.016	0.03	0.00
49	735	12.25	2.5	0.223	0.228	0.201	0.022	0.04	0.00
50	750	12.50	2.6	0.232	0.224	0.209	0.008	0.02	0.00
51	765	12.75	2.8	0.250	0.221	0.225	0.029	0.06	9.79
52	780	13.00	2.9	0.259	0.218	0.233	0.041	0.08	31.95
53	795	13.25	3.4	0.303	0.214	0.273	0.089	0.18	118.58
54	810	13.50	3.4	0.303	0.211	0.273	0.092	0.19	124.46
55	825	13.75	2.3	0.205	0.208	0.185	0.021	0.04	0.00
56	840	14.00	2.3	0.205	0.205	0.185	0.000	0.00	0.00
57	855	14.25	2.7	0.241	0.202	0.217	0.039	0.08	28.68
58	870	14.50	2.6	0.232	0.199	0.209	0.033	0.07	18.11
59	885	14.75	2.6	0.232	0.196	0.209	0.036	0.07	23.61
60	900	15.00	2.5	0.223	0.193	0.201	0.030	0.06	12.88
61	915	15.25	2.4	0.214	0.190	0.193	0.024	0.05	2.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.187	0.185	0.018	0.04	0.00
63	945	15.75	1.9	0.169	0.184	0.153	0.017	0.03	0.00
64	960	16.00	1.9	0.169	0.181	0.153	0.017	0.03	0.00
65	975	16.25	0.4	0.036	0.178	0.032	0.004	0.01	0.00
66	990	16.50	0.4	0.036	0.176	0.032	0.004	0.01	0.00
67	1005	16.75	0.3	0.027	0.173	0.024	0.003	0.01	0.00
68	1020	17.00	0.3	0.027	0.170	0.024	0.003	0.01	0.00
69	1035	17.25	0.5	0.045	0.168	0.040	0.004	0.01	0.00
70	1050	17.50	0.5	0.045	0.165	0.040	0.004	0.01	0.00
71	1065	17.75	0.5	0.045	0.163	0.040	0.004	0.01	0.00
72	1080	18.00	0.4	0.036	0.160	0.032	0.004	0.01	0.00
73	1095	18.25	0.4	0.036	0.158	0.032	0.004	0.01	0.00
74	1110	18.50	0.4	0.036	0.156	0.032	0.004	0.01	0.00
75	1125	18.75	0.3	0.027	0.153	0.024	0.003	0.01	0.00
76	1140	19.00	0.2	0.018	0.151	0.016	0.002	0.00	0.00
77	1155	19.25	0.3	0.027	0.149	0.024	0.003	0.01	0.00
78	1170	19.50	0.4	0.036	0.147	0.032	0.004	0.01	0.00
79	1185	19.75	0.3	0.027	0.145	0.024	0.003	0.01	0.00
80	1200	20.00	0.2	0.018	0.143	0.016	0.002	0.00	0.00
81	1215	20.25	0.3	0.027	0.141	0.024	0.003	0.01	0.00
82	1230	20.50	0.3	0.027	0.139	0.024	0.003	0.01	0.00
83	1245	20.75	0.3	0.027	0.138	0.024	0.003	0.01	0.00
84	1260	21.00	0.2	0.018	0.136	0.016	0.002	0.00	0.00
85	1275	21.25	0.3	0.027	0.134	0.024	0.003	0.01	0.00
86	1290	21.50	0.2	0.018	0.133	0.016	0.002	0.00	0.00
87	1305	21.75	0.3	0.027	0.131	0.024	0.003	0.01	0.00
88	1320	22.00	0.2	0.018	0.130	0.016	0.002	0.00	0.00
89	1335	22.25	0.3	0.027	0.129	0.024	0.003	0.01	0.00
90	1350	22.50	0.2	0.018	0.127	0.016	0.002	0.00	0.00
91	1365	22.75	0.2	0.018	0.126	0.016	0.002	0.00	0.00
92	1380	23.00	0.2	0.018	0.125	0.016	0.002	0.00	0.00
93	1395	23.25	0.2	0.018	0.124	0.016	0.002	0.00	0.00
94	1410	23.50	0.2	0.018	0.124	0.016	0.002	0.00	0.00
95	1425	23.75	0.2	0.018	0.123	0.016	0.002	0.00	0.00
96	1440	24.00	0.2	0.018	0.123	0.016	0.002	0.00	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.26
FLOOD VOLUME (acft)	0.04
FLOOD VOLUME (cuft)	1902.84
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	370.13
PEAK FLOW (cfs)	0.19

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.03	10	10	14	-	465.00	-	0.00
3	15	0.03	8	8	14	-	465.00	-	0.00
4	20	0.04	11	11	14	-	465.00	-	0.00
5	25	0.04	11	11	14	-	465.00	-	0.00
6	30	0.05	14	14	14	-	465.00	-	0.00
7	35	0.04	11	11	14	-	465.00	-	0.00
8	40	0.05	14	14	14	-	465.00	-	0.00
9	45	0.05	14	14	14	-	465.00	-	0.00
10	50	0.04	11	11	14	-	465.00	-	0.00
11	55	0.04	12	12	14	-	465.00	-	0.00
12	60	0.05	14	14	14	-	465.00	-	0.00
13	65	0.06	18	18	14	4	465.00	4	0.00
14	70	0.06	18	21	14	7	465.00	7	0.00
15	75	0.06	18	25	14	11	465.00	11	0.00
16	80	0.01	3	13	14	-	465.00	-	0.00
17	85	0.16	48	48	14	34	465.01	34	0.00
18	90	0.18	55	89	14	75	465.02	75	0.00
19	95	0.11	33	108	14	94	465.03	94	0.00
20	100	0.18	55	149	14	135	465.04	135	0.00
21	105	0.33	100	235	14	221	465.07	221	0.01
22	110	0.28	85	307	14	292	465.09	292	0.01
23	115	0.23	70	363	14	349	465.10	349	0.01
24	120	0.26	78	427	14	413	465.12	413	0.01
25	125	0.28	85	498	14	484	465.14	484	0.01
26	130	0.56	168	652	14	638	465.19	638	0.01
27	135	0.76	228	866	14	852	465.25	852	0.02
28	140	0.39	116	968	14	954	465.28	954	0.02
29	145	1.21	364	1,318	14	1,304	465.39	1,304	0.03
30	150	1.34	401	1,705	14	1,691	465.50	1,691	0.04
31	155	1.56	469	2,160	14	2,146	465.64	2,146	0.05
32	160	0.99	296	2,442	14	2,428	465.72	2,428	0.06
33	165	0.01	3	2,431	14	2,417	465.72	2,417	0.06
34	170	0.05	14	2,430	14	2,416	465.72	2,416	0.06
35	175	0.05	14	2,430	14	2,416	465.72	2,416	0.06
36	180	0.02	5	2,420	14	2,406	465.72	2,406	0.06

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.02	5	5	14	-	465.00	-	0.00
2	10	0.02	6	6	14	-	465.00	-	0.00
3	15	0.02	6	6	14	-	465.00	-	0.00
4	20	0.02	6	6	14	-	465.00	-	0.00
5	25	0.02	6	6	14	-	465.00	-	0.00
6	30	0.02	7	7	14	-	465.00	-	0.00
7	35	0.02	7	7	14	-	465.00	-	0.00
8	40	0.02	7	7	14	-	465.00	-	0.00
9	45	0.02	7	7	14	-	465.00	-	0.00
10	50	0.02	7	7	14	-	465.00	-	0.00
11	55	0.02	7	7	14	-	465.00	-	0.00
12	60	0.03	8	8	14	-	465.00	-	0.00
13	65	0.03	8	8	14	-	465.00	-	0.00
14	70	0.03	8	8	14	-	465.00	-	0.00
15	75	0.03	8	8	14	-	465.00	-	0.00
16	80	0.03	8	8	14	-	465.00	-	0.00
17	85	0.03	8	8	14	-	465.00	-	0.00
18	90	0.03	8	8	14	-	465.00	-	0.00
19	95	0.03	8	8	14	-	465.00	-	0.00
20	100	0.03	8	8	14	-	465.00	-	0.00
21	105	0.03	8	8	14	-	465.00	-	0.00
22	110	0.03	8	8	14	-	465.00	-	0.00
23	115	0.03	8	8	14	-	465.00	-	0.00
24	120	0.03	9	9	14	-	465.00	-	0.00
25	125	0.03	8	8	14	-	465.00	-	0.00
26	130	0.03	9	9	14	-	465.00	-	0.00
27	135	0.03	9	9	14	-	465.00	-	0.00
28	140	0.03	9	9	14	-	465.00	-	0.00
29	145	0.03	9	9	14	-	465.00	-	0.00
30	150	0.03	9	9	14	-	465.00	-	0.00
31	155	0.03	9	9	14	-	465.00	-	0.00
32	160	0.03	9	9	14	-	465.00	-	0.00
33	165	0.03	10	10	14	-	465.00	-	0.00
34	170	0.03	10	10	14	-	465.00	-	0.00
35	175	0.03	10	10	14	-	465.00	-	0.00
36	180	0.03	10	10	14	-	465.00	-	0.00
37	185	0.03	10	10	14	-	465.00	-	0.00
38	190	0.04	11	11	14	-	465.00	-	0.00
39	195	0.04	11	11	14	-	465.00	-	0.00
40	200	0.04	11	11	14	-	465.00	-	0.00
41	205	0.04	12	12	14	-	465.00	-	0.00
42	210	0.04	13	13	14	-	465.00	-	0.00
43	215	0.05	14	14	14	-	465.00	-	0.00
44	220	0.05	14	14	14	-	465.00	-	0.00
45	225	0.05	15	15	14	1	465.00	1	0.00
46	230	0.05	15	15	14	1	465.00	1	0.00
47	235	0.03	10	11	14	-	465.00	-	0.00
48	240	0.03	10	10	14	-	465.00	-	0.00
49	245	0.06	19	19	14	5	465.00	5	0.00
50	250	0.10	29	35	14	21	465.01	21	0.00
51	255	0.13	39	60	14	46	465.01	46	0.00
52	260	0.16	49	94	14	80	465.02	80	0.00
53	265	0.20	59	139	14	125	465.04	125	0.00
54	270	0.20	59	184	14	170	465.05	170	0.00
55	275	0.23	69	238	14	224	465.07	224	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.26	78	303	14	289	465.09	289	0.01
57	285	0.29	88	377	14	363	465.11	363	0.01
58	290	0.29	88	451	14	437	465.13	437	0.01
59	295	0.33	98	535	14	521	465.16	521	0.01
60	300	0.36	108	629	14	615	465.18	615	0.01
61	305	0.52	157	772	14	758	465.23	758	0.02
62	310	0.69	206	965	14	951	465.28	951	0.02
63	315	0.79	236	1,186	14	1,172	465.35	1,172	0.03
64	320	0.88	265	1,438	14	1,424	465.42	1,424	0.03
65	325	1.05	315	1,738	14	1,724	465.51	1,724	0.04
66	330	1.34	403	2,127	14	2,113	465.63	2,113	0.05
67	335	0.13	39	2,152	14	2,138	465.64	2,138	0.05
68	340	0.03	9	2,147	14	2,133	465.63	2,133	0.05
69	345	0.02	6	2,139	14	2,125	465.63	2,125	0.05
70	350	0.02	5	2,130	14	2,116	465.63	2,116	0.05
71	355	0.01	3	2,119	14	2,105	465.63	2,105	0.05
72	360	0.01	2	2,107	14	2,093	465.62	2,093	0.05

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.00	3	3	42	-	465.00	-	0.00
2	30	0.01	5	5	42	-	465.00	-	0.00
3	45	0.01	5	5	42	-	465.00	-	0.00
4	60	0.01	6	6	42	-	465.00	-	0.00
5	75	0.01	5	5	42	-	465.00	-	0.00
6	90	0.01	5	5	42	-	465.00	-	0.00
7	105	0.01	5	5	42	-	465.00	-	0.00
8	120	0.01	6	6	42	-	465.00	-	0.00
9	135	0.01	6	6	42	-	465.00	-	0.00
10	150	0.01	6	6	42	-	465.00	-	0.00
11	165	0.01	8	8	42	-	465.00	-	0.00
12	180	0.01	8	8	42	-	465.00	-	0.00
13	195	0.01	8	8	42	-	465.00	-	0.00
14	210	0.01	8	8	42	-	465.00	-	0.00
15	225	0.01	8	8	42	-	465.00	-	0.00
16	240	0.01	10	10	42	-	465.00	-	0.00
17	255	0.01	10	10	42	-	465.00	-	0.00
18	270	0.01	11	11	42	-	465.00	-	0.00
19	285	0.01	11	11	42	-	465.00	-	0.00
20	300	0.01	13	13	42	-	465.00	-	0.00
21	315	0.01	10	10	42	-	465.00	-	0.00
22	330	0.01	11	11	42	-	465.00	-	0.00
23	345	0.01	13	13	42	-	465.00	-	0.00
24	360	0.01	13	13	42	-	465.00	-	0.00
25	375	0.02	15	15	42	-	465.00	-	0.00
26	390	0.02	15	15	42	-	465.00	-	0.00
27	405	0.02	16	16	42	-	465.00	-	0.00
28	420	0.02	16	16	42	-	465.00	-	0.00
29	435	0.02	16	16	42	-	465.00	-	0.00
30	450	0.02	18	18	42	-	465.00	-	0.00
31	465	0.02	19	19	42	-	465.00	-	0.00
32	480	0.02	21	21	42	-	465.00	-	0.00
33	495	0.03	24	24	42	-	465.00	-	0.00
34	510	0.03	24	24	42	-	465.00	-	0.00
35	525	0.03	26	26	42	-	465.00	-	0.00
36	540	0.03	27	27	42	-	465.00	-	0.00
37	555	0.03	31	31	42	-	465.00	-	0.00
38	570	0.04	32	32	42	-	465.00	-	0.00
39	585	0.04	34	34	42	-	465.00	-	0.00
40	600	0.04	35	35	42	-	465.00	-	0.00
41	615	0.03	24	24	42	-	465.00	-	0.00
42	630	0.03	24	24	42	-	465.00	-	0.00
43	645	0.04	32	32	42	-	465.00	-	0.00
44	660	0.04	32	32	42	-	465.00	-	0.00
45	675	0.03	31	31	42	-	465.00	-	0.00
46	690	0.03	31	31	42	-	465.00	-	0.00
47	705	0.03	27	27	42	-	465.00	-	0.00
48	720	0.03	29	29	42	-	465.00	-	0.00
49	735	0.04	40	40	42	-	465.00	-	0.00
50	750	0.02	14	14	42	-	465.00	-	0.00
51	765	0.06	52	52	42	10	465.00	10	0.00
52	780	0.08	74	84	42	42	465.01	42	0.00
53	795	0.18	161	203	42	160	465.05	160	0.00
54	810	0.19	167	327	42	285	465.08	285	0.01
55	825	0.04	37	322	42	280	465.08	280	0.01
56	840	0.00	1	280	42	238	465.07	238	0.01
57	855	0.08	71	309	42	267	465.08	267	0.01
58	870	0.07	60	327	42	285	465.08	285	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.07	66	351	42	309	465.09	309	0.01
60	900	0.06	55	364	42	321	465.10	321	0.01
61	915	0.05	44	366	42	324	465.10	324	0.01
62	930	0.04	33	357	42	315	465.09	315	0.01
63	945	0.03	31	345	42	303	465.09	303	0.01
64	960	0.03	31	334	42	292	465.09	292	0.01
65	975	0.01	6	298	42	256	465.08	256	0.01
66	990	0.01	6	262	42	220	465.07	220	0.01
67	1005	0.01	5	225	42	183	465.05	183	0.00
68	1020	0.01	5	187	42	145	465.04	145	0.00
69	1035	0.01	8	153	42	111	465.03	111	0.00
70	1050	0.01	8	119	42	77	465.02	77	0.00
71	1065	0.01	8	85	42	43	465.01	43	0.00
72	1080	0.01	6	49	42	7	465.00	7	0.00
73	1095	0.01	6	13	42	-	465.00	-	0.00
74	1110	0.01	6	6	42	-	465.00	-	0.00
75	1125	0.01	5	5	42	-	465.00	-	0.00
76	1140	0.00	3	3	42	-	465.00	-	0.00
77	1155	0.01	5	5	42	-	465.00	-	0.00
78	1170	0.01	6	6	42	-	465.00	-	0.00
79	1185	0.01	5	5	42	-	465.00	-	0.00
80	1200	0.00	3	3	42	-	465.00	-	0.00
81	1215	0.01	5	5	42	-	465.00	-	0.00
82	1230	0.01	5	5	42	-	465.00	-	0.00
83	1245	0.01	5	5	42	-	465.00	-	0.00
84	1260	0.00	3	3	42	-	465.00	-	0.00
85	1275	0.01	5	5	42	-	465.00	-	0.00
86	1290	0.00	3	3	42	-	465.00	-	0.00
87	1305	0.01	5	5	42	-	465.00	-	0.00
88	1320	0.00	3	3	42	-	465.00	-	0.00
89	1335	0.01	5	5	42	-	465.00	-	0.00
90	1350	0.00	3	3	42	-	465.00	-	0.00
91	1365	0.00	3	3	42	-	465.00	-	0.00
92	1380	0.00	3	3	42	-	465.00	-	0.00
93	1395	0.00	3	3	42	-	465.00	-	0.00
94	1410	0.00	3	3	42	-	465.00	-	0.00
95	1425	0.00	3	3	42	-	465.00	-	0.00
96	1440	0.00	3	3	42	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.570	1.00	1.04	1.36	10.570	1.00	1.36	2.23	10.570	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	1.04	SUM [9]	10.57	SUM [11]	1.36	SUM [13]	10.57	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.49	0.49	0.40
FLOOD VOLUME	(cu-ft)	18,821	18,747	15,460
	(acre-ft)	0.43	0.43	0.35
REQUIRED STORAGE	(cu-ft)	16,281	14,878	6,850
	(acre-ft)	0.37	0.34	0.16
PEAK FLOW	(cfs)	8.76	7.61	1.44
MAXIMUM WSEL	(ft)	465.99	465.91	465.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525
C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.19	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.19	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.19	0.12	0.01	0.15	0.00
4	20	0.33	1.5	0.187	0.19	0.17	0.02	0.20	0.00
5	25	0.42	1.5	0.187	0.19	0.17	0.02	0.20	0.00
6	30	0.50	1.8	0.225	0.19	0.20	0.03	0.32	24.03
7	35	0.58	1.5	0.187	0.19	0.17	0.02	0.20	0.00
8	40	0.67	1.8	0.225	0.19	0.20	0.03	0.32	24.03
9	45	0.75	1.8	0.225	0.19	0.20	0.03	0.32	24.03
10	50	0.83	1.5	0.187	0.19	0.17	0.02	0.20	0.00
11	55	0.92	1.6	0.200	0.19	0.18	0.01	0.06	0.00
12	60	1.00	1.8	0.225	0.19	0.20	0.03	0.32	24.03
13	65	1.08	2.2	0.275	0.19	0.25	0.08	0.85	182.33
14	70	1.17	2.2	0.275	0.19	0.25	0.08	0.85	182.33
15	75	1.25	2.2	0.275	0.19	0.25	0.08	0.85	182.33
16	80	1.33	2.0	0.250	0.19	0.22	0.06	0.59	103.18
17	85	1.42	2.6	0.324	0.19	0.29	0.13	1.38	340.63
18	90	1.50	2.7	0.337	0.19	0.30	0.14	1.51	380.20
19	95	1.58	2.4	0.300	0.19	0.27	0.11	1.11	261.48
20	100	1.67	2.7	0.337	0.19	0.30	0.14	1.51	380.20
21	105	1.75	3.3	0.412	0.19	0.37	0.22	2.30	617.64
22	110	1.83	3.1	0.387	0.19	0.35	0.19	2.04	538.50
23	115	1.92	2.9	0.362	0.19	0.33	0.17	1.77	459.35
24	120	2.00	3.0	0.374	0.19	0.34	0.18	1.91	498.92
25	125	2.08	3.1	0.387	0.19	0.35	0.19	2.04	538.50
26	130	2.17	4.2	0.524	0.19	0.47	0.33	3.49	973.81
27	135	2.25	5.0	0.624	0.19	0.56	0.43	4.54	1290.40
28	140	2.33	3.5	0.437	0.19	0.39	0.24	2.56	696.79
29	145	2.42	6.8	0.849	0.19	0.76	0.65	6.92	2002.74
30	150	2.50	7.3	0.911	0.19	0.82	0.72	7.58	2200.61
31	155	2.58	8.2	1.023	0.19	0.92	0.83	8.76	2556.77
32	160	2.67	5.9	0.736	0.19	0.66	0.54	5.73	1646.57
33	165	2.75	2.0	0.250	0.19	0.22	0.06	0.59	103.18
34	170	2.83	1.8	0.225	0.19	0.20	0.03	0.32	24.03
35	175	2.92	1.8	0.225	0.19	0.20	0.03	0.32	24.03
36	180	3.00	0.6	0.075	0.19	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18821.12
REQUIRED STORAGE (acft)	0.37
REQUIRED STORAGE (cuft)	16280.67
PEAK FLOW RATE (cfs)	8.76

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.19	0.07	0.01	0.09	0.00
2	10	0.17	0.6	0.098	0.19	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.19	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.19	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.19	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.19	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.19	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.19	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.19	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.19	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.19	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.19	0.12	0.01	0.14	0.00
13	65	1.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
14	70	1.17	0.8	0.131	0.19	0.12	0.01	0.14	0.00
15	75	1.25	0.8	0.131	0.19	0.12	0.01	0.14	0.00
16	80	1.33	0.8	0.131	0.19	0.12	0.01	0.14	0.00
17	85	1.42	0.8	0.131	0.19	0.12	0.01	0.14	0.00
18	90	1.50	0.8	0.131	0.19	0.12	0.01	0.14	0.00
19	95	1.58	0.8	0.131	0.19	0.12	0.01	0.14	0.00
20	100	1.67	0.8	0.131	0.19	0.12	0.01	0.14	0.00
21	105	1.75	0.8	0.131	0.19	0.12	0.01	0.14	0.00
22	110	1.83	0.8	0.131	0.19	0.12	0.01	0.14	0.00
23	115	1.92	0.8	0.131	0.19	0.12	0.01	0.14	0.00
24	120	2.00	0.9	0.147	0.19	0.13	0.01	0.16	0.00
25	125	2.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
26	130	2.17	0.9	0.147	0.19	0.13	0.01	0.16	0.00
27	135	2.25	0.9	0.147	0.19	0.13	0.01	0.16	0.00
28	140	2.33	0.9	0.147	0.19	0.13	0.01	0.16	0.00
29	145	2.42	0.9	0.147	0.19	0.13	0.01	0.16	0.00
30	150	2.50	0.9	0.147	0.19	0.13	0.01	0.16	0.00
31	155	2.58	0.9	0.147	0.19	0.13	0.01	0.16	0.00
32	160	2.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
33	165	2.75	1.0	0.163	0.19	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.19	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.19	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.19	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.19	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.19	0.16	0.02	0.19	0.00
39	195	3.25	1.1	0.180	0.19	0.16	0.02	0.19	0.00
40	200	3.33	1.1	0.180	0.19	0.16	0.02	0.19	0.00
41	205	3.42	1.2	0.196	0.19	0.18	0.00	0.02	0.00
42	210	3.50	1.3	0.212	0.19	0.19	0.02	0.19	0.00
43	215	3.58	1.4	0.228	0.19	0.21	0.03	0.36	36.21
44	220	3.67	1.4	0.228	0.19	0.21	0.03	0.36	36.21
45	225	3.75	1.5	0.245	0.19	0.22	0.05	0.54	87.96
46	230	3.83	1.5	0.245	0.19	0.22	0.05	0.54	87.96
47	235	3.92	1.6	0.261	0.19	0.24	0.07	0.71	139.71
48	240	4.00	1.6	0.261	0.19	0.24	0.07	0.71	139.71
49	245	4.08	1.7	0.277	0.19	0.25	0.08	0.88	191.46
50	250	4.17	1.8	0.294	0.19	0.26	0.10	1.05	243.21
51	255	4.25	1.9	0.310	0.19	0.28	0.12	1.23	294.96
52	260	4.33	2.0	0.326	0.19	0.29	0.13	1.40	346.71
53	265	4.42	2.1	0.343	0.19	0.31	0.15	1.57	398.47
54	270	4.50	2.1	0.343	0.19	0.31	0.15	1.57	398.47
55	275	4.58	2.2	0.359	0.19	0.32	0.16	1.74	450.22
56	280	4.67	2.3	0.375	0.19	0.34	0.18	1.92	501.97

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.19	0.35	0.20	2.09	553.72
58	290	4.83	2.4	0.392	0.19	0.35	0.20	2.09	553.72
59	295	4.92	2.5	0.408	0.19	0.37	0.21	2.26	605.47
60	300	5.00	2.6	0.424	0.19	0.38	0.23	2.43	657.22
61	305	5.08	3.1	0.506	0.19	0.46	0.31	3.30	915.97
62	310	5.17	3.6	0.588	0.19	0.53	0.39	4.16	1174.73
63	315	5.25	3.9	0.636	0.19	0.57	0.44	4.68	1329.98
64	320	5.33	4.2	0.685	0.19	0.62	0.49	5.19	1485.23
65	325	5.42	4.7	0.767	0.19	0.69	0.57	6.06	1743.98
66	330	5.50	5.6	0.914	0.19	0.82	0.72	7.61	2209.74
67	335	5.58	1.9	0.310	0.19	0.28	0.12	1.23	294.96
68	340	5.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
69	345	5.75	0.6	0.098	0.19	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.19	0.07	0.01	0.09	0.00
71	355	5.92	0.3	0.049	0.19	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.19	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18747.03
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14877.95
PEAK FLOW RATE (cfs)	7.61

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.343	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.339	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.335	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.331	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.327	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.323	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.319	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.316	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.312	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.308	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.304	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.300	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.297	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.293	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.289	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.286	0.048	0.005	0.06	0.00
17	255	4.25	0.6	0.054	0.282	0.048	0.005	0.06	0.00
18	270	4.50	0.7	0.062	0.278	0.056	0.006	0.07	0.00
19	285	4.75	0.7	0.062	0.275	0.056	0.006	0.07	0.00
20	300	5.00	0.8	0.071	0.271	0.064	0.007	0.08	0.00
21	315	5.25	0.6	0.054	0.268	0.048	0.005	0.06	0.00
22	330	5.50	0.7	0.062	0.264	0.056	0.006	0.07	0.00
23	345	5.75	0.8	0.071	0.261	0.064	0.007	0.08	0.00
24	360	6.00	0.8	0.071	0.257	0.064	0.007	0.08	0.00
25	375	6.25	0.9	0.080	0.254	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.251	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.247	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.244	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.241	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.237	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.234	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.231	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.228	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.224	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.221	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.218	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.215	0.153	0.017	0.18	0.00
38	570	9.50	2.0	0.178	0.212	0.161	0.018	0.19	0.00
39	585	9.75	2.1	0.187	0.209	0.169	0.019	0.20	0.00
40	600	10.00	2.2	0.196	0.206	0.177	0.020	0.21	0.00
41	615	10.25	1.5	0.134	0.203	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.200	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.197	0.161	0.018	0.19	0.00
44	660	11.00	2.0	0.178	0.194	0.161	0.018	0.19	0.00
45	675	11.25	1.9	0.169	0.191	0.153	0.017	0.18	0.00
46	690	11.50	1.9	0.169	0.189	0.153	0.017	0.18	0.00
47	705	11.75	1.7	0.152	0.186	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.183	0.145	0.016	0.17	0.00
49	735	12.25	2.5	0.223	0.180	0.201	0.043	0.45	188.01
50	750	12.50	2.6	0.232	0.178	0.209	0.054	0.57	298.56
51	765	12.75	2.8	0.250	0.175	0.225	0.075	0.79	493.67
52	780	13.00	2.9	0.259	0.172	0.233	0.086	0.91	603.61
53	795	13.25	3.4	0.303	0.170	0.273	0.134	1.41	1052.67
54	810	13.50	3.4	0.303	0.167	0.273	0.136	1.44	1077.14
55	825	13.75	2.3	0.205	0.165	0.185	0.041	0.43	167.88
56	840	14.00	2.3	0.205	0.162	0.185	0.043	0.45	191.72
57	855	14.25	2.7	0.241	0.160	0.217	0.081	0.86	554.66
58	870	14.50	2.6	0.232	0.157	0.209	0.075	0.79	492.99
59	885	14.75	2.6	0.232	0.155	0.209	0.077	0.82	515.85
60	900	15.00	2.5	0.223	0.152	0.201	0.071	0.75	453.52
61	915	15.25	2.4	0.214	0.150	0.193	0.064	0.68	390.86

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
62	930	15.50	2.3	0.205	0.148	0.185	0.057	0.61	327.85
63	945	15.75	1.9	0.169	0.146	0.153	0.024	0.25	9.93
64	960	16.00	1.9	0.169	0.143	0.153	0.026	0.28	31.09
65	975	16.25	0.4	0.036	0.141	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.139	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.137	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.135	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.133	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.131	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.129	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.127	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.125	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.116	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.110	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.109	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.106	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.105	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.104	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.102	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.101	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.100	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.099	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.099	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.098	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.097	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.097	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15459.88
REQUIRED STORAGE (acft)	0.16
REQUIRED STORAGE (cuft)	6850.04
PEAK FLOW (cfs)	1.44

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	73	-	465.00	-	0.00
2	10	0.17	51	51	73	-	465.00	-	0.00
3	15	0.15	44	44	73	-	465.00	-	0.00
4	20	0.20	59	59	73	-	465.00	-	0.00
5	25	0.20	59	59	73	-	465.00	-	0.00
6	30	0.32	97	97	73	24	465.00	24	0.00
7	35	0.20	59	83	73	11	465.00	11	0.00
8	40	0.32	97	107	73	35	465.00	35	0.00
9	45	0.32	97	131	73	59	465.00	59	0.00
10	50	0.20	59	118	73	46	465.00	46	0.00
11	55	0.06	17	63	73	-	465.00	-	0.00
12	60	0.32	97	97	73	24	465.00	24	0.00
13	65	0.85	255	279	73	206	465.01	206	0.00
14	70	0.85	255	461	73	389	465.02	389	0.01
15	75	0.85	255	644	73	571	465.03	571	0.01
16	80	0.59	176	747	73	674	465.04	674	0.02
17	85	1.38	413	1,087	73	1,015	465.06	1,015	0.02
18	90	1.51	453	1,468	73	1,395	465.09	1,395	0.03
19	95	1.11	334	1,729	73	1,657	465.10	1,657	0.04
20	100	1.51	453	2,109	73	2,037	465.12	2,037	0.05
21	105	2.30	690	2,727	73	2,654	465.16	2,654	0.06
22	110	2.04	611	3,265	73	3,193	465.20	3,193	0.07
23	115	1.77	532	3,725	73	3,652	465.22	3,652	0.08
24	120	1.91	572	4,224	73	4,151	465.25	4,151	0.10
25	125	2.04	611	4,762	73	4,690	465.29	4,690	0.11
26	130	3.49	1,046	5,736	73	5,663	465.35	5,663	0.13
27	135	4.54	1,363	7,026	73	6,954	465.43	6,954	0.16
28	140	2.56	769	7,723	73	7,651	465.47	7,651	0.18
29	145	6.92	2,075	9,726	73	9,653	465.59	9,653	0.22
30	150	7.58	2,273	11,927	73	11,854	465.72	11,854	0.27
31	155	8.76	2,629	14,483	73	14,411	465.88	14,411	0.33
32	160	5.73	1,719	16,130	73	16,057	465.98	16,057	0.37
33	165	0.59	176	16,233	73	16,161	465.99	16,161	0.37
34	170	0.32	97	16,257	73	16,185	465.99	16,185	0.37
35	175	0.32	97	16,281	73	16,209	465.99	16,209	0.37
36	180	0.08	24	16,232	73	16,160	465.99	16,160	0.37

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.09	26	26	73	-	465.00	-	0.00
2	10	0.10	31	31	73	-	465.00	-	0.00
3	15	0.10	31	31	73	-	465.00	-	0.00
4	20	0.10	31	31	73	-	465.00	-	0.00
5	25	0.10	31	31	73	-	465.00	-	0.00
6	30	0.12	36	36	73	-	465.00	-	0.00
7	35	0.12	36	36	73	-	465.00	-	0.00
8	40	0.12	36	36	73	-	465.00	-	0.00
9	45	0.12	36	36	73	-	465.00	-	0.00
10	50	0.12	36	36	73	-	465.00	-	0.00
11	55	0.12	36	36	73	-	465.00	-	0.00
12	60	0.14	41	41	73	-	465.00	-	0.00
13	65	0.14	41	41	73	-	465.00	-	0.00
14	70	0.14	41	41	73	-	465.00	-	0.00
15	75	0.14	41	41	73	-	465.00	-	0.00
16	80	0.14	41	41	73	-	465.00	-	0.00
17	85	0.14	41	41	73	-	465.00	-	0.00
18	90	0.14	41	41	73	-	465.00	-	0.00
19	95	0.14	41	41	73	-	465.00	-	0.00
20	100	0.14	41	41	73	-	465.00	-	0.00
21	105	0.14	41	41	73	-	465.00	-	0.00
22	110	0.14	41	41	73	-	465.00	-	0.00
23	115	0.14	41	41	73	-	465.00	-	0.00
24	120	0.16	47	47	73	-	465.00	-	0.00
25	125	0.14	41	41	73	-	465.00	-	0.00
26	130	0.16	47	47	73	-	465.00	-	0.00
27	135	0.16	47	47	73	-	465.00	-	0.00
28	140	0.16	47	47	73	-	465.00	-	0.00
29	145	0.16	47	47	73	-	465.00	-	0.00
30	150	0.16	47	47	73	-	465.00	-	0.00
31	155	0.16	47	47	73	-	465.00	-	0.00
32	160	0.16	47	47	73	-	465.00	-	0.00
33	165	0.17	52	52	73	-	465.00	-	0.00
34	170	0.17	52	52	73	-	465.00	-	0.00
35	175	0.17	52	52	73	-	465.00	-	0.00
36	180	0.17	52	52	73	-	465.00	-	0.00
37	185	0.17	52	52	73	-	465.00	-	0.00
38	190	0.19	57	57	73	-	465.00	-	0.00
39	195	0.19	57	57	73	-	465.00	-	0.00
40	200	0.19	57	57	73	-	465.00	-	0.00
41	205	0.02	5	5	73	-	465.00	-	0.00
42	210	0.19	57	57	73	-	465.00	-	0.00
43	215	0.36	109	109	73	36	465.00	36	0.00
44	220	0.36	109	145	73	72	465.00	72	0.00
45	225	0.54	161	233	73	160	465.01	160	0.00
46	230	0.54	161	321	73	248	465.02	248	0.01
47	235	0.71	212	461	73	388	465.02	388	0.01
48	240	0.71	212	600	73	528	465.03	528	0.01
49	245	0.88	264	792	73	719	465.04	719	0.02
50	250	1.05	316	1,035	73	962	465.06	962	0.02
51	255	1.23	368	1,330	73	1,257	465.08	1,257	0.03
52	260	1.40	419	1,677	73	1,604	465.10	1,604	0.04
53	265	1.57	471	2,075	73	2,003	465.12	2,003	0.05
54	270	1.57	471	2,474	73	2,401	465.15	2,401	0.06
55	275	1.74	523	2,924	73	2,851	465.17	2,851	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.92	575	3,426	73	3,353	465.20	3,353	0.08
57	285	2.09	626	3,980	73	3,907	465.24	3,907	0.09
58	290	2.09	626	4,533	73	4,461	465.27	4,461	0.10
59	295	2.26	678	5,139	73	5,066	465.31	5,066	0.12
60	300	2.43	730	5,796	73	5,723	465.35	5,723	0.13
61	305	3.30	989	6,712	73	6,639	465.41	6,639	0.15
62	310	4.16	1,247	7,887	73	7,814	465.48	7,814	0.18
63	315	4.68	1,403	9,217	73	9,144	465.56	9,144	0.21
64	320	5.19	1,558	10,702	73	10,629	465.65	10,629	0.24
65	325	6.06	1,817	12,446	73	12,373	465.76	12,373	0.28
66	330	7.61	2,282	14,656	73	14,583	465.89	14,583	0.33
67	335	1.23	368	14,951	73	14,878	465.91	14,878	0.34
68	340	0.16	47	14,925	73	14,852	465.91	14,852	0.34
69	345	0.10	31	14,883	73	14,810	465.91	14,810	0.34
70	350	0.09	26	14,836	73	14,764	465.90	14,764	0.34
71	355	0.05	16	14,779	73	14,707	465.90	14,707	0.34
72	360	0.03	10	14,717	73	14,644	465.90	14,644	0.34

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	17	17	218	-	465.00	-	0.00
2	30	0.03	25	25	218	-	465.00	-	0.00
3	45	0.03	25	25	218	-	465.00	-	0.00
4	60	0.04	34	34	218	-	465.00	-	0.00
5	75	0.03	25	25	218	-	465.00	-	0.00
6	90	0.03	25	25	218	-	465.00	-	0.00
7	105	0.03	25	25	218	-	465.00	-	0.00
8	120	0.04	34	34	218	-	465.00	-	0.00
9	135	0.04	34	34	218	-	465.00	-	0.00
10	150	0.04	34	34	218	-	465.00	-	0.00
11	165	0.05	42	42	218	-	465.00	-	0.00
12	180	0.05	42	42	218	-	465.00	-	0.00
13	195	0.05	42	42	218	-	465.00	-	0.00
14	210	0.05	42	42	218	-	465.00	-	0.00
15	225	0.05	42	42	218	-	465.00	-	0.00
16	240	0.06	51	51	218	-	465.00	-	0.00
17	255	0.06	51	51	218	-	465.00	-	0.00
18	270	0.07	59	59	218	-	465.00	-	0.00
19	285	0.07	59	59	218	-	465.00	-	0.00
20	300	0.08	68	68	218	-	465.00	-	0.00
21	315	0.06	51	51	218	-	465.00	-	0.00
22	330	0.07	59	59	218	-	465.00	-	0.00
23	345	0.08	68	68	218	-	465.00	-	0.00
24	360	0.08	68	68	218	-	465.00	-	0.00
25	375	0.08	76	76	218	-	465.00	-	0.00
26	390	0.08	76	76	218	-	465.00	-	0.00
27	405	0.09	85	85	218	-	465.00	-	0.00
28	420	0.09	85	85	218	-	465.00	-	0.00
29	435	0.09	85	85	218	-	465.00	-	0.00
30	450	0.10	93	93	218	-	465.00	-	0.00
31	465	0.11	102	102	218	-	465.00	-	0.00
32	480	0.12	110	110	218	-	465.00	-	0.00
33	495	0.14	127	127	218	-	465.00	-	0.00
34	510	0.14	127	127	218	-	465.00	-	0.00
35	525	0.15	136	136	218	-	465.00	-	0.00
36	540	0.16	144	144	218	-	465.00	-	0.00
37	555	0.18	161	161	218	-	465.00	-	0.00
38	570	0.19	170	170	218	-	465.00	-	0.00
39	585	0.20	178	178	218	-	465.00	-	0.00
40	600	0.21	187	187	218	-	465.00	-	0.00
41	615	0.14	127	127	218	-	465.00	-	0.00
42	630	0.14	127	127	218	-	465.00	-	0.00
43	645	0.19	170	170	218	-	465.00	-	0.00
44	660	0.19	170	170	218	-	465.00	-	0.00
45	675	0.18	161	161	218	-	465.00	-	0.00
46	690	0.18	161	161	218	-	465.00	-	0.00
47	705	0.16	144	144	218	-	465.00	-	0.00
48	720	0.17	153	153	218	-	465.00	-	0.00
49	735	0.45	406	406	218	188	465.01	188	0.00
50	750	0.57	516	704	218	487	465.03	487	0.01
51	765	0.79	711	1,198	218	980	465.06	980	0.02
52	780	0.91	821	1,802	218	1,584	465.10	1,584	0.04
53	795	1.41	1,270	2,854	218	2,637	465.16	2,637	0.06
54	810	1.44	1,295	3,931	218	3,714	465.23	3,714	0.09
55	825	0.43	386	4,099	218	3,882	465.24	3,882	0.09
56	840	0.45	409	4,291	218	4,073	465.25	4,073	0.09
57	855	0.86	772	4,846	218	4,628	465.28	4,628	0.11
58	870	0.79	711	5,339	218	5,121	465.31	5,121	0.12

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.82	734	5,855	218	5,637	465.34	5,637	0.13
60	900	0.75	671	6,308	218	6,090	465.37	6,090	0.14
61	915	0.68	609	6,699	218	6,481	465.40	6,481	0.15
62	930	0.61	546	7,027	218	6,809	465.42	6,809	0.16
63	945	0.25	228	7,037	218	6,819	465.42	6,819	0.16
64	960	0.28	249	7,068	218	6,850	465.42	6,850	0.16
65	975	0.04	34	6,884	218	6,666	465.41	6,666	0.15
66	990	0.04	34	6,700	218	6,482	465.40	6,482	0.15
67	1005	0.03	25	6,508	218	6,290	465.38	6,290	0.14
68	1020	0.03	25	6,316	218	6,098	465.37	6,098	0.14
69	1035	0.05	42	6,140	218	5,923	465.36	5,923	0.14
70	1050	0.05	42	5,965	218	5,747	465.35	5,747	0.13
71	1065	0.05	42	5,790	218	5,572	465.34	5,572	0.13
72	1080	0.04	34	5,606	218	5,388	465.33	5,388	0.12
73	1095	0.04	34	5,422	218	5,204	465.32	5,204	0.12
74	1110	0.04	34	5,238	218	5,020	465.31	5,020	0.12
75	1125	0.03	25	5,046	218	4,828	465.30	4,828	0.11
76	1140	0.02	17	4,845	218	4,627	465.28	4,627	0.11
77	1155	0.03	25	4,653	218	4,435	465.27	4,435	0.10
78	1170	0.04	34	4,469	218	4,251	465.26	4,251	0.10
79	1185	0.03	25	4,277	218	4,059	465.25	4,059	0.09
80	1200	0.02	17	4,076	218	3,858	465.24	3,858	0.09
81	1215	0.03	25	3,884	218	3,666	465.22	3,666	0.08
82	1230	0.03	25	3,691	218	3,474	465.21	3,474	0.08
83	1245	0.03	25	3,499	218	3,281	465.20	3,281	0.08
84	1260	0.02	17	3,298	218	3,081	465.19	3,081	0.07
85	1275	0.03	25	3,106	218	2,888	465.18	2,888	0.07
86	1290	0.02	17	2,905	218	2,687	465.16	2,687	0.06
87	1305	0.03	25	2,713	218	2,495	465.15	2,495	0.06
88	1320	0.02	17	2,512	218	2,294	465.14	2,294	0.05
89	1335	0.03	25	2,320	218	2,102	465.13	2,102	0.05
90	1350	0.02	17	2,119	218	1,901	465.12	1,901	0.04
91	1365	0.02	17	1,918	218	1,701	465.10	1,701	0.04
92	1380	0.02	17	1,718	218	1,500	465.09	1,500	0.03
93	1395	0.02	17	1,517	218	1,299	465.08	1,299	0.03
94	1410	0.02	17	1,316	218	1,098	465.07	1,098	0.03
95	1425	0.02	17	1,115	218	897	465.05	897	0.02
96	1440	0.02	17	914	218	697	465.04	697	0.02

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.250	1.00	1.04	1.36	10.250	1.00	1.36	2.23	10.250	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	1.04	SUM [9]	10.25	SUM [11]	1.36	SUM [13]	10.25	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.46	0.36
FLOOD VOLUME	(cu-ft)	17,326	17,301	13,560
	(acre-ft)	0.40	0.40	0.31
REQUIRED STORAGE	(cu-ft)	14,912	13,552	5,367
	(acre-ft)	0.34	0.31	0.12
PEAK FLOW	(cfs)	8.38	7.26	1.29
MAXIMUM WSEL	(ft)	465.94	465.86	465.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561
C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.21	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.21	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.21	0.12	0.01	0.14	0.00
4	20	0.33	1.5	0.187	0.21	0.17	0.02	0.19	0.00
5	25	0.42	1.5	0.187	0.21	0.17	0.02	0.19	0.00
6	30	0.50	1.8	0.225	0.21	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.21	0.17	0.02	0.19	0.00
8	40	0.67	1.8	0.225	0.21	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.21	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.21	0.17	0.02	0.19	0.00
11	55	0.92	1.6	0.200	0.21	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.21	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.21	0.25	0.07	0.71	141.78
14	70	1.17	2.2	0.275	0.21	0.25	0.07	0.71	141.78
15	75	1.25	2.2	0.275	0.21	0.25	0.07	0.71	141.78
16	80	1.33	2.0	0.250	0.21	0.22	0.04	0.45	65.03
17	85	1.42	2.6	0.324	0.21	0.29	0.12	1.22	295.29
18	90	1.50	2.7	0.337	0.21	0.30	0.13	1.34	333.66
19	95	1.58	2.4	0.300	0.21	0.27	0.09	0.96	218.54
20	100	1.67	2.7	0.337	0.21	0.30	0.13	1.34	333.66
21	105	1.75	3.3	0.412	0.21	0.37	0.21	2.11	563.92
22	110	1.83	3.1	0.387	0.21	0.35	0.18	1.86	487.17
23	115	1.92	2.9	0.362	0.21	0.33	0.16	1.60	410.42
24	120	2.00	3.0	0.374	0.21	0.34	0.17	1.73	448.79
25	125	2.08	3.1	0.387	0.21	0.35	0.18	1.86	487.17
26	130	2.17	4.2	0.524	0.21	0.47	0.32	3.26	909.30
27	135	2.25	5.0	0.624	0.21	0.56	0.42	4.29	1216.31
28	140	2.33	3.5	0.437	0.21	0.39	0.23	2.37	640.67
29	145	2.42	6.8	0.849	0.21	0.76	0.64	6.59	1907.08
30	150	2.50	7.3	0.911	0.21	0.82	0.71	7.23	2098.96
31	155	2.58	8.2	1.023	0.21	0.92	0.82	8.38	2444.34
32	160	2.67	5.9	0.736	0.21	0.66	0.53	5.44	1561.70
33	165	2.75	2.0	0.250	0.21	0.22	0.04	0.45	65.03
34	170	2.83	1.8	0.225	0.21	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.21	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.21	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17326.37
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14912.39
PEAK FLOW RATE (cfs)	8.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.21	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.21	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.21	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.21	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.21	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.21	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.21	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.21	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.21	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.21	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.21	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.21	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.21	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.21	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.21	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.21	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.21	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.21	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.21	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.21	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.21	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.21	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.21	0.13	0.01	0.15	0.00
25	125	2.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.21	0.13	0.01	0.15	0.00
27	135	2.25	0.9	0.147	0.21	0.13	0.01	0.15	0.00
28	140	2.33	0.9	0.147	0.21	0.13	0.01	0.15	0.00
29	145	2.42	0.9	0.147	0.21	0.13	0.01	0.15	0.00
30	150	2.50	0.9	0.147	0.21	0.13	0.01	0.15	0.00
31	155	2.58	0.9	0.147	0.21	0.13	0.01	0.15	0.00
32	160	2.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
33	165	2.75	1.0	0.163	0.21	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.21	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.21	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.21	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.21	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.21	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.21	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.21	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.21	0.18	0.02	0.20	0.00
42	210	3.50	1.3	0.212	0.21	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.21	0.21	0.02	0.23	0.09
44	220	3.67	1.4	0.228	0.21	0.21	0.02	0.23	0.09
45	225	3.75	1.5	0.245	0.21	0.22	0.04	0.40	50.27
46	230	3.83	1.5	0.245	0.21	0.22	0.04	0.40	50.27
47	235	3.92	1.6	0.261	0.21	0.24	0.06	0.57	100.46
48	240	4.00	1.6	0.261	0.21	0.24	0.06	0.57	100.46
49	245	4.08	1.7	0.277	0.21	0.25	0.07	0.73	150.64
50	250	4.17	1.8	0.294	0.21	0.26	0.09	0.90	200.82
51	255	4.25	1.9	0.310	0.21	0.28	0.10	1.07	251.01
52	260	4.33	2.0	0.326	0.21	0.29	0.12	1.24	301.19
53	265	4.42	2.1	0.343	0.21	0.31	0.14	1.40	351.38
54	270	4.50	2.1	0.343	0.21	0.31	0.14	1.40	351.38
55	275	4.58	2.2	0.359	0.21	0.32	0.15	1.57	401.56
56	280	4.67	2.3	0.375	0.21	0.34	0.17	1.74	451.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.21	0.35	0.19	1.91	501.93
58	290	4.83	2.4	0.392	0.21	0.35	0.19	1.91	501.93
59	295	4.92	2.5	0.408	0.21	0.37	0.20	2.07	552.11
60	300	5.00	2.6	0.424	0.21	0.38	0.22	2.24	602.30
61	305	5.08	3.1	0.506	0.21	0.46	0.30	3.08	853.22
62	310	5.17	3.6	0.588	0.21	0.53	0.38	3.91	1104.14
63	315	5.25	3.9	0.636	0.21	0.57	0.43	4.41	1254.69
64	320	5.33	4.2	0.685	0.21	0.62	0.48	4.92	1405.24
65	325	5.42	4.7	0.767	0.21	0.69	0.56	5.75	1656.16
66	330	5.50	5.6	0.914	0.21	0.82	0.71	7.26	2107.82
67	335	5.58	1.9	0.310	0.21	0.28	0.10	1.07	251.01
68	340	5.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
69	345	5.75	0.6	0.098	0.21	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.21	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.21	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.21	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.46
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17301.15
REQUIRED STORAGE (acft)	0.31
REQUIRED STORAGE (cuft)	13551.86
PEAK FLOW RATE (cfs)	7.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.018	0.363	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.359	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.355	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.351	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.347	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.343	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.338	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.334	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.330	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.326	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.322	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.318	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.314	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.310	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.307	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.303	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.299	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.295	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.291	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.288	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.284	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.280	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.276	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.273	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.269	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.266	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.262	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.258	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.255	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.252	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.248	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.245	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.241	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.238	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.235	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.231	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.228	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.225	0.161	0.018	0.18	0.00
39	585	9.75	2.1	0.187	0.222	0.169	0.019	0.19	0.00
40	600	10.00	2.2	0.196	0.218	0.177	0.020	0.20	0.00
41	615	10.25	1.5	0.134	0.215	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.212	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.209	0.161	0.018	0.18	0.00
44	660	11.00	2.0	0.178	0.206	0.161	0.018	0.18	0.00
45	675	11.25	1.9	0.169	0.203	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.200	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.197	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.194	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.191	0.201	0.032	0.33	84.85
50	750	12.50	2.6	0.232	0.188	0.209	0.044	0.45	193.54
51	765	12.75	2.8	0.250	0.185	0.225	0.064	0.66	384.21
52	780	13.00	2.9	0.259	0.183	0.233	0.076	0.78	492.27
53	795	13.25	3.4	0.303	0.180	0.273	0.123	1.27	929.17
54	810	13.50	3.4	0.303	0.177	0.273	0.126	1.29	954.32
55	825	13.75	2.3	0.205	0.174	0.185	0.031	0.31	73.98
56	840	14.00	2.3	0.205	0.172	0.185	0.033	0.34	98.48
57	855	14.25	2.7	0.241	0.169	0.217	0.072	0.73	451.79
58	870	14.50	2.6	0.232	0.167	0.209	0.065	0.67	393.33
59	885	14.75	2.6	0.232	0.164	0.209	0.068	0.70	416.82
60	900	15.00	2.5	0.223	0.162	0.201	0.061	0.63	357.68
61	915	15.25	2.4	0.214	0.159	0.193	0.055	0.56	298.20

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
62	930	15.50	2.3	0.205	0.157	0.185	0.049	0.50	238.37
63	945	15.75	1.9	0.169	0.154	0.153	0.015	0.16	0.00
64	960	16.00	1.9	0.169	0.152	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.150	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.145	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.143	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.141	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.139	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.137	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.133	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.131	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.129	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.127	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.125	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.122	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.117	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.114	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.113	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.109	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.108	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.107	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.106	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.104	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13560.19
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5367.00
PEAK FLOW (cfs)	1.29

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	50	50	70	-	465.00	-	0.00
2	10	0.17	50	50	70	-	465.00	-	0.00
3	15	0.14	42	42	70	-	465.00	-	0.00
4	20	0.19	58	58	70	-	465.00	-	0.00
5	25	0.19	58	58	70	-	465.00	-	0.00
6	30	0.19	58	58	70	-	465.00	-	0.00
7	35	0.19	58	58	70	-	465.00	-	0.00
8	40	0.19	58	58	70	-	465.00	-	0.00
9	45	0.19	58	58	70	-	465.00	-	0.00
10	50	0.19	58	58	70	-	465.00	-	0.00
11	55	0.20	61	61	70	-	465.00	-	0.00
12	60	0.19	58	58	70	-	465.00	-	0.00
13	65	0.71	212	212	70	142	465.01	142	0.00
14	70	0.71	212	353	70	284	465.02	284	0.01
15	75	0.71	212	495	70	425	465.03	425	0.01
16	80	0.45	135	560	70	490	465.03	490	0.01
17	85	1.22	365	855	70	786	465.05	786	0.02
18	90	1.34	403	1,189	70	1,119	465.07	1,119	0.03
19	95	0.96	288	1,408	70	1,338	465.08	1,338	0.03
20	100	1.34	403	1,741	70	1,672	465.11	1,672	0.04
21	105	2.11	634	2,305	70	2,235	465.14	2,235	0.05
22	110	1.86	557	2,792	70	2,723	465.17	2,723	0.06
23	115	1.60	480	3,203	70	3,133	465.20	3,133	0.07
24	120	1.73	519	3,652	70	3,582	465.23	3,582	0.08
25	125	1.86	557	4,139	70	4,069	465.26	4,069	0.09
26	130	3.26	979	5,048	70	4,978	465.32	4,978	0.11
27	135	4.29	1,286	6,264	70	6,195	465.39	6,195	0.14
28	140	2.37	710	6,905	70	6,835	465.43	6,835	0.16
29	145	6.59	1,977	8,812	70	8,742	465.55	8,742	0.20
30	150	7.23	2,169	10,911	70	10,841	465.69	10,841	0.25
31	155	8.38	2,514	13,355	70	13,286	465.84	13,286	0.30
32	160	5.44	1,631	14,917	70	14,847	465.94	14,847	0.34
33	165	0.45	135	14,982	70	14,912	465.94	14,912	0.34
34	170	0.19	58	14,970	70	14,901	465.94	14,901	0.34
35	175	0.19	58	14,959	70	14,889	465.94	14,889	0.34
36	180	0.08	23	14,912	70	14,842	465.94	14,842	0.34

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	25	25	70	-	465.00	-	0.00
2	10	0.10	30	30	70	-	465.00	-	0.00
3	15	0.10	30	30	70	-	465.00	-	0.00
4	20	0.10	30	30	70	-	465.00	-	0.00
5	25	0.10	30	30	70	-	465.00	-	0.00
6	30	0.12	35	35	70	-	465.00	-	0.00
7	35	0.12	35	35	70	-	465.00	-	0.00
8	40	0.12	35	35	70	-	465.00	-	0.00
9	45	0.12	35	35	70	-	465.00	-	0.00
10	50	0.12	35	35	70	-	465.00	-	0.00
11	55	0.12	35	35	70	-	465.00	-	0.00
12	60	0.13	40	40	70	-	465.00	-	0.00
13	65	0.13	40	40	70	-	465.00	-	0.00
14	70	0.13	40	40	70	-	465.00	-	0.00
15	75	0.13	40	40	70	-	465.00	-	0.00
16	80	0.13	40	40	70	-	465.00	-	0.00
17	85	0.13	40	40	70	-	465.00	-	0.00
18	90	0.13	40	40	70	-	465.00	-	0.00
19	95	0.13	40	40	70	-	465.00	-	0.00
20	100	0.13	40	40	70	-	465.00	-	0.00
21	105	0.13	40	40	70	-	465.00	-	0.00
22	110	0.13	40	40	70	-	465.00	-	0.00
23	115	0.13	40	40	70	-	465.00	-	0.00
24	120	0.15	45	45	70	-	465.00	-	0.00
25	125	0.13	40	40	70	-	465.00	-	0.00
26	130	0.15	45	45	70	-	465.00	-	0.00
27	135	0.15	45	45	70	-	465.00	-	0.00
28	140	0.15	45	45	70	-	465.00	-	0.00
29	145	0.15	45	45	70	-	465.00	-	0.00
30	150	0.15	45	45	70	-	465.00	-	0.00
31	155	0.15	45	45	70	-	465.00	-	0.00
32	160	0.15	45	45	70	-	465.00	-	0.00
33	165	0.17	50	50	70	-	465.00	-	0.00
34	170	0.17	50	50	70	-	465.00	-	0.00
35	175	0.17	50	50	70	-	465.00	-	0.00
36	180	0.17	50	50	70	-	465.00	-	0.00
37	185	0.17	50	50	70	-	465.00	-	0.00
38	190	0.18	55	55	70	-	465.00	-	0.00
39	195	0.18	55	55	70	-	465.00	-	0.00
40	200	0.18	55	55	70	-	465.00	-	0.00
41	205	0.20	60	60	70	-	465.00	-	0.00
42	210	0.07	20	20	70	-	465.00	-	0.00
43	215	0.23	70	70	70	0	465.00	0	0.00
44	220	0.23	70	70	70	0	465.00	0	0.00
45	225	0.40	120	120	70	50	465.00	50	0.00
46	230	0.40	120	171	70	101	465.01	101	0.00
47	235	0.57	170	271	70	201	465.01	201	0.00
48	240	0.57	170	371	70	302	465.02	302	0.01
49	245	0.73	220	522	70	452	465.03	452	0.01
50	250	0.90	271	723	70	653	465.04	653	0.01
51	255	1.07	321	974	70	904	465.06	904	0.02
52	260	1.24	371	1,275	70	1,205	465.08	1,205	0.03
53	265	1.40	421	1,626	70	1,557	465.10	1,557	0.04
54	270	1.40	421	1,978	70	1,908	465.12	1,908	0.04
55	275	1.57	471	2,379	70	2,310	465.15	2,310	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.74	522	2,831	70	2,761	465.17	2,761	0.06
57	285	1.91	572	3,333	70	3,263	465.21	3,263	0.07
58	290	1.91	572	3,835	70	3,765	465.24	3,765	0.09
59	295	2.07	622	4,387	70	4,317	465.27	4,317	0.10
60	300	2.24	672	4,989	70	4,920	465.31	4,920	0.11
61	305	3.08	923	5,843	70	5,773	465.37	5,773	0.13
62	310	3.91	1,174	6,947	70	6,877	465.44	6,877	0.16
63	315	4.41	1,324	8,201	70	8,132	465.51	8,132	0.19
64	320	4.92	1,475	9,607	70	9,537	465.60	9,537	0.22
65	325	5.75	1,726	11,263	70	11,193	465.71	11,193	0.26
66	330	7.26	2,178	13,371	70	13,301	465.84	13,301	0.31
67	335	1.07	321	13,622	70	13,552	465.86	13,552	0.31
68	340	0.15	45	13,597	70	13,527	465.86	13,527	0.31
69	345	0.10	30	13,557	70	13,488	465.85	13,488	0.31
70	350	0.08	25	13,513	70	13,443	465.85	13,443	0.31
71	355	0.05	15	13,458	70	13,388	465.85	13,388	0.31
72	360	0.03	10	13,398	70	13,328	465.84	13,328	0.31

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	209	-	465.00	-	0.00
2	30	0.03	25	25	209	-	465.00	-	0.00
3	45	0.03	25	25	209	-	465.00	-	0.00
4	60	0.04	33	33	209	-	465.00	-	0.00
5	75	0.03	25	25	209	-	465.00	-	0.00
6	90	0.03	25	25	209	-	465.00	-	0.00
7	105	0.03	25	25	209	-	465.00	-	0.00
8	120	0.04	33	33	209	-	465.00	-	0.00
9	135	0.04	33	33	209	-	465.00	-	0.00
10	150	0.04	33	33	209	-	465.00	-	0.00
11	165	0.05	41	41	209	-	465.00	-	0.00
12	180	0.05	41	41	209	-	465.00	-	0.00
13	195	0.05	41	41	209	-	465.00	-	0.00
14	210	0.05	41	41	209	-	465.00	-	0.00
15	225	0.05	41	41	209	-	465.00	-	0.00
16	240	0.05	49	49	209	-	465.00	-	0.00
17	255	0.05	49	49	209	-	465.00	-	0.00
18	270	0.06	58	58	209	-	465.00	-	0.00
19	285	0.06	58	58	209	-	465.00	-	0.00
20	300	0.07	66	66	209	-	465.00	-	0.00
21	315	0.05	49	49	209	-	465.00	-	0.00
22	330	0.06	58	58	209	-	465.00	-	0.00
23	345	0.07	66	66	209	-	465.00	-	0.00
24	360	0.07	66	66	209	-	465.00	-	0.00
25	375	0.08	74	74	209	-	465.00	-	0.00
26	390	0.08	74	74	209	-	465.00	-	0.00
27	405	0.09	82	82	209	-	465.00	-	0.00
28	420	0.09	82	82	209	-	465.00	-	0.00
29	435	0.09	82	82	209	-	465.00	-	0.00
30	450	0.10	91	91	209	-	465.00	-	0.00
31	465	0.11	99	99	209	-	465.00	-	0.00
32	480	0.12	107	107	209	-	465.00	-	0.00
33	495	0.14	123	123	209	-	465.00	-	0.00
34	510	0.14	123	123	209	-	465.00	-	0.00
35	525	0.15	132	132	209	-	465.00	-	0.00
36	540	0.16	140	140	209	-	465.00	-	0.00
37	555	0.17	156	156	209	-	465.00	-	0.00
38	570	0.18	165	165	209	-	465.00	-	0.00
39	585	0.19	173	173	209	-	465.00	-	0.00
40	600	0.20	181	181	209	-	465.00	-	0.00
41	615	0.14	123	123	209	-	465.00	-	0.00
42	630	0.14	123	123	209	-	465.00	-	0.00
43	645	0.18	165	165	209	-	465.00	-	0.00
44	660	0.18	165	165	209	-	465.00	-	0.00
45	675	0.17	156	156	209	-	465.00	-	0.00
46	690	0.17	156	156	209	-	465.00	-	0.00
47	705	0.16	140	140	209	-	465.00	-	0.00
48	720	0.16	148	148	209	-	465.00	-	0.00
49	735	0.33	294	294	209	85	465.01	85	0.00
50	750	0.45	403	488	209	278	465.02	278	0.01
51	765	0.66	594	872	209	663	465.04	663	0.02
52	780	0.78	702	1,364	209	1,155	465.07	1,155	0.03
53	795	1.27	1,139	2,293	209	2,084	465.13	2,084	0.05
54	810	1.29	1,164	3,248	209	3,038	465.19	3,038	0.07
55	825	0.31	283	3,322	209	3,112	465.20	3,112	0.07
56	840	0.34	308	3,420	209	3,211	465.20	3,211	0.07
57	855	0.73	661	3,872	209	3,663	465.23	3,663	0.08
58	870	0.67	603	4,265	209	4,056	465.26	4,056	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.70	626	4,682	209	4,473	465.28	4,473	0.10
60	900	0.63	567	5,040	209	4,830	465.31	4,830	0.11
61	915	0.56	508	5,338	209	5,129	465.32	5,129	0.12
62	930	0.50	448	5,576	209	5,367	465.34	5,367	0.12
63	945	0.16	141	5,508	209	5,298	465.34	5,298	0.12
64	960	0.18	162	5,461	209	5,251	465.33	5,251	0.12
65	975	0.04	33	5,284	209	5,075	465.32	5,075	0.12
66	990	0.04	33	5,108	209	4,898	465.31	4,898	0.11
67	1005	0.03	25	4,923	209	4,714	465.30	4,714	0.11
68	1020	0.03	25	4,738	209	4,529	465.29	4,529	0.10
69	1035	0.05	41	4,570	209	4,361	465.28	4,361	0.10
70	1050	0.05	41	4,402	209	4,193	465.27	4,193	0.10
71	1065	0.05	41	4,234	209	4,024	465.25	4,024	0.09
72	1080	0.04	33	4,057	209	3,848	465.24	3,848	0.09
73	1095	0.04	33	3,881	209	3,671	465.23	3,671	0.08
74	1110	0.04	33	3,704	209	3,495	465.22	3,495	0.08
75	1125	0.03	25	3,520	209	3,310	465.21	3,310	0.08
76	1140	0.02	16	3,327	209	3,117	465.20	3,117	0.07
77	1155	0.03	25	3,142	209	2,933	465.19	2,933	0.07
78	1170	0.04	33	2,966	209	2,756	465.17	2,756	0.06
79	1185	0.03	25	2,781	209	2,572	465.16	2,572	0.06
80	1200	0.02	16	2,588	209	2,379	465.15	2,379	0.05
81	1215	0.03	25	2,403	209	2,194	465.14	2,194	0.05
82	1230	0.03	25	2,219	209	2,009	465.13	2,009	0.05
83	1245	0.03	25	2,034	209	1,825	465.12	1,825	0.04
84	1260	0.02	16	1,841	209	1,632	465.10	1,632	0.04
85	1275	0.03	25	1,656	209	1,447	465.09	1,447	0.03
86	1290	0.02	16	1,463	209	1,254	465.08	1,254	0.03
87	1305	0.03	25	1,279	209	1,069	465.07	1,069	0.02
88	1320	0.02	16	1,086	209	876	465.06	876	0.02
89	1335	0.03	25	901	209	692	465.04	692	0.02
90	1350	0.02	16	708	209	499	465.03	499	0.01
91	1365	0.02	16	515	209	306	465.02	306	0.01
92	1380	0.02	16	322	209	113	465.01	113	0.00
93	1395	0.02	16	129	209	-	465.00	-	0.00
94	1410	0.02	16	16	209	-	465.00	-	0.00
95	1425	0.02	16	16	209	-	465.00	-	0.00
96	1440	0.02	16	16	209	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.790	1.00	1.04	1.36	9.790	1.00	1.36	2.23	9.790	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	1.04	SUM [9]	9.79	SUM [11]	1.36	SUM [13]	9.79	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.47	0.37
FLOOD VOLUME	(cu-ft)	16,627	16,600	13,067
	(acre-ft)	0.38	0.38	0.30
REQUIRED STORAGE	(cu-ft)	14,362	13,085	5,344
	(acre-ft)	0.33	0.30	0.12
PEAK FLOW	(cfs)	8.01	6.94	1.24
MAXIMUM WSEL	(ft)	465.49	465.40	464.87

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603
C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.20	0.15	0.02	0.16	0.00
2	10	0.17	1.3	0.162	0.20	0.15	0.02	0.16	0.00
3	15	0.25	1.1	0.137	0.20	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.20	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.20	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.20	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.20	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.20	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.20	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.20	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.20	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.20	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.20	0.25	0.07	0.68	141.06
14	70	1.17	2.2	0.275	0.20	0.25	0.07	0.68	141.06
15	75	1.25	2.2	0.275	0.20	0.25	0.07	0.68	141.06
16	80	1.33	2.0	0.250	0.20	0.22	0.04	0.44	67.75
17	85	1.42	2.6	0.324	0.20	0.29	0.12	1.17	287.67
18	90	1.50	2.7	0.337	0.20	0.30	0.13	1.29	324.33
19	95	1.58	2.4	0.300	0.20	0.27	0.09	0.93	214.37
20	100	1.67	2.7	0.337	0.20	0.30	0.13	1.29	324.33
21	105	1.75	3.3	0.412	0.20	0.37	0.21	2.03	544.25
22	110	1.83	3.1	0.387	0.20	0.35	0.18	1.78	470.94
23	115	1.92	2.9	0.362	0.20	0.33	0.16	1.54	397.63
24	120	2.00	3.0	0.374	0.20	0.34	0.17	1.66	434.29
25	125	2.08	3.1	0.387	0.20	0.35	0.18	1.78	470.94
26	130	2.17	4.2	0.524	0.20	0.47	0.32	3.13	874.13
27	135	2.25	5.0	0.624	0.20	0.56	0.42	4.10	1167.36
28	140	2.33	3.5	0.437	0.20	0.39	0.23	2.27	617.56
29	145	2.42	6.8	0.849	0.20	0.76	0.64	6.30	1827.13
30	150	2.50	7.3	0.911	0.20	0.82	0.71	6.91	2010.40
31	155	2.58	8.2	1.023	0.20	0.92	0.82	8.01	2340.28
32	160	2.67	5.9	0.736	0.20	0.66	0.53	5.20	1497.25
33	165	2.75	2.0	0.250	0.20	0.22	0.04	0.44	67.75
34	170	2.83	1.8	0.225	0.20	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.20	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.20	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16626.67
REQUIRED STORAGE (acft)	0.33
REQUIRED STORAGE (cuft)	14361.53
PEAK FLOW RATE (cfs)	8.01

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.20	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.20	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.20	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.20	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.20	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.20	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.20	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.20	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.20	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.20	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.20	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.20	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.20	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.20	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.20	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.20	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.20	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.20	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.20	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.20	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.20	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.20	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.20	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.20	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.20	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.20	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.20	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.20	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.20	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.20	0.15	0.02	0.16	0.00
34	170	2.83	1.0	0.163	0.20	0.15	0.02	0.16	0.00
35	175	2.92	1.0	0.163	0.20	0.15	0.02	0.16	0.00
36	180	3.00	1.0	0.163	0.20	0.15	0.02	0.16	0.00
37	185	3.08	1.0	0.163	0.20	0.15	0.02	0.16	0.00
38	190	3.17	1.1	0.180	0.20	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.20	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.20	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.20	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.20	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.20	0.21	0.02	0.23	5.72
44	220	3.67	1.4	0.228	0.20	0.21	0.02	0.23	5.72
45	225	3.75	1.5	0.245	0.20	0.22	0.04	0.39	53.65
46	230	3.83	1.5	0.245	0.20	0.22	0.04	0.39	53.65
47	235	3.92	1.6	0.261	0.20	0.24	0.06	0.55	101.58
48	240	4.00	1.6	0.261	0.20	0.24	0.06	0.55	101.58
49	245	4.08	1.7	0.277	0.20	0.25	0.07	0.71	149.52
50	250	4.17	1.8	0.294	0.20	0.26	0.09	0.87	197.45
51	255	4.25	1.9	0.310	0.20	0.28	0.11	1.03	245.38
52	260	4.33	2.0	0.326	0.20	0.29	0.12	1.19	293.31
53	265	4.42	2.1	0.343	0.20	0.31	0.14	1.35	341.24
54	270	4.50	2.1	0.343	0.20	0.31	0.14	1.35	341.24
55	275	4.58	2.2	0.359	0.20	0.32	0.15	1.51	389.18
56	280	4.67	2.3	0.375	0.20	0.34	0.17	1.67	437.11

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.20	0.35	0.19	1.83	485.04
58	290	4.83	2.4	0.392	0.20	0.35	0.19	1.83	485.04
59	295	4.92	2.5	0.408	0.20	0.37	0.20	1.99	532.97
60	300	5.00	2.6	0.424	0.20	0.38	0.22	2.15	580.90
61	305	5.08	3.1	0.506	0.20	0.46	0.30	2.95	820.56
62	310	5.17	3.6	0.588	0.20	0.53	0.38	3.75	1060.22
63	315	5.25	3.9	0.636	0.20	0.57	0.43	4.23	1204.02
64	320	5.33	4.2	0.685	0.20	0.62	0.48	4.71	1347.81
65	325	5.42	4.7	0.767	0.20	0.69	0.56	5.50	1587.47
66	330	5.50	5.6	0.914	0.20	0.82	0.71	6.94	2018.86
67	335	5.58	1.9	0.310	0.20	0.28	0.11	1.03	245.38
68	340	5.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.20	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.20	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.20	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.20	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16599.70
REQUIRED STORAGE (acft)	0.30
REQUIRED STORAGE (cuft)	13084.61
PEAK FLOW RATE (cfs)	6.94

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.018	0.362	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.357	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.353	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.349	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.345	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.341	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.337	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.333	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.329	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.325	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.321	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.317	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.313	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.309	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.305	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.301	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.297	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.294	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.290	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.286	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.282	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.279	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.275	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.272	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.268	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.264	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.261	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.257	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.254	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.250	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.247	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.243	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.240	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.237	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.233	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.230	0.136	0.015	0.15	0.00
37	555	9.25	1.9	0.169	0.227	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.224	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.220	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.217	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.214	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.211	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.208	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.205	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.202	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.199	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.196	0.136	0.015	0.15	0.00
48	720	12.00	1.8	0.161	0.193	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.190	0.201	0.033	0.32	97.34
50	750	12.50	2.6	0.232	0.187	0.209	0.045	0.44	201.03
51	765	12.75	2.8	0.250	0.185	0.225	0.065	0.64	383.03
52	780	13.00	2.9	0.259	0.182	0.233	0.077	0.75	486.13
53	795	13.25	3.4	0.303	0.179	0.273	0.124	1.22	903.31
54	810	13.50	3.4	0.303	0.176	0.273	0.127	1.24	927.21
55	825	13.75	2.3	0.205	0.174	0.185	0.032	0.31	86.27
56	840	14.00	2.3	0.205	0.171	0.185	0.034	0.33	109.55
57	855	14.25	2.7	0.241	0.168	0.217	0.072	0.71	446.90
58	870	14.50	2.6	0.232	0.166	0.209	0.066	0.65	390.96
59	885	14.75	2.6	0.232	0.163	0.209	0.069	0.67	413.29
60	900	15.00	2.5	0.223	0.161	0.201	0.062	0.61	356.70
61	915	15.25	2.4	0.214	0.158	0.193	0.056	0.55	299.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	in/hr Max	in/hr Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.156	0.185	0.049	0.48	242.53
63	945	15.75	1.9	0.169	0.153	0.153	0.016	0.16	0.00
64	960	16.00	1.9	0.169	0.151	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.149	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.144	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.142	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.140	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.138	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.136	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.132	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.130	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.128	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.126	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.124	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.119	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.116	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.107	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.106	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.105	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.103	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.102	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.37
FLOOD VOLUME (acft)	0.30
FLOOD VOLUME (cuft)	13066.60
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5344.02
PEAK FLOW (cfs)	1.24

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	48	48	64	-	464.50	-	0.00
2	10	0.16	48	48	64	-	464.50	-	0.00
3	15	0.13	40	40	64	-	464.50	-	0.00
4	20	0.18	55	55	64	-	464.50	-	0.00
5	25	0.18	55	55	64	-	464.50	-	0.00
6	30	0.19	58	58	64	-	464.50	-	0.00
7	35	0.18	55	55	64	-	464.50	-	0.00
8	40	0.19	58	58	64	-	464.50	-	0.00
9	45	0.19	58	58	64	-	464.50	-	0.00
10	50	0.18	55	55	64	-	464.50	-	0.00
11	55	0.20	59	59	64	-	464.50	-	0.00
12	60	0.19	58	58	64	-	464.50	-	0.00
13	65	0.68	205	205	64	141	464.51	141	0.00
14	70	0.68	205	346	64	282	464.52	282	0.01
15	75	0.68	205	487	64	423	464.53	423	0.01
16	80	0.44	132	555	64	491	464.53	491	0.01
17	85	1.17	352	842	64	779	464.55	779	0.02
18	90	1.29	388	1,167	64	1,103	464.58	1,103	0.03
19	95	0.93	278	1,381	64	1,317	464.59	1,317	0.03
20	100	1.29	388	1,705	64	1,642	464.61	1,642	0.04
21	105	2.03	608	2,250	64	2,186	464.65	2,186	0.05
22	110	1.78	535	2,721	64	2,657	464.68	2,657	0.06
23	115	1.54	462	3,118	64	3,054	464.71	3,054	0.07
24	120	1.66	498	3,553	64	3,489	464.74	3,489	0.08
25	125	1.78	535	4,024	64	3,960	464.77	3,960	0.09
26	130	3.13	938	4,898	64	4,834	464.83	4,834	0.11
27	135	4.10	1,231	6,065	64	6,001	464.91	6,001	0.14
28	140	2.27	681	6,683	64	6,619	464.96	6,619	0.15
29	145	6.30	1,891	8,510	64	8,446	465.08	8,446	0.19
30	150	6.91	2,074	10,520	64	10,456	465.22	10,456	0.24
31	155	8.01	2,404	12,860	64	12,797	465.38	12,797	0.29
32	160	5.20	1,561	14,358	64	14,294	465.49	14,294	0.33
33	165	0.44	132	14,425	64	14,362	465.49	14,362	0.33
34	170	0.19	58	14,420	64	14,356	465.49	14,356	0.33
35	175	0.19	58	14,414	64	14,350	465.49	14,350	0.33
36	180	0.07	22	14,372	64	14,309	465.49	14,309	0.33

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	24	24	64	-	464.50	-	0.00
2	10	0.10	29	29	64	-	464.50	-	0.00
3	15	0.10	29	29	64	-	464.50	-	0.00
4	20	0.10	29	29	64	-	464.50	-	0.00
5	25	0.10	29	29	64	-	464.50	-	0.00
6	30	0.11	34	34	64	-	464.50	-	0.00
7	35	0.11	34	34	64	-	464.50	-	0.00
8	40	0.11	34	34	64	-	464.50	-	0.00
9	45	0.11	34	34	64	-	464.50	-	0.00
10	50	0.11	34	34	64	-	464.50	-	0.00
11	55	0.11	34	34	64	-	464.50	-	0.00
12	60	0.13	38	38	64	-	464.50	-	0.00
13	65	0.13	38	38	64	-	464.50	-	0.00
14	70	0.13	38	38	64	-	464.50	-	0.00
15	75	0.13	38	38	64	-	464.50	-	0.00
16	80	0.13	38	38	64	-	464.50	-	0.00
17	85	0.13	38	38	64	-	464.50	-	0.00
18	90	0.13	38	38	64	-	464.50	-	0.00
19	95	0.13	38	38	64	-	464.50	-	0.00
20	100	0.13	38	38	64	-	464.50	-	0.00
21	105	0.13	38	38	64	-	464.50	-	0.00
22	110	0.13	38	38	64	-	464.50	-	0.00
23	115	0.13	38	38	64	-	464.50	-	0.00
24	120	0.14	43	43	64	-	464.50	-	0.00
25	125	0.13	38	38	64	-	464.50	-	0.00
26	130	0.14	43	43	64	-	464.50	-	0.00
27	135	0.14	43	43	64	-	464.50	-	0.00
28	140	0.14	43	43	64	-	464.50	-	0.00
29	145	0.14	43	43	64	-	464.50	-	0.00
30	150	0.14	43	43	64	-	464.50	-	0.00
31	155	0.14	43	43	64	-	464.50	-	0.00
32	160	0.14	43	43	64	-	464.50	-	0.00
33	165	0.16	48	48	64	-	464.50	-	0.00
34	170	0.16	48	48	64	-	464.50	-	0.00
35	175	0.16	48	48	64	-	464.50	-	0.00
36	180	0.16	48	48	64	-	464.50	-	0.00
37	185	0.16	48	48	64	-	464.50	-	0.00
38	190	0.18	53	53	64	-	464.50	-	0.00
39	195	0.18	53	53	64	-	464.50	-	0.00
40	200	0.18	53	53	64	-	464.50	-	0.00
41	205	0.19	58	58	64	-	464.50	-	0.00
42	210	0.07	22	22	64	-	464.50	-	0.00
43	215	0.23	70	70	64	6	464.50	6	0.00
44	220	0.23	70	75	64	11	464.50	11	0.00
45	225	0.39	118	129	64	65	464.50	65	0.00
46	230	0.39	118	183	64	119	464.51	119	0.00
47	235	0.55	165	284	64	220	464.52	220	0.01
48	240	0.55	165	386	64	322	464.52	322	0.01
49	245	0.71	213	535	64	471	464.53	471	0.01
50	250	0.87	261	733	64	669	464.55	669	0.02
51	255	1.03	309	978	64	914	464.56	914	0.02
52	260	1.19	357	1,271	64	1,208	464.58	1,208	0.03
53	265	1.35	405	1,613	64	1,549	464.61	1,549	0.04
54	270	1.35	405	1,954	64	1,890	464.63	1,890	0.04
55	275	1.51	453	2,343	64	2,279	464.66	2,279	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.67	501	2,780	64	2,716	464.69	2,716	0.06
57	285	1.83	549	3,265	64	3,201	464.72	3,201	0.07
58	290	1.83	549	3,750	64	3,686	464.75	3,686	0.08
59	295	1.99	597	4,283	64	4,219	464.79	4,219	0.10
60	300	2.15	645	4,864	64	4,800	464.83	4,800	0.11
61	305	2.95	884	5,685	64	5,621	464.89	5,621	0.13
62	310	3.75	1,124	6,745	64	6,681	464.96	6,681	0.15
63	315	4.23	1,268	7,949	64	7,885	465.05	7,885	0.18
64	320	4.71	1,412	9,297	64	9,233	465.14	9,233	0.21
65	325	5.50	1,651	10,884	64	10,820	465.25	10,820	0.25
66	330	6.94	2,083	12,903	64	12,839	465.39	12,839	0.29
67	335	1.03	309	13,148	64	13,085	465.40	13,085	0.30
68	340	0.14	43	13,128	64	13,064	465.40	13,064	0.30
69	345	0.10	29	13,093	64	13,029	465.40	13,029	0.30
70	350	0.08	24	13,053	64	12,989	465.40	12,989	0.30
71	355	0.05	14	13,003	64	12,939	465.39	12,939	0.30
72	360	0.03	10	12,949	64	12,885	465.39	12,885	0.30

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	192	-	464.50	-	0.00
2	30	0.03	24	24	192	-	464.50	-	0.00
3	45	0.03	24	24	192	-	464.50	-	0.00
4	60	0.03	31	31	192	-	464.50	-	0.00
5	75	0.03	24	24	192	-	464.50	-	0.00
6	90	0.03	24	24	192	-	464.50	-	0.00
7	105	0.03	24	24	192	-	464.50	-	0.00
8	120	0.03	31	31	192	-	464.50	-	0.00
9	135	0.03	31	31	192	-	464.50	-	0.00
10	150	0.03	31	31	192	-	464.50	-	0.00
11	165	0.04	39	39	192	-	464.50	-	0.00
12	180	0.04	39	39	192	-	464.50	-	0.00
13	195	0.04	39	39	192	-	464.50	-	0.00
14	210	0.04	39	39	192	-	464.50	-	0.00
15	225	0.04	39	39	192	-	464.50	-	0.00
16	240	0.05	47	47	192	-	464.50	-	0.00
17	255	0.05	47	47	192	-	464.50	-	0.00
18	270	0.06	55	55	192	-	464.50	-	0.00
19	285	0.06	55	55	192	-	464.50	-	0.00
20	300	0.07	63	63	192	-	464.50	-	0.00
21	315	0.05	47	47	192	-	464.50	-	0.00
22	330	0.06	55	55	192	-	464.50	-	0.00
23	345	0.07	63	63	192	-	464.50	-	0.00
24	360	0.07	63	63	192	-	464.50	-	0.00
25	375	0.08	71	71	192	-	464.50	-	0.00
26	390	0.08	71	71	192	-	464.50	-	0.00
27	405	0.09	79	79	192	-	464.50	-	0.00
28	420	0.09	79	79	192	-	464.50	-	0.00
29	435	0.09	79	79	192	-	464.50	-	0.00
30	450	0.10	86	86	192	-	464.50	-	0.00
31	465	0.10	94	94	192	-	464.50	-	0.00
32	480	0.11	102	102	192	-	464.50	-	0.00
33	495	0.13	118	118	192	-	464.50	-	0.00
34	510	0.13	118	118	192	-	464.50	-	0.00
35	525	0.14	126	126	192	-	464.50	-	0.00
36	540	0.15	134	134	192	-	464.50	-	0.00
37	555	0.17	149	149	192	-	464.50	-	0.00
38	570	0.17	157	157	192	-	464.50	-	0.00
39	585	0.18	165	165	192	-	464.50	-	0.00
40	600	0.19	173	173	192	-	464.50	-	0.00
41	615	0.13	118	118	192	-	464.50	-	0.00
42	630	0.13	118	118	192	-	464.50	-	0.00
43	645	0.17	157	157	192	-	464.50	-	0.00
44	660	0.17	157	157	192	-	464.50	-	0.00
45	675	0.17	149	149	192	-	464.50	-	0.00
46	690	0.17	149	149	192	-	464.50	-	0.00
47	705	0.15	134	134	192	-	464.50	-	0.00
48	720	0.16	141	141	192	-	464.50	-	0.00
49	735	0.32	289	289	192	97	464.51	97	0.00
50	750	0.44	393	490	192	298	464.52	298	0.01
51	765	0.64	575	873	192	681	464.55	681	0.02
52	780	0.75	678	1,359	192	1,168	464.58	1,168	0.03
53	795	1.22	1,095	2,262	192	2,071	464.64	2,071	0.05
54	810	1.24	1,119	3,190	192	2,998	464.71	2,998	0.07
55	825	0.31	278	3,276	192	3,084	464.71	3,084	0.07
56	840	0.33	301	3,386	192	3,194	464.72	3,194	0.07
57	855	0.71	639	3,832	192	3,641	464.75	3,641	0.08
58	870	0.65	583	4,223	192	4,032	464.78	4,032	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.67	605	4,637	192	4,445	464.81	4,445	0.10
60	900	0.61	548	4,993	192	4,802	464.83	4,802	0.11
61	915	0.55	491	5,293	192	5,101	464.85	5,101	0.12
62	930	0.48	434	5,536	192	5,344	464.87	5,344	0.12
63	945	0.16	141	5,485	192	5,293	464.87	5,293	0.12
64	960	0.18	161	5,455	192	5,263	464.86	5,263	0.12
65	975	0.03	31	5,294	192	5,103	464.85	5,103	0.12
66	990	0.03	31	5,134	192	4,943	464.84	4,943	0.11
67	1005	0.03	24	4,966	192	4,775	464.83	4,775	0.11
68	1020	0.03	24	4,798	192	4,606	464.82	4,606	0.11
69	1035	0.04	39	4,646	192	4,454	464.81	4,454	0.10
70	1050	0.04	39	4,493	192	4,302	464.80	4,302	0.10
71	1065	0.04	39	4,341	192	4,149	464.79	4,149	0.10
72	1080	0.03	31	4,181	192	3,989	464.78	3,989	0.09
73	1095	0.03	31	4,021	192	3,829	464.76	3,829	0.09
74	1110	0.03	31	3,860	192	3,669	464.75	3,669	0.08
75	1125	0.03	24	3,692	192	3,501	464.74	3,501	0.08
76	1140	0.02	16	3,516	192	3,325	464.73	3,325	0.08
77	1155	0.03	24	3,348	192	3,157	464.72	3,157	0.07
78	1170	0.03	31	3,188	192	2,996	464.71	2,996	0.07
79	1185	0.03	24	3,020	192	2,828	464.70	2,828	0.06
80	1200	0.02	16	2,844	192	2,652	464.68	2,652	0.06
81	1215	0.03	24	2,676	192	2,484	464.67	2,484	0.06
82	1230	0.03	24	2,508	192	2,316	464.66	2,316	0.05
83	1245	0.03	24	2,340	192	2,148	464.65	2,148	0.05
84	1260	0.02	16	2,164	192	1,972	464.64	1,972	0.05
85	1275	0.03	24	1,996	192	1,804	464.62	1,804	0.04
86	1290	0.02	16	1,820	192	1,628	464.61	1,628	0.04
87	1305	0.03	24	1,652	192	1,460	464.60	1,460	0.03
88	1320	0.02	16	1,476	192	1,284	464.59	1,284	0.03
89	1335	0.03	24	1,308	192	1,116	464.58	1,116	0.03
90	1350	0.02	16	1,132	192	940	464.57	940	0.02
91	1365	0.02	16	956	192	764	464.55	764	0.02
92	1380	0.02	16	780	192	588	464.54	588	0.01
93	1395	0.02	16	604	192	413	464.53	413	0.01
94	1410	0.02	16	428	192	237	464.52	237	0.01
95	1425	0.02	16	252	192	61	464.50	61	0.00
96	1440	0.02	16	76	192	-	464.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.490	1.00	1.04	1.36	9.490	1.00	1.36	2.23	9.490	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	1.04	SUM [9]	9.49	SUM [11]	1.36	SUM [13]	9.49	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.36	0.35	0.22
FLOOD VOLUME	(cu-ft)	12,335	12,150	7,524
	(acre-ft)	0.28	0.28	0.17
REQUIRED STORAGE	(cu-ft)	9,965	8,400	646
	(acre-ft)	0.23	0.19	0.01
PEAK FLOW	(cfs)	7.12	6.08	0.65
MAXIMUM WSEL	(ft)	464.04	463.95	463.53

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767
C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.04		
CONSTANT LOSS RATE-in/hr	0.27		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.27	0.15	0.02	0.15	0.00
2	10	0.17	1.3	0.162	0.27	0.15	0.02	0.15	0.00
3	15	0.25	1.1	0.137	0.27	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.27	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.27	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.27	0.20	0.02	0.21	0.00
7	35	0.58	1.5	0.187	0.27	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.27	0.20	0.02	0.21	0.00
9	45	0.75	1.8	0.225	0.27	0.20	0.02	0.21	0.00
10	50	0.83	1.5	0.187	0.27	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.27	0.18	0.02	0.19	0.00
12	60	1.00	1.8	0.225	0.27	0.20	0.02	0.21	0.00
13	65	1.08	2.2	0.275	0.27	0.25	0.00	0.02	0.00
14	70	1.17	2.2	0.275	0.27	0.25	0.00	0.02	0.00
15	75	1.25	2.2	0.275	0.27	0.25	0.00	0.02	0.00
16	80	1.33	2.0	0.250	0.27	0.22	0.02	0.24	0.00
17	85	1.42	2.6	0.324	0.27	0.29	0.05	0.49	65.03
18	90	1.50	2.7	0.337	0.27	0.30	0.06	0.61	100.56
19	95	1.58	2.4	0.300	0.27	0.27	0.03	0.25	0.00
20	100	1.67	2.7	0.337	0.27	0.30	0.06	0.61	100.56
21	105	1.75	3.3	0.412	0.27	0.37	0.14	1.32	313.75
22	110	1.83	3.1	0.387	0.27	0.35	0.11	1.08	242.69
23	115	1.92	2.9	0.362	0.27	0.33	0.09	0.85	171.63
24	120	2.00	3.0	0.374	0.27	0.34	0.10	0.96	207.16
25	125	2.08	3.1	0.387	0.27	0.35	0.11	1.08	242.69
26	130	2.17	4.2	0.524	0.27	0.47	0.25	2.38	633.52
27	135	2.25	5.0	0.624	0.27	0.56	0.35	3.33	917.77
28	140	2.33	3.5	0.437	0.27	0.39	0.16	1.56	384.81
29	145	2.42	6.8	0.849	0.27	0.76	0.58	5.46	1557.32
30	150	2.50	7.3	0.911	0.27	0.82	0.64	6.06	1734.97
31	155	2.58	8.2	1.023	0.27	0.92	0.75	7.12	2054.75
32	160	2.67	5.9	0.736	0.27	0.66	0.46	4.40	1237.54
33	165	2.75	2.0	0.250	0.27	0.22	0.02	0.24	0.00
34	170	2.83	1.8	0.225	0.27	0.20	0.02	0.21	0.00
35	175	2.92	1.8	0.225	0.27	0.20	0.02	0.21	0.00
36	180	3.00	0.6	0.075	0.27	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12334.87
REQUIRED STORAGE (acft)	0.23
REQUIRED STORAGE (cuft)	9964.74
PEAK FLOW RATE (cfs)	7.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.27	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.27	0.09	0.01	0.09	0.00
3	15	0.25	0.6	0.098	0.27	0.09	0.01	0.09	0.00
4	20	0.33	0.6	0.098	0.27	0.09	0.01	0.09	0.00
5	25	0.42	0.6	0.098	0.27	0.09	0.01	0.09	0.00
6	30	0.50	0.7	0.114	0.27	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.27	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.27	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.27	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.27	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.27	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.27	0.12	0.01	0.12	0.00
13	65	1.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
14	70	1.17	0.8	0.131	0.27	0.12	0.01	0.12	0.00
15	75	1.25	0.8	0.131	0.27	0.12	0.01	0.12	0.00
16	80	1.33	0.8	0.131	0.27	0.12	0.01	0.12	0.00
17	85	1.42	0.8	0.131	0.27	0.12	0.01	0.12	0.00
18	90	1.50	0.8	0.131	0.27	0.12	0.01	0.12	0.00
19	95	1.58	0.8	0.131	0.27	0.12	0.01	0.12	0.00
20	100	1.67	0.8	0.131	0.27	0.12	0.01	0.12	0.00
21	105	1.75	0.8	0.131	0.27	0.12	0.01	0.12	0.00
22	110	1.83	0.8	0.131	0.27	0.12	0.01	0.12	0.00
23	115	1.92	0.8	0.131	0.27	0.12	0.01	0.12	0.00
24	120	2.00	0.9	0.147	0.27	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
26	130	2.17	0.9	0.147	0.27	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.27	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.27	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.27	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.27	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.27	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.27	0.15	0.02	0.15	0.00
34	170	2.83	1.0	0.163	0.27	0.15	0.02	0.15	0.00
35	175	2.92	1.0	0.163	0.27	0.15	0.02	0.15	0.00
36	180	3.00	1.0	0.163	0.27	0.15	0.02	0.15	0.00
37	185	3.08	1.0	0.163	0.27	0.15	0.02	0.15	0.00
38	190	3.17	1.1	0.180	0.27	0.16	0.02	0.17	0.00
39	195	3.25	1.1	0.180	0.27	0.16	0.02	0.17	0.00
40	200	3.33	1.1	0.180	0.27	0.16	0.02	0.17	0.00
41	205	3.42	1.2	0.196	0.27	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.27	0.19	0.02	0.20	0.00
43	215	3.58	1.4	0.228	0.27	0.21	0.02	0.22	0.00
44	220	3.67	1.4	0.228	0.27	0.21	0.02	0.22	0.00
45	225	3.75	1.5	0.245	0.27	0.22	0.02	0.23	0.00
46	230	3.83	1.5	0.245	0.27	0.22	0.02	0.23	0.00
47	235	3.92	1.6	0.261	0.27	0.24	0.03	0.25	0.00
48	240	4.00	1.6	0.261	0.27	0.24	0.03	0.25	0.00
49	245	4.08	1.7	0.277	0.27	0.25	0.00	0.04	0.00
50	250	4.17	1.8	0.294	0.27	0.26	0.02	0.20	0.00
51	255	4.25	1.9	0.310	0.27	0.28	0.04	0.35	24.04
52	260	4.33	2.0	0.326	0.27	0.29	0.05	0.51	70.50
53	265	4.42	2.1	0.343	0.27	0.31	0.07	0.66	116.96
54	270	4.50	2.1	0.343	0.27	0.31	0.07	0.66	116.96
55	275	4.58	2.2	0.359	0.27	0.32	0.09	0.82	163.43
56	280	4.67	2.3	0.375	0.27	0.34	0.10	0.97	209.89

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.27	0.35	0.12	1.13	256.35
58	290	4.83	2.4	0.392	0.27	0.35	0.12	1.13	256.35
59	295	4.92	2.5	0.408	0.27	0.37	0.14	1.28	302.82
60	300	5.00	2.6	0.424	0.27	0.38	0.15	1.44	349.28
61	305	5.08	3.1	0.506	0.27	0.46	0.23	2.21	581.59
62	310	5.17	3.6	0.588	0.27	0.53	0.31	2.99	813.91
63	315	5.25	3.9	0.636	0.27	0.57	0.36	3.45	953.30
64	320	5.33	4.2	0.685	0.27	0.62	0.41	3.92	1092.69
65	325	5.42	4.7	0.767	0.27	0.69	0.49	4.69	1325.00
66	330	5.50	5.6	0.914	0.27	0.82	0.64	6.08	1743.17
67	335	5.58	1.9	0.310	0.27	0.28	0.04	0.35	24.04
68	340	5.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.27	0.09	0.01	0.09	0.00
70	350	5.83	0.5	0.082	0.27	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.27	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.27	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.35
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12149.95
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8400.27
PEAK FLOW RATE (cfs)	6.08

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.018	0.482	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.476	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.471	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.465	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.460	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.454	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.449	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.443	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.438	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.433	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.427	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.422	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.417	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.412	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.407	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.401	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.396	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.391	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.386	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.381	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.376	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.371	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.367	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.362	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.357	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.352	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.347	0.080	0.009	0.08	0.00
28	420	7.00	1.0	0.089	0.343	0.080	0.009	0.08	0.00
29	435	7.25	1.0	0.089	0.338	0.080	0.009	0.08	0.00
30	450	7.50	1.1	0.098	0.334	0.088	0.010	0.09	0.00
31	465	7.75	1.2	0.107	0.329	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.324	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.320	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.315	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.311	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.307	0.136	0.015	0.14	0.00
37	555	9.25	1.9	0.169	0.302	0.153	0.017	0.16	0.00
38	570	9.50	2.0	0.178	0.298	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.294	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.290	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.285	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.281	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.277	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.273	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.269	0.153	0.017	0.16	0.00
46	690	11.50	1.9	0.169	0.265	0.153	0.017	0.16	0.00
47	705	11.75	1.7	0.152	0.261	0.136	0.015	0.14	0.00
48	720	12.00	1.8	0.161	0.257	0.145	0.016	0.15	0.00
49	735	12.25	2.5	0.223	0.253	0.201	0.022	0.21	0.00
50	750	12.50	2.6	0.232	0.250	0.209	0.023	0.22	0.00
51	765	12.75	2.8	0.250	0.246	0.225	0.004	0.04	0.00
52	780	13.00	2.9	0.259	0.242	0.233	0.017	0.16	0.00
53	795	13.25	3.4	0.303	0.239	0.273	0.065	0.61	307.33
54	810	13.50	3.4	0.303	0.235	0.273	0.068	0.65	338.20
55	825	13.75	2.3	0.205	0.231	0.185	0.021	0.19	0.00
56	840	14.00	2.3	0.205	0.228	0.185	0.021	0.19	0.00
57	855	14.25	2.7	0.241	0.224	0.217	0.016	0.16	0.00
58	870	14.50	2.6	0.232	0.221	0.209	0.011	0.10	0.00
59	885	14.75	2.6	0.232	0.218	0.209	0.014	0.14	0.00
60	900	15.00	2.5	0.223	0.214	0.201	0.009	0.08	0.00
61	915	15.25	2.4	0.214	0.211	0.193	0.003	0.03	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr			Flow	
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.208	0.185	0.021	0.19	0.00
63	945	15.75	1.9	0.169	0.205	0.153	0.017	0.16	0.00
64	960	16.00	1.9	0.169	0.201	0.153	0.017	0.16	0.00
65	975	16.25	0.4	0.036	0.198	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.195	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.192	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.189	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.187	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.184	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.181	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.178	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.176	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.173	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.171	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.168	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.166	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.164	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.161	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.159	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.157	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.155	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.153	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.151	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.149	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.148	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.146	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.145	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.143	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.142	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.141	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.139	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.138	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.138	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.137	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.137	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.22
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7524.21
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	645.53
PEAK FLOW (cfs)	0.65

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.27 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	46	46	82	-	463.50	-	0.00
2	10	0.15	46	46	82	-	463.50	-	0.00
3	15	0.13	39	39	82	-	463.50	-	0.00
4	20	0.18	53	53	82	-	463.50	-	0.00
5	25	0.18	53	53	82	-	463.50	-	0.00
6	30	0.21	64	64	82	-	463.50	-	0.00
7	35	0.18	53	53	82	-	463.50	-	0.00
8	40	0.21	64	64	82	-	463.50	-	0.00
9	45	0.21	64	64	82	-	463.50	-	0.00
10	50	0.18	53	53	82	-	463.50	-	0.00
11	55	0.19	57	57	82	-	463.50	-	0.00
12	60	0.21	64	64	82	-	463.50	-	0.00
13	65	0.02	5	5	82	-	463.50	-	0.00
14	70	0.02	5	5	82	-	463.50	-	0.00
15	75	0.02	5	5	82	-	463.50	-	0.00
16	80	0.24	71	71	82	-	463.50	-	0.00
17	85	0.49	147	147	82	65	463.50	65	0.00
18	90	0.61	182	248	82	166	463.51	166	0.00
19	95	0.25	76	242	82	160	463.51	160	0.00
20	100	0.61	182	342	82	260	463.51	260	0.01
21	105	1.32	396	656	82	574	463.53	574	0.01
22	110	1.08	325	899	82	817	463.54	817	0.02
23	115	0.85	254	1,070	82	988	463.55	988	0.02
24	120	0.96	289	1,277	82	1,195	463.56	1,195	0.03
25	125	1.08	325	1,520	82	1,438	463.58	1,438	0.03
26	130	2.38	715	2,153	82	2,072	463.61	2,072	0.05
27	135	3.33	1,000	3,071	82	2,989	463.66	2,989	0.07
28	140	1.56	467	3,456	82	3,374	463.68	3,374	0.08
29	145	5.46	1,639	5,013	82	4,931	463.77	4,931	0.11
30	150	6.06	1,817	6,748	82	6,666	463.86	6,666	0.15
31	155	7.12	2,137	8,803	82	8,721	463.97	8,721	0.20
32	160	4.40	1,319	10,041	82	9,959	464.04	9,959	0.23
33	165	0.24	71	10,030	82	9,948	464.04	9,948	0.23
34	170	0.21	64	10,012	82	9,930	464.04	9,930	0.23
35	175	0.21	64	9,994	82	9,912	464.04	9,912	0.23
36	180	0.07	21	9,933	82	9,851	464.03	9,851	0.23

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	23	23	82	-	463.50	-	0.00
2	10	0.09	28	28	82	-	463.50	-	0.00
3	15	0.09	28	28	82	-	463.50	-	0.00
4	20	0.09	28	28	82	-	463.50	-	0.00
5	25	0.09	28	28	82	-	463.50	-	0.00
6	30	0.11	33	33	82	-	463.50	-	0.00
7	35	0.11	33	33	82	-	463.50	-	0.00
8	40	0.11	33	33	82	-	463.50	-	0.00
9	45	0.11	33	33	82	-	463.50	-	0.00
10	50	0.11	33	33	82	-	463.50	-	0.00
11	55	0.11	33	33	82	-	463.50	-	0.00
12	60	0.12	37	37	82	-	463.50	-	0.00
13	65	0.12	37	37	82	-	463.50	-	0.00
14	70	0.12	37	37	82	-	463.50	-	0.00
15	75	0.12	37	37	82	-	463.50	-	0.00
16	80	0.12	37	37	82	-	463.50	-	0.00
17	85	0.12	37	37	82	-	463.50	-	0.00
18	90	0.12	37	37	82	-	463.50	-	0.00
19	95	0.12	37	37	82	-	463.50	-	0.00
20	100	0.12	37	37	82	-	463.50	-	0.00
21	105	0.12	37	37	82	-	463.50	-	0.00
22	110	0.12	37	37	82	-	463.50	-	0.00
23	115	0.12	37	37	82	-	463.50	-	0.00
24	120	0.14	42	42	82	-	463.50	-	0.00
25	125	0.12	37	37	82	-	463.50	-	0.00
26	130	0.14	42	42	82	-	463.50	-	0.00
27	135	0.14	42	42	82	-	463.50	-	0.00
28	140	0.14	42	42	82	-	463.50	-	0.00
29	145	0.14	42	42	82	-	463.50	-	0.00
30	150	0.14	42	42	82	-	463.50	-	0.00
31	155	0.14	42	42	82	-	463.50	-	0.00
32	160	0.14	42	42	82	-	463.50	-	0.00
33	165	0.15	46	46	82	-	463.50	-	0.00
34	170	0.15	46	46	82	-	463.50	-	0.00
35	175	0.15	46	46	82	-	463.50	-	0.00
36	180	0.15	46	46	82	-	463.50	-	0.00
37	185	0.15	46	46	82	-	463.50	-	0.00
38	190	0.17	51	51	82	-	463.50	-	0.00
39	195	0.17	51	51	82	-	463.50	-	0.00
40	200	0.17	51	51	82	-	463.50	-	0.00
41	205	0.19	56	56	82	-	463.50	-	0.00
42	210	0.20	60	60	82	-	463.50	-	0.00
43	215	0.22	65	65	82	-	463.50	-	0.00
44	220	0.22	65	65	82	-	463.50	-	0.00
45	225	0.23	70	70	82	-	463.50	-	0.00
46	230	0.23	70	70	82	-	463.50	-	0.00
47	235	0.25	74	74	82	-	463.50	-	0.00
48	240	0.25	74	74	82	-	463.50	-	0.00
49	245	0.04	13	13	82	-	463.50	-	0.00
50	250	0.20	60	60	82	-	463.50	-	0.00
51	255	0.35	106	106	82	24	463.50	24	0.00
52	260	0.51	152	176	82	95	463.51	95	0.00
53	265	0.66	199	293	82	211	463.51	211	0.00
54	270	0.66	199	410	82	328	463.52	328	0.01
55	275	0.82	245	574	82	492	463.53	492	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.97	292	784	82	702	463.54	702	0.02
57	285	1.13	338	1,040	82	958	463.55	958	0.02
58	290	1.13	338	1,296	82	1,214	463.57	1,214	0.03
59	295	1.28	385	1,599	82	1,517	463.58	1,517	0.03
60	300	1.44	431	1,949	82	1,867	463.60	1,867	0.04
61	305	2.21	664	2,530	82	2,448	463.63	2,448	0.06
62	310	2.99	896	3,344	82	3,262	463.68	3,262	0.07
63	315	3.45	1,035	4,297	82	4,215	463.73	4,215	0.10
64	320	3.92	1,175	5,390	82	5,308	463.79	5,308	0.12
65	325	4.69	1,407	6,715	82	6,633	463.86	6,633	0.15
66	330	6.08	1,825	8,458	82	8,376	463.95	8,376	0.19
67	335	0.35	106	8,482	82	8,400	463.95	8,400	0.19
68	340	0.14	42	8,442	82	8,360	463.95	8,360	0.19
69	345	0.09	28	8,388	82	8,306	463.95	8,306	0.19
70	350	0.08	23	8,329	82	8,247	463.95	8,247	0.19
71	355	0.05	14	8,261	82	8,179	463.94	8,179	0.19
72	360	0.03	9	8,189	82	8,107	463.94	8,107	0.19

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	15	15	246	-	463.50	-	0.00
2	30	0.03	23	23	246	-	463.50	-	0.00
3	45	0.03	23	23	246	-	463.50	-	0.00
4	60	0.03	30	30	246	-	463.50	-	0.00
5	75	0.03	23	23	246	-	463.50	-	0.00
6	90	0.03	23	23	246	-	463.50	-	0.00
7	105	0.03	23	23	246	-	463.50	-	0.00
8	120	0.03	30	30	246	-	463.50	-	0.00
9	135	0.03	30	30	246	-	463.50	-	0.00
10	150	0.03	30	30	246	-	463.50	-	0.00
11	165	0.04	38	38	246	-	463.50	-	0.00
12	180	0.04	38	38	246	-	463.50	-	0.00
13	195	0.04	38	38	246	-	463.50	-	0.00
14	210	0.04	38	38	246	-	463.50	-	0.00
15	225	0.04	38	38	246	-	463.50	-	0.00
16	240	0.05	46	46	246	-	463.50	-	0.00
17	255	0.05	46	46	246	-	463.50	-	0.00
18	270	0.06	53	53	246	-	463.50	-	0.00
19	285	0.06	53	53	246	-	463.50	-	0.00
20	300	0.07	61	61	246	-	463.50	-	0.00
21	315	0.05	46	46	246	-	463.50	-	0.00
22	330	0.06	53	53	246	-	463.50	-	0.00
23	345	0.07	61	61	246	-	463.50	-	0.00
24	360	0.07	61	61	246	-	463.50	-	0.00
25	375	0.08	69	69	246	-	463.50	-	0.00
26	390	0.08	69	69	246	-	463.50	-	0.00
27	405	0.08	76	76	246	-	463.50	-	0.00
28	420	0.08	76	76	246	-	463.50	-	0.00
29	435	0.08	76	76	246	-	463.50	-	0.00
30	450	0.09	84	84	246	-	463.50	-	0.00
31	465	0.10	91	91	246	-	463.50	-	0.00
32	480	0.11	99	99	246	-	463.50	-	0.00
33	495	0.13	114	114	246	-	463.50	-	0.00
34	510	0.13	114	114	246	-	463.50	-	0.00
35	525	0.14	122	122	246	-	463.50	-	0.00
36	540	0.14	130	130	246	-	463.50	-	0.00
37	555	0.16	145	145	246	-	463.50	-	0.00
38	570	0.17	152	152	246	-	463.50	-	0.00
39	585	0.18	160	160	246	-	463.50	-	0.00
40	600	0.19	168	168	246	-	463.50	-	0.00
41	615	0.13	114	114	246	-	463.50	-	0.00
42	630	0.13	114	114	246	-	463.50	-	0.00
43	645	0.17	152	152	246	-	463.50	-	0.00
44	660	0.17	152	152	246	-	463.50	-	0.00
45	675	0.16	145	145	246	-	463.50	-	0.00
46	690	0.16	145	145	246	-	463.50	-	0.00
47	705	0.14	130	130	246	-	463.50	-	0.00
48	720	0.15	137	137	246	-	463.50	-	0.00
49	735	0.21	190	190	246	-	463.50	-	0.00
50	750	0.22	198	198	246	-	463.50	-	0.00
51	765	0.04	33	33	246	-	463.50	-	0.00
52	780	0.16	141	141	246	-	463.50	-	0.00
53	795	0.61	553	553	246	307	463.52	307	0.01
54	810	0.65	584	891	246	646	463.53	646	0.01
55	825	0.19	175	821	246	575	463.53	575	0.01
56	840	0.19	175	750	246	504	463.53	504	0.01
57	855	0.16	141	645	246	399	463.52	399	0.01
58	870	0.10	94	493	246	248	463.51	248	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.14	123	371	246	125	463.51	125	0.00
60	900	0.08	75	200	246	-	463.50	-	0.00
61	915	0.03	27	27	246	-	463.50	-	0.00
62	930	0.19	175	175	246	-	463.50	-	0.00
63	945	0.16	145	145	246	-	463.50	-	0.00
64	960	0.16	145	145	246	-	463.50	-	0.00
65	975	0.03	30	30	246	-	463.50	-	0.00
66	990	0.03	30	30	246	-	463.50	-	0.00
67	1005	0.03	23	23	246	-	463.50	-	0.00
68	1020	0.03	23	23	246	-	463.50	-	0.00
69	1035	0.04	38	38	246	-	463.50	-	0.00
70	1050	0.04	38	38	246	-	463.50	-	0.00
71	1065	0.04	38	38	246	-	463.50	-	0.00
72	1080	0.03	30	30	246	-	463.50	-	0.00
73	1095	0.03	30	30	246	-	463.50	-	0.00
74	1110	0.03	30	30	246	-	463.50	-	0.00
75	1125	0.03	23	23	246	-	463.50	-	0.00
76	1140	0.02	15	15	246	-	463.50	-	0.00
77	1155	0.03	23	23	246	-	463.50	-	0.00
78	1170	0.03	30	30	246	-	463.50	-	0.00
79	1185	0.03	23	23	246	-	463.50	-	0.00
80	1200	0.02	15	15	246	-	463.50	-	0.00
81	1215	0.03	23	23	246	-	463.50	-	0.00
82	1230	0.03	23	23	246	-	463.50	-	0.00
83	1245	0.03	23	23	246	-	463.50	-	0.00
84	1260	0.02	15	15	246	-	463.50	-	0.00
85	1275	0.03	23	23	246	-	463.50	-	0.00
86	1290	0.02	15	15	246	-	463.50	-	0.00
87	1305	0.03	23	23	246	-	463.50	-	0.00
88	1320	0.02	15	15	246	-	463.50	-	0.00
89	1335	0.03	23	23	246	-	463.50	-	0.00
90	1350	0.02	15	15	246	-	463.50	-	0.00
91	1365	0.02	15	15	246	-	463.50	-	0.00
92	1380	0.02	15	15	246	-	463.50	-	0.00
93	1395	0.02	15	15	246	-	463.50	-	0.00
94	1410	0.02	15	15	246	-	463.50	-	0.00
95	1425	0.02	15	15	246	-	463.50	-	0.00
96	1440	0.02	15	15	246	-	463.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	2.010	1.00	2.12	2.78	2.010	1.00	2.78	4.47	2.010	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	2.12	SUM [9]	2.01	SUM [11]	2.78	SUM [13]	2.01	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.39	1.40	1.43
FLOOD VOLUME	(cu-ft)	10,165	10,196	10,445
	(acre-ft)	0.23	0.23	0.24
REQUIRED STORAGE	(cu-ft)	9,580	9,148	8,100
	(acre-ft)	0.22	0.21	0.19
PEAK FLOW	(cfs)	3.70	3.26	0.80
MAXIMUM WSEL	(ft)	467.45	467.36	467.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866

C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.25	0.30	0.09	0.17	37.46
2	10	0.17	1.3	0.331	0.25	0.30	0.09	0.17	37.46
3	15	0.25	1.1	0.280	0.25	0.25	0.03	0.07	6.78
4	20	0.33	1.5	0.382	0.25	0.34	0.14	0.27	68.14
5	25	0.42	1.5	0.382	0.25	0.34	0.14	0.27	68.14
6	30	0.50	1.8	0.458	0.25	0.41	0.21	0.43	114.16
7	35	0.58	1.5	0.382	0.25	0.34	0.14	0.27	68.14
8	40	0.67	1.8	0.458	0.25	0.41	0.21	0.43	114.16
9	45	0.75	1.8	0.458	0.25	0.41	0.21	0.43	114.16
10	50	0.83	1.5	0.382	0.25	0.34	0.14	0.27	68.14
11	55	0.92	1.6	0.407	0.25	0.37	0.16	0.33	83.48
12	60	1.00	1.8	0.458	0.25	0.41	0.21	0.43	114.16
13	65	1.08	2.2	0.560	0.25	0.50	0.31	0.63	175.52
14	70	1.17	2.2	0.560	0.25	0.50	0.31	0.63	175.52
15	75	1.25	2.2	0.560	0.25	0.50	0.31	0.63	175.52
16	80	1.33	2.0	0.509	0.25	0.46	0.26	0.53	144.84
17	85	1.42	2.6	0.661	0.25	0.60	0.42	0.84	236.89
18	90	1.50	2.7	0.687	0.25	0.62	0.44	0.89	252.23
19	95	1.58	2.4	0.611	0.25	0.55	0.37	0.73	206.21
20	100	1.67	2.7	0.687	0.25	0.62	0.44	0.89	252.23
21	105	1.75	3.3	0.840	0.25	0.76	0.59	1.19	344.27
22	110	1.83	3.1	0.789	0.25	0.71	0.54	1.09	313.59
23	115	1.92	2.9	0.738	0.25	0.66	0.49	0.99	282.91
24	120	2.00	3.0	0.763	0.25	0.69	0.52	1.04	298.25
25	125	2.08	3.1	0.789	0.25	0.71	0.54	1.09	313.59
26	130	2.17	4.2	1.068	0.25	0.96	0.82	1.65	482.33
27	135	2.25	5.0	1.272	0.25	1.14	1.03	2.06	605.05
28	140	2.33	3.5	0.890	0.25	0.80	0.65	1.30	374.95
29	145	2.42	6.8	1.730	0.25	1.56	1.48	2.98	881.18
30	150	2.50	7.3	1.857	0.25	1.67	1.61	3.24	957.88
31	155	2.58	8.2	2.086	0.25	1.88	1.84	3.70	1095.94
32	160	2.67	5.9	1.501	0.25	1.35	1.26	2.52	743.12
33	165	2.75	2.0	0.509	0.25	0.46	0.26	0.53	144.84
34	170	2.83	1.8	0.458	0.25	0.41	0.21	0.43	114.16
35	175	2.92	1.8	0.458	0.25	0.41	0.21	0.43	114.16
36	180	3.00	0.6	0.153	0.25	0.14	0.02	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.39
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10165.45
REQUIRED STORAGE (acft)	0.22
REQUIRED STORAGE (cuft)	9579.59
PEAK FLOW RATE (cfs)	3.70

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.25	0.15	0.02	0.03	0.00
2	10	0.17	0.6	0.200	0.25	0.18	0.02	0.04	0.00
3	15	0.25	0.6	0.200	0.25	0.18	0.02	0.04	0.00
4	20	0.33	0.6	0.200	0.25	0.18	0.02	0.04	0.00
5	25	0.42	0.6	0.200	0.25	0.18	0.02	0.04	0.00
6	30	0.50	0.7	0.234	0.25	0.21	0.02	0.05	0.01
7	35	0.58	0.7	0.234	0.25	0.21	0.02	0.05	0.01
8	40	0.67	0.7	0.234	0.25	0.21	0.02	0.05	0.01
9	45	0.75	0.7	0.234	0.25	0.21	0.02	0.05	0.01
10	50	0.83	0.7	0.234	0.25	0.21	0.02	0.05	0.01
11	55	0.92	0.7	0.234	0.25	0.21	0.02	0.05	0.01
12	60	1.00	0.8	0.267	0.25	0.24	0.02	0.04	0.00
13	65	1.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
14	70	1.17	0.8	0.267	0.25	0.24	0.02	0.04	0.00
15	75	1.25	0.8	0.267	0.25	0.24	0.02	0.04	0.00
16	80	1.33	0.8	0.267	0.25	0.24	0.02	0.04	0.00
17	85	1.42	0.8	0.267	0.25	0.24	0.02	0.04	0.00
18	90	1.50	0.8	0.267	0.25	0.24	0.02	0.04	0.00
19	95	1.58	0.8	0.267	0.25	0.24	0.02	0.04	0.00
20	100	1.67	0.8	0.267	0.25	0.24	0.02	0.04	0.00
21	105	1.75	0.8	0.267	0.25	0.24	0.02	0.04	0.00
22	110	1.83	0.8	0.267	0.25	0.24	0.02	0.04	0.00
23	115	1.92	0.8	0.267	0.25	0.24	0.02	0.04	0.00
24	120	2.00	0.9	0.300	0.25	0.27	0.05	0.11	19.08
25	125	2.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
26	130	2.17	0.9	0.300	0.25	0.27	0.05	0.11	19.08
27	135	2.25	0.9	0.300	0.25	0.27	0.05	0.11	19.08
28	140	2.33	0.9	0.300	0.25	0.27	0.05	0.11	19.08
29	145	2.42	0.9	0.300	0.25	0.27	0.05	0.11	19.08
30	150	2.50	0.9	0.300	0.25	0.27	0.05	0.11	19.08
31	155	2.58	0.9	0.300	0.25	0.27	0.05	0.11	19.08
32	160	2.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
33	165	2.75	1.0	0.334	0.25	0.30	0.09	0.18	39.20
34	170	2.83	1.0	0.334	0.25	0.30	0.09	0.18	39.20
35	175	2.92	1.0	0.334	0.25	0.30	0.09	0.18	39.20
36	180	3.00	1.0	0.334	0.25	0.30	0.09	0.18	39.20
37	185	3.08	1.0	0.334	0.25	0.30	0.09	0.18	39.20
38	190	3.17	1.1	0.367	0.25	0.33	0.12	0.24	59.31
39	195	3.25	1.1	0.367	0.25	0.33	0.12	0.24	59.31
40	200	3.33	1.1	0.367	0.25	0.33	0.12	0.24	59.31
41	205	3.42	1.2	0.400	0.25	0.36	0.16	0.31	79.43
42	210	3.50	1.3	0.434	0.25	0.39	0.19	0.38	99.55
43	215	3.58	1.4	0.467	0.25	0.42	0.22	0.45	119.66
44	220	3.67	1.4	0.467	0.25	0.42	0.22	0.45	119.66
45	225	3.75	1.5	0.500	0.25	0.45	0.26	0.51	139.78
46	230	3.83	1.5	0.500	0.25	0.45	0.26	0.51	139.78
47	235	3.92	1.6	0.534	0.25	0.48	0.29	0.58	159.89
48	240	4.00	1.6	0.534	0.25	0.48	0.29	0.58	159.89
49	245	4.08	1.7	0.567	0.25	0.51	0.32	0.65	180.01
50	250	4.17	1.8	0.600	0.25	0.54	0.36	0.71	200.13
51	255	4.25	1.9	0.634	0.25	0.57	0.39	0.78	220.24
52	260	4.33	2.0	0.667	0.25	0.60	0.42	0.85	240.36
53	265	4.42	2.1	0.701	0.25	0.63	0.46	0.92	260.48
54	270	4.50	2.1	0.701	0.25	0.63	0.46	0.92	260.48
55	275	4.58	2.2	0.734	0.25	0.66	0.49	0.98	280.59
56	280	4.67	2.3	0.767	0.25	0.69	0.52	1.05	300.71

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.25	0.72	0.56	1.12	320.82
58	290	4.83	2.4	0.801	0.25	0.72	0.56	1.12	320.82
59	295	4.92	2.5	0.834	0.25	0.75	0.59	1.18	340.94
60	300	5.00	2.6	0.867	0.25	0.78	0.62	1.25	361.06
61	305	5.08	3.1	1.034	0.25	0.93	0.79	1.59	461.64
62	310	5.17	3.6	1.201	0.25	1.08	0.96	1.92	562.22
63	315	5.25	3.9	1.301	0.25	1.17	1.06	2.12	622.56
64	320	5.33	4.2	1.401	0.25	1.26	1.16	2.32	682.91
65	325	5.42	4.7	1.568	0.25	1.41	1.32	2.66	783.49
66	330	5.50	5.6	1.868	0.25	1.68	1.62	3.26	964.54
67	335	5.58	1.9	0.634	0.25	0.57	0.39	0.78	220.24
68	340	5.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
69	345	5.75	0.6	0.200	0.25	0.18	0.02	0.04	0.00
70	350	5.83	0.5	0.167	0.25	0.15	0.02	0.03	0.00
71	355	5.92	0.3	0.100	0.25	0.09	0.01	0.02	0.00
72	360	6.00	0.2	0.067	0.25	0.06	0.01	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.40
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10195.68
REQUIRED STORAGE (acft)	0.21
REQUIRED STORAGE (cuft)	9147.59
PEAK FLOW RATE (cfs)	3.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.036	0.433	0.032	0.004	0.01	0.00
2	30	0.50	0.3	0.054	0.428	0.048	0.005	0.01	0.00
3	45	0.75	0.3	0.054	0.423	0.048	0.005	0.01	0.00
4	60	1.00	0.4	0.072	0.418	0.064	0.007	0.01	0.00
5	75	1.25	0.3	0.054	0.413	0.048	0.005	0.01	0.00
6	90	1.50	0.3	0.054	0.408	0.048	0.005	0.01	0.00
7	105	1.75	0.3	0.054	0.403	0.048	0.005	0.01	0.00
8	120	2.00	0.4	0.072	0.399	0.064	0.007	0.01	0.00
9	135	2.25	0.4	0.072	0.394	0.064	0.007	0.01	0.00
10	150	2.50	0.4	0.072	0.389	0.064	0.007	0.01	0.00
11	165	2.75	0.5	0.089	0.384	0.080	0.009	0.02	0.00
12	180	3.00	0.5	0.089	0.379	0.080	0.009	0.02	0.00
13	195	3.25	0.5	0.089	0.375	0.080	0.009	0.02	0.00
14	210	3.50	0.5	0.089	0.370	0.080	0.009	0.02	0.00
15	225	3.75	0.5	0.089	0.365	0.080	0.009	0.02	0.00
16	240	4.00	0.6	0.107	0.361	0.097	0.011	0.02	0.00
17	255	4.25	0.6	0.107	0.356	0.097	0.011	0.02	0.00
18	270	4.50	0.7	0.125	0.352	0.113	0.013	0.03	0.00
19	285	4.75	0.7	0.125	0.347	0.113	0.013	0.03	0.00
20	300	5.00	0.8	0.143	0.343	0.129	0.014	0.03	0.00
21	315	5.25	0.6	0.107	0.338	0.097	0.011	0.02	0.00
22	330	5.50	0.7	0.125	0.334	0.113	0.013	0.03	0.00
23	345	5.75	0.8	0.143	0.330	0.129	0.014	0.03	0.00
24	360	6.00	0.8	0.143	0.325	0.129	0.014	0.03	0.00
25	375	6.25	0.9	0.161	0.321	0.145	0.016	0.03	0.00
26	390	6.50	0.9	0.161	0.317	0.145	0.016	0.03	0.00
27	405	6.75	1.0	0.179	0.312	0.161	0.018	0.04	0.00
28	420	7.00	1.0	0.179	0.308	0.161	0.018	0.04	0.00
29	435	7.25	1.0	0.179	0.304	0.161	0.018	0.04	0.00
30	450	7.50	1.1	0.197	0.300	0.177	0.020	0.04	0.00
31	465	7.75	1.2	0.215	0.296	0.193	0.021	0.04	0.00
32	480	8.00	1.3	0.232	0.292	0.209	0.023	0.05	0.00
33	495	8.25	1.5	0.268	0.288	0.241	0.027	0.05	6.29
34	510	8.50	1.5	0.268	0.284	0.241	0.027	0.05	6.29
35	525	8.75	1.6	0.286	0.280	0.257	0.007	0.01	0.00
36	540	9.00	1.7	0.304	0.276	0.274	0.028	0.06	9.01
37	555	9.25	1.9	0.340	0.272	0.306	0.068	0.14	80.76
38	570	9.50	2.0	0.358	0.268	0.322	0.090	0.18	120.10
39	585	9.75	2.1	0.375	0.264	0.338	0.111	0.22	159.37
40	600	10.00	2.2	0.393	0.260	0.354	0.133	0.27	198.58
41	615	10.25	1.5	0.268	0.256	0.241	0.012	0.02	0.00
42	630	10.50	1.5	0.268	0.253	0.241	0.015	0.03	0.00
43	645	10.75	2.0	0.358	0.249	0.322	0.109	0.22	154.08
44	660	11.00	2.0	0.358	0.245	0.322	0.112	0.23	160.67
45	675	11.25	1.9	0.340	0.242	0.306	0.098	0.20	134.85
46	690	11.50	1.9	0.340	0.238	0.306	0.101	0.20	141.31
47	705	11.75	1.7	0.304	0.235	0.274	0.069	0.14	83.00
48	720	12.00	1.8	0.322	0.231	0.290	0.091	0.18	121.66
49	735	12.25	2.5	0.447	0.228	0.402	0.219	0.44	354.32
50	750	12.50	2.6	0.465	0.224	0.418	0.240	0.48	392.84
51	765	12.75	2.8	0.501	0.221	0.451	0.280	0.56	463.63
52	780	13.00	2.9	0.519	0.218	0.467	0.301	0.60	502.00
53	795	13.25	3.4	0.608	0.214	0.547	0.394	0.79	669.68
54	810	13.50	3.4	0.608	0.211	0.547	0.397	0.80	675.55
55	825	13.75	2.3	0.411	0.208	0.370	0.203	0.41	325.56
56	840	14.00	2.3	0.411	0.205	0.370	0.206	0.42	331.29
57	855	14.25	2.7	0.483	0.202	0.434	0.281	0.57	466.31
58	870	14.50	2.6	0.465	0.199	0.418	0.266	0.54	439.54
59	885	14.75	2.6	0.465	0.196	0.418	0.269	0.54	445.03
60	900	15.00	2.5	0.447	0.193	0.402	0.254	0.51	418.10
61	915	15.25	2.4	0.429	0.190	0.386	0.240	0.48	391.08
62	930	15.50	2.3	0.411	0.187	0.370	0.225	0.45	363.98
63	945	15.75	1.9	0.340	0.184	0.306	0.156	0.31	239.77
64	960	16.00	1.9	0.340	0.181	0.306	0.159	0.32	244.85
65	975	16.25	0.4	0.072	0.178	0.064	0.007	0.01	0.00
66	990	16.50	0.4	0.072	0.176	0.064	0.007	0.01	0.00
67	1005	16.75	0.3	0.054	0.173	0.048	0.005	0.01	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.170	0.048	0.005	0.01	0.00
69	1035	17.25	0.5	0.089	0.168	0.080	0.009	0.02	0.00
70	1050	17.50	0.5	0.089	0.165	0.080	0.009	0.02	0.00
71	1065	17.75	0.5	0.089	0.163	0.080	0.009	0.02	0.00
72	1080	18.00	0.4	0.072	0.160	0.064	0.007	0.01	0.00
73	1095	18.25	0.4	0.072	0.158	0.064	0.007	0.01	0.00
74	1110	18.50	0.4	0.072	0.156	0.064	0.007	0.01	0.00
75	1125	18.75	0.3	0.054	0.153	0.048	0.005	0.01	0.00
76	1140	19.00	0.2	0.036	0.151	0.032	0.004	0.01	0.00
77	1155	19.25	0.3	0.054	0.149	0.048	0.005	0.01	0.00
78	1170	19.50	0.4	0.072	0.147	0.064	0.007	0.01	0.00
79	1185	19.75	0.3	0.054	0.145	0.048	0.005	0.01	0.00
80	1200	20.00	0.2	0.036	0.143	0.032	0.004	0.01	0.00
81	1215	20.25	0.3	0.054	0.141	0.048	0.005	0.01	0.00
82	1230	20.50	0.3	0.054	0.139	0.048	0.005	0.01	0.00
83	1245	20.75	0.3	0.054	0.138	0.048	0.005	0.01	0.00
84	1260	21.00	0.2	0.036	0.136	0.032	0.004	0.01	0.00
85	1275	21.25	0.3	0.054	0.134	0.048	0.005	0.01	0.00
86	1290	21.50	0.2	0.036	0.133	0.032	0.004	0.01	0.00
87	1305	21.75	0.3	0.054	0.131	0.048	0.005	0.01	0.00
88	1320	22.00	0.2	0.036	0.130	0.032	0.004	0.01	0.00
89	1335	22.25	0.3	0.054	0.129	0.048	0.005	0.01	0.00
90	1350	22.50	0.2	0.036	0.127	0.032	0.004	0.01	0.00
91	1365	22.75	0.2	0.036	0.126	0.032	0.004	0.01	0.00
92	1380	23.00	0.2	0.036	0.125	0.032	0.004	0.01	0.00
93	1395	23.25	0.2	0.036	0.124	0.032	0.004	0.01	0.00
94	1410	23.50	0.2	0.036	0.124	0.032	0.004	0.01	0.00
95	1425	23.75	0.2	0.036	0.123	0.032	0.004	0.01	0.00
96	1440	24.00	0.2	0.036	0.123	0.032	0.004	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10444.84
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8099.53
PEAK FLOW (cfs)	0.80

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	52	52	14	37	465.01	37	0.00
2	10	0.17	52	89	14	75	465.02	75	0.00
3	15	0.07	21	96	14	82	465.02	82	0.00
4	20	0.27	82	164	14	150	465.04	150	0.00
5	25	0.27	82	232	14	218	465.06	218	0.01
6	30	0.43	128	346	14	332	465.10	332	0.01
7	35	0.27	82	414	14	400	465.12	400	0.01
8	40	0.43	128	529	14	514	465.15	514	0.01
9	45	0.43	128	643	14	629	465.19	629	0.01
10	50	0.27	82	711	14	697	465.21	697	0.02
11	55	0.33	98	794	14	780	465.23	780	0.02
12	60	0.43	128	908	14	894	465.27	894	0.02
13	65	0.63	190	1,084	14	1,070	465.32	1,070	0.02
14	70	0.63	190	1,260	14	1,245	465.37	1,245	0.03
15	75	0.63	190	1,435	14	1,421	465.42	1,421	0.03
16	80	0.53	159	1,580	14	1,566	465.47	1,566	0.04
17	85	0.84	251	1,817	14	1,803	465.54	1,803	0.04
18	90	0.89	266	2,069	14	2,055	465.61	2,055	0.05
19	95	0.73	220	2,275	14	2,261	465.67	2,261	0.05
20	100	0.89	266	2,527	14	2,513	465.75	2,513	0.06
21	105	1.19	358	2,872	14	2,858	465.85	2,858	0.07
22	110	1.09	328	3,185	14	3,171	465.94	3,171	0.07
23	115	0.99	297	3,468	14	3,454	466.02	3,454	0.08
24	120	1.04	312	3,766	14	3,752	466.10	3,752	0.09
25	125	1.09	328	4,080	14	4,066	466.17	4,066	0.09
26	130	1.65	496	4,562	14	4,548	466.29	4,548	0.10
27	135	2.06	619	5,167	14	5,153	466.44	5,153	0.12
28	140	1.30	389	5,542	14	5,528	466.53	5,528	0.13
29	145	2.98	895	6,424	14	6,409	466.75	6,409	0.15
30	150	3.24	972	7,381	14	7,367	466.99	7,367	0.17
31	155	3.70	1,110	8,477	14	8,463	467.21	8,463	0.19
32	160	2.52	757	9,220	14	9,206	467.37	9,206	0.21
33	165	0.53	159	9,365	14	9,351	467.40	9,351	0.21
34	170	0.43	128	9,479	14	9,465	467.42	9,465	0.22
35	175	0.43	128	9,594	14	9,580	467.45	9,580	0.22
36	180	0.03	9	9,589	14	9,575	467.45	9,575	0.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.04	12	12	14	-	465.00	-	0.00
3	15	0.04	12	12	14	-	465.00	-	0.00
4	20	0.04	12	12	14	-	465.00	-	0.00
5	25	0.04	12	12	14	-	465.00	-	0.00
6	30	0.05	14	14	14	0	465.00	0	0.00
7	35	0.05	14	14	14	0	465.00	0	0.00
8	40	0.05	14	14	14	0	465.00	0	0.00
9	45	0.05	14	14	14	0	465.00	0	0.00
10	50	0.05	14	14	14	0	465.00	0	0.00
11	55	0.05	14	14	14	0	465.00	0	0.00
12	60	0.04	13	13	14	-	465.00	-	0.00
13	65	0.04	13	13	14	-	465.00	-	0.00
14	70	0.04	13	13	14	-	465.00	-	0.00
15	75	0.04	13	13	14	-	465.00	-	0.00
16	80	0.04	13	13	14	-	465.00	-	0.00
17	85	0.04	13	13	14	-	465.00	-	0.00
18	90	0.04	13	13	14	-	465.00	-	0.00
19	95	0.04	13	13	14	-	465.00	-	0.00
20	100	0.04	13	13	14	-	465.00	-	0.00
21	105	0.04	13	13	14	-	465.00	-	0.00
22	110	0.04	13	13	14	-	465.00	-	0.00
23	115	0.04	13	13	14	-	465.00	-	0.00
24	120	0.11	33	33	14	19	465.01	19	0.00
25	125	0.04	13	32	14	18	465.01	18	0.00
26	130	0.11	33	51	14	37	465.01	37	0.00
27	135	0.11	33	70	14	56	465.02	56	0.00
28	140	0.11	33	89	14	75	465.02	75	0.00
29	145	0.11	33	108	14	94	465.03	94	0.00
30	150	0.11	33	128	14	113	465.03	113	0.00
31	155	0.11	33	147	14	133	465.04	133	0.00
32	160	0.11	33	166	14	152	465.05	152	0.00
33	165	0.18	53	205	14	191	465.06	191	0.00
34	170	0.18	53	244	14	230	465.07	230	0.01
35	175	0.18	53	283	14	269	465.08	269	0.01
36	180	0.18	53	322	14	308	465.09	308	0.01
37	185	0.18	53	362	14	348	465.10	348	0.01
38	190	0.24	73	421	14	407	465.12	407	0.01
39	195	0.24	73	480	14	466	465.14	466	0.01
40	200	0.24	73	540	14	526	465.16	526	0.01
41	205	0.31	94	619	14	605	465.18	605	0.01
42	210	0.38	114	719	14	705	465.21	705	0.02
43	215	0.45	134	838	14	824	465.25	824	0.02
44	220	0.45	134	958	14	944	465.28	944	0.02
45	225	0.51	154	1,098	14	1,084	465.32	1,084	0.02
46	230	0.51	154	1,237	14	1,223	465.36	1,223	0.03
47	235	0.58	174	1,397	14	1,383	465.41	1,383	0.03
48	240	0.58	174	1,557	14	1,543	465.46	1,543	0.04
49	245	0.65	194	1,737	14	1,723	465.51	1,723	0.04
50	250	0.71	214	1,937	14	1,923	465.57	1,923	0.04
51	255	0.78	234	2,158	14	2,144	465.64	2,144	0.05
52	260	0.85	254	2,398	14	2,384	465.71	2,384	0.05
53	265	0.92	275	2,658	14	2,644	465.79	2,644	0.06
54	270	0.92	275	2,919	14	2,905	465.86	2,905	0.07
55	275	0.98	295	3,200	14	3,185	465.95	3,185	0.07

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.05	315	3,500	14	3,486	466.03	3,486	0.08
57	285	1.12	335	3,821	14	3,807	466.11	3,807	0.09
58	290	1.12	335	4,142	14	4,128	466.19	4,128	0.09
59	295	1.18	355	4,483	14	4,469	466.27	4,469	0.10
60	300	1.25	375	4,844	14	4,830	466.36	4,830	0.11
61	305	1.59	476	5,306	14	5,291	466.47	5,291	0.12
62	310	1.92	576	5,868	14	5,854	466.61	5,854	0.13
63	315	2.12	637	6,490	14	6,476	466.77	6,476	0.15
64	320	2.32	697	7,173	14	7,159	466.93	7,159	0.16
65	325	2.66	798	7,957	14	7,943	467.11	7,943	0.18
66	330	3.26	979	8,921	14	8,907	467.31	8,907	0.20
67	335	0.78	234	9,142	14	9,127	467.35	9,127	0.21
68	340	0.11	33	9,161	14	9,147	467.36	9,147	0.21
69	345	0.04	12	9,159	14	9,145	467.36	9,145	0.21
70	350	0.03	10	9,155	14	9,140	467.36	9,140	0.21
71	355	0.02	6	9,147	14	9,132	467.35	9,132	0.21
72	360	0.01	4	9,136	14	9,122	467.35	9,122	0.21

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.01	6	6	42	-	465.00	-	0.00
2	30	0.01	10	10	42	-	465.00	-	0.00
3	45	0.01	10	10	42	-	465.00	-	0.00
4	60	0.01	13	13	42	-	465.00	-	0.00
5	75	0.01	10	10	42	-	465.00	-	0.00
6	90	0.01	10	10	42	-	465.00	-	0.00
7	105	0.01	10	10	42	-	465.00	-	0.00
8	120	0.01	13	13	42	-	465.00	-	0.00
9	135	0.01	13	13	42	-	465.00	-	0.00
10	150	0.01	13	13	42	-	465.00	-	0.00
11	165	0.02	16	16	42	-	465.00	-	0.00
12	180	0.02	16	16	42	-	465.00	-	0.00
13	195	0.02	16	16	42	-	465.00	-	0.00
14	210	0.02	16	16	42	-	465.00	-	0.00
15	225	0.02	16	16	42	-	465.00	-	0.00
16	240	0.02	19	19	42	-	465.00	-	0.00
17	255	0.02	19	19	42	-	465.00	-	0.00
18	270	0.03	23	23	42	-	465.00	-	0.00
19	285	0.03	23	23	42	-	465.00	-	0.00
20	300	0.03	26	26	42	-	465.00	-	0.00
21	315	0.02	19	19	42	-	465.00	-	0.00
22	330	0.03	23	23	42	-	465.00	-	0.00
23	345	0.03	26	26	42	-	465.00	-	0.00
24	360	0.03	26	26	42	-	465.00	-	0.00
25	375	0.03	29	29	42	-	465.00	-	0.00
26	390	0.03	29	29	42	-	465.00	-	0.00
27	405	0.04	32	32	42	-	465.00	-	0.00
28	420	0.04	32	32	42	-	465.00	-	0.00
29	435	0.04	32	32	42	-	465.00	-	0.00
30	450	0.04	36	36	42	-	465.00	-	0.00
31	465	0.04	39	39	42	-	465.00	-	0.00
32	480	0.05	42	42	42	-	465.00	-	0.00
33	495	0.05	49	49	42	6	465.00	6	0.00
34	510	0.05	49	55	42	13	465.00	13	0.00
35	525	0.01	12	24	42	-	465.00	-	0.00
36	540	0.06	51	51	42	9	465.00	9	0.00
37	555	0.14	123	132	42	90	465.03	90	0.00
38	570	0.18	162	252	42	210	465.06	210	0.00
39	585	0.22	202	411	42	369	465.11	369	0.01
40	600	0.27	241	610	42	568	465.17	568	0.01
41	615	0.02	21	589	42	547	465.16	547	0.01
42	630	0.03	28	575	42	532	465.16	532	0.01
43	645	0.22	196	729	42	687	465.20	687	0.02
44	660	0.23	203	889	42	847	465.25	847	0.02
45	675	0.20	177	1,024	42	982	465.29	982	0.02
46	690	0.20	184	1,166	42	1,123	465.33	1,123	0.03
47	705	0.14	125	1,249	42	1,206	465.36	1,206	0.03
48	720	0.18	164	1,370	42	1,328	465.39	1,328	0.03
49	735	0.44	397	1,725	42	1,682	465.50	1,682	0.04
50	750	0.48	435	2,117	42	2,075	465.62	2,075	0.05
51	765	0.56	506	2,581	42	2,539	465.76	2,539	0.06
52	780	0.60	544	3,083	42	3,041	465.90	3,041	0.07
53	795	0.79	712	3,753	42	3,711	466.09	3,711	0.09
54	810	0.80	718	4,428	42	4,386	466.25	4,386	0.10
55	825	0.41	368	4,754	42	4,712	466.33	4,712	0.11
56	840	0.42	374	5,085	42	5,043	466.41	5,043	0.12
57	855	0.57	509	5,551	42	5,509	466.53	5,509	0.13
58	870	0.54	482	5,991	42	5,949	466.64	5,949	0.14

