PLANNING COMMISSION AGENDA

September 14, 2022 at 6:00 PM

Wilsonville City Hall & Remote Video Conferencing

PARTICIPANTS MAY ATTEND THE MEETING AT:
City Hall, 29799 SW Town Center Loop East, Wilsonville, Oregon
YouTube: https://youtube.com/c/CityofWilsonvilleOR
Zoom: https://us02web.zoom.us/j/87239032604

TO PROVIDE PUBLIC TESTIMONY:
Individuals may submit a testimony card online:
https://www.ci.wilsonville.or.us/PC-SpeakerCard
or via email to Dan Pauly: Pauly@ci.wilsonville.or.us, 503-570-1536
by 2:00 PM on the date of the meeting noting the agenda item
for which testimony is being submitted in the subject line.

CALL TO ORDER - ROLL CALL [6:00 PM]

Olive Gallagher	Breanne Tusinski
Jennifer Willard	Aaron Woods
Kamran Mesbah	Andrew Karr
Ron Heberlein	

PLEDGE OF ALLEGIANCE

CITIZEN INPUT

This is the time that citizens have the opportunity to address the Planning Commission regarding any item that is not already scheduled for a formal Public Hearing tonight. Therefore, if any member of the audience would like to speak about any Work Session item or any other matter of concern, please raise your hand so that we may hear from you now.

ADMINISTRATIVE MATTERS

1. Consideration of the July 13, 2022 & August 10, 2022 Planning Commission minutes

WORK SESSION [6:15 PM]

2. Airport Good-Neighbor Policies (Bateschell)(30 Minutes)

3. Wastewater Treatment Plant Master Plan (Nacrelli)(30 Minutes)

4. Frog Pond East and South Master Plan (Pauly)(45 Minutes)

INFORMATIONAL [8:00 PM]

5. City Council Action Minutes (August 1 & 15, 2022)(No staff presentation)

6. 2022 PC Work Program (No staff presentation)

ADJOURN [8:10 PM]

Time frames for agenda items are not time certain (i.e. agenda items may be considered earlier than indicated). The City will endeavor to provide the following services, without cost, if requested at least 48 hours prior to the meeting by contacting Mandi Simmons, Administrative Assistant at 503-682-4960: assistive listening devices (ALD), sign language interpreter, and/or bilingual interpreter. Those who need accessibility assistance can contact the City by phone through the Federal Information Relay Service at 1-800-877-8339 for TTY/Voice communication.

Habrá intérpretes disponibles para aquéllas personas que no hablan Inglés, previo acuerdo. Comuníquese al 503-682-4960.

PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

ADMINISTRATIVE MATTERS

1. Consideration of the July 13, 2022 & August 10, 2022 PC Meeting Minutes

PLANNING COMMISSION
MEETING MINUTES
July 13, 2022 at 6:00 PM
City Hall Council Chambers & Remote Video Conferencing

CALL TO ORDER - ROLL CALL
A regular meeting of the Wilsonville Planning Commission was held at City Hall beginning at 6:00 p.m. on Wednesday, July 13, 2022. Chair Heberlein called the meeting to order at 6:01 p.m., followed by roll call. Those present:

Planning Commission:	Ron Heberlein, Jennifer Willard, Aaron Woods, Andrew Karr, and Kamran Mesbah. Olive Gallagher arrived after roll call. Breanne Tusinski was absent.
City Staff:	Daniel Pauly, Ryan Adams, Mike Nacrelli, and Mandi Simmons.

PLEDGE OF ALLEGIANCE
The Pledge of Allegiance was recited.

CITIZEN'S INPUT
This is an opportunity for visitors to address the Planning Commission on items not on the agenda.
There was none.

ADMINISTRATIVE MATTERS

1. Consideration of the June 8, 2022 Planning Commission Minutes

The June 8, 2022 Planning Commission Minutes were accepted as presented.

WORK SESSION

2. Wastewater Treatment Plant Master Plan (Nacrelli)

Mike Nacrelli, Senior Civil Engineer, noted the Wastewater Treatment Plant Master Plan was the first since the last major upgrade to the Master Plan in 2012 and would look at the plant capacity, condition of the equipment, the regulatory landscape, and any issues that needed to be incorporated into a capital plan.

Dave Price, Project Manager & Vice President, Carollo Engineers, briefly highlighted his professional background. He presented the Wastewater Treatment Plant (WWTP) Master Plan via PowerPoint, noting Carollo based its planning around the City's Comprehensive Plan and the growth expected in the community through 2045 to ensure the treatment plant had capacity to treat in compliance with the NPDS permit to discharge to the Willamette River. Also reviewed were potential regulatory drivers, the WWTP condition and process capacity assessments, alternatives evaluation for addressing capacity deficiencies, as well as the recommended plan for new projects and infrastructure to provide additional capacity, the proposed phasing schedule, projected yearly cashflow, and next steps, which included the Master Plan's adoption anticipated in mid-October.

Discussion and feedback from the Planning Commission was as follows with responses to Commissioner questions as noted:

- Had the upcoming projects in 2023 and 2024 been estimated in the City's budget to provide the needed funding? (Slides 15 and 16)
    - Mr. Nacrelli replied the larger dollar amount projects, the UV System Improvement and Secondary Clarifier Mechanisms, were both in the Five-Year Plan of the recently adopted budget. The Seismic Improvements project could be accommodated in the City's Wastewater Capital Budget, and Staff would look into adding it to the Five-Year Plan in the next budget cycle. The Fiber Optic Cable Addition, at less than $60,000, was a relatively small project. The Dewatering Performance Optimization project did yet have a dollar amount and Staff would work with Jacobs Engineering Group Inc., the City's contract operator, to get that figure. The City might provide some funding through that operations contract, but the project would not have a major impact on the City's cash flow.
        - He confirmed a good amount of the near term proposed projects were in the Five-Year Plan, though a few things still needed to be addressed.
- What was the financing plan for 2031? Would funds come from CIP and is there adequate annual Capital Improvement Project (CIP) funding for the 2031 projects? (Slide 16)
    - Mr. Nacrelli noted the 2031 Solids Dryer Improvements project was the next big project. As mentioned in the Staff report, the current fiscal year budget identified a wastewater rate study and SDC analysis would be done in. The final Master Plan document would be used to see what the numbers and schedule meant for the monthly rates and the system development charges (SDCs) and how they might need to be adjusted. After the public hearings, over the next year, figuring out the finance plan would be the next step in implementation.
- Mr. Price clarified that grouting any soil voids around the existing piping was not part of the Seismic Improvements project but recommended in the geotechnical report and Northwest Geotech's study. When Northwest Geotech did its site work, no active erosion or piping was occurring; however, the City would need to pay attention to those requirements when doing the new improvements for the aeration basin, or if something was identified that appeared could be an issue, such as a hole showing up suddenly after some rain events. He did not know of anything to be worried about regarding the soils currently.
- Were there many complaints over odor and should the City do any projects to address odor?
    - Mr. Nacrelli responded he had not heard much about odor complaints from the operators at the site or from Delora Kerber, Public Works Director, who manages the contract.
    - Mr. Price added odor-control facilities were tied to the dryer and the solids building. He was not a solids processing expert, but there were risks when the process was interrupted and solids were not making it through the dewatering process to the dryer on a continual basis, which would occur because something broke or something else interrupted the normal flow. Under normal operations, the assumption was that the existing units were functioning as they were intended to control odor.
    - Mr. Nacrelli added he had not noticed any odor during his many times visiting the site.
- Mr. Nacrelli clarified the process for solids did not include a digester with gas harvesting, noting the digesters were eliminated with the last upgrade.
    - Mr. Price added there was no digestion, dewatered raw solids went from the centrifuge units right into the dryer unit, and that process was intended to function on a continual basis.
- Regarding plans for generating gas in the future, which was typical when dealing with solids, Mr. Nacrelli noted producing heat and electricity from harvested methane had been a big part of his previous job at

the City of Gresham, but it would be prohibitive for the City of Wilsonville to ~~try and~~ go back to using anaerobic digestion after eliminating the digesters.

- Mr. Price clarified that the percentage increases on Slide 4 were 2045 projections for an increase in the potential need for capacity based upon Staff's analysis using Metro numbers.
  - On how the percentage projections compared to the population increase percentage, Mr. Price replied the projected population of 30,000 in 2045 (Slide 3) was less than those represented in the table. (Slide 4) Often, conservative numbers were used when evaluating specific elements, like the loads or flows, for future growth and what would be produced. To ensure, Carollo was being conservative for planning purposes, the best-case scenario was not used. Every home built would not necessarily have the number of residents assumed by the Comprehensive Plan.
- The project assumed the same per capita load and flow generation seen today for 2045. The population increase would be around 18 percent, but the analysis showed increases of more than twice that in all categories. What infiltration inflow analysis information was available?
  - Mr. Price replied evaluations for treatment facilities looked at the actual flows received at the plant. Depending on the circumstance, the client's desires, and the needs of the community, the analysis might look at the collection system model to see the maximum amount of flow it could deliver. Typically, the flow numbers were generated based upon an evaluation using rolling averages, often a maximum month flow based upon a rolling 30-day average was used; not what the average was in one month compared to some time period, often it was the previous five years. The analysis did not necessarily utilize the same kinds of assumptions used in a collection system plan in part because with a treatment plant, no matter how tight the site was, the assumption was that more capacity could be built, expanded, or intensified. However, once pipe was put in the ground, it was difficult to make it any larger so often the collection system plan made very conservative assumptions, especially for peak flows it needed to convey to the plant to prevent wastewater protrusion from manholes.
- Did the City have a handle on clear water intrusion in the system?
  - Mr. Nacrelli replied the Wastewater Collection System Master Plan would have definitely looked at water intrusion and the Master Plan had a CIP to replace a lot of older pipes. He had been involved in several projects in Charbonneau, an older area where the age of the infrastructure had been a particular issue. The City was definitely addressing intrusion and the best way to do it was to either line or replace old pipes.
  - Commissioner Mesbah responded he had hoped to hear the City had a handle on any potential large inflow areas; not old pipes, but broken lines, especially in low areas with shallow ground water and he assumed some gravity lines were located where such water intrusion could occur, letting in water that was not efficient to treat. Was a conservation plan to reduce the loads in the future part of the WWTP Master Plan, assuming people would be as wasteful as they were today?
    - Mr. Nacrelli noted the increases in BOD and TSS were a bit higher than the flows, which probably reflected that the influent was often trending stronger because less clean water, or rainwater, was coming into the system. The City was treating the same amount of solids, but the hydraulic impact was not as severe as it would have been in past years. (Slide 4) He agreed more efficient pipe materials, fixtures, and plumbing contributed to less water being treated.
      - A program to encourage more conservation would be more to do with the water distribution and plumbing side of things and was not part of this project's scope. However, the City was interested in conservation and pursuing it.
    - Mr. Price added one thing that came up with many of the planning studies he had done over the last 18 to 20 years was the idea that flows were very important, and they are however, as Mr.

Nacrelli had indicated, wastewater management tried to control the flow as well as ensure a process that could handle and treat the organic loads coming in, all of which included contaminants. In his experience, water conservation efforts did not always benefit wastewater treatment plants. For example, efforts in northern California, where constituents were regulated to a much lower level than DEQ, had resulted in the unintended consequence of water coming into the plants with a much higher concentration of pollutants. Water conservation was important, but it needed to be looked at carefully and watched at the wastewater plant, which was why the loads were looked at closely in the analysis which was often more important in some ways.

- Mr. Nacrelli noted the flows and loads increase was greater than the population increase and asked if that was because non-residential sources were also included.
  - Mr. Price confirmed the numbers did reflect non-residential sources, which included the prison and other industrial/commercial users within the service area, which were not reflected in the population numbers. Following Commissioner Mesbah's comments, he did want to take a hard look at the flows and loads analysis along with evolving land uses to make sure everything was in line.
- Industrial uses, like a brewery with higher loads to the treatment plant might exist in the city that the Commission was unaware of. Was the growth projection lowballed or would the City experience higher growth?
  - Mr. Nacrelli replied Metro's numbers were definitely on the low end, which was why they looked more closely at the medium projections indicated by the green line. (Slide 3, Green line)
- Historically, Metro numbers had been low, but the other aspect was that the City did have some say in how fast it grew. Some of the costs shown in the Draft Cash Flow chart were the costs of growth. (Slide 16) Perhaps those things should be thought about in addition to the expansion of load systems, etc. There were costs associated with choosing to grow which the City needed to be strategic about. The plan was conservative and seemed to have room to cover more than Metro's projections. Layering conservatism in the planning process should be avoided. Conservatism in facilities planning sometimes resulted in over-building unnecessarily that went unused long term.
  - Mr. Price replied that was a concern of his as well. Process engineers were conservative because no one wanted to under plan. The community should pay close attention to who was responsible for paying for which element of the need. Unfortunately, some elements might not be driven by capacity, but performance. There was an element of capacity embedded even in that large dryer unit that somebody would benefit from other than the existing users.
  - Mr. Nacrelli added because the City did not appear to have a capacity issue in the near-term, it could track what growth actually looks like over the next five years and then adjust accordingly, as the Master Plan would be adaptive. The City had not updated the Plan in 10 years, but he expected the City would not go longer than five years before assessing growth and making adjustments to the Master Plan as necessary.
- It would be helpful for the report to include a full built-out analysis. As the City built out areas it was adding, would it have adequate capacity, or would capacity go unused by the time the equipment needed to be replaced because it was not useful anymore; without having really used it? That would be a waste of taxpayer or ratepayer money. A full build-out analysis with timelines would provide some idea of whether the growth of the facility was being tracked in lockstep with the expected built-out of the areas added to the urban area.
  - Mr. Price noted the flows and loads had been projected out to the projection curves. Early in the analysis of the plant, Carollo Engineering, in conjunction with City Staff, decided not to necessarily

plan around the built-out numbers for the reasons pointed out. Including the build-out numbers would result in a more intense treatment plant site at the facility to account for the population nearly doubling, as shown by the projection on the higher rate curve. (Slide 3)

- Mr. Nacrelli clarified build-out was unrelated to the rate of growth. The current city boundaries and reserve areas would max out and fill up at some point according to how the areas were zoned. There was a number associated with build-out, though ~~not~~ it was not necessarily tied to a time frame but to land use.

- Build-out could be tied to a time frame because the Planning Department had some idea of how fast the neighborhoods would develop. For example, 1680 units were planned for Town Center, 1750 units were planned in Frog Pond East and South. At 2.5 people per unit, 8500 residents would be living in developments the City knew were likely to be built between 2022 and 2035. Coffee Creek and Basalt Creek would likely be built out within a 20-year time period. While those were industrial uses, the City knew it would happen during the subject growth period.
- The expected growth chart should reflect the planning the City knew was already in progress. The city's population would increase from 27,000 to 37,000 just with the known development in Frog Pond East and South and Town Center, and that did not include Frog Pond West. The standard curve should include known development and another curve should address potential additional growth.
  - Additionally, the City should be explicit in its conservatism. Right now, the plan showed a 12 percent population growth from 2021 to 2045, but a 30 percent increase in load. The discrepancy between those two numbers should be explicit, especially as it the Master Plan progressed toward Council. The plan needed to be explicit in why the load increase was twice as much as the population growth, which was a big deal.
  - Mr. Nacrelli clarified Jacobs Engineering had taken over CH2MHill, the company that had the design/build/operate contract for the treatment plant, so Jacobs was now the City's contract operator for the treatment plant.
- As different population projections were done, Staff and the consultants were asked to use the same time frame for gathering historical data and for the future projection. For example, show 30 years' worth of previous data and then project 30 years into the future. A projection using 5 years of data to project 25 years in the future was not statistically defensible. The prior five years of growth could have been a growth spurt that was being extended 30 years into the future, which was not accurate. Growth, especially in a small city like Wilsonville, was choppy, so it should be averaged out to determine the long-term trends.

3. Frog Pond East and South Master Plan (Pauly)

Dan Pauly, Planning Manager, noted this was the Commission's sixth work session on the Frog Pond East and South Master Plan. He presented the Master Plan, including updates in response to the Commission's feedback via PowerPoint, reviewing the housing related design concepts and describing the similarities and differences between the three housing design types, displaying examples of each type using photographs from Villebois and Frog Pond West. He noted three housing design types were not set in stone, but the presentation addressed questions from Council and would be helpful for the Commission. Understanding the three housing types would be important in developing policy.

Joe Dills, MIG|APG continued the PowerPoint presentation, summarizing the feedback and preferences discussed by the Planning Commission last month, noting the aspiration to create and connect special destinations within the neighborhoods was still part of the physical planning. (Slide 29) He described the

updates made to create the Draft Plan Preferred Alternative (Slide 30), including changes to traffic circulation, street classifications, and the placement of housing types which helped enhance connectivity throughout the Master Plan area. Additional comments from Saumya Kini from Walker Macy addressed the equitable distribution of housing and multiple types of affordable products throughout the neighborhood and Andrew Paris from MIG|APG overviewed the housing capacity estimates and mix assumptions used to determine the impacts to transportation and infrastructure planning.

Mr. Dills noted the Planning Commission's policy discussion would determine how to achieve the best variety within the housing types. Unlike Villebois, which had a master developer, replicating the best of Villebois would need to be done through public standards and zoning ordinance techniques.

Comments from the Commission and responses to Commissioner questions was as follows:

- Initially there did not seem to be enough Type I in South, but since three-unit town houses could fit into both Type I and Type II. The mix within the type allowed some flexibility with the minimums and maximums. The map was fine.
- Ms. Kini clarified the arrows pointing toward the BPA easement indicated there would be some kind of public connection, whether it was an alley or a pocket park.
    - Mr. Pauly added Staff was still exploring a potential connection across the easement on the north end near the Grange. Otherwise, Staff did not expect any vehicular access across the easement.
- Mr. Dills clarified the arrow down the middle of BPA easement was a proposed trail and as it connected to and crossed Stafford Rd, the trail would be in the proximity of the northern extension of the Boeckman Creek Trail, which Metro was ultimately showing as a trail that would go up into the Stafford Basin. The proposed trail would connect the area to the larger, regional trail network. (Slide 30)
    - Having openings into that open space between houses on the long block paralleling the BPA easement was suggested.
- Ms. Kini noted previous discussions suggested a portion of school property south of the Future Community Park could provide an opportunity for Type 1 housing; however, since the previous meeting, it had been determined that property should be considered part of the school district and was shown as such on the map. The team also had good communication with the City's traffic engineers and the School District about the trail connections and felt confident about showing a trail connection going south toward Boeckman Creek Primary School.
    - Did the land use change result in fewer dwelling units in Alternative C? At the last meeting, Alternative C had a total of 1,803 dwelling units and now it showed approximately 1,600 units. The focus of the new alternative was to do a little mixing and matching within Alternative C. Was the reduction in the overall buildable area driving the reduction in the number of units?
        - Mr. Dills confirmed the school parcel was part of the reduction, but the larger cumulative effect was from going from fuzzy lines to hard lines with block thinking. The amount of Type I decreased as it was fit into areas with the actual conceptual block formation.

Mr. Pauly continued the PowerPoint presentation with a review of housing variety policy options, key points to consider, and a summary of four draft policy options to facilitate housing variety. Staff recommended combining Policy Options 2 and 3 to adopt a minimum of target housing types and a maximum of individual housing types.

- He clarified that including Frog Pond West, the entire area was similar to Villebois, which was developed mainly by four developers. While some small developers would come into play, Frog Pond would ultimately have a maximum of four or five developers. Frog Pond East would not have as many as North

where the large tracts of land would likely be controlled by one or two developers. There was potential for some smaller scale projects in the southern portion.

Planning Commissioner comments and responses to Staff's questions (Slide 37) continued as follows with Staff addressing further questions as noted.

Commissioner Willard expressed support for Policy Option 4.

Commissioner Karr:

- Liked Policy Option 4 but asked if specifying a minimum and maximum would require a minimum and maximum for each housing category within the type or could a maximum just be attached to detached single-family, for example.
  - Mr. Pauly replied the number would be adjustable; each bucket did not have to be in each block. The minimums and maximums could vary based on the size of the subdistrict or the context.
- Noted detached single-family would push things out of the affordable range, so developers would get the idea if a maximum was placed on at least detached single-family. He believed minimum and maximum requirements were needed on housing types in order to meet the City's affordable and equitable housing initiatives. If not required, developers would build detached single-family houses as they were the most profitable.

Commissioner Woods also liked Staff's recommendation, which provided a good balance between the City complying with HB 2001 and providing a limit range on housing types. However, in addition to single-family detached homes, there should be options for tiny homes, perhaps even a tiny home requirement, if builders were available, to offer more affordability for first-time homebuyers. He clarified tiny homes were typically 499 sq ft to a maximum of 899 sq ft and had all the amenities of a larger home but were just smaller in size and cost.

Commissioner Gallagher believed the City needed to be very clear about the minimum standards regarding what the City wanted to achieve. If the City just made suggestions, profit would overrule standards. She confirmed this was captured in Policy Option 4.

Commissioner Mesbah:

- Also liked Policy Option 4. In looking at the different housing types presented, it was clear that articulation of the façade made a big difference in how the space looked and felt. He was not sure the project team was talking about that level of design at this point or if they ever would.
  - Mr. Pauly replied the City could build off some of the articulation standards adopted for Middle Housing as well as the articulation standards in Frog Pond.
- Commented he had to remind himself that details, like bump outs and coves, which make an attractive façade add to the cost of construction, but he would hate to see blank walls for the affordable housing. There was an approach to affordable housing that said real affordable housing needed to be really well designed because otherwise there were additional costs in maintenance and other things. He hoped it would all fall into place to be a harmonious and coherent look for the neighborhood.

Commissioner Karr asked that Staff include a breakdown of the housing types in Villebois at a future work session. Villebois was a good representation of what the Planning Commission would like to see; though the streets were narrow, it was a nice housing development. He noted discussion had begun about urban renewal and using tax incremental funding to help with some of the HB 2001 affordability requirements in Frog Pond.

Commissioner Heberlein:

- Agreed requiring a certain mix of housing was the only way to go realistically and liked the idea of focusing on a maximum number of single-family homes, which should be investigated further. However, would placing a maximum number on any product type penalize later developers as those in earlier could take up certain housing units? Was there some mechanism to help ensure that would not happen?
  - Mr. Pauly replied the geography the standards were based on would assume each geography was done by one single developer.
- Supported Policy Option 4 as a blend was good.
- Requested that Staff bring examples of housing variety policies that had been successful elsewhere to future work sessions to be used as a template.
  - Mr. Dills replied research had shown that Wilsonville was a trailblazer regarding such policy.

INFORMATIONAL

4. Outreach Framework (Pauly)

Daniel Pauly, Planning Manager, noted Consultants Bill de la Cruz and Pat Noyes had concluded their contract work resulting in draft Outreach Framework. He presented the Wilsonville Framework for Inclusive Engagement via PowerPoint, noting the updates made since the Commission's May work session and…. providing an overview of the framework, how the process was designed, examples of barriers and potential actions, as well as a menu of outreach activity, and next steps.

Commissioner Karr believed the City had done a good job of engaging with the community in the past, but the framework elevated its game, adding a focus on underrepresented stakeholders would help to better serve the entire community, not just the few who attended all the meetings. He applauded the City's efforts, noting in the long run, the framework would make the City/Wilsonville that much better.

Commissioner Woods said he had participated in the framework from the very beginning and found the outcome to be very comprehensive, detailed, and specific. Some key items would be very difficult to overcome, the first being the general interest from the community itself and looking at what the community wants and needs. Hopefully, there were community ambassadors to help to pool groups together and find out exactly what the City was missing. 'Build it and they will come' would not work in this scenario. There were multiple attack points the City would have to approach and it would take some time. Engaging unrepresented stakeholders would be extremely important. The framework was an excellent document, but the City had to do a deep dive and look at how to tie together some of the needs while trying to understand what the community and underserved communities need as well as finding ways to bring them out. Some people would not be able to travel to meetings or access Zoom meetings. It was a good document, but there were key points to concentrate on to make the City's objectives work.

Commissioner Mesbah seconded Commissioner Woods' statements. He was pleased with the framework document, adding the City was dealing with a general citizenry that is disinterested until something is proposed that catches their attention. Throughout the country, communities were finding out that they needed to build that kind of engagement and community spirit into a functioning democracy at a small scale. Part of the impetus for having the Diversity, Equity, and Inclusion (DEI) Committee was to have a committee focused on building that kind of rapport with the community and that kind of outreach, especially with underrepresented communities. Perhaps, if the City built engagement with the underrepresented, the rest of the community would also get interested because the effort necessary to do that kind of work would have spillover effects throughout the community. The Planning Commission needed to think about building that level of engagement as part of its job description. The Planning Commission was the outreach committee. As the document noted, just holding public hearings was not outreach. The Commission needed to come up with

ideas to engage portions of neighborhoods and the community on different issues; perhaps even going out to the community instead of expecting the community to come to the Planning Commission. He wanted to underscore Commissioner Woods' statement that this work was heavy lifting, and the City needed to start brainstorming about how to do it.

Commissioner Gallagher agreed it was a heavy lift and added that, as an ethicist, she wanted to point out that the City could have the best of intentions, but it was trying to overcome something that was based on a sense of trust and respect, which was not something that could be overcome by forming a committee with good intentions; it had to be built over time through action, and it was a very challenging process, especially in the country right now. She did not want all the good intentions of trying to bring people together to overlook the reason why those populations felt not included to begin with, which would just put a Band-aid on a problem that was not going to heal.

Commissioner Heberlein believed the Outreach Framework was a great step towards helping to ensure the City was consistent in how it reached out and solicited input. A key would be to focus on Steps 1 and 2, making sure the citizenry was involved in defining the problem and identifying the desired outcome and making sure the City was focused on listening to the entirety of the citizenry in those early steps. The City tended to jump to brainstorming solutions, but it needed to make sure it had a general consensus on defining the problem. There was a significant amount of disagreement over whether a bridge was needed on the Boeckman Dip and the City's money being better spent elsewhere. This was an example of where the City may have been able to do a better job of defining the problem, the desired outcome, and getting the citizens' involvement up front to mitigate some of that, even though it may have resulted in the same solution. He was hopeful the document could help the City make more informed decisions moving forward.

Commissioner Gallagher noted earlier comments about setting a minimum standard for developers in terms of the types of housing the City wanted and added that in a way, the Commission was really asking the citizens of Wilsonville, 'What kind of town are we? What kind of a place do we want to be? What kind of values and what kind of behavior do we want to reflect that will make people feel welcome here and included?' How could this be quantified [put your arms around it] unless certain behavioral standards were set in order to achieve the vision for the type of community the citizens wanted and tried to live it every day.

Commissioner Willard asked to see the long-term data over the engagement through the six steps outlined in the Framework. Was there a particular step in which the community was more engaged? Those numbers could be used as a baseline to measure progress from. In terms of diversity, equity, and inclusion, it would be helpful to understand what parity was. What did the City know about the mix in the community and the engagement it got now, and when would that be at parity? Those two data figures would be meaningful to understand if the City was making progress.

5. City Council Action Minutes (June 6 & 20, 2022) (No staff presentation)

There were no comments.

6. 2022 PC Work Program (No staff presentation)

There were no comments.

ADJOURNMENT

The regular meeting of the Wilsonville Planning Commission adjourned at 8:29 p.m.

Respectfully submitted,

By Paula Pinyerd of ABC Transcription Services, LLC. for
Mandi Simmons, Planning Administrative Assistant

PLANNING COMMISSION MEETING MINUTES

August 10, 2022 at 6:00 PM

City Hall Council Chambers & Remote Video Conferencing

CALL TO ORDER - ROLL CALL

A regular meeting of the Wilsonville Planning Commission was held at City Hall beginning at 6:00 p.m. on Wednesday, August 10, 2022. Chair Heberlein called the meeting to order at 6:00 p.m., followed by roll call. Those present:

Planning Commission:	Ron Heberlein, Aaron Woods, Andrew Karr, Kamran Mesbah, Olive Gallagher, and Breanne Tusinski. Jennifer Willard was absent.
City Staff:	Miranda Bateschell, Ryan Adams, Daniel Pauly, Dwight Brashear, Eric Loomis, Kelsey Lewis, Mandi Simmons.

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance was recited.

CITIZEN'S INPUT

This is an opportunity for visitors to address the Planning Commission on items not on the agenda. There was none.

ADMINISTRATIVE MATTERS

1. Consideration of the July 13, 2022, Planning Commission Minutes

Consideration of the July 13, 2022, Planning Commission Minutes was postponed to the Commission's September meeting.

WORK SESSION

2. Transit Master Plan (Lewis)

Kelsey Lewis, SMART Grants and Programs Manager, introduced the Transit Master Plan (TMP) update noting SMART Transit Director Dwight Brashear and Transit Operations Manager Eric Loomis were present via Zoom for questions.

Michelle Poyourow noted she was involved in the TMP in 2016 and was honored to come before the Planning Commission again. She presented the progress on the TMP update via PowerPoint, introducing the project team members from Jarrett Walker + Associates, enviroissues, who were leading the public engagement, and from Parametrix, who would assist with transit operations advice,

capital planning, and fleet planning once a transit network and service plan was drafted. She briefly described the purpose of the TMP update, the changes since the last update in 2017, and the general project timeline, noting the progress made so far and anticipated milestones of the update with completion expected in Spring/Summer 2023.

Brenda Martin, Public Involvement Specialist, enviroissues, continued the PowerPoint presentation, highlighting events and tools during the first phase of public engagement occurring through October and describing the public survey and stakeholder workshops planned in August and September. Her key additional comments were as follows:

- The public survey scheduled to begin this Friday, August 12th would be administered online via the 'Let's Talk Wilsonville' SMART page for the TMP as well as on board buses to solicit bus riders' participation. (Slide 7) SMART Staff had been attending farmers markets and community events throughout the city this summer to let the public know about the TMP update and would continue to do so until the end of the survey on September 12, 2022. (Slide 7)
  - While much of the information being sought from the survey was available from data over the last couple of years, much of it had changed due to the pandemic.
- An intensive, half-day workshop would be held in early September for stakeholders with a vested interest in the TMP, such as those representing agencies or key organization/community groups that tended to be more transit-dependent or had trouble connecting to transit currently. The workshop would focus on gaining a better understanding about the tradeoffs between local versus regional service, and the priorities regarding where SMART could better serve the residents and visitors of Wilsonville. Enviroissues had created a list of stakeholders to invite to the September workshop and sought the Planning Commission's input about any additional stakeholders to invite to September's workshop. (Slide 9)

Comments and suggestions from the Commission were as follows with responses to Commissioner questions as noted:

- Additional stakeholders suggested by the Commission included homeowner associations (HOAs), minority groups, and more focus on youth representation.
  - Enviroissues could contact the City's Diversity, Equity, and Inclusion (DEI) Commission for specific suggestions on how to reach different ethnic groups in the city.
    - **Ms. Martin** assured the team would work to ensure all stakeholder groups included a diverse representation at the workshop.
  - With two or three physical therapy clinics in the area, as well as Providence Medical Center, those who are injured for a period of time and unable to transport themselves could be an underserved population who did not realize the transit options available when unable to drive themselves.
  - Many people in younger generations, such as older high school students and college students, were looking to test the limits of their freedom and reduce their carbon footprint.
  - The youth were the future of transit and the future of the city, and it was important that the City was really listening to those who would be using the system for the longest period of time.
- 'Stakeholder' typically meant those who use the transit system, but those who did not use the system may emerge from the survey. Having follow-up conversations with non-riders was suggested to understand why they did not use the system, whether any were potential users, and what the impediments were to ridership.

- **Ms. Martin** noted a few survey questions asked how often the respondent had taken SMART over the last year, and if they had not ridden or had never used SMART, they were asked for their reasons and allowed to choose as many as applied. Those results would be interesting and could help the consultants do some follow-up. Those non-users were not the stakeholders usually thought of, but they were the people SMART was trying to convince to use transit.

- **Ms. Martin** clarified the survey had been translated into Spanish, and she believed the page could be translated via Google, which the team would research.
- Understanding the goal would better inform what stakeholders to suggest. If the goal was to achieve an X increase in ridership that would involve a different set of stakeholders. If the goal was to maintain the existing ridership base, then that was a different set of stakeholders. Knowing what was trying to be achieved would make it easier to develop a list of stakeholders.
    - **Ms. Martin** believed the existing summary included a list of goals for the TMP.
    - **Ms. Poyourow** noted the stakeholder workshop would address questions of priority and policy for the future TMP. Stakeholders were not just people who might themselves want to ride the bus, but also people whose opinions should be considered about how Wilsonville grows, how transit changes in Wilsonville, and what would be most important as the City developed its transit system over the next five years. The stakeholders were people with lots of different perspectives on the city, the life and growth of the city, as well as people interested in transit. The existing stakeholder list included a very specific portion of the community, so homeowners would be a good addition to the stakeholder group.

3. Frog Pond East and South Master Plan (Pauly)

Dan Pauly, Planning Manager, presented the updates to the Frog Pond East and South Master Plan via PowerPoint, providing information requested from the Commission, which included a brief overview of Villebois' housing mix, highlighting the design concepts discussed in February, and presenting the residential polices for housing variety. Staff sought input on several elements related to the criteria for Components 1 and 2, which involved target housing types and a cap on single housing types, respectively.

- Component 1. (Slides 7-8) Staff had some initial ideas about target housing types and the criteria to use. (Slide 8) He noted defining the mix of uses would not define any specific price point, but would look at the mix that would give the best opportunity to serve different market segments.
    - Targeting housing types identified in the Affordable Housing Analysis would serve the market rate segment of 80 to 120 percent of the Area Median Income (AMI).
    - Other ideas included accessory dwelling units (ADU) and cottages. ADUs could help with affordability as well as meet certain demographic segments of the market not otherwise served by larger homes.
    - Accessible living options were another idea, particularly smaller, accessible, single-floor options; however, these options would further analysis by the project team.
    - As discussed during July's work session, some housing varieties would not likely be built by the market through incentive so a requirement would make more sense. However, the City may be able to incentivize some housing types, such as ADUs.
    - Staff sought feedback on identifying the target housing types, how much of each housing type should be required and what to require versus incentivize.

The Commissioner comments and feedback regarding Component 1 Criteria was as follows with responses to Commissioner questions as noted:

- Different housing products could be placed within all three housing types, so with the 80% to 120% AMI goal and knowing Frog Pond West was built out with larger houses, East and South would need a mix of townhouses, condos, and smaller, detached single family homes.
  - Commissioner Karr suggested Type 1 could be a mixture of 4-unit townhouses, multi-story condos, and detached single-family with 20 percent minimums and 30 percent maximums of each type. Type 2 could be a mix of three-unit townhouses and detached single-family homes, both with 30 percent minimums and 50 percent maximums, for a kind of 50/50 split. Type 3 could be four- and two-unit townhouses mixed at 50 percent and detached single-family homes at 50 percent. He agreed to email Mr. Pauly those numbers, which could be passed on to the other Commissioners.
- **Mr. Pauly** confirmed that a zoning scheme could be developed that offered a minimum requirement of a housing type and incentives for exceeding the minimum percentage.
- The City should do everything possible to have a standard minimum and then incentivize, which would work with other design preferences. Although how to provide a target mix for a balanced approach was unclear at this time, providing housing types with no numbers was a problem. It was important that the City not paint itself into a corner and make it impossible to meet not only incentives but the market situation. Thus far, the Commission had worked on the premise of keeping flexibility while also including minimum targets to avoid missing the opportunities for achieving the upward mobility and housing mix desired. The markets analysis was very helpful but coming up with a design and policy that allowed flexibility for Staff and those rendering approval to find the best and most doable mix at the time was difficult. Having draft policy language to frame the issue would enable Commissioners to give provide better feedback.
    - **Mr. Pauly** noted Staff could explore ways to update the regulated mix in a couple years after the City completed the Housing Needs Analysis and had a new production strategy.
  - Hopefully, that was not needed. The hope was to have aspirational language that tells decision makers, whenever decisions were made, what the target vision is and allow them to hone that to the conditions and opportunities at the time. Maybe that was not doable, and something would need to be set up now, and then revisited in two to three years.
- The City was looking at market affordability of 80 to 120 percent. Was there a reason 60 to 80 percent was not considered?
  - **Mr. Pauly** replied 60 to 80 percent would not be delivered by market rate housing and would need to be some sort of subsidized-type project which, in terms of types, would still be allowed but would be separate from the Master Plan. Language would likely exempt subsidized, affordable housing from any variety requirements. If funding came into place, partnerships were made, and an affordable developer built something, that would be outside this Master Plan. The City could not require a certain amount of 60 to 80 percent, and it was likely no products could be developed at that price point without being subsidized somehow.
    - Information was available in the Affordable Housing Analysis, but tiny homes would likely be in the 80 to 120 percent category. While tiny homes would meet a different kind of market need demographic than other products, they would still be fairly expensive due to the fixed cost of building the infrastructure and installing kitchen and bathroom fixtures.

    - He confirmed cottages referred to cottage clusters (Slide 8) and confirmed Staff would double check to see if the cost of cottages or tiny homes could meet the below 80 percent market segment, and if so, the City may want to include them in the target housing types.
- Staff was encouraged to look into the affordability of tiny homes and cottages more closely, and Commissioner Woods offered to send more information if needed. For affordability purposes and considering first-time homeowners, the City should seriously consider tiny homes while ensuring the tiny homes fit with the models in the particular subareas.
- The City should consider a certain percentage of accessible, one-level homes that could meet the needs of seniors or those looking to move from a two-story to a one-story home.
- As far as requiring versus incentivizing, incentivizing was preferred. Certainly, the City did need to require a certain percentage, but determining those percentages was a struggle given all the other variables being discussed. Perhaps **Commissioner Karr's** information would help.
- It was important for the City to pay attention to the extreme changes happening in the country, the climate, and in the world, and serving the needs of the future population rather than the known quantity in the present. Concern was expressed about the City making decisions about percentages of housing types based on what was known right now, when the question was what kind of community would Wilsonville be 20 years from now? What kind of population was the City trying to attract? What kind of businesses? Would the City be able to provide housing to the population working in those businesses?
    - That was why flexibility was needed.
- Regarding comments about the affordability of cottages and tiny houses, the City's focus in Frog Pond was as it should be. The Commission had already discussed that a greenfield development could not effectively produce affordability. The graphs on Page 20 of Attachment 1 indicated where the housing shortfall was in the city, which was drastic, as well as the closing housing target the City could meet for the Frog Pond neighborhood, which was on the edge of the city. The Planning Commission had discussed how having public funding available for housing would make things different, at least in other parts of the city, so the City could have housing availability for lower percentages of median income. Had City Council discussed that topic or was the Council still where it was three years ago prior to the housing strategy? Was the City getting any closer to at least looking down the road at the potential of having housing services?
    - **Mr. Pauly** confirmed that was in process, but there was certainly more work to do. Council was looking at the TOD transit project to provide some immediate affordable housing. Matt Lorenzen recently worked on the vertical housing tax credit which could be used both in Town Center and Villebois, and potentially even in the Frog Pond commercial area, if the developer wanted to do vertical mixed use. In addition, the Urban Renewal Task force recently had a meeting about exploring how urban renewal could come into play and considered a system similar to the Wilsonville Investment Now (WIN) Program, where spot-specific additions were made to the Urban Renewal District in order to take advantage of help from tax increment financing to assist with affordable housing. All these options were being proactively looked at right now, and there was a lot more to do. City Council realized affordability was an ongoing conversation but was interested in the topic.
- Staff's comments were helpful. The timeline for any discussions to start creating options for affordable housing was probably about the same as the development of the Frog Pond neighborhood. Since those conversations were happening at the same time, Frog Pond did not have to be the last, best chance for the City to get everything it needed in affordability taken care

of, which would not be doable anyway as the analysis showed. The need to be flexible was critical, so the City did not lose out on opportunity because it was too rigid and not creative enough, or too lenient and avoided keeping the accountability to get as much affordability as possible.

- Regarding affordable housing, the City was in a conundrum with a green field in Frog Pond. The stats on Page 14 of the Affordable Housing Analysis showed the City's greatest need currently was very expensive housing and really inexpensive housing, which was not at all what the City was aiming for with Frog Pond. The only way the City would get to the lower end was through "infill-subsidized," taking existing market rate housing and subsidize based on a person, rather than subsidizing an entire building, like a HUD building. The City was missing the mark with its target of serving the 80 to 120 percent bracket in Frog Pond because the largest demand shown was in the 150 percent or more bracket. Basically, the city's largest housing need was at the top end and at at the bottom end of the income scale. If Frog Pond was built out for the 80 to 120 percent target, people would buy the houses, however, how long the houses would stay in that target range was questionable; house values would inflate quickly.
  - **Mr. Pauly** clarified the tables on Page 14 were an extrapolation of existing population and reflected a gap for the 120 percent because that was not a strong part of the city's existing product mix and population.
- Wouldn't Exhibit 15 identify the City's housing need gap? The center portion of the chart showed the existing housing needs, and the only three needs were very high income, very low income, and extremely low income, which matched Exhibit 9 on Page 14.
  - If the needs were broken up differently, like middle income from 80 to 100 percent and then 100 to 120 percent, then that product mix might show up from 100 to 120 percent AMI.
    - **Mr. Pauly** replied he would follow up on that at the next work session.
  - It was a question of who the housing was being built for. Was housing being built for people in the 80 to 120 percent MFI who had not yet moved to the area or for people already in Wilsonville who wanted 120 percent MFI and above?
    - Exhibit 9 indicated there was a huge shortfall above 120 percent, which was probably above 150 percent AMI. If the city did not have housing for those people, they might buy a less affordable house or move out of Wilsonville to an area with houses that fit their lifestyle. Villebois was a well designed, built, and looking community. If that was what the City was shooting for and those housing types fit the 80 to 120 percent AMI, then that should be the City's goal. Right now, there was a huge shortfall in the less than 30 percent AMI, and the City had to figure out how to make housing available for that portion of the population, though perhaps not within Frog Pond.
    - Housing being built in Frog Pond West was all at 120 percent AMI and above.
- In Exhibit 15, did the city distribution include Frog Pond West, both what had been built and what was planned to be built?
    - **Mr. Pauly** replied ECONorthwest was not present as Staff had not anticipated such detailed questions about the data, but they could be invited to the next work session.
  - Including Frog Pond West in the city distribution shown in Exhibit 15 on Page 20 of the attachment or page 49 of the PDF was one thing, but if not, it seemed to indicate the City had built some of the 120 percent and above, which changed the existing housing need, as well as the potential requirements for what the City needed to build in Frog Pond East and South. The answer was important to ensure the City was using all the data available. Currently, the proposed target showed the need for lots of high and middle income, and very little of the

other things the City needed. While it was not possible to solve the existing need gap for extremely low income in Frog Pond East and South on its own that did not mean the Commission should not try to do something meaningful to make progress. Having nothing or very little meant the existing gap would get larger. Defining targets for housing types was difficult without being able to see that picture more clearly.