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.54	487	6,436	42	6,394	466.75	6,394	0.15
60	900	0.51	460	6,854	42	6,812	466.85	6,812	0.16
61	915	0.48	433	7,245	42	7,203	466.94	7,203	0.17
62	930	0.45	406	7,609	42	7,567	467.03	7,567	0.17
63	945	0.31	282	7,849	42	7,807	467.08	7,807	0.18
64	960	0.32	287	8,094	42	8,052	467.13	8,052	0.18
65	975	0.01	13	8,065	42	8,022	467.12	8,022	0.18
66	990	0.01	13	8,035	42	7,993	467.12	7,993	0.18
67	1005	0.01	10	8,003	42	7,961	467.11	7,961	0.18
68	1020	0.01	10	7,970	42	7,928	467.10	7,928	0.18
69	1035	0.02	16	7,944	42	7,902	467.10	7,902	0.18
70	1050	0.02	16	7,918	42	7,876	467.09	7,876	0.18
71	1065	0.02	16	7,892	42	7,850	467.09	7,850	0.18
72	1080	0.01	13	7,863	42	7,821	467.08	7,821	0.18
73	1095	0.01	13	7,833	42	7,791	467.08	7,791	0.18
74	1110	0.01	13	7,804	42	7,762	467.07	7,762	0.18
75	1125	0.01	10	7,772	42	7,729	467.06	7,729	0.18
76	1140	0.01	6	7,736	42	7,694	467.06	7,694	0.18
77	1155	0.01	10	7,703	42	7,661	467.05	7,661	0.18
78	1170	0.01	13	7,674	42	7,632	467.04	7,632	0.18
79	1185	0.01	10	7,642	42	7,599	467.04	7,599	0.17
80	1200	0.01	6	7,606	42	7,564	467.03	7,564	0.17
81	1215	0.01	10	7,573	42	7,531	467.02	7,531	0.17
82	1230	0.01	10	7,541	42	7,499	467.01	7,499	0.17
83	1245	0.01	10	7,508	42	7,466	467.01	7,466	0.17
84	1260	0.01	6	7,473	42	7,430	467.00	7,430	0.17
85	1275	0.01	10	7,440	42	7,398	466.99	7,398	0.17
86	1290	0.01	6	7,404	42	7,362	466.98	7,362	0.17
87	1305	0.01	10	7,372	42	7,330	466.98	7,330	0.17
88	1320	0.01	6	7,336	42	7,294	466.97	7,294	0.17
89	1335	0.01	10	7,303	42	7,261	466.96	7,261	0.17
90	1350	0.01	6	7,268	42	7,225	466.95	7,225	0.17
91	1365	0.01	6	7,232	42	7,190	466.94	7,190	0.17
92	1380	0.01	6	7,196	42	7,154	466.93	7,154	0.16
93	1395	0.01	6	7,160	42	7,118	466.92	7,118	0.16
94	1410	0.01	6	7,125	42	7,082	466.92	7,082	0.16
95	1425	0.01	6	7,089	42	7,047	466.91	7,047	0.16
96	1440	0.01	6	7,053	42	7,011	466.90	7,011	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD — PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
BASIC DATA CALCULATION FORM — JOB # 0
SHORTCUT METHOD — BY ES R. BAZUA, P.E. — DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.570	1.00	2.12	2.78	10.570	1.00	2.78	4.47	10.570	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	2.12	SUM [9]	10.57	SUM [11]	2.78	SUM [13]	10.57	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.54	1.64	1.79
FLOOD VOLUME	(cu-ft)	59,174	63,009	68,653
	(acre-ft)	1.36	1.45	1.58
REQUIRED STORAGE	(cu-ft)	56,096	57,661	56,204
	(acre-ft)	1.29	1.32	1.29
PEAK FLOW	(cfs)	20.00	17.69	4.66
MAXIMUM WSEL	(ft)	468.11	468.19	468.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525
C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.19	0.30	0.14	1.44	360.41
2	10	0.17	1.3	0.331	0.19	0.30	0.14	1.44	360.41
3	15	0.25	1.1	0.280	0.19	0.25	0.09	0.91	199.07
4	20	0.33	1.5	0.382	0.19	0.34	0.19	1.98	521.75
5	25	0.42	1.5	0.382	0.19	0.34	0.19	1.98	521.75
6	30	0.50	1.8	0.458	0.19	0.41	0.26	2.79	763.76
7	35	0.58	1.5	0.382	0.19	0.34	0.19	1.98	521.75
8	40	0.67	1.8	0.458	0.19	0.41	0.26	2.79	763.76
9	45	0.75	1.8	0.458	0.19	0.41	0.26	2.79	763.76
10	50	0.83	1.5	0.382	0.19	0.34	0.19	1.98	521.75
11	55	0.92	1.6	0.407	0.19	0.37	0.21	2.25	602.42
12	60	1.00	1.8	0.458	0.19	0.41	0.26	2.79	763.76
13	65	1.08	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
14	70	1.17	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
15	75	1.25	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
16	80	1.33	2.0	0.509	0.19	0.46	0.31	3.33	925.11
17	85	1.42	2.6	0.661	0.19	0.60	0.47	4.94	1409.13
18	90	1.50	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
19	95	1.58	2.4	0.611	0.19	0.55	0.42	4.40	1247.79
20	100	1.67	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
21	105	1.75	3.3	0.840	0.19	0.76	0.65	6.82	1973.82
22	110	1.83	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
23	115	1.92	2.9	0.738	0.19	0.66	0.54	5.75	1651.14
24	120	2.00	3.0	0.763	0.19	0.69	0.57	6.01	1731.81
25	125	2.08	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
26	130	2.17	4.2	1.068	0.19	0.96	0.87	9.24	2699.85
27	135	2.25	5.0	1.272	0.19	1.14	1.08	11.39	3345.21
28	140	2.33	3.5	0.890	0.19	0.80	0.70	7.36	2135.16
29	145	2.42	6.8	1.730	0.19	1.56	1.54	16.23	4797.28
30	150	2.50	7.3	1.857	0.19	1.67	1.66	17.58	5200.63
31	155	2.58	8.2	2.086	0.19	1.88	1.89	20.00	5926.66
32	160	2.67	5.9	1.501	0.19	1.35	1.31	13.81	4071.24
33	165	2.75	2.0	0.509	0.19	0.46	0.31	3.33	925.11
34	170	2.83	1.8	0.458	0.19	0.41	0.26	2.79	763.76
35	175	2.92	1.8	0.458	0.19	0.41	0.26	2.79	763.76
36	180	3.00	0.6	0.153	0.19	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.54
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59173.82
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56095.73
PEAK FLOW RATE (cfs)	20.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.19	0.15	0.02	0.18	0.00
2	10	0.17	0.6	0.200	0.19	0.18	0.01	0.06	0.00
3	15	0.25	0.6	0.200	0.19	0.18	0.01	0.06	0.00
4	20	0.33	0.6	0.200	0.19	0.18	0.01	0.06	0.00
5	25	0.42	0.6	0.200	0.19	0.18	0.01	0.06	0.00
6	30	0.50	0.7	0.234	0.19	0.21	0.04	0.42	52.19
7	35	0.58	0.7	0.234	0.19	0.21	0.04	0.42	52.19
8	40	0.67	0.7	0.234	0.19	0.21	0.04	0.42	52.19
9	45	0.75	0.7	0.234	0.19	0.21	0.04	0.42	52.19
10	50	0.83	0.7	0.234	0.19	0.21	0.04	0.42	52.19
11	55	0.92	0.7	0.234	0.19	0.21	0.04	0.42	52.19
12	60	1.00	0.8	0.267	0.19	0.24	0.07	0.77	157.98
13	65	1.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
14	70	1.17	0.8	0.267	0.19	0.24	0.07	0.77	157.98
15	75	1.25	0.8	0.267	0.19	0.24	0.07	0.77	157.98
16	80	1.33	0.8	0.267	0.19	0.24	0.07	0.77	157.98
17	85	1.42	0.8	0.267	0.19	0.24	0.07	0.77	157.98
18	90	1.50	0.8	0.267	0.19	0.24	0.07	0.77	157.98
19	95	1.58	0.8	0.267	0.19	0.24	0.07	0.77	157.98
20	100	1.67	0.8	0.267	0.19	0.24	0.07	0.77	157.98
21	105	1.75	0.8	0.267	0.19	0.24	0.07	0.77	157.98
22	110	1.83	0.8	0.267	0.19	0.24	0.07	0.77	157.98
23	115	1.92	0.8	0.267	0.19	0.24	0.07	0.77	157.98
24	120	2.00	0.9	0.300	0.19	0.27	0.11	1.12	263.76
25	125	2.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
26	130	2.17	0.9	0.300	0.19	0.27	0.11	1.12	263.76
27	135	2.25	0.9	0.300	0.19	0.27	0.11	1.12	263.76
28	140	2.33	0.9	0.300	0.19	0.27	0.11	1.12	263.76
29	145	2.42	0.9	0.300	0.19	0.27	0.11	1.12	263.76
30	150	2.50	0.9	0.300	0.19	0.27	0.11	1.12	263.76
31	155	2.58	0.9	0.300	0.19	0.27	0.11	1.12	263.76
32	160	2.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
33	165	2.75	1.0	0.334	0.19	0.30	0.14	1.47	369.55
34	170	2.83	1.0	0.334	0.19	0.30	0.14	1.47	369.55
35	175	2.92	1.0	0.334	0.19	0.30	0.14	1.47	369.55
36	180	3.00	1.0	0.334	0.19	0.30	0.14	1.47	369.55
37	185	3.08	1.0	0.334	0.19	0.30	0.14	1.47	369.55
38	190	3.17	1.1	0.367	0.19	0.33	0.17	1.83	475.33
39	195	3.25	1.1	0.367	0.19	0.33	0.17	1.83	475.33
40	200	3.33	1.1	0.367	0.19	0.33	0.17	1.83	475.33
41	205	3.42	1.2	0.400	0.19	0.36	0.21	2.18	581.11
42	210	3.50	1.3	0.434	0.19	0.39	0.24	2.53	686.90
43	215	3.58	1.4	0.467	0.19	0.42	0.27	2.88	792.68
44	220	3.67	1.4	0.467	0.19	0.42	0.27	2.88	792.68
45	225	3.75	1.5	0.500	0.19	0.45	0.31	3.24	898.47
46	230	3.83	1.5	0.500	0.19	0.45	0.31	3.24	898.47
47	235	3.92	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
48	240	4.00	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
49	245	4.08	1.7	0.567	0.19	0.51	0.37	3.94	1110.04
50	250	4.17	1.8	0.600	0.19	0.54	0.41	4.29	1215.82
51	255	4.25	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
52	260	4.33	2.0	0.667	0.19	0.60	0.47	5.00	1427.39
53	265	4.42	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
54	270	4.50	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
55	275	4.58	2.2	0.734	0.19	0.66	0.54	5.71	1638.96
56	280	4.67	2.3	0.767	0.19	0.69	0.57	6.06	1744.75

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
58	290	4.83	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
59	295	4.92	2.5	0.834	0.19	0.75	0.64	6.76	1956.31
60	300	5.00	2.6	0.867	0.19	0.78	0.67	7.12	2062.10
61	305	5.08	3.1	1.034	0.19	0.93	0.84	8.88	2591.02
62	310	5.17	3.6	1.201	0.19	1.08	1.01	10.64	3119.94
63	315	5.25	3.9	1.301	0.19	1.17	1.11	11.70	3437.30
64	320	5.33	4.2	1.401	0.19	1.26	1.21	12.76	3754.65
65	325	5.42	4.7	1.568	0.19	1.41	1.37	14.52	4283.57
66	330	5.50	5.6	1.868	0.19	1.68	1.67	17.69	5235.64
67	335	5.58	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
68	340	5.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
69	345	5.75	0.6	0.200	0.19	0.18	0.01	0.06	0.00
70	350	5.83	0.5	0.167	0.19	0.15	0.02	0.18	0.00
71	355	5.92	0.3	0.100	0.19	0.09	0.01	0.11	0.00
72	360	6.00	0.2	0.067	0.19	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.64
FLOOD VOLUME (acft)	1.45
FLOOD VOLUME (cuft)	63008.73
REQUIRED STORAGE (acft)	1.32
REQUIRED STORAGE (cuft)	57661.37
PEAK FLOW RATE (cfs)	17.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.343	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.339	0.048	0.005	0.06	0.00
3	45	0.75	0.3	0.054	0.335	0.048	0.005	0.06	0.00
4	60	1.00	0.4	0.072	0.331	0.064	0.007	0.08	0.00
5	75	1.25	0.3	0.054	0.327	0.048	0.005	0.06	0.00
6	90	1.50	0.3	0.054	0.323	0.048	0.005	0.06	0.00
7	105	1.75	0.3	0.054	0.319	0.048	0.005	0.06	0.00
8	120	2.00	0.4	0.072	0.316	0.064	0.007	0.08	0.00
9	135	2.25	0.4	0.072	0.312	0.064	0.007	0.08	0.00
10	150	2.50	0.4	0.072	0.308	0.064	0.007	0.08	0.00
11	165	2.75	0.5	0.089	0.304	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.300	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.297	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.293	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.289	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.286	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.278	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.275	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.271	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.268	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.264	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.261	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.257	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.254	0.145	0.016	0.17	0.00
26	390	6.50	0.9	0.161	0.251	0.145	0.016	0.17	0.00
27	405	6.75	1.0	0.179	0.247	0.161	0.018	0.19	0.00
28	420	7.00	1.0	0.179	0.244	0.161	0.018	0.19	0.00
29	435	7.25	1.0	0.179	0.241	0.161	0.018	0.19	0.00
30	450	7.50	1.1	0.197	0.237	0.177	0.020	0.21	0.00
31	465	7.75	1.2	0.215	0.234	0.193	0.021	0.23	0.00
32	480	8.00	1.3	0.232	0.231	0.209	0.002	0.02	0.00
33	495	8.25	1.5	0.268	0.228	0.241	0.041	0.43	167.88
34	510	8.50	1.5	0.268	0.224	0.241	0.044	0.46	198.07
35	525	8.75	1.6	0.286	0.221	0.257	0.065	0.68	398.09
36	540	9.00	1.7	0.304	0.218	0.274	0.086	0.91	597.84
37	555	9.25	1.9	0.340	0.215	0.306	0.125	1.32	967.41
38	570	9.50	2.0	0.358	0.212	0.322	0.146	1.54	1166.63
39	585	9.75	2.1	0.375	0.209	0.338	0.166	1.76	1365.57
40	600	10.00	2.2	0.393	0.206	0.354	0.187	1.98	1564.23
41	615	10.25	1.5	0.268	0.203	0.241	0.065	0.69	401.88
42	630	10.50	1.5	0.268	0.200	0.241	0.068	0.72	429.90
43	645	10.75	2.0	0.358	0.197	0.322	0.160	1.70	1308.09
44	660	11.00	2.0	0.358	0.194	0.322	0.163	1.73	1335.54
45	675	11.25	1.9	0.340	0.191	0.306	0.148	1.57	1192.62
46	690	11.50	1.9	0.340	0.189	0.306	0.151	1.60	1219.49
47	705	11.75	1.7	0.304	0.186	0.274	0.118	1.25	905.90
48	720	12.00	1.8	0.322	0.183	0.290	0.139	1.47	1102.28
49	735	12.25	2.5	0.447	0.180	0.402	0.267	2.82	2318.92
50	750	12.50	2.6	0.465	0.178	0.418	0.287	3.04	2514.71
51	765	12.75	2.8	0.501	0.175	0.451	0.326	3.44	2880.29
52	780	13.00	2.9	0.519	0.172	0.467	0.346	3.66	3075.47
53	795	13.25	3.4	0.608	0.170	0.547	0.438	4.63	3950.71
54	810	13.50	3.4	0.608	0.167	0.547	0.441	4.66	3975.18
55	825	13.75	2.3	0.411	0.165	0.370	0.247	2.61	2128.32
56	840	14.00	2.3	0.411	0.162	0.370	0.249	2.63	2152.16
57	855	14.25	2.7	0.483	0.160	0.434	0.323	3.42	2856.04
58	870	14.50	2.6	0.465	0.157	0.418	0.308	3.25	2709.14
59	885	14.75	2.6	0.465	0.155	0.418	0.310	3.28	2732.00
60	900	15.00	2.5	0.447	0.152	0.402	0.295	3.11	2584.44
61	915	15.25	2.4	0.429	0.150	0.386	0.279	2.95	2436.54
62	930	15.50	2.3	0.411	0.148	0.370	0.263	2.78	2288.29
63	945	15.75	1.9	0.340	0.146	0.306	0.194	2.05	1629.43
64	960	16.00	1.9	0.340	0.143	0.306	0.196	2.08	1650.58
65	975	16.25	0.4	0.072	0.141	0.064	0.007	0.08	0.00
66	990	16.50	0.4	0.072	0.139	0.064	0.007	0.08	0.00
67	1005	16.75	0.3	0.054	0.137	0.048	0.005	0.06	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.135	0.048	0.005	0.06	0.00
69	1035	17.25	0.5	0.089	0.133	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.131	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.129	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.127	0.064	0.007	0.08	0.00
73	1095	18.25	0.4	0.072	0.125	0.064	0.007	0.08	0.00
74	1110	18.50	0.4	0.072	0.123	0.064	0.007	0.08	0.00
75	1125	18.75	0.3	0.054	0.121	0.048	0.005	0.06	0.00
76	1140	19.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.118	0.048	0.005	0.06	0.00
78	1170	19.50	0.4	0.072	0.116	0.064	0.007	0.08	0.00
79	1185	19.75	0.3	0.054	0.115	0.048	0.005	0.06	0.00
80	1200	20.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.112	0.048	0.005	0.06	0.00
82	1230	20.50	0.3	0.054	0.110	0.048	0.005	0.06	0.00
83	1245	20.75	0.3	0.054	0.109	0.048	0.005	0.06	0.00
84	1260	21.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.106	0.048	0.005	0.06	0.00
86	1290	21.50	0.2	0.036	0.105	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.104	0.048	0.005	0.06	0.00
88	1320	22.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.102	0.048	0.005	0.06	0.00
90	1350	22.50	0.2	0.036	0.101	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.100	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.099	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.099	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.098	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.097	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.097	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.79
FLOOD VOLUME (acft)	1.58
FLOOD VOLUME (cuft)	68652.95
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56203.65
PEAK FLOW (cfs)	4.66

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.44	433	433	73	360	465.02	360	0.01
2	10	1.44	433	793	73	721	465.04	721	0.02
3	15	0.91	272	992	73	920	465.06	920	0.02
4	20	1.98	594	1,514	73	1,442	465.09	1,442	0.03
5	25	1.98	594	2,036	73	1,963	465.12	1,963	0.05
6	30	2.79	836	2,800	73	2,727	465.17	2,727	0.06
7	35	1.98	594	3,322	73	3,249	465.20	3,249	0.07
8	40	2.79	836	4,085	73	4,013	465.25	4,013	0.09
9	45	2.79	836	4,849	73	4,776	465.29	4,776	0.11
10	50	1.98	594	5,371	73	5,298	465.32	5,298	0.12
11	55	2.25	675	5,973	73	5,901	465.36	5,901	0.14
12	60	2.79	836	6,737	73	6,664	465.41	6,664	0.15
13	65	3.86	1,159	7,823	73	7,751	465.47	7,751	0.18
14	70	3.86	1,159	8,910	73	8,837	465.54	8,837	0.20
15	75	3.86	1,159	9,996	73	9,924	465.61	9,924	0.23
16	80	3.33	998	10,921	73	10,849	465.66	10,849	0.25
17	85	4.94	1,482	12,331	73	12,258	465.75	12,258	0.28
18	90	5.21	1,562	13,820	73	13,748	465.84	13,748	0.32
19	95	4.40	1,320	15,068	73	14,996	465.92	14,996	0.34
20	100	5.21	1,562	16,558	73	16,485	466.01	16,485	0.38
21	105	6.82	2,046	18,532	73	18,459	466.12	18,459	0.42
22	110	6.28	1,885	20,344	73	20,272	466.22	20,272	0.47
23	115	5.75	1,724	21,995	73	21,923	466.31	21,923	0.50
24	120	6.01	1,804	23,727	73	23,655	466.41	23,655	0.54
25	125	6.28	1,885	25,540	73	25,467	466.51	25,467	0.58
26	130	9.24	2,772	28,239	73	28,167	466.66	28,167	0.65
27	135	11.39	3,418	31,585	73	31,512	466.85	31,512	0.72
28	140	7.36	2,208	33,720	73	33,647	466.96	33,647	0.77
29	145	16.23	4,870	38,517	73	38,445	467.21	38,445	0.88
30	150	17.58	5,273	43,718	73	43,645	467.48	43,645	1.00
31	155	20.00	5,999	49,644	73	49,572	467.78	49,572	1.14
32	160	13.81	4,144	53,716	73	53,643	467.99	53,643	1.23
33	165	3.33	998	54,641	73	54,568	468.04	54,568	1.25
34	170	2.79	836	55,405	73	55,332	468.07	55,332	1.27
35	175	2.79	836	56,168	73	56,096	468.11	56,096	1.29
36	180	0.16	48	56,144	73	56,072	468.11	56,072	1.29

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	53	53	73	-	465.00	-	0.00
2	10	0.06	19	19	73	-	465.00	-	0.00
3	15	0.06	19	19	73	-	465.00	-	0.00
4	20	0.06	19	19	73	-	465.00	-	0.00
5	25	0.06	19	19	73	-	465.00	-	0.00
6	30	0.42	125	125	73	52	465.00	52	0.00
7	35	0.42	125	177	73	104	465.01	104	0.00
8	40	0.42	125	229	73	157	465.01	157	0.00
9	45	0.42	125	281	73	209	465.01	209	0.00
10	50	0.42	125	334	73	261	465.02	261	0.01
11	55	0.42	125	386	73	313	465.02	313	0.01
12	60	0.77	231	544	73	471	465.03	471	0.01
13	65	0.77	231	702	73	629	465.04	629	0.01
14	70	0.77	231	860	73	787	465.05	787	0.02
15	75	0.77	231	1,018	73	945	465.06	945	0.02
16	80	0.77	231	1,176	73	1,103	465.07	1,103	0.03
17	85	0.77	231	1,334	73	1,261	465.08	1,261	0.03
18	90	0.77	231	1,492	73	1,419	465.09	1,419	0.03
19	95	0.77	231	1,650	73	1,577	465.10	1,577	0.04
20	100	0.77	231	1,808	73	1,735	465.11	1,735	0.04
21	105	0.77	231	1,966	73	1,893	465.12	1,893	0.04
22	110	0.77	231	2,123	73	2,051	465.13	2,051	0.05
23	115	0.77	231	2,281	73	2,209	465.14	2,209	0.05
24	120	1.12	336	2,545	73	2,473	465.15	2,473	0.06
25	125	0.77	231	2,703	73	2,631	465.16	2,631	0.06
26	130	1.12	336	2,967	73	2,894	465.18	2,894	0.07
27	135	1.12	336	3,231	73	3,158	465.19	3,158	0.07
28	140	1.12	336	3,494	73	3,422	465.21	3,422	0.08
29	145	1.12	336	3,758	73	3,686	465.23	3,686	0.08
30	150	1.12	336	4,022	73	3,949	465.24	3,949	0.09
31	155	1.12	336	4,286	73	4,213	465.26	4,213	0.10
32	160	1.12	336	4,550	73	4,477	465.27	4,477	0.10
33	165	1.47	442	4,919	73	4,846	465.30	4,846	0.11
34	170	1.47	442	5,289	73	5,216	465.32	5,216	0.12
35	175	1.47	442	5,658	73	5,586	465.34	5,586	0.13
36	180	1.47	442	6,028	73	5,955	465.36	5,955	0.14
37	185	1.47	442	6,397	73	6,325	465.39	6,325	0.15
38	190	1.83	548	6,873	73	6,800	465.42	6,800	0.16
39	195	1.83	548	7,348	73	7,275	465.44	7,275	0.17
40	200	1.83	548	7,823	73	7,751	465.47	7,751	0.18
41	205	2.18	654	8,404	73	8,332	465.51	8,332	0.19
42	210	2.53	759	9,091	73	9,019	465.55	9,019	0.21
43	215	2.88	865	9,884	73	9,811	465.60	9,811	0.23
44	220	2.88	865	10,677	73	10,604	465.65	10,604	0.24
45	225	3.24	971	11,575	73	11,503	465.70	11,503	0.26
46	230	3.24	971	12,474	73	12,401	465.76	12,401	0.28
47	235	3.59	1,077	13,478	73	13,405	465.82	13,405	0.31
48	240	3.59	1,077	14,482	73	14,409	465.88	14,409	0.33
49	245	3.94	1,183	15,592	73	15,520	465.95	15,520	0.36
50	250	4.29	1,288	16,808	73	16,735	466.02	16,735	0.38
51	255	4.65	1,394	18,130	73	18,057	466.09	18,057	0.41
52	260	5.00	1,500	19,557	73	19,484	466.17	19,484	0.45
53	265	5.35	1,606	21,090	73	21,018	466.26	21,018	0.48
54	270	5.35	1,606	22,623	73	22,551	466.35	22,551	0.52
55	275	5.71	1,712	24,262	73	24,190	466.44	24,190	0.56

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	6.06	1,817	26,007	73	25,934	466.53	25,934	0.60
57	285	6.41	1,923	27,858	73	27,785	466.64	27,785	0.64
58	290	6.41	1,923	29,708	73	29,635	466.74	29,635	0.68
59	295	6.76	2,029	31,664	73	31,592	466.85	31,592	0.73
60	300	7.12	2,135	33,726	73	33,654	466.97	33,654	0.77
61	305	8.88	2,664	36,317	73	36,245	467.10	36,245	0.83
62	310	10.64	3,193	39,437	73	39,365	467.26	39,365	0.90
63	315	11.70	3,510	42,875	73	42,802	467.44	42,802	0.98
64	320	12.76	3,827	46,629	73	46,557	467.63	46,557	1.07
65	325	14.52	4,356	50,913	73	50,840	467.85	50,840	1.17
66	330	17.69	5,308	56,149	73	56,076	468.11	56,076	1.29
67	335	4.65	1,394	57,470	73	57,398	468.17	57,398	1.32
68	340	1.12	336	57,734	73	57,661	468.19	57,661	1.32
69	345	0.06	19	57,680	73	57,608	468.18	57,608	1.32
70	350	0.18	53	57,661	73	57,588	468.18	57,588	1.32
71	355	0.11	32	57,620	73	57,547	468.18	57,547	1.32
72	360	0.07	21	57,568	73	57,496	468.18	57,496	1.32

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	34	34	218	-	465.00	-	0.00
2	30	0.06	51	51	218	-	465.00	-	0.00
3	45	0.06	51	51	218	-	465.00	-	0.00
4	60	0.08	68	68	218	-	465.00	-	0.00
5	75	0.06	51	51	218	-	465.00	-	0.00
6	90	0.06	51	51	218	-	465.00	-	0.00
7	105	0.06	51	51	218	-	465.00	-	0.00
8	120	0.08	68	68	218	-	465.00	-	0.00
9	135	0.08	68	68	218	-	465.00	-	0.00
10	150	0.08	68	68	218	-	465.00	-	0.00
11	165	0.09	85	85	218	-	465.00	-	0.00
12	180	0.09	85	85	218	-	465.00	-	0.00
13	195	0.09	85	85	218	-	465.00	-	0.00
14	210	0.09	85	85	218	-	465.00	-	0.00
15	225	0.09	85	85	218	-	465.00	-	0.00
16	240	0.11	102	102	218	-	465.00	-	0.00
17	255	0.11	102	102	218	-	465.00	-	0.00
18	270	0.13	119	119	218	-	465.00	-	0.00
19	285	0.13	119	119	218	-	465.00	-	0.00
20	300	0.15	136	136	218	-	465.00	-	0.00
21	315	0.11	102	102	218	-	465.00	-	0.00
22	330	0.13	119	119	218	-	465.00	-	0.00
23	345	0.15	136	136	218	-	465.00	-	0.00
24	360	0.15	136	136	218	-	465.00	-	0.00
25	375	0.17	153	153	218	-	465.00	-	0.00
26	390	0.17	153	153	218	-	465.00	-	0.00
27	405	0.19	170	170	218	-	465.00	-	0.00
28	420	0.19	170	170	218	-	465.00	-	0.00
29	435	0.19	170	170	218	-	465.00	-	0.00
30	450	0.21	187	187	218	-	465.00	-	0.00
31	465	0.23	204	204	218	-	465.00	-	0.00
32	480	0.02	15	15	218	-	465.00	-	0.00
33	495	0.43	386	386	218	168	465.01	168	0.00
34	510	0.46	416	584	218	366	465.02	366	0.01
35	525	0.68	616	982	218	764	465.05	764	0.02
36	540	0.91	816	1,580	218	1,362	465.08	1,362	0.03
37	555	1.32	1,185	2,547	218	2,329	465.14	2,329	0.05
38	570	1.54	1,384	3,714	218	3,496	465.21	3,496	0.08
39	585	1.76	1,583	5,079	218	4,861	465.30	4,861	0.11
40	600	1.98	1,782	6,643	218	6,426	465.39	6,426	0.15
41	615	0.69	620	7,045	218	6,828	465.42	6,828	0.16
42	630	0.72	648	7,475	218	7,257	465.44	7,257	0.17
43	645	1.70	1,526	8,783	218	8,566	465.52	8,566	0.20
44	660	1.73	1,553	10,119	218	9,901	465.61	9,901	0.23
45	675	1.57	1,410	11,311	218	11,094	465.68	11,094	0.25
46	690	1.60	1,437	12,531	218	12,313	465.75	12,313	0.28
47	705	1.25	1,124	13,437	218	13,219	465.81	13,219	0.30
48	720	1.47	1,320	14,539	218	14,321	465.88	14,321	0.33
49	735	2.82	2,537	16,858	218	16,640	466.02	16,640	0.38
50	750	3.04	2,732	19,373	218	19,155	466.16	19,155	0.44
51	765	3.44	3,098	22,253	218	22,035	466.32	22,035	0.51
52	780	3.66	3,293	25,329	218	25,111	466.49	25,111	0.58
53	795	4.63	4,168	29,279	218	29,062	466.71	29,062	0.67
54	810	4.66	4,193	33,254	218	33,037	466.93	33,037	0.76
55	825	2.61	2,346	35,383	218	35,165	467.05	35,165	0.81
56	840	2.63	2,370	37,535	218	37,317	467.16	37,317	0.86
57	855	3.42	3,074	40,391	218	40,173	467.30	40,173	0.92
58	870	3.25	2,927	43,100	218	42,882	467.44	42,882	0.98

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.28	2,950	45,832	218	45,614	467.58	45,614	1.05
60	900	3.11	2,802	48,417	218	48,199	467.71	48,199	1.11
61	915	2.95	2,654	50,853	218	50,635	467.84	50,635	1.16
62	930	2.78	2,506	53,141	218	52,924	467.95	52,924	1.21
63	945	2.05	1,847	54,771	218	54,553	468.04	54,553	1.25
64	960	2.08	1,868	56,421	218	56,204	468.12	56,204	1.29
65	975	0.08	68	56,272	218	56,054	468.11	56,054	1.29
66	990	0.08	68	56,122	218	55,904	468.10	55,904	1.28
67	1005	0.06	51	55,955	218	55,738	468.09	55,738	1.28
68	1020	0.06	51	55,789	218	55,571	468.08	55,571	1.28
69	1035	0.09	85	55,656	218	55,438	468.08	55,438	1.27
70	1050	0.09	85	55,523	218	55,305	468.07	55,305	1.27
71	1065	0.09	85	55,390	218	55,173	468.07	55,173	1.27
72	1080	0.08	68	55,241	218	55,023	468.06	55,023	1.26
73	1095	0.08	68	55,091	218	54,873	468.05	54,873	1.26
74	1110	0.08	68	54,941	218	54,724	468.04	54,724	1.26
75	1125	0.06	51	54,775	218	54,557	468.04	54,557	1.25
76	1140	0.04	34	54,591	218	54,373	468.03	54,373	1.25
77	1155	0.06	51	54,424	218	54,206	468.02	54,206	1.24
78	1170	0.08	68	54,274	218	54,057	468.01	54,057	1.24
79	1185	0.06	51	54,108	218	53,890	468.00	53,890	1.24
80	1200	0.04	34	53,924	218	53,706	467.99	53,706	1.23
81	1215	0.06	51	53,757	218	53,539	467.99	53,539	1.23
82	1230	0.06	51	53,590	218	53,373	467.98	53,373	1.23
83	1245	0.06	51	53,424	218	53,206	467.97	53,206	1.22
84	1260	0.04	34	53,240	218	53,022	467.96	53,022	1.22
85	1275	0.06	51	53,073	218	52,856	467.95	52,856	1.21
86	1290	0.04	34	52,890	218	52,672	467.94	52,672	1.21
87	1305	0.06	51	52,723	218	52,505	467.93	52,505	1.21
88	1320	0.04	34	52,539	218	52,321	467.92	52,321	1.20
89	1335	0.06	51	52,372	218	52,155	467.92	52,155	1.20
90	1350	0.04	34	52,189	218	51,971	467.91	51,971	1.19
91	1365	0.04	34	52,005	218	51,787	467.90	51,787	1.19
92	1380	0.04	34	51,821	218	51,603	467.89	51,603	1.18
93	1395	0.04	34	51,637	218	51,420	467.88	51,420	1.18
94	1410	0.04	34	51,454	218	51,236	467.87	51,236	1.18
95	1425	0.04	34	51,270	218	51,052	467.86	51,052	1.17
96	1440	0.04	34	51,086	218	50,869	467.85	50,869	1.17

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.250	1.00	2.12	2.78	10.250	1.00	2.78	4.47	10.250	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	2.12	SUM [9]	10.25	SUM [11]	2.78	SUM [13]	10.25	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	56,125	59,056	63,525
	(acre-ft)	1.29	1.36	1.46
REQUIRED STORAGE	(cu-ft)	53,172	53,709	51,340
	(acre-ft)	1.22	1.23	1.18
PEAK FLOW	(cfs)	19.27	17.04	4.42
MAXIMUM WSEL	(ft)	468.04	468.07	467.95

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561
C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.21	0.30	0.12	1.28	314.48
2	10	0.17	1.3	0.331	0.21	0.30	0.12	1.28	314.48
3	15	0.25	1.1	0.280	0.21	0.25	0.07	0.76	158.02
4	20	0.33	1.5	0.382	0.21	0.34	0.18	1.80	470.93
5	25	0.42	1.5	0.382	0.21	0.34	0.18	1.80	470.93
6	30	0.50	1.8	0.458	0.21	0.41	0.25	2.58	705.62
7	35	0.58	1.5	0.382	0.21	0.34	0.18	1.80	470.93
8	40	0.67	1.8	0.458	0.21	0.41	0.25	2.58	705.62
9	45	0.75	1.8	0.458	0.21	0.41	0.25	2.58	705.62
10	50	0.83	1.5	0.382	0.21	0.34	0.18	1.80	470.93
11	55	0.92	1.6	0.407	0.21	0.37	0.20	2.06	549.16
12	60	1.00	1.8	0.458	0.21	0.41	0.25	2.58	705.62
13	65	1.08	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
14	70	1.17	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
15	75	1.25	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
16	80	1.33	2.0	0.509	0.21	0.46	0.30	3.11	862.07
17	85	1.42	2.6	0.661	0.21	0.60	0.46	4.67	1331.44
18	90	1.50	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
19	95	1.58	2.4	0.611	0.21	0.55	0.40	4.15	1174.98
20	100	1.67	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
21	105	1.75	3.3	0.840	0.21	0.76	0.63	6.50	1879.04
22	110	1.83	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
23	115	1.92	2.9	0.738	0.21	0.66	0.53	5.45	1566.12
24	120	2.00	3.0	0.763	0.21	0.69	0.56	5.71	1644.35
25	125	2.08	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
26	130	2.17	4.2	1.068	0.21	0.96	0.86	8.84	2583.09
27	135	2.25	5.0	1.272	0.21	1.14	1.07	10.93	3208.91
28	140	2.33	3.5	0.890	0.21	0.80	0.68	7.02	2035.49
29	145	2.42	6.8	1.730	0.21	1.56	1.52	15.62	4617.02
30	150	2.50	7.3	1.857	0.21	1.67	1.65	16.93	5008.16
31	155	2.58	8.2	2.086	0.21	1.88	1.88	19.27	5712.21
32	160	2.67	5.9	1.501	0.21	1.35	1.30	13.28	3912.96
33	165	2.75	2.0	0.509	0.21	0.46	0.30	3.11	862.07
34	170	2.83	1.8	0.458	0.21	0.41	0.25	2.58	705.62
35	175	2.92	1.8	0.458	0.21	0.41	0.25	2.58	705.62
36	180	3.00	0.6	0.153	0.21	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.29
FLOOD VOLUME (cuft)	56125.24
REQUIRED STORAGE (acft)	1.22
REQUIRED STORAGE (cuft)	53171.53
PEAK FLOW RATE (cfs)	19.27

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.21	0.15	0.02	0.17	0.00
2	10	0.17	0.6	0.200	0.21	0.18	0.02	0.21	0.00
3	15	0.25	0.6	0.200	0.21	0.18	0.02	0.21	0.00
4	20	0.33	0.6	0.200	0.21	0.18	0.02	0.21	0.00
5	25	0.42	0.6	0.200	0.21	0.18	0.02	0.21	0.00
6	30	0.50	0.7	0.234	0.21	0.21	0.03	0.28	15.59
7	35	0.58	0.7	0.234	0.21	0.21	0.03	0.28	15.59
8	40	0.67	0.7	0.234	0.21	0.21	0.03	0.28	15.59
9	45	0.75	0.7	0.234	0.21	0.21	0.03	0.28	15.59
10	50	0.83	0.7	0.234	0.21	0.21	0.03	0.28	15.59
11	55	0.92	0.7	0.234	0.21	0.21	0.03	0.28	15.59
12	60	1.00	0.8	0.267	0.21	0.24	0.06	0.63	118.17
13	65	1.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
14	70	1.17	0.8	0.267	0.21	0.24	0.06	0.63	118.17
15	75	1.25	0.8	0.267	0.21	0.24	0.06	0.63	118.17
16	80	1.33	0.8	0.267	0.21	0.24	0.06	0.63	118.17
17	85	1.42	0.8	0.267	0.21	0.24	0.06	0.63	118.17
18	90	1.50	0.8	0.267	0.21	0.24	0.06	0.63	118.17
19	95	1.58	0.8	0.267	0.21	0.24	0.06	0.63	118.17
20	100	1.67	0.8	0.267	0.21	0.24	0.06	0.63	118.17
21	105	1.75	0.8	0.267	0.21	0.24	0.06	0.63	118.17
22	110	1.83	0.8	0.267	0.21	0.24	0.06	0.63	118.17
23	115	1.92	0.8	0.267	0.21	0.24	0.06	0.63	118.17
24	120	2.00	0.9	0.300	0.21	0.27	0.09	0.97	220.75
25	125	2.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
26	130	2.17	0.9	0.300	0.21	0.27	0.09	0.97	220.75
27	135	2.25	0.9	0.300	0.21	0.27	0.09	0.97	220.75
28	140	2.33	0.9	0.300	0.21	0.27	0.09	0.97	220.75
29	145	2.42	0.9	0.300	0.21	0.27	0.09	0.97	220.75
30	150	2.50	0.9	0.300	0.21	0.27	0.09	0.97	220.75
31	155	2.58	0.9	0.300	0.21	0.27	0.09	0.97	220.75
32	160	2.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
33	165	2.75	1.0	0.334	0.21	0.30	0.13	1.31	323.33
34	170	2.83	1.0	0.334	0.21	0.30	0.13	1.31	323.33
35	175	2.92	1.0	0.334	0.21	0.30	0.13	1.31	323.33
36	180	3.00	1.0	0.334	0.21	0.30	0.13	1.31	323.33
37	185	3.08	1.0	0.334	0.21	0.30	0.13	1.31	323.33
38	190	3.17	1.1	0.367	0.21	0.33	0.16	1.65	425.91
39	195	3.25	1.1	0.367	0.21	0.33	0.16	1.65	425.91
40	200	3.33	1.1	0.367	0.21	0.33	0.16	1.65	425.91
41	205	3.42	1.2	0.400	0.21	0.36	0.19	1.99	528.50
42	210	3.50	1.3	0.434	0.21	0.39	0.23	2.34	631.08
43	215	3.58	1.4	0.467	0.21	0.42	0.26	2.68	733.66
44	220	3.67	1.4	0.467	0.21	0.42	0.26	2.68	733.66
45	225	3.75	1.5	0.500	0.21	0.45	0.29	3.02	836.24
46	230	3.83	1.5	0.500	0.21	0.45	0.29	3.02	836.24
47	235	3.92	1.6	0.534	0.21	0.48	0.33	3.36	938.82
48	240	4.00	1.6	0.534	0.21	0.48	0.33	3.36	938.82
49	245	4.08	1.7	0.567	0.21	0.51	0.36	3.70	1041.41
50	250	4.17	1.8	0.600	0.21	0.54	0.39	4.05	1143.99
51	255	4.25	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
52	260	4.33	2.0	0.667	0.21	0.60	0.46	4.73	1349.15
53	265	4.42	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
54	270	4.50	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
55	275	4.58	2.2	0.734	0.21	0.66	0.53	5.41	1554.32
56	280	4.67	2.3	0.767	0.21	0.69	0.56	5.76	1656.90

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
58	290	4.83	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
59	295	4.92	2.5	0.834	0.21	0.75	0.63	6.44	1862.06
60	300	5.00	2.6	0.867	0.21	0.78	0.66	6.78	1964.64
61	305	5.08	3.1	1.034	0.21	0.93	0.83	8.49	2477.55
62	310	5.17	3.6	1.201	0.21	1.08	1.00	10.20	2990.46
63	315	5.25	3.9	1.301	0.21	1.17	1.10	11.23	3298.21
64	320	5.33	4.2	1.401	0.21	1.26	1.20	12.25	3605.96
65	325	5.42	4.7	1.568	0.21	1.41	1.36	13.96	4118.87
66	330	5.50	5.6	1.868	0.21	1.68	1.66	17.04	5042.10
67	335	5.58	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
68	340	5.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
69	345	5.75	0.6	0.200	0.21	0.18	0.02	0.21	0.00
70	350	5.83	0.5	0.167	0.21	0.15	0.02	0.17	0.00
71	355	5.92	0.3	0.100	0.21	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.21	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59055.81
REQUIRED STORAGE (acft)	1.23
REQUIRED STORAGE (cuft)	53709.02
PEAK FLOW RATE (cfs)	17.04

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.363	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.359	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.355	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.351	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.347	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.343	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.338	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.334	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.330	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.326	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.322	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.318	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.314	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.310	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.307	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.303	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.299	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.295	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.291	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.288	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.284	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.280	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.276	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.273	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.269	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.266	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.262	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.258	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.255	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.252	0.177	0.020	0.20	0.00
31	465	7.75	1.2	0.215	0.248	0.193	0.021	0.22	0.00
32	480	8.00	1.3	0.232	0.245	0.209	0.023	0.24	5.05
33	495	8.25	1.5	0.268	0.241	0.241	0.027	0.28	39.29
34	510	8.50	1.5	0.268	0.238	0.241	0.030	0.31	70.31
35	525	8.75	1.6	0.286	0.235	0.257	0.052	0.53	266.00
36	540	9.00	1.7	0.304	0.231	0.274	0.073	0.75	461.42
37	555	9.25	1.9	0.340	0.228	0.306	0.112	1.15	821.51
38	570	9.50	2.0	0.358	0.225	0.322	0.133	1.36	1016.37
39	585	9.75	2.1	0.375	0.222	0.338	0.154	1.58	1210.96
40	600	10.00	2.2	0.393	0.218	0.354	0.175	1.79	1405.26
41	615	10.25	1.5	0.268	0.215	0.241	0.053	0.54	279.74
42	630	10.50	1.5	0.268	0.212	0.241	0.056	0.58	308.53
43	645	10.75	2.0	0.358	0.209	0.322	0.149	1.52	1161.74
44	660	11.00	2.0	0.358	0.206	0.322	0.152	1.55	1189.95
45	675	11.25	1.9	0.340	0.203	0.306	0.137	1.40	1052.92
46	690	11.50	1.9	0.340	0.200	0.306	0.140	1.43	1080.54
47	705	11.75	1.7	0.304	0.197	0.274	0.107	1.10	777.97
48	720	12.00	1.8	0.322	0.194	0.290	0.128	1.31	969.93
49	735	12.25	2.5	0.447	0.191	0.402	0.256	2.62	2151.25
50	750	12.50	2.6	0.465	0.188	0.418	0.277	2.84	2342.59
51	765	12.75	2.8	0.501	0.185	0.451	0.315	3.23	2698.57
52	780	13.00	2.9	0.519	0.183	0.467	0.336	3.44	2889.30
53	795	13.25	3.4	0.608	0.180	0.547	0.428	4.39	3739.48
54	810	13.50	3.4	0.608	0.177	0.547	0.431	4.42	3764.62
55	825	13.75	2.3	0.411	0.174	0.370	0.237	2.43	1975.07
56	840	14.00	2.3	0.411	0.172	0.370	0.239	2.45	1999.56
57	855	14.25	2.7	0.483	0.169	0.434	0.314	3.21	2683.50
58	870	14.50	2.6	0.465	0.167	0.418	0.298	3.06	2542.39
59	885	14.75	2.6	0.465	0.164	0.418	0.301	3.08	2565.88
60	900	15.00	2.5	0.447	0.162	0.402	0.285	2.93	2424.08
61	915	15.25	2.4	0.429	0.159	0.386	0.270	2.77	2281.94
62	930	15.50	2.3	0.411	0.157	0.370	0.255	2.61	2139.45
63	945	15.75	1.9	0.340	0.154	0.306	0.185	1.90	1501.78
64	960	16.00	1.9	0.340	0.152	0.306	0.188	1.93	1523.52
65	975	16.25	0.4	0.072	0.150	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.145	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.143	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.141	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.139	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.137	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.133	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.131	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.129	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.127	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.125	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.122	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.117	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.114	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.113	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.109	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.108	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.107	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.106	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.104	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.46
FLOOD VOLUME (cuft)	63525.46
REQUIRED STORAGE (acft)	1.18
REQUIRED STORAGE (cuft)	51340.48
PEAK FLOW (cfs)	4.42

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.28	384	384	70	314	465.02	314	0.01
2	10	1.28	384	699	70	629	465.04	629	0.01
3	15	0.76	228	857	70	787	465.05	787	0.02
4	20	1.80	541	1,328	70	1,258	465.08	1,258	0.03
5	25	1.80	541	1,799	70	1,729	465.11	1,729	0.04
6	30	2.58	775	2,504	70	2,434	465.15	2,434	0.06
7	35	1.80	541	2,975	70	2,905	465.18	2,905	0.07
8	40	2.58	775	3,681	70	3,611	465.23	3,611	0.08
9	45	2.58	775	4,386	70	4,317	465.27	4,317	0.10
10	50	1.80	541	4,857	70	4,788	465.30	4,788	0.11
11	55	2.06	619	5,406	70	5,337	465.34	5,337	0.12
12	60	2.58	775	6,112	70	6,042	465.38	6,042	0.14
13	65	3.63	1,088	7,131	70	7,061	465.45	7,061	0.16
14	70	3.63	1,088	8,149	70	8,079	465.51	8,079	0.19
15	75	3.63	1,088	9,168	70	9,098	465.58	9,098	0.21
16	80	3.11	932	10,030	70	9,960	465.63	9,960	0.23
17	85	4.67	1,401	11,361	70	11,291	465.71	11,291	0.26
18	90	4.93	1,479	12,771	70	12,701	465.80	12,701	0.29
19	95	4.15	1,245	13,946	70	13,876	465.88	13,876	0.32
20	100	4.93	1,479	15,356	70	15,286	465.97	15,286	0.35
21	105	6.50	1,949	17,235	70	17,165	466.08	17,165	0.39
22	110	5.97	1,792	18,957	70	18,887	466.18	18,887	0.43
23	115	5.45	1,636	20,523	70	20,453	466.27	20,453	0.47
24	120	5.71	1,714	22,168	70	22,098	466.36	22,098	0.51
25	125	5.97	1,792	23,890	70	23,820	466.46	23,820	0.55
26	130	8.84	2,653	26,473	70	26,403	466.61	26,403	0.61
27	135	10.93	3,279	29,682	70	29,612	466.79	29,612	0.68
28	140	7.02	2,105	31,718	70	31,648	466.91	31,648	0.73
29	145	15.62	4,687	36,335	70	36,265	467.16	36,265	0.83
30	150	16.93	5,078	41,343	70	41,273	467.42	41,273	0.95
31	155	19.27	5,782	47,055	70	46,985	467.72	46,985	1.08
32	160	13.28	3,983	50,968	70	50,898	467.93	50,898	1.17
33	165	3.11	932	51,830	70	51,760	467.97	51,760	1.19
34	170	2.58	775	52,536	70	52,466	468.01	52,466	1.20
35	175	2.58	775	53,241	70	53,172	468.04	53,172	1.22
36	180	0.16	47	53,218	70	53,149	468.04	53,149	1.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	70	-	465.00	-	0.00
2	10	0.21	62	62	70	-	465.00	-	0.00
3	15	0.21	62	62	70	-	465.00	-	0.00
4	20	0.21	62	62	70	-	465.00	-	0.00
5	25	0.21	62	62	70	-	465.00	-	0.00
6	30	0.28	85	85	70	16	465.00	16	0.00
7	35	0.28	85	101	70	31	465.00	31	0.00
8	40	0.28	85	117	70	47	465.00	47	0.00
9	45	0.28	85	132	70	62	465.00	62	0.00
10	50	0.28	85	148	70	78	465.00	78	0.00
11	55	0.28	85	163	70	94	465.01	94	0.00
12	60	0.63	188	281	70	212	465.01	212	0.00
13	65	0.63	188	400	70	330	465.02	330	0.01
14	70	0.63	188	518	70	448	465.03	448	0.01
15	75	0.63	188	636	70	566	465.04	566	0.01
16	80	0.63	188	754	70	684	465.04	684	0.02
17	85	0.63	188	872	70	803	465.05	803	0.02
18	90	0.63	188	990	70	921	465.06	921	0.02
19	95	0.63	188	1,109	70	1,039	465.07	1,039	0.02
20	100	0.63	188	1,227	70	1,157	465.07	1,157	0.03
21	105	0.63	188	1,345	70	1,275	465.08	1,275	0.03
22	110	0.63	188	1,463	70	1,393	465.09	1,393	0.03
23	115	0.63	188	1,581	70	1,512	465.10	1,512	0.03
24	120	0.97	291	1,802	70	1,732	465.11	1,732	0.04
25	125	0.63	188	1,920	70	1,850	465.12	1,850	0.04
26	130	0.97	291	2,141	70	2,071	465.13	2,071	0.05
27	135	0.97	291	2,362	70	2,292	465.15	2,292	0.05
28	140	0.97	291	2,582	70	2,513	465.16	2,513	0.06
29	145	0.97	291	2,803	70	2,733	465.17	2,733	0.06
30	150	0.97	291	3,024	70	2,954	465.19	2,954	0.07
31	155	0.97	291	3,245	70	3,175	465.20	3,175	0.07
32	160	0.97	291	3,465	70	3,396	465.21	3,396	0.08
33	165	1.31	393	3,789	70	3,719	465.24	3,719	0.09
34	170	1.31	393	4,112	70	4,042	465.26	4,042	0.09
35	175	1.31	393	4,435	70	4,366	465.28	4,366	0.10
36	180	1.31	393	4,759	70	4,689	465.30	4,689	0.11
37	185	1.31	393	5,082	70	5,012	465.32	5,012	0.12
38	190	1.65	496	5,508	70	5,438	465.34	5,438	0.12
39	195	1.65	496	5,934	70	5,864	465.37	5,864	0.13
40	200	1.65	496	6,360	70	6,290	465.40	6,290	0.14
41	205	1.99	598	6,888	70	6,819	465.43	6,819	0.16
42	210	2.34	701	7,519	70	7,450	465.47	7,450	0.17
43	215	2.68	803	8,253	70	8,183	465.52	8,183	0.19
44	220	2.68	803	8,987	70	8,917	465.56	8,917	0.20
45	225	3.02	906	9,823	70	9,753	465.62	9,753	0.22
46	230	3.02	906	10,659	70	10,589	465.67	10,589	0.24
47	235	3.36	1,009	11,598	70	11,528	465.73	11,528	0.26
48	240	3.36	1,009	12,537	70	12,467	465.79	12,467	0.29
49	245	3.70	1,111	13,578	70	13,509	465.85	13,509	0.31
50	250	4.05	1,214	14,722	70	14,652	465.93	14,652	0.34
51	255	4.39	1,316	15,969	70	15,899	466.01	15,899	0.36
52	260	4.73	1,419	17,318	70	17,248	466.08	17,248	0.40
53	265	5.07	1,522	18,770	70	18,700	466.17	18,700	0.43
54	270	5.07	1,522	20,221	70	20,152	466.25	20,152	0.46
55	275	5.41	1,624	21,776	70	21,706	466.34	21,706	0.50

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.76	1,727	23,433	70	23,363	466.43	23,363	0.54
57	285	6.10	1,829	25,192	70	25,122	466.53	25,122	0.58
58	290	6.10	1,829	26,952	70	26,882	466.64	26,882	0.62
59	295	6.44	1,932	28,814	70	28,744	466.74	28,744	0.66
60	300	6.78	2,034	30,778	70	30,709	466.86	30,709	0.70
61	305	8.49	2,547	33,256	70	33,186	467.00	33,186	0.76
62	310	10.20	3,060	36,246	70	36,177	467.15	36,177	0.83
63	315	11.23	3,368	39,545	70	39,475	467.33	39,475	0.91
64	320	12.25	3,676	43,151	70	43,081	467.52	43,081	0.99
65	325	13.96	4,189	47,269	70	47,200	467.73	47,200	1.08
66	330	17.04	5,112	52,311	70	52,242	468.00	52,242	1.20
67	335	4.39	1,316	53,558	70	53,488	468.06	53,488	1.23
68	340	0.97	291	53,779	70	53,709	468.07	53,709	1.23
69	345	0.21	62	53,771	70	53,701	468.07	53,701	1.23
70	350	0.17	51	53,752	70	53,682	468.07	53,682	1.23
71	355	0.10	31	53,713	70	53,643	468.06	53,643	1.23
72	360	0.07	21	53,664	70	53,594	468.06	53,594	1.23

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	33	33	209	-	465.00	-	0.00
2	30	0.05	49	49	209	-	465.00	-	0.00
3	45	0.05	49	49	209	-	465.00	-	0.00
4	60	0.07	66	66	209	-	465.00	-	0.00
5	75	0.05	49	49	209	-	465.00	-	0.00
6	90	0.05	49	49	209	-	465.00	-	0.00
7	105	0.05	49	49	209	-	465.00	-	0.00
8	120	0.07	66	66	209	-	465.00	-	0.00
9	135	0.07	66	66	209	-	465.00	-	0.00
10	150	0.07	66	66	209	-	465.00	-	0.00
11	165	0.09	82	82	209	-	465.00	-	0.00
12	180	0.09	82	82	209	-	465.00	-	0.00
13	195	0.09	82	82	209	-	465.00	-	0.00
14	210	0.09	82	82	209	-	465.00	-	0.00
15	225	0.09	82	82	209	-	465.00	-	0.00
16	240	0.11	99	99	209	-	465.00	-	0.00
17	255	0.11	99	99	209	-	465.00	-	0.00
18	270	0.13	115	115	209	-	465.00	-	0.00
19	285	0.13	115	115	209	-	465.00	-	0.00
20	300	0.15	132	132	209	-	465.00	-	0.00
21	315	0.11	99	99	209	-	465.00	-	0.00
22	330	0.13	115	115	209	-	465.00	-	0.00
23	345	0.15	132	132	209	-	465.00	-	0.00
24	360	0.15	132	132	209	-	465.00	-	0.00
25	375	0.16	148	148	209	-	465.00	-	0.00
26	390	0.16	148	148	209	-	465.00	-	0.00
27	405	0.18	165	165	209	-	465.00	-	0.00
28	420	0.18	165	165	209	-	465.00	-	0.00
29	435	0.18	165	165	209	-	465.00	-	0.00
30	450	0.20	181	181	209	-	465.00	-	0.00
31	465	0.22	198	198	209	-	465.00	-	0.00
32	480	0.24	214	214	209	5	465.00	5	0.00
33	495	0.28	249	254	209	44	465.00	44	0.00
34	510	0.31	280	324	209	115	465.01	115	0.00
35	525	0.53	475	590	209	381	465.02	381	0.01
36	540	0.75	671	1,051	209	842	465.05	842	0.02
37	555	1.15	1,031	1,873	209	1,664	465.11	1,664	0.04
38	570	1.36	1,226	2,889	209	2,680	465.17	2,680	0.06
39	585	1.58	1,420	4,100	209	3,891	465.25	3,891	0.09
40	600	1.79	1,615	5,506	209	5,296	465.34	5,296	0.12
41	615	0.54	489	5,785	209	5,576	465.35	5,576	0.13
42	630	0.58	518	6,094	209	5,884	465.37	5,884	0.14
43	645	1.52	1,371	7,256	209	7,046	465.45	7,046	0.16
44	660	1.55	1,399	8,446	209	8,236	465.52	8,236	0.19
45	675	1.40	1,262	9,498	209	9,289	465.59	9,289	0.21
46	690	1.43	1,290	10,579	209	10,370	465.66	10,370	0.24
47	705	1.10	987	11,357	209	11,148	465.71	11,148	0.26
48	720	1.31	1,179	12,327	209	12,117	465.77	12,117	0.28
49	735	2.62	2,361	14,478	209	14,269	465.90	14,269	0.33
50	750	2.84	2,552	16,821	209	16,611	466.05	16,611	0.38
51	765	3.23	2,908	19,519	209	19,310	466.20	19,310	0.44
52	780	3.44	3,099	22,409	209	22,199	466.37	22,199	0.51
53	795	4.39	3,949	26,148	209	25,939	466.58	25,939	0.60
54	810	4.42	3,974	29,913	209	29,703	466.80	29,703	0.68
55	825	2.43	2,184	31,888	209	31,678	466.91	31,678	0.73
56	840	2.45	2,209	33,887	209	33,678	467.02	33,678	0.77
57	855	3.21	2,893	36,571	209	36,361	467.16	36,361	0.83
58	870	3.06	2,752	39,113	209	38,904	467.30	38,904	0.89

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.08	2,775	41,679	209	41,470	467.43	41,470	0.95
60	900	2.93	2,633	44,103	209	43,894	467.56	43,894	1.01
61	915	2.77	2,491	46,385	209	46,176	467.68	46,176	1.06
62	930	2.61	2,349	48,525	209	48,315	467.79	48,315	1.11
63	945	1.90	1,711	50,026	209	49,817	467.87	49,817	1.14
64	960	1.93	1,733	51,550	209	51,340	467.95	51,340	1.18
65	975	0.07	66	51,406	209	51,197	467.94	51,197	1.18
66	990	0.07	66	51,263	209	51,054	467.93	51,054	1.17
67	1005	0.05	49	51,103	209	50,894	467.92	50,894	1.17
68	1020	0.05	49	50,943	209	50,734	467.92	50,734	1.16
69	1035	0.09	82	50,816	209	50,607	467.91	50,607	1.16
70	1050	0.09	82	50,689	209	50,480	467.90	50,480	1.16
71	1065	0.09	82	50,563	209	50,353	467.90	50,353	1.16
72	1080	0.07	66	50,419	209	50,210	467.89	50,210	1.15
73	1095	0.07	66	50,276	209	50,066	467.88	50,066	1.15
74	1110	0.07	66	50,132	209	49,923	467.87	49,923	1.15
75	1125	0.05	49	49,972	209	49,763	467.87	49,763	1.14
76	1140	0.04	33	49,796	209	49,587	467.86	49,587	1.14
77	1155	0.05	49	49,636	209	49,427	467.85	49,427	1.13
78	1170	0.07	66	49,493	209	49,283	467.84	49,283	1.13
79	1185	0.05	49	49,333	209	49,124	467.83	49,124	1.13
80	1200	0.04	33	49,157	209	48,947	467.82	48,947	1.12
81	1215	0.05	49	48,997	209	48,787	467.81	48,787	1.12
82	1230	0.05	49	48,837	209	48,627	467.81	48,627	1.12
83	1245	0.05	49	48,677	209	48,467	467.80	48,467	1.11
84	1260	0.04	33	48,500	209	48,291	467.79	48,291	1.11
85	1275	0.05	49	48,341	209	48,131	467.78	48,131	1.10
86	1290	0.04	33	48,164	209	47,955	467.77	47,955	1.10
87	1305	0.05	49	48,004	209	47,795	467.76	47,795	1.10
88	1320	0.04	33	47,828	209	47,619	467.75	47,619	1.09
89	1335	0.05	49	47,668	209	47,459	467.75	47,459	1.09
90	1350	0.04	33	47,492	209	47,282	467.74	47,282	1.09
91	1365	0.04	33	47,315	209	47,106	467.73	47,106	1.08
92	1380	0.04	33	47,139	209	46,929	467.72	46,929	1.08
93	1395	0.04	33	46,962	209	46,753	467.71	46,753	1.07
94	1410	0.04	33	46,786	209	46,577	467.70	46,577	1.07
95	1425	0.04	33	46,610	209	46,400	467.69	46,400	1.07
96	1440	0.04	33	46,433	209	46,224	467.68	46,224	1.06

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.790	1.00	2.12	2.78	9.790	1.00	2.78	4.47	9.790	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	2.12	SUM [9]	9.79	SUM [11]	2.78	SUM [13]	9.79	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	53,707	56,587	60,936
	(acre-ft)	1.23	1.30	1.40
REQUIRED STORAGE	(cu-ft)	50,983	51,654	49,570
	(acre-ft)	1.17	1.19	1.14
PEAK FLOW	(cfs)	18.42	16.28	4.23
MAXIMUM WSEL	(ft)	467.67	467.70	467.59

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603
C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.20	0.30	0.13	1.23	306.00
2	10	0.17	1.3	0.331	0.20	0.30	0.13	1.23	306.00
3	15	0.25	1.1	0.280	0.20	0.25	0.08	0.73	156.57
4	20	0.33	1.5	0.382	0.20	0.34	0.18	1.73	455.43
5	25	0.42	1.5	0.382	0.20	0.34	0.18	1.73	455.43
6	30	0.50	1.8	0.458	0.20	0.41	0.25	2.48	679.59
7	35	0.58	1.5	0.382	0.20	0.34	0.18	1.73	455.43
8	40	0.67	1.8	0.458	0.20	0.41	0.25	2.48	679.59
9	45	0.75	1.8	0.458	0.20	0.41	0.25	2.48	679.59
10	50	0.83	1.5	0.382	0.20	0.34	0.18	1.73	455.43
11	55	0.92	1.6	0.407	0.20	0.37	0.20	1.98	530.15
12	60	1.00	1.8	0.458	0.20	0.41	0.25	2.48	679.59
13	65	1.08	2.2	0.560	0.20	0.50	0.35	3.47	978.46
14	70	1.17	2.2	0.560	0.20	0.50	0.35	3.47	978.46
15	75	1.25	2.2	0.560	0.20	0.50	0.35	3.47	978.46
16	80	1.33	2.0	0.509	0.20	0.46	0.30	2.98	829.02
17	85	1.42	2.6	0.661	0.20	0.60	0.46	4.47	1277.32
18	90	1.50	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
19	95	1.58	2.4	0.611	0.20	0.55	0.41	3.97	1127.89
20	100	1.67	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
21	105	1.75	3.3	0.840	0.20	0.76	0.63	6.21	1800.35
22	110	1.83	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
23	115	1.92	2.9	0.738	0.20	0.66	0.53	5.22	1501.48
24	120	2.00	3.0	0.763	0.20	0.69	0.56	5.47	1576.19
25	125	2.08	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
26	130	2.17	4.2	1.068	0.20	0.96	0.86	8.46	2472.80
27	135	2.25	5.0	1.272	0.20	1.14	1.07	10.45	3070.54
28	140	2.33	3.5	0.890	0.20	0.80	0.69	6.71	1949.78
29	145	2.42	6.8	1.730	0.20	1.56	1.53	14.93	4415.45
30	150	2.50	7.3	1.857	0.20	1.67	1.65	16.18	4789.04
31	155	2.58	8.2	2.086	0.20	1.88	1.88	18.42	5461.49
32	160	2.67	5.9	1.501	0.20	1.35	1.30	12.69	3742.99
33	165	2.75	2.0	0.509	0.20	0.46	0.30	2.98	829.02
34	170	2.83	1.8	0.458	0.20	0.41	0.25	2.48	679.59
35	175	2.92	1.8	0.458	0.20	0.41	0.25	2.48	679.59
36	180	3.00	0.6	0.153	0.20	0.14	0.02	0.15	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.23
FLOOD VOLUME (cuft)	53707.39
REQUIRED STORAGE (acft)	1.17
REQUIRED STORAGE (cuft)	50982.60
PEAK FLOW RATE (cfs)	18.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.20	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.20	0.18	0.02	0.20	0.00
3	15	0.25	0.6	0.200	0.20	0.18	0.02	0.20	0.00
4	20	0.33	0.6	0.200	0.20	0.18	0.02	0.20	0.00
5	25	0.42	0.6	0.200	0.20	0.18	0.02	0.20	0.00
6	30	0.50	0.7	0.234	0.20	0.21	0.03	0.28	20.52
7	35	0.58	0.7	0.234	0.20	0.21	0.03	0.28	20.52
8	40	0.67	0.7	0.234	0.20	0.21	0.03	0.28	20.52
9	45	0.75	0.7	0.234	0.20	0.21	0.03	0.28	20.52
10	50	0.83	0.7	0.234	0.20	0.21	0.03	0.28	20.52
11	55	0.92	0.7	0.234	0.20	0.21	0.03	0.28	20.52
12	60	1.00	0.8	0.267	0.20	0.24	0.06	0.61	118.50
13	65	1.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
14	70	1.17	0.8	0.267	0.20	0.24	0.06	0.61	118.50
15	75	1.25	0.8	0.267	0.20	0.24	0.06	0.61	118.50
16	80	1.33	0.8	0.267	0.20	0.24	0.06	0.61	118.50
17	85	1.42	0.8	0.267	0.20	0.24	0.06	0.61	118.50
18	90	1.50	0.8	0.267	0.20	0.24	0.06	0.61	118.50
19	95	1.58	0.8	0.267	0.20	0.24	0.06	0.61	118.50
20	100	1.67	0.8	0.267	0.20	0.24	0.06	0.61	118.50
21	105	1.75	0.8	0.267	0.20	0.24	0.06	0.61	118.50
22	110	1.83	0.8	0.267	0.20	0.24	0.06	0.61	118.50
23	115	1.92	0.8	0.267	0.20	0.24	0.06	0.61	118.50
24	120	2.00	0.9	0.300	0.20	0.27	0.10	0.93	216.48
25	125	2.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
26	130	2.17	0.9	0.300	0.20	0.27	0.10	0.93	216.48
27	135	2.25	0.9	0.300	0.20	0.27	0.10	0.93	216.48
28	140	2.33	0.9	0.300	0.20	0.27	0.10	0.93	216.48
29	145	2.42	0.9	0.300	0.20	0.27	0.10	0.93	216.48
30	150	2.50	0.9	0.300	0.20	0.27	0.10	0.93	216.48
31	155	2.58	0.9	0.300	0.20	0.27	0.10	0.93	216.48
32	160	2.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
33	165	2.75	1.0	0.334	0.20	0.30	0.13	1.26	314.46
34	170	2.83	1.0	0.334	0.20	0.30	0.13	1.26	314.46
35	175	2.92	1.0	0.334	0.20	0.30	0.13	1.26	314.46
36	180	3.00	1.0	0.334	0.20	0.30	0.13	1.26	314.46
37	185	3.08	1.0	0.334	0.20	0.30	0.13	1.26	314.46
38	190	3.17	1.1	0.367	0.20	0.33	0.16	1.59	412.44
39	195	3.25	1.1	0.367	0.20	0.33	0.16	1.59	412.44
40	200	3.33	1.1	0.367	0.20	0.33	0.16	1.59	412.44
41	205	3.42	1.2	0.400	0.20	0.36	0.20	1.91	510.41
42	210	3.50	1.3	0.434	0.20	0.39	0.23	2.24	608.39
43	215	3.58	1.4	0.467	0.20	0.42	0.26	2.57	706.37
44	220	3.67	1.4	0.467	0.20	0.42	0.26	2.57	706.37
45	225	3.75	1.5	0.500	0.20	0.45	0.30	2.89	804.35
46	230	3.83	1.5	0.500	0.20	0.45	0.30	2.89	804.35
47	235	3.92	1.6	0.534	0.20	0.48	0.33	3.22	902.33
48	240	4.00	1.6	0.534	0.20	0.48	0.33	3.22	902.33
49	245	4.08	1.7	0.567	0.20	0.51	0.36	3.55	1000.31
50	250	4.17	1.8	0.600	0.20	0.54	0.40	3.87	1098.28
51	255	4.25	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
52	260	4.33	2.0	0.667	0.20	0.60	0.46	4.53	1294.24
53	265	4.42	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
54	270	4.50	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
55	275	4.58	2.2	0.734	0.20	0.66	0.53	5.18	1490.20
56	280	4.67	2.3	0.767	0.20	0.69	0.56	5.51	1588.18

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
58	290	4.83	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
59	295	4.92	2.5	0.834	0.20	0.75	0.63	6.16	1784.13
60	300	5.00	2.6	0.867	0.20	0.78	0.66	6.49	1882.11
61	305	5.08	3.1	1.034	0.20	0.93	0.83	8.12	2372.00
62	310	5.17	3.6	1.201	0.20	1.08	1.00	9.75	2861.89
63	315	5.25	3.9	1.301	0.20	1.17	1.10	10.73	3155.83
64	320	5.33	4.2	1.401	0.20	1.26	1.20	11.71	3449.76
65	325	5.42	4.7	1.568	0.20	1.41	1.36	13.35	3939.66
66	330	5.50	5.6	1.868	0.20	1.68	1.66	16.28	4821.46
67	335	5.58	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
68	340	5.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
69	345	5.75	0.6	0.200	0.20	0.18	0.02	0.20	0.00
70	350	5.83	0.5	0.167	0.20	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.20	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.20	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.30
FLOOD VOLUME (cuft)	56587.21
REQUIRED STORAGE (acft)	1.19
REQUIRED STORAGE (cuft)	51653.82
PEAK FLOW RATE (cfs)	16.28

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.362	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.357	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.353	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.349	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.345	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.341	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.337	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.333	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.329	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.325	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.321	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.317	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.313	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.309	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.305	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.301	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.297	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.294	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.290	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.286	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.279	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.275	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.272	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.268	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.264	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.261	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.257	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.254	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.250	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.247	0.193	0.021	0.21	0.00
32	480	8.00	1.3	0.232	0.243	0.209	0.023	0.23	13.15
33	495	8.25	1.5	0.268	0.240	0.241	0.028	0.28	55.92
34	510	8.50	1.5	0.268	0.237	0.241	0.031	0.31	85.41
35	525	8.75	1.6	0.286	0.233	0.257	0.053	0.52	272.18
36	540	9.00	1.7	0.304	0.230	0.274	0.074	0.72	458.69
37	555	9.25	1.9	0.340	0.227	0.306	0.113	1.10	802.48
38	570	9.50	2.0	0.358	0.224	0.322	0.134	1.31	988.46
39	585	9.75	2.1	0.375	0.220	0.338	0.155	1.52	1174.18
40	600	10.00	2.2	0.393	0.217	0.354	0.176	1.72	1359.63
41	615	10.25	1.5	0.268	0.214	0.241	0.054	0.53	284.49
42	630	10.50	1.5	0.268	0.211	0.241	0.057	0.56	311.86
43	645	10.75	2.0	0.358	0.208	0.322	0.150	1.46	1126.65
44	660	11.00	2.0	0.358	0.205	0.322	0.153	1.49	1153.47
45	675	11.25	1.9	0.340	0.202	0.306	0.138	1.35	1022.46
46	690	11.50	1.9	0.340	0.199	0.306	0.141	1.38	1048.71
47	705	11.75	1.7	0.304	0.196	0.274	0.108	1.06	759.60
48	720	12.00	1.8	0.322	0.193	0.290	0.129	1.26	942.83
49	735	12.25	2.5	0.447	0.190	0.402	0.257	2.51	2071.00
50	750	12.50	2.6	0.465	0.187	0.418	0.278	2.72	2253.64
51	765	12.75	2.8	0.501	0.185	0.451	0.316	3.09	2593.53
52	780	13.00	2.9	0.519	0.182	0.467	0.337	3.30	2775.58
53	795	13.25	3.4	0.608	0.179	0.547	0.429	4.20	3587.49
54	810	13.50	3.4	0.608	0.176	0.547	0.432	4.23	3611.39
55	825	13.75	2.3	0.411	0.174	0.370	0.238	2.33	1902.04
56	840	14.00	2.3	0.411	0.171	0.370	0.240	2.35	1925.32
57	855	14.25	2.7	0.483	0.168	0.434	0.314	3.08	2578.46
58	870	14.50	2.6	0.465	0.166	0.418	0.299	2.93	2443.57
59	885	14.75	2.6	0.465	0.163	0.418	0.302	2.95	2465.90
60	900	15.00	2.5	0.447	0.161	0.402	0.286	2.80	2330.36
61	915	15.25	2.4	0.429	0.158	0.386	0.271	2.65	2194.50
62	930	15.50	2.3	0.411	0.156	0.370	0.255	2.50	2058.30
63	945	15.75	1.9	0.340	0.153	0.306	0.186	1.82	1449.14
64	960	16.00	1.9	0.340	0.151	0.306	0.189	1.85	1469.81
65	975	16.25	0.4	0.072	0.149	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.144	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.142	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.140	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.138	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.136	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.132	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.130	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.128	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.126	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.124	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.121	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.119	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.116	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.112	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.107	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.106	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.105	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.103	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.102	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.40
FLOOD VOLUME (cuft)	60935.59
REQUIRED STORAGE (acft)	1.14
REQUIRED STORAGE (cuft)	49570.20
PEAK FLOW (cfs)	4.23

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.23	370	370	64	306	464.52	306	0.01
2	10	1.23	370	676	64	612	464.54	612	0.01
3	15	0.73	220	832	64	769	464.55	769	0.02
4	20	1.73	519	1,288	64	1,224	464.58	1,224	0.03
5	25	1.73	519	1,743	64	1,679	464.62	1,679	0.04
6	30	2.48	743	2,423	64	2,359	464.66	2,359	0.05
7	35	1.73	519	2,878	64	2,814	464.69	2,814	0.06
8	40	2.48	743	3,558	64	3,494	464.74	3,494	0.08
9	45	2.48	743	4,238	64	4,174	464.79	4,174	0.10
10	50	1.73	519	4,693	64	4,629	464.82	4,629	0.11
11	55	1.98	594	5,223	64	5,159	464.86	5,159	0.12
12	60	2.48	743	5,903	64	5,839	464.90	5,839	0.13
13	65	3.47	1,042	6,881	64	6,817	464.97	6,817	0.16
14	70	3.47	1,042	7,860	64	7,796	465.04	7,796	0.18
15	75	3.47	1,042	8,838	64	8,774	465.11	8,774	0.20
16	80	2.98	893	9,667	64	9,603	465.16	9,603	0.22
17	85	4.47	1,341	10,944	64	10,881	465.25	10,881	0.25
18	90	4.72	1,416	12,296	64	12,233	465.35	12,233	0.28
19	95	3.97	1,192	13,424	64	13,360	465.42	13,360	0.31
20	100	4.72	1,416	14,776	64	14,712	465.52	14,712	0.34
21	105	6.21	1,864	16,577	64	16,513	465.63	16,513	0.38
22	110	5.72	1,715	18,228	64	18,164	465.73	18,164	0.42
23	115	5.22	1,565	19,729	64	19,665	465.83	19,665	0.45
24	120	5.47	1,640	21,305	64	21,241	465.92	21,241	0.49
25	125	5.72	1,715	22,956	64	22,892	466.03	22,892	0.53
26	130	8.46	2,537	25,429	64	25,365	466.18	25,365	0.58
27	135	10.45	3,134	28,500	64	28,436	466.38	28,436	0.65
28	140	6.71	2,014	30,449	64	30,385	466.50	30,385	0.70
29	145	14.93	4,479	34,865	64	34,801	466.75	34,801	0.80
30	150	16.18	4,853	39,654	64	39,590	467.02	39,590	0.91
31	155	18.42	5,525	45,115	64	45,051	467.34	45,051	1.03
32	160	12.69	3,807	48,858	64	48,794	467.55	48,794	1.12
33	165	2.98	893	49,687	64	49,623	467.59	49,623	1.14
34	170	2.48	743	50,367	64	50,303	467.63	50,303	1.15
35	175	2.48	743	51,046	64	50,983	467.67	50,983	1.17
36	180	0.15	45	51,027	64	50,964	467.66	50,964	1.17

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	49	49	64	-	464.50	-	0.00
2	10	0.20	59	59	64	-	464.50	-	0.00
3	15	0.20	59	59	64	-	464.50	-	0.00
4	20	0.20	59	59	64	-	464.50	-	0.00
5	25	0.20	59	59	64	-	464.50	-	0.00
6	30	0.28	84	84	64	21	464.50	21	0.00
7	35	0.28	84	105	64	41	464.50	41	0.00
8	40	0.28	84	125	64	62	464.50	62	0.00
9	45	0.28	84	146	64	82	464.51	82	0.00
10	50	0.28	84	166	64	103	464.51	103	0.00
11	55	0.28	84	187	64	123	464.51	123	0.00
12	60	0.61	182	306	64	242	464.52	242	0.01
13	65	0.61	182	424	64	360	464.52	360	0.01
14	70	0.61	182	543	64	479	464.53	479	0.01
15	75	0.61	182	661	64	597	464.54	597	0.01
16	80	0.61	182	780	64	716	464.55	716	0.02
17	85	0.61	182	898	64	834	464.56	834	0.02
18	90	0.61	182	1,017	64	953	464.57	953	0.02
19	95	0.61	182	1,135	64	1,071	464.57	1,071	0.02
20	100	0.61	182	1,254	64	1,190	464.58	1,190	0.03
21	105	0.61	182	1,372	64	1,308	464.59	1,308	0.03
22	110	0.61	182	1,491	64	1,427	464.60	1,427	0.03
23	115	0.61	182	1,609	64	1,545	464.61	1,545	0.04
24	120	0.93	280	1,826	64	1,762	464.62	1,762	0.04
25	125	0.61	182	1,944	64	1,880	464.63	1,880	0.04
26	130	0.93	280	2,161	64	2,097	464.64	2,097	0.05
27	135	0.93	280	2,377	64	2,313	464.66	2,313	0.05
28	140	0.93	280	2,593	64	2,530	464.67	2,530	0.06
29	145	0.93	280	2,810	64	2,746	464.69	2,746	0.06
30	150	0.93	280	3,026	64	2,963	464.70	2,963	0.07
31	155	0.93	280	3,243	64	3,179	464.72	3,179	0.07
32	160	0.93	280	3,459	64	3,395	464.73	3,395	0.08
33	165	1.26	378	3,774	64	3,710	464.76	3,710	0.09
34	170	1.26	378	4,088	64	4,024	464.78	4,024	0.09
35	175	1.26	378	4,403	64	4,339	464.80	4,339	0.10
36	180	1.26	378	4,717	64	4,653	464.82	4,653	0.11
37	185	1.26	378	5,032	64	4,968	464.84	4,968	0.11
38	190	1.59	476	5,444	64	5,380	464.87	5,380	0.12
39	195	1.59	476	5,857	64	5,793	464.90	5,793	0.13
40	200	1.59	476	6,269	64	6,205	464.93	6,205	0.14
41	205	1.91	574	6,779	64	6,716	464.96	6,716	0.15
42	210	2.24	672	7,388	64	7,324	465.01	7,324	0.17
43	215	2.57	770	8,094	64	8,030	465.06	8,030	0.18
44	220	2.57	770	8,801	64	8,737	465.10	8,737	0.20
45	225	2.89	868	9,605	64	9,541	465.16	9,541	0.22
46	230	2.89	868	10,409	64	10,345	465.22	10,345	0.24
47	235	3.22	966	11,312	64	11,248	465.28	11,248	0.26
48	240	3.22	966	12,214	64	12,150	465.34	12,150	0.28
49	245	3.55	1,064	13,214	64	13,150	465.41	13,150	0.30
50	250	3.87	1,162	14,312	64	14,249	465.49	14,249	0.33
51	255	4.20	1,260	15,509	64	15,445	465.56	15,445	0.35
52	260	4.53	1,358	16,803	64	16,739	465.64	16,739	0.38
53	265	4.85	1,456	18,195	64	18,131	465.73	18,131	0.42
54	270	4.85	1,456	19,587	64	19,524	465.82	19,524	0.45
55	275	5.18	1,554	21,078	64	21,014	465.91	21,014	0.48

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.51	1,652	22,666	64	22,602	466.01	22,602	0.52
57	285	5.83	1,750	24,352	64	24,288	466.12	24,288	0.56
58	290	5.83	1,750	26,038	64	25,974	466.22	25,974	0.60
59	295	6.16	1,848	27,822	64	27,758	466.33	27,758	0.64
60	300	6.49	1,946	29,704	64	29,640	466.45	29,640	0.68
61	305	8.12	2,436	32,076	64	32,012	466.59	32,012	0.73
62	310	9.75	2,926	34,938	64	34,874	466.76	34,874	0.80
63	315	10.73	3,220	38,094	64	38,030	466.94	38,030	0.87
64	320	11.71	3,514	41,544	64	41,480	467.13	41,480	0.95
65	325	13.35	4,004	45,483	64	45,420	467.36	45,420	1.04
66	330	16.28	4,885	50,305	64	50,241	467.63	50,241	1.15
67	335	4.20	1,260	51,501	64	51,437	467.69	51,437	1.18
68	340	0.93	280	51,718	64	51,654	467.70	51,654	1.19
69	345	0.20	59	51,713	64	51,649	467.70	51,649	1.19
70	350	0.16	49	51,698	64	51,634	467.70	51,634	1.19
71	355	0.10	29	51,663	64	51,599	467.70	51,599	1.18
72	360	0.07	20	51,619	64	51,555	467.70	51,555	1.18

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	32	32	192	-	464.50	-	0.00
2	30	0.05	47	47	192	-	464.50	-	0.00
3	45	0.05	47	47	192	-	464.50	-	0.00
4	60	0.07	63	63	192	-	464.50	-	0.00
5	75	0.05	47	47	192	-	464.50	-	0.00
6	90	0.05	47	47	192	-	464.50	-	0.00
7	105	0.05	47	47	192	-	464.50	-	0.00
8	120	0.07	63	63	192	-	464.50	-	0.00
9	135	0.07	63	63	192	-	464.50	-	0.00
10	150	0.07	63	63	192	-	464.50	-	0.00
11	165	0.09	79	79	192	-	464.50	-	0.00
12	180	0.09	79	79	192	-	464.50	-	0.00
13	195	0.09	79	79	192	-	464.50	-	0.00
14	210	0.09	79	79	192	-	464.50	-	0.00
15	225	0.09	79	79	192	-	464.50	-	0.00
16	240	0.11	95	95	192	-	464.50	-	0.00
17	255	0.11	95	95	192	-	464.50	-	0.00
18	270	0.12	110	110	192	-	464.50	-	0.00
19	285	0.12	110	110	192	-	464.50	-	0.00
20	300	0.14	126	126	192	-	464.50	-	0.00
21	315	0.11	95	95	192	-	464.50	-	0.00
22	330	0.12	110	110	192	-	464.50	-	0.00
23	345	0.14	126	126	192	-	464.50	-	0.00
24	360	0.14	126	126	192	-	464.50	-	0.00
25	375	0.16	142	142	192	-	464.50	-	0.00
26	390	0.16	142	142	192	-	464.50	-	0.00
27	405	0.18	158	158	192	-	464.50	-	0.00
28	420	0.18	158	158	192	-	464.50	-	0.00
29	435	0.18	158	158	192	-	464.50	-	0.00
30	450	0.19	173	173	192	-	464.50	-	0.00
31	465	0.21	189	189	192	-	464.50	-	0.00
32	480	0.23	205	205	192	13	464.50	13	0.00
33	495	0.28	248	261	192	69	464.50	69	0.00
34	510	0.31	277	346	192	154	464.51	154	0.00
35	525	0.52	464	618	192	427	464.53	427	0.01
36	540	0.72	650	1,077	192	885	464.56	885	0.02
37	555	1.10	994	1,879	192	1,688	464.62	1,688	0.04
38	570	1.31	1,180	2,868	192	2,676	464.69	2,676	0.06
39	585	1.52	1,366	4,042	192	3,850	464.77	3,850	0.09
40	600	1.72	1,551	5,402	192	5,210	464.86	5,210	0.12
41	615	0.53	476	5,686	192	5,495	464.88	5,495	0.13
42	630	0.56	504	5,998	192	5,806	464.90	5,806	0.13
43	645	1.46	1,318	7,125	192	6,933	464.98	6,933	0.16
44	660	1.49	1,345	8,278	192	8,087	465.06	8,087	0.19
45	675	1.35	1,214	9,301	192	9,109	465.13	9,109	0.21
46	690	1.38	1,240	10,349	192	10,158	465.20	10,158	0.23
47	705	1.06	951	11,109	192	10,917	465.25	10,917	0.25
48	720	1.26	1,134	12,052	192	11,860	465.32	11,860	0.27
49	735	2.51	2,263	14,123	192	13,931	465.46	13,931	0.32
50	750	2.72	2,445	16,376	192	16,185	465.61	16,185	0.37
51	765	3.09	2,785	18,970	192	18,778	465.77	18,778	0.43
52	780	3.30	2,967	21,746	192	21,554	465.94	21,554	0.49
53	795	4.20	3,779	25,333	192	25,141	466.17	25,141	0.58
54	810	4.23	3,803	28,944	192	28,753	466.40	28,753	0.66
55	825	2.33	2,094	30,846	192	30,655	466.51	30,655	0.70
56	840	2.35	2,117	32,772	192	32,580	466.62	32,580	0.75
57	855	3.08	2,770	35,350	192	35,159	466.77	35,159	0.81
58	870	2.93	2,635	37,794	192	37,602	466.91	37,602	0.86

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.95	2,658	40,260	192	40,068	467.05	40,068	0.92
60	900	2.80	2,522	42,590	192	42,398	467.19	42,398	0.97
61	915	2.65	2,386	44,785	192	44,593	467.31	44,593	1.02
62	930	2.50	2,250	46,843	192	46,651	467.43	46,651	1.07
63	945	1.82	1,641	48,292	192	48,100	467.51	48,100	1.10
64	960	1.85	1,661	49,762	192	49,570	467.59	49,570	1.14
65	975	0.07	63	49,633	192	49,442	467.58	49,442	1.14
66	990	0.07	63	49,505	192	49,313	467.58	49,313	1.13
67	1005	0.05	47	49,360	192	49,169	467.57	49,169	1.13
68	1020	0.05	47	49,216	192	49,024	467.56	49,024	1.13
69	1035	0.09	79	49,103	192	48,911	467.55	48,911	1.12
70	1050	0.09	79	48,990	192	48,798	467.55	48,798	1.12
71	1065	0.09	79	48,877	192	48,686	467.54	48,686	1.12
72	1080	0.07	63	48,749	192	48,557	467.54	48,557	1.11
73	1095	0.07	63	48,620	192	48,428	467.53	48,428	1.11
74	1110	0.07	63	48,491	192	48,300	467.52	48,300	1.11
75	1125	0.05	47	48,347	192	48,155	467.51	48,155	1.11
76	1140	0.04	32	48,187	192	47,995	467.51	47,995	1.10
77	1155	0.05	47	48,042	192	47,851	467.50	47,851	1.10
78	1170	0.07	63	47,914	192	47,722	467.49	47,722	1.10
79	1185	0.05	47	47,769	192	47,578	467.48	47,578	1.09
80	1200	0.04	32	47,609	192	47,418	467.47	47,418	1.09
81	1215	0.05	47	47,465	192	47,273	467.46	47,273	1.09
82	1230	0.05	47	47,320	192	47,129	467.46	47,129	1.08
83	1245	0.05	47	47,176	192	46,984	467.45	46,984	1.08
84	1260	0.04	32	47,016	192	46,824	467.44	46,824	1.07
85	1275	0.05	47	46,872	192	46,680	467.43	46,680	1.07
86	1290	0.04	32	46,711	192	46,520	467.42	46,520	1.07
87	1305	0.05	47	46,567	192	46,375	467.41	46,375	1.06
88	1320	0.04	32	46,407	192	46,215	467.40	46,215	1.06
89	1335	0.05	47	46,262	192	46,071	467.40	46,071	1.06
90	1350	0.04	32	46,102	192	45,911	467.39	45,911	1.05
91	1365	0.04	32	45,942	192	45,751	467.38	45,751	1.05
92	1380	0.04	32	45,782	192	45,590	467.37	45,590	1.05
93	1395	0.04	32	45,622	192	45,430	467.36	45,430	1.04
94	1410	0.04	32	45,462	192	45,270	467.35	45,270	1.04
95	1425	0.04	32	45,302	192	45,110	467.34	45,110	1.04
96	1440	0.04	32	45,142	192	44,950	467.33	44,950	1.03

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.490	1.00	2.12	2.78	9.490	1.00	2.78	4.47	9.490	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	2.12	SUM [9]	9.49	SUM [11]	2.78	SUM [13]	9.49	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.31	1.30	1.28
FLOOD VOLUME	(cu-ft)	45,222	44,840	44,164
	(acre-ft)	1.04	1.03	1.01
REQUIRED STORAGE	(cu-ft)	41,999	39,086	31,405
	(acre-ft)	0.96	0.90	0.72
PEAK FLOW	(cfs)	17.21	15.14	3.54
MAXIMUM WSEL	(ft)	465.64	465.51	465.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767
C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.27	0.30	0.06	0.55	82.80
2	10	0.17	1.3	0.331	0.27	0.30	0.06	0.55	82.80
3	15	0.25	1.1	0.280	0.27	0.25	0.01	0.07	0.00
4	20	0.33	1.5	0.382	0.27	0.34	0.11	1.03	227.65
5	25	0.42	1.5	0.382	0.27	0.34	0.11	1.03	227.65
6	30	0.50	1.8	0.458	0.27	0.41	0.19	1.76	444.94
7	35	0.58	1.5	0.382	0.27	0.34	0.11	1.03	227.65
8	40	0.67	1.8	0.458	0.27	0.41	0.19	1.76	444.94
9	45	0.75	1.8	0.458	0.27	0.41	0.19	1.76	444.94
10	50	0.83	1.5	0.382	0.27	0.34	0.11	1.03	227.65
11	55	0.92	1.6	0.407	0.27	0.37	0.13	1.27	300.08
12	60	1.00	1.8	0.458	0.27	0.41	0.19	1.76	444.94
13	65	1.08	2.2	0.560	0.27	0.50	0.29	2.72	734.65
14	70	1.17	2.2	0.560	0.27	0.50	0.29	2.72	734.65
15	75	1.25	2.2	0.560	0.27	0.50	0.29	2.72	734.65
16	80	1.33	2.0	0.509	0.27	0.46	0.24	2.24	589.79
17	85	1.42	2.6	0.661	0.27	0.60	0.39	3.69	1024.36
18	90	1.50	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
19	95	1.58	2.4	0.611	0.27	0.55	0.34	3.20	879.50
20	100	1.67	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
21	105	1.75	3.3	0.840	0.27	0.76	0.57	5.38	1531.35
22	110	1.83	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
23	115	1.92	2.9	0.738	0.27	0.66	0.46	4.41	1241.64
24	120	2.00	3.0	0.763	0.27	0.69	0.49	4.65	1314.07
25	125	2.08	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
26	130	2.17	4.2	1.068	0.27	0.96	0.80	7.55	2183.20
27	135	2.25	5.0	1.272	0.27	1.14	1.00	9.48	2762.62
28	140	2.33	3.5	0.890	0.27	0.80	0.62	5.86	1676.21
29	145	2.42	6.8	1.730	0.27	1.56	1.46	13.83	4066.32
30	150	2.50	7.3	1.857	0.27	1.67	1.58	15.03	4428.46
31	155	2.58	8.2	2.086	0.27	1.88	1.81	17.21	5080.31
32	160	2.67	5.9	1.501	0.27	1.35	1.23	11.65	3414.47
33	165	2.75	2.0	0.509	0.27	0.46	0.24	2.24	589.79
34	170	2.83	1.8	0.458	0.27	0.41	0.19	1.76	444.94
35	175	2.92	1.8	0.458	0.27	0.41	0.19	1.76	444.94
36	180	3.00	0.6	0.153	0.27	0.14	0.02	0.14	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.31
FLOOD VOLUME (acft)	1.04
FLOOD VOLUME (cuft)	45221.59
REQUIRED STORAGE (acft)	0.96
REQUIRED STORAGE (cuft)	41998.54
PEAK FLOW RATE (cfs)	17.21

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.27	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.27	0.18	0.02	0.19	0.00
3	15	0.25	0.6	0.200	0.27	0.18	0.02	0.19	0.00
4	20	0.33	0.6	0.200	0.27	0.18	0.02	0.19	0.00
5	25	0.42	0.6	0.200	0.27	0.18	0.02	0.19	0.00
6	30	0.50	0.7	0.234	0.27	0.21	0.02	0.22	0.00
7	35	0.58	0.7	0.234	0.27	0.21	0.02	0.22	0.00
8	40	0.67	0.7	0.234	0.27	0.21	0.02	0.22	0.00
9	45	0.75	0.7	0.234	0.27	0.21	0.02	0.22	0.00
10	50	0.83	0.7	0.234	0.27	0.21	0.02	0.22	0.00
11	55	0.92	0.7	0.234	0.27	0.21	0.02	0.22	0.00
12	60	1.00	0.8	0.267	0.27	0.24	0.03	0.25	0.00
13	65	1.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
14	70	1.17	0.8	0.267	0.27	0.24	0.03	0.25	0.00
15	75	1.25	0.8	0.267	0.27	0.24	0.03	0.25	0.00
16	80	1.33	0.8	0.267	0.27	0.24	0.03	0.25	0.00
17	85	1.42	0.8	0.267	0.27	0.24	0.03	0.25	0.00
18	90	1.50	0.8	0.267	0.27	0.24	0.03	0.25	0.00
19	95	1.58	0.8	0.267	0.27	0.24	0.03	0.25	0.00
20	100	1.67	0.8	0.267	0.27	0.24	0.03	0.25	0.00
21	105	1.75	0.8	0.267	0.27	0.24	0.03	0.25	0.00
22	110	1.83	0.8	0.267	0.27	0.24	0.03	0.25	0.00
23	115	1.92	0.8	0.267	0.27	0.24	0.03	0.25	0.00
24	120	2.00	0.9	0.300	0.27	0.27	0.03	0.26	0.00
25	125	2.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
26	130	2.17	0.9	0.300	0.27	0.27	0.03	0.26	0.00
27	135	2.25	0.9	0.300	0.27	0.27	0.03	0.26	0.00
28	140	2.33	0.9	0.300	0.27	0.27	0.03	0.26	0.00
29	145	2.42	0.9	0.300	0.27	0.27	0.03	0.26	0.00
30	150	2.50	0.9	0.300	0.27	0.27	0.03	0.26	0.00
31	155	2.58	0.9	0.300	0.27	0.27	0.03	0.26	0.00
32	160	2.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
33	165	2.75	1.0	0.334	0.27	0.30	0.06	0.58	91.00
34	170	2.83	1.0	0.334	0.27	0.30	0.06	0.58	91.00
35	175	2.92	1.0	0.334	0.27	0.30	0.06	0.58	91.00
36	180	3.00	1.0	0.334	0.27	0.30	0.06	0.58	91.00
37	185	3.08	1.0	0.334	0.27	0.30	0.06	0.58	91.00
38	190	3.17	1.1	0.367	0.27	0.33	0.09	0.89	185.97
39	195	3.25	1.1	0.367	0.27	0.33	0.09	0.89	185.97
40	200	3.33	1.1	0.367	0.27	0.33	0.09	0.89	185.97
41	205	3.42	1.2	0.400	0.27	0.36	0.13	1.21	280.95
42	210	3.50	1.3	0.434	0.27	0.39	0.16	1.53	375.93
43	215	3.58	1.4	0.467	0.27	0.42	0.19	1.84	470.90
44	220	3.67	1.4	0.467	0.27	0.42	0.19	1.84	470.90
45	225	3.75	1.5	0.500	0.27	0.45	0.23	2.16	565.88
46	230	3.83	1.5	0.500	0.27	0.45	0.23	2.16	565.88
47	235	3.92	1.6	0.534	0.27	0.48	0.26	2.48	660.85
48	240	4.00	1.6	0.534	0.27	0.48	0.26	2.48	660.85
49	245	4.08	1.7	0.567	0.27	0.51	0.29	2.79	755.83
50	250	4.17	1.8	0.600	0.27	0.54	0.33	3.11	850.81
51	255	4.25	1.9	0.634	0.27	0.57	0.36	3.43	945.78
52	260	4.33	2.0	0.667	0.27	0.60	0.39	3.74	1040.76
53	265	4.42	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
54	270	4.50	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
55	275	4.58	2.2	0.734	0.27	0.66	0.46	4.38	1230.71
56	280	4.67	2.3	0.767	0.27	0.69	0.49	4.69	1325.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
58	290	4.83	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
59	295	4.92	2.5	0.834	0.27	0.75	0.56	5.33	1515.64
60	300	5.00	2.6	0.867	0.27	0.78	0.59	5.64	1610.61
61	305	5.08	3.1	1.034	0.27	0.93	0.76	7.22	2085.49
62	310	5.17	3.6	1.201	0.27	1.08	0.93	8.81	2560.37
63	315	5.25	3.9	1.301	0.27	1.17	1.03	9.76	2845.30
64	320	5.33	4.2	1.401	0.27	1.26	1.13	10.71	3130.23
65	325	5.42	4.7	1.568	0.27	1.41	1.30	12.29	3605.11
66	330	5.50	5.6	1.868	0.27	1.68	1.60	15.14	4459.89
67	335	5.58	1.9	0.634	0.27	0.57	0.36	3.43	945.78
68	340	5.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
69	345	5.75	0.6	0.200	0.27	0.18	0.02	0.19	0.00
70	350	5.83	0.5	0.167	0.27	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.27	0.09	0.01	0.09	0.00
72	360	6.00	0.2	0.067	0.27	0.06	0.01	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.30
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44839.99
REQUIRED STORAGE (acft)	0.90
REQUIRED STORAGE (cuft)	39085.84
PEAK FLOW RATE (cfs)	15.14

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.036	0.482	0.032	0.004	0.03	0.00
2	30	0.50	0.3	0.054	0.476	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.471	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.465	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.460	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.454	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.449	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.443	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.438	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.433	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.427	0.080	0.009	0.08	0.00
12	180	3.00	0.5	0.089	0.422	0.080	0.009	0.08	0.00
13	195	3.25	0.5	0.089	0.417	0.080	0.009	0.08	0.00
14	210	3.50	0.5	0.089	0.412	0.080	0.009	0.08	0.00
15	225	3.75	0.5	0.089	0.407	0.080	0.009	0.08	0.00
16	240	4.00	0.6	0.107	0.401	0.097	0.011	0.10	0.00
17	255	4.25	0.6	0.107	0.396	0.097	0.011	0.10	0.00
18	270	4.50	0.7	0.125	0.391	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.386	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.381	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.376	0.097	0.011	0.10	0.00
22	330	5.50	0.7	0.125	0.371	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.367	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.362	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.357	0.145	0.016	0.15	0.00
26	390	6.50	0.9	0.161	0.352	0.145	0.016	0.15	0.00
27	405	6.75	1.0	0.179	0.347	0.161	0.018	0.17	0.00
28	420	7.00	1.0	0.179	0.343	0.161	0.018	0.17	0.00
29	435	7.25	1.0	0.179	0.338	0.161	0.018	0.17	0.00
30	450	7.50	1.1	0.197	0.334	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.329	0.193	0.021	0.20	0.00
32	480	8.00	1.3	0.232	0.324	0.209	0.023	0.22	0.00
33	495	8.25	1.5	0.268	0.320	0.241	0.027	0.25	0.00
34	510	8.50	1.5	0.268	0.315	0.241	0.027	0.25	0.00
35	525	8.75	1.6	0.286	0.311	0.257	0.029	0.27	0.00
36	540	9.00	1.7	0.304	0.307	0.274	0.030	0.29	13.81
37	555	9.25	1.9	0.340	0.302	0.306	0.037	0.35	73.64
38	570	9.50	2.0	0.358	0.298	0.322	0.060	0.57	263.09
39	585	9.75	2.1	0.375	0.294	0.338	0.082	0.78	452.20
40	600	10.00	2.2	0.393	0.290	0.354	0.104	0.99	640.96
41	615	10.25	1.5	0.268	0.285	0.241	0.027	0.25	0.00
42	630	10.50	1.5	0.268	0.281	0.241	0.027	0.25	0.00
43	645	10.75	2.0	0.358	0.277	0.322	0.080	0.76	441.57
44	660	11.00	2.0	0.358	0.273	0.322	0.085	0.80	476.21
45	675	11.25	1.9	0.340	0.269	0.306	0.071	0.67	357.77
46	690	11.50	1.9	0.340	0.265	0.306	0.075	0.71	391.68
47	705	11.75	1.7	0.304	0.261	0.274	0.043	0.41	119.79
48	720	12.00	1.8	0.322	0.257	0.290	0.065	0.61	305.68
49	735	12.25	2.5	0.447	0.253	0.402	0.194	1.84	1407.47
50	750	12.50	2.6	0.465	0.250	0.418	0.215	2.04	1592.60
51	765	12.75	2.8	0.501	0.246	0.451	0.255	2.42	1930.06
52	780	13.00	2.9	0.519	0.242	0.467	0.276	2.62	2114.43
53	795	13.25	3.4	0.608	0.239	0.547	0.369	3.51	2909.26
54	810	13.50	3.4	0.608	0.235	0.547	0.373	3.54	2940.13
55	825	13.75	2.3	0.411	0.231	0.370	0.180	1.71	1290.76
56	840	14.00	2.3	0.411	0.228	0.370	0.183	1.74	1320.84
57	855	14.25	2.7	0.483	0.224	0.434	0.258	2.45	1961.36
58	870	14.50	2.6	0.465	0.221	0.418	0.244	2.32	1837.90
59	885	14.75	2.6	0.465	0.218	0.418	0.247	2.35	1866.75
60	900	15.00	2.5	0.447	0.214	0.402	0.233	2.21	1742.46
61	915	15.25	2.4	0.429	0.211	0.386	0.218	2.07	1617.74
62	930	15.50	2.3	0.411	0.208	0.370	0.204	1.93	1492.59
63	945	15.75	1.9	0.340	0.205	0.306	0.135	1.28	908.87
64	960	16.00	1.9	0.340	0.201	0.306	0.138	1.31	935.56
65	975	16.25	0.4	0.072	0.198	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.195	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.192	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
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EFFECTIVE RAIN CALCULATION FORM

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68	1020	17.00	0.3	0.054	0.189	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.187	0.080	0.009	0.08	0.00
70	1050	17.50	0.5	0.089	0.184	0.080	0.009	0.08	0.00
71	1065	17.75	0.5	0.089	0.181	0.080	0.009	0.08	0.00
72	1080	18.00	0.4	0.072	0.178	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.176	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.173	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.171	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.168	0.032	0.004	0.03	0.00
77	1155	19.25	0.3	0.054	0.166	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.164	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.161	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.159	0.032	0.004	0.03	0.00
81	1215	20.25	0.3	0.054	0.157	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.155	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.153	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.151	0.032	0.004	0.03	0.00
85	1275	21.25	0.3	0.054	0.149	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.148	0.032	0.004	0.03	0.00
87	1305	21.75	0.3	0.054	0.146	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.145	0.032	0.004	0.03	0.00
89	1335	22.25	0.3	0.054	0.143	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.142	0.032	0.004	0.03	0.00
91	1365	22.75	0.2	0.036	0.141	0.032	0.004	0.03	0.00
92	1380	23.00	0.2	0.036	0.139	0.032	0.004	0.03	0.00
93	1395	23.25	0.2	0.036	0.138	0.032	0.004	0.03	0.00
94	1410	23.50	0.2	0.036	0.138	0.032	0.004	0.03	0.00
95	1425	23.75	0.2	0.036	0.137	0.032	0.004	0.03	0.00
96	1440	24.00	0.2	0.036	0.137	0.032	0.004	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.28
FLOOD VOLUME (acft)	1.01
FLOOD VOLUME (cuft)	44164.39
REQUIRED STORAGE (acft)	0.72
REQUIRED STORAGE (cuft)	31405.17
PEAK FLOW (cfs)	3.54

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.27 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.55	165	165	82	83	463.50	83	0.00
2	10	0.55	165	248	82	166	463.51	166	0.00
3	15	0.07	20	185	82	104	463.51	104	0.00
4	20	1.03	310	413	82	331	463.52	331	0.01
5	25	1.03	310	641	82	559	463.53	559	0.01
6	30	1.76	527	1,086	82	1,004	463.55	1,004	0.02
7	35	1.03	310	1,313	82	1,231	463.57	1,231	0.03
8	40	1.76	527	1,758	82	1,676	463.59	1,676	0.04
9	45	1.76	527	2,203	82	2,121	463.61	2,121	0.05
10	50	1.03	310	2,431	82	2,349	463.63	2,349	0.05
11	55	1.27	382	2,731	82	2,649	463.64	2,649	0.06
12	60	1.76	527	3,176	82	3,094	463.67	3,094	0.07
13	65	2.72	817	3,911	82	3,829	463.71	3,829	0.09
14	70	2.72	817	4,645	82	4,563	463.75	4,563	0.10
15	75	2.72	817	5,380	82	5,298	463.79	5,298	0.12
16	80	2.24	672	5,970	82	5,888	463.82	5,888	0.14
17	85	3.69	1,106	6,994	82	6,912	463.87	6,912	0.16
18	90	3.93	1,179	8,091	82	8,009	463.93	8,009	0.18
19	95	3.20	961	8,970	82	8,888	463.98	8,888	0.20
20	100	3.93	1,179	10,067	82	9,985	464.04	9,985	0.23
21	105	5.38	1,613	11,598	82	11,517	464.12	11,517	0.26
22	110	4.89	1,468	12,985	82	12,903	464.20	12,903	0.30
23	115	4.41	1,324	14,227	82	14,145	464.26	14,145	0.32
24	120	4.65	1,396	15,541	82	15,459	464.34	15,459	0.35
25	125	4.89	1,468	16,927	82	16,845	464.41	16,845	0.39
26	130	7.55	2,265	19,110	82	19,028	464.53	19,028	0.44
27	135	9.48	2,845	21,873	82	21,791	464.66	21,791	0.50
28	140	5.86	1,758	23,549	82	23,467	464.74	23,467	0.54
29	145	13.83	4,148	27,616	82	27,534	464.94	27,534	0.63
30	150	15.03	4,510	32,044	82	31,962	465.16	31,962	0.73
31	155	17.21	5,162	37,124	82	37,042	465.41	37,042	0.85
32	160	11.65	3,496	40,539	82	40,457	465.57	40,457	0.93
33	165	2.24	672	41,129	82	41,047	465.60	41,047	0.94
34	170	1.76	527	41,573	82	41,492	465.62	41,492	0.95
35	175	1.76	527	42,018	82	41,936	465.64	41,936	0.96
36	180	0.14	43	41,980	82	41,898	465.64	41,898	0.96

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	47	47	82	-	463.50	-	0.00
2	10	0.19	57	57	82	-	463.50	-	0.00
3	15	0.19	57	57	82	-	463.50	-	0.00
4	20	0.19	57	57	82	-	463.50	-	0.00
5	25	0.19	57	57	82	-	463.50	-	0.00
6	30	0.22	66	66	82	-	463.50	-	0.00
7	35	0.22	66	66	82	-	463.50	-	0.00
8	40	0.22	66	66	82	-	463.50	-	0.00
9	45	0.22	66	66	82	-	463.50	-	0.00
10	50	0.22	66	66	82	-	463.50	-	0.00
11	55	0.22	66	66	82	-	463.50	-	0.00
12	60	0.25	76	76	82	-	463.50	-	0.00
13	65	0.25	76	76	82	-	463.50	-	0.00
14	70	0.25	76	76	82	-	463.50	-	0.00
15	75	0.25	76	76	82	-	463.50	-	0.00
16	80	0.25	76	76	82	-	463.50	-	0.00
17	85	0.25	76	76	82	-	463.50	-	0.00
18	90	0.25	76	76	82	-	463.50	-	0.00
19	95	0.25	76	76	82	-	463.50	-	0.00
20	100	0.25	76	76	82	-	463.50	-	0.00
21	105	0.25	76	76	82	-	463.50	-	0.00
22	110	0.25	76	76	82	-	463.50	-	0.00
23	115	0.25	76	76	82	-	463.50	-	0.00
24	120	0.26	78	78	82	-	463.50	-	0.00
25	125	0.25	76	76	82	-	463.50	-	0.00
26	130	0.26	78	78	82	-	463.50	-	0.00
27	135	0.26	78	78	82	-	463.50	-	0.00
28	140	0.26	78	78	82	-	463.50	-	0.00
29	145	0.26	78	78	82	-	463.50	-	0.00
30	150	0.26	78	78	82	-	463.50	-	0.00
31	155	0.26	78	78	82	-	463.50	-	0.00
32	160	0.26	78	78	82	-	463.50	-	0.00
33	165	0.58	173	173	82	91	463.50	91	0.00
34	170	0.58	173	264	82	182	463.51	182	0.00
35	175	0.58	173	355	82	273	463.51	273	0.01
36	180	0.58	173	446	82	364	463.52	364	0.01
37	185	0.58	173	537	82	455	463.52	455	0.01
38	190	0.89	268	723	82	641	463.53	641	0.01
39	195	0.89	268	909	82	827	463.54	827	0.02
40	200	0.89	268	1,095	82	1,013	463.55	1,013	0.02
41	205	1.21	363	1,376	82	1,294	463.57	1,294	0.03
42	210	1.53	458	1,752	82	1,670	463.59	1,670	0.04
43	215	1.84	553	2,223	82	2,141	463.62	2,141	0.05
44	220	1.84	553	2,694	82	2,612	463.64	2,612	0.06
45	225	2.16	648	3,259	82	3,177	463.67	3,177	0.07
46	230	2.16	648	3,825	82	3,743	463.70	3,743	0.09
47	235	2.48	743	4,486	82	4,404	463.74	4,404	0.10
48	240	2.48	743	5,147	82	5,065	463.77	5,065	0.12
49	245	2.79	838	5,903	82	5,821	463.81	5,821	0.13
50	250	3.11	933	6,754	82	6,672	463.86	6,672	0.15
51	255	3.43	1,028	7,699	82	7,617	463.91	7,617	0.17
52	260	3.74	1,123	8,740	82	8,658	463.97	8,658	0.20
53	265	4.06	1,218	9,876	82	9,794	464.03	9,794	0.22
54	270	4.06	1,218	11,012	82	10,930	464.09	10,930	0.25
55	275	4.38	1,313	12,242	82	12,160	464.16	12,160	0.28

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	4.69	1,408	13,568	82	13,486	464.23	13,486	0.31
57	285	5.01	1,503	14,989	82	14,907	464.31	14,907	0.34
58	290	5.01	1,503	16,409	82	16,327	464.38	16,327	0.37
59	295	5.33	1,598	17,925	82	17,843	464.46	17,843	0.41
60	300	5.64	1,693	19,536	82	19,454	464.55	19,454	0.45
61	305	7.22	2,167	21,621	82	21,539	464.65	21,539	0.49
62	310	8.81	2,642	24,181	82	24,100	464.78	24,100	0.55
63	315	9.76	2,927	27,027	82	26,945	464.92	26,945	0.62
64	320	10.71	3,212	30,157	82	30,075	465.07	30,075	0.69
65	325	12.29	3,687	33,762	82	33,680	465.25	33,680	0.77
66	330	15.14	4,542	38,222	82	38,140	465.47	38,140	0.88
67	335	3.43	1,028	39,168	82	39,086	465.51	39,086	0.90
68	340	0.26	78	39,164	82	39,082	465.51	39,082	0.90
69	345	0.19	57	39,139	82	39,057	465.51	39,057	0.90
70	350	0.16	47	39,104	82	39,022	465.51	39,022	0.90
71	355	0.09	28	39,051	82	38,969	465.51	38,969	0.89
72	360	0.06	19	38,988	82	38,906	465.50	38,906	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	31	31	246	-	463.50	-	0.00
2	30	0.05	46	46	246	-	463.50	-	0.00
3	45	0.05	46	46	246	-	463.50	-	0.00
4	60	0.07	61	61	246	-	463.50	-	0.00
5	75	0.05	46	46	246	-	463.50	-	0.00
6	90	0.05	46	46	246	-	463.50	-	0.00
7	105	0.05	46	46	246	-	463.50	-	0.00
8	120	0.07	61	61	246	-	463.50	-	0.00
9	135	0.07	61	61	246	-	463.50	-	0.00
10	150	0.07	61	61	246	-	463.50	-	0.00
11	165	0.08	76	76	246	-	463.50	-	0.00
12	180	0.08	76	76	246	-	463.50	-	0.00
13	195	0.08	76	76	246	-	463.50	-	0.00
14	210	0.08	76	76	246	-	463.50	-	0.00
15	225	0.08	76	76	246	-	463.50	-	0.00
16	240	0.10	92	92	246	-	463.50	-	0.00
17	255	0.10	92	92	246	-	463.50	-	0.00
18	270	0.12	107	107	246	-	463.50	-	0.00
19	285	0.12	107	107	246	-	463.50	-	0.00
20	300	0.14	122	122	246	-	463.50	-	0.00
21	315	0.10	92	92	246	-	463.50	-	0.00
22	330	0.12	107	107	246	-	463.50	-	0.00
23	345	0.14	122	122	246	-	463.50	-	0.00
24	360	0.14	122	122	246	-	463.50	-	0.00
25	375	0.15	137	137	246	-	463.50	-	0.00
26	390	0.15	137	137	246	-	463.50	-	0.00
27	405	0.17	153	153	246	-	463.50	-	0.00
28	420	0.17	153	153	246	-	463.50	-	0.00
29	435	0.17	153	153	246	-	463.50	-	0.00
30	450	0.19	168	168	246	-	463.50	-	0.00
31	465	0.20	183	183	246	-	463.50	-	0.00
32	480	0.22	199	199	246	-	463.50	-	0.00
33	495	0.25	229	229	246	-	463.50	-	0.00
34	510	0.25	229	229	246	-	463.50	-	0.00
35	525	0.27	244	244	246	-	463.50	-	0.00
36	540	0.29	260	260	246	14	463.50	14	0.00
37	555	0.35	319	333	246	87	463.50	87	0.00
38	570	0.57	509	596	246	351	463.52	351	0.01
39	585	0.78	698	1,049	246	803	463.54	803	0.02
40	600	0.99	887	1,689	246	1,444	463.58	1,444	0.03
41	615	0.25	229	1,673	246	1,427	463.58	1,427	0.03
42	630	0.25	229	1,656	246	1,410	463.58	1,410	0.03
43	645	0.76	687	2,098	246	1,852	463.60	1,852	0.04
44	660	0.80	722	2,574	246	2,328	463.63	2,328	0.05
45	675	0.67	604	2,932	246	2,686	463.65	2,686	0.06
46	690	0.71	637	3,323	246	3,077	463.67	3,077	0.07
47	705	0.41	366	3,443	246	3,197	463.67	3,197	0.07
48	720	0.61	551	3,749	246	3,503	463.69	3,503	0.08
49	735	1.84	1,653	5,156	246	4,910	463.77	4,910	0.11
50	750	2.04	1,838	6,749	246	6,503	463.85	6,503	0.15
51	765	2.42	2,176	8,679	246	8,433	463.96	8,433	0.19
52	780	2.62	2,360	10,793	246	10,547	464.07	10,547	0.24
53	795	3.51	3,155	13,703	246	13,457	464.23	13,457	0.31
54	810	3.54	3,186	16,643	246	16,397	464.39	16,397	0.38
55	825	1.71	1,537	17,933	246	17,688	464.46	17,688	0.41
56	840	1.74	1,567	19,254	246	19,008	464.52	19,008	0.44
57	855	2.45	2,207	21,216	246	20,970	464.62	20,970	0.48
58	870	2.32	2,084	23,054	246	22,808	464.71	22,808	0.52

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.35	2,113	24,920	246	24,674	464.80	24,674	0.57
60	900	2.21	1,988	26,663	246	26,417	464.89	26,417	0.61
61	915	2.07	1,864	28,280	246	28,035	464.97	28,035	0.64
62	930	1.93	1,738	29,773	246	29,527	465.04	29,527	0.68
63	945	1.28	1,155	30,682	246	30,436	465.09	30,436	0.70
64	960	1.31	1,181	31,618	246	31,372	465.13	31,372	0.72
65	975	0.07	61	31,433	246	31,187	465.12	31,187	0.72
66	990	0.07	61	31,248	246	31,002	465.12	31,002	0.71
67	1005	0.05	46	31,048	246	30,802	465.11	30,802	0.71
68	1020	0.05	46	30,848	246	30,602	465.10	30,602	0.70
69	1035	0.08	76	30,679	246	30,433	465.09	30,433	0.70
70	1050	0.08	76	30,509	246	30,263	465.08	30,263	0.69
71	1065	0.08	76	30,340	246	30,094	465.07	30,094	0.69
72	1080	0.07	61	30,155	246	29,909	465.06	29,909	0.69
73	1095	0.07	61	29,970	246	29,724	465.05	29,724	0.68
74	1110	0.07	61	29,786	246	29,540	465.04	29,540	0.68
75	1125	0.05	46	29,586	246	29,340	465.03	29,340	0.67
76	1140	0.03	31	29,370	246	29,125	465.02	29,125	0.67
77	1155	0.05	46	29,170	246	28,925	465.01	28,925	0.66
78	1170	0.07	61	28,986	246	28,740	465.00	28,740	0.66
79	1185	0.05	46	28,786	246	28,540	464.99	28,540	0.66
80	1200	0.03	31	28,570	246	28,325	464.98	28,325	0.65
81	1215	0.05	46	28,370	246	28,125	464.97	28,125	0.65
82	1230	0.05	46	28,170	246	27,925	464.96	27,925	0.64
83	1245	0.05	46	27,970	246	27,725	464.95	27,725	0.64
84	1260	0.03	31	27,755	246	27,509	464.94	27,509	0.63
85	1275	0.05	46	27,555	246	27,309	464.93	27,309	0.63
86	1290	0.03	31	27,340	246	27,094	464.92	27,094	0.62
87	1305	0.05	46	27,140	246	26,894	464.91	26,894	0.62
88	1320	0.03	31	26,925	246	26,679	464.90	26,679	0.61
89	1335	0.05	46	26,725	246	26,479	464.89	26,479	0.61
90	1350	0.03	31	26,509	246	26,264	464.88	26,264	0.60
91	1365	0.03	31	26,294	246	26,048	464.87	26,048	0.60
92	1380	0.03	31	26,079	246	25,833	464.86	25,833	0.59
93	1395	0.03	31	25,864	246	25,618	464.85	25,618	0.59
94	1410	0.03	31	25,648	246	25,402	464.84	25,402	0.58
95	1425	0.03	31	25,433	246	25,187	464.83	25,187	0.58
96	1440	0.03	31	25,218	246	24,972	464.82	24,972	0.57

IV STREET FLOWRATE CAPACITY

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 100 year storm event can be contained within the street right of way per City of Coachella drainage standards

In terms of on-site drainage, the site is divided into 4 separate quadrants, each draining to a separate surface retention basin. Within each quadrant, the maximum tributary area contributing runoff to any single street is 5 acres. Rational method calculations based on the 100 year design storm for 5 acres drainage area are provided in this section to quantify the maximum flowrate (Q) that must be conveyed by any on-site interior street. Manning's equation for open channel flow has then been used to show that the 100 year maximum flowrate (Q) can be contained within the street section right of way.