- Staff had indicated that certain target housing types did not include low, very low, or extremely low-income housing, because that would require subsidies and some other support from the City. But if the City cared about affordable housing, why not identify targets for those housing types as well, even if that meant land did not get built on? If the City really cared about solving those problems, then maybe it had to wait for the money policies to be in place to support that type of development. The City did not have to build in Frog Pond East and South right now but was choosing to do so.
  - **Mr. Pauly** said the types of housing below 80 percent AMI would be similar to the 80 to 120 percent but subsidized. The regulations being discussed were about products rather than actual price points. State law had fairly specific limitations regarding what the City could do with inclusionary zoning in terms of requiring a certain income need be met and that was not being addressed directly in the discussion. The question was what product mix would be most likely to meet identified needs at market rate.
  - Hopefully, some projects came in with funding from different sources to make the houses more affordable, however the City could not require and guarantee that through zoning tools. Other tools beyond zoning were needed to accomplish that.
- The idea was the City should have that right product mix to help facilitate the lower price points, even though the City could not force a price point on its own. The City should help provide the opportunity for smaller condos, smaller townhouses, and smaller detached houses.
  - **Mr. Pauly** agreed that made sense. He confirmed the Commission wanted Staff to further investigate whether ADUs, cottages, and other living options would be able to meet the needs at below 80 percent AMI at market rate and how those types could be facilitated.
- Updating Exhibits 2 through 4 to break out cottages and ADUs was also suggested. Currently, the smallest type shown was two-bedroom condos. Perhaps adding those two product types would give the Commission and the rest of the City, a better feel for what those price points could be and whether cottages and ADUs could be included as targets for specific housing types.

- Two or three statements had been made which were all true at the same time. The target housing type was going to be targeted towards a certain AMI, which was fine. Affordability was not all a zoning issue, which was correct as well. However, during the discussion, a willingness or encouragement from some of the Commissioners, and perhaps all of the Commission, was to encourage the City to move faster in providing incentive tools to make affordable units available in the Frog Pond neighborhood, even if not through zoning. The City could come up with a policy or scheme that allowed the City to buy certain units and make those units available as affordable housing. The City should also act to ensure the units remained affordable in the future, as opposed to gentrifying. Staff should keep in mind Commissioner comments about encouraging and making affordability available more quickly.
- The City needed to identify what it was trying to accomplish in Frog Pond and make sure it did not move away from that. Given the 80 to 120 percent AMI, the City should keep its objectives for the neighborhood in line with affordable housing.

- There was no discussion regarding creating a visionary partnership between the kind of people the City was trying to create housing for and the kind of community it hoped to create as Wilsonville grew. What kind of industry and business was the City trying to attract? There should be some sort of partnership on that side because the businesses brought into the city would require employees and management who wanted to live in Wilsonville. If there was a clear idea of the community the City was building for in the future, it would help the City anticipate the kind of people who wanted to come live and buy in Wilsonville, so they could work in their own community and not have to commute.

Mr. Pauly continued the PowerPoint presentation, describing the purpose of a cap on housing variety and requesting some guidance on the criteria for Component 2. Was the cap about limiting too many expensive or detached single-family homes or was it about making sure there was variety throughout the neighborhood, even if that meant fewer, less expensive units?

The Commissioner comments and feedback regarding Component 2 Criteria was as follows with responses to Commissioner questions as noted:

- Further development of the minimum and maximum types would prevent a predominance of any one housing type. The struggle would be to make it affordable, and cottages seem to be the best answer for making housing affordable, which meant there would be fewer single-family dwellings. It was neither good or bad, but variety could be controlled through minimums and maximums by type.
    - **Mr. Pauly** noted Component 2 generally regarded a maximum of any one type of in a given area. Did the City want to focus that cap on single-unit dwellings or apply the cap generally, including to market-rate housing that may be more affordable?
    - The City would want to include minimums and maximums across types because that would result in something similar to Villebois, which included townhouse buildings with one to five units, each with a different look and feel so there did not seem to be an overwhelming number of townhouses because the buildings were not similar in structure, color, and shape. The Village Center seemed to have a large number of multi housing units and townhouses with more and more single family on the edges.
    - Having minimums and maximums were a good approach, but balance of housing varieties was needed to ensure the neighborhood did not look like townhouses predominantly in a particular area and but looked like a homogenous community across the board.
    - Once the minimums were settled, the maximums would balance out more, but more information was needed.
- Some of the neighborhood design was based on the transect concept where the neighborhood center would have higher density. Similar to Villebois Village Center, more density would be in the village center. That density concentration was not an imbalance, but a concept that high density housing was placed near activity centers. The Commission had discussed balance overall in the neighborhood and that typically, affordable units were put in the most undesirable part of the neighborhood, out of the way and out of sight. The Commission decided early on that it did not want that and talked about Raj Chetty's research on how neighborhoods help lower income children develop a different outlook as a result of being cohorts of higher income children in the neighborhood. Mixing the affordability element with the type was the other aspect of balancing the neighborhood out and not having one type predominate in one area. The Commission had

discussions regarding those issues over the past several months and had agreements in those conversations.

- Requiring variety generally was important to ensure a cohesive neighborhood. Defining what the percentages should be throughout the neighborhood would help ensure the City would get what it was looking for in terms of the general look and feel. It could not be only X amount in a specific district, but the central area would be denser, and it would be spread out from there, but as long as the City had those percentages set up appropriately, it would be fine.

Miranda Bateschell, Planning Director, thanked the Planning Commissioners for a great conversation, noting she did not envy their position. A lot was discussed about Villebois tonight, and she wanted to point out why the City was in a more difficult position currently. With Villebois, the City could geographically determine what housing types were going to go where with precision and created a transect of density and could set aside specific parcels for townhomes, for example. During the development of Villebois, there were times when the development community came to the City and said this was too challenging and asked to build single-family homes. The City said no and eventually the townhomes it wanted were eventually built on the set aside parcels. The townhomes inevitably offered a different price point than the single-family detached. Currently, the City had to comply with House Bill 2001, which was good in some ways because the bill required additional variety. However, the legislation did not allow the City to provide the same type of precision or known development pattern in a specific area. Before the City could designate certain areas for cottage housing, townhomes, or other specific product, but that type of precision or flexibility was no longer available. The City was now in a position of allowing many more housing types to be built on any given parcel, which made it more difficult to know whether the developer would choose a single-family home, townhouse, cottage cluster or ADU. The State rules were the reason the City was discussing minimum and maximum percentages. Whether the City landed on something precise or something that provided more flexibility with more of a range was an important factor in the City determining how to confirm the same type of variety without the same tool. She acknowledged it was a difficult exercise, but Staff appreciated the dialogue and questions. Staff would also appreciate knowing about anything the Planning Commissioners thought would help them better answer the questions and direct the City towards an answer.

Chair Heberlein appreciated the Planning Director's helpful comments, noting the Commissioners pointed questions and comments were not reflective of any displeasure on anything. The Commissioners just wanted to be sure they got it right. The problem could be solved if the City was able to come up with a creative way to buy the land; then it could replicate what was done in Villebois.

Mr. Pauly echoed the Planning Director's appreciation for the Planning Commission's discussion, which had been very helpful and provided good feedback. A lot of hard mental work had occurred in the last hour.

Saumya Kini and Joe Dills of MIG|APG, continued the PowerPoint presentation, describing the Public Realm and the key guiding principles used in its design, as well as the draft Public Realm materials included in the packet that would be refined and expanded upon based on the Commission's feedback. (Slides 11-23)

- Two street and block demonstration options were presented to meet the intent of providing a safe and low-stress accessible network of transportation options. Each option showed differences in the connection between Frog Pond Lane and 60th Ave, the location of the neighborhood park, pedestrian crossings across Advance Rd, and how homes fronted on Stafford Rd. (Slide 18)
  - **Mr. Pauly** added the movement of the neighborhood park and Type 1 up to be adjacent to the BPA easement reflected in Option 2 grew out of City Council comments about better utilizing the BPA easement, perhaps as an extension of the neighborhood park. Staff had messages into BPA to explore what options could be used on the easement, including parking.

All Commissioners preferred Street and Block Demonstration Option 2. Key additional comments and feedback regarding Options 1 and 2 were as follows (Slide 18):

- While having the main street flow into the park in Option 1 was nice, moving the park to flow into the easement, as shown in Option 2, made more sense. Not having houses face the busy Stafford Rd was preferred because a child could run out the door into the street, as opposed to running out into the back yard. Homebuyers might look elsewhere if the homes faced Stafford Rd.
- Moving the neighborhood park adjacent to the easement would give the City a lot more bang for its buck and the park fit well in that location. Moving Type 1 to abut the BPA easement was preferred and there were no issues with the other areas in Option 2.
- Connecting the park to the easement provided a gateway for the easement into the neighborhood, instead of turning one's back onto the easement like Option 1. Option 2, especially with Type 1 housing looking over the easement for a good portion, would make the easement a more defensible, owned space as part of the neighborhood. With Option 1, it was uncertain how the neighborhood would 'own' the easement.
  - Having a more boulevard-like design for one of the streets was preferred to connect the neighborhood park and easement with the future community park instead of a trail, which was envisioned as lines on a paved street.
    - With another park being planned, there should be some kind of connection between the two, and an open boulevard was preferred.
  - A well-designed wide, green sidewalk on one side of the street connecting the neighborhood park to the future community park through the downtown area or higher density residential area would create an even better, organic connection of the natural areas at the core of the neighborhood.
  - In Option 2, having no Type 1 housing in and around open space in the middle neighborhood area was good.
- Having the park next to and encroaching upon the BPA easement was a good use of additional real estate from the easement.
- The Type 1 intersection and connectivity with the easement and neighborhood park was a top feature of Option 2.
  - Given the neighborhood park's location in relation to the BPA easement, maybe the park's size could be reduced because the BPA easement space could be utilized, especially if the City was trying to maximize buildable space to reduce overall development costs.
  - An alternative was to steal a bit of space from the neighborhood park to create a linear park from the Grange through the high-value trees down to the commercial main street to have a connection between those two areas. Reducing the size of the neighborhood park while still

maintaining the connection to the BPA easement would enable a connection from the Grange to the commercial main street and make the treed area a bit more functional.

Two options were presented for the bike and pedestrian circulation in the Master Plan. Each option included differences in shared street verses bike lane use, trail connections, and bike lane connections between Frog Pond Lane and 60th Ave. (Slides 19-20)

- A cross-section concept for Advance Rd as it passed by the community park was also presented as one option for consideration where a collector cross-section and right-of-way would include generous 12-ft sidewalks, a planted median, bike lanes and incorporate existing power poles into a planter strip on the north side. Houses would front onto the community park to create a sense of integration of the park and eyes on the park as the street redeveloped. (Slide 21)

Key comments and feedback regarding the street cross-section, Bike and Pedestrian Circulation Options, and Park and Open Space Framework were as follows (Slides 19-23):

- **Mr. Pauly** understood the green connection between the community park and neighborhood park along what would be an extension of 60th Ave north of Advance Rd was probably a good candidate for the cross-section concept, as well as Brisband St.
- Overall, the Commissioners liked the options presented.
- If 60th Ave worked best to have a wider sidewalk, as proposed on Advance Rd, and provide a connector between the community park and neighborhood park that was fine. Having a connection to the downtown was good, too.
    - Would the green area close to the commercial area that had been suggested as linear park fit in any kind of a green space trail? It was an opportunity that would otherwise be missed. A green focal point was shown on the Park and Open Space Framework (Slide 22) but not necessarily any connection between the green area and the commercial area.
- The wider street going into Brisbane St was a good option.
- The Advance Rd concept was great and opened up the whole feel for a neighborhood.
- The presented options provided a lot of trail connections and bike paths. The Advanced Rd cross-section would tie East and South together nicely, even though there was a main artery between them.
- The Advance Rd cross-section showed the area at the proposed community park, but what did it look like another 750 ft farther down in the rural area and not in the City of Wilsonville? Would the same cross-section be used clear to the end and then dead end into nothing?
    - **Mr. Pauly** replied the north side of Advance Rd would continue to have the wide treatment shown in the concept. Beyond 60th Ave were homes unlikely to redevelop so the southside of the road would likely not continue at that point but have a curb. There was likely an opportunity to bring the trail up to make a strong connection through the neighborhood into the BPA easement, so the trail would not dead end into the Boeckman Dip but curve up into the BPA trail.
- Having a more emphasized tie in as far as bicycle circulation in the BPA easement would be good. Bike riders could go from Advance Rd through the BPA easement and then down, bypassing the entire section of neighborhood unless that was their destination. Having intentional access to the BPA easement and connections to those major streets at Stafford and Advance Rd would be key feature, as well as the tie-ins from the BPA easement to the neighborhood park going into the commercial center.

- Frog Pond East had trail connections to most all of the green focal points in the Parks and Open Space Framework, but there were no trail connections in Frog Pond South. Should those connections be considered? The trail in the lower-left quadrant below Meridian School should connect with the trail to Boeckman Creek School. Were there other trail connections between South and the future community park? (Slide 22)
- The green focal point at the northeast section north of the BPA easement seemed out of balance in terms of the center of that general neighborhood area. In fact, both green focal points shown north of the BPA easement could be more centrally located rather than being so close to the BPA easement.

Mr. Pauly briefly summarized the engagement activities being used to obtain feedback on the Master Plan, noting the City's survey work currently focused on the public realm. The survey text was in the meeting packet and Commissioners were encouraged to take the survey or provide comments on the topics of the survey. The City was working with the School District on holding an open house on August 23rd regarding the design of Frog Pond School. City Staffs were also working internally across the Planning, Parks, and Engineering Departments on the Frog Pond West Park and Boeckman Corridor Project.

Mr. Dills confirmed the project team had a nice set of summertime outreaches going on.

Chair Heberlein thanked everyone for all the time and effort being put into the project.

INFORMATIONAL

4. City Council Action Minutes (July 18, 2022) (No staff presentation)
5. 2022 PC Work Program (No staff presentation)

Daniel Pauly, Planning Manager, stated the Wastewater Treatment Plant Master Plan was moved out a month to address some concerns, including the demographic issues discussed in the last work session. Otherwise, the work program was looking as planned.

ADJOURNMENT

Chair Heberlein adjourned the regular meeting of the Wilsonville Planning Commission at 8:07 p.m.

Respectfully submitted,

By Paula Pinyerd of ABC Transcription Services, LLC. for
Mandi Simmons, Planning Administrative Assistant

PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

WORK SESSION

2. Airport Good-Neighbor Policies (Bateschell) (30 minutes)

PLANNING COMMISSION MEETING
STAFF REPORT

Meeting Date: September 19, 2022	**Subject: Airport Good-Neighbor Policies** **Staff Member:** Miranda Bateschell, Planning Director **Department:** Community Development
Action Required	**Advisory Board/Commission Recommendation**
☐ Motion ☐ Public Hearing Date: ☐ Ordinance 1st Reading Date: ☐ Ordinance 2nd Reading Date: ☐ Resolution ☒ Information or Direction ☐ Information Only ☐ Council Direction ☐ Consent Agenda	☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:** The Planning Commission held a work session on the draft policies on September 14, 2022.
Staff Recommendation: Review and provide feedback on the draft Comprehensive Plan Policies pertaining to the Aurora Airport.	
Recommended Language for Motion: N/A	
Project / Issue Relates To:	

☒Council Goals/Priorities: Goal 7: Protect Wilsonville's environment and increase access to sustainable lifestyle choices	☒Adopted Master Plan(s): Wilsonville Comprehensive Plan	☐Not Applicable

ISSUE BEFORE COMMISSION:

The project team will present draft airport good-neighbor policies to add to the Wilsonville Comprehensive Plan.

EXECUTIVE SUMMARY:

The Aurora Airport is located in Marion County and is approximately 1.6 miles south of the Wilsonville City Limits. The airport flight path is over Wilsonville with the closest neighborhood impacted by the Airport being Charbonneau. The Airport's current operations and planned future growth have both positive and negative impacts to residents and businesses in the City. While the City of Wilsonville does not have direct jurisdiction of lands outside of the city limits or urban growth boundary, such as the Aurora Airport site, State law requires intergovernmental coordination between state agencies and affected jurisdictions on land use issues. As far back as 1991, the City's Urban Growth Management Agreement with Clackamas County included reference to the airport as an area of interest to both the City and County.

Beginning in 2009, as part of a previous airport master planning process, Clackamas County and the City of Wilsonville made joint requests to participate with other impacted jurisdictions via an intergovernmental agreement (IGA) to plan for growth and development at the airport. Both entities were included on the Planning Advisory Committee, which could make recommendations but had no authority. A similar, new airport master planning process is underway now, which could propose a runway expansion to accommodate larger aircraft.

As an affected jurisdiction, it is important to articulate the relevant land use issues in local adopted policy for purposes of intergovernmental coordination and standing in state law. The Clackamas County Comprehensive Plan includes policies specifically addressing the Aurora Airport, while the City of Wilsonville Comprehensive Plan does not. Recent land use proceedings have noted the lack of applicable airport-related policies in the Wilsonville Comprehensive Plan.

Federal and state law require protecting aviation operation from intrusion of incompatible uses, and the City's existing zoning and transportation policies comply with limiting physical hazards to air navigation in the area surrounding the Aurora Airport. However, policies have not been adopted to address potential impacts of existing Airport operations and potential growth to public infrastructure and services, natural and environmental systems, and local residents and businesses.

This Comprehensive Plan update project aims to: acknowledge the positive and negative impacts of the Airport's current operations to Wilsonville residents and businesses; identify the prospective impacts of potential growth and intensification of use at the Aurora Airport and through-the-fence properties; and establish policy objectives that both articulate these effects on the City of Wilsonville and also provide direction to the City on how to advocate for the continued benefits of the existing operations as well as the proper mitigation for the negative impacts of aviation activity and development.

The project team incorporated feedback from the community, key stakeholders, the Planning Commission and City Council into a draft amendment to the City's Comprehensive Plan (Attachment 1). The airport good neighbor policies will be adopted in the form of a new, geographically defined Area of Special Concern in Section F of the Comprehensive Plan. Areas of Special Concern are intended to "include specific language describing special considerations that

must be addressed in development of these areas." The special considerations guide the City when planning for or reviewing development in these Areas. Potential development in these Areas could affect the immediate vicinity, places in Wilsonville connected to the Area of Special Concern through geography or travel routes, or the Wilsonville community as a whole, depending on what is proposed.

The Aurora Airport affects the community but is located outside of the City. Planning and development proposed in that Area may impact the City of Wilsonville in several ways but is outside the City's direct control and entitlement process, making it suitable to be designated as an Area of Special Concern. The articulation of special considerations through Area of Special Concern O in the Comprehensive Plan, will guide the City's participation in planning efforts led by other agencies and the City's review of development proposals in the Area, giving the City an opportunity to advocate for those considerations to be appropriately addressed. As such, the boundary is focused on the Airport and vicinity, and the language addresses the land use related impacts to the entire City of growth, development, and intensification of use in the Area. Some of the existing Areas of Special Concern (Areas A-N) are either outside of the City limits or were outside of the City limits at the time of their adoption providing precedent for this designation.

Attachment 2 provides a series of maps, which depict Area of Special Concern O and its relationship to geographic facilities and resources relevant to the special considerations and City:

- The "Boundary Map" shows the Area of Special Concern boundary, which serves as the basis for amending the Area of Special Concern Map on Comprehensive Plan page F-13.
- The "Airport Areas Map" shows the Aurora Airport campus and Through-the-Fence boundaries to inform discussions about Area O relative to development near the Airport.
- The "Resource Map" highlights key transportation and natural/recreational resources in the vicinity of Area O.

The team welcomes feedback from the Commission on the draft, specifically:

1. Are there any key policy objectives or special considerations missing?
2. Do the policy objectives reflect the City's scope of influence?

EXPECTED RESULTS:

Work sessions with the Planning Commission and City Council will provide guidance to finalize the airport good-neighbor policies. The key outcome expected at the end of this project is the adoption of Comprehensive Plan policies to memorialize and address the highest priority issues pertaining to the interrelationships between Aurora Airport and the City of Wilsonville.

TIMELINE:

The team is finalizing draft policies with adoption anticipated by the end of the calendar year.

CURRENT YEAR BUDGET IMPACTS:

The project budget is $38,760 covered by the Community Development general professional services fund for FY 2021-22 and carried over into FY 22-23.

COMMUNITY INVOLVEMENT PROCESS:
Community outreach for the project included surveys, interviews, and open houses, and was conducted primarily online and remotely due to the COVID-19 pandemic. The team received input from the Commission and Council on key stakeholders to engage during this process.

POTENTIAL IMPACTS OR BENEFIT TO THE COMMUNITY:
Comprehensive Plan policies will provide the City with clear, adopted policy priorities as they relate to the Aurora Airport. This will clarify City interests and hopefully, provide more opportunity for the City to participate in formal Airport planning efforts.

ALTERNATIVES:
The Commission can provide policy alternatives to be considered.

CITY MANAGER COMMENT:
N/A

ATTACHMENTS:
1. Wilsonville Comprehensive Plan Area of Special Concern O (draft, dated 9/3/2022)
2. Area of Special Concern O Maps (draft, dated 9/6/2022)

Attachment 1

Wilsonville Comprehensive Plan Area of Special Concern O
Draft Proposed Language, September 3, 2022

AREA O

This Area is focused on the Aurora State Airport and other adjacent properties. Aurora State Airport is a Category II, Urban General Aviation Airport operated by Oregon Department of Aviation and located approximately 1.6 miles south of Wilsonville city limits. The Airport is within Marion County, but it extends northward to the shared boundary with Clackamas County. Arndt Road serves as the northern boundary, Boones Ferry Road NE is the western boundary, and Area O extends south and east to include the Aurora Airport and adjacent parcels. The boundary of Area O encompasses the Aurora Airport property, adjacent properties with through-the-fence access, and adjacent rural properties that form a buffer around developed areas near the Airport.

The City of Wilsonville and Aurora State Airport are separated by a portion of a larger agricultural district known as the French Prairie. Although the Airport is outside of the City of Wilsonville's boundaries, the runway at the Aurora State Airport is oriented in a north-south direction and aircraft taking off and landing fly over Wilsonville bringing noise and air pollution. Existing environmental and infrastructure issues at and in the vicinity of the Aurora State Airport have the potential to negatively impact the City of Wilsonville. These issues could worsen due to development and intensification of use in Area O. The Interstate 5 Freeway, State Route 551, and other major roadways in the vicinity connect to the transportation system within the City of Wilsonville. Sewage treatment via septic systems for large industrial scale development and stormwater runoff in and around the airport can negatively impact the Willamette River watershed, in turn effecting water quality, natural habitat, and recreational opportunities for the surrounding communities.

The existing federal and state framework of regulations, policies, and guidance specific to airport compatibility planning focuses primarily on protecting airports and aviation operation from intrusion of incompatible uses, rather than limiting or mitigating the impacts of aviation on nearby communities. Therefore, existing policies include limiting physical hazards to air navigation in the area surrounding the Aurora Airport, but do not address potential impacts of existing operations and potential growth to public infrastructure and services, natural and environmental systems, and local residents. The designation of Area O provides policy direction for the City when reviewing proposed development and participating in planning efforts in the Area. Area-specific objectives both recognize the Aurora Airport's role in the state transportation system and local economy and identify the impacts to Wilsonville of airport expansion and intensification of use in the Area.

The City has identified a range of potential impacts from aviation operations at Aurora State Airport and development on the airport property and surrounding lands, including:

- Noise and air pollution from flight patterns over Wilsonville, particularly in residential areas, that negatively impact quality of life.

- Water pollution in the vicinity of, and to, the Willamette River, which the City of Wilsonville relies on as its primary source of water. The Willamette River is also an important environmental

and recreational resource for the region and is designated and protected as part of the Willamette River Greenway by Statewide Planning Goal 15.

- Loss of high-quality farmland. The fertile foundation agricultural land of French Prairie surrounding the Aurora State Airport includes high value soils. This area is designated Rural Reserve, consistent with existing policies adopted by the State of Oregon, Clackamas County, the Metro region, and City of Wilsonville. The City acknowledges and supports the Airport's contribution to various sectors of the local economy, and also recognizes agricultural activity in French Prairie is exceptional and contributes substantially to the State's and Wilsonville's economy by providing farm goods to local firms. Preservation of high-quality farmland in the French Prairie and its designation as a Rural Reserve continues to be a local priority.

- Negative impacts to the development of industrial and employment land in Wilsonville. The Metro Urban Growth Management Functional Plan designates several locations within the Wilsonville Urban Growth Boundary as Regionally Significant Industrial Areas, Industrial Areas, or other Employment Lands. The City of Wilsonville has adopted standards to preserve these areas for the purpose of meeting regional employment need, and to provide infrastructure to support their development. Potential development of industrial or other employment uses in "through-the-fence" areas or other parcels adjacent to the Airport, conflicts with regional and state policy in directing industrial growth towards designated employment lands within urban areas, including Wilsonville.

- Surface transportation access and adequate levels of service in the City of Wilsonville, Area O, and routes connecting across the French Prairie. The Aurora State Airport is a component of the State's transportation system and provides economic benefits to Wilsonville residents and businesses by providing nearby access to general aviation and helicopter facilities. Surface transportation facilities, including I-5, Highway 551, Arndt Road, Airport Road, and Boones Ferry Road all connect to and impact the effective function of the transportation system in Wilsonville, and provide access between Wilsonville and French Prairie, the Aurora Airport, and Willamette Valley to the south. These transportation routes are designed to cross rural areas and could be negatively impacted by increased development intensity on rural land in the vicinity of the Airport.

- Resiliency and capacity for emergency response. The Airport provides an operational base for emergency service providers and could support the resilience of the region in the event of a Cascadia event earthquake or other natural disaster. Changes to the configuration of the Airport, type of operations housed there, or development-related impacts to surface transportation connections between Wilsonville and Area O, would diminish the overall benefits provided by the Airport.

<u>Objectives</u>

1) Engage as an Affected Jurisdiction in Aurora State Airport master planning or other processes to review future development plans and policy for the Airport and through-the-fence properties.

Advocate for operational and development policies for the Airport that include adequate provision of infrastructure, protection of environmental systems, and noise control measures.

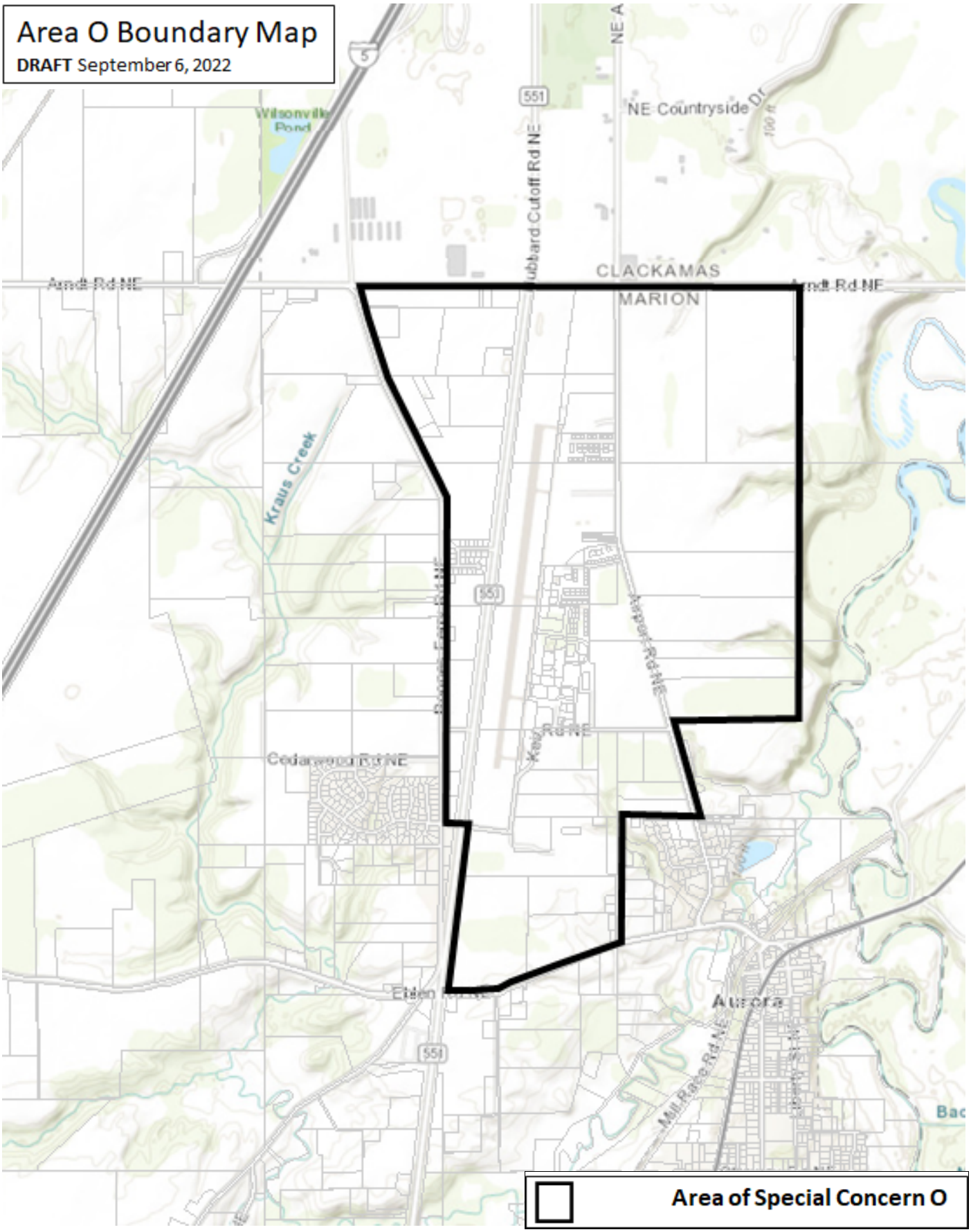
2) Evaluate and respond to proposals for changes to the type and intensity of aviation activities at the Aurora State Airport to minimize noise and pollution impacts to residents, businesses, and environmental or public resources in the Wilsonville Urban Growth Boundary.

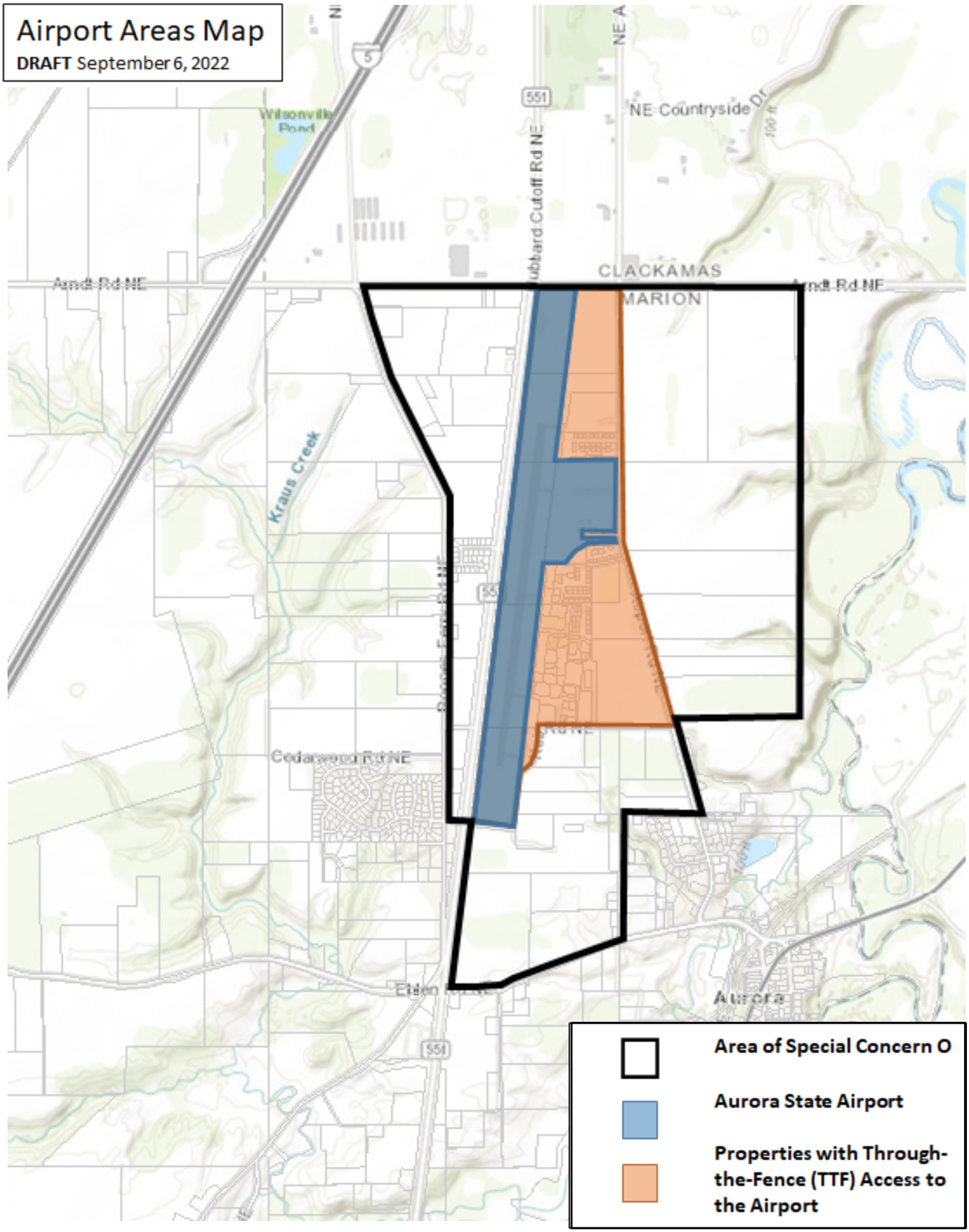
3) Maintain ongoing coordination with applicable agencies and organizations, including Oregon Department of Aviation, Oregon Department of Environmental Quality, Airport operators and aviation stakeholders to reduce the impacts of aviation on noise-sensitive areas like residential districts and environmental resource areas such as the Willamette River. Support a FAR Part 150 study to develop Noise Exposure Maps defining the existing and future noise exposure boundaries surrounding the Airport.

4) Evaluate and respond to public and private development and infrastructure projects in Area O to ensure that rural development patterns and agricultural activities are protected, supporting regional food security, the agricultural economy, and protection of environmental resources, consistent with State of Oregon and Clackamas County policies designating lands as Exclusive Farm Use and Rural Reserves.

5) Ensure that development within Area O includes appropriate concurrent upgrades to infrastructure and public services that maintain rural development patterns and prevent negative impacts to the water, sewer, stormwater, and transportation systems serving Wilsonville and surrounding areas.

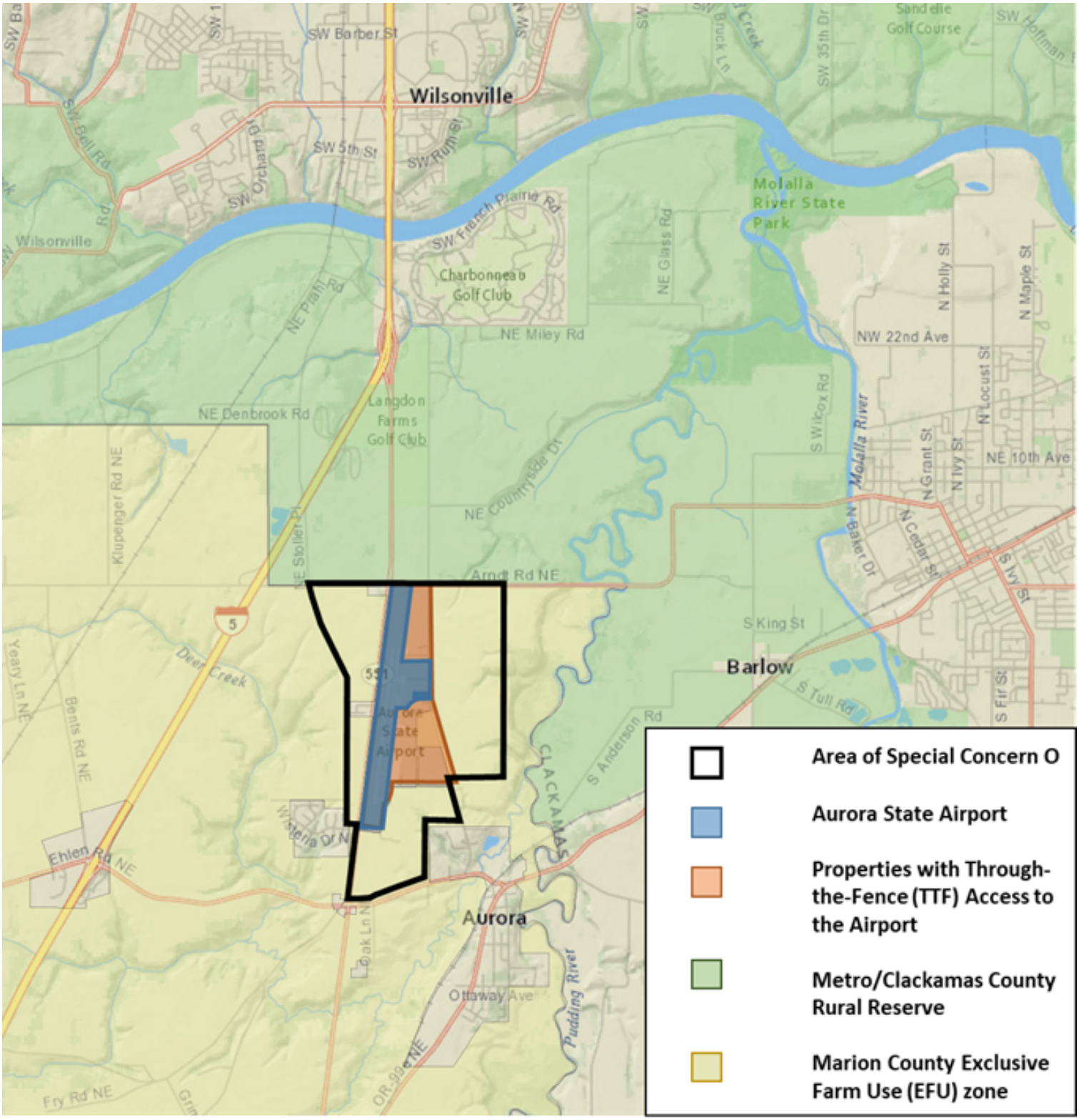
6) Advocate to maintain the general aviation designation and existing services at Aurora Airport, as an air transportation resource supporting Wilsonville-based businesses, as a hub in emergency management plans, and as an operational base for emergency service providers. Evaluate and respond to development proposals proposing to increase development intensity in Area O that could hinder safe, convenient, and efficient access to the Airport.


Area O Boundary Map
DRAFT September 6, 2022
Wilsonville Pond
NE Countryside Dr
Hubbard Cutoff Rd NE
CLACKAMAS
MARION
Kraus Creek
Area of Special Concern O


Airport Areas Map
DRAFT September 6, 2022
Wilsonville Pond
NE Countryside Dr
Hubbard Cutoff Rd NE
CLACKAMAS
MARION
Arndt Rd NE
Kraus Creek
Cedarwood Rd NE
Ehlen
Aurora
551
Area of Special Concern O
Aurora State Airport
Properties with Through-the-Fence (TTF) Access to the Airport

Area O Resource Map

DRAFT September 6, 2022



PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

WORK SESSION

3. Wastewater Treatment Plant Master Plan (Nacrelli) (30 minutes)

PLANNING COMMISSION WORK SESSION
STAFF REPORT

Meeting Date: September 14, 2022	**Subject:** Wastewater Treatment Plant Master Plan **Staff Member:** Mike Nacrelli, Senior Civil Engineer **Department:** Community Development
Action Required	**Advisory Board/Commission Recommendation**
☐ Motion ☐ Public Hearing Date: ☐ Ordinance 1st Reading Date: ☐ Ordinance 2nd Reading Date: ☐ Resolution ☒ Information or Direction ☐ Information Only ☐ Council Direction ☐ Consent Agenda	☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:** N/A
Staff Recommendation: Provide requested input regarding recommended capital improvement plan.	
Recommended Language for Motion: N/A	
Project / Issue Relates To:	
☒Council Goals/Priorities: Align infrastructure plans with sustainable financing resources.	☐Adopted Master Plan(s): ☐Not Applicable

ISSUE BEFORE PLANNING COMMISSION:

Provide feedback and input on components of the Wastewater Treatment Plant (WWTP) Master Plan.

EXECUTIVE SUMMARY:

This new City of Wilsonville (City) Wastewater Treatment Plant (WWTP) Master Plan (the Plan) has been developed to satisfy requirements associated with the State of Oregon Department of Environmental Quality (DEQ) guidance document entitled "Preparing Wastewater Planning Documents and Environmental Reports for Public Utilities." To accommodate future flows and loads, projections were developed based on population projections and referencing WWTP historical data and DEQ wet weather project methodologies. Similarly, to accommodate future water quality regulations, the Plan is adaptive and considers potential future regulatory changes.

The City prepared the Plan with the goal of developing a capital plan that identifies improvements required through the planning period (today through 2045) to comply with requirements of the WWTP National Pollutant Discharge Elimination System (NPDES) permit and potential future regulatory requirements, while accommodating growth identified in the City of Wilsonville Comprehensive Plan (October 2018, updated June 2020 - the 2018 Comprehensive Plan). These improvements are designed to provide the best value to the City's ratepayers by maximizing the use of existing infrastructure and improving system operation while continuing to protect water quality and human health and supporting economic development, consistent with goals and policies contained in the 2018 Comprehensive Plan and 2021-2023 City Council Goals.

The City's WWTP was originally built in 1971 and discharges treated effluent to the Willamette River. The WWTP underwent major upgrades in 2014 to expand the average dry weather capacity to four million gallons per day (mgd) to accommodate the City's continued growth. The WWTP processes include headworks screening and grit removal facilities, aeration basins, stabilization basins, secondary clarifiers, biosolids processing, cloth filtration, and disinfection processes. Additionally, the City contracts with Jacobs for operation of the wastewater treatment plant, located at 9275 Southwest Tauchman Road.

This Plan identifies improvements taking into consideration:

- The age and condition of existing process equipment and structures,
- Growth in demand for sewer service due to increased population and economic development over the planning period,
- Potential changes to water quality regulations impacting process needs in order to meet effluent limitations and discharge prohibitions imposed by the Oregon Department of Environmental Quality (DEQ), and
- Consistency with the 2018 Comprehensive Plan and City Council 2021-2023 Goals 5, 6 and 7.

Updated Growth Projection and Capital Improvement Plan

The previous (7/13/2022) work session included a capital improvement plan based on population growth projections over the planning period obtained from Metro. The growth projections have since been updated to an assumed 2.9% annual population increase, consistent with recent planning documents adopted by the City, including the Wastewater Collection System Master Plan (November 2014) and the Willamette River Water Treatment Plan Master Plan Update (March 2018). This change results in a considerably higher level of capital investment over the planning period, as reflected in the table below.

Project Description	Timeframe	Cost*
Dewatering Performance Optimization	2023	$155,724
UV System Improvement	2023	$1,370,369
Fiber Optic Conduit Addition	2023	$45,679
Seismic Improvements	2024	$841,323
New Aeration Basin and Blower	2025	$6,928,208
Replace Secondary Clarifier Mechanisms	2026	$1,382,827
Membrane Bioreactor (MBR) Phase 1 (includes new blower, fine screens, and electrical upgrades)	2028 – 2029	$31,811,200
New Solids Dryer	2031 – 2032	$13,371,479
MBR Phase 2 (includes new blower)	2033 – 2034	$6,211,200
Thickening and Dewatering Improvements	2035	$2,854,359
New Cooling Tower	2036 – 2037	$452,138
MRB Phase 3 (includes 2 new blowers)	2038	$4,742,400
MBR Phase 4 (includes 2 new blowers)	2040 – 2041	$5,142,400
Total		**$75,309,306**
*Costs are shown in 2022 dollars and include 25% for engineering, legal, and administration.		