Q(100) MAX. = 10.92 CFS

MAX. STREET CAPACITY = 13.86 CFS

```
                Riverside County Rational Hydrology Program

     CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version
7.1
          Rational Hydrology Study        Date: 09/25/24
File:CALHOUN100STREET.out
     ---------------------------------------------------------------
------
     CALHOUN 100 YEAR - 5 ACRE STUDY


     ---------------------------------------------------------------
------
      *********   Hydrology Study Control Information **********

      English (in-lb) Units used in input data file

     ---------------------------------------------------------------
------


     Program License Serial Number 6253

     ---------------------------------------------------------------
------
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual

     Storm event (year) =  100.00 Antecedent Moisture Condition = 2

     2 year, 1 hour precipitation =  0.350(In.)
     100 year, 1 hour precipitation =  1.330(In.)

     Storm event year = 100.0
     Calculated rainfall intensity data:
     1 hour intensity =  1.330(In/Hr)
     Slope of intensity duration curve = 0.5900




     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
     Process from Point/Station      100.000 to Point/Station
200.000
     **** INITIAL AREA EVALUATION ****
     ____________________________________________________________
____
     Initial area flow distance =  1000.000(Ft.)
     Top (of initial area) elevation =   450.000(Ft.)
     Bottom (of initial area) elevation =   446.500(Ft.)
     Difference in elevation =     3.500(Ft.)
     Slope =    0.00350  s(percent)=       0.35
     TC = k(0.370)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration =   18.171 min.
     Rainfall intensity =      2.691(In/Hr) for a   100.0 year storm
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     10.922(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 0.350
End of computations, total study area =            5.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

100 YEAR STREET CAPACITY

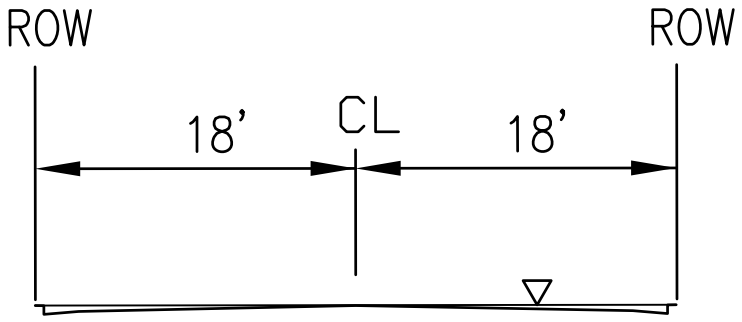
WITHIN PROJECT HALF STREET (NO CURB GUTTER AND SIDEWALK IMPROVEMENTS ON NON-PROJECT SIDE)

n=0.016

S=0.0035

R=A/P= 0.196

$Q=(1.49/n)AR^{2/3}S^{1/2}$ = 13.86cfs



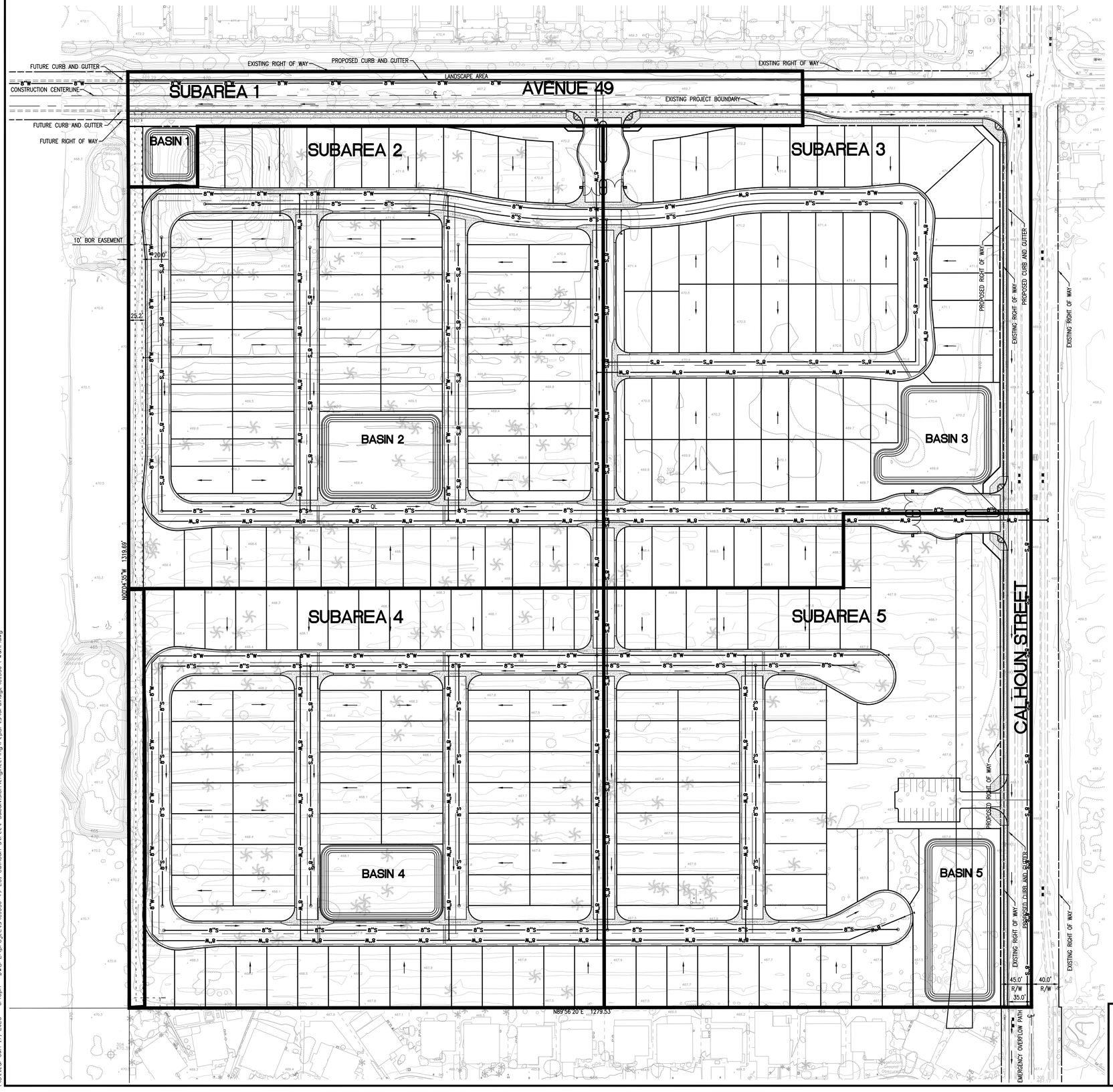
WETTED PERIMETER (P)=38.02

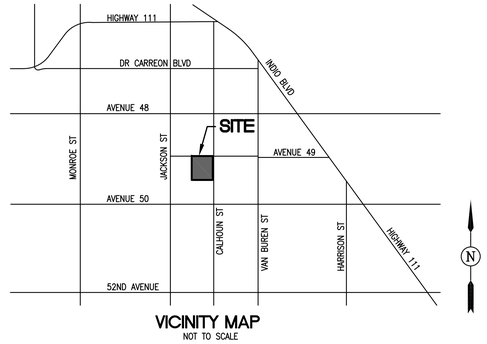
CROSS SECTION AREA (A)=7.46

V APPENDIX

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP
NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

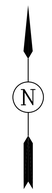
AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'



GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

PREPARED BY:
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ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg

NOAA Atlas 14, Volume 6, Version 2
Location name: Coachella, California, USA*
Latitude: 33.6909°, Longitude: -116.2099°
Elevation: -31 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.053-0.077)	**0.100** (0.083-0.121)	**0.152** (0.126-0.184)	**0.198** (0.163-0.242)	**0.266** (0.212-0.338)	**0.325** (0.253-0.421)	**0.390** (0.297-0.518)	**0.464** (0.343-0.634)	**0.576** (0.408-0.821)	**0.674** (0.461-0.997)
10-min	**0.092** (0.076-0.111)	**0.143** (0.119-0.173)	**0.217** (0.181-0.264)	**0.283** (0.233-0.347)	**0.382** (0.304-0.484)	**0.466** (0.363-0.604)	**0.559** (0.425-0.743)	**0.665** (0.491-0.909)	**0.825** (0.584-1.18)	**0.967** (0.661-1.43)
15-min	**0.111** (0.092-0.134)	**0.173** (0.144-0.210)	**0.263** (0.218-0.319)	**0.343** (0.282-0.420)	**0.462** (0.368-0.586)	**0.564** (0.439-0.730)	**0.676** (0.514-0.899)	**0.804** (0.594-1.10)	**0.998** (0.706-1.42)	**1.17** (0.799-1.73)
30-min	**0.160** (0.134-0.194)	**0.251** (0.209-0.304)	**0.381** (0.316-0.463)	**0.496** (0.409-0.608)	**0.669** (0.533-0.848)	**0.816** (0.636-1.06)	**0.979** (0.745-1.30)	**1.16** (0.860-1.59)	**1.44** (1.02-2.06)	**1.69** (1.16-2.50)
60-min	**0.225** (0.188-0.272)	**0.352** (0.293-0.426)	**0.534** (0.444-0.649)	**0.696** (0.573-0.853)	**0.938** (0.747-1.19)	**1.14** (0.892-1.48)	**1.37** (1.04-1.83)	**1.63** (1.21-2.23)	**2.03** (1.44-2.89)	**2.38** (1.62-3.51)
2-hr	**0.311** (0.260-0.377)	**0.462** (0.385-0.560)	**0.687** (0.571-0.835)	**0.891** (0.734-1.09)	**1.21** (0.961-1.53)	**1.48** (1.15-1.92)	**1.79** (1.36-2.38)	**2.14** (1.58-2.93)	**2.69** (1.90-3.83)	**3.17** (2.17-4.68)
3-hr	**0.375** (0.313-0.454)	**0.547** (0.456-0.663)	**0.806** (0.669-0.979)	**1.04** (0.861-1.28)	**1.42** (1.13-1.80)	**1.74** (1.36-2.26)	**2.12** (1.61-2.82)	**2.55** (1.88-3.49)	**3.22** (2.28-4.60)	**3.82** (2.61-5.65)
6-hr	**0.495** (0.413-0.599)	**0.715** (0.596-0.866)	**1.05** (0.871-1.27)	**1.36** (1.12-1.66)	**1.84** (1.47-2.34)	**2.28** (1.78-2.95)	**2.78** (2.11-3.69)	**3.36** (2.48-4.59)	**4.27** (3.02-6.08)	**5.08** (3.47-7.51)
12-hr	**0.598** (0.499-0.724)	**0.883** (0.736-1.07)	**1.31** (1.09-1.59)	**1.70** (1.40-2.09)	**2.31** (1.84-2.93)	**2.85** (2.22-3.69)	**3.46** (2.63-4.60)	**4.17** (3.08-5.70)	**5.27** (3.73-7.52)	**6.25** (4.27-9.23)
24-hr	**0.751** (0.665-0.866)	**1.14** (1.01-1.32)	**1.72** (1.51-1.98)	**2.23** (1.95-2.60)	**3.02** (2.56-3.64)	**3.71** (3.08-4.56)	**4.47** (3.63-5.63)	**5.34** (4.22-6.91)	**6.67** (5.06-8.97)	**7.83** (5.75-10.9)
2-day	**0.871** (0.770-1.00)	**1.34** (1.18-1.55)	**2.02** (1.78-2.34)	**2.63** (2.30-3.06)	**3.53** (2.99-4.26)	**4.30** (3.57-5.29)	**5.15** (4.18-6.48)	**6.10** (4.82-7.89)	**7.53** (5.71-10.1)	**8.74** (6.42-12.2)
3-day	**0.933** (0.825-1.08)	**1.44** (1.28-1.67)	**2.18** (1.92-2.52)	**2.82** (2.47-3.30)	**3.79** (3.21-4.56)	**4.60** (3.82-5.65)	**5.49** (4.46-6.91)	**6.49** (5.12-8.38)	**7.96** (6.04-10.7)	**9.21** (6.76-12.8)
4-day	**0.983** (0.870-1.13)	**1.52** (1.34-1.76)	**2.29** (2.02-2.65)	**2.97** (2.60-3.47)	**3.98** (3.37-4.79)	**4.82** (4.01-5.93)	**5.75** (4.66-7.23)	**6.78** (5.35-8.75)	**8.29** (6.29-11.2)	**9.58** (7.03-13.3)
7-day	**1.04** (0.923-1.20)	**1.61** (1.42-1.86)	**2.41** (2.12-2.79)	**3.12** (2.73-3.64)	**4.16** (3.52-5.01)	**5.03** (4.18-6.18)	**5.98** (4.85-7.52)	**7.03** (5.55-9.08)	**8.57** (6.50-11.5)	**9.88** (7.25-13.7)
10-day	**1.08** (0.955-1.24)	**1.66** (1.47-1.92)	**2.48** (2.19-2.87)	**3.21** (2.80-3.74)	**4.27** (3.62-5.14)	**5.16** (4.29-6.34)	**6.13** (4.97-7.71)	**7.19** (5.68-9.30)	**8.76** (6.65-11.8)	**10.1** (7.40-14.0)
20-day	**1.15** (1.02-1.33)	**1.78** (1.58-2.06)	**2.68** (2.36-3.10)	**3.46** (3.03-4.04)	**4.61** (3.91-5.55)	**5.56** (4.62-6.84)	**6.60** (5.35-8.30)	**7.73** (6.10-9.99)	**9.38** (7.12-12.6)	**10.8** (7.90-15.0)
30-day	**1.20** (1.06-1.38)	**1.88** (1.66-2.17)	**2.86** (2.52-3.31)	**3.71** (3.25-4.33)	**4.97** (4.21-5.98)	**6.00** (4.98-7.38)	**7.12** (5.77-8.95)	**8.33** (6.58-10.8)	**10.1** (7.66-13.6)	**11.5** (8.47-16.0)
45-day	**1.30** (1.15-1.49)	**2.07** (1.83-2.39)	**3.18** (2.80-3.68)	**4.14** (3.62-4.83)	**5.56** (4.72-6.70)	**6.74** (5.60-8.28)	**8.00** (6.49-10.1)	**9.36** (7.39-12.1)	**11.3** (8.59-15.2)	**12.9** (9.50-18.0)
60-day	**1.36** (1.21-1.57)	**2.21** (1.95-2.55)	**3.42** (3.01-3.96)	**4.48** (3.92-5.22)	**6.03** (5.11-7.26)	**7.31** (6.07-8.98)	**8.68** (7.04-10.9)	**10.2** (8.03-13.1)	**12.3** (9.33-16.5)	**14.0** (10.3-19.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Appendix E
Calhoun Street Housing Development Preliminary Water Quality Management Plan

Project Specific
Preliminary Water Quality Management Plan

Calhoun Street Subdivision
49-251 Calhoun Street Subdivision

DEVELOPMENT NO. **ASSESSOR'S PARCEL NO. 612-260-010**
DESIGN REVIEW NO. **CUP #**

Prepared for:

Rod Vandenburg
43-584 Via Magellan Drive
Palm Desert, CA 92201
Telephone: (760) 799-8227

Prepared by:

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1/17/26

James Bazua
RCE 58394

Date
Exp. 12/31/26

REGISTERED PROFESSIONAL ENGINEER
JAMES RON BAZUA
No 58394
Exp. 12/31/26
CIVIL
STATE OF CALIFORNIA

Original Date Prepared: January 17, 2025

Revision Date(s):

OWNER'S CERTIFICATION

This project-specific Preliminary Water Quality Management Plan (WQMP) has been prepared for:

Rod Vandenburg by **The Altum Group** for the project known as **Calhoun Street Subdivision** at **49-251 Calhoun Street, Coachella, CA 92236.**

.

This Preliminary WQMP is intended to comply with the requirements of The City of Coachella for **ASSESSOR'S PARCEL NUMBERS: 612-260-010** which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of the WQMP and will ensure that the WQMP is amended as appropriate to reflect up-to-date conditions on the site. This Preliminary WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of the WQMP. At least one copy of the Final WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of the Final WQMP. The undersigned is aware that implementation of the WQMP is enforceable under The City of Coachella Water Quality Ordinance (City of Coachella Ordinance 1057, Section 5 Chapter 13.6).

If the undersigned transfers its interest in the subject property/project, the undersigned shall notify the successor in interest of its responsibility to implement the WQMP.

"I, the undersigned, certify under penalty of law that I am the owner of the property that is the subject of the WQMP, and that the provisions of the WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

_____
Owner's Signature

_____
Owner's Printed Name

Owner
Rod Vandenburg
Owner's Title/Position

_____
Date

43-584 Via Magellan Drive
Palm Desert, CA 92201
(760) 799-8227

ATTEST

_____
Notary Signature

_____
Printed Name

_____
Title/Position

_____
Date

THIS FORM SHALL BE NOTARIZED BEFORE ACCEPTANCE OF THE FINAL PROJECT SPECIFIC WQMP

Contents

SECTION **PAGE**

I. Project Description 1
II. Site Characterization 5
III. Pollutants of Concern 7
IV. Hydrologic Conditions of Concern 8
V. Best Management Practices 9
V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs 9
V.1.A Site Design BMP Concepts and LID/Site Design BMPs 11
V.1.B Treatment Control BMPs 17
V.1.C Measurable Goal Summary 19
V.2 Source Control BMPs 20
V.3 Equivalent Treatment Control BMP Alternatives 24
V.4 Regionally-Based BMPs 24
VI. Operation and Maintenance Responsibility for BMPs 25
VII. Funding 28

TABLES

Table 1. Pollutant of Concern Summary 7
Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency 10
Table 3. Implementation of Site Design BMP Concepts 12
Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal 16
Table 5: Treatment Control BMP Summary 18
Table 6: Measurable Goal Summary 19
Table 7. Source Control BMPs 20

APPENDICES

A. Conditions of Approval
B. Vicinity Map, WQMP Site Plan, and Receiving Waters Map
C. Supporting Detail Related to Hydrologic Conditions of Concern (If Applicable)
D. Educational Materials
E. Soils Report (if applicable)
F. Structural BMP and/or Retention Facility Sizing Calculations and Design Details
G. Agreements – CC&Rs, Covenant and Agreements, BMP Maintenance Agreements and/or Other Mechanisms for ensuring ongoing Operation, Maintenance, Funding and Transfer of Requirements for this project-specific WQMP
H. Phase 1 Environmental Site Assessment – Summary of Site Remediation Conducted and Use Restrictions
I. Project-Specific WQMP Summary Data Form

I. Project Description

Project Owner: **Pacific Coast Properties**
43-584 Via Magellan Drive
Palm Desert, CA 92201
Telephone: **(760) 799-8227**
Ron Vandenburg - Owner

WQMP Preparer: TheAltumGroup
James R. Bazua, PE
44-600 Village Court Suite 100
Palm Desert, CA 92260
Telephone: (760) 346 – 4750
james.bazua@thealtumgroup.com

_____

James Bazua — Date

RCE 58394 — Exp. 12/31/26

Project Site Address:	**49-251 Calhoun Street** **Coachella, CA 92236**
Planning Area/ Community Name/ Development Name:	**General Neighborhood**
APN Number(s):	**612-260-010**
Latitude & Longitude:	**33.6915, -116.2099**
Receiving Water:	**Coachella Valley Stormwater Channel**
Project Site Size:	**39.98 acres**

Standard Industrial Classification (SIC) Code: **6552 Land Subdividers and Developers**

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): Y ☐ N ☒

Additional Permits/Approvals required for the Project:

AGENCY	Permit required
State Department of Fish and Wildlife, Fish and Game Code §1602 Streambed Alteration Agreement	Y ☐ N☒
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Certification	Y ☐ N☒
US Army Corps of Engineers, CWA Section 404 permit	Y ☐ N☒
US Fish and Wildlife, Endangered Species Act Section 7 biological opinion	Y ☐ N☒
Statewide Construction General Permit Coverage	Y ☒ N☐
Statewide Industrial General Permit Coverage	Y ☐ N☒
South Coast Air Quality Management District – PM10 Approval to comply with Rule 403	Y ☒ N☐
Other: City of Coachella Grading Permit and Building Permit	Y ☒ N☐

Project Description

The proposed Calhoun Street Subdivision (Project) is located at 49-251 Calhoun Street, at Calhoun Street & Avenue 49, Coachella, CA 92236. The Accessor's Parcel Number is 612-260-010. The total Project area is 39.98 acres and is vacant under the existing condition. Proposed improvements will consist of the construction of a 257-lot residential subdivision that will disturb 100% of the existing vacant land. Included in project construction activities are clearing and grubbing, rough and precise grading, construction of roadways, buildings for each lot, landscaping areas, and a 1.96 acre park on the east side of the project along Calhoun Street.

Under post development conditions, storm runoff generated on-site will surface flow via local surface streets toward on-site retention basin collection systems. The on-site retention basin systems are designed to store 100% of runoff generated during the worst case 100-year design storm event.

Flows exceeding the storage capacity of the on-site retention basin systems in an emergency overflow condition will exit the project and flow onto Calhoun Street, then follow a northerly direction, toward Avenue 48, where it will continue east until entering the existing MS4 storm drain inlet facility on Van Buren Street, then continues underground toward the east (approximately 1 mile) until it empties into the Coachella Valley Storm Channel.

Appendix A of the project-specific Final WQMP will include a complete copy of the Conditions of Approval. Appendix B of this project-specific Preliminary WQMP includes:

a. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail; and

b. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Source Control, LID/Site Design and Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.
- Location of points where onsite (or tributary offsite) flows exit the property/project site.
- Delineation of proposed drainage area boundaries, including tributary offsite areas, for each location where flows exit the project site and existing site (where existing site flows are required to be addressed). Each tributary area should be clearly denoted.

- Pre- and post-project topography.

Appendix I is a one-page form that summarizes pertinent information relative to the project-specific WQMP.

II. Site Characterization

Land Use Designation or Zoning: **General Neighborhood**

Current Property Use: **Vacant Land**

Proposed Property Use: **General Neighborhood – Residential Subdivision**

Availability of Soils Report: Y ☐ N ☒ *Note: A soils report is required if infiltration BMPs are utilized. Report will be included with Final WQMP Appendix E.*

Phase 1 Site Assessment: Y ☒ N ☐ *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use Designated Receiving Waters
Coachella Valley Stormwater Channel	DDT, Dieldrin, Pathogens, Toxaphene, Toxicity, Total Ammonia	FRSH, REC 1, REC 2, WARM, WILD, RARE	Designated as RARE (18.0 miles)

III. Pollutants of Concern

Table 1. Pollutant of Concern Summary

Pollutant Category	Potential for Project and/or Existing Site	Causing Receiving Water Impairment
Bacteria/Virus	YES	YES
Heavy Metals	YES	NO
Nutrients	YES	NO
Toxic Organic Compounds	YES	YES
Sediment/Turbidity	YES	NO
Trash & Debris	YES	NO
Oil & Grease	YES	NO
Toxaphene	NO	YES

1) Pathogens are disease causing virus or bacteria. Pathogens are an impairment in the Coachella Valley Storm Water Channel from Dillon Road to the Salton Sea.

2) Toxaphene is an insecticide which was banned from use in the United States in 1990. Therefore, it is not a potential for the project but is currently a receiving water impairment.

3) Petroleum hydrocarbons are one of the most common organic compounds associated with street and parking lots and is a potential pollutant for the site. See Section V.2 for a description of appropriate Source Control BMPs.

4) Oil and Grease associated with landscaping and onsite operations are potential pollutants for the development. See Section V.2 for a description of appropriate Source Control BMP's.

5) PCBs, Dieldrin, and DDT are banned substances in the US.

IV. Hydrologic Conditions of Concern

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater"). This section does not need to be completed; however, retention facility design details and sizing calculations must be included in Appendix F.

No ☐ This section must be completed.

This Project meets the following condition:

☐ **Condition A**: 1) Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4 or engineered and maintained channel, 2) the discharge is in full compliance with local land use authority requirements for connections and discharges to the MS4 (including both quality and quantity requirements), 3) the discharge would not significantly impact stream habitat in proximate Receiving Waters, **and** 4) the discharge is authorized by the local land use authority.

☐ **Condition B**: The project disturbs less than 1 acre and is not part of a larger common plan of development that exceeds 1 acre of disturbance. The disturbed area calculation must include all disturbances associated with larger plans of development.

☐ **Condition C**: The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by, where applicable, complying with the local land use authority's on-site retention ordinance, or minimizing impervious area on a site and incorporating other Site-Design BMP concepts and LID/Site Design BMPs that assure non-exceedance of pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the local land use authority.

☐ **None:** Refer to Section 3.4 of the Whitewater River Region WQMP Guidance document for additional requirements.

Supporting engineering studies, calculations, and reports are included in Appendix C.

	2 year – 24 hour		10 year – 24 hour	
	Precondition	**Post-condition**	**Precondition**	**Post-condition**
Discharge (cfs)				
Velocity (fps)				
Volume (cubic feet)				
Duration (minutes)				

V. Best Management Practices

This project implements Best Management Practices (BMPs) to address the Pollutants of Concern that may potentially be generated from the use of the project site. These BMPs have been selected and implemented to comply with Section 3.5 of the WQMP Guidance document, and consist of Site Design BMP concepts, Source Control, LID/Site Design and, if/where necessary, Treatment Control BMPs as described herein.

V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain Urban Runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater). **The LID/Site Design measurable goal has thus been met (100%), and Sections V.1.A and V.1.B do not need to be completed**; however, retention facility design details and sizing calculations must be included in Appendix F, and '100%' should be entered into Column 3 of Table 6 below.

No ☐ Section V.1 must be completed.

This section of the Project-Specific WQMP documents the LID/Site Design BMPs and, if/where necessary, the Treatment Control BMPs that will be implemented on the project to meet the requirements detailed within Section 3.5.1 of the WQMP Guidance document. Section 3.5.1 includes requirements to implement Site Design Concepts and BMPs, and includes requirements to address Pollutants of Concern with BMPs. Further, sub-section 3.5.1.1 specifically requires that Pollutants of Concern be addressed with LID/Site Design BMPs to the extent feasible.

LID/Site Design BMPs are those BMPs listed within Table 2 below which promote retention and/or feature a natural treatment mechanism; off-site and regionally-based BMPs are also LID/Site Design BMPs, and therefore count towards the measurable goal, if they fit these criteria. This project incorporates LID/Site Design BMPs to fully address the Treatment Control BMP requirement where and to the extent feasible. If and where it has been acceptably demonstrated to the local land use authority that it is infeasible to fully meet this requirement with LID/Site Design BMPs, Section V.1.B (below) includes a description of the conventional Treatment Control BMPs that will be substituted to meet the same requirements.

In addressing Pollutants of Concern, BMPs are selected using Table 2 below.

Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency (1)

(Sources: Riverside County Flood Control & Water Conservation District Design Handbook for Low Impact Development Best Management Practices, dated September 2011, the Orange County Technical Guidance Document for Water Quality Management Plans, dated May 19, 2011, and the Caltrans Treatment BMP Technology Report, dated April 2010 and April 2008)

Pollutant of Concern	Landscape Swale[2, 3]	Landscape Strip[2, 3]	Biofiltration (with underdrain)[2, 3]	Extended Detention Basin[2]	Sand Filter Basin[2]	Infiltration Basin[2]	Infiltration Trench[2]	Permeable Pavement[2]	Bioretention (w/o underdrain)[2, 3]	Other BMPs Including Proprietary BMPs[4, 6]
Sediment & Turbidity	M	M	H	M	H	H	H	H	H	Varies by Product[5]
Nutrients	L/M	L/M	M	L/M	L/M	H	H	H	H	
Toxic Organic Compounds	M/H	M/H	M/H	L	L/M	H	H	H	H	
Trash & Debris	L	L	H	H	H	H	H	L	H	
Bacteria & Viruses (also: Pathogens)	L	M	H	L	M	H	H	H	H	
Oil & Grease	M	M	H	M	H	H	H	H	H	
Heavy Metals	M	M/H	M/H	L/M	M	H	H	H	H	

Abbreviations:

L: Low removal efficiency M: Medium removal efficiency H: High removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Expected performance when designed in accordance with the most current edition of the document, "Riverside County, Whitewater River Region Stormwater Quality Best Management Practice Design Handbook".

(3) Performance dependent upon design which includes implementation of thick vegetative cover. Local water conservation and/or landscaping requirements should be considered; approval is based on the discretion of the local land use authority.

(4) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP (including proprietary filters, hydrodynamic separators, inserts, etc.), or newly developed/emerging stormwater treatment technologies.

(5) Expected performance should be based on evaluation of unit processes provided by BMP and available testing data. Approval is based on the discretion of the local land use authority.

(6) When used for primary treatment as opposed to pre-treatment, requires site-specific approval by the local land use authority.

V.1.A SITE DESIGN BMP CONCEPTS AND LID/SITE DESIGN BMPS

This section documents the Site Design BMP concepts and LID/Site Design BMPs that will be implemented on this project to comply with the requirements detailed in Section 3.5.1 of the WQMP Guidance document.

- Table 3 herein documents the implementation of the Site Design BMP Concepts described in sub-sections 3.5.1.3 and 3.5.1.4.
- Table 4 herein documents the extent to which this project has implemented the LID/Site Design goals described in sub-section 3.5.1.1.

Table 3. Implementation of Site Design BMP Concepts

Design Concept	Technique	Specific BMP	Included			Brief Reason for BMPs Indicated as No or N/A
			Yes	No	N/A	
Site Design BMP Concept 1	**Minimize Urban Runoff, Minimize Impervious Footprint, and Conserve Natural Areas** **(See WQMP Section 3.5.1.3)**	Conserve natural areas by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition.	☐	☐	☐	
		Conserve natural areas by incorporating the goals of the Multi-Species Habitat Conservation Plan or other natural resource plans.	☐	☐	☐	
		Preserve natural drainage features and natural depressional storage areas on the site.	☐	☐	☐	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☐	☐	☐	
		Use natural drainage systems.	☐	☐	☐	
		Where applicable, incorporate Self-Treating Areas	☐	☐	☐	
		Where applicable, incorporate Self-Retaining Areas	☐	☐	☐	
		Increase the building floor to area ratio (i.e., number of stories above or below ground).	☐	☐	☐	
		Construct streets, sidewalks and parking lot aisles to minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised.	☐	☐	☐	
		Reduce widths of streets where off-street parking is available.	☐	☐	☐	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Design residential and commercial sites to contain and infiltrate roof runoff, or direct roof runoff to landscaped swales or buffer areas.	☐	☐	☐	
		Drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☐	☐	☐	
		Incorporate landscaped buffer areas between sidewalks and streets.	☐	☐	☐	
		Use natural or landscaped drainage swales in lieu of underground piping or imperviously lined swales.	☐	☐	☐	
		Where soil conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	☐	☐	☐	
		Maximize the permeable area by constructing walkways, trails, patios, overflow parking, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces such as pervious concrete, porous asphalt, unit pavers, and granular materials.	☐	☐	☐	
		Use one or more of the following:				
		Rural swale system: street sheet flows to landscaped swale or gravel shoulder, curbs used at street corners, and culverts used under driveways and street crossings.	☐	☐	☐	
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to landscaped swale or biofilter.	☐	☐	☐	
		Dual drainage system: first flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder; high flows connect directly to MS4s.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of driveways and private residential parking areas:				
		Design driveways with shared access, flared (single lane at street), or wheel strips (paving only under the tires).	☐	☐	☐	
		Uncovered temporary or guest parking on residential lots paved with a permeable surface, or designed to drain into landscaping.	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2 (cont'd)	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of parking areas:				
		Where landscaping is proposed in parking areas, incorporate parking area landscaping into the drainage design.	☐	☐	☐	
		Overflow parking (parking stalls provided in excess of the Permittee's minimum parking requirements) may be constructed with permeable pavement.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP (or BMPs) as approved by the local land use authority (Note: Additional narrative required describing BMP and how it addresses site design concept).	☐	☐	☐	

Project Site Design BMP Concepts:

The site design BMPs will include a Infiltration Basin system BMP designed to capture 100% of the 100 year storm event per City of Coachella standards.

Alternative Project Site Design BMP Concepts:

N/A

Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal

(1) DRAINAGE SUB-AREA ID OR NO.	(2) LID/SITE DESIGN BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF LID/SITE DESIGN BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
TOTAL PROJECT AREA TREATED WITH LID/SITE DESIGN BMPs (NEAREST 0.1 ACRE)						**39.98**

*** LID/Site Design BMPs listed in this table are those that completely address the 'Treatment Control BMP requirement' for their drainage sub-area.**

Justification of infeasibility for sub-areas not addressed with LID/Site Design BMPs

Not applicable; Treatment Control & Site Design BMP's are addressed by the Infiltration Basin design system.

V.1.B TREATMENT CONTROL BMPS

Conventional Treatment Control BMPs shall be implemented to address the project's Pollutants of Concern as required in WQMP Section 3.5.1 where, and to the extent that, Section V.1.A has demonstrated that it is infeasible to meet these requirements through implementation of LID/Site Design BMPs.

☒ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP completely address the 'Treatment Control BMP requirement' for the entire project site (and where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP Guidance document. Supporting documentation for the sizing of these LID/Site Design BMPs is included in Appendix F. ***Section V.1.B does not need to be completed**.

☐ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP do **NOT** completely address the 'Treatment Control BMP requirement' for the entire project site (or where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP. ***Section V.1.B must be completed.**

The Treatment Control BMPs identified in this section are selected, sized and implemented to treat the design criteria of V_{BMP} and/or Q_{BMP} for all project (and if required, existing site) drainage sub-areas which were not fully addressed using LID/Site Design BMPs. Supporting documentation for the sizing of these Treatment Control BMPs is included in Appendix F.

Table 5: Treatment Control BMP Summary

(1) DRAINAGE SUB-AREA ID OR NO.	(2) TREATMENT CONTROL BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF TREATMENT CONTROL BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
	TOTAL PROJECT AREA TREATED WITH TREATMENT CONTROL BMPs (NEAREST 0.1 ACRE)					0.0

V.1.C MEASURABLE GOAL SUMMARY

This section documents the extent to which this project has met the measurable goal described in WQMP Section 3.5.1.1 of addressing 100% of the project's 'Treatment Control BMP requirement' with LID/Site Design BMPs. Projects required to retain Urban Runoff onsite in conformance with local ordinance are considered to have met the measurable goal; for these instances, '100%' is entered into Column 3 of the Table.

Table 6: Measurable Goal Summary

(1) **Total Area Treated with LID/Site Design BMPs** (Last row of Table 4)	(2) **Total Area Treated with Treatment Control BMPs** (Last row of Table 5)	(3) **% of Treatment Control BMP Requirement addressed with LID/Site Design BMPs**
39.98 ac	0.0 ac	100%

V.2 SOURCE CONTROL BMPS

This section identifies and describes the Source Control BMPs applicable and implemented on this project.

Table 7. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
Storm Drain Inlet Stenciling and Signage	☐	☒	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	Not part of the project design.
Properly Design*:			
Fueling Areas	☐	☒	
Air/Water Supply Area Drainage	☐	☒	No facilities.
Trash Storage Areas	☒	☐	
Loading Docks	☐	☒	No facilities.
Maintenance Bays	☐	☒	No facilities.
Vehicle and Equipment Wash Areas	☐	☒	No facilities.
Outdoor Material Storage Areas	☐	☒	No facilities.
Outdoor Work Areas or Processing Areas	☐	☒	No facilities.
Provide Wash Water Controls for Food Preparation Areas	☐	☒	No facilities.

*Details demonstrating proper design must be included in Appendix F.

5.2.1 Non-Structural Source Control BMPs

5.2.1.1 Education

Yes

The owner, as responsible party for implementing the Final WQMP, will ensure that owner's employees, operators, and managers are properly trained and attend continuing education classes.

5.2.1.2 Activity Restrictions

Yes

Certain activities within the project area may be restricted to enable the owner/operator to meet the City's water quality requirements. For example, maintenance of vehicles (which contributes to storm water contamination by oil and grease) is not authorized in this area.

5.2.1.3 Irrigation System and Landscape Maintenance

Yes

Owner shall ensure that the irrigation systems within the project site are operating properly. Owner shall also ensure that the ground's landscaping is maintained regularly so that the project site is in compliance with all City water quality requirements.

5.2.1.4 Common Area Litter Control

Yes

Owner shall ensure that employees regularly patrol the site in an effort to keep it free of litter so that the project site is in compliance with all City water quality requirements.

5.2.1.5 Street Sweeping

Yes

Owner shall ensure that the streets is regularly swept so that the project site is in compliance with all City water quality requirements. Streets/driveways and parking lots shall be swept at least quarterly, including just prior to start of the rainy season (October 1st). The frequency shall be no less than the frequency of street sweeping by the Co-Permittee on public streets.

5.2.1.6 Drainage Facility Inspection and Maintenance

Yes

Owner shall ensure that drainage facilities within the project area are regularly inspected (at least annually) and maintained properly so that the project site is in compliance with all City water quality requirements. At a minimum, routine maintenance of drainage facilities should take place in the late summer or early fall prior to the start of the rainy season (October 1st).

5.2.2 Structural Source Control BMPs

5.2.2.1 MS4 Stenciling and Signage

No

The existing site does not drain directly to MS4 facilities as the redevelopment area will

include a retention basin infiltration facility (BMP) which will intercept a 100% of the post-development storm flow. Also, no curb inlets are proposed on-site.

5.2.2.2 Landscape and Irrigation System Design

Yes

The project will be designed to include native, drought-tolerant plants. These plants use less water, and help reduce the use of fertilizers and pesticides. The irrigation system will be programmable and utilize drip emitters, limiting excess irrigation runoff. The landscape and irrigation system will be designed in accordance with the City's water quality requirements.

5.2.2.3 Protect Slopes and Channels

Yes

Project plans shall include Source Control BMPs to decrease the potential for erosion of slopes. The following design principles shall be considered, and incorporated and implemented where determined applicable and feasible by the local land use authority:

- Convey runoff safely from the tops of slopes.
- Plant slopes with native or drought tolerant vegetation.

5.2.2.4 Provide Community Car Wash Racks

No

The project site will not include community car wash racks as part of the project design.

5.2.2.5 Fueling Areas

No

Project development does not include the construction of fueling areas.

5.2.2.6 Air/Water Supply Area Drainage

No

The project site will not include air/water supply areas.

5.2.2.7 Trash Storage Areas

Yes

The project site will include trash storage areas. Trash storage (or trash enclosures) will be located on-site. Also, trash dumpsters will have attached covers and shall be leak proof. The entire trash storage surface area will be concrete.

5.2.2.8 Loading Docks

No

The project site will not include loading docks.

5.2.2.9 Maintenance Bays

No

The project site will not include maintenance bays.

5.2.2.10 Vehicle and Equipment Wash Areas

No

The project site will not include vehicle and equipment wash areas.

5.2.2.11 Outdoor Material Storage Areas

No

The project site will not Outdoor Material Storage Areas

5.2.2.12 Outdoor Work Areas or Processing Areas

No

The project site will not include outdoor work areas or processing areas.

5.2.2.13 Wash Water Areas for Food Preparation Areas

No

The project site will not include outdoor work areas or processing areas.

Appendix D includes copies of the educational materials (described in Section 3.5.2.1 of the WQMP Guidance document) that will be used in implementing the project-specific WQMP.

V.3 EQUIVALENT TREATMENT CONTROL BMP ALTERNATIVES

The project site will not include any other treatment control alternatives.

V.4 REGIONALLY-BASED BMPS

100% of the runoff generated on-site during 100 year design frequency storm will be retained on-site in an infiltration type retention basin.

VI. Operation and Maintenance Responsibility for BMPs

Appendix G of the project-specific WQMP will include copies of CC&Rs, Covenant and Agreements, BMP Maintenance Agreement and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

Operations and maintenance (O&M) will be performed, as necessary, by Pacific Coast Properties, their agents, and/or their assignees. The BMPs for the project are a infiltration type retention basins designed with a capacity to store the runoff generated during the 100-year storm event.

Maintenance of the site and on-site storm drain and retention basin system consists primarily of the removal of trash and debris, repair and removal/reinstallation of facilities if damaged or saturated by native material (due to wind and water erosion) or sediment and organic material from human activity. Any removed material must be hauled away to an approved disposal facility. See Appendix D for a recommended “Infiltration System Maintenance Plan”.

Routine inspection and required maintenance of all BMPs and the site should begin immediately upon completion of construction and continue throughout the life of the project. Records of all inspection and repair/modifications shall be kept by the owner. The following persons shall be responsible for all O&M and inspections, until such time as another staff member is designated:

Rod Vandenburg
Pacific Coast Properties
43-584 Via Magellan Drive
Coachella, CA 92201
Telephone: (760) 403- 6647

(1) ALL BMPS REQUIRING MAINTENANCE	(2) DESCRIPTION OF O&M ACTIVITIES	(3) START DATE	(4) O&M FREQUENCY	(5) PARTY RESPONSIBLE FOR O&M	(6) SELF INSPECTION AND RECORD KEEPING REQUIREMENTS
EDUCATION FOR PROPERTY OWNERS OPERATORS, OR EMPLOYEES	MATERIALS WILL BE AVAILABLE TO EMPLOYEES, MAINTENANCE CREWS AND CONTRACTORS. PROVIDE EDUCATIONAL MATERIALS ON AN ANNUAL BASIS AND UPON HIRING OF EMPLOYEES.	AT PROJECT COMPLETION	ANNUALLY	PACIFIC COAST PROPERTIES	SEE ATTCHED EXAMPLE OF TRAINING / EDUCATION LOG. RECORD TRAINING OF EMPLOYEES
ACTIVITY RESTRICTIONS	PROVIDE ACCESS TO WQMP FOR ALL EMPLOYEES AND CONTRACTORS THAT PERFORM MAINTENANCE WORK.	AT PROJECT COMPLETION	ANNUALLY	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
IRRIGATION SYSTEM AND LANDSCAPE MANAGEMENT	INSPECT ALL COMMON LANDSCAPE AREAS AND REPLACE DEAD VEGETATION. INSPECT, ADJUST AND REPAIR IRRIGATION SYSTEM.	UPON COMPLETION OF LANDSCAPED AREAS	WEEKLY DURING REGULAR MAINTENANCE	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
COMMON AREA LITTER CONTROL	INSPECT AND REMOVE ALL LITTER AND DEBRIS LOCATED IN ALL COMMON AREAS, INCLUDING STREETS, PARKWAYS AND SIDEWALKS	AT PROJECT COMPLETION	AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
STREET SWEEPING	INSPECT FOR SEDIMENT DURING ROUTINE MAINTENANCE ADJUST FREQUENCY OF SWEEPING OPERATIONS	PROJECT COMPLETION	BI-MONTHLY AND AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG

DRAINAGE FACILITY PROTECTION	INSPECT ALL CATCH BASINS AND STORM DRAIN PIPES, REMOVE LITTER DEBRIS AND ANY LIQUIDS	UPON INSTALLATION OF STORM DRAIN SYSTEM ADDITIONS	QUARTERLY AND AFTER A QUALIFYING RAIN EVENT OF 0.5" /24HRS	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
LANDSCAPE AND IRRIGATION SYSTEM DESIGN	INSPECT AND REPAIR LANDSCAPE IRRIGATION TIMERS. INSPECT AND REPAIR ALL SPRINKLER HEADS AS NEEDED,	UPON COMPLETION OF LANDSCAPED AREAS	WEEKLY	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
TRASH STORAGE AREA	INSPECT INTEGRITY OF STRUCTURAL ELEMENTS REPLACE CONTAINERS WHEN NEEDED	AT PROJECT COMPLETION	MONTHLY AND AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
RETENTION BASIN	INSPECT AND REMOVE LITTER AND DEBRIS, MAINTAIN LANDSCAPE, REMOVE DEAD VEGETATION	AT PROJECT COMPLETION	QUARTERLY DURING DRY SEASON, MONTHLY DURING RAINY SEASON	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG

VII. Funding

Source funding and long term funding of operations and maintenance of the project BMP will be provided by Pacific Coast Properties (Owner), their agents, and/or assignees. Funding will be addressed in a covenant agreement entered into between City of Coachella and the Owner before approval of the Final WQMP.

Appendix A

Conditions of Approval

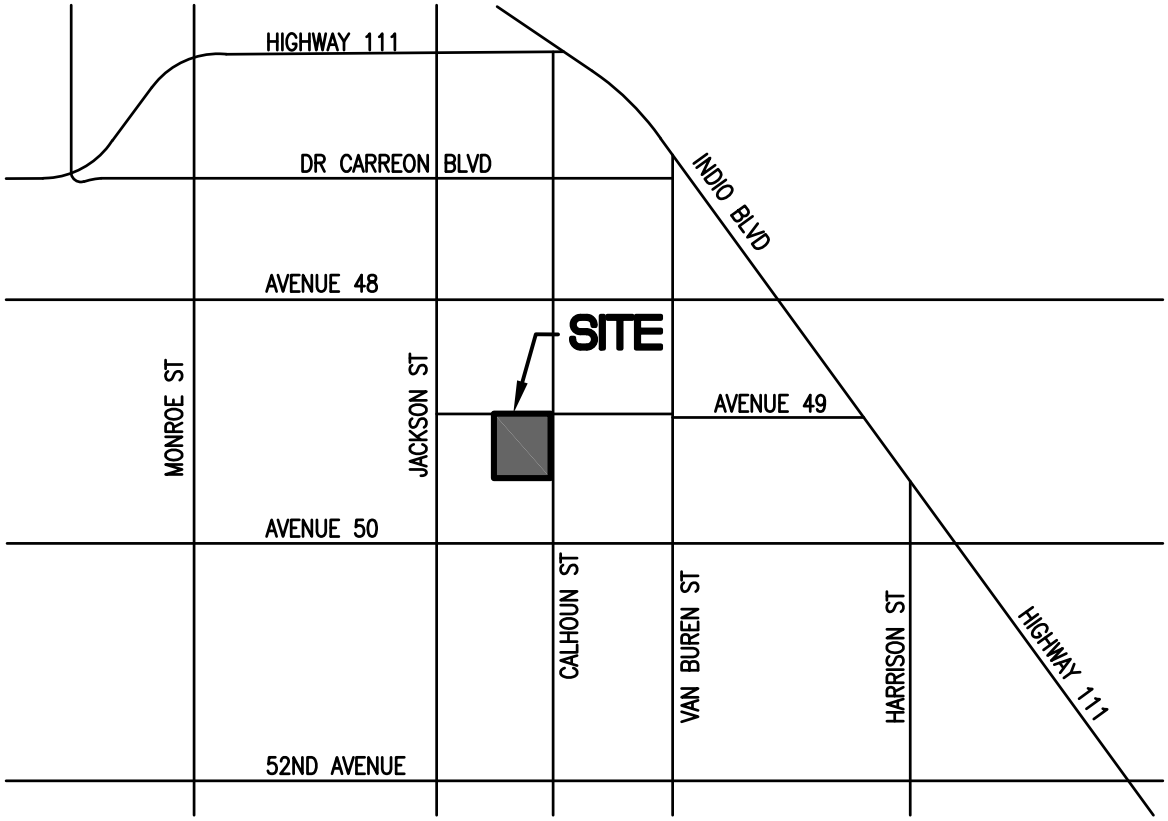
N/A

Planning Commission Resolution _____

Dated _____

Appendix B

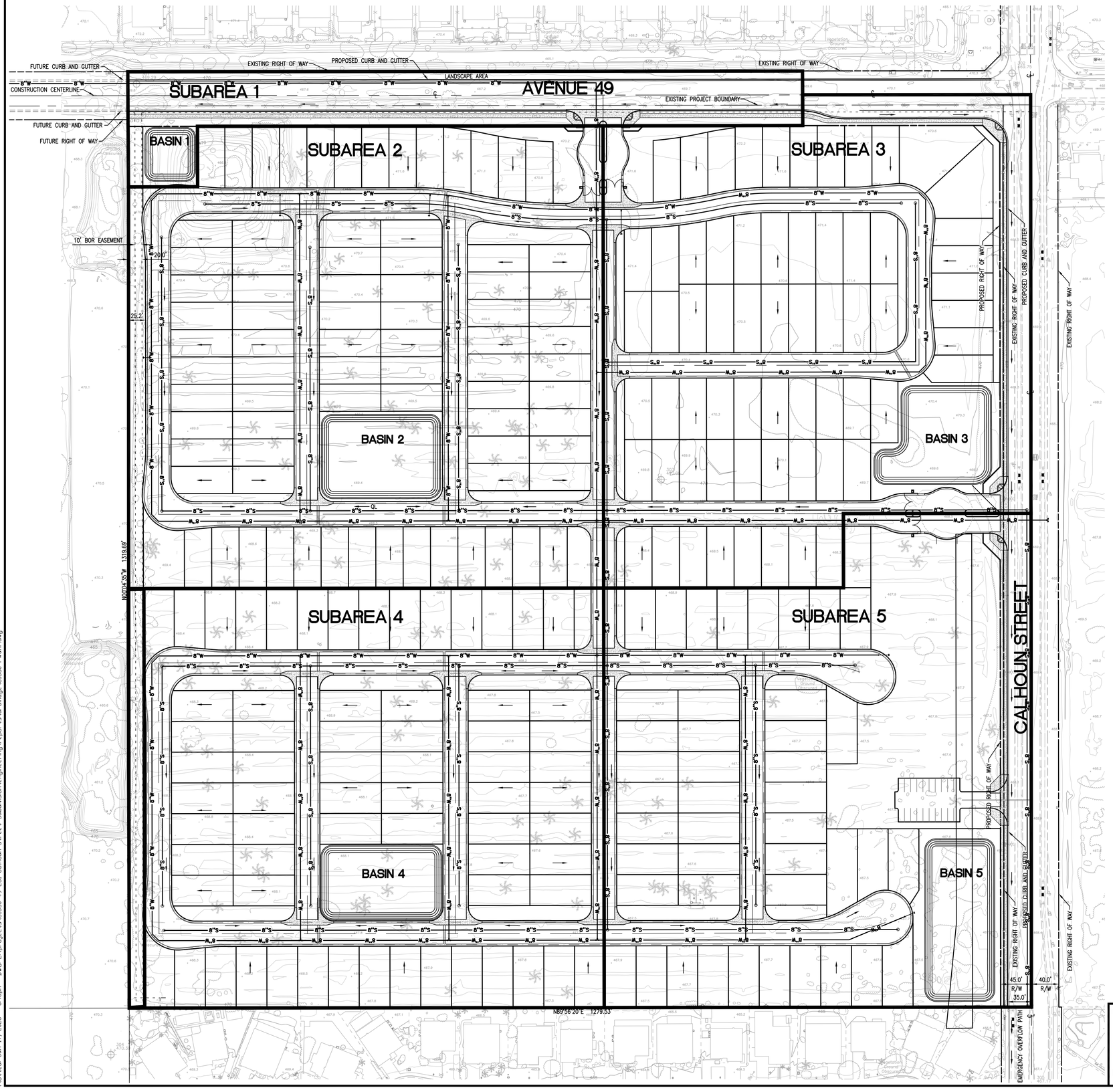
Vicinity Map, WQMP Site Plan, and Receiving Waters Map

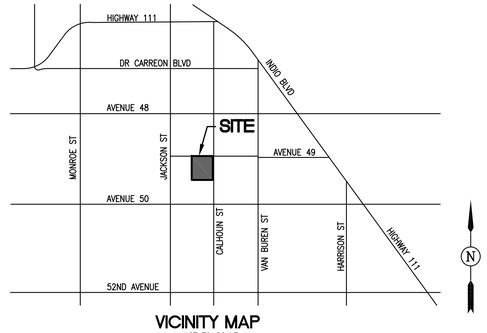


VICINITY MAP
NOT TO SCALE

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP
NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'

N

GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

PREPARED BY:
The Altum Group
44-600 Village Court, Suite 100
Palm Desert, CA 92260
t.760.346.4750 f. 760.340.0089
TheAltumGroup.com
ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

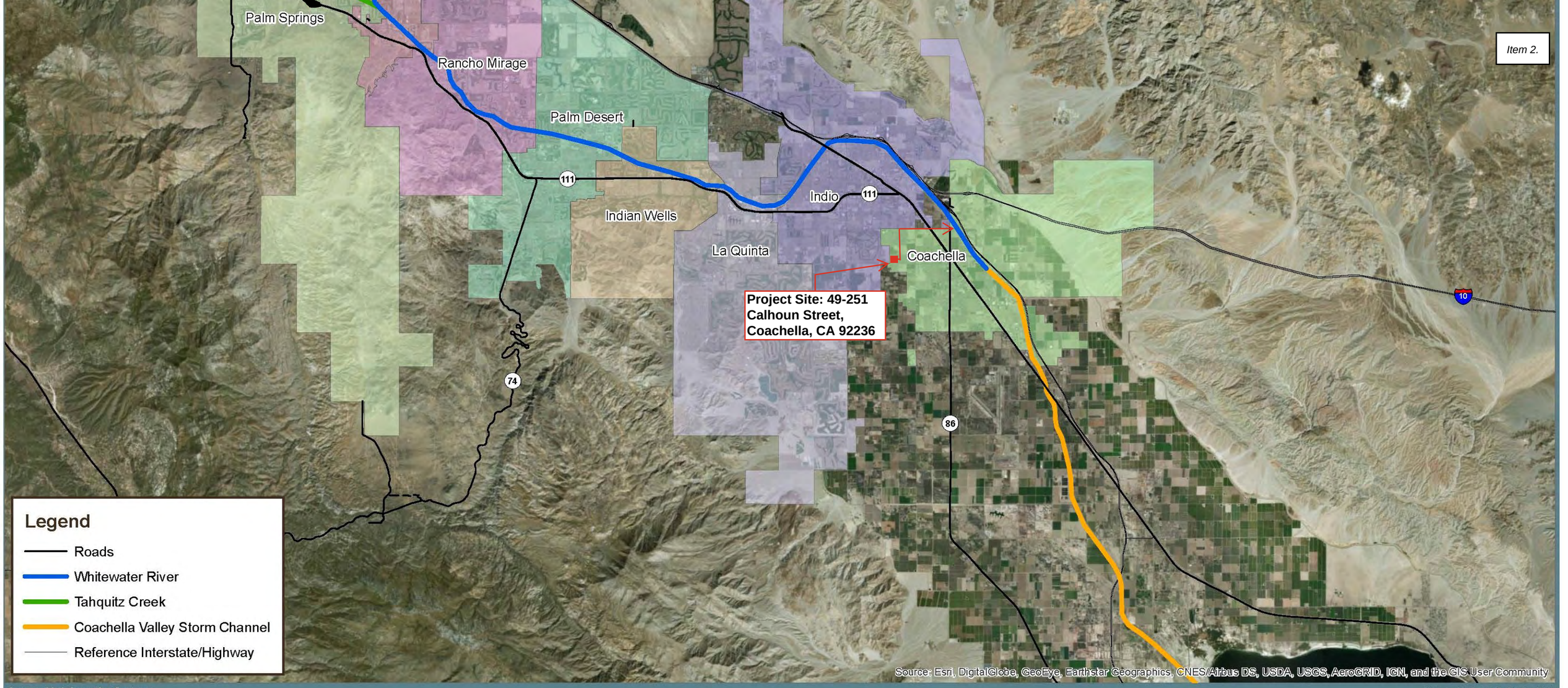
CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg



Geographic Information Systems

Cartographic Design By: Randee Martin

TheAltumGroup
Strive Higher
44-600 Village Ct Suite 100, Palm Desert, CA 92260
Phone: (760) 346 - 4750 TheAltumGroup.com

1 inch = 2.755735 miles

Receiving Water Exhibit

Appendix C

Supporting Detail Related to Hydrologic Conditions of Concern

N/A

Appendix D

Educational Materials

Item 2.

Internet Address (URL) • http://www.epa.gov
Recycled/Recyclable • Printed With Vegetable
Oil Based Inks on 100% Postconsumer,
Process Chlorine Free Recycled Paper

EPA 833-B-03-002

January 2003

EPA United States Environmental Protection Agency

THE YEAR OF CLEAN WATER
Celebrate Protect

A Citizen's Guide to Understanding Stormwater



After the Storm



What is stormwater runoff?



Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution



Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.



- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.



- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

Stormwater Pollution Solutions



Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

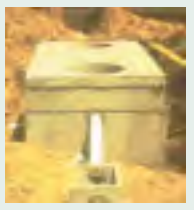
Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

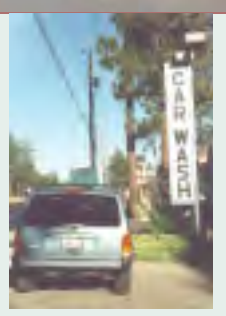
Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.



Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.



Commercial

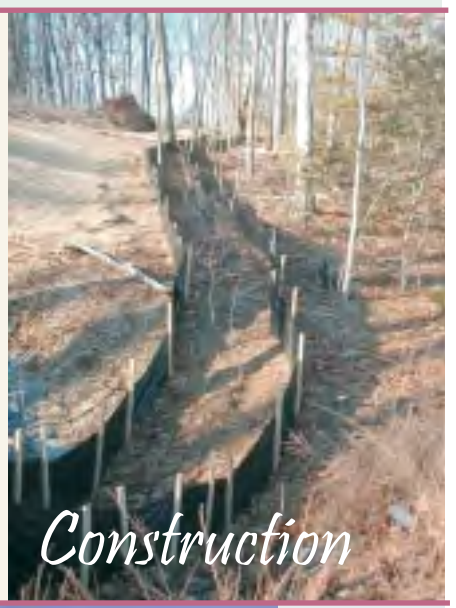
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

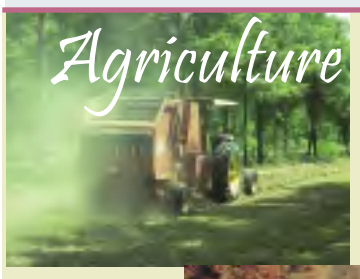
- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



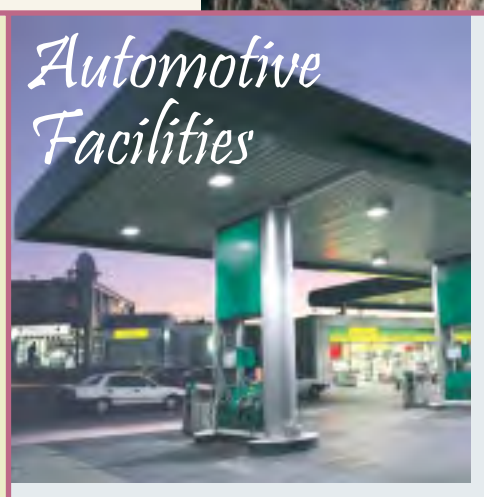


Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separa



Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

What's the Scoop?



Tips for a Healthy Pet and a Healthier Environment

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surr[illegible]s.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.





Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet or place in trash can.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary bags or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on sto[illegible]er problems and solutions, request presentations about stormwater pollution in your child's class[illegible]or learn about free grasscycling and composting workshops.

SCOOP THE POOP



Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICE to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

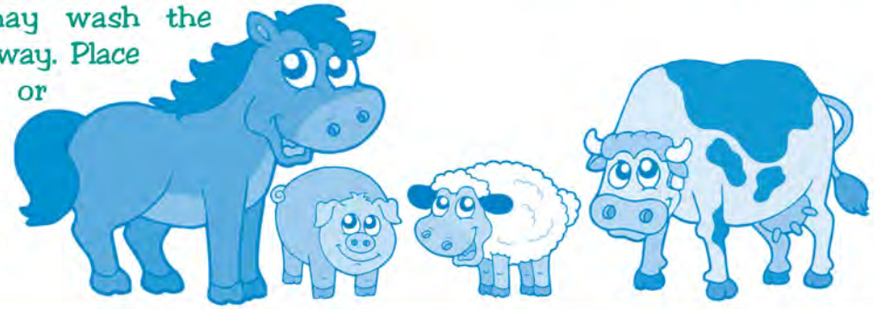
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- STORE your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- BUILD a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- READ the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- KEEP animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- MATERIAL STORAGE SAFETY TIPS Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.



Thank you for doing your part to protect your watershed, the environment, your pets and your community!

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercours

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.



- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - **is strictly prohibited by local ordinances, state and federal law**. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

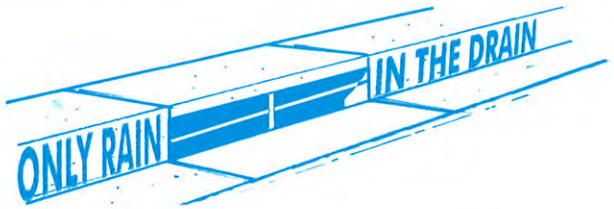
Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...



Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.



A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

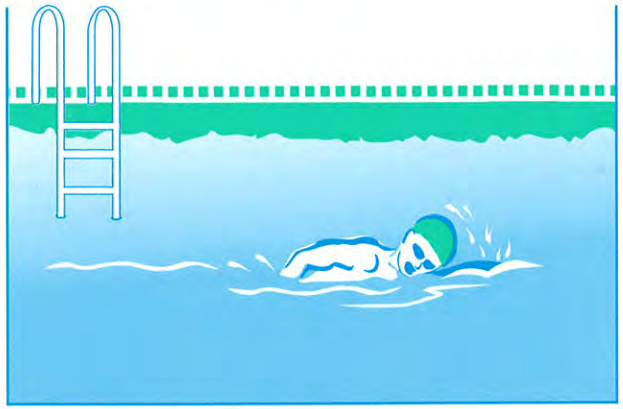
The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.



Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.



If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.



Infiltration System
Inspection and Maintenance Checklist

Property Address: _____ Property Owner: _____

Treatment Measure No.: _____ Date of Inspection: _____ Type of Inspection: ☐ Monthly ☐ Pre-Wet Season ☐ After heavy runoff (1" or greater)

Inspector(s): _____ ☐ End of Wet Season ☐ Other: _____

Defect	**Conditions When Maintenance Is Needed**	**Maintenance Needed? (Yes/No)**	**Comments** (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	**Results Expected When Maintenance Is Performed**
1. Standing Water	When water stands in the infiltration system between storms and does not drain within 3 days after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following may apply: sediment or trash blockages removed, improved grade from head to foot of infiltration system.
2. Trash and Debris Accumulation	Trash and debris accumulated in the infiltration system.			Trash and debris removed from infiltration system and disposed of properly.
3. Sediment	Evidence of sedimentation in system.			Material removed and disposed of properly so that there is no clogging or blockage.
4. Inlet/Outlet	Inlet/outlet areas clogged with sediment or debris, and/or eroded.			Material removed and disposed of properly so that there is no clogging or blockage in the inlet and outlet areas.
5. Overflow Spillway	Clogged with sediment or debris, and/or eroded.			Material removed and disposed of properly so that there is no clogging or blockage, and system is restored to design condition.
6. Miscellaneous	Any condition not covered above that needs attention in order for the infiltration system to function as designed.			Meet the design specifications.

SAMPLE

Infiltration System Maintenance Plan
for

Routine Maintenance Activities

The principal maintenance objective is to prevent sediment buildup and clogging, which reduces pollutant removal efficiency and may lead to system failure. Routine maintenance activities, and the frequency at which they will be conducted, are shown in Table 1.

Table 1
Routine Maintenance Activities for Infiltration Systems

No.	Maintenance Task	Frequency of Task
1	Remove obstructions, debris and trash from infiltration system and dispose of properly. Drywells may cleaned by vacuuming the upper chamber with a vacuum truck.	Monthly, or as needed after storm events
2	Inspect system to ensure that it drains between storms, and within 3 days after rainfall. Check drywell/observation well 2-3 days after storm to confirm drainage.	Monthly during wet season, or as needed after storm events
3	For drywells, replace filter material (and screen if it is damaged) in accordance with City of Rancho Mirage Standard Detail No. 306 (see attached).	Monthly, or as needed after storm events
4	Monitor drywell/observation well to confirm that system has drained during dry season.	Annually, during dry season
5	Remove any trash, grass clippings and other debris in the streets, gutters or parking area (see BMP SC-43) and near the system perimeter. Dispose of properly.	As needed
6	Inspect infiltration system using the inspection checklist.	Monthly, or after storm events 1” or greater, and after removal of accumulated debris or material

Mosquito Abatement

Standing water shall not remain in the treatment measures for more than three days, to prevent mosquito generation.

Inspections

The Infiltration System Inspection and Maintenance Checklist provided shall be used to conduct inspections monthly (or as needed), identify needed maintenance, and record maintenance that is conducted.

10. PUBLIC EDUCATION AND OUTREACH

WATERSHED SPECIFIC EDUCATIONAL ACTIVITIES CONDUCTED DURING THE REPORTING PERIOD

This section provides an overview of watershed specific education activities conducted by the Permittees. During the reporting period **Appendix E** contains images of most public education materials that are described in this section.

Program Overview

The Riverside County NPDES Permittees have established an ongoing watershed based public education and outreach program known as the "**Only Rain Down the Storm Drain"** pollution prevention program. The specific objectives of the public education program include:

- Fostering a broad public awareness of water pollution concerns;
- Increasing public acceptance of pollution prevention activities to curtail everyday human behaviors that contribute to water quality problems;
- Educating/informing the general public, regulators and key local government and state decision makers on Urban Runoff conditions in Riverside County; and
- Promoting stewardship of local water resources.

The "Only Rain Down the Storm Drain" program implements the public awareness objectives by focusing on three areas of pollutant reduction/prevention:

- Public Behavior;
- Proper Management of Pollutants; and
- Business Specific Education Outreach.

In addition, when attempting to make use of the finite resources available to the Public Education Program, the Permittees use these management goals to ensure that resources are used effectively:

- Focusing on pollutants of concern specific to each watershed region;
- Coordinating public education efforts with adjacent storm water management programs and other related education programs to share resources, coordinate outreach efforts, and avoid costly duplication of effort; and
- Adapt public education programs and objectives, based on effectiveness analysis, to address changing MS4 programs and objectives.

Program Highlights

The public education program continues to develop changes for the better. Highlights include:

- The public education program has developed surveys in both English and Spanish. The purpose of these surveys is to evaluate the effectiveness of the public education program and are distributed to the public at community events. The results of these surveys are contained in **Appendix E**. Two surveys were also developed for the K-3 and 4 through 6 grades education outreach programs.

- The public education web page continues to be revamped and improved.
- The program continues to update brochures and develop outreach programs specific to the needs of the MS4.
- As part of the on-going effectiveness evaluation for the municipal training programs, testing has been incorporated into the training for evaluation of its efficiency. In addition, the overall training program was evaluated and is included in the Assessment and Enhancement Analysis of the NPDES Traning Program, August 2006 in **Appendix E.**
- Each month, the County hosts a New Employee Orientation to an average of forty new employees. All the attendees receive "Only Rain Down the Storm Drain" materials and promotionals. The Toll Free 800 Number the message to call to report illegal storm drain disposal is incorporated into all materials.

Santa Ana Pollutants of Concern

Based on monitoring data collected to date, the current 303(d) list and discussions among the Co-Permittees, and stakeholders, the following preventative pollutants of concern were established for this watershed. More discussion on the selection of preventative pollutants of concern can be found in the monitoring section of this report. After each identified pollutant, specific BMP outreach activities are identified to address the pollutant:

- Sedimentation associated with Urban Development and Land Uses
    - Specific section on construction, municipal, industrial/commercial and new development training focusing on the need to address sedimentation within the watershed;
    - Distribution of dust pans at public education outreach events to promote dry cleaning of drive ways and impervious surfaces;
    - Construction BMP Poster;
    - School/Student program incorporates education on controlling soil erosion;
    - The "After the Storm" and Storm Water Pollution, what you should know brochures
    - General Construction Activities & Outdoor Activities brochure

- Nutrients and pathogens associated with Urban Development and Land Uses
    - Specific section on construction, municipal, industrial/commercial and new development training focusing on the need to address increased nutrients within the watershed;
    - Pet Waste "What's the Scoop" brochure;
    - Partnership with SGA Advertising to place pet waste information in pet stores, veterinarian clinics, kennels and pet grooming facilities;
    - Coordination with Riverside County Animal Control Department to distribute "What's the Scoop" and "After the Storm" brochures to families adopting pets;
    - The Agricultural Commissioner assist in educating on water conservation, fertilizer management and integrated pest management practices. In conjunction with County Waste Management's Composting Workshop, the "After the Storm" brochure and

Household Hazardous Waste flyer is included in the adult informational packet.
- o "Keep Our Water Clean" video to cover proper use of fertilizers as well as excess runoff from sprinklers;
- o Earth Day mailing inserts were developed to inform residents about the problem of storm water pollution and provide simple pollution prevention activities in gardening;
- o Adult presentations conducted by RCRCD discussing the effects of fertilizers and pesticides on local waterways;
- o The "After the Storm" brochure; and
- o Construction BMP Activities brochure and poster.

In addition, the District has developed other outreach materials to focus on other pollutants and pollutant causing activities/businesses commonly associated with urban runoff. Outreach methods can be combined to focus on specific pollutants that may exist within the watershed.

24-hour Watershed-Wide Outreach Portals

The Permittees maintain three 24-hour/7 days per week watershed wide portals to receive and distribute information regarding the "Only Rain Down the Storm Drain" program. These portals include a website, 1-800 number, and an e-mail address.

Storm Water Protection Program Website

The District operates a website that provides information on how to report illegal dumping, clogged storm drains, facility signage and worn or missing curb markers, as well as provide information on upcoming activities, opportunities for public participation in program development and general information about Urban Runoff pollution prevention techniques. The website is located at:

http://www.floodcontrol.co.riverside.ca.us/stormwater/

Almost all of the District's outreach materials have been scanned into an electronic .pdf format and are available for download. Online Order forms and phone numbers are also available to assist in obtaining information that might not be available online.

The website contains pages specific to the following target audiences:
- General Public/Residents
- Businesses
- Developers
- Contractors
- Schools and Teachers
- Kids Page

In addition the website contains links to:

- Assist viewers in locating their watershed
- An online media library
- Materials order form
- 1-800 information to report storm drain pollution

The District tracks the number of hits to its public education website. The website was completely revamped during the previous reporting period and the web-page counter replaced this reporting period. Results of the webpage counter report are included in **Appendix E.**

Storm Water toll free 1-800 Hotline

On October 1994, a Toll Free "800" telephone number for reporting suspected Urban Runoff pollution and obtaining pollution prevention information was established.

1. This call line offers easy to understand instructions for connecting to County Environmental Health or Waste Management to obtain grasscycling, composting, or household hazardous waste collection dates and locations.
2. The 24-hour Hotline also allows callers to report clogged catch basin inlets, illegal dumping and other illicit discharge violations.
3. Finally, the hotline allows people to order public education materials and/or request storm water presentations for schools or community groups. The Permittees advertise the hotline in all appropriate County telephone directories, public education outreach materials, and in other appropriate venues and locations. Callers to the hotline are given options to seek emergency services if the spill is of a suspicious origin or a safety issue.

The 1-800 line diverts callers to appropriate Permittee departments based on caller selections. Callers requesting information on pollution collection activities are diverted to either County Environmental Health or Waste Management depending on their specific selection. Callers reporting illicit discharges are directed to County Code Enforcement, who accepts the calls and then re-directs them to appropriate Permittee Code Enforcement Departments. Calls for public education materials or presentations are directed to the district's front desk and then to the District's Public Education Staff. School presentation inquiries are directed to the Riverside County Conservation District office, who have been contracted to provide education to elementary schools in the Santa Ana Region. The specific text to the hotline is included as **Exhibit A**.

The provider of the 1-800 line, Riverside County Communication, tracks the number of incoming calls to the line. This tracking mechanism was discontinued during past reporting period but restored this reporting period.

Exhibit A
"ONLY RAIN DOWN THE STORM DRAIN" POLLUTION PREVENTION PROGRAM

TOLL FREE 1-800 LINE DIALOGUE

Thank you for calling the "Only Rain Down the Storm Drain" Pollution Prevention Program. To better serve the needs of our County communities, please listen carefully to the following options:

If this is an emergency, or you wish to report a significant release or threatened releases of hazardous material into the storm drain or elsewhere in the environment, please hang up and immediately Dial 911.

(Si esta llamada es una emergencia o decea reportar desechos de contaminantes peligrosos en las alcantarillas o en el medio ambiente, por favor cuelge y llame 911.)

For water service connection, disconnection, or any other water utility information, call your local water service provider.

To report illegal dumping at residential, commercial, industrial or construction sites, please call Environmental Health at 951.955.8982, or press #1 to be directly connected.

For information regarding Household Hazardous Waste Collection Events, please Press #2.

To report clogged storm drains, please call your local municipal public works department. To report faded or missing "Only Rain Down the Storm Drain" storm drain markers, please press #3.

For General or specific business pollution prevention information or to receive other pollution prevention information please press #3.

(Drop Off Dialogue)

Thank you for your interest in obtaining information on storm drain pollution protection. Basic, construction, industrial, commercial and children's storm water protection outreach packets are available. For a quick response to your request, please slowly and clearly leave your name, address, city and zip code. Also state the type and quantity of the materials you are interested in receiving. Should you need additional assistance, provide your area code and phone number and someone will contact you as soon as possible.

To inquire about our free storm water classroom presentations, workshops, youth group activities and other outreach programs, please press #4.

(Drop Off Dialogue)

The "Only Rain Down the Storm Drain" public education program offers classroom presentations, workshops, youth group activities, special event opportunities and other programs. For inquiries for the Temecula or Murrieta area, please press #1 (Drops to Mission Resource Conservation District)

For inquiries in all other Riverside County areas, press 2 (drops to Riverside/Corona Resource Conservation District).

For Grasscycling and composting information or workshops, please PRESS #5. (to 951.486.3200)

For additional assistance regarding our storm drain pollution prevention program during regular business office hours, Monday through Thursday from 7:30 am to 5:30 pm and on Friday from 7:30 am to 4:30 pm

E-mail

The Permittees also maintain an e-mail address that can be used to report illicit discharges or request storm water related public information. The e-mail address is:

Flood.fcnpdes@co.riverside.ca.us

E-mails are received by the District's Public Information Specialist and are responded to, in most cases, within 2 business days.

Program Coordination with other Stakeholders

The "Only Rain Down the Storm Drain" program has used partnerships to leverage and increase available resources. The Permittees utilize every opportunity to work with Co-permittees, local environmental groups, and other public, private and business organizations to maximize use of existing distribution outlets, events, programs and materials. Impressions, attendance, and other measures of effectiveness relative to these programs are included in **Appendix E** (Public Education) of this Watershed Annual Report.

To facilitate statewide awareness of storm water public education, educate local and state decision makers, and assist in the development of more effective public education outreach programs, the District participates in the following public education committees:

- Public Information Public Participation Committee (PIPP) – A subcommittee of the California Storm Water Quality Association, and
- Western Regional Pollution Prevention Network (WRPPN)

To leverage education outreach resources and coordinate public education activities with other environmental programs, the Permittees closely coordinate and/or have existing partnerships with the following entities/organizations:

- Household Hazardous Waste Information Exchange (HHWIE); This is an eGroup that provides household hazardous waste affiliates the ability to better communicate, share ideas and the latest in legislative rulings.
- Riverside-Corona Resource Conservation District (RCRCD);
- Partnership to provide student education outreach in the Santa Ana and Whitewater Watersheds
- Partnership to provide adult education outreach activities in the Santa Ana and Whitewater Watersheds
- Partnership to provide support services for public education outreach activities at community events
- Mission Resource Conservation District (RCRCD);
- Partnership to provide student education outreach in the Santa Ana and Santa Margarita Watersheds
- Partnership to provide adult education outreach activities in the Santa Ana and Santa Margarita Watersheds

- Partnership to provide support services for public education outreach activities at community events

- California Regional Environmental Education Community Network (CREEC)
  - A network whose mission is to develop a communication network which provides educators with access to high quality environmental education resources to enhance the environmental literacy of California students.

- Santa Ana River Watershed Clean Up Stakeholders Group in coordination with Riverside Corona Conservation District, Keep Riverside Clean and Beautiful and the California Coastal Commission's Coast. This collaboration of environmental partners support and encourage volunteers, allies and groups to gather for a day to remove trash and debris from the Santa Ana River that might otherwise flow downstream, through the river to the ocean.

- In addition the "Only Rain Down the Storm Drain" program also coordinates with the following City/County departments to distribute appropriate storm water education outreach materials:

  - City/County/District Front Counters
  - County Waste Management
  - County Public Health Department
  - Agriculture Department
  - County Executive Offices
  - Code Enforcement
  - County Parks
  - Animal Control;
  - Economic Development Agency
  - County Assessor/Recorders Office
  - Bio-terrorism
  - Fleet Services
  - Human Resources
  - Library System
  - Central Mail
    - Stamp on every piece of mail sent by the County that identifies the 1-800 Number and requests that citizens call it to report storm drain pollution.
  - County Safety
  - County DPSS
  - Transportation and Land Management

In general, brochures and promotional items are provided to these departments for distribution in public lobbies, training sessions, through customer interactions and new employee orientations.

Finally, the "Only Drain Down the Storm Drain" Program also coordinates with the following state and/or local government or business entities to distribute public education information:

- Western Riverside Council of Governments
- Santa Ana Regional Water Quality Control Board
- Orange County Watershed & Coastal Resources Division
- Santa Ana Watershed Association
- South Coast Air Quality Management District
- Santa Rosa Plateau
- Bureau of Reclamation
- Elsinore Valley Municipal Water District
- Metropolitan Water District
- Lake Elsinore/San Jacinto Watershed Authority
- Eastern Municipal Water District
- The Water Education Center
- Rancho California Water District
- Valley Greeters
- Department of Water Resources Southern District
- Western Municipal Water District
- Business Industrial Association (BIA)
- Caltrans

Outreach Tools to Change Public Behavior

The "Only Rain Down the Storm Drain" program conducts a wide range of outreach activities to residents, students, community groups, new home owners, homeowner associations; informing them of how their "everyday activities" may contribute to the pollution of Receiving Waters, and encouraging them to adopt alternatives that will lessen or eliminate pollution-causing behaviors. Program efforts include providing information on pollution prevention techniques and informing residents about the proper disposal of household hazardous wastes, construction materials, used motor oil, pet waste and litter. Public education materials and media emphasize the theme that all citizens have a role to play in reducing and preventing the polluting of Receiving Waters. The goal is to present a clear and consistent message that explains the simple connections between people's everyday activities and their impacts upon Receiving Water quality.

As the public education and outreach program continues to be implemented and enhanced, the Permittees hope to broaden public awareness of Urban Runoff quality problems, promote proper disposal of household hazardous waste and motor oil, encourage illegal discharge reporting, foster good stewardship of Receiving Waters, and take personal responsibility for their actions in preventing pollution.

While public education outreach at events indicates that most people are willing to act in an environmentally responsible manner if given simple ways to change their behavior to avoid polluting our water bodies; most are unaware of the sources of pollution from everyday urban land use. The "Only Rain Down the Storm Drain" pollution prevention program using various media forms educates the County's population about modified behaviors to prevent storm water pollution by focusing on residents, general public, students, home gardeners, do-it-yourselfers, mobile businesses, etc.

Direct Outreach Methods

The "Only Rain Down the Storm Drain" program interfaces directly via program staff, or through contracts and partnerships, to the public through attendance at community events, school education programs, adult education programs and/or by providing classroom based training. Specific outreach activities, segregated by target audiences, are described below.

General Community Outreach

The "Only Rain Down the Storm Drain" program participates in various community events to ensure that our message is delivered to the largest possible municipal audience. At these community events, surveys, to assess overall program effectiveness, have been used.

In addition, the "Only Rain Down the Storm Drain" program has partnered with County Environmental Health to ensure that a storm drain pollution prevention material is available and distributed at all Household Hazardous Waste and Antifreeze, Batteries, Oil and Paint Collection Centers and/or Events throughout each of the Watershed Region's within Riverside County. These events provide free disposal sites for receiving common pollutants that can impair Receiving Waters.

Elementary School Outreach

Elementary (K-6)

The Riverside County Resource Conservation District (RCRCD) continues to provide a variety of K-6 education programs for the "Only Rain Down the Storm Drain" Program. The K-6 education program includes materials such as the Storm Water Pollution Prevention Patrol workbook, the Fancy Fin hands-on classroom presentation and accompanying coloring book, various word match and crossword activity sheets and videos. A second story line featuring Fancy Fin and her friend Phinnious J. Green (a Pacific Tree Frog) educate students about point and non-point pollution and their effects on the environment and other creatures in the watershed. School materials are offered to all public and provide schools in the Santa Ana Watershed Region, as well as to youth groups such as the boy and girl scouts.

Secondary Schools

A video entitled "How to Conduct an Environmentally Friendly Car Wash and Make Money Too" was developed for the "Car Wash Challenge" program. An accompanying flyer is also used which informs students/groups of the potential storm water problems generated from car wash runoff, and provides practical BMPs to minimize or eliminate contaminated runoff. The original focus of the program was high school clubs. However, after contacting several high schools, it was discovered that car washing fundraisers are relatively rare and revenue deficient in comparison with other high

school fund raising activities. Nevertheless, church groups, scout troops and other organizations do conduct car wash fundraisers. Thus, the scope of the Car Wash Challenge program has been expanded to include these additional fundraising organizations.

Adult Outreach

Valley Greeters is a "Welcoming Wagon" business taking discount coupons, product samples and general vicinity information door to door to new residents and homeowners to the Temecula, Murrieta and Lake Elsinore area. For the past four years, Valley Greeters has included our MS4 materials, (After the Storm; What's the Scoop; Pool, Spa and Fountain Maintenance and HHW Collection Schedule). This information is accompanied with a handy full size dustpan, shop cloth and vehicle air freshener. Every material and promotional is clearly imprinted with the 1-800 Toll Free number for reporting illegal discharges into the storm drain. Young family members receive a copy of Fancy Finn and box of crayons. This business is solely dependent on the status of the construction economy and by January, 07 experienced a considerable slowdown.

The "Only Rain Down the Storm Drain" program contracts with the Riverside/Corona Resource Conservation District for public outreach. Storm Water Pollution Prevention presentations are given to community groups who call and request such services.

Steve Groner & Associates has been retained to prepare and present workshops at major home improvement stores throughout Riverside County. The workshops include passing out reading material regarding targeted BMPs to the public through established corporate partnerships (paint, hardware, home show coordinators, home improvement, garden centers, nurseries and pet stores). All commercial employees are informed about storm water impacts that could occur from the improper application of all types of home and garden hazardous chemicals. In turn, the employees are then able to share with customers on the proper use and disposal of products that are potential storm drain pollutants. Attendees at the workshop receive "Only Rain Down the Storm Drain" promotionals to help emphasize the storm water pollution prevention message. Fixed advertising tools such as counter displays, tear sheets have been placed throughout to attract attention.

Brochures

Residential: After the Storm; Storm Water Pollution and the Solutions, Household Hazardous Waste Collection Schedule, Outdoor Activities; Swimming Pool, Jacuzzi and Fountain Maintenance; and What's the Scoop (Pet waste).

Outreach Materials

In addition to the brochures mentioned above, the program utilizes other effective outreach materials such as, magnets, a billboard ad, videos, newspaper supplements, flyers, door knob hangers, calendars, promotionals items, workbooks, curriculum, shop rags, shelf talkers, tear sheets, posters and print ads to cultivate interest in the program.

A door hanger is also being utilized to help address problem discharges that are commonly observed in residential settings. The door hanger notifies the recipient that a problem discharge was observed flowing in to the street and offering help by following recommended pollution prevention activities. The door hanger is provided to all cities and is used by various County departments and the NPDES staff when conducting field or site activities/inspections.

Mailing Inserts/Slugs

The "Only Rain Down the Storm Drain" Pollution Prevention Program encourages advertising the County's Household Hazardous Waste Collection events via the use of mail inserts. The inserts are included in various utility bills and special notice mass mailings.

In addition, the "Only Rain Down the Storm Drain" program has coordinated with the County Mail Department to have the postage meter carry the "Only Rain Down the Storm Drain" message and the 1-800 Toll Free number to report an illegal storm drain disposal or spill. In 05/06, over 5,000,000 pieces of outgoing County mail were stamped with the message. In November of 06, the postage system was replaced with more sophisticated postage meter units but the cost of the ink in the new system far exceeded the costs and benefits from other media options and therefore this media venue was dissolved.

Media Outreach

The "Only Rain Down the Storm Drain" Program continues to utilize various mass media to reach the public and promote the storm water pollution prevention. Special newspaper inserts, fliers, and advertisements help increase public awareness of storm water pollution and environmental protection.

- Our Sixth Edition of a four-page insert called the National Pollution Prevention or P-2, (National Pollution Prevention Week recognization), was distributed Countywide through the PennySaver. The insert included topics on proper disposal of pet waste, pesticide alternatives, motor oil recycling, grass-cycling, pool and spa best management practices, storm drain marking program, storm water school presentations, general storm drain pollution protection, business storm water pollution information, household hazardous waste (HHW) collection events, syringe disposal program, composting workshops and motor oil specific recycling locations. The insert is released to over 650,500 Riverside County homes generating an increase of calls to the 800 Toll Free Hotline and District IC/ID investigations.

Cooperative Used Oil Program

The Western Riverside Council of Governments (WRCOG) is responsible for administering the Used Oil Block Cycle Grant on behalf of ten cities within WRCOG's boundaries. These cities include: Banning, Beaumont, Canyon Lake, Lake Elsinore, Murrieta, Norco, Perris, Riverside, San Jacinto and Temecula.

The objective of the Used Oil Block Grant is to make it convenient for Do-It-Yourselfers (DIYers) to recycle their used oil and to make it easy for them to find a Certified Center accepting used oil. In order for these centers to be certified, they need to apply for certification with the California Integrated Waste Management Board (CIWMB). As a grant recipient, WRCOG contacts non-certified centers in the jurisdiction to interest them in becoming certified used motor oil collection center. The goal is to see a significant decrease in the amount of illegally dumped motor oil by adding more oil collection centers within close proximity to users.

Through the same grant funding source, WRCOG also provides used oil containers for distribution to DIYers who need proper containers for automotive fluids. Through WRCOG efforts, all certified centers in the County are in compliance to state and local mandates.

The Storm Drain Pollution Prevention Program assists WRCOG's efforts by making available our MS4 information and supporting promotionals for distributions to their targeted groups.

At various venues, WRCOG staff obtain participant responses to a ten question survey. The survey examines the public's understanding on:

- used oil recycling,
- used oil drop-off locations,
- curbside programs, and other local recycling programs.

The program also maintains an English and Spanish 800 hotline that can be used to get answers to any recycling question a resident may have regarding, "where the nearest Certified Center is located?" and "where can I find a used oil container?". The phone number is printed on all distributed materials including the oil containers.

Cleanest County in the West Program

Through another grant funding source, WRCOG created the "Cleanest County in the West" program to address issues relating to litter and illegal dumping. The program was designed to assist jurisdictions in meeting the 50% diversion goals mandated by Assembly Bill 939. AB 939 was a state mandate signed in 1989 that required cities to reduce their waste by 50% by the Year 2000.

The core of the program is the elementary school assembly. WRCOG partners with Radio Disney AM 1290 to present an interactive and informational presentation for children in grades K-6th. This program continually reinforces the responsibility of everyone to recycle and pick up litter.

WRCOG at the end of the assembly gives the school two recycling containers for the collection of cans and bottles. During the 06/07 school year, over 18,000 students and 600 teachers have experienced the assembly. Each student receives an environmental activity book and an application to join the Riverside County Kids Recycle Club where they will receive a quarterly newspaper. This club has over 200 members.

Like the "Only Rain Down the Storm Drain" Program which promotes litter reduction and recycling throughout the Santa Ana Region, WRCOG also participates in events to promote litter reduction and beverage container recycling. These events gives staff an opportunity to assess how informed the local community is regarding recycling and also allows us to distribute brochures and informational flyers that will assist people in finding the nearest recycling center. During these events promotional items made from recycled content are also given out to show examples on how used items such as money can be recycled into new things such as a pencil, a promotional product first used by the "Only Rain Down the Storm Drain" Program. This particular promotional item especially increases the interest of the people visiting out booth and demonstrates how almost anything can be recycled and reused.

Outreach tools specific to Business Specific

The "Only Rain Down the Storm Drain" Program conducts a wide range of outreach activities to businesses; informing them of how their "everyday activities" may contribute to the pollution of Receiving Waters, and encouraging them to adopt alternatives that will lessen or eliminate polluting-causing activities. Program efforts include providing information on pollution prevention techniques and informing businesses about the proper disposal of wastes. Public education materials and media emphasize the theme that all businesses have a role to play in reducing and preventing the polluting of Receiving waters. The goal is to present a clear and consistent message that explains the simple connections between a business' everyday activities and their impacts upon Receiving Water quality.

Originally, the business education program mainly consisted of the development and distribution of formal BMP guidance and outreach to business associations. The program has now expanded to include direct outreach to businesses through classroom formats, advertising in business trade papers and providing exhibits at various business specific symposiums.

Discussion of the current Business Specific Outreach tools implemented by the Permittees are discussed below.

Direct Business Outreach Activities

The "Only Rain Down the Storm Drain" Program partners with various entities to provide training and education. Currently, the District has allowed AEI-CASC Engineering, a consultant who provides the Permittees internal education programs to train developers and consultants regarding the new WQMP/SUSMP requirements for Riverside County. The District has partnered with Riverside/Corona Resource Conservation District, to develop a Water Quality Design class that focuses on sub-regional solutions and low impact development. This class was offered for the first time through UCR extension in October 2005. Additionally, the District presented at Construction Storm Water Compliance Workshop hosted by the Building Industry Association of Southern California (BIA/SC) on March 22, 2006. The workshop focused on state and municipal construction requirements for contractors, developers, and consultants.

Through the Compliance Assistance Program (CAP), a partnership with County Environmental Health restaurants and businesses that handle hazardous wastes are reviewed for potential storm water impacts from their activities. Each business is provided with storm drain pollution prevention public education outreach information specific to their activities.

Steve Groner Associates has been retained to prepare and present workshops at major home improvement stores throughout Riverside County. The workshops include a handout educating the store's employees about storm water impacts that could occur from improper application of paint, pesticides or fertilizers. Attendees at the workshop also receive "Only Rain Down the Storm Drain" information and promotionals to help highlight the storm water protection message. Employees are then able to share with customers the proper use and disposal of products that are potential storm drain pollutants. Point of purchase displays, tearsheets, and counter displays have been installed at strategic locations to educate the public directly.

Each new business trade in Riverside County that is listed in the Inland Business Press newspaper is provided with an "Only Rain Down the Storm Drain" Pollution Prevention packet.

Brochures

Commercial*:* After the Storm; Food Facilities; Outdoor Cleaning Activities and Non-Point Source Discharges; Automotive Maintenance & Car Care. Note: (Staff is revising the Outdoor Activity brochure to include broader examples of urban pollution causing activities such as, power washers and mobile vehicle maintenance operators).

Industrial*:* After the Storm; Outdoor Cleaning Activities and Non-Point Source Discharges; and Your Facility May Need a Storm Water Permit.

Construction*:* After the Storm; Outdoor Cleaning Activities and Non-Point Source Discharges; General Construction & Site Supervision The revision to the construction brochure is pending the finalization of the construction permit.

Posters

BMP posters for automotive, food service establishments (available in Spanish) and construction employees are available. The posters address activities associated with the automotive repair industry, and the food/restaurant industry that may pose a threat to water quality. There are also two new posters for the Fueling Stations and Service Bay Service centers. All the posters recommend storm water BMPs and are designed to serve as informative and attractive visual reminders for employees.

Media Outreach

In March, 07, a full-page ad was placed in the Inland Business Press newspaper to draw the attention of Inland Empire businesses whose urban runoff activities might be threatening local

water quality. The ad also provided links to the District's and CASQA's website for more detailed BMP information.

Supplemental Environmental Projects (SEP)

In an effort to change the behaviors of large storm drain pollution prevention offenders in the County, Environmental Health established a Supplemental Environmental Project (S.E.P.). The S.E.P. requires from the violator a monetary fine and/or the violator's cooperation for the development of a public education tool on the effects of polluted urban run off. S.E.P.'s to date include:

- A Downs Energy SEP project resulted in the development of a billboard ad that has been greeting commuters traveling Westbound on the 60 Freeway lanes.

Outreach tools specific to Pollutants

"Only Rain Down the Storm Drain" Pollution Prevention Program conducts a wide range of outreach activities focusing on reduction of certain pollutants in the receiving waters. These outreach activities focus on sources of those pollutants whether it is residential, business, municipal or some other state or federal source. Education materials explain how "everyday activities" of potential sources may contribute to the pollution of receiving waters, and encourage the sources to adopt alternative approaches to pollutant management that will lessen or eliminate polluting-causing activities. Program efforts include providing information on pollution prevention techniques and informing sources about the proper disposal of pollutants. Public education materials and media emphasize the theme that all citizens/businesses have a role to play in reducing and preventing the polluting of receiving waters. The goal is to present a clear and consistent message that explains the simple connections between a business' everyday activities and their impacts upon receiving water quality.

Each subsection that follows identifies how existing outreach materials previously described address specific potential pollutant sources in the watershed.

Use of pesticides, fertilizers, and herbicides

A. The Riverside County Agricultural Commissioner's Pesticide Applicator's License renewal information package includes materials on the proper use of pesticides and offers information on training workshops. The license renewal process requires continuing education of applicants and detailed record keeping of pesticide applications. Municipal employees that are responsible for the application of pesticides are encouraged to obtain and maintain credentials as Certified Applicators and/or licensed Pest Control Advisors.

B. The "Home Garden Care" materials are being revised to draw and attract the interest of the general public and amateur gardener. The new materials will include Integrated Pest Management and plant selection and materials from the State Water Resource Control Board, Central Contra Costa IPM Outreach Program, University of California and The

Orange County Storm Water Program are being used. All the materials selected offer alternatives to using chemically based pesticides, herbicides and fertilizers.

C. The "Keep Our Water Clean" video covers proper use of pesticides, fertilizers and herbicides as well as excess runoff from sprinklers.

D. The September annual “Only Rain Down The Storm Drain’s” participation in the National Pollution Prevention Week insert informs residents about the problem of storm water pollution and provides simple pollution prevention activities in gardening.

E. The “Only Rain Down The Storm Drain” adult presentations conducted by RCRCD discusses the effects of pesticides and fertilizers on local waterways. The materials distributed following the presentation promote alternatives to pesticide use in the yard and garden.

F. The 2006 Environmental Calendar included a wide array of storm water protection information. It is designed to attract the adult audience by listing best management practices, scheduled special events, household hazardous waste collection sites, used oil collection sites, composting workshops, citywide clean ups, and each of the watersheds along with geographical information. Throughout the calendar the main message is “Only Rain Down The Storm Drain” and the hotline number to call for additional home garden care information.

G. Steve Groner Associates has been retained to prepare and present employee workshops at major home improvement stores throughout Riverside County. This information is then passed on to the public via the shelf talkers accessible to the public or when an employee is addressed with a question. The workshops include information on BMPs the public should be aware of for pesticide and fertilizer application, use, and storage.

Appendix E

Soils Report

Appendix F

Structural BMP and/or Retention Facility Sizing Calculations and Design Details

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

COACHELLA, CA

PRELIMINARY HYDROLOGY REPORT

PREPARED FOR:
PACIFIC COAST PROPERTIES
43-584 VIA MAGELLAN DRIVE
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PREPARED BY:
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January 17, 2025

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R.C.E. 58394
Expiration Date: December 31, 2026



SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

PRELIMINARY HYDROLOGY REPORT

TABLE OF CONTENTS:

I PURPOSE AND SCOPE

II DESIGN METHODOLOGY

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

IV STREET FLOWRATE CAPACITY

V APPENDIX – REFERENCE MATERIAL

I. PURPOSE AND SCOPE

This report was prepared in support of the Calhoun Street at 49th Avenue Subdivision entitlement package submittal. The purpose of this preliminary report is to analyze the existing and proposed drainage patterns, discuss the on-site drainage design and size the proposed on-site drainage facilities to meet the City of Coachella drainage ordinance requirements.

The existing project site is an undeveloped lot at the southwesterly corner of the intersection of Calhoun Street and 49th Avenue in Coachella, CA. The proposed project improvements include the addition of residential lots with an interior access drive serving the lots on a 38.76 acre parcel. The site is bound to the north and east with fully improved public streets, to the east by a residential subdivision under development and to the south by an existing residential subdivision. The project proposes to obtain access to the site from Calhoun Street to the east, and from 49th Avenue to the north. The site will be drain via street surface flow to a series of on-site retention basins designed to capture and and store the storm run off generated during the 100 year design storm event. In general, the existing site is not subject to offsite storm flows.

II. DESIGN METHODOLOGY AND CALCULATIONS

The Calhoun Street project will provide five (5) on-site storm drain infiltration retention basin systems designed to capture and store the runoff generated from the "worst case" 100 year design storm based on City of Coachella requirements. The five retention basins have a combined volume capacity designed to store the runoff generated on-site during the 100 year design storm as well as runoff from the Calhoun Street half street project frontage and the 49 Avenue full width street frontage within the public right of way. The low point on the existing project site occurs on the project's easterly frontage. Runoff that exceeds the capacity of the on-site retention basin storage systems in an emergency overflow condition is designed to overflow onto interior surface streets and exit via surface flow onto Calhoun Street following the historical drainage pattern toward the south.

Riverside County Flood Control District Synthetic Unit Hydrograph methods are used to quantify the runoff volume generated and stored on-site during the 100 year "worst case" design storm return period. The program data and results prepared for this project are included in the Appendix of this report. The program model typically accounts for the volume of runoff lost due to infiltration in the basins and the allowable design retention basin infiltration rate of 10 gal./s.f./day (0.67 in/hr) established by City of Coachella will be applied over the surface area of the basin bottoms. The combined capacity of all five on-site basins will be compared to the total design runoff volume calculated for the Calhoun Street project to show that runoff generated during the 100 year design storm can be stored within the basins at a depth not to exceed 3ft and the runoff generated during the 10 year storm event can be stored within the on-site basins at a depth not to exceed 1.5 feet in accordance with City of Coachella retention basin criteria.

City of Coachella requires that runoff water stored on-site must be evacuated completely via infiltration within a period of 72 hours in order to comply with vector control concerns. In order to help facilitate this requirement, City of Coachella has limited the maximum depth of

stored runoff within any basin to 1.5' during the 10 year storm event and the maximum depth of any on-site retention basin must not exceed 3.5 feet.

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 10 year storm is contained below the top of the proposed street curbs and runoff generated during the 100 year storm event is contained within street right of way. Street flowrates (Q) will be calculated by applying the Rational Method using CivilD software.

DESIGN CRITERIA

The following Riverside County Flood Control District (RCFCD) parameters were used in the preparation of the analyses:

- 2 year – 1 hour Precipitation 0.35" (NOAA)
- 10 year – 1 hour Precipitation 0.70" (NOAA)
- 10 year – 3 hour Precipitation 1.04" (NOAA)
- 10 year – 6 hour Precipitation 1.36" (NOAA)
- 10 year – 24 hour Precipitation 1.04" (NOAA)
- 100 year – 1 hour Precipitation 1.37" (NOAA)
- 100 year – 3 hour Precipitation 2.12" (NOAA)
- 100 year – 6 hour Precipitation 2.78" (NOAA)
- 100 year – 24 hour Precipitation 4.47" (NOAA)
- Hydrologic Soil Type "B" US Dept. of Agriculture, SCS
- Runoff Index Number 56 (RCFC&WCD Plate E-6.1)
- Assumed Design Percolation Rate 0.67 in/hr
- Slope Intensity Duration Curve 0.59 (RCFC&WCD Plate D-4.6)

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATED RETENTION VOLUMES

SUBAREA	100 YR. VOLUME REQUIRED (CU.FT.)	BASIN VOLUME PROVIDED (CU.FT.)	100 YR. BASIN STORAGE DEPTH	10 YR. BASIN STORAGE DEPTH
1	9,580	12,250	2.45	0.72
2	57,661	64,193	3.19’	0.99’
3	53,709	62,528	3.07’	0.94’
4	51,654	57,236	3.20	0.99
5	41,999	72,828	2.14’	0.54

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	2.010	1.00	1.04	1.36	2.010	1.00	1.36	2.23	2.010	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	1.04	SUM [9]	2.01	SUM [11]	1.36	SUM [13]	2.01	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.40	0.39	0.26
FLOOD VOLUME	(cu-ft)	2,906	2,880	1,903
	(acre-ft)	0.07	0.07	0.04
REQUIRED STORAGE	(cu-ft)	2,439	2,140	370
	(acre-ft)	0.06	0.05	0.01
PEAK FLOW	(cfs)	1.56	1.34	0.19
MAXIMUM WSEL	(ft)	465.72	465.64	465.10

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866
C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.25	0.15	0.02	0.03	0.00
2	10	0.17	1.3	0.162	0.25	0.15	0.02	0.03	0.00
3	15	0.25	1.1	0.137	0.25	0.12	0.01	0.03	0.00
4	20	0.33	1.5	0.187	0.25	0.17	0.02	0.04	0.00
5	25	0.42	1.5	0.187	0.25	0.17	0.02	0.04	0.00
6	30	0.50	1.8	0.225	0.25	0.20	0.02	0.05	0.00
7	35	0.58	1.5	0.187	0.25	0.17	0.02	0.04	0.00
8	40	0.67	1.8	0.225	0.25	0.20	0.02	0.05	0.00
9	45	0.75	1.8	0.225	0.25	0.20	0.02	0.05	0.00
10	50	0.83	1.5	0.187	0.25	0.17	0.02	0.04	0.00
11	55	0.92	1.6	0.200	0.25	0.18	0.02	0.04	0.00
12	60	1.00	1.8	0.225	0.25	0.20	0.02	0.05	0.00
13	65	1.08	2.2	0.275	0.25	0.25	0.03	0.06	3.60
14	70	1.17	2.2	0.275	0.25	0.25	0.03	0.06	3.60
15	75	1.25	2.2	0.275	0.25	0.25	0.03	0.06	3.60
16	80	1.33	2.0	0.250	0.25	0.22	0.00	0.01	0.00
17	85	1.42	2.6	0.324	0.25	0.29	0.08	0.16	33.70
18	90	1.50	2.7	0.337	0.25	0.30	0.09	0.18	41.22
19	95	1.58	2.4	0.300	0.25	0.27	0.05	0.11	18.65
20	100	1.67	2.7	0.337	0.25	0.30	0.09	0.18	41.22
21	105	1.75	3.3	0.412	0.25	0.37	0.17	0.33	86.38
22	110	1.83	3.1	0.387	0.25	0.35	0.14	0.28	71.33
23	115	1.92	2.9	0.362	0.25	0.33	0.12	0.23	56.28
24	120	2.00	3.0	0.374	0.25	0.34	0.13	0.26	63.80
25	125	2.08	3.1	0.387	0.25	0.35	0.14	0.28	71.33
26	130	2.17	4.2	0.524	0.25	0.47	0.28	0.56	154.11
27	135	2.25	5.0	0.624	0.25	0.56	0.38	0.76	214.31
28	140	2.33	3.5	0.437	0.25	0.39	0.19	0.39	101.43
29	145	2.42	6.8	0.849	0.25	0.76	0.60	1.21	349.77
30	150	2.50	7.3	0.911	0.25	0.82	0.67	1.34	387.39
31	155	2.58	8.2	1.023	0.25	0.92	0.78	1.56	455.12
32	160	2.67	5.9	0.736	0.25	0.66	0.49	0.99	282.04
33	165	2.75	2.0	0.250	0.25	0.22	0.00	0.01	0.00
34	170	2.83	1.8	0.225	0.25	0.20	0.02	0.05	0.00
35	175	2.92	1.8	0.225	0.25	0.20	0.02	0.05	0.00
36	180	3.00	0.6	0.075	0.25	0.07	0.01	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2906.38
REQUIRED STORAGE (acft)	0.06
REQUIRED STORAGE (cuft)	2438.86
PEAK FLOW RATE (cfs)	1.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.25	0.07	0.01	0.02	0.00
2	10	0.17	0.6	0.098	0.25	0.09	0.01	0.02	0.00
3	15	0.25	0.6	0.098	0.25	0.09	0.01	0.02	0.00
4	20	0.33	0.6	0.098	0.25	0.09	0.01	0.02	0.00
5	25	0.42	0.6	0.098	0.25	0.09	0.01	0.02	0.00
6	30	0.50	0.7	0.114	0.25	0.10	0.01	0.02	0.00
7	35	0.58	0.7	0.114	0.25	0.10	0.01	0.02	0.00
8	40	0.67	0.7	0.114	0.25	0.10	0.01	0.02	0.00
9	45	0.75	0.7	0.114	0.25	0.10	0.01	0.02	0.00
10	50	0.83	0.7	0.114	0.25	0.10	0.01	0.02	0.00
11	55	0.92	0.7	0.114	0.25	0.10	0.01	0.02	0.00
12	60	1.00	0.8	0.131	0.25	0.12	0.01	0.03	0.00
13	65	1.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
14	70	1.17	0.8	0.131	0.25	0.12	0.01	0.03	0.00
15	75	1.25	0.8	0.131	0.25	0.12	0.01	0.03	0.00
16	80	1.33	0.8	0.131	0.25	0.12	0.01	0.03	0.00
17	85	1.42	0.8	0.131	0.25	0.12	0.01	0.03	0.00
18	90	1.50	0.8	0.131	0.25	0.12	0.01	0.03	0.00
19	95	1.58	0.8	0.131	0.25	0.12	0.01	0.03	0.00
20	100	1.67	0.8	0.131	0.25	0.12	0.01	0.03	0.00
21	105	1.75	0.8	0.131	0.25	0.12	0.01	0.03	0.00
22	110	1.83	0.8	0.131	0.25	0.12	0.01	0.03	0.00
23	115	1.92	0.8	0.131	0.25	0.12	0.01	0.03	0.00
24	120	2.00	0.9	0.147	0.25	0.13	0.01	0.03	0.00
25	125	2.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
26	130	2.17	0.9	0.147	0.25	0.13	0.01	0.03	0.00
27	135	2.25	0.9	0.147	0.25	0.13	0.01	0.03	0.00
28	140	2.33	0.9	0.147	0.25	0.13	0.01	0.03	0.00
29	145	2.42	0.9	0.147	0.25	0.13	0.01	0.03	0.00
30	150	2.50	0.9	0.147	0.25	0.13	0.01	0.03	0.00
31	155	2.58	0.9	0.147	0.25	0.13	0.01	0.03	0.00
32	160	2.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
33	165	2.75	1.0	0.163	0.25	0.15	0.02	0.03	0.00
34	170	2.83	1.0	0.163	0.25	0.15	0.02	0.03	0.00
35	175	2.92	1.0	0.163	0.25	0.15	0.02	0.03	0.00
36	180	3.00	1.0	0.163	0.25	0.15	0.02	0.03	0.00
37	185	3.08	1.0	0.163	0.25	0.15	0.02	0.03	0.00
38	190	3.17	1.1	0.180	0.25	0.16	0.02	0.04	0.00
39	195	3.25	1.1	0.180	0.25	0.16	0.02	0.04	0.00
40	200	3.33	1.1	0.180	0.25	0.16	0.02	0.04	0.00
41	205	3.42	1.2	0.196	0.25	0.18	0.02	0.04	0.00
42	210	3.50	1.3	0.212	0.25	0.19	0.02	0.04	0.00
43	215	3.58	1.4	0.228	0.25	0.21	0.02	0.05	0.00
44	220	3.67	1.4	0.228	0.25	0.21	0.02	0.05	0.00
45	225	3.75	1.5	0.245	0.25	0.22	0.02	0.05	0.69
46	230	3.83	1.5	0.245	0.25	0.22	0.02	0.05	0.69
47	235	3.92	1.6	0.261	0.25	0.24	0.02	0.03	0.00
48	240	4.00	1.6	0.261	0.25	0.24	0.02	0.03	0.00
49	245	4.08	1.7	0.277	0.25	0.25	0.03	0.06	5.33
50	250	4.17	1.8	0.294	0.25	0.26	0.05	0.10	15.17
51	255	4.25	1.9	0.310	0.25	0.28	0.06	0.13	25.02
52	260	4.33	2.0	0.326	0.25	0.29	0.08	0.16	34.86
53	265	4.42	2.1	0.343	0.25	0.31	0.10	0.20	44.70
54	270	4.50	2.1	0.343	0.25	0.31	0.10	0.20	44.70
55	275	4.58	2.2	0.359	0.25	0.32	0.11	0.23	54.54
56	280	4.67	2.3	0.375	0.25	0.34	0.13	0.26	64.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.25	0.35	0.15	0.29	74.22
58	290	4.83	2.4	0.392	0.25	0.35	0.15	0.29	74.22
59	295	4.92	2.5	0.408	0.25	0.37	0.16	0.33	84.06
60	300	5.00	2.6	0.424	0.25	0.38	0.18	0.36	93.90
61	305	5.08	3.1	0.506	0.25	0.46	0.26	0.52	143.11
62	310	5.17	3.6	0.588	0.25	0.53	0.34	0.69	192.31
63	315	5.25	3.9	0.636	0.25	0.57	0.39	0.79	221.83
64	320	5.33	4.2	0.685	0.25	0.62	0.44	0.88	251.36
65	325	5.42	4.7	0.767	0.25	0.69	0.52	1.05	300.56
66	330	5.50	5.6	0.914	0.25	0.82	0.67	1.34	389.13
67	335	5.58	1.9	0.310	0.25	0.28	0.06	0.13	25.02
68	340	5.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
69	345	5.75	0.6	0.098	0.25	0.09	0.01	0.02	0.00
70	350	5.83	0.5	0.082	0.25	0.07	0.01	0.02	0.00
71	355	5.92	0.3	0.049	0.25	0.04	0.00	0.01	0.00
72	360	6.00	0.2	0.033	0.25	0.03	0.00	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.39
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2879.82
REQUIRED STORAGE (acft)	0.05
REQUIRED STORAGE (cuft)	2139.79
PEAK FLOW RATE (cfs)	1.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.433	0.016	0.002	0.00	0.00
2	30	0.50	0.3	0.027	0.428	0.024	0.003	0.01	0.00
3	45	0.75	0.3	0.027	0.423	0.024	0.003	0.01	0.00
4	60	1.00	0.4	0.036	0.418	0.032	0.004	0.01	0.00
5	75	1.25	0.3	0.027	0.413	0.024	0.003	0.01	0.00
6	90	1.50	0.3	0.027	0.408	0.024	0.003	0.01	0.00
7	105	1.75	0.3	0.027	0.403	0.024	0.003	0.01	0.00
8	120	2.00	0.4	0.036	0.399	0.032	0.004	0.01	0.00
9	135	2.25	0.4	0.036	0.394	0.032	0.004	0.01	0.00
10	150	2.50	0.4	0.036	0.389	0.032	0.004	0.01	0.00
11	165	2.75	0.5	0.045	0.384	0.040	0.004	0.01	0.00
12	180	3.00	0.5	0.045	0.379	0.040	0.004	0.01	0.00
13	195	3.25	0.5	0.045	0.375	0.040	0.004	0.01	0.00
14	210	3.50	0.5	0.045	0.370	0.040	0.004	0.01	0.00
15	225	3.75	0.5	0.045	0.365	0.040	0.004	0.01	0.00
16	240	4.00	0.6	0.054	0.361	0.048	0.005	0.01	0.00
17	255	4.25	0.6	0.054	0.356	0.048	0.005	0.01	0.00
18	270	4.50	0.7	0.062	0.352	0.056	0.006	0.01	0.00
19	285	4.75	0.7	0.062	0.347	0.056	0.006	0.01	0.00
20	300	5.00	0.8	0.071	0.343	0.064	0.007	0.01	0.00
21	315	5.25	0.6	0.054	0.338	0.048	0.005	0.01	0.00
22	330	5.50	0.7	0.062	0.334	0.056	0.006	0.01	0.00
23	345	5.75	0.8	0.071	0.330	0.064	0.007	0.01	0.00
24	360	6.00	0.8	0.071	0.325	0.064	0.007	0.01	0.00
25	375	6.25	0.9	0.080	0.321	0.072	0.008	0.02	0.00
26	390	6.50	0.9	0.080	0.317	0.072	0.008	0.02	0.00
27	405	6.75	1.0	0.089	0.312	0.080	0.009	0.02	0.00
28	420	7.00	1.0	0.089	0.308	0.080	0.009	0.02	0.00
29	435	7.25	1.0	0.089	0.304	0.080	0.009	0.02	0.00
30	450	7.50	1.1	0.098	0.300	0.088	0.010	0.02	0.00
31	465	7.75	1.2	0.107	0.296	0.096	0.011	0.02	0.00
32	480	8.00	1.3	0.116	0.292	0.104	0.012	0.02	0.00
33	495	8.25	1.5	0.134	0.288	0.120	0.013	0.03	0.00
34	510	8.50	1.5	0.134	0.284	0.120	0.013	0.03	0.00
35	525	8.75	1.6	0.143	0.280	0.128	0.014	0.03	0.00
36	540	9.00	1.7	0.152	0.276	0.136	0.015	0.03	0.00
37	555	9.25	1.9	0.169	0.272	0.153	0.017	0.03	0.00
38	570	9.50	2.0	0.178	0.268	0.161	0.018	0.04	0.00
39	585	9.75	2.1	0.187	0.264	0.169	0.019	0.04	0.00
40	600	10.00	2.2	0.196	0.260	0.177	0.020	0.04	0.00
41	615	10.25	1.5	0.134	0.256	0.120	0.013	0.03	0.00
42	630	10.50	1.5	0.134	0.253	0.120	0.013	0.03	0.00
43	645	10.75	2.0	0.178	0.249	0.161	0.018	0.04	0.00
44	660	11.00	2.0	0.178	0.245	0.161	0.018	0.04	0.00
45	675	11.25	1.9	0.169	0.242	0.153	0.017	0.03	0.00
46	690	11.50	1.9	0.169	0.238	0.153	0.017	0.03	0.00
47	705	11.75	1.7	0.152	0.235	0.136	0.015	0.03	0.00
48	720	12.00	1.8	0.161	0.231	0.145	0.016	0.03	0.00
49	735	12.25	2.5	0.223	0.228	0.201	0.022	0.04	0.00
50	750	12.50	2.6	0.232	0.224	0.209	0.008	0.02	0.00
51	765	12.75	2.8	0.250	0.221	0.225	0.029	0.06	9.79
52	780	13.00	2.9	0.259	0.218	0.233	0.041	0.08	31.95
53	795	13.25	3.4	0.303	0.214	0.273	0.089	0.18	118.58
54	810	13.50	3.4	0.303	0.211	0.273	0.092	0.19	124.46
55	825	13.75	2.3	0.205	0.208	0.185	0.021	0.04	0.00
56	840	14.00	2.3	0.205	0.205	0.185	0.000	0.00	0.00
57	855	14.25	2.7	0.241	0.202	0.217	0.039	0.08	28.68
58	870	14.50	2.6	0.232	0.199	0.209	0.033	0.07	18.11
59	885	14.75	2.6	0.232	0.196	0.209	0.036	0.07	23.61
60	900	15.00	2.5	0.223	0.193	0.201	0.030	0.06	12.88
61	915	15.25	2.4	0.214	0.190	0.193	0.024	0.05	2.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.187	0.185	0.018	0.04	0.00
63	945	15.75	1.9	0.169	0.184	0.153	0.017	0.03	0.00
64	960	16.00	1.9	0.169	0.181	0.153	0.017	0.03	0.00
65	975	16.25	0.4	0.036	0.178	0.032	0.004	0.01	0.00
66	990	16.50	0.4	0.036	0.176	0.032	0.004	0.01	0.00
67	1005	16.75	0.3	0.027	0.173	0.024	0.003	0.01	0.00
68	1020	17.00	0.3	0.027	0.170	0.024	0.003	0.01	0.00
69	1035	17.25	0.5	0.045	0.168	0.040	0.004	0.01	0.00
70	1050	17.50	0.5	0.045	0.165	0.040	0.004	0.01	0.00
71	1065	17.75	0.5	0.045	0.163	0.040	0.004	0.01	0.00
72	1080	18.00	0.4	0.036	0.160	0.032	0.004	0.01	0.00
73	1095	18.25	0.4	0.036	0.158	0.032	0.004	0.01	0.00
74	1110	18.50	0.4	0.036	0.156	0.032	0.004	0.01	0.00
75	1125	18.75	0.3	0.027	0.153	0.024	0.003	0.01	0.00
76	1140	19.00	0.2	0.018	0.151	0.016	0.002	0.00	0.00
77	1155	19.25	0.3	0.027	0.149	0.024	0.003	0.01	0.00
78	1170	19.50	0.4	0.036	0.147	0.032	0.004	0.01	0.00
79	1185	19.75	0.3	0.027	0.145	0.024	0.003	0.01	0.00
80	1200	20.00	0.2	0.018	0.143	0.016	0.002	0.00	0.00
81	1215	20.25	0.3	0.027	0.141	0.024	0.003	0.01	0.00
82	1230	20.50	0.3	0.027	0.139	0.024	0.003	0.01	0.00
83	1245	20.75	0.3	0.027	0.138	0.024	0.003	0.01	0.00
84	1260	21.00	0.2	0.018	0.136	0.016	0.002	0.00	0.00
85	1275	21.25	0.3	0.027	0.134	0.024	0.003	0.01	0.00
86	1290	21.50	0.2	0.018	0.133	0.016	0.002	0.00	0.00
87	1305	21.75	0.3	0.027	0.131	0.024	0.003	0.01	0.00
88	1320	22.00	0.2	0.018	0.130	0.016	0.002	0.00	0.00
89	1335	22.25	0.3	0.027	0.129	0.024	0.003	0.01	0.00
90	1350	22.50	0.2	0.018	0.127	0.016	0.002	0.00	0.00
91	1365	22.75	0.2	0.018	0.126	0.016	0.002	0.00	0.00
92	1380	23.00	0.2	0.018	0.125	0.016	0.002	0.00	0.00
93	1395	23.25	0.2	0.018	0.124	0.016	0.002	0.00	0.00
94	1410	23.50	0.2	0.018	0.124	0.016	0.002	0.00	0.00
95	1425	23.75	0.2	0.018	0.123	0.016	0.002	0.00	0.00
96	1440	24.00	0.2	0.018	0.123	0.016	0.002	0.00	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.26
FLOOD VOLUME (acft)	0.04
FLOOD VOLUME (cuft)	1902.84
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	370.13
PEAK FLOW (cfs)	0.19

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.03	10	10	14	-	465.00	-	0.00
3	15	0.03	8	8	14	-	465.00	-	0.00
4	20	0.04	11	11	14	-	465.00	-	0.00
5	25	0.04	11	11	14	-	465.00	-	0.00
6	30	0.05	14	14	14	-	465.00	-	0.00
7	35	0.04	11	11	14	-	465.00	-	0.00
8	40	0.05	14	14	14	-	465.00	-	0.00
9	45	0.05	14	14	14	-	465.00	-	0.00
10	50	0.04	11	11	14	-	465.00	-	0.00
11	55	0.04	12	12	14	-	465.00	-	0.00
12	60	0.05	14	14	14	-	465.00	-	0.00
13	65	0.06	18	18	14	4	465.00	4	0.00
14	70	0.06	18	21	14	7	465.00	7	0.00
15	75	0.06	18	25	14	11	465.00	11	0.00
16	80	0.01	3	13	14	-	465.00	-	0.00
17	85	0.16	48	48	14	34	465.01	34	0.00
18	90	0.18	55	89	14	75	465.02	75	0.00
19	95	0.11	33	108	14	94	465.03	94	0.00
20	100	0.18	55	149	14	135	465.04	135	0.00
21	105	0.33	100	235	14	221	465.07	221	0.01
22	110	0.28	85	307	14	292	465.09	292	0.01
23	115	0.23	70	363	14	349	465.10	349	0.01
24	120	0.26	78	427	14	413	465.12	413	0.01
25	125	0.28	85	498	14	484	465.14	484	0.01
26	130	0.56	168	652	14	638	465.19	638	0.01
27	135	0.76	228	866	14	852	465.25	852	0.02
28	140	0.39	116	968	14	954	465.28	954	0.02
29	145	1.21	364	1,318	14	1,304	465.39	1,304	0.03
30	150	1.34	401	1,705	14	1,691	465.50	1,691	0.04
31	155	1.56	469	2,160	14	2,146	465.64	2,146	0.05
32	160	0.99	296	2,442	14	2,428	465.72	2,428	0.06
33	165	0.01	3	2,431	14	2,417	465.72	2,417	0.06
34	170	0.05	14	2,430	14	2,416	465.72	2,416	0.06
35	175	0.05	14	2,430	14	2,416	465.72	2,416	0.06
36	180	0.02	5	2,420	14	2,406	465.72	2,406	0.06

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.02	5	5	14	-	465.00	-	0.00
2	10	0.02	6	6	14	-	465.00	-	0.00
3	15	0.02	6	6	14	-	465.00	-	0.00
4	20	0.02	6	6	14	-	465.00	-	0.00
5	25	0.02	6	6	14	-	465.00	-	0.00
6	30	0.02	7	7	14	-	465.00	-	0.00
7	35	0.02	7	7	14	-	465.00	-	0.00
8	40	0.02	7	7	14	-	465.00	-	0.00
9	45	0.02	7	7	14	-	465.00	-	0.00
10	50	0.02	7	7	14	-	465.00	-	0.00
11	55	0.02	7	7	14	-	465.00	-	0.00
12	60	0.03	8	8	14	-	465.00	-	0.00
13	65	0.03	8	8	14	-	465.00	-	0.00
14	70	0.03	8	8	14	-	465.00	-	0.00
15	75	0.03	8	8	14	-	465.00	-	0.00
16	80	0.03	8	8	14	-	465.00	-	0.00
17	85	0.03	8	8	14	-	465.00	-	0.00
18	90	0.03	8	8	14	-	465.00	-	0.00
19	95	0.03	8	8	14	-	465.00	-	0.00
20	100	0.03	8	8	14	-	465.00	-	0.00
21	105	0.03	8	8	14	-	465.00	-	0.00
22	110	0.03	8	8	14	-	465.00	-	0.00
23	115	0.03	8	8	14	-	465.00	-	0.00
24	120	0.03	9	9	14	-	465.00	-	0.00
25	125	0.03	8	8	14	-	465.00	-	0.00
26	130	0.03	9	9	14	-	465.00	-	0.00
27	135	0.03	9	9	14	-	465.00	-	0.00
28	140	0.03	9	9	14	-	465.00	-	0.00
29	145	0.03	9	9	14	-	465.00	-	0.00
30	150	0.03	9	9	14	-	465.00	-	0.00
31	155	0.03	9	9	14	-	465.00	-	0.00
32	160	0.03	9	9	14	-	465.00	-	0.00
33	165	0.03	10	10	14	-	465.00	-	0.00
34	170	0.03	10	10	14	-	465.00	-	0.00
35	175	0.03	10	10	14	-	465.00	-	0.00
36	180	0.03	10	10	14	-	465.00	-	0.00
37	185	0.03	10	10	14	-	465.00	-	0.00
38	190	0.04	11	11	14	-	465.00	-	0.00
39	195	0.04	11	11	14	-	465.00	-	0.00
40	200	0.04	11	11	14	-	465.00	-	0.00
41	205	0.04	12	12	14	-	465.00	-	0.00
42	210	0.04	13	13	14	-	465.00	-	0.00
43	215	0.05	14	14	14	-	465.00	-	0.00
44	220	0.05	14	14	14	-	465.00	-	0.00
45	225	0.05	15	15	14	1	465.00	1	0.00
46	230	0.05	15	15	14	1	465.00	1	0.00
47	235	0.03	10	11	14	-	465.00	-	0.00
48	240	0.03	10	10	14	-	465.00	-	0.00
49	245	0.06	19	19	14	5	465.00	5	0.00
50	250	0.10	29	35	14	21	465.01	21	0.00
51	255	0.13	39	60	14	46	465.01	46	0.00
52	260	0.16	49	94	14	80	465.02	80	0.00
53	265	0.20	59	139	14	125	465.04	125	0.00
54	270	0.20	59	184	14	170	465.05	170	0.00
55	275	0.23	69	238	14	224	465.07	224	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.26	78	303	14	289	465.09	289	0.01
57	285	0.29	88	377	14	363	465.11	363	0.01
58	290	0.29	88	451	14	437	465.13	437	0.01
59	295	0.33	98	535	14	521	465.16	521	0.01
60	300	0.36	108	629	14	615	465.18	615	0.01
61	305	0.52	157	772	14	758	465.23	758	0.02
62	310	0.69	206	965	14	951	465.28	951	0.02
63	315	0.79	236	1,186	14	1,172	465.35	1,172	0.03
64	320	0.88	265	1,438	14	1,424	465.42	1,424	0.03
65	325	1.05	315	1,738	14	1,724	465.51	1,724	0.04
66	330	1.34	403	2,127	14	2,113	465.63	2,113	0.05
67	335	0.13	39	2,152	14	2,138	465.64	2,138	0.05
68	340	0.03	9	2,147	14	2,133	465.63	2,133	0.05
69	345	0.02	6	2,139	14	2,125	465.63	2,125	0.05
70	350	0.02	5	2,130	14	2,116	465.63	2,116	0.05
71	355	0.01	3	2,119	14	2,105	465.63	2,105	0.05
72	360	0.01	2	2,107	14	2,093	465.62	2,093	0.05

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.00	3	3	42	-	465.00	-	0.00
2	30	0.01	5	5	42	-	465.00	-	0.00
3	45	0.01	5	5	42	-	465.00	-	0.00
4	60	0.01	6	6	42	-	465.00	-	0.00
5	75	0.01	5	5	42	-	465.00	-	0.00
6	90	0.01	5	5	42	-	465.00	-	0.00
7	105	0.01	5	5	42	-	465.00	-	0.00
8	120	0.01	6	6	42	-	465.00	-	0.00
9	135	0.01	6	6	42	-	465.00	-	0.00
10	150	0.01	6	6	42	-	465.00	-	0.00
11	165	0.01	8	8	42	-	465.00	-	0.00
12	180	0.01	8	8	42	-	465.00	-	0.00
13	195	0.01	8	8	42	-	465.00	-	0.00
14	210	0.01	8	8	42	-	465.00	-	0.00
15	225	0.01	8	8	42	-	465.00	-	0.00
16	240	0.01	10	10	42	-	465.00	-	0.00
17	255	0.01	10	10	42	-	465.00	-	0.00
18	270	0.01	11	11	42	-	465.00	-	0.00
19	285	0.01	11	11	42	-	465.00	-	0.00
20	300	0.01	13	13	42	-	465.00	-	0.00
21	315	0.01	10	10	42	-	465.00	-	0.00
22	330	0.01	11	11	42	-	465.00	-	0.00
23	345	0.01	13	13	42	-	465.00	-	0.00
24	360	0.01	13	13	42	-	465.00	-	0.00
25	375	0.02	15	15	42	-	465.00	-	0.00
26	390	0.02	15	15	42	-	465.00	-	0.00
27	405	0.02	16	16	42	-	465.00	-	0.00
28	420	0.02	16	16	42	-	465.00	-	0.00
29	435	0.02	16	16	42	-	465.00	-	0.00
30	450	0.02	18	18	42	-	465.00	-	0.00
31	465	0.02	19	19	42	-	465.00	-	0.00
32	480	0.02	21	21	42	-	465.00	-	0.00
33	495	0.03	24	24	42	-	465.00	-	0.00
34	510	0.03	24	24	42	-	465.00	-	0.00
35	525	0.03	26	26	42	-	465.00	-	0.00
36	540	0.03	27	27	42	-	465.00	-	0.00
37	555	0.03	31	31	42	-	465.00	-	0.00
38	570	0.04	32	32	42	-	465.00	-	0.00
39	585	0.04	34	34	42	-	465.00	-	0.00
40	600	0.04	35	35	42	-	465.00	-	0.00
41	615	0.03	24	24	42	-	465.00	-	0.00
42	630	0.03	24	24	42	-	465.00	-	0.00
43	645	0.04	32	32	42	-	465.00	-	0.00
44	660	0.04	32	32	42	-	465.00	-	0.00
45	675	0.03	31	31	42	-	465.00	-	0.00
46	690	0.03	31	31	42	-	465.00	-	0.00
47	705	0.03	27	27	42	-	465.00	-	0.00
48	720	0.03	29	29	42	-	465.00	-	0.00
49	735	0.04	40	40	42	-	465.00	-	0.00
50	750	0.02	14	14	42	-	465.00	-	0.00
51	765	0.06	52	52	42	10	465.00	10	0.00
52	780	0.08	74	84	42	42	465.01	42	0.00
53	795	0.18	161	203	42	160	465.05	160	0.00
54	810	0.19	167	327	42	285	465.08	285	0.01
55	825	0.04	37	322	42	280	465.08	280	0.01
56	840	0.00	1	280	42	238	465.07	238	0.01
57	855	0.08	71	309	42	267	465.08	267	0.01
58	870	0.07	60	327	42	285	465.08	285	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.07	66	351	42	309	465.09	309	0.01
60	900	0.06	55	364	42	321	465.10	321	0.01
61	915	0.05	44	366	42	324	465.10	324	0.01
62	930	0.04	33	357	42	315	465.09	315	0.01
63	945	0.03	31	345	42	303	465.09	303	0.01
64	960	0.03	31	334	42	292	465.09	292	0.01
65	975	0.01	6	298	42	256	465.08	256	0.01
66	990	0.01	6	262	42	220	465.07	220	0.01
67	1005	0.01	5	225	42	183	465.05	183	0.00
68	1020	0.01	5	187	42	145	465.04	145	0.00
69	1035	0.01	8	153	42	111	465.03	111	0.00
70	1050	0.01	8	119	42	77	465.02	77	0.00
71	1065	0.01	8	85	42	43	465.01	43	0.00
72	1080	0.01	6	49	42	7	465.00	7	0.00
73	1095	0.01	6	13	42	-	465.00	-	0.00
74	1110	0.01	6	6	42	-	465.00	-	0.00
75	1125	0.01	5	5	42	-	465.00	-	0.00
76	1140	0.00	3	3	42	-	465.00	-	0.00
77	1155	0.01	5	5	42	-	465.00	-	0.00
78	1170	0.01	6	6	42	-	465.00	-	0.00
79	1185	0.01	5	5	42	-	465.00	-	0.00
80	1200	0.00	3	3	42	-	465.00	-	0.00
81	1215	0.01	5	5	42	-	465.00	-	0.00
82	1230	0.01	5	5	42	-	465.00	-	0.00
83	1245	0.01	5	5	42	-	465.00	-	0.00
84	1260	0.00	3	3	42	-	465.00	-	0.00
85	1275	0.01	5	5	42	-	465.00	-	0.00
86	1290	0.00	3	3	42	-	465.00	-	0.00
87	1305	0.01	5	5	42	-	465.00	-	0.00
88	1320	0.00	3	3	42	-	465.00	-	0.00
89	1335	0.01	5	5	42	-	465.00	-	0.00
90	1350	0.00	3	3	42	-	465.00	-	0.00
91	1365	0.00	3	3	42	-	465.00	-	0.00
92	1380	0.00	3	3	42	-	465.00	-	0.00
93	1395	0.00	3	3	42	-	465.00	-	0.00
94	1410	0.00	3	3	42	-	465.00	-	0.00
95	1425	0.00	3	3	42	-	465.00	-	0.00
96	1440	0.00	3	3	42	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.570	1.00	1.04	1.36	10.570	1.00	1.36	2.23	10.570	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	1.04	SUM [9]	10.57	SUM [11]	1.36	SUM [13]	10.57	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.49	0.49	0.40
FLOOD VOLUME	(cu-ft)	18,821	18,747	15,460
	(acre-ft)	0.43	0.43	0.35
REQUIRED STORAGE	(cu-ft)	16,281	14,878	6,850
	(acre-ft)	0.37	0.34	0.16
PEAK FLOW	(cfs)	8.76	7.61	1.44
MAXIMUM WSEL	(ft)	465.99	465.91	465.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525
C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.19	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.19	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.19	0.12	0.01	0.15	0.00
4	20	0.33	1.5	0.187	0.19	0.17	0.02	0.20	0.00
5	25	0.42	1.5	0.187	0.19	0.17	0.02	0.20	0.00
6	30	0.50	1.8	0.225	0.19	0.20	0.03	0.32	24.03
7	35	0.58	1.5	0.187	0.19	0.17	0.02	0.20	0.00
8	40	0.67	1.8	0.225	0.19	0.20	0.03	0.32	24.03
9	45	0.75	1.8	0.225	0.19	0.20	0.03	0.32	24.03
10	50	0.83	1.5	0.187	0.19	0.17	0.02	0.20	0.00
11	55	0.92	1.6	0.200	0.19	0.18	0.01	0.06	0.00
12	60	1.00	1.8	0.225	0.19	0.20	0.03	0.32	24.03
13	65	1.08	2.2	0.275	0.19	0.25	0.08	0.85	182.33
14	70	1.17	2.2	0.275	0.19	0.25	0.08	0.85	182.33
15	75	1.25	2.2	0.275	0.19	0.25	0.08	0.85	182.33
16	80	1.33	2.0	0.250	0.19	0.22	0.06	0.59	103.18
17	85	1.42	2.6	0.324	0.19	0.29	0.13	1.38	340.63
18	90	1.50	2.7	0.337	0.19	0.30	0.14	1.51	380.20
19	95	1.58	2.4	0.300	0.19	0.27	0.11	1.11	261.48
20	100	1.67	2.7	0.337	0.19	0.30	0.14	1.51	380.20
21	105	1.75	3.3	0.412	0.19	0.37	0.22	2.30	617.64
22	110	1.83	3.1	0.387	0.19	0.35	0.19	2.04	538.50
23	115	1.92	2.9	0.362	0.19	0.33	0.17	1.77	459.35
24	120	2.00	3.0	0.374	0.19	0.34	0.18	1.91	498.92
25	125	2.08	3.1	0.387	0.19	0.35	0.19	2.04	538.50
26	130	2.17	4.2	0.524	0.19	0.47	0.33	3.49	973.81
27	135	2.25	5.0	0.624	0.19	0.56	0.43	4.54	1290.40
28	140	2.33	3.5	0.437	0.19	0.39	0.24	2.56	696.79
29	145	2.42	6.8	0.849	0.19	0.76	0.65	6.92	2002.74
30	150	2.50	7.3	0.911	0.19	0.82	0.72	7.58	2200.61
31	155	2.58	8.2	1.023	0.19	0.92	0.83	8.76	2556.77
32	160	2.67	5.9	0.736	0.19	0.66	0.54	5.73	1646.57
33	165	2.75	2.0	0.250	0.19	0.22	0.06	0.59	103.18
34	170	2.83	1.8	0.225	0.19	0.20	0.03	0.32	24.03
35	175	2.92	1.8	0.225	0.19	0.20	0.03	0.32	24.03
36	180	3.00	0.6	0.075	0.19	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18821.12
REQUIRED STORAGE (acft)	0.37
REQUIRED STORAGE (cuft)	16280.67
PEAK FLOW RATE (cfs)	8.76

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.19	0.07	0.01	0.09	0.00
2	10	0.17	0.6	0.098	0.19	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.19	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.19	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.19	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.19	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.19	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.19	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.19	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.19	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.19	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.19	0.12	0.01	0.14	0.00
13	65	1.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
14	70	1.17	0.8	0.131	0.19	0.12	0.01	0.14	0.00
15	75	1.25	0.8	0.131	0.19	0.12	0.01	0.14	0.00
16	80	1.33	0.8	0.131	0.19	0.12	0.01	0.14	0.00
17	85	1.42	0.8	0.131	0.19	0.12	0.01	0.14	0.00
18	90	1.50	0.8	0.131	0.19	0.12	0.01	0.14	0.00
19	95	1.58	0.8	0.131	0.19	0.12	0.01	0.14	0.00
20	100	1.67	0.8	0.131	0.19	0.12	0.01	0.14	0.00
21	105	1.75	0.8	0.131	0.19	0.12	0.01	0.14	0.00
22	110	1.83	0.8	0.131	0.19	0.12	0.01	0.14	0.00
23	115	1.92	0.8	0.131	0.19	0.12	0.01	0.14	0.00
24	120	2.00	0.9	0.147	0.19	0.13	0.01	0.16	0.00
25	125	2.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
26	130	2.17	0.9	0.147	0.19	0.13	0.01	0.16	0.00
27	135	2.25	0.9	0.147	0.19	0.13	0.01	0.16	0.00
28	140	2.33	0.9	0.147	0.19	0.13	0.01	0.16	0.00
29	145	2.42	0.9	0.147	0.19	0.13	0.01	0.16	0.00
30	150	2.50	0.9	0.147	0.19	0.13	0.01	0.16	0.00
31	155	2.58	0.9	0.147	0.19	0.13	0.01	0.16	0.00
32	160	2.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
33	165	2.75	1.0	0.163	0.19	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.19	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.19	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.19	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.19	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.19	0.16	0.02	0.19	0.00
39	195	3.25	1.1	0.180	0.19	0.16	0.02	0.19	0.00
40	200	3.33	1.1	0.180	0.19	0.16	0.02	0.19	0.00
41	205	3.42	1.2	0.196	0.19	0.18	0.00	0.02	0.00
42	210	3.50	1.3	0.212	0.19	0.19	0.02	0.19	0.00
43	215	3.58	1.4	0.228	0.19	0.21	0.03	0.36	36.21
44	220	3.67	1.4	0.228	0.19	0.21	0.03	0.36	36.21
45	225	3.75	1.5	0.245	0.19	0.22	0.05	0.54	87.96
46	230	3.83	1.5	0.245	0.19	0.22	0.05	0.54	87.96
47	235	3.92	1.6	0.261	0.19	0.24	0.07	0.71	139.71
48	240	4.00	1.6	0.261	0.19	0.24	0.07	0.71	139.71
49	245	4.08	1.7	0.277	0.19	0.25	0.08	0.88	191.46
50	250	4.17	1.8	0.294	0.19	0.26	0.10	1.05	243.21
51	255	4.25	1.9	0.310	0.19	0.28	0.12	1.23	294.96
52	260	4.33	2.0	0.326	0.19	0.29	0.13	1.40	346.71
53	265	4.42	2.1	0.343	0.19	0.31	0.15	1.57	398.47
54	270	4.50	2.1	0.343	0.19	0.31	0.15	1.57	398.47
55	275	4.58	2.2	0.359	0.19	0.32	0.16	1.74	450.22
56	280	4.67	2.3	0.375	0.19	0.34	0.18	1.92	501.97

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.19	0.35	0.20	2.09	553.72
58	290	4.83	2.4	0.392	0.19	0.35	0.20	2.09	553.72
59	295	4.92	2.5	0.408	0.19	0.37	0.21	2.26	605.47
60	300	5.00	2.6	0.424	0.19	0.38	0.23	2.43	657.22
61	305	5.08	3.1	0.506	0.19	0.46	0.31	3.30	915.97
62	310	5.17	3.6	0.588	0.19	0.53	0.39	4.16	1174.73
63	315	5.25	3.9	0.636	0.19	0.57	0.44	4.68	1329.98
64	320	5.33	4.2	0.685	0.19	0.62	0.49	5.19	1485.23
65	325	5.42	4.7	0.767	0.19	0.69	0.57	6.06	1743.98
66	330	5.50	5.6	0.914	0.19	0.82	0.72	7.61	2209.74
67	335	5.58	1.9	0.310	0.19	0.28	0.12	1.23	294.96
68	340	5.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
69	345	5.75	0.6	0.098	0.19	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.19	0.07	0.01	0.09	0.00
71	355	5.92	0.3	0.049	0.19	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.19	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18747.03
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14877.95
PEAK FLOW RATE (cfs)	7.61

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.343	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.339	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.335	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.331	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.327	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.323	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.319	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.316	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.312	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.308	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.304	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.300	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.297	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.293	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.289	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.286	0.048	0.005	0.06	0.00
17	255	4.25	0.6	0.054	0.282	0.048	0.005	0.06	0.00
18	270	4.50	0.7	0.062	0.278	0.056	0.006	0.07	0.00
19	285	4.75	0.7	0.062	0.275	0.056	0.006	0.07	0.00
20	300	5.00	0.8	0.071	0.271	0.064	0.007	0.08	0.00
21	315	5.25	0.6	0.054	0.268	0.048	0.005	0.06	0.00
22	330	5.50	0.7	0.062	0.264	0.056	0.006	0.07	0.00
23	345	5.75	0.8	0.071	0.261	0.064	0.007	0.08	0.00
24	360	6.00	0.8	0.071	0.257	0.064	0.007	0.08	0.00
25	375	6.25	0.9	0.080	0.254	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.251	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.247	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.244	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.241	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.237	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.234	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.231	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.228	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.224	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.221	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.218	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.215	0.153	0.017	0.18	0.00
38	570	9.50	2.0	0.178	0.212	0.161	0.018	0.19	0.00
39	585	9.75	2.1	0.187	0.209	0.169	0.019	0.20	0.00
40	600	10.00	2.2	0.196	0.206	0.177	0.020	0.21	0.00
41	615	10.25	1.5	0.134	0.203	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.200	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.197	0.161	0.018	0.19	0.00
44	660	11.00	2.0	0.178	0.194	0.161	0.018	0.19	0.00
45	675	11.25	1.9	0.169	0.191	0.153	0.017	0.18	0.00
46	690	11.50	1.9	0.169	0.189	0.153	0.017	0.18	0.00
47	705	11.75	1.7	0.152	0.186	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.183	0.145	0.016	0.17	0.00
49	735	12.25	2.5	0.223	0.180	0.201	0.043	0.45	188.01
50	750	12.50	2.6	0.232	0.178	0.209	0.054	0.57	298.56
51	765	12.75	2.8	0.250	0.175	0.225	0.075	0.79	493.67
52	780	13.00	2.9	0.259	0.172	0.233	0.086	0.91	603.61
53	795	13.25	3.4	0.303	0.170	0.273	0.134	1.41	1052.67
54	810	13.50	3.4	0.303	0.167	0.273	0.136	1.44	1077.14
55	825	13.75	2.3	0.205	0.165	0.185	0.041	0.43	167.88
56	840	14.00	2.3	0.205	0.162	0.185	0.043	0.45	191.72
57	855	14.25	2.7	0.241	0.160	0.217	0.081	0.86	554.66
58	870	14.50	2.6	0.232	0.157	0.209	0.075	0.79	492.99
59	885	14.75	2.6	0.232	0.155	0.209	0.077	0.82	515.85
60	900	15.00	2.5	0.223	0.152	0.201	0.071	0.75	453.52
61	915	15.25	2.4	0.214	0.150	0.193	0.064	0.68	390.86

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
62	930	15.50	2.3	0.205	0.148	0.185	0.057	0.61	327.85
63	945	15.75	1.9	0.169	0.146	0.153	0.024	0.25	9.93
64	960	16.00	1.9	0.169	0.143	0.153	0.026	0.28	31.09
65	975	16.25	0.4	0.036	0.141	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.139	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.137	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.135	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.133	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.131	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.129	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.127	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.125	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.116	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.110	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.109	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.106	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.105	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.104	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.102	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.101	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.100	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.099	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.099	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.098	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.097	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.097	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15459.88
REQUIRED STORAGE (acft)	0.16
REQUIRED STORAGE (cuft)	6850.04
PEAK FLOW (cfs)	1.44

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	73	-	465.00	-	0.00
2	10	0.17	51	51	73	-	465.00	-	0.00
3	15	0.15	44	44	73	-	465.00	-	0.00
4	20	0.20	59	59	73	-	465.00	-	0.00
5	25	0.20	59	59	73	-	465.00	-	0.00
6	30	0.32	97	97	73	24	465.00	24	0.00
7	35	0.20	59	83	73	11	465.00	11	0.00
8	40	0.32	97	107	73	35	465.00	35	0.00
9	45	0.32	97	131	73	59	465.00	59	0.00
10	50	0.20	59	118	73	46	465.00	46	0.00
11	55	0.06	17	63	73	-	465.00	-	0.00
12	60	0.32	97	97	73	24	465.00	24	0.00
13	65	0.85	255	279	73	206	465.01	206	0.00
14	70	0.85	255	461	73	389	465.02	389	0.01
15	75	0.85	255	644	73	571	465.03	571	0.01
16	80	0.59	176	747	73	674	465.04	674	0.02
17	85	1.38	413	1,087	73	1,015	465.06	1,015	0.02
18	90	1.51	453	1,468	73	1,395	465.09	1,395	0.03
19	95	1.11	334	1,729	73	1,657	465.10	1,657	0.04
20	100	1.51	453	2,109	73	2,037	465.12	2,037	0.05
21	105	2.30	690	2,727	73	2,654	465.16	2,654	0.06
22	110	2.04	611	3,265	73	3,193	465.20	3,193	0.07
23	115	1.77	532	3,725	73	3,652	465.22	3,652	0.08
24	120	1.91	572	4,224	73	4,151	465.25	4,151	0.10
25	125	2.04	611	4,762	73	4,690	465.29	4,690	0.11
26	130	3.49	1,046	5,736	73	5,663	465.35	5,663	0.13
27	135	4.54	1,363	7,026	73	6,954	465.43	6,954	0.16
28	140	2.56	769	7,723	73	7,651	465.47	7,651	0.18
29	145	6.92	2,075	9,726	73	9,653	465.59	9,653	0.22
30	150	7.58	2,273	11,927	73	11,854	465.72	11,854	0.27
31	155	8.76	2,629	14,483	73	14,411	465.88	14,411	0.33
32	160	5.73	1,719	16,130	73	16,057	465.98	16,057	0.37
33	165	0.59	176	16,233	73	16,161	465.99	16,161	0.37
34	170	0.32	97	16,257	73	16,185	465.99	16,185	0.37
35	175	0.32	97	16,281	73	16,209	465.99	16,209	0.37
36	180	0.08	24	16,232	73	16,160	465.99	16,160	0.37

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.09	26	26	73	-	465.00	-	0.00
2	10	0.10	31	31	73	-	465.00	-	0.00
3	15	0.10	31	31	73	-	465.00	-	0.00
4	20	0.10	31	31	73	-	465.00	-	0.00
5	25	0.10	31	31	73	-	465.00	-	0.00
6	30	0.12	36	36	73	-	465.00	-	0.00
7	35	0.12	36	36	73	-	465.00	-	0.00
8	40	0.12	36	36	73	-	465.00	-	0.00
9	45	0.12	36	36	73	-	465.00	-	0.00
10	50	0.12	36	36	73	-	465.00	-	0.00
11	55	0.12	36	36	73	-	465.00	-	0.00
12	60	0.14	41	41	73	-	465.00	-	0.00
13	65	0.14	41	41	73	-	465.00	-	0.00
14	70	0.14	41	41	73	-	465.00	-	0.00
15	75	0.14	41	41	73	-	465.00	-	0.00
16	80	0.14	41	41	73	-	465.00	-	0.00
17	85	0.14	41	41	73	-	465.00	-	0.00
18	90	0.14	41	41	73	-	465.00	-	0.00
19	95	0.14	41	41	73	-	465.00	-	0.00
20	100	0.14	41	41	73	-	465.00	-	0.00
21	105	0.14	41	41	73	-	465.00	-	0.00
22	110	0.14	41	41	73	-	465.00	-	0.00
23	115	0.14	41	41	73	-	465.00	-	0.00
24	120	0.16	47	47	73	-	465.00	-	0.00
25	125	0.14	41	41	73	-	465.00	-	0.00
26	130	0.16	47	47	73	-	465.00	-	0.00
27	135	0.16	47	47	73	-	465.00	-	0.00
28	140	0.16	47	47	73	-	465.00	-	0.00
29	145	0.16	47	47	73	-	465.00	-	0.00
30	150	0.16	47	47	73	-	465.00	-	0.00
31	155	0.16	47	47	73	-	465.00	-	0.00
32	160	0.16	47	47	73	-	465.00	-	0.00
33	165	0.17	52	52	73	-	465.00	-	0.00
34	170	0.17	52	52	73	-	465.00	-	0.00
35	175	0.17	52	52	73	-	465.00	-	0.00
36	180	0.17	52	52	73	-	465.00	-	0.00
37	185	0.17	52	52	73	-	465.00	-	0.00
38	190	0.19	57	57	73	-	465.00	-	0.00
39	195	0.19	57	57	73	-	465.00	-	0.00
40	200	0.19	57	57	73	-	465.00	-	0.00
41	205	0.02	5	5	73	-	465.00	-	0.00
42	210	0.19	57	57	73	-	465.00	-	0.00
43	215	0.36	109	109	73	36	465.00	36	0.00
44	220	0.36	109	145	73	72	465.00	72	0.00
45	225	0.54	161	233	73	160	465.01	160	0.00
46	230	0.54	161	321	73	248	465.02	248	0.01
47	235	0.71	212	461	73	388	465.02	388	0.01
48	240	0.71	212	600	73	528	465.03	528	0.01
49	245	0.88	264	792	73	719	465.04	719	0.02
50	250	1.05	316	1,035	73	962	465.06	962	0.02
51	255	1.23	368	1,330	73	1,257	465.08	1,257	0.03
52	260	1.40	419	1,677	73	1,604	465.10	1,604	0.04
53	265	1.57	471	2,075	73	2,003	465.12	2,003	0.05
54	270	1.57	471	2,474	73	2,401	465.15	2,401	0.06
55	275	1.74	523	2,924	73	2,851	465.17	2,851	0.07

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.92	575	3,426	73	3,353	465.20	3,353	0.08
57	285	2.09	626	3,980	73	3,907	465.24	3,907	0.09
58	290	2.09	626	4,533	73	4,461	465.27	4,461	0.10
59	295	2.26	678	5,139	73	5,066	465.31	5,066	0.12
60	300	2.43	730	5,796	73	5,723	465.35	5,723	0.13
61	305	3.30	989	6,712	73	6,639	465.41	6,639	0.15
62	310	4.16	1,247	7,887	73	7,814	465.48	7,814	0.18
63	315	4.68	1,403	9,217	73	9,144	465.56	9,144	0.21
64	320	5.19	1,558	10,702	73	10,629	465.65	10,629	0.24
65	325	6.06	1,817	12,446	73	12,373	465.76	12,373	0.28
66	330	7.61	2,282	14,656	73	14,583	465.89	14,583	0.33
67	335	1.23	368	14,951	73	14,878	465.91	14,878	0.34
68	340	0.16	47	14,925	73	14,852	465.91	14,852	0.34
69	345	0.10	31	14,883	73	14,810	465.91	14,810	0.34
70	350	0.09	26	14,836	73	14,764	465.90	14,764	0.34
71	355	0.05	16	14,779	73	14,707	465.90	14,707	0.34
72	360	0.03	10	14,717	73	14,644	465.90	14,644	0.34

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	17	17	218	-	465.00	-	0.00
2	30	0.03	25	25	218	-	465.00	-	0.00
3	45	0.03	25	25	218	-	465.00	-	0.00
4	60	0.04	34	34	218	-	465.00	-	0.00
5	75	0.03	25	25	218	-	465.00	-	0.00
6	90	0.03	25	25	218	-	465.00	-	0.00
7	105	0.03	25	25	218	-	465.00	-	0.00
8	120	0.04	34	34	218	-	465.00	-	0.00
9	135	0.04	34	34	218	-	465.00	-	0.00
10	150	0.04	34	34	218	-	465.00	-	0.00
11	165	0.05	42	42	218	-	465.00	-	0.00
12	180	0.05	42	42	218	-	465.00	-	0.00
13	195	0.05	42	42	218	-	465.00	-	0.00
14	210	0.05	42	42	218	-	465.00	-	0.00
15	225	0.05	42	42	218	-	465.00	-	0.00
16	240	0.06	51	51	218	-	465.00	-	0.00
17	255	0.06	51	51	218	-	465.00	-	0.00
18	270	0.07	59	59	218	-	465.00	-	0.00
19	285	0.07	59	59	218	-	465.00	-	0.00
20	300	0.08	68	68	218	-	465.00	-	0.00
21	315	0.06	51	51	218	-	465.00	-	0.00
22	330	0.07	59	59	218	-	465.00	-	0.00
23	345	0.08	68	68	218	-	465.00	-	0.00
24	360	0.08	68	68	218	-	465.00	-	0.00
25	375	0.08	76	76	218	-	465.00	-	0.00
26	390	0.08	76	76	218	-	465.00	-	0.00
27	405	0.09	85	85	218	-	465.00	-	0.00
28	420	0.09	85	85	218	-	465.00	-	0.00
29	435	0.09	85	85	218	-	465.00	-	0.00
30	450	0.10	93	93	218	-	465.00	-	0.00
31	465	0.11	102	102	218	-	465.00	-	0.00
32	480	0.12	110	110	218	-	465.00	-	0.00
33	495	0.14	127	127	218	-	465.00	-	0.00
34	510	0.14	127	127	218	-	465.00	-	0.00
35	525	0.15	136	136	218	-	465.00	-	0.00
36	540	0.16	144	144	218	-	465.00	-	0.00
37	555	0.18	161	161	218	-	465.00	-	0.00
38	570	0.19	170	170	218	-	465.00	-	0.00
39	585	0.20	178	178	218	-	465.00	-	0.00
40	600	0.21	187	187	218	-	465.00	-	0.00
41	615	0.14	127	127	218	-	465.00	-	0.00
42	630	0.14	127	127	218	-	465.00	-	0.00
43	645	0.19	170	170	218	-	465.00	-	0.00
44	660	0.19	170	170	218	-	465.00	-	0.00
45	675	0.18	161	161	218	-	465.00	-	0.00
46	690	0.18	161	161	218	-	465.00	-	0.00
47	705	0.16	144	144	218	-	465.00	-	0.00
48	720	0.17	153	153	218	-	465.00	-	0.00
49	735	0.45	406	406	218	188	465.01	188	0.00
50	750	0.57	516	704	218	487	465.03	487	0.01
51	765	0.79	711	1,198	218	980	465.06	980	0.02
52	780	0.91	821	1,802	218	1,584	465.10	1,584	0.04
53	795	1.41	1,270	2,854	218	2,637	465.16	2,637	0.06
54	810	1.44	1,295	3,931	218	3,714	465.23	3,714	0.09
55	825	0.43	386	4,099	218	3,882	465.24	3,882	0.09
56	840	0.45	409	4,291	218	4,073	465.25	4,073	0.09
57	855	0.86	772	4,846	218	4,628	465.28	4,628	0.11
58	870	0.79	711	5,339	218	5,121	465.31	5,121	0.12

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.82	734	5,855	218	5,637	465.34	5,637	0.13
60	900	0.75	671	6,308	218	6,090	465.37	6,090	0.14
61	915	0.68	609	6,699	218	6,481	465.40	6,481	0.15
62	930	0.61	546	7,027	218	6,809	465.42	6,809	0.16
63	945	0.25	228	7,037	218	6,819	465.42	6,819	0.16
64	960	0.28	249	7,068	218	6,850	465.42	6,850	0.16
65	975	0.04	34	6,884	218	6,666	465.41	6,666	0.15
66	990	0.04	34	6,700	218	6,482	465.40	6,482	0.15
67	1005	0.03	25	6,508	218	6,290	465.38	6,290	0.14
68	1020	0.03	25	6,316	218	6,098	465.37	6,098	0.14
69	1035	0.05	42	6,140	218	5,923	465.36	5,923	0.14
70	1050	0.05	42	5,965	218	5,747	465.35	5,747	0.13
71	1065	0.05	42	5,790	218	5,572	465.34	5,572	0.13
72	1080	0.04	34	5,606	218	5,388	465.33	5,388	0.12
73	1095	0.04	34	5,422	218	5,204	465.32	5,204	0.12
74	1110	0.04	34	5,238	218	5,020	465.31	5,020	0.12
75	1125	0.03	25	5,046	218	4,828	465.30	4,828	0.11
76	1140	0.02	17	4,845	218	4,627	465.28	4,627	0.11
77	1155	0.03	25	4,653	218	4,435	465.27	4,435	0.10
78	1170	0.04	34	4,469	218	4,251	465.26	4,251	0.10
79	1185	0.03	25	4,277	218	4,059	465.25	4,059	0.09
80	1200	0.02	17	4,076	218	3,858	465.24	3,858	0.09
81	1215	0.03	25	3,884	218	3,666	465.22	3,666	0.08
82	1230	0.03	25	3,691	218	3,474	465.21	3,474	0.08
83	1245	0.03	25	3,499	218	3,281	465.20	3,281	0.08
84	1260	0.02	17	3,298	218	3,081	465.19	3,081	0.07
85	1275	0.03	25	3,106	218	2,888	465.18	2,888	0.07
86	1290	0.02	17	2,905	218	2,687	465.16	2,687	0.06
87	1305	0.03	25	2,713	218	2,495	465.15	2,495	0.06
88	1320	0.02	17	2,512	218	2,294	465.14	2,294	0.05
89	1335	0.03	25	2,320	218	2,102	465.13	2,102	0.05
90	1350	0.02	17	2,119	218	1,901	465.12	1,901	0.04
91	1365	0.02	17	1,918	218	1,701	465.10	1,701	0.04
92	1380	0.02	17	1,718	218	1,500	465.09	1,500	0.03
93	1395	0.02	17	1,517	218	1,299	465.08	1,299	0.03
94	1410	0.02	17	1,316	218	1,098	465.07	1,098	0.03
95	1425	0.02	17	1,115	218	897	465.05	897	0.02
96	1440	0.02	17	914	218	697	465.04	697	0.02

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.250	1.00	1.04	1.36	10.250	1.00	1.36	2.23	10.250	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	1.04	SUM [9]	10.25	SUM [11]	1.36	SUM [13]	10.25	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.46	0.36
FLOOD VOLUME	(cu-ft)	17,326	17,301	13,560
	(acre-ft)	0.40	0.40	0.31
REQUIRED STORAGE	(cu-ft)	14,912	13,552	5,367
	(acre-ft)	0.34	0.31	0.12
PEAK FLOW	(cfs)	8.38	7.26	1.29
MAXIMUM WSEL	(ft)	465.94	465.86	465.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561
C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.21	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.21	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.21	0.12	0.01	0.14	0.00
4	20	0.33	1.5	0.187	0.21	0.17	0.02	0.19	0.00
5	25	0.42	1.5	0.187	0.21	0.17	0.02	0.19	0.00
6	30	0.50	1.8	0.225	0.21	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.21	0.17	0.02	0.19	0.00
8	40	0.67	1.8	0.225	0.21	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.21	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.21	0.17	0.02	0.19	0.00
11	55	0.92	1.6	0.200	0.21	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.21	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.21	0.25	0.07	0.71	141.78
14	70	1.17	2.2	0.275	0.21	0.25	0.07	0.71	141.78
15	75	1.25	2.2	0.275	0.21	0.25	0.07	0.71	141.78
16	80	1.33	2.0	0.250	0.21	0.22	0.04	0.45	65.03
17	85	1.42	2.6	0.324	0.21	0.29	0.12	1.22	295.29
18	90	1.50	2.7	0.337	0.21	0.30	0.13	1.34	333.66
19	95	1.58	2.4	0.300	0.21	0.27	0.09	0.96	218.54
20	100	1.67	2.7	0.337	0.21	0.30	0.13	1.34	333.66
21	105	1.75	3.3	0.412	0.21	0.37	0.21	2.11	563.92
22	110	1.83	3.1	0.387	0.21	0.35	0.18	1.86	487.17
23	115	1.92	2.9	0.362	0.21	0.33	0.16	1.60	410.42
24	120	2.00	3.0	0.374	0.21	0.34	0.17	1.73	448.79
25	125	2.08	3.1	0.387	0.21	0.35	0.18	1.86	487.17
26	130	2.17	4.2	0.524	0.21	0.47	0.32	3.26	909.30
27	135	2.25	5.0	0.624	0.21	0.56	0.42	4.29	1216.31
28	140	2.33	3.5	0.437	0.21	0.39	0.23	2.37	640.67
29	145	2.42	6.8	0.849	0.21	0.76	0.64	6.59	1907.08
30	150	2.50	7.3	0.911	0.21	0.82	0.71	7.23	2098.96
31	155	2.58	8.2	1.023	0.21	0.92	0.82	8.38	2444.34
32	160	2.67	5.9	0.736	0.21	0.66	0.53	5.44	1561.70
33	165	2.75	2.0	0.250	0.21	0.22	0.04	0.45	65.03
34	170	2.83	1.8	0.225	0.21	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.21	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.21	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17326.37
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14912.39
PEAK FLOW RATE (cfs)	8.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.21	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.21	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.21	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.21	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.21	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.21	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.21	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.21	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.21	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.21	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.21	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.21	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.21	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.21	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.21	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.21	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.21	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.21	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.21	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.21	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.21	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.21	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.21	0.13	0.01	0.15	0.00
25	125	2.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.21	0.13	0.01	0.15	0.00
27	135	2.25	0.9	0.147	0.21	0.13	0.01	0.15	0.00
28	140	2.33	0.9	0.147	0.21	0.13	0.01	0.15	0.00
29	145	2.42	0.9	0.147	0.21	0.13	0.01	0.15	0.00
30	150	2.50	0.9	0.147	0.21	0.13	0.01	0.15	0.00
31	155	2.58	0.9	0.147	0.21	0.13	0.01	0.15	0.00
32	160	2.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
33	165	2.75	1.0	0.163	0.21	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.21	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.21	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.21	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.21	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.21	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.21	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.21	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.21	0.18	0.02	0.20	0.00
42	210	3.50	1.3	0.212	0.21	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.21	0.21	0.02	0.23	0.09
44	220	3.67	1.4	0.228	0.21	0.21	0.02	0.23	0.09
45	225	3.75	1.5	0.245	0.21	0.22	0.04	0.40	50.27
46	230	3.83	1.5	0.245	0.21	0.22	0.04	0.40	50.27
47	235	3.92	1.6	0.261	0.21	0.24	0.06	0.57	100.46
48	240	4.00	1.6	0.261	0.21	0.24	0.06	0.57	100.46
49	245	4.08	1.7	0.277	0.21	0.25	0.07	0.73	150.64
50	250	4.17	1.8	0.294	0.21	0.26	0.09	0.90	200.82
51	255	4.25	1.9	0.310	0.21	0.28	0.10	1.07	251.01
52	260	4.33	2.0	0.326	0.21	0.29	0.12	1.24	301.19
53	265	4.42	2.1	0.343	0.21	0.31	0.14	1.40	351.38
54	270	4.50	2.1	0.343	0.21	0.31	0.14	1.40	351.38
55	275	4.58	2.2	0.359	0.21	0.32	0.15	1.57	401.56
56	280	4.67	2.3	0.375	0.21	0.34	0.17	1.74	451.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.21	0.35	0.19	1.91	501.93
58	290	4.83	2.4	0.392	0.21	0.35	0.19	1.91	501.93
59	295	4.92	2.5	0.408	0.21	0.37	0.20	2.07	552.11
60	300	5.00	2.6	0.424	0.21	0.38	0.22	2.24	602.30
61	305	5.08	3.1	0.506	0.21	0.46	0.30	3.08	853.22
62	310	5.17	3.6	0.588	0.21	0.53	0.38	3.91	1104.14
63	315	5.25	3.9	0.636	0.21	0.57	0.43	4.41	1254.69
64	320	5.33	4.2	0.685	0.21	0.62	0.48	4.92	1405.24
65	325	5.42	4.7	0.767	0.21	0.69	0.56	5.75	1656.16
66	330	5.50	5.6	0.914	0.21	0.82	0.71	7.26	2107.82
67	335	5.58	1.9	0.310	0.21	0.28	0.10	1.07	251.01
68	340	5.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
69	345	5.75	0.6	0.098	0.21	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.21	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.21	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.21	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.46
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17301.15
REQUIRED STORAGE (acft)	0.31
REQUIRED STORAGE (cuft)	13551.86
PEAK FLOW RATE (cfs)	7.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.363	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.359	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.355	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.351	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.347	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.343	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.338	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.334	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.330	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.326	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.322	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.318	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.314	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.310	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.307	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.303	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.299	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.295	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.291	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.288	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.284	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.280	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.276	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.273	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.269	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.266	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.262	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.258	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.255	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.252	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.248	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.245	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.241	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.238	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.235	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.231	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.228	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.225	0.161	0.018	0.18	0.00
39	585	9.75	2.1	0.187	0.222	0.169	0.019	0.19	0.00
40	600	10.00	2.2	0.196	0.218	0.177	0.020	0.20	0.00
41	615	10.25	1.5	0.134	0.215	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.212	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.209	0.161	0.018	0.18	0.00
44	660	11.00	2.0	0.178	0.206	0.161	0.018	0.18	0.00
45	675	11.25	1.9	0.169	0.203	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.200	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.197	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.194	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.191	0.201	0.032	0.33	84.85
50	750	12.50	2.6	0.232	0.188	0.209	0.044	0.45	193.54
51	765	12.75	2.8	0.250	0.185	0.225	0.064	0.66	384.21
52	780	13.00	2.9	0.259	0.183	0.233	0.076	0.78	492.27
53	795	13.25	3.4	0.303	0.180	0.273	0.123	1.27	929.17
54	810	13.50	3.4	0.303	0.177	0.273	0.126	1.29	954.32
55	825	13.75	2.3	0.205	0.174	0.185	0.031	0.31	73.98
56	840	14.00	2.3	0.205	0.172	0.185	0.033	0.34	98.48
57	855	14.25	2.7	0.241	0.169	0.217	0.072	0.73	451.79
58	870	14.50	2.6	0.232	0.167	0.209	0.065	0.67	393.33
59	885	14.75	2.6	0.232	0.164	0.209	0.068	0.70	416.82
60	900	15.00	2.5	0.223	0.162	0.201	0.061	0.63	357.68
61	915	15.25	2.4	0.214	0.159	0.193	0.055	0.56	298.20

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
62	930	15.50	2.3	0.205	0.157	0.185	0.049	0.50	238.37
63	945	15.75	1.9	0.169	0.154	0.153	0.015	0.16	0.00
64	960	16.00	1.9	0.169	0.152	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.150	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.145	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.143	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.141	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.139	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.137	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.133	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.131	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.129	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.127	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.125	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.122	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.117	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.114	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.113	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.109	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.108	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.107	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.106	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.104	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13560.19
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5367.00
PEAK FLOW (cfs)	1.29

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	50	50	70	-	465.00	-	0.00
2	10	0.17	50	50	70	-	465.00	-	0.00
3	15	0.14	42	42	70	-	465.00	-	0.00
4	20	0.19	58	58	70	-	465.00	-	0.00
5	25	0.19	58	58	70	-	465.00	-	0.00
6	30	0.19	58	58	70	-	465.00	-	0.00
7	35	0.19	58	58	70	-	465.00	-	0.00
8	40	0.19	58	58	70	-	465.00	-	0.00
9	45	0.19	58	58	70	-	465.00	-	0.00
10	50	0.19	58	58	70	-	465.00	-	0.00
11	55	0.20	61	61	70	-	465.00	-	0.00
12	60	0.19	58	58	70	-	465.00	-	0.00
13	65	0.71	212	212	70	142	465.01	142	0.00
14	70	0.71	212	353	70	284	465.02	284	0.01
15	75	0.71	212	495	70	425	465.03	425	0.01
16	80	0.45	135	560	70	490	465.03	490	0.01
17	85	1.22	365	855	70	786	465.05	786	0.02
18	90	1.34	403	1,189	70	1,119	465.07	1,119	0.03
19	95	0.96	288	1,408	70	1,338	465.08	1,338	0.03
20	100	1.34	403	1,741	70	1,672	465.11	1,672	0.04
21	105	2.11	634	2,305	70	2,235	465.14	2,235	0.05
22	110	1.86	557	2,792	70	2,723	465.17	2,723	0.06
23	115	1.60	480	3,203	70	3,133	465.20	3,133	0.07
24	120	1.73	519	3,652	70	3,582	465.23	3,582	0.08
25	125	1.86	557	4,139	70	4,069	465.26	4,069	0.09
26	130	3.26	979	5,048	70	4,978	465.32	4,978	0.11
27	135	4.29	1,286	6,264	70	6,195	465.39	6,195	0.14
28	140	2.37	710	6,905	70	6,835	465.43	6,835	0.16
29	145	6.59	1,977	8,812	70	8,742	465.55	8,742	0.20
30	150	7.23	2,169	10,911	70	10,841	465.69	10,841	0.25
31	155	8.38	2,514	13,355	70	13,286	465.84	13,286	0.30
32	160	5.44	1,631	14,917	70	14,847	465.94	14,847	0.34
33	165	0.45	135	14,982	70	14,912	465.94	14,912	0.34
34	170	0.19	58	14,970	70	14,901	465.94	14,901	0.34
35	175	0.19	58	14,959	70	14,889	465.94	14,889	0.34
36	180	0.08	23	14,912	70	14,842	465.94	14,842	0.34

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	25	25	70	-	465.00	-	0.00
2	10	0.10	30	30	70	-	465.00	-	0.00
3	15	0.10	30	30	70	-	465.00	-	0.00
4	20	0.10	30	30	70	-	465.00	-	0.00
5	25	0.10	30	30	70	-	465.00	-	0.00
6	30	0.12	35	35	70	-	465.00	-	0.00
7	35	0.12	35	35	70	-	465.00	-	0.00
8	40	0.12	35	35	70	-	465.00	-	0.00
9	45	0.12	35	35	70	-	465.00	-	0.00
10	50	0.12	35	35	70	-	465.00	-	0.00
11	55	0.12	35	35	70	-	465.00	-	0.00
12	60	0.13	40	40	70	-	465.00	-	0.00
13	65	0.13	40	40	70	-	465.00	-	0.00
14	70	0.13	40	40	70	-	465.00	-	0.00
15	75	0.13	40	40	70	-	465.00	-	0.00
16	80	0.13	40	40	70	-	465.00	-	0.00
17	85	0.13	40	40	70	-	465.00	-	0.00
18	90	0.13	40	40	70	-	465.00	-	0.00
19	95	0.13	40	40	70	-	465.00	-	0.00
20	100	0.13	40	40	70	-	465.00	-	0.00
21	105	0.13	40	40	70	-	465.00	-	0.00
22	110	0.13	40	40	70	-	465.00	-	0.00
23	115	0.13	40	40	70	-	465.00	-	0.00
24	120	0.15	45	45	70	-	465.00	-	0.00
25	125	0.13	40	40	70	-	465.00	-	0.00
26	130	0.15	45	45	70	-	465.00	-	0.00
27	135	0.15	45	45	70	-	465.00	-	0.00
28	140	0.15	45	45	70	-	465.00	-	0.00
29	145	0.15	45	45	70	-	465.00	-	0.00
30	150	0.15	45	45	70	-	465.00	-	0.00
31	155	0.15	45	45	70	-	465.00	-	0.00
32	160	0.15	45	45	70	-	465.00	-	0.00
33	165	0.17	50	50	70	-	465.00	-	0.00
34	170	0.17	50	50	70	-	465.00	-	0.00
35	175	0.17	50	50	70	-	465.00	-	0.00
36	180	0.17	50	50	70	-	465.00	-	0.00
37	185	0.17	50	50	70	-	465.00	-	0.00
38	190	0.18	55	55	70	-	465.00	-	0.00
39	195	0.18	55	55	70	-	465.00	-	0.00
40	200	0.18	55	55	70	-	465.00	-	0.00
41	205	0.20	60	60	70	-	465.00	-	0.00
42	210	0.07	20	20	70	-	465.00	-	0.00
43	215	0.23	70	70	70	0	465.00	0	0.00
44	220	0.23	70	70	70	0	465.00	0	0.00
45	225	0.40	120	120	70	50	465.00	50	0.00
46	230	0.40	120	171	70	101	465.01	101	0.00
47	235	0.57	170	271	70	201	465.01	201	0.00
48	240	0.57	170	371	70	302	465.02	302	0.01
49	245	0.73	220	522	70	452	465.03	452	0.01
50	250	0.90	271	723	70	653	465.04	653	0.01
51	255	1.07	321	974	70	904	465.06	904	0.02
52	260	1.24	371	1,275	70	1,205	465.08	1,205	0.03
53	265	1.40	421	1,626	70	1,557	465.10	1,557	0.04
54	270	1.40	421	1,978	70	1,908	465.12	1,908	0.04
55	275	1.57	471	2,379	70	2,310	465.15	2,310	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.74	522	2,831	70	2,761	465.17	2,761	0.06
57	285	1.91	572	3,333	70	3,263	465.21	3,263	0.07
58	290	1.91	572	3,835	70	3,765	465.24	3,765	0.09
59	295	2.07	622	4,387	70	4,317	465.27	4,317	0.10
60	300	2.24	672	4,989	70	4,920	465.31	4,920	0.11
61	305	3.08	923	5,843	70	5,773	465.37	5,773	0.13
62	310	3.91	1,174	6,947	70	6,877	465.44	6,877	0.16
63	315	4.41	1,324	8,201	70	8,132	465.51	8,132	0.19
64	320	4.92	1,475	9,607	70	9,537	465.60	9,537	0.22
65	325	5.75	1,726	11,263	70	11,193	465.71	11,193	0.26
66	330	7.26	2,178	13,371	70	13,301	465.84	13,301	0.31
67	335	1.07	321	13,622	70	13,552	465.86	13,552	0.31
68	340	0.15	45	13,597	70	13,527	465.86	13,527	0.31
69	345	0.10	30	13,557	70	13,488	465.85	13,488	0.31
70	350	0.08	25	13,513	70	13,443	465.85	13,443	0.31
71	355	0.05	15	13,458	70	13,388	465.85	13,388	0.31
72	360	0.03	10	13,398	70	13,328	465.84	13,328	0.31

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	209	-	465.00	-	0.00
2	30	0.03	25	25	209	-	465.00	-	0.00
3	45	0.03	25	25	209	-	465.00	-	0.00
4	60	0.04	33	33	209	-	465.00	-	0.00
5	75	0.03	25	25	209	-	465.00	-	0.00
6	90	0.03	25	25	209	-	465.00	-	0.00
7	105	0.03	25	25	209	-	465.00	-	0.00
8	120	0.04	33	33	209	-	465.00	-	0.00
9	135	0.04	33	33	209	-	465.00	-	0.00
10	150	0.04	33	33	209	-	465.00	-	0.00
11	165	0.05	41	41	209	-	465.00	-	0.00
12	180	0.05	41	41	209	-	465.00	-	0.00
13	195	0.05	41	41	209	-	465.00	-	0.00
14	210	0.05	41	41	209	-	465.00	-	0.00
15	225	0.05	41	41	209	-	465.00	-	0.00
16	240	0.05	49	49	209	-	465.00	-	0.00
17	255	0.05	49	49	209	-	465.00	-	0.00
18	270	0.06	58	58	209	-	465.00	-	0.00
19	285	0.06	58	58	209	-	465.00	-	0.00
20	300	0.07	66	66	209	-	465.00	-	0.00
21	315	0.05	49	49	209	-	465.00	-	0.00
22	330	0.06	58	58	209	-	465.00	-	0.00
23	345	0.07	66	66	209	-	465.00	-	0.00
24	360	0.07	66	66	209	-	465.00	-	0.00
25	375	0.08	74	74	209	-	465.00	-	0.00
26	390	0.08	74	74	209	-	465.00	-	0.00
27	405	0.09	82	82	209	-	465.00	-	0.00
28	420	0.09	82	82	209	-	465.00	-	0.00
29	435	0.09	82	82	209	-	465.00	-	0.00
30	450	0.10	91	91	209	-	465.00	-	0.00
31	465	0.11	99	99	209	-	465.00	-	0.00
32	480	0.12	107	107	209	-	465.00	-	0.00
33	495	0.14	123	123	209	-	465.00	-	0.00
34	510	0.14	123	123	209	-	465.00	-	0.00
35	525	0.15	132	132	209	-	465.00	-	0.00
36	540	0.16	140	140	209	-	465.00	-	0.00
37	555	0.17	156	156	209	-	465.00	-	0.00
38	570	0.18	165	165	209	-	465.00	-	0.00
39	585	0.19	173	173	209	-	465.00	-	0.00
40	600	0.20	181	181	209	-	465.00	-	0.00
41	615	0.14	123	123	209	-	465.00	-	0.00
42	630	0.14	123	123	209	-	465.00	-	0.00
43	645	0.18	165	165	209	-	465.00	-	0.00
44	660	0.18	165	165	209	-	465.00	-	0.00
45	675	0.17	156	156	209	-	465.00	-	0.00
46	690	0.17	156	156	209	-	465.00	-	0.00
47	705	0.16	140	140	209	-	465.00	-	0.00
48	720	0.16	148	148	209	-	465.00	-	0.00
49	735	0.33	294	294	209	85	465.01	85	0.00
50	750	0.45	403	488	209	278	465.02	278	0.01
51	765	0.66	594	872	209	663	465.04	663	0.02
52	780	0.78	702	1,364	209	1,155	465.07	1,155	0.03
53	795	1.27	1,139	2,293	209	2,084	465.13	2,084	0.05
54	810	1.29	1,164	3,248	209	3,038	465.19	3,038	0.07
55	825	0.31	283	3,322	209	3,112	465.20	3,112	0.07
56	840	0.34	308	3,420	209	3,211	465.20	3,211	0.07
57	855	0.73	661	3,872	209	3,663	465.23	3,663	0.08
58	870	0.67	603	4,265	209	4,056	465.26	4,056	0.09

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.70	626	4,682	209	4,473	465.28	4,473	0.10
60	900	0.63	567	5,040	209	4,830	465.31	4,830	0.11
61	915	0.56	508	5,338	209	5,129	465.32	5,129	0.12
62	930	0.50	448	5,576	209	5,367	465.34	5,367	0.12
63	945	0.16	141	5,508	209	5,298	465.34	5,298	0.12
64	960	0.18	162	5,461	209	5,251	465.33	5,251	0.12
65	975	0.04	33	5,284	209	5,075	465.32	5,075	0.12
66	990	0.04	33	5,108	209	4,898	465.31	4,898	0.11
67	1005	0.03	25	4,923	209	4,714	465.30	4,714	0.11
68	1020	0.03	25	4,738	209	4,529	465.29	4,529	0.10
69	1035	0.05	41	4,570	209	4,361	465.28	4,361	0.10
70	1050	0.05	41	4,402	209	4,193	465.27	4,193	0.10
71	1065	0.05	41	4,234	209	4,024	465.25	4,024	0.09
72	1080	0.04	33	4,057	209	3,848	465.24	3,848	0.09
73	1095	0.04	33	3,881	209	3,671	465.23	3,671	0.08
74	1110	0.04	33	3,704	209	3,495	465.22	3,495	0.08
75	1125	0.03	25	3,520	209	3,310	465.21	3,310	0.08
76	1140	0.02	16	3,327	209	3,117	465.20	3,117	0.07
77	1155	0.03	25	3,142	209	2,933	465.19	2,933	0.07
78	1170	0.04	33	2,966	209	2,756	465.17	2,756	0.06
79	1185	0.03	25	2,781	209	2,572	465.16	2,572	0.06
80	1200	0.02	16	2,588	209	2,379	465.15	2,379	0.05
81	1215	0.03	25	2,403	209	2,194	465.14	2,194	0.05
82	1230	0.03	25	2,219	209	2,009	465.13	2,009	0.05
83	1245	0.03	25	2,034	209	1,825	465.12	1,825	0.04
84	1260	0.02	16	1,841	209	1,632	465.10	1,632	0.04
85	1275	0.03	25	1,656	209	1,447	465.09	1,447	0.03
86	1290	0.02	16	1,463	209	1,254	465.08	1,254	0.03
87	1305	0.03	25	1,279	209	1,069	465.07	1,069	0.02
88	1320	0.02	16	1,086	209	876	465.06	876	0.02
89	1335	0.03	25	901	209	692	465.04	692	0.02
90	1350	0.02	16	708	209	499	465.03	499	0.01
91	1365	0.02	16	515	209	306	465.02	306	0.01
92	1380	0.02	16	322	209	113	465.01	113	0.00
93	1395	0.02	16	129	209	-	465.00	-	0.00
94	1410	0.02	16	16	209	-	465.00	-	0.00
95	1425	0.02	16	16	209	-	465.00	-	0.00
96	1440	0.02	16	16	209	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.790	1.00	1.04	1.36	9.790	1.00	1.36	2.23	9.790	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	1.04	SUM [9]	9.79	SUM [11]	1.36	SUM [13]	9.79	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.47	0.37
FLOOD VOLUME	(cu-ft)	16,627	16,600	13,067
	(acre-ft)	0.38	0.38	0.30
REQUIRED STORAGE	(cu-ft)	14,362	13,085	5,344
	(acre-ft)	0.33	0.30	0.12
PEAK FLOW	(cfs)	8.01	6.94	1.24
MAXIMUM WSEL	(ft)	465.49	465.40	464.87

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603
C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.20	0.15	0.02	0.16	0.00
2	10	0.17	1.3	0.162	0.20	0.15	0.02	0.16	0.00
3	15	0.25	1.1	0.137	0.20	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.20	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.20	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.20	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.20	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.20	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.20	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.20	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.20	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.20	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.20	0.25	0.07	0.68	141.06
14	70	1.17	2.2	0.275	0.20	0.25	0.07	0.68	141.06
15	75	1.25	2.2	0.275	0.20	0.25	0.07	0.68	141.06
16	80	1.33	2.0	0.250	0.20	0.22	0.04	0.44	67.75
17	85	1.42	2.6	0.324	0.20	0.29	0.12	1.17	287.67
18	90	1.50	2.7	0.337	0.20	0.30	0.13	1.29	324.33
19	95	1.58	2.4	0.300	0.20	0.27	0.09	0.93	214.37
20	100	1.67	2.7	0.337	0.20	0.30	0.13	1.29	324.33
21	105	1.75	3.3	0.412	0.20	0.37	0.21	2.03	544.25
22	110	1.83	3.1	0.387	0.20	0.35	0.18	1.78	470.94
23	115	1.92	2.9	0.362	0.20	0.33	0.16	1.54	397.63
24	120	2.00	3.0	0.374	0.20	0.34	0.17	1.66	434.29
25	125	2.08	3.1	0.387	0.20	0.35	0.18	1.78	470.94
26	130	2.17	4.2	0.524	0.20	0.47	0.32	3.13	874.13
27	135	2.25	5.0	0.624	0.20	0.56	0.42	4.10	1167.36
28	140	2.33	3.5	0.437	0.20	0.39	0.23	2.27	617.56
29	145	2.42	6.8	0.849	0.20	0.76	0.64	6.30	1827.13
30	150	2.50	7.3	0.911	0.20	0.82	0.71	6.91	2010.40
31	155	2.58	8.2	1.023	0.20	0.92	0.82	8.01	2340.28
32	160	2.67	5.9	0.736	0.20	0.66	0.53	5.20	1497.25
33	165	2.75	2.0	0.250	0.20	0.22	0.04	0.44	67.75
34	170	2.83	1.8	0.225	0.20	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.20	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.20	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16626.67
REQUIRED STORAGE (acft)	0.33
REQUIRED STORAGE (cuft)	14361.53
PEAK FLOW RATE (cfs)	8.01

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.20	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.20	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.20	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.20	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.20	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.20	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.20	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.20	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.20	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.20	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.20	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.20	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.20	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.20	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.20	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.20	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.20	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.20	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.20	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.20	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.20	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.20	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.20	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.20	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.20	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.20	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.20	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.20	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.20	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.20	0.15	0.02	0.16	0.00
34	170	2.83	1.0	0.163	0.20	0.15	0.02	0.16	0.00
35	175	2.92	1.0	0.163	0.20	0.15	0.02	0.16	0.00
36	180	3.00	1.0	0.163	0.20	0.15	0.02	0.16	0.00
37	185	3.08	1.0	0.163	0.20	0.15	0.02	0.16	0.00
38	190	3.17	1.1	0.180	0.20	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.20	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.20	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.20	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.20	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.20	0.21	0.02	0.23	5.72
44	220	3.67	1.4	0.228	0.20	0.21	0.02	0.23	5.72
45	225	3.75	1.5	0.245	0.20	0.22	0.04	0.39	53.65
46	230	3.83	1.5	0.245	0.20	0.22	0.04	0.39	53.65
47	235	3.92	1.6	0.261	0.20	0.24	0.06	0.55	101.58
48	240	4.00	1.6	0.261	0.20	0.24	0.06	0.55	101.58
49	245	4.08	1.7	0.277	0.20	0.25	0.07	0.71	149.52
50	250	4.17	1.8	0.294	0.20	0.26	0.09	0.87	197.45
51	255	4.25	1.9	0.310	0.20	0.28	0.11	1.03	245.38
52	260	4.33	2.0	0.326	0.20	0.29	0.12	1.19	293.31
53	265	4.42	2.1	0.343	0.20	0.31	0.14	1.35	341.24
54	270	4.50	2.1	0.343	0.20	0.31	0.14	1.35	341.24
55	275	4.58	2.2	0.359	0.20	0.32	0.15	1.51	389.18
56	280	4.67	2.3	0.375	0.20	0.34	0.17	1.67	437.11

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.20	0.35	0.19	1.83	485.04
58	290	4.83	2.4	0.392	0.20	0.35	0.19	1.83	485.04
59	295	4.92	2.5	0.408	0.20	0.37	0.20	1.99	532.97
60	300	5.00	2.6	0.424	0.20	0.38	0.22	2.15	580.90
61	305	5.08	3.1	0.506	0.20	0.46	0.30	2.95	820.56
62	310	5.17	3.6	0.588	0.20	0.53	0.38	3.75	1060.22
63	315	5.25	3.9	0.636	0.20	0.57	0.43	4.23	1204.02
64	320	5.33	4.2	0.685	0.20	0.62	0.48	4.71	1347.81
65	325	5.42	4.7	0.767	0.20	0.69	0.56	5.50	1587.47
66	330	5.50	5.6	0.914	0.20	0.82	0.71	6.94	2018.86
67	335	5.58	1.9	0.310	0.20	0.28	0.11	1.03	245.38
68	340	5.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.20	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.20	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.20	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.20	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16599.70
REQUIRED STORAGE (acft)	0.30
REQUIRED STORAGE (cuft)	13084.61
PEAK FLOW RATE (cfs)	6.94

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.018	0.362	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.357	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.353	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.349	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.345	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.341	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.337	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.333	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.329	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.325	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.321	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.317	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.313	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.309	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.305	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.301	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.297	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.294	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.290	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.286	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.282	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.279	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.275	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.272	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.268	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.264	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.261	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.257	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.254	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.250	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.247	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.243	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.240	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.237	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.233	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.230	0.136	0.015	0.15	0.00
37	555	9.25	1.9	0.169	0.227	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.224	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.220	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.217	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.214	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.211	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.208	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.205	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.202	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.199	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.196	0.136	0.015	0.15	0.00
48	720	12.00	1.8	0.161	0.193	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.190	0.201	0.033	0.32	97.34
50	750	12.50	2.6	0.232	0.187	0.209	0.045	0.44	201.03
51	765	12.75	2.8	0.250	0.185	0.225	0.065	0.64	383.03
52	780	13.00	2.9	0.259	0.182	0.233	0.077	0.75	486.13
53	795	13.25	3.4	0.303	0.179	0.273	0.124	1.22	903.31
54	810	13.50	3.4	0.303	0.176	0.273	0.127	1.24	927.21
55	825	13.75	2.3	0.205	0.174	0.185	0.032	0.31	86.27
56	840	14.00	2.3	0.205	0.171	0.185	0.034	0.33	109.55
57	855	14.25	2.7	0.241	0.168	0.217	0.072	0.71	446.90
58	870	14.50	2.6	0.232	0.166	0.209	0.066	0.65	390.96
59	885	14.75	2.6	0.232	0.163	0.209	0.069	0.67	413.29
60	900	15.00	2.5	0.223	0.161	0.201	0.062	0.61	356.70
61	915	15.25	2.4	0.214	0.158	0.193	0.056	0.55	299.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr				
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.156	0.185	0.049	0.48	242.53
63	945	15.75	1.9	0.169	0.153	0.153	0.016	0.16	0.00
64	960	16.00	1.9	0.169	0.151	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.149	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.144	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.142	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.140	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.138	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.136	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.132	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.130	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.128	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.126	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.124	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.119	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.116	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.107	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.106	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.105	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.103	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.102	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.37
FLOOD VOLUME (acft)	0.30
FLOOD VOLUME (cuft)	13066.60
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5344.02
PEAK FLOW (cfs)	1.24

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	48	48	64	-	464.50	-	0.00
2	10	0.16	48	48	64	-	464.50	-	0.00
3	15	0.13	40	40	64	-	464.50	-	0.00
4	20	0.18	55	55	64	-	464.50	-	0.00
5	25	0.18	55	55	64	-	464.50	-	0.00
6	30	0.19	58	58	64	-	464.50	-	0.00
7	35	0.18	55	55	64	-	464.50	-	0.00
8	40	0.19	58	58	64	-	464.50	-	0.00
9	45	0.19	58	58	64	-	464.50	-	0.00
10	50	0.18	55	55	64	-	464.50	-	0.00
11	55	0.20	59	59	64	-	464.50	-	0.00
12	60	0.19	58	58	64	-	464.50	-	0.00
13	65	0.68	205	205	64	141	464.51	141	0.00
14	70	0.68	205	346	64	282	464.52	282	0.01
15	75	0.68	205	487	64	423	464.53	423	0.01
16	80	0.44	132	555	64	491	464.53	491	0.01
17	85	1.17	352	842	64	779	464.55	779	0.02
18	90	1.29	388	1,167	64	1,103	464.58	1,103	0.03
19	95	0.93	278	1,381	64	1,317	464.59	1,317	0.03
20	100	1.29	388	1,705	64	1,642	464.61	1,642	0.04
21	105	2.03	608	2,250	64	2,186	464.65	2,186	0.05
22	110	1.78	535	2,721	64	2,657	464.68	2,657	0.06
23	115	1.54	462	3,118	64	3,054	464.71	3,054	0.07
24	120	1.66	498	3,553	64	3,489	464.74	3,489	0.08
25	125	1.78	535	4,024	64	3,960	464.77	3,960	0.09
26	130	3.13	938	4,898	64	4,834	464.83	4,834	0.11
27	135	4.10	1,231	6,065	64	6,001	464.91	6,001	0.14
28	140	2.27	681	6,683	64	6,619	464.96	6,619	0.15
29	145	6.30	1,891	8,510	64	8,446	465.08	8,446	0.19
30	150	6.91	2,074	10,520	64	10,456	465.22	10,456	0.24
31	155	8.01	2,404	12,860	64	12,797	465.38	12,797	0.29
32	160	5.20	1,561	14,358	64	14,294	465.49	14,294	0.33
33	165	0.44	132	14,425	64	14,362	465.49	14,362	0.33
34	170	0.19	58	14,420	64	14,356	465.49	14,356	0.33
35	175	0.19	58	14,414	64	14,350	465.49	14,350	0.33
36	180	0.07	22	14,372	64	14,309	465.49	14,309	0.33

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	24	24	64	-	464.50	-	0.00
2	10	0.10	29	29	64	-	464.50	-	0.00
3	15	0.10	29	29	64	-	464.50	-	0.00
4	20	0.10	29	29	64	-	464.50	-	0.00
5	25	0.10	29	29	64	-	464.50	-	0.00
6	30	0.11	34	34	64	-	464.50	-	0.00
7	35	0.11	34	34	64	-	464.50	-	0.00
8	40	0.11	34	34	64	-	464.50	-	0.00
9	45	0.11	34	34	64	-	464.50	-	0.00
10	50	0.11	34	34	64	-	464.50	-	0.00
11	55	0.11	34	34	64	-	464.50	-	0.00
12	60	0.13	38	38	64	-	464.50	-	0.00
13	65	0.13	38	38	64	-	464.50	-	0.00
14	70	0.13	38	38	64	-	464.50	-	0.00
15	75	0.13	38	38	64	-	464.50	-	0.00
16	80	0.13	38	38	64	-	464.50	-	0.00
17	85	0.13	38	38	64	-	464.50	-	0.00
18	90	0.13	38	38	64	-	464.50	-	0.00
19	95	0.13	38	38	64	-	464.50	-	0.00
20	100	0.13	38	38	64	-	464.50	-	0.00
21	105	0.13	38	38	64	-	464.50	-	0.00
22	110	0.13	38	38	64	-	464.50	-	0.00
23	115	0.13	38	38	64	-	464.50	-	0.00
24	120	0.14	43	43	64	-	464.50	-	0.00
25	125	0.13	38	38	64	-	464.50	-	0.00
26	130	0.14	43	43	64	-	464.50	-	0.00
27	135	0.14	43	43	64	-	464.50	-	0.00
28	140	0.14	43	43	64	-	464.50	-	0.00
29	145	0.14	43	43	64	-	464.50	-	0.00
30	150	0.14	43	43	64	-	464.50	-	0.00
31	155	0.14	43	43	64	-	464.50	-	0.00
32	160	0.14	43	43	64	-	464.50	-	0.00
33	165	0.16	48	48	64	-	464.50	-	0.00
34	170	0.16	48	48	64	-	464.50	-	0.00
35	175	0.16	48	48	64	-	464.50	-	0.00
36	180	0.16	48	48	64	-	464.50	-	0.00
37	185	0.16	48	48	64	-	464.50	-	0.00
38	190	0.18	53	53	64	-	464.50	-	0.00
39	195	0.18	53	53	64	-	464.50	-	0.00
40	200	0.18	53	53	64	-	464.50	-	0.00
41	205	0.19	58	58	64	-	464.50	-	0.00
42	210	0.07	22	22	64	-	464.50	-	0.00
43	215	0.23	70	70	64	6	464.50	6	0.00
44	220	0.23	70	75	64	11	464.50	11	0.00
45	225	0.39	118	129	64	65	464.50	65	0.00
46	230	0.39	118	183	64	119	464.51	119	0.00
47	235	0.55	165	284	64	220	464.52	220	0.01
48	240	0.55	165	386	64	322	464.52	322	0.01
49	245	0.71	213	535	64	471	464.53	471	0.01
50	250	0.87	261	733	64	669	464.55	669	0.02
51	255	1.03	309	978	64	914	464.56	914	0.02
52	260	1.19	357	1,271	64	1,208	464.58	1,208	0.03
53	265	1.35	405	1,613	64	1,549	464.61	1,549	0.04
54	270	1.35	405	1,954	64	1,890	464.63	1,890	0.04
55	275	1.51	453	2,343	64	2,279	464.66	2,279	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.67	501	2,780	64	2,716	464.69	2,716	0.06
57	285	1.83	549	3,265	64	3,201	464.72	3,201	0.07
58	290	1.83	549	3,750	64	3,686	464.75	3,686	0.08
59	295	1.99	597	4,283	64	4,219	464.79	4,219	0.10
60	300	2.15	645	4,864	64	4,800	464.83	4,800	0.11
61	305	2.95	884	5,685	64	5,621	464.89	5,621	0.13
62	310	3.75	1,124	6,745	64	6,681	464.96	6,681	0.15
63	315	4.23	1,268	7,949	64	7,885	465.05	7,885	0.18
64	320	4.71	1,412	9,297	64	9,233	465.14	9,233	0.21
65	325	5.50	1,651	10,884	64	10,820	465.25	10,820	0.25
66	330	6.94	2,083	12,903	64	12,839	465.39	12,839	0.29
67	335	1.03	309	13,148	64	13,085	465.40	13,085	0.30
68	340	0.14	43	13,128	64	13,064	465.40	13,064	0.30
69	345	0.10	29	13,093	64	13,029	465.40	13,029	0.30
70	350	0.08	24	13,053	64	12,989	465.40	12,989	0.30
71	355	0.05	14	13,003	64	12,939	465.39	12,939	0.30
72	360	0.03	10	12,949	64	12,885	465.39	12,885	0.30

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	192	-	464.50	-	0.00
2	30	0.03	24	24	192	-	464.50	-	0.00
3	45	0.03	24	24	192	-	464.50	-	0.00
4	60	0.03	31	31	192	-	464.50	-	0.00
5	75	0.03	24	24	192	-	464.50	-	0.00
6	90	0.03	24	24	192	-	464.50	-	0.00
7	105	0.03	24	24	192	-	464.50	-	0.00
8	120	0.03	31	31	192	-	464.50	-	0.00
9	135	0.03	31	31	192	-	464.50	-	0.00
10	150	0.03	31	31	192	-	464.50	-	0.00
11	165	0.04	39	39	192	-	464.50	-	0.00
12	180	0.04	39	39	192	-	464.50	-	0.00
13	195	0.04	39	39	192	-	464.50	-	0.00
14	210	0.04	39	39	192	-	464.50	-	0.00
15	225	0.04	39	39	192	-	464.50	-	0.00
16	240	0.05	47	47	192	-	464.50	-	0.00
17	255	0.05	47	47	192	-	464.50	-	0.00
18	270	0.06	55	55	192	-	464.50	-	0.00
19	285	0.06	55	55	192	-	464.50	-	0.00
20	300	0.07	63	63	192	-	464.50	-	0.00
21	315	0.05	47	47	192	-	464.50	-	0.00
22	330	0.06	55	55	192	-	464.50	-	0.00
23	345	0.07	63	63	192	-	464.50	-	0.00
24	360	0.07	63	63	192	-	464.50	-	0.00
25	375	0.08	71	71	192	-	464.50	-	0.00
26	390	0.08	71	71	192	-	464.50	-	0.00
27	405	0.09	79	79	192	-	464.50	-	0.00
28	420	0.09	79	79	192	-	464.50	-	0.00
29	435	0.09	79	79	192	-	464.50	-	0.00
30	450	0.10	86	86	192	-	464.50	-	0.00
31	465	0.10	94	94	192	-	464.50	-	0.00
32	480	0.11	102	102	192	-	464.50	-	0.00
33	495	0.13	118	118	192	-	464.50	-	0.00
34	510	0.13	118	118	192	-	464.50	-	0.00
35	525	0.14	126	126	192	-	464.50	-	0.00
36	540	0.15	134	134	192	-	464.50	-	0.00
37	555	0.17	149	149	192	-	464.50	-	0.00
38	570	0.17	157	157	192	-	464.50	-	0.00
39	585	0.18	165	165	192	-	464.50	-	0.00
40	600	0.19	173	173	192	-	464.50	-	0.00
41	615	0.13	118	118	192	-	464.50	-	0.00
42	630	0.13	118	118	192	-	464.50	-	0.00
43	645	0.17	157	157	192	-	464.50	-	0.00
44	660	0.17	157	157	192	-	464.50	-	0.00
45	675	0.17	149	149	192	-	464.50	-	0.00
46	690	0.17	149	149	192	-	464.50	-	0.00
47	705	0.15	134	134	192	-	464.50	-	0.00
48	720	0.16	141	141	192	-	464.50	-	0.00
49	735	0.32	289	289	192	97	464.51	97	0.00
50	750	0.44	393	490	192	298	464.52	298	0.01
51	765	0.64	575	873	192	681	464.55	681	0.02
52	780	0.75	678	1,359	192	1,168	464.58	1,168	0.03
53	795	1.22	1,095	2,262	192	2,071	464.64	2,071	0.05
54	810	1.24	1,119	3,190	192	2,998	464.71	2,998	0.07
55	825	0.31	278	3,276	192	3,084	464.71	3,084	0.07
56	840	0.33	301	3,386	192	3,194	464.72	3,194	0.07
57	855	0.71	639	3,832	192	3,641	464.75	3,641	0.08
58	870	0.65	583	4,223	192	4,032	464.78	4,032	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.67	605	4,637	192	4,445	464.81	4,445	0.10
60	900	0.61	548	4,993	192	4,802	464.83	4,802	0.11
61	915	0.55	491	5,293	192	5,101	464.85	5,101	0.12
62	930	0.48	434	5,536	192	5,344	464.87	5,344	0.12
63	945	0.16	141	5,485	192	5,293	464.87	5,293	0.12
64	960	0.18	161	5,455	192	5,263	464.86	5,263	0.12
65	975	0.03	31	5,294	192	5,103	464.85	5,103	0.12
66	990	0.03	31	5,134	192	4,943	464.84	4,943	0.11
67	1005	0.03	24	4,966	192	4,775	464.83	4,775	0.11
68	1020	0.03	24	4,798	192	4,606	464.82	4,606	0.11
69	1035	0.04	39	4,646	192	4,454	464.81	4,454	0.10
70	1050	0.04	39	4,493	192	4,302	464.80	4,302	0.10
71	1065	0.04	39	4,341	192	4,149	464.79	4,149	0.10
72	1080	0.03	31	4,181	192	3,989	464.78	3,989	0.09
73	1095	0.03	31	4,021	192	3,829	464.76	3,829	0.09
74	1110	0.03	31	3,860	192	3,669	464.75	3,669	0.08
75	1125	0.03	24	3,692	192	3,501	464.74	3,501	0.08
76	1140	0.02	16	3,516	192	3,325	464.73	3,325	0.08
77	1155	0.03	24	3,348	192	3,157	464.72	3,157	0.07
78	1170	0.03	31	3,188	192	2,996	464.71	2,996	0.07
79	1185	0.03	24	3,020	192	2,828	464.70	2,828	0.06
80	1200	0.02	16	2,844	192	2,652	464.68	2,652	0.06
81	1215	0.03	24	2,676	192	2,484	464.67	2,484	0.06
82	1230	0.03	24	2,508	192	2,316	464.66	2,316	0.05
83	1245	0.03	24	2,340	192	2,148	464.65	2,148	0.05
84	1260	0.02	16	2,164	192	1,972	464.64	1,972	0.05
85	1275	0.03	24	1,996	192	1,804	464.62	1,804	0.04
86	1290	0.02	16	1,820	192	1,628	464.61	1,628	0.04
87	1305	0.03	24	1,652	192	1,460	464.60	1,460	0.03
88	1320	0.02	16	1,476	192	1,284	464.59	1,284	0.03
89	1335	0.03	24	1,308	192	1,116	464.58	1,116	0.03
90	1350	0.02	16	1,132	192	940	464.57	940	0.02
91	1365	0.02	16	956	192	764	464.55	764	0.02
92	1380	0.02	16	780	192	588	464.54	588	0.01
93	1395	0.02	16	604	192	413	464.53	413	0.01
94	1410	0.02	16	428	192	237	464.52	237	0.01
95	1425	0.02	16	252	192	61	464.50	61	0.00
96	1440	0.02	16	76	192	-	464.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.490	1.00	1.04	1.36	9.490	1.00	1.36	2.23	9.490	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	1.04	SUM [9]	9.49	SUM [11]	1.36	SUM [13]	9.49	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.36	0.35	0.22
FLOOD VOLUME	(cu-ft)	12,335	12,150	7,524
	(acre-ft)	0.28	0.28	0.17
REQUIRED STORAGE	(cu-ft)	9,965	8,400	646
	(acre-ft)	0.23	0.19	0.01
PEAK FLOW	(cfs)	7.12	6.08	0.65
MAXIMUM WSEL	(ft)	464.04	463.95	463.53

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767
C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.04		
CONSTANT LOSS RATE-in/hr	0.27		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.27	0.15	0.02	0.15	0.00
2	10	0.17	1.3	0.162	0.27	0.15	0.02	0.15	0.00
3	15	0.25	1.1	0.137	0.27	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.27	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.27	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.27	0.20	0.02	0.21	0.00
7	35	0.58	1.5	0.187	0.27	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.27	0.20	0.02	0.21	0.00
9	45	0.75	1.8	0.225	0.27	0.20	0.02	0.21	0.00
10	50	0.83	1.5	0.187	0.27	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.27	0.18	0.02	0.19	0.00
12	60	1.00	1.8	0.225	0.27	0.20	0.02	0.21	0.00
13	65	1.08	2.2	0.275	0.27	0.25	0.00	0.02	0.00
14	70	1.17	2.2	0.275	0.27	0.25	0.00	0.02	0.00
15	75	1.25	2.2	0.275	0.27	0.25	0.00	0.02	0.00
16	80	1.33	2.0	0.250	0.27	0.22	0.02	0.24	0.00
17	85	1.42	2.6	0.324	0.27	0.29	0.05	0.49	65.03
18	90	1.50	2.7	0.337	0.27	0.30	0.06	0.61	100.56
19	95	1.58	2.4	0.300	0.27	0.27	0.03	0.25	0.00
20	100	1.67	2.7	0.337	0.27	0.30	0.06	0.61	100.56
21	105	1.75	3.3	0.412	0.27	0.37	0.14	1.32	313.75
22	110	1.83	3.1	0.387	0.27	0.35	0.11	1.08	242.69
23	115	1.92	2.9	0.362	0.27	0.33	0.09	0.85	171.63
24	120	2.00	3.0	0.374	0.27	0.34	0.10	0.96	207.16
25	125	2.08	3.1	0.387	0.27	0.35	0.11	1.08	242.69
26	130	2.17	4.2	0.524	0.27	0.47	0.25	2.38	633.52
27	135	2.25	5.0	0.624	0.27	0.56	0.35	3.33	917.77
28	140	2.33	3.5	0.437	0.27	0.39	0.16	1.56	384.81
29	145	2.42	6.8	0.849	0.27	0.76	0.58	5.46	1557.32
30	150	2.50	7.3	0.911	0.27	0.82	0.64	6.06	1734.97
31	155	2.58	8.2	1.023	0.27	0.92	0.75	7.12	2054.75
32	160	2.67	5.9	0.736	0.27	0.66	0.46	4.40	1237.54
33	165	2.75	2.0	0.250	0.27	0.22	0.02	0.24	0.00
34	170	2.83	1.8	0.225	0.27	0.20	0.02	0.21	0.00
35	175	2.92	1.8	0.225	0.27	0.20	0.02	0.21	0.00
36	180	3.00	0.6	0.075	0.27	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12334.87
REQUIRED STORAGE (acft)	0.23
REQUIRED STORAGE (cuft)	9964.74
PEAK FLOW RATE (cfs)	7.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.082	0.27	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.27	0.09	0.01	0.09	0.00
3	15	0.25	0.6	0.098	0.27	0.09	0.01	0.09	0.00
4	20	0.33	0.6	0.098	0.27	0.09	0.01	0.09	0.00
5	25	0.42	0.6	0.098	0.27	0.09	0.01	0.09	0.00
6	30	0.50	0.7	0.114	0.27	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.27	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.27	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.27	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.27	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.27	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.27	0.12	0.01	0.12	0.00
13	65	1.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
14	70	1.17	0.8	0.131	0.27	0.12	0.01	0.12	0.00
15	75	1.25	0.8	0.131	0.27	0.12	0.01	0.12	0.00
16	80	1.33	0.8	0.131	0.27	0.12	0.01	0.12	0.00
17	85	1.42	0.8	0.131	0.27	0.12	0.01	0.12	0.00
18	90	1.50	0.8	0.131	0.27	0.12	0.01	0.12	0.00
19	95	1.58	0.8	0.131	0.27	0.12	0.01	0.12	0.00
20	100	1.67	0.8	0.131	0.27	0.12	0.01	0.12	0.00
21	105	1.75	0.8	0.131	0.27	0.12	0.01	0.12	0.00
22	110	1.83	0.8	0.131	0.27	0.12	0.01	0.12	0.00
23	115	1.92	0.8	0.131	0.27	0.12	0.01	0.12	0.00
24	120	2.00	0.9	0.147	0.27	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
26	130	2.17	0.9	0.147	0.27	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.27	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.27	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.27	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.27	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.27	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.27	0.15	0.02	0.15	0.00
34	170	2.83	1.0	0.163	0.27	0.15	0.02	0.15	0.00
35	175	2.92	1.0	0.163	0.27	0.15	0.02	0.15	0.00
36	180	3.00	1.0	0.163	0.27	0.15	0.02	0.15	0.00
37	185	3.08	1.0	0.163	0.27	0.15	0.02	0.15	0.00
38	190	3.17	1.1	0.180	0.27	0.16	0.02	0.17	0.00
39	195	3.25	1.1	0.180	0.27	0.16	0.02	0.17	0.00
40	200	3.33	1.1	0.180	0.27	0.16	0.02	0.17	0.00
41	205	3.42	1.2	0.196	0.27	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.27	0.19	0.02	0.20	0.00
43	215	3.58	1.4	0.228	0.27	0.21	0.02	0.22	0.00
44	220	3.67	1.4	0.228	0.27	0.21	0.02	0.22	0.00
45	225	3.75	1.5	0.245	0.27	0.22	0.02	0.23	0.00
46	230	3.83	1.5	0.245	0.27	0.22	0.02	0.23	0.00
47	235	3.92	1.6	0.261	0.27	0.24	0.03	0.25	0.00
48	240	4.00	1.6	0.261	0.27	0.24	0.03	0.25	0.00
49	245	4.08	1.7	0.277	0.27	0.25	0.00	0.04	0.00
50	250	4.17	1.8	0.294	0.27	0.26	0.02	0.20	0.00
51	255	4.25	1.9	0.310	0.27	0.28	0.04	0.35	24.04
52	260	4.33	2.0	0.326	0.27	0.29	0.05	0.51	70.50
53	265	4.42	2.1	0.343	0.27	0.31	0.07	0.66	116.96
54	270	4.50	2.1	0.343	0.27	0.31	0.07	0.66	116.96
55	275	4.58	2.2	0.359	0.27	0.32	0.09	0.82	163.43
56	280	4.67	2.3	0.375	0.27	0.34	0.10	0.97	209.89

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.392	0.27	0.35	0.12	1.13	256.35
58	290	4.83	2.4	0.392	0.27	0.35	0.12	1.13	256.35
59	295	4.92	2.5	0.408	0.27	0.37	0.14	1.28	302.82
60	300	5.00	2.6	0.424	0.27	0.38	0.15	1.44	349.28
61	305	5.08	3.1	0.506	0.27	0.46	0.23	2.21	581.59
62	310	5.17	3.6	0.588	0.27	0.53	0.31	2.99	813.91
63	315	5.25	3.9	0.636	0.27	0.57	0.36	3.45	953.30
64	320	5.33	4.2	0.685	0.27	0.62	0.41	3.92	1092.69
65	325	5.42	4.7	0.767	0.27	0.69	0.49	4.69	1325.00
66	330	5.50	5.6	0.914	0.27	0.82	0.64	6.08	1743.17
67	335	5.58	1.9	0.310	0.27	0.28	0.04	0.35	24.04
68	340	5.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.27	0.09	0.01	0.09	0.00
70	350	5.83	0.5	0.082	0.27	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.27	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.27	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.35
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12149.95
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8400.27
PEAK FLOW RATE (cfs)	6.08

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.482	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.476	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.471	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.465	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.460	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.454	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.449	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.443	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.438	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.433	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.427	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.422	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.417	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.412	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.407	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.401	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.396	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.391	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.386	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.381	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.376	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.371	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.367	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.362	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.357	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.352	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.347	0.080	0.009	0.08	0.00
28	420	7.00	1.0	0.089	0.343	0.080	0.009	0.08	0.00
29	435	7.25	1.0	0.089	0.338	0.080	0.009	0.08	0.00
30	450	7.50	1.1	0.098	0.334	0.088	0.010	0.09	0.00
31	465	7.75	1.2	0.107	0.329	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.324	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.320	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.315	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.311	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.307	0.136	0.015	0.14	0.00
37	555	9.25	1.9	0.169	0.302	0.153	0.017	0.16	0.00
38	570	9.50	2.0	0.178	0.298	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.294	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.290	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.285	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.281	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.277	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.273	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.269	0.153	0.017	0.16	0.00
46	690	11.50	1.9	0.169	0.265	0.153	0.017	0.16	0.00
47	705	11.75	1.7	0.152	0.261	0.136	0.015	0.14	0.00
48	720	12.00	1.8	0.161	0.257	0.145	0.016	0.15	0.00
49	735	12.25	2.5	0.223	0.253	0.201	0.022	0.21	0.00
50	750	12.50	2.6	0.232	0.250	0.209	0.023	0.22	0.00
51	765	12.75	2.8	0.250	0.246	0.225	0.004	0.04	0.00
52	780	13.00	2.9	0.259	0.242	0.233	0.017	0.16	0.00
53	795	13.25	3.4	0.303	0.239	0.273	0.065	0.61	307.33
54	810	13.50	3.4	0.303	0.235	0.273	0.068	0.65	338.20
55	825	13.75	2.3	0.205	0.231	0.185	0.021	0.19	0.00
56	840	14.00	2.3	0.205	0.228	0.185	0.021	0.19	0.00
57	855	14.25	2.7	0.241	0.224	0.217	0.016	0.16	0.00
58	870	14.50	2.6	0.232	0.221	0.209	0.011	0.10	0.00
59	885	14.75	2.6	0.232	0.218	0.209	0.014	0.14	0.00
60	900	15.00	2.5	0.223	0.214	0.201	0.009	0.08	0.00
61	915	15.25	2.4	0.214	0.211	0.193	0.003	0.03	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.208	0.185	0.021	0.19	0.00
63	945	15.75	1.9	0.169	0.205	0.153	0.017	0.16	0.00
64	960	16.00	1.9	0.169	0.201	0.153	0.017	0.16	0.00
65	975	16.25	0.4	0.036	0.198	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.195	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.192	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.189	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.187	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.184	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.181	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.178	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.176	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.173	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.171	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.168	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.166	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.164	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.161	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.159	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.157	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.155	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.153	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.151	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.149	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.148	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.146	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.145	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.143	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.142	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.141	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.139	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.138	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.138	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.137	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.137	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.22
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7524.21
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	645.53
PEAK FLOW (cfs)	0.65

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.27 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	46	46	82	-	463.50	-	0.00
2	10	0.15	46	46	82	-	463.50	-	0.00
3	15	0.13	39	39	82	-	463.50	-	0.00
4	20	0.18	53	53	82	-	463.50	-	0.00
5	25	0.18	53	53	82	-	463.50	-	0.00
6	30	0.21	64	64	82	-	463.50	-	0.00
7	35	0.18	53	53	82	-	463.50	-	0.00
8	40	0.21	64	64	82	-	463.50	-	0.00
9	45	0.21	64	64	82	-	463.50	-	0.00
10	50	0.18	53	53	82	-	463.50	-	0.00
11	55	0.19	57	57	82	-	463.50	-	0.00
12	60	0.21	64	64	82	-	463.50	-	0.00
13	65	0.02	5	5	82	-	463.50	-	0.00
14	70	0.02	5	5	82	-	463.50	-	0.00
15	75	0.02	5	5	82	-	463.50	-	0.00
16	80	0.24	71	71	82	-	463.50	-	0.00
17	85	0.49	147	147	82	65	463.50	65	0.00
18	90	0.61	182	248	82	166	463.51	166	0.00
19	95	0.25	76	242	82	160	463.51	160	0.00
20	100	0.61	182	342	82	260	463.51	260	0.01
21	105	1.32	396	656	82	574	463.53	574	0.01
22	110	1.08	325	899	82	817	463.54	817	0.02
23	115	0.85	254	1,070	82	988	463.55	988	0.02
24	120	0.96	289	1,277	82	1,195	463.56	1,195	0.03
25	125	1.08	325	1,520	82	1,438	463.58	1,438	0.03
26	130	2.38	715	2,153	82	2,072	463.61	2,072	0.05
27	135	3.33	1,000	3,071	82	2,989	463.66	2,989	0.07
28	140	1.56	467	3,456	82	3,374	463.68	3,374	0.08
29	145	5.46	1,639	5,013	82	4,931	463.77	4,931	0.11
30	150	6.06	1,817	6,748	82	6,666	463.86	6,666	0.15
31	155	7.12	2,137	8,803	82	8,721	463.97	8,721	0.20
32	160	4.40	1,319	10,041	82	9,959	464.04	9,959	0.23
33	165	0.24	71	10,030	82	9,948	464.04	9,948	0.23
34	170	0.21	64	10,012	82	9,930	464.04	9,930	0.23
35	175	0.21	64	9,994	82	9,912	464.04	9,912	0.23
36	180	0.07	21	9,933	82	9,851	464.03	9,851	0.23

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	23	23	82	-	463.50	-	0.00
2	10	0.09	28	28	82	-	463.50	-	0.00
3	15	0.09	28	28	82	-	463.50	-	0.00
4	20	0.09	28	28	82	-	463.50	-	0.00
5	25	0.09	28	28	82	-	463.50	-	0.00
6	30	0.11	33	33	82	-	463.50	-	0.00
7	35	0.11	33	33	82	-	463.50	-	0.00
8	40	0.11	33	33	82	-	463.50	-	0.00
9	45	0.11	33	33	82	-	463.50	-	0.00
10	50	0.11	33	33	82	-	463.50	-	0.00
11	55	0.11	33	33	82	-	463.50	-	0.00
12	60	0.12	37	37	82	-	463.50	-	0.00
13	65	0.12	37	37	82	-	463.50	-	0.00
14	70	0.12	37	37	82	-	463.50	-	0.00
15	75	0.12	37	37	82	-	463.50	-	0.00
16	80	0.12	37	37	82	-	463.50	-	0.00
17	85	0.12	37	37	82	-	463.50	-	0.00
18	90	0.12	37	37	82	-	463.50	-	0.00
19	95	0.12	37	37	82	-	463.50	-	0.00
20	100	0.12	37	37	82	-	463.50	-	0.00
21	105	0.12	37	37	82	-	463.50	-	0.00
22	110	0.12	37	37	82	-	463.50	-	0.00
23	115	0.12	37	37	82	-	463.50	-	0.00
24	120	0.14	42	42	82	-	463.50	-	0.00
25	125	0.12	37	37	82	-	463.50	-	0.00
26	130	0.14	42	42	82	-	463.50	-	0.00
27	135	0.14	42	42	82	-	463.50	-	0.00
28	140	0.14	42	42	82	-	463.50	-	0.00
29	145	0.14	42	42	82	-	463.50	-	0.00
30	150	0.14	42	42	82	-	463.50	-	0.00
31	155	0.14	42	42	82	-	463.50	-	0.00
32	160	0.14	42	42	82	-	463.50	-	0.00
33	165	0.15	46	46	82	-	463.50	-	0.00
34	170	0.15	46	46	82	-	463.50	-	0.00
35	175	0.15	46	46	82	-	463.50	-	0.00
36	180	0.15	46	46	82	-	463.50	-	0.00
37	185	0.15	46	46	82	-	463.50	-	0.00
38	190	0.17	51	51	82	-	463.50	-	0.00
39	195	0.17	51	51	82	-	463.50	-	0.00
40	200	0.17	51	51	82	-	463.50	-	0.00
41	205	0.19	56	56	82	-	463.50	-	0.00
42	210	0.20	60	60	82	-	463.50	-	0.00
43	215	0.22	65	65	82	-	463.50	-	0.00
44	220	0.22	65	65	82	-	463.50	-	0.00
45	225	0.23	70	70	82	-	463.50	-	0.00
46	230	0.23	70	70	82	-	463.50	-	0.00
47	235	0.25	74	74	82	-	463.50	-	0.00
48	240	0.25	74	74	82	-	463.50	-	0.00
49	245	0.04	13	13	82	-	463.50	-	0.00
50	250	0.20	60	60	82	-	463.50	-	0.00
51	255	0.35	106	106	82	24	463.50	24	0.00
52	260	0.51	152	176	82	95	463.51	95	0.00
53	265	0.66	199	293	82	211	463.51	211	0.00
54	270	0.66	199	410	82	328	463.52	328	0.01
55	275	0.82	245	574	82	492	463.53	492	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.97	292	784	82	702	463.54	702	0.02
57	285	1.13	338	1,040	82	958	463.55	958	0.02
58	290	1.13	338	1,296	82	1,214	463.57	1,214	0.03
59	295	1.28	385	1,599	82	1,517	463.58	1,517	0.03
60	300	1.44	431	1,949	82	1,867	463.60	1,867	0.04
61	305	2.21	664	2,530	82	2,448	463.63	2,448	0.06
62	310	2.99	896	3,344	82	3,262	463.68	3,262	0.07
63	315	3.45	1,035	4,297	82	4,215	463.73	4,215	0.10
64	320	3.92	1,175	5,390	82	5,308	463.79	5,308	0.12
65	325	4.69	1,407	6,715	82	6,633	463.86	6,633	0.15
66	330	6.08	1,825	8,458	82	8,376	463.95	8,376	0.19
67	335	0.35	106	8,482	82	8,400	463.95	8,400	0.19
68	340	0.14	42	8,442	82	8,360	463.95	8,360	0.19
69	345	0.09	28	8,388	82	8,306	463.95	8,306	0.19
70	350	0.08	23	8,329	82	8,247	463.95	8,247	0.19
71	355	0.05	14	8,261	82	8,179	463.94	8,179	0.19
72	360	0.03	9	8,189	82	8,107	463.94	8,107	0.19

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	15	15	246	-	463.50	-	0.00
2	30	0.03	23	23	246	-	463.50	-	0.00
3	45	0.03	23	23	246	-	463.50	-	0.00
4	60	0.03	30	30	246	-	463.50	-	0.00
5	75	0.03	23	23	246	-	463.50	-	0.00
6	90	0.03	23	23	246	-	463.50	-	0.00
7	105	0.03	23	23	246	-	463.50	-	0.00
8	120	0.03	30	30	246	-	463.50	-	0.00
9	135	0.03	30	30	246	-	463.50	-	0.00
10	150	0.03	30	30	246	-	463.50	-	0.00
11	165	0.04	38	38	246	-	463.50	-	0.00
12	180	0.04	38	38	246	-	463.50	-	0.00
13	195	0.04	38	38	246	-	463.50	-	0.00
14	210	0.04	38	38	246	-	463.50	-	0.00
15	225	0.04	38	38	246	-	463.50	-	0.00
16	240	0.05	46	46	246	-	463.50	-	0.00
17	255	0.05	46	46	246	-	463.50	-	0.00
18	270	0.06	53	53	246	-	463.50	-	0.00
19	285	0.06	53	53	246	-	463.50	-	0.00
20	300	0.07	61	61	246	-	463.50	-	0.00
21	315	0.05	46	46	246	-	463.50	-	0.00
22	330	0.06	53	53	246	-	463.50	-	0.00
23	345	0.07	61	61	246	-	463.50	-	0.00
24	360	0.07	61	61	246	-	463.50	-	0.00
25	375	0.08	69	69	246	-	463.50	-	0.00
26	390	0.08	69	69	246	-	463.50	-	0.00
27	405	0.08	76	76	246	-	463.50	-	0.00
28	420	0.08	76	76	246	-	463.50	-	0.00
29	435	0.08	76	76	246	-	463.50	-	0.00
30	450	0.09	84	84	246	-	463.50	-	0.00
31	465	0.10	91	91	246	-	463.50	-	0.00
32	480	0.11	99	99	246	-	463.50	-	0.00
33	495	0.13	114	114	246	-	463.50	-	0.00
34	510	0.13	114	114	246	-	463.50	-	0.00
35	525	0.14	122	122	246	-	463.50	-	0.00
36	540	0.14	130	130	246	-	463.50	-	0.00
37	555	0.16	145	145	246	-	463.50	-	0.00
38	570	0.17	152	152	246	-	463.50	-	0.00
39	585	0.18	160	160	246	-	463.50	-	0.00
40	600	0.19	168	168	246	-	463.50	-	0.00
41	615	0.13	114	114	246	-	463.50	-	0.00
42	630	0.13	114	114	246	-	463.50	-	0.00
43	645	0.17	152	152	246	-	463.50	-	0.00
44	660	0.17	152	152	246	-	463.50	-	0.00
45	675	0.16	145	145	246	-	463.50	-	0.00
46	690	0.16	145	145	246	-	463.50	-	0.00
47	705	0.14	130	130	246	-	463.50	-	0.00
48	720	0.15	137	137	246	-	463.50	-	0.00
49	735	0.21	190	190	246	-	463.50	-	0.00
50	750	0.22	198	198	246	-	463.50	-	0.00
51	765	0.04	33	33	246	-	463.50	-	0.00
52	780	0.16	141	141	246	-	463.50	-	0.00
53	795	0.61	553	553	246	307	463.52	307	0.01
54	810	0.65	584	891	246	646	463.53	646	0.01
55	825	0.19	175	821	246	575	463.53	575	0.01
56	840	0.19	175	750	246	504	463.53	504	0.01
57	855	0.16	141	645	246	399	463.52	399	0.01
58	870	0.10	94	493	246	248	463.51	248	0.01

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.14	123	371	246	125	463.51	125	0.00
60	900	0.08	75	200	246	-	463.50	-	0.00
61	915	0.03	27	27	246	-	463.50	-	0.00
62	930	0.19	175	175	246	-	463.50	-	0.00
63	945	0.16	145	145	246	-	463.50	-	0.00
64	960	0.16	145	145	246	-	463.50	-	0.00
65	975	0.03	30	30	246	-	463.50	-	0.00
66	990	0.03	30	30	246	-	463.50	-	0.00
67	1005	0.03	23	23	246	-	463.50	-	0.00
68	1020	0.03	23	23	246	-	463.50	-	0.00
69	1035	0.04	38	38	246	-	463.50	-	0.00
70	1050	0.04	38	38	246	-	463.50	-	0.00
71	1065	0.04	38	38	246	-	463.50	-	0.00
72	1080	0.03	30	30	246	-	463.50	-	0.00
73	1095	0.03	30	30	246	-	463.50	-	0.00
74	1110	0.03	30	30	246	-	463.50	-	0.00
75	1125	0.03	23	23	246	-	463.50	-	0.00
76	1140	0.02	15	15	246	-	463.50	-	0.00
77	1155	0.03	23	23	246	-	463.50	-	0.00
78	1170	0.03	30	30	246	-	463.50	-	0.00
79	1185	0.03	23	23	246	-	463.50	-	0.00
80	1200	0.02	15	15	246	-	463.50	-	0.00
81	1215	0.03	23	23	246	-	463.50	-	0.00
82	1230	0.03	23	23	246	-	463.50	-	0.00
83	1245	0.03	23	23	246	-	463.50	-	0.00
84	1260	0.02	15	15	246	-	463.50	-	0.00
85	1275	0.03	23	23	246	-	463.50	-	0.00
86	1290	0.02	15	15	246	-	463.50	-	0.00
87	1305	0.03	23	23	246	-	463.50	-	0.00
88	1320	0.02	15	15	246	-	463.50	-	0.00
89	1335	0.03	23	23	246	-	463.50	-	0.00
90	1350	0.02	15	15	246	-	463.50	-	0.00
91	1365	0.02	15	15	246	-	463.50	-	0.00
92	1380	0.02	15	15	246	-	463.50	-	0.00
93	1395	0.02	15	15	246	-	463.50	-	0.00
94	1410	0.02	15	15	246	-	463.50	-	0.00
95	1425	0.02	15	15	246	-	463.50	-	0.00
96	1440	0.02	15	15	246	-	463.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	2.010	1.00	2.12	2.78	2.010	1.00	2.78	4.47	2.010	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	2.12	SUM [9]	2.01	SUM [11]	2.78	SUM [13]	2.01	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.39	1.40	1.43
FLOOD VOLUME	(cu-ft)	10,165	10,196	10,445
	(acre-ft)	0.23	0.23	0.24
REQUIRED STORAGE	(cu-ft)	9,580	9,148	8,100
	(acre-ft)	0.22	0.21	0.19
PEAK FLOW	(cfs)	3.70	3.26	0.80
MAXIMUM WSEL	(ft)	467.45	467.36	467.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866
C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.25	0.30	0.09	0.17	37.46
2	10	0.17	1.3	0.331	0.25	0.30	0.09	0.17	37.46
3	15	0.25	1.1	0.280	0.25	0.25	0.03	0.07	6.78
4	20	0.33	1.5	0.382	0.25	0.34	0.14	0.27	68.14
5	25	0.42	1.5	0.382	0.25	0.34	0.14	0.27	68.14
6	30	0.50	1.8	0.458	0.25	0.41	0.21	0.43	114.16
7	35	0.58	1.5	0.382	0.25	0.34	0.14	0.27	68.14
8	40	0.67	1.8	0.458	0.25	0.41	0.21	0.43	114.16
9	45	0.75	1.8	0.458	0.25	0.41	0.21	0.43	114.16
10	50	0.83	1.5	0.382	0.25	0.34	0.14	0.27	68.14
11	55	0.92	1.6	0.407	0.25	0.37	0.16	0.33	83.48
12	60	1.00	1.8	0.458	0.25	0.41	0.21	0.43	114.16
13	65	1.08	2.2	0.560	0.25	0.50	0.31	0.63	175.52
14	70	1.17	2.2	0.560	0.25	0.50	0.31	0.63	175.52
15	75	1.25	2.2	0.560	0.25	0.50	0.31	0.63	175.52
16	80	1.33	2.0	0.509	0.25	0.46	0.26	0.53	144.84
17	85	1.42	2.6	0.661	0.25	0.60	0.42	0.84	236.89
18	90	1.50	2.7	0.687	0.25	0.62	0.44	0.89	252.23
19	95	1.58	2.4	0.611	0.25	0.55	0.37	0.73	206.21
20	100	1.67	2.7	0.687	0.25	0.62	0.44	0.89	252.23
21	105	1.75	3.3	0.840	0.25	0.76	0.59	1.19	344.27
22	110	1.83	3.1	0.789	0.25	0.71	0.54	1.09	313.59
23	115	1.92	2.9	0.738	0.25	0.66	0.49	0.99	282.91
24	120	2.00	3.0	0.763	0.25	0.69	0.52	1.04	298.25
25	125	2.08	3.1	0.789	0.25	0.71	0.54	1.09	313.59
26	130	2.17	4.2	1.068	0.25	0.96	0.82	1.65	482.33
27	135	2.25	5.0	1.272	0.25	1.14	1.03	2.06	605.05
28	140	2.33	3.5	0.890	0.25	0.80	0.65	1.30	374.95
29	145	2.42	6.8	1.730	0.25	1.56	1.48	2.98	881.18
30	150	2.50	7.3	1.857	0.25	1.67	1.61	3.24	957.88
31	155	2.58	8.2	2.086	0.25	1.88	1.84	3.70	1095.94
32	160	2.67	5.9	1.501	0.25	1.35	1.26	2.52	743.12
33	165	2.75	2.0	0.509	0.25	0.46	0.26	0.53	144.84
34	170	2.83	1.8	0.458	0.25	0.41	0.21	0.43	114.16
35	175	2.92	1.8	0.458	0.25	0.41	0.21	0.43	114.16
36	180	3.00	0.6	0.153	0.25	0.14	0.02	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.39
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10165.45
REQUIRED STORAGE (acft)	0.22
REQUIRED STORAGE (cuft)	9579.59
PEAK FLOW RATE (cfs)	3.70

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.25	0.15	0.02	0.03	0.00
2	10	0.17	0.6	0.200	0.25	0.18	0.02	0.04	0.00
3	15	0.25	0.6	0.200	0.25	0.18	0.02	0.04	0.00
4	20	0.33	0.6	0.200	0.25	0.18	0.02	0.04	0.00
5	25	0.42	0.6	0.200	0.25	0.18	0.02	0.04	0.00
6	30	0.50	0.7	0.234	0.25	0.21	0.02	0.05	0.01
7	35	0.58	0.7	0.234	0.25	0.21	0.02	0.05	0.01
8	40	0.67	0.7	0.234	0.25	0.21	0.02	0.05	0.01
9	45	0.75	0.7	0.234	0.25	0.21	0.02	0.05	0.01
10	50	0.83	0.7	0.234	0.25	0.21	0.02	0.05	0.01
11	55	0.92	0.7	0.234	0.25	0.21	0.02	0.05	0.01
12	60	1.00	0.8	0.267	0.25	0.24	0.02	0.04	0.00
13	65	1.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
14	70	1.17	0.8	0.267	0.25	0.24	0.02	0.04	0.00
15	75	1.25	0.8	0.267	0.25	0.24	0.02	0.04	0.00
16	80	1.33	0.8	0.267	0.25	0.24	0.02	0.04	0.00
17	85	1.42	0.8	0.267	0.25	0.24	0.02	0.04	0.00
18	90	1.50	0.8	0.267	0.25	0.24	0.02	0.04	0.00
19	95	1.58	0.8	0.267	0.25	0.24	0.02	0.04	0.00
20	100	1.67	0.8	0.267	0.25	0.24	0.02	0.04	0.00
21	105	1.75	0.8	0.267	0.25	0.24	0.02	0.04	0.00
22	110	1.83	0.8	0.267	0.25	0.24	0.02	0.04	0.00
23	115	1.92	0.8	0.267	0.25	0.24	0.02	0.04	0.00
24	120	2.00	0.9	0.300	0.25	0.27	0.05	0.11	19.08
25	125	2.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
26	130	2.17	0.9	0.300	0.25	0.27	0.05	0.11	19.08
27	135	2.25	0.9	0.300	0.25	0.27	0.05	0.11	19.08
28	140	2.33	0.9	0.300	0.25	0.27	0.05	0.11	19.08
29	145	2.42	0.9	0.300	0.25	0.27	0.05	0.11	19.08
30	150	2.50	0.9	0.300	0.25	0.27	0.05	0.11	19.08
31	155	2.58	0.9	0.300	0.25	0.27	0.05	0.11	19.08
32	160	2.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
33	165	2.75	1.0	0.334	0.25	0.30	0.09	0.18	39.20
34	170	2.83	1.0	0.334	0.25	0.30	0.09	0.18	39.20
35	175	2.92	1.0	0.334	0.25	0.30	0.09	0.18	39.20
36	180	3.00	1.0	0.334	0.25	0.30	0.09	0.18	39.20
37	185	3.08	1.0	0.334	0.25	0.30	0.09	0.18	39.20
38	190	3.17	1.1	0.367	0.25	0.33	0.12	0.24	59.31
39	195	3.25	1.1	0.367	0.25	0.33	0.12	0.24	59.31
40	200	3.33	1.1	0.367	0.25	0.33	0.12	0.24	59.31
41	205	3.42	1.2	0.400	0.25	0.36	0.16	0.31	79.43
42	210	3.50	1.3	0.434	0.25	0.39	0.19	0.38	99.55
43	215	3.58	1.4	0.467	0.25	0.42	0.22	0.45	119.66
44	220	3.67	1.4	0.467	0.25	0.42	0.22	0.45	119.66
45	225	3.75	1.5	0.500	0.25	0.45	0.26	0.51	139.78
46	230	3.83	1.5	0.500	0.25	0.45	0.26	0.51	139.78
47	235	3.92	1.6	0.534	0.25	0.48	0.29	0.58	159.89
48	240	4.00	1.6	0.534	0.25	0.48	0.29	0.58	159.89
49	245	4.08	1.7	0.567	0.25	0.51	0.32	0.65	180.01
50	250	4.17	1.8	0.600	0.25	0.54	0.36	0.71	200.13
51	255	4.25	1.9	0.634	0.25	0.57	0.39	0.78	220.24
52	260	4.33	2.0	0.667	0.25	0.60	0.42	0.85	240.36
53	265	4.42	2.1	0.701	0.25	0.63	0.46	0.92	260.48
54	270	4.50	2.1	0.701	0.25	0.63	0.46	0.92	260.48
55	275	4.58	2.2	0.734	0.25	0.66	0.49	0.98	280.59
56	280	4.67	2.3	0.767	0.25	0.69	0.52	1.05	300.71

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.25	0.72	0.56	1.12	320.82
58	290	4.83	2.4	0.801	0.25	0.72	0.56	1.12	320.82
59	295	4.92	2.5	0.834	0.25	0.75	0.59	1.18	340.94
60	300	5.00	2.6	0.867	0.25	0.78	0.62	1.25	361.06
61	305	5.08	3.1	1.034	0.25	0.93	0.79	1.59	461.64
62	310	5.17	3.6	1.201	0.25	1.08	0.96	1.92	562.22
63	315	5.25	3.9	1.301	0.25	1.17	1.06	2.12	622.56
64	320	5.33	4.2	1.401	0.25	1.26	1.16	2.32	682.91
65	325	5.42	4.7	1.568	0.25	1.41	1.32	2.66	783.49
66	330	5.50	5.6	1.868	0.25	1.68	1.62	3.26	964.54
67	335	5.58	1.9	0.634	0.25	0.57	0.39	0.78	220.24
68	340	5.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
69	345	5.75	0.6	0.200	0.25	0.18	0.02	0.04	0.00
70	350	5.83	0.5	0.167	0.25	0.15	0.02	0.03	0.00
71	355	5.92	0.3	0.100	0.25	0.09	0.01	0.02	0.00
72	360	6.00	0.2	0.067	0.25	0.06	0.01	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.40
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10195.68
REQUIRED STORAGE (acft)	0.21
REQUIRED STORAGE (cuft)	9147.59
PEAK FLOW RATE (cfs)	3.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.036	0.433	0.032	0.004	0.01	0.00
2	30	0.50	0.3	0.054	0.428	0.048	0.005	0.01	0.00
3	45	0.75	0.3	0.054	0.423	0.048	0.005	0.01	0.00
4	60	1.00	0.4	0.072	0.418	0.064	0.007	0.01	0.00
5	75	1.25	0.3	0.054	0.413	0.048	0.005	0.01	0.00
6	90	1.50	0.3	0.054	0.408	0.048	0.005	0.01	0.00
7	105	1.75	0.3	0.054	0.403	0.048	0.005	0.01	0.00
8	120	2.00	0.4	0.072	0.399	0.064	0.007	0.01	0.00
9	135	2.25	0.4	0.072	0.394	0.064	0.007	0.01	0.00
10	150	2.50	0.4	0.072	0.389	0.064	0.007	0.01	0.00
11	165	2.75	0.5	0.089	0.384	0.080	0.009	0.02	0.00
12	180	3.00	0.5	0.089	0.379	0.080	0.009	0.02	0.00
13	195	3.25	0.5	0.089	0.375	0.080	0.009	0.02	0.00
14	210	3.50	0.5	0.089	0.370	0.080	0.009	0.02	0.00
15	225	3.75	0.5	0.089	0.365	0.080	0.009	0.02	0.00
16	240	4.00	0.6	0.107	0.361	0.097	0.011	0.02	0.00
17	255	4.25	0.6	0.107	0.356	0.097	0.011	0.02	0.00
18	270	4.50	0.7	0.125	0.352	0.113	0.013	0.03	0.00
19	285	4.75	0.7	0.125	0.347	0.113	0.013	0.03	0.00
20	300	5.00	0.8	0.143	0.343	0.129	0.014	0.03	0.00
21	315	5.25	0.6	0.107	0.338	0.097	0.011	0.02	0.00
22	330	5.50	0.7	0.125	0.334	0.113	0.013	0.03	0.00
23	345	5.75	0.8	0.143	0.330	0.129	0.014	0.03	0.00
24	360	6.00	0.8	0.143	0.325	0.129	0.014	0.03	0.00
25	375	6.25	0.9	0.161	0.321	0.145	0.016	0.03	0.00
26	390	6.50	0.9	0.161	0.317	0.145	0.016	0.03	0.00
27	405	6.75	1.0	0.179	0.312	0.161	0.018	0.04	0.00
28	420	7.00	1.0	0.179	0.308	0.161	0.018	0.04	0.00
29	435	7.25	1.0	0.179	0.304	0.161	0.018	0.04	0.00
30	450	7.50	1.1	0.197	0.300	0.177	0.020	0.04	0.00
31	465	7.75	1.2	0.215	0.296	0.193	0.021	0.04	0.00
32	480	8.00	1.3	0.232	0.292	0.209	0.023	0.05	0.00
33	495	8.25	1.5	0.268	0.288	0.241	0.027	0.05	6.29
34	510	8.50	1.5	0.268	0.284	0.241	0.027	0.05	6.29
35	525	8.75	1.6	0.286	0.280	0.257	0.007	0.01	0.00
36	540	9.00	1.7	0.304	0.276	0.274	0.028	0.06	9.01
37	555	9.25	1.9	0.340	0.272	0.306	0.068	0.14	80.76
38	570	9.50	2.0	0.358	0.268	0.322	0.090	0.18	120.10
39	585	9.75	2.1	0.375	0.264	0.338	0.111	0.22	159.37
40	600	10.00	2.2	0.393	0.260	0.354	0.133	0.27	198.58
41	615	10.25	1.5	0.268	0.256	0.241	0.012	0.02	0.00
42	630	10.50	1.5	0.268	0.253	0.241	0.015	0.03	0.00
43	645	10.75	2.0	0.358	0.249	0.322	0.109	0.22	154.08
44	660	11.00	2.0	0.358	0.245	0.322	0.112	0.23	160.67
45	675	11.25	1.9	0.340	0.242	0.306	0.098	0.20	134.85
46	690	11.50	1.9	0.340	0.238	0.306	0.101	0.20	141.31
47	705	11.75	1.7	0.304	0.235	0.274	0.069	0.14	83.00
48	720	12.00	1.8	0.322	0.231	0.290	0.091	0.18	121.66
49	735	12.25	2.5	0.447	0.228	0.402	0.219	0.44	354.32
50	750	12.50	2.6	0.465	0.224	0.418	0.240	0.48	392.84
51	765	12.75	2.8	0.501	0.221	0.451	0.280	0.56	463.63
52	780	13.00	2.9	0.519	0.218	0.467	0.301	0.60	502.00
53	795	13.25	3.4	0.608	0.214	0.547	0.394	0.79	669.68
54	810	13.50	3.4	0.608	0.211	0.547	0.397	0.80	675.55
55	825	13.75	2.3	0.411	0.208	0.370	0.203	0.41	325.56
56	840	14.00	2.3	0.411	0.205	0.370	0.206	0.42	331.29
57	855	14.25	2.7	0.483	0.202	0.434	0.281	0.57	466.31
58	870	14.50	2.6	0.465	0.199	0.418	0.266	0.54	439.54
59	885	14.75	2.6	0.465	0.196	0.418	0.269	0.54	445.03
60	900	15.00	2.5	0.447	0.193	0.402	0.254	0.51	418.10
61	915	15.25	2.4	0.429	0.190	0.386	0.240	0.48	391.08
62	930	15.50	2.3	0.411	0.187	0.370	0.225	0.45	363.98
63	945	15.75	1.9	0.340	0.184	0.306	0.156	0.31	239.77
64	960	16.00	1.9	0.340	0.181	0.306	0.159	0.32	244.85
65	975	16.25	0.4	0.072	0.178	0.064	0.007	0.01	0.00
66	990	16.50	0.4	0.072	0.176	0.064	0.007	0.01	0.00
67	1005	16.75	0.3	0.054	0.173	0.048	0.005	0.01	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.170	0.048	0.005	0.01	0.00
69	1035	17.25	0.5	0.089	0.168	0.080	0.009	0.02	0.00
70	1050	17.50	0.5	0.089	0.165	0.080	0.009	0.02	0.00
71	1065	17.75	0.5	0.089	0.163	0.080	0.009	0.02	0.00
72	1080	18.00	0.4	0.072	0.160	0.064	0.007	0.01	0.00
73	1095	18.25	0.4	0.072	0.158	0.064	0.007	0.01	0.00
74	1110	18.50	0.4	0.072	0.156	0.064	0.007	0.01	0.00
75	1125	18.75	0.3	0.054	0.153	0.048	0.005	0.01	0.00
76	1140	19.00	0.2	0.036	0.151	0.032	0.004	0.01	0.00
77	1155	19.25	0.3	0.054	0.149	0.048	0.005	0.01	0.00
78	1170	19.50	0.4	0.072	0.147	0.064	0.007	0.01	0.00
79	1185	19.75	0.3	0.054	0.145	0.048	0.005	0.01	0.00
80	1200	20.00	0.2	0.036	0.143	0.032	0.004	0.01	0.00
81	1215	20.25	0.3	0.054	0.141	0.048	0.005	0.01	0.00
82	1230	20.50	0.3	0.054	0.139	0.048	0.005	0.01	0.00
83	1245	20.75	0.3	0.054	0.138	0.048	0.005	0.01	0.00
84	1260	21.00	0.2	0.036	0.136	0.032	0.004	0.01	0.00
85	1275	21.25	0.3	0.054	0.134	0.048	0.005	0.01	0.00
86	1290	21.50	0.2	0.036	0.133	0.032	0.004	0.01	0.00
87	1305	21.75	0.3	0.054	0.131	0.048	0.005	0.01	0.00
88	1320	22.00	0.2	0.036	0.130	0.032	0.004	0.01	0.00
89	1335	22.25	0.3	0.054	0.129	0.048	0.005	0.01	0.00
90	1350	22.50	0.2	0.036	0.127	0.032	0.004	0.01	0.00
91	1365	22.75	0.2	0.036	0.126	0.032	0.004	0.01	0.00
92	1380	23.00	0.2	0.036	0.125	0.032	0.004	0.01	0.00
93	1395	23.25	0.2	0.036	0.124	0.032	0.004	0.01	0.00
94	1410	23.50	0.2	0.036	0.124	0.032	0.004	0.01	0.00
95	1425	23.75	0.2	0.036	0.123	0.032	0.004	0.01	0.00
96	1440	24.00	0.2	0.036	0.123	0.032	0.004	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10444.84
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8099.53
PEAK FLOW (cfs)	0.80

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	52	52	14	37	465.01	37	0.00
2	10	0.17	52	89	14	75	465.02	75	0.00
3	15	0.07	21	96	14	82	465.02	82	0.00
4	20	0.27	82	164	14	150	465.04	150	0.00
5	25	0.27	82	232	14	218	465.06	218	0.01
6	30	0.43	128	346	14	332	465.10	332	0.01
7	35	0.27	82	414	14	400	465.12	400	0.01
8	40	0.43	128	529	14	514	465.15	514	0.01
9	45	0.43	128	643	14	629	465.19	629	0.01
10	50	0.27	82	711	14	697	465.21	697	0.02
11	55	0.33	98	794	14	780	465.23	780	0.02
12	60	0.43	128	908	14	894	465.27	894	0.02
13	65	0.63	190	1,084	14	1,070	465.32	1,070	0.02
14	70	0.63	190	1,260	14	1,245	465.37	1,245	0.03
15	75	0.63	190	1,435	14	1,421	465.42	1,421	0.03
16	80	0.53	159	1,580	14	1,566	465.47	1,566	0.04
17	85	0.84	251	1,817	14	1,803	465.54	1,803	0.04
18	90	0.89	266	2,069	14	2,055	465.61	2,055	0.05
19	95	0.73	220	2,275	14	2,261	465.67	2,261	0.05
20	100	0.89	266	2,527	14	2,513	465.75	2,513	0.06
21	105	1.19	358	2,872	14	2,858	465.85	2,858	0.07
22	110	1.09	328	3,185	14	3,171	465.94	3,171	0.07
23	115	0.99	297	3,468	14	3,454	466.02	3,454	0.08
24	120	1.04	312	3,766	14	3,752	466.10	3,752	0.09
25	125	1.09	328	4,080	14	4,066	466.17	4,066	0.09
26	130	1.65	496	4,562	14	4,548	466.29	4,548	0.10
27	135	2.06	619	5,167	14	5,153	466.44	5,153	0.12
28	140	1.30	389	5,542	14	5,528	466.53	5,528	0.13
29	145	2.98	895	6,424	14	6,409	466.75	6,409	0.15
30	150	3.24	972	7,381	14	7,367	466.99	7,367	0.17
31	155	3.70	1,110	8,477	14	8,463	467.21	8,463	0.19
32	160	2.52	757	9,220	14	9,206	467.37	9,206	0.21
33	165	0.53	159	9,365	14	9,351	467.40	9,351	0.21
34	170	0.43	128	9,479	14	9,465	467.42	9,465	0.22
35	175	0.43	128	9,594	14	9,580	467.45	9,580	0.22
36	180	0.03	9	9,589	14	9,575	467.45	9,575	0.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.04	12	12	14	-	465.00	-	0.00
3	15	0.04	12	12	14	-	465.00	-	0.00
4	20	0.04	12	12	14	-	465.00	-	0.00
5	25	0.04	12	12	14	-	465.00	-	0.00
6	30	0.05	14	14	14	0	465.00	0	0.00
7	35	0.05	14	14	14	0	465.00	0	0.00
8	40	0.05	14	14	14	0	465.00	0	0.00
9	45	0.05	14	14	14	0	465.00	0	0.00
10	50	0.05	14	14	14	0	465.00	0	0.00
11	55	0.05	14	14	14	0	465.00	0	0.00
12	60	0.04	13	13	14	-	465.00	-	0.00
13	65	0.04	13	13	14	-	465.00	-	0.00
14	70	0.04	13	13	14	-	465.00	-	0.00
15	75	0.04	13	13	14	-	465.00	-	0.00
16	80	0.04	13	13	14	-	465.00	-	0.00
17	85	0.04	13	13	14	-	465.00	-	0.00
18	90	0.04	13	13	14	-	465.00	-	0.00
19	95	0.04	13	13	14	-	465.00	-	0.00
20	100	0.04	13	13	14	-	465.00	-	0.00
21	105	0.04	13	13	14	-	465.00	-	0.00
22	110	0.04	13	13	14	-	465.00	-	0.00
23	115	0.04	13	13	14	-	465.00	-	0.00
24	120	0.11	33	33	14	19	465.01	19	0.00
25	125	0.04	13	32	14	18	465.01	18	0.00
26	130	0.11	33	51	14	37	465.01	37	0.00
27	135	0.11	33	70	14	56	465.02	56	0.00
28	140	0.11	33	89	14	75	465.02	75	0.00
29	145	0.11	33	108	14	94	465.03	94	0.00
30	150	0.11	33	128	14	113	465.03	113	0.00
31	155	0.11	33	147	14	133	465.04	133	0.00
32	160	0.11	33	166	14	152	465.05	152	0.00
33	165	0.18	53	205	14	191	465.06	191	0.00
34	170	0.18	53	244	14	230	465.07	230	0.01
35	175	0.18	53	283	14	269	465.08	269	0.01
36	180	0.18	53	322	14	308	465.09	308	0.01
37	185	0.18	53	362	14	348	465.10	348	0.01
38	190	0.24	73	421	14	407	465.12	407	0.01
39	195	0.24	73	480	14	466	465.14	466	0.01
40	200	0.24	73	540	14	526	465.16	526	0.01
41	205	0.31	94	619	14	605	465.18	605	0.01
42	210	0.38	114	719	14	705	465.21	705	0.02
43	215	0.45	134	838	14	824	465.25	824	0.02
44	220	0.45	134	958	14	944	465.28	944	0.02
45	225	0.51	154	1,098	14	1,084	465.32	1,084	0.02
46	230	0.51	154	1,237	14	1,223	465.36	1,223	0.03
47	235	0.58	174	1,397	14	1,383	465.41	1,383	0.03
48	240	0.58	174	1,557	14	1,543	465.46	1,543	0.04
49	245	0.65	194	1,737	14	1,723	465.51	1,723	0.04
50	250	0.71	214	1,937	14	1,923	465.57	1,923	0.04
51	255	0.78	234	2,158	14	2,144	465.64	2,144	0.05
52	260	0.85	254	2,398	14	2,384	465.71	2,384	0.05
53	265	0.92	275	2,658	14	2,644	465.79	2,644	0.06
54	270	0.92	275	2,919	14	2,905	465.86	2,905	0.07
55	275	0.98	295	3,200	14	3,185	465.95	3,185	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.05	315	3,500	14	3,486	466.03	3,486	0.08
57	285	1.12	335	3,821	14	3,807	466.11	3,807	0.09
58	290	1.12	335	4,142	14	4,128	466.19	4,128	0.09
59	295	1.18	355	4,483	14	4,469	466.27	4,469	0.10
60	300	1.25	375	4,844	14	4,830	466.36	4,830	0.11
61	305	1.59	476	5,306	14	5,291	466.47	5,291	0.12
62	310	1.92	576	5,868	14	5,854	466.61	5,854	0.13
63	315	2.12	637	6,490	14	6,476	466.77	6,476	0.15
64	320	2.32	697	7,173	14	7,159	466.93	7,159	0.16
65	325	2.66	798	7,957	14	7,943	467.11	7,943	0.18
66	330	3.26	979	8,921	14	8,907	467.31	8,907	0.20
67	335	0.78	234	9,142	14	9,127	467.35	9,127	0.21
68	340	0.11	33	9,161	14	9,147	467.36	9,147	0.21
69	345	0.04	12	9,159	14	9,145	467.36	9,145	0.21
70	350	0.03	10	9,155	14	9,140	467.36	9,140	0.21
71	355	0.02	6	9,147	14	9,132	467.35	9,132	0.21
72	360	0.01	4	9,136	14	9,122	467.35	9,122	0.21

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.01	6	6	42	-	465.00	-	0.00
2	30	0.01	10	10	42	-	465.00	-	0.00
3	45	0.01	10	10	42	-	465.00	-	0.00
4	60	0.01	13	13	42	-	465.00	-	0.00
5	75	0.01	10	10	42	-	465.00	-	0.00
6	90	0.01	10	10	42	-	465.00	-	0.00
7	105	0.01	10	10	42	-	465.00	-	0.00
8	120	0.01	13	13	42	-	465.00	-	0.00
9	135	0.01	13	13	42	-	465.00	-	0.00
10	150	0.01	13	13	42	-	465.00	-	0.00
11	165	0.02	16	16	42	-	465.00	-	0.00
12	180	0.02	16	16	42	-	465.00	-	0.00
13	195	0.02	16	16	42	-	465.00	-	0.00
14	210	0.02	16	16	42	-	465.00	-	0.00
15	225	0.02	16	16	42	-	465.00	-	0.00
16	240	0.02	19	19	42	-	465.00	-	0.00
17	255	0.02	19	19	42	-	465.00	-	0.00
18	270	0.03	23	23	42	-	465.00	-	0.00
19	285	0.03	23	23	42	-	465.00	-	0.00
20	300	0.03	26	26	42	-	465.00	-	0.00
21	315	0.02	19	19	42	-	465.00	-	0.00
22	330	0.03	23	23	42	-	465.00	-	0.00
23	345	0.03	26	26	42	-	465.00	-	0.00
24	360	0.03	26	26	42	-	465.00	-	0.00
25	375	0.03	29	29	42	-	465.00	-	0.00
26	390	0.03	29	29	42	-	465.00	-	0.00
27	405	0.04	32	32	42	-	465.00	-	0.00
28	420	0.04	32	32	42	-	465.00	-	0.00
29	435	0.04	32	32	42	-	465.00	-	0.00
30	450	0.04	36	36	42	-	465.00	-	0.00
31	465	0.04	39	39	42	-	465.00	-	0.00
32	480	0.05	42	42	42	-	465.00	-	0.00
33	495	0.05	49	49	42	6	465.00	6	0.00
34	510	0.05	49	55	42	13	465.00	13	0.00
35	525	0.01	12	24	42	-	465.00	-	0.00
36	540	0.06	51	51	42	9	465.00	9	0.00
37	555	0.14	123	132	42	90	465.03	90	0.00
38	570	0.18	162	252	42	210	465.06	210	0.00
39	585	0.22	202	411	42	369	465.11	369	0.01
40	600	0.27	241	610	42	568	465.17	568	0.01
41	615	0.02	21	589	42	547	465.16	547	0.01
42	630	0.03	28	575	42	532	465.16	532	0.01
43	645	0.22	196	729	42	687	465.20	687	0.02
44	660	0.23	203	889	42	847	465.25	847	0.02
45	675	0.20	177	1,024	42	982	465.29	982	0.02
46	690	0.20	184	1,166	42	1,123	465.33	1,123	0.03
47	705	0.14	125	1,249	42	1,206	465.36	1,206	0.03
48	720	0.18	164	1,370	42	1,328	465.39	1,328	0.03
49	735	0.44	397	1,725	42	1,682	465.50	1,682	0.04
50	750	0.48	435	2,117	42	2,075	465.62	2,075	0.05
51	765	0.56	506	2,581	42	2,539	465.76	2,539	0.06
52	780	0.60	544	3,083	42	3,041	465.90	3,041	0.07
53	795	0.79	712	3,753	42	3,711	466.09	3,711	0.09
54	810	0.80	718	4,428	42	4,386	466.25	4,386	0.10
55	825	0.41	368	4,754	42	4,712	466.33	4,712	0.11
56	840	0.42	374	5,085	42	5,043	466.41	5,043	0.12
57	855	0.57	509	5,551	42	5,509	466.53	5,509	0.13
58	870	0.54	482	5,991	42	5,949	466.64	5,949	0.14

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.54	487	6,436	42	6,394	466.75	6,394	0.15
60	900	0.51	460	6,854	42	6,812	466.85	6,812	0.16
61	915	0.48	433	7,245	42	7,203	466.94	7,203	0.17
62	930	0.45	406	7,609	42	7,567	467.03	7,567	0.17
63	945	0.31	282	7,849	42	7,807	467.08	7,807	0.18
64	960	0.32	287	8,094	42	8,052	467.13	8,052	0.18
65	975	0.01	13	8,065	42	8,022	467.12	8,022	0.18
66	990	0.01	13	8,035	42	7,993	467.12	7,993	0.18
67	1005	0.01	10	8,003	42	7,961	467.11	7,961	0.18
68	1020	0.01	10	7,970	42	7,928	467.10	7,928	0.18
69	1035	0.02	16	7,944	42	7,902	467.10	7,902	0.18
70	1050	0.02	16	7,918	42	7,876	467.09	7,876	0.18
71	1065	0.02	16	7,892	42	7,850	467.09	7,850	0.18
72	1080	0.01	13	7,863	42	7,821	467.08	7,821	0.18
73	1095	0.01	13	7,833	42	7,791	467.08	7,791	0.18
74	1110	0.01	13	7,804	42	7,762	467.07	7,762	0.18
75	1125	0.01	10	7,772	42	7,729	467.06	7,729	0.18
76	1140	0.01	6	7,736	42	7,694	467.06	7,694	0.18
77	1155	0.01	10	7,703	42	7,661	467.05	7,661	0.18
78	1170	0.01	13	7,674	42	7,632	467.04	7,632	0.18
79	1185	0.01	10	7,642	42	7,599	467.04	7,599	0.17
80	1200	0.01	6	7,606	42	7,564	467.03	7,564	0.17
81	1215	0.01	10	7,573	42	7,531	467.02	7,531	0.17
82	1230	0.01	10	7,541	42	7,499	467.01	7,499	0.17
83	1245	0.01	10	7,508	42	7,466	467.01	7,466	0.17
84	1260	0.01	6	7,473	42	7,430	467.00	7,430	0.17
85	1275	0.01	10	7,440	42	7,398	466.99	7,398	0.17
86	1290	0.01	6	7,404	42	7,362	466.98	7,362	0.17
87	1305	0.01	10	7,372	42	7,330	466.98	7,330	0.17
88	1320	0.01	6	7,336	42	7,294	466.97	7,294	0.17
89	1335	0.01	10	7,303	42	7,261	466.96	7,261	0.17
90	1350	0.01	6	7,268	42	7,225	466.95	7,225	0.17
91	1365	0.01	6	7,232	42	7,190	466.94	7,190	0.17
92	1380	0.01	6	7,196	42	7,154	466.93	7,154	0.16
93	1395	0.01	6	7,160	42	7,118	466.92	7,118	0.16
94	1410	0.01	6	7,125	42	7,082	466.92	7,082	0.16
95	1425	0.01	6	7,089	42	7,047	466.91	7,047	0.16
96	1440	0.01	6	7,053	42	7,011	466.90	7,011	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.570	1.00	2.12	2.78	10.570	1.00	2.78	4.47	10.570	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	2.12	SUM [9]	10.57	SUM [11]	2.78	SUM [13]	10.57	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.54	1.64	1.79
FLOOD VOLUME	(cu-ft)	59,174	63,009	68,653
	(acre-ft)	1.36	1.45	1.58
REQUIRED STORAGE	(cu-ft)	56,096	57,661	56,204
	(acre-ft)	1.29	1.32	1.29
PEAK FLOW	(cfs)	20.00	17.69	4.66
MAXIMUM WSEL	(ft)	468.11	468.19	468.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525
C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	2.12		
CONSTANT LOSS RATE-in/hr	0.19		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.19	0.30	0.14	1.44	360.41
2	10	0.17	1.3	0.331	0.19	0.30	0.14	1.44	360.41
3	15	0.25	1.1	0.280	0.19	0.25	0.09	0.91	199.07
4	20	0.33	1.5	0.382	0.19	0.34	0.19	1.98	521.75
5	25	0.42	1.5	0.382	0.19	0.34	0.19	1.98	521.75
6	30	0.50	1.8	0.458	0.19	0.41	0.26	2.79	763.76
7	35	0.58	1.5	0.382	0.19	0.34	0.19	1.98	521.75
8	40	0.67	1.8	0.458	0.19	0.41	0.26	2.79	763.76
9	45	0.75	1.8	0.458	0.19	0.41	0.26	2.79	763.76
10	50	0.83	1.5	0.382	0.19	0.34	0.19	1.98	521.75
11	55	0.92	1.6	0.407	0.19	0.37	0.21	2.25	602.42
12	60	1.00	1.8	0.458	0.19	0.41	0.26	2.79	763.76
13	65	1.08	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
14	70	1.17	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
15	75	1.25	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
16	80	1.33	2.0	0.509	0.19	0.46	0.31	3.33	925.11
17	85	1.42	2.6	0.661	0.19	0.60	0.47	4.94	1409.13
18	90	1.50	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
19	95	1.58	2.4	0.611	0.19	0.55	0.42	4.40	1247.79
20	100	1.67	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
21	105	1.75	3.3	0.840	0.19	0.76	0.65	6.82	1973.82
22	110	1.83	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
23	115	1.92	2.9	0.738	0.19	0.66	0.54	5.75	1651.14
24	120	2.00	3.0	0.763	0.19	0.69	0.57	6.01	1731.81
25	125	2.08	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
26	130	2.17	4.2	1.068	0.19	0.96	0.87	9.24	2699.85
27	135	2.25	5.0	1.272	0.19	1.14	1.08	11.39	3345.21
28	140	2.33	3.5	0.890	0.19	0.80	0.70	7.36	2135.16
29	145	2.42	6.8	1.730	0.19	1.56	1.54	16.23	4797.28
30	150	2.50	7.3	1.857	0.19	1.67	1.66	17.58	5200.63
31	155	2.58	8.2	2.086	0.19	1.88	1.89	20.00	5926.66
32	160	2.67	5.9	1.501	0.19	1.35	1.31	13.81	4071.24
33	165	2.75	2.0	0.509	0.19	0.46	0.31	3.33	925.11
34	170	2.83	1.8	0.458	0.19	0.41	0.26	2.79	763.76
35	175	2.92	1.8	0.458	0.19	0.41	0.26	2.79	763.76
36	180	3.00	0.6	0.153	0.19	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.54
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59173.82
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56095.73
PEAK FLOW RATE (cfs)	20.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.19	0.15	0.02	0.18	0.00
2	10	0.17	0.6	0.200	0.19	0.18	0.01	0.06	0.00
3	15	0.25	0.6	0.200	0.19	0.18	0.01	0.06	0.00
4	20	0.33	0.6	0.200	0.19	0.18	0.01	0.06	0.00
5	25	0.42	0.6	0.200	0.19	0.18	0.01	0.06	0.00
6	30	0.50	0.7	0.234	0.19	0.21	0.04	0.42	52.19
7	35	0.58	0.7	0.234	0.19	0.21	0.04	0.42	52.19
8	40	0.67	0.7	0.234	0.19	0.21	0.04	0.42	52.19
9	45	0.75	0.7	0.234	0.19	0.21	0.04	0.42	52.19
10	50	0.83	0.7	0.234	0.19	0.21	0.04	0.42	52.19
11	55	0.92	0.7	0.234	0.19	0.21	0.04	0.42	52.19
12	60	1.00	0.8	0.267	0.19	0.24	0.07	0.77	157.98
13	65	1.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
14	70	1.17	0.8	0.267	0.19	0.24	0.07	0.77	157.98
15	75	1.25	0.8	0.267	0.19	0.24	0.07	0.77	157.98
16	80	1.33	0.8	0.267	0.19	0.24	0.07	0.77	157.98
17	85	1.42	0.8	0.267	0.19	0.24	0.07	0.77	157.98
18	90	1.50	0.8	0.267	0.19	0.24	0.07	0.77	157.98
19	95	1.58	0.8	0.267	0.19	0.24	0.07	0.77	157.98
20	100	1.67	0.8	0.267	0.19	0.24	0.07	0.77	157.98
21	105	1.75	0.8	0.267	0.19	0.24	0.07	0.77	157.98
22	110	1.83	0.8	0.267	0.19	0.24	0.07	0.77	157.98
23	115	1.92	0.8	0.267	0.19	0.24	0.07	0.77	157.98
24	120	2.00	0.9	0.300	0.19	0.27	0.11	1.12	263.76
25	125	2.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
26	130	2.17	0.9	0.300	0.19	0.27	0.11	1.12	263.76
27	135	2.25	0.9	0.300	0.19	0.27	0.11	1.12	263.76
28	140	2.33	0.9	0.300	0.19	0.27	0.11	1.12	263.76
29	145	2.42	0.9	0.300	0.19	0.27	0.11	1.12	263.76
30	150	2.50	0.9	0.300	0.19	0.27	0.11	1.12	263.76
31	155	2.58	0.9	0.300	0.19	0.27	0.11	1.12	263.76
32	160	2.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
33	165	2.75	1.0	0.334	0.19	0.30	0.14	1.47	369.55
34	170	2.83	1.0	0.334	0.19	0.30	0.14	1.47	369.55
35	175	2.92	1.0	0.334	0.19	0.30	0.14	1.47	369.55
36	180	3.00	1.0	0.334	0.19	0.30	0.14	1.47	369.55
37	185	3.08	1.0	0.334	0.19	0.30	0.14	1.47	369.55
38	190	3.17	1.1	0.367	0.19	0.33	0.17	1.83	475.33
39	195	3.25	1.1	0.367	0.19	0.33	0.17	1.83	475.33
40	200	3.33	1.1	0.367	0.19	0.33	0.17	1.83	475.33
41	205	3.42	1.2	0.400	0.19	0.36	0.21	2.18	581.11
42	210	3.50	1.3	0.434	0.19	0.39	0.24	2.53	686.90
43	215	3.58	1.4	0.467	0.19	0.42	0.27	2.88	792.68
44	220	3.67	1.4	0.467	0.19	0.42	0.27	2.88	792.68
45	225	3.75	1.5	0.500	0.19	0.45	0.31	3.24	898.47
46	230	3.83	1.5	0.500	0.19	0.45	0.31	3.24	898.47
47	235	3.92	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
48	240	4.00	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
49	245	4.08	1.7	0.567	0.19	0.51	0.37	3.94	1110.04
50	250	4.17	1.8	0.600	0.19	0.54	0.41	4.29	1215.82
51	255	4.25	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
52	260	4.33	2.0	0.667	0.19	0.60	0.47	5.00	1427.39
53	265	4.42	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
54	270	4.50	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
55	275	4.58	2.2	0.734	0.19	0.66	0.54	5.71	1638.96
56	280	4.67	2.3	0.767	0.19	0.69	0.57	6.06	1744.75

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
58	290	4.83	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
59	295	4.92	2.5	0.834	0.19	0.75	0.64	6.76	1956.31
60	300	5.00	2.6	0.867	0.19	0.78	0.67	7.12	2062.10
61	305	5.08	3.1	1.034	0.19	0.93	0.84	8.88	2591.02
62	310	5.17	3.6	1.201	0.19	1.08	1.01	10.64	3119.94
63	315	5.25	3.9	1.301	0.19	1.17	1.11	11.70	3437.30
64	320	5.33	4.2	1.401	0.19	1.26	1.21	12.76	3754.65
65	325	5.42	4.7	1.568	0.19	1.41	1.37	14.52	4283.57
66	330	5.50	5.6	1.868	0.19	1.68	1.67	17.69	5235.64
67	335	5.58	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
68	340	5.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
69	345	5.75	0.6	0.200	0.19	0.18	0.01	0.06	0.00
70	350	5.83	0.5	0.167	0.19	0.15	0.02	0.18	0.00
71	355	5.92	0.3	0.100	0.19	0.09	0.01	0.11	0.00
72	360	6.00	0.2	0.067	0.19	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.64
FLOOD VOLUME (acft)	1.45
FLOOD VOLUME (cuft)	63008.73
REQUIRED STORAGE (acft)	1.32
REQUIRED STORAGE (cuft)	57661.37
PEAK FLOW RATE (cfs)	17.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.343	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.339	0.048	0.005	0.06	0.00
3	45	0.75	0.3	0.054	0.335	0.048	0.005	0.06	0.00
4	60	1.00	0.4	0.072	0.331	0.064	0.007	0.08	0.00
5	75	1.25	0.3	0.054	0.327	0.048	0.005	0.06	0.00
6	90	1.50	0.3	0.054	0.323	0.048	0.005	0.06	0.00
7	105	1.75	0.3	0.054	0.319	0.048	0.005	0.06	0.00
8	120	2.00	0.4	0.072	0.316	0.064	0.007	0.08	0.00
9	135	2.25	0.4	0.072	0.312	0.064	0.007	0.08	0.00
10	150	2.50	0.4	0.072	0.308	0.064	0.007	0.08	0.00
11	165	2.75	0.5	0.089	0.304	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.300	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.297	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.293	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.289	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.286	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.278	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.275	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.271	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.268	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.264	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.261	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.257	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.254	0.145	0.016	0.17	0.00
26	390	6.50	0.9	0.161	0.251	0.145	0.016	0.17	0.00
27	405	6.75	1.0	0.179	0.247	0.161	0.018	0.19	0.00
28	420	7.00	1.0	0.179	0.244	0.161	0.018	0.19	0.00
29	435	7.25	1.0	0.179	0.241	0.161	0.018	0.19	0.00
30	450	7.50	1.1	0.197	0.237	0.177	0.020	0.21	0.00
31	465	7.75	1.2	0.215	0.234	0.193	0.021	0.23	0.00
32	480	8.00	1.3	0.232	0.231	0.209	0.002	0.02	0.00
33	495	8.25	1.5	0.268	0.228	0.241	0.041	0.43	167.88
34	510	8.50	1.5	0.268	0.224	0.241	0.044	0.46	198.07
35	525	8.75	1.6	0.286	0.221	0.257	0.065	0.68	398.09
36	540	9.00	1.7	0.304	0.218	0.274	0.086	0.91	597.84
37	555	9.25	1.9	0.340	0.215	0.306	0.125	1.32	967.41
38	570	9.50	2.0	0.358	0.212	0.322	0.146	1.54	1166.63
39	585	9.75	2.1	0.375	0.209	0.338	0.166	1.76	1365.57
40	600	10.00	2.2	0.393	0.206	0.354	0.187	1.98	1564.23
41	615	10.25	1.5	0.268	0.203	0.241	0.065	0.69	401.88
42	630	10.50	1.5	0.268	0.200	0.241	0.068	0.72	429.90
43	645	10.75	2.0	0.358	0.197	0.322	0.160	1.70	1308.09
44	660	11.00	2.0	0.358	0.194	0.322	0.163	1.73	1335.54
45	675	11.25	1.9	0.340	0.191	0.306	0.148	1.57	1192.62
46	690	11.50	1.9	0.340	0.189	0.306	0.151	1.60	1219.49
47	705	11.75	1.7	0.304	0.186	0.274	0.118	1.25	905.90
48	720	12.00	1.8	0.322	0.183	0.290	0.139	1.47	1102.28
49	735	12.25	2.5	0.447	0.180	0.402	0.267	2.82	2318.92
50	750	12.50	2.6	0.465	0.178	0.418	0.287	3.04	2514.71
51	765	12.75	2.8	0.501	0.175	0.451	0.326	3.44	2880.29
52	780	13.00	2.9	0.519	0.172	0.467	0.346	3.66	3075.47
53	795	13.25	3.4	0.608	0.170	0.547	0.438	4.63	3950.71
54	810	13.50	3.4	0.608	0.167	0.547	0.441	4.66	3975.18
55	825	13.75	2.3	0.411	0.165	0.370	0.247	2.61	2128.32
56	840	14.00	2.3	0.411	0.162	0.370	0.249	2.63	2152.16
57	855	14.25	2.7	0.483	0.160	0.434	0.323	3.42	2856.04
58	870	14.50	2.6	0.465	0.157	0.418	0.308	3.25	2709.14
59	885	14.75	2.6	0.465	0.155	0.418	0.310	3.28	2732.00
60	900	15.00	2.5	0.447	0.152	0.402	0.295	3.11	2584.44
61	915	15.25	2.4	0.429	0.150	0.386	0.279	2.95	2436.54
62	930	15.50	2.3	0.411	0.148	0.370	0.263	2.78	2288.29
63	945	15.75	1.9	0.340	0.146	0.306	0.194	2.05	1629.43
64	960	16.00	1.9	0.340	0.143	0.306	0.196	2.08	1650.58
65	975	16.25	0.4	0.072	0.141	0.064	0.007	0.08	0.00
66	990	16.50	0.4	0.072	0.139	0.064	0.007	0.08	0.00
67	1005	16.75	0.3	0.054	0.137	0.048	0.005	0.06	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.135	0.048	0.005	0.06	0.00
69	1035	17.25	0.5	0.089	0.133	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.131	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.129	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.127	0.064	0.007	0.08	0.00
73	1095	18.25	0.4	0.072	0.125	0.064	0.007	0.08	0.00
74	1110	18.50	0.4	0.072	0.123	0.064	0.007	0.08	0.00
75	1125	18.75	0.3	0.054	0.121	0.048	0.005	0.06	0.00
76	1140	19.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.118	0.048	0.005	0.06	0.00
78	1170	19.50	0.4	0.072	0.116	0.064	0.007	0.08	0.00
79	1185	19.75	0.3	0.054	0.115	0.048	0.005	0.06	0.00
80	1200	20.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.112	0.048	0.005	0.06	0.00
82	1230	20.50	0.3	0.054	0.110	0.048	0.005	0.06	0.00
83	1245	20.75	0.3	0.054	0.109	0.048	0.005	0.06	0.00
84	1260	21.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.106	0.048	0.005	0.06	0.00
86	1290	21.50	0.2	0.036	0.105	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.104	0.048	0.005	0.06	0.00
88	1320	22.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.102	0.048	0.005	0.06	0.00
90	1350	22.50	0.2	0.036	0.101	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.100	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.099	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.099	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.098	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.097	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.097	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.79
FLOOD VOLUME (acft)	1.58
FLOOD VOLUME (cuft)	68652.95
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56203.65
PEAK FLOW (cfs)	4.66

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.44	433	433	73	360	465.02	360	0.01
2	10	1.44	433	793	73	721	465.04	721	0.02
3	15	0.91	272	992	73	920	465.06	920	0.02
4	20	1.98	594	1,514	73	1,442	465.09	1,442	0.03
5	25	1.98	594	2,036	73	1,963	465.12	1,963	0.05
6	30	2.79	836	2,800	73	2,727	465.17	2,727	0.06
7	35	1.98	594	3,322	73	3,249	465.20	3,249	0.07
8	40	2.79	836	4,085	73	4,013	465.25	4,013	0.09
9	45	2.79	836	4,849	73	4,776	465.29	4,776	0.11
10	50	1.98	594	5,371	73	5,298	465.32	5,298	0.12
11	55	2.25	675	5,973	73	5,901	465.36	5,901	0.14
12	60	2.79	836	6,737	73	6,664	465.41	6,664	0.15
13	65	3.86	1,159	7,823	73	7,751	465.47	7,751	0.18
14	70	3.86	1,159	8,910	73	8,837	465.54	8,837	0.20
15	75	3.86	1,159	9,996	73	9,924	465.61	9,924	0.23
16	80	3.33	998	10,921	73	10,849	465.66	10,849	0.25
17	85	4.94	1,482	12,331	73	12,258	465.75	12,258	0.28
18	90	5.21	1,562	13,820	73	13,748	465.84	13,748	0.32
19	95	4.40	1,320	15,068	73	14,996	465.92	14,996	0.34
20	100	5.21	1,562	16,558	73	16,485	466.01	16,485	0.38
21	105	6.82	2,046	18,532	73	18,459	466.12	18,459	0.42
22	110	6.28	1,885	20,344	73	20,272	466.22	20,272	0.47
23	115	5.75	1,724	21,995	73	21,923	466.31	21,923	0.50
24	120	6.01	1,804	23,727	73	23,655	466.41	23,655	0.54
25	125	6.28	1,885	25,540	73	25,467	466.51	25,467	0.58
26	130	9.24	2,772	28,239	73	28,167	466.66	28,167	0.65
27	135	11.39	3,418	31,585	73	31,512	466.85	31,512	0.72
28	140	7.36	2,208	33,720	73	33,647	466.96	33,647	0.77
29	145	16.23	4,870	38,517	73	38,445	467.21	38,445	0.88
30	150	17.58	5,273	43,718	73	43,645	467.48	43,645	1.00
31	155	20.00	5,999	49,644	73	49,572	467.78	49,572	1.14
32	160	13.81	4,144	53,716	73	53,643	467.99	53,643	1.23
33	165	3.33	998	54,641	73	54,568	468.04	54,568	1.25
34	170	2.79	836	55,405	73	55,332	468.07	55,332	1.27
35	175	2.79	836	56,168	73	56,096	468.11	56,096	1.29
36	180	0.16	48	56,144	73	56,072	468.11	56,072	1.29

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	53	53	73	-	465.00	-	0.00
2	10	0.06	19	19	73	-	465.00	-	0.00
3	15	0.06	19	19	73	-	465.00	-	0.00
4	20	0.06	19	19	73	-	465.00	-	0.00
5	25	0.06	19	19	73	-	465.00	-	0.00
6	30	0.42	125	125	73	52	465.00	52	0.00
7	35	0.42	125	177	73	104	465.01	104	0.00
8	40	0.42	125	229	73	157	465.01	157	0.00
9	45	0.42	125	281	73	209	465.01	209	0.00
10	50	0.42	125	334	73	261	465.02	261	0.01
11	55	0.42	125	386	73	313	465.02	313	0.01
12	60	0.77	231	544	73	471	465.03	471	0.01
13	65	0.77	231	702	73	629	465.04	629	0.01
14	70	0.77	231	860	73	787	465.05	787	0.02
15	75	0.77	231	1,018	73	945	465.06	945	0.02
16	80	0.77	231	1,176	73	1,103	465.07	1,103	0.03
17	85	0.77	231	1,334	73	1,261	465.08	1,261	0.03
18	90	0.77	231	1,492	73	1,419	465.09	1,419	0.03
19	95	0.77	231	1,650	73	1,577	465.10	1,577	0.04
20	100	0.77	231	1,808	73	1,735	465.11	1,735	0.04
21	105	0.77	231	1,966	73	1,893	465.12	1,893	0.04
22	110	0.77	231	2,123	73	2,051	465.13	2,051	0.05
23	115	0.77	231	2,281	73	2,209	465.14	2,209	0.05
24	120	1.12	336	2,545	73	2,473	465.15	2,473	0.06
25	125	0.77	231	2,703	73	2,631	465.16	2,631	0.06
26	130	1.12	336	2,967	73	2,894	465.18	2,894	0.07
27	135	1.12	336	3,231	73	3,158	465.19	3,158	0.07
28	140	1.12	336	3,494	73	3,422	465.21	3,422	0.08
29	145	1.12	336	3,758	73	3,686	465.23	3,686	0.08
30	150	1.12	336	4,022	73	3,949	465.24	3,949	0.09
31	155	1.12	336	4,286	73	4,213	465.26	4,213	0.10
32	160	1.12	336	4,550	73	4,477	465.27	4,477	0.10
33	165	1.47	442	4,919	73	4,846	465.30	4,846	0.11
34	170	1.47	442	5,289	73	5,216	465.32	5,216	0.12
35	175	1.47	442	5,658	73	5,586	465.34	5,586	0.13
36	180	1.47	442	6,028	73	5,955	465.36	5,955	0.14
37	185	1.47	442	6,397	73	6,325	465.39	6,325	0.15
38	190	1.83	548	6,873	73	6,800	465.42	6,800	0.16
39	195	1.83	548	7,348	73	7,275	465.44	7,275	0.17
40	200	1.83	548	7,823	73	7,751	465.47	7,751	0.18
41	205	2.18	654	8,404	73	8,332	465.51	8,332	0.19
42	210	2.53	759	9,091	73	9,019	465.55	9,019	0.21
43	215	2.88	865	9,884	73	9,811	465.60	9,811	0.23
44	220	2.88	865	10,677	73	10,604	465.65	10,604	0.24
45	225	3.24	971	11,575	73	11,503	465.70	11,503	0.26
46	230	3.24	971	12,474	73	12,401	465.76	12,401	0.28
47	235	3.59	1,077	13,478	73	13,405	465.82	13,405	0.31
48	240	3.59	1,077	14,482	73	14,409	465.88	14,409	0.33
49	245	3.94	1,183	15,592	73	15,520	465.95	15,520	0.36
50	250	4.29	1,288	16,808	73	16,735	466.02	16,735	0.38
51	255	4.65	1,394	18,130	73	18,057	466.09	18,057	0.41
52	260	5.00	1,500	19,557	73	19,484	466.17	19,484	0.45
53	265	5.35	1,606	21,090	73	21,018	466.26	21,018	0.48
54	270	5.35	1,606	22,623	73	22,551	466.35	22,551	0.52
55	275	5.71	1,712	24,262	73	24,190	466.44	24,190	0.56

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	6.06	1,817	26,007	73	25,934	466.53	25,934	0.60
57	285	6.41	1,923	27,858	73	27,785	466.64	27,785	0.64
58	290	6.41	1,923	29,708	73	29,635	466.74	29,635	0.68
59	295	6.76	2,029	31,664	73	31,592	466.85	31,592	0.73
60	300	7.12	2,135	33,726	73	33,654	466.97	33,654	0.77
61	305	8.88	2,664	36,317	73	36,245	467.10	36,245	0.83
62	310	10.64	3,193	39,437	73	39,365	467.26	39,365	0.90
63	315	11.70	3,510	42,875	73	42,802	467.44	42,802	0.98
64	320	12.76	3,827	46,629	73	46,557	467.63	46,557	1.07
65	325	14.52	4,356	50,913	73	50,840	467.85	50,840	1.17
66	330	17.69	5,308	56,149	73	56,076	468.11	56,076	1.29
67	335	4.65	1,394	57,470	73	57,398	468.17	57,398	1.32
68	340	1.12	336	57,734	73	57,661	468.19	57,661	1.32
69	345	0.06	19	57,680	73	57,608	468.18	57,608	1.32
70	350	0.18	53	57,661	73	57,588	468.18	57,588	1.32
71	355	0.11	32	57,620	73	57,547	468.18	57,547	1.32
72	360	0.07	21	57,568	73	57,496	468.18	57,496	1.32

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	34	34	218	-	465.00	-	0.00
2	30	0.06	51	51	218	-	465.00	-	0.00
3	45	0.06	51	51	218	-	465.00	-	0.00
4	60	0.08	68	68	218	-	465.00	-	0.00
5	75	0.06	51	51	218	-	465.00	-	0.00
6	90	0.06	51	51	218	-	465.00	-	0.00
7	105	0.06	51	51	218	-	465.00	-	0.00
8	120	0.08	68	68	218	-	465.00	-	0.00
9	135	0.08	68	68	218	-	465.00	-	0.00
10	150	0.08	68	68	218	-	465.00	-	0.00
11	165	0.09	85	85	218	-	465.00	-	0.00
12	180	0.09	85	85	218	-	465.00	-	0.00
13	195	0.09	85	85	218	-	465.00	-	0.00
14	210	0.09	85	85	218	-	465.00	-	0.00
15	225	0.09	85	85	218	-	465.00	-	0.00
16	240	0.11	102	102	218	-	465.00	-	0.00
17	255	0.11	102	102	218	-	465.00	-	0.00
18	270	0.13	119	119	218	-	465.00	-	0.00
19	285	0.13	119	119	218	-	465.00	-	0.00
20	300	0.15	136	136	218	-	465.00	-	0.00
21	315	0.11	102	102	218	-	465.00	-	0.00
22	330	0.13	119	119	218	-	465.00	-	0.00
23	345	0.15	136	136	218	-	465.00	-	0.00
24	360	0.15	136	136	218	-	465.00	-	0.00
25	375	0.17	153	153	218	-	465.00	-	0.00
26	390	0.17	153	153	218	-	465.00	-	0.00
27	405	0.19	170	170	218	-	465.00	-	0.00
28	420	0.19	170	170	218	-	465.00	-	0.00
29	435	0.19	170	170	218	-	465.00	-	0.00
30	450	0.21	187	187	218	-	465.00	-	0.00
31	465	0.23	204	204	218	-	465.00	-	0.00
32	480	0.02	15	15	218	-	465.00	-	0.00
33	495	0.43	386	386	218	168	465.01	168	0.00
34	510	0.46	416	584	218	366	465.02	366	0.01
35	525	0.68	616	982	218	764	465.05	764	0.02
36	540	0.91	816	1,580	218	1,362	465.08	1,362	0.03
37	555	1.32	1,185	2,547	218	2,329	465.14	2,329	0.05
38	570	1.54	1,384	3,714	218	3,496	465.21	3,496	0.08
39	585	1.76	1,583	5,079	218	4,861	465.30	4,861	0.11
40	600	1.98	1,782	6,643	218	6,426	465.39	6,426	0.15
41	615	0.69	620	7,045	218	6,828	465.42	6,828	0.16
42	630	0.72	648	7,475	218	7,257	465.44	7,257	0.17
43	645	1.70	1,526	8,783	218	8,566	465.52	8,566	0.20
44	660	1.73	1,553	10,119	218	9,901	465.61	9,901	0.23
45	675	1.57	1,410	11,311	218	11,094	465.68	11,094	0.25
46	690	1.60	1,437	12,531	218	12,313	465.75	12,313	0.28
47	705	1.25	1,124	13,437	218	13,219	465.81	13,219	0.30
48	720	1.47	1,320	14,539	218	14,321	465.88	14,321	0.33
49	735	2.82	2,537	16,858	218	16,640	466.02	16,640	0.38
50	750	3.04	2,732	19,373	218	19,155	466.16	19,155	0.44
51	765	3.44	3,098	22,253	218	22,035	466.32	22,035	0.51
52	780	3.66	3,293	25,329	218	25,111	466.49	25,111	0.58
53	795	4.63	4,168	29,279	218	29,062	466.71	29,062	0.67
54	810	4.66	4,193	33,254	218	33,037	466.93	33,037	0.76
55	825	2.61	2,346	35,383	218	35,165	467.05	35,165	0.81
56	840	2.63	2,370	37,535	218	37,317	467.16	37,317	0.86
57	855	3.42	3,074	40,391	218	40,173	467.30	40,173	0.92
58	870	3.25	2,927	43,100	218	42,882	467.44	42,882	0.98

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.28	2,950	45,832	218	45,614	467.58	45,614	1.05
60	900	3.11	2,802	48,417	218	48,199	467.71	48,199	1.11
61	915	2.95	2,654	50,853	218	50,635	467.84	50,635	1.16
62	930	2.78	2,506	53,141	218	52,924	467.95	52,924	1.21
63	945	2.05	1,847	54,771	218	54,553	468.04	54,553	1.25
64	960	2.08	1,868	56,421	218	56,204	468.12	56,204	1.29
65	975	0.08	68	56,272	218	56,054	468.11	56,054	1.29
66	990	0.08	68	56,122	218	55,904	468.10	55,904	1.28
67	1005	0.06	51	55,955	218	55,738	468.09	55,738	1.28
68	1020	0.06	51	55,789	218	55,571	468.08	55,571	1.28
69	1035	0.09	85	55,656	218	55,438	468.08	55,438	1.27
70	1050	0.09	85	55,523	218	55,305	468.07	55,305	1.27
71	1065	0.09	85	55,390	218	55,173	468.07	55,173	1.27
72	1080	0.08	68	55,241	218	55,023	468.06	55,023	1.26
73	1095	0.08	68	55,091	218	54,873	468.05	54,873	1.26
74	1110	0.08	68	54,941	218	54,724	468.04	54,724	1.26
75	1125	0.06	51	54,775	218	54,557	468.04	54,557	1.25
76	1140	0.04	34	54,591	218	54,373	468.03	54,373	1.25
77	1155	0.06	51	54,424	218	54,206	468.02	54,206	1.24
78	1170	0.08	68	54,274	218	54,057	468.01	54,057	1.24
79	1185	0.06	51	54,108	218	53,890	468.00	53,890	1.24
80	1200	0.04	34	53,924	218	53,706	467.99	53,706	1.23
81	1215	0.06	51	53,757	218	53,539	467.99	53,539	1.23
82	1230	0.06	51	53,590	218	53,373	467.98	53,373	1.23
83	1245	0.06	51	53,424	218	53,206	467.97	53,206	1.22
84	1260	0.04	34	53,240	218	53,022	467.96	53,022	1.22
85	1275	0.06	51	53,073	218	52,856	467.95	52,856	1.21
86	1290	0.04	34	52,890	218	52,672	467.94	52,672	1.21
87	1305	0.06	51	52,723	218	52,505	467.93	52,505	1.21
88	1320	0.04	34	52,539	218	52,321	467.92	52,321	1.20
89	1335	0.06	51	52,372	218	52,155	467.92	52,155	1.20
90	1350	0.04	34	52,189	218	51,971	467.91	51,971	1.19
91	1365	0.04	34	52,005	218	51,787	467.90	51,787	1.19
92	1380	0.04	34	51,821	218	51,603	467.89	51,603	1.18
93	1395	0.04	34	51,637	218	51,420	467.88	51,420	1.18
94	1410	0.04	34	51,454	218	51,236	467.87	51,236	1.18
95	1425	0.04	34	51,270	218	51,052	467.86	51,052	1.17
96	1440	0.04	34	51,086	218	50,869	467.85	50,869	1.17

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD — PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
BASIC DATA CALCULATION FORM — JOB # 0
SHORTCUT METHOD — BY ES R. BAZUA, P.E. — DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.250	1.00	2.12	2.78	10.250	1.00	2.78	4.47	10.250	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	2.12	SUM [9]	10.25	SUM [11]	2.78	SUM [13]	10.25	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	56,125	59,056	63,525
	(acre-ft)	1.29	1.36	1.46
REQUIRED STORAGE	(cu-ft)	53,172	53,709	51,340
	(acre-ft)	1.22	1.23	1.18
PEAK FLOW	(cfs)	19.27	17.04	4.42
MAXIMUM WSEL	(ft)	468.04	468.07	467.95

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561
C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.21	0.30	0.12	1.28	314.48
2	10	0.17	1.3	0.331	0.21	0.30	0.12	1.28	314.48
3	15	0.25	1.1	0.280	0.21	0.25	0.07	0.76	158.02
4	20	0.33	1.5	0.382	0.21	0.34	0.18	1.80	470.93
5	25	0.42	1.5	0.382	0.21	0.34	0.18	1.80	470.93
6	30	0.50	1.8	0.458	0.21	0.41	0.25	2.58	705.62
7	35	0.58	1.5	0.382	0.21	0.34	0.18	1.80	470.93
8	40	0.67	1.8	0.458	0.21	0.41	0.25	2.58	705.62
9	45	0.75	1.8	0.458	0.21	0.41	0.25	2.58	705.62
10	50	0.83	1.5	0.382	0.21	0.34	0.18	1.80	470.93
11	55	0.92	1.6	0.407	0.21	0.37	0.20	2.06	549.16
12	60	1.00	1.8	0.458	0.21	0.41	0.25	2.58	705.62
13	65	1.08	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
14	70	1.17	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
15	75	1.25	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
16	80	1.33	2.0	0.509	0.21	0.46	0.30	3.11	862.07
17	85	1.42	2.6	0.661	0.21	0.60	0.46	4.67	1331.44
18	90	1.50	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
19	95	1.58	2.4	0.611	0.21	0.55	0.40	4.15	1174.98
20	100	1.67	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
21	105	1.75	3.3	0.840	0.21	0.76	0.63	6.50	1879.04
22	110	1.83	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
23	115	1.92	2.9	0.738	0.21	0.66	0.53	5.45	1566.12
24	120	2.00	3.0	0.763	0.21	0.69	0.56	5.71	1644.35
25	125	2.08	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
26	130	2.17	4.2	1.068	0.21	0.96	0.86	8.84	2583.09
27	135	2.25	5.0	1.272	0.21	1.14	1.07	10.93	3208.91
28	140	2.33	3.5	0.890	0.21	0.80	0.68	7.02	2035.49
29	145	2.42	6.8	1.730	0.21	1.56	1.52	15.62	4617.02
30	150	2.50	7.3	1.857	0.21	1.67	1.65	16.93	5008.16
31	155	2.58	8.2	2.086	0.21	1.88	1.88	19.27	5712.21
32	160	2.67	5.9	1.501	0.21	1.35	1.30	13.28	3912.96
33	165	2.75	2.0	0.509	0.21	0.46	0.30	3.11	862.07
34	170	2.83	1.8	0.458	0.21	0.41	0.25	2.58	705.62
35	175	2.92	1.8	0.458	0.21	0.41	0.25	2.58	705.62
36	180	3.00	0.6	0.153	0.21	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.29
FLOOD VOLUME (cuft)	56125.24
REQUIRED STORAGE (acft)	1.22
REQUIRED STORAGE (cuft)	53171.53
PEAK FLOW RATE (cfs)	19.27

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.21	0.15	0.02	0.17	0.00
2	10	0.17	0.6	0.200	0.21	0.18	0.02	0.21	0.00
3	15	0.25	0.6	0.200	0.21	0.18	0.02	0.21	0.00
4	20	0.33	0.6	0.200	0.21	0.18	0.02	0.21	0.00
5	25	0.42	0.6	0.200	0.21	0.18	0.02	0.21	0.00
6	30	0.50	0.7	0.234	0.21	0.21	0.03	0.28	15.59
7	35	0.58	0.7	0.234	0.21	0.21	0.03	0.28	15.59
8	40	0.67	0.7	0.234	0.21	0.21	0.03	0.28	15.59
9	45	0.75	0.7	0.234	0.21	0.21	0.03	0.28	15.59
10	50	0.83	0.7	0.234	0.21	0.21	0.03	0.28	15.59
11	55	0.92	0.7	0.234	0.21	0.21	0.03	0.28	15.59
12	60	1.00	0.8	0.267	0.21	0.24	0.06	0.63	118.17
13	65	1.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
14	70	1.17	0.8	0.267	0.21	0.24	0.06	0.63	118.17
15	75	1.25	0.8	0.267	0.21	0.24	0.06	0.63	118.17
16	80	1.33	0.8	0.267	0.21	0.24	0.06	0.63	118.17
17	85	1.42	0.8	0.267	0.21	0.24	0.06	0.63	118.17
18	90	1.50	0.8	0.267	0.21	0.24	0.06	0.63	118.17
19	95	1.58	0.8	0.267	0.21	0.24	0.06	0.63	118.17
20	100	1.67	0.8	0.267	0.21	0.24	0.06	0.63	118.17
21	105	1.75	0.8	0.267	0.21	0.24	0.06	0.63	118.17
22	110	1.83	0.8	0.267	0.21	0.24	0.06	0.63	118.17
23	115	1.92	0.8	0.267	0.21	0.24	0.06	0.63	118.17
24	120	2.00	0.9	0.300	0.21	0.27	0.09	0.97	220.75
25	125	2.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
26	130	2.17	0.9	0.300	0.21	0.27	0.09	0.97	220.75
27	135	2.25	0.9	0.300	0.21	0.27	0.09	0.97	220.75
28	140	2.33	0.9	0.300	0.21	0.27	0.09	0.97	220.75
29	145	2.42	0.9	0.300	0.21	0.27	0.09	0.97	220.75
30	150	2.50	0.9	0.300	0.21	0.27	0.09	0.97	220.75
31	155	2.58	0.9	0.300	0.21	0.27	0.09	0.97	220.75
32	160	2.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
33	165	2.75	1.0	0.334	0.21	0.30	0.13	1.31	323.33
34	170	2.83	1.0	0.334	0.21	0.30	0.13	1.31	323.33
35	175	2.92	1.0	0.334	0.21	0.30	0.13	1.31	323.33
36	180	3.00	1.0	0.334	0.21	0.30	0.13	1.31	323.33
37	185	3.08	1.0	0.334	0.21	0.30	0.13	1.31	323.33
38	190	3.17	1.1	0.367	0.21	0.33	0.16	1.65	425.91
39	195	3.25	1.1	0.367	0.21	0.33	0.16	1.65	425.91
40	200	3.33	1.1	0.367	0.21	0.33	0.16	1.65	425.91
41	205	3.42	1.2	0.400	0.21	0.36	0.19	1.99	528.50
42	210	3.50	1.3	0.434	0.21	0.39	0.23	2.34	631.08
43	215	3.58	1.4	0.467	0.21	0.42	0.26	2.68	733.66
44	220	3.67	1.4	0.467	0.21	0.42	0.26	2.68	733.66
45	225	3.75	1.5	0.500	0.21	0.45	0.29	3.02	836.24
46	230	3.83	1.5	0.500	0.21	0.45	0.29	3.02	836.24
47	235	3.92	1.6	0.534	0.21	0.48	0.33	3.36	938.82
48	240	4.00	1.6	0.534	0.21	0.48	0.33	3.36	938.82
49	245	4.08	1.7	0.567	0.21	0.51	0.36	3.70	1041.41
50	250	4.17	1.8	0.600	0.21	0.54	0.39	4.05	1143.99
51	255	4.25	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
52	260	4.33	2.0	0.667	0.21	0.60	0.46	4.73	1349.15
53	265	4.42	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
54	270	4.50	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
55	275	4.58	2.2	0.734	0.21	0.66	0.53	5.41	1554.32
56	280	4.67	2.3	0.767	0.21	0.69	0.56	5.76	1656.90

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
58	290	4.83	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
59	295	4.92	2.5	0.834	0.21	0.75	0.63	6.44	1862.06
60	300	5.00	2.6	0.867	0.21	0.78	0.66	6.78	1964.64
61	305	5.08	3.1	1.034	0.21	0.93	0.83	8.49	2477.55
62	310	5.17	3.6	1.201	0.21	1.08	1.00	10.20	2990.46
63	315	5.25	3.9	1.301	0.21	1.17	1.10	11.23	3298.21
64	320	5.33	4.2	1.401	0.21	1.26	1.20	12.25	3605.96
65	325	5.42	4.7	1.568	0.21	1.41	1.36	13.96	4118.87
66	330	5.50	5.6	1.868	0.21	1.68	1.66	17.04	5042.10
67	335	5.58	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
68	340	5.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
69	345	5.75	0.6	0.200	0.21	0.18	0.02	0.21	0.00
70	350	5.83	0.5	0.167	0.21	0.15	0.02	0.17	0.00
71	355	5.92	0.3	0.100	0.21	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.21	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59055.81
REQUIRED STORAGE (acft)	1.23
REQUIRED STORAGE (cuft)	53709.02
PEAK FLOW RATE (cfs)	17.04

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.363	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.359	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.355	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.351	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.347	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.343	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.338	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.334	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.330	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.326	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.322	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.318	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.314	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.310	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.307	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.303	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.299	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.295	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.291	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.288	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.284	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.280	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.276	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.273	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.269	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.266	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.262	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.258	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.255	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.252	0.177	0.020	0.20	0.00
31	465	7.75	1.2	0.215	0.248	0.193	0.021	0.22	0.00
32	480	8.00	1.3	0.232	0.245	0.209	0.023	0.24	5.05
33	495	8.25	1.5	0.268	0.241	0.241	0.027	0.28	39.29
34	510	8.50	1.5	0.268	0.238	0.241	0.030	0.31	70.31
35	525	8.75	1.6	0.286	0.235	0.257	0.052	0.53	266.00
36	540	9.00	1.7	0.304	0.231	0.274	0.073	0.75	461.42
37	555	9.25	1.9	0.340	0.228	0.306	0.112	1.15	821.51
38	570	9.50	2.0	0.358	0.225	0.322	0.133	1.36	1016.37
39	585	9.75	2.1	0.375	0.222	0.338	0.154	1.58	1210.96
40	600	10.00	2.2	0.393	0.218	0.354	0.175	1.79	1405.26
41	615	10.25	1.5	0.268	0.215	0.241	0.053	0.54	279.74
42	630	10.50	1.5	0.268	0.212	0.241	0.056	0.58	308.53
43	645	10.75	2.0	0.358	0.209	0.322	0.149	1.52	1161.74
44	660	11.00	2.0	0.358	0.206	0.322	0.152	1.55	1189.95
45	675	11.25	1.9	0.340	0.203	0.306	0.137	1.40	1052.92
46	690	11.50	1.9	0.340	0.200	0.306	0.140	1.43	1080.54
47	705	11.75	1.7	0.304	0.197	0.274	0.107	1.10	777.97
48	720	12.00	1.8	0.322	0.194	0.290	0.128	1.31	969.93
49	735	12.25	2.5	0.447	0.191	0.402	0.256	2.62	2151.25
50	750	12.50	2.6	0.465	0.188	0.418	0.277	2.84	2342.59
51	765	12.75	2.8	0.501	0.185	0.451	0.315	3.23	2698.57
52	780	13.00	2.9	0.519	0.183	0.467	0.336	3.44	2889.30
53	795	13.25	3.4	0.608	0.180	0.547	0.428	4.39	3739.48
54	810	13.50	3.4	0.608	0.177	0.547	0.431	4.42	3764.62
55	825	13.75	2.3	0.411	0.174	0.370	0.237	2.43	1975.07
56	840	14.00	2.3	0.411	0.172	0.370	0.239	2.45	1999.56
57	855	14.25	2.7	0.483	0.169	0.434	0.314	3.21	2683.50
58	870	14.50	2.6	0.465	0.167	0.418	0.298	3.06	2542.39
59	885	14.75	2.6	0.465	0.164	0.418	0.301	3.08	2565.88
60	900	15.00	2.5	0.447	0.162	0.402	0.285	2.93	2424.08
61	915	15.25	2.4	0.429	0.159	0.386	0.270	2.77	2281.94
62	930	15.50	2.3	0.411	0.157	0.370	0.255	2.61	2139.45
63	945	15.75	1.9	0.340	0.154	0.306	0.185	1.90	1501.78
64	960	16.00	1.9	0.340	0.152	0.306	0.188	1.93	1523.52
65	975	16.25	0.4	0.072	0.150	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.145	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.143	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.141	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.139	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.137	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.133	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.131	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.129	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.127	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.125	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.122	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.117	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.114	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.113	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.109	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.108	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.107	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.106	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.104	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.46
FLOOD VOLUME (cuft)	63525.46
REQUIRED STORAGE (acft)	1.18
REQUIRED STORAGE (cuft)	51340.48
PEAK FLOW (cfs)	4.42

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.28	384	384	70	314	465.02	314	0.01
2	10	1.28	384	699	70	629	465.04	629	0.01
3	15	0.76	228	857	70	787	465.05	787	0.02
4	20	1.80	541	1,328	70	1,258	465.08	1,258	0.03
5	25	1.80	541	1,799	70	1,729	465.11	1,729	0.04
6	30	2.58	775	2,504	70	2,434	465.15	2,434	0.06
7	35	1.80	541	2,975	70	2,905	465.18	2,905	0.07
8	40	2.58	775	3,681	70	3,611	465.23	3,611	0.08
9	45	2.58	775	4,386	70	4,317	465.27	4,317	0.10
10	50	1.80	541	4,857	70	4,788	465.30	4,788	0.11
11	55	2.06	619	5,406	70	5,337	465.34	5,337	0.12
12	60	2.58	775	6,112	70	6,042	465.38	6,042	0.14
13	65	3.63	1,088	7,131	70	7,061	465.45	7,061	0.16
14	70	3.63	1,088	8,149	70	8,079	465.51	8,079	0.19
15	75	3.63	1,088	9,168	70	9,098	465.58	9,098	0.21
16	80	3.11	932	10,030	70	9,960	465.63	9,960	0.23
17	85	4.67	1,401	11,361	70	11,291	465.71	11,291	0.26
18	90	4.93	1,479	12,771	70	12,701	465.80	12,701	0.29
19	95	4.15	1,245	13,946	70	13,876	465.88	13,876	0.32
20	100	4.93	1,479	15,356	70	15,286	465.97	15,286	0.35
21	105	6.50	1,949	17,235	70	17,165	466.08	17,165	0.39
22	110	5.97	1,792	18,957	70	18,887	466.18	18,887	0.43
23	115	5.45	1,636	20,523	70	20,453	466.27	20,453	0.47
24	120	5.71	1,714	22,168	70	22,098	466.36	22,098	0.51
25	125	5.97	1,792	23,890	70	23,820	466.46	23,820	0.55
26	130	8.84	2,653	26,473	70	26,403	466.61	26,403	0.61
27	135	10.93	3,279	29,682	70	29,612	466.79	29,612	0.68
28	140	7.02	2,105	31,718	70	31,648	466.91	31,648	0.73
29	145	15.62	4,687	36,335	70	36,265	467.16	36,265	0.83
30	150	16.93	5,078	41,343	70	41,273	467.42	41,273	0.95
31	155	19.27	5,782	47,055	70	46,985	467.72	46,985	1.08
32	160	13.28	3,983	50,968	70	50,898	467.93	50,898	1.17
33	165	3.11	932	51,830	70	51,760	467.97	51,760	1.19
34	170	2.58	775	52,536	70	52,466	468.01	52,466	1.20
35	175	2.58	775	53,241	70	53,172	468.04	53,172	1.22
36	180	0.16	47	53,218	70	53,149	468.04	53,149	1.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	70	-	465.00	-	0.00
2	10	0.21	62	62	70	-	465.00	-	0.00
3	15	0.21	62	62	70	-	465.00	-	0.00
4	20	0.21	62	62	70	-	465.00	-	0.00
5	25	0.21	62	62	70	-	465.00	-	0.00
6	30	0.28	85	85	70	16	465.00	16	0.00
7	35	0.28	85	101	70	31	465.00	31	0.00
8	40	0.28	85	117	70	47	465.00	47	0.00
9	45	0.28	85	132	70	62	465.00	62	0.00
10	50	0.28	85	148	70	78	465.00	78	0.00
11	55	0.28	85	163	70	94	465.01	94	0.00
12	60	0.63	188	281	70	212	465.01	212	0.00
13	65	0.63	188	400	70	330	465.02	330	0.01
14	70	0.63	188	518	70	448	465.03	448	0.01
15	75	0.63	188	636	70	566	465.04	566	0.01
16	80	0.63	188	754	70	684	465.04	684	0.02
17	85	0.63	188	872	70	803	465.05	803	0.02
18	90	0.63	188	990	70	921	465.06	921	0.02
19	95	0.63	188	1,109	70	1,039	465.07	1,039	0.02
20	100	0.63	188	1,227	70	1,157	465.07	1,157	0.03
21	105	0.63	188	1,345	70	1,275	465.08	1,275	0.03
22	110	0.63	188	1,463	70	1,393	465.09	1,393	0.03
23	115	0.63	188	1,581	70	1,512	465.10	1,512	0.03
24	120	0.97	291	1,802	70	1,732	465.11	1,732	0.04
25	125	0.63	188	1,920	70	1,850	465.12	1,850	0.04
26	130	0.97	291	2,141	70	2,071	465.13	2,071	0.05
27	135	0.97	291	2,362	70	2,292	465.15	2,292	0.05
28	140	0.97	291	2,582	70	2,513	465.16	2,513	0.06
29	145	0.97	291	2,803	70	2,733	465.17	2,733	0.06
30	150	0.97	291	3,024	70	2,954	465.19	2,954	0.07
31	155	0.97	291	3,245	70	3,175	465.20	3,175	0.07
32	160	0.97	291	3,465	70	3,396	465.21	3,396	0.08
33	165	1.31	393	3,789	70	3,719	465.24	3,719	0.09
34	170	1.31	393	4,112	70	4,042	465.26	4,042	0.09
35	175	1.31	393	4,435	70	4,366	465.28	4,366	0.10
36	180	1.31	393	4,759	70	4,689	465.30	4,689	0.11
37	185	1.31	393	5,082	70	5,012	465.32	5,012	0.12
38	190	1.65	496	5,508	70	5,438	465.34	5,438	0.12
39	195	1.65	496	5,934	70	5,864	465.37	5,864	0.13
40	200	1.65	496	6,360	70	6,290	465.40	6,290	0.14
41	205	1.99	598	6,888	70	6,819	465.43	6,819	0.16
42	210	2.34	701	7,519	70	7,450	465.47	7,450	0.17
43	215	2.68	803	8,253	70	8,183	465.52	8,183	0.19
44	220	2.68	803	8,987	70	8,917	465.56	8,917	0.20
45	225	3.02	906	9,823	70	9,753	465.62	9,753	0.22
46	230	3.02	906	10,659	70	10,589	465.67	10,589	0.24
47	235	3.36	1,009	11,598	70	11,528	465.73	11,528	0.26
48	240	3.36	1,009	12,537	70	12,467	465.79	12,467	0.29
49	245	3.70	1,111	13,578	70	13,509	465.85	13,509	0.31
50	250	4.05	1,214	14,722	70	14,652	465.93	14,652	0.34
51	255	4.39	1,316	15,969	70	15,899	466.01	15,899	0.36
52	260	4.73	1,419	17,318	70	17,248	466.08	17,248	0.40
53	265	5.07	1,522	18,770	70	18,700	466.17	18,700	0.43
54	270	5.07	1,522	20,221	70	20,152	466.25	20,152	0.46
55	275	5.41	1,624	21,776	70	21,706	466.34	21,706	0.50

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.76	1,727	23,433	70	23,363	466.43	23,363	0.54
57	285	6.10	1,829	25,192	70	25,122	466.53	25,122	0.58
58	290	6.10	1,829	26,952	70	26,882	466.64	26,882	0.62
59	295	6.44	1,932	28,814	70	28,744	466.74	28,744	0.66
60	300	6.78	2,034	30,778	70	30,709	466.86	30,709	0.70
61	305	8.49	2,547	33,256	70	33,186	467.00	33,186	0.76
62	310	10.20	3,060	36,246	70	36,177	467.15	36,177	0.83
63	315	11.23	3,368	39,545	70	39,475	467.33	39,475	0.91
64	320	12.25	3,676	43,151	70	43,081	467.52	43,081	0.99
65	325	13.96	4,189	47,269	70	47,200	467.73	47,200	1.08
66	330	17.04	5,112	52,311	70	52,242	468.00	52,242	1.20
67	335	4.39	1,316	53,558	70	53,488	468.06	53,488	1.23
68	340	0.97	291	53,779	70	53,709	468.07	53,709	1.23
69	345	0.21	62	53,771	70	53,701	468.07	53,701	1.23
70	350	0.17	51	53,752	70	53,682	468.07	53,682	1.23
71	355	0.10	31	53,713	70	53,643	468.06	53,643	1.23
72	360	0.07	21	53,664	70	53,594	468.06	53,594	1.23

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	33	33	209	-	465.00	-	0.00
2	30	0.05	49	49	209	-	465.00	-	0.00
3	45	0.05	49	49	209	-	465.00	-	0.00
4	60	0.07	66	66	209	-	465.00	-	0.00
5	75	0.05	49	49	209	-	465.00	-	0.00
6	90	0.05	49	49	209	-	465.00	-	0.00
7	105	0.05	49	49	209	-	465.00	-	0.00
8	120	0.07	66	66	209	-	465.00	-	0.00
9	135	0.07	66	66	209	-	465.00	-	0.00
10	150	0.07	66	66	209	-	465.00	-	0.00
11	165	0.09	82	82	209	-	465.00	-	0.00
12	180	0.09	82	82	209	-	465.00	-	0.00
13	195	0.09	82	82	209	-	465.00	-	0.00
14	210	0.09	82	82	209	-	465.00	-	0.00
15	225	0.09	82	82	209	-	465.00	-	0.00
16	240	0.11	99	99	209	-	465.00	-	0.00
17	255	0.11	99	99	209	-	465.00	-	0.00
18	270	0.13	115	115	209	-	465.00	-	0.00
19	285	0.13	115	115	209	-	465.00	-	0.00
20	300	0.15	132	132	209	-	465.00	-	0.00
21	315	0.11	99	99	209	-	465.00	-	0.00
22	330	0.13	115	115	209	-	465.00	-	0.00
23	345	0.15	132	132	209	-	465.00	-	0.00
24	360	0.15	132	132	209	-	465.00	-	0.00
25	375	0.16	148	148	209	-	465.00	-	0.00
26	390	0.16	148	148	209	-	465.00	-	0.00
27	405	0.18	165	165	209	-	465.00	-	0.00
28	420	0.18	165	165	209	-	465.00	-	0.00
29	435	0.18	165	165	209	-	465.00	-	0.00
30	450	0.20	181	181	209	-	465.00	-	0.00
31	465	0.22	198	198	209	-	465.00	-	0.00
32	480	0.24	214	214	209	5	465.00	5	0.00
33	495	0.28	249	254	209	44	465.00	44	0.00
34	510	0.31	280	324	209	115	465.01	115	0.00
35	525	0.53	475	590	209	381	465.02	381	0.01
36	540	0.75	671	1,051	209	842	465.05	842	0.02
37	555	1.15	1,031	1,873	209	1,664	465.11	1,664	0.04
38	570	1.36	1,226	2,889	209	2,680	465.17	2,680	0.06
39	585	1.58	1,420	4,100	209	3,891	465.25	3,891	0.09
40	600	1.79	1,615	5,506	209	5,296	465.34	5,296	0.12
41	615	0.54	489	5,785	209	5,576	465.35	5,576	0.13
42	630	0.58	518	6,094	209	5,884	465.37	5,884	0.14
43	645	1.52	1,371	7,256	209	7,046	465.45	7,046	0.16
44	660	1.55	1,399	8,446	209	8,236	465.52	8,236	0.19
45	675	1.40	1,262	9,498	209	9,289	465.59	9,289	0.21
46	690	1.43	1,290	10,579	209	10,370	465.66	10,370	0.24
47	705	1.10	987	11,357	209	11,148	465.71	11,148	0.26
48	720	1.31	1,179	12,327	209	12,117	465.77	12,117	0.28
49	735	2.62	2,361	14,478	209	14,269	465.90	14,269	0.33
50	750	2.84	2,552	16,821	209	16,611	466.05	16,611	0.38
51	765	3.23	2,908	19,519	209	19,310	466.20	19,310	0.44
52	780	3.44	3,099	22,409	209	22,199	466.37	22,199	0.51
53	795	4.39	3,949	26,148	209	25,939	466.58	25,939	0.60
54	810	4.42	3,974	29,913	209	29,703	466.80	29,703	0.68
55	825	2.43	2,184	31,888	209	31,678	466.91	31,678	0.73
56	840	2.45	2,209	33,887	209	33,678	467.02	33,678	0.77
57	855	3.21	2,893	36,571	209	36,361	467.16	36,361	0.83
58	870	3.06	2,752	39,113	209	38,904	467.30	38,904	0.89

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.08	2,775	41,679	209	41,470	467.43	41,470	0.95
60	900	2.93	2,633	44,103	209	43,894	467.56	43,894	1.01
61	915	2.77	2,491	46,385	209	46,176	467.68	46,176	1.06
62	930	2.61	2,349	48,525	209	48,315	467.79	48,315	1.11
63	945	1.90	1,711	50,026	209	49,817	467.87	49,817	1.14
64	960	1.93	1,733	51,550	209	51,340	467.95	51,340	1.18
65	975	0.07	66	51,406	209	51,197	467.94	51,197	1.18
66	990	0.07	66	51,263	209	51,054	467.93	51,054	1.17
67	1005	0.05	49	51,103	209	50,894	467.92	50,894	1.17
68	1020	0.05	49	50,943	209	50,734	467.92	50,734	1.16
69	1035	0.09	82	50,816	209	50,607	467.91	50,607	1.16
70	1050	0.09	82	50,689	209	50,480	467.90	50,480	1.16
71	1065	0.09	82	50,563	209	50,353	467.90	50,353	1.16
72	1080	0.07	66	50,419	209	50,210	467.89	50,210	1.15
73	1095	0.07	66	50,276	209	50,066	467.88	50,066	1.15
74	1110	0.07	66	50,132	209	49,923	467.87	49,923	1.15
75	1125	0.05	49	49,972	209	49,763	467.87	49,763	1.14
76	1140	0.04	33	49,796	209	49,587	467.86	49,587	1.14
77	1155	0.05	49	49,636	209	49,427	467.85	49,427	1.13
78	1170	0.07	66	49,493	209	49,283	467.84	49,283	1.13
79	1185	0.05	49	49,333	209	49,124	467.83	49,124	1.13
80	1200	0.04	33	49,157	209	48,947	467.82	48,947	1.12
81	1215	0.05	49	48,997	209	48,787	467.81	48,787	1.12
82	1230	0.05	49	48,837	209	48,627	467.81	48,627	1.12
83	1245	0.05	49	48,677	209	48,467	467.80	48,467	1.11
84	1260	0.04	33	48,500	209	48,291	467.79	48,291	1.11
85	1275	0.05	49	48,341	209	48,131	467.78	48,131	1.10
86	1290	0.04	33	48,164	209	47,955	467.77	47,955	1.10
87	1305	0.05	49	48,004	209	47,795	467.76	47,795	1.10
88	1320	0.04	33	47,828	209	47,619	467.75	47,619	1.09
89	1335	0.05	49	47,668	209	47,459	467.75	47,459	1.09
90	1350	0.04	33	47,492	209	47,282	467.74	47,282	1.09
91	1365	0.04	33	47,315	209	47,106	467.73	47,106	1.08
92	1380	0.04	33	47,139	209	46,929	467.72	46,929	1.08
93	1395	0.04	33	46,962	209	46,753	467.71	46,753	1.07
94	1410	0.04	33	46,786	209	46,577	467.70	46,577	1.07
95	1425	0.04	33	46,610	209	46,400	467.69	46,400	1.07
96	1440	0.04	33	46,433	209	46,224	467.68	46,224	1.06

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.790	1.00	2.12	2.78	9.790	1.00	2.78	4.47	9.790	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	2.12	SUM [9]	9.79	SUM [11]	2.78	SUM [13]	9.79	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	53,707	56,587	60,936
	(acre-ft)	1.23	1.30	1.40
REQUIRED STORAGE	(cu-ft)	50,983	51,654	49,570
	(acre-ft)	1.17	1.19	1.14
PEAK FLOW	(cfs)	18.42	16.28	4.23
MAXIMUM WSEL	(ft)	467.67	467.70	467.59

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603
C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.20	0.30	0.13	1.23	306.00
2	10	0.17	1.3	0.331	0.20	0.30	0.13	1.23	306.00
3	15	0.25	1.1	0.280	0.20	0.25	0.08	0.73	156.57
4	20	0.33	1.5	0.382	0.20	0.34	0.18	1.73	455.43
5	25	0.42	1.5	0.382	0.20	0.34	0.18	1.73	455.43
6	30	0.50	1.8	0.458	0.20	0.41	0.25	2.48	679.59
7	35	0.58	1.5	0.382	0.20	0.34	0.18	1.73	455.43
8	40	0.67	1.8	0.458	0.20	0.41	0.25	2.48	679.59
9	45	0.75	1.8	0.458	0.20	0.41	0.25	2.48	679.59
10	50	0.83	1.5	0.382	0.20	0.34	0.18	1.73	455.43
11	55	0.92	1.6	0.407	0.20	0.37	0.20	1.98	530.15
12	60	1.00	1.8	0.458	0.20	0.41	0.25	2.48	679.59
13	65	1.08	2.2	0.560	0.20	0.50	0.35	3.47	978.46
14	70	1.17	2.2	0.560	0.20	0.50	0.35	3.47	978.46
15	75	1.25	2.2	0.560	0.20	0.50	0.35	3.47	978.46
16	80	1.33	2.0	0.509	0.20	0.46	0.30	2.98	829.02
17	85	1.42	2.6	0.661	0.20	0.60	0.46	4.47	1277.32
18	90	1.50	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
19	95	1.58	2.4	0.611	0.20	0.55	0.41	3.97	1127.89
20	100	1.67	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
21	105	1.75	3.3	0.840	0.20	0.76	0.63	6.21	1800.35
22	110	1.83	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
23	115	1.92	2.9	0.738	0.20	0.66	0.53	5.22	1501.48
24	120	2.00	3.0	0.763	0.20	0.69	0.56	5.47	1576.19
25	125	2.08	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
26	130	2.17	4.2	1.068	0.20	0.96	0.86	8.46	2472.80
27	135	2.25	5.0	1.272	0.20	1.14	1.07	10.45	3070.54
28	140	2.33	3.5	0.890	0.20	0.80	0.69	6.71	1949.78
29	145	2.42	6.8	1.730	0.20	1.56	1.53	14.93	4415.45
30	150	2.50	7.3	1.857	0.20	1.67	1.65	16.18	4789.04
31	155	2.58	8.2	2.086	0.20	1.88	1.88	18.42	5461.49
32	160	2.67	5.9	1.501	0.20	1.35	1.30	12.69	3742.99
33	165	2.75	2.0	0.509	0.20	0.46	0.30	2.98	829.02
34	170	2.83	1.8	0.458	0.20	0.41	0.25	2.48	679.59
35	175	2.92	1.8	0.458	0.20	0.41	0.25	2.48	679.59
36	180	3.00	0.6	0.153	0.20	0.14	0.02	0.15	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.23
FLOOD VOLUME (cuft)	53707.39
REQUIRED STORAGE (acft)	1.17
REQUIRED STORAGE (cuft)	50982.60
PEAK FLOW RATE (cfs)	18.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.20	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.20	0.18	0.02	0.20	0.00
3	15	0.25	0.6	0.200	0.20	0.18	0.02	0.20	0.00
4	20	0.33	0.6	0.200	0.20	0.18	0.02	0.20	0.00
5	25	0.42	0.6	0.200	0.20	0.18	0.02	0.20	0.00
6	30	0.50	0.7	0.234	0.20	0.21	0.03	0.28	20.52
7	35	0.58	0.7	0.234	0.20	0.21	0.03	0.28	20.52
8	40	0.67	0.7	0.234	0.20	0.21	0.03	0.28	20.52
9	45	0.75	0.7	0.234	0.20	0.21	0.03	0.28	20.52
10	50	0.83	0.7	0.234	0.20	0.21	0.03	0.28	20.52
11	55	0.92	0.7	0.234	0.20	0.21	0.03	0.28	20.52
12	60	1.00	0.8	0.267	0.20	0.24	0.06	0.61	118.50
13	65	1.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
14	70	1.17	0.8	0.267	0.20	0.24	0.06	0.61	118.50
15	75	1.25	0.8	0.267	0.20	0.24	0.06	0.61	118.50
16	80	1.33	0.8	0.267	0.20	0.24	0.06	0.61	118.50
17	85	1.42	0.8	0.267	0.20	0.24	0.06	0.61	118.50
18	90	1.50	0.8	0.267	0.20	0.24	0.06	0.61	118.50
19	95	1.58	0.8	0.267	0.20	0.24	0.06	0.61	118.50
20	100	1.67	0.8	0.267	0.20	0.24	0.06	0.61	118.50
21	105	1.75	0.8	0.267	0.20	0.24	0.06	0.61	118.50
22	110	1.83	0.8	0.267	0.20	0.24	0.06	0.61	118.50
23	115	1.92	0.8	0.267	0.20	0.24	0.06	0.61	118.50
24	120	2.00	0.9	0.300	0.20	0.27	0.10	0.93	216.48
25	125	2.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
26	130	2.17	0.9	0.300	0.20	0.27	0.10	0.93	216.48
27	135	2.25	0.9	0.300	0.20	0.27	0.10	0.93	216.48
28	140	2.33	0.9	0.300	0.20	0.27	0.10	0.93	216.48
29	145	2.42	0.9	0.300	0.20	0.27	0.10	0.93	216.48
30	150	2.50	0.9	0.300	0.20	0.27	0.10	0.93	216.48
31	155	2.58	0.9	0.300	0.20	0.27	0.10	0.93	216.48
32	160	2.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
33	165	2.75	1.0	0.334	0.20	0.30	0.13	1.26	314.46
34	170	2.83	1.0	0.334	0.20	0.30	0.13	1.26	314.46
35	175	2.92	1.0	0.334	0.20	0.30	0.13	1.26	314.46
36	180	3.00	1.0	0.334	0.20	0.30	0.13	1.26	314.46
37	185	3.08	1.0	0.334	0.20	0.30	0.13	1.26	314.46
38	190	3.17	1.1	0.367	0.20	0.33	0.16	1.59	412.44
39	195	3.25	1.1	0.367	0.20	0.33	0.16	1.59	412.44
40	200	3.33	1.1	0.367	0.20	0.33	0.16	1.59	412.44
41	205	3.42	1.2	0.400	0.20	0.36	0.20	1.91	510.41
42	210	3.50	1.3	0.434	0.20	0.39	0.23	2.24	608.39
43	215	3.58	1.4	0.467	0.20	0.42	0.26	2.57	706.37
44	220	3.67	1.4	0.467	0.20	0.42	0.26	2.57	706.37
45	225	3.75	1.5	0.500	0.20	0.45	0.30	2.89	804.35
46	230	3.83	1.5	0.500	0.20	0.45	0.30	2.89	804.35
47	235	3.92	1.6	0.534	0.20	0.48	0.33	3.22	902.33
48	240	4.00	1.6	0.534	0.20	0.48	0.33	3.22	902.33
49	245	4.08	1.7	0.567	0.20	0.51	0.36	3.55	1000.31
50	250	4.17	1.8	0.600	0.20	0.54	0.40	3.87	1098.28
51	255	4.25	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
52	260	4.33	2.0	0.667	0.20	0.60	0.46	4.53	1294.24
53	265	4.42	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
54	270	4.50	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
55	275	4.58	2.2	0.734	0.20	0.66	0.53	5.18	1490.20
56	280	4.67	2.3	0.767	0.20	0.69	0.56	5.51	1588.18

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
58	290	4.83	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
59	295	4.92	2.5	0.834	0.20	0.75	0.63	6.16	1784.13
60	300	5.00	2.6	0.867	0.20	0.78	0.66	6.49	1882.11
61	305	5.08	3.1	1.034	0.20	0.93	0.83	8.12	2372.00
62	310	5.17	3.6	1.201	0.20	1.08	1.00	9.75	2861.89
63	315	5.25	3.9	1.301	0.20	1.17	1.10	10.73	3155.83
64	320	5.33	4.2	1.401	0.20	1.26	1.20	11.71	3449.76
65	325	5.42	4.7	1.568	0.20	1.41	1.36	13.35	3939.66
66	330	5.50	5.6	1.868	0.20	1.68	1.66	16.28	4821.46
67	335	5.58	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
68	340	5.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
69	345	5.75	0.6	0.200	0.20	0.18	0.02	0.20	0.00
70	350	5.83	0.5	0.167	0.20	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.20	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.20	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.30
FLOOD VOLUME (cuft)	56587.21
REQUIRED STORAGE (acft)	1.19
REQUIRED STORAGE (cuft)	51653.82
PEAK FLOW RATE (cfs)	16.28

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.362	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.357	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.353	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.349	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.345	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.341	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.337	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.333	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.329	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.325	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.321	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.317	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.313	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.309	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.305	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.301	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.297	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.294	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.290	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.286	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.279	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.275	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.272	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.268	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.264	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.261	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.257	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.254	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.250	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.247	0.193	0.021	0.21	0.00
32	480	8.00	1.3	0.232	0.243	0.209	0.023	0.23	13.15
33	495	8.25	1.5	0.268	0.240	0.241	0.028	0.28	55.92
34	510	8.50	1.5	0.268	0.237	0.241	0.031	0.31	85.41
35	525	8.75	1.6	0.286	0.233	0.257	0.053	0.52	272.18
36	540	9.00	1.7	0.304	0.230	0.274	0.074	0.72	458.69
37	555	9.25	1.9	0.340	0.227	0.306	0.113	1.10	802.48
38	570	9.50	2.0	0.358	0.224	0.322	0.134	1.31	988.46
39	585	9.75	2.1	0.375	0.220	0.338	0.155	1.52	1174.18
40	600	10.00	2.2	0.393	0.217	0.354	0.176	1.72	1359.63
41	615	10.25	1.5	0.268	0.214	0.241	0.054	0.53	284.49
42	630	10.50	1.5	0.268	0.211	0.241	0.057	0.56	311.86
43	645	10.75	2.0	0.358	0.208	0.322	0.150	1.46	1126.65
44	660	11.00	2.0	0.358	0.205	0.322	0.153	1.49	1153.47
45	675	11.25	1.9	0.340	0.202	0.306	0.138	1.35	1022.46
46	690	11.50	1.9	0.340	0.199	0.306	0.141	1.38	1048.71
47	705	11.75	1.7	0.304	0.196	0.274	0.108	1.06	759.60
48	720	12.00	1.8	0.322	0.193	0.290	0.129	1.26	942.83
49	735	12.25	2.5	0.447	0.190	0.402	0.257	2.51	2071.00
50	750	12.50	2.6	0.465	0.187	0.418	0.278	2.72	2253.64
51	765	12.75	2.8	0.501	0.185	0.451	0.316	3.09	2593.53
52	780	13.00	2.9	0.519	0.182	0.467	0.337	3.30	2775.58
53	795	13.25	3.4	0.608	0.179	0.547	0.429	4.20	3587.49
54	810	13.50	3.4	0.608	0.176	0.547	0.432	4.23	3611.39
55	825	13.75	2.3	0.411	0.174	0.370	0.238	2.33	1902.04
56	840	14.00	2.3	0.411	0.171	0.370	0.240	2.35	1925.32
57	855	14.25	2.7	0.483	0.168	0.434	0.314	3.08	2578.46
58	870	14.50	2.6	0.465	0.166	0.418	0.299	2.93	2443.57
59	885	14.75	2.6	0.465	0.163	0.418	0.302	2.95	2465.90
60	900	15.00	2.5	0.447	0.161	0.402	0.286	2.80	2330.36
61	915	15.25	2.4	0.429	0.158	0.386	0.271	2.65	2194.50
62	930	15.50	2.3	0.411	0.156	0.370	0.255	2.50	2058.30
63	945	15.75	1.9	0.340	0.153	0.306	0.186	1.82	1449.14
64	960	16.00	1.9	0.340	0.151	0.306	0.189	1.85	1469.81
65	975	16.25	0.4	0.072	0.149	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.144	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.142	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.140	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.138	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.136	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.132	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.130	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.128	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.126	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.124	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.121	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.119	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.116	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.112	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.107	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.106	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.105	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.103	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.102	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.40
FLOOD VOLUME (cuft)	60935.59
REQUIRED STORAGE (acft)	1.14
REQUIRED STORAGE (cuft)	49570.20
PEAK FLOW (cfs)	4.23

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.23	370	370	64	306	464.52	306	0.01
2	10	1.23	370	676	64	612	464.54	612	0.01
3	15	0.73	220	832	64	769	464.55	769	0.02
4	20	1.73	519	1,288	64	1,224	464.58	1,224	0.03
5	25	1.73	519	1,743	64	1,679	464.62	1,679	0.04
6	30	2.48	743	2,423	64	2,359	464.66	2,359	0.05
7	35	1.73	519	2,878	64	2,814	464.69	2,814	0.06
8	40	2.48	743	3,558	64	3,494	464.74	3,494	0.08
9	45	2.48	743	4,238	64	4,174	464.79	4,174	0.10
10	50	1.73	519	4,693	64	4,629	464.82	4,629	0.11
11	55	1.98	594	5,223	64	5,159	464.86	5,159	0.12
12	60	2.48	743	5,903	64	5,839	464.90	5,839	0.13
13	65	3.47	1,042	6,881	64	6,817	464.97	6,817	0.16
14	70	3.47	1,042	7,860	64	7,796	465.04	7,796	0.18
15	75	3.47	1,042	8,838	64	8,774	465.11	8,774	0.20
16	80	2.98	893	9,667	64	9,603	465.16	9,603	0.22
17	85	4.47	1,341	10,944	64	10,881	465.25	10,881	0.25
18	90	4.72	1,416	12,296	64	12,233	465.35	12,233	0.28
19	95	3.97	1,192	13,424	64	13,360	465.42	13,360	0.31
20	100	4.72	1,416	14,776	64	14,712	465.52	14,712	0.34
21	105	6.21	1,864	16,577	64	16,513	465.63	16,513	0.38
22	110	5.72	1,715	18,228	64	18,164	465.73	18,164	0.42
23	115	5.22	1,565	19,729	64	19,665	465.83	19,665	0.45
24	120	5.47	1,640	21,305	64	21,241	465.92	21,241	0.49
25	125	5.72	1,715	22,956	64	22,892	466.03	22,892	0.53
26	130	8.46	2,537	25,429	64	25,365	466.18	25,365	0.58
27	135	10.45	3,134	28,500	64	28,436	466.38	28,436	0.65
28	140	6.71	2,014	30,449	64	30,385	466.50	30,385	0.70
29	145	14.93	4,479	34,865	64	34,801	466.75	34,801	0.80
30	150	16.18	4,853	39,654	64	39,590	467.02	39,590	0.91
31	155	18.42	5,525	45,115	64	45,051	467.34	45,051	1.03
32	160	12.69	3,807	48,858	64	48,794	467.55	48,794	1.12
33	165	2.98	893	49,687	64	49,623	467.59	49,623	1.14
34	170	2.48	743	50,367	64	50,303	467.63	50,303	1.15
35	175	2.48	743	51,046	64	50,983	467.67	50,983	1.17
36	180	0.15	45	51,027	64	50,964	467.66	50,964	1.17

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	49	49	64	-	464.50	-	0.00
2	10	0.20	59	59	64	-	464.50	-	0.00
3	15	0.20	59	59	64	-	464.50	-	0.00
4	20	0.20	59	59	64	-	464.50	-	0.00
5	25	0.20	59	59	64	-	464.50	-	0.00
6	30	0.28	84	84	64	21	464.50	21	0.00
7	35	0.28	84	105	64	41	464.50	41	0.00
8	40	0.28	84	125	64	62	464.50	62	0.00
9	45	0.28	84	146	64	82	464.51	82	0.00
10	50	0.28	84	166	64	103	464.51	103	0.00
11	55	0.28	84	187	64	123	464.51	123	0.00
12	60	0.61	182	306	64	242	464.52	242	0.01
13	65	0.61	182	424	64	360	464.52	360	0.01
14	70	0.61	182	543	64	479	464.53	479	0.01
15	75	0.61	182	661	64	597	464.54	597	0.01
16	80	0.61	182	780	64	716	464.55	716	0.02
17	85	0.61	182	898	64	834	464.56	834	0.02
18	90	0.61	182	1,017	64	953	464.57	953	0.02
19	95	0.61	182	1,135	64	1,071	464.57	1,071	0.02
20	100	0.61	182	1,254	64	1,190	464.58	1,190	0.03
21	105	0.61	182	1,372	64	1,308	464.59	1,308	0.03
22	110	0.61	182	1,491	64	1,427	464.60	1,427	0.03
23	115	0.61	182	1,609	64	1,545	464.61	1,545	0.04
24	120	0.93	280	1,826	64	1,762	464.62	1,762	0.04
25	125	0.61	182	1,944	64	1,880	464.63	1,880	0.04
26	130	0.93	280	2,161	64	2,097	464.64	2,097	0.05
27	135	0.93	280	2,377	64	2,313	464.66	2,313	0.05
28	140	0.93	280	2,593	64	2,530	464.67	2,530	0.06
29	145	0.93	280	2,810	64	2,746	464.69	2,746	0.06
30	150	0.93	280	3,026	64	2,963	464.70	2,963	0.07
31	155	0.93	280	3,243	64	3,179	464.72	3,179	0.07
32	160	0.93	280	3,459	64	3,395	464.73	3,395	0.08
33	165	1.26	378	3,774	64	3,710	464.76	3,710	0.09
34	170	1.26	378	4,088	64	4,024	464.78	4,024	0.09
35	175	1.26	378	4,403	64	4,339	464.80	4,339	0.10
36	180	1.26	378	4,717	64	4,653	464.82	4,653	0.11
37	185	1.26	378	5,032	64	4,968	464.84	4,968	0.11
38	190	1.59	476	5,444	64	5,380	464.87	5,380	0.12
39	195	1.59	476	5,857	64	5,793	464.90	5,793	0.13
40	200	1.59	476	6,269	64	6,205	464.93	6,205	0.14
41	205	1.91	574	6,779	64	6,716	464.96	6,716	0.15
42	210	2.24	672	7,388	64	7,324	465.01	7,324	0.17
43	215	2.57	770	8,094	64	8,030	465.06	8,030	0.18
44	220	2.57	770	8,801	64	8,737	465.10	8,737	0.20
45	225	2.89	868	9,605	64	9,541	465.16	9,541	0.22
46	230	2.89	868	10,409	64	10,345	465.22	10,345	0.24
47	235	3.22	966	11,312	64	11,248	465.28	11,248	0.26
48	240	3.22	966	12,214	64	12,150	465.34	12,150	0.28
49	245	3.55	1,064	13,214	64	13,150	465.41	13,150	0.30
50	250	3.87	1,162	14,312	64	14,249	465.49	14,249	0.33
51	255	4.20	1,260	15,509	64	15,445	465.56	15,445	0.35
52	260	4.53	1,358	16,803	64	16,739	465.64	16,739	0.38
53	265	4.85	1,456	18,195	64	18,131	465.73	18,131	0.42
54	270	4.85	1,456	19,587	64	19,524	465.82	19,524	0.45
55	275	5.18	1,554	21,078	64	21,014	465.91	21,014	0.48

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.51	1,652	22,666	64	22,602	466.01	22,602	0.52
57	285	5.83	1,750	24,352	64	24,288	466.12	24,288	0.56
58	290	5.83	1,750	26,038	64	25,974	466.22	25,974	0.60
59	295	6.16	1,848	27,822	64	27,758	466.33	27,758	0.64
60	300	6.49	1,946	29,704	64	29,640	466.45	29,640	0.68
61	305	8.12	2,436	32,076	64	32,012	466.59	32,012	0.73
62	310	9.75	2,926	34,938	64	34,874	466.76	34,874	0.80
63	315	10.73	3,220	38,094	64	38,030	466.94	38,030	0.87
64	320	11.71	3,514	41,544	64	41,480	467.13	41,480	0.95
65	325	13.35	4,004	45,483	64	45,420	467.36	45,420	1.04
66	330	16.28	4,885	50,305	64	50,241	467.63	50,241	1.15
67	335	4.20	1,260	51,501	64	51,437	467.69	51,437	1.18
68	340	0.93	280	51,718	64	51,654	467.70	51,654	1.19
69	345	0.20	59	51,713	64	51,649	467.70	51,649	1.19
70	350	0.16	49	51,698	64	51,634	467.70	51,634	1.19
71	355	0.10	29	51,663	64	51,599	467.70	51,599	1.18
72	360	0.07	20	51,619	64	51,555	467.70	51,555	1.18

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	32	32	192	-	464.50	-	0.00
2	30	0.05	47	47	192	-	464.50	-	0.00
3	45	0.05	47	47	192	-	464.50	-	0.00
4	60	0.07	63	63	192	-	464.50	-	0.00
5	75	0.05	47	47	192	-	464.50	-	0.00
6	90	0.05	47	47	192	-	464.50	-	0.00
7	105	0.05	47	47	192	-	464.50	-	0.00
8	120	0.07	63	63	192	-	464.50	-	0.00
9	135	0.07	63	63	192	-	464.50	-	0.00
10	150	0.07	63	63	192	-	464.50	-	0.00
11	165	0.09	79	79	192	-	464.50	-	0.00
12	180	0.09	79	79	192	-	464.50	-	0.00
13	195	0.09	79	79	192	-	464.50	-	0.00
14	210	0.09	79	79	192	-	464.50	-	0.00
15	225	0.09	79	79	192	-	464.50	-	0.00
16	240	0.11	95	95	192	-	464.50	-	0.00
17	255	0.11	95	95	192	-	464.50	-	0.00
18	270	0.12	110	110	192	-	464.50	-	0.00
19	285	0.12	110	110	192	-	464.50	-	0.00
20	300	0.14	126	126	192	-	464.50	-	0.00
21	315	0.11	95	95	192	-	464.50	-	0.00
22	330	0.12	110	110	192	-	464.50	-	0.00
23	345	0.14	126	126	192	-	464.50	-	0.00
24	360	0.14	126	126	192	-	464.50	-	0.00
25	375	0.16	142	142	192	-	464.50	-	0.00
26	390	0.16	142	142	192	-	464.50	-	0.00
27	405	0.18	158	158	192	-	464.50	-	0.00
28	420	0.18	158	158	192	-	464.50	-	0.00
29	435	0.18	158	158	192	-	464.50	-	0.00
30	450	0.19	173	173	192	-	464.50	-	0.00
31	465	0.21	189	189	192	-	464.50	-	0.00
32	480	0.23	205	205	192	13	464.50	13	0.00
33	495	0.28	248	261	192	69	464.50	69	0.00
34	510	0.31	277	346	192	154	464.51	154	0.00
35	525	0.52	464	618	192	427	464.53	427	0.01
36	540	0.72	650	1,077	192	885	464.56	885	0.02
37	555	1.10	994	1,879	192	1,688	464.62	1,688	0.04
38	570	1.31	1,180	2,868	192	2,676	464.69	2,676	0.06
39	585	1.52	1,366	4,042	192	3,850	464.77	3,850	0.09
40	600	1.72	1,551	5,402	192	5,210	464.86	5,210	0.12
41	615	0.53	476	5,686	192	5,495	464.88	5,495	0.13
42	630	0.56	504	5,998	192	5,806	464.90	5,806	0.13
43	645	1.46	1,318	7,125	192	6,933	464.98	6,933	0.16
44	660	1.49	1,345	8,278	192	8,087	465.06	8,087	0.19
45	675	1.35	1,214	9,301	192	9,109	465.13	9,109	0.21
46	690	1.38	1,240	10,349	192	10,158	465.20	10,158	0.23
47	705	1.06	951	11,109	192	10,917	465.25	10,917	0.25
48	720	1.26	1,134	12,052	192	11,860	465.32	11,860	0.27
49	735	2.51	2,263	14,123	192	13,931	465.46	13,931	0.32
50	750	2.72	2,445	16,376	192	16,185	465.61	16,185	0.37
51	765	3.09	2,785	18,970	192	18,778	465.77	18,778	0.43
52	780	3.30	2,967	21,746	192	21,554	465.94	21,554	0.49
53	795	4.20	3,779	25,333	192	25,141	466.17	25,141	0.58
54	810	4.23	3,803	28,944	192	28,753	466.40	28,753	0.66
55	825	2.33	2,094	30,846	192	30,655	466.51	30,655	0.70
56	840	2.35	2,117	32,772	192	32,580	466.62	32,580	0.75
57	855	3.08	2,770	35,350	192	35,159	466.77	35,159	0.81
58	870	2.93	2,635	37,794	192	37,602	466.91	37,602	0.86

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.95	2,658	40,260	192	40,068	467.05	40,068	0.92
60	900	2.80	2,522	42,590	192	42,398	467.19	42,398	0.97
61	915	2.65	2,386	44,785	192	44,593	467.31	44,593	1.02
62	930	2.50	2,250	46,843	192	46,651	467.43	46,651	1.07
63	945	1.82	1,641	48,292	192	48,100	467.51	48,100	1.10
64	960	1.85	1,661	49,762	192	49,570	467.59	49,570	1.14
65	975	0.07	63	49,633	192	49,442	467.58	49,442	1.14
66	990	0.07	63	49,505	192	49,313	467.58	49,313	1.13
67	1005	0.05	47	49,360	192	49,169	467.57	49,169	1.13
68	1020	0.05	47	49,216	192	49,024	467.56	49,024	1.13
69	1035	0.09	79	49,103	192	48,911	467.55	48,911	1.12
70	1050	0.09	79	48,990	192	48,798	467.55	48,798	1.12
71	1065	0.09	79	48,877	192	48,686	467.54	48,686	1.12
72	1080	0.07	63	48,749	192	48,557	467.54	48,557	1.11
73	1095	0.07	63	48,620	192	48,428	467.53	48,428	1.11
74	1110	0.07	63	48,491	192	48,300	467.52	48,300	1.11
75	1125	0.05	47	48,347	192	48,155	467.51	48,155	1.11
76	1140	0.04	32	48,187	192	47,995	467.51	47,995	1.10
77	1155	0.05	47	48,042	192	47,851	467.50	47,851	1.10
78	1170	0.07	63	47,914	192	47,722	467.49	47,722	1.10
79	1185	0.05	47	47,769	192	47,578	467.48	47,578	1.09
80	1200	0.04	32	47,609	192	47,418	467.47	47,418	1.09
81	1215	0.05	47	47,465	192	47,273	467.46	47,273	1.09
82	1230	0.05	47	47,320	192	47,129	467.46	47,129	1.08
83	1245	0.05	47	47,176	192	46,984	467.45	46,984	1.08
84	1260	0.04	32	47,016	192	46,824	467.44	46,824	1.07
85	1275	0.05	47	46,872	192	46,680	467.43	46,680	1.07
86	1290	0.04	32	46,711	192	46,520	467.42	46,520	1.07
87	1305	0.05	47	46,567	192	46,375	467.41	46,375	1.06
88	1320	0.04	32	46,407	192	46,215	467.40	46,215	1.06
89	1335	0.05	47	46,262	192	46,071	467.40	46,071	1.06
90	1350	0.04	32	46,102	192	45,911	467.39	45,911	1.05
91	1365	0.04	32	45,942	192	45,751	467.38	45,751	1.05
92	1380	0.04	32	45,782	192	45,590	467.37	45,590	1.05
93	1395	0.04	32	45,622	192	45,430	467.36	45,430	1.04
94	1410	0.04	32	45,462	192	45,270	467.35	45,270	1.04
95	1425	0.04	32	45,302	192	45,110	467.34	45,110	1.04
96	1440	0.04	32	45,142	192	44,950	467.33	44,950	1.03

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.490	1.00	2.12	2.78	9.490	1.00	2.78	4.47	9.490	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	2.12	SUM [9]	9.49	SUM [11]	2.78	SUM [13]	9.49	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.31	1.30	1.28
FLOOD VOLUME	(cu-ft)	45,222	44,840	44,164
	(acre-ft)	1.04	1.03	1.01
REQUIRED STORAGE	(cu-ft)	41,999	39,086	31,405
	(acre-ft)	0.96	0.90	0.72
PEAK FLOW	(cfs)	17.21	15.14	3.54
MAXIMUM WSEL	(ft)	465.64	465.51	465.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767
C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.27	0.30	0.06	0.55	82.80
2	10	0.17	1.3	0.331	0.27	0.30	0.06	0.55	82.80
3	15	0.25	1.1	0.280	0.27	0.25	0.01	0.07	0.00
4	20	0.33	1.5	0.382	0.27	0.34	0.11	1.03	227.65
5	25	0.42	1.5	0.382	0.27	0.34	0.11	1.03	227.65
6	30	0.50	1.8	0.458	0.27	0.41	0.19	1.76	444.94
7	35	0.58	1.5	0.382	0.27	0.34	0.11	1.03	227.65
8	40	0.67	1.8	0.458	0.27	0.41	0.19	1.76	444.94
9	45	0.75	1.8	0.458	0.27	0.41	0.19	1.76	444.94
10	50	0.83	1.5	0.382	0.27	0.34	0.11	1.03	227.65
11	55	0.92	1.6	0.407	0.27	0.37	0.13	1.27	300.08
12	60	1.00	1.8	0.458	0.27	0.41	0.19	1.76	444.94
13	65	1.08	2.2	0.560	0.27	0.50	0.29	2.72	734.65
14	70	1.17	2.2	0.560	0.27	0.50	0.29	2.72	734.65
15	75	1.25	2.2	0.560	0.27	0.50	0.29	2.72	734.65
16	80	1.33	2.0	0.509	0.27	0.46	0.24	2.24	589.79
17	85	1.42	2.6	0.661	0.27	0.60	0.39	3.69	1024.36
18	90	1.50	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
19	95	1.58	2.4	0.611	0.27	0.55	0.34	3.20	879.50
20	100	1.67	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
21	105	1.75	3.3	0.840	0.27	0.76	0.57	5.38	1531.35
22	110	1.83	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
23	115	1.92	2.9	0.738	0.27	0.66	0.46	4.41	1241.64
24	120	2.00	3.0	0.763	0.27	0.69	0.49	4.65	1314.07
25	125	2.08	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
26	130	2.17	4.2	1.068	0.27	0.96	0.80	7.55	2183.20
27	135	2.25	5.0	1.272	0.27	1.14	1.00	9.48	2762.62
28	140	2.33	3.5	0.890	0.27	0.80	0.62	5.86	1676.21
29	145	2.42	6.8	1.730	0.27	1.56	1.46	13.83	4066.32
30	150	2.50	7.3	1.857	0.27	1.67	1.58	15.03	4428.46
31	155	2.58	8.2	2.086	0.27	1.88	1.81	17.21	5080.31
32	160	2.67	5.9	1.501	0.27	1.35	1.23	11.65	3414.47
33	165	2.75	2.0	0.509	0.27	0.46	0.24	2.24	589.79
34	170	2.83	1.8	0.458	0.27	0.41	0.19	1.76	444.94
35	175	2.92	1.8	0.458	0.27	0.41	0.19	1.76	444.94
36	180	3.00	0.6	0.153	0.27	0.14	0.02	0.14	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.31
FLOOD VOLUME (acft)	1.04
FLOOD VOLUME (cuft)	45221.59
REQUIRED STORAGE (acft)	0.96
REQUIRED STORAGE (cuft)	41998.54
PEAK FLOW RATE (cfs)	17.21

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.167	0.27	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.27	0.18	0.02	0.19	0.00
3	15	0.25	0.6	0.200	0.27	0.18	0.02	0.19	0.00
4	20	0.33	0.6	0.200	0.27	0.18	0.02	0.19	0.00
5	25	0.42	0.6	0.200	0.27	0.18	0.02	0.19	0.00
6	30	0.50	0.7	0.234	0.27	0.21	0.02	0.22	0.00
7	35	0.58	0.7	0.234	0.27	0.21	0.02	0.22	0.00
8	40	0.67	0.7	0.234	0.27	0.21	0.02	0.22	0.00
9	45	0.75	0.7	0.234	0.27	0.21	0.02	0.22	0.00
10	50	0.83	0.7	0.234	0.27	0.21	0.02	0.22	0.00
11	55	0.92	0.7	0.234	0.27	0.21	0.02	0.22	0.00
12	60	1.00	0.8	0.267	0.27	0.24	0.03	0.25	0.00
13	65	1.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
14	70	1.17	0.8	0.267	0.27	0.24	0.03	0.25	0.00
15	75	1.25	0.8	0.267	0.27	0.24	0.03	0.25	0.00
16	80	1.33	0.8	0.267	0.27	0.24	0.03	0.25	0.00
17	85	1.42	0.8	0.267	0.27	0.24	0.03	0.25	0.00
18	90	1.50	0.8	0.267	0.27	0.24	0.03	0.25	0.00
19	95	1.58	0.8	0.267	0.27	0.24	0.03	0.25	0.00
20	100	1.67	0.8	0.267	0.27	0.24	0.03	0.25	0.00
21	105	1.75	0.8	0.267	0.27	0.24	0.03	0.25	0.00
22	110	1.83	0.8	0.267	0.27	0.24	0.03	0.25	0.00
23	115	1.92	0.8	0.267	0.27	0.24	0.03	0.25	0.00
24	120	2.00	0.9	0.300	0.27	0.27	0.03	0.26	0.00
25	125	2.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
26	130	2.17	0.9	0.300	0.27	0.27	0.03	0.26	0.00
27	135	2.25	0.9	0.300	0.27	0.27	0.03	0.26	0.00
28	140	2.33	0.9	0.300	0.27	0.27	0.03	0.26	0.00
29	145	2.42	0.9	0.300	0.27	0.27	0.03	0.26	0.00
30	150	2.50	0.9	0.300	0.27	0.27	0.03	0.26	0.00
31	155	2.58	0.9	0.300	0.27	0.27	0.03	0.26	0.00
32	160	2.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
33	165	2.75	1.0	0.334	0.27	0.30	0.06	0.58	91.00
34	170	2.83	1.0	0.334	0.27	0.30	0.06	0.58	91.00
35	175	2.92	1.0	0.334	0.27	0.30	0.06	0.58	91.00
36	180	3.00	1.0	0.334	0.27	0.30	0.06	0.58	91.00
37	185	3.08	1.0	0.334	0.27	0.30	0.06	0.58	91.00
38	190	3.17	1.1	0.367	0.27	0.33	0.09	0.89	185.97
39	195	3.25	1.1	0.367	0.27	0.33	0.09	0.89	185.97
40	200	3.33	1.1	0.367	0.27	0.33	0.09	0.89	185.97
41	205	3.42	1.2	0.400	0.27	0.36	0.13	1.21	280.95
42	210	3.50	1.3	0.434	0.27	0.39	0.16	1.53	375.93
43	215	3.58	1.4	0.467	0.27	0.42	0.19	1.84	470.90
44	220	3.67	1.4	0.467	0.27	0.42	0.19	1.84	470.90
45	225	3.75	1.5	0.500	0.27	0.45	0.23	2.16	565.88
46	230	3.83	1.5	0.500	0.27	0.45	0.23	2.16	565.88
47	235	3.92	1.6	0.534	0.27	0.48	0.26	2.48	660.85
48	240	4.00	1.6	0.534	0.27	0.48	0.26	2.48	660.85
49	245	4.08	1.7	0.567	0.27	0.51	0.29	2.79	755.83
50	250	4.17	1.8	0.600	0.27	0.54	0.33	3.11	850.81
51	255	4.25	1.9	0.634	0.27	0.57	0.36	3.43	945.78
52	260	4.33	2.0	0.667	0.27	0.60	0.39	3.74	1040.76
53	265	4.42	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
54	270	4.50	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
55	275	4.58	2.2	0.734	0.27	0.66	0.46	4.38	1230.71
56	280	4.67	2.3	0.767	0.27	0.69	0.49	4.69	1325.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
58	290	4.83	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
59	295	4.92	2.5	0.834	0.27	0.75	0.56	5.33	1515.64
60	300	5.00	2.6	0.867	0.27	0.78	0.59	5.64	1610.61
61	305	5.08	3.1	1.034	0.27	0.93	0.76	7.22	2085.49
62	310	5.17	3.6	1.201	0.27	1.08	0.93	8.81	2560.37
63	315	5.25	3.9	1.301	0.27	1.17	1.03	9.76	2845.30
64	320	5.33	4.2	1.401	0.27	1.26	1.13	10.71	3130.23
65	325	5.42	4.7	1.568	0.27	1.41	1.30	12.29	3605.11
66	330	5.50	5.6	1.868	0.27	1.68	1.60	15.14	4459.89
67	335	5.58	1.9	0.634	0.27	0.57	0.36	3.43	945.78
68	340	5.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
69	345	5.75	0.6	0.200	0.27	0.18	0.02	0.19	0.00
70	350	5.83	0.5	0.167	0.27	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.27	0.09	0.01	0.09	0.00
72	360	6.00	0.2	0.067	0.27	0.06	0.01	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.30
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44839.99
REQUIRED STORAGE (acft)	0.90
REQUIRED STORAGE (cuft)	39085.84
PEAK FLOW RATE (cfs)	15.14

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.036	0.482	0.032	0.004	0.03	0.00
2	30	0.50	0.3	0.054	0.476	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.471	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.465	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.460	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.454	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.449	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.443	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.438	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.433	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.427	0.080	0.009	0.08	0.00
12	180	3.00	0.5	0.089	0.422	0.080	0.009	0.08	0.00
13	195	3.25	0.5	0.089	0.417	0.080	0.009	0.08	0.00
14	210	3.50	0.5	0.089	0.412	0.080	0.009	0.08	0.00
15	225	3.75	0.5	0.089	0.407	0.080	0.009	0.08	0.00
16	240	4.00	0.6	0.107	0.401	0.097	0.011	0.10	0.00
17	255	4.25	0.6	0.107	0.396	0.097	0.011	0.10	0.00
18	270	4.50	0.7	0.125	0.391	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.386	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.381	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.376	0.097	0.011	0.10	0.00
22	330	5.50	0.7	0.125	0.371	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.367	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.362	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.357	0.145	0.016	0.15	0.00
26	390	6.50	0.9	0.161	0.352	0.145	0.016	0.15	0.00
27	405	6.75	1.0	0.179	0.347	0.161	0.018	0.17	0.00
28	420	7.00	1.0	0.179	0.343	0.161	0.018	0.17	0.00
29	435	7.25	1.0	0.179	0.338	0.161	0.018	0.17	0.00
30	450	7.50	1.1	0.197	0.334	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.329	0.193	0.021	0.20	0.00
32	480	8.00	1.3	0.232	0.324	0.209	0.023	0.22	0.00
33	495	8.25	1.5	0.268	0.320	0.241	0.027	0.25	0.00
34	510	8.50	1.5	0.268	0.315	0.241	0.027	0.25	0.00
35	525	8.75	1.6	0.286	0.311	0.257	0.029	0.27	0.00
36	540	9.00	1.7	0.304	0.307	0.274	0.030	0.29	13.81
37	555	9.25	1.9	0.340	0.302	0.306	0.037	0.35	73.64
38	570	9.50	2.0	0.358	0.298	0.322	0.060	0.57	263.09
39	585	9.75	2.1	0.375	0.294	0.338	0.082	0.78	452.20
40	600	10.00	2.2	0.393	0.290	0.354	0.104	0.99	640.96
41	615	10.25	1.5	0.268	0.285	0.241	0.027	0.25	0.00
42	630	10.50	1.5	0.268	0.281	0.241	0.027	0.25	0.00
43	645	10.75	2.0	0.358	0.277	0.322	0.080	0.76	441.57
44	660	11.00	2.0	0.358	0.273	0.322	0.085	0.80	476.21
45	675	11.25	1.9	0.340	0.269	0.306	0.071	0.67	357.77
46	690	11.50	1.9	0.340	0.265	0.306	0.075	0.71	391.68
47	705	11.75	1.7	0.304	0.261	0.274	0.043	0.41	119.79
48	720	12.00	1.8	0.322	0.257	0.290	0.065	0.61	305.68
49	735	12.25	2.5	0.447	0.253	0.402	0.194	1.84	1407.47
50	750	12.50	2.6	0.465	0.250	0.418	0.215	2.04	1592.60
51	765	12.75	2.8	0.501	0.246	0.451	0.255	2.42	1930.06
52	780	13.00	2.9	0.519	0.242	0.467	0.276	2.62	2114.43
53	795	13.25	3.4	0.608	0.239	0.547	0.369	3.51	2909.26
54	810	13.50	3.4	0.608	0.235	0.547	0.373	3.54	2940.13
55	825	13.75	2.3	0.411	0.231	0.370	0.180	1.71	1290.76
56	840	14.00	2.3	0.411	0.228	0.370	0.183	1.74	1320.84
57	855	14.25	2.7	0.483	0.224	0.434	0.258	2.45	1961.36
58	870	14.50	2.6	0.465	0.221	0.418	0.244	2.32	1837.90
59	885	14.75	2.6	0.465	0.218	0.418	0.247	2.35	1866.75
60	900	15.00	2.5	0.447	0.214	0.402	0.233	2.21	1742.46
61	915	15.25	2.4	0.429	0.211	0.386	0.218	2.07	1617.74
62	930	15.50	2.3	0.411	0.208	0.370	0.204	1.93	1492.59
63	945	15.75	1.9	0.340	0.205	0.306	0.135	1.28	908.87
64	960	16.00	1.9	0.340	0.201	0.306	0.138	1.31	935.56
65	975	16.25	0.4	0.072	0.198	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.195	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.192	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1
BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.189	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.187	0.080	0.009	0.08	0.00
70	1050	17.50	0.5	0.089	0.184	0.080	0.009	0.08	0.00
71	1065	17.75	0.5	0.089	0.181	0.080	0.009	0.08	0.00
72	1080	18.00	0.4	0.072	0.178	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.176	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.173	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.171	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.168	0.032	0.004	0.03	0.00
77	1155	19.25	0.3	0.054	0.166	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.164	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.161	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.159	0.032	0.004	0.03	0.00
81	1215	20.25	0.3	0.054	0.157	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.155	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.153	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.151	0.032	0.004	0.03	0.00
85	1275	21.25	0.3	0.054	0.149	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.148	0.032	0.004	0.03	0.00
87	1305	21.75	0.3	0.054	0.146	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.145	0.032	0.004	0.03	0.00
89	1335	22.25	0.3	0.054	0.143	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.142	0.032	0.004	0.03	0.00
91	1365	22.75	0.2	0.036	0.141	0.032	0.004	0.03	0.00
92	1380	23.00	0.2	0.036	0.139	0.032	0.004	0.03	0.00
93	1395	23.25	0.2	0.036	0.138	0.032	0.004	0.03	0.00
94	1410	23.50	0.2	0.036	0.138	0.032	0.004	0.03	0.00
95	1425	23.75	0.2	0.036	0.137	0.032	0.004	0.03	0.00
96	1440	24.00	0.2	0.036	0.137	0.032	0.004	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.28
FLOOD VOLUME (acft)	1.01
FLOOD VOLUME (cuft)	44164.39
REQUIRED STORAGE (acft)	0.72
REQUIRED STORAGE (cuft)	31405.17
PEAK FLOW (cfs)	3.54

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.27 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.55	165	165	82	83	463.50	83	0.00
2	10	0.55	165	248	82	166	463.51	166	0.00
3	15	0.07	20	185	82	104	463.51	104	0.00
4	20	1.03	310	413	82	331	463.52	331	0.01
5	25	1.03	310	641	82	559	463.53	559	0.01
6	30	1.76	527	1,086	82	1,004	463.55	1,004	0.02
7	35	1.03	310	1,313	82	1,231	463.57	1,231	0.03
8	40	1.76	527	1,758	82	1,676	463.59	1,676	0.04
9	45	1.76	527	2,203	82	2,121	463.61	2,121	0.05
10	50	1.03	310	2,431	82	2,349	463.63	2,349	0.05
11	55	1.27	382	2,731	82	2,649	463.64	2,649	0.06
12	60	1.76	527	3,176	82	3,094	463.67	3,094	0.07
13	65	2.72	817	3,911	82	3,829	463.71	3,829	0.09
14	70	2.72	817	4,645	82	4,563	463.75	4,563	0.10
15	75	2.72	817	5,380	82	5,298	463.79	5,298	0.12
16	80	2.24	672	5,970	82	5,888	463.82	5,888	0.14
17	85	3.69	1,106	6,994	82	6,912	463.87	6,912	0.16
18	90	3.93	1,179	8,091	82	8,009	463.93	8,009	0.18
19	95	3.20	961	8,970	82	8,888	463.98	8,888	0.20
20	100	3.93	1,179	10,067	82	9,985	464.04	9,985	0.23
21	105	5.38	1,613	11,598	82	11,517	464.12	11,517	0.26
22	110	4.89	1,468	12,985	82	12,903	464.20	12,903	0.30
23	115	4.41	1,324	14,227	82	14,145	464.26	14,145	0.32
24	120	4.65	1,396	15,541	82	15,459	464.34	15,459	0.35
25	125	4.89	1,468	16,927	82	16,845	464.41	16,845	0.39
26	130	7.55	2,265	19,110	82	19,028	464.53	19,028	0.44
27	135	9.48	2,845	21,873	82	21,791	464.66	21,791	0.50
28	140	5.86	1,758	23,549	82	23,467	464.74	23,467	0.54
29	145	13.83	4,148	27,616	82	27,534	464.94	27,534	0.63
30	150	15.03	4,510	32,044	82	31,962	465.16	31,962	0.73
31	155	17.21	5,162	37,124	82	37,042	465.41	37,042	0.85
32	160	11.65	3,496	40,539	82	40,457	465.57	40,457	0.93
33	165	2.24	672	41,129	82	41,047	465.60	41,047	0.94
34	170	1.76	527	41,573	82	41,492	465.62	41,492	0.95
35	175	1.76	527	42,018	82	41,936	465.64	41,936	0.96
36	180	0.14	43	41,980	82	41,898	465.64	41,898	0.96

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	47	47	82	-	463.50	-	0.00
2	10	0.19	57	57	82	-	463.50	-	0.00
3	15	0.19	57	57	82	-	463.50	-	0.00
4	20	0.19	57	57	82	-	463.50	-	0.00
5	25	0.19	57	57	82	-	463.50	-	0.00
6	30	0.22	66	66	82	-	463.50	-	0.00
7	35	0.22	66	66	82	-	463.50	-	0.00
8	40	0.22	66	66	82	-	463.50	-	0.00
9	45	0.22	66	66	82	-	463.50	-	0.00
10	50	0.22	66	66	82	-	463.50	-	0.00
11	55	0.22	66	66	82	-	463.50	-	0.00
12	60	0.25	76	76	82	-	463.50	-	0.00
13	65	0.25	76	76	82	-	463.50	-	0.00
14	70	0.25	76	76	82	-	463.50	-	0.00
15	75	0.25	76	76	82	-	463.50	-	0.00
16	80	0.25	76	76	82	-	463.50	-	0.00
17	85	0.25	76	76	82	-	463.50	-	0.00
18	90	0.25	76	76	82	-	463.50	-	0.00
19	95	0.25	76	76	82	-	463.50	-	0.00
20	100	0.25	76	76	82	-	463.50	-	0.00
21	105	0.25	76	76	82	-	463.50	-	0.00
22	110	0.25	76	76	82	-	463.50	-	0.00
23	115	0.25	76	76	82	-	463.50	-	0.00
24	120	0.26	78	78	82	-	463.50	-	0.00
25	125	0.25	76	76	82	-	463.50	-	0.00
26	130	0.26	78	78	82	-	463.50	-	0.00
27	135	0.26	78	78	82	-	463.50	-	0.00
28	140	0.26	78	78	82	-	463.50	-	0.00
29	145	0.26	78	78	82	-	463.50	-	0.00
30	150	0.26	78	78	82	-	463.50	-	0.00
31	155	0.26	78	78	82	-	463.50	-	0.00
32	160	0.26	78	78	82	-	463.50	-	0.00
33	165	0.58	173	173	82	91	463.50	91	0.00
34	170	0.58	173	264	82	182	463.51	182	0.00
35	175	0.58	173	355	82	273	463.51	273	0.01
36	180	0.58	173	446	82	364	463.52	364	0.01
37	185	0.58	173	537	82	455	463.52	455	0.01
38	190	0.89	268	723	82	641	463.53	641	0.01
39	195	0.89	268	909	82	827	463.54	827	0.02
40	200	0.89	268	1,095	82	1,013	463.55	1,013	0.02
41	205	1.21	363	1,376	82	1,294	463.57	1,294	0.03
42	210	1.53	458	1,752	82	1,670	463.59	1,670	0.04
43	215	1.84	553	2,223	82	2,141	463.62	2,141	0.05
44	220	1.84	553	2,694	82	2,612	463.64	2,612	0.06
45	225	2.16	648	3,259	82	3,177	463.67	3,177	0.07
46	230	2.16	648	3,825	82	3,743	463.70	3,743	0.09
47	235	2.48	743	4,486	82	4,404	463.74	4,404	0.10
48	240	2.48	743	5,147	82	5,065	463.77	5,065	0.12
49	245	2.79	838	5,903	82	5,821	463.81	5,821	0.13
50	250	3.11	933	6,754	82	6,672	463.86	6,672	0.15
51	255	3.43	1,028	7,699	82	7,617	463.91	7,617	0.17
52	260	3.74	1,123	8,740	82	8,658	463.97	8,658	0.20
53	265	4.06	1,218	9,876	82	9,794	464.03	9,794	0.22
54	270	4.06	1,218	11,012	82	10,930	464.09	10,930	0.25
55	275	4.38	1,313	12,242	82	12,160	464.16	12,160	0.28

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	4.69	1,408	13,568	82	13,486	464.23	13,486	0.31
57	285	5.01	1,503	14,989	82	14,907	464.31	14,907	0.34
58	290	5.01	1,503	16,409	82	16,327	464.38	16,327	0.37
59	295	5.33	1,598	17,925	82	17,843	464.46	17,843	0.41
60	300	5.64	1,693	19,536	82	19,454	464.55	19,454	0.45
61	305	7.22	2,167	21,621	82	21,539	464.65	21,539	0.49
62	310	8.81	2,642	24,181	82	24,100	464.78	24,100	0.55
63	315	9.76	2,927	27,027	82	26,945	464.92	26,945	0.62
64	320	10.71	3,212	30,157	82	30,075	465.07	30,075	0.69
65	325	12.29	3,687	33,762	82	33,680	465.25	33,680	0.77
66	330	15.14	4,542	38,222	82	38,140	465.47	38,140	0.88
67	335	3.43	1,028	39,168	82	39,086	465.51	39,086	0.90
68	340	0.26	78	39,164	82	39,082	465.51	39,082	0.90
69	345	0.19	57	39,139	82	39,057	465.51	39,057	0.90
70	350	0.16	47	39,104	82	39,022	465.51	39,022	0.90
71	355	0.09	28	39,051	82	38,969	465.51	38,969	0.89
72	360	0.06	19	38,988	82	38,906	465.50	38,906	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	31	31	246	-	463.50	-	0.00
2	30	0.05	46	46	246	-	463.50	-	0.00
3	45	0.05	46	46	246	-	463.50	-	0.00
4	60	0.07	61	61	246	-	463.50	-	0.00
5	75	0.05	46	46	246	-	463.50	-	0.00
6	90	0.05	46	46	246	-	463.50	-	0.00
7	105	0.05	46	46	246	-	463.50	-	0.00
8	120	0.07	61	61	246	-	463.50	-	0.00
9	135	0.07	61	61	246	-	463.50	-	0.00
10	150	0.07	61	61	246	-	463.50	-	0.00
11	165	0.08	76	76	246	-	463.50	-	0.00
12	180	0.08	76	76	246	-	463.50	-	0.00
13	195	0.08	76	76	246	-	463.50	-	0.00
14	210	0.08	76	76	246	-	463.50	-	0.00
15	225	0.08	76	76	246	-	463.50	-	0.00
16	240	0.10	92	92	246	-	463.50	-	0.00
17	255	0.10	92	92	246	-	463.50	-	0.00
18	270	0.12	107	107	246	-	463.50	-	0.00
19	285	0.12	107	107	246	-	463.50	-	0.00
20	300	0.14	122	122	246	-	463.50	-	0.00
21	315	0.10	92	92	246	-	463.50	-	0.00
22	330	0.12	107	107	246	-	463.50	-	0.00
23	345	0.14	122	122	246	-	463.50	-	0.00
24	360	0.14	122	122	246	-	463.50	-	0.00
25	375	0.15	137	137	246	-	463.50	-	0.00
26	390	0.15	137	137	246	-	463.50	-	0.00
27	405	0.17	153	153	246	-	463.50	-	0.00
28	420	0.17	153	153	246	-	463.50	-	0.00
29	435	0.17	153	153	246	-	463.50	-	0.00
30	450	0.19	168	168	246	-	463.50	-	0.00
31	465	0.20	183	183	246	-	463.50	-	0.00
32	480	0.22	199	199	246	-	463.50	-	0.00
33	495	0.25	229	229	246	-	463.50	-	0.00
34	510	0.25	229	229	246	-	463.50	-	0.00
35	525	0.27	244	244	246	-	463.50	-	0.00
36	540	0.29	260	260	246	14	463.50	14	0.00
37	555	0.35	319	333	246	87	463.50	87	0.00
38	570	0.57	509	596	246	351	463.52	351	0.01
39	585	0.78	698	1,049	246	803	463.54	803	0.02
40	600	0.99	887	1,689	246	1,444	463.58	1,444	0.03
41	615	0.25	229	1,673	246	1,427	463.58	1,427	0.03
42	630	0.25	229	1,656	246	1,410	463.58	1,410	0.03
43	645	0.76	687	2,098	246	1,852	463.60	1,852	0.04
44	660	0.80	722	2,574	246	2,328	463.63	2,328	0.05
45	675	0.67	604	2,932	246	2,686	463.65	2,686	0.06
46	690	0.71	637	3,323	246	3,077	463.67	3,077	0.07
47	705	0.41	366	3,443	246	3,197	463.67	3,197	0.07
48	720	0.61	551	3,749	246	3,503	463.69	3,503	0.08
49	735	1.84	1,653	5,156	246	4,910	463.77	4,910	0.11
50	750	2.04	1,838	6,749	246	6,503	463.85	6,503	0.15
51	765	2.42	2,176	8,679	246	8,433	463.96	8,433	0.19
52	780	2.62	2,360	10,793	246	10,547	464.07	10,547	0.24
53	795	3.51	3,155	13,703	246	13,457	464.23	13,457	0.31
54	810	3.54	3,186	16,643	246	16,397	464.39	16,397	0.38
55	825	1.71	1,537	17,933	246	17,688	464.46	17,688	0.41
56	840	1.74	1,567	19,254	246	19,008	464.52	19,008	0.44
57	855	2.45	2,207	21,216	246	20,970	464.62	20,970	0.48
58	870	2.32	2,084	23,054	246	22,808	464.71	22,808	0.52

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.35	2,113	24,920	246	24,674	464.80	24,674	0.57
60	900	2.21	1,988	26,663	246	26,417	464.89	26,417	0.61
61	915	2.07	1,864	28,280	246	28,035	464.97	28,035	0.64
62	930	1.93	1,738	29,773	246	29,527	465.04	29,527	0.68
63	945	1.28	1,155	30,682	246	30,436	465.09	30,436	0.70
64	960	1.31	1,181	31,618	246	31,372	465.13	31,372	0.72
65	975	0.07	61	31,433	246	31,187	465.12	31,187	0.72
66	990	0.07	61	31,248	246	31,002	465.12	31,002	0.71
67	1005	0.05	46	31,048	246	30,802	465.11	30,802	0.71
68	1020	0.05	46	30,848	246	30,602	465.10	30,602	0.70
69	1035	0.08	76	30,679	246	30,433	465.09	30,433	0.70
70	1050	0.08	76	30,509	246	30,263	465.08	30,263	0.69
71	1065	0.08	76	30,340	246	30,094	465.07	30,094	0.69
72	1080	0.07	61	30,155	246	29,909	465.06	29,909	0.69
73	1095	0.07	61	29,970	246	29,724	465.05	29,724	0.68
74	1110	0.07	61	29,786	246	29,540	465.04	29,540	0.68
75	1125	0.05	46	29,586	246	29,340	465.03	29,340	0.67
76	1140	0.03	31	29,370	246	29,125	465.02	29,125	0.67
77	1155	0.05	46	29,170	246	28,925	465.01	28,925	0.66
78	1170	0.07	61	28,986	246	28,740	465.00	28,740	0.66
79	1185	0.05	46	28,786	246	28,540	464.99	28,540	0.66
80	1200	0.03	31	28,570	246	28,325	464.98	28,325	0.65
81	1215	0.05	46	28,370	246	28,125	464.97	28,125	0.65
82	1230	0.05	46	28,170	246	27,925	464.96	27,925	0.64
83	1245	0.05	46	27,970	246	27,725	464.95	27,725	0.64
84	1260	0.03	31	27,755	246	27,509	464.94	27,509	0.63
85	1275	0.05	46	27,555	246	27,309	464.93	27,309	0.63
86	1290	0.03	31	27,340	246	27,094	464.92	27,094	0.62
87	1305	0.05	46	27,140	246	26,894	464.91	26,894	0.62
88	1320	0.03	31	26,925	246	26,679	464.90	26,679	0.61
89	1335	0.05	46	26,725	246	26,479	464.89	26,479	0.61
90	1350	0.03	31	26,509	246	26,264	464.88	26,264	0.60
91	1365	0.03	31	26,294	246	26,048	464.87	26,048	0.60
92	1380	0.03	31	26,079	246	25,833	464.86	25,833	0.59
93	1395	0.03	31	25,864	246	25,618	464.85	25,618	0.59
94	1410	0.03	31	25,648	246	25,402	464.84	25,402	0.58
95	1425	0.03	31	25,433	246	25,187	464.83	25,187	0.58
96	1440	0.03	31	25,218	246	24,972	464.82	24,972	0.57

IV STREET FLOWRATE CAPACITY

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 100 year storm event can be contained within the street right of way per City of Coachella drainage standards

In terms of on-site drainage, the site is divided into 4 separate quadrants, each draining to a separate surface retention basin. Within each quadrant, the maximum tributary area contributing runoff to any single street is 5 acres. Rational method calculations based on the 100 year design storm for 5 acres drainage area are provided in this section to quantify the maximum flowrate (Q) that must be conveyed by any on-site interior street. Manning's equation for open channel flow has then been used to show that the 100 year maximum flowrate (Q) can be contained within the street section right of way.

Q(100) MAX. = 10.92 CFS

MAX. STREET CAPACITY = 13.86 CFS