As shown in the table above, the most significant impact to the required level of capital investment is the need for membrane bioreactor (MBR) facilities. These are state-of-the-art, compact facilities that provide a high level of treatment. The adjusted growth projection results in an approximate doubling of the City population over the planning period. Due to the limited amount of space available at the existing WWTP site, MBR facilities are the only feasible means of providing the necessary treatment to accommodate such a substantial rate of growth.

EXPECTED RESULTS:

The Plan includes a list of recommended capital improvements, along with an anticipated schedule for completion and preliminary cost estimates. These improvements will provide the basis for an analysis of sewer rates and system development charges (SDCs) that will be necessary to provide adequate funding to implement to required upgrades.

TIMELINE:

This is the third in a series of presentations to the Planning Commission and City Council. Completed and planned meetings are as follows:

- Planning Commission Work Session 7/13 (completed)
- City Council Work Session 8/1 (completed)
- Planning Commission Work Session 9/14
- Planning Commission Public Hearing 10/12
- City Council Work Session 11/7
- City Council Public Hearing 1st Reading 11/21
- City Council 2nd Reading 12/5

CURRENT YEAR BUDGET IMPACTS:

The remaining contract balance for finalizing the Plan will carry over into FY 22/23. An additional $92,450 has been budgeted in FY 22/23 for the Sewer System Rate Study and SDC Update, using a combination of Sewer Operating funds and SDCs.

COMMUNITY INVOLVEMENT PROCESS:
The public hearings listed above will provide opportunity for public input. In addition, the Sewer System Rate Study and SDC Update will include a robust public engagement process.

POTENTIAL IMPACTS or BENEFIT TO THE COMMUNITY:
A technically and financially sound plan for providing reliable wastewater treatment, capacity to accommodate future development, and compliance with environmental regulations.

ALTERNATIVES:
The Plan is based on a projected population growth rate that is somewhat aggressive but is consistent with other recently adopted planning documents and with historical growth data. The capital project schedule can be adjusted as appropriate if actual growth rates differ significantly from the projected growth included in the Plan.

ATTACHMENTS:
N/A

PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

WORK SESSION

4. Frog Pond East and South Master Plan (Pauly) (45 minutes)

PLANNING COMMISSION MEETING
STAFF REPORT

Meeting Date: September 14, 2022	**Subject:** Frog Pond East and South Master Plan **Staff Member:** Daniel Pauly, Planning Manager **Department:** Community Development
Action Required	**Advisory Board/Commission Recommendation**
☐ Motion ☐ Public Hearing Date: ☐ Ordinance 1st Reading Date: ☐ Ordinance 2nd Reading Date: ☐ Resolution ☒ Information or Direction ☐ Information Only ☐ Council Direction ☐ Consent Agenda	☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:** N/A
Staff Recommendation: Provide input regarding Frog Pond East and South Master Plan.	
Recommended Language for Motion: N/A	
Project / Issue Relates To:	

☒Council Goals/Priorities: Expand home ownership	☒Adopted Master Plan(s): Frog Pond Area Plan	☐Not Applicable

ISSUE BEFORE PLANNING COMMISSION:
Provide feedback and input on infrastructure analyses and plans for Frog Pond East and South.

EXECUTIVE SUMMARY:

Following designation of the area on the east side of Wilsonville as an urban reserve in 2010, the City adopted the Frog Pond Area Plan in 2015 to set the stage for additional planning and eventual development to meet identified housing needs. Besides the urban reserve area, the Frog Pond Area Plan also established a vision for growth for undeveloped land already within the City's Urban Growth Boundary (UGB) now known as Frog Pond West. In 2017, a Master Plan and implementing zoning code was adopted for Frog Pond West. The Master Plan provided the necessary regulatory framework for the residential neighborhood currently under development north of Boeckman Road and west of Stafford Road.

In 2018, Metro expanded the UGB to include the urban reserve land known as Frog Pond East and South. As part of the Metro Ordinance adopting the UGB expansion, Metro required Wilsonville to complete master planning to make the area development ready, from a regulatory standpoint, by December 2022. Similar to past master planning efforts, such as Villebois and Frog Pond West, this master planning effort will identify the types and locations of the homes, other land uses, parks, open spaces, streets, trails and neighborhood amenities to be built over the next 10-20 years. To support implementation of the plan, the process will also identify water, sewer, stormwater, and transportation infrastructure needs and funding sources.

This will be the Planning Commission's eighth work session on the Frog Pond East and South Master Plan. The previous work sessions and their content were as follows:

Work Session 1-October 2021: Focus on overall project scope and the outreach plan.

Work Session 2-December 2021: Initial feedback on the needs and opportunities for affordable housing and housing variety.

Work Session 3-February 2022: Continuation of the topic of housing needs for more detailed feedback and direction, introduction of the neighborhood commercial evaluation.

Work Session 4-April 2022: Further discussion of the neighborhood commercial center and discussion of the design concepts for development of land use and urban design alternatives.

Work Session 5-June 2022: Review and direction on draft land use alternatives, including mapping the locations of different housing design types and forms (grouped into Type 1, Type 2, and Type 3).

Work Session 6-July 2022: Review of draft preferred land use alternative and direction on land use policies around housing variety.

Work Session 7-August 2022: Direction on criteria for evaluating housing variety policy options and public realm master plan components.

This *Work Session 8* will primarily focus on the Transportation Analysis (Attachment 1) and Infrastructure Technical Memo (Attachment 2). The consultant team will be available to discuss and answer any questions. In addition, the project team will report back on questions about role of Frog Pond West in filling housing needs and the costs of ADUs.

Transportation Analysis and Proposed Infrastructure
The 2015 Frog Pond Area Plan set the vision for all three Frog Pond neighborhoods and thus, included a transportation evaluation that encompassed Frog Pond East and South. Traffic modeling has thus anticipated development of these neighborhoods consistent with the Plan. The attached Transportation Analysis (Attachment 1) refines the prior 2015 evaluation. The Transportation Analysis is based on the maximum potential amount of commercial - to test the system, the analysis assumed 50,000 square feet although the current recommendation is a maximum of 44,000 square feet - and the likely number of dwelling units (1,800) under the preferred land use alternative. As a next step, the information from the preferred land use alternative Transportation Analysis will be used to develop a street project list to include in the infrastructure plan.

Key points of the Transportation Analysis are as follows:

- With recommended improvements and construction of high-priority projects in the Wilsonville and Clackamas County Transportation System Plans (TSPs), level of service will be met at impacted intersections, both nearby and further away in Wilsonville. This includes at I-5 interchanges and the Elligsen/Stafford intersection.

- New round-a-bouts are recommended on Stafford Road at Kahle Road and Brisband Street and on Advance Road at 60th Avenue.

- A median/barrier is recommended on Stafford Road at Frog Pond Lane to prevent traffic from crossing Stafford Road while still allowing most movements to and from Stafford Road into Frog Pond West and Frog Pond East.

- A number of pedestrian crossing amenities are recommended subject to further refinement with public input, including from stakeholders such as the school district.

A separate sensitivity analysis is also planned to test a higher hypothetical dwelling unit count of approximately 2,400 units. This higher dwelling unit amount reflects 20 units per net acre, which is a density prescribed in one of the compliance options in State administrative rules for new urban areas to comply with House Bill 2001 middle housing law. The project team is still analyzing and confirming impact of a higher unit count and will share in a future work session.

Water, Sanitary Sewer Proposed Infrastructure
Similar to the transportation analysis, initial water, sanitary sewer, and stormwater analysis was completed for the 2015 Frog Pond Area Plan. In a June work session, an existing conditions analysis was presented, which included the discussion of existing conditions of the Frog Pond East and South area infrastructure, previously prepared plans, and a review of applicable standards. The Infrastructure Technical Memo (Attachment 2) builds on this previous work and lays out the proposed infrastructure to serve Frog Pond East and South in a manner that meets City standards. Like the Transportation Analysis, the Infrastructure Technical Memo tests the maximum potential amount of commercial and the likely number of dwelling units under the

preferred land use alternative. The infrastructure memo also includes testing for the higher residential unit count of approximately 2,400 for the reasons described above under the Transportation Analysis.

The information from the Infrastructure Technical Memo will be used to estimate infrastructure costs for the Frog Pond East and South Master Plan area. The following are some key points from the proposed infrastructure analysis regarding water and sanitary sewer:

- Key off-site infrastructure planned in the City's existing infrastructure master plans are needed to provide infrastructure capacity to Frog Pond East and South:
    - Water storage capacity: Westside tank northwest of Villebois, anticipated completion 2025.
    - Downstream sanitary sewer capacity: Boeckman Road Sewer Trunk Line, construction planned in 2024. Boeckman Creek sewer interceptor, anticipated completion 2025.
- The exact amount of development that can occur in Frog Pond East and South prior to completion of the key planned off-site infrastructure projects will need further analysis. This may occur either as part of the Master Plan and/or at time of development proposal. Capacity will depend on the amount and timing of development in Frog Pond East and South relative to development in Frog Pond West and elsewhere in the City.
- Not previously identified in an infrastructure master plan, important off-site 12-inch water distribution connections are needed under Boeckman Creek from the end of Frog Pond Lane towards Canyon Creek Road and beneath Meridian Creek just south of Meridian Creek Middle School.
- Due to topography, Frog Pond East and South will require four sanitary sewer lift stations.
- The hypothetical higher density residential land use scenario would not substantially impact or increase costs for the planned framework water system or sanitary sewer system.

Stormwater infrastructure will also be part of the Frog Pond East and South Master Plan. Additional analysis and discussion is needed by the project team prior to presentation of stormwater infrastructure to the Planning Commission. The team plans to bring forward in an upcoming work session.

Follow Up from Past Work Session on Housing Variety

The following are questions from the prior work session regarding housing variety and policy development and responses from the project team. The project team invites the Planning Commission to review this information and ask any additional clarifying questions.

Q: Does the data in the Affordable Housing Analysis, specifically the need for higher-end housing, reflect the development of Frog Pond West?

A: Frog Pond West began developing in 2019 and is not reflected in data presented from 2018. Figure 9 of the Affordable Housing Analysis shows a deficit of 773 units for households making 150% or more of MFI. According to Exhibit 4 in the same report 150% MFI represents a household income of approximately $140,000 which could afford a home of about $770,000. Staff notes increased interest rates are currently making it less affordable, but for consistency will use the data from the Affordable Housing Analysis. A majority of the detached homes in Frog Pond West are selling at or above this price satisfying a large portion of this need. Exact numbers are not known and will not be analyzed until the needs citywide housing needs analysis scheduled in 2023, but based on review of readily available real estate data staff is comfortable saying at least 400-500 units in this price range will be completed in Frog Pond West, likely more. In addition, completion of Clermont in Villebois is expected to produce at least 60-70 additional homes in this price area. At most, the 2018 need for households 150% or more MFI remaining to be satisfied by Frog Pond East and South is 200-300 units. Current draft housing variety policy would allow this to be met.

Q: What is the expected affordability to rent or buy an Accessory Dwelling Unit (ADU) in Frog Pond East and South relative to other unit types?

A: According to the ADU Memo presented to the Commission in February, and reattached here (Attachment 3), the rent for an ADU in Frog Pond West is expected to be from the $1,000's to over $2,000, similar to market-rate apartments of similar size. The memo's analysis predicts the sale price for a for-sale ADU would be $300,000's to $400,000's, similar to the anticipated cost of a for-sale condo or small townhouse.

The project team otherwise continues to develop draft policies and regulations around housing variety that will be discussed at future work sessions. The project team does encourage the Planning Commission to share additional thoughts or questions that have come up around housing variety.

Discussion Questions:

1. What questions or comments does the Commission have about the Transportation Analysis (Attachment 1)?
2. What questions or comments does the Commission have about the Infrastructure Analysis (Attachment 2)?

3. What additional feedback or direction, if any, does the Commission have for the preferred alternative and draft residential variety policies since the prior work session?

EXPECTED RESULTS:
Feedback and direction from the Planning Commission to guide continued development and refinement of the Frog Pond East and South Master Plan on: transportation and other infrastructure and housing variety policy.

TIMELINE:
This is the eighth in a series of work sessions for the Planning Commission. The next work session is planned for October. The Master Plan is scheduled to be completed by December 2022, with some implementation elements extending into early 2023.

CURRENT YEAR BUDGET IMPACTS:
The project is funded by a combination of a $350,000 Metro grant, an $81,000 Oregon DLCD grant, and matching City funds in the form of staff time. $311,000 is budgeted in FY 22/23 to complete the project.

COMMUNITY INVOLVEMENT PROCESS:
The project has a community engagement plan which lays out a robust public engagement program that will include meaningful and impactful involvement of people who identify with historically marginalized communities. The project team recently completed a number of outreach events, results and impacts of which will be shared in an upcoming work session.

POTENTIAL IMPACTS OR BENEFIT TO THE COMMUNITY:
Furthering of the City's Equitable Housing Strategic Plan and Council's goal of affordable home ownership, while creating Wilsonville's next great neighborhoods.

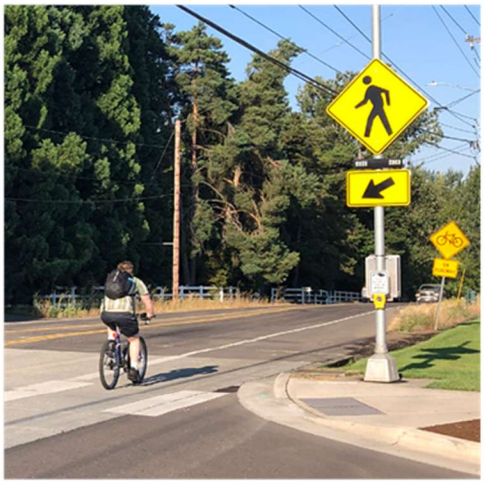
ALTERNATIVES:
The Planning Commission and City Council can continue to direct changes to the draft plan elements. In addition, the Planning Commission and City Council continues to have a number of policy options related to housing variety.

ATTACHMENTS:
1. Transportation Analysis (dated September 7, 2022)
2. Infrastructure Technical Memo (dated September 6, 2022)
3. ADU Memo (dated January 31, 2022)

FROG POND EAST & SOUTH MASTER PLAN

TRANSPORTATION ANALYSIS: EXISTING AND FUTURE CONDITIONS

SEPTEMBER 2022



EAST & SOUTH MASTER PLAN

PREPARED FOR THE CITY OF WILSONVILLE

WILSONVILLE
OREGON

PREPARED BY DKS ASSOCIATES

DKS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

This report documents the traffic analysis performed in association with the Frog Pond East & South Master Plan in Wilsonville, Oregon. This report provides a more refined evaluation of the East and South land use as compared to the Frog Pond Area Plan,[1] which was adopted in 2015, and builds on the work of the Frog Pond West Master Plan,[2] which was adopted in 2017.

An executive summary of this transportation analysis is provided below. The following sections of this memorandum document the existing traffic conditions (2022), future baseline and build traffic conditions (2040), and a list of resulting transportation projects. The year 2040 was selected for future analysis to be consistent with the Metro Regional Transportation Plan (RTP) and Wilsonville Travel Demand Model's horizon year.

EXECUTIVE SUMMARY

To determine existing and future transportation conditions for the Frog Pond East and South neighborhoods, a comprehensive traffic analysis was performed. The analysis focused on the major intersections both within the project vicinity and within Wilsonville at large, including the two I-5 interchange areas (i.e., Wilsonville Road and Elligsen Road). The study area includes 15 total intersections, including 4 key gateway intersections to the neighborhoods.

The existing conditions analysis was based on recent 2021 and 2022 traffic counts and existing intersection geometries, while the future analysis was based on traffic forecasts for the 2040 horizon year and improved intersection geometries associated with all High Priority Projects included in Wilsonville's Transportation System Plan (TSP). The future analysis consisted of two scenarios: 2040 Baseline and 2040 Build. The future land use assumptions are consistent with the Metro model, which was used to update the travel demand model for the Build scenario. The 2040 Baseline scenario assumes no additional growth beyond what is currently assumed in the 2040 model and the 2040 Build scenario represents the likely build-out of the study area, which includes up to 1,800 housing units and up to 44,000 square feet of commercial space within the East and South neighborhoods.

The City has also identified a hypothetical higher-density alternative which calls for approximately 2,400 total units in the combined East and South neighborhoods. This higher dwelling unit amount reflects 20 units per net acre, which is a density prescribed in one of the compliance options in State administrative rules for new urban areas to comply with House Bill 2001 middle housing law. The project team is still analyzing and confirming the impact of a hypothetical higher unit count and will incorporate it into a future draft of this Transportation Analysis.

Intersection traffic operations were analyzed for the weekday PM peak hour under the existing and both future scenarios to evaluate if the study intersections meet desired performance levels as required by the City of Wilsonville, Clackamas County, and Oregon Department of Transportation

[1] Frog Pond West Master Plan, City of Wilsonville, July 17, 2017.
[2] Frog Pond Area Plan, City of Wilsonville, November 16, 2015.

(ODOT). All intersections except the Stafford Road/65th Avenue intersection currently meet operating standards and targets. Additional coordination between Clackamas County and City of Wilsonville is recommended regarding the necessary improvements to that intersection to accommodate future Frog Pond development.

In the future 2040 scenarios, all but three of the study intersections are expected to continue to meet standards and targets in the future assuming the completion of the High Priority Projects identified in the TSP. Those three intersections are located along Stafford Road and are the gateway intersections to the Frog Pond East neighborhood and were analyzed as stop controlled intersections. The following transportation improvements are recommended for these intersections.

- **Stafford Road/Kahle Road:** Install a single-lane roundabout
- **Stafford Road/Frog Pond Lane:** Install a raised median to prohibit minor street through and left turns and install an enhanced pedestrian crossing with a center refuge median.
- **Stafford Road/Brisband Street:** Install a single-lane roundabout

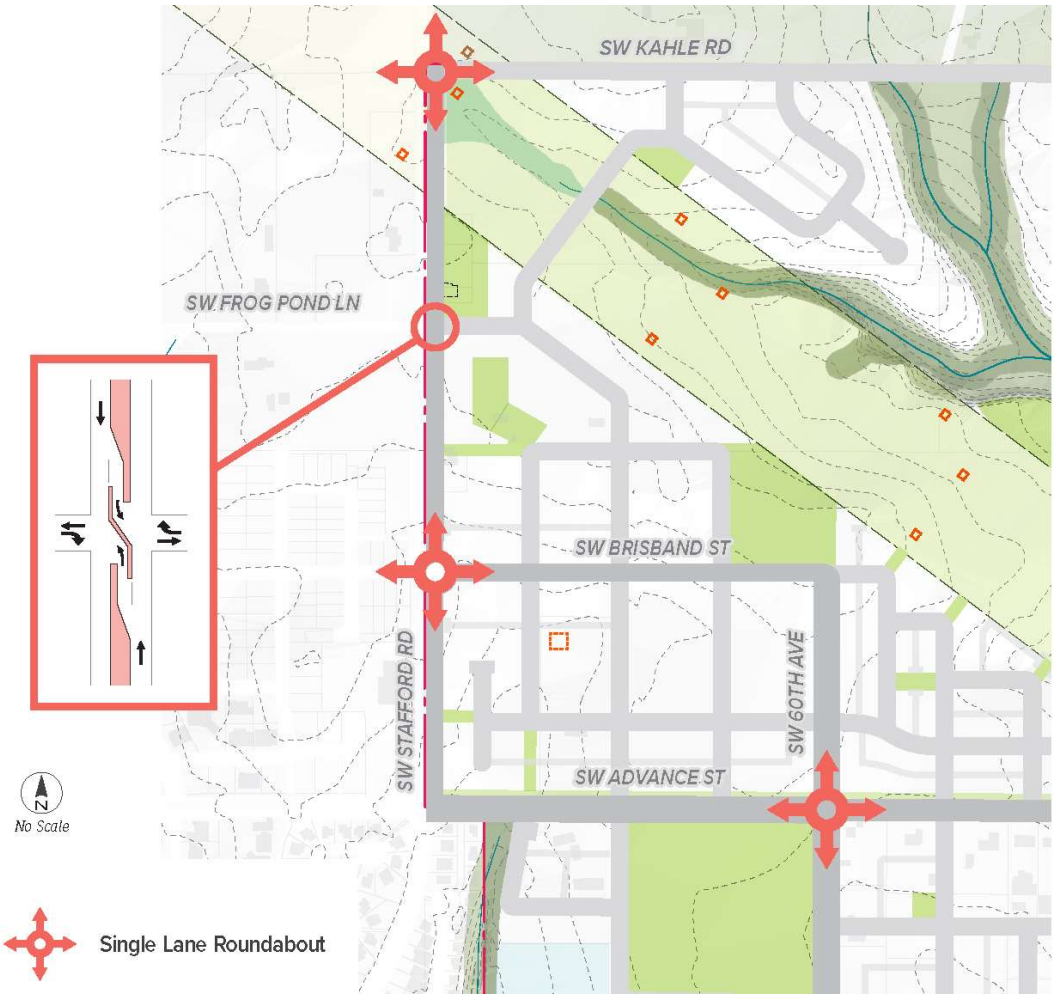


FIGURE 1: RECOMMENDED INTERSECTION IMPROVEMENTS

Additional transportation projects were identified for the East and South neighborhood to enhance safety, which are listed below:

- Install a roundabout at Advance Road/60th Avenue. The installation of a roundabout at this location will create a gateway between the high-speed rural traffic and the new desired slower urban speeds. The roundabout will also provide for slower speeds and improved access to the Frog Pond neighborhoods.

- Install various pedestrian, bicycle, and trail improvements on Stafford Road and Advance Road (shown below).