```
                Riverside County Rational Hydrology Program

     CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version
7.1
           Rational Hydrology Study        Date: 09/25/24
File:CALHOUN100STREET.out
     ---------------------------------------------------------------
------
     CALHOUN 100 YEAR - 5 ACRE STUDY


     ---------------------------------------------------------------
------
      *********   Hydrology Study Control Information **********

      English (in-lb) Units used in input data file

     ---------------------------------------------------------------
------


     Program License Serial Number 6253

     ---------------------------------------------------------------
------
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual

     Storm event (year) =  100.00 Antecedent Moisture Condition = 2

     2 year, 1 hour precipitation =  0.350(In.)
     100 year, 1 hour precipitation =  1.330(In.)

     Storm event year = 100.0
     Calculated rainfall intensity data:
     1 hour intensity =  1.330(In/Hr)
     Slope of intensity duration curve = 0.5900




     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
     Process from Point/Station      100.000 to Point/Station
200.000
     **** INITIAL AREA EVALUATION ****
     ____________________________________________________________
____
     Initial area flow distance =  1000.000(Ft.)
     Top (of initial area) elevation =   450.000(Ft.)
     Bottom (of initial area) elevation =   446.500(Ft.)
     Difference in elevation =     3.500(Ft.)
     Slope =    0.00350  s(percent)=       0.35
     TC = k(0.370)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration =   18.171 min.
     Rainfall intensity =      2.691(In/Hr) for a   100.0 year storm
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     10.922(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 0.350
End of computations, total study area =            5.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

100 YEAR STREET CAPACITY

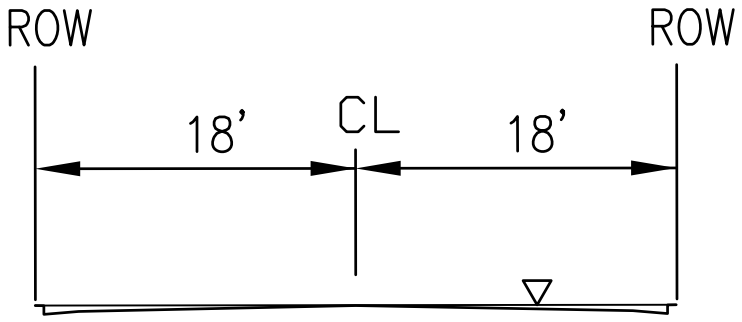
WITHIN PROJECT HALF STREET (NO CURB GUTTER AND SIDEWALK IMPROVEMENTS ON NON-PROJECT SIDE)

$n=0.016$

$S=0.0035$

$R=A/P= 0.196$

$Q=(1.49/n)AR^{2/3}S^{1/2} = 13.86cfs$



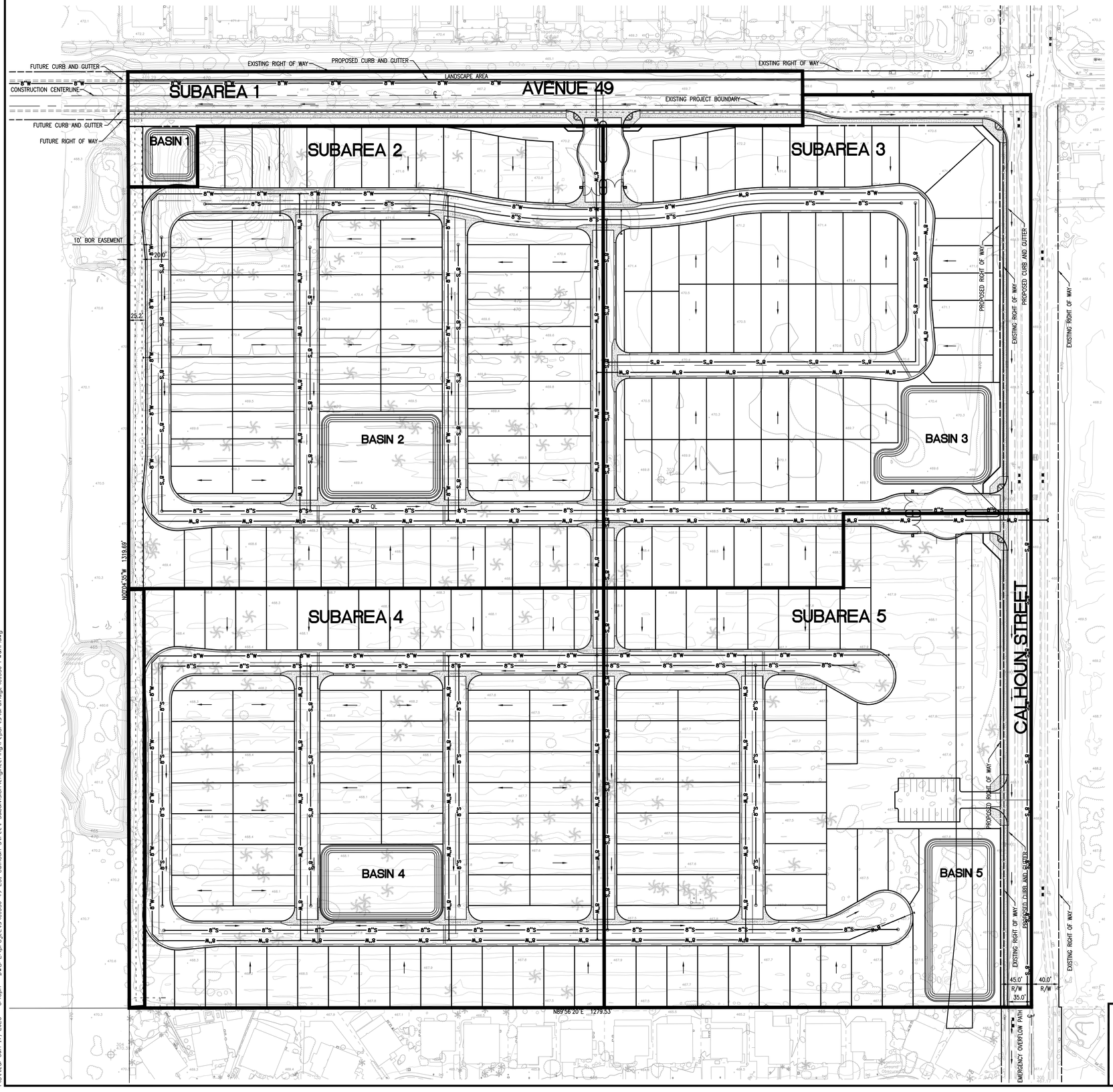
WETTED PERIMETER (P)=38.02

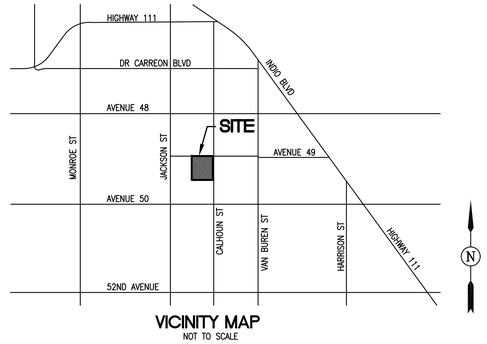
CROSS SECTION AREA (A)=7.46

V APPENDIX

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP
NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'

N

GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

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TheAltumGroup.com
ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg

NOAA Atlas 14, Volume 6, Version 2
Location name: Coachella, California, USA*
Latitude: 33.6909°, Longitude: -116.2099°
Elevation: -31 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.053-0.077)	**0.100** (0.083-0.121)	**0.152** (0.126-0.184)	**0.198** (0.163-0.242)	**0.266** (0.212-0.338)	**0.325** (0.253-0.421)	**0.390** (0.297-0.518)	**0.464** (0.343-0.634)	**0.576** (0.408-0.821)	**0.674** (0.461-0.997)
10-min	**0.092** (0.076-0.111)	**0.143** (0.119-0.173)	**0.217** (0.181-0.264)	**0.283** (0.233-0.347)	**0.382** (0.304-0.484)	**0.466** (0.363-0.604)	**0.559** (0.425-0.743)	**0.665** (0.491-0.909)	**0.825** (0.584-1.18)	**0.967** (0.661-1.43)
15-min	**0.111** (0.092-0.134)	**0.173** (0.144-0.210)	**0.263** (0.218-0.319)	**0.343** (0.282-0.420)	**0.462** (0.368-0.586)	**0.564** (0.439-0.730)	**0.676** (0.514-0.899)	**0.804** (0.594-1.10)	**0.998** (0.706-1.42)	**1.17** (0.799-1.73)
30-min	**0.160** (0.134-0.194)	**0.251** (0.209-0.304)	**0.381** (0.316-0.463)	**0.496** (0.409-0.608)	**0.669** (0.533-0.848)	**0.816** (0.636-1.06)	**0.979** (0.745-1.30)	**1.16** (0.860-1.59)	**1.44** (1.02-2.06)	**1.69** (1.16-2.50)
60-min	**0.225** (0.188-0.272)	**0.352** (0.293-0.426)	**0.534** (0.444-0.649)	**0.696** (0.573-0.853)	**0.938** (0.747-1.19)	**1.14** (0.892-1.48)	**1.37** (1.04-1.83)	**1.63** (1.21-2.23)	**2.03** (1.44-2.89)	**2.38** (1.62-3.51)
2-hr	**0.311** (0.260-0.377)	**0.462** (0.385-0.560)	**0.687** (0.571-0.835)	**0.891** (0.734-1.09)	**1.21** (0.961-1.53)	**1.48** (1.15-1.92)	**1.79** (1.36-2.38)	**2.14** (1.58-2.93)	**2.69** (1.90-3.83)	**3.17** (2.17-4.68)
3-hr	**0.375** (0.313-0.454)	**0.547** (0.456-0.663)	**0.806** (0.669-0.979)	**1.04** (0.861-1.28)	**1.42** (1.13-1.80)	**1.74** (1.36-2.26)	**2.12** (1.61-2.82)	**2.55** (1.88-3.49)	**3.22** (2.28-4.60)	**3.82** (2.61-5.65)
6-hr	**0.495** (0.413-0.599)	**0.715** (0.596-0.866)	**1.05** (0.871-1.27)	**1.36** (1.12-1.66)	**1.84** (1.47-2.34)	**2.28** (1.78-2.95)	**2.78** (2.11-3.69)	**3.36** (2.48-4.59)	**4.27** (3.02-6.08)	**5.08** (3.47-7.51)
12-hr	**0.598** (0.499-0.724)	**0.883** (0.736-1.07)	**1.31** (1.09-1.59)	**1.70** (1.40-2.09)	**2.31** (1.84-2.93)	**2.85** (2.22-3.69)	**3.46** (2.63-4.60)	**4.17** (3.08-5.70)	**5.27** (3.73-7.52)	**6.25** (4.27-9.23)
24-hr	**0.751** (0.665-0.866)	**1.14** (1.01-1.32)	**1.72** (1.51-1.98)	**2.23** (1.95-2.60)	**3.02** (2.56-3.64)	**3.71** (3.08-4.56)	**4.47** (3.63-5.63)	**5.34** (4.22-6.91)	**6.67** (5.06-8.97)	**7.83** (5.75-10.9)
2-day	**0.871** (0.770-1.00)	**1.34** (1.18-1.55)	**2.02** (1.78-2.34)	**2.63** (2.30-3.06)	**3.53** (2.99-4.26)	**4.30** (3.57-5.29)	**5.15** (4.18-6.48)	**6.10** (4.82-7.89)	**7.53** (5.71-10.1)	**8.74** (6.42-12.2)
3-day	**0.933** (0.825-1.08)	**1.44** (1.28-1.67)	**2.18** (1.92-2.52)	**2.82** (2.47-3.30)	**3.79** (3.21-4.56)	**4.60** (3.82-5.65)	**5.49** (4.46-6.91)	**6.49** (5.12-8.38)	**7.96** (6.04-10.7)	**9.21** (6.76-12.8)
4-day	**0.983** (0.870-1.13)	**1.52** (1.34-1.76)	**2.29** (2.02-2.65)	**2.97** (2.60-3.47)	**3.98** (3.37-4.79)	**4.82** (4.01-5.93)	**5.75** (4.66-7.23)	**6.78** (5.35-8.75)	**8.29** (6.29-11.2)	**9.58** (7.03-13.3)
7-day	**1.04** (0.923-1.20)	**1.61** (1.42-1.86)	**2.41** (2.12-2.79)	**3.12** (2.73-3.64)	**4.16** (3.52-5.01)	**5.03** (4.18-6.18)	**5.98** (4.85-7.52)	**7.03** (5.55-9.08)	**8.57** (6.50-11.5)	**9.88** (7.25-13.7)
10-day	**1.08** (0.955-1.24)	**1.66** (1.47-1.92)	**2.48** (2.19-2.87)	**3.21** (2.80-3.74)	**4.27** (3.62-5.14)	**5.16** (4.29-6.34)	**6.13** (4.97-7.71)	**7.19** (5.68-9.30)	**8.76** (6.65-11.8)	**10.1** (7.40-14.0)
20-day	**1.15** (1.02-1.33)	**1.78** (1.58-2.06)	**2.68** (2.36-3.10)	**3.46** (3.03-4.04)	**4.61** (3.91-5.55)	**5.56** (4.62-6.84)	**6.60** (5.35-8.30)	**7.73** (6.10-9.99)	**9.38** (7.12-12.6)	**10.8** (7.90-15.0)
30-day	**1.20** (1.06-1.38)	**1.88** (1.66-2.17)	**2.86** (2.52-3.31)	**3.71** (3.25-4.33)	**4.97** (4.21-5.98)	**6.00** (4.98-7.38)	**7.12** (5.77-8.95)	**8.33** (6.58-10.8)	**10.1** (7.66-13.6)	**11.5** (8.47-16.0)
45-day	**1.30** (1.15-1.49)	**2.07** (1.83-2.39)	**3.18** (2.80-3.68)	**4.14** (3.62-4.83)	**5.56** (4.72-6.70)	**6.74** (5.60-8.28)	**8.00** (6.49-10.1)	**9.36** (7.39-12.1)	**11.3** (8.59-15.2)	**12.9** (9.50-18.0)
60-day	**1.36** (1.21-1.57)	**2.21** (1.95-2.55)	**3.42** (3.01-3.96)	**4.48** (3.92-5.22)	**6.03** (5.11-7.26)	**7.31** (6.07-8.98)	**8.68** (7.04-10.9)	**10.2** (8.03-13.1)	**12.3** (9.33-16.5)	**14.0** (10.3-19.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS, BMP MAINTENANCE AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

N/A

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

The Altum Group
44-600 Village Court, Suite 100
Palm Desert, California 92260

Proposal for
Geotechnical Engineering Feasibility Report and
Phase I Environmental Site Assessment
Vandenburg
APN: 612-260-010-6
Coachella, Riverside County, California

August 1, 2023

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August 1, 2023 Proposal No.: BER-23-8-001

The Altum Group
44-600 Village Court, Suite 100
Palm Desert, California 92260

Attention: Rich Malacoff, AICP, Principal Planner

Subject: **Geotechnical Engineering Feasibility Report and Phase I Environmental Site Assessment**

Project: **Vandenburg**
APN: 612-260-010-6
Coachella, Riverside County, California

Earth Systems Pacific [Earth Systems] is pleased to submit this proposal to provide geotechnical services and a Phase I Environmental Site Assessment for the above referenced project. Since 1969, the Earth Systems group of companies has provided expert geo-professional services to assist our clients through all aspects of geotechnical and geologic engineering, environmental engineering, and construction related materials testing and inspection services. Our dedicated staff understands the diverse geotechnical, geologic, and construction-related issues that may affect the proposed project and will work to develop practical and economical geotechnical engineering solutions through innovative approaches. We have prepared this proposal based on our understanding of preliminary project information provided by the client. We have estimated the total number of borings and our fees based on preliminary information provided by the client. We also understand that the proposed structure/s will be developed under the regulation of the current California Building Code [CBC] (2022). Based upon the anticipated conditions, the following sections describe our understanding of the project and our anticipated scope of services in order to meet the above requirements.

This project will be managed by Mr. Kevin Paul, GE 2930, who will also oversee the engineering evaluation and report preparation, and be the Principal on the project. Mr. Mark Spykerman, EG 1174, will also oversee the interpretation of the site geologic conditions.

Environmental work on this project will be performed under the direct supervision of an Environmental Professional [EP], in accordance with the US EPA AAI and ASTM E-1527-13 requirements.

SITE AREA AND PROJECT UNDERSTANDING

We understand the proposed project is contained within one accessor parcel number located southwest corner of Avenue 49 and Calhoun Street, Riverside County, California. The legal address is APNs: 612-260-010-6. The project is bounded by future extension of Avenue 49 to the north, Calhoun Street to the east, abandoned date palm farmland to the south and west. The APN report states the area is approximately 38.8 acres and has a high potential for liquefaction. The site appears to have been used as a former date tree farm.

The client provided site plan shows multiple improvements on the project site. The following improvements are noted:

- Three subareas containing apartment buildings, total 15.2 acres.
- Residential Lots.
- Park site totaling 1.5 acres.
- Two retention basins along Calhoun Street

Note, plans showing actual building locations and other improvements have not been provided to Earth Systems at the time of drafting this proposal; hence, the reason for "feasibility level" geotechnical report. Earth Systems shall review the 100 percent concept plans to determine if the report can become a "full level" geotechnical report. The client should understand that Earth Systems could require additional exploration, lab testing, and report addendums based on the comparison of the now and future Concept Plans and other project plans.

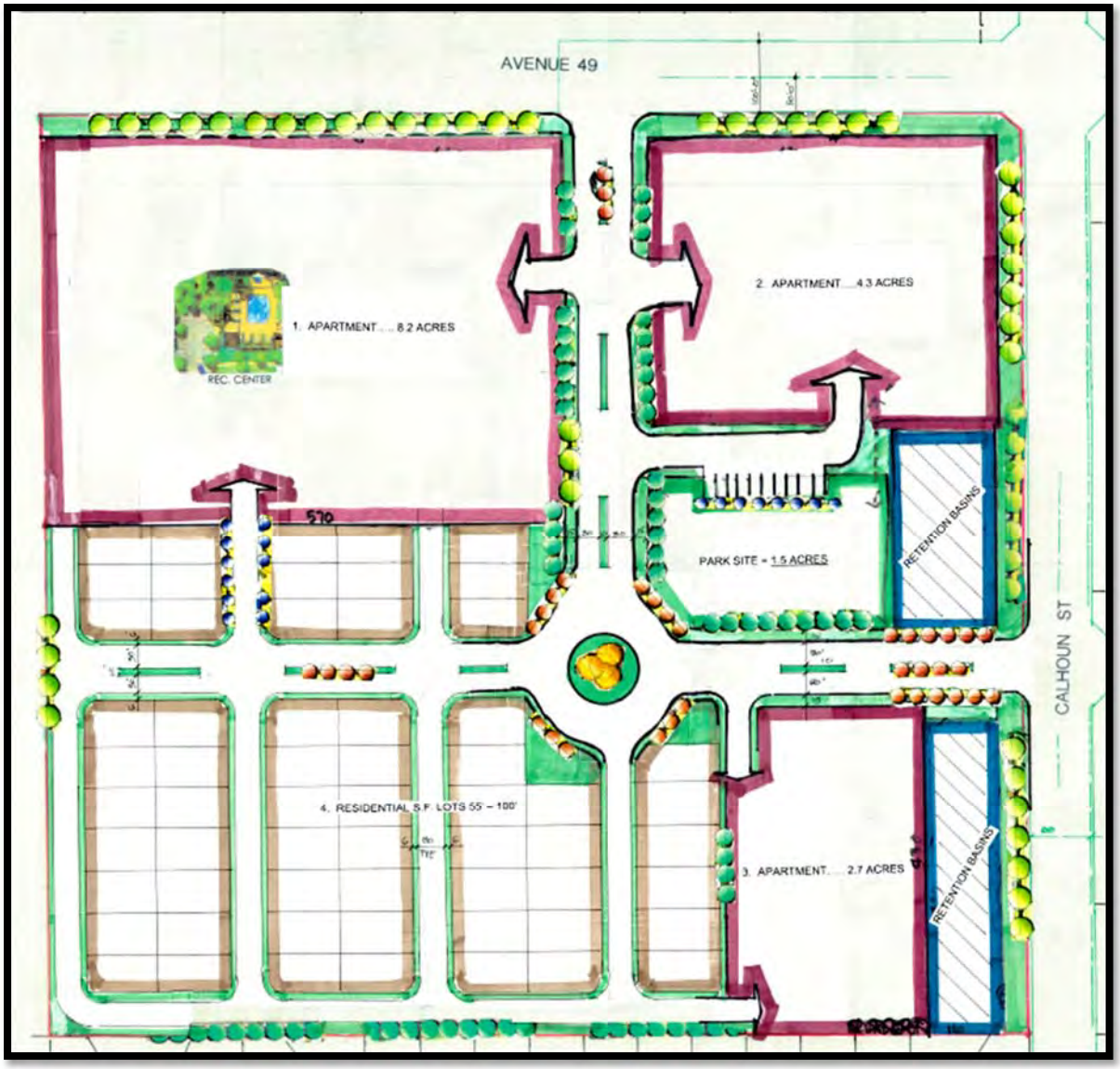


Figure 1 Conceptual Site Plan

Earth Systems assumes any new structure will be one to two-story with slab on grade construction. Earth Systems also assumes the structure will be made of wood or metal frame construction with shallow conventional foundation. Below grade basement levels are not anticipated. We assume column loads are anticipated not to exceed approximately 50 kips for spread footings and 3 kip/LF for wall loads. Based on the type of development, appurtenant site work is anticipated to include perimeter walls, trash enclosure, asphaltic pavement, driveway approaches, PCC sidewalk, underground utilities and landscaping. If all weather roads consisting of gravel is desired, please contact Earth Systems for these design recommendations.

Preliminary grading elevations were not available at this time. We assumed that proposed grades will be approximately (+/-3 feet) those of existing site grades. Site soils are expected to be coarse grained soils. Bedrock is not expected to be within the limits of the borings (maximum depth of 50 feet). However, groundwater may be near the 50-foot depth of search required by the California Building Code.

The purpose of our study will be to explore the subsurface conditions and provide geotechnical recommendations for project design. Two locations will be selected prior to field explorations to perform shallow boring percolation tests for proposed storm basin infiltration. This proposal contains a brief project description, our proposed approach to the project based upon our initial assessment of site conditions and readily available information, our proposed scope of services, schedule, and proposed fee. Since detailed services may involve greater expense, we ask that our clients participate in determining the level of service, which provides adequate information for their purposes. Please review this information and our proposed scope. If you should have any questions or suggested revisions to our scope, please do not hesitate to contact the signatory of this proposal. Our proposal is based upon the assumption that we will be provided full access to the site during normal business hours (M-F, 7 am to 6 pm) to complete field activities and that drilling with a gasoline powered drill rig equipped with a 140-pound hammer to drive the soil samplers can be used at the site.

PROPOSED SCOPE OF GEOTECHNICAL SERVICES

Our scope will include performing subsurface exploration, laboratory testing, and preparing one report of our findings and recommendations regarding geotechnical and geologic aspects of the project. Specific tasks are as follows:

Task 1 - Literature Review

We propose to begin our services by reviewing select geologic and geotechnical literature pertaining to the project. This will include a review of various hazard, fault and geologic maps prepared by the U.S. Geological Survey, Riverside County, and other governmental agencies as they relate to the site.

Task 2 - Utility Coordination, USA Layout

Each of our proposed field exploration locations will be located and marked in the field and cleared with known utility lines as identified by Underground Service Alert [USA]. Our proposed exploration locations will be located in the field by hand measuring devices such as tape or a

wheel, based on the control provided, and a consumer grade hand-held GPS (accuracy +- 15 feet). The accuracy of location will be governed by the method used.

Task 3 – Field Exploration

We propose to evaluate the general subsurface conditions at the site by utilizing a rubber track rig-mounted drill utilizing hollow-stem auger type techniques. Borings will be performed to collect field data and soil samples to evaluate the general nature of the anticipated site soils. Our proposed exploration locations will be selected based on client provided information of the proposed improvements. Additionally, backhoe test pits on the order of 5 to 10 feet deep will be excavated to observe the depth of date palm roots.

Our planned boring exploration will include approximately five (5) exploration borings. Boring depths vary between 10 and 50 feet (50-foot depth) in depth below the ground surface or practical refusal. Boring and pit depths are measured below the existing ground surface and will be excavated to the approximate stated depth or to practical refusal, whichever occurs first. Boring and pit depths may be adjusted depending on conditions encountered.

A representative from Earth Systems will maintain a log of the subsurface conditions encountered and will obtain samples for visual observation, classification and laboratory testing. Soils will be logged in general accordance with the Unified Soil Classification System. Our typical sampling interval within the borings will be approximately every 2½ to 5 feet to the full depth explored; however, sampling intervals may be adjusted depending on the materials encountered. Bulk samples of the soil materials will be obtained. The number of blows necessary to drive either a Standard Penetration Test [SPT] sampler or a modified California-type sampler within the borings will be recorded. The depth to groundwater will be measured, if encountered. Borings will be backfilled with the soils from the cuttings and tamped upon completion. Controlled compaction of the backfill is not proposed. Our field exploration will be provided under the direction of a Registered Engineer from our firm.

In the event that unusual site conditions not presently anticipated are encountered during the exploration, we will bring it to your attention and will discuss with you the effect of these conditions on both the estimated cost and timing of the report.

Task 4 - Laboratory Testing

Laboratory tests will be performed on selected samples to evaluate the physical characteristics of the materials encountered during our field exploration. We anticipate laboratory testing may include moisture content, dry unit weight, maximum density/optimum moisture content, sieve analysis, Expansion Index, R-value, and consolidation/collapse potential. Testing will be performed in general accordance with American Society for Testing and Materials [ASTM] or appropriate test procedure. Selected samples will also be tested for a screening level of corrosion potential (pH, electrical resistivity, water-soluble sulfates, and water-soluble chlorides). Earth Systems does not practice corrosion engineering; however, these test results may be used by a qualified engineer in designing an appropriate corrosion control plan for the project. The tests selected and the frequency of testing may be modified and will be based on the subsurface conditions encountered.

Task 5 – Analysis and Report

Earth Systems will analyze the field data obtained, perform preliminary engineering analyses, and provide recommended design parameters for earthwork and foundations for the proposed structure/s. The results of our field exploration and engineering analysis will be summarized in a report prepared under the supervision of a Registered Engineer. Four copies of this report will be provided to the client. We anticipate that our report will include:

- A description of the proposed project including a site plan showing the approximate boring locations.
- A description of the surface and subsurface site conditions including groundwater conditions, as encountered in our field exploration.
- A description of the site geologic setting and possible associated geology-related hazards, including liquefaction, subsidence, and seismic settlement analysis.
- A discussion of regional geology and site seismicity.
- A description of local and regional active faults.
- A discussion of other geologic hazards such as ground shaking, landslides, flooding, and tsunamis.
- A discussion of site conditions, including the geotechnical suitability of the site for the general type of construction proposed.
- A "General Procedure" seismic analysis including geotechnical seismic design coefficients in accordance with the 2022 CBC.
- Recommendations for imported fill (if required) for use in compacted fills.
- Recommendations for foundation design including parameters for shallow foundations and building pad and subgrade preparation.
- Anticipated total and differential settlements for the recommended foundation system.
- Preliminary recommendations for the mitigation of seismic induced settlement.
- Recommendations for lateral earth pressures (active, at-rest, and passive) for retaining walls, including drainage requirements, coefficients of friction and seismic earth pressures.
- Recommendations for site preparation, earthwork, and fill compaction specifications.
- Discussion of anticipated excavation conditions, including shrinkage and/or bulking.
- Recommendations for underground utility trench backfill and import soils.
- Recommendations for stability of temporary trench excavations.
- Recommendations for slabs-on-grade (building slabs and walkways), including recommendations for reducing the potential for moisture transmission through interior slabs.

- Asphalt concrete pavement and Portland cement driveway recommendations for auto, driveways, and fire lanes (Traffic Index values of 5.0 for parking areas and 7.0 for driveways, and 5.0 for fire lanes).
- Recommendations for collapsible or expansive soils (if applicable).
- Recommendations for location specific storm water infiltration rates. Note, infiltration rates will be provided in the geotechnical report.
- A discussion of the corrosion potential of the near-surface soils encountered during our field exploration.
- An appendix, which will include a summary of the field exploration and laboratory testing program.

Task 6 – Percolation Testing for Basin Infiltration

In addition to the geotechnical explorations, two (2) borings will be drilled and used for percolation testing and soil classification. The percolation testing borings will extend no deeper than 5 feet below the ground surface. Drilling must be performed in conjunction with the geotechnical engineering exploration during our field exploration and these will be used for percolation testing in proposed infiltration systems (location to be determined by the hydraulic engineer prior to drilling operations). The percolation test values will be converted to infiltration values based on Porchet Method defined in Riverside County (accepted by San Bernardino County) Low Impact Development BMP Design Handbook: Shallow Percolation Test. Test holes will extend vertically to maximum depth of 5 feet below the existing ground surface representing the assumed bottom of the drainage facility. Perforated PVC pipe and gravel and sock will be placed into the test hole to hold it open during the test, and the test holes will be pre-soaked and allowed to sit overnight if required.

Percolation testing will consist of adding up to 3 feet of clean water to the test holes. Adding the water will allow measuring the rate at which the water percolates into the subsurface by periodically measuring the drop in water surface over time. The tests will take about one hour if a sandy protocol is used, and will last about six hours if a clayey protocol is used (in general conformance with the standards of the Riverside County Low Impact Development BMP Design Handbook: Shallow Percolation Test. For the clayey protocol, the testing will be performed the day after the hole has been presoaked; for the sandy protocol, the testing can be performed two hours after the hole has been presoaked. Based on knowledge of the surface soils designated as sandy, we anticipate that the sandy testing protocol may apply. The tests can be performed concurrently in the various test holes.

Optional Task 7 – Private Utility Locating

As USA does not locate utilities on private property. We offer, as an optional task item, to perform private utility locating at the proposed boring locations if utility plans are not available from the owner and they would like greater assurance of not encountering a buried utility during the drilling.

GEOTECHNICAL FEES

We propose to complete the proposed scope of work presented above assuming typical site conditions on a fixed-fee basis as detailed below:

Geotechnical Engineering Report and Seismic Hazards Evaluation and Percolation Testing (Tasks 1-6)	$19,900.00
Private Utility Locating (Optional Task 7)	$ 1,500.00

Typical site conditions assume reasonable accessibility for a truck mounted drill rig, permits are not required, monitoring by third parties are not required, and minimal delays for utility clearances. In the event that unusual site conditions not presently anticipated are encountered during the exploration, we will bring it to your attention and will discuss with you the effect of these conditions on both the estimated cost and timing of the reports.

Other services not included are private utility locating (unless option selected), percolation testing for leach private sewage, temporary traffic control plans & permit & devices & device setup, plan reviews, response to reviews, meetings, testing or observation during construction, or any other service not expressly detailed. If required, services in addition to the scope of work described above will be billed on a time-and-expense basis, based upon the Fee Schedule in effect at the time the services are provided.

Our proposal is based on the understanding that our services, as outlined in this proposal, are not subject to Prevailing Wage Law for non-professional field staff (i.e. drillers and helpers). In the event that the Department of Industrial Relations determines that additional Prevailing Wage Law applies to the project, (client) agrees to pay to Consultant any additional compensation necessary to adjust Consultant's employees' wages to conform to the Prevailing Wage Law on this project.

GEOTECHNICAL SCHEDULE

Based on the requested information, we feel confident that we can provide the geotechnical engineering report as outlined in this proposal in an expeditious manner. Typically, once authorization to enter the property and a signed contract and retainer are received, we will mark respective boring locations in the field. Subsequent to field marking, we will contact Underground Service Alert which requires 48 hours notification prior to any underground excavation or drilling. Depending on subcontractor availability, we anticipate excavating our field borings within one to two weeks after the minimum 48 hour wait required by Underground Service Alert. Drilling operations will take approximately one day to complete.

Laboratory testing is anticipated to take three weeks to complete after drilling is completed. This time frame is governed by the type of testing performed as certain tests anticipated for this project require at least two weeks to run. Normal time frames from receipt of authorization to report submittal is typically about six to eight weeks. If requested, we can provide preliminary design data in the interim period before the report is finalized.

PROPOSED SCOPE OF ENVIRONMENTAL SERVICES

Our environmental scope will include performing a standard Phase I Environmental Site Assessment. No additional environmental services are proposed. The purpose of an ESA is to evaluate the potential for soil or groundwater contamination at a site due to the possible past use, storage, or handling of hazardous materials or petroleum products on or near the site, based on a visit to the site and a review of readily obtainable information concerning site activities and conditions. The scope of work is based on United States Environmental Protection Agency Final All Appropriate Inquiry Rule (2006) [US EPA AAI] and ASTM Standard E-1527-13, *Standard Practice for Environmental Site Assessments*. Our cost estimate is based on performing the following scope of services:

Site Reconnaissance: This will include a visual reconnaissance of the site, noting physical evidence of potential contamination or possible sources of contamination. The client/owner, tenants, and/or site personnel will be interviewed (if possible) regarding current and past site usage. The site will be photographed to document current conditions. Adjacent site uses will also be observed to evaluate their possible impact on the subject property.

Site History Investigation: The history of the site will be researched to identify past land use at and near the site related to the storage, production, or use of hazardous materials. If possible, persons with knowledge of past site uses will be interviewed. Documents to be reviewed may include the following:

- Historical aerial photographs
- Topographic maps
- Munger Oil maps
- Fire insurance maps
- Land title information
- Local street directories
- Zoning/land use records
- Interviews with current and/or former owners, occupants, and operators
- Engineering and institutional controls, such as deed restrictions and restrictive zoning to a radius of ½-mile, if contained in publicly available lists/registries
- Tribal records of subject property and adjoining properties (if tribal land)
- Local government records such as building department files
- Environmental cleanup liens
- Prior investigative reports (non-Earth Systems reports must be provided by the client)

Regulatory Agency Record Review: Many regulatory agencies compile information concerning sites that generate, store, use, and/or have released hazardous materials. This information will be accessed by obtaining a report from a firm that specializes in maintaining a database of this type of information. The search radii for this review will be in accordance with the US EPA AAI and ASTM standard E-1527-13 (plus an additional distance to accommodate large sites, as appropriate). In addition, personnel at select government agencies will be contacted for information they may have regarding

environmental conditions at the site or in the site vicinity. If the site or an adjacent property is known to have had a release of hazardous materials, the agency files for that site will be reviewed (if readily obtainable). We have assumed that this review will take no more than 2 hours.

Report Preparation: A report summarizing the results of the assessment will be prepared and sent to the client. The report will present our findings regarding past land use on and around the site, our opinion regarding the potential for soil or groundwater contamination at the site, and our recommendations for additional assessment of the site (if deemed appropriate). The US EPA AAI and ASTM standard E1527-13 require the identification of gaps in the data used in evaluating the site. Data gaps encountered in the project, and their significance to the project, will be summarized. The report is normally provided in digital form (as a pdf). Up to three paper copies of the report can be provided upon request at no additional cost.

Note that the collection or analysis of samples of building materials, soil, groundwater, or air is not typically included in the scope of an ESA and is not proposed here. Assessment for the presence of molds is also not included. We do not propose to determine the degree or extent of any contamination that may be identified during this phase of work. If needed, these evaluations would normally be performed as part of a subsequent "Phase II" investigation, at an additional fee.

ENVIRONMENTAL FEES

We propose to conduct this Phase I with a normal turnaround time of 4 weeks and on a fixed-fee basis.

Phase I Environmental Site Assessment – site has past use	$4,900.00

In lieu of requesting a credit application and performing a credit check, we will invoice you for this amount when we receive authorization to proceed. That invoice must be paid before the report will be issued.

ENVIRONMENTAL SCHEDULE

Phase I ESA's typically require about four weeks to complete. Please note that some of the information required to complete the ESA may not be available within the project time-frame. Significant information that does not arrive by the time of publication will be reported as a data gap.

TERMS FOR SERVICE

The following terms and conditions shall be incorporated into the agreement for services and form the basis for the fees developed within. Contract terms more onerous than presented within or insurance greater than $1,000,000 typical limit could incur greater fee.

1. STUDY, MONITORING & INSPECTION: If the services include monitoring or inspection of soil, construction and/or materials, Client shall authorize and pay for Consultant to provide sufficient observation and professional inspection to permit Consultant to form opinions according to accepted statistical sampling methods as to whether the work has been performed

in accordance with recommendations. Such opinions, while statistically valid, do not guaranty uniformity of conditions or materials. Similarly, soils and geology investigations do not guaranty uniformity of subsurface conditions. Client hereby represents and warrants that it has provided and shall provide to Consultant all information and sufficient advance notice necessary in order for Consultant to perform the appropriate level of services. No statement or action of Consultant can relieve Client's contractors of their obligation to perform their work properly. Consultant has no authority to supervise or stop the work of others.

2. SITE ACCESS & UTILITIES: Client has sole responsibility for securing site access, locating utilities, and any repair.

3. BILLING AND PAYMENT: Client will pay Consultant the proposal amount or, if none is stated, according to the fee schedule in effect at the time our services are provided. Prior to initiation of fieldwork, a retainer may be required. This retainer shall be maintained throughout the project and shall be applied to the final invoice. Payment is due on presentation of invoices, and is delinquent if Consultant has not received payment within 30-days from date of an invoice. Client will pay an additional charge of 1-1/2 (1.5) percent per month (or the maximum percentage allowed by law, whichever is lower) on any delinquent amount. Each payment will first be applied to accrued interest, costs and fees and then to the principal unpaid amount. All time spent and expenses incurred (including any in-house or outside attorney's fees) in connection with collection of any delinquent amount will be paid by the Client to Consultant per Consultant's current fee schedule. Payment by Credit Card is subject to a 3% additional fee.

4. OWNERSHIP OF DOCUMENTS: Consultant owns all documents it creates and grants Client limited license to use the documents for the purposes stated in the documents. Consultant reserves the right to withhold delivery of documents to Client until payment in full of current invoices has been received.

5. TERMINATION: This agreement may be terminated by either party effective seven (7) days from the date of written notice, or if the client suspends the work for three (3) months. In the event of termination, Consultant will be paid for services performed prior to the date of termination plus reasonable termination expenses. If Consultant has not received payment for any invoice within 30 days from the date of the invoice, or in the event of anticipatory breach by Client, Consultant may suspend performance of its services immediately and may terminate this contract.

6. RISK ALLOCATION: In order for Client to obtain the benefit of a fee which includes a lesser allowance for compensating Consultant for its litigation risk, Client agrees to indemnify, hold harmless and defend Consultant, its agents, employees, or officers, from and against any and all loss, claim, expenses, including attorney's fees, injury, damages, liability or costs arising out of non-design services (i.e., services other than as defined by Civil Code Section 2784) performed by Consultant on this project, except where such loss injury, damage, liability, cost, expenses or claims are the result of the sole negligence or willful misconduct of Consultant. Client further agrees to limit the total aggregate liability of Consultant, its agents, employees, and officers to Client on the entire project, to the greater of $25,000.00 or total fees charged by Consultant, except that Consultant's liability for willful misconduct shall not be limited. These terms may be negotiable depending on the particular facts of your project. You should consult with an attorney experienced in construction contracts and litigation regarding this provision.

7. HAZARDOUS MATERIALS: Consultant is responsible only for hazardous materials brought by Consultant onto the site. Client retains ownership and responsibility in all respects for other hazardous materials and associated damage.

8. ASSIGNS AND THIRD PARTIES: This Contract is intended only to benefit the parties hereto. No person who is not a signatory to this Contract shall have any rights hereunder to rely on this Contract or on any of Consultant's services or reports without the express written authorization of Consultant. This Contract shall not be assigned by Client without the Consultant's written consent. This Contract is binding on any successor companies to Client or Consultant, and on the surviving corporation in the event of a merger or acquisition.

9. STANDARD OF CARE: Consultant agrees to strive to perform its services that are intended solely for the use of the Client, in a proper and professional manner in accordance with current standards of environmental practice in this community at this time. The Client agrees to pay for and look to Consultant only for such performances. No warranty or guarantee is expressed or implied. Consultant and the Client agree that there are risks of earth movement and property damage inherent in land development and repair and that Consultant has not been authorized to perform the exhaustive and economically unfeasible investigation necessary to eliminate such risks.

10. EFFECTS OF SITE EXPLORATION: It is understood that in the normal course of providing these services, Consultant may be required to access the site to perform field exploration. All boreholes will be backfilled at completion; however, some settlement should be anticipated. Consultant will attempt to minimize the effects of the exploration operations on the site. However, it must be understood that some damage to existing roadways, vegetation, or other improvements may occur. Consultant does not propose to restore the site to the same condition as was present prior to the exploration operations.

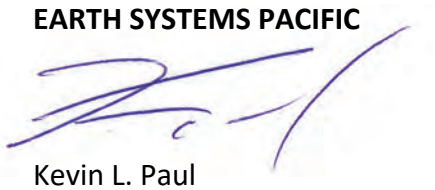
11. GOVERNING LAW, SURVIVAL AND FORUM SELECTION: The contract shall be governed by laws of the State of California. If any of the provisions contained in this agreement are held invalid, the enforceability of the remaining provisions will not be impaired. Limitations of liability, indemnities, representations and warranties by Client will survive termination of this agreement. The signatories represent and warrant that they are authorized by the entities on whose behalf they sign to enter into this contract and that their principals have filed fictitious business name statements, if required. All disputes between Consultant and client related to this agreement will be submitted to the court of the county where Consultant's principal place of business is located and client waives the right to remove the action to any other county or judicial jurisdiction.

CLOSURE

If the proposed Scope of Services, Terms for Service and Fee are satisfactory, **please sign in the space provided. Please return one copy to our office with the Owner Information Form.** This will constitute authorization for us to proceed with work on the project. Our fee will be billed subsequent to the submission of our final report to the client. Based on the passing of Assembly Bill No. 2629, services may not commence until the execution of a written contract. This agreement can be terminated by either party by notification in writing. Earth Systems responsibility for the project will end upon completion of the services described herein or termination of the agreement, unless authorization to perform additional work and agreement for payment thereof is provided by the client. This proposal is valid for a period of 90 days. If authorized after 90 days, Earth Systems reserves the right to reconsider the fees presented herein. We look forward to assisting you on this project and we thank you for the opportunity to submit this proposal.

If you have any questions or require additional information, please do not hesitate to contact the undersigned at (760) 345-1588.

Respectfully submitted,
EARTH SYSTEMS PACIFIC



Kevin L. Paul
Vice President

PLEASE RETURN A SIGNED COPY TO EARTH SYSTEMS PACIFIC

Proposal/ac/cgj/klp/mh

AGREED TO AND ACCEPTED

_____
CLIENT NAME (IN PRINT)

_____
SIGNATURE AND TITLE

_____
TIN/SSN (Tax ID No. /Social Security No.)
(This information and signature above authorizes us to review Client credit history.)

_____
DATE

Check Below to Authorize Services:

☐ Geotechnical Engineering Feasibility Report

☐ Optional Task 7 – Private Utility Locating

☐ Phase I Environmental Site Assessment

Attachments: Owner Information Form

Distribution: 1/Rich Malacoff: rich.malacoff@thealtumgroup.com
1/BER File

Earth Systems

Request for Owner Information for California Preliminary Notice

Project Name: _____ **Project No:** _____

Scope of Work: _____ **Estimated Value: $**_____

Address: _____

Tract and/or Lot # and APN #: _____
(Legal Description)

Party Retaining Services (i.e. Client): _____
(Legal Entity)

Attention: _____

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Property Owner: _____
(Owner or Reputed Owner)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

General Contractor (if applicable): _____
(General Contractor or Reputed Contractor)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Lender: (if applicable): _____
(Construction Lender, or Reputed Construction Lender, if any)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Pursuant to California Civil Code Section 8208, we request that you provide us with the above information to be used in a Preliminary Notice of work performed to the job site identified above. The statute requires that this information be furnished uponyour receipt of this request.

Return completed form to: _____

Appendix I

PROJECT-SPECIFIC WQMP SUMMARY DATA FORM

Project-Specific WQMP Summary Data Form

Applicant Information	
Name and Title	Rod Vandenburg
Company	Pacific Coast Properties
Phone	(760) 779 - 8227
Email	
Project Information	
Project Name (as shown on project application/project-specific WQMP)	Calhoun Street Subdivision
Street Address	49-251 Calhoun Street, Coachella, CA
Nearest Cross Streets	Avenue 49 and Calhoun Street
Municipality (City or Unincorporated County)	City of Coachella
Zip Code	92236
Tract Number(s) and/or Assessor Parcel Number(s)	612-260-010
Other (other information to help identify location of project)	
Watershed	Whitewater River

Indicate type of project.		**Priority Development Projects (Use an "X" in cell preceding project type):**
		SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 25%
		SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 10% & erosive soils
		Commercial or Industrial ≥ 100,000 sq. ft.
		Automotive repair shop
		Retail Gasoline Outlet disturbing > 5,000 sq. ft.
		Restaurant disturbing > 5,000 sq. ft.
	X	Home subdivision ≥ 10 housing units
		Parking lot ≥ 5,000 sq. ft. or ≥ 25 parking spaces

Date Project-Specific PWQMP Submitted	
Size of Project Area (nearest 0.1 acre)	39.98 acres
Project Area managed with Site Design or Low Impact Development (LID) BMPs (nearest 0.1 acre)	100%
Is the project subject to onsite retention by ordinance or policy?	Yes
Are Treatment Control BMPs required?	No
Name of the entity that will implement, operate, and maintain the post-construction BMPs	Pacific Coast Properties
Contact Name	Ron Vandenburg
Street or Mailing Address	43-584 Via Magellan Drive, Palm Desert, CA 92201
City	Palm Desert
Zip Code	92201
Phone	(760) 779 - 8227
Space Below for Use by City/County Staff Only	
Preceding Information Verified by (consistent with information in project-specific WQMP)	**Name:** **Date:**
Date Project-Specific WQMP Approved:	
Data Entered by	**Name:** **Date:**
Other Comments	

Appendix F
Calhoun Street Housing Development Traffic Impact Analysis

URBAN | CROSSROADS

CALHOUN STREET SUBDIVISION

TRAFFIC ANALYSIS

PREPARED BY: Janette Cachola | jcachola@urbanxroads.com
Marlie Whiteman, P.E. | mwhiteman@urbanxroads.com
John Kain, AICP | jkain@urbanxroads.com

TABLE OF CONTENTS

Table of Contents ii

Appendices iv

List of Exhibits v

List of Tables vi

List of Abbreviated Terms vii

1 Introduction 1

1.1 Project Overview 1
1.2 Analysis Scenarios 1
1.3 Study Area 3
1.4 Analysis Findings 3

2 Methodologies 7

2.1 Level of Service 7
2.2 Intersection Capacity Analysis 7
2.3 Traffic Signal Warrant Analysis Methodology 9
2.4 Minimum Acceptable Levels of Service (LOS) 10

3 Area Conditions 11

3.1 Existing Circulation Network 11
3.2 City of Coachella General Plan Circulation Element 11
3.3 Transit Service 11
3.4 Pedestrian and Bicycle Facilities 11
3.5 Existing (2024) Traffic Counts 16
3.6 Intersection Operations Analysis 16
3.7 Traffic Signal Warrants Analysis 19

4 Projected Future Traffic 21

4.1 Project Trip Generation 21
4.2 Project Trip Distribution 22
4.3 Modal Split 22
4.4 Project Trip Assignment 22
4.5 Background Traffic 22

5 EAP (2026) Traffic Conditions 29

5.1 EAP Traffic Volume Forecasts 29
5.2 Intersection Operations Analysis 29
5.3 Traffic Signal Warrants Analysis 29

6 EAPC (2026) Traffic Conditions 33

6.1 EAPC (2026) Traffic Volume Forecasts 33
6.2 Intersection Operations Analysis 33
6.3 Traffic Signal Warrants Analysis 33
6.4 Cumulative Improvements 36

7 Cumulative and Site Access Improvements 37

7.1 Recommended Cumulative Improvement 37
7.2 ON-Site and Site-Adjacent Improvements 37

8 References 41

APPENDICES

Appendix 1.1: Traffic Study Scope

Appendix 1.2: VMT Screening

Appendix 3.1: Traffic Counts –2024

Appendix 3.2: Existing (2024) Conditions Intersection Operations Analysis Worksheets

Appendix 3.3: Traffic Signal Warrant Analysis Worksheets

Appendix 5.1: EAP (2026) Conditions Intersection Operations Analysis Worksheets

Appendix 6.1: EAPC (2026) Conditions Intersection Operations Analysis Worksheets

LIST OF EXHIBITS

Exhibit 1-1: Preliminary Site Plan 2
Exhibit 1-2: Study Area 4
Exhibit 3-1: Existing Number of Through Lanes and Intersection Controls 12
Exhibit 3-2: City of Coachella General Plan Circulation Element 13
Exhibit 3-3: City of Coachella General Plan Roadway Cross-Sections 14
Exhibit 3-4: Existing Pedestrian and Bike Facilities 15
Exhibit 3-5: Existing (2024) Traffic Volumes 17
Exhibit 4-1: Project Trip Distribution 24
Exhibit 4-2: Project Only Traffic volumes 25
Exhibit 4-3: Cumulative Development Location Map 26
Exhibit 5-1: EAP (2026) Traffic Volumes 31
Exhibit 6-1: EAPC (2026) Traffic Volumes 34
Exhibit 7-1: Site Access Recommendations 39
Exhibit 7-2: Recommended Intersection Improvements for EAP (2026) and EAPC (2026) Conditions 40

LIST OF TABLES

Table 1-1: Intersection Analysis Locations 3
Table 1-2: Level of Service Summary 5
Table 2-1: Signalized Intersection LOS Thresholds 8
Table 2-2: Unsignalized Intersection LOS Thresholds 9
Table 2-3: Traffic Signal Warrant Analysis Locations 10
Table 3-1: Intersection Analysis for Existing (2024) Conditions 18
Table 4-1: Project Trip Generation Summary 21
Table 4-2: Cumulative Development Land Use Summary 27
Table 5-1: Intersection Analysis for EAP (2026) Conditions 32
Table 6-1: Intersection Analysis for EAPC (2026) Conditions 35
Table 7-1: Existing Plus Ambient Plus Project Plus Cumulative (EAPC) Fair Share Calculations 37

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
EAP	Existing Plus Ambient Plus Project
EAPC	Existing Plus Ambient Plus Project Plus Cumulative
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	Calhoun Street Subdivision
sf	Square Feet
TA	Traffic Analysis

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1 INTRODUCTION

This report presents the results of the traffic analysis (TA) for Calhoun Street Subdivision ("Project"), located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, as shown on Exhibit 1-1.

The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and recommend improvements to achieve acceptable circulation system operational conditions. This TA has been prepared based in accordance with the County of Riverside's Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled (December 2020), as the City of Coachella utilizes the County guidelines. (1) Urban Crossroads, Inc. prepared a traffic study scoping package (included in Appendix 1.1) which was reviewed by City's consultant prior to the preparation of this report.

1.1 PROJECT OVERVIEW

The Project is proposed to consist of 259 single family residential units and a 1.5-acre park on approximately 40 acres. It is anticipated that the Project would be developed by year 2026. A preliminary site plan of the proposed Project is shown in Exhibit 1-1. Access to the Project will be provided via Access 1 at Calhoun Street (full access) and Access 2 at Avenue 49 (full access).

In order to develop the traffic characteristics of the proposed Project, trip-generation rates provided in the *Institute of Transportation Engineers (ITE) Trip Generation* (11th Edition, 2021) are utilized.

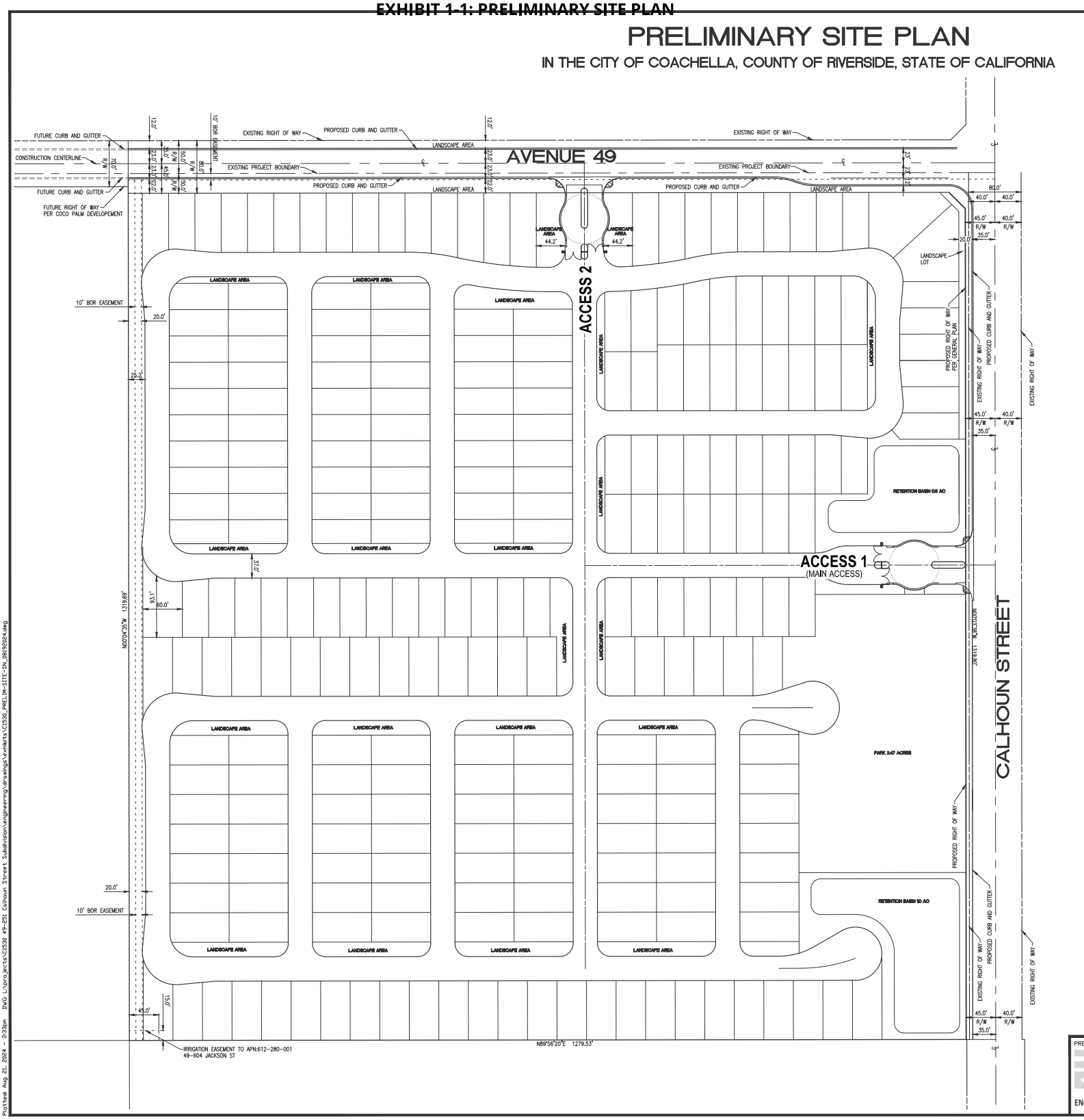
The Project is anticipated to generate a total of 2,517 trip-ends per day with 192 AM peak hour trips and 250 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2024) Conditions
- Existing plus Ambient plus Project (EAP) (2026) Conditions
- Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) Conditions

EXHIBIT 1-1: PRELIMINARY SITE PLAN



For the existing study area intersections, traffic count data has been collected in January and June, 2024 during the AM peak period of 7:00 AM to 9:00 AM and PM peak period of 4:00 PM to 6:00 PM.

The Existing plus Ambient plus Project (EAP) conditions analysis determines the potential near-term cumulative circulation system deficiencies with the Project but without known cumulative projects. To account for background traffic growth, an ambient growth factor from Existing conditions of 4.04% (2% per year, compounded annually over 2 years) is included for EAP (2026) traffic conditions. The ambient growth is consistent with the growth used by other projects within the City of Coachella.

The Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) traffic conditions analysis determines the potential cumulative circulation system deficiencies, including the Project and other known cumulative projects. The cumulative project list was compiled from information provided in the City of Coachella website.

1.3 STUDY AREA

The Project study area was defined in coordination with the City of Coachella. Exhibit 1-2 presents the study area and intersection analysis locations. The intersections listed in Table 1-1 were selected for this TA with City of Coachella technical staff concurrence.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	#	Intersection
1	Calhoun St. / Dr. Carreon Bl.	5	Jackson St. / Avenue 49 - Odlum Dr.
2	Calhoun St. / Avenue 48	6	Calhoun St. / Access 1
3	Calhoun St. / Avenue 49	7	Access 2 / Avenue 49
4	Calhoun St. / Avenue 50		

1.4 ANALYSIS FINDINGS

This section provides a summary of the analysis results for Existing (2024), EAP (2026), and EAPC (2026) conditions. Table 1-2 presents a summary of study area LOS conditions for each analysis scenario.

1.4.1 EXISTING (2024) CONDITIONS

For Existing (2024) traffic conditions the unsignalized study area intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5) are operating at unacceptable level of service (LOS "E" or worse). Each of these three locations meet the traffic volume warrants for installation of a traffic signal based upon existing traffic counts.

EXHIBIT 1-2: TRAFFIC ANALYSIS STUDY AREA

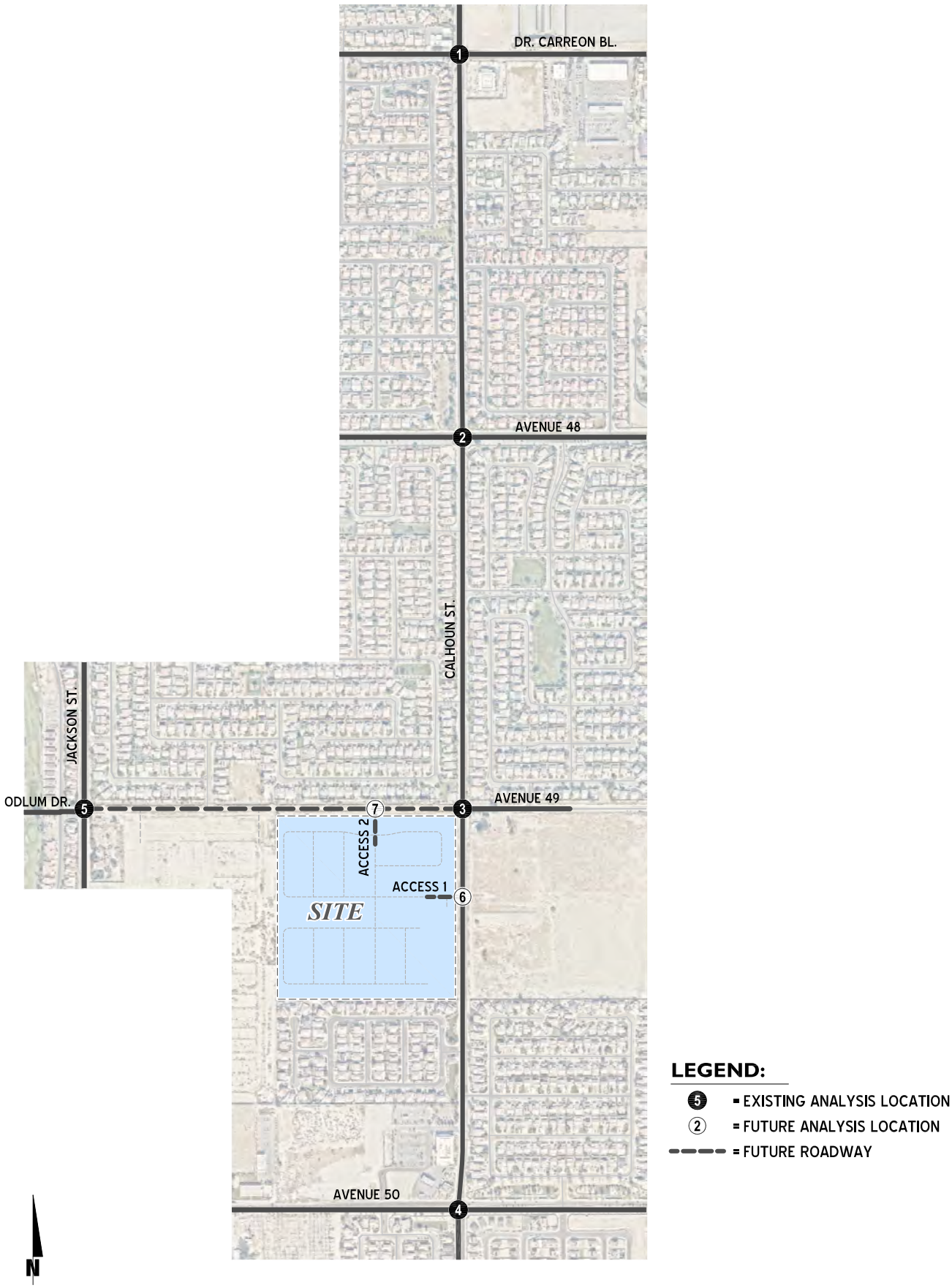


TABLE 1-2: LEVEL OF SERVICE (LOS) SUMMARY

#	Intersection	Existing (2024) AM	Existing (2024) PM	EAP (2026) AM	EAP (2026) PM	EAPC (2026) AM	EAPC (2026) PM
1	Calhoun St. / Dr. Carreon Bl.						
	- Without Improvements	F	A - D	F	E	F	F
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
2	Calhoun St. / Avenue 48	A - D	A - D	A - D	A - D	A - D	A - D
3	Calhoun St. / Avenue 49						
	- Without Improvements	F	A - D	F	E	F	F
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
4	Calhoun St. / Avenue 50	A - D	A - D	A - D	A - D	A - D	A - D
5	Jackson St. / Avenue 49 - Odlum Dr.						
	- Without Improvements	F	A - D	F	A - D	F	E
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
6	Calhoun St. / Access 1	N/A	N/A	A - D	A - D	A - D	A - D
7	Access 2 / Avenue 49	N/A	N/A	A - D	A - D	A - D	A - D

Legend:

= A - D = E = F

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]1-2_LOS Summary

1.4.2 EXISTING PLUS AMBIENT PLUS PROJECT (EAP) (2026) CONDITIONS

For EAP (2026) traffic conditions, there are no additional intersections anticipated to operate at unacceptable LOS during peak hours beyond the three locations which have existing deficiencies. Installation of a traffic signal at each of the deficient intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5) are anticipated to address intersection operational deficiencies.

Although the intersection of Calhoun Street / Access 1 (#6) operates at an acceptable LOS for EAP conditions, this location meets the volume warrants for installation of a traffic signal.

1.4.3 EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (EAPC) (2026) CONDITIONS

For EAPC (2026) traffic conditions, there are no additional intersections anticipated to operate at unacceptable LOS during peak hours. Similar to EAP conditions, installation of traffic signal at the three deficient unsignalized intersections are anticipated to address intersection operational deficiencies.

Detailed Project fair share calculations, for each peak hour, are provided in Table 7-1 for the three locations where traffic signals are warranted for all analysis scenarios (existing, EAP, and EAPC).

Site-adjacent improvements are listed in Section 7.2 and include the following:

- Project to construct Avenue 49 as a 2-lane roadway (40 feet curb-to-curb width) from Jackson Street to the Project's westerly site boundary.
- Project to construct Avenue 49 at its ultimate southerly half section width as a Primary Arterial with bicycle facility from the Project's westerly site boundary to the Project's easterly site boundary (Calhoun Street).
- Project to widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with Bicycle facility from Project's northerly site boundary (Avenue 49) to the Project's southerly boundary.
- Project to implement a new traffic signal at the Calhoun Street / Avenue 49 (#3) intersection, with potential future reimbursement contingent upon cumulative development activity.
- Access to the adjacent public park to be provided from Calhoun Street, subject to park development access and parking plans (to be determined).

1.4.4 VEHICLE MILES TRAVELED (VMT)

Appendix 1.2 contains the approved VMT screening analysis which was performed in a separate document (Calhoun Street Subdivision Vehicle Miles Traveled (VMT) Screening, Urban Crossroads, June 18, 2024) and no further VMT is required.

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with the County of Riverside TIA Guidelines. (1)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near Capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 7th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (2)The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Coachella requires signalized intersection operations analysis based on the methodology described in the HCM. (2) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-1.

The traffic modeling and signal timing optimization software package Synchro (Version 12) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and Capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes are adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour.

The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (2)

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Serice, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and indvidual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 7th Edition

[1] if V/C is greater than 1.0 then LOS is F per HCM

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Coachella requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (2) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection.

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Serice, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersections capacity exceeded.	>50.00	F

Source: HCM, 7th Edition

[1] if V/C is greater than 1.0 then LOS is F per HCM

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (3)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (3) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Urban warrants have been used as posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used on roadways with speeds greater than 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants.

Traffic signal warrant analyses were performed for the following unsignalized study area intersections shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection	#	Intersection
1	Calhoun St. / Dr. Carreon Bl.	6	Calhoun St. / Access 1
3	Calhoun St. / Avenue 49	7	Access 2 / Avenue 49
5	Jackson St. / Avenue 49 - Odlum Dr.		

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 EAP *(2026) Traffic Conditions* and Section 6 *EAPC (2026) Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

For the purposes of this analysis, the following thresholds of significance have been applied to study area intersections located within the City of Coachella to identify significant impacts through a comparison of Existing and EAP traffic conditions:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing traffic conditions and the addition of project traffic is expected to cause the intersection to operate at an unacceptable level of service (LOS E or F), the impact is considered significant;
- If an intersection is projected to operate at LOS E or LOS F under Existing, and the addition of project traffic, the impact is considered significant.

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects. The Project's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the Project adds significant traffic to the forecasted deficiency. A Project's contribution to a cumulatively considerable impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate the potential cumulative impact. If full funding of future cumulative improvements is not reasonably assured, a temporary unmitigated cumulative impact may occur until the needed improvement is fully funded and constructed.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Coachella General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the Project scope (Appendix 1.1), the study area includes 5 existing intersections as shown previously on Exhibit 1-2, which have been agreed upon with City staff. Exhibit 3-1 illustrates the number of through traffic lanes for existing roadways and traffic controls for study area intersections.

3.2 CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located at the southwest corner of Tyler Street and Avenue 53 in the City of Coachella. Exhibit 3-2 shows the City of Coachella General Plan Circulation Element, with planned roadway classifications. Exhibit 3-3 illustrates the City of Coachella General Plan roadway cross-sections.

Calhoun Street is classified as a Collector with Bicycle Facility in the study area.

Dr. Carreon Boulevard and Avenue 49 are classified as a Primary Arterial with Bicycle Facility in the study area.

Avenue 48 and Avenue 50 are classified as a Major Arterial with Bicycle Facility in the study area.

3.3 TRANSIT SERVICE

The City of Coachella is currently served by the SunLine Transit Agency; currently, Route 8 is located along Calhoun Street (between Avenue 48 and Avenue 50), Dr. Carreon Boulevard (between Jackson Street & Van Buren Street), Avenue 48 (between Calhoun Street & Van Buren Street), Avenue 50 (east of Calhoun Street) in the study area. Transit service is reviewed and updated by Sunline periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.4 PEDESTRIAN AND BICYCLE FACILITIES

The existing pedestrian facilities within the study area are shown on Exhibit 3-4. As shown on Exhibit 3-4, existing on-street bike lanes are located along the Calhoun Street, Avenue 48, and Avenue 50. Sidewalks generally exist on Avenue 48 and Avenue 50. Some portions of the sidewalk exist on Calhoun Street, Jackson Street, Dr. Carreon Boulevard, Odlum Drive, and Avenue 49.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

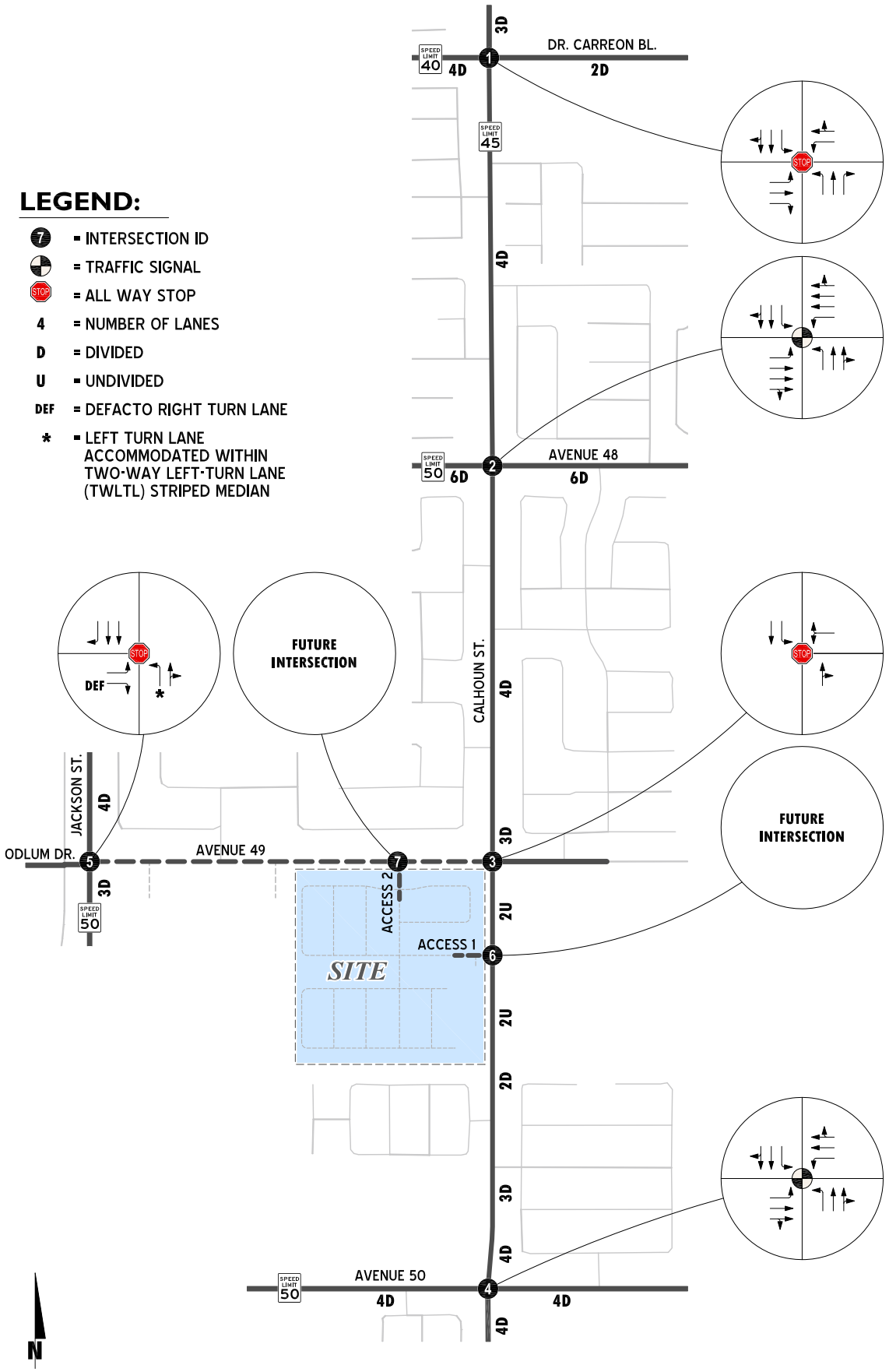
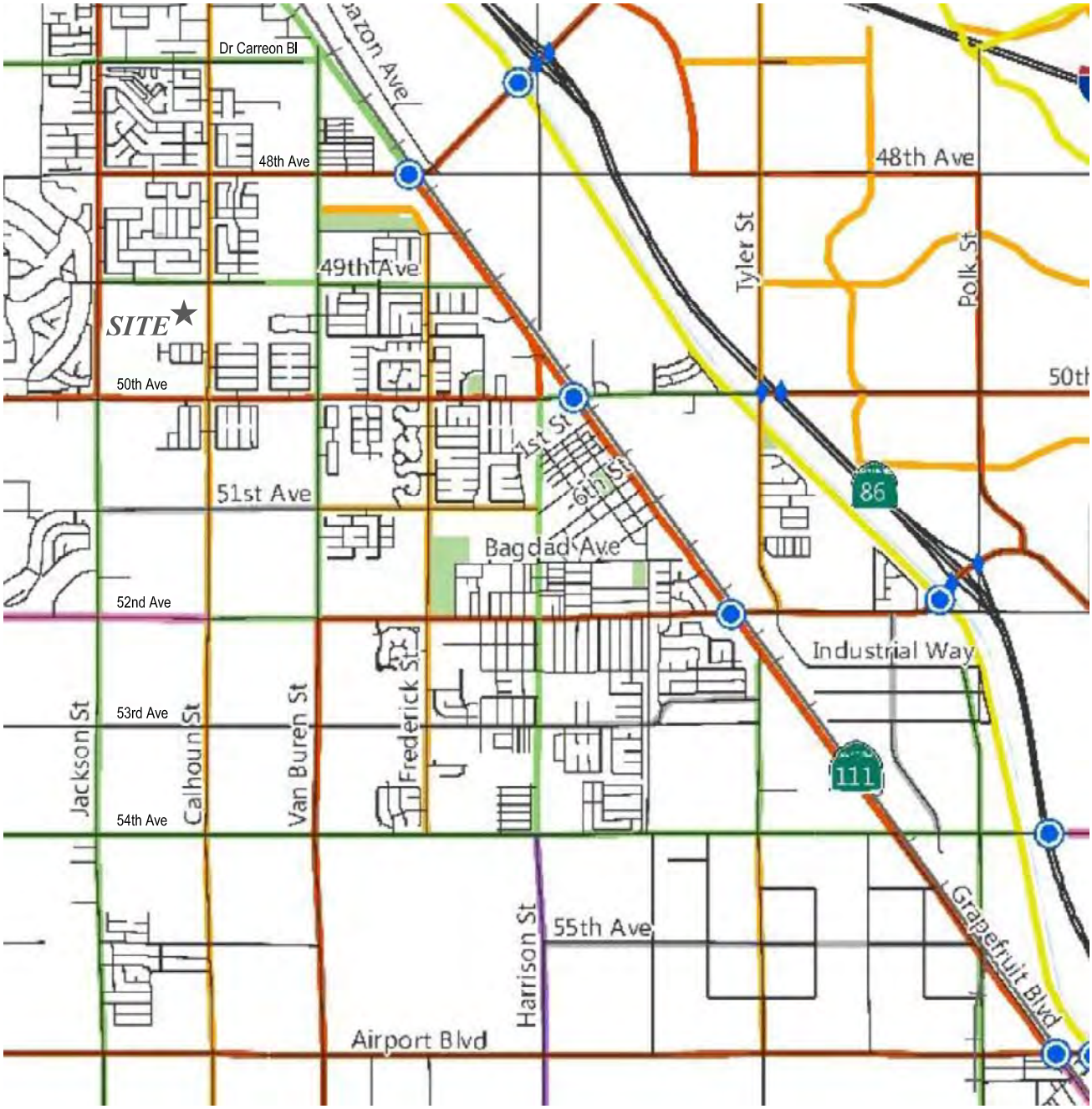


EXHIBIT 3-2: CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT



SOURCE: CITY OF COACHELLA

LEGEND:

3 = EXISTING ANALYSIS LOCATION

EXHIBIT 3-3: CITY OF COACHELLA GENERAL PLAN ROADWAY CROSS-SECTIONS

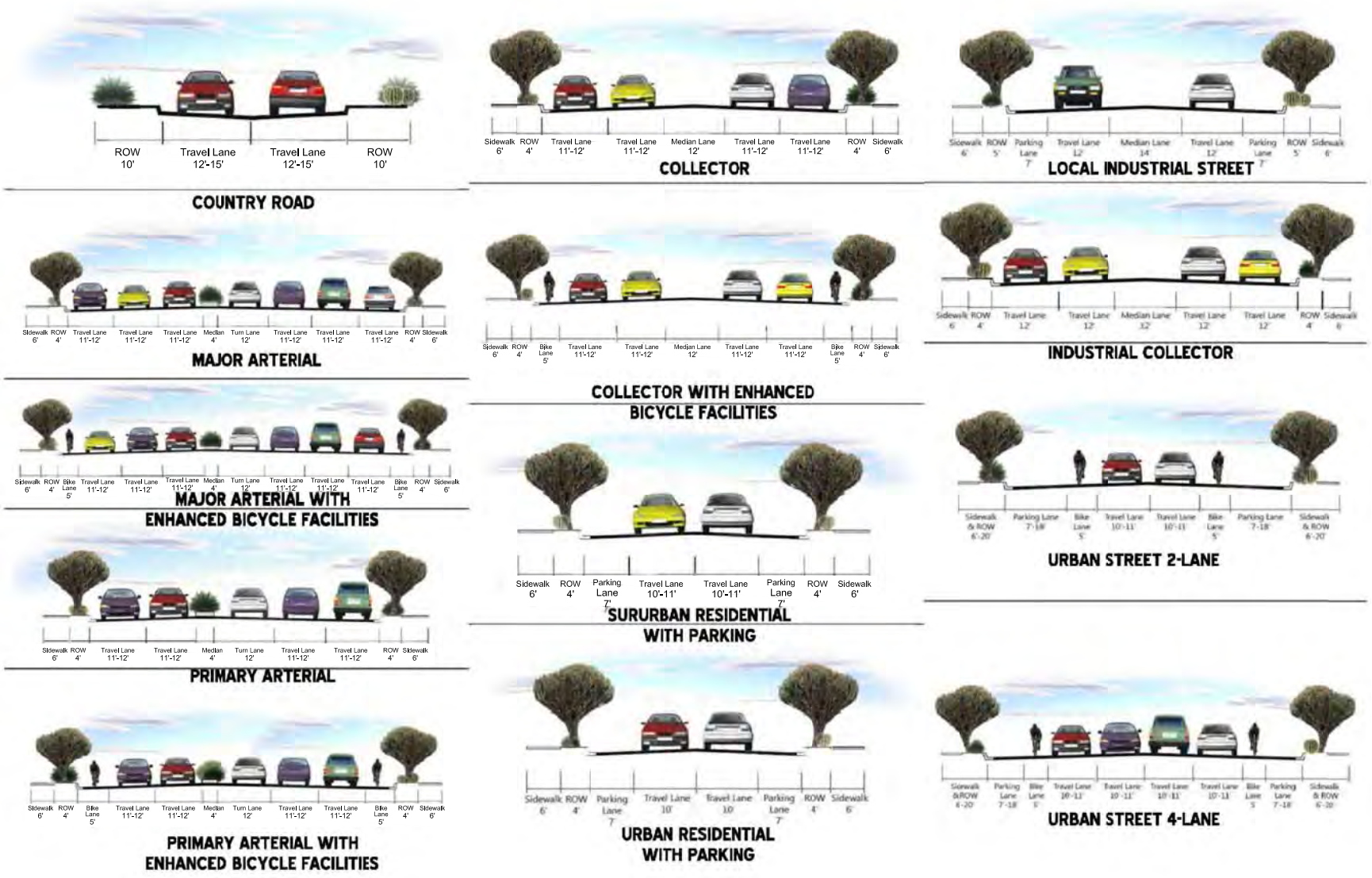
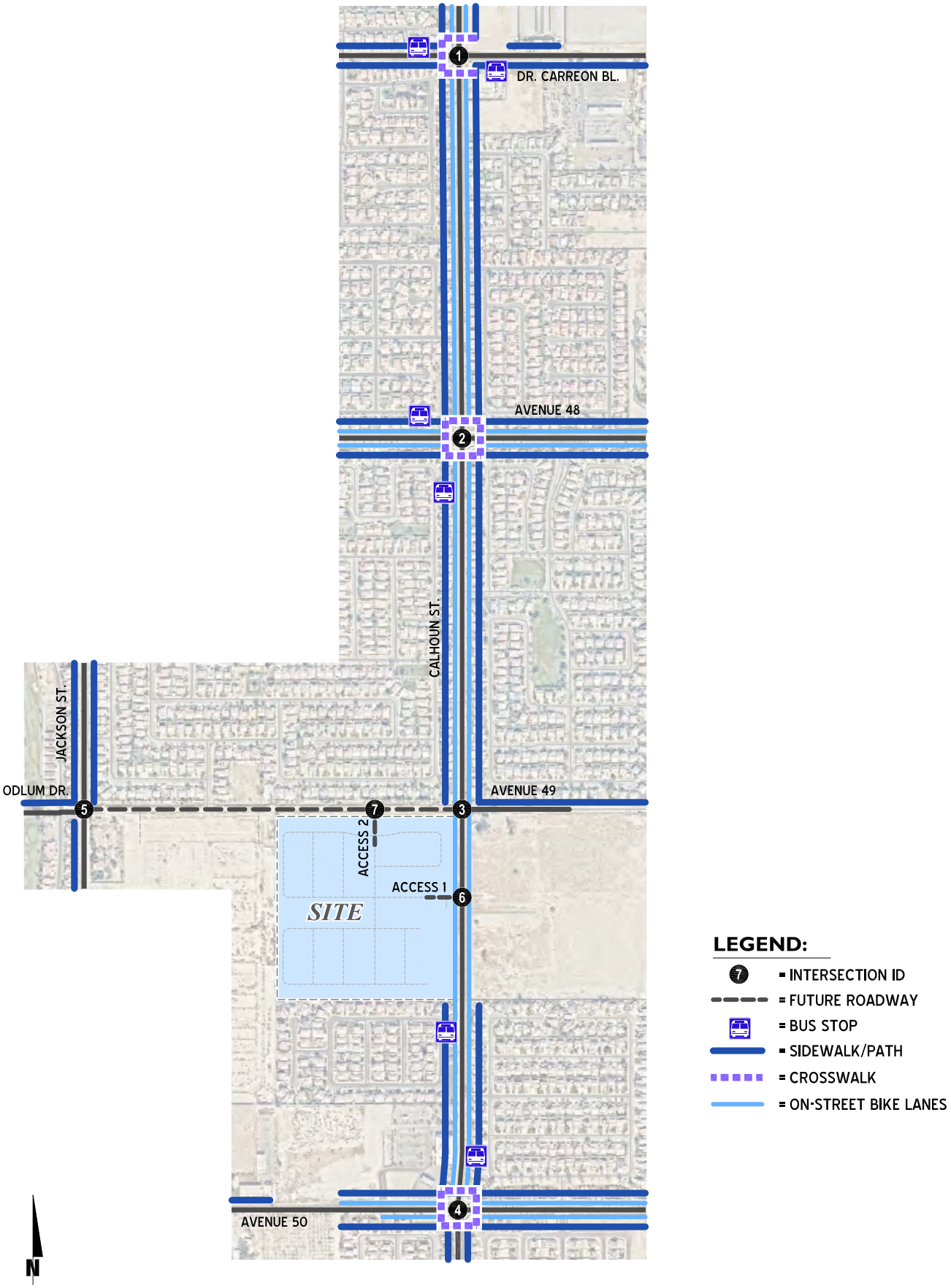


EXHIBIT 3-4: EXISTING PEDESTRIAN AND BIKE FACILITIES



3.5 EXISTING (2024) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2024. The City of Coachella experiences seasonal population variations over the course of the year, with relatively higher populations during the winter months from January to the end of March. To compensate for the discrepancy, counts not taken during this peak winter period (January 2 to March 31) require seasonal adjustments. A 20% increase is applied to counts taken in August to estimate peak season. This factor is consistent with other nearby jurisdictions within the Coachella Valley area.