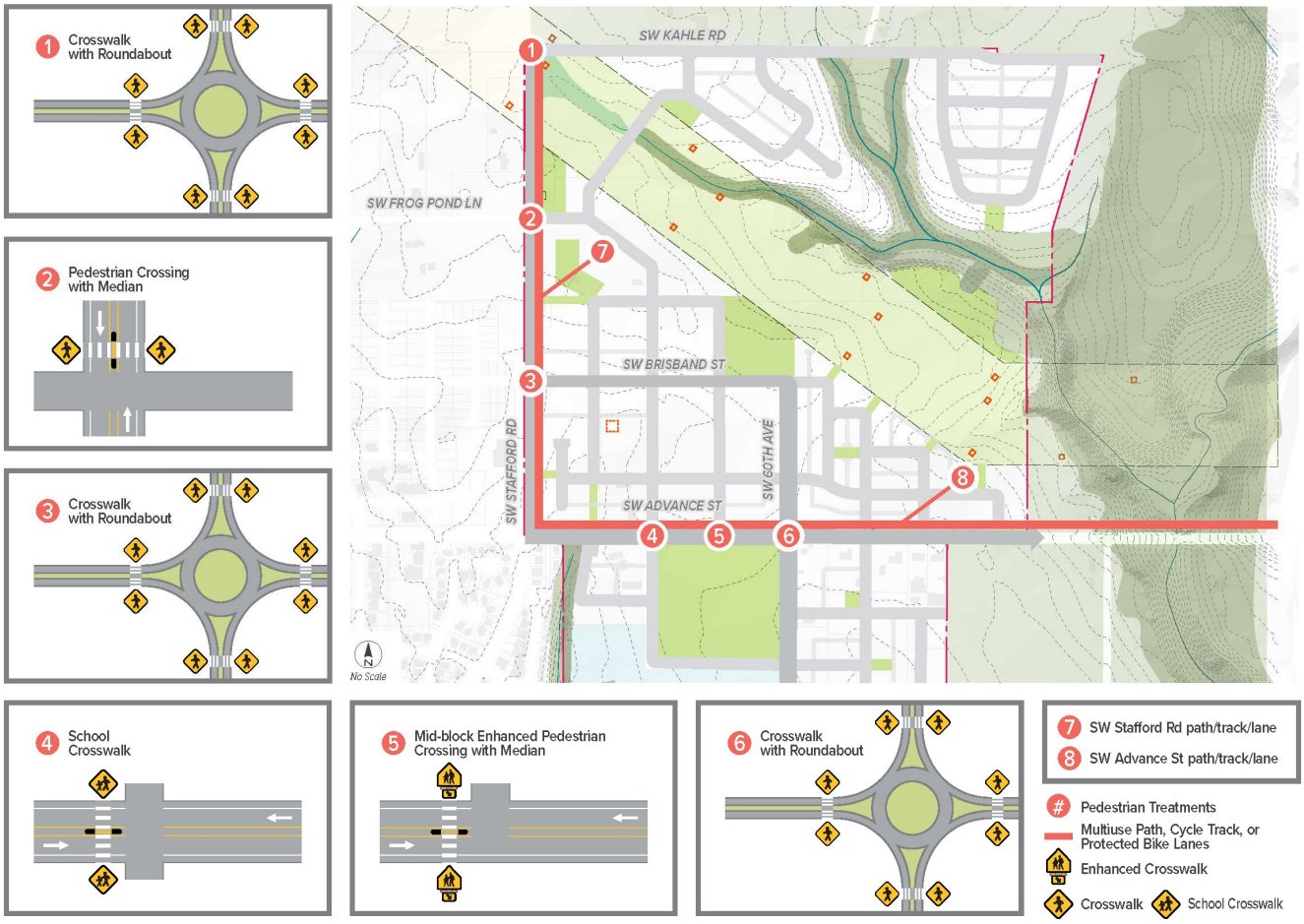


FIGURE 2: RECOMMENDED PEDESTRIAN, BICYCLE, AND TRAIL IMPROVEMENTS

EXISTING TRAFFIC CONDITIONS (2022)

Existing traffic conditions were evaluated for the study area and include traffic volumes; intersection operations; and bike, pedestrian, and trail conditions.

EXISTING TRAFFIC VOLUMES

Traffic counts were collected for the PM peak period (4:00 to 6:00 p.m.) at the following study intersections.[3] The PM peak hour traffic volumes (i.e., the highest hourly volumes during the peak period) are shown in Figure **3** and the traffic counts are provided in the appendix.

- Elligsen Road/I-5 Southbound Ramp
- Elligsen Road/I-5 Northbound Ramp
- Elligsen Road/Parkway Avenue
- Elligsen Road/Parkway Center Drive
- Stafford Road/65th Avenue
- Boeckman Road/Parkway Avenue
- Boeckman Road/Canyon Creek Road
- Boeckman Road-Advance Road/Stafford Road-Wilsonville Road
- Advance Road/60th Avenue
- Stafford Road/Brisband Street
- Stafford Road/Frog Pond Lane
- Stafford Road/Kahle Road
- Wilsonville Road/I-5 Southbound Ramp
- Wilsonville Road/I-5 Northbound Ramp
- Wilsonville Road/Town Center Loop West

INTERSECTION PERFORMANCE MEASURES

Agency mobility standards often require intersections to meet level of service (LOS) or volume-to-capacity (v/c) intersection operation thresholds. Additional operational details are provided in the appendix.

- The intersection LOS is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.

- The volume-to-capacity (v/c) ratio represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the V/C ratio

[3] The counts were collected on September 22, 2021; September 30, 2021; March 30, 2022; May 18, 2022; and June 7, 2022.

approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, resulting in the formation of excessive queues.

The City of Wilsonville requires all intersections to meet its minimum acceptable level of service (LOS) standard of LOS D for the PM peak period.[4]

Clackamas County requires that, for intersections outside of city limits, signalized and roundabout intersections must meet the volume-to-capacity ratio (v/c) of 0.90 or less and unsignalized intersections must meet the minimum LOS standard of LOS E during the PM peak period.[5]

ODOT specifies a typical mobility target for interchange ramps of a volume-to-capacity ratio (v/c) of 0.85. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the main line, then the target can be increased to a 0.90 v/c ratio.[6] This is the case for both of the I-5 interchange areas in Wilsonville.

EXISTING INTERSECTION OPERATIONS

Intersection operations were analyzed for the PM peak hour to evaluate whether the transportation network currently operates within desired performance levels as required by the City of Wilsonville, Clackamas County, and ODOT. Intersections are the focus of the analysis because they are the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity.

The existing PM peak hour intersection operations at the study intersection were determined based on the 6th Edition Highway Capacity Manual methodology.[7] Table 1 lists the estimated average delay (in seconds), level of service (LOS), and volume to capacity (v/c) ratio for each study intersection. As shown, all intersections currently meet operating standards and targets with exception of Stafford Road/65th Avenue, which is within Clackamas County's jurisdiction. Additional coordination between Clackamas County and City of Wilsonville is recommended regarding the necessary improvements at this intersection to accommodate future Frog Pond development.

[4] Policy 5, Wilsonville Transportation System Plan, Amended November 16, 2020.

[5] System Performance Policies, Chapter 5: Transportation System Plan, Clackamas County Comprehensive Plan, Amended January 1, 2022.

[6] Oregon Highway Plan, Action 1F.1, Oregon Department Of Transportation, Amended May 2015.

[7] Highway Capacity Manual, 6th Edition, Transportation Research Board, 2017.

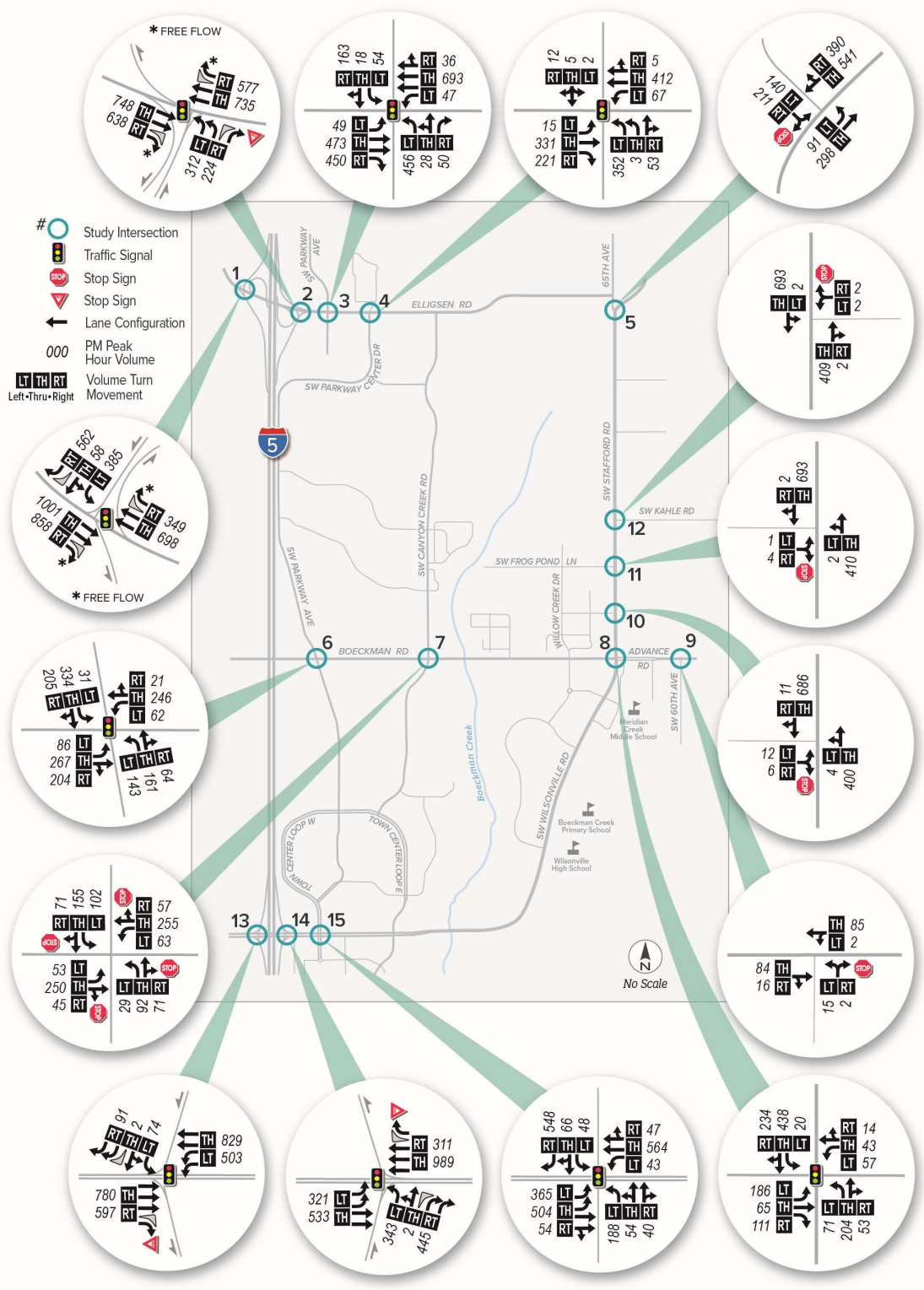


FIGURE 3: EXISTING 2022 TRAFFIC VOLUMES, LANE GEOMETRIES, AND TRAFFIC CONTROL

TABLE 1: EXISTING (2022) INTERSECTION OPERATIONS

INTERSECTION	OPERATING STANDARD	PM PEAK HOUR		
		V/C	DELAY	LOS
SIGNALIZED				
ELLIGSEN RD/I-5 SB RAMPS	v/c ≤ 0.90	0.74	19.5	B
ELLIGSEN RD/I-5 NB RAMPS	v/c ≤ 0.90	0.34	8.4	A
ELLIGSEN RD/PARKWAY AVE	LOS D	0.32	15.9	B
ELLIGSEN RD/PARKWAY CENTER DR	LOS D	0.40	14.9	B
BOECKMAN RD/PARKWAY AVE	LOS D	0.84	25.6	C
STAFFORD RD-WILSONVILLE RD /BOECKMAN RD-ADVANCE RD	LOS D	0.65	17.0	B
WILSONVILLE RD/I-5 SB RAMPS	v/c ≤ 0.90	0.38	19.3	B
WILSONVILLE RD/I-5 NB RAMPS	v/c ≤ 0.90	0.44	16.2	B
WILSONVILLE RD/TOWN CENTER LP WEST	LOS D	0.38	28.1	C
TWO-WAY STOP-CONTROLLED				
STAFFORD RD/65TH AVE	LOS E	>1.20	**>120**	**B/F**
ADVANCE RD/60TH AVE	LOS D	0.03	9.8	A/A
STAFFORD RD/BRISBAND ST	LOS D	0.08	20.9	A/C
STAFFORD RD/FROG POND LN	LOS D	0.02	15.7	A/C
STAFFORD RD/KAHLE RD	LOS D	0.01	16.9	A/C
ALL-WAY STOP-CONTROLLED				
BOECKMAN RD/CANYON CREEK RD	LOS D	0.71	20.3	C

SIGNALIZED INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Total Volume-to-Capacity Ratio
LOS = Total Level of Service

TWO-WAY STOP-CONTROLLED INTERSECTION:
Delay = Critical Movement Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Critical Levels of Service (Major/Minor Road)

ALL-WAY STOP CONTROLLED INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Total Level of Service

BICYCLE, PEDESTRIAN, AND TRAIL NEEDS

Bicycle, pedestrian, transit, and trail conditions and needs were considered for the study area, with particular emphasis on connectivity to the rest of Wilsonville's neighborhoods, trails, parks, and schools.

The Wilsonville TSP identifies various multimodal improvement projects that are intended to address the deficiencies. Projects within the vicinity of the Frog Pond Area include urban upgrades to Boeckman Road and Stafford Road, which include bike lanes, sidewalks, and transit stop improvements/additions. The TSP also includes a project for new trails through the Frog Pond East and South neighborhoods.

ADVANCE ROAD NEEDS

Additional school safety improvements should be considered on Advance Road near Meridian Creek Middle School. An increase in pedestrian and bicycle traffic to and from the school can be expected with the buildout of the East and South neighborhoods, necessitating pedestrian crossing enhancements on Advance Road.

The urban upgrade improvements on Boeckman Road are currently in the design phase and a separated multi-use path, cycle track, or protected bike lanes are being considered along Boeckman Road. It is desired by the City to extend the identified multimodal improvements on Boeckman Road to the west of Stafford Road along Advance Road fronting the Frog Pond development.

STAFFORD ROAD NEEDS

Pedestrian crossing enhancements on Stafford Road will be needed as the East neighborhood is built out. A significant increase in pedestrian and bicycle trips are expected across Stafford Road between the existing Frog Pond West neighborhood and the planned primary school (in Frog Pond West) to housing and commercial uses in the East neighborhood. Key locations for crossing enhancements would be at Frog Pond Lane and Brisband Street. A signalized crossing already exists at the Stafford Road-Wilsonville Road/Boeckman Road-Advance Road intersection.

Separated pedestrian and bicycle facilities are also desired along Stafford Road since it is a higher speed, higher volume facility. A separated multi-use path, cycle track, or protected bike lanes should be considered along Stafford Road fronting the Frog Pond development on either the west or east side. Given that the majority of the west side of Stafford Road has already gone through development review, the east side of Stafford Road would be the preferred location for a separated pedestrian and bicycle facility.

Recommendations for bicycle and pedestrian projects are listed on page 18 of this memo.

FUTURE BASELINE CONDITIONS (2040)

Future baseline (2040) traffic conditions were evaluated for the study area and include the forecasted baseline traffic volumes and intersection operations. For analysis purposes, the East and South neighborhoods are assumed to experience full build-out by the year 2040.

FUTURE BASELINE TRAFFIC VOLUMES

Future traffic volumes were forecasted for the study intersections using the recently updated travel forecast models developed specifically for Wilsonville. The models apply trip generation and trip distribution data directly taken from the Metro regional travel demand forecast models but add additional detail to better represent local travel conditions and routing within Wilsonville.

Figure 4 shows the PM peak hour traffic volumes for the study intersections based on the Metro model assumptions. As the forecasts are consistent with the current Metro land use assumptions, this scenario is referred to as the 2040 Baseline scenario. This scenario already accounts for some existing homes in the West neighborhood and contains land use assumptions (housing and some employment) in the East and South neighborhoods in 2040.

It should be noted that the Metro model was used for this study because it represents the latest regionally approved land use for Wilsonville and the Region. This model was completed by Metro, in collaboration with the City, after the City's TSP was approved and includes additional land use and transportation network assumptions adopted by Metro after the TSP was adopted.

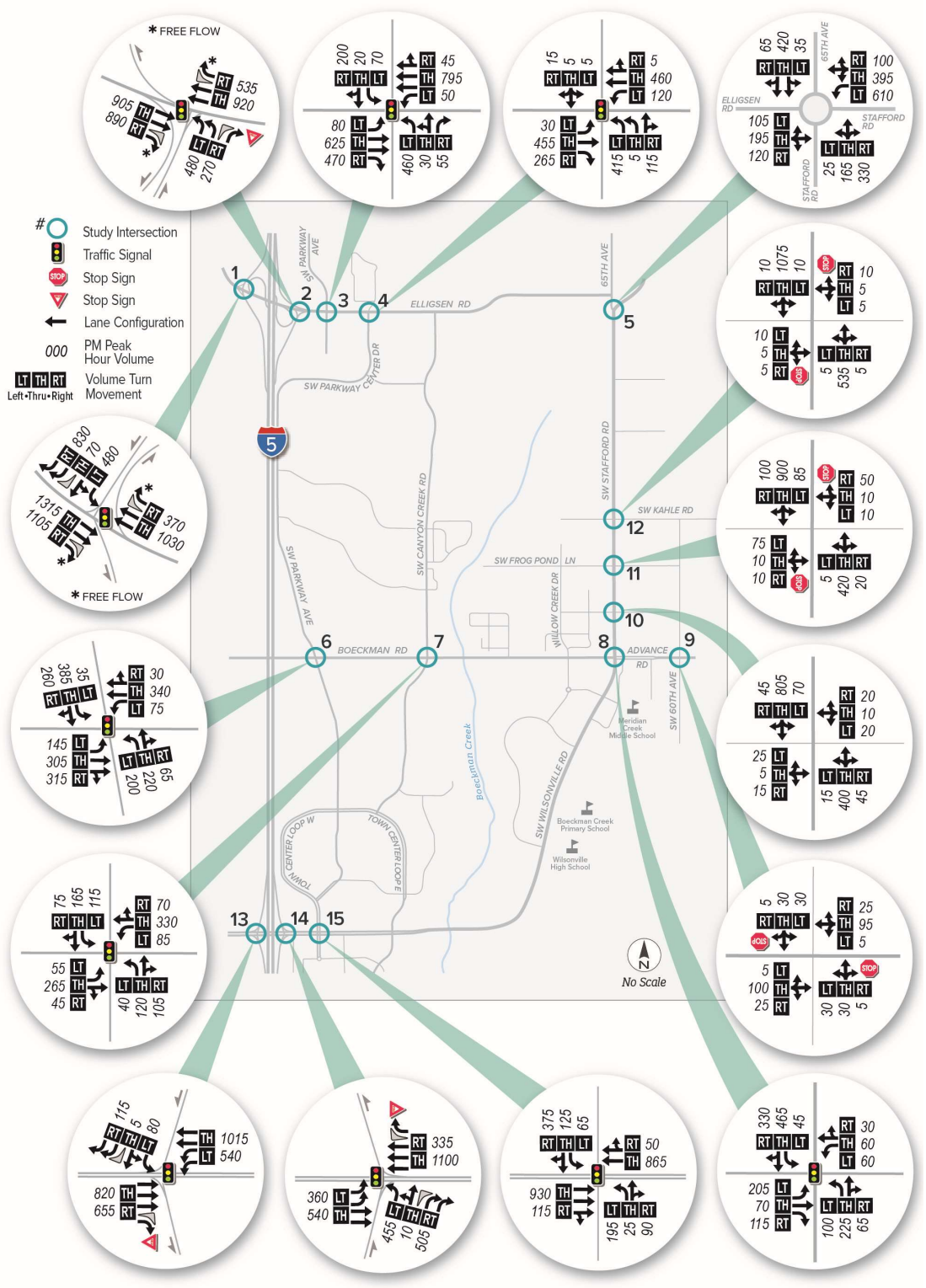


FIGURE 4: BASELINE (2040) TRAFFIC VOLUMES, LANE GEOMETRIES, AND TRAFFIC CONTROL

FUTURE HIGH-PRIORITY TSP PROJECTS

The future baseline scenario assumed improved intersection geometries associated with all High Priority Projects included in Wilsonville's TSP. The High Priority Projects applicable to the Frog Pond study area include the following:

- Addition of a second southbound right turn lane on the I-5 Southbound Off-Ramp at Elligsen Road (SI-07).
- Addition of dual eastbound and westbound through lanes at Boeckman Road/Parkway Avenue intersection (RW-01).
- Installation of traffic signal at Boeckman Road/Canyon Creek Road (UU-01). The City of Wilsonville is currently in the conceptual design phase for this intersection and a roundabout is also under consideration.
- Intersection modifications at Wilsonville Road/Town Center Loop West which including eliminating westbound and eastbound left turns, addition of an eastbound through "trap" lane, and reduction of the northbound and southbound approaches to a left turn lane and shared through-right turn lane (SI-09).
- Installation of a roundabout and combination of the existing intersections of Elligsen Road/65th Avenue and Stafford Road/65th Avenue (SI-03). This intersection is located within Clackamas County and is identified in their TSP but is also referenced in the Wilsonville TSP. For this analysis, the roundabout was evaluated as a partial dual-lane roundabout.

FUTURE BASELINE INTERSECTION OPERATIONS

Intersection traffic operations under the future 2040 Baseline scenario were analyzed for the PM peak hour to evaluate whether the transportation network is expected to remain within desired performance levels as required by the City of Wilsonville, Clackamas County, and ODOT.

Table 2 lists the estimated average delay (in seconds), level of service (LOS), and volume to capacity (v/c) ratio that each study intersection and future access is expected to experience.

As shown, all intersections are expected to meet operating standards and targets under Baseline conditions with exception of the Stafford Road/Kahle Road, Stafford Road/Frog Pond Lane, and Stafford Road/Brisband Street intersections, which were analyzed as key gateways to the Frog Pond East neighborhood.

TABLE 2: FUTURE BASELINE (2040) INTERSECTION OPERATIONS

INTERSECTION	OPERATING STANDARD	PM PEAK HOUR		
		V/C	DELAY	LOS
SIGNALIZED				
ELLIGSEN RD/I-5 SB RAMPS	v/c ≤ 0.90	0.73	18.1	B
ELLIGSEN RD/I-5 NB RAMPS	v/c ≤ 0.90	0.45	9.3	A
ELLIGSEN RD/PARKWAY AVE	LOS D	0.52	24.4	C
ELLIGSEN RD/PARKWAY CENTER DR	LOS D	0.55	16.9	B
BOECKMAN RD/PARKWAY AVE	LOS D	0.82	23.5	C
BOECKMAN RD/CANYON CREEK RD	LOS D	0.57	15.2	B
STAFFORD RD-WILSONVILLE RD /BOECKMAN RD-ADVANCE RD	LOS D	0.79	22.5	C
WILSONVILLE RD/I-5 SB RAMPS	v/c ≤ 0.90	0.40	14.0	B
WILSONVILLE RD/I-5 NB RAMPS	v/c ≤ 0.90	0.52	22.2	C
WILSONVILLE RD/TOWN CENTER LP WEST	LOS D	0.82	44.3	D
TWO-WAY STOP-CONTROLLED				
ADVANCE RD/60TH AVE	LOS D	0.11	11.4	A/B
STAFFORD RD/BRISBAND ST	LOS D	0.49	**72.6**	**A/F**
STAFFORD RD/FROG POND LN	LOS D	>1.20	**>120**	**B/F**
STAFFORD RD/KAHLE RD	LOS D	0.29	**70.3**	**B/F**
ROUNDABOUT				
STAFFORD RD/65TH AVE/ELLIGSEN RD	v/c ≤ 0.90	0.84	17.9	B

SIGNALIZED INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Total Volume-to-Capacity Ratio
LOS = Total Level of Service

TWO-WAY STOP-CONTROLLED INTERSECTION:
Delay = Critical Movement Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Critical Levels of Service (Major/Minor Road)

ROUNDABOUT INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Total Level of Service

ANTICIPATED BUILD CONDITIONS (2040)

Anticipated build (2040) traffic conditions were evaluated for the study area and include the land use assumptions, anticipated build traffic volumes and intersection operations, and identified transportation improvements.

LAND USE ASSUMPTIONS AND ADJUSTMENTS

As mentioned previously, the 2040 Wilsonville Travel Demand model currently contains housing and job land use assumptions for the Frog Pond East and South neighborhoods. Now that the East and South neighborhood layouts have been further refined, the assumed quantity of housing units and commercial space have been estimated. To best analyze the impact of the estimated full buildout of the East and South neighborhoods, DKS adjusted the Wilsonville Travel Demand Model assumptions for the transportation analysis zones (TAZs) that comprise the Frog Pond East and South neighborhoods to account for a higher number of housing units than what is currently assumed.

Table 3 lists the land use adjustments that were applied to the 2040 Travel Demand Model to emulate the anticipated land use generation for Frog Pond (Build scenario). As shown below, the number of household units for both neighborhoods was increased by 136% and 0 jobs were increased.

TABLE 3: TRAVEL DEMAND MODEL ADJUSTMENTS

	HOUSEHOLDS	JOBS
EAST NEIGHBORHOOD	Increase by 103%	No Change 0%
SOUTH NEIGHBORHOOD	Increase by 225%	No Change 0%
TOTAL	**Increase by 130%**	**No Change 0%**

ANTICIPATED BUILD TRAFFIC VOLUMES

The future 2040 Build traffic volumes were forecasted for the study area using the Wilsonville travel forecast model with the adjustments as previously discussed. Intersection operations were then evaluated to determine how sufficiently the City's future transportation system would support the long-term estimated build-out of the Frog Pond East and South neighborhoods, therefore determining what improvements might be needed. The PM peak hour traffic volumes, lane geometries, and intersection operating conditions are shown in Figure 5.

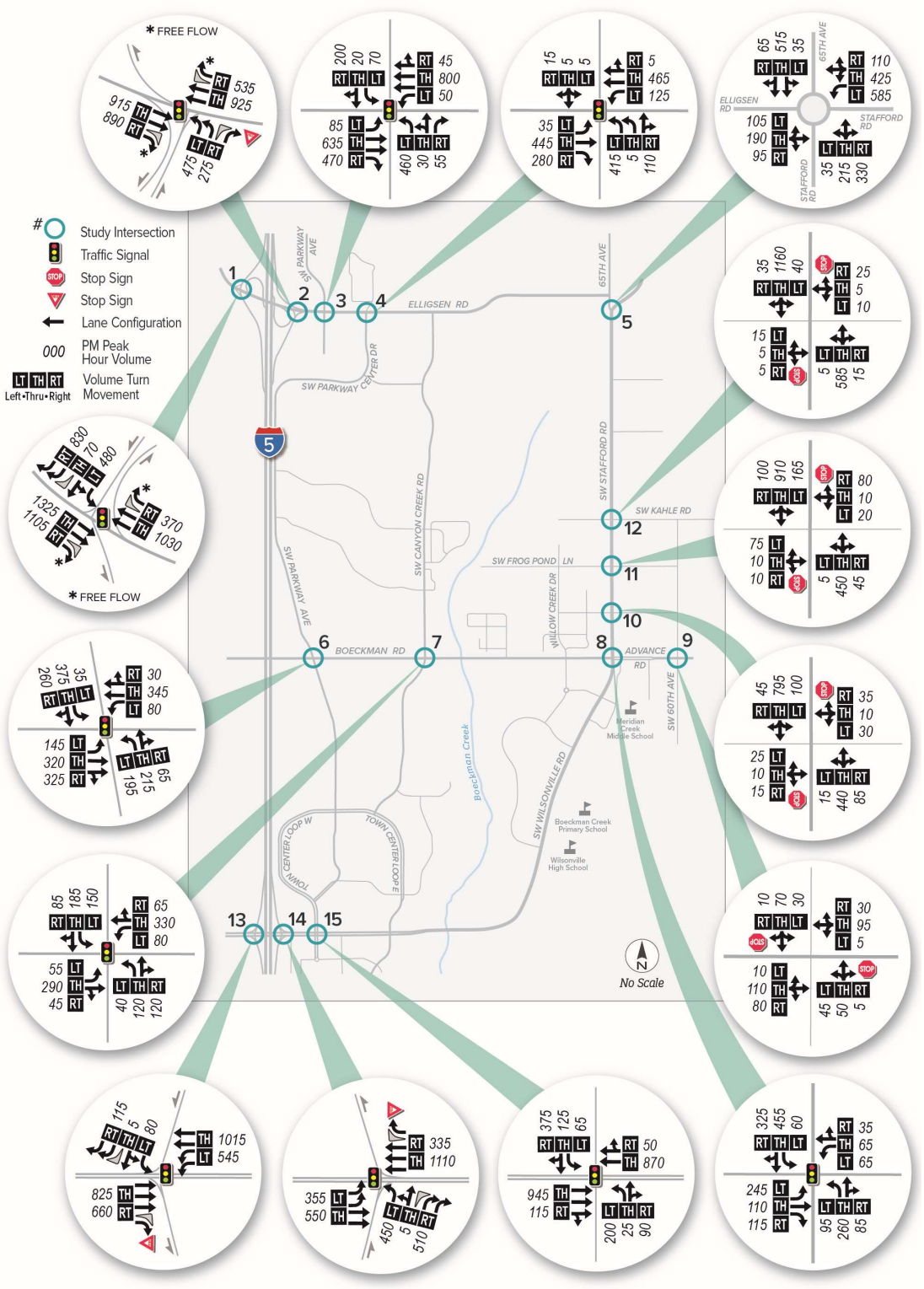


FIGURE 5: BUILD (2040) TRAFFIC VOLUMES, LANE GEOMETRIES, AND TRAFFIC CONTROL

ANTICIPATED BUILD INTERSECTION OPERATIONS

Intersection traffic operations under the future 2040 Build scenario were analyzed for the PM peak hour with the same intersection geometries that were assumed in the Baseline scenario. Table 4 the estimated average delay (in seconds), level of service (LOS), and volume to capacity (v/c) ratio for each study intersection.

TABLE 4: ANTICIPATED BUILD (2040) INTERSECTION OPERATIONS

INTERSECTION	OPERATING STANDARD	PM PEAK HOUR		
		V/C	DELAY	LOS
SIGNALIZED				
ELLIGSEN RD/I-5 SB RAMPS	v/c ≤ 0.90	0.73	18.2	B
ELLIGSEN RD/I-5 NB RAMPS	v/c ≤ 0.90	0.45	9.2	A
ELLIGSEN RD/PARKWAY AVE	LOS D	0.53	24.5	C
ELLIGSEN RD/PARKWAY CENTER DR	LOS D	0.54	16.8	B
BOECKMAN RD/PARKWAY AVE	LOS D	0.81	23.3	C
BOECKMAN RD/CANYON CREEK RD	LOS D	0.60	15.9	B
BOECKMAN RD-ADVANCE RD/ STAFFORD RD-WILSONVILLE RD	LOS D	0.81	22.6	C
WILSONVILLE RD/I-5 SB RAMPS	v/c ≤ 0.90	0.40	14.0	B
WILSONVILLE RD/I-5 NB RAMPS	v/c ≤ 0.90	0.52	22.1	C
WILSONVILLE RD/TOWN CENTER LP WEST	LOS D	0.82	44.1	D
TWO-WAY STOP-CONTROLLED				
ADVANCE RD/60TH AVE	LOS D	0.20	13.2	A/B
STAFFORD RD/BRISBAND ST	LOS D	0.85	**>120**	**A/F**
STAFFORD RD/FROG POND LN	LOS D	>1.20	**>120**	**B/F**
STAFFORD RD/KAHLE RD	LOS D	0.65	**>120**	**B/F**
ROUNDABOUT				
STAFFORD RD/65TH AVE/ ELLIGSEN RD	v/c ≤ 0.90	0.85	21.0	C

SIGNALIZED INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Total Volume-to-Capacity Ratio
LOS = Total Level of Service

TWO-WAY STOP-CONTROLLED INTERSECTION:
Delay = Critical Movement Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Critical Levels of Service (Major/Minor Road)

ROUNDABOUT INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Total Level of Service

As shown, the unsignalized intersections/accesses along Stafford Road (Kahle Road, Frog Pond Lane, and Brisband Street) are expected to exceed the City's LOS D performance standard. The primary reason is the high through volumes that influence delay experienced by side street vehicles attempting to turn left.

RECOMMENDED TRANSPORTATION IMPROVEMENTS

The three intersections along Stafford Road are located approximately within 800–900 feet from one another. Therefore, the interaction of all improvements at these intersections must be carefully considered due to their proximity. The following projects have therefore been identified to improve the three gateway intersections along Stafford Road to meet the City's level of service D performance standard.

Due to the planned location of the commercial uses off Brisband Street, it is desirable to allow all vehicle turning movements at the Brisband Street intersection to provide full access and connectivity to those land uses. It is also desirable to have a full-access gateway intersection at the far north end of the housing development to function as a gateway between the rural higher speed traffic and urban slower speed traffic and provide safe access to the Frog Pond development. There is a strong desire to preserve the historic Grange building on the northeast corner of Stafford Road/Frog Pond Lane intersection. Turn restrictions could be implemented at the Stafford Road/Frog Pond Lane intersection (restrict minor street through and left turns) to allow access to safe movements (left in, right in and right out). A full access roundabout at Frog Pond Lane would likely require the removal or relocation of the historic Grange building due to the required footprint of the improvement.

If two intersections are improved with roundabouts with a limited access between the two full-access locations, it is likely that many of the residents and drivers familiar with the area would choose to turn left or go through at those improved intersections during the peak periods, particularly with good Collector/Local Street connectivity. Local street connections in both the East and West neighborhoods are planned that would allow sufficient connectivity for vehicles to access the proposed roundabouts Kahle Road or Brisband Street to cross Stafford Road or turn left onto Stafford Road. A discussion on the advantages and disadvantages of roundabouts are provided in a subsequent section.

The recommended improvements are highlighted below.

KAHLE ROAD/STAFFORD ROAD

At this intersection, install a single-lane roundabout with pedestrian island. In addition to meeting capacity needs, the proposed roundabout would improve safety and provide a distinct transition between the rural and urban land use and traffic speeds in the area. The roundabout should include pedestrian medians for enhanced pedestrian crossings.

FROG POND LANE/STAFFORD ROAD

At this intersection, install a raised center median and traffic separator that allows northbound and southbound right and left turns from Stafford Road and minor street

right turns but restricts minor street eastbound and westbound through and left turn movements to and from Frog Pond West and East. The restriction is needed to facilitate safe vehicle and pedestrian/bicycle movements at the intersection and to meet the City's LOS standard. This intersection should include enhanced pedestrian crossings with median breaks for safe and improved pedestrian connectivity.

BRISBAND STREET/STAFFORD ROAD

At this intersection, install a single-lane roundabout. This will require a slight shift of Stafford Road to the east to accommodate the necessary right-of-way. The roundabout should include pedestrian medians for enhanced pedestrian crossings.

60TH AVENUE/ADVANCE ROAD

At this intersection, install a single-lane roundabout. While not a necessary improvement for traffic operating conditions, the proposed roundabout would improve safety and provide a distinct transition between the rural land use with high-speed traffic and urban land use with slower vehicle speeds and the need for multimodal safety in the area.

IMPROVED OPERATING CONDITIONS

The table below shows the intersection operations for the four intersections with the identified transportation improvements in place. As shown, all four intersections will meet the City LOS standard while providing safe multimodal improvements for pedestrian and bicycles.

TABLE 5: ANTICIPATED BUILD (2040) INTERSECTION OPERATIONS - IMPROVEMENTS

INTERSECTION	IMPROVEMENT	OPERATING STANDARD	PM PEAK HOUR		
			V/C	DELAY	LOS
ADVANCE RD/ 60TH AVE	Roundabout	LOS D	0.19	4.3	A
STAFFORD RD/ BRISBAND ST	Roundabout	LOS D	0.78	12.7	B
STAFFORD RD/ FROG POND LN	Two-Way Stop-Controlled with Minor Street Turn Restrictions	LOS D	0.04	18.5	B/C
STAFFORD RD/ KAHLE RD	Roundabout	LOS D	0.99	29.6	D

TWO-WAY STOP-CONTROLLED INTERSECTION:
Delay = Critical Movement Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Critical Levels of Service (Major/Minor Road)

ROUNDABOUT INTERSECTION:
Delay = Average Intersection Delay (secs)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Total Level of Service

Advantages of Installing a Roundabout

- Roundabouts can reduce delay for side street traffic because no approach is given more priority than another. Therefore, the Kahle Road and Brisband Street intersections would no longer be anticipated to operate at LOS F in the future scenarios.

- Roundabouts can help to slow traffic speeds on the roadway. Typical circulating speeds for a roundabout are 15 – 20 miles per hour (mph), which would help to calm traffic in the vicinity of the Frog Pond development area.

- Converting a stop-controlled intersection to a single-lane roundabout can reduce fatal and injury crashes by 82%.

- Roundabouts reduce the number of conflict points between vehicles and between vehicles and pedestrians/bicycles.

- Roundabouts at Stafford Road/Kahle Road and Advance Road/60th Avenue would provide clear gateways between the rural and urban environments. The Stafford Road/Kahle Road location is under the BPA power line easement and would have underutilized land available to accommodate the larger footprint that roundabouts require.

Disadvantages of Installing a Roundabout

- Because all approaches are treated the same and must yield to traffic within the roundabout, this would introduce delay for traffic on the major approaches (Stafford Road).

- Roundabouts are more difficult for large trucks and agricultural vehicles to navigate and may result in complaints from the freight community and farmers.

- Roundabouts can be difficult for school aged pedestrians and bicyclists to cross because there is no exclusive stop phase (as is provided with a traffic signal). The lack of straight paths and clear turns can also be difficult for the vision impaired.

- Roundabouts require a larger footprint, which would require additional right-of-way dedication or acquisition.

IDENTIFIED PROJECTS

The following lists of transportation projects have been identified through the evaluation of the proposed Frog Pond East and South neighborhoods.

STREET PROJECTS

- Widen Stafford Road to a three-lane cross section (two travel lanes with a center turn lane). Include curb, gutter, sidewalks, landscape strips, and bicycle facilities on both sides. Additionally, acquire the necessary right-of-way to accommodate a five-lane cross section. See sensitivity analysis in next section for explanation.
- Widen Advance Road to a three-lane cross section (two travel lanes with a center turn lane). Include curb, gutter, sidewalks, landscape strips, and bicycle facilities on both sides.
- Construct Local And Neighborhood Collector streets through the East and South neighborhoods consistent with the draft master plan to provide connections to the internal land uses.

INTERSECTION PROJECTS

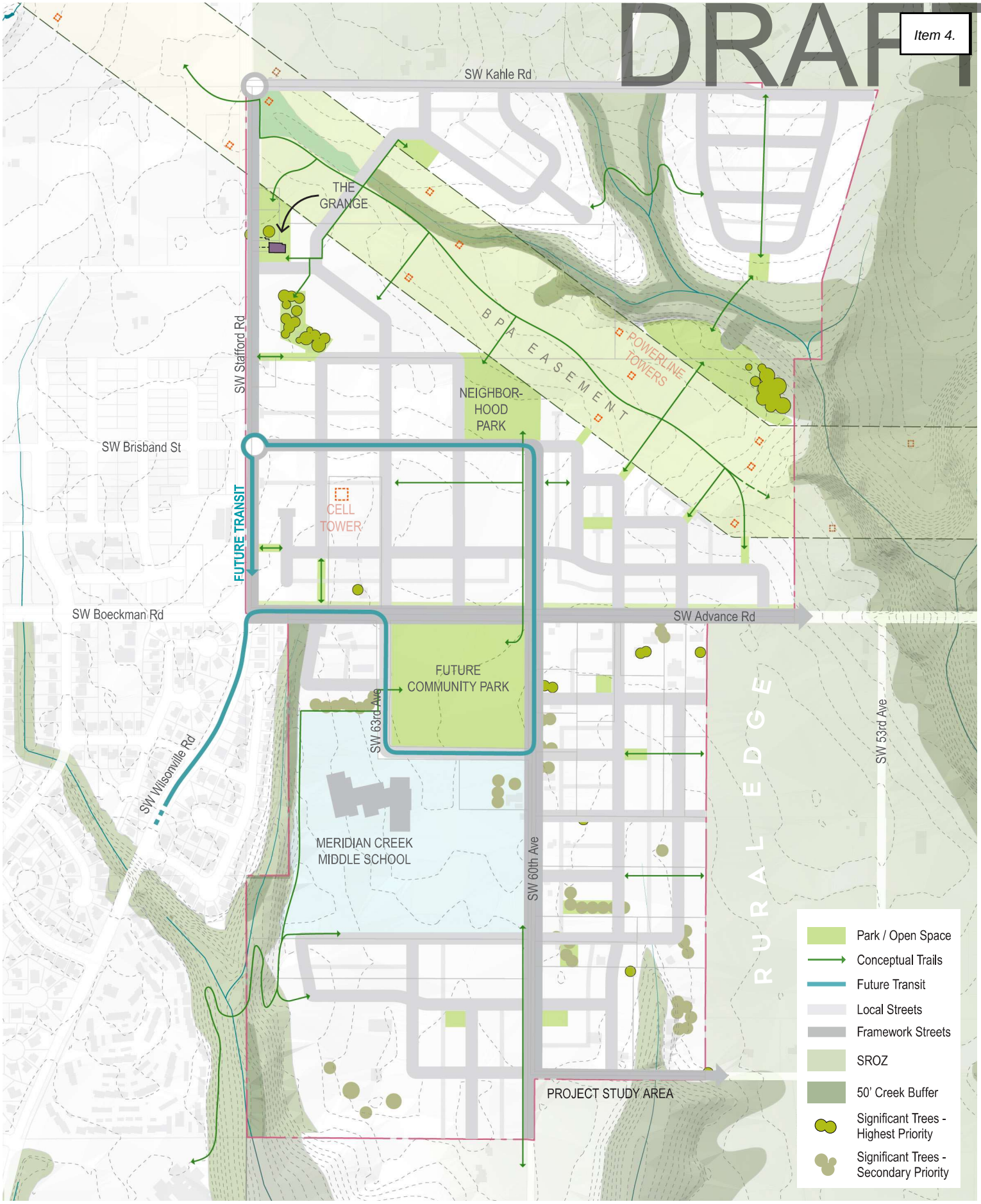
- Install a single-lane roundabout at Stafford Road/Kahle Road.
- Install a median that restricts minor street left turn and through movements at Stafford Road/Frog Pond Lane.
- Install a single-lane roundabout at Stafford Road/Brisband Street.
- Install a single-lane roundabout at Advance Road/60th Avenue.