The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The weekday AM and PM peak hour count data are representative of typical peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity that would prevent or limit roadway access and detour routes. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic. Existing weekday peak hour intersection volumes are shown on Exhibit 3-5.

Existing weekday ADT volumes are also shown on Exhibit 3-5. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.658 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.90 percent. As such, the above equation utilizing a factor of 12.658 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.90 percent (i.e., 1/0.070 = 12.658) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses.

3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates that no study area intersections operate at unacceptable LOS (LOS "E" or worse). The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

EXHIBIT 3-5: EXISTING (2024) TRAFFIC VOLUMES

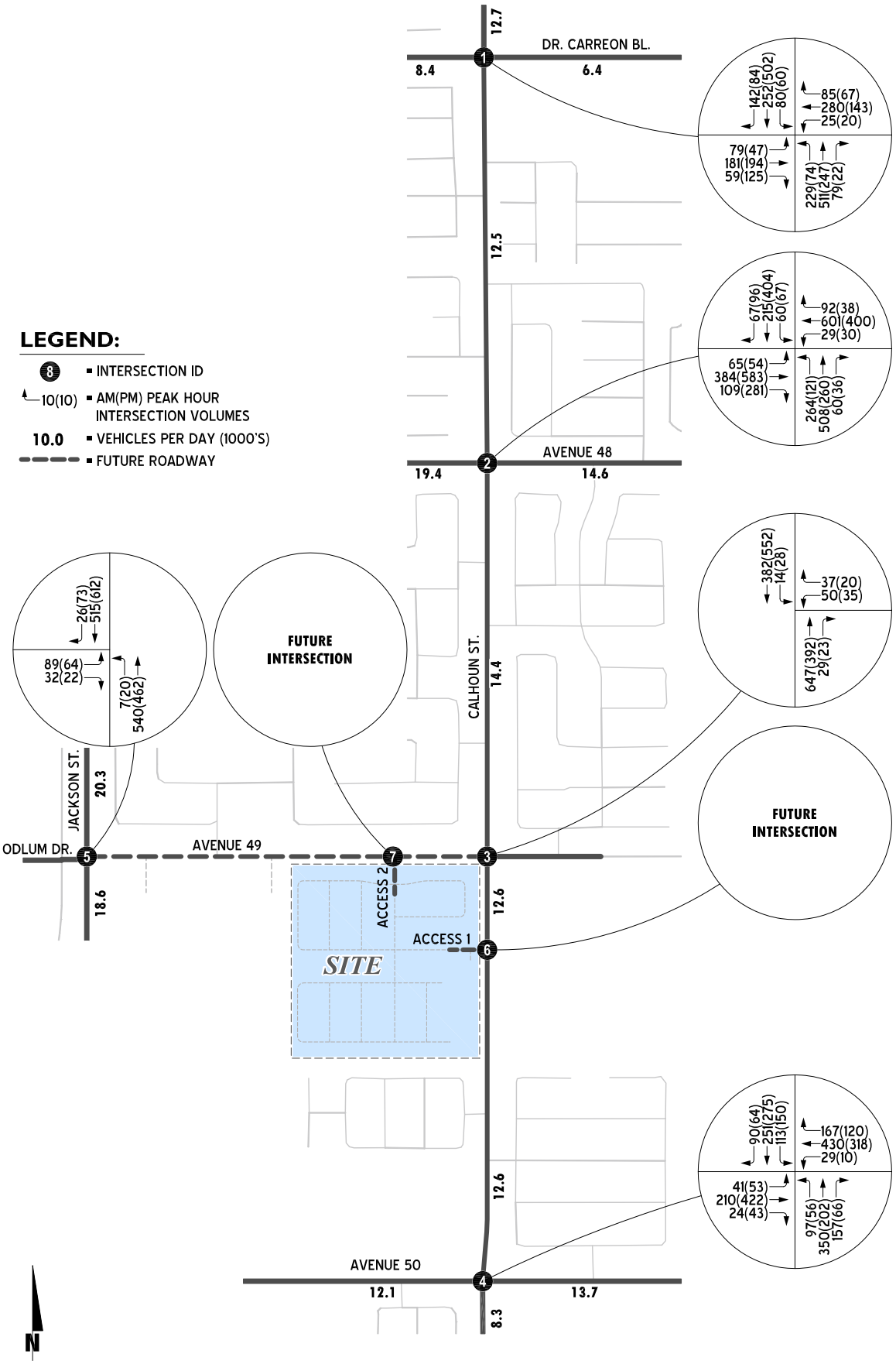


TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2023) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2]												Delay[3] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Calhoun St. / Dr. Carreon Bl.	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	28.7	F	D
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	32.5	28.6	C	C
3	Calhoun St. / Avenue 49	AWS	0	1	0	1	1	1	0	0	0	0	1!	0	51.2	20.3	F	C
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	2	0	1	2	0	33.1	28.5	C	C
5	Jackson St. / Avenue 49 - Odlum Dr.	AWS	1*	1	0	0	2	1	1	0	d	0	0	0	51.9	23.0	F	C
6	Calhoun St. / Access 1		Future Intersection												-	-		
7	Access 2 / Avenue 49		Future Intersection												-	-		

[1] TS = Traffic Signal; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

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3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on 2024 peak hour intersection turning volumes (see Appendix 3.3). For Existing (2024) traffic conditions, the following three unsignalized study area intersections currently meets traffic volume warrants for installation of a traffic signal.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network.

The Project is proposed to consist of 259 single family residential units and a 1.5-acre park with dog run on approximately 40 acres.

It is anticipated that the Project will be operational by year 2026. Access to the Project will be provided via Access 1 at Calhoun Street (full access) and Access 2 at Avenue 49 (full access)

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

In order to develop the traffic characteristics of the proposed project, the trip generation rates provided in the *Institute of Transportation Engineers (ITE) Trip Generation* (11th Edition, 2021) have been utilized (4).

Table 4-1 shows the vehicle trip generation rates for the Project, as well as the vehicle trip generation summary with daily and peak hour trip generation estimates. As shown on Table 4-1, the Project is anticipated to generate a total of 2,517 trip-ends per day with 192 AM peak hour trips and 250 PM peak hour trips.

TABLE 4-1: PROJECT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	259	DU	0.18	0.52	0.70	0.59	0.35	0.94	9.43
Park with Dog Run[3]	--	1.5	AC	3.25	3.25	6.50	2.25	2.25	4.50	50.00

Trip Generation Results

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	259	DU	47	135	182	153	91	244	2,442
Park with Dog Run	--	1.5	AC	5	5	10	3	3	6	75
TOTAL				**52**	**140**	**192**	**156**	**94**	**250**	**2,517**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).
[2] DU = Dwelling Unit; AC = Acre
[3] Since ITE does not have trip rates for a park with dog run, similar use based on SANDAG's City park is utilized to account for higher park activity related to the dog run use.

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4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and proximity to the surrounding highway network. Trip distribution patterns proposed for the Project are illustrated on Exhibit 4-1.

4.3 MODAL SPLIT

The potential for Project trips to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project weekday ADT and weekday peak hour intersection turning movement volumes are shown on Exhibit 4-2.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2026 traffic conditions. The total ambient growth is 4.04% for 2026 traffic conditions. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in conjunction with traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

Exhibit 4-3 illustrates the cumulative development location map. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. A summary of cumulative development projects and their proposed land uses are shown on Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the EAP forecasts to ensure that traffic generated by the listed cumulative development projects on Table 4-2 are reflected as part of the background traffic.

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2026)
  - Existing (2024) volumes
  - Ambient growth traffic (4.04% over 2 years)
  - Project traffic
- EAPC (2026)
  - Existing (2024) volumes
  - Ambient growth traffic (4.04% over 2 years)
  - Project traffic
  - Cumulative development traffic

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION

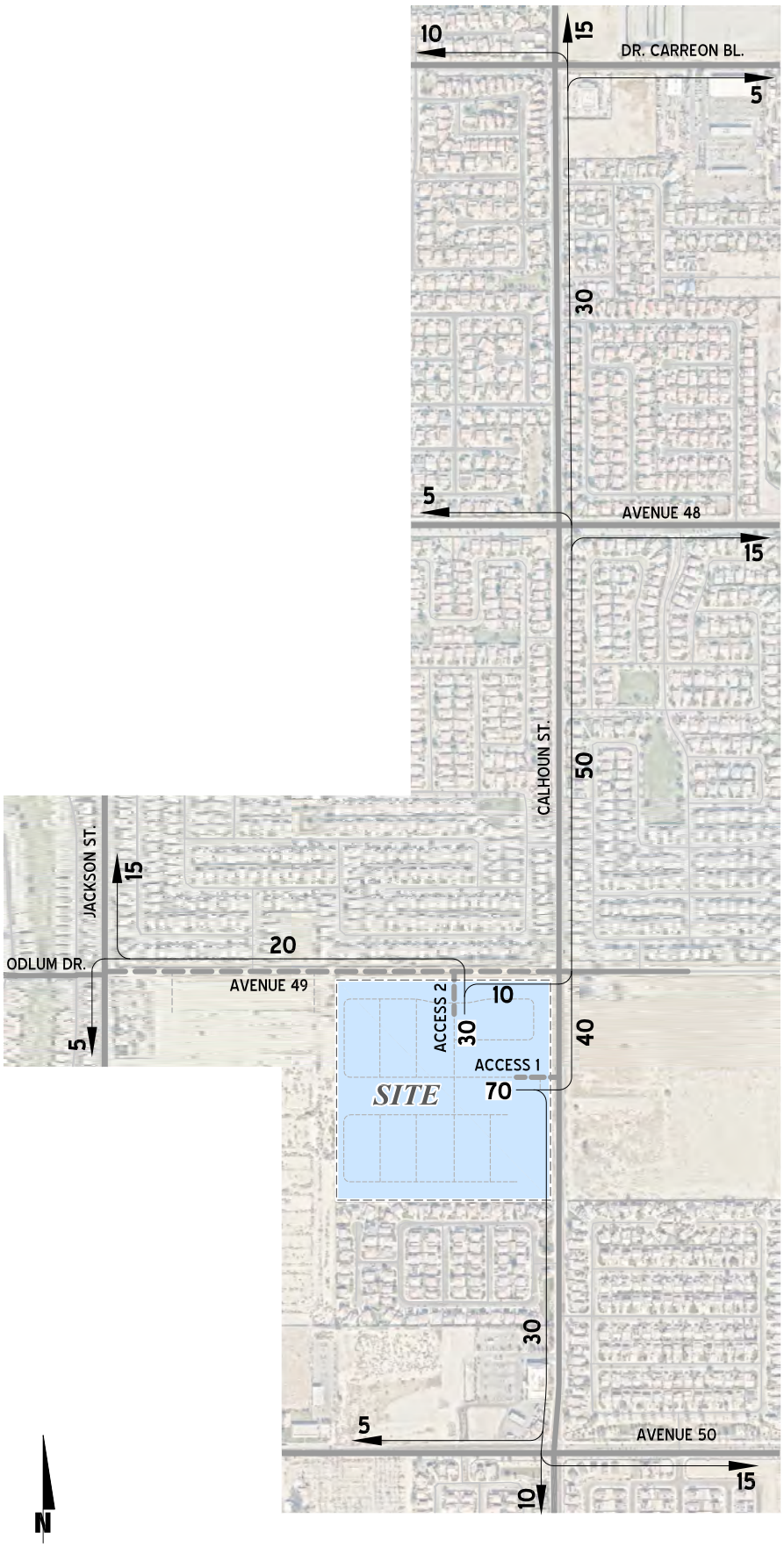

EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES

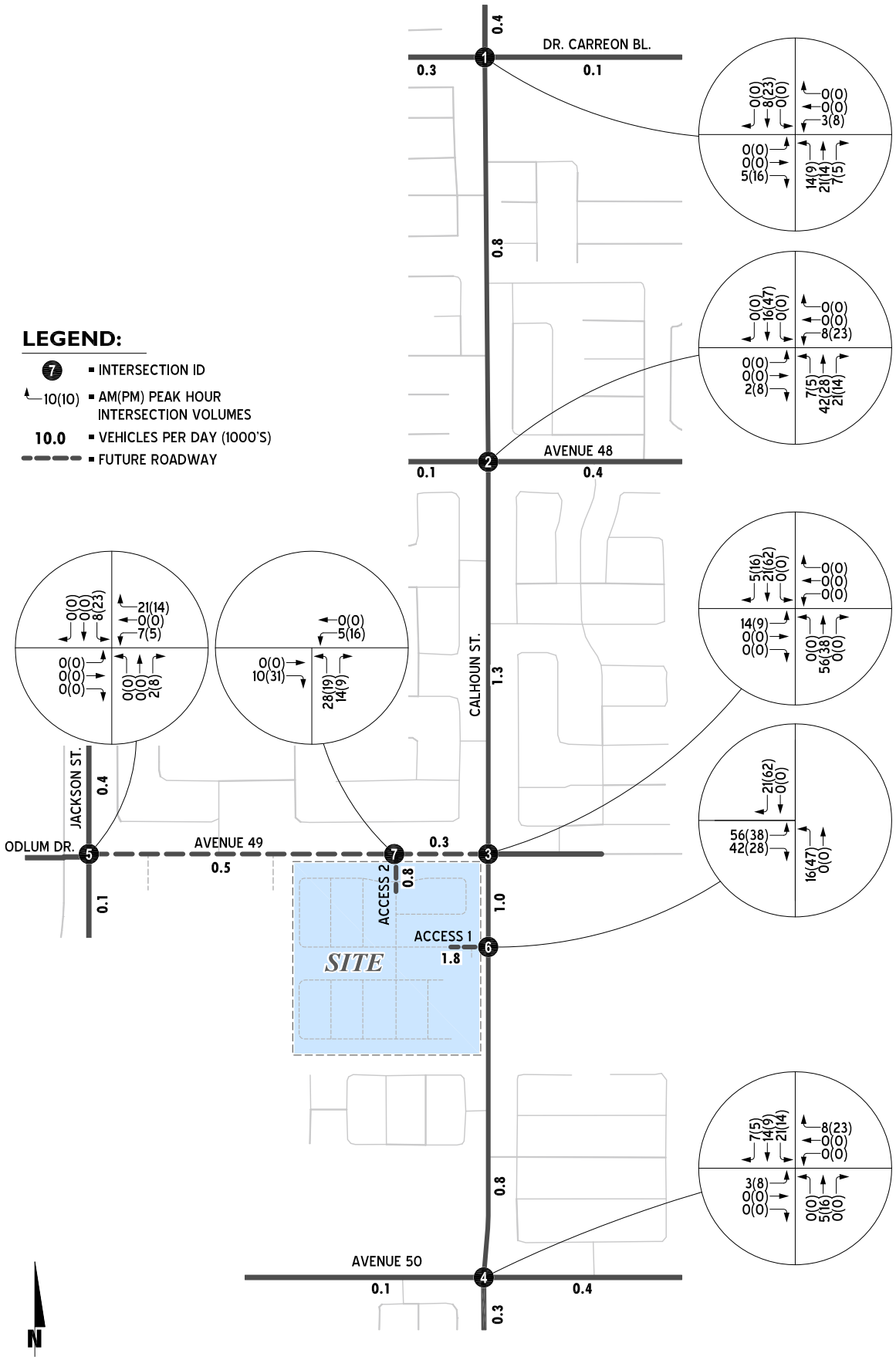

EXHIBIT 4-3: CUMULATIVE DEVELOPMENT MAP

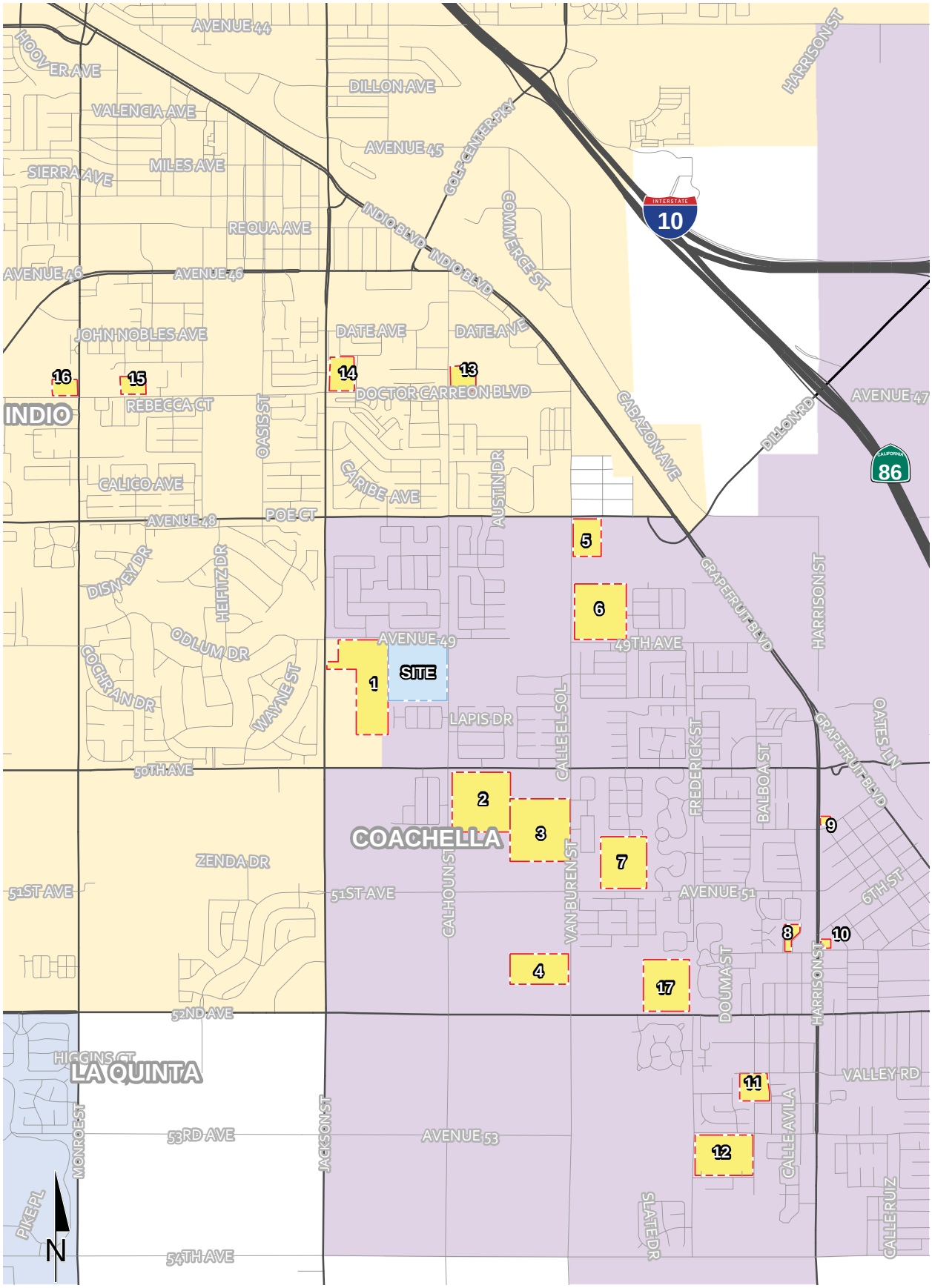

TABLE 4-2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

TAZ	Project	Land Use	Quantity	Units[1]
1	TT 38072	Single Family Residential	173	DU
2	Mariposa Pointe	Single Family Residential	155	DU
3	Sevilla II	Single Family Residential	204	DU
4	Encanto	Single Family Residential	112	DU
5	Glenroy Hotel Project	Resort casitas/bungalows	620	RM
		Hotel	130	RM
		Restaurant	3.6	TSF
		Retail Cannabis	3.12	TSF
		General Store	2.5	TSF
		Coffee shop with drive thru	2.5	TSF
6	Rancho Flores 2	Single Family Residential	124	DU
7	Sevilla by Pulte	Single Family Residential	232	DU
8	Placita Dolores Huerta	Multifamily Residential	110	DU
9	Fountainhead Plaza (NEC 1st St. & Cesar Chavez St.)	Supermarket	20.422	TSF
		Fast-Food Restaurant	2.6	TSF
		Coffee Shop w/ Restaurant	2.1	TSF
10	Tripoli Mixed-Use	Multifamily Residential	108	DU
11	Villa Verde Apartments	Multifamily Residential	152	DU
12	Bellissima (Tract 31978)	Single Family Residential	111	DU
13	West Coast Self Storage	Self-Storage Facility	62	TSF
14	Indio Public Safety Campus (NEC Jackson St. & Dr. Carreon Bl.)	Fire Station Expansion	4.1	TSF
		Police Headquarters Expansion	44	EMP
		Government Office Complex	30.1	TSF
15	Coachella Medical Center (North of Dr. Carreon Bl., b/w Monroe & Arabia)	Skilled Nursing Facility	288	Beds
16	Tower Market	Convenience Mkt. w/ Pumps	12	VFP
17	Frederick St. Residential (NWC Frederick/Ave. 52)	Single Family Residential	256	DU

[1] DU = Dwelling Units; TSF = Thousand Square Feet; RM = Rooms; EMP = Employees; VFP = Vehicle Fueling Positions

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5 EAP (2026) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Ambient plus Project (EAP) conditions and the resulting intersection operations and traffic signal warrant analyses.

The lane configurations and traffic controls assumed to be in place for EAP (2026) conditions are consistent with those shown previously on Exhibit 3-1, with the exception driveways and those facilities assumed to be constructed by the project to provide site access are assumed to be in place for EAP (2026) conditions (e.g., intersection and roadway improvements at the projects' frontage and driveways).

5.1 EAP TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% and the addition of project traffic. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EAP (2026) traffic conditions are shown on Exhibit 5-1.

5.2 INTERSECTION OPERATIONS ANALYSIS

EAP peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 Methodologies of this TA.

The intersection analysis results summarized in Table 5-1, indicate that the following intersections are anticipated to continue to operate at an unacceptable LOS during peak hours under EAP conditions, without installation of the traffic signal that is currently warranted for existing conditions.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

The intersection operations analysis worksheets for EAP traffic conditions are included in Appendix 5.1 of this TA.

5.3 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for EAP (2026) traffic conditions provided in Appendix 3.3. For EAP conditions, the intersection of Calhoun Street / Access 1 (#6) meets the volume warrants for installation of a traffic signal (see Appendix 3.3).

As mentioned previously, it is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS.

An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

Installation of a traffic signal is currently not recommended at Calhoun Street / Access 1 (#6) intersection for the following reasons:

- This intersection is anticipated to operate at an acceptable LOS for EAP (2026) conditions with cross-street stop control.
- Access to the Project site is also provided at the Access 2 / Avenue 49 (#7) intersection, which is anticipated to operate at LOS "A" during peak hours for both EAP and EAPC conditions.
- This intersection is also anticipated to operate at an acceptable LOS for EAPC (2026) conditions with cross-street stop control.

EXHIBIT 5-1: EXISTING PLUS AMBIENT PLUS PROJECT (2026) TRAFFIC VOLUMES

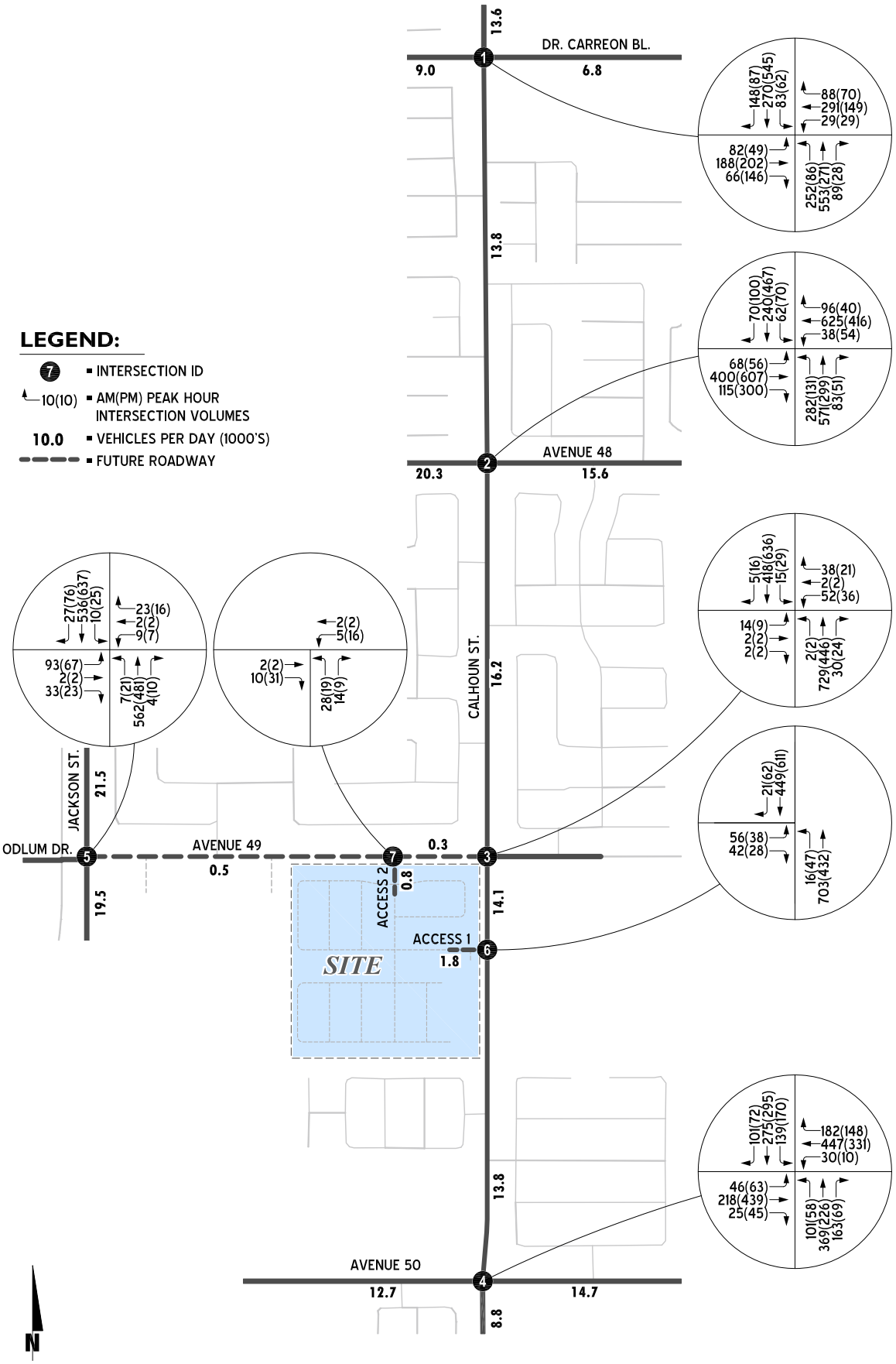


TABLE 5-1: INTERSECTION ANALYSIS FOR EAP (2026) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM
1	Calhoun St. / Dr. Carreon Bl.																	
	- With Existing All-Way Stop	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	41.7	F	E
	- With Traffic Signal Improvement	**TS**	1	1	1	1	2	0	1	1	1	1	1	0	39.0	31.9	D	C
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	33.7	30.3	C	C
3	Calhoun St. / Avenue 49																	
	- With Existing All-Way Stop	AWS	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	>80	46.2	F	E
	- With Traffic Signal Improvement	**TS**	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	10.4	7.9	B	A
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	**2**	0	1	2	0	34.3	29.3	C	C
5	Jackson St. / Avenue 49 - Odlum Dr.																	
	- With Existing All-Way Stop	AWS	1*	1	0	1*	2	1	1	0	d	0	**1!**	0	74.2	35.0	F	D
	- With Traffic Signal Improvement	**TS**	**1**	1	0	**1**	2	1	0.5	0.5	d	0	**1!**	0	12.4	9.2	B	A
6	Calhoun St. / Access 1	**CSS**	**1**	1	0	0	1	0	0	**1!**	0	0	0	0	27.3	25.1	D	D
7	Access 2 / Avenue 49	**CSS**	0	**1!**	0	0	0	0	0	**1**	0	**0.5**	**0.5**	0	8.7	8.8	A	A

[1] TS = Traffic Signal; CSS = Cross-Street Stop; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median; **1** = Improvement

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]EAP

6 EAPC (2026) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

The lane configurations and traffic controls assumed to be in place for EAPC (2026) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for EAPC conditions (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- If applicable, driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC conditions (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

6.1 EAPC (2026) TRAFFIC VOLUME FORECASTS

This scenario consists of existing traffic volumes plus an ambient growth factor of 4.04% plus traffic from pending and approved but not yet constructed known development projects in the area plus the Project.

The weekday ADT and weekday peak hour volumes which can be expected for EAPC (2026) traffic conditions are shown on Exhibit 6-1.

6.2 INTERSECTION OPERATIONS ANALYSIS

The intersection analysis results summarized in Table 6-1, indicate that the following intersections are anticipated to continue to operate at an unacceptable LOS during peak hours under EAPC conditions, without installation of the traffic signal that are currently warranted for existing conditions.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

The intersection operations analysis worksheets for EAPC traffic conditions are included in Appendix 6.1 of this TA.

EXHIBIT 6-1: EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (2026) TRAFFIC VOLUMES

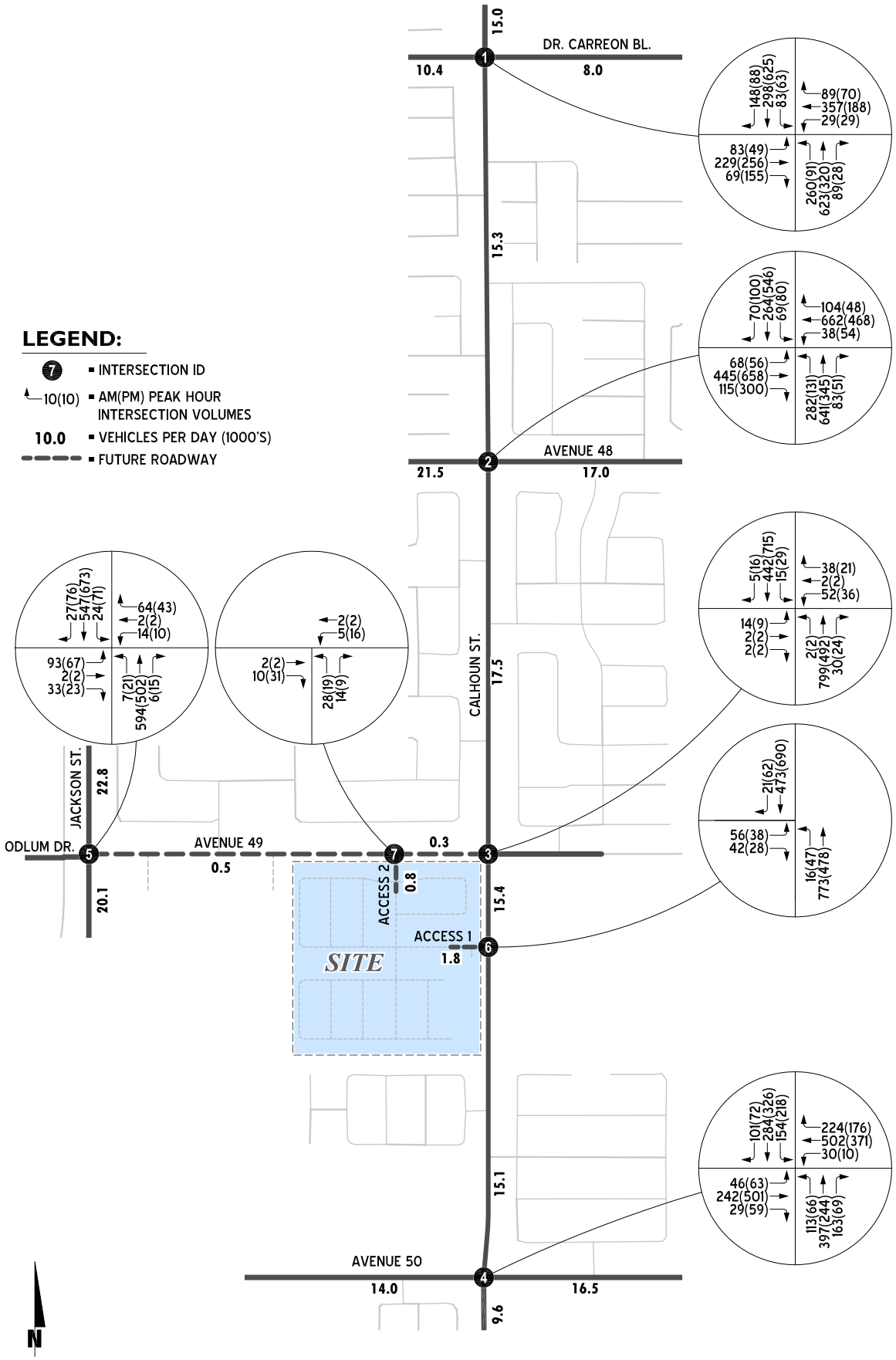


TABLE 6-1: INTERSECTION ANALYSIS FOR EAPC (2026) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM
1	Calhoun St. / Dr. Carreon Bl.																	
	- With Existing All-Way Stop	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	>80	F	F
	- With Traffic Signal Improvement	**TS**	1	1	1	1	2	0	1	1	1	1	1	0	43.6	32.6	D	C
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	34.7	31.0	C	C
3	Calhoun St. / Avenue 49																	
	- With Existing All-Way Stop	AWS	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	>80	75.4	F	F
	- With Traffic Signal Improvement	**TS**	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	10.9	7.8	B	A
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	**2**	0	1	2	0	37.8	30.5	D	C
5	Jackson St. / Avenue 49 - Odlum Dr.																	
	- With Existing All-Way Stop	AWS	1*	1	0	1*	2	1	1	0	d	0	**1!**	0	>80	47.9	F	E
	- With Traffic Signal Improvement	**TS**	**1**	1	0	**1**	2	1	0.5	0.5	d	0	**1!**	0	15.7	11.9	B	B
6	Calhoun St. / Access 1	**CSS**	**1**	1	0	0	1	0	0	**1!**	0	0	0	0	32.2	30.6	D	D
7	Access 2 / Avenue 49	**CSS**	0	**1!**	0	0	0	0	0	**1**	0	**0.5**	**0.5**	0	8.7	8.8	A	A

[1] TS = Traffic Signal; CSS = Cross-Street Stop; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median; **1** = Improvement

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]EAPC

6.3 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis worksheets for EAPC (2026) traffic conditions are provided in Appendix 3.3. For EAPC conditions, no additional study area intersections meet the volume warrants for installation of a traffic signal (see Appendix 3.3).

As mentioned previously, a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

Installation of a traffic signal at the intersection of Calhoun Street / Access 1 (which was previously warranted under EAP 2026 conditions) is not currently recommended since this intersection is anticipated to continue to operate at an acceptable LOS under EAPC (2026) conditions as a cross-street stop controlled intersection.

6.4 CUMULATIVE IMPROVEMENTS

The provision of traffic signal control addresses the off-site intersection operational deficiency for EAPC (2026) conditions at the intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5). The effectiveness of this recommended signal improvement at the abovementioned intersections are presented in Table 6-1 for EAPC (2026) traffic conditions.

The intersection operations analysis worksheets for EAPC (2026) traffic conditions, with this traffic signal improvement, are included in Appendix 6.1 of this TA.

7 CUMULATIVE AND SITE ACCESS IMPROVEMENTS

7.1 RECOMMENDED CUMULATIVE IMPROVEMENTS

The provision of traffic signal control addresses the off-site intersection operational deficiency for EAPC (2026) conditions at the intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5).

Detailed fair share calculations, for each peak hour, are provided below (see Table 7-1).

TABLE 7-1: EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (EAPC) FAIR SHARE CALCULATIONS

#	Intersection	Existing (2024) Traffic	EAPC (2026) Traffic[3]	Project Only Traffic	Total New Traffic[1]	Project Fair Share (%)[2]
1	Calhoun St. / Dr. Carreon Bl.					
	• AM Peak Hour	2,002	2,357	58	355	16.3%
	• PM Peak Hour	1,585	1,962	75	377	**19.9%**
3	Calhoun St. / Avenue 49					
	• AM Peak Hour	1,159	1,403	96	244	39.3%
	• PM Peak Hour	1,050	1,350	125	300	**41.7%**
5	Jackson St. / Avenue 49 - Odlum Dr.					
	• AM Peak Hour	1,209	1,413	38	204	18.6%
	• PM Peak Hour	1,253	1,505	50	252	**19.8%**

[1] Total New Traffic = (EAPC 2026 - Existing Traffic)

[2] Project Fair Share % = (Project Only Traffic / Total New Traffic)

[3] Existing Plus Ambient Plus Project Plus Cumulative (2026) Conditions

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]7-1 FairShare

7.2 ON-SITE AND SITE-ADJACENT IMPROVEMENTS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project. On-site and site adjacent recommendations are shown on Exhibit 7-1.

- Project to construct Avenue 49 as a 2-lane roadway (40 feet curb-to-curb width) from Jackson Street to the Project's westerly site boundary.
- Project to construct Avenue 49 at its ultimate southerly half section width as a Primary Arterial with bicycle facility from the Project's westerly site boundary to the Project's easterly site boundary (Calhoun Street).

- Project to widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with Bicycle facility from Project's northerly site boundary (Avenue 49) to the Project's southerly boundary.
- Project to implement a new traffic signal at the Calhoun Street / Avenue 49 (#3) intersection, with potential future reimbursement contingent upon cumulative development activity.
- Access to the adjacent public park to be provided from Calhoun Street, subject to park development access and parking plans (to be determined).

Exhibit 7-2 shows the following site access and site adjacent intersection improvements:

#3 – Calhoun Street / Avenue 49

- Provide a separate northbound left turn lane.
- Modify southbound approach striping to provide a separate southbound right turn lane.
- Provide a shared eastbound left/thru/right lane.

#6 – Calhoun Street / Access 1

- Provide a separate northbound left turn lane.
- Provide a shared eastbound left/right turn lane.

#7 – Access 1 / Avenue 49

- Provide a shared northbound left/right turn lane.
- Provide a shared eastbound thru/right turn lane.
- Provide a shared westbound left/thru lane.

EXHIBIT 7-1: SITE ACCESS RECOMMENDATIONS

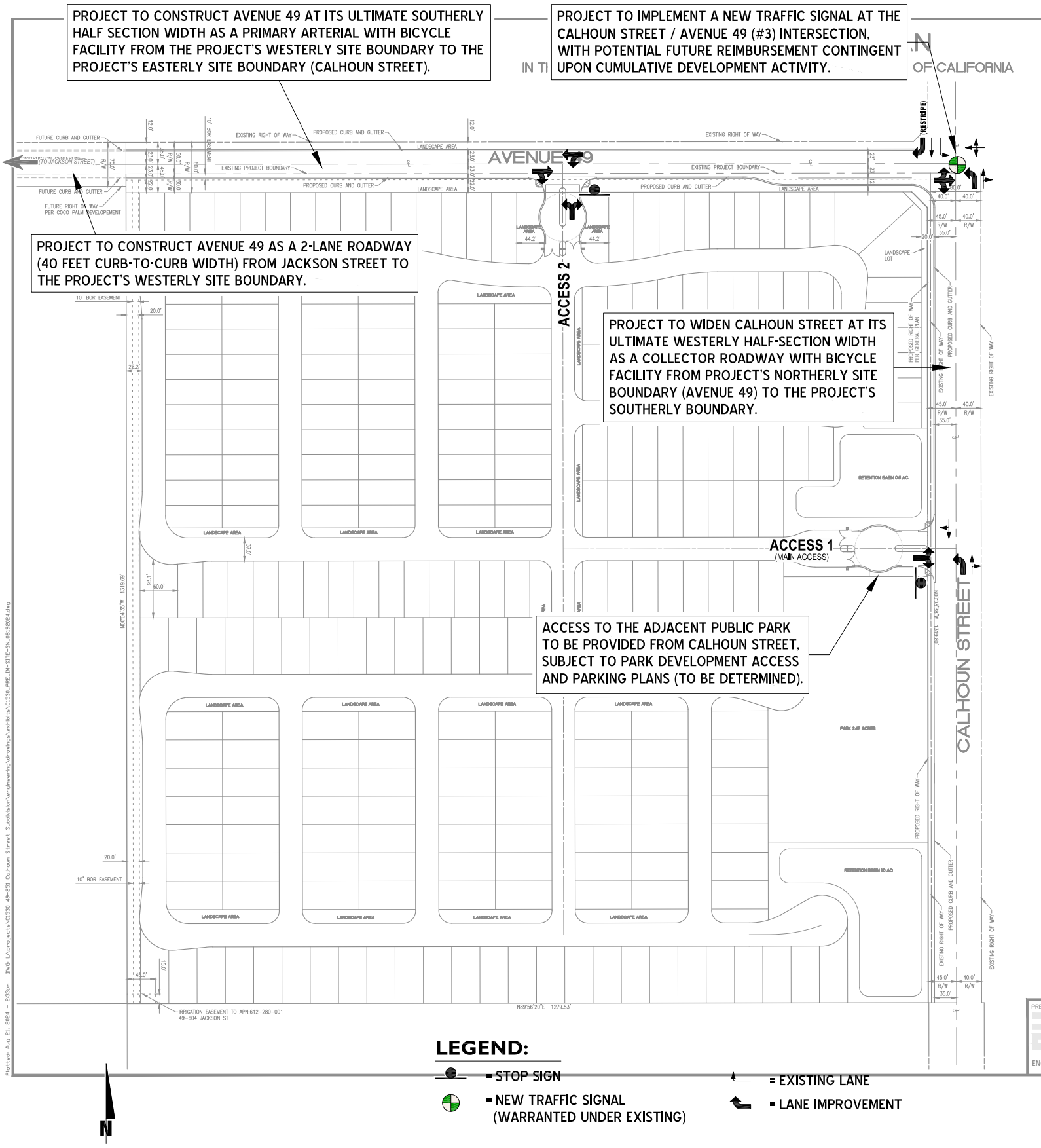
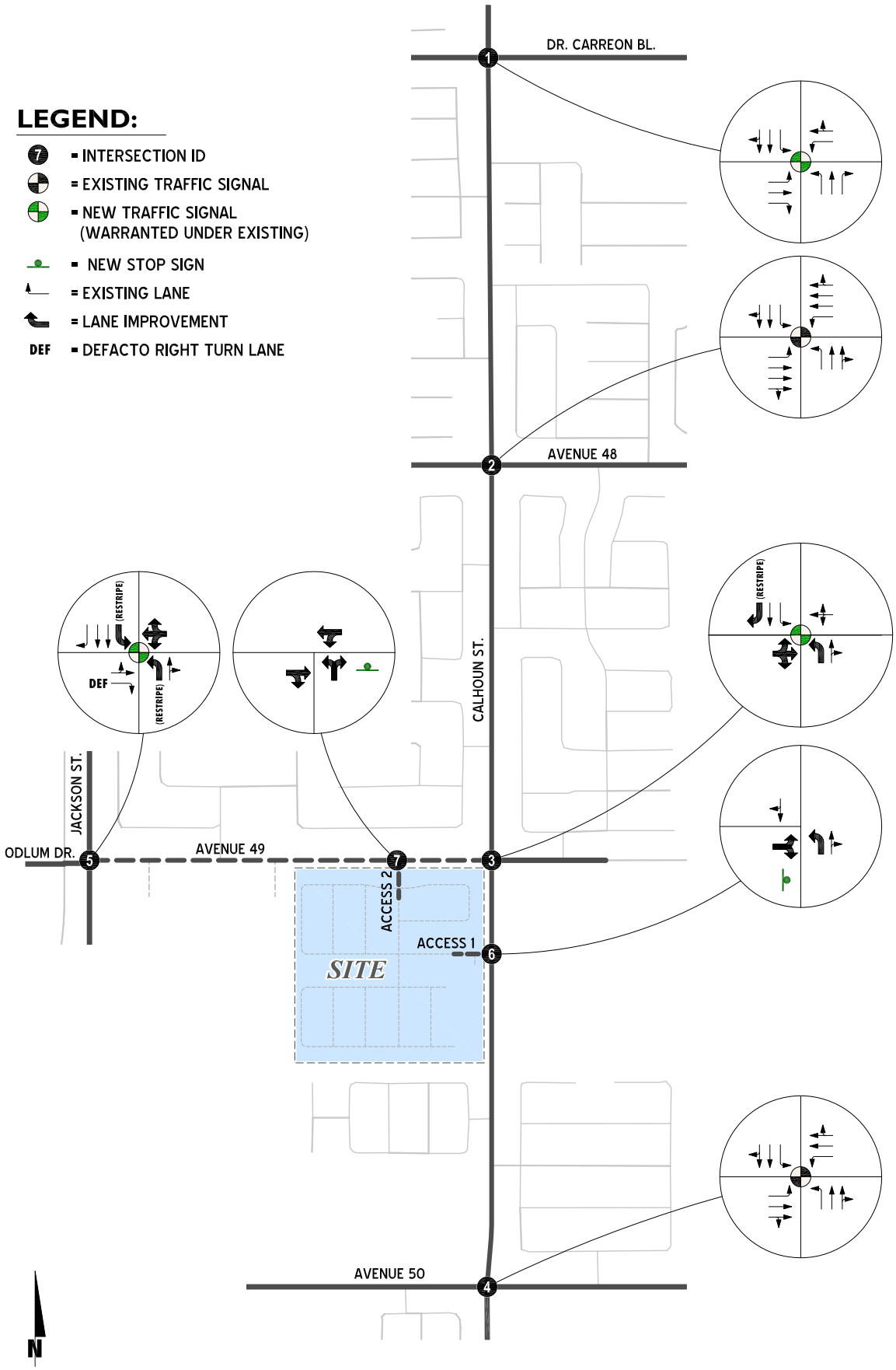


EXHIBIT 7-2: RECOMMENDED INTERSECTION IMPROVEMENTS FOR EAP (2026) AND EAPC (2026) CONDITIONS



8 REFERENCES

1. **Riverside County.** *Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled.* Riverside County : s.n., December 2020.
2. **Transportation Research Board.** *Highway Capacity Manual (HCM), 7th Edition.* s.l. : National Academy of Sciences, 2022.
3. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).
4. **Institute of Transportation Engineers.** Trip Generation Manual. 11th Edition, 2021.

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APPENDIX 1.1: TRAFFIC STUDY SCOPE

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SCOPING AGREEMENT FOR TRANSPORTATION LOS ANALYSIS

This letter acknowledges the Riverside County Transportation Department requirements for transportation level of service analysis of the following project. The analysis must follow the Riverside County Transportation Department Transportation Analysis Guidelines, December 2020.

Case No.	
Related Cases	
Project Name:	Calhoun Street Subdivision
Project Address:	Southwest corner of Calhoun Street and Avenue 49
Project Description:	258 single family detached residential units and 1.5 acre park with dog run

	Traffic Consultant	Applicant/Developer
Name:	Marlie Whiteman, P.E., Urban Crossroads, Inc.	Terra Nova Planning & Research, Inc. - Nicole Criste
Address:	1133 Camelback St. #8329	42635 Melanie Place, Ste 101
	Newport Beach, CA 92658	Palm Desert, CA. 92211
Telephone:	714.585.0574	(760) 341-4800
E-mail:	mwhiteman@urbanxroads.com	ncriste@terranovaplanning.com

Current GP Land Use: Suburban Neighborhood
Current Zoning: Suburban Neighborhood (S-N)
Proposed Land Use: Suburban Neighborhood
Proposed Zoning: Suburban Neighborhood (S-N)

A. Trip Generation Source: ITE Trip Generation 11th Edition (see Table 1)

	Current Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	
AM Trips/Saturday Morning				51	139	190
PM Trips/Sunday Afternoon				155	93	248

Internal Trip Allowance ☐ Yes ☑ No (____ % Trip Discount)
Pass-By Trip Allowance ☐ Yes ☑ No (____ % Trip Discount)

A pass-by trip discount of 25% is allowed for appropriate land uses. The pass-by trips at adjacent study area intersections and project driveways shall be indicated on a report figure.

B. Trip Geographic Distribution: (attach exhibit for detailed assignment)

N %	S %	E %	W %
See Exhibit 3			

C. Background Traffic

Project Build-out Year:	2026	Annual Ambient Growth Rate:	2 %
Phase Year(s)	Not Applicable		
Other projects to be analyzed:	To be provided by the City. Initial list provided in Exhibit 8 and Table 2.		
Model/Forecast methodology	Not Applicable		

D. Study intersections: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. Calhoun St. / Dr. Carreon Bl.
2. Calhoun St. / Avenue 48
3. Calhoun St. / Avenue 49
4. Calhoun St. / Avenue 50
5. Jackson St. / Odlum Dr.
6. Access 2 / Avenue 49 (Future)
7. Calhoun St. / Access 1 (Future)
8. Calhoun St. / Access 3 (Future)
9.
10.

E. Study Roadway Segments: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. Calhoun Street, south of Avenue 49
2.
3.
4.
5.
6.
7.
8.
9.
10.

F. Other Jurisdictional

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? ☑ Yes ☐ No

If yes, name of jurisdiction(s): Coachella

G. Site Plan (please attach reduced copy) See Exhibit 1

H. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Transportation Department)

(NOTE: If the traffic study states that "a traffic signal is warranted" (or "a traffic signal appears to be warranted," or similar statement) at an existing unsignalized intersection under existing conditions, 8-hour approach traffic volume information must be submitted in addition to the peak hourly turning movement counts for that intersection.)

I. Existing Conditions

Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.

Date of counts August 27, 2024

***NOTE* Traffic Study Submittal Form and appropriate fee must be submitted with this form.**

Recommended by:

Marlie Whiteman 08/14/2024

Traffic Consultant Date

Approved Scoping Agreement

Date

Scoping Agreement Submitted on 06/17/2024

Revised on 08/14/2024

MEMORANDUM

URBAN CROSSROADS

DATE: August 14, 2024
TO: Mr. Andrew Simmons, P.E., City of Coachella
FROM: John Kain and Marlie Whiteman, Urban Crossroads, Inc.
JOB NO: 15830-02 LOS Scope.docx

CALHOUN STREET SUBDIVISION – LEVEL OF SERVICE (LOS) ANALYSIS SCOPE

Urban Crossroads, Inc. is pleased to submit the following LOS traffic study scope for the proposed Calhoun Street Subdivision development (**Project**). The Project is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella. The following evaluation is based on the County of Riverside's Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled (December 2020), as the City of Coachella utilizes the County guidelines.

PROJECT DESCRIPTION

It is our understanding that the Project is to consist of 258 dwelling units and a 1.5-acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1.

Access to the Project is provided via Access 1 at Calhoun Street (full access), Access 2 at Avenue 49 (full access), and Access 3 at Calhoun Street (right-in/right-out only access for the park).

STUDY AREA

Exhibit 2 presents the study area intersection analysis locations. Study area intersections will be evaluated using the HCM 7 methodology. Count data will be collected during the AM and PM peak hours on a typical weekday.

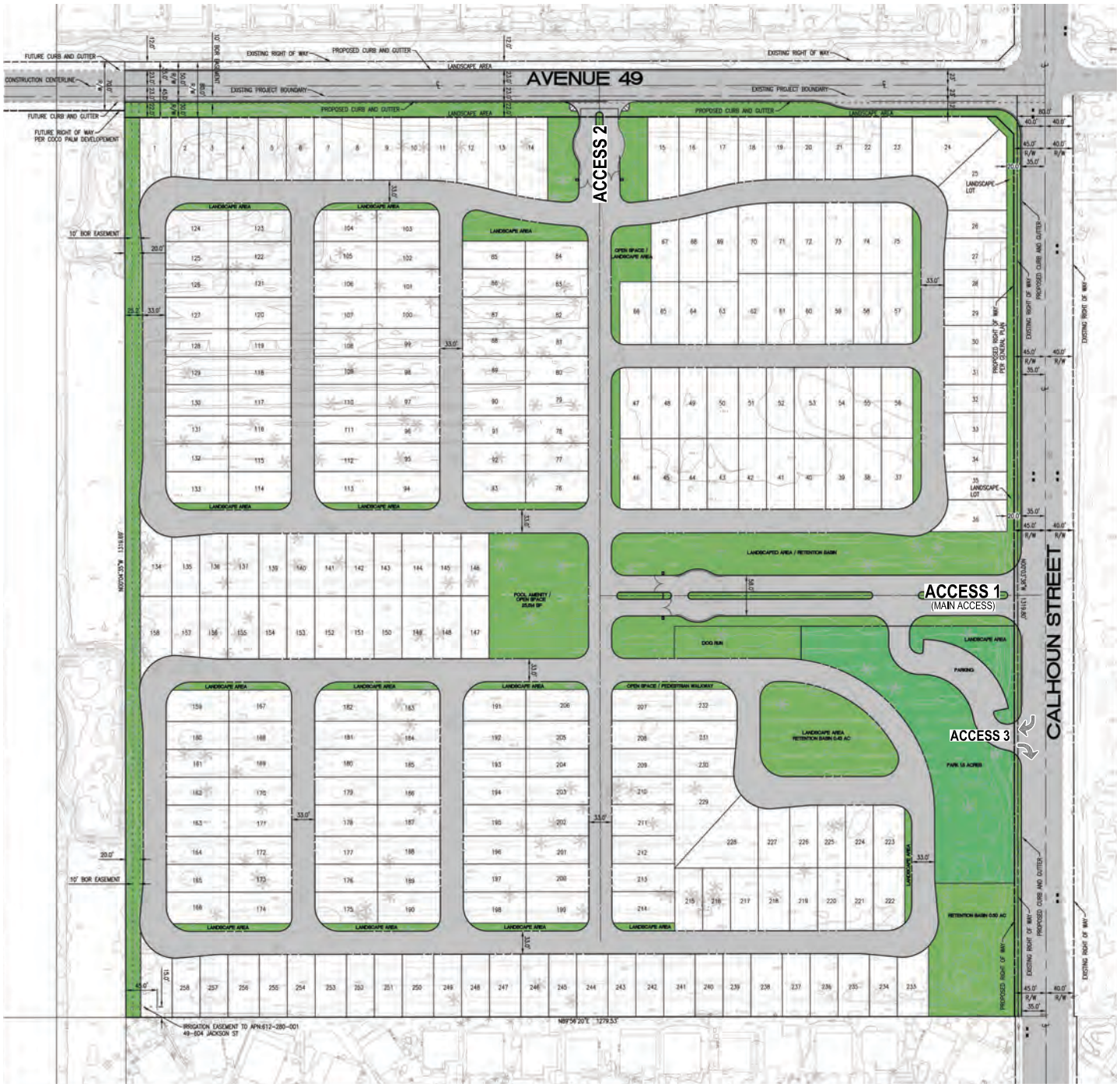
ANALYSIS SCENARIOS

The analysis of peak hour operations at study area intersections will be provided for the following analysis scenarios:

- Existing (2024)
- Existing Plus Ambient Growth Plus Project (2026) Conditions (EAP)
  - EAP with Improvements *(if needed)*
- Existing Plus Ambient Growth Plus Cumulative (2026) Conditions (EAC)
  - EAC with Improvements *(if needed)*
- Existing Plus Ambient Growth Plus Project Plus Cumulative (2026) Conditions (EAPC)
  - EAPC with Improvements *(if needed)*

EAP traffic conditions will be utilized to determine direct Project traffic impacts, while the EAPC (2026) analysis will be utilized to determine the Project's cumulatively considerable/direct impacts (subject to payment of fees/fair share).

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

▪ RIGHT-IN/RIGHT-OUT ONLY

N

Based on the traffic analysis results, the TA will indicate new improvement requirements and fair share contribution for the proposed Project.

STUDY AREA

Per the County's traffic study guidelines, the study area has been developed by including locations where the Project is anticipated to contribute 50 or more peak hour trips within a 5-mile radius of the Project. Exhibit 2 presents the study area intersection analysis locations. The study area intersections will be evaluated using the HCM 7 methodology.

AMBIENT GROWTH ASSUMPTIONS

An ambient growth rate of 2.0 percent per year is proposed for the study area intersections which will be compounded for each year to the Project's Opening Year of 2026 (in addition to cumulative development traffic overlays). The growth rate is consistent with the growth rate utilized by the County of Riverside.

TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. Table 1 presents the trip generation rates and the resulting trip generation summary for the proposed Project. The trip generation rates used for this analysis are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation manual, 11th Edition, 2021. As shown in Table 1, the Project is anticipated to generate a total of 2,508 trip-ends per day with 190 AM peak hour trips and 248 PM peak hour trips.

TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions, or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land use and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Exhibits 3 and 4 illustrate the outbound and inbound trip distribution patterns for the Project, respectively.

PROJECT TRAFFIC VOLUMES

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project Only Average Daily Traffic (ADT) volumes and AM and PM peak hour intersection turning movement volumes are shown on Exhibit 5.

EXHIBIT 2: TRAFFIC ANALYSIS STUDY AREA

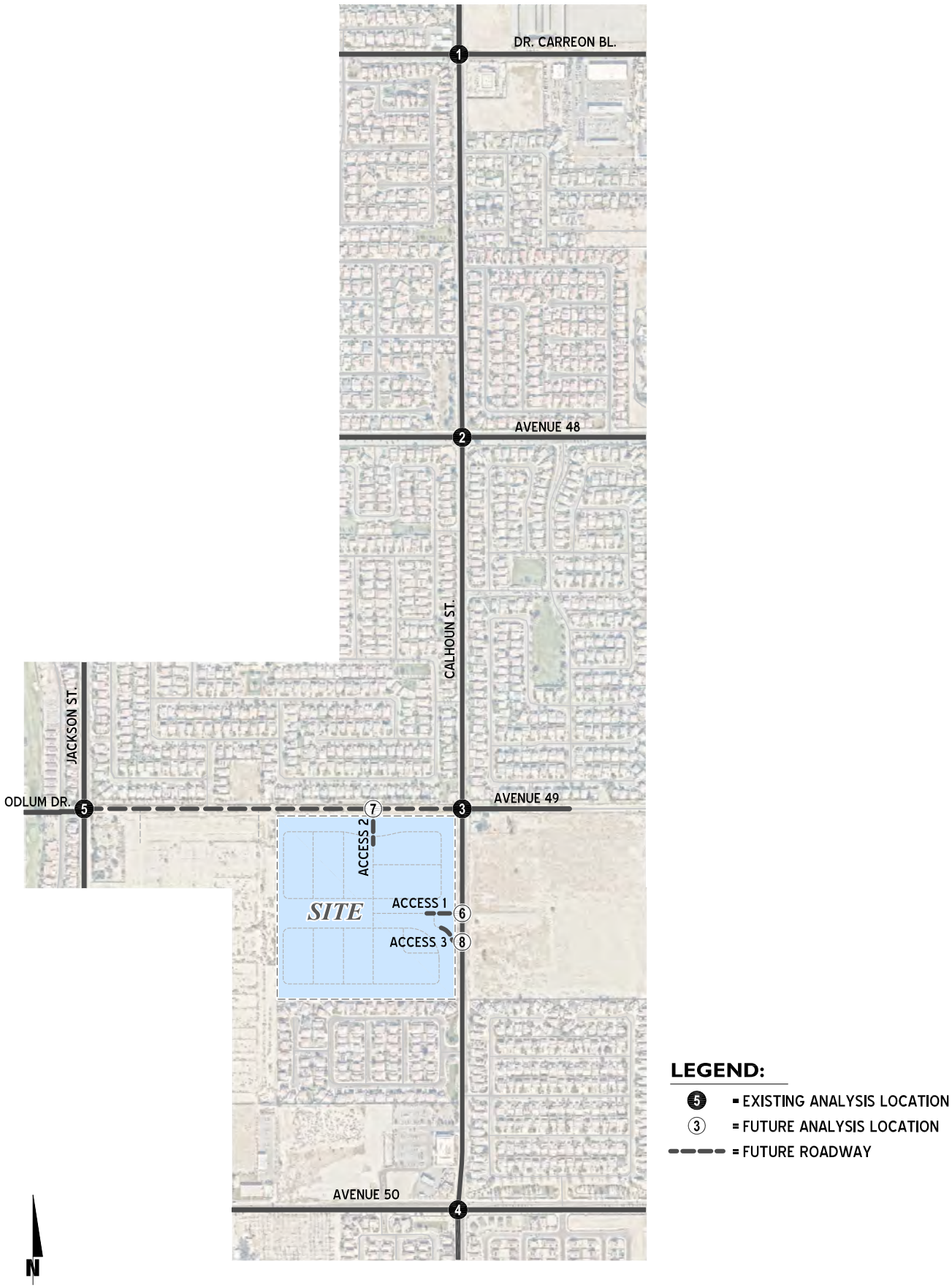


TABLE 1: PROJECT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	258	DU	0.18	0.52	0.70	0.59	0.35	0.94	9.43
Park with Dog Run[3]	--	1.5	AC	3.25	3.25	6.50	2.25	2.25	4.50	50.00

Trip Generation Results

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	258	DU	46	134	180	152	90	242	2,433
Park with Dog Run	--	1.5	AC	5	5	10	3	3	6	75
TOTAL				**51**	**139**	**190**	**155**	**93**	**248**	**2,508**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

[2] DU = Dwelling Unit; AC = Acre

[3] Since ITE does not have trip rates for a park with dog run, similar use based on SANDAG's City park is utilized to account for higher park activity related to the dog run use.

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EXHIBIT 3: PROJECT OUTBOUND TRIP DISTRIBUTION

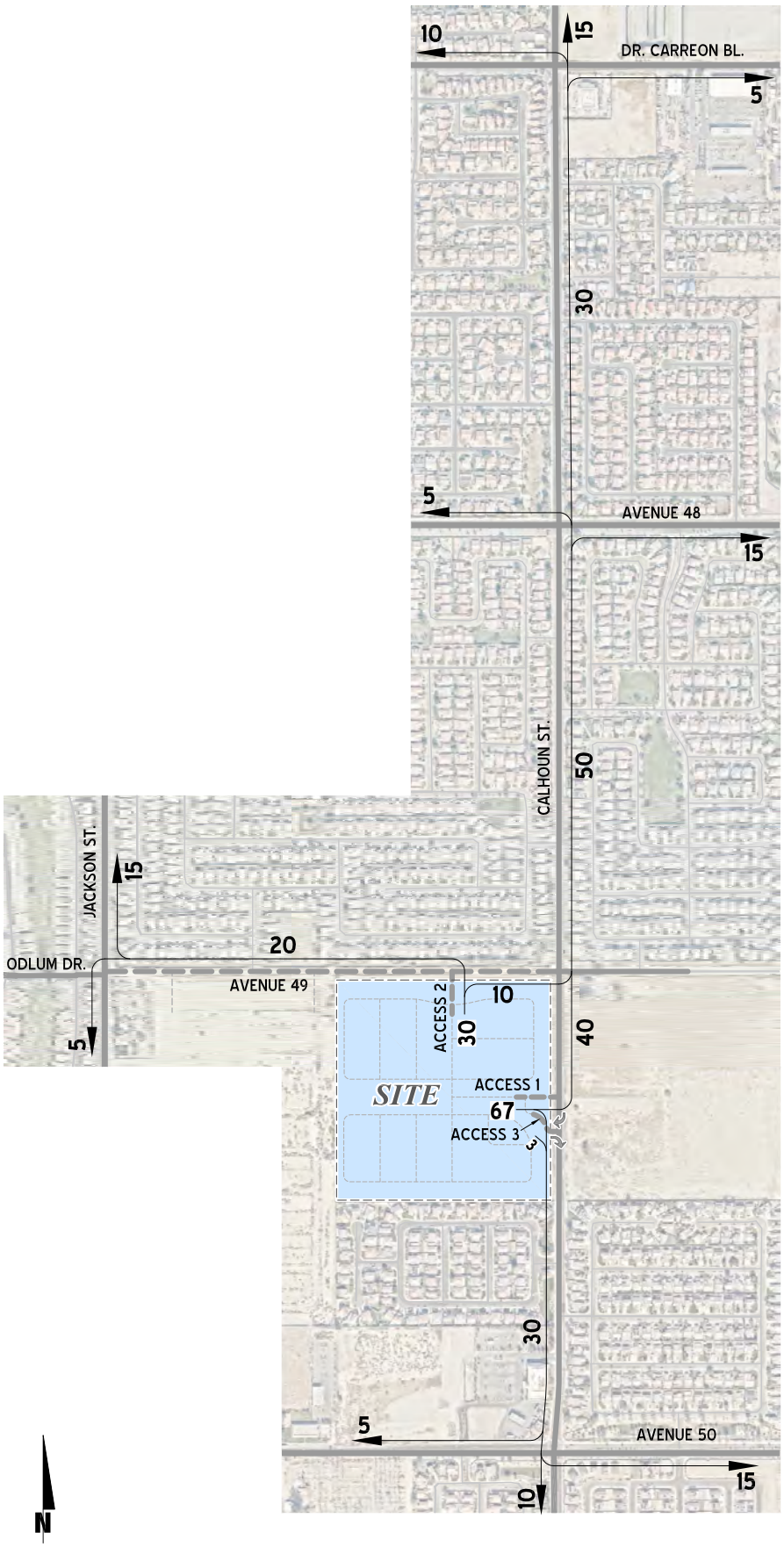


EXHIBIT 4: PROJECT INBOUND TRIP DISTRIBUTION

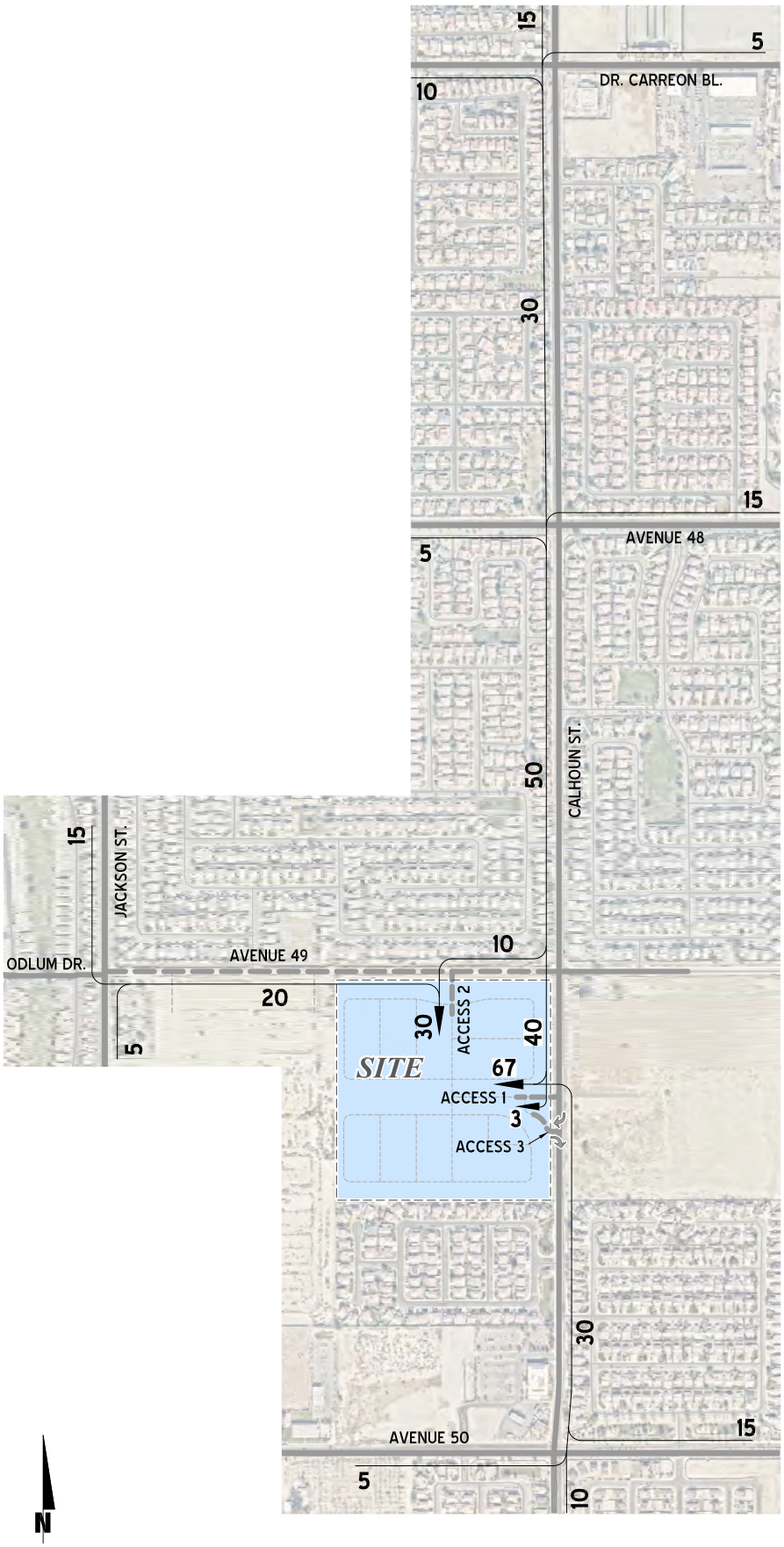
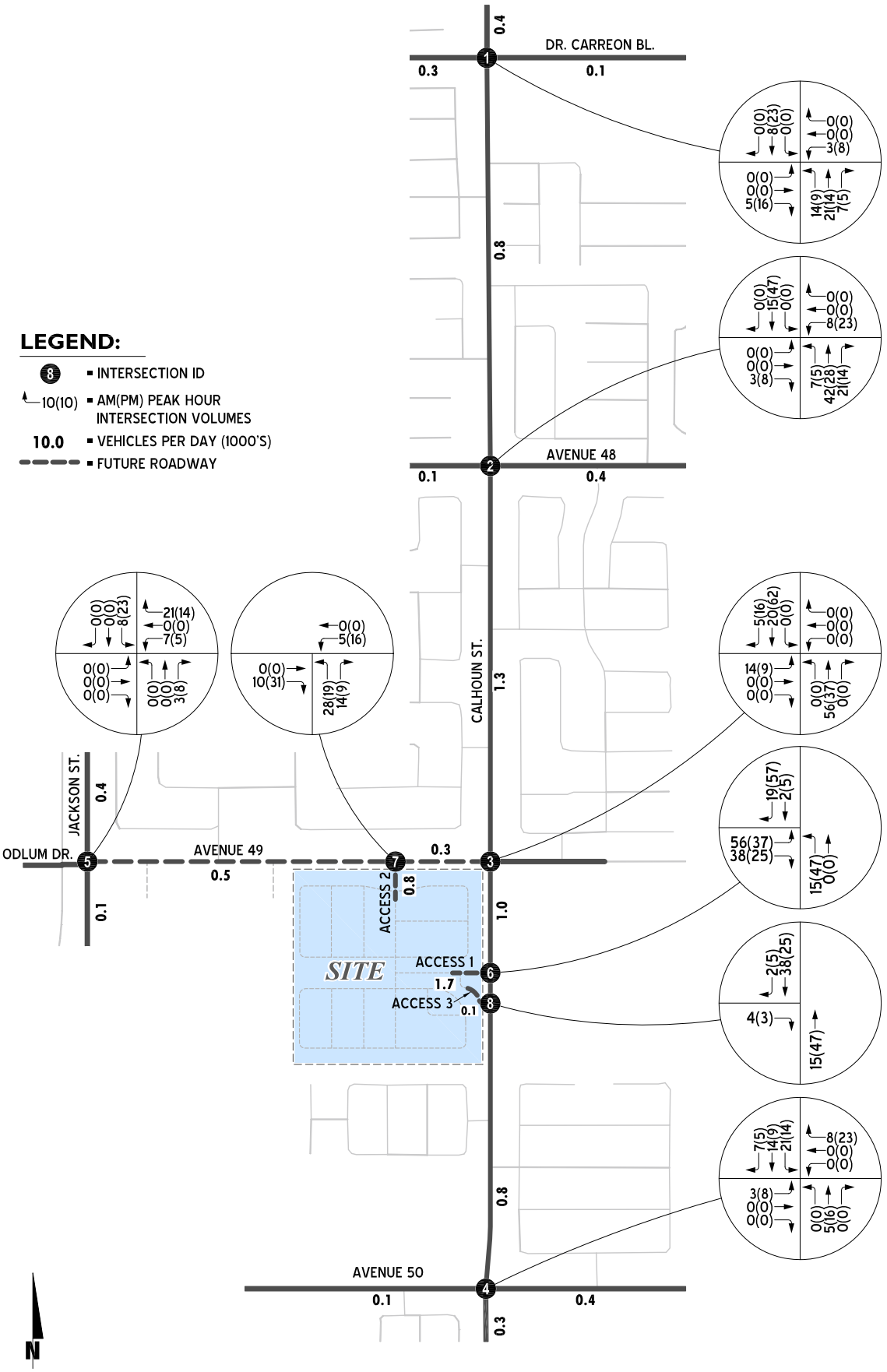


EXHIBIT 5: PROJECT ONLY TRAFFIC VOLUMES



LEVEL OF SERVICE (LOS) CRITERIA AND THRESHOLDS OF SIGNIFICANCE

The City of Coachella's current General Plan applies LOS D as a performance threshold for roadway segments and intersections.

The following thresholds of significance will be applied to study area intersections to identify significant impacts through a comparison of Existing and EAP traffic conditions:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing traffic conditions and the addition of project traffic is expected to cause the intersection to operate at an unacceptable level of service (i.e., LOS E or F), the impact is considered significant;
- If an intersection is projected to operate at LOS E or LOS F under Existing, with the addition of project traffic, the impact is considered significant.

EXISTING COUNT DATA

New traffic counts will be conducted during a typical weekday when local schools are in session and operating on a typical bell schedule. No adjustments are proposed to the traffic counts for the baseline traffic condition with the exception of volume balancing between closely spaced intersections. Traffic counts are scheduled and will be conducted on August 27th with school in full session and not during music festival weekends.

Intersection turning movement counts will be conducted at the study area intersection locations for weekday AM (7-9AM) and weekday PM (4-6PM).

CITY GENERAL PLAN CIRCULATION ELEMENT

The adopted City of Coachella General Plan Circulation Element is shown on Exhibit 6. Exhibit 7 shows the City of Coachella General Plan roadway cross-sections.

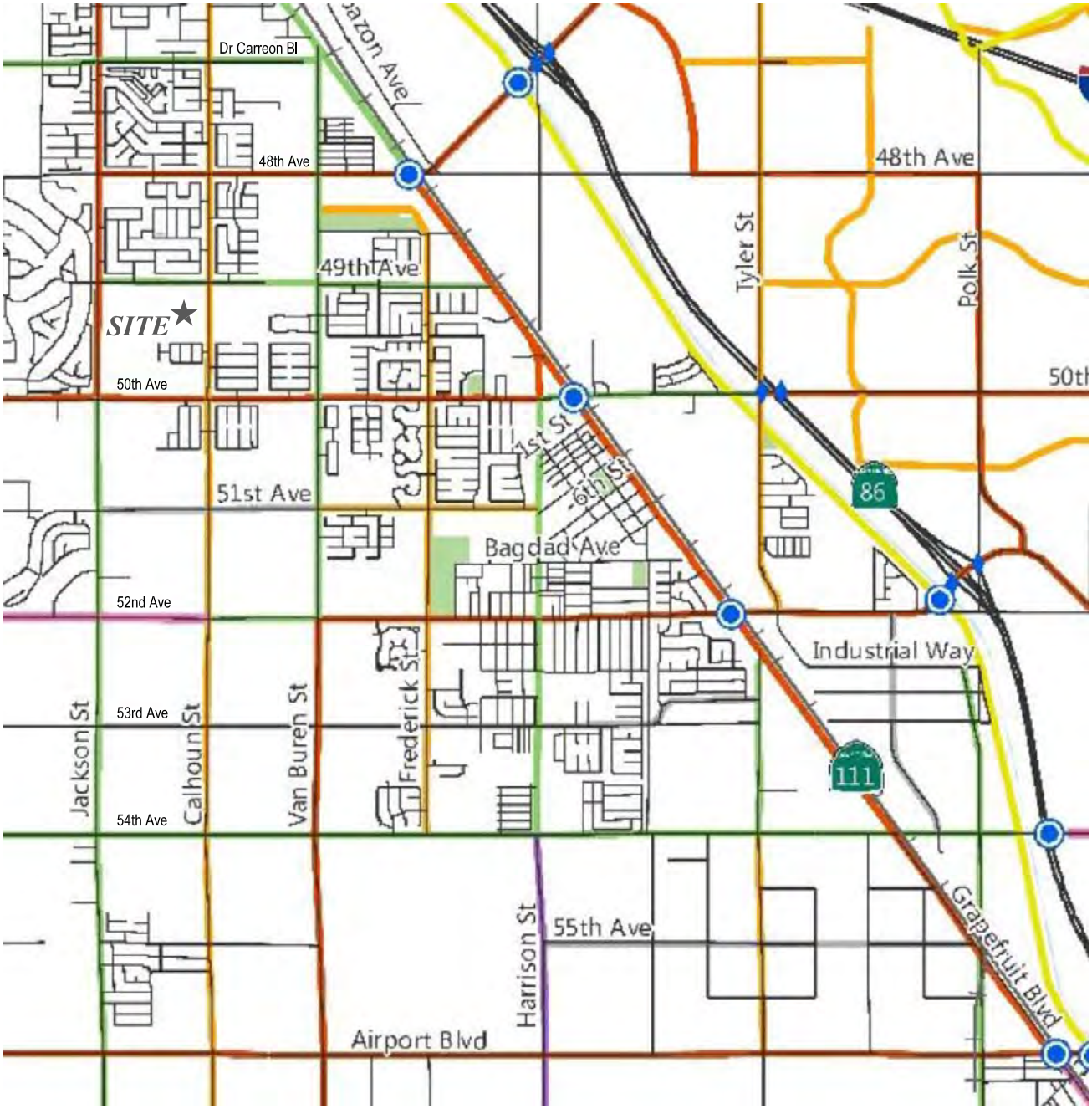
CUMULATIVE DEVELOPMENT

It is requested that City staff review the list of cumulative development projects (shown on Exhibit 8 and listed on Table 2) and any additional information for projects that should be included in this traffic study that may not be reflected Exhibit 8.

Information pertaining to project location, land use, and intensity are necessary for consideration and to estimate trip generation.

If you have any questions, please contact us directly at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

EXHIBIT 6: CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT



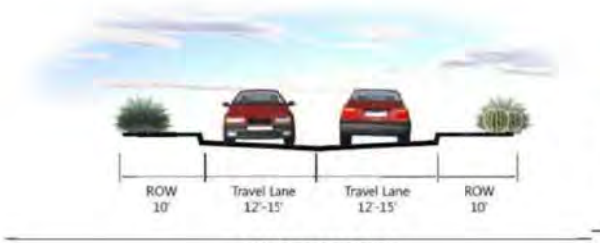
SOURCE: CITY OF COACHELLA

N

LEGEND:

3 = EXISTING ANALYSIS LOCATION

EXHIBIT 7: CITY OF COACHELLA GENERAL PLAN ROADWAY CROSS-SECTIONS



COUNTRY ROAD



MAJOR ARTERIAL



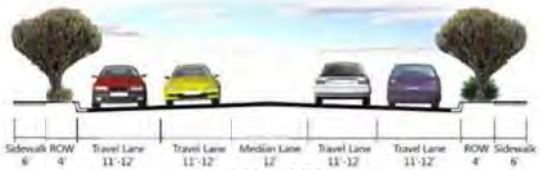
MAJOR ARTERIAL WITH ENHANCED BICYCLE FACILITIES



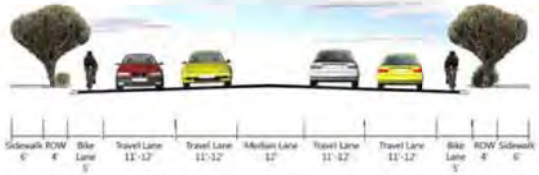
PRIMARY ARTERIAL



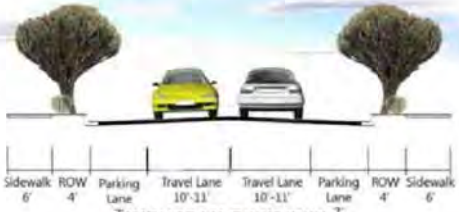
PRIMARY ARTERIAL WITH ENHANCED BICYCLE FACILITIES



COLLECTOR



COLLECTOR WITH ENHANCED BICYCLE FACILITIES



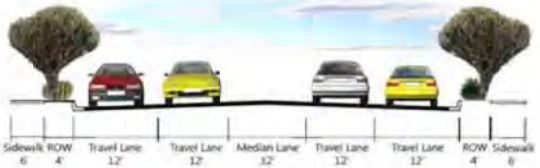
SURURBAN RESIDENTIAL WITH PARKING



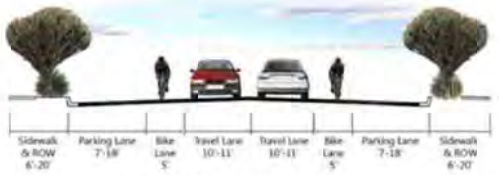
URBAN RESIDENTIAL WITH PARKING



LOCAL INDUSTRIAL STREET



INDUSTRIAL COLLECTOR



URBAN STREET 2-LANE



URBAN STREET 4-LANE

EXHIBIT 8: CUMULATIVE DEVELOPMENT MAP

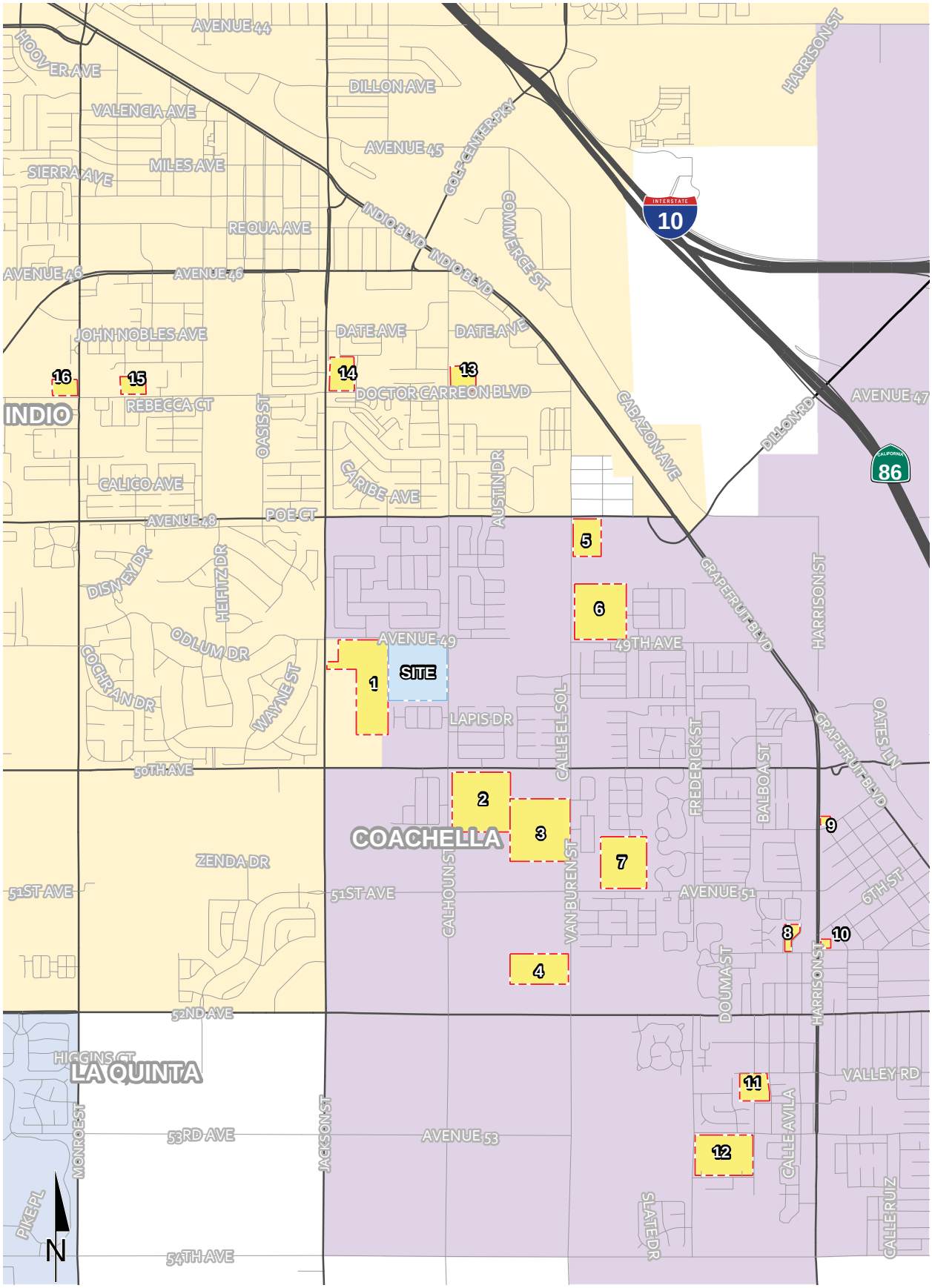


TABLE 2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

TAZ	Project	Land Use	Quantity	Units[1]
1	TT 38072	Single Family Residential	173	DU
2	Mariposa Pointe	Single Family Residential	155	DU
3	Sevilla II	Single Family Residential	204	DU
4	Encanto	Single Family Residential	112	DU
5	Glenroy Hotel Project	Resort casitas/bungalows	620	RM
		Hotel	130	RM
		Restaurant	3.6	TSF
		Retail Cannabis	3.12	TSF
		General Store	2.5	TSF
		Coffee shop with drive thru	2.5	TSF
6	Rancho Flores 2	Single Family Residential	124	DU
7	Sevilla by Pulte	Single Family Residential	232	DU
8	Placita Dolores Huerta	Multifamily Residential	110	DU
9	Fountainhead Plaza (NEC 1st St. & Cesar Chavez St.)	Supermarket	20.422	TSF
		Fast-Food Restaurant	2.6	TSF
		Coffee Shop w/ Restaurant	2.1	TSF
10	Tripoli Mixed-Use	Multifamily Residential	108	DU
11	Villa Verde Apartments	Multifamily Residential	152	DU
12	Bellissima (Tract 31978)	Single Family Residential	111	DU
13	West Coast Self Storage	Self-Storage Facility	62	TSF
14	Indio Public Safety Campus (NEC Jackson St. & Dr. Carreon Bl.)	Fire Station Expansion	4.1	TSF
		Police Headquarters Expansion	44	EMP
		Government Office Complex	30.1	TSF
15	Coachella Medical Center (North of Dr. Carreon Bl., b/w Monroe & Arabia)	Skilled Nursing Facility	288	Beds
16	Tower Market	Convenience Mkt. w/ Pumps	12	VFP

[1] DU = Dwelling Units; TSF = Thousand Square Feet; RM = Rooms; EMP = Employees; VFP = Vehicle Fueling Positions

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APPENDIX 1.2: VMT SCREENING

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URBAN CROSSROADS

June 18, 2024

Mr. Andrew Simmons, P.E.
City of Coachella
53990 Enterprise Way
Coachella, CA 92236

CALHOUN STREET SUBDIVISION VEHICLE MILES TRAVELED (VMT) SCREENING

Mr. Andrew Simmons, P.E.,

Urban Crossroads, Inc. is pleased to provide the following Vehicle Miles Traveled (VMT) Screening for the Calhoun Street Subdivision development (Project), which is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella.

PROJECT OVERVIEW

It is our understanding that the Project is to consist of 258 dwelling units and an 1.5 acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1. Access to the Project is provided via two full access driveways (Access 1 at Calhoun Street and Access 2 at Avenue 49), and one right-in/right-out only access for the park (Access 3 at Calhoun Street).

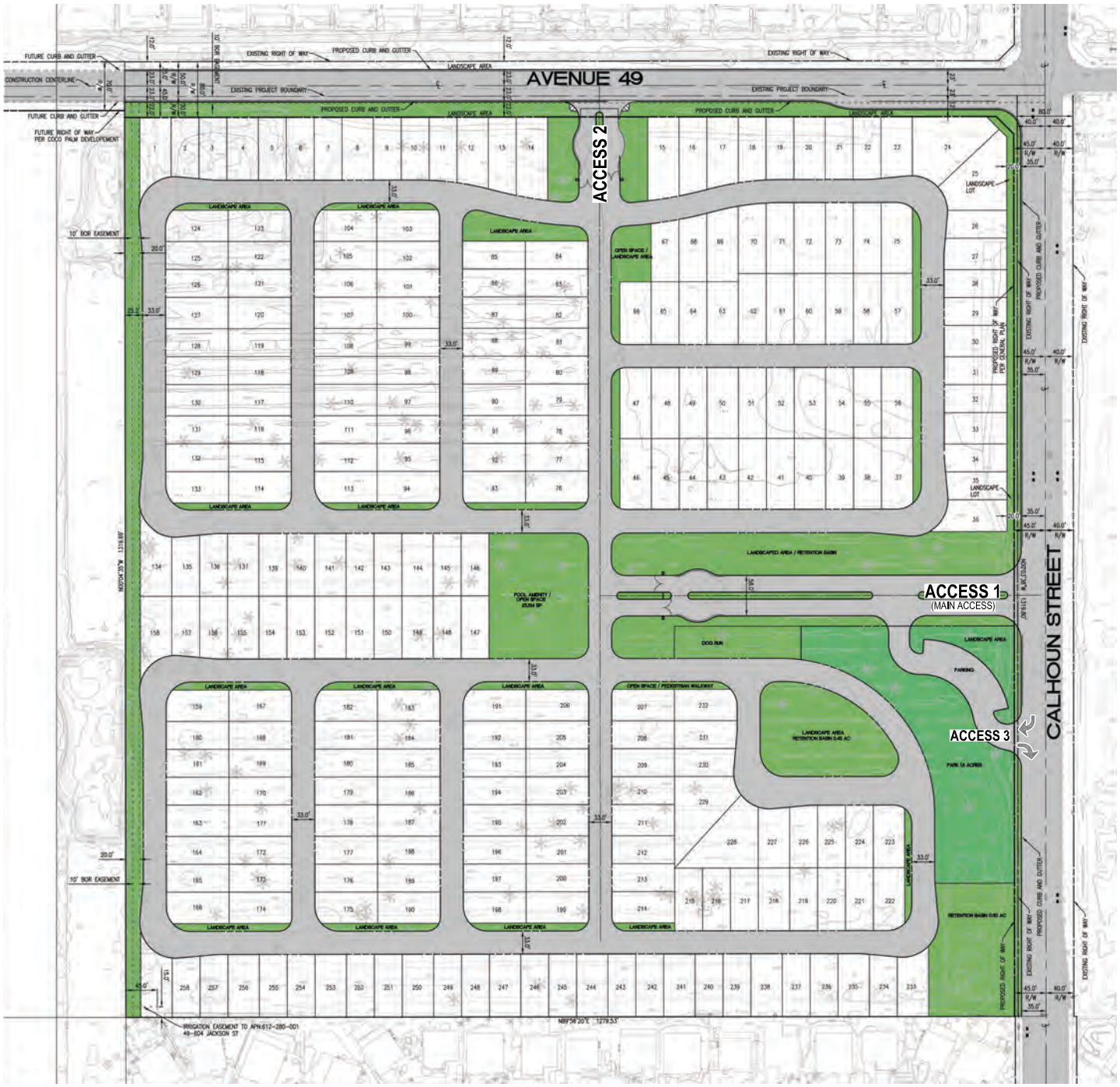
BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**) (1). Based on OPR's Technical Advisory, the County of Riverside adopted their Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled (December of 2020) (**County Guidelines**) (2). The City of Coachella utilizes the adopted County Guidelines.

Consistent with County Guidelines, projects should evaluate available screening criteria based on their location and project type to determine if a presumption of a less than significant transportation impact can be made. The following project screening thresholds were selected for review based on their applicability to the proposed Project:

- Small Projects Screening
- High Quality Transit Areas (HQTA) Screening
- Map-Based Screening
- Local Essential Service Screening

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

▪ RIGHT-IN/RIGHT-OUT ONLY

N

SMALL PROJECTS SCREENING

County Guidelines identify those projects forecasted to generate greenhouse gas (GHG) emissions below 3,000 Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$) per year are also assumed to cause a less than significant VMT impact.[1] The County Guidelines provides a list of land use types based on quantity (i.e., dwelling units or square footage) and provides a typical development potential to be below the 3,000 $MTCO_2e$ per year. Single Family Housing projects less than or equal to 110 dwelling units have been identified to meet the County threshold[2].

The Project quantity of 258 dwelling units is more than the residential VMT screening criteria.

Small Projects screening criteria is not met.

HIGH QUALITY TRANSIT AREAS (HQTA) SCREENING

Projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[3] or an existing stop along a "high-quality transit corridor"[4]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. The Project is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

HQTA screening criteria is not met.

MAP-BASED SCREENING

The County Guidelines note that "residential projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT."[5] Urban Crossroads has obtained a VMT data table from County Staff for all TAZs within Riverside County that identifies VMT per capita for the purposes of identifying low VMT areas. The data utilizes the sub-regional Riverside Transportation Analysis Model (RIVTAM) to measure baseline VMT performance, and a comparison was made to the applicable impact threshold.

The Project's TAZ was identified in the Riverside County Transportation Analysis Model (RIVTAM) as TAZ 4787.

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[1] County Guidelines; Page 19.
[2] County Guidelines; Page 42, Table 1
[3] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[4] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").
[5] Technical Advisory; Page 12

The County's data table identifies the Project's TAZ 4787 to generate 7.974 VMT per capita. The County regional threshold is 15.2 VMT per capita[6]; therefore the Project is located in a low VMT area.

Map-Based screening criteria is met for residential.

LOCAL ESSENTIAL SERVICE SCREENING

The introduction of new local essential services shortens non-discretionary trips by putting those goods and services closer to complimentary land uses, resulting in conditions which do not increase overall VMT. The park with dog run provides a local service to adjacent land uses that otherwise attract travelers from more distant locations; therefore, the park with dog run is presumed to not increase overall VMT.

Local Essential Service screening criteria is met for park with dog run.

CONCLUSION

In summary, the Project was evaluated consistent with available screening criteria as presented in the County Guidelines. The map based screening criteria is met for residential uses and the local essential service screening criteria is met for park with dog run, so a full analysis of VMT associated with site is not required. The Project is presumed to have a less than significant impact on VMT.

If you have any questions, please contact us at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

Respectfully submitted,

URBAN CROSSROADS, INC.

John Kain, AICP
Principal

Marlie Whiteman, P.E.
Senior Associate

[6] County Guidelines; Page 22

REFERENCES

1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.

2. **County of Riverside.** *Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled.* County of Riverside : s.n., December 2020.

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APPENDIX 3.1: TRAFFIC COUNTS –2024

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Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Dr Carreon Boulevard
Weather: Clear

File Name : 01_COA_Cal_Dr C AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	10	31	29	70	4	22	10	36	23	103	6	132	10	15	4	29	267
07:15 AM	18	30	48	96	2	38	16	56	39	112	18	169	17	29	14	60	381
07:30 AM	14	54	29	97	7	57	17	81	57	112	19	188	19	46	11	76	442
07:45 AM	16	65	24	105	8	63	15	86	50	115	15	180	14	41	9	64	435
Total	58	180	130	368	21	180	58	259	169	442	58	669	60	131	38	229	1525
08:00 AM	19	61	17	97	4	75	23	102	45	87	14	146	16	35	15	66	411
08:15 AM	11	51	12	74	6	58	8	72	18	63	9	90	9	34	18	61	297
08:30 AM	9	44	15	68	1	45	8	54	22	60	4	86	9	41	10	60	268
08:45 AM	8	41	3	52	3	35	6	44	19	39	4	62	10	18	15	43	201
Total	47	197	47	291	14	213	45	272	104	249	31	384	44	128	58	230	1177
Grand Total	105	377	177	659	35	393	103	531	273	691	89	1053	104	259	96	459	2702
Apprch %	15.9	57.2	26.9		6.6	74	19.4		25.9	65.6	8.5		22.7	56.4	20.9		
Total %	3.9	14	6.6	24.4	1.3	14.5	3.8	19.7	10.1	25.6	3.3	39	3.8	9.6	3.6	17	

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	18	30	**48**	96	2	38	16	56	39	112	18	169	17	29	14	60	381
07:30 AM	14	54	29	97	7	57	17	81	**57**	112	**19**	**188**	**19**	**46**	11	**76**	**442**
07:45 AM	16	**65**	24	**105**	**8**	63	15	86	50	**115**	15	180	14	41	9	64	435
08:00 AM	**19**	61	17	97	4	**75**	**23**	**102**	45	87	14	146	16	35	**15**	66	411
Total Volume	67	210	118	395	21	233	71	325	191	426	66	683	66	151	49	266	1669
% App. Total	17	53.2	29.9		6.5	71.7	21.8		28	62.4	9.7		24.8	56.8	18.4		
PHF	.882	.808	.615	.940	.656	.777	.772	.797	.838	.926	.868	.908	.868	.821	.817	.875	.944

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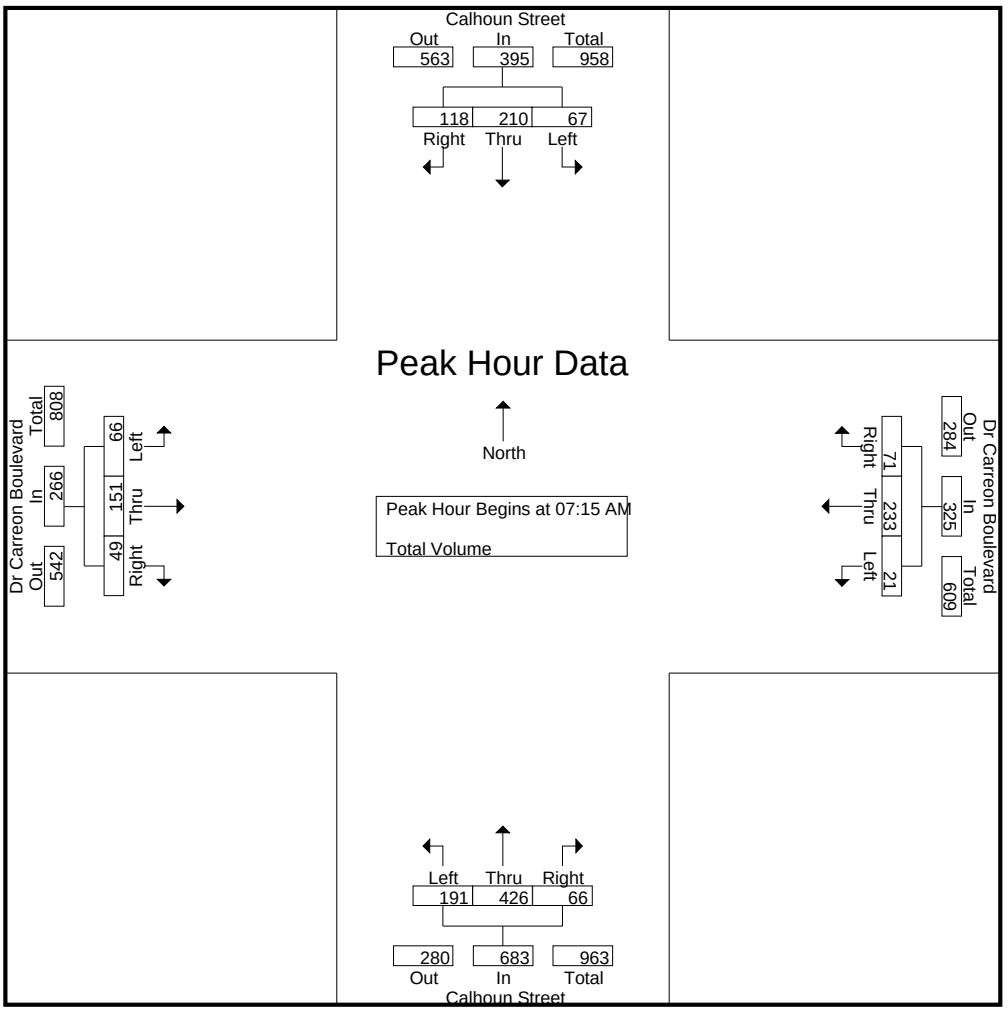
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				07:15 AM				07:30 AM			
+0 mins.	18	30	**48**	96	7	57	17	81	39	112	18	169	**19**	**46**	11	**76**
+15 mins.	14	54	29	97	**8**	63	15	86	**57**	112	**19**	**188**	14	41	9	64
+30 mins.	16	**65**	24	**105**	4	**75**	**23**	**102**	50	**115**	15	180	16	35	15	66
+45 mins.	**19**	61	17	97	6	58	8	72	45	87	14	146	9	34	**18**	61
Total Volume	67	210	118	395	25	253	63	341	191	426	66	683	58	156	53	267
% App. Total	17	53.2	29.9		7.3	74.2	18.5		28	62.4	9.7		21.7	58.4	19.9	
PHF	.882	.808	.615	.940	.781	.843	.685	.836	.838	.926	.868	.908	.763	.848	.736	.878

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	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	21	110	16	147	6	26	13	45	13	44	2	59	10	46	35	91	342
04:15 PM	11	113	17	141	1	38	14	53	16	48	2	66	5	42	21	68	328
04:30 PM	11	107	22	140	7	28	19	54	19	60	6	85	13	41	24	78	357
04:45 PM	7	88	15	110	3	27	10	40	14	54	8	76	11	33	24	68	294
Total	50	418	70	538	17	119	56	192	62	206	18	286	39	162	104	305	1321
05:00 PM	8	98	16	122	4	27	13	44	16	59	6	81	12	30	28	70	317
05:15 PM	7	116	23	146	3	24	13	40	19	62	8	89	8	41	25	74	349
05:30 PM	13	100	26	139	3	37	6	46	18	54	6	78	8	34	30	72	335
05:45 PM	8	93	13	114	9	33	16	58	19	53	4	76	9	22	9	40	288
Total	36	407	78	521	19	121	48	188	72	228	24	324	37	127	92	256	1289
Grand Total	86	825	148	1059	36	240	104	380	134	434	42	610	76	289	196	561	2610
Apprch %	8.1	77.9	14		9.5	63.2	27.4		22	71.1	6.9		13.5	51.5	34.9		
Total %	3.3	31.6	5.7	40.6	1.4	9.2	4	14.6	5.1	16.6	1.6	23.4	2.9	11.1	7.5	21.5	

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**21**	110	16	**147**	6	26	13	45	13	44	2	59	10	**46**	**35**	**91**	342
04:15 PM	11	**113**	17	141	1	**38**	14	53	16	48	2	66	5	42	21	68	328
04:30 PM	11	107	**22**	140	**7**	28	**19**	**54**	**19**	**60**	6	**85**	**13**	41	24	78	**357**
04:45 PM	7	88	15	110	3	27	10	40	14	54	**8**	76	11	33	24	68	294
Total Volume	50	418	70	538	17	119	56	192	62	206	18	286	39	162	104	305	1321
% App. Total	9.3	77.7	13		8.9	62	29.2		21.7	72	6.3		12.8	53.1	34.1		
PHF	.595	.925	.795	.915	.607	.783	.737	.889	.816	.858	.563	.841	.750	.880	.743	.838	.925

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Site Code : 05124698
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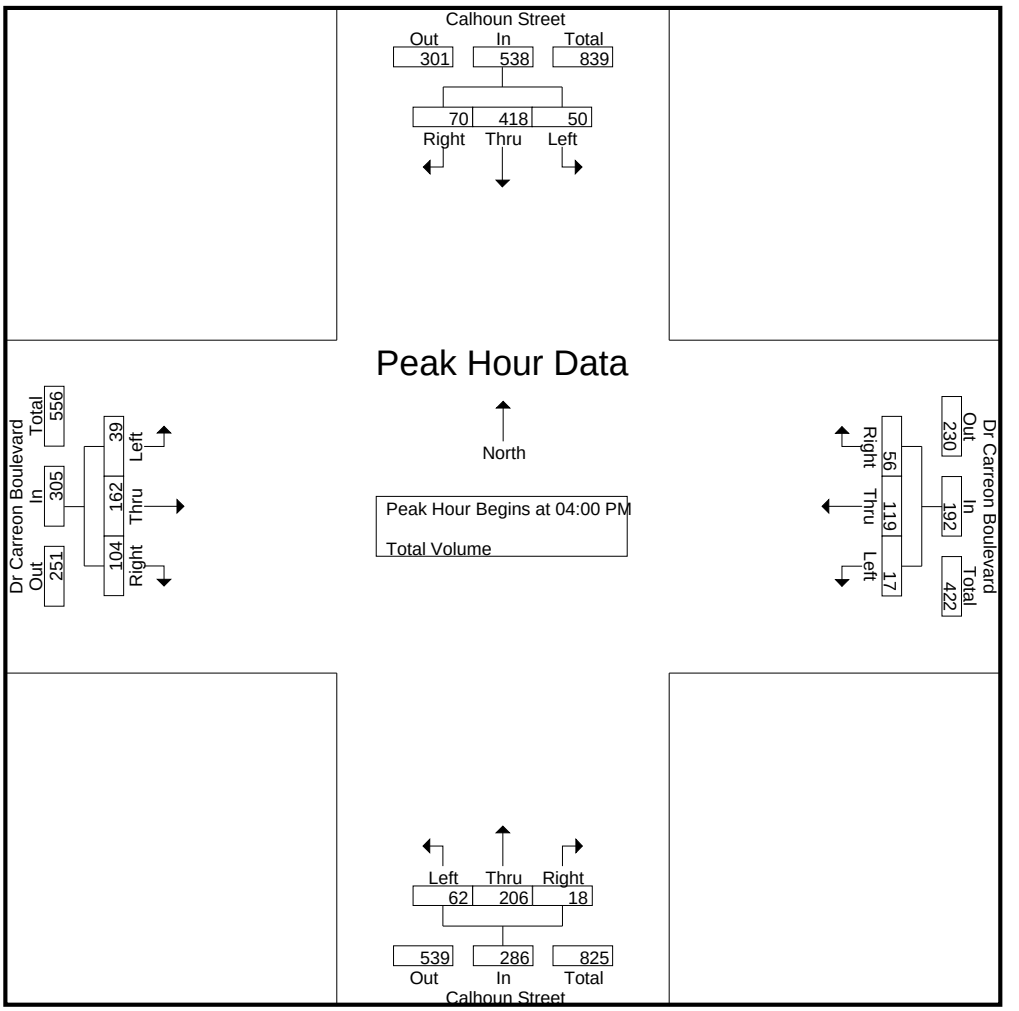
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:00 PM			
+0 mins.	**21**	110	16	**147**	6	26	13	45	**19**	60	6	85	10	**46**	**35**	**91**
+15 mins.	11	**113**	17	141	1	**38**	14	53	14	54	**8**	76	5	42	21	68
+30 mins.	11	107	**22**	140	**7**	28	**19**	**54**	16	59	6	81	**13**	41	24	78
+45 mins.	7	88	15	110	3	27	10	40	19	**62**	8	**89**	11	33	24	68
Total Volume	50	418	70	538	17	119	56	192	68	235	28	331	39	162	104	305
% App. Total	9.3	77.7	13		8.9	62	29.2		20.5	71	8.5		12.8	53.1	34.1	
PHF	.595	.925	.795	.915	.607	.783	.737	.889	.895	.948	.875	.930	.750	.880	.743	.838

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 48
Weather: Clear

File Name : 02_COA_Cal_Ave 48 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	8	25	15	48	3	76	13	92	42	92	8	142	8	45	13	66	348
07:15 AM	10	24	11	45	3	81	14	98	30	105	10	145	17	64	22	103	391
07:30 AM	14	50	12	76	7	142	18	167	62	115	13	190	9	73	24	106	539
07:45 AM	15	58	16	89	7	146	25	178	69	127	15	211	12	108	19	139	617
Total	47	157	54	258	20	445	70	535	203	439	46	688	46	290	78	414	1895
08:00 AM	11	47	17	75	7	132	20	159	59	76	12	147	16	75	26	117	498
08:15 AM	11	41	13	65	2	104	11	117	41	45	5	91	16	46	29	91	364
08:30 AM	5	34	21	60	3	90	7	100	34	48	5	87	13	72	23	108	355
08:45 AM	8	28	19	55	6	96	8	110	23	38	6	67	12	57	16	85	317
Total	35	150	70	255	18	422	46	486	157	207	28	392	57	250	94	401	1534
Grand Total	82	307	124	513	38	867	116	1021	360	646	74	1080	103	540	172	815	3429
Apprch %	16	59.8	24.2		3.7	84.9	11.4		33.3	59.8	6.9		12.6	66.3	21.1		
Total %	2.4	9	3.6	15	1.1	25.3	3.4	29.8	10.5	18.8	2.2	31.5	3	15.7	5	23.8	

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	10	24	11	45	3	81	14	98	30	105	10	145	**17**	64	22	103	391
07:30 AM	14	50	12	76	**7**	142	18	167	62	115	13	190	9	73	24	106	539
07:45 AM	**15**	**58**	16	**89**	7	**146**	**25**	**178**	**69**	**127**	**15**	**211**	12	**108**	19	**139**	**617**
08:00 AM	11	47	**17**	75	7	132	20	159	59	76	12	147	16	75	**26**	117	498
Total Volume	50	179	56	285	24	501	77	602	220	423	50	693	54	320	91	465	2045
% App. Total	17.5	62.8	19.6		4	83.2	12.8		31.7	61	7.2		11.6	68.8	19.6		
PHF	.833	.772	.824	.801	.857	.858	.770	.846	.797	.833	.833	.821	.794	.741	.875	.836	.829

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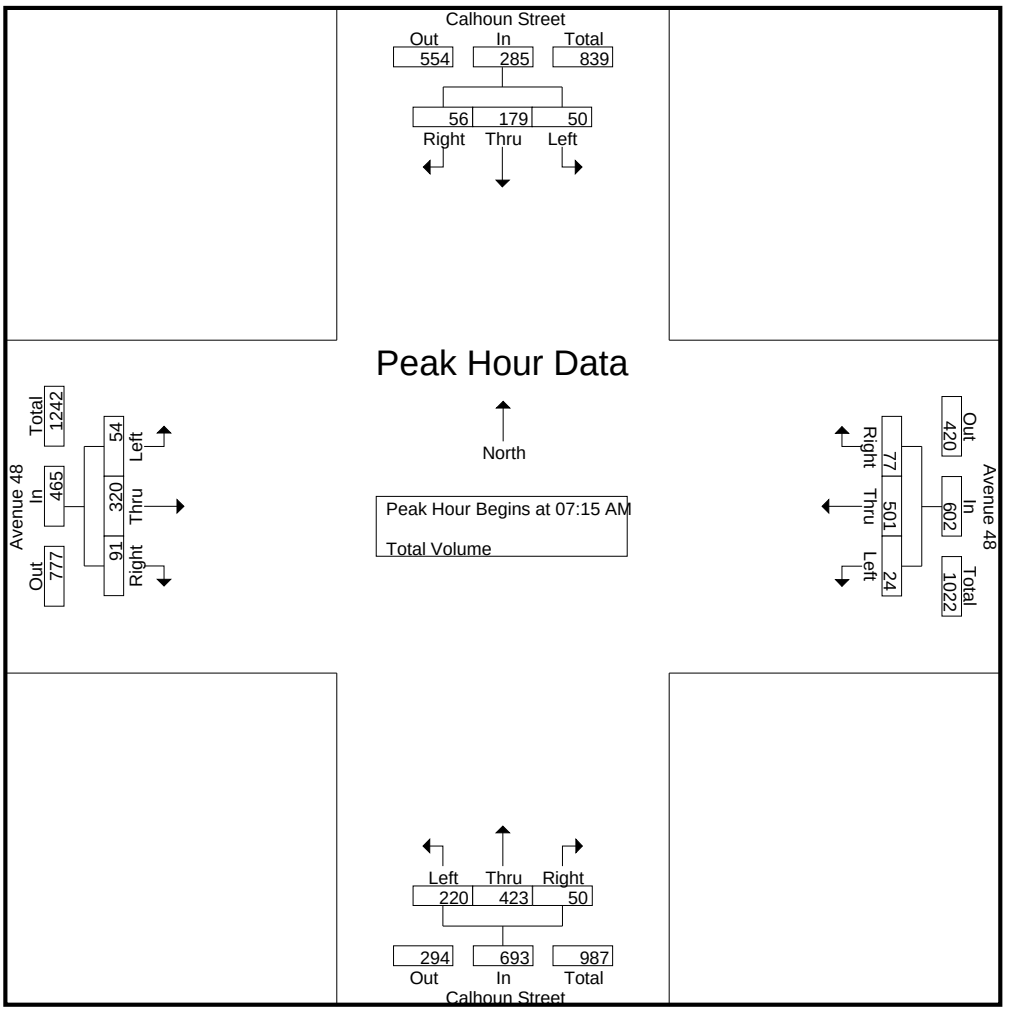
City of Coachella
N/S: Calhoun Street
E/W: Avenue 48
Weather: Clear

File Name : 02_COA_Cal_Ave 48 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:15 AM				07:15 AM			
+0 mins.	14	50	12	76	**7**	142	18	167	30	105	10	145	**17**	64	22	103
+15 mins.	**15**	**58**	16	**89**	7	**146**	**25**	**178**	62	115	13	190	9	73	24	106
+30 mins.	11	47	**17**	75	7	132	20	159	**69**	**127**	**15**	**211**	12	**108**	19	**139**
+45 mins.	11	41	13	65	2	104	11	117	59	76	12	147	16	75	**26**	117
Total Volume	51	196	58	305	23	524	74	621	220	423	50	693	54	320	91	465
% App. Total	16.7	64.3	19		3.7	84.4	11.9		31.7	61	7.2		11.6	68.8	19.6	
PHF	.850	.845	.853	.857	.821	.897	.740	.872	.797	.833	.833	.821	.794	.741	.875	.836

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City of Coachella
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File Name : 02_COA_Cal_Ave 48 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	19	91	17	127	10	95	9	114	19	40	6	65	12	124	60	196	502
04:15 PM	16	77	15	108	9	89	9	107	37	31	6	74	16	125	58	199	488
04:30 PM	13	82	22	117	5	76	12	93	24	57	8	89	9	143	50	202	501
04:45 PM	10	85	16	111	6	93	4	103	23	50	5	78	14	103	62	179	471
Total	58	335	70	463	30	353	34	417	103	178	25	306	51	495	230	776	1962
05:00 PM	22	85	21	128	9	83	10	102	31	41	7	79	11	124	63	198	507
05:15 PM	11	85	21	117	5	81	6	92	23	69	10	102	11	116	59	186	497
05:30 PM	16	75	18	109	2	89	14	105	36	34	9	79	18	109	53	180	473
05:45 PM	8	70	16	94	6	91	6	103	27	49	7	83	9	92	58	159	439
Total	57	315	76	448	22	344	36	402	117	193	33	343	49	441	233	723	1916
Grand Total	115	650	146	911	52	697	70	819	220	371	58	649	100	936	463	1499	3878
Apprch %	12.6	71.4	16		6.3	85.1	8.5		33.9	57.2	8.9		6.7	62.4	30.9		
Total %	3	16.8	3.8	23.5	1.3	18	1.8	21.1	5.7	9.6	1.5	16.7	2.6	24.1	11.9	38.7	

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	13	82	**22**	117	5	76	**12**	93	24	57	8	89	9	**143**	50	**202**	501
04:45 PM	10	**85**	16	111	6	**93**	4	**103**	23	50	5	78	**14**	103	62	179	471
05:00 PM	**22**	85	21	**128**	**9**	83	10	102	**31**	41	7	79	11	124	**63**	198	**507**
05:15 PM	11	85	21	117	5	81	6	92	23	**69**	**10**	**102**	11	116	59	186	497
Total Volume	56	337	80	473	25	333	32	390	101	217	30	348	45	486	234	765	1976
% App. Total	11.8	71.2	16.9		6.4	85.4	8.2		29	62.4	8.6		5.9	63.5	30.6		
PHF	.636	.991	.909	.924	.694	.895	.667	.947	.815	.786	.750	.853	.804	.850	.929	.947	.974

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City of Coachella
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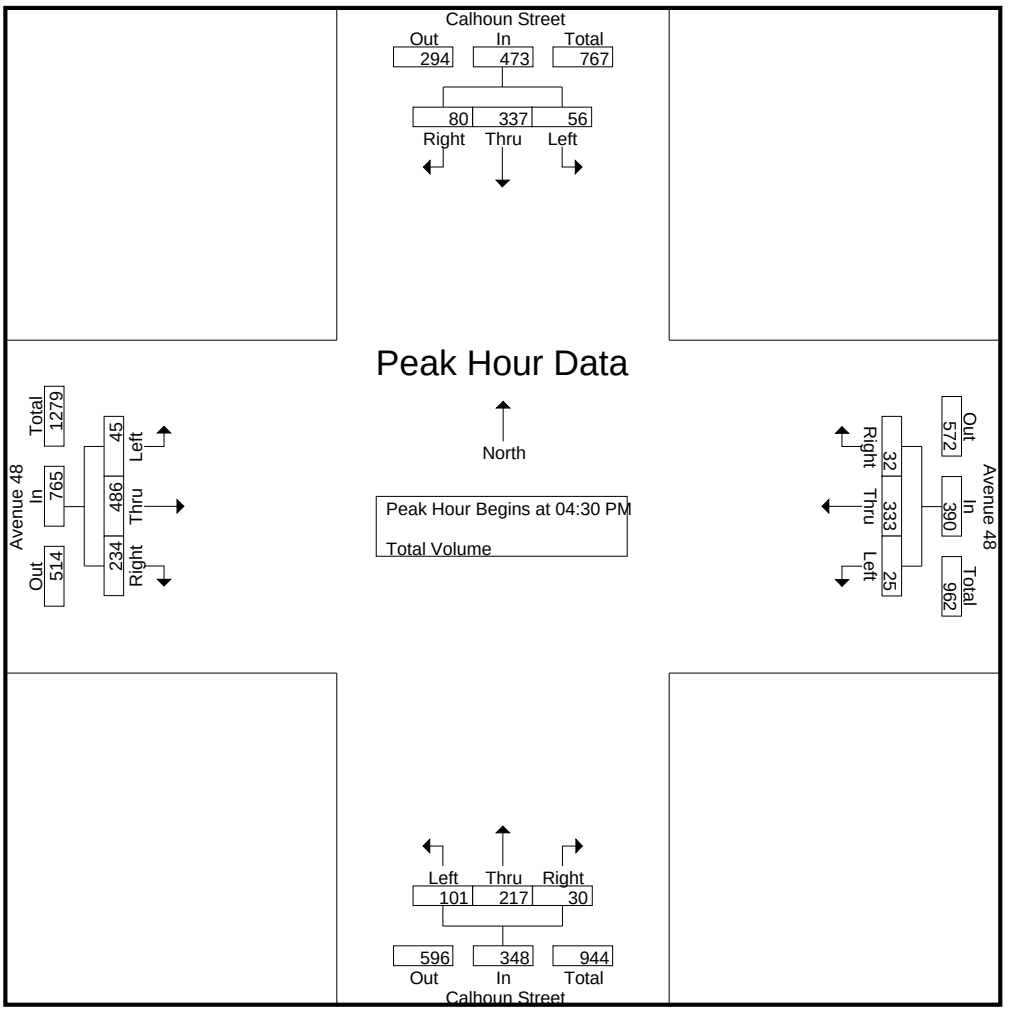
Weather: Clear

File Name : 02_COA_Cal_Ave 48 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:30 PM				04:15 PM			
+0 mins.	13	82	**22**	117	**10**	**95**	9	**114**	24	57	8	89	**16**	125	58	199
+15 mins.	10	**85**	16	111	9	89	9	107	23	50	5	78	9	**143**	50	**202**
+30 mins.	**22**	85	21	**128**	5	76	**12**	93	**31**	41	7	79	14	103	62	179
+45 mins.	11	85	21	117	6	93	4	103	23	**69**	**10**	**102**	11	124	**63**	198
Total Volume	56	337	80	473	30	353	34	417	101	217	30	348	50	495	233	778
% App. Total	11.8	71.2	16.9		7.2	84.7	8.2		29	62.4	8.6		6.4	63.6	29.9	
PHF	.636	.991	.909	.924	.750	.929	.708	.914	.815	.786	.750	.853	.781	.865	.925	.963

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 49
Weather: Clear

File Name : 03_COA_Cal_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	47	0	49	8	0	9	17	0	116	4	120	0	0	0	0	186
07:15 AM	1	60	0	61	9	0	6	15	0	126	3	129	0	0	0	0	205
07:30 AM	2	90	0	92	10	0	10	20	0	147	9	156	0	0	0	0	268
07:45 AM	4	97	0	101	16	0	10	26	0	148	6	154	0	0	0	0	281
Total	9	294	0	303	43	0	35	78	0	537	22	559	0	0	0	0	940
08:00 AM	5	71	1	77	7	0	5	12	0	118	6	124	1	0	0	1	214
08:15 AM	6	70	0	76	6	0	7	13	0	76	2	78	0	0	0	0	167
08:30 AM	3	59	0	62	4	0	7	11	0	67	7	74	0	0	0	0	147
08:45 AM	2	45	0	47	2	0	6	8	0	54	3	57	1	0	1	2	114
Total	16	245	1	262	19	0	25	44	0	315	18	333	2	0	1	3	642
Grand Total	25	539	1	565	62	0	60	122	0	852	40	892	2	0	1	3	1582
Apprch %	4.4	95.4	0.2		50.8	0	49.2		0	95.5	4.5		66.7	0	33.3		
Total %	1.6	34.1	0.1	35.7	3.9	0	3.8	7.7	0	53.9	2.5	56.4	0.1	0	0.1	0.2	

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	60	0	61	9	0	6	15	0	126	3	129	0	0	0	0	205
07:30 AM	2	90	0	92	10	0	**10**	20	0	147	**9**	**156**	0	0	0	0	268
07:45 AM	4	**97**	0	**101**	**16**	0	10	**26**	0	**148**	6	154	0	0	0	0	**281**
08:00 AM	**5**	71	**1**	77	7	0	5	12	0	118	6	124	**1**	0	0	**1**	214
Total Volume	12	318	1	331	42	0	31	73	0	539	24	563	1	0	0	1	968
% App. Total	3.6	96.1	0.3		57.5	0	42.5		0	95.7	4.3		100	0	0		
PHF	.600	.820	.250	.819	.656	.000	.775	.702	.000	.910	.667	.902	.250	.000	.000	.250	.861

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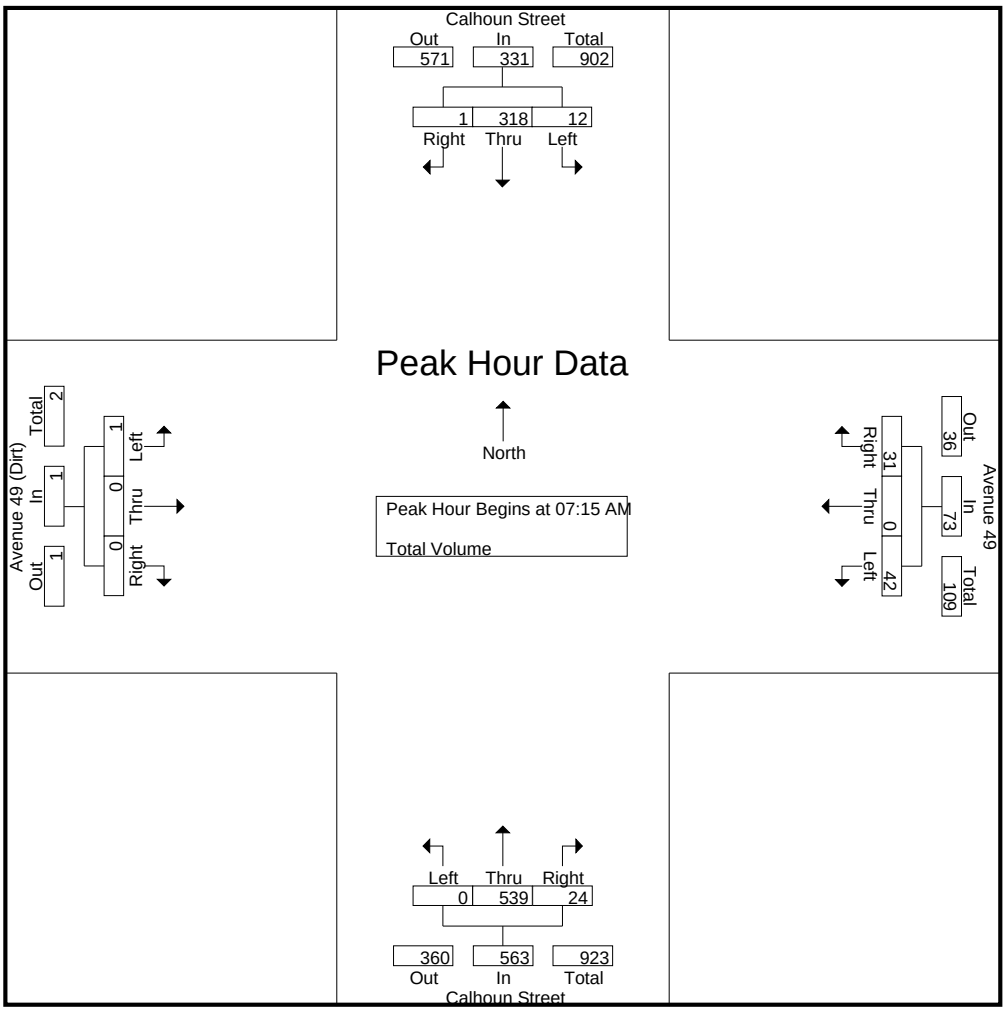
File Name : 03_COA_Cal_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:15 AM				08:00 AM			
+0 mins.	2	90	0	92	8	0	9	17	0	126	3	129	**1**	0	0	1
+15 mins.	4	**97**	0	**101**	9	0	6	15	0	147	**9**	**156**	0	0	0	0
+30 mins.	5	71	**1**	77	10	0	**10**	20	0	**148**	6	154	0	0	0	0
+45 mins.	**6**	70	0	76	**16**	0	10	**26**	0	118	6	124	1	0	**1**	**2**
Total Volume	17	328	1	346	43	0	35	78	0	539	24	563	2	0	1	3
% App. Total	4.9	94.8	0.3		55.1	0	44.9		0	95.7	4.3		66.7	0	33.3	
PHF	.708	.845	.250	.856	.672	.000	.875	.750	.000	.910	.667	.902	.500	.000	.250	.375

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 49
Weather: Clear

File Name : 03_COA_Cal_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	133	0	136	7	0	3	10	1	77	14	92	0	0	0	0	238
04:15 PM	10	118	0	128	4	0	4	8	0	60	7	67	1	0	0	1	204
04:30 PM	6	113	0	119	5	0	3	8	0	86	8	94	0	0	0	0	221
04:45 PM	8	110	0	118	9	0	5	14	0	72	3	75	0	0	0	0	207
Total	27	474	0	501	25	0	15	40	1	295	32	328	1	0	0	1	870
05:00 PM	6	113	0	119	8	0	3	11	0	84	2	86	1	0	0	1	217
05:15 PM	3	124	0	127	7	0	6	13	0	85	6	91	0	0	0	0	231
05:30 PM	5	104	0	109	6	0	4	10	0	74	7	81	0	0	0	0	200
05:45 PM	4	114	0	118	11	0	7	18	0	75	13	88	0	0	0	0	224
Total	18	455	0	473	32	0	20	52	0	318	28	346	1	0	0	1	872
Grand Total	45	929	0	974	57	0	35	92	1	613	60	674	2	0	0	2	1742
Apprch %	4.6	95.4	0		62	0	38		0.1	90.9	8.9		100	0	0		
Total %	2.6	53.3	0	55.9	3.3	0	2	5.3	0.1	35.2	3.4	38.7	0.1	0	0	0.1	

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	6	113	0	119	5	0	3	8	0	**86**	**8**	**94**	0	0	0	0	221
04:45 PM	**8**	110	0	118	**9**	0	5	**14**	0	72	3	75	0	0	0	0	207
05:00 PM	6	113	0	119	8	0	3	11	0	84	2	86	**1**	0	0	**1**	217
05:15 PM	3	**124**	0	**127**	7	0	**6**	13	0	85	6	91	0	0	0	0	**231**
Total Volume	23	460	0	483	29	0	17	46	0	327	19	346	1	0	0	1	876
% App. Total	4.8	95.2	0		63	0	37		0	94.5	5.5		100	0	0		
PHF	.719	.927	.000	.951	.806	.000	.708	.821	.000	.951	.594	.920	.250	.000	.000	.250	.948

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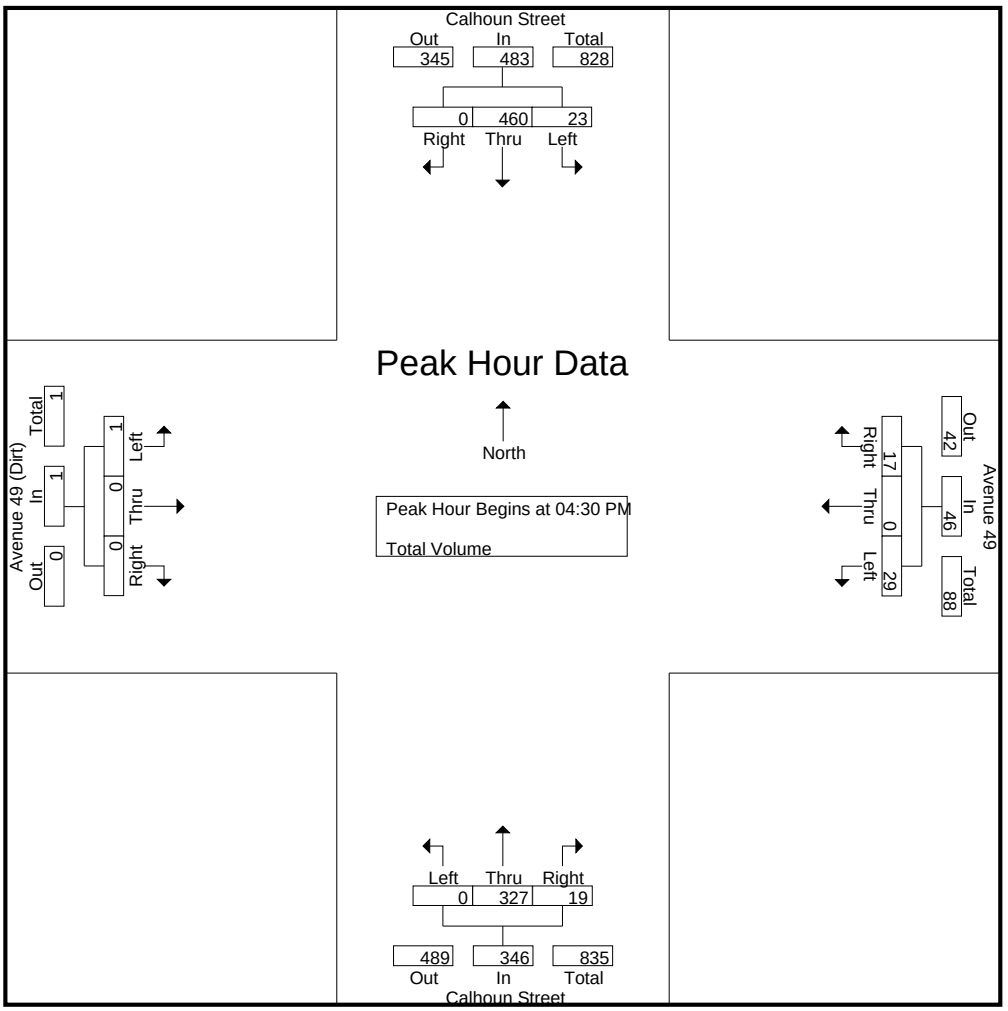
City of Coachella
N/S: Calhoun Street
E/W: Avenue 49
Weather: Clear

File Name : 03_COA_Cal_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:30 PM				04:15 PM			
+0 mins.	3	**133**	0	**136**	8	0	3	11	0	**86**	**8**	**94**	**1**	0	0	**1**
+15 mins.	**10**	118	0	128	7	0	6	13	0	72	3	75	0	0	0	0
+30 mins.	6	113	0	119	6	0	4	10	0	84	2	86	0	0	0	0
+45 mins.	8	110	0	118	**11**	0	**7**	**18**	0	85	6	91	1	0	0	1
Total Volume	27	474	0	501	32	0	20	52	0	327	19	346	2	0	0	2
% App. Total	5.4	94.6	0		61.5	0	38.5		0	94.5	5.5		100	0	0	
PHF	.675	.891	.000	.921	.727	.000	.714	.722	.000	.951	.594	.920	.500	.000	.000	.500

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	30	8	57	9	79	24	112	17	84	22	123	3	28	2	33	325
07:15 AM	16	39	9	64	4	89	28	121	21	74	21	116	7	35	6	48	349
07:30 AM	23	64	19	106	5	93	32	130	27	79	33	139	8	32	6	46	421
07:45 AM	36	59	30	125	7	77	40	124	18	82	67	167	11	54	4	69	485
Total	94	192	66	352	25	338	124	487	83	319	143	545	29	149	18	196	1580
08:00 AM	19	47	17	83	8	99	39	146	15	57	10	82	8	54	4	66	377
08:15 AM	24	40	9	73	3	106	26	135	7	31	7	45	7	45	10	62	315
08:30 AM	21	26	14	61	2	71	17	90	4	30	5	39	9	53	7	69	259
08:45 AM	18	25	6	49	3	73	12	88	5	20	10	35	13	45	2	60	232
Total	82	138	46	266	16	349	94	459	31	138	32	201	37	197	23	257	1183
Grand Total	176	330	112	618	41	687	218	946	114	457	175	746	66	346	41	453	2763
Apprch %	28.5	53.4	18.1		4.3	72.6	23		15.3	61.3	23.5		14.6	76.4	9.1		
Total %	6.4	11.9	4.1	22.4	1.5	24.9	7.9	34.2	4.1	16.5	6.3	27	2.4	12.5	1.5	16.4	

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	16	39	9	64	4	89	28	121	21	74	21	116	7	35	**6**	48	349
07:30 AM	23	**64**	19	106	5	93	32	130	**27**	79	33	139	8	32	6	46	421
07:45 AM	**36**	59	**30**	**125**	7	77	**40**	124	18	**82**	**67**	**167**	**11**	**54**	4	**69**	**485**
08:00 AM	19	47	17	83	**8**	**99**	39	**146**	15	57	10	82	8	54	4	66	377
Total Volume	94	209	75	378	24	358	139	521	81	292	131	504	34	175	20	229	1632
% App. Total	24.9	55.3	19.8		4.6	68.7	26.7		16.1	57.9	26		14.8	76.4	8.7		
PHF	.653	.816	.625	.756	.750	.904	.869	.892	.750	.890	.489	.754	.773	.810	.833	.830	.841

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City of Coachella
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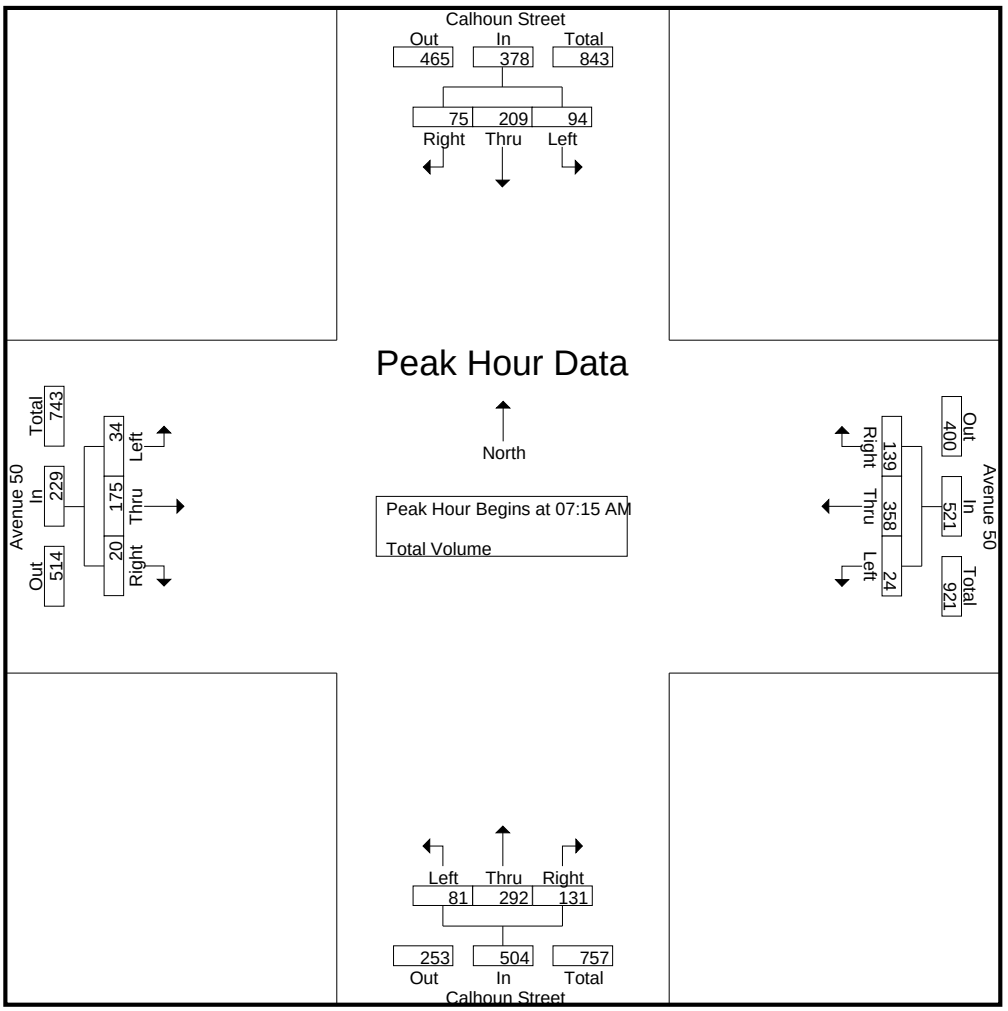
File Name : 04_COA_Cal_Ave 50 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:00 AM				07:45 AM			
+0 mins.	23	**64**	19	106	5	93	32	130	17	**84**	22	123	**11**	**54**	4	**69**
+15 mins.	**36**	59	**30**	**125**	7	77	**40**	124	21	74	21	116	8	54	4	66
+30 mins.	19	47	17	83	**8**	99	39	**146**	**27**	79	33	139	7	45	**10**	62
+45 mins.	24	40	9	73	3	**106**	26	135	18	82	**67**	**167**	9	53	7	69
Total Volume	102	210	75	387	23	375	137	535	83	319	143	545	35	206	25	266
% App. Total	26.4	54.3	19.4		4.3	70.1	25.6		15.2	58.5	26.2		13.2	77.4	9.4	
PHF	.708	.820	.625	.774	.719	.884	.856	.916	.769	.949	.534	.816	.795	.954	.625	.964

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	36	64	8	108	2	73	31	106	9	44	9	62	10	91	10	111	387
04:15 PM	32	72	17	121	2	76	24	102	13	37	7	57	12	81	11	104	384
04:30 PM	29	59	10	98	5	81	22	108	15	45	23	83	10	76	8	94	383
04:45 PM	35	60	13	108	2	44	15	61	7	38	13	58	9	77	6	92	319
Total	132	255	48	435	11	274	92	377	44	164	52	260	41	325	35	401	1473
05:00 PM	32	53	14	99	5	60	21	86	13	45	18	76	8	96	7	111	372
05:15 PM	29	59	16	104	1	77	18	96	7	42	24	73	14	88	12	114	387
05:30 PM	25	56	12	93	1	66	26	93	15	39	6	60	12	91	8	111	357
05:45 PM	39	61	11	111	1	62	35	98	12	42	7	61	10	77	9	96	366
Total	125	229	53	407	8	265	100	373	47	168	55	270	44	352	36	432	1482
Grand Total	257	484	101	842	19	539	192	750	91	332	107	530	85	677	71	833	2955
Apprch %	30.5	57.5	12		2.5	71.9	25.6		17.2	62.6	20.2		10.2	81.3	8.5		
Total %	8.7	16.4	3.4	28.5	0.6	18.2	6.5	25.4	3.1	11.2	3.6	17.9	2.9	22.9	2.4	28.2	

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	32	53	14	99	**5**	60	21	86	13	**45**	18	**76**	8	**96**	7	111	372
05:15 PM	29	59	**16**	104	1	**77**	18	96	7	42	**24**	73	**14**	88	**12**	**114**	**387**
05:30 PM	25	56	12	93	1	66	26	93	**15**	39	6	60	12	91	8	111	357
05:45 PM	**39**	**61**	11	**111**	1	62	**35**	**98**	12	42	7	61	10	77	9	96	366
Total Volume	125	229	53	407	8	265	100	373	47	168	55	270	44	352	36	432	1482
% App. Total	30.7	56.3	13		2.1	71	26.8		17.4	62.2	20.4		10.2	81.5	8.3		
PHF	.801	.939	.828	.917	.400	.860	.714	.952	.783	.933	.573	.888	.786	.917	.750	.947	.957

Counts Unlimited, Inc.
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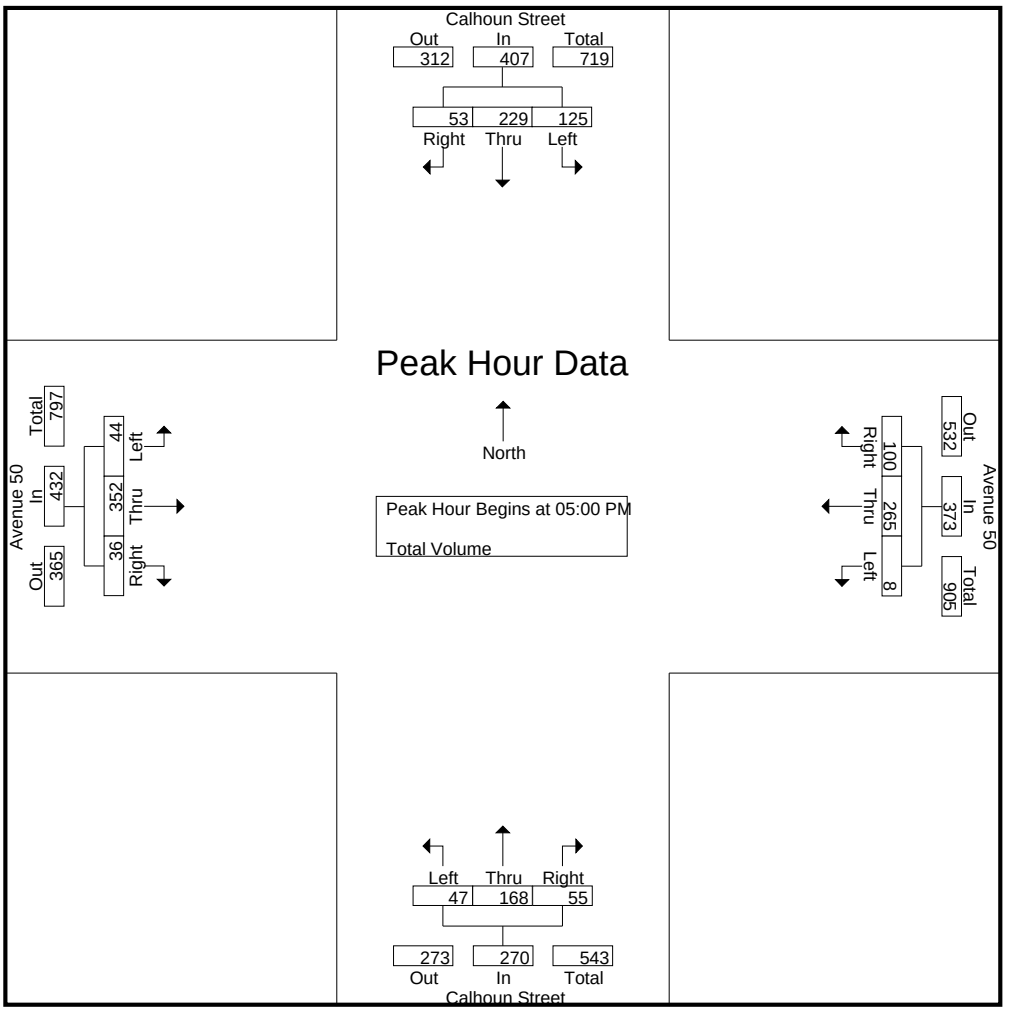
City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				05:00 PM			
+0 mins.	**36**	64	8	108	2	73	**31**	106	**15**	**45**	23	**83**	8	**96**	7	111
+15 mins.	32	**72**	**17**	**121**	2	76	24	102	7	38	13	58	**14**	88	**12**	**114**
+30 mins.	29	59	10	98	**5**	**81**	22	**108**	13	45	18	76	12	91	8	111
+45 mins.	35	60	13	108	2	44	15	61	7	42	**24**	73	10	77	9	96
Total Volume	132	255	48	435	11	274	92	377	42	170	78	290	44	352	36	432
% App. Total	30.3	58.6	11		2.9	72.7	24.4		14.5	58.6	26.9		10.2	81.5	8.3	
PHF	.917	.885	.706	.899	.550	.846	.742	.873	.700	.944	.813	.873	.786	.917	.750	.947

Counts Unlimited, Inc.
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City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	79	2	84	1	0	0	1	2	93	0	95	11	0	8	19	199
07:15 AM	1	105	1	107	1	0	0	1	1	109	1	111	14	0	7	21	240
07:30 AM	1	115	5	121	1	0	2	3	0	122	1	123	28	0	10	38	285
07:45 AM	0	119	8	127	1	0	1	2	2	100	0	102	16	0	4	20	251
Total	5	418	16	439	4	0	3	7	5	424	2	431	69	0	29	98	975
08:00 AM	0	88	8	96	1	0	1	2	3	115	1	119	16	1	5	22	239
08:15 AM	1	100	8	109	0	0	1	1	1	99	1	101	14	0	7	21	232
08:30 AM	3	81	8	92	4	0	1	5	0	107	0	107	10	0	3	13	217
08:45 AM	0	75	5	80	0	0	1	1	1	113	0	114	9	0	5	14	209
Total	4	344	29	377	5	0	4	9	5	434	2	441	49	1	20	70	897
Grand Total	9	762	45	816	9	0	7	16	10	858	4	872	118	1	49	168	1872
Apprch %	1.1	93.4	5.5		56.2	0	43.8		1.1	98.4	0.5		70.2	0.6	29.2		
Total %	0.5	40.7	2.4	43.6	0.5	0	0.4	0.9	0.5	45.8	0.2	46.6	6.3	0.1	2.6	9	

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**1**	105	1	107	**1**	0	0	1	1	109	**1**	111	14	0	7	21	240
07:30 AM	1	115	5	121	1	0	**2**	**3**	0	**122**	1	**123**	**28**	0	**10**	**38**	**285**
07:45 AM	0	**119**	**8**	**127**	1	0	1	2	2	100	0	102	16	0	4	20	251
08:00 AM	0	88	8	96	1	0	1	2	**3**	115	1	119	16	**1**	5	22	239
Total Volume	2	427	22	451	4	0	4	8	6	446	3	455	74	1	26	101	1015
% App. Total	0.4	94.7	4.9		50	0	50		1.3	98	0.7		73.3	1	25.7		
PHF	.500	.897	.688	.888	1.00	.000	.500	.667	.500	.914	.750	.925	.661	.250	.650	.664	.890

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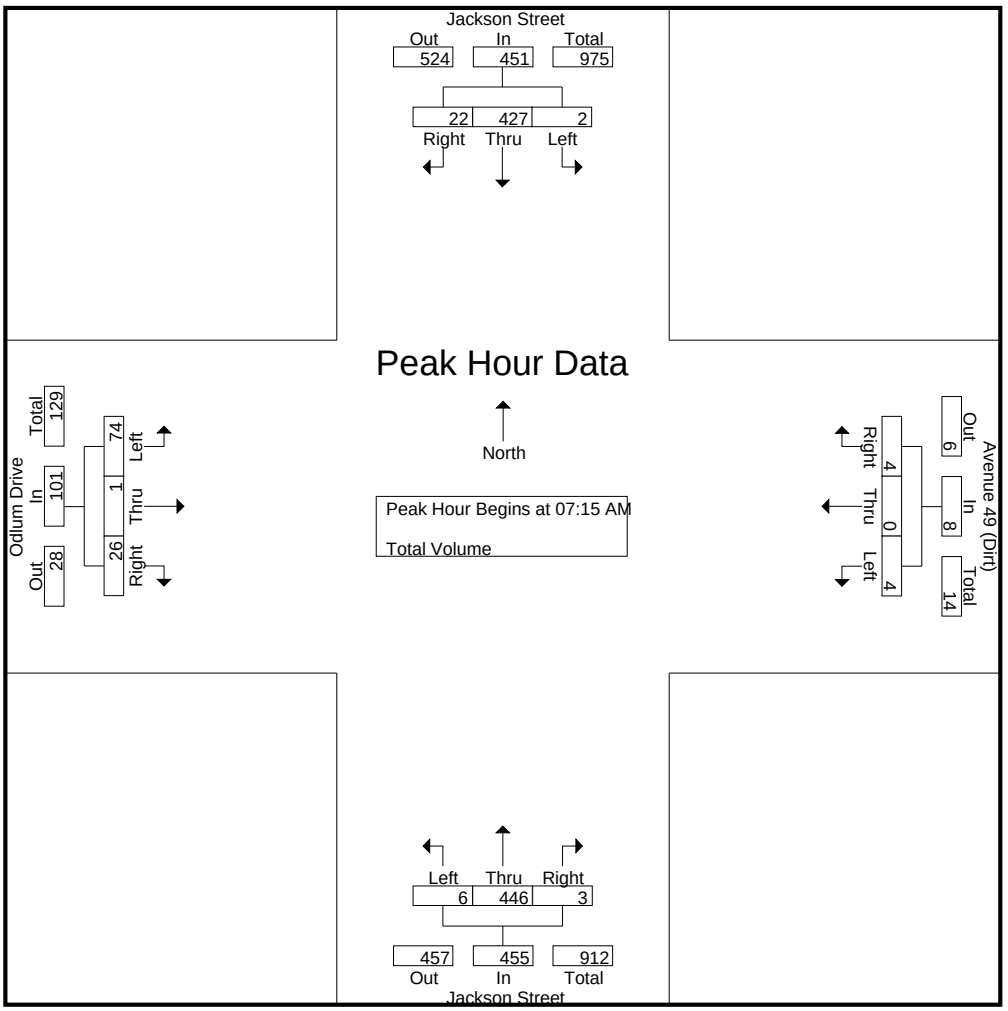
City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:45 AM				07:15 AM				07:15 AM			
+0 mins.	**1**	115	5	121	1	0	**1**	2	1	109	**1**	111	14	0	7	21
+15 mins.	0	**119**	**8**	**127**	1	0	1	2	0	**122**	1	**123**	**28**	0	**10**	**38**
+30 mins.	0	88	8	96	0	0	1	1	2	100	0	102	16	0	4	20
+45 mins.	1	100	8	109	**4**	0	1	**5**	**3**	115	1	119	16	**1**	5	22
Total Volume	2	422	29	453	6	0	4	10	6	446	3	455	74	1	26	101
% App. Total	0.4	93.2	6.4		60	0	40		1.3	98	0.7		73.3	1	25.7	
PHF	.500	.887	.906	.892	.375	.000	1.000	.500	.500	.914	.750	.925	.661	.250	.650	.664

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City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	115	10	125	0	0	0	0	4	121	0	125	12	0	2	14	264
04:15 PM	1	120	18	139	0	0	1	1	4	95	0	99	18	0	4	22	261
04:30 PM	0	108	15	123	0	0	3	3	5	103	0	108	15	0	5	20	254
04:45 PM	0	134	12	146	0	0	2	2	4	88	2	94	10	0	7	17	259
Total	1	477	55	533	0	0	6	6	17	407	2	426	55	0	18	73	1038
05:00 PM	0	147	16	163	1	0	0	1	4	93	0	97	10	0	2	12	273
05:15 PM	0	134	18	152	0	0	0	0	4	88	0	92	5	0	5	10	254
05:30 PM	0	106	16	122	0	0	4	4	2	101	0	103	13	0	4	17	246
05:45 PM	0	103	18	121	0	0	0	0	4	91	0	95	4	0	4	8	224
Total	0	490	68	558	1	0	4	5	14	373	0	387	32	0	15	47	997
Grand Total	1	967	123	1091	1	0	10	11	31	780	2	813	87	0	33	120	2035
Apprch %	0.1	88.6	11.3		9.1	0	90.9		3.8	95.9	0.2		72.5	0	27.5		
Total %	0	47.5	6	53.6	0	0	0.5	0.5	1.5	38.3	0.1	40	4.3	0	1.6	5.9	

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**1**	120	**18**	139	0	0	1	1	4	95	0	99	**18**	0	4	**22**	261
04:30 PM	0	108	15	123	0	0	**3**	**3**	**5**	**103**	0	**108**	15	0	5	20	254
04:45 PM	0	134	12	146	0	0	2	2	4	88	**2**	94	10	0	**7**	17	259
05:00 PM	0	**147**	16	**163**	**1**	0	0	1	4	93	0	97	10	0	2	12	**273**
Total Volume	1	509	61	571	1	0	6	7	17	379	2	398	53	0	18	71	1047
% App. Total	0.2	89.1	10.7		14.3	0	85.7		4.3	95.2	0.5		74.6	0	25.4		
PHF	.250	.866	.847	.876	.250	.000	.500	.583	.850	.920	.250	.921	.736	.000	.643	.807	.959

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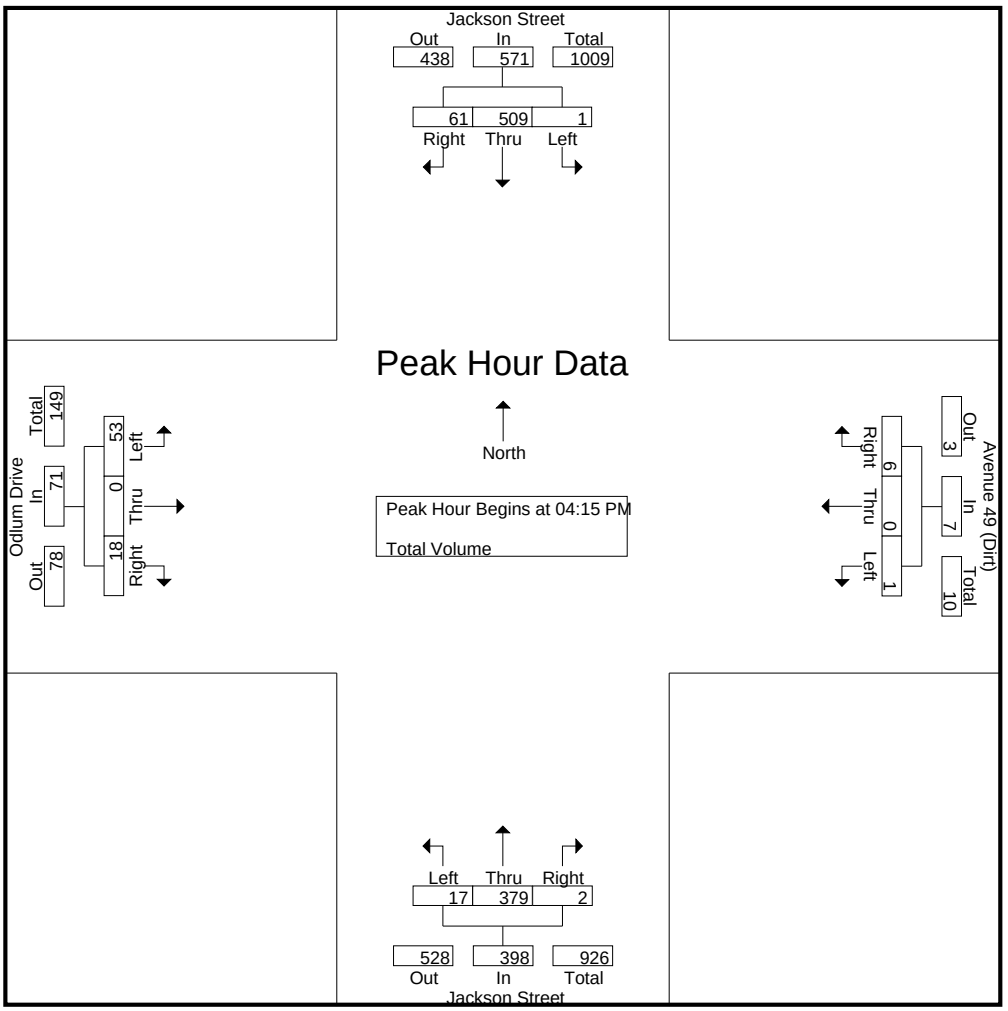
City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:15 PM				04:00 PM				04:00 PM			
+0 mins.	0	108	15	123	0	0	1	1	4	**121**	0	**125**	12	0	2	14
+15 mins.	0	134	12	146	0	0	**3**	**3**	4	95	0	99	**18**	0	4	**22**
+30 mins.	0	**147**	16	**163**	0	0	2	2	**5**	103	0	108	15	0	5	20
+45 mins.	0	134	**18**	152	**1**	0	0	1	4	88	**2**	94	10	0	**7**	17
Total Volume	0	523	61	584	1	0	6	7	17	407	2	426	55	0	18	73
% App. Total	0	89.6	10.4		14.3	0	85.7		4	95.5	0.5		75.3	0	24.7	
PHF	.000	.889	.847	.896	.250	.000	.500	.583	.850	.841	.250	.852	.764	.000	.643	.830

Counts Unlimited, Inc.

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City of Coachella
Calhoun Street
S/ Avenue 48
24 Hour Directional Volume Count

COA001
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		8	51			18	78				
12:15		7	80			13	69				
12:30		7	57			3	102				
12:45		3	74	25	262	19	76	53	325	78	587
01:00		4	76			9	68				
01:15		4	55			10	70				
01:30		3	65			7	80				
01:45		0	72	11	268	3	89	29	307	40	575
02:00		1	85			0	89				
02:15		5	90			3	98				
02:30		5	**112**			3	138				
02:45		4	**102**	15	389	3	155	9	480	24	869
03:00		3	**132**			4	130				
03:15		7	**93**			2	135				
03:30		15	104			3	133				
03:45		16	70	41	399	5	111	14	509	55	908
04:00		15	70			5	**169**				
04:15		16	79			13	**156**				
04:30		34	89			3	**146**				
04:45		47	77	112	315	4	**158**	25	629	137	944
05:00		28	80			21	159				
05:15		38	98			20	164				
05:30		66	77			28	146				
05:45		57	87	189	342	44	148	113	617	302	959
06:00		66	74			52	110				
06:15		68	81			69	120				
06:30		84	79			85	108				
06:45		110	80	328	314	90	118	296	456	624	770
07:00		141	73			47	116				
07:15		**167**	61			69	108				
07:30		**184**	54			**108**	94				
07:45		**198**	50	690	238	**97**	97	321	415	1011	653
08:00		**143**	56			**84**	115				
08:15		90	50			**71**	106				
08:30		85	51			62	141				
08:45		71	43	389	200	48	103	265	465	654	665
09:00		67	46			59	85				
09:15		56	25			49	78				
09:30		69	36			43	70				
09:45		58	22	250	129	42	60	193	293	443	422
10:00		64	18			54	46				
10:15		50	25			53	51				
10:30		55	13			48	38				
10:45		50	14	219	70	51	40	206	175	425	245
11:00		56	20			61	24				
11:15		45	13			63	17				
11:30		55	13			59	25				
11:45		53	11	209	57	70	14	253	80	462	137
Total		2478	2983	2478	2983	1777	4751	1777	4751	4255	7734
Combined Total		5461		5461		6528		6528		11989	
AM Peak	-	07:15	-	-	-	07:30	-	-	-	-	-
Vol.	-	692	-	-	-	360	-	-	-	-	-
P.H.F.		0.874				0.833					
PM Peak	-	-	02:30	-	-	-	04:00	-	-	-	-
Vol.	-	-	439	-	-	-	629	-	-	-	-
P.H.F.			0.831				0.930				
Percentage		45.4%	54.6%			27.2%	72.8%				
ADT/AADT		ADT 11,989		AADT 11,989							

Counts Unlimited, Inc.

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City of Coachella
Calhoun Street
S/ Avenue 49
24 Hour Directional Volume Count

COA002
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		13	72			9	44				
12:15		10	51			4	66				
12:30		3	88			5	51				
12:45		9	66	35	277	2	60	20	221	55	498
01:00		5	69			4	58				
01:15		8	60			3	52				
01:30		4	76			3	56				
01:45		4	82	21	287	1	72	11	238	32	525
02:00		0	84			2	72				
02:15		1	102			4	**91**				
02:30		2	124			6	**116**				
02:45		3	134	6	444	3	**109**	15	388	21	832
03:00		4	110			3	**146**				
03:15		2	110			5	89				
03:30		4	113			10	98				
03:45		3	87	13	420	8	66	26	399	39	819
04:00		6	**140**			12	92				
04:15		13	**124**			11	68				
04:30		11	**118**			24	90				
04:45		11	**120**	41	502	31	78	78	328	119	830
05:00		17	123			18	84				
05:15		23	134			30	94				
05:30		38	108			44	82				
05:45		60	130	138	495	42	84	134	344	272	839
06:00		40	88			56	72				
06:15		60	86			56	78				
06:30		91	102			77	59				
06:45		83	87	274	363	98	76	287	285	561	648
07:00		56	82			118	69				
07:15		72	70			**134**	58				
07:30		**97**	64			**156**	46				
07:45		**121**	76	346	292	**154**	52	562	225	908	517
08:00		**82**	88			**121**	56				
08:15		**78**	68			76	57				
08:30		64	88			76	55				
08:45		44	68	268	312	58	49	331	217	599	529
09:00		51	68			56	46				
09:15		47	49			41	32				
09:30		43	48			50	37				
09:45		46	40	187	205	55	17	202	132	389	337
10:00		52	30			44	25				
10:15		45	28			46	25				
10:30		44	25			52	13				
10:45		48	28	189	111	42	19	184	82	373	193
11:00		50	16			44	20				
11:15		64	9			50	13				
11:30		51	15			52	14				
11:45		76	6	241	46	47	11	193	58	434	104
Total		1759	3754	1759	3754	2043	2917	2043	2917	3802	6671
Combined Total		5513		5513		4960		4960		10473	
AM Peak	-	07:30	-	-	-	07:15	-	-	-	-	-
Vol.	-	378	-	-	-	565	-	-	-	-	-
P.H.F.		0.781				0.905					
PM Peak	-	-	04:00	-	-	-	02:15	-	-	-	-
Vol.	-	-	502	-	-	-	462	-	-	-	-
P.H.F.			0.896				0.791				
Percentage		31.9%	68.1%			41.2%	58.8%				
ADT/AADT		ADT 10,473		AADT 10,473							

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
(951) 268-6268
email: counts@countsunlimited.com

City of Coachella
Jackson Street
N/ Odium Drive
24 Hour Directional Volume Count

COA003
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		10	134			13	107				
12:15		7	141			7	88				
12:30		5	128			8	120				
12:45		3	129	25	532	7	112	35	427	60	959
01:00		4	139			1	83				
01:15		6	136			5	76				
01:30		2	164			8	106				
01:45		2	164	14	603	4	103	18	368	32	971
02:00		2	145			2	100				
02:15		5	184			3	133				
02:30		7	**199**			3	121				
02:45		4	**173**	18	701	3	131	11	485	29	1186
03:00		5	**190**			3	149				
03:15		6	**188**			2	144				
03:30		13	145			6	115				
03:45		6	127	30	650	1	164	12	572	42	1222
04:00		8	175			8	151				
04:15		22	162			16	160				
04:30		27	171			20	**158**				
04:45		40	148	97	656	31	**176**	75	645	172	1301
05:00		39	160			29	**183**				
05:15		57	149			53	**180**				
05:30		70	169			74	147				
05:45		87	154	253	632	118	139	274	649	527	1281
06:00		82	157			85	101				
06:15		97	141			96	114				
06:30		119	125			101	108				
06:45		157	126	455	549	97	99	379	422	834	971
07:00		138	104			100	80				
07:15		**188**	109			**132**	67				
07:30		**207**	113			**136**	89				
07:45		**164**	126	697	452	**135**	80	503	316	1200	768
08:00		**190**	128			**124**	104				
08:15		150	85			116	77				
08:30		159	97			106	63				
08:45		171	71	670	381	99	72	445	316	1115	697
09:00		140	56			71	76				
09:15		139	37			86	71				
09:30		120	56			93	62				
09:45		144	34	543	183	107	53	357	262	900	445
10:00		129	39			85	28				
10:15		160	28			98	34				
10:30		156	27			80	24				
10:45		142	17	587	111	111	20	374	106	961	217
11:00		145	9			95	29				
11:15		153	19			77	23				
11:30		146	10			88	13				
11:45		113	5	557	43	76	13	336	78	893	121
Total		3946	5493	3946	5493	2819	4646	2819	4646	6765	10139
Combined Total		9439		9439		7465		7465		16904	
AM Peak	-	07:15	-	-	-	07:15	-	-	-	-	-
Vol.	-	749	-	-	-	527	-	-	-	-	-
P.H.F.		0.905				0.969					
PM Peak	-	-	02:30	-	-	-	04:30	-	-	-	-
Vol.	-	-	750	-	-	-	697	-	-	-	-
P.H.F.			0.942				0.952				
Percentage		41.8%	58.2%			37.8%	62.2%				
ADT/AADT		ADT 16,904		AADT 16,904							

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APPENDIX 3.2: EXISTING (2024) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	181	59	25	280	85	229	511	79	80	252	142
Future Volume (vph)	79	181	59	25	280	85	229	511	79	80	252	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	102.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	181	59	25	280	85	229	511	79	80	252	142
Future Vol, veh/h	79	181	59	25	280	85	229	511	79	80	252	142
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	84	193	63	27	298	90	244	544	84	85	268	151
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	24.9	106.1	173.3	28.1
HCM LOS	C	F	F	D

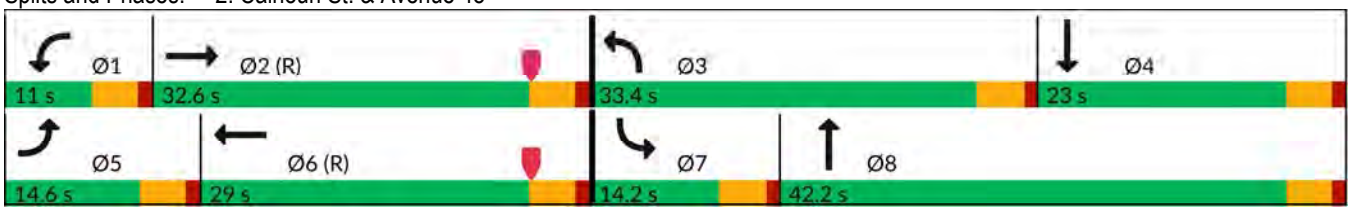
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	77%	0%	100%	37%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	23%	0%	0%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	229	511	79	79	181	59	25	365	80	168	226
LT Vol	229	0	0	79	0	0	25	0	80	0	0
Through Vol	0	511	0	0	181	0	0	280	0	168	84
RT Vol	0	0	79	0	0	59	0	85	0	0	142
Lane Flow Rate	244	544	84	84	193	63	27	388	85	179	240
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.705	1.485	0.214	0.267	0.586	0.179	0.08	1.099	0.259	0.519	0.669
Departure Headway (Hd)	10.882	10.362	9.634	12.411	11.892	11.165	11.489	10.826	11.944	11.421	10.961
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	334	353	375	292	306	323	314	338	303	318	332
Service Time	8.582	8.062	7.334	10.111	9.592	8.865	9.189	8.526	9.644	9.121	8.661
HCM Lane V/C Ratio	0.731	1.541	0.224	0.288	0.631	0.195	0.086	1.148	0.281	0.563	0.723
HCM Control Delay, s/veh	35.9	259.4	14.9	19.6	30.1	16.3	15.2	112.3	18.8	25.8	33.2
HCM Lane LOS	E	F	B	C	D	C	C	F	C	D	D
HCM 95th-tile Q	5.1	28	0.8	1.1	3.5	0.6	0.3	13.9	1	2.8	4.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	384	109	29	601	92	264	508	60	60	215	67
Future Volume (vph)	65	384	109	29	601	92	264	508	60	60	215	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.6	32.6		11.0	29.0		33.4	42.2		14.2	23.0	
Total Split (%)	14.6%	32.6%		11.0%	29.0%		33.4%	42.2%		14.2%	23.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	384	109	29	601	92	264	508	60	60	215	67
Future Volume (veh/h)	65	384	109	29	601	92	264	508	60	60	215	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	78	463	131	35	724	111	318	612	72	72	259	81
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	1434	393	55	1496	227	357	1208	142	93	613	188
Arrive On Green	0.06	0.36	0.36	0.03	0.33	0.33	0.20	0.38	0.38	0.05	0.23	0.23
Sat Flow, veh/h	1781	3986	1092	1781	4473	679	1781	3203	376	1781	2680	820
Grp Volume(v), veh/h	78	393	201	35	549	286	318	339	345	72	170	170
Grp Sat Flow(s),veh/h/ln	1781	1702	1674	1781	1702	1748	1781	1777	1803	1781	1777	1723
Q Serve(g_s), s	4.3	8.4	8.7	1.9	12.8	13.0	17.4	14.7	14.7	4.0	8.1	8.5
Cycle Q Clear(g_c), s	4.3	8.4	8.7	1.9	12.8	13.0	17.4	14.7	14.7	4.0	8.1	8.5
Prop In Lane	1.00		0.65	1.00		0.39	1.00		0.21	1.00		0.48
Lane Grp Cap(c), veh/h	100	1225	602	55	1139	585	357	670	680	93	407	394
V/C Ratio(X)	0.78	0.32	0.33	0.63	0.48	0.49	0.89	0.51	0.51	0.78	0.42	0.43
Avail Cap(c_a), veh/h	180	1225	602	116	1139	585	515	670	680	173	407	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.6	23.2	23.3	47.9	26.4	26.5	38.9	24.0	24.0	46.8	32.9	33.0
Incr Delay (d2), s/veh	12.1	0.7	1.5	11.3	1.5	2.9	13.1	2.7	2.7	12.8	3.1	3.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.2	3.4	1.0	5.0	5.5	8.5	6.2	6.4	2.0	3.7	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.6	23.9	24.8	59.2	27.9	29.4	52.0	26.7	26.7	59.6	36.0	36.4
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		672			870			1002			412	
Approach Delay, s/veh		28.2			29.6			34.7			40.3	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	40.5	24.5	27.4	10.1	38.0	9.7	42.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	28.1	28.9	18.5	10.1	24.5	9.7	37.7
Max Q Clear Time (g_c+I1), s	3.9	10.7	19.4	10.5	6.3	15.0	6.0	16.7
Green Ext Time (p_c), s	0.0	3.1	0.6	1.1	0.0	3.3	0.0	3.8

Intersection Summary	
HCM 7th Control Delay, s/veh	32.5
HCM 7th LOS	C



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	37	647	29	14	382
Future Volume (vph)	50	37	647	29	14	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	60				60	
Link Speed (mph)	30		45			45
Link Distance (ft)	1354		2442			287
Travel Time (s)	30.8		37.0			4.3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)						
Sign Control	Stop		Stop			Stop

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	51.2
Intersection LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	37	647	29	14	382
Future Vol, veh/h	50	37	647	29	14	382
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	43	752	34	16	444
Number of Lanes	1	0	1	0	1	1

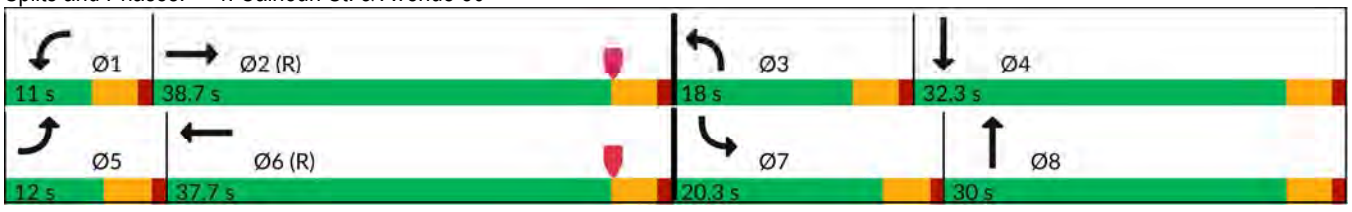
Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay, s/veh	11.2	75.2	19
HCM LOS	B	F	C

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	57%	100%	0%
Vol Thru, %	96%	0%	0%	100%
Vol Right, %	4%	43%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	676	87	14	382
LT Vol	0	50	14	0
Through Vol	647	0	0	382
RT Vol	29	37	0	0
Lane Flow Rate	786	101	16	444
Geometry Grp	4a	2	5	5
Degree of Util (X)	1.07	0.184	0.027	0.679
Departure Headway (Hd)	4.902	6.716	6.125	5.619
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	731	537	588	649
Service Time	2.994	4.716	3.825	3.319
HCM Lane V/C Ratio	1.075	0.188	0.027	0.684
HCM Control Delay, s/veh	75.2	11.2	9	19.4
HCM Lane LOS	F	B	A	C
HCM 95th-tile Q	20.5	0.7	0.1	5.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	210	24	29	430	167	97	350	157	113	251	90
Future Volume (vph)	41	210	24	29	430	167	97	350	157	113	251	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	38.7		11.0	37.7		18.0	30.0		20.3	32.3	
Total Split (%)	12.0%	38.7%		11.0%	37.7%		18.0%	30.0%		20.3%	32.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	210	24	29	430	167	97	350	157	113	251	90
Future Volume (veh/h)	41	210	24	29	430	167	97	350	157	113	251	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	250	29	35	512	199	115	417	187	135	299	107
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	1381	159	55	1061	411	144	635	282	167	717	251
Arrive On Green	0.04	0.43	0.43	0.03	0.42	0.42	0.08	0.27	0.27	0.09	0.28	0.28
Sat Flow, veh/h	1781	3212	369	1781	2504	969	1781	2394	1062	1781	2580	904
Grp Volume(v), veh/h	49	137	142	35	363	348	115	308	296	135	204	202
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1781	1777	1696	1781	1777	1679	1781	1777	1708
Q Serve(g_s), s	2.7	4.8	4.9	1.9	14.8	14.9	6.3	15.4	15.7	7.4	9.4	9.7
Cycle Q Clear(g_c), s	2.7	4.8	4.9	1.9	14.8	14.9	6.3	15.4	15.7	7.4	9.4	9.7
Prop In Lane	1.00		0.20	1.00		0.57	1.00		0.63	1.00		0.53
Lane Grp Cap(c), veh/h	66	764	776	55	753	719	144	472	446	167	494	475
V/C Ratio(X)	0.74	0.18	0.18	0.63	0.48	0.48	0.80	0.65	0.66	0.81	0.41	0.43
Avail Cap(c_a), veh/h	134	764	776	116	753	719	240	472	446	281	494	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	17.6	17.6	47.9	20.9	20.9	45.1	32.6	32.8	44.4	29.4	29.6
Incr Delay (d2), s/veh	14.8	0.5	0.5	11.3	2.2	2.3	9.6	6.9	7.6	9.0	2.5	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.9	2.0	1.0	6.0	5.8	3.1	7.2	7.0	3.6	4.1	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.5	18.1	18.2	59.2	23.1	23.2	54.7	39.6	40.3	53.4	32.0	32.3
LnGrp LOS	E	B	B	E	C	C	D	D	D	D	C	C
Approach Vol, veh/h		328			746			719			541	
Approach Delay, s/veh		24.8			24.8			42.3			37.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	47.5	12.6	32.3	8.2	46.9	13.9	31.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	34.2	13.5	27.8	7.5	33.2	15.8	25.5
Max Q Clear Time (g_c+I1), s	3.9	6.9	8.3	11.7	4.7	16.9	9.4	17.7
Green Ext Time (p_c), s	0.0	1.4	0.1	1.9	0.0	3.6	0.2	2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	33.1
HCM 7th LOS	C



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	32	7	540	515	26
Future Volume (vph)	89	32	7	540	515	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	100			205
Storage Lanes	0	1	1			1
Taper Length (ft)	60		60			
Link Speed (mph)	30			50	50	
Link Distance (ft)	590			968	636	
Travel Time (s)	13.4			13.2	8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	51.9
Intersection LOS	F

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	32	7	540	515	26
Future Vol, veh/h	89	32	7	540	515	26
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	36	8	607	579	29
Number of Lanes	1	1	1	1	2	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay, s/veh	13.3	95.2	16.7
HCM LOS	B	F	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	540	89	32	258	258	26
LT Vol	7	0	89	0	0	0	0
Through Vol	0	540	0	0	258	258	0
RT Vol	0	0	0	32	0	0	26
Lane Flow Rate	8	607	100	36	289	289	29
Geometry Grp	6	6	6	6	6	6	6
Degree of Util (X)	0.015	1.109	0.235	0.073	0.534	0.534	0.034
Departure Headway (Hd)	7.084	6.579	8.793	7.563	6.896	6.896	4.424
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	506	552	411	476	527	527	814
Service Time	4.822	4.316	6.493	5.263	4.596	4.596	2.124
HCM Lane V/C Ratio	0.016	1.1	0.243	0.076	0.548	0.548	0.036
HCM Control Delay, s/veh	9.9	96.3	14.2	10.9	17.2	17.2	7.3
HCM Lane LOS	A	F	B	B	C	C	A
HCM 95th-tile Q	0	19.2	0.9	0.2	3.1	3.1	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	194	125	20	143	67	74	247	22	60	502	84
Future Volume (vph)	47	194	125	20	143	67	74	247	22	60	502	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	28.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	194	125	20	143	67	74	247	22	60	502	84
Future Vol, veh/h	47	194	125	20	143	67	74	247	22	60	502	84
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	209	134	22	154	72	80	266	24	65	540	90
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	19.6	23.8	27.1	36.5
HCM LOS	C	C	D	E

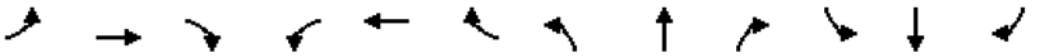
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	68%	0%	100%	67%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	32%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	74	247	22	47	194	125	20	210	60	335	251
LT Vol	74	0	0	47	0	0	20	0	60	0	0
Through Vol	0	247	0	0	194	0	0	143	0	335	167
RT Vol	0	0	22	0	0	125	0	67	0	0	84
Lane Flow Rate	80	266	24	51	209	134	22	226	65	360	270
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.221	0.701	0.058	0.14	0.55	0.328	0.06	0.589	0.166	0.876	0.64
Departure Headway (Hd)	10.018	9.504	8.783	10.002	9.492	8.778	10.106	9.383	9.276	8.763	8.523
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	357	380	406	358	380	409	354	384	386	414	422
Service Time	7.801	7.286	6.565	7.782	7.271	6.556	7.884	7.16	7.049	6.536	6.295
HCM Lane V/C Ratio	0.224	0.7	0.059	0.142	0.55	0.328	0.062	0.589	0.168	0.87	0.64
HCM Control Delay, s/veh	15.6	31.9	12.1	14.4	23.4	15.8	13.5	24.8	13.9	48.9	25.4
HCM Lane LOS	C	D	B	B	C	C	B	C	B	E	D
HCM 95th-tile Q	0.8	5.1	0.2	0.5	3.2	1.4	0.2	3.6	0.6	8.8	4.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	583	281	30	400	38	121	260	36	67	404	96
Future Volume (vph)	54	583	281	30	400	38	121	260	36	67	404	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	37.0		12.0	34.0		21.0	35.0		16.0	30.0	
Total Split (%)	15.0%	37.0%		12.0%	34.0%		21.0%	35.0%		16.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	583	281	30	400	38	121	260	36	67	404	96
Future Volume (veh/h)	54	583	281	30	400	38	121	260	36	67	404	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	56	601	290	31	412	39	125	268	37	69	416	99
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	1484	691	51	2016	188	156	958	131	89	763	180
Arrive On Green	0.04	0.44	0.44	0.03	0.42	0.42	0.09	0.31	0.31	0.05	0.27	0.27
Sat Flow, veh/h	1781	3404	1585	1781	4751	443	1781	3141	429	1781	2853	673
Grp Volume(v), veh/h	56	601	290	31	293	158	125	150	155	69	258	257
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1791	1781	1777	1793	1781	1777	1749
Q Serve(g_s), s	3.1	12.1	12.6	1.7	5.4	5.6	6.9	6.4	6.6	3.8	12.4	12.6
Cycle Q Clear(g_c), s	3.1	12.1	12.6	1.7	5.4	5.6	6.9	6.4	6.6	3.8	12.4	12.6
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.24	1.00		0.38
Lane Grp Cap(c), veh/h	72	1484	691	51	1444	760	156	542	547	89	475	468
V/C Ratio(X)	0.77	0.40	0.42	0.60	0.20	0.21	0.80	0.28	0.28	0.77	0.54	0.55
Avail Cap(c_a), veh/h	187	1484	691	134	1444	760	294	542	547	205	475	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	19.3	19.5	48.0	18.1	18.2	44.8	26.4	26.4	46.9	31.4	31.5
Incr Delay (d2), s/veh	15.9	0.8	1.9	10.8	0.3	0.6	9.1	1.3	1.3	13.1	4.4	4.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.5	4.6	0.9	2.0	2.2	3.3	2.8	2.9	2.0	5.6	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.4	20.1	21.3	58.8	18.5	18.8	53.9	27.7	27.7	60.1	35.8	36.0
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	D
Approach Vol, veh/h		947			482			430			584	
Approach Delay, s/veh		23.1			21.2			35.3			38.8	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	48.1	13.3	31.3	8.6	46.9	9.5	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	32.5	16.5	25.5	10.5	29.5	11.5	30.5
Max Q Clear Time (g_c+I1), s	3.7	14.6	8.9	14.6	5.1	7.6	5.8	8.6
Green Ext Time (p_c), s	0.0	5.1	0.2	2.1	0.0	2.4	0.0	1.5

Intersection Summary	
HCM 7th Control Delay, s/veh	28.6
HCM 7th LOS	C



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	20	392	23	28	552
Future Volume (vph)	35	20	392	23	28	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	60				60	
Link Speed (mph)	30		45			45
Link Distance (ft)	1354		2442			287
Travel Time (s)	30.8		37.0			4.3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop		Stop			Stop

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	20	392	23	28	552
Future Vol, veh/h	35	20	392	23	28	552
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	21	413	24	29	581
Number of Lanes	1	0	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay, s/veh	9.9	14.7	25.3
HCM LOS	A	B	D

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	64%	100%	0%
Vol Thru, %	94%	0%	0%	100%
Vol Right, %	6%	36%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	415	55	28	552
LT Vol	0	35	28	0
Through Vol	392	0	0	552
RT Vol	23	20	0	0
Lane Flow Rate	437	58	29	581
Geometry Grp	4a	2	5	5
Degree of Util (X)	0.589	0.099	0.045	0.814
Departure Headway (Hd)	4.857	6.16	5.544	5.041
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	738	576	644	715
Service Time	2.908	4.258	3.294	2.79
HCM Lane V/C Ratio	0.592	0.101	0.045	0.813
HCM Control Delay, s/veh	14.7	9.9	8.6	26.1
HCM Lane LOS	B	A	A	D
HCM 95th-tile Q	3.9	0.3	0.1	8.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	422	43	10	318	120	56	202	66	150	275	64
Future Volume (vph)	53	422	43	10	318	120	56	202	66	150	275	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	16.0	37.0		11.0	32.0		16.0	26.0		26.0	36.0	
Total Split (%)	16.0%	37.0%		11.0%	32.0%		16.0%	26.0%		26.0%	36.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	422	43	10	318	120	56	202	66	150	275	64
Future Volume (veh/h)	53	422	43	10	318	120	56	202	66	150	275	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	440	45	10	331	125	58	210	69	156	286	67
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1468	149	22	1073	398	75	663	212	191	903	208
Arrive On Green	0.04	0.45	0.45	0.01	0.42	0.42	0.04	0.25	0.25	0.11	0.31	0.31
Sat Flow, veh/h	1781	3256	332	1781	2537	941	1781	2649	846	1781	2867	661
Grp Volume(v), veh/h	55	239	246	10	230	226	58	139	140	156	175	178
Grp Sat Flow(s),veh/h/ln	1781	1777	1811	1781	1777	1701	1781	1777	1718	1781	1777	1751
Q Serve(g_s), s	3.1	8.5	8.6	0.6	8.6	8.8	3.2	6.4	6.7	8.6	7.5	7.7
Cycle Q Clear(g_c), s	3.1	8.5	8.6	0.6	8.6	8.8	3.2	6.4	6.7	8.6	7.5	7.7
Prop In Lane	1.00		0.18	1.00		0.55	1.00		0.49	1.00		0.38
Lane Grp Cap(c), veh/h	71	801	816	22	752	719	75	444	430	191	560	552
V/C Ratio(X)	0.77	0.30	0.30	0.46	0.31	0.31	0.77	0.31	0.33	0.82	0.31	0.32
Avail Cap(c_a), veh/h	205	801	816	116	752	719	205	444	430	383	560	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	17.4	17.5	49.1	19.1	19.2	47.4	30.5	30.6	43.7	26.0	26.1
Incr Delay (d2), s/veh	16.1	1.0	0.9	14.6	1.1	1.1	15.3	1.8	2.0	8.4	1.5	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.4	3.5	0.3	3.5	3.4	1.7	2.8	2.9	4.1	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.7	18.4	18.4	63.7	20.2	20.3	62.7	32.3	32.6	52.1	27.5	27.6
LnGrp LOS	E	B	B	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		540			466			337			509	
Approach Delay, s/veh		23.0			21.2			37.7			35.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	49.6	8.7	36.0	8.5	46.8	15.2	29.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	32.5	11.5	31.5	11.5	27.5	21.5	21.5
Max Q Clear Time (g_c+I1), s	2.6	10.6	5.2	9.7	5.1	10.8	10.6	8.7
Green Ext Time (p_c), s	0.0	2.4	0.0	1.8	0.0	2.1	0.3	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	28.5
HCM 7th LOS	C



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	64	22	20	462	612	73
Future Volume (vph)	64	22	20	462	612	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	100			205
Storage Lanes	0	1	1			1
Taper Length (ft)	60		60			
Link Speed (mph)	30			50	50	
Link Distance (ft)	590			968	636	
Travel Time (s)	13.4			13.2	8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	23
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	22	20	462	612	73
Future Vol, veh/h	64	22	20	462	612	73
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	23	21	481	638	76
Number of Lanes	1	1	1	1	2	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay, s/veh	12.1	35.5	15.6
HCM LOS	B	E	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	462	64	22	306	306	73
LT Vol	20	0	64	0	0	0	0
Through Vol	0	462	0	0	306	306	0
RT Vol	0	0	0	22	0	0	73
Lane Flow Rate	21	481	67	23	319	319	76
Geometry Grp	6	6	6	6	6	6	6
Degree of Util (X)	0.04	0.858	0.155	0.046	0.554	0.554	0.08
Departure Headway (Hd)	6.924	6.42	8.383	7.16	6.255	6.255	3.796
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	516	563	426	497	574	574	936
Service Time	4.679	4.175	6.171	4.947	4.011	4.011	1.551
HCM Lane V/C Ratio	0.041	0.854	0.157	0.046	0.556	0.556	0.081
HCM Control Delay, s/veh	10	36.6	12.7	10.3	16.6	16.6	6.9
HCM Lane LOS	A	E	B	B	C	C	A
HCM 95th-tile Q	0.1	9.3	0.5	0.1	3.4	3.4	0.3

APPENDIX 3.3: TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

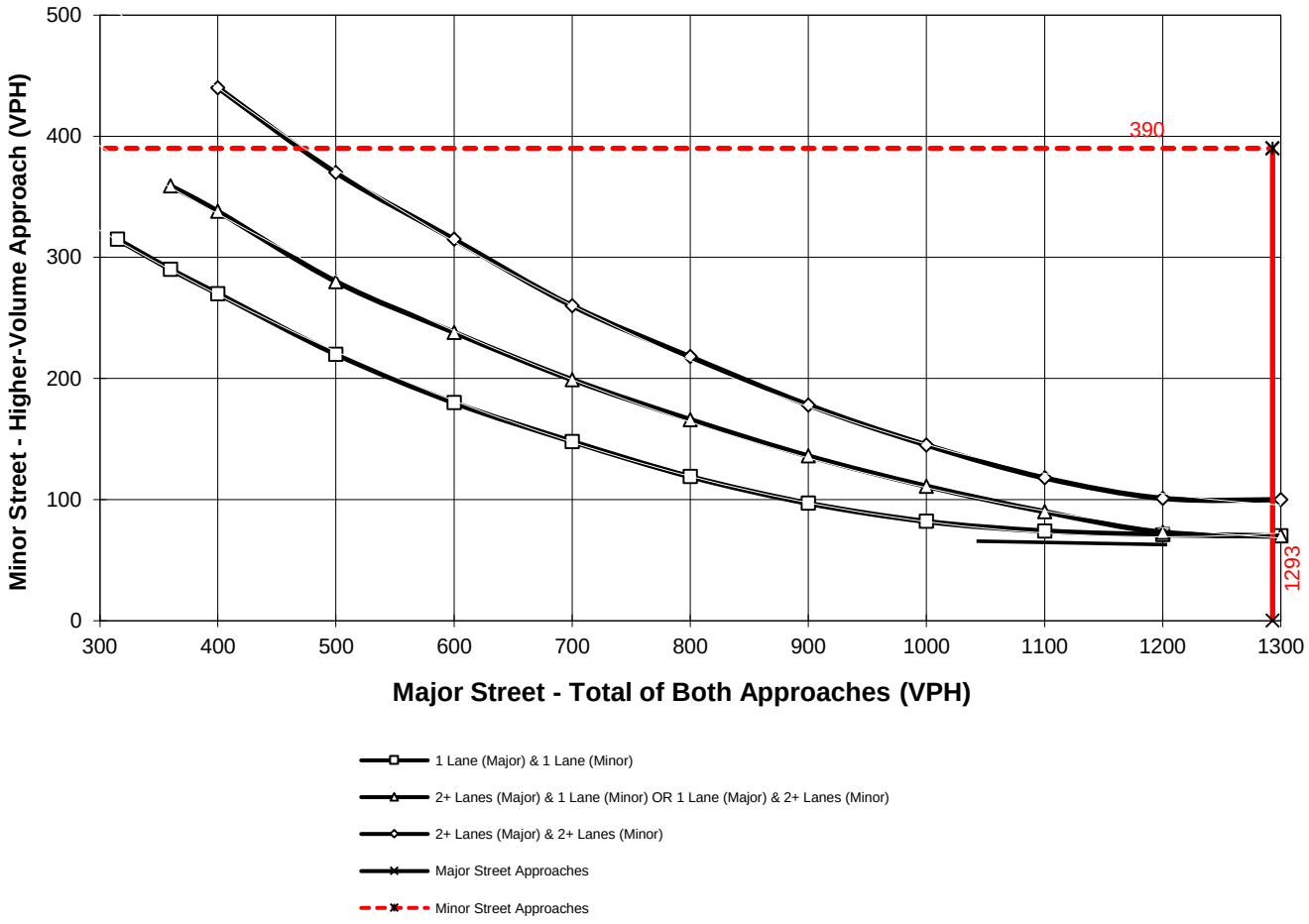
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **1,293**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Dr. Carreon Bl.**
High Volume Approach (VPH) = **390**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #1

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

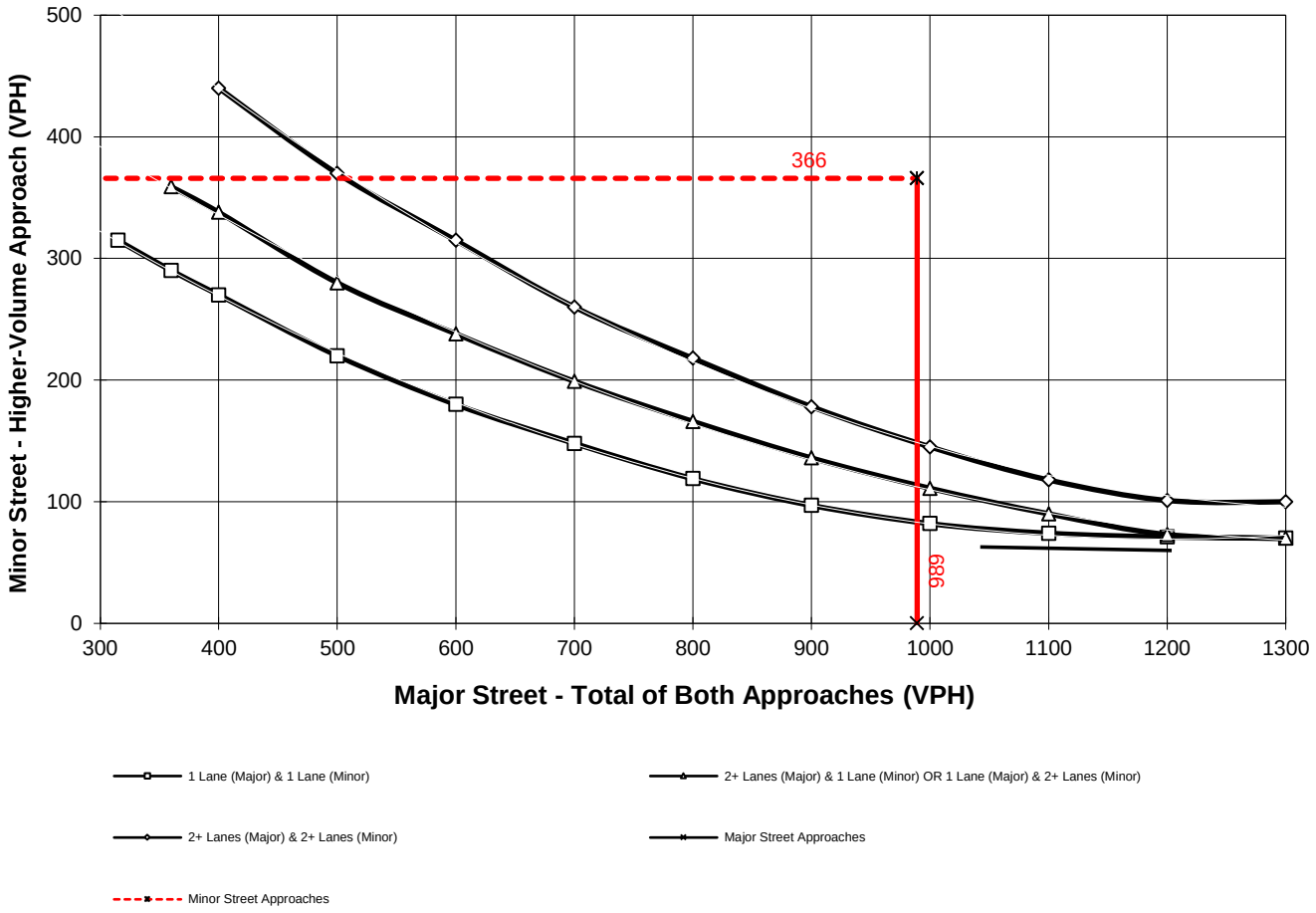
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **989**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Dr. Carreon Bl.**
High Volume Approach (VPH) = **366**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #1

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

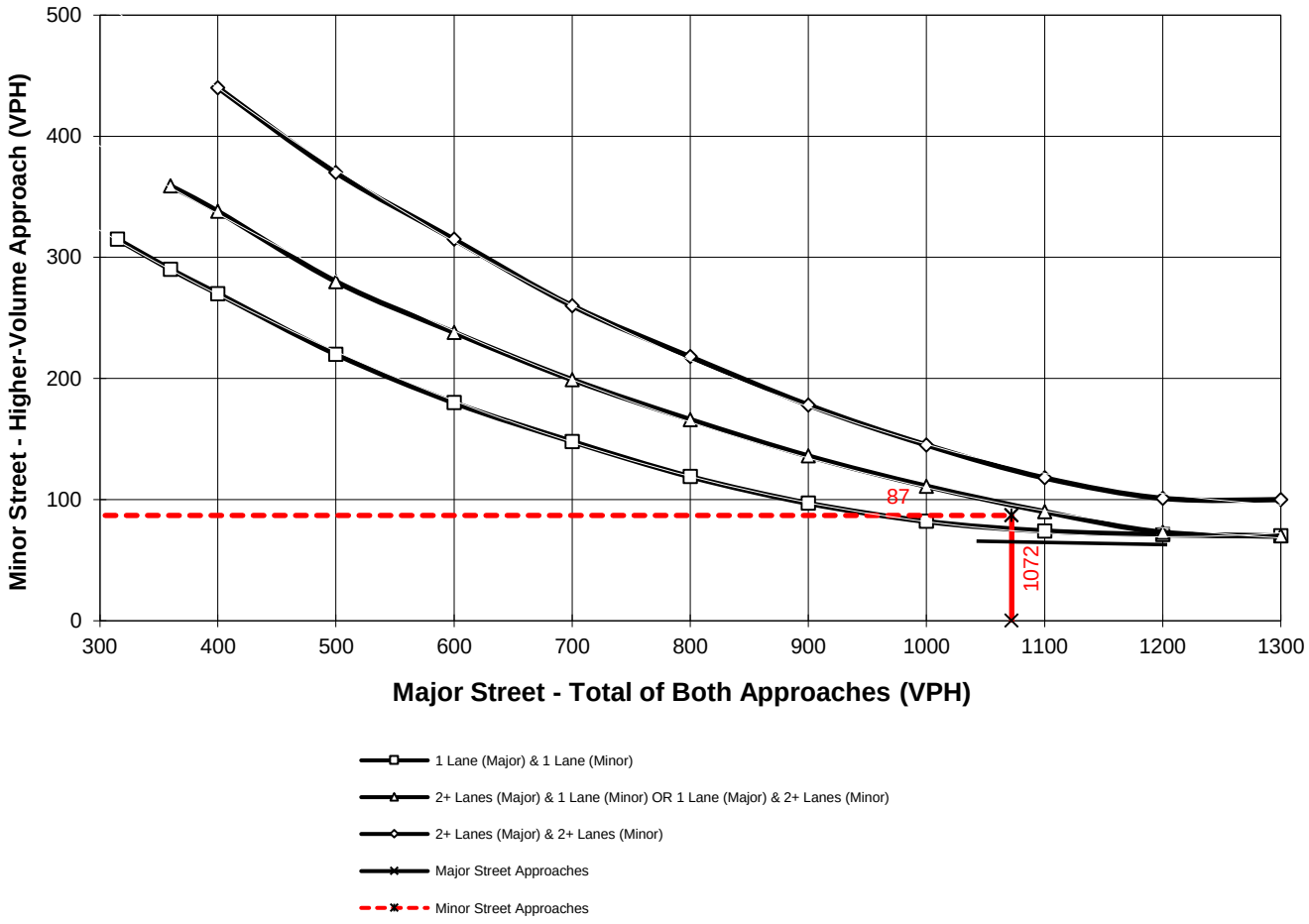
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **1,072**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Avenue 49**
High Volume Approach (VPH) = **87**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #3

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

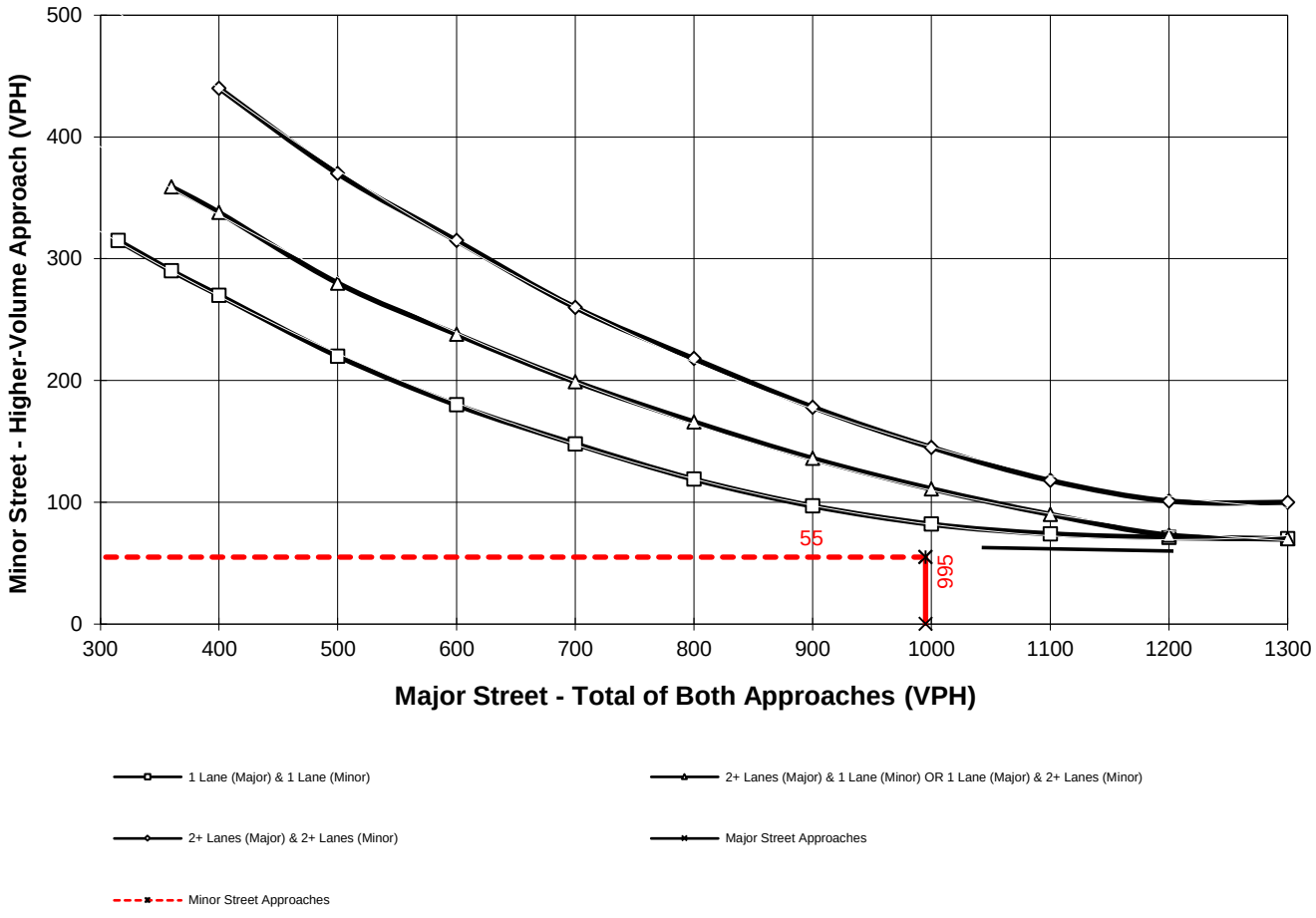
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **995**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Avenue 49**
High Volume Approach (VPH) = **55**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #3

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

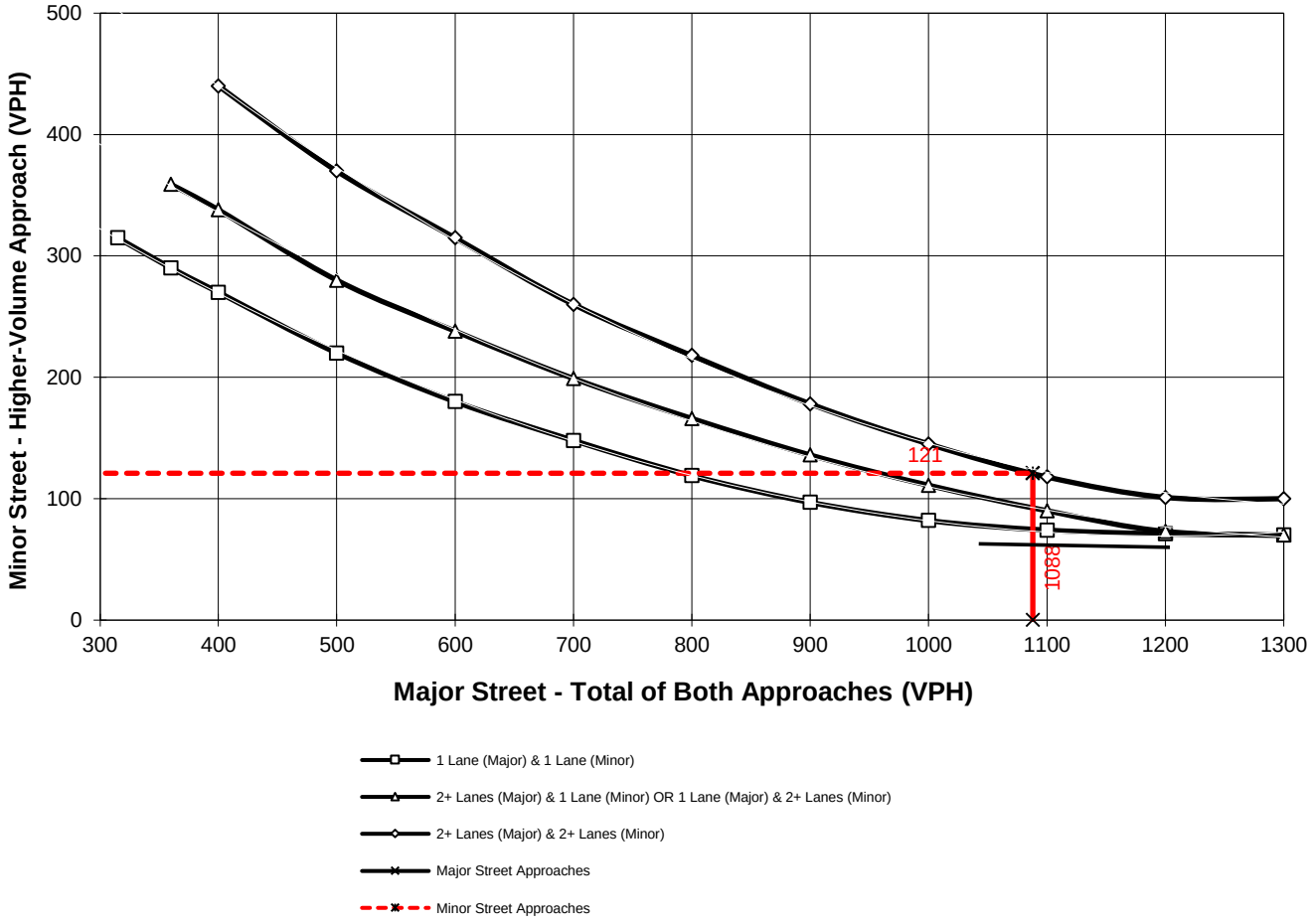
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Jackson St.** Total of Both Approaches (VPH) = **1,088**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Avenue 49 - Odlum Dr.** High Volume Approach (VPH) = **121**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #5

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

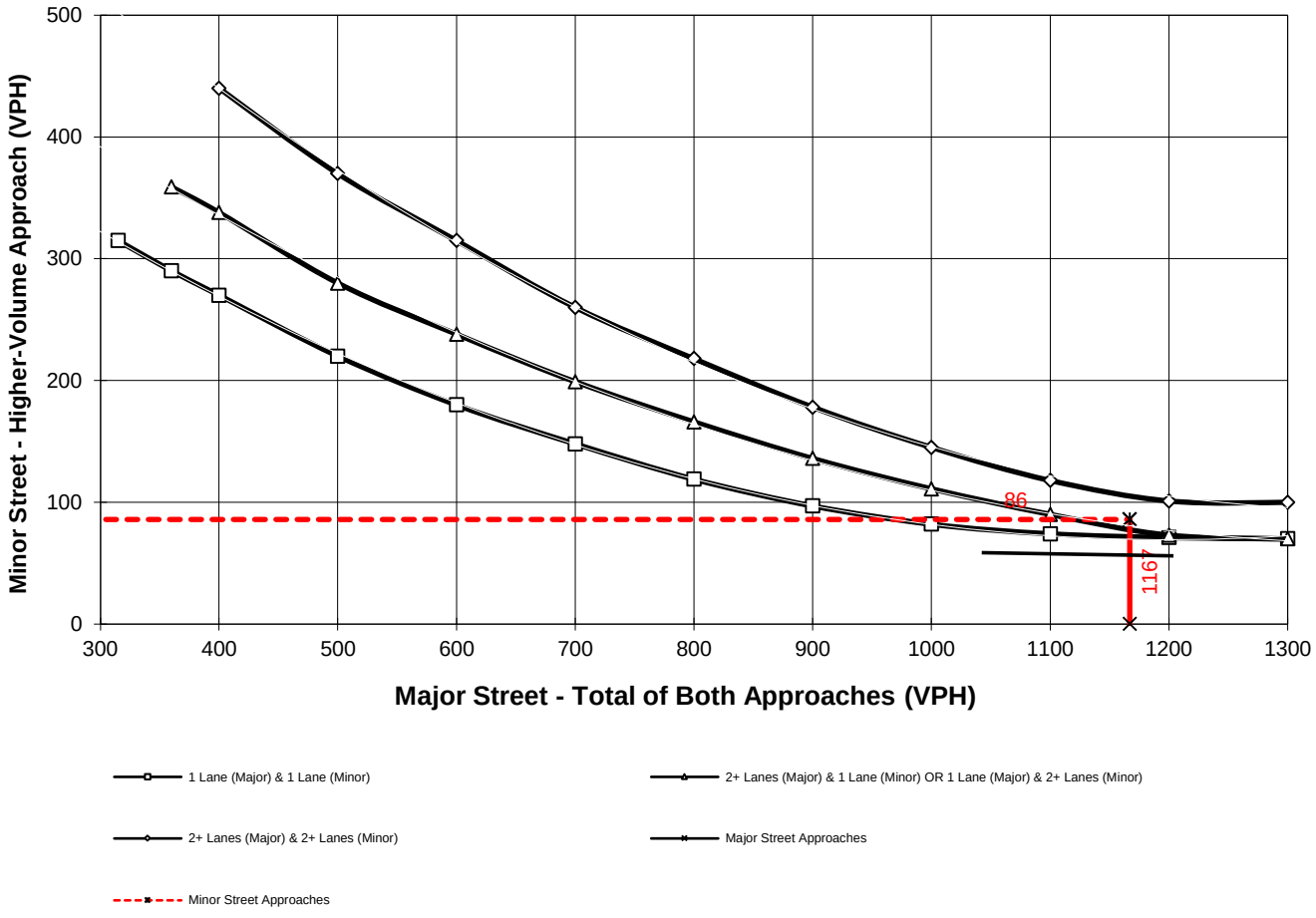
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Jackson St.** Total of Both Approaches (VPH) = **1,167**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Avenue 49 - Odlum Dr.** High Volume Approach (VPH) = **86**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #5

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM		TRAFFIC CONDITIONS		EAC (2026)
				CALC	JC	DATE	09/03/24
Jurisdiction:	City of Coachella			CHK		DATE	
Major Street:	Jackson St.				Critical Approach Speed (Major)		45 mph
Minor Street:	Avenue 49 - Odlum Dr.				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **2** lane

Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **21,208** vpd

Minor Street Future ADT = **1,179** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or

In built up area of isolated community of < 10,000 population ……

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements ADT: Vehicles Per Day on Major Street (Total of Both Approaches)		Minimum Requirements ADT: Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
CONDITION A - Minimum Vehicular Volume					
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	8,000	5,600	2,400	1,680
2 + **21,208**	*1* **1,179**	9,600	6,720 *	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic					
Satisfied	Not Satisfied				
XX					
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	12,000	8,400	1,200	850
2 + **21,208**	*1* **1,179**	14,400	10,080 *	1,200	850 *
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 70% **B** 100%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___ DIST	___ CO	___ RTE	___ PM	TRAFFIC CONDITIONS	**EAP (2026)**
				CALC JC	DATE 09/03/24
Jurisdiction: **City of Coachella**				CHK	DATE
Major Street: **Calhoun St.**				Critical Approach Speed (Major)	45 mph
Minor Street: **Access 1**				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **13,958** vpd Minor Street Future ADT = **882** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or **RURAL (R)**

In built up area of isolated community of < 10,000 population ……

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements ADT: Vehicles Per Day on Major Street (Total of Both Approaches)		Minimum Requirements ADT: Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied / Not Satisfied (XX)						
	1 **13,958**	*1* **882**	8,000	5,600 *	2,400	1,680
	2 +	*1*	9,600	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied (XX) / Not Satisfied						
	1 **13,958**	*1* **882**	12,000	8,400 *	1,200	850 *
	2 +	*1*	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied / Not Satisfied (XX)			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 53%	**B** 100%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM				
				TRAFFIC CONDITIONS		**EAP (2026)**	
				CALC	JC	DATE	09/03/24
Jurisdiction:	**City of Coachella**			CHK		DATE	
Major Street:	**Access 2**			Critical Approach Speed (Major)		30	mph
Minor Street:	**Avenue 49**			Critical Approach Speed (Minor)		25	mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **378** vpd Minor Street Future ADT = **378** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements ADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **378**	*1* **378**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **378**	*1* **378**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..		2 CONDITIONS 80%		2 CONDITIONS 80%	
A	**B**				
5%	**3%**				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	EAPC (2026)
				CALC JC	DATE 09/03/24
				CHK	DATE

Jurisdiction: **City of Coachella**

Major Street: **Access 2** — Critical Approach Speed (Major) 45 mph

Minor Street: **Avenue 49** — Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane — Minor Street Approach Lanes **1** lane

Major Street Future ADT = **378** vpd — Minor Street Future ADT = **378** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ..... √

or **RURAL (R)**

In built up area of isolated community of < 10,000 population .....

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach: Major Street	Minor Street	Minimum Requirements ADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
	CONDITION A - Minimum Vehicular Volume					
Satisfied / XX						
Not Satisfied / XX						
	1 **378**	*1* **378**	8,000	5,600	2,400	1,680
	2 +	*1*	9,600	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
	CONDITION B - Interruption of Continuous Traffic					
Satisfied						
Not Satisfied / XX						
	1 **378**	*1* **378**	12,000	8,400	1,200	850
	2 +	*1*	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
	Combination of CONDITIONS A + B					
Satisfied						
Not Satisfied / XX			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more	**A** 7%	**B** 5%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 5.1: EAP (2026) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	129.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	188	66	29	291	88	252	553	89	83	270	148
Future Vol, veh/h	82	188	66	29	291	88	252	553	89	83	270	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	87	200	70	31	310	94	268	588	95	88	287	157
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

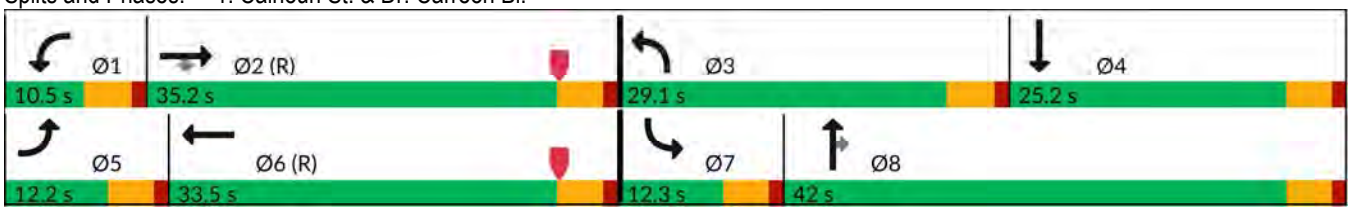
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	27.3	136.4	219.1	32.3
HCM LOS	D	F	F	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	77%	0%	100%	38%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	23%	0%	0%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	553	89	82	188	66	29	379	83	180	238
LT Vol	252	0	0	82	0	0	29	0	83	0	0
Through Vol	0	553	0	0	188	0	0	291	0	180	90
RT Vol	0	0	89	0	0	66	0	88	0	0	148
Lane Flow Rate	268	588	95	87	200	70	31	403	88	191	253
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.788	1.649	0.247	0.283	0.623	0.205	0.096	1.19	0.274	0.568	0.72
Departure Headway (Hd)	11.311	10.79	10.059	12.953	12.433	11.704	11.979	11.316	12.478	11.954	11.497
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	322	341	359	279	292	309	301	323	290	304	316
Service Time	9.011	8.49	7.759	10.653	10.133	9.404	9.679	9.016	10.178	9.654	9.197
HCM Lane V/C Ratio	0.832	1.724	0.265	0.312	0.685	0.227	0.103	1.248	0.303	0.628	0.801
HCM Control Delay, s/veh	45.6	330.8	16	20.7	33.7	17.4	15.9	145.6	19.8	29.3	38.9
HCM Lane LOS	E	F	C	C	D	C	C	F	C	D	E
HCM 95th-tile Q	6.4	33.3	1	1.1	3.9	0.8	0.3	16.3	1.1	3.3	5.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	12.2	35.2	35.2	10.5	33.5		29.1	42.0	42.0	12.3	25.2	
Total Split (%)	12.2%	35.2%	35.2%	10.5%	33.5%		29.1%	42.0%	42.0%	12.3%	25.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.



HCM 7th Signalized Intersection Summary
1: Calhoun St. & Dr. Carreon Bl.

EAP (2026) AM Peak Ho
WITH IMPROVEMENTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (veh/h)	82	188	66	29	291	88	252	553	89	83	270	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	200	70	31	310	94	268	588	95	88	287	157
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	661	560	51	441	134	305	701	594	112	597	318
Arrive On Green	0.06	0.35	0.35	0.03	0.32	0.32	0.17	0.38	0.38	0.06	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	1781	1377	418	1781	1870	1585	1781	2240	1192
Grp Volume(v), veh/h	87	200	70	31	0	404	268	588	95	88	226	218
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1795	1781	1870	1585	1781	1777	1656
Q Serve(g_s), s	4.8	7.7	3.0	1.7	0.0	19.7	14.7	28.7	4.0	4.9	10.7	11.1
Cycle Q Clear(g_c), s	4.8	7.7	3.0	1.7	0.0	19.7	14.7	28.7	4.0	4.9	10.7	11.1
Prop In Lane	1.00		1.00	1.00		0.23	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	111	661	560	51	0	574	305	701	594	112	474	441
V/C Ratio(X)	0.79	0.30	0.13	0.60	0.00	0.70	0.88	0.84	0.16	0.79	0.48	0.49
Avail Cap(c_a), veh/h	137	661	560	107	0	574	438	701	594	139	474	441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	23.4	21.9	48.0	0.0	29.8	40.4	28.5	20.8	46.2	30.8	31.0
Incr Delay (d2), s/veh	20.9	1.2	0.5	10.8	0.0	7.1	11.4	9.7	0.5	20.6	3.4	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.5	1.1	0.9	0.0	9.2	7.1	13.7	1.5	2.7	4.9	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	67.1	24.6	22.3	58.8	0.0	36.9	51.9	38.2	21.3	66.8	34.2	34.9
LnGrp LOS	E	C	C	E		D	D	D	C	E	C	C
Approach Vol, veh/h		357			435			951			532	
Approach Delay, s/veh		34.5			38.5			40.4			39.9	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	39.8	21.6	31.2	10.7	36.5	10.8	42.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.0	30.7	24.6	20.7	7.7	29.0	7.8	37.5
Max Q Clear Time (g_c+I1), s	3.7	9.7	16.7	13.1	6.8	21.7	6.9	30.7
Green Ext Time (p_c), s	0.0	1.2	0.5	1.5	0.0	1.3	0.0	2.2

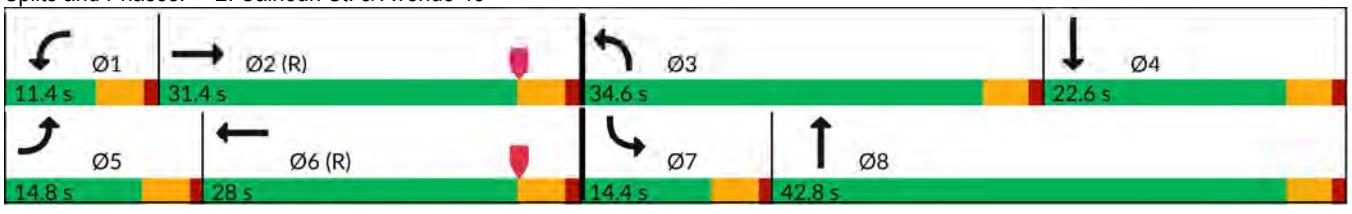
Intersection Summary	
HCM 7th Control Delay, s/veh	39.0
HCM 7th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	400	115	38	625	96	282	571	83	62	240	70
Future Volume (vph)	68	400	115	38	625	96	282	571	83	62	240	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.8	31.4		11.4	28.0		34.6	42.8		14.4	22.6	
Total Split (%)	14.8%	31.4%		11.4%	28.0%		34.6%	42.8%		14.4%	22.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	400	115	38	625	96	282	571	83	62	240	70
Future Volume (veh/h)	68	400	115	38	625	96	282	571	83	62	240	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	482	139	46	753	116	340	688	100	75	289	84
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1375	384	64	1446	221	379	1193	173	97	613	175
Arrive On Green	0.06	0.35	0.35	0.04	0.32	0.32	0.21	0.38	0.38	0.05	0.22	0.22
Sat Flow, veh/h	1781	3966	1109	1781	4469	683	1781	3114	452	1781	2729	778
Grp Volume(v), veh/h	82	412	209	46	572	297	340	392	396	75	186	187
Grp Sat Flow(s),veh/h/ln	1781	1702	1671	1781	1702	1747	1781	1777	1789	1781	1777	1730
Q Serve(g_s), s	4.5	9.0	9.4	2.6	13.7	13.8	18.6	17.5	17.5	4.2	9.1	9.4
Cycle Q Clear(g_c), s	4.5	9.0	9.4	2.6	13.7	13.8	18.6	17.5	17.5	4.2	9.1	9.4
Prop In Lane	1.00		0.66	1.00		0.39	1.00		0.25	1.00		0.45
Lane Grp Cap(c), veh/h	105	1180	579	64	1102	566	379	681	685	97	399	388
V/C Ratio(X)	0.78	0.35	0.36	0.72	0.52	0.52	0.90	0.58	0.58	0.78	0.47	0.48
Avail Cap(c_a), veh/h	183	1180	579	123	1102	566	536	681	685	176	399	388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	24.3	24.4	47.7	27.5	27.6	38.3	24.4	24.4	46.7	33.6	33.7
Incr Delay (d2), s/veh	11.6	0.8	1.7	13.8	1.8	3.5	13.7	3.5	3.5	12.4	3.9	4.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.5	3.7	1.3	5.4	5.9	9.1	7.5	7.6	2.1	4.2	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.0	25.1	26.1	61.5	29.2	31.0	52.0	28.0	28.0	59.1	37.5	37.9
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		703			915			1128			448	
Approach Delay, s/veh		29.3			31.4			35.2			41.3	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	39.2	25.8	27.0	10.4	36.9	9.9	42.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	26.9	30.1	18.1	10.3	23.5	9.9	38.3
Max Q Clear Time (g_c+I1), s	4.6	11.4	20.6	11.4	6.5	15.8	6.2	19.5
Green Ext Time (p_c), s	0.0	3.1	0.7	1.1	0.0	3.0	0.0	4.3

Intersection Summary	
HCM 7th Control Delay, s/veh	33.7
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	165.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	2	52	2	38	2	729	30	15	418	5
Future Vol, veh/h	14	2	2	52	2	38	2	729	30	15	418	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	2	2	60	2	44	2	848	35	17	486	6
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

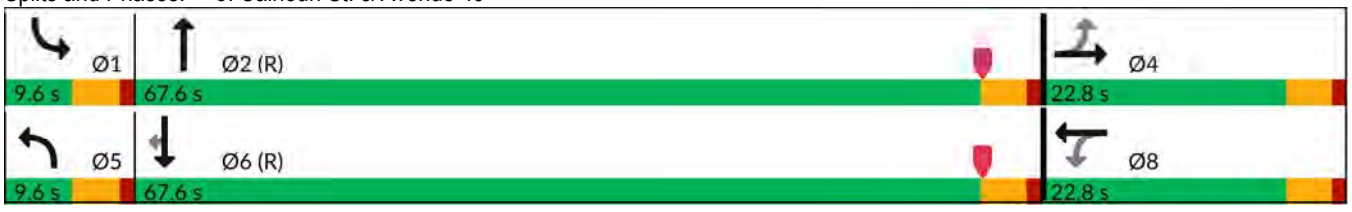
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	12.2	13.3	267.6	25.2
HCM LOS	B	B	F	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	78%	57%	100%	0%	0%
Vol Thru, %	0%	96%	11%	2%	0%	100%	0%
Vol Right, %	0%	4%	11%	41%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	759	18	92	15	418	5
LT Vol	2	0	14	52	15	0	0
Through Vol	0	729	2	2	0	418	0
RT Vol	0	30	2	38	0	0	5
Lane Flow Rate	2	883	21	107	17	486	6
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	1.539	0.047	0.218	0.03	0.763	0.008
Departure Headway (Hd)	6.812	6.278	9.082	8.32	6.683	6.174	5.461
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	528	582	397	434	539	588	659
Service Time	4.514	3.981	6.782	6.02	4.383	3.874	3.161
HCM Lane V/C Ratio	0.004	1.517	0.053	0.247	0.032	0.827	0.009
HCM Control Delay, s/veh	9.5	268.3	12.2	13.3	9.6	26	8.2
HCM Lane LOS	A	F	B	B	A	D	A
HCM 95th-tile Q	0	45.8	0.1	0.8	0.1	6.9	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.8	22.8		22.8	22.8		9.6	67.6		9.6	67.6	67.6
Total Split (%)	22.8%	22.8%		22.8%	22.8%		9.6%	67.6%		9.6%	67.6%	67.6%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (veh/h)	14	2	2	52	2	38	2	729	30	15	418	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	2	2	60	2	44	2	848	35	17	486	6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	20	13	125	9	56	5	1352	56	34	1448	1227
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.76	0.76	0.02	0.77	0.77
Sat Flow, veh/h	1093	231	147	785	106	632	1781	1783	74	1781	1870	1585
Grp Volume(v), veh/h	20	0	0	106	0	0	2	0	883	17	486	6
Grp Sat Flow(s),veh/h/ln	1470	0	0	1523	0	0	1781	0	1857	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	5.6	0.0	0.0	0.1	0.0	21.9	0.9	7.9	0.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	6.8	0.0	0.0	0.1	0.0	21.9	0.9	7.9	0.1
Prop In Lane	0.80		0.10	0.57		0.42	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	194	0	0	190	0	0	5	0	1408	34	1448	1227
V/C Ratio(X)	0.10	0.00	0.00	0.56	0.00	0.00	0.42	0.00	0.63	0.51	0.34	0.00
Avail Cap(c_a), veh/h	329	0	0	332	0	0	91	0	1408	91	1448	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.6	0.0	0.0	49.8	0.0	5.6	48.6	3.4	2.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.0	48.5	0.0	2.1	11.4	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	2.7	0.0	0.0	0.1	0.0	6.2	0.5	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.3	0.0	0.0	47.1	0.0	0.0	98.3	0.0	7.7	60.0	4.1	2.6
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		20			106			885			509	
Approach Delay, s/veh		42.3			47.1			7.9			5.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	80.3		13.3	4.8	81.9		13.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.1		18.3	5.1	63.1		18.3				
Max Q Clear Time (g_c+I1), s	2.9	23.9		3.1	2.1	9.9		8.8				
Green Ext Time (p_c), s	0.0	7.4		0.0	0.0	3.1		0.3				

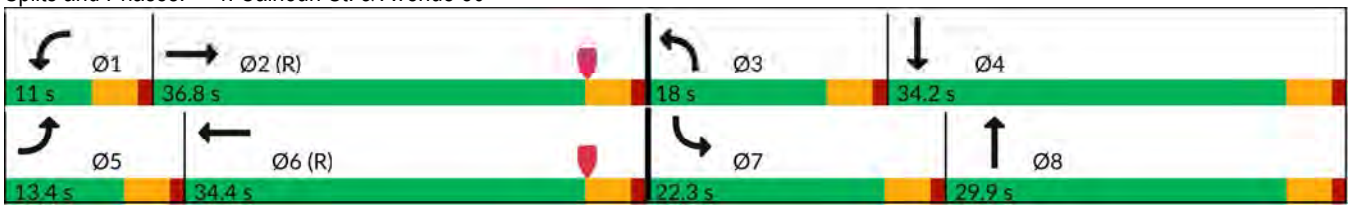
Intersection Summary												
HCM 7th Control Delay, s/veh			10.4									
HCM 7th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	218	25	30	447	182	101	369	163	139	275	101
Future Volume (vph)	46	218	25	30	447	182	101	369	163	139	275	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.4	36.8		11.0	34.4		18.0	29.9		22.3	34.2	
Total Split (%)	13.4%	36.8%		11.0%	34.4%		18.0%	29.9%		22.3%	34.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

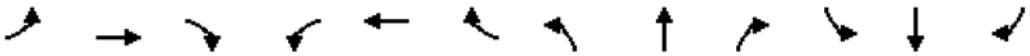
Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	218	25	30	447	182	101	369	163	139	275	101
Future Volume (veh/h)	46	218	25	30	447	182	101	369	163	139	275	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	260	30	36	532	217	120	439	194	165	327	120
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1309	150	56	984	400	150	648	284	199	760	274
Arrive On Green	0.04	0.41	0.41	0.03	0.40	0.40	0.08	0.27	0.27	0.11	0.30	0.30
Sat Flow, veh/h	1781	3214	367	1781	2465	1002	1781	2405	1053	1781	2559	922
Grp Volume(v), veh/h	55	143	147	36	383	366	120	323	310	165	225	222
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1781	1777	1690	1781	1777	1681	1781	1777	1704
Q Serve(g_s), s	3.1	5.2	5.3	2.0	16.5	16.6	6.6	16.3	16.5	9.1	10.2	10.5
Cycle Q Clear(g_c), s	3.1	5.2	5.3	2.0	16.5	16.6	6.6	16.3	16.5	9.1	10.2	10.5
Prop In Lane	1.00		0.20	1.00		0.59	1.00		0.63	1.00		0.54
Lane Grp Cap(c), veh/h	71	724	735	56	709	675	150	479	453	199	528	506
V/C Ratio(X)	0.78	0.20	0.20	0.64	0.54	0.54	0.80	0.68	0.68	0.83	0.43	0.44
Avail Cap(c_a), veh/h	159	724	735	116	709	675	240	479	453	317	528	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	19.1	19.1	47.9	23.0	23.0	45.0	32.6	32.7	43.5	28.3	28.4
Incr Delay (d2), s/veh	16.3	0.6	0.6	11.4	2.9	3.1	9.5	7.4	8.1	9.7	2.5	2.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.1	2.2	1.0	6.9	6.6	3.2	7.6	7.4	4.4	4.5	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.9	19.7	19.7	59.3	25.9	26.2	54.4	40.1	40.8	53.2	30.8	31.2
LnGrp LOS	E	B	B	E	C	C	D	D	D	D	C	C
Approach Vol, veh/h		345			785			753			612	
Approach Delay, s/veh		26.8			27.6			42.7			37.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	45.2	12.9	34.2	8.5	44.4	15.7	31.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	32.3	13.5	29.7	8.9	29.9	17.8	25.4
Max Q Clear Time (g_c+I1), s	4.0	7.3	8.6	12.5	5.1	18.6	11.1	18.5
Green Ext Time (p_c), s	0.0	1.4	0.1	2.2	0.0	3.2	0.2	2.0

Intersection Summary	
HCM 7th Control Delay, s/veh	34.3
HCM 7th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	74.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	2	33	9	2	23	7	562	4	10	536	27
Future Vol, veh/h	93	2	33	9	2	23	7	562	4	10	536	27
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	2	37	10	2	26	8	631	4	11	602	30
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

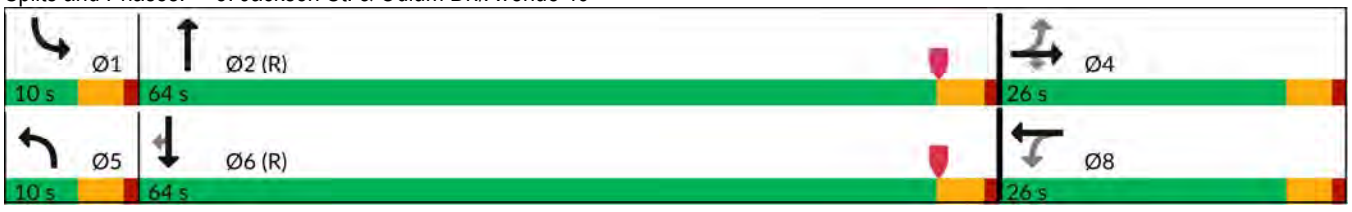
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	14.3	12.5	140.9	24.6
HCM LOS	B	B	F	C

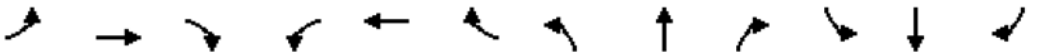
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	98%	0%	26%	100%	0%	0%
Vol Thru, %	0%	99%	2%	0%	6%	0%	100%	87%
Vol Right, %	0%	1%	0%	100%	68%	0%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	566	95	33	34	10	357	206
LT Vol	7	0	93	0	9	10	0	0
Through Vol	0	562	2	0	2	0	357	179
RT Vol	0	4	0	33	23	0	0	27
Lane Flow Rate	8	636	107	37	38	11	401	231
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.016	1.23	0.26	0.078	0.089	0.023	0.767	0.436
Departure Headway (Hd)	7.476	6.964	9.332	8.105	8.967	7.848	7.338	7.244
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	478	521	387	445	402	459	498	501
Service Time	5.229	4.716	7.032	5.805	6.667	5.548	5.038	4.944
HCM Lane V/C Ratio	0.017	1.221	0.276	0.083	0.095	0.024	0.805	0.461
HCM Control Delay, s/veh	10.4	142.5	15.3	11.5	12.5	10.7	30.3	15.4
HCM Lane LOS	B	F	C	B	B	B	D	C
HCM 95th-tile Q	0	24.4	1	0.3	0.3	0.1	6.7	2.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	26.0	26.0	26.0	26.0	26.0		10.0	64.0		10.0	64.0	64.0
Total Split (%)	26.0%	26.0%	26.0%	26.0%	26.0%		10.0%	64.0%		10.0%	64.0%	64.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (veh/h)	93	2	33	9	2	23	7	562	4	10	536	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	2	37	10	2	26	8	631	4	11	602	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	200	3	274	54	29	82	18	1261	8	23	2425	1082
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.68	0.68	0.01	0.68	0.68
Sat Flow, veh/h	747	19	1585	51	169	475	1781	1856	12	1781	3554	1585
Grp Volume(v), veh/h	106	0	37	38	0	0	8	0	635	11	602	30
Grp Sat Flow(s),veh/h/ln	765	0	1585	694	0	0	1781	0	1868	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	2.0	0.3	0.0	0.0	0.4	0.0	16.5	0.6	6.5	0.6
Cycle Q Clear(g_c), s	15.1	0.0	2.0	15.3	0.0	0.0	0.4	0.0	16.5	0.6	6.5	0.6
Prop In Lane	0.98		1.00	0.26		0.68	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	274	165	0	0	18	0	1269	23	2425	1082
V/C Ratio(X)	0.52	0.00	0.14	0.23	0.00	0.00	0.45	0.00	0.50	0.47	0.25	0.03
Avail Cap(c_a), veh/h	262	0	341	230	0	0	98	0	1269	98	2425	1082
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.4	0.0	35.0	35.5	0.0	0.0	49.2	0.0	7.8	49.0	6.1	5.1
Incr Delay (d2), s/veh	2.1	0.0	0.2	0.7	0.0	0.0	16.8	0.0	1.4	13.9	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.8	0.8	0.0	0.0	0.3	0.0	5.4	0.4	1.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.5	0.0	35.3	36.2	0.0	0.0	66.1	0.0	9.2	62.8	6.3	5.2
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		143			38			643			643	
Approach Delay, s/veh		40.6			36.2			9.9			7.2	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	72.4		21.8	5.5	72.7		21.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	59.5		21.5	5.5	59.5		21.5				
Max Q Clear Time (g_c+I1), s	2.6	18.5		17.1	2.4	8.5		17.3				
Green Ext Time (p_c), s	0.0	4.1		0.2	0.0	4.1		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		12.4	
HCM 7th LOS		B	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	42	16	703	449	21
Future Volume (vph)	56	42	16	703	449	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	42	16	703	449	21
Future Vol, veh/h	56	42	16	703	449	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	44	17	740	473	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1257	484	495	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	189	583	1069	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	583	1069	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	27.33	0.19	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	262	-	-
HCM Lane V/C Ratio	0.016	-	0.393	-	-
HCM Control Delay (s/veh)	8.4	-	27.3	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	1.8	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	10	5	2	28	14
Future Volume (vph)	2	10	5	2	28	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	10	5	2	28	14
Future Vol, veh/h	2	10	5	2	28	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	11	5	2	29	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	20	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1606	-	997	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1606	-	994	1075
Mov Cap-2 Maneuver	-	-	-	-	994	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	5.18	8.69
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1286	-
HCM Lane V/C Ratio	0.043	-	-	0.003	-
HCM Control Delay (s/veh)	8.7	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	41.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	202	146	29	149	70	86	271	28	62	545	87
Future Vol, veh/h	49	202	146	29	149	70	86	271	28	62	545	87
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	217	157	31	160	75	92	291	30	67	586	94
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	23.1	28.6	37.5	59.3
HCM LOS	C	D	E	F

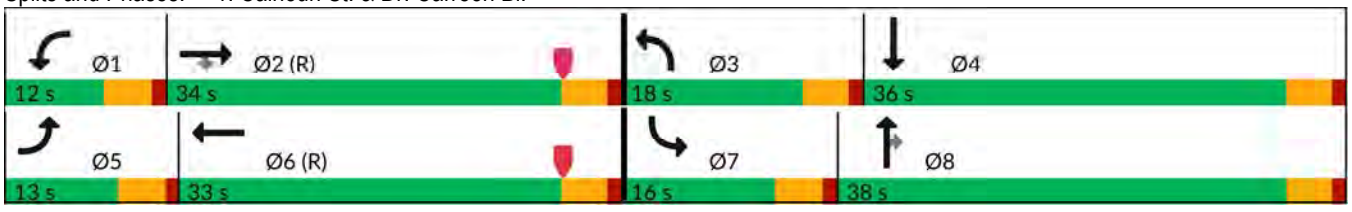
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	68%	0%	100%	68%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	32%	0%	0%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	271	28	49	202	146	29	219	62	363	269
LT Vol	86	0	0	49	0	0	29	0	62	0	0
Through Vol	0	271	0	0	202	0	0	149	0	363	182
RT Vol	0	0	28	0	0	146	0	70	0	0	87
Lane Flow Rate	92	291	30	53	217	157	31	235	67	391	289
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.274	0.821	0.079	0.156	0.613	0.412	0.093	0.657	0.185	1.029	0.742
Departure Headway (Hd)	10.79	10.272	9.548	10.812	10.299	9.581	10.904	10.18	9.997	9.481	9.247
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	335	356	378	334	352	378	331	358	361	387	393
Service Time	8.49	7.972	7.248	8.512	7.999	7.281	8.604	7.88	7.697	7.181	6.947
HCM Lane V/C Ratio	0.275	0.817	0.079	0.159	0.616	0.415	0.094	0.656	0.186	1.01	0.735
HCM Control Delay, s/veh	17.5	46.3	13.1	15.5	28	18.8	14.7	30.4	15	85.3	34.3
HCM Lane LOS	C	E	B	C	D	C	B	D	B	F	D
HCM 95th-tile Q	1.1	7.2	0.3	0.5	3.9	2	0.3	4.4	0.7	12.8	5.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	13.0	34.0	34.0	12.0	33.0		18.0	38.0	38.0	16.0	36.0	
Total Split (%)	13.0%	34.0%	34.0%	12.0%	33.0%		18.0%	38.0%	38.0%	16.0%	36.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (veh/h)	49	202	146	29	149	70	86	271	28	62	545	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	217	157	31	160	75	92	291	30	67	586	94
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	762	646	51	479	225	118	627	531	87	974	156
Arrive On Green	0.04	0.41	0.41	0.03	0.40	0.40	0.07	0.34	0.34	0.05	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1204	564	1781	1870	1585	1781	3068	491
Grp Volume(v), veh/h	53	217	157	31	0	235	92	291	30	67	339	341
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1769	1781	1870	1585	1781	1777	1782
Q Serve(g_s), s	2.9	7.8	6.5	1.7	0.0	9.2	5.1	12.3	1.3	3.7	16.1	16.2
Cycle Q Clear(g_c), s	2.9	7.8	6.5	1.7	0.0	9.2	5.1	12.3	1.3	3.7	16.1	16.2
Prop In Lane	1.00		1.00	1.00		0.32	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	69	762	646	51	0	704	118	627	531	87	564	566
V/C Ratio(X)	0.77	0.28	0.24	0.60	0.00	0.33	0.78	0.46	0.06	0.77	0.60	0.60
Avail Cap(c_a), veh/h	151	762	646	134	0	704	240	627	531	205	564	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	19.9	19.5	48.0	0.0	20.9	46.0	26.2	22.5	47.0	28.8	28.8
Incr Delay (d2), s/veh	16.5	0.9	0.9	10.8	0.0	1.3	10.2	2.4	0.2	13.4	4.7	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.4	2.4	0.9	0.0	3.9	2.5	5.5	0.5	1.9	7.3	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.2	20.8	20.4	58.8	0.0	22.2	56.2	28.6	22.7	60.5	33.4	33.5
LnGrp LOS	E	C	C	E		C	E	C	C	E	C	C
Approach Vol, veh/h		427			266			413			747	
Approach Delay, s/veh		26.0			26.5			34.3			35.9	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	45.2	11.1	36.3	8.4	44.3	9.4	38.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	29.5	13.5	31.5	8.5	28.5	11.5	33.5
Max Q Clear Time (g_c+I1), s	3.7	9.8	7.1	18.2	4.9	11.2	5.7	14.3
Green Ext Time (p_c), s	0.0	1.6	0.1	3.3	0.0	1.1	0.0	1.5

Intersection Summary	
HCM 7th Control Delay, s/veh	31.9
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	607	300	54	416	40	131	299	51	70	467	100
Future Volume (vph)	56	607	300	54	416	40	131	299	51	70	467	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	35.0		14.0	35.0		21.0	36.0		15.0	30.0	
Total Split (%)	14.0%	35.0%		14.0%	35.0%		21.0%	36.0%		15.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	607	300	54	416	40	131	299	51	70	467	100
Future Volume (veh/h)	56	607	300	54	416	40	131	299	51	70	467	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	626	309	56	429	41	135	308	53	72	481	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	1403	653	72	1950	184	167	957	163	93	797	170
Arrive On Green	0.04	0.41	0.41	0.04	0.41	0.41	0.09	0.31	0.31	0.05	0.27	0.27
Sat Flow, veh/h	1781	3404	1585	1781	4747	447	1781	3038	517	1781	2915	621
Grp Volume(v), veh/h	58	626	309	56	306	164	135	179	182	72	292	292
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1790	1781	1777	1777	1781	1777	1759
Q Serve(g_s), s	3.2	13.2	14.2	3.1	5.8	5.9	7.4	7.7	7.8	4.0	14.3	14.5
Cycle Q Clear(g_c), s	3.2	13.2	14.2	3.1	5.8	5.9	7.4	7.7	7.8	4.0	14.3	14.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.29	1.00		0.35
Lane Grp Cap(c), veh/h	75	1403	653	72	1398	735	167	560	560	93	486	481
V/C Ratio(X)	0.77	0.45	0.47	0.77	0.22	0.22	0.81	0.32	0.33	0.77	0.60	0.61
Avail Cap(c_a), veh/h	169	1403	653	169	1398	735	294	560	560	187	486	481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	21.2	21.5	47.5	19.1	19.1	44.4	26.1	26.1	46.8	31.6	31.6
Incr Delay (d2), s/veh	15.5	1.0	2.4	16.0	0.4	0.7	8.9	1.5	1.5	12.8	5.4	5.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	5.0	5.3	1.6	2.2	2.4	3.6	3.3	3.4	2.0	6.5	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.9	22.2	23.9	63.5	19.4	19.8	53.4	27.6	27.7	59.6	37.0	37.2
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	D
Approach Vol, veh/h		993			526			496			656	
Approach Delay, s/veh		25.1			24.2			34.6			39.6	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	45.7	13.9	31.8	8.7	45.6	9.7	36.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	30.5	16.5	25.5	9.5	30.5	10.5	31.5
Max Q Clear Time (g_c+I1), s	5.1	16.2	9.4	16.5	5.2	7.9	6.0	9.8
Green Ext Time (p_c), s	0.0	4.8	0.2	2.2	0.0	2.5	0.0	1.8

Intersection Summary	
HCM 7th Control Delay, s/veh	30.3
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	46.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	2	2	36	2	21	2	446	24	29	636	16
Future Vol, veh/h	9	2	2	36	2	21	2	446	24	29	636	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	2	38	2	22	2	469	25	31	669	17
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

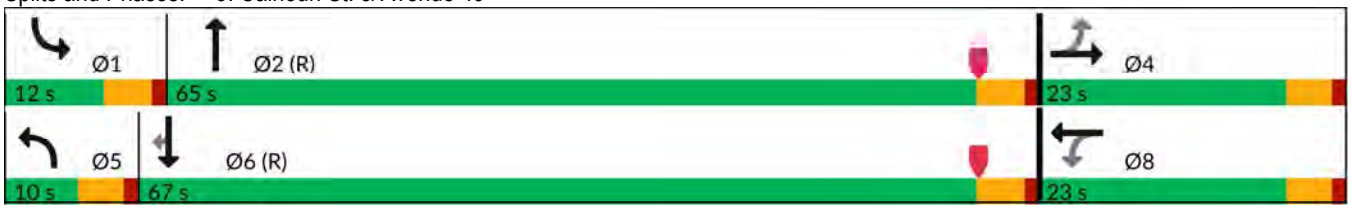
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	11.1	11.6	38.6	55.2
HCM LOS	B	B	E	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	69%	61%	100%	0%	0%
Vol Thru, %	0%	95%	15%	3%	0%	100%	0%
Vol Right, %	0%	5%	15%	36%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	470	13	59	29	636	16
LT Vol	2	0	9	36	29	0	0
Through Vol	0	446	2	2	0	636	0
RT Vol	0	24	2	21	0	0	16
Lane Flow Rate	2	495	14	62	31	669	17
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	0.876	0.031	0.132	0.05	1.004	0.022
Departure Headway (Hd)	6.916	6.376	8.049	7.656	5.904	5.399	4.692
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	517	569	444	468	607	676	763
Service Time	4.659	4.12	5.818	5.416	3.63	3.125	2.419
HCM Lane V/C Ratio	0.004	0.87	0.032	0.132	0.051	0.99	0.022
HCM Control Delay, s/veh	9.7	38.7	11.1	11.6	8.9	58.5	7.5
HCM Lane LOS	A	E	B	B	A	F	A
HCM 95th-tile Q	0	9.9	0.1	0.5	0.2	16	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	23.0	23.0		23.0	23.0		10.0	65.0		12.0	67.0	67.0
Total Split (%)	23.0%	23.0%		23.0%	23.0%		10.0%	65.0%		12.0%	67.0%	67.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (veh/h)	9	2	2	36	2	21	2	446	24	29	636	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	2	2	38	2	22	2	469	25	31	669	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	25	14	106	5	29	5	1377	73	51	1512	1281
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.78	0.78	0.03	0.81	0.81
Sat Flow, veh/h	993	464	265	890	91	540	1781	1760	94	1781	1870	1585
Grp Volume(v), veh/h	13	0	0	62	0	0	2	0	494	31	669	17
Grp Sat Flow(s),veh/h/ln	1723	0	0	1521	0	0	1781	0	1853	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	7.9	1.7	10.7	0.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.0	0.0	0.0	0.1	0.0	7.9	1.7	10.7	0.2
Prop In Lane	0.69		0.15	0.61		0.35	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	154	0	0	140	0	0	5	0	1450	51	1512	1281
V/C Ratio(X)	0.08	0.00	0.00	0.44	0.00	0.00	0.42	0.00	0.34	0.60	0.44	0.01
Avail Cap(c_a), veh/h	347	0	0	334	0	0	98	0	1450	134	1512	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	0.0	46.6	0.0	0.0	49.8	0.0	3.2	48.0	2.9	1.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.2	0.0	0.0	48.5	0.0	0.6	10.8	0.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.6	0.0	0.0	0.1	0.0	1.9	0.9	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.3	0.0	0.0	48.8	0.0	0.0	98.3	0.0	3.9	58.8	3.8	1.9
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		13			62			496			717	
Approach Delay, s/veh		45.3			48.8			4.3			6.1	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	82.7		9.9	4.8	85.3		9.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	60.5		18.5	5.5	62.5		18.5				
Max Q Clear Time (g_c+I1), s	3.7	9.9		2.7	2.1	12.7		6.0				
Green Ext Time (p_c), s	0.0	3.1		0.0	0.0	4.8		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	7.9	
HCM 7th LOS	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	439	45	10	331	148	58	226	69	170	295	72
Future Volume (vph)	63	439	45	10	331	148	58	226	69	170	295	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	16.0	39.0		10.0	33.0		16.0	25.0		26.0	35.0	
Total Split (%)	16.0%	39.0%		10.0%	33.0%		16.0%	25.0%		26.0%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	439	45	10	331	148	58	226	69	170	295	72
Future Volume (veh/h)	63	439	45	10	331	148	58	226	69	170	295	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	457	47	10	345	154	60	235	72	177	307	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	1494	153	22	1018	446	78	618	185	212	866	208
Arrive On Green	0.05	0.46	0.46	0.01	0.42	0.42	0.04	0.23	0.23	0.12	0.31	0.31
Sat Flow, veh/h	1781	3254	333	1781	2404	1054	1781	2696	806	1781	2841	683
Grp Volume(v), veh/h	66	249	255	10	253	246	60	153	154	177	190	192
Grp Sat Flow(s),veh/h/ln	1781	1777	1810	1781	1777	1681	1781	1777	1725	1781	1777	1747
Q Serve(g_s), s	3.7	8.8	8.9	0.6	9.6	9.9	3.3	7.3	7.6	9.7	8.3	8.6
Cycle Q Clear(g_c), s	3.7	8.8	8.9	0.6	9.6	9.9	3.3	7.3	7.6	9.7	8.3	8.6
Prop In Lane	1.00		0.18	1.00		0.63	1.00		0.47	1.00		0.39
Lane Grp Cap(c), veh/h	85	816	831	22	752	712	78	407	396	212	542	533
V/C Ratio(X)	0.77	0.30	0.31	0.46	0.34	0.35	0.77	0.38	0.39	0.83	0.35	0.36
Avail Cap(c_a), veh/h	205	816	831	98	752	712	205	407	396	383	542	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	17.0	17.0	49.1	19.4	19.5	47.3	32.5	32.6	43.1	27.0	27.1
Incr Delay (d2), s/veh	13.6	1.0	1.0	14.6	1.2	1.3	14.8	2.6	2.9	8.2	1.8	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.5	3.6	0.3	3.9	3.8	1.7	3.3	3.3	4.6	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.7	18.0	18.0	63.7	20.6	20.8	62.2	35.1	35.5	51.3	28.8	29.0
LnGrp LOS	E	B	B	E	C	C	E	D	D	D	C	C
Approach Vol, veh/h		570			509			367			559	
Approach Delay, s/veh		22.9			21.5			39.7			36.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	50.4	8.9	35.0	9.3	46.8	16.4	27.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	34.5	11.5	30.5	11.5	28.5	21.5	20.5
Max Q Clear Time (g_c+I1), s	2.6	10.9	5.3	10.6	5.7	11.9	11.7	9.6
Green Ext Time (p_c), s	0.0	2.6	0.0	1.9	0.0	2.4	0.3	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	29.3
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	35
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	67	2	23	7	2	16	21	481	10	25	637	76
Future Vol, veh/h	67	2	23	7	2	16	21	481	10	25	637	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	2	24	7	2	17	22	501	10	26	664	79
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

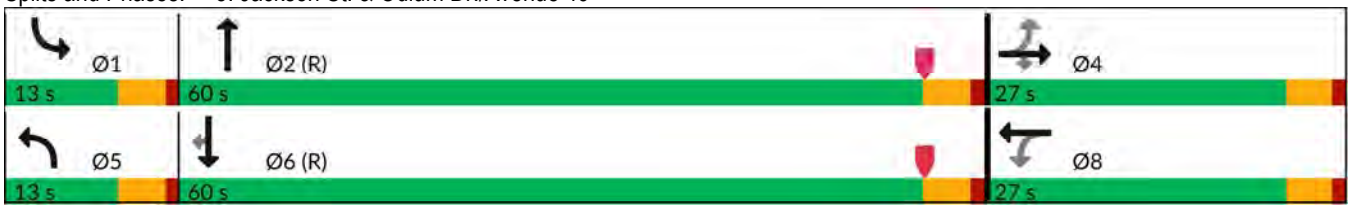
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	12.9	11.7	54.8	24.9
HCM LOS	B	B	F	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	97%	0%	28%	100%	0%	0%
Vol Thru, %	0%	98%	3%	0%	8%	0%	100%	74%
Vol Right, %	0%	2%	0%	100%	64%	0%	0%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	491	69	23	25	25	425	288
LT Vol	21	0	67	0	7	25	0	0
Through Vol	0	481	2	0	2	0	425	212
RT Vol	0	10	0	23	16	0	0	76
Lane Flow Rate	22	511	72	24	26	26	442	300
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.044	0.964	0.179	0.052	0.061	0.051	0.807	0.532
Departure Headway (Hd)	7.303	6.784	8.985	7.769	8.491	7.075	6.568	6.381
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	532	402	464	424	502	549	559
Service Time	5.099	4.579	6.687	5.471	6.198	4.874	4.367	4.18
HCM Lane V/C Ratio	0.045	0.961	0.179	0.052	0.061	0.052	0.805	0.537
HCM Control Delay, s/veh	10.4	56.7	13.6	10.9	11.7	10.3	31.6	16.3
HCM Lane LOS	B	F	B	B	B	B	D	C
HCM 95th-tile Q	0.1	12.6	0.6	0.2	0.2	0.2	7.8	3.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	27.0	27.0	27.0	27.0		13.0	60.0		13.0	60.0	60.0
Total Split (%)	27.0%	27.0%	27.0%	27.0%	27.0%		13.0%	60.0%		13.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (veh/h)	67	2	23	7	2	16	21	481	10	25	637	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	2	24	7	2	17	22	501	10	26	664	79
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	3	106	54	19	53	41	1411	28	46	2754	1228
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.02	0.77	0.77	0.03	0.78	0.78
Sat Flow, veh/h	1441	41	1585	128	290	790	1781	1827	36	1781	3554	1585
Grp Volume(v), veh/h	72	0	24	26	0	0	22	0	511	26	664	79
Grp Sat Flow(s),veh/h/ln	1482	0	1585	1208	0	0	1781	0	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.0	1.2	0.0	8.6	1.4	5.2	1.2
Cycle Q Clear(g_c), s	4.7	0.0	1.4	4.7	0.0	0.0	1.2	0.0	8.6	1.4	5.2	1.2
Prop In Lane	0.97		1.00	0.27		0.65	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	170	0	106	127	0	0	41	0	1439	46	2754	1228
V/C Ratio(X)	0.42	0.00	0.23	0.21	0.00	0.00	0.54	0.00	0.36	0.57	0.24	0.06
Avail Cap(c_a), veh/h	392	0	357	370	0	0	151	0	1439	151	2754	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	0.0	44.2	44.2	0.0	0.0	48.3	0.0	3.6	48.2	3.1	2.7
Incr Delay (d2), s/veh	1.7	0.0	1.1	0.8	0.0	0.0	10.7	0.0	0.7	10.6	0.2	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.6	0.6	0.0	0.0	0.6	0.0	2.1	0.7	1.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.3	0.0	45.2	45.0	0.0	0.0	59.0	0.0	4.3	58.7	3.3	2.8
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		96			26			533			769	
Approach Delay, s/veh		46.8			45.0			6.5			5.1	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	81.7		11.2	6.8	82.0		11.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	8.5	55.5		22.5	8.5	55.5		22.5				
Max Q Clear Time (g_c+I1), s	3.4	10.6		6.7	3.2	7.2		6.7				
Green Ext Time (p_c), s	0.0	3.1		0.3	0.0	4.7		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	9.2
HCM 7th LOS	A



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	28	47	432	611	62
Future Volume (vph)	38	28	47	432	611	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	28	47	432	611	62
Future Vol, veh/h	38	28	47	432	611	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	29	49	455	643	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1229	676	708	0	-	0
Stage 1	676	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	196	454	890	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	185	454	890	-	-	-
Mov Cap-2 Maneuver	185	-	-	-	-	-
Stage 1	477	-	-	-	-	-
Stage 2	576	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	25.13	0.91	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	890	-	247	-	-
HCM Lane V/C Ratio	0.056	-	0.281	-	-
HCM Control Delay (s/veh)	9.3	-	25.1	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	31	16	2	19	9
Future Volume (vph)	2	31	16	2	19	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	31	16	2	19	9
Future Vol, veh/h	2	31	16	2	19	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	33	17	2	20	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	54	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1577	-	954	1060
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1577	-	944	1060
Mov Cap-2 Maneuver	-	-	-	-	944	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	6.5	8.79
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1575	-
HCM Lane V/C Ratio	0.03	-	-	0.011	-
HCM Control Delay (s/veh)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX 6.1: EAPC (2026) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Lanes, Volumes, Timings
1: Calhoun St. & Dr. Carreon Bl.

EAPC (2026) AM Peak Ho

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	189.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	83	229	69	29	357	89	260	623	89	83	298	148
Future Vol, veh/h	83	229	69	29	357	89	260	623	89	83	298	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	244	73	31	380	95	277	663	95	88	317	157
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	38.3	235.1	308.9	39.5
HCM LOS	E	F	F	E

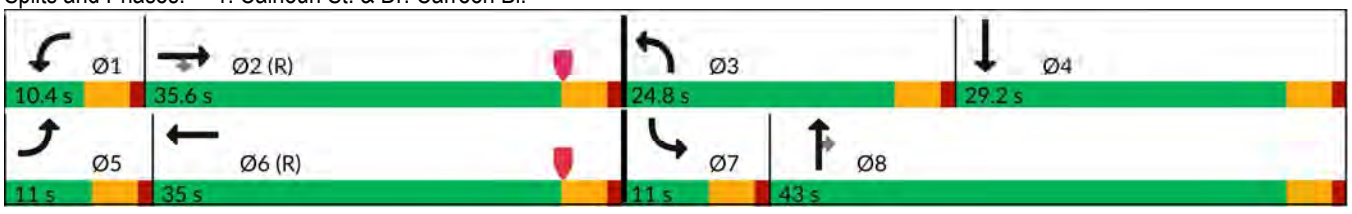
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	80%	0%	100%	40%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	20%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	623	89	83	229	69	29	446	83	199	247
LT Vol	260	0	0	83	0	0	29	0	83	0	0
Through Vol	0	623	0	0	229	0	0	357	0	199	99
RT Vol	0	0	89	0	0	69	0	89	0	0	148
Lane Flow Rate	277	663	95	88	244	73	31	474	88	211	263
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.843	1.93	0.258	0.292	0.774	0.219	0.099	1.447	0.282	0.645	0.773
Departure Headway (Hd)	12.223	11.697	10.96	13.812	13.289	12.555	12.663	12.023	13.546	13.017	12.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	299	318	329	262	275	288	285	308	267	279	289
Service Time	9.923	9.397	8.66	11.512	10.989	10.255	10.363	9.723	11.246	10.717	10.273
HCM Lane V/C Ratio	0.926	2.085	0.289	0.336	0.887	0.253	0.109	1.539	0.33	0.756	0.91
HCM Control Delay, s/veh	56.3	455.9	17.4	22.1	50.1	18.7	16.7	249.3	21.5	36.6	47.8
HCM Lane LOS	F	F	C	C	F	C	C	F	C	E	E
HCM 95th-tile Q	7.2	41.2	1	1.2	5.8	0.8	0.3	23.6	1.1	4.1	5.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	11.0	35.6	35.6	10.4	35.0		24.8	43.0	43.0	11.0	29.2	
Total Split (%)	11.0%	35.6%	35.6%	10.4%	35.0%		24.8%	43.0%	43.0%	11.0%	29.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.



HCM 7th Signalized Intersection Summary
1: Calhoun St. & Dr. Carreon Bl.

EAPC (2026) AM Peak Ho
WITH IMPROVEMENTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (veh/h)	83	229	69	29	357	89	260	623	89	83	298	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	244	73	31	380	95	277	663	95	88	317	157
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	642	544	51	447	112	311	720	610	112	634	307
Arrive On Green	0.06	0.34	0.34	0.03	0.31	0.31	0.17	0.38	0.38	0.06	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	1781	1444	361	1781	1870	1585	1781	2321	1124
Grp Volume(v), veh/h	88	244	73	31	0	475	277	663	95	88	241	233
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1805	1781	1870	1585	1781	1777	1668
Q Serve(g_s), s	4.9	9.9	3.2	1.7	0.0	24.7	15.2	33.8	3.9	4.9	11.4	11.8
Cycle Q Clear(g_c), s	4.9	9.9	3.2	1.7	0.0	24.7	15.2	33.8	3.9	4.9	11.4	11.8
Prop In Lane	1.00		1.00	1.00		0.20	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	112	642	544	51	0	559	311	720	610	112	486	456
V/C Ratio(X)	0.79	0.38	0.13	0.60	0.00	0.85	0.89	0.92	0.16	0.79	0.50	0.51
Avail Cap(c_a), veh/h	116	642	544	105	0	559	362	720	610	116	486	456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	24.8	22.6	48.0	0.0	32.4	40.4	29.3	20.1	46.2	30.5	30.7
Incr Delay (d2), s/veh	28.6	1.7	0.5	10.8	0.0	15.0	16.8	15.3	0.4	28.6	3.6	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.5	1.2	0.9	0.0	12.5	7.8	16.9	1.4	3.0	5.2	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.8	26.5	23.1	58.8	0.0	47.3	57.2	44.5	20.5	74.8	34.1	34.7
LnGrp LOS	E	C	C	E		D	E	D	C	E	C	C
Approach Vol, veh/h		405			506			1035			562	
Approach Delay, s/veh		36.4			48.0			45.7			40.8	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	38.8	21.9	31.8	10.8	35.5	10.8	43.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.9	31.1	20.3	24.7	6.5	30.5	6.5	38.5
Max Q Clear Time (g_c+I1), s	3.7	11.9	17.2	13.8	6.9	26.7	6.9	35.8
Green Ext Time (p_c), s	0.0	1.4	0.2	2.0	0.0	1.0	0.0	1.2

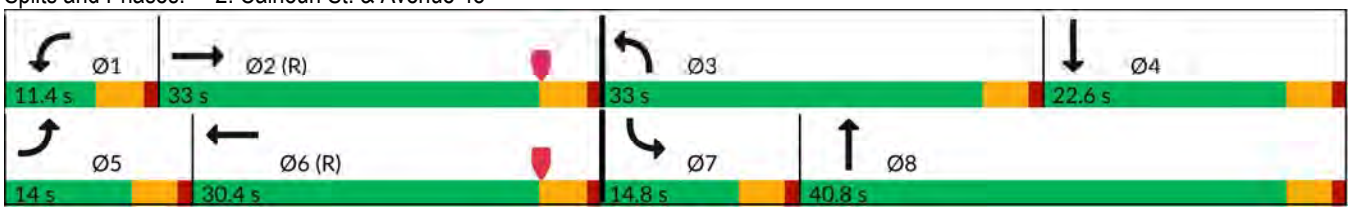
Intersection Summary	
HCM 7th Control Delay, s/veh	43.6
HCM 7th LOS	D

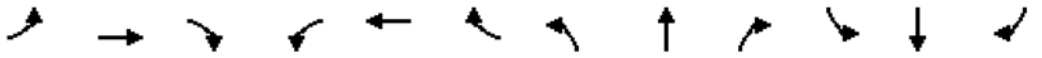
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	445	115	38	662	104	282	641	83	69	264	70
Future Volume (vph)	68	445	115	38	662	104	282	641	83	69	264	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	33.0		11.4	30.4		33.0	40.8		14.8	22.6	
Total Split (%)	14.0%	33.0%		11.4%	30.4%		33.0%	40.8%		14.8%	22.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48

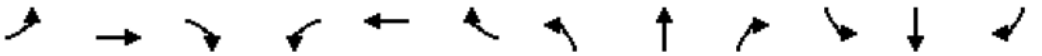




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	445	115	38	662	104	282	641	83	69	264	70
Future Volume (veh/h)	68	445	115	38	662	104	282	641	83	69	264	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	536	139	46	798	125	340	772	100	83	318	84
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1467	371	64	1507	234	378	1148	149	107	588	153
Arrive On Green	0.06	0.36	0.36	0.04	0.34	0.34	0.21	0.36	0.36	0.06	0.21	0.21
Sat Flow, veh/h	1781	4061	1028	1781	4456	693	1781	3164	410	1781	2791	726
Grp Volume(v), veh/h	82	447	228	46	608	315	340	433	439	83	201	201
Grp Sat Flow(s),veh/h/ln	1781	1702	1685	1781	1702	1746	1781	1777	1797	1781	1777	1740
Q Serve(g_s), s	4.5	9.7	10.0	2.6	14.4	14.6	18.6	20.6	20.6	4.6	10.1	10.3
Cycle Q Clear(g_c), s	4.5	9.7	10.0	2.6	14.4	14.6	18.6	20.6	20.6	4.6	10.1	10.3
Prop In Lane	1.00		0.61	1.00		0.40	1.00		0.23	1.00		0.42
Lane Grp Cap(c), veh/h	105	1229	609	64	1151	590	378	645	652	107	374	366
V/C Ratio(X)	0.78	0.36	0.37	0.72	0.53	0.53	0.90	0.67	0.67	0.78	0.54	0.55
Avail Cap(c_a), veh/h	169	1229	609	123	1151	590	508	645	652	183	374	366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	23.5	23.6	47.7	26.7	26.7	38.4	26.8	26.8	46.4	35.1	35.2
Incr Delay (d2), s/veh	11.7	0.8	1.8	13.8	1.7	3.4	15.4	5.5	5.5	11.6	5.4	5.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.7	4.0	1.3	5.7	6.2	9.3	9.1	9.2	2.3	4.7	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	24.3	25.4	61.5	28.4	30.1	53.7	32.3	32.3	57.9	40.5	41.1
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		757			969			1212			485	
Approach Delay, s/veh		28.3			30.5			38.3			43.7	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	40.6	25.7	25.6	10.4	38.3	10.5	40.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	28.5	28.5	18.1	9.5	25.9	10.3	36.3
Max Q Clear Time (g_c+I1), s	4.6	12.0	20.6	12.3	6.5	16.6	6.6	22.6
Green Ext Time (p_c), s	0.0	3.5	0.6	1.0	0.0	3.7	0.0	4.3

Intersection Summary	
HCM 7th Control Delay, s/veh	34.7
HCM 7th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	211.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	2	52	2	38	2	799	30	15	442	5
Future Vol, veh/h	14	2	2	52	2	38	2	799	30	15	442	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	2	2	60	2	44	2	929	35	17	514	6
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

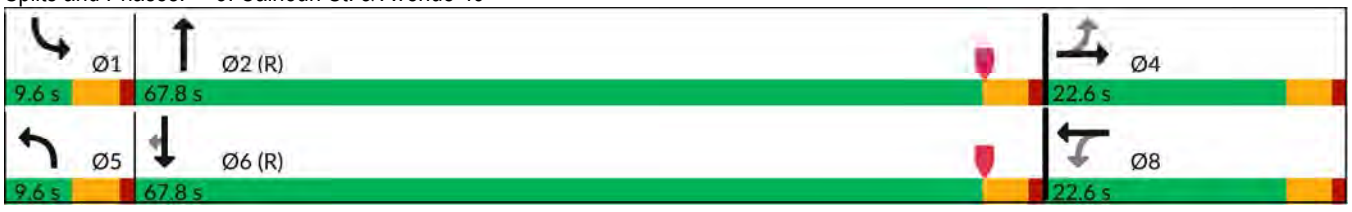
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	12.6	13.7	338.9	29.4
HCM LOS	B	B	F	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	78%	57%	100%	0%	0%
Vol Thru, %	0%	96%	11%	2%	0%	100%	0%
Vol Right, %	0%	4%	11%	41%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	829	18	92	15	442	5
LT Vol	2	0	14	52	15	0	0
Through Vol	0	799	2	2	0	442	0
RT Vol	0	30	2	38	0	0	5
Lane Flow Rate	2	964	21	107	17	514	6
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	1.702	0.047	0.22	0.03	0.808	0.008
Departure Headway (Hd)	6.886	6.355	9.408	8.606	6.809	6.299	5.585
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	523	578	383	420	529	581	645
Service Time	4.586	4.055	7.108	6.306	4.509	3.999	3.285
HCM Lane V/C Ratio	0.004	1.668	0.055	0.255	0.032	0.885	0.009
HCM Control Delay, s/veh	9.6	339.7	12.6	13.7	9.7	30.3	8.3
HCM Lane LOS	A	F	B	B	A	D	A
HCM 95th-tile Q	0	56.1	0.1	0.8	0.1	8	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.6	22.6		22.6	22.6		9.6	67.8		9.6	67.8	67.8
Total Split (%)	22.6%	22.6%		22.6%	22.6%		9.6%	67.8%		9.6%	67.8%	67.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 72.9 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (veh/h)	14	2	2	52	2	38	2	799	30	15	442	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	2	2	60	2	44	2	929	35	17	514	6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	20	13	125	9	56	5	1358	51	34	1448	1227
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.76	0.76	0.02	0.77	0.77
Sat Flow, veh/h	1093	231	147	785	106	632	1781	1791	67	1781	1870	1585
Grp Volume(v), veh/h	20	0	0	106	0	0	2	0	964	17	514	6
Grp Sat Flow(s),veh/h/ln	1470	0	0	1523	0	0	1781	0	1858	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	5.6	0.0	0.0	0.1	0.0	26.1	0.9	8.5	0.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	6.8	0.0	0.0	0.1	0.0	26.1	0.9	8.5	0.1
Prop In Lane	0.80		0.10	0.57		0.42	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	194	0	0	190	0	0	5	0	1409	34	1448	1227
V/C Ratio(X)	0.10	0.00	0.00	0.56	0.00	0.00	0.42	0.00	0.68	0.51	0.35	0.00
Avail Cap(c_a), veh/h	326	0	0	329	0	0	91	0	1409	91	1448	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.6	0.0	0.0	49.8	0.0	6.1	48.6	3.5	2.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.0	48.5	0.0	2.7	11.4	0.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	2.7	0.0	0.0	0.1	0.0	7.4	0.5	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.3	0.0	0.0	47.1	0.0	0.0	98.3	0.0	8.8	60.0	4.2	2.6
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		20			106			966			537	
Approach Delay, s/veh		42.3			47.1			9.0			5.9	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	80.3		13.3	4.8	81.9		13.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.3		18.1	5.1	63.3		18.1				
Max Q Clear Time (g_c+I1), s	2.9	28.1		3.1	2.1	10.5		8.8				
Green Ext Time (p_c), s	0.0	8.5		0.0	0.0	3.3		0.3				

Intersection Summary			
HCM 7th Control Delay, s/veh		10.9	
HCM 7th LOS		B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	242	29	30	502	224	113	397	163	154	284	101
Future Volume (vph)	46	242	29	30	502	224	113	397	163	154	284	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	40.0		11.0	39.0		19.8	28.0		21.0	29.2	
Total Split (%)	12.0%	40.0%		11.0%	39.0%		19.8%	28.0%		21.0%	29.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

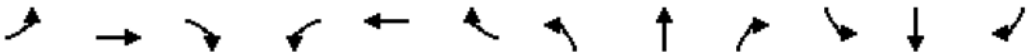
Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	242	29	30	502	224	113	397	163	154	284	101
Future Volume (veh/h)	46	242	29	30	502	224	113	397	163	154	284	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	288	35	36	598	267	135	473	194	183	338	120
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1379	166	56	1012	452	167	579	236	217	680	237
Arrive On Green	0.04	0.43	0.43	0.03	0.42	0.42	0.09	0.24	0.24	0.12	0.26	0.26
Sat Flow, veh/h	1781	3193	385	1781	2389	1066	1781	2463	1003	1781	2583	902
Grp Volume(v), veh/h	55	159	164	36	445	420	135	340	327	183	231	227
Grp Sat Flow(s),veh/h/ln	1781	1777	1801	1781	1777	1679	1781	1777	1690	1781	1777	1708
Q Serve(g_s), s	3.1	5.6	5.7	2.0	19.2	19.3	7.4	18.1	18.3	10.1	11.0	11.3
Cycle Q Clear(g_c), s	3.1	5.6	5.7	2.0	19.2	19.3	7.4	18.1	18.3	10.1	11.0	11.3
Prop In Lane	1.00		0.21	1.00		0.64	1.00		0.59	1.00		0.53
Lane Grp Cap(c), veh/h	71	767	778	56	753	711	167	418	397	217	467	449
V/C Ratio(X)	0.78	0.21	0.21	0.64	0.59	0.59	0.81	0.81	0.82	0.84	0.49	0.51
Avail Cap(c_a), veh/h	134	767	778	116	753	711	273	418	397	294	467	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	17.7	17.8	47.9	22.2	22.2	44.5	36.2	36.3	43.0	31.2	31.3
Incr Delay (d2), s/veh	16.4	0.6	0.6	11.4	3.4	3.6	9.0	15.9	17.3	15.2	3.7	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.2	2.3	1.0	8.0	7.6	3.6	9.3	9.1	5.2	5.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.0	18.3	18.4	59.3	25.5	25.8	53.5	52.1	53.6	58.2	34.9	35.3
LnGrp LOS	E	B	B	E	C	C	D	D	D	E	C	D
Approach Vol, veh/h		378			901			802			641	
Approach Delay, s/veh		25.0			27.0			52.9			41.7	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	47.7	13.9	30.8	8.5	46.9	16.7	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	35.5	15.3	24.7	7.5	34.5	16.5	23.5
Max Q Clear Time (g_c+I1), s	4.0	7.7	9.4	13.3	5.1	21.3	12.1	20.3
Green Ext Time (p_c), s	0.0	1.6	0.1	1.9	0.0	4.1	0.2	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	37.8
HCM 7th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	100
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	2	33	14	2	64	7	594	6	24	547	27
Future Vol, veh/h	93	2	33	14	2	64	7	594	6	24	547	27
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	2	37	16	2	72	8	667	7	27	615	30
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

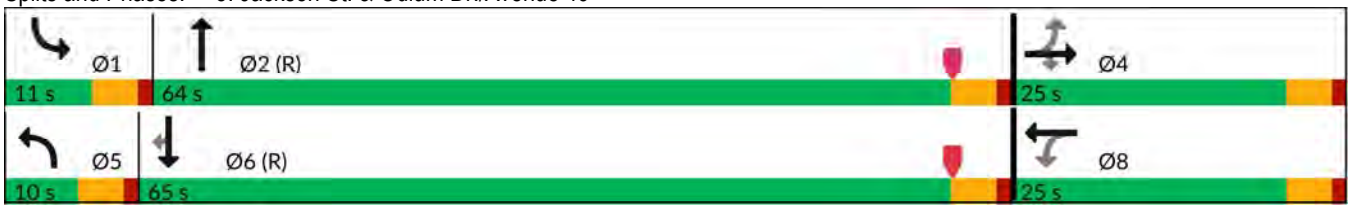
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	15.2	14.3	199.6	28.6
HCM LOS	C	B	F	D

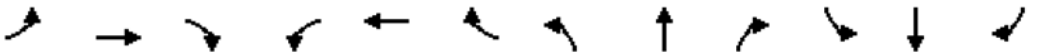
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	98%	0%	18%	100%	0%	0%
Vol Thru, %	0%	99%	2%	0%	2%	0%	100%	87%
Vol Right, %	0%	1%	0%	100%	80%	0%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	600	95	33	80	24	365	209
LT Vol	7	0	93	0	14	24	0	0
Through Vol	0	594	2	0	2	0	365	182
RT Vol	0	6	0	33	64	0	0	27
Lane Flow Rate	8	674	107	37	90	27	410	235
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.017	1.373	0.269	0.081	0.209	0.057	0.812	0.46
Departure Headway (Hd)	7.847	7.33	9.972	8.735	9.219	8.367	7.855	7.762
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	454	499	363	413	392	431	463	468
Service Time	5.624	5.107	7.672	6.435	6.919	6.067	5.555	5.462
HCM Lane V/C Ratio	0.018	1.351	0.295	0.09	0.23	0.063	0.886	0.502
HCM Control Delay, s/veh	10.8	201.8	16.3	12.2	14.3	11.6	36.5	16.9
HCM Lane LOS	B	F	C	B	B	B	E	C
HCM 95th-tile Q	0.1	30.8	1.1	0.3	0.8	0.2	7.6	2.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	25.0	25.0	25.0	25.0	25.0		10.0	64.0		11.0	65.0	65.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		10.0%	64.0%		11.0%	65.0%	65.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (veh/h)	93	2	33	14	2	64	7	594	6	24	547	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	2	37	16	2	72	8	667	7	27	615	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	3	325	42	26	105	18	1171	12	47	2310	1030
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.63	0.63	0.03	0.65	0.65
Sat Flow, veh/h	492	13	1585	0	128	511	1781	1847	19	1781	3554	1585
Grp Volume(v), veh/h	106	0	37	90	0	0	8	0	674	27	615	30
Grp Sat Flow(s),veh/h/ln	505	0	1585	639	0	0	1781	0	1867	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.9	0.0	0.0	0.0	0.4	0.0	20.7	1.5	7.3	0.7
Cycle Q Clear(g_c), s	20.5	0.0	1.9	20.5	0.0	0.0	0.4	0.0	20.7	1.5	7.3	0.7
Prop In Lane	0.98		1.00	0.18		0.80	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	175	0	325	173	0	0	18	0	1183	47	2310	1030
V/C Ratio(X)	0.61	0.00	0.11	0.52	0.00	0.00	0.45	0.00	0.57	0.57	0.27	0.03
Avail Cap(c_a), veh/h	175	0	325	173	0	0	98	0	1183	116	2310	1030
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	32.4	34.2	0.0	0.0	49.2	0.0	10.5	48.1	7.4	6.2
Incr Delay (d2), s/veh	5.9	0.0	0.2	2.7	0.0	0.0	16.8	0.0	2.0	10.6	0.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.7	2.0	0.0	0.0	0.3	0.0	7.4	0.8	2.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.8	0.0	32.5	37.0	0.0	0.0	66.1	0.0	12.5	58.7	7.7	6.3
LnGrp LOS	D		C	D			E		B	E	A	A
Approach Vol, veh/h		143			90			682			672	
Approach Delay, s/veh		42.4			37.0			13.1			9.7	
Approach LOS		D			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	67.9		25.0	5.5	69.5		25.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	59.5		20.5	5.5	60.5		20.5				
Max Q Clear Time (g_c+I1), s	3.5	22.7		22.5	2.4	9.3		22.5				
Green Ext Time (p_c), s	0.0	4.5		0.0	0.0	4.2		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		15.7	
HCM 7th LOS		B	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	42	16	773	473	21
Future Volume (vph)	56	42	16	773	473	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	42	16	773	473	21
Future Vol, veh/h	56	42	16	773	473	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	44	17	814	498	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1356	509	520	0	-	0
Stage 1	509	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	164	564	1046	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	162	564	1046	-	-	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	32.17	0.17	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1046	-	233	-	-
HCM Lane V/C Ratio	0.016	-	0.443	-	-
HCM Control Delay (s/veh)	8.5	-	32.2	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	2.1	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	10	5	2	28	14
Future Volume (vph)	2	10	5	2	28	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	10	5	2	28	14
Future Vol, veh/h	2	10	5	2	28	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	11	5	2	29	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	20	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1606	-	997	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1606	-	994	1075
Mov Cap-2 Maneuver	-	-	-	-	994	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	5.18	8.69
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1286	-
HCM Lane V/C Ratio	0.043	-	-	0.003	-
HCM Control Delay (s/veh)	8.7	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	83.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	256	155	29	188	70	91	320	28	63	625	88
Future Vol, veh/h	49	256	155	29	188	70	91	320	28	63	625	88
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	275	167	31	202	75	98	344	30	68	672	95
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	39.3	51.8	77.6	124.1
HCM LOS	E	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	73%	0%	100%	70%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	27%	0%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	320	28	49	256	155	29	258	63	417	296
LT Vol	91	0	0	49	0	0	29	0	63	0	0
Through Vol	0	320	0	0	256	0	0	188	0	417	208
RT Vol	0	0	28	0	0	155	0	70	0	0	88
Lane Flow Rate	98	344	30	53	275	167	31	277	68	448	319
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.311	1.048	0.086	0.168	0.84	0.477	0.102	0.859	0.206	1.301	0.907
Departure Headway (Hd)	12.046	11.525	10.795	12.054	11.537	10.813	12.047	11.357	11.212	10.691	10.474
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	300	317	334	299	317	335	299	322	322	345	347
Service Time	9.746	9.225	8.495	9.754	9.237	8.513	9.747	9.057	8.912	8.391	8.174
HCM Lane V/C Ratio	0.327	1.085	0.09	0.177	0.868	0.499	0.104	0.86	0.211	1.299	0.919
HCM Control Delay, s/veh	20.1	99.5	14.5	17.2	53.4	23	16.1	55.8	16.8	185.3	60.9
HCM Lane LOS	C	F	B	C	F	C	C	F	C	F	F
HCM 95th-tile Q	1.3	12.1	0.3	0.6	7.3	2.5	0.3	7.7	0.8	20.6	9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	12.0	36.0	36.0	11.0	35.0		17.0	39.0	39.0	14.0	36.0	
Total Split (%)	12.0%	36.0%	36.0%	11.0%	35.0%		17.0%	39.0%	39.0%	14.0%	36.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.



HCM 7th Signalized Intersection Summary
1: Calhoun St. & Dr. Carreon Bl.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (veh/h)	49	256	155	29	188	70	91	320	28	63	625	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	275	167	31	202	75	98	344	30	68	672	95
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	742	629	51	504	187	125	645	547	88	1014	143
Arrive On Green	0.04	0.40	0.40	0.03	0.39	0.39	0.07	0.34	0.34	0.05	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1301	483	1781	1870	1585	1781	3126	441
Grp Volume(v), veh/h	53	275	167	31	0	277	98	344	30	68	382	385
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1783	1781	1870	1585	1781	1777	1791
Q Serve(g_s), s	2.9	10.4	7.1	1.7	0.0	11.3	5.4	14.8	1.3	3.8	18.5	18.5
Cycle Q Clear(g_c), s	2.9	10.4	7.1	1.7	0.0	11.3	5.4	14.8	1.3	3.8	18.5	18.5
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	69	742	629	51	0	691	125	645	547	88	576	581
V/C Ratio(X)	0.77	0.37	0.27	0.60	0.00	0.40	0.79	0.53	0.05	0.77	0.66	0.66
Avail Cap(c_a), veh/h	134	742	629	116	0	691	223	645	547	169	576	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	21.3	20.3	48.0	0.0	22.2	45.8	26.3	21.9	47.0	29.1	29.1
Incr Delay (d2), s/veh	16.5	1.4	1.0	10.8	0.0	1.7	9.9	3.0	0.2	13.4	5.9	5.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.6	2.6	0.9	0.0	4.8	2.7	6.7	0.5	2.0	8.4	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.2	22.7	21.4	58.8	0.0	24.0	55.6	29.3	22.0	60.4	35.0	35.0
LnGrp LOS	E	C	C	E		C	E	C	C	E	C	C
Approach Vol, veh/h		495			308			472			835	
Approach Delay, s/veh		26.7			27.5			34.3			37.0	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	44.2	11.5	36.9	8.4	43.2	9.4	39.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	31.5	12.5	31.5	7.5	30.5	9.5	34.5
Max Q Clear Time (g_c+I1), s	3.7	12.4	7.4	20.5	4.9	13.3	5.8	16.8
Green Ext Time (p_c), s	0.0	1.9	0.1	3.4	0.0	1.4	0.0	1.8

Intersection Summary	
HCM 7th Control Delay, s/veh	32.6
HCM 7th LOS	C

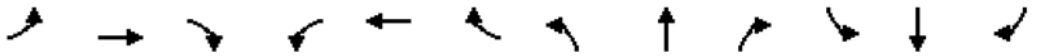
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	658	300	54	468	48	131	345	51	80	546	100
Future Volume (vph)	56	658	300	54	468	48	131	345	51	80	546	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	34.4		13.6	34.0		20.0	37.0		15.0	32.0	
Total Split (%)	14.0%	34.4%		13.6%	34.0%		20.0%	37.0%		15.0%	32.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	658	300	54	468	48	131	345	51	80	546	100
Future Volume (veh/h)	56	658	300	54	468	48	131	345	51	80	546	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	678	309	56	482	49	135	356	53	82	563	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	1363	612	72	1857	186	167	1010	149	105	872	159
Arrive On Green	0.04	0.40	0.40	0.04	0.39	0.39	0.09	0.32	0.32	0.06	0.29	0.29
Sat Flow, veh/h	1781	3448	1547	1781	4716	473	1781	3106	459	1781	3001	547
Grp Volume(v), veh/h	58	669	318	56	346	185	135	202	207	82	333	333
Grp Sat Flow(s),veh/h/ln	1781	1702	1592	1781	1702	1785	1781	1777	1788	1781	1777	1772
Q Serve(g_s), s	3.2	14.8	15.1	3.1	6.9	7.0	7.4	8.7	8.8	4.5	16.3	16.4
Cycle Q Clear(g_c), s	3.2	14.8	15.1	3.1	6.9	7.0	7.4	8.7	8.8	4.5	16.3	16.4
Prop In Lane	1.00		0.97	1.00		0.26	1.00		0.26	1.00		0.31
Lane Grp Cap(c), veh/h	75	1346	629	72	1341	703	167	577	581	105	516	515
V/C Ratio(X)	0.77	0.50	0.51	0.78	0.26	0.26	0.81	0.35	0.36	0.78	0.64	0.65
Avail Cap(c_a), veh/h	169	1346	629	162	1341	703	276	577	581	187	516	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	22.8	22.8	47.5	20.5	20.5	44.5	25.7	25.8	46.4	31.0	31.0
Incr Delay (d2), s/veh	15.5	1.3	2.9	16.0	0.5	0.9	9.0	1.7	1.7	11.6	6.1	6.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	5.7	5.7	1.6	2.6	2.9	3.6	3.7	3.8	2.3	7.5	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.9	24.1	25.7	63.6	20.9	21.4	53.5	27.4	27.5	58.0	37.0	37.2
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		1045			587			544			748	
Approach Delay, s/veh		26.7			25.1			33.9			39.4	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	44.0	13.9	33.6	8.7	43.9	10.4	37.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.1	29.9	15.5	27.5	9.5	29.5	10.5	32.5
Max Q Clear Time (g_c+I1), s	5.1	17.1	9.4	18.4	5.2	9.0	6.5	10.8
Green Ext Time (p_c), s	0.0	4.8	0.1	2.5	0.0	2.8	0.0	2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	31.0
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	75.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	2	2	36	2	21	2	492	24	29	715	16
Future Vol, veh/h	9	2	2	36	2	21	2	492	24	29	715	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	2	38	2	22	2	518	25	31	753	17
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

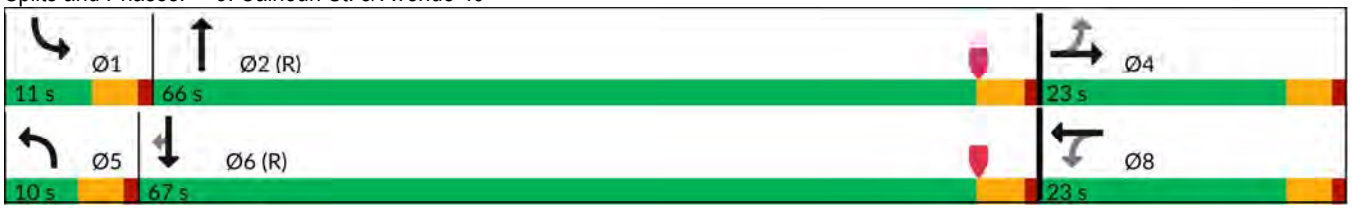
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	11.4	11.9	52.9	96.8
HCM LOS	B	B	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	69%	61%	100%	0%	0%
Vol Thru, %	0%	95%	15%	3%	0%	100%	0%
Vol Right, %	0%	5%	15%	36%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	516	13	59	29	715	16
LT Vol	2	0	9	36	29	0	0
Through Vol	0	492	2	2	0	715	0
RT Vol	0	24	2	21	0	0	16
Lane Flow Rate	2	543	14	62	31	753	17
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	0.953	0.031	0.132	0.051	1.143	0.022
Departure Headway (Hd)	7.162	6.625	8.424	8.001	5.973	5.467	4.76
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	503	554	427	451	602	670	755
Service Time	4.862	4.325	6.124	5.701	3.681	3.175	2.468
HCM Lane V/C Ratio	0.004	0.98	0.033	0.137	0.051	1.124	0.023
HCM Control Delay, s/veh	9.9	53.1	11.4	11.9	9	102.4	7.6
HCM Lane LOS	A	F	B	B	A	F	A
HCM 95th-tile Q	0	12.4	0.1	0.5	0.2	23.7	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	23.0	23.0		23.0	23.0		10.0	66.0		11.0	67.0	67.0
Total Split (%)	23.0%	23.0%		23.0%	23.0%		10.0%	66.0%		11.0%	67.0%	67.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (veh/h)	9	2	2	36	2	21	2	492	24	29	715	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	2	2	38	2	22	2	518	25	31	753	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	25	14	106	5	29	5	1384	67	51	1512	1281
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.78	0.78	0.03	0.81	0.81
Sat Flow, veh/h	993	464	265	890	91	540	1781	1770	85	1781	1870	1585
Grp Volume(v), veh/h	13	0	0	62	0	0	2	0	543	31	753	17
Grp Sat Flow(s),veh/h/ln	1723	0	0	1521	0	0	1781	0	1855	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	9.0	1.7	12.9	0.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.0	0.0	0.0	0.1	0.0	9.0	1.7	12.9	0.2
Prop In Lane	0.69		0.15	0.61		0.35	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	154	0	0	140	0	0	5	0	1451	51	1512	1281
V/C Ratio(X)	0.08	0.00	0.00	0.44	0.00	0.00	0.42	0.00	0.37	0.60	0.50	0.01
Avail Cap(c_a), veh/h	347	0	0	334	0	0	98	0	1451	116	1512	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	0.0	46.6	0.0	0.0	49.8	0.0	3.4	48.0	3.1	1.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.2	0.0	0.0	48.5	0.0	0.7	10.8	1.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.6	0.0	0.0	0.1	0.0	2.2	0.9	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.3	0.0	0.0	48.8	0.0	0.0	98.3	0.0	4.1	58.8	4.2	1.9
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		13			62			545			801	
Approach Delay, s/veh		45.3			48.8			4.4			6.3	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	82.7		9.9	4.8	85.3		9.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	61.5		18.5	5.5	62.5		18.5				
Max Q Clear Time (g_c+I1), s	3.7	11.0		2.7	2.1	14.9		6.0				
Green Ext Time (p_c), s	0.0	3.5		0.0	0.0	5.7		0.2				

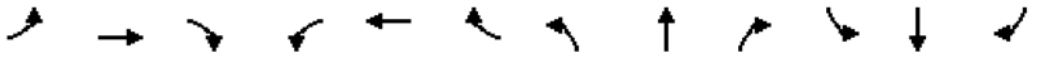
Intersection Summary		
HCM 7th Control Delay, s/veh	7.8	
HCM 7th LOS	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	501	59	10	371	176	66	244	69	218	326	72
Future Volume (vph)	63	501	59	10	371	176	66	244	69	218	326	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	37.0		10.0	32.0		15.0	24.0		29.0	38.0	
Total Split (%)	15.0%	37.0%		10.0%	32.0%		15.0%	24.0%		29.0%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	501	59	10	371	176	66	244	69	218	326	72
Future Volume (veh/h)	63	501	59	10	371	176	66	244	69	218	326	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	522	61	10	386	183	69	254	72	227	340	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	1356	158	22	910	425	89	650	180	264	972	212
Arrive On Green	0.05	0.42	0.42	0.01	0.39	0.39	0.05	0.24	0.24	0.15	0.34	0.34
Sat Flow, veh/h	1781	3206	374	1781	2350	1099	1781	2747	762	1781	2901	632
Grp Volume(v), veh/h	66	289	294	10	290	279	69	162	164	227	207	208
Grp Sat Flow(s),veh/h/ln	1781	1777	1803	1781	1777	1673	1781	1777	1733	1781	1777	1757
Q Serve(g_s), s	3.7	11.2	11.3	0.6	12.0	12.2	3.8	7.7	8.0	12.4	8.7	9.0
Cycle Q Clear(g_c), s	3.7	11.2	11.3	0.6	12.0	12.2	3.8	7.7	8.0	12.4	8.7	9.0
Prop In Lane	1.00		0.21	1.00		0.66	1.00		0.44	1.00		0.36
Lane Grp Cap(c), veh/h	85	751	762	22	688	647	89	421	410	264	595	588
V/C Ratio(X)	0.77	0.38	0.39	0.46	0.42	0.43	0.77	0.39	0.40	0.86	0.35	0.35
Avail Cap(c_a), veh/h	187	751	762	98	688	647	187	421	410	436	595	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	19.9	19.9	49.1	22.5	22.5	46.9	32.1	32.2	41.6	25.0	25.1
Incr Delay (d2), s/veh	13.7	1.5	1.5	14.6	1.9	2.1	13.2	2.7	2.9	9.0	1.6	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	4.6	0.3	5.0	4.8	2.0	3.5	3.5	5.9	3.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.8	21.4	21.4	63.7	24.4	24.6	60.1	34.7	35.1	50.6	26.6	26.8
LnGrp LOS	E	C	C	E	C	C	E	C	D	D	C	C
Approach Vol, veh/h		649			579			395			642	
Approach Delay, s/veh		25.4			25.2			39.3			35.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	46.8	9.5	38.0	9.3	43.2	19.3	28.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	32.5	10.5	33.5	10.5	27.5	24.5	19.5
Max Q Clear Time (g_c+I1), s	2.6	13.3	5.8	11.0	5.7	14.2	14.4	10.0
Green Ext Time (p_c), s	0.0	2.9	0.0	2.2	0.0	2.5	0.4	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	30.5
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	47.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	67	2	23	10	2	43	21	502	15	71	673	76
Future Vol, veh/h	67	2	23	10	2	43	21	502	15	71	673	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	2	24	10	2	45	22	523	16	74	701	79
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

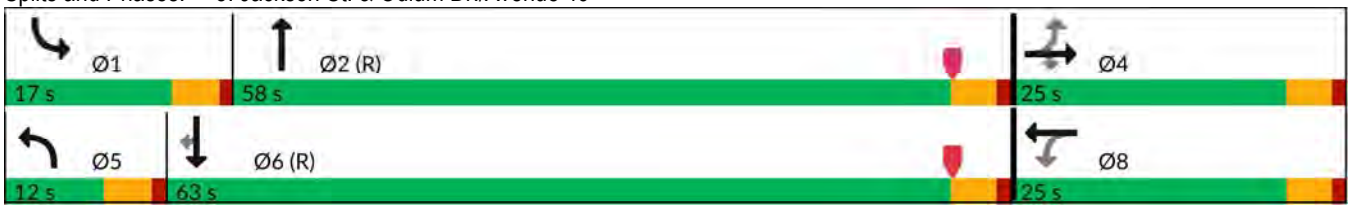
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	13.7	12.8	83.5	30.7
HCM LOS	B	B	F	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	97%	0%	18%	100%	0%	0%
Vol Thru, %	0%	97%	3%	0%	4%	0%	100%	75%
Vol Right, %	0%	3%	0%	100%	78%	0%	0%	25%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	517	69	23	55	71	449	300
LT Vol	21	0	67	0	10	71	0	0
Through Vol	0	502	2	0	2	0	449	224
RT Vol	0	15	0	23	43	0	0	76
Lane Flow Rate	22	539	72	24	57	74	467	313
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.047	1.069	0.183	0.053	0.134	0.15	0.881	0.574
Departure Headway (Hd)	7.671	7.144	9.533	8.31	8.737	7.508	6.999	6.819
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	464	506	379	434	413	481	523	532
Service Time	5.465	4.937	7.233	6.01	6.437	5.208	4.699	4.519
HCM Lane V/C Ratio	0.047	1.065	0.19	0.055	0.138	0.154	0.893	0.588
HCM Control Delay, s/veh	10.8	86.5	14.4	11.5	12.8	11.5	42	18.3
HCM Lane LOS	B	F	B	B	B	B	E	C
HCM 95th-tile Q	0.1	16.4	0.7	0.2	0.5	0.5	9.8	3.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	25.0	25.0	25.0	25.0	25.0		12.0	58.0		17.0	63.0	63.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		12.0%	58.0%		17.0%	63.0%	63.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (veh/h)	67	2	23	10	2	43	21	502	15	71	673	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	2	24	10	2	45	22	523	16	74	701	79
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	3	123	48	13	69	41	1324	41	96	2716	1211
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.08	0.02	0.73	0.73	0.05	0.76	0.76
Sat Flow, veh/h	1248	36	1585	76	161	890	1781	1805	55	1781	3554	1585
Grp Volume(v), veh/h	72	0	24	57	0	0	22	0	539	74	701	79
Grp Sat Flow(s),veh/h/ln	1284	0	1585	1127	0	0	1781	0	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.4	0.1	0.0	0.0	1.2	0.0	10.9	4.1	5.8	1.2
Cycle Q Clear(g_c), s	5.6	0.0	1.4	5.7	0.0	0.0	1.2	0.0	10.9	4.1	5.8	1.2
Prop In Lane	0.97		1.00	0.18		0.79	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	171	0	123	130	0	0	41	0	1364	96	2716	1211
V/C Ratio(X)	0.42	0.00	0.19	0.44	0.00	0.00	0.54	0.00	0.40	0.77	0.26	0.07
Avail Cap(c_a), veh/h	345	0	325	328	0	0	134	0	1364	223	2716	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	43.2	44.1	0.0	0.0	48.3	0.0	5.0	46.7	3.5	2.9
Incr Delay (d2), s/veh	1.6	0.0	0.8	2.3	0.0	0.0	10.7	0.0	0.9	12.4	0.2	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.6	1.4	0.0	0.0	0.6	0.0	3.1	2.1	1.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.8	0.0	43.9	46.4	0.0	0.0	59.0	0.0	5.9	59.1	3.7	3.0
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		96			57			561			854	
Approach Delay, s/veh		46.0			46.4			7.9			8.4	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	77.8		12.3	6.8	80.9		12.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	12.5	53.5		20.5	7.5	58.5		20.5				
Max Q Clear Time (g_c+I1), s	6.1	12.9		7.6	3.2	7.8		7.7				
Green Ext Time (p_c), s	0.1	3.3		0.3	0.0	5.1		0.2				

Intersection Summary			
HCM 7th Control Delay, s/veh		11.9	
HCM 7th LOS		B	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	28	47	478	690	62
Future Volume (vph)	38	28	47	478	690	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	28	47	478	690	62
Future Vol, veh/h	38	28	47	478	690	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	29	49	503	726	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1361	759	792	0	-	0
Stage 1	759	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	163	406	829	-	-	-
Stage 1	462	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	154	406	829	-	-	-
Mov Cap-2 Maneuver	154	-	-	-	-	-
Stage 1	435	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	30.6	3 0.86	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	829	-	209	-	-
HCM Lane V/C Ratio	0.06	-	0.333	-	-
HCM Control Delay (s/veh)	9.6	-	30.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	31	16	2	19	9
Future Volume (vph)	2	31	16	2	19	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	31	16	2	19	9
Future Vol, veh/h	2	31	16	2	19	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	33	17	2	20	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	54	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1577	-	954	1060
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1577	-	944	1060
Mov Cap-2 Maneuver	-	-	-	-	944	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	6.5	8.79
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1575	-
HCM Lane V/C Ratio	0.03	-	-	0.011	-
HCM Control Delay (s/veh)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Appendix G
Calhoun Street Housing Development Vehicle Miles Traveled Screening Assessment

URBAN | CROSSROADS

June 18, 2024

Mr. Andrew Simmons, P.E.
City of Coachella
53990 Enterprise Way
Coachella, CA 92236

CALHOUN STREET SUBDIVISION VEHICLE MILES TRAVELED (VMT) SCREENING

Mr. Andrew Simmons, P.E.,

Urban Crossroads, Inc. is pleased to provide the following Vehicle Miles Traveled (VMT) Screening for the Calhoun Street Subdivision development (Project), which is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella.

PROJECT OVERVIEW

It is our understanding that the Project is to consist of 258 dwelling units and an 1.5 acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1. Access to the Project is provided via two full access driveways (Access 1 at Calhoun Street and Access 2 at Avenue 49), and one right-in/right-out only access for the park (Access 3 at Calhoun Street).

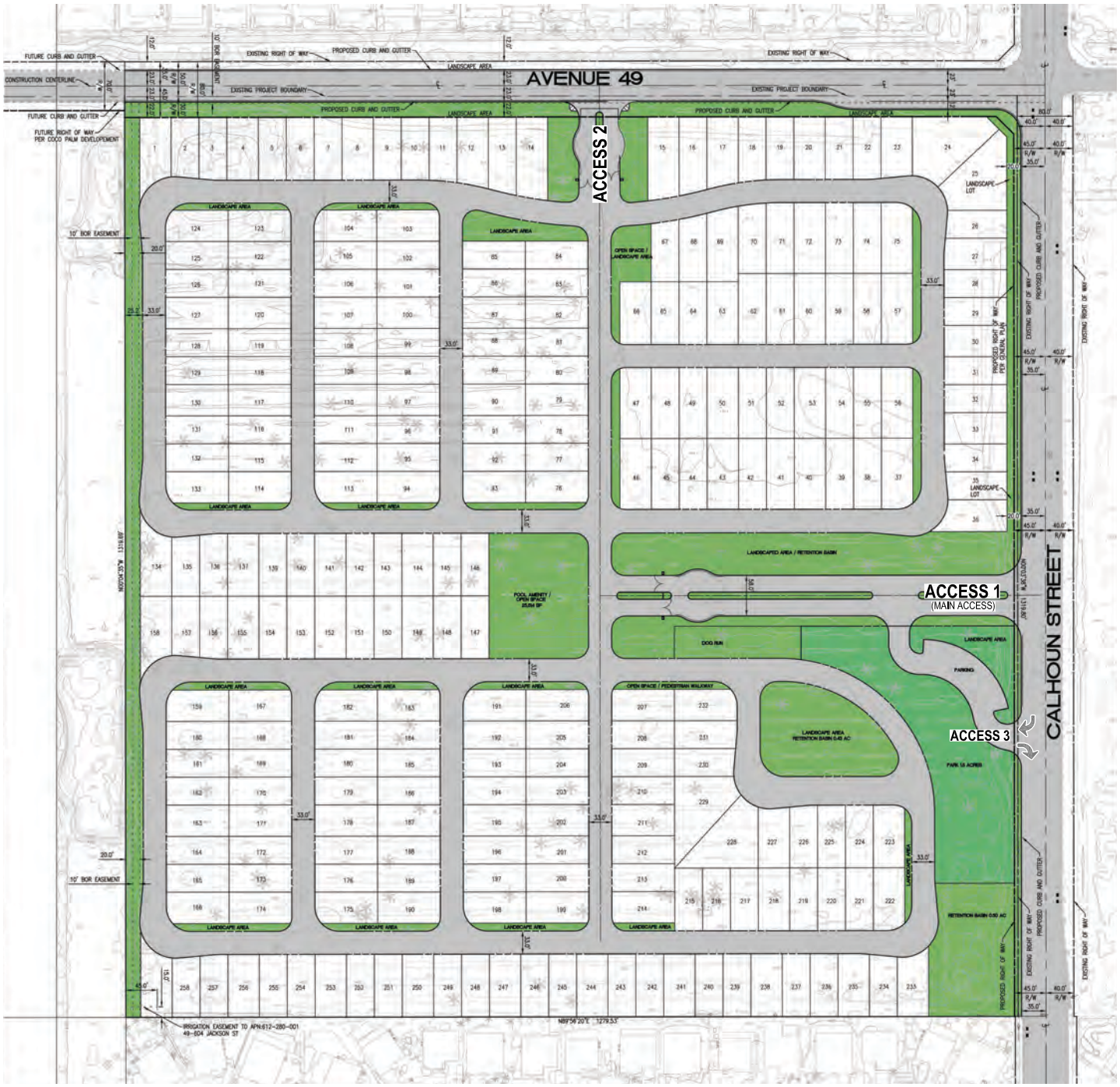
BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**) (1). Based on OPR's Technical Advisory, the County of Riverside adopted their Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled (December of 2020) (**County Guidelines**) (2). The City of Coachella utilizes the adopted County Guidelines.

Consistent with County Guidelines, projects should evaluate available screening criteria based on their location and project type to determine if a presumption of a less than significant transportation impact can be made. The following project screening thresholds were selected for review based on their applicability to the proposed Project:

- Small Projects Screening
- High Quality Transit Areas (HQTA) Screening
- Map-Based Screening
- Local Essential Service Screening

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

▪ RIGHT-IN/RIGHT-OUT ONLY

N

SMALL PROJECTS SCREENING

County Guidelines identify those projects forecasted to generate greenhouse gas (GHG) emissions below 3,000 Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$) per year are also assumed to cause a less than significant VMT impact.[1] The County Guidelines provides a list of land use types based on quantity (i.e., dwelling units or square footage) and provides a typical development potential to be below the 3,000 $MTCO_2e$ per year. Single Family Housing projects less than or equal to 110 dwelling units have been identified to meet the County threshold[2].

The Project quantity of 258 dwelling units is more than the residential VMT screening criteria.

Small Projects screening criteria is not met.

HIGH QUALITY TRANSIT AREAS (HQTA) SCREENING

Projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[3] or an existing stop along a "high-quality transit corridor"[4]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. The Project is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

HQTA screening criteria is not met.

MAP-BASED SCREENING

The County Guidelines note that "residential projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT."[5] Urban Crossroads has obtained a VMT data table from County Staff for all TAZs within Riverside County that identifies VMT per capita for the purposes of identifying low VMT areas. The data utilizes the sub-regional Riverside Transportation Analysis Model (RIVTAM) to measure baseline VMT performance, and a comparison was made to the applicable impact threshold.

The Project's TAZ was identified in the Riverside County Transportation Analysis Model (RIVTAM) as TAZ 4787.

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[1] County Guidelines; Page 19.
[2] County Guidelines; Page 42, Table 1
[3] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[4] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").
[5] Technical Advisory; Page 12

The County's data table identifies the Project's TAZ 4787 to generate 7.974 VMT per capita. The County regional threshold is 15.2 VMT per capita[6]; therefore the Project is located in a low VMT area.

Map-Based screening criteria is met for residential.

LOCAL ESSENTIAL SERVICE SCREENING

The introduction of new local essential services shortens non-discretionary trips by putting those goods and services closer to complimentary land uses, resulting in conditions which do not increase overall VMT. The park with dog run provides a local service to adjacent land uses that otherwise attract travelers from more distant locations; therefore, the park with dog run is presumed to not increase overall VMT.

Local Essential Service screening criteria is met for park with dog run.

CONCLUSION

In summary, the Project was evaluated consistent with available screening criteria as presented in the County Guidelines. The map based screening criteria is met for residential uses and the local essential service screening criteria is met for park with dog run, so a full analysis of VMT associated with site is not required. The Project is presumed to have a less than significant impact on VMT.

If you have any questions, please contact us at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

Respectfully submitted,

URBAN CROSSROADS, INC.

John Kain, AICP
Principal

Marlie Whiteman, P.E.
Senior Associate

[6] County Guidelines; Page 22

REFERENCES

1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.

2. **County of Riverside.** *Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled.* County of Riverside : s.n., December 2020.

Calhoun Street Housing Development
Environmental Assessment EA 25-02
Tentative Tract Map TTM 39051
Conditional Use Permit 390
Planned Unit Development

Response to Comments

The City received 3 comment letters to the Initial Study/Mitigated Negative Declaration (ISMND) for the Calhoun Street Housing Development (Project). Comment Letters were received from the Department of Toxic Substance Control, U.S Fish and Wildlife Services, and the California Department of Fish and Wildlife. Responses to each letter are provided below. The comment letters are provided in Appendix A.

A. Department of Toxic Substance Control
Letter dated November 21, 2025

Comment 1:

The Department of Toxic Substances Control (DTSC) reviewed the Mitigated Negative Declaration (MND) for the Calhoun Street Housing Development (Project). The proposed Project is a Tentative Tract Map, Environmental Assessment, Conditional Use Permit and Planned Unit Development for a single-family residential project. The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres. DTSC recommends and requests consideration of the following comments:

Response 1:

The commenter describes the Project, and no further response is required. Responses to individual issues raised by the commenter are provided individually below.

Comment 2:

1. When agricultural crops and/or land uses are proposed or rezoned for residential use, several contaminants of concern (COCs) can be present. The Lead Agency shall identify the amounts of Pesticides and Organochlorine Pesticides (OCPs) historically used on the property. If present, OCPs requiring further analysis aredichloro-diphenyl-trichloroethane, toxaphene, and dieldrin. Additionally, any level of arsenic present would require further analysis and sampling and must meet approved local area baselines or thresholds. If they do not, remedial action must take place to mitigate them below those thresholds. Additional COCs may be found in mixing/loading/storage areas, drainage ditches, farmhouses, or any other outbuildings and should be sampled and analyzed. If smudge pots had been routinely utilized, additional sampling for Polycyclic Aromatic Hydrocarbons and/or Total Petroleum

Hydrocarbons may be required. These recommendations should be adhered to and become part of the environmental document. Please refer to the DTSC's Human and Ecological Risk Office (HERO) webpage for the most recent guidance and screening levels.

Response 2:

The comment is noted. As noted in Section IX, Hazards and Hazardous Materials, the Project will be subject to all local, regional and state requirements, including the levels of the chemicals identified in the comment. Traditionally, high levels of agricultural chemicals have not been identified in Coachella Valley farming activities. The City thanks the commenter for the information provided, and will condition the Project to provide soil sampling results with the submittal of grading plans. This local requirement will assure that impacts associated with these chemicals remain less than significant.

Comment 3

2. DTSC recommends all imported soil/fill material be tested to ensure all COCs meet screening levels as outlined in DTSC's Preliminary Endangerment Assessment Guidance Manual. Furthermore, DTSC advises referencing the DTSC Information Advisory Clean Imported Fill Material Fact Sheet if importing fill is necessary. To minimize the possibility of introducing contaminated soil/fill material there should be documentation of the origins of the soil/fill material and, if applicable, sampling be conducted to ensure that the imported soil/fill material are suitable for the intended land use. The soil sampling should include analysis based on the source of the soil/fill and knowledge of prior land use.

Response 3:

The City thanks the commenter for the information provided. Clean fill is a requirement for all imported soils into any project in the City, and its origin must be documented. Furthermore, the Project geologist will monitor grading and certify the pads for the Project, also insuring that oversight occurs during grading.

Comment 4:

3. The City of Coachella should consider soil testing as mentioned in comment #1. If, in the event any COC results are above DTSC residential screening levels, DTSC recommends the City of Coachella address the contaminations within the Project area through an Environmental Site Assessment and/or receive oversight from a self-certified local agency, DTSC or Regional Water Quality Control Board. If entering into one of DTSC's voluntary agreements, please note that DTSC uses a single standard Request for Lead Agency Oversight Application for all agreement types. Please apply for DTSC oversight using this link: Request for Agency Oversight Application. Submittal of the online application includes an agreement to pay costs incurred during agreement preparation. If you have any questions about the application portal, please contact the relevant Regional Brownfield Coordinator for your Project.

Response 4:

The commenter's recommendations are noted. Please also see Response 1.

Comment 5:

DTSC would like to thank you for the opportunity to comment on the MND for the Calhoun Street Housing Development. Thank you for your assistance in protecting California's people and environment from the harmful effects of toxic substances. If you have any questions or would like clarification on DTSC's comments, please respond to this letter or via our CEQA Review email for additional guidance.

Response 5:

The City thanks the Department for participating in the City's CEQA process for this Project.

B. U.S. Fish and Wildlife Service
Letter dated December 4, 2025

Comment 1:

This letter is in response to the notice of availability dated November 18, 2025, soliciting comments on the draft Initial Study Mitigated Negative Declaration (ISMND) for the Calhoun Street Housing Development Project (Project), located in the City of Coachella, Riverside County, California. The proposed Project site is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella (City) and is bounded along the west perimeter by lands within the City of Indio, California.

We offer the following comments on the ISMND as they relate to potential impacts on public trust resources. The primary concern and mandate of the U.S. Fish and Wildlife Service (Service) is the conservation, protection, and enhancement of fish and wildlife resources and their habitats for the continuing benefit of the American people. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and threatened or endangered animals and plants listed under the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.). The comments provided herein are based on the information provided in the ISMND and our knowledge of sensitive and declining fish and wildlife resources.

The Project site is within the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) Area, and the City is a Local Permittee to the CVMSHCP. The Project applicant proposes to subdivide the 39.98 acres (ac) Project site for a future build of a private, gated residential community containing 257 single-family homes and a 3.53-ac public park, with 3.13-ac for recreational open space and 0.40 ac for a landscaped retention basin. The proposed Project also includes right-of-way allowances for future road improvements along Avenue 49 and Calhoun Street. The Project site is surrounded by single-family residential land uses on the north, south, and west, and a vacant lot occurs on the east of the Project site. Currently, the Project site is zoned as "General Neighborhood" in the City's General Plan 2035 Update. The applicant proposes a Planned Unit Development that would permit flexible standards for smaller lot sizes and a higher density for a private gated community than the Project site's current designation allows.

Response 1:

The comment relates the Service's role and provides a project description. Responses to the Service's primary concerns are provided below:

Comment 2:

NESTING BIRDS

The draft ISMND states that a field assessment occurred on February 29, 2024. The field assessment included the 39.98-ac Project site and a 500-foot buffer zone. The Project site, which previously hosted a date palm grove, contains rows of leftover date palms on the southern and western portions of the site. The northeast portion is graded and has not been used to grow dates since 2002. Sparse perennial vegetation occurs throughout the Project site, particularly under the remaining date palms and in the northwest corner, which contains a small irrigation reservoir. The draft ISMND states that due to existing site disturbances, including the previous date palm grove, grading, and recent off-road vehicle use and dumping of trash, the probability of special status-species occurring on the site is low. No special-status species, including nesting birds, were observed during the field assessment; however, the draft ISMND notes that due to the existing vegetative scrub and date palms, the Project site may still be used by resident and migratory nesting birds.

Due to the presence of sparse vegetation throughout the Project site, the Service agrees that special-status species have the potential to occur within the Project site. The presence of sparse vegetation, particularly cover of shrubs, is suitable habitat for ground-nesting birds. Moreover, the presence of bare ground on the northeast portion of the Project site also constitutes suitable nesting habitat for some ground-nesting birds. Therefore, the proposed development has the potential to impact nesting birds. However, the ISMND does not indicate that focused nesting bird surveys were completed, likely contributing to the lack of nesting bird observations during the field assessment. Focused nesting bird surveys, both within and outside of nesting season, are necessary to accurately confirm nesting bird presence or absence. A complete assessment of the biological resources within the Project area is required to assess the Project's potential impacts to nesting birds. Please revise the ISMND to include a complete assessment of the Project's potential impacts to nesting bird habitat, including completion of nesting bird surveys during the appropriate time of year, to determine the extent of nesting birds on the Project site.

The draft ISMND includes Mitigation Measure (MM) BIO-1, which states that "[b]ird nesting season for resident birds in Southern California occurs between February 1 and August 31." Please note that the timing of nesting season is highly variable. Changing climate conditions have resulted in nesting birds breeding both earlier and later in the year than suggested in previous guidance. Nesting season may generally be considered to occur between January and October; however, timing varies on a species-by-species basis. Coordination with the Service and the California Department of Fish and Wildlife (CDFW; collectively, the Wildlife Agencies) is necessary to determine appropriate timing of nesting season surveys. Additionally, to address the variability in nesting season, we recommend that MM-BIO-1 be revised to require nesting bird surveys throughout construction, both within and outside of nesting season, to avoid any potential adverse effects to nesting.

Response 2:

The comment is noted. However, the need for nesting bird surveys at this time is not supported by substantial evidence. The Project biologist and the Initial Study clearly identify that there is potential for nesting birds on the property, even in its degraded condition, provides an assessment of the likely species, and states that there could be impacts to MBTA covered species (pages 37-40). To mitigate any impacts on MBTA covered species, the Initial Study provides for pre-construction bird surveys consistent with MBTA requirements. Finally, as it relates to the commenter's request that nesting bird surveys be conducted throughout construction, the request is made without evidence that birds could nest on the site once it is cleared of vegetation. The Initial Study correctly identified the impact, and provided mitigation which will reduce impacts to less than significant levels. No change is required.

Comment 3:

BURROWING OWL

The draft ISMND states that marginally suitable habitat for western burrowing owl (*Athene cunicularia hypugaea*; burrowing owl), a CVMSHCP-Covered Species, Service Bird of Conservation Concern, and candidate species under the California Endangered Species Act, occurs intermittently throughout the Project site, and suitable California ground squirrel burrows were observed during the field assessment. Additionally, the draft ISMND states that the Project site is largely disturbed. Burrowing owl are known to occupy disturbed habitat; therefore, due to the presence of disturbed habitat, sparse vegetation, and suitable burrows within the Project area, the Service agrees with the conclusion that suitable habitat for burrowing owl occurs on the Project site, and burrowing owls have the potential to inhabit the site. No burrowing owls or signs of burrowing owls were observed during the field assessment; however, the draft ISMND does not indicate completion of focused burrowing owl surveys. Focused burrowing owl surveys during the breeding season and nonbreeding season are necessary to accurately confirm burrowing owl presence or absence. Pursuant to the CDFW Staff Report on Burrowing Owl Mitigation (2012 or most recent version), for both breeding and non-breeding season surveys, a minimum of four survey visits are required to assess a site for burrowing owl presence. Given the lack of multiple, focused burrowing owl surveys, the total number of burrowing owl individuals or suitable and occupied burrows within the Project site and 500-foot buffer is unknown. Please revise the draft ISMND to include an accurate assessment of the Project's potential impacts to burrowing owl, including focused survey results following the protocols outlined in the 2012 Staff Report on Burrowing Owl Mitigation.

MM BIO-2 states that burrowing owl avoidance surveys must be conducted immediately preceding development, including 14-30 days prior to initiating ground disturbance activities, and within 24 hours of ground disturbance, in compliance with the 2012 Staff Report on Burrowing Owl Mitigation. As stated in the 2012 Staff Report on Burrowing Owl Mitigation, burrowing owls may re-colonize a Project site should any time lapses between Project activities occur. Such time lapses would trigger subsequent take avoidance surveys, which may include a final survey conducted within 24 hours prior to ground disturbance. Due to the potential for burrowing owl to occur throughout the construction period, in addition to focused surveys (breeding season and

non-breeding season) and take avoidance surveys prior to initiating ground disturbance, additional surveillance monitoring surveys for burrowing owls should be continued throughout construction to avoid any potential impacts to burrowing owl [see the 2012 Staff Report, Site Surveillance (page 9), Appendix D, Take Avoidance Surveys (page 29-30)].

MM BIO-2 also states that "Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls." As stated above, burrowing owl is a Covered Species under the CVMSHCP. The CVMSHCP is governed by both CDFW's Natural Community Conservation Plan Permit and the Service's section 10(a)(1)(B) permit issued under the Act. Although burrowing owl is not a federally listed species under the Act, a non-listed species covered in a Habitat Conservation Plan (HCP) must be treated as if it were already listed, and all conservation measures described in the HCP for that species must be fully implemented. Please revise MM BIO-2 to require that, if the focused surveys and/or pre-construction surveys confirm burrowing owl presence, the Project applicant shall submit a Burrowing Owl Plan that includes avoidance, minimization, and mitigation measures to both Wildlife Agencies for review and approval prior to any ground disturbance or vegetation removal. The Project proponent shall coordinate with the Wildlife Agencies on the appropriate avoidance, minimization, and mitigation measures to be included in the Burrowing Owl Plan. Per Section 4.4 and Section 8.5.2 of the CVMSHCP, relocation of burrowing owls must follow protocols accepted by the Wildlife Agencies, and active relocation and eviction/passive relocation must be determined through coordination with the Wildlife Agencies for all Covered Activities. As such, please revise MM BIO-2 to state that if avoidance of burrowing owl is not possible, the Project applicant shall coordinate with both Wildlife Agencies on a burrowing owl relocation plan. Additionally, please include language that states that the Project proponent shall submit the relocation plan to the Wildlife Agencies for review and approval. Both the Burrowing Owl Plan and relocation plan should be submitted to the Wildlife Agencies for review and approval as soon as possible to avoid project delays due to the burrowing owl breeding season. These measures are necessary for the City in fulfilling its obligations as a CVMSHCP Permittee.

Response 3:

The Initial Study clearly states that burrowing owl and their sign were not identified on the Project site (page 37-40). The habitat is marginal. Further, burrowing owl in the Coachella Valley are not migratory. Therefore, although an owl could relocate to the site prior to its construction, there is no need for seasonal surveys. On the other hand, BIO-2 clearly requires pre-construction surveys, which will establish conditions on the site prior to disturbance, and allow for their safe relocation, if necessary, at that time should they occur. In addition, the mitigation measure specifically states that pre-construction surveys be conducted in compliance with the CDFW Staff Report, which includes specific measures required for relocation plans if required. The Initial Study correctly identifies the potential impact and provides mitigation that will ensure that impacts to burrowing owl remain less than significant, if the species were to occur on the Project site. No change to the Initial Study is required.

Comment 4:

WESTERN YELLOW BAT

The draft ISMND states that roosting habitat for the western yellow bat (*Lasiurus xanthinus*), a CVMSHCP-Covered Species, is absent on the Project site, and probability of foraging is low. The draft ISMND concludes that the western yellow bat is absent from the Project site. Western yellow bat habitat includes valley foothill riparian, desert riparian, desert wash, and palm oasis habitats, and the species typically roosts in the skirt of dead fronds of fan palms. Western yellow bat has been documented to roost in both native and non-native palm trees, and additional information has shown that they may roost in the dead fronds of other plants with structural similarities to fan palms. Additionally, the species has also been documented to occur in open grassy areas, residential areas, over swimming pools, and in orchards. Dead palm fronds occur within the fallow date palm grove portion of the Project site, and the Project site and surrounding residential areas may provide foraging opportunities; therefore, the Service considers the Project site to contain suitable habitat for western yellow bat, and western yellow bat have the potential to occur within the Project site.

The draft ISMND indicates that western yellow bats were not observed during the field assessment. However, the draft ISMND does not indicate completion of focused bat surveys, likely contributing to the lack of western yellow bat observations during the field assessment. Focused bat surveys are necessary to accurately confirm the presence or absence of special-status bat species. Please revise the draft ISMND to include a complete assessment of the Project's potential impacts to bat habitat, including completion of focused bat surveys following accepted survey methods, to accurately determine the extent of bats on and adjacent to the proposed Project site. In addition to focused surveys, pre-construction clearance surveys are necessary to avoid any potential impacts to western yellow bat. Please revise the draft ISMND to require bat pre-construction surveys conducted by a qualified biologist, with detailed information regarding the survey methods, including the number of days of acoustic monitoring, emergence roost counts, and number of roost count observers included. Additionally, please note that multiple surveys are required during the maternity season to accurately document roost activity. A minimum of two surveys during the maternity season, one during spring and one during summer, are required. In addition to bat maternity season surveys, a winter survey and migration period survey should also be required to identify presence of bats in the Project site throughout the year. If special status bats are determined to be present at the Project site, please coordinate with the Service on implementation of the appropriate avoidance, minimization, and mitigation measures prior to beginning project activities.

We appreciate the opportunity to provide comments on the draft ISMND. If you have any questions regarding these comments, please contact Lory Salazar-Velasquez.

Response 4:

As stated in the IS (Table IV-1), there is no roosting habitat for western yellow bat, and it is a covered species under the CVMSHCP. The habitat on the site is highly degraded, and only scattered date palms remain. As such, there is no need for bat surveys, and the provisions of

the CVMSHCP apply. The applicant will be required to pay the MSHCP fee at the time of development. No change to the Initial Study is required.

The City thanks the Service for participating in the CEQA process.

C. California Department of Fish and Wildlife
Letter dated December 8, 2025

Comment 1:

The California Department of Fish and Wildlife (CDFW) received a Draft Mitigated Negative Declaration (MND) from the City of Coachella (City) for the Project pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.1

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife.

Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE
CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on Projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY
Proponent: Pacific Modern Builders LLC

Objective: The Project proposes to subdivide the Project site for a future build out of a residential community containing 257 single-family homes and a public park with a total area of 3.53 acres, 3.13 acres for recreational open space, and four retention basins that will accept all on-site flows.

Construction activities would occur during the day, and there would be no need to apply nighttime security lighting on the Project site. Construction activities would not introduce new sources of light or glare. Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought-tolerant trees and bushes.

Location: The Project site is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, Riverside County, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number 612-260-010.

Timeframe: The MND indicates that construction activities would be completed by 2026.

Response 1:

The comment is noted. It provides a description of the Project and requires no further response.

Comment 2:

COMMENTS AND RECOMMENDATIONS
CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (i.e., biological resources). CDFW offers the comments and recommendations below to assist the City in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. The MND has not adequately identified and disclosed the Project's impacts (i.e., direct, indirect, and cumulative) on biological resources and whether those impacts are reduced to less than significant.

CDFW's comments and recommendations on the MND are explained in greater detail below and summarized here. CDFW is concerned that the MND does not adequately identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW also concludes that the MND lacks sufficient information to facilitate a meaningful review by CDFW, including a complete and accurate assessment of biological resources on the Project site. CDFW requests that additional information and analyses be added to a revised MND, along with avoidance, minimization, and mitigation measures that avoid or reduce impacts to less than significant.

<u>Existing Environmental Setting</u>

Compliance with CEQA is predicated on a complete and accurate description of the environmental setting that may be affected by the proposed Project. CDFW is concerned that the assessment of the existing environmental setting has not been adequately analyzed in the MND. CDFW is concerned that without a complete and accurate description of the existing environmental setting, the MND may provide an incomplete analysis of Project-related environmental impacts.

The MND lacks a complete assessment of biological resources associated with burrowing owl (*Athene cunicularia*) and western yellow bat (*Lasiurus xanthinus*) within the Project site and surrounding area. A complete and accurate assessment of the environmental setting and Project-related impacts to biological resources is needed to both identify appropriate avoidance, minimization, and mitigation measures and demonstrate that these measures reduce Project impacts to less than significant.

Response 2:

The comment is noted. The comment is overbroad and non-specific. Individual responses to burrowing owl and western yellow bat concerns are provided below.

Comment 3:

Mitigation Measures

CEQA requires that an MND include mitigation measures to avoid or reduce significant impacts. CDFW is concerned that the mitigation measures proposed in the MND are not adequate to avoid or reduce impacts to biological resources to below a level of significance. To support the City in ensuring that Project impacts to biological resources are reduced to less than significant, CDFW recommends adding mitigation measures for surveys for bats, avoidance of bats during tree removal, artificial nighttime lighting, and compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), as well as revising the mitigation measures for nesting birds and burrowing owls.

1) Nesting Birds

It is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Codeor any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

With regard to the CVMSHCP, per its associated Implementing Agreement (IA) and Permits from CDFW and the U.S. Fish and Wildlife Service (the Wildlife Agencies), Take associated with Covered Activities will not be in violation of the Migratory Bird Treaty Act and will be consistent with Fish and Game Code sections 3503 and 3503.5; therefore, all Covered Activities within and outside Conservation Areas must undertake measures to avoid the take of individuals, nests, and eggs of nesting birds. The CVMSHCP includes a general conservation measure that applies to all bird species to avoid impacts to habitat for nesting birds during the nesting season (CVMSHCP Section 9.7). Per IA Section 13.2, the City is obligated to ensure the projects to which it confers Take Authorization under the CVMSHCP comply with all terms and

requirements of the CVMSHCP, the Wildlife Agencies' Permits that create the CVMSHCP, and the IA, including compliance with laws that protect nesting birds..

Page 39 of the MND indicates that "existing vegetative scrub and date palms found on the Project site could potentially be used by both resident and migratory nesting birds." CDFW adds that the Project site contains suitable habitat for both ground-nesting birds and birds that nest in shrubs and trees.

The MND includes Mitigation Measure BIO-1 for nesting birds, which indicates that the "bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity." CDFW considers the mitigation measure for nesting birds in the MND to be inadequate in scope and timing to avoid or reduce impacts to nesting birds to a level less than significant. In alignment with the CVMSHCP's general conservation measure for nesting birds (CVMSHCP Section 9.7), CDFW recommends Project construction activities are conducted outside of the peak nesting bird season. CDFW also recommends the completion of nesting bird surveys *regardless* of the time of year to ensure that impacts to nesting birds and their nests and eggs are avoided. The timing of the nesting season varies greatly depending on several factors, such as bird species, weather conditions in any given year, and long-term climate changes (e.g., drought, warming, etc.). In response to warming, birds have been reported to breed earlier, thereby reducing temperatures that nests are exposed to during breeding and tracking shifts in availability of resources (Socolar et al., 2017[2]). CDFW staff have observed that climate change conditions may result in the nesting bird season occurring earlier and later in the year than historical nesting season dates. CDFW recommends that disturbance of occupied nests of migratory birds and raptors within the Project site and surrounding area be avoided any time birds are nesting on-site. CDFW therefore recommends the completion of nesting bird surveys *regardless of the time of year* to ensure compliance with all applicable laws pertaining to nesting and migratory birds.

To support the City in avoiding or reducing impacts to nesting birds to a level less than significant, CDFW recommends Mitigation Measure BIO-1 is revised as follows, with additions in **bold** and removals in ~~strikethrough~~:

Mitigation Measure BIO-1: Nesting Birds
To the greatest extent feasible, the Project will avoid construction activities during the peak nesting season (January 15 through September 15). Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting

phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on-site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance. ~~Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre- construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.~~

Pursuant to the CEQA Guidelines, section 15097(f), CDFW has prepared a draft mitigation monitoring and reporting program (MMRP) in Attachment 1 for revised MM BIO-1 and MM BIO-2, as well as CDFW-recommended MM BIO-[A], MM BIO-[B], MM BIO-[C], and MM BIO-[D].

Response 3:

The comment is noted. However, the commenter appears to imply that birds may nest on the site outside of the established nesting period, outside of that recommended through MBTA. The City's responsibility is to assure that nesting birds are not disturbed, and that construction be avoided until the young have fledged. It is important to note that MBTA covered species include almost all bird species that could nest on the site, and that since a pre-construction survey will be required, all birds nesting on the site will be identified, regardless of MBTA status. The Initial Study mitigates impacts to nesting bird species to less than significant levels as written. The mitigation measure and the Initial Study correctly protect nesting birds, and do not require amendment.

Comment 4:

2) Burrowing Owl

On October 10, 2024, the Fish and Game Commission determined that western burrowing owl warrants protection as a candidate species under the California Endangered Species Act (Fish & G. Code, § 2050 et seq.). During the candidacy period, western burrowing owl will be afforded the same protection as threatened and endangered species under CESA. If Project activities, including relocation, could result in take, appropriate CESA authorization (i.e., Incidental Take Permit under Fish and Game Code section 2081) should be obtained prior to commencement of Project activities.

Take of individual burrowing owls and their nests or eggs is defined by Fish and Game Code section 86, and prohibited by sections 3503, 3503.5, and 3513. Take is defined in Fish and Game Code section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill." Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

With regard to the CVMSHCP, the CDFW Natural Community Conservation Plan (NCCP) Permit #2835-2008-001-06 does not provide Take Authorization for burrowing owl individuals, nests, or eggs. To the contrary, section 3.5.6 of the NCCP Permit states burrowing owl "pairs or individuals will not be Taken" and reiterates that the "HCP/NCCP does not authorize Take of [burrowing owl] nests [or] eggs[.]" Therefore, throughout the CVMSHCP area—both within and without Conservation Areas—Permittees must ensure that activities occurring within their jurisdictions do not result in the take, possession, or destruction of burrowing owl individuals, nests, or eggs. Any activity occurring within the CVMSHCP area that results in the take of burrowing owl individuals, nests, or eggs would be unlawful and would not be a Covered Activity under the CVMSHCP. Per IA Section 13.2, the City is obligated to ensure the projects to which it confers Take Authorization under the CVMSHCP comply with all terms and requirements of the CVMSHCP, the Wildlife Agencies' Permits that created the CVMSHCP, and the IA, including compliance with laws that protect burrowing owls.

Page 40 of the MND states that "no burrowing owls, or signs of burrowing owls were observed during the site survey, however, suitable habitat and burrows suitable for burrowing owls were observed on the Project site. Burrowing owls could potentially relocate to the Project site between the time of the site survey and the start of construction due to their attraction to open dry areas and agricultural sites." CDFW agrees that the Project site contains suitable nesting and foraging habitat for burrowing owl. The MND and its supporting documents lack information on whether focused surveys for burrowing owl were conducted and the methods used to conduct any surveys for burrowing owl. Because the MND lacks the findings of recent focused surveys for burrowing owl following the guidelines in the *Staff Report on Burrowing Owl Mitigation*,[3] the number and locations of suitable and occupied burrows within the Project site are unknown. Given the lack of results from focused surveys for burrowing owl following recommended protocols and the lack of survey reports, CDFW is limited in its ability to provide biological expertise to support the City in reducing impacts to burrowing owl to a level less than significant. CDFW recommends that the MND is revised to include the results of four focused surveys for burrowing owl within the entire Project site and surrounding area, including survey reports,[4] following the guidelines outlined in Appendix D of the *Staff Report on Burrowing Owl Mitigation* and to incorporate appropriate avoidance, minimization, and mitigation measures for burrowing owl. Focused surveys are needed to inform appropriate avoidance, minimization, and mitigation

measures and support the City in avoiding or reducing impacts to burrowing owl to a level less than significant. CDFW requests that if burrowing owls are detected during focused surveys, survey results are submitted to the Wildlife Agencies, and the City initiate consultation with the Wildlife Agencies to identify a path forward regarding the protection of burrowing owls.

The MND includes Mitigation Measure BIO-2, which indicates that "to ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted." In addition to pre-construction surveys, CDFW recommends that focused burrowing owl surveys are first conducted and the results submitted to Wildlife Agencies. This provides time for the City and Project proponent to start coordination with the Wildlife Agencies early to identify appropriate avoidance, minimization, and mitigation measures and reduce the chance of Project delays. Without details on focused surveys and appropriate information sharing and coordination with the Wildlife Agencies, CDFW considers Mitigation Measure BIO-2 to be inadequate in scope and timing to avoid or reduce impacts to burrowing owl to a level less than significant.

To support the City in avoiding or reducing impacts to burrowing owl to a level less than significant, CDFW recommends that Mitigation Measure BIO-2 is revised with the following additions in **bold** and removals in ~~strikethrough~~:

Mitigation Measure BIO-2: Burrowing Owl Focused and Pre-Construction Surveys

Suitable burrowing owl habitat has been confirmed on the site; therefore, focused burrowing owl surveys shall be conducted by a CDFW-approved qualified biologist prior to any Project activities, including vegetation- or ground-disturbing activities. CDFW strongly recommends that focused surveys are conducted in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version)[5]. If burrowing owls are detected during the focused surveys, the qualified biologist and Project proponent shall begin coordination with CDFW and USFWS immediately, and shall submit the results of focused surveys to CDFW and USFWS as soon results become available and before commencement of any Project activities, including any vegetation- or ground-disturbing activities. CDFW recommends that the information included in the survey results be consistent with Appendix D of the *Staff Report on Burrowing Owl Mitigation*, including a detailed map showing locations of all burrowing owls, burrowing owl sign, potential burrows, and occupied burrows (occupied means at least one burrowing owl or its sign has been observed within the last three years; may be indicated by owl sign including feathers, pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site); a description of the behavior of burrowing owls during surveys; a description of survey methods; and other items listed in Appendix D of the *Staff Report on Burrowing Owl Mitigation* under "Survey Reports." Consultation with CDFW and USFWS must be completed prior to commencement of any Project activities, including vegetation- or ground-disturbing activities. If impacts to occupied burrowing owl habitat or burrow(s) or burrowing owl individuals, nests, or eggs cannot be avoided, appropriate NCCP (Fish and Game Code section 2835) or CESA authorization (i.e., Incidental Take Permit under Fish and Game Code section 2081(b)) should be obtained from CDFW prior to commencement of Project activities, including vegetation- or ground-disturbing activities.

Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be repeated when there is a pause in construction of more than 30 days. Preconstruction surveys shall be performed by a CDFW-approved qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted and the qualified biologist shall coordinate with CDFW and USFWS. Project activities shall not recommence until consultation with CDFW and USFWS is completed. ~~To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.~~

Response 4:

First, it is noted that the Commission found, in October 2024, that burrowing owl should be considered a candidate for listing. The species has not been listed by the Commission. Further, the biological resource study and the Initial Study correctly identify that no owls or their sign were found on the site, and that habitat is poor, but that the species could utilize existing mammal burrows on the site. Based on the poor habitat and the complete lack of sign, the qualified biologist did not recommend breeding season surveys, nor are they warranted. The Initial Study correctly requires pre-construction surveys “in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols.” These protocols provide detailed performance standards for how the surveys are to be undertaken, and how the biologist is to work with CDFW if the species is identified on-site. The mitigation measure correctly assures that impacts to burrowing owl will remain less than significant, and no change in the Initial Study is required.

Comment 5:

3) Bats

Page 4 of the MND indicates that the Project “site has been partially cleared, although many date palms remain scattered throughout 75% of the parcel while the northeast corner of the parcel is graded and barren.” Regarding the probability for western yellow bat to occur on the Project site, page 39 of the MND indicates the following: “Nesting: Absent. Roosting habitat lacking.” The MND and its supporting documents lack additional information on the presence or avoidance, minimization, or mitigation measures for western yellow bat. CDFW disagrees with the conclusion that no suitable roosting habitat for western yellow bat is located within or adjacent to the Project site. CDFW notes that palm trees are the preferred roost site of western yellow bats, which roost in the attached dead leaf fronds, or “skirts,” of both native and non-native palm trees. Street View imagery using Google Earth and photos included in the Biological Assessment show that some of the date palms within the Project site contain relatively full

"skirts," habitat that is suitable for western yellow bat (and other bat species). CDFW considers the Project site to contain suitable roosting habitat for western yellow bat. Without appropriate avoidance, minimization, and mitigation measures, such as surveys to assess presence and appropriate methods to remove fan palms, CDFW considers the MND to be inadequate in avoiding or reducing impacts to western yellow bat to a level less than significant.

To support the City in avoiding or reducing impacts to western yellow bat to a level less than significant, CDFW recommends that the City add the following mitigation measures to a revised MND:

Mitigation Measure BIO-[A]: Surveys for Daytime, Nighttime, Wintering (Hibernacula), and Maternity Roosting Sites for Western Yellow Bat

Prior to commencing Project activities, a CDFW-approved qualified bat biologist shall perform bat habitat/roosting surveys to determine presence of daytime, nighttime, wintering (hibernacula), and maternity roost sites. Surveys shall be conducted during favorable weather conditions only. Each survey shall consist of one dusk emergence survey (start one hour before sunset and last for three hours), followed by one pre-dawn re-entry survey (start one hour before sunrise and last for two hours), and one daytime visual inspection of all potential roosting habitat on the Project site. Surveys shall be conducted within one 24-hour period. Visual inspections shall focus on the identification of bat sign (i.e., individuals, guano, urine staining, corpses, feeding remains, scratch marks and bats squeaking and chattering). Bat detectors, bat call analysis, and visual observation shall be used during all dusk emergence and pre-dawn re-entry surveys. If active maternity roosts are identified in the work area or 500 feet extending from the work area, Project construction will only occur between October 1 and February 28, outside of the maternity roosting season when young bats are present but are not yet ready to fly out of the roost. Maternity roosts shall not be evicted, excluded, removed, or disturbed. If active hibernacula are identified in the work area or 500 feet extending from the work area, a minimum 500-foot no-work buffer shall be provided around hibernacula. Buffers shall be left in place until the end of Project construction and activities or until a qualified bat biologist determines that the hibernacula are no longer active. Project-related construction and activities shall not occur between 30 minutes before sunset and 30 minutes after sunrise. Hibernacula roosts shall not be evicted, excluded, removed, or disturbed.

The Project proposes removal of the date palms within the Project site. The removal of palm trees that contain roosting habitat for bats can subject bats to impacts ranging from permanent loss of day roosts, including maternity roosts, to direct mortality if avoidance, minimization, and mitigation measures are not implemented. To support the City in avoiding or reducing impacts to western yellow bats to less than significant, CDFW also recommends that the following mitigation measure is added to a revised MND:

Mitigation Measure BIO-[B]: Avoidance of Bats during Tree Removal
Tree removal work with the potential to house roosting bats shall be performed between September 15 and October 31 to minimize direct impacts to roosting bats. This time period is after young are volant (flying) but before expected onset of torpor (wintering

inactivity). Tree removal work may also be conducted between February 15 and March 31, following winter torpor and prior to the start of the maternity season. No tree removals shall occur during the hibernation season, which typically begins in November or December (depending on weather conditions) and continues through mid-February, due to the high potential for mortality of hibernating bats. Depending on weather conditions and the best professional judgement of a qualified bat biologist approved by CDFW, tree removal work may be performed in November if the forecasted nighttime low temperatures on the evening of removal and the subsequent four evenings do not drop below 45˚F. In November, if weather is cold (i.e., forecasted nighttime low temperatures reach 45˚F or less for that evening and the next four evenings), then no tree removals shall be performed. All palm removals shall require a two-step removal process and the involvement of a CDFW-approved qualified bat biologist to ensure that no roosting bats are killed during this activity. The following two-step tree removal process shall be implemented over two consecutive days: on Day 1, live palm fronds located above the frond skirt, and as identified by a qualified bat biologist, will be removed. On Day 2, the remainder of the tree may be removed without supervision by a qualified bat biologist.

Response 5:

See Response B.4., above. The commenter's review of aerial photos from 2022, as identified in GoogleEarth imagery, is not representative of current conditions, nor does it supplant a site visit by a qualified biologist, as was conducted for the Initial Study. No change to the Initial Study is required.

Comment 6:

4) Coachella Valley Multiple Species Habitat Conservation Plan

Local Development Mitigation Fee

The Project is located within the CVMSHCP Plan Boundary and outside of a Conservation Area and contains habitat for Covered Species and/or conserved natural communities. Per CVMSHCP Section 5.2.1.1 and IA Sections 12.2.1 and 13.2, the City is obligated to impose a local development mitigation fee for new development within the Plan Area that impacts vacant land containing Habitat for Covered Species and/or conserved natural communities, including small vacant lots within urban areas that contain natural open space, and to transmit collected fees to CVCC at least quarterly and prior to impacts to Covered Species and their Habitats. Page 40 of the MND states that the "City of Coachella is a signatory to the CVMSHCP and therefore the Project is required to pay a Development Mitigation Fee." To accurately document the City's obligation to impose and transmit a Local Development Mitigation Fee for the Project, CDFW recommends the City add the following mitigation measure to a revised MND:

Mitigation Measure BIO-[C]: CVMSHCP Compliance
Prior to construction and issuance of any grading permit, the City shall ensure compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) and its associated Implementing Agreement and shall ensure the collection of payment of the CVMSHCP Local Development Mitigation Fee and transfer of revenues to the Coachella Valley Conservation Commission.

Response 6:

As stated in the Initial Study, page 40, the Project is required to pay the CVMSHCP fee. Standard requirements do not require mitigation under CEQA, and no change to the Initial Study is therefore required.

Comment 7:

5) Artificial Nighttime Lighting

Page 22 of the MND indicates that the "Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Daytime glare may also be expected from windows. However, the Project's sources of lighting and glare would be consistent with and not exceed light and glare emissions from existing nearby development. The Project would adhere to the City's lighting requirements and would not produce light and glare upward into the sky." The MND lacks an analysis of direct, indirect, and cumulative impacts of artificial nighttime lighting, including impacts associated with long-term operations, on biological resources including migratory birds that fly at night, burrowing owls, bats, and other nocturnal and crepuscular wildlife. The Project is located adjacent to vacant, sparsely vegetated areas to the west and east of the Project site—areas that provide suitable nesting, roosting, foraging, and refugia habitat for birds, migratory birds that fly at night, burrowing owls, bats, and other nocturnal and crepuscular wildlife. The Project's proposed artificial nighttime lighting has the potential to significantly and adversely affect wildlife in these vacant areas adjacent to the Project site. Artificial lighting alters ecological processes including, but not limited to, the temporal niches of species; the repair and recovery of physiological function; the measurement of time through interference with the detection of circadian and lunar and seasonal cycles; the detection of resources and natural enemies; and navigation.[6] Many species use photoperiod cues for communication (e.g., bird song[7]), determining when to begin foraging,[8] behavioral thermoregulation,[9] and migration.[10] Phototaxis, a phenomenon that results in attraction and movement towards light, can disorient, entrap, and temporarily blind wildlife species that experience it.[10]

CDFW recommends that the MND is revised to include an analysis of the direct, indirect, and cumulative impacts of artificial nighttime lighting associated with the Project's long-term operations on biological resources, and appropriate avoidance, minimization, and mitigation measures that will avoid or reduce impacts to less than significant.

To support the City in avoiding, minimizing, and mitigating for the Project's direct and indirect impacts of artificial nighttime lighting on biological resources, CDFW recommends that the City include in a revised MND the following mitigation measure:

Mitigation Measure BIO-[D]: Artificial Nighttime Lightin

Throughout construction and the lifetime operations of the Project, the City shall eliminate all nonessential lighting throughout the Project area and avoid or limit the use of artificial light at night during the hours of dawn and dusk when many wildlife species are most active. The City shall ensure that all lighting for the Project is fully shielded, cast downward and directed away from surrounding open-space and agricultural areas,

reduced in intensity to the greatest extent possible, and does not result in lighting trespass including glare into surrounding areas or upward into the night sky (see the International Dark-Sky Association standards at http://darksky.org/). The City shall ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less, proper disposal of hazardous waste, and recycling of lighting that contains toxic compounds with a qualified recycler.

Response 7:

The commenter's opinion is noted, but provides no substantial evidence that the Project will result in substantial lighting, or that the lighting proposed for the Project will impact biological resources. The site is surrounded by development, and is required to comply with the City's ordinances which strictly limit lighting. The City's construction hour restrictions make it unlikely that construction will occur at night. There is no evidence that lighting on the property would be significant, and no change to the Initial Study is required.

Comment 8:

6) Landscaping
Page 114 of the MND states that the "landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought-tolerant trees and bushes." The MND lacks additional information on landscaping plans. CDFW recommends that the MND include recommendations regarding landscaping from Section 4.0 of the CVMSHCP "Table 4-112: Coachella Valley Native Plants Recommended for Landscaping" (pp. 4-180 to 4-182; https://cvmshcp.org/plan-documents/). CDFW also recommends incorporation of water-wise concepts in any Project landscape design plans. In particular, CDFW recommends xeriscaping with locally native California species and installing water-efficient and targeted irrigation systems (such as drip irrigation). Native plants support butterflies, birds, reptiles, amphibians, small mammals, bees, and other pollinators that evolved with those plants. More information on native plants suitable for the Project location and nearby nurseries is available at Calscape: https://calscape.org/. Local water agencies/cities and resource conservation cities in your area may be able to provide information on plant nurseries that carry locally native species, and some facilities display drought-tolerant locally native species demonstration gardens. Information on drought-tolerant landscaping and water-efficient irrigation systems is available on California's Save our Water website: https://saveourwater.com/.

Response 8:

The comment is noted. The Project is required to comply with both the City's water efficient landscaping standards and CVWD's water conservation requirements in landscaping, which include water budgeting for landscaped areas. The Project will therefore be regulated to assure low water use in landscaping, as clearly stated in the Initial Study.

Comment 9:

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be filled out and submitted online at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

ENVIRONMENTAL DOCUMENT FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of environmental document filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the environmental document filing fee is required in order for the underlying Project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

CDFW appreciates the opportunity to comment on the MND to assist City in identifying and mitigating Project impacts to biological resources. CDFW concludes that the MND does not adequately identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW recommends that revised and additional mitigation measures and analysis as described in this letter be added to a revised MND.

CDFW personnel are available for consultation regarding biological resources and strategies to avoid and minimize impacts. Questions regarding this letter or further coordination should be directed to Jacob Skaggs, Senior Environmental Scientist Specialist, at jacob.skaggs@wildlife.ca.gov.

Response 9:

The City will continue to assure that biologists report their findings when studies are prepared, and that CDFW fees are paid when necessary.

The commenter's opinions are noted, but as described above, the City has prepared an Initial Study which complies with CEQA and which will mitigate the impacts of the Project to less than significant levels. No changes to the document are necessary.

APPENDIX A

Comment Letters

Department of Toxic Substances Control

Yana Garcia
Secretary for
Environmental Protection

Katherine M. Butler, MPH, Director
8800 Cal Center Drive
Sacramento, California 95826-3200
dtsc.ca.gov

Gavin Newsom
Governor

SENT VIA ELECTRONIC MAIL

November 21, 2025

Adrian Moreno
Associate Planner
City of Coachella
53990 Enterprise Way
Coachella, CA 92236
amoreno@coachella.org

RE: MITIGATED NEGATIVE DECLARATION FOR THE CALHOUN STREET HOUSING DEVELOPMENT DATED NOVEMBER 19, 2025, STATE CLEARINGHOUSE NUMBER 2025110786

Dear Adrian Moreno,

The Department of Toxic Substances Control (DTSC) reviewed the Mitigated Negative Declaration (MND) for the Calhoun Street Housing Development (Project). The proposed Project is a Tentative Tract Map, Environmental Assessment, Conditional Use Permit and Planned Unit Development for a single-family residential project. The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres. DTSC recommends and requests consideration of the following comments:

1. When agricultural crops and/or land uses are proposed or rezoned for residential use, several contaminants of concern (COCs) can be present. The Lead Agency shall identify the amounts of Pesticides and Organochlorine Pesticides (OCPs) historically used on the property. If present, OCPs requiring further analysis are

dichloro-diphenyl-trichloroethane, toxaphene, and dieldrin. Additionally, any level of arsenic present would require further analysis and sampling and must meet approved local area baselines or thresholds. If they do not, remedial action must take place to mitigate them below those thresholds. Additional COCs may be found in mixing/loading/storage areas, drainage ditches, farmhouses, or any other outbuildings and should be sampled and analyzed. If smudge pots had been routinely utilized, additional sampling for Polycyclic Aromatic Hydrocarbons and/or Total Petroleum Hydrocarbons may be required. These recommendations should be adhered to and become part of the environmental document. Please refer to the DTSC's Human and Ecological Risk Office (HERO) webpage for the most recent guidance and screening levels.

2. DTSC recommends all imported soil/fill material be tested to ensure all COCs meet screening levels as outlined in DTSC's Preliminary Endangerment Assessment Guidance Manual. Furthermore, DTSC advises referencing the DTSC Information Advisory Clean Imported Fill Material Fact Sheet if importing fill is necessary. To minimize the possibility of introducing contaminated soil/fill material there should be documentation of the origins of the soil/fill material and, if applicable, sampling be conducted to ensure that the imported soil/fill material are suitable for the intended land use. The soil sampling should include analysis based on the source of the soil/fill and knowledge of prior land use.

3. The City of Coachella should consider soil testing as mentioned in comment #1. If, in the event any COC results are above DTSC residential screening levels, DTSC recommends the City of Coachella address the contaminations within the Project area through an Environmental Site Assessment and/or receive oversight from a self-certified local agency, DTSC or Regional Water Quality Control Board. If entering into one of DTSC's voluntary agreements, please note that DTSC uses a single standard Request for Lead Agency Oversight Application for all agreement types. Please apply for DTSC oversight using this link: Request for Agency Oversight Application. Submittal of the online application includes an agreement to pay costs incurred during agreement preparation. If you have any

questions about the application portal, please contact the relevant Regional Brownfield Coordinator for your Project.

DTSC would like to thank you for the opportunity to comment on the MND for the Calhoun Street Housing Development. Thank you for your assistance in protecting California's people and environment from the harmful effects of toxic substances. If you have any questions or would like clarification on DTSC's comments, please respond to this letter or via our CEQA Review email for additional guidance.

Sincerely,

Dave Kereazis

Dave Kereazis
Associate Environmental Planner
HWMP-Permitting Division – CEQA Unit
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

cc: (via email)

Governor's Office of Land Use and Climate Innovation
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United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, California 92262

In Reply Refer to:
2026-0019760 -CEQA-TA-ERIV

December 4, 2025
Sent Electronically

Adrian Moreno
Associate Planner
City of Coachella
53990 Enterprise Way
Coachella, California 92236

Subject: Notice of Availability of a Draft Initial Study Mitigated Negative Declaration for the Calhoun Street Housing Development Project, City of Coachella, Riverside County, California

Dear Adrian Moreno:

This letter is in response to the notice of availability dated November 18, 2025, soliciting comments on the draft Initial Study Mitigated Negative Declaration (ISMND) for the Calhoun Street Housing Development Project (Project), located in the City of Coachella, Riverside County, California. The proposed Project site is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella (City) and is bounded along the west perimeter by lands within the City of Indio, California.

We offer the following comments on the ISMND as they relate to potential impacts on public trust resources. The primary concern and mandate of the U.S. Fish and Wildlife Service (Service) is the conservation, protection, and enhancement of fish and wildlife resources and their habitats for the continuing benefit of the American people. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and threatened or endangered animals and plants listed under the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.). The comments provided herein are based on the information provided in the ISMND and our knowledge of sensitive and declining fish and wildlife resources.

The Project site is within the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) Area, and the City is a Local Permittee to the CVMSHCP. The Project applicant proposes to subdivide the 39.98 acres (ac) Project site for a future build of a private, gated residential community containing 257 single-family homes and a 3.53-ac public park, with 3.13-ac for recreational open space and 0.40 ac for a landscaped retention basin. The proposed Project also includes right-of-way allowances for future road improvements along Avenue 49 and Calhoun Street. The Project site is surrounded by single-family residential land uses on the north, south, and west, and a vacant lot occurs on the east of the Project site. Currently, the Project site is zoned as “General Neighborhood” in the City’s General Plan 2035 Update. The applicant

proposes a Planned Unit Development that would permit flexible standards for smaller lot sizes and a higher density for a private gated community than the Project site's current designation allows.

NESTING BIRDS

The draft ISMND states that a field assessment occurred on February 29, 2024. The field assessment included the 39.98-ac Project site and a 500-foot buffer zone. The Project site, which previously hosted a date palm grove, contains rows of leftover date palms on the southern and western portions of the site. The northeast portion is graded and has not been used to grow dates since 2002. Sparse perennial vegetation occurs throughout the Project site, particularly under the remaining date palms and in the northwest corner, which contains a small irrigation reservoir. The draft ISMND states that due to existing site disturbances, including the previous date palm grove, grading, and recent off-road vehicle use and dumping of trash, the probability of special status-species occurring on the site is low. No special-status species, including nesting birds, were observed during the field assessment; however, the draft ISMND notes that due to the existing vegetative scrub and date palms, the Project site may still be used by resident and migratory nesting birds.

Due to the presence of sparse vegetation throughout the Project site, the Service agrees that special-status species have the potential to occur within the Project site. The presence of sparse vegetation, particularly cover of shrubs, is suitable habitat for ground-nesting birds. Moreover, the presence of bare ground on the northeast portion of the Project site also constitutes suitable nesting habitat for some ground-nesting birds. Therefore, the proposed development has the potential to impact nesting birds. However, the ISMND does not indicate that focused nesting bird surveys were completed, likely contributing to the lack of nesting bird observations during the field assessment. Focused nesting bird surveys, both within and outside of nesting season, are necessary to accurately confirm nesting bird presence or absence. A complete assessment of the biological resources within the Project area is required to assess the Project's potential impacts to nesting birds. Please revise the ISMND to include a complete assessment of the Project's potential impacts to nesting bird habitat, including completion of nesting bird surveys during the appropriate time of year, to determine the extent of nesting birds on the Project site.

The draft ISMND includes Mitigation Measure (MM) BIO-1, which states that "[b]ird nesting season for resident birds in Southern California occurs between February 1 and August 31." Please note that the timing of nesting season is highly variable. Changing climate conditions have resulted in nesting birds breeding both earlier and later in the year than suggested in previous guidance. Nesting season may generally be considered to occur between January and October; however, timing varies on a species-by-species basis. Coordination with the Service and the California Department of Fish and Wildlife (CDFW; collectively, the Wildlife Agencies) is necessary to determine appropriate timing of nesting season surveys. Additionally, to address the variability in nesting season, we recommend that MM-BIO-1 be revised to require nesting bird surveys throughout construction, both within and outside of nesting season, to avoid any potential adverse effects to nesting.

BURROWING OWL

The draft ISMND states that marginally suitable habitat for western burrowing owl (*Athene cunicularia hypugaea*; burrowing owl), a CVMSHCP-Covered Species, Service Bird of Conservation Concern, and candidate species under the California Endangered Species Act, occurs intermittently throughout the Project site, and suitable California ground squirrel burrows were observed during the field assessment. Additionally, the draft ISMND states that the Project site is largely disturbed. Burrowing owl are known to occupy disturbed habitat; therefore, due to the presence of disturbed habitat, sparse vegetation, and suitable burrows within the Project area, the Service agrees with the conclusion that suitable habitat for burrowing owl occurs on the Project site, and burrowing owls have the potential to inhabit the site. No burrowing owls or signs of burrowing owls were observed during the field assessment; however, the draft ISMND does not indicate completion of focused burrowing owl surveys. Focused burrowing owl surveys during the breeding season and nonbreeding season are necessary to accurately confirm burrowing owl presence or absence. Pursuant to the CDFW Staff Report on Burrowing Owl Mitigation (2012 or most recent version), for both breeding and non-breeding season surveys, a minimum of four survey visits are required to assess a site for burrowing owl presence. Given the lack of multiple, focused burrowing owl surveys, the total number of burrowing owl individuals or suitable and occupied burrows within the Project site and 500-foot buffer is unknown. Please revise the draft ISMND to include an accurate assessment of the Project's potential impacts to burrowing owl, including focused survey results following the protocols outlined in the 2012 Staff Report on Burrowing Owl Mitigation.

MM BIO-2 states that burrowing owl avoidance surveys must be conducted immediately preceding development, including 14-30 days prior to initiating ground disturbance activities, and within 24 hours of ground disturbance, in compliance with the 2012 Staff Report on Burrowing Owl Mitigation. As stated in the 2012 Staff Report on Burrowing Owl Mitigation, burrowing owls may re-colonize a Project site should any time lapses between Project activities occur. Such time lapses would trigger subsequent take avoidance surveys, which may include a final survey conducted within 24 hours prior to ground disturbance. Due to the potential for burrowing owl to occur throughout the construction period, in addition to focused surveys (breeding season and non-breeding season) and take avoidance surveys prior to initiating ground disturbance, additional surveillance monitoring surveys for burrowing owls should be continued throughout construction to avoid any potential impacts to burrowing owl [see the 2012 Staff Report, Site Surveillance (page 9), Appendix D, Take Avoidance Surveys (page 29-30)].

MM BIO-2 also states that "Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls." As stated above, burrowing owl is a Covered Species under the CVMSHCP. The CVMSHCP is governed by both CDFW's Natural Community Conservation Plan Permit and the Service's section 10(a)(1)(B) permit issued under the Act. Although burrowing owl is not a federally listed species under the Act, a non-listed species covered in a Habitat Conservation Plan (HCP) must be treated as if it were already listed, and all conservation measures described in the HCP for that species must be fully implemented. Please revise MM BIO-2 to require that, if the focused surveys and/or pre-construction surveys confirm burrowing owl presence, the Project

applicant shall submit a Burrowing Owl Plan that includes avoidance, minimization, and mitigation measures to both Wildlife Agencies for review and approval prior to any ground disturbance or vegetation removal. The Project proponent shall coordinate with the Wildlife Agencies on the appropriate avoidance, minimization, and mitigation measures to be included in the Burrowing Owl Plan. Per Section 4.4 and Section 8.5.2 of the CVMSHCP, relocation of burrowing owls must follow protocols accepted by the Wildlife Agencies, and active relocation and eviction/passive relocation must be determined through coordination with the Wildlife Agencies for all Covered Activities. As such, please revise MM BIO-2 to state that if avoidance of burrowing owl is not possible, the Project applicant shall coordinate with both Wildlife Agencies on a burrowing owl relocation plan. Additionally, please include language that states that the Project proponent shall submit the relocation plan to the Wildlife Agencies for review and approval. Both the Burrowing Owl Plan and relocation plan should be submitted to the Wildlife Agencies for review and approval as soon as possible to avoid project delays due to the burrowing owl breeding season. These measures are necessary for the City in fulfilling its obligations as a CVMSHCP Permittee.

WESTERN YELLOW BAT

The draft ISMND states that roosting habitat for the western yellow bat (*Lasiurus xanthinus*), a CVMSHCP-Covered Species, is absent on the Project site, and probability of foraging is low. The draft ISMND concludes that the western yellow bat is absent from the Project site. Western yellow bat habitat includes valley foothill riparian, desert riparian, desert wash, and palm oasis habitats, and the species typically roosts in the skirt of dead fronds of fan palms. Western yellow bat has been documented to roost in both native and non-native palm trees, and additional information has shown that they may roost in the dead fronds of other plants with structural similarities to fan palms. Additionally, the species has also been documented to occur in open grassy areas, residential areas, over swimming pools, and in orchards. Dead palm fronds occur within the fallow date palm grove portion of the Project site, and the Project site and surrounding residential areas may provide foraging opportunities; therefore, the Service considers the Project site to contain suitable habitat for western yellow bat, and western yellow bat have the potential to occur within the Project site.

The draft ISMND indicates that western yellow bats were not observed during the field assessment. However, the draft ISMND does not indicate completion of focused bat surveys, likely contributing to the lack of western yellow bat observations during the field assessment. Focused bat surveys are necessary to accurately confirm the presence or absence of special-status bat species. Please revise the draft ISMND to include a complete assessment of the Project's potential impacts to bat habitat, including completion of focused bat surveys following accepted survey methods, to accurately determine the extent of bats on and adjacent to the proposed Project site. In addition to focused surveys, pre-construction clearance surveys are necessary to avoid any potential impacts to western yellow bat. Please revise the draft ISMND to require bat pre-construction surveys conducted by a qualified biologist, with detailed information regarding the survey methods, including the number of days of acoustic monitoring, emergence roost counts, and number of roost count observers included. Additionally, please note that multiple surveys are required during the maternity season to accurately document roost activity. A

minimum of two surveys during the maternity season, one during spring and one during summer, are required. In addition to bat maternity season surveys, a winter survey and migration period survey should also be required to identify presence of bats in the Project site throughout the year. If special status bats are determined to be present at the Project site, please coordinate with the Service on implementation of the appropriate avoidance, minimization, and mitigation measures prior to beginning project activities.

We appreciate the opportunity to provide comments on the draft ISMND. If you have any questions regarding these comments, please contact Lory Salazar-Velasquez.[1]

Sincerely,

for Brian Croft
Field Supervisor

[1] lory_salazar-velasquez@fws.gov.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

December 8, 2025
Sent via email

Adrian Moreno
Associate Planner
City of Coachella
53990 Enterprise Way
Coachella, CA 92236
amoreno@coachella.org

Calhoun Street Housing Development Project (PROJECT)
Mitigated Negative Declaration (MND)
SCH# 2025110786

Dear Adrian Moreno:

The California Department of Fish and Wildlife (CDFW) received a Draft Mitigated Negative Declaration (MND) from the City of Coachella (City) for the Project pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on Projects and related activities that have the potential to adversely affect fish and wildlife resources.

[1]CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY

Proponent: Pacific Modern Builders LLC

Objective: The Project proposes to subdivide the Project site for a future build out of a residential community containing 257 single-family homes and a public park with a total area of 3.53 acres, 3.13 acres for recreational open space, and four retention basins that will accept all on-site flows. Construction activities would occur during the day, and there would be no need to apply nighttime security lighting on the Project site. Construction activities would not introduce new sources of light or glare. Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought-tolerant trees and bushes.

Location: The Project site is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, Riverside County, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number 612-260-010.

Timeframe: The MND indicates that construction activities would be completed by 2026.

COMMENTS AND RECOMMENDATIONS

CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (i.e., biological resources). CDFW offers the comments and recommendations below to assist the City in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. The MND has not adequately identified and disclosed the Project's impacts (i.e., direct, indirect, and cumulative) on biological resources and whether those impacts are reduced to less than significant.

CDFW's comments and recommendations on the MND are explained in greater detail below and summarized here. CDFW is concerned that the MND does not adequately

identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW also concludes that the MND lacks sufficient information to facilitate a meaningful review by CDFW, including a complete and accurate assessment of biological resources on the Project site. CDFW requests that additional information and analyses be added to a revised MND, along with avoidance, minimization, and mitigation measures that avoid or reduce impacts to less than significant.

Existing Environmental Setting

Compliance with CEQA is predicated on a complete and accurate description of the environmental setting that may be affected by the proposed Project. CDFW is concerned that the assessment of the existing environmental setting has not been adequately analyzed in the MND. CDFW is concerned that without a complete and accurate description of the existing environmental setting, the MND may provide an incomplete analysis of Project-related environmental impacts.

The MND lacks a complete assessment of biological resources associated with burrowing owl (*Athene cunicularia*) and western yellow bat (*Lasiurus xanthinus*) within the Project site and surrounding area. A complete and accurate assessment of the environmental setting and Project-related impacts to biological resources is needed to both identify appropriate avoidance, minimization, and mitigation measures and demonstrate that these measures reduce Project impacts to less than significant.

Mitigation Measures

CEQA requires that an MND include mitigation measures to avoid or reduce significant impacts. CDFW is concerned that the mitigation measures proposed in the MND are not adequate to avoid or reduce impacts to biological resources to below a level of significance. To support the City in ensuring that Project impacts to biological resources are reduced to less than significant, CDFW recommends adding mitigation measures for surveys for bats, avoidance of bats during tree removal, artificial nighttime lighting, and compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), as well as revising the mitigation measures for nesting birds and burrowing owls.

1) Nesting Birds

It is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code

or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

With regard to the CVMSHCP, per its associated Implementing Agreement (IA) and Permits from CDFW and the U.S. Fish and Wildlife Service (the Wildlife Agencies), Take associated with Covered Activities will not be in violation of the Migratory Bird Treaty Act and will be consistent with Fish and Game Code sections 3503 and 3503.5; therefore, all Covered Activities within and outside Conservation Areas must undertake measures to avoid the take of individuals, nests, and eggs of nesting birds. The CVMSHCP includes a general conservation measure that applies to all bird species to avoid impacts to habitat for nesting birds during the nesting season (CVMSHCP Section 9.7). Per IA Section 13.2, the City is obligated to ensure the projects to which it confers Take Authorization under the CVMSHCP comply with all terms and requirements of the CVMSHCP, the Wildlife Agencies' Permits that create the CVMSHCP, and the IA, including compliance with laws that protect nesting birds..

Page 39 of the MND indicates that "existing vegetative scrub and date palms found on the Project site could potentially be used by both resident and migratory nesting birds." CDFW adds that the Project site contains suitable habitat for both ground-nesting birds and birds that nest in shrubs and trees.

The MND includes Mitigation Measure BIO-1 for nesting birds, which indicates that the "bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity." CDFW considers the mitigation measure for nesting birds in the MND to be inadequate in scope and timing to avoid or reduce impacts to nesting birds to a level less than significant. In alignment with the CVMSHCP's general conservation measure for nesting birds (CVMSHCP Section 9.7), CDFW recommends Project construction activities are conducted outside of the peak nesting bird season. CDFW also recommends the completion of nesting bird surveys *regardless* of the time of year to ensure that impacts to nesting birds and their nests and eggs are avoided. The timing of the nesting season varies greatly depending on several factors, such as bird species, weather conditions in any given year, and long-term climate changes (e.g., drought, warming, etc.). In response to warming, birds have been reported to breed earlier, thereby reducing temperatures that nests are exposed to during breeding and

tracking shifts in availability of resources (Socolar et al., 2017[2]). CDFW staff have observed that climate change conditions may result in the nesting bird season occurring earlier and later in the year than historical nesting season dates. CDFW recommends that disturbance of occupied nests of migratory birds and raptors within the Project site and surrounding area be avoided any time birds are nesting on-site. CDFW therefore recommends the completion of nesting bird surveys *regardless of the time of year* to ensure compliance with all applicable laws pertaining to nesting and migratory birds.

To support the City in avoiding or reducing impacts to nesting birds to a level less than significant, CDFW recommends Mitigation Measure BIO-1 is revised as follows, with additions in **bold** and removals in ~~strikethrough~~:

Mitigation Measure BIO-1: Nesting Birds

To the greatest extent feasible, the Project will avoid construction activities during the peak nesting season (January 15 through September 15). Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on-site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance. ~~Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-~~

[2] Socolar JB, Epanchin PN, Beissinger SR and Tingley MW (2017). Phenological shifts conserve thermal niches. Proceedings of the National Academy of Sciences 114(49): 12976-12981.

~~construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.~~

Pursuant to the CEQA Guidelines, section 15097(f), CDFW has prepared a draft mitigation monitoring and reporting program (MMRP) in Attachment 1 for revised MM BIO-1 and MM BIO-2, as well as CDFW-recommended MM BIO-[A], MM BIO-[B], MM BIO-[C], and MM BIO-[D].

2) Burrowing Owl

On October 10, 2024, the Fish and Game Commission determined that western burrowing owl warrants protection as a candidate species under the California Endangered Species Act (Fish & G. Code, § 2050 et seq.). During the candidacy period, western burrowing owl will be afforded the same protection as threatened and endangered species under CESA. If Project activities, including relocation, could result in take, appropriate CESA authorization (i.e., Incidental Take Permit under Fish and Game Code section 2081) should be obtained prior to commencement of Project activities.

Take of individual burrowing owls and their nests or eggs is defined by Fish and Game Code section 86, and prohibited by sections 3503, 3503.5, and 3513. Take is defined in Fish and Game Code section 86 as “hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill.” Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

With regard to the CVMSHCP, the CDFW Natural Community Conservation Plan (NCCP) Permit #2835-2008-001-06 does not provide Take Authorization for burrowing owl individuals, nests, or eggs. To the contrary, section 3.5.6 of the NCCP Permit states

burrowing owl “pairs or individuals will not be Taken” and reiterates that the “HCP/NCCP does not authorize Take of [burrowing owl] nests [or] eggs[.]” Therefore, throughout the CVMSHCP area—both within and without Conservation Areas—Permittees must ensure that activities occurring within their jurisdictions do not result in the take, possession, or destruction of burrowing owl individuals, nests, or eggs. Any activity occurring within the CVMSHCP area that results in the take of burrowing owl individuals, nests, or eggs would be unlawful and would not be a Covered Activity under the CVMSHCP. Per IA Section 13.2, the City is obligated to ensure the projects to which it confers Take Authorization under the CVMSHCP comply with all terms and requirements of the CVMSHCP, the Wildlife Agencies’ Permits that created the CVMSHCP, and the IA, including compliance with laws that protect burrowing owls.

Page 40 of the MND states that “no burrowing owls, or signs of burrowing owls were observed during the site survey, however, suitable habitat and burrows suitable for burrowing owls were observed on the Project site. Burrowing owls could potentially relocate to the Project site between the time of the site survey and the start of construction due to their attraction to open dry areas and agricultural sites.” CDFW agrees that the Project site contains suitable nesting and foraging habitat for burrowing owl. The MND and its supporting documents lack information on whether focused surveys for burrowing owl were conducted and the methods used to conduct any surveys for burrowing owl. Because the MND lacks the findings of recent focused surveys for burrowing owl following the guidelines in the *Staff Report on Burrowing Owl Mitigation*,[3] the number and locations of suitable and occupied burrows within the Project site are unknown. Given the lack of results from focused surveys for burrowing owl following recommended protocols and the lack of survey reports, CDFW is limited in its ability to provide biological expertise to support the City in reducing impacts to burrowing owl to a level less than significant. CDFW recommends that the MND is revised to include the results of four focused surveys for burrowing owl within the entire Project site and surrounding area, including survey reports,[4] following the guidelines outlined in Appendix D of the *Staff Report on Burrowing Owl Mitigation* and to incorporate appropriate avoidance, minimization, and mitigation measures for burrowing owl. Focused surveys are needed to inform appropriate avoidance, minimization, and mitigation measures and support the City in avoiding or reducing impacts to burrowing owl to a level less than significant. CDFW requests that if burrowing owls are detected

[3] California Department of Fish and Game (CDFG). 2012. Staff report on burrowing owl mitigation. State of California, Natural Resources Agency. Available for download at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843&inline

[4] Survey reports should include details on survey methods and results, including, but not limited to, the names and qualifications of surveyor(s); a description of survey methods; a description of the conditions of the project site and recent photos; map(s) showing the locations of all suitable burrows, occupied burrows, burrowing owls, and burrowing owl sign; descriptions of burrowing owl behavior observed; California Natural Diversity Database (CNDDB) field survey forms, etc. For more information, see Appendix D, Survey Reports, of the CDFW 2012 Staff Report on Burrowing Owl Mitigation.

during focused surveys, survey results are submitted to the Wildlife Agencies, and the City initiate consultation with the Wildlife Agencies to identify a path forward regarding the protection of burrowing owls.

The MND includes Mitigation Measure BIO-2, which indicates that "to ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted." In addition to pre-construction surveys, CDFW recommends that focused burrowing owl surveys are first conducted and the results submitted to Wildlife Agencies. This provides time for the City and Project proponent to start coordination with the Wildlife Agencies early to identify appropriate avoidance, minimization, and mitigation measures and reduce the chance of Project delays. Without details on focused surveys and appropriate information sharing and coordination with the Wildlife Agencies, CDFW considers Mitigation Measure BIO-2 to be inadequate in scope and timing to avoid or reduce impacts to burrowing owl to a level less than significant.

To support the City in avoiding or reducing impacts to burrowing owl to a level less than significant, CDFW recommends that Mitigation Measure BIO-2 is revised with the following additions in **bold** and removals in ~~strikethrough~~:

Mitigation Measure BIO-2: Burrowing Owl Focused and Pre-Construction Surveys

Suitable burrowing owl habitat has been confirmed on the site; therefore, focused burrowing owl surveys shall be conducted by a CDFW-approved qualified biologist prior to any Project activities, including vegetation- or ground-disturbing activities. CDFW strongly recommends that focused surveys are conducted in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version)[5]. If burrowing owls are detected during the focused surveys, the qualified biologist and Project proponent shall begin coordination with CDFW and USFWS immediately, and shall submit the results of focused surveys to CDFW and USFWS as soon results become available and before commencement of any Project activities, including any vegetation- or ground-disturbing activities. CDFW recommends that the information included in the survey results be consistent with Appendix D of the *Staff Report on Burrowing Owl Mitigation*, including a detailed map showing locations of all burrowing owls, burrowing owl sign, potential burrows, and occupied burrows (occupied means at least one burrowing owl or its sign has been observed within the last three years; may be indicated by owl sign including feathers, pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site); a description of the behavior of burrowing owls during surveys; a description of survey

[5] California Department of Fish and Wildlife (CDFW). 2012. Staff Report on Burrowing Owl Mitigation. State of California, Natural Resources Agency. Available for download at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843.

methods; and other items listed in Appendix D of the *Staff Report on Burrowing Owl Mitigation* under "Survey Reports." Consultation with CDFW and USFWS must be completed prior to commencement of any Project activities, including vegetation- or ground-disturbing activities. If impacts to occupied burrowing owl habitat or burrow(s) or burrowing owl individuals, nests, or eggs cannot be avoided, appropriate NCCP (Fish and Game Code section 2835) or CESA authorization (i.e., Incidental Take Permit under Fish and Game Code section 2081(b)) should be obtained from CDFW prior to commencement of Project activities, including vegetation- or ground-disturbing activities.

Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be repeated when there is a pause in construction of more than 30 days. Preconstruction surveys shall be performed by a CDFW-approved qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted and the qualified biologist shall coordinate with CDFW and USFWS. Project activities shall not recommence until consultation with CDFW and USFWS is completed. ~~To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.~~

3) Bats

Page 4 of the MND indicates that the Project "site has been partially cleared, although many date palms remain scattered throughout 75% of the parcel while the northeast corner of the parcel is graded and barren." Regarding the probability for western yellow bat to occur on the Project site, page 39 of the MND indicates the following: "Nesting: Absent. Roosting habitat lacking." The MND and its supporting documents lack additional information on the presence or avoidance, minimization, or mitigation measures for western yellow bat. CDFW disagrees with the conclusion that no suitable roosting habitat for western yellow bat is located within or adjacent to the Project site. CDFW notes that palm trees are the preferred roost site of western yellow bats, which roost in the attached dead leaf fronds, or "skirts," of both native and non-native palm trees. Street View imagery using Google Earth and photos included in the Biological Assessment show that some of the date palms within the Project site contain relatively full "skirts," habitat that is suitable for western yellow bat (and other bat species). CDFW

considers the Project site to contain suitable roosting habitat for western yellow bat. Without appropriate avoidance, minimization, and mitigation measures, such as surveys to assess presence and appropriate methods to remove fan palms, CDFW considers the MND to be inadequate in avoiding or reducing impacts to western yellow bat to a level less than significant.

To support the City in avoiding or reducing impacts to western yellow bat to a level less than significant, CDFW recommends that the City add the following mitigation measures to a revised MND:

Mitigation Measure BIO-[A]: Surveys for Daytime, Nighttime, Wintering (Hibernacula), and Maternity Roosting Sites for Western Yellow Bat

Prior to commencing Project activities, a CDFW-approved qualified bat biologist shall perform bat habitat/roosting surveys to determine presence of daytime, nighttime, wintering (hibernacula), and maternity roost sites. Surveys shall be conducted during favorable weather conditions only. Each survey shall consist of one dusk emergence survey (start one hour before sunset and last for three hours), followed by one pre-dawn re-entry survey (start one hour before sunrise and last for two hours), and one daytime visual inspection of all potential roosting habitat on the Project site. Surveys shall be conducted within one 24-hour period. Visual inspections shall focus on the identification of bat sign (i.e., individuals, guano, urine staining, corpses, feeding remains, scratch marks and bats squeaking and chattering). Bat detectors, bat call analysis, and visual observation shall be used during all dusk emergence and pre-dawn re-entry surveys. If active maternity roosts are identified in the work area or 500 feet extending from the work area, Project construction will only occur between October 1 and February 28, outside of the maternity roosting season when young bats are present but are not yet ready to fly out of the roost. Maternity roosts shall not be evicted, excluded, removed, or disturbed. If active hibernacula are identified in the work area or 500 feet extending from the work area, a minimum 500-foot no-work buffer shall be provided around hibernacula. Buffers shall be left in place until the end of Project construction and activities or until a qualified bat biologist determines that the hibernacula are no longer active. Project-related construction and activities shall not occur between 30 minutes before sunset and 30 minutes after sunrise. Hibernacula roosts shall not be evicted, excluded, removed, or disturbed.

The Project proposes removal of the date palms within the Project site. The removal of palm trees that contain roosting habitat for bats can subject bats to impacts ranging from permanent loss of day roosts, including maternity roosts, to direct mortality if avoidance, minimization, and mitigation measures are not implemented. To support the City in avoiding or reducing impacts to western yellow bats to less than significant, CDFW also recommends that the following mitigation measure is added to a revised

MND:

Mitigation Measure BIO-[B]: Avoidance of Bats during Tree Removal

Tree removal work with the potential to house roosting bats shall be performed between September 15 and October 31 to minimize direct impacts to roosting bats. This time period is after young are volant (flying) but before expected onset of torpor (wintering inactivity). Tree removal work may also be conducted between February 15 and March 31, following winter torpor and prior to the start of the maternity season. No tree removals shall occur during the hibernation season, which typically begins in November or December (depending on weather conditions) and continues through mid-February, due to the high potential for mortality of hibernating bats. Depending on weather conditions and the best professional judgement of a qualified bat biologist approved by CDFW, tree removal work may be performed in November if the forecasted nighttime low temperatures on the evening of removal and the subsequent four evenings do not drop below 45˚F. In November, if weather is cold (i.e., forecasted nighttime low temperatures reach 45˚F or less for that evening and the next four evenings), then no tree removals shall be performed. All palm removals shall require a two-step removal process and the involvement of a CDFW-approved qualified bat biologist to ensure that no roosting bats are killed during this activity. The following two-step tree removal process shall be implemented over two consecutive days: on Day 1, live palm fronds located above the frond skirt, and as identified by a qualified bat biologist, will be removed. On Day 2, the remainder of the tree may be removed without supervision by a qualified bat biologist.

4) Coachella Valley Multiple Species Habitat Conservation Plan

Local Development Mitigation Fee

The Project is located within the CVMSHCP Plan Boundary and outside of a Conservation Area and contains habitat for Covered Species and/or conserved natural communities. Per CVMSHCP Section 5.2.1.1 and IA Sections 12.2.1 and 13.2, the City is obligated to impose a local development mitigation fee for new development within the Plan Area that impacts vacant land containing Habitat for Covered Species and/or conserved natural communities, including small vacant lots within urban areas that contain natural open space, and to transmit collected fees to CVCC at least quarterly and prior to impacts to Covered Species and their Habitats. Page 40 of the MND states that the “City of Coachella is a signatory to the CVMSHCP and therefore the Project is required to pay a Development Mitigation Fee.” To accurately document the City’s obligation to impose and transmit a Local Development Mitigation Fee for the Project, CDFW recommends the City add the following mitigation measure to a revised MND:

Mitigation Measure BIO-[C]: CVMSHCP Compliance

Prior to construction and issuance of any grading permit, the City shall ensure compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) and its associated Implementing Agreement and shall ensure the collection of payment of the CVMSHCP Local Development Mitigation Fee and transfer of revenues to the Coachella Valley Conservation Commission.

5) Artificial Nighttime Lighting

Page 22 of the MND indicates that the "Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Daytime glare may also be expected from windows. However, the Project's sources of lighting and glare would be consistent with and not exceed light and glare emissions from existing nearby development. The Project would adhere to the City's lighting requirements and would not produce light and glare upward into the sky." The MND lacks an analysis of direct, indirect, and cumulative impacts of artificial nighttime lighting, including impacts associated with long-term operations, on biological resources including migratory birds that fly at night, burrowing owls, bats, and other nocturnal and crepuscular wildlife. The Project is located adjacent to vacant, sparsely vegetated areas to the west and east of the Project site—areas that provide suitable nesting, roosting, foraging, and refugia habitat for birds, migratory birds that fly at night, burrowing owls, bats, and other nocturnal and crepuscular wildlife. The Project's proposed artificial nighttime lighting has the potential to significantly and adversely affect wildlife in these vacant areas adjacent to the Project site. Artificial lighting alters ecological processes including, but not limited to, the temporal niches of species; the repair and recovery of physiological function; the measurement of time through interference with the detection of circadian and lunar and seasonal cycles; the detection of resources and natural enemies; and navigation.[6] Many species use photoperiod cues for communication (e.g., bird song[7]), determining when to begin foraging,[8] behavioral thermoregulation,[9] and migration.[10] Phototaxis, a phenomenon that results in attraction and movement towards light, can disorient, entrap, and temporarily blind wildlife species that experience it.[10]

CDFW recommends that the MND is revised to include an analysis of the direct, indirect, and cumulative impacts of artificial nighttime lighting associated with the Project's long-term operations on biological resources, and appropriate avoidance,

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[6] Gatson, K. J., Bennie, J., Davies, T., Hopkins, J. 2013. The ecological impacts of nighttime light pollution: a mechanistic appraisal. Biological Reviews, 88.4: 912-927.
[7] Miller, M. W. 2006. Apparent effects of light pollution on singing behavior of American robins. The Condor 108:130–139.
[8] Stone, E. L., G. Jones, and S. Harris. 2009. Street lighting disturbs commuting bats. Current Biology 19:1123–1127.
[9] Beiswenger, R. E. 1977. Diet patterns of aggregative behavior in tadpoles of *Bufo americanus*, in relation to light and temperature. Ecology 58:98–108.
[10] Longcore, T., and C. Rich. 2004. Ecological light pollution - Review. Frontiers in Ecology and the Environment 2:191–198.

minimization, and mitigation measures that will avoid or reduce impacts to less than significant.

To support the City in avoiding, minimizing, and mitigating for the Project's direct and indirect impacts of artificial nighttime lighting on biological resources, CDFW recommends that the City include in a revised MND the following mitigation measure:

Mitigation Measure BIO-[D]: Artificial Nighttime Lighting

Throughout construction and the lifetime operations of the Project, the City shall eliminate all nonessential lighting throughout the Project area and avoid or limit the use of artificial light at night during the hours of dawn and dusk when many wildlife species are most active. The City shall ensure that all lighting for the Project is fully shielded, cast downward and directed away from surrounding open-space and agricultural areas, reduced in intensity to the greatest extent possible, and does not result in lighting trespass including glare into surrounding areas or upward into the night sky (see the International Dark-Sky Association standards at http://darksky.org/). The City shall ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less, proper disposal of hazardous waste, and recycling of lighting that contains toxic compounds with a qualified recycler.

6) Landscaping

Page 114 of the MND states that the "landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought- tolerant trees and bushes." The MND lacks additional information on landscaping plans. CDFW recommends that the MND include recommendations regarding landscaping from Section 4.0 of the CVMSHCP "Table 4-112: Coachella Valley Native Plants Recommended for Landscaping" (pp. 4-180 to 4-182; https://cvmshcp.org/plan-documents/). CDFW also recommends incorporation of water-wise concepts in any Project landscape design plans. In particular, CDFW recommends xeriscaping with locally native California species and installing water-efficient and targeted irrigation systems (such as drip irrigation). Native plants support butterflies, birds, reptiles, amphibians, small mammals, bees, and other pollinators that evolved with those plants. More information on native plants suitable for the Project location and nearby nurseries is available at Calscape: https://calscape.org/. Local water agencies/cities and resource conservation cities in your area may be able to provide information on plant nurseries that carry locally native species, and some facilities display drought-tolerant locally native species demonstration gardens. Information on drought-tolerant landscaping and water-efficient irrigation systems is available on California's Save our Water website: https://saveourwater.com/.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be filled out and submitted online at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

ENVIRONMENTAL DOCUMENT FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of environmental document filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the environmental document filing fee is required in order for the underlying Project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

CDFW appreciates the opportunity to comment on the MND to assist City in identifying and mitigating Project impacts to biological resources. CDFW concludes that the MND does not adequately identify or mitigate the Project's significant, or potentially significant, impacts to biological resources. CDFW recommends that revised and additional mitigation measures and analysis as described in this letter be added to a revised MND.

CDFW personnel are available for consultation regarding biological resources and strategies to avoid and minimize impacts. Questions regarding this letter or further coordination should be directed to Jacob Skaggs, Senior Environmental Scientist Specialist, at jacob.skaggs@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Kim Freeburn
84F92FFEEFD24C8...

Kim Freeburn
Environmental Program Manager

Attachment 1: MMRP for CDFW-Proposed Mitigation Measures

ec:

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ATTACHMENT 1: MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

Mitigation Measures	**Timing and Methods**	**Responsible Parties**
Mitigation Measure BIO-1: Nesting Birds **To the greatest extent feasible, the Project will avoid construction activities during the peak nesting season (January 15 through September 15). Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines**	**Timing:** No more than 3 days prior to all vegetation removal or ground-disturbing activities throughout all phases of the Project. **Methods:** See Mitigation Measure	**Implementation**: City of Coachella and Project Proponent **Monitoring and Reporting**: City of Coachella

and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on-site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance.		
Mitigation Measure BIO-2: Burrowing Owl Focused and Pre-Construction Surveys **Suitable burrowing owl habitat has been confirmed on the site; therefore, focused burrowing owl surveys shall be conducted by a CDFW-approved qualified biologist prior to any Project activities, including vegetation- or ground-disturbing activities. CDFW strongly recommends that focused surveys are conducted in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version)[11]. If burrowing owls are detected during the focused surveys, the qualified biologist and Project proponent shall begin coordination with CDFW and USFWS immediately, and shall submit the results of focused surveys to CDFW and USFWS as soon results become available and before commencement of any Project activities,**	**Timing: Focused surveys:** Consistent with timing in Appendix D of the Staff Report on Burrowing Owl Mitigation and prior to commencement of any Project activities, including vegetation- or ground-disturbing activities for all phases of the Project. **Pre-construction surveys:** No less than 14 days prior to start of Project-related activities and within 24 hours prior to	**Implementation**: City of Coachella and Project Proponent **Monitoring and Reporting**: City of Coachella

[11] California Department of Fish and Wildlife (CDFW). 2012. Staff Report on Burrowing Owl Mitigation. State of California, Natural Resources Agency. Available for download at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843.

including any vegetation- or ground-disturbing activities. CDFW recommends that the information included in the survey results be consistent with Appendix D of the *Staff Report on Burrowing Owl Mitigation*, including a detailed map showing locations of all burrowing owls, burrowing owl sign, potential burrows, and occupied burrows (occupied means at least one burrowing owl or its sign has been observed within the last three years; may be indicated by owl sign including feathers, pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site); a description of the behavior of burrowing owls during surveys; a description of survey methods; and other items listed in Appendix D of the *Staff Report on Burrowing Owl Mitigation* under "Survey Reports." Consultation with CDFW and USFWS must be completed prior to commencement of any Project activities, including vegetation- or ground-disturbing activities. If impacts to occupied burrowing owl habitat or burrow(s) or burrowing owl individuals, nests, or eggs cannot be avoided, appropriate NCCP (Fish and Game Code section 2835) or CESA authorization (i.e., Incidental Take Permit under Fish and Game Code section 2081(b)) should be obtained from CDFW prior to commencement of Project activities, including vegetation- or ground-disturbing activities. **Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be repeated when there is a pause in construction of more than 30 days. Preconstruction surveys shall be performed**	ground disturbance for all phases of the Project and when there is a pause in construction of more than 30 days. **Methods:** See Mitigation Measure	

by a CDFW-approved qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted and the qualified biologist shall coordinate with CDFW and USFWS. Project activities shall not recommence until consultation with CDFW and USFWS is completed.		
Mitigation Measure BIO-[A]: Surveys for Daytime, Nighttime, Wintering (Hibernacula), and Maternity Roosting Sites for Western Yellow Bat **Prior to commencing Project activities, a CDFW-approved qualified bat biologist shall perform bat habitat/roosting surveys to determine presence of daytime, nighttime, wintering (hibernacula), and maternity roost sites. Surveys shall be conducted during favorable weather conditions only. Each survey shall consist of one dusk emergence survey (start one hour before sunset and last for three hours), followed by one pre-dawn re-entry survey (start one hour before sunrise and last for two hours), and one daytime visual inspection of all potential roosting habitat on the Project site. Surveys shall be conducted within one 24-hour period. Visual inspections shall focus on the identification of bat sign (i.e., individuals, guano, urine staining, corpses, feeding remains, scratch marks and bats squeaking and chattering). Bat detectors, bat call analysis, and visual observation shall be used during all dusk emergence and pre-dawn re-entry surveys. If active maternity roosts are identified in the work area or 500 feet extending from the work area, Project construction will only occur between**	**Timing:** Prior to commencement of Project Activities. **Methods:** See Mitigation Measure	**Implementation**: City of Coachella and Project Proponent **Monitoring and Reporting**: City of Coachella

October 1 and February 28, outside of the maternity roosting season when young bats are present but are not yet ready to fly out of the roost. Maternity roosts shall not be evicted, excluded, removed, or disturbed. If active hibernacula are identified in the work area or 500 feet extending from the work area, a minimum 500-foot no-work buffer shall be provided around hibernacula. Buffers shall be left in place until the end of Project construction and activities or until a qualified bat biologist determines that the hibernacula are no longer active. Project-related construction and activities shall not occur between 30 minutes before sunset and 30 minutes after sunrise. Hibernacula roosts shall not be evicted, excluded, removed, or disturbed.		
Mitigation Measure BIO-[B]: Avoidance of Bats during Tree Removal **Tree removal work with the potential to house roosting bats shall be performed between September 15 and October 31 to minimize direct impacts to roosting bats. This time period is after young are volant (flying) but before expected onset of torpor (wintering inactivity). Tree removal work may also be conducted between February 15 and March 31, following winter torpor and prior to the start of the maternity season. No tree removals shall occur during the hibernation season, which typically begins in November or December (depending on weather conditions) and continues through mid-February, due to the high potential for mortality of hibernating bats. Depending on weather conditions and the best professional judgement of a qualified bat biologist approved by CDFW, tree removal work may be performed in November if the forecasted nighttime low temperatures on**	**Timing:** See Mitigation Measure. **Methods:** See Mitigation Measure	**Implementation**: City of Coachella and Project Proponent **Monitoring and Reporting**: City of Coachella

the evening of removal and the subsequent four evenings do not drop below 45˚F. In November, if weather is cold (i.e., forecasted nighttime low temperatures reach 45˚F or less for that evening and the next four evenings), then no tree removals shall be performed. All palm removals shall require a two-step removal process and the involvement of a CDFW-approved qualified bat biologist to ensure that no roosting bats are killed during this activity. The following two-step tree removal process shall be implemented over two consecutive days: on Day 1, live palm fronds located above the frond skirt, and as identified by a qualified bat biologist, will be removed. On Day 2, the remainder of the tree may be removed without supervision by a qualified bat biologist.		
Mitigation Measure BIO-[C]: CVMSHCP Compliance **Prior to construction and issuance of any grading permit, the City shall ensure compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) and its associated Implementing Agreement and shall ensure the collection of payment of the CVMSHCP Local Development Mitigation Fee and transfer of revenues to the Coachella Valley Conservation Commission.**	**Timing:** Prior to construction and issuance of any grading permit. **Methods:** See Mitigation Measure	**Implementation**: City of Coachella **Monitoring and Reporting**: City of Coachella
Mitigation Measure BIO-[D]: Artificial Nighttime Lighting **Throughout construction and the lifetime operations of the Project, the City shall eliminate all nonessential lighting throughout the Project area and avoid or limit the use of artificial light at night during the hours of dawn and dusk when many**	**Timing:** Throughout construction and the lifetime operations of the Project **Methods:** See Mitigation Measure	**Implementation**: City of Coachella and Project Proponent **Monitoring and Reporting**: City of Coachella

wildlife species are most active. The City shall ensure that all lighting for the Project is fully shielded, cast downward and directed away from surrounding open-space and agricultural areas, reduced in intensity to the greatest extent possible, and does not result in lighting trespass including glare into surrounding areas or upward into the night sky (see the International Dark-Sky Association standards at http://darksky.org/). The City shall ensure use of LED lighting with a correlated color temperature of 3,000 Kelvins or less, proper disposal of hazardous waste, and recycling of lighting that contains toxic compounds with a qualified recycler.		

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Project Justification Statement

Calhoun Street Housing Development – Planned Unit Development (PUD)

a. How the proposed development is superior to what is permitted by the underlying zone;

The underlying General Neighborhood (G-N) zoning designation allows for medium- to high-density residential development. If developed conventionally under base zoning, the site could result in a standard tract subdivision without coordinated open space, setbacks, sidewalks, amenities, or enhanced public improvements.

The PUD provides a superior outcome by:

- Delivering a 3.13-acre public park with active and passive recreational amenities connected to the residential community with private access while maintaining good public access and visibility.
- Establishing enhanced perimeter setbacks (26 feet along Calhoun Street and Avenue 49) with 6ft wide sidewalks, landscaped parkways, and decorative entry treatments, creating a stronger neighborhood edge and higher quality streetscape.
- Designing a walkable internal circulation system with sidewalks that connect directly to Avenue 49 and Calhoun Street, with multiple egress and ingress for pedestrians and bicyclists.
- Providing flexible lot standards that allow for attainable housing while maintaining potential for high-quality architecture, landscaping, and open space.

b. How the proposed project conforms to Chapter 17.38 – Planned Unit Developments

The project satisfies the intent of Chapter 17.38 by:

- Establishing custom development standards and design guidelines tailored to the site while remaining consistent with the General Plan.
- Demonstrating superior site design and amenities compared to the base zone, including coordinated landscaping, open space, and pedestrian circulation improvements.
- Providing defined public benefits as required by Section 17.38.035, including on-site public amenities, off-site infrastructure improvements, and contributions to community livability.
- Utilizing the PUD process to achieve flexibility in lot size and setbacks while ensuring compatibility with adjacent neighborhoods through perimeter landscaping, walls, and architectural review.

- Use of Street trees will not be used between sidewalk and street curb to prevent damage to underground utilities. The applicant will place extra canopy trees elsewhere along the street line to provide maximum shade.

- One of the advantages of this project to the City and the future residents is the open space that is built into the project. There will be a major open space on the southeast corner of the site which will provide shade and turf area for people to rest and recreate. This is more than what most provide.

- Building massing, architectural theming, and signage will be deferred to a future builder to allow project branding that reflects current market trends and buyer preferences. The PUD establishes overarching architectural guidelines to ensure compatibility with the surrounding area and

provides a flexible material palette for perimeter walls and residential architecture, maintaining consistency in community character while allowing appropriate design flexibility.

- Section 17.38.030 – Design Guidelines of the Coachella Municipal Code requires streets to include a landscaped parkway with street trees located between the sidewalk and the street curb. While interior streets comply with this standard, the project proposes that perimeter street trees be located between the perimeter sidewalk and the perimeter CMU wall. This placement is necessary for two key reasons: (1) the root systems of large street trees would conflict with IID underground utilities located within the traditional landscape parkway between the sidewalk and curb, and (2) positioning street trees west and south of the sidewalk will provide significantly improved pedestrian shading due to the solar path and angle throughout the day.

- Subdivision signage and entry monument design will be coordinated with the future architectural theming of the development. As the final architectural character has not yet been determined, specific sign designs will be required of the project's Conditions of Approval. A detailed sign and monument plan shall be submitted to the Development Services Director, and final design approval shall be required prior to installation.

c. Exceptions to the underlying zoning regulations being requested and why they are necessary;

The PUD seeks modest exceptions from the G-N standards to allow for a more efficient and attainable neighborhood design. These include:

- Minimum lot size: 3,400 sq. ft. (vs. 4,000 sq. ft. required).
- Lot depth: 85 ft. (vs. 90 ft. required).
- Side yard setback: 5 ft. (vs. 10 ft. required).
- Rear yard setback: 15 ft. (vs. 20 ft. required).

These adjustments are necessary in the PUD to:

- Provide a broad range of housing types on smaller lots, consistent with General Plan goals of supporting attainable and diverse housing opportunities.
- Achieve a more efficient subdivision layout while preserving required parking, private yard space, and open space.
- Enable the project to contribute additional land and resources toward public benefits (park, landscaping, street and infrastructure improvements).

d. Public benefit provided that justifies exceptions to underlying zoning standards;

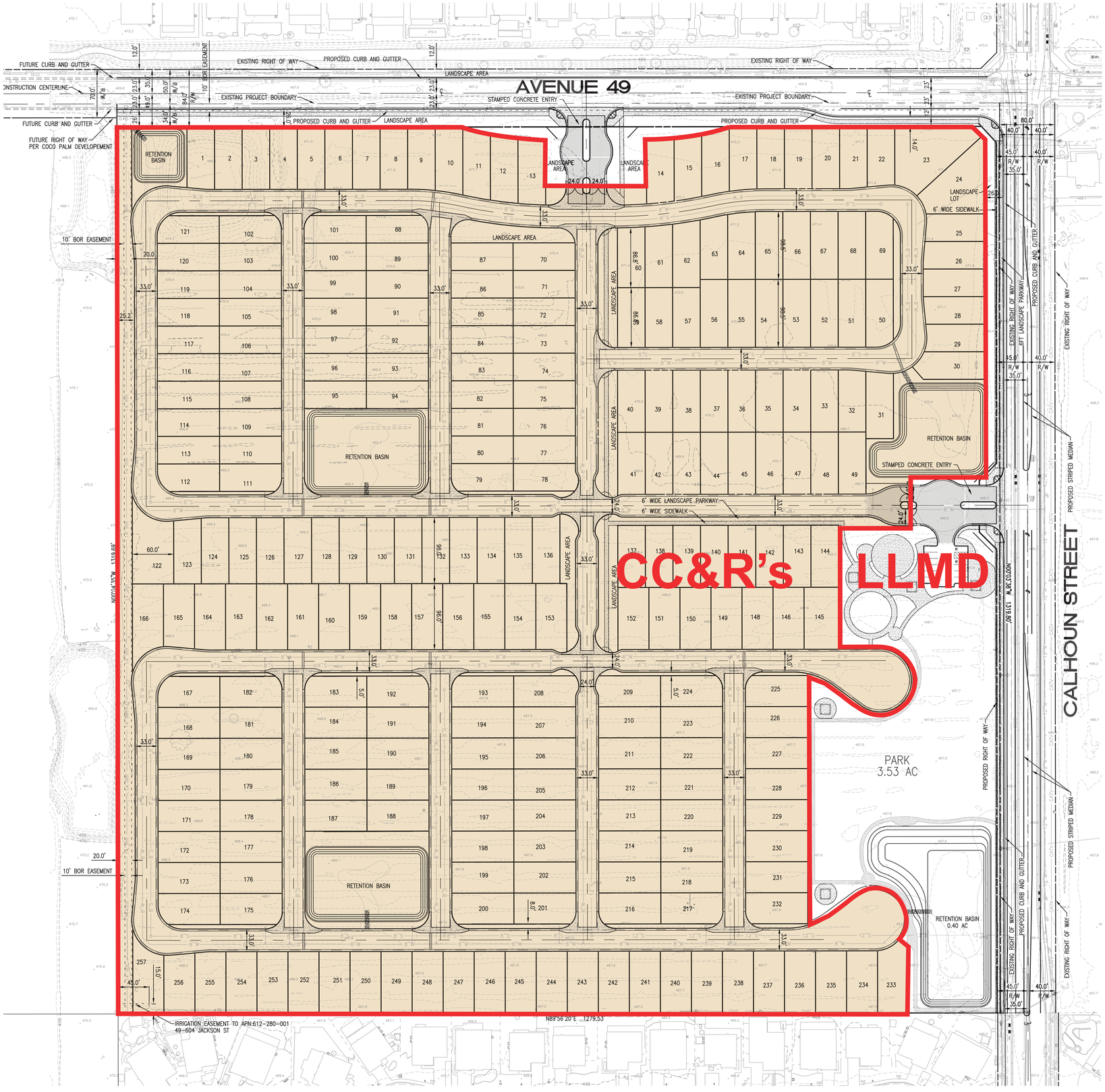
The project provides multiple, tangible public benefits that offset the requested zoning exceptions:

1. Public Park (3.13 acres) – A centrally located, fully accessible public park with tot lot, basketball court, shade structures, bike racks, seating areas, lighting, and both active and passive recreation areas. This park will serve not only future residents but the surrounding community as well.
2. Calhoun Street Improvements (1,300 linear feet) – Half-street improvements including new pavement, curb, gutter, undergrounding of existing overhead utilities, new streetlights, and a 26-foot landscaped setback with 6-foot sidewalks and landscaped parkway.
3. Avenue 49 Improvements (1,300 linear feet) – Full-street improvements along a currently undeveloped roadway, including curb, gutter, sidewalks, and landscaping on both sides. These

improvements complete a critical east-west corridor and create long-term circulation benefits for the community.

4. Stormwater Infrastructure – Construction of an above-ground retention basin along Avenue 49 to capture and retain 100% of off-site stormwater flows, providing a local benefit that supports future growth beyond the project site.
5. Enhanced Streetscape and Entry Design – Decorative pavers, stamped concrete, wide landscaped setbacks, and coordinated public park, wall, and fencing treatments that elevate the overall character of the project and surrounding area.

Collectively, the public park, major infrastructure improvements, off-site stormwater facilities, and enhanced landscaping exceed the baseline requirements. These improvements represent substantial public benefits that justify the requested deviations from the base zoning and demonstrate compliance with the purpose and intent of the City's Planned Unit Development ordinance.

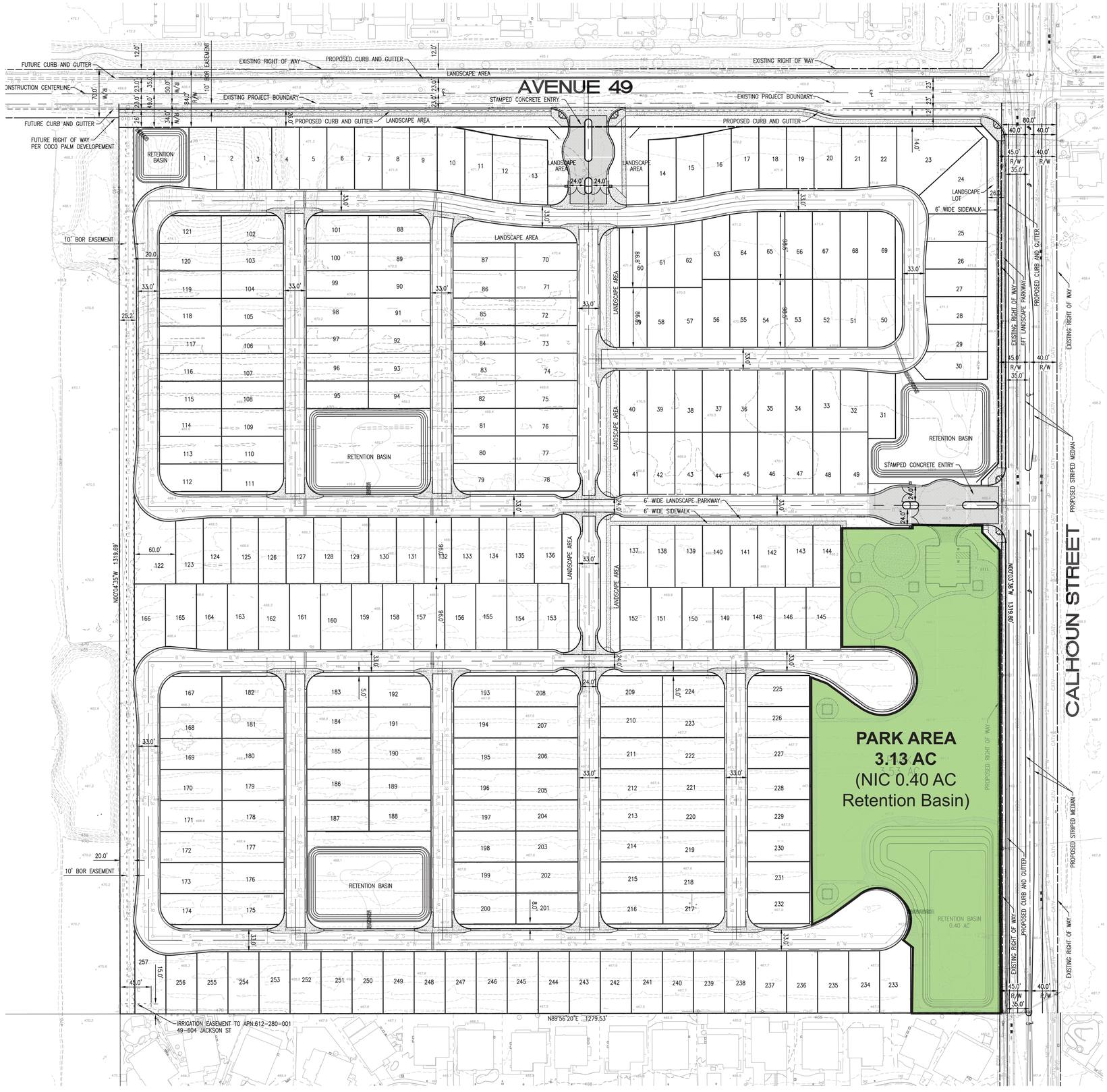


12/05/2025

Calhoun Street Housing Development
Coachella, California
APN: 612-260-010

The Altum Group

SHEET TITLE:
LLMD & CC&R's Exhibit



12/05/2025

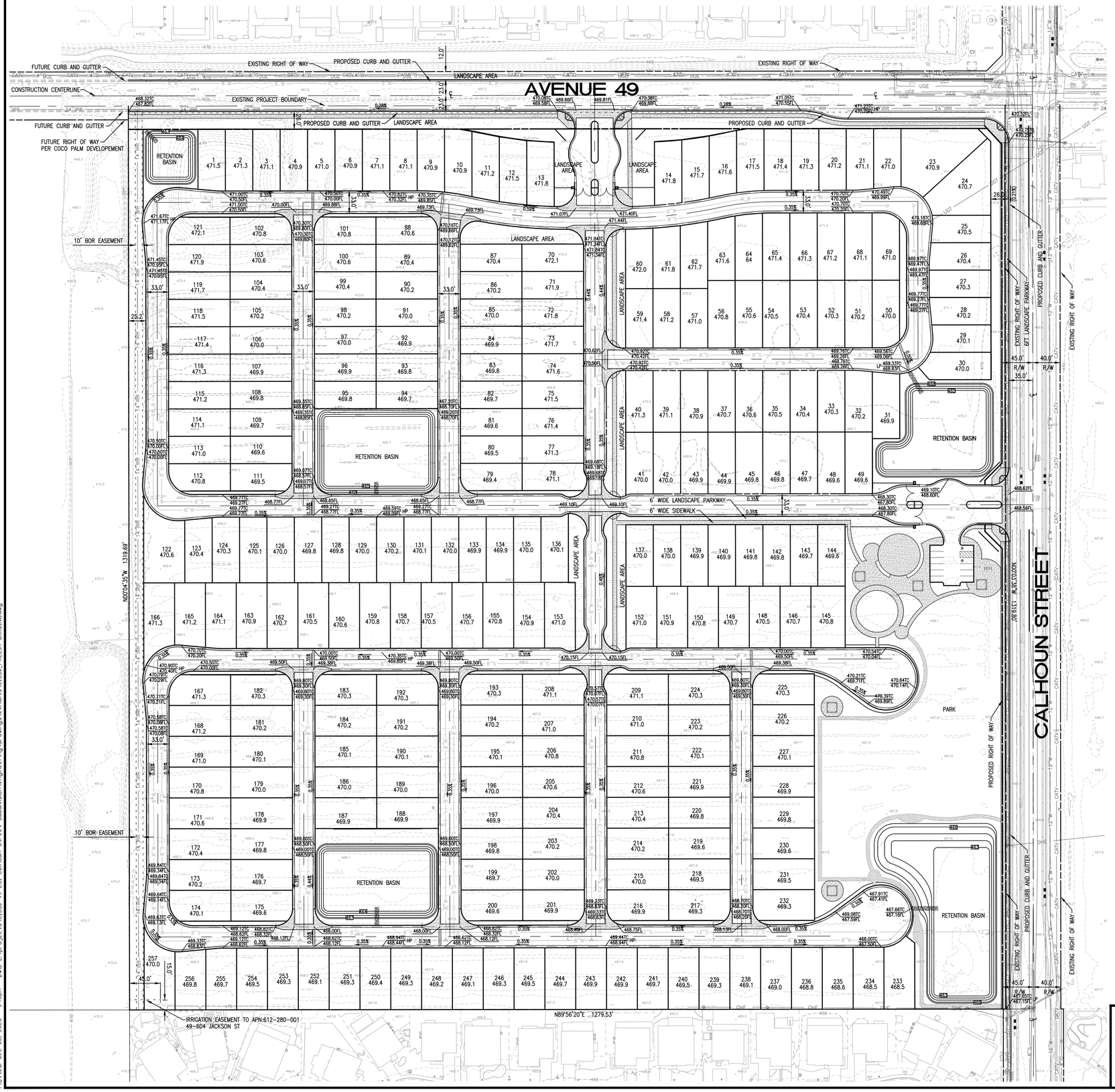
Calhoun Street Housing Development
Coachella, California
APN: 612-260-010

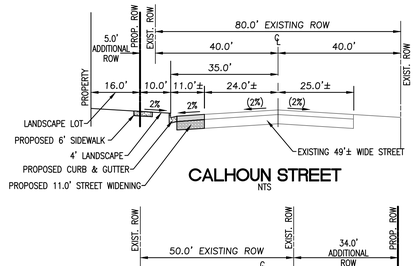
The Altum Group

SHEET TITLE:
PARK AREA EXHIBIT

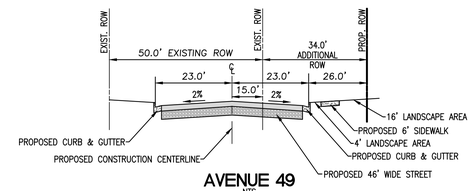
PRELIMINARY GRADING PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

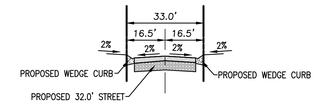




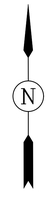
CALHOUN STREET
NTS



AVENUE 49
NTS



PRIVATE ON-SITE STREETS
(ONE SIDED STREET PARKING ONLY)
NTS



GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

EARTHWORK

RAW CUT	–	36,477 C.Y.
RAW FILL	–	52,266 C.Y.
IMPORT	–	15,749 C.Y.

Dec 05, 2025

PREPARED BY:
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CITY OF COACHELLA, CALIFORNIA

PRELIMINARY GRADING PLAN

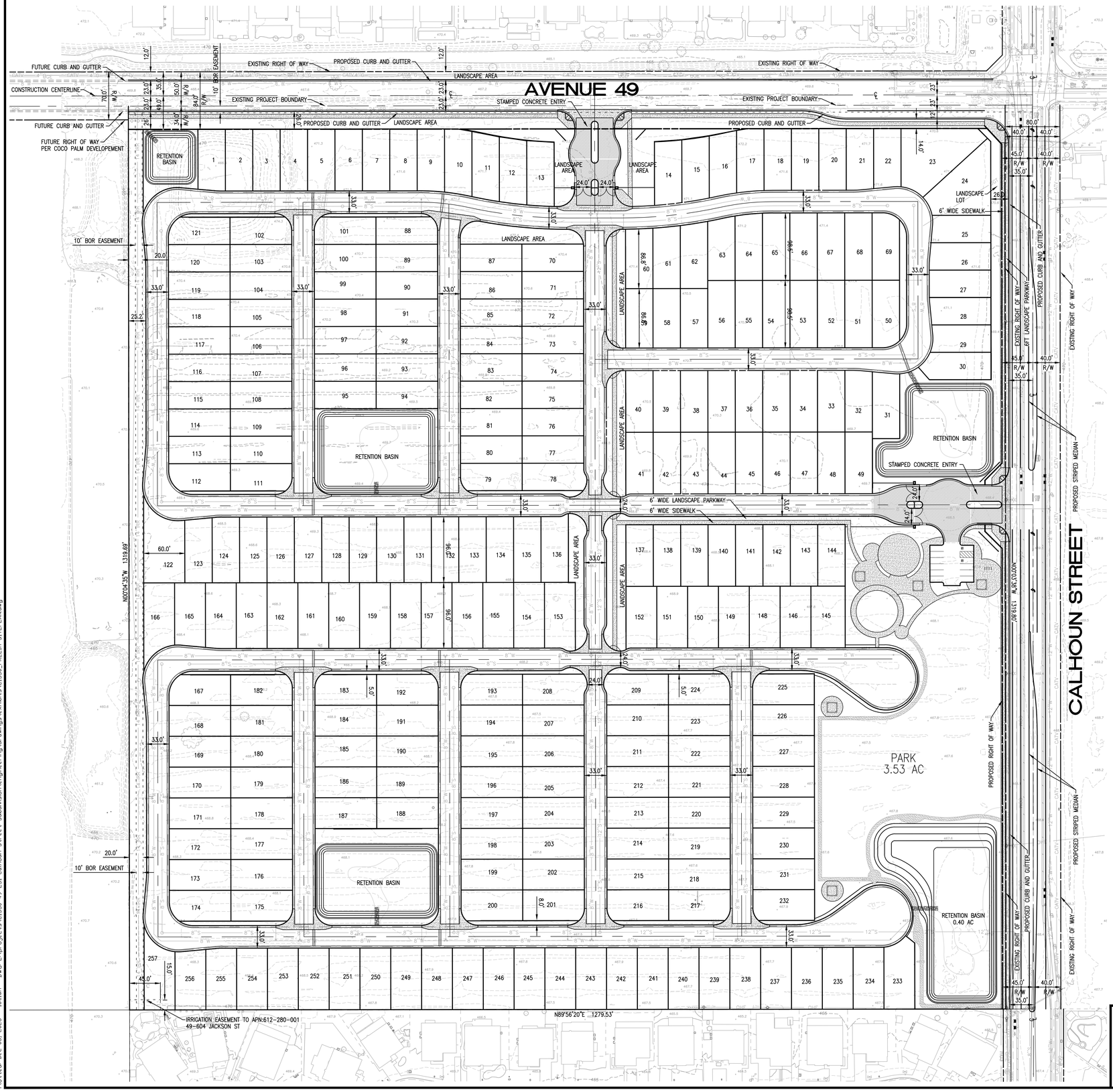
FOR: CALHOUN STREET SUBDIVISION

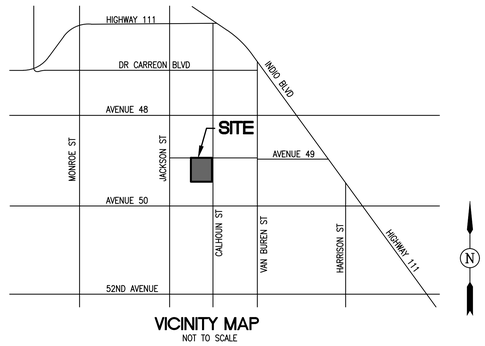
SHEET NO. GP1

Plotted: Dec 05, 2025 - 1:43pm DWG L:\projects\21530 49-251 Calhoun Street Subdivision\engineering\drawings\exhibits\21530_PRELIM-GRADING.dwg

PRELIMINARY SITE PLAN

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP
NOT TO SCALE

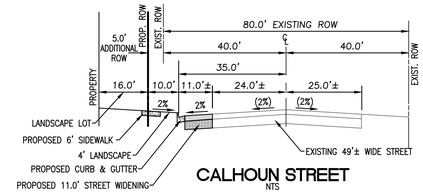
ASSESSOR'S PARCEL NO.
612-260-010

SITE ADDRESS
VACANT LAND

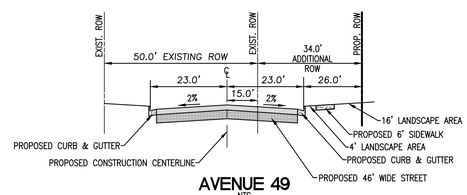
GENERAL PLAN
GENERAL NEIGHBORHOOD

SITE AREA TABULATION

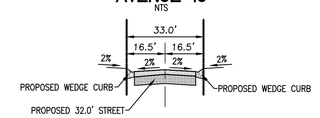
PARCEL AREA (GROSS)	39.98 AC.
ROW DEDICATION	1.21 AC.
PARCEL AREA (NET)	38.77 AC.
PUBLIC PARK	3.53 AC.
40FT WIDE LOTS	144
45FT WIDE LOTS	113
TOTAL	**257 LOTS**



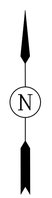
CALHOUN STREET
NTS



AVENUE 49
NTS



PRIVATE ON-SITE STREETS
(ONE SIDED STREET PARKING ONLY)
NTS



GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

Dec 05, 2025

PREPARED BY:
The Altum Group
ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL
44-600 Village Court, Suite 100
Palm Desert, CA 92260
t.760.346.4750 f. 760.340.0089
TheAltumGroup.com

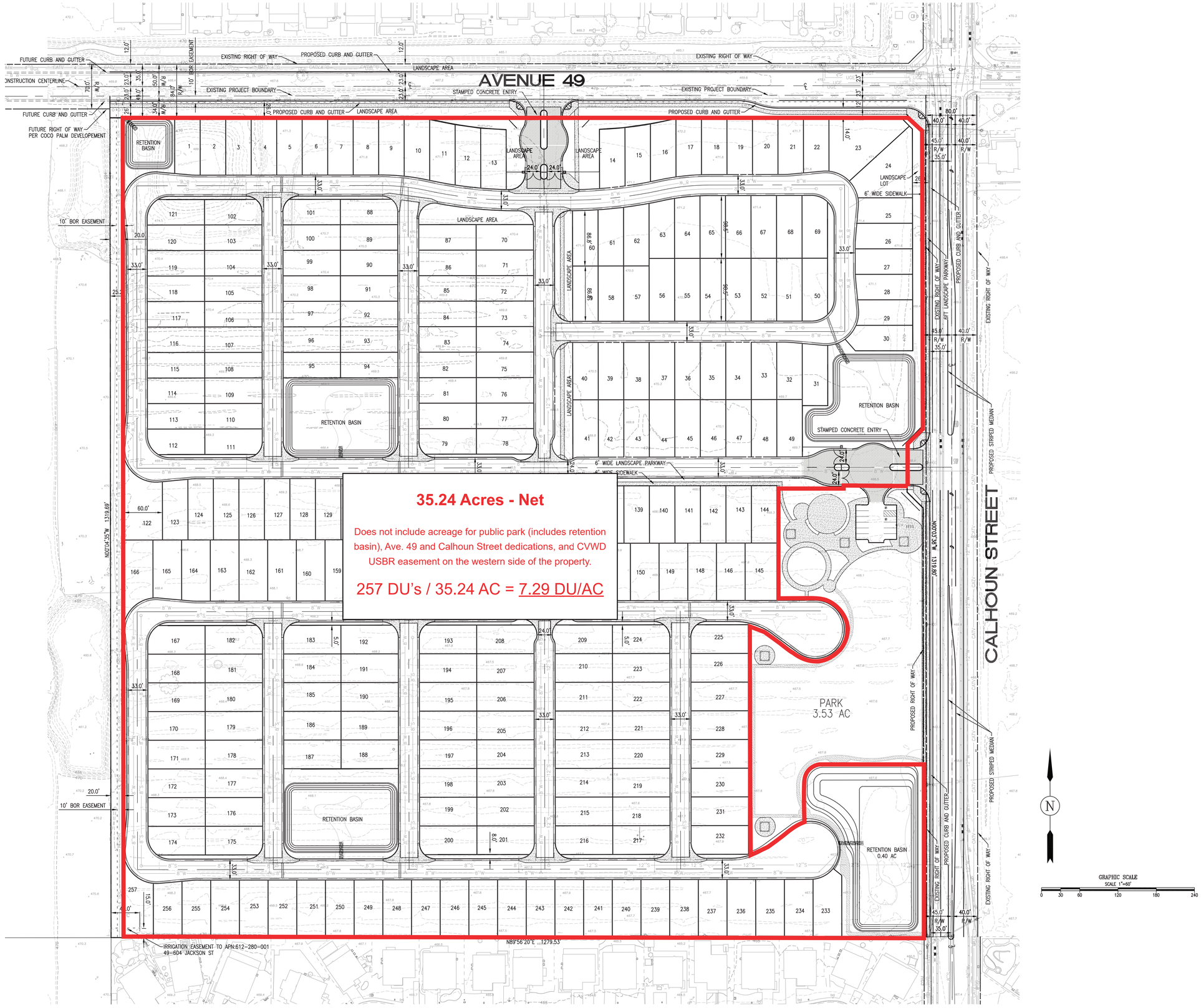
CITY OF COACHELLA, CALIFORNIA

PRELIMINARY SITE PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO. SP1

Plotted: Dec 05, 2025 - 10:11am DWG L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\drawings\exhibits\C1530_PRELIM-SITEPLAN.dwg



35.24 Acres - Net

Does not include acreage for public park (includes retention basin), Ave. 49 and Calhoun Street dedications, and CVWD USBR easement on the western side of the property.

257 DU's / 35.24 AC = 7.29 DU/AC

12/05/2025

Calhoun Street Housing Development
Coachella, California
APN: 612-260-010

The Altum Group

SHEET TITLE:
DENSITY CALCULATION EXHIBIT

LocaliQ
California
GANNETT

PO Box 631437 Cincinnati, OH 45263-1437

AFFIDAVIT OF PUBLICATION

Delia Granados
City Of Coachella - Legals
53990 Enterprise WAY
Coachella CA 92236-3817

STATE OF WISCONSIN, COUNTY OF BROWN

The Desert Sun, a newspaper published in the city of Palm Springs, Riverside County, State of California, and personal knowledge of the facts herein state and that the notice hereto annexed was Published in said newspapers in the issue:

PDS desertsun.com 11/16/2025
PDS Palm Springs Desert Sun 11/16/2025

and that the fees charged are legal.
Sworn to and subscribed before on 11/16/2025

Legal Clerk

Notary, State of WI, County of Brown

My commission expires

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Tax Amount:	$0.00		
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VICKY FELTY
Notary Public
State of Wisconsin

CITY OF COACHELLA
NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION
TENTATIVE TRACT MAP 39051
CALHOUN STREET AND AVENUE 49

LEAD AGENCY: City of Coachella
53990 Enterprise Way
Coachella, CA 92236
CONTACT PERSON: Adrian Moreno, Associate Planner
760-398-3502
PROJECT TITLE: Calhoun Street Housing Development
Environmental Assessment EA 25-02
Tentative Tract Map TTM 39051
Conditional Use Permit 390
Planned Unit Development
PROJECT LOCATION: Southwest corner of Calhoun Street and Avenue 49
APN: 612-260-010
PROJECT DESCRIPTION: The proposed Calhoun Street Housing Development is a Tentative Tract Map, Environmental Assessment, Conditional Use Permit and Planned Unit Development (PUD) for a single-family residential project. The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres – 3.13 acres for recreational open space and a 0.40-acre landscaped retention basin.
ENVIRONMENTAL DETERMINATION: The City of Coachella, acting as Lead Agency, has prepared a Draft Initial Study / Mitigated Negative Declaration (IS/MND) pursuant to the statutes and guidelines of the California Environmental Quality Act (CEQA). The purpose of the IS/MND is to evaluate the environmental impacts associated with the development of the project. The City has reviewed the project and concludes the project would not have a significant impact on the environment with the implementation of mitigation measures.
20-DAY PUBLIC REVIEW PERIOD: The City invites written public comment on the Draft Initial Study / Mitigated Negative Declaration from November 18, 2025 through December 8, 2025. Written comments on the Draft IS/MND must be received within the public review period at the Development Services Department address (53990 Enterprise Way, Coachella, CA 92236). Comments may also be submitted via email to amoreno@coachella.org. The Draft IS/MND is available for review at the Development Services Department and on the City's website at: https://www.coachella.org/departments/development-services/environmental-reviews
PUBLIC MEETING: The Planning Commission will hold a public hearing to consider the Project on a future date (to be determined) in a separate notice pursuant to City of Coachella Noticing Requirements. The City Council public hearing date has not been set. Please contact Mr. Moreno at amoreno@coachella.org for more information regarding the hearing date.
11/16/2025

LocaliQ
California
GANNETT

Order Confirmation

Not an Invoice

Account Number:	1252586
Customer Name:	City Of Coachella - Legals
Customer Address:	City Of Coachella - Legals 53990 Enterprise WAY Coachella CA 92236-3817
Contact Name:	Adrian Moreno
Contact Phone:	
Contact Email:	amoreno@coachella.org
PO Number:	

Date:	12/01/2025
Order Number:	11886996
Prepayment Amount:	$ 0.00

Column Count:	1.0000
Line Count:	140.0000
Height in Inches:	14.5100

Print

Product	#Insertions	Start - End	Category
PDS Palm Springs Desert Sun	1	12/07/2025 - 12/07/2025	Govt Public Notices
PDS desertsun.com	1	12/07/2025 - 12/07/2025	Govt Public Notices

As an incentive for customers, we provide a discount off the total order cost equal to the 3.99% service fee if you pay with Cash/Check/ACH. Pay by Cash/Check/ACH and save!

Total Cash Order Confirmation Amount Due	$303.20
Tax Amount	$0.00
Service Fee 3.99%	$12.10
Cash/Check/ACH Discount	-$12.10
Payment Amount by Cash/Check/ACH	$303.20
Payment Amount by Credit Card	$315.30

Order Confirmation Amount	**$303.20**

Ad Preview

NOTICE OF PUBLIC HEARING CITY OF COACHELLA PLANNING COMMISSION MEETING

NOTICE IS HEREBY GIVEN that the Planning Commission of the City of Coachella will hold a public hearing on Wednesday, December 17, 2025 at 6:00 p.m. at 1515 Sixth Street, Coachella CA 92236 to consider oral and written testimony regarding TTM No. 39051, CUP No. 390, EA No. 25-02 Calhoun Street Subdivision project for the proposed single-family residential project. The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, California. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres – 3.13 acres for recreational open space and a 0.40-acre landscaped retention basin. Applicant: Pacific Modern Builders LLC

Pursuant to CEQA, an Initial Study was prepared for the Calhoun Street Subdivision project. The Initial Study concluded that the proposed project will not have a significant effect on the environment and is recommending that the Planning Commission adopt a negative declaration for the proposed project. A 20-day public review period ran from November 18, 2025, to December 8, 2025. A Mitigation Monitoring and Reporting Program has been prepared as part of the Initial Study.

Copies of the Application materials submitted are available for public inspection at the Coachella Development Services Department 53990 Enterprise Way, Coachella, CA 92236 between the hours of 7:00 am and 6:00 pm, Monday through Thursday. City Hall is closed on Fridays. (Se Habla Español).

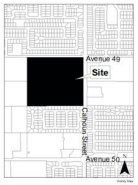
In addition to submitting written comments at the address noted above, you may email amoreno@coachella.org or call (760) 398-3102 before 4:30 p.m. on the day of the meeting to leave a voice message. You may request to speak via zoom by contacting the Planning Commission Secretary through the above means before 5:30 p.m. on the day of the meeting and requesting a Zoom link to the meeting. Public comments either received via email, telephonically or via Zoom must be limited to a maximum of 250 words written or three minutes spoken.

The live stream of the meeting may be viewed online by accessing the City's website at www.coachella.org, and clicking on the "Agendas/Minutes" tab located on the home page, and finding the Zoom Meetings link to the meeting on the posted agenda.

If any individual or group challenges this action in court, issues raised may be limited to those issues raised at the public hearing described in this notice or in written testimony. Any questions or comments may be directed to:

Adrian Moreno, Associate Planner
53-990 Enterprise Way,
Coachella, CA 92236
(760) 398-3102

BY ORDER OF PLANNING COMMISSION SECRETARY



Dec 7, 2025 #11886996