PEDESTRIAN, BICYCLE, AND TRAIL PROJECTS

- Install a mid-block crossing on Advance Road between 60th Avenue and 63rd Avenue to facilitate safe crossings between the future park and East neighborhood. A Rectangular Rapid Flashing Beacon (RRFB) should be added to one of the crossings at either 63rd Avenue, 60th Avenue, or the midblock crossing between them.
- Install a crosswalk with median at the Frog Pond Lane/Stafford Road. It is assumed that additional safe and accessible bicycle and pedestrian crossings will be provided via the identified roundabouts at Kahle Road/Stafford Road and Brisband Street/Stafford Road.
- Extend the planned pedestrian and bicycle facility improvements on Boeckman Road to Advance Road east of Stafford Road. The desired cross section for Boeckman Road is still in the design stage but will likely include a multi-use path, cycle track, or protected bike lanes.
- Construct a separated multi-use path, two-way cycle track, or protected bike lanes along the east side of Stafford Road.
- Construct pedestrian and bicycle trails through the East and South neighborhoods consistent with the draft master plan to provide connections to existing local and regional trails in Wilsonville

APPENDIX

EAST & SOUTH
MASTER PLAN



EAST & SOUTH MASTER PLAN

STREET DEMONSTRATION PLAN - OPT 2

DRAFT 8.02.2022

0' 150' 300' 600'

CONTENTS

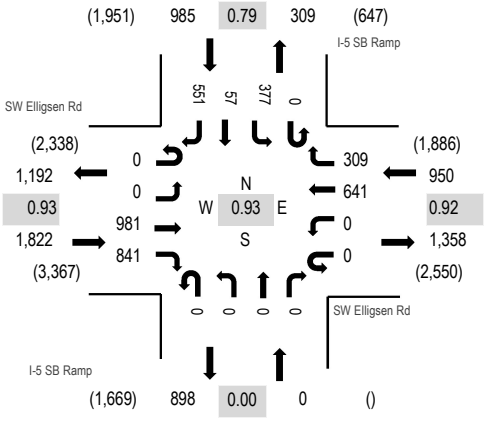
TRAFFIC COUNT DATA

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

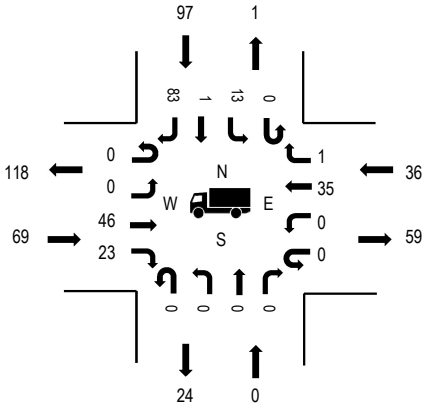
Location: 4 I-5 SB Ramp & SW Elligsen Rd PM
Date: Wednesday, September 22, 2021
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour

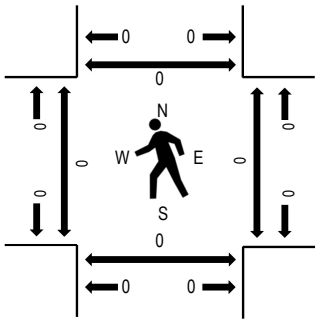
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.8%	0.93
WB	3.8%	0.92
NB	0.0%	0.00
SB	9.8%	0.79
All	5.4%	0.93

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Elligsen Rd Eastbound				SW Elligsen Rd Westbound				I-5 SB Ramp Northbound				I-5 SB Ramp Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	74	72	0	0	41	26	0	0	0	0	0	47	8	53	321	3,757
4:05 PM	0	0	92	65	0	0	48	29	0	0	0	0	0	46	10	56	346	3,746
4:10 PM	0	0	97	77	0	0	55	23	0	0	0	0	0	37	13	43	345	3,709
4:15 PM	0	0	65	74	0	0	54	20	0	0	0	0	0	40	5	45	303	3,652
4:20 PM	0	0	76	71	0	0	60	31	0	0	0	0	0	24	8	50	320	3,655
4:25 PM	0	0	67	68	0	0	67	32	0	0	0	0	0	25	6	42	307	3,601
4:30 PM	0	0	108	61	0	0	50	28	0	0	0	0	0	34	0	37	318	3,622
4:35 PM	0	0	86	72	0	0	56	31	0	0	0	0	0	13	0	47	305	3,585
4:40 PM	0	0	86	78	0	0	40	31	0	0	0	0	0	25	1	54	315	3,573
4:45 PM	0	0	75	73	0	0	59	17	0	0	0	0	0	31	1	32	288	3,553
4:50 PM	0	0	71	63	0	0	53	23	0	0	0	0	0	32	3	54	299	3,538
4:55 PM	0	0	84	67	0	0	58	18	0	0	0	0	0	23	2	38	290	3,483
5:00 PM	0	0	78	75	0	0	48	31	0	0	0	0	0	26	6	46	310	3,447
5:05 PM	0	0	85	67	0	0	51	33	0	0	0	0	0	31	2	40	309	
5:10 PM	0	0	87	58	0	0	48	35	0	0	0	0	0	21	3	36	288	
5:15 PM	0	0	75	65	0	0	55	53	0	0	0	0	0	22	0	36	306	
5:20 PM	0	0	65	59	0	0	49	24	0	0	0	0	0	31	0	38	266	
5:25 PM	0	0	76	74	0	0	54	29	0	0	0	0	0	35	5	55	328	
5:30 PM	0	0	65	54	0	0	42	30	0	0	0	0	0	30	6	54	281	
5:35 PM	0	0	69	66	0	0	68	26	0	0	0	0	0	20	7	37	293	
5:40 PM	0	0	72	57	0	0	45	29	0	0	0	0	0	33	10	49	295	
5:45 PM	0	0	54	50	0	0	56	19	0	0	0	0	0	32	6	56	273	
5:50 PM	0	0	53	47	0	0	38	15	0	0	0	0	0	33	9	49	244	
5:55 PM	0	0	54	40	0	0	44	14	0	0	0	0	0	45	5	52	254	
Count Total	0	0	1,814	1,553	0	0	1,239	647	0	0	0	0	0	736	116	1,099	7,204	
Peak Hour	0	0	981	841	0	0	641	309	0	0	0	0	0	377	57	551	3,757	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

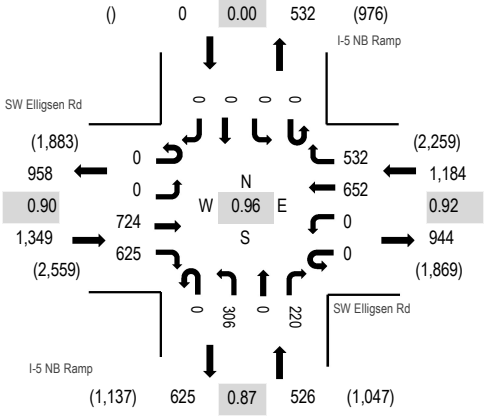
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	9	0	2	6	17	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	10	0	2	6	18	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	2	0	3	8	13	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	0	6	10	18	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	5	0	1	6	12	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	6	0	3	7	16	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	6	0	4	7	17	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	1	9	11	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	10	0	4	11	25	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	7	0	1	7	15	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	5	0	2	12	19	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	6	0	7	8	21	4:55 PM	0	0	1	0	1	4:55 PM	0	0	0	1	1
5:00 PM	4	0	1	7	12	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	0	3	3	8	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	4	0	2	7	13	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	2	6	8	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	3	0	4	10	17	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	7	0	2	4	13	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	4	0	2	5	11	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	4	0	5	5	14	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	7	0	2	2	11	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	7	0	1	6	14	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	9	0	3	7	19	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	5	0	3	7	15	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	125	0	66	166	357	Count Total	0	0	1	0	1	Count Total	0	0	0	1	1
Peak Hour	69	0	36	97	202	Peak Hour	0	0	1	0	1	Peak Hour	0	0	0	1	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

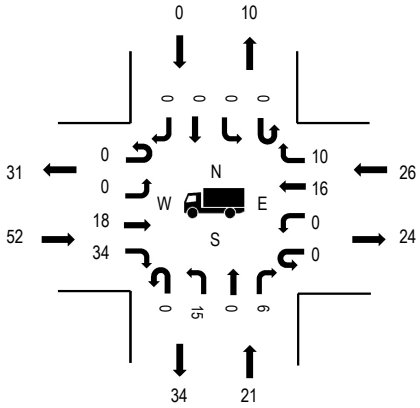
Location: 5 I-5 NB Ramp & SW Elligsen Rd PM
Date: Wednesday, September 22, 2021
Peak Hour: 04:05 PM - 05:05 PM
Peak 15-Minutes: 04:05 PM - 04:20 PM

Peak Hour

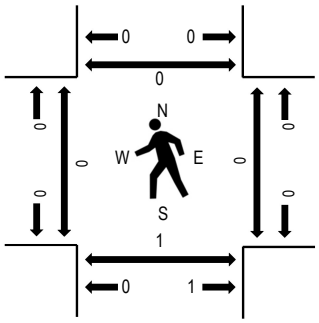
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.9%	0.90
WB	2.2%	0.92
NB	4.0%	0.87
SB	0.0%	0.00
All	3.2%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Elligsen Rd Eastbound				SW Elligsen Rd Westbound				I-5 NB Ramp Northbound				I-5 NB Ramp Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	76	41	0	0	48	36	0	18	0	18	0	0	0	0	237	3,045
4:05 PM	0	0	76	54	0	0	51	49	0	25	0	21	0	0	0	0	276	3,059
4:10 PM	0	0	58	73	0	0	58	46	0	19	0	16	0	0	0	0	270	3,051
4:15 PM	0	0	70	43	0	0	49	47	0	23	0	16	0	0	0	0	248	3,023
4:20 PM	0	0	60	51	0	0	64	44	0	29	0	16	0	0	0	0	264	3,027
4:25 PM	0	0	53	40	0	0	62	39	0	37	0	22	0	0	0	0	253	3,006
4:30 PM	0	0	64	62	0	0	51	43	0	27	0	30	0	0	0	0	277	3,015
4:35 PM	0	0	42	65	0	0	65	46	0	23	0	17	0	0	0	0	258	2,977
4:40 PM	0	0	53	57	0	0	46	37	0	25	0	13	0	0	0	0	231	2,959
4:45 PM	0	0	59	43	0	0	48	39	0	27	0	17	0	0	0	0	233	2,971
4:50 PM	0	0	74	39	0	0	50	52	0	25	0	21	0	0	0	0	261	2,936
4:55 PM	0	0	58	52	0	0	48	38	0	28	0	13	0	0	0	0	237	2,862
5:00 PM	0	0	57	46	0	0	60	52	0	18	0	18	0	0	0	0	251	2,820
5:05 PM	0	0	58	61	0	0	66	48	0	19	0	16	0	0	0	0	268	
5:10 PM	0	0	52	49	0	0	61	42	0	21	0	17	0	0	0	0	242	
5:15 PM	0	0	51	39	0	0	72	33	0	38	0	19	0	0	0	0	252	
5:20 PM	0	0	59	41	0	0	48	42	0	25	0	28	0	0	0	0	243	
5:25 PM	0	0	66	54	0	0	64	37	0	18	0	23	0	0	0	0	262	
5:30 PM	0	0	63	40	0	0	50	49	0	23	0	14	0	0	0	0	239	
5:35 PM	0	0	48	41	0	0	53	42	0	41	0	15	0	0	0	0	240	
5:40 PM	0	0	67	42	0	0	51	37	0	23	0	23	0	0	0	0	243	
5:45 PM	0	0	47	28	0	0	51	27	0	24	0	21	0	0	0	0	198	
5:50 PM	0	0	55	40	0	0	37	22	0	16	0	17	0	0	0	0	187	
5:55 PM	0	0	56	36	0	0	30	29	0	28	0	16	0	0	0	0	195	
Count Total	0	0	1,422	1,137	0	0	1,283	976	0	600	0	447	0	0	0	0	5,865	
Peak Hour	0	0	724	625	0	0	652	532	0	306	0	220	0	0	0	0	3,059	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

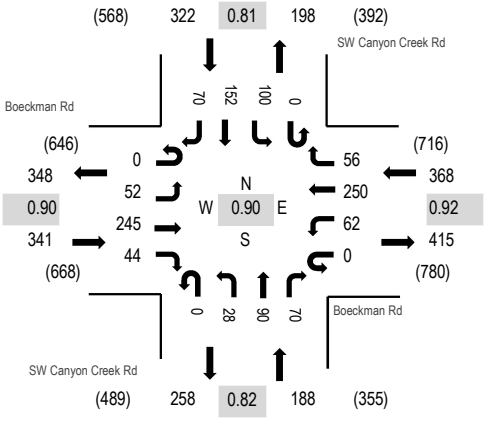
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	7	1	2	0	10	4:00 PM	1	0	0	0	1	4:00 PM	0	0	0	0	0
4:05 PM	4	2	1	0	7	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	2	2	2	0	6	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	3	3	1	0	7	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	7	2	5	0	14	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	4	2	2	0	8	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	7	2	3	0	12	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	2	1	2	0	5	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	6	0	4	0	10	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	6	0	0	0	6	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	6	2	2	0	10	4:50 PM	0	0	0	0	0	4:50 PM	0	1	0	0	1
4:55 PM	4	5	2	0	11	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	2	0	3	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	4	3	1	0	8	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	3	0	1	0	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	4	1	0	6	5:15 PM	0	0	0	0	0	5:15 PM	0	1	0	0	1
5:20 PM	2	4	1	0	7	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	4	2	0	0	6	5:25 PM	0	0	1	0	1	5:25 PM	0	0	0	0	0
5:30 PM	7	1	2	0	10	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	5	3	3	0	11	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	4	2	1	0	7	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	3	1	1	0	5	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	4	2	2	0	8	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	3	2	5	0	10	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	99	46	46	0	191	Count Total	1	0	1	0	2	Count Total	0	2	0	0	2
Peak Hour	52	21	26	0	99	Peak Hour	0	0	0	0	0	Peak Hour	0	1	0	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

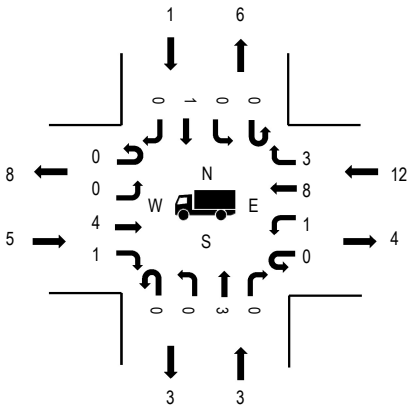
Location: 2 SW Canyon Creek Rd & Boeckman Rd PM
Date: Thursday, September 30, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:50 PM - 05:05 PM

Peak Hour

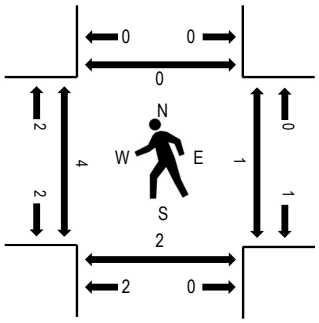
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.5%	0.90
WB	3.3%	0.92
NB	1.6%	0.82
SB	0.3%	0.81
All	1.7%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	Boeckman Rd Eastbound				Boeckman Rd Westbound				SW Canyon Creek Rd Northbound				SW Canyon Creek Rd Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	6	17	8	0	11	31	4	0	4	5	2	0	5	9	4	106	1,142
4:05 PM	0	4	22	2	0	4	18	7	0	0	8	6	0	2	9	1	83	1,148
4:10 PM	0	5	21	3	0	3	20	4	0	1	5	5	0	3	15	7	92	1,172
4:15 PM	0	5	14	3	0	2	15	5	0	2	15	6	0	8	7	3	85	1,184
4:20 PM	0	2	28	2	0	4	14	6	0	2	11	4	0	5	15	3	96	1,201
4:25 PM	0	3	19	7	0	7	22	4	0	3	7	4	0	7	9	2	94	1,201
4:30 PM	0	3	23	3	0	8	21	4	0	2	4	5	0	7	5	9	94	1,202
4:35 PM	0	4	22	5	0	2	19	5	0	3	10	1	0	3	13	3	90	1,214
4:40 PM	0	3	19	2	0	6	12	3	0	3	8	4	0	11	14	7	92	1,215
4:45 PM	0	3	18	4	0	1	20	3	0	3	5	3	0	9	9	7	85	1,219
4:50 PM	0	8	12	4	0	5	31	6	0	2	9	5	0	12	16	3	113	1,214
4:55 PM	0	7	25	2	0	6	19	3	0	3	7	8	0	9	13	10	112	1,190
5:00 PM	0	5	22	0	0	2	12	6	0	5	9	11	0	16	15	9	112	1,165
5:05 PM	0	2	27	7	0	8	24	6	0	1	7	3	0	9	10	3	107	
5:10 PM	0	3	21	6	0	8	20	5	0	1	11	4	0	6	12	7	104	
5:15 PM	0	7	19	3	0	4	20	6	0	3	10	7	0	6	14	3	102	
5:20 PM	0	5	14	5	0	7	23	7	0	3	4	5	0	6	11	6	96	
5:25 PM	0	4	19	6	0	7	18	5	0	2	3	3	0	7	16	5	95	
5:30 PM	0	2	25	5	0	3	20	3	0	1	10	7	0	10	11	9	106	
5:35 PM	0	3	21	1	0	6	17	5	0	3	8	5	0	4	17	1	91	
5:40 PM	0	3	22	1	0	5	26	1	0	1	7	9	0	6	8	7	96	
5:45 PM	0	1	21	3	0	7	20	2	0	2	8	6	0	6	2	2	80	
5:50 PM	0	2	16	4	0	5	20	6	0	0	11	2	0	10	10	3	89	
5:55 PM	0	4	19	2	0	6	16	5	0	0	5	3	0	9	14	4	87	
Count Total	0	94	486	88	0	127	478	111	0	50	187	118	0	176	274	118	2,307	
Peak Hour	0	52	245	44	0	62	250	56	0	28	90	70	0	100	152	70	1,219	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

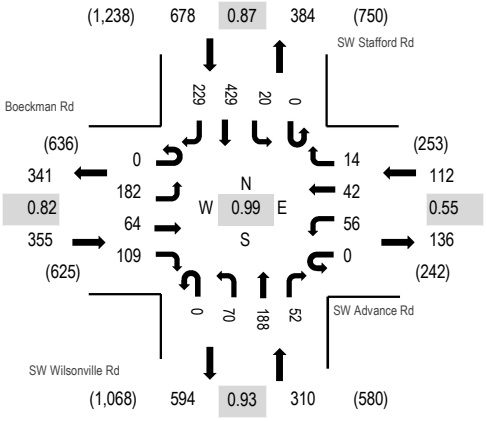
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	3	0	3	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	2	2	0	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	0	1	0	2	4:10 PM	0	0	0	0	0	4:10 PM	0	2	0	0	2
4:15 PM	1	1	0	1	3	4:15 PM	0	0	0	0	0	4:15 PM	1	2	2	0	5
4:20 PM	0	1	1	0	2	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	2	0	3	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	2	0	3	4:30 PM	0	0	0	0	0	4:30 PM	0	2	0	0	2
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	2	0	2
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	1	1	4:40 PM	0	0	0	0	0
4:45 PM	0	0	1	0	1	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	1	0	1	4:50 PM	0	0	0	1	1	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	1	0	0	1
5:05 PM	1	0	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	1	0	0	0	1
5:10 PM	1	0	1	0	2	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	1	1	2	5:15 PM	0	0	0	0	0	5:15 PM	1	0	0	0	1
5:20 PM	2	0	2	0	4	5:20 PM	0	0	0	0	0	5:20 PM	0	1	0	0	1
5:25 PM	0	0	1	0	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	1	2	0	3	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	2	3	0	5	5:35 PM	0	0	0	0	0	5:35 PM	0	0	1	0	1
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	2	0	0	0	2
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	2	0	0	0	2
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	1	0	0	1
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	9	7	23	2	41	Count Total	0	0	0	2	2	Count Total	7	9	5	0	21
Peak Hour	5	3	12	1	21	Peak Hour	0	0	0	1	1	Peak Hour	4	2	1	0	7

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

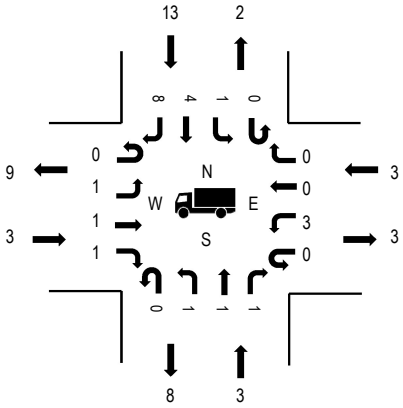
Location: 4 SW Wilsonville Rd & SW Advance Rd PM
Date: Thursday, September 30, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

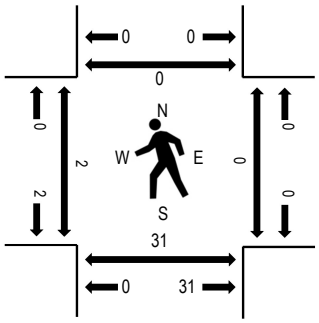
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.8%	0.82
WB	2.7%	0.55
NB	1.0%	0.93
SB	1.9%	0.87
All	1.5%	0.99

Traffic Counts - Motorized Vehicles

Interval Start Time	Boeckman Rd Eastbound				SW Advance Rd Westbound				SW Wilsonville Rd Northbound				SW Stafford Rd Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	11	4	8	0	16	19	12	0	4	14	1	0	5	26	16	136	1,289
4:05 PM	0	16	1	0	0	3	2	3	0	4	20	1	0	2	22	19	93	1,263
4:10 PM	0	17	6	3	0	4	2	6	0	4	16	3	0	0	31	14	106	1,294
4:15 PM	0	10	2	0	0	4	1	3	0	7	14	4	0	0	23	15	83	1,323
4:20 PM	0	20	7	6	0	9	2	5	0	5	13	1	0	0	30	12	110	1,350
4:25 PM	0	12	3	7	0	5	5	3	0	1	18	7	0	3	25	27	116	1,363
4:30 PM	0	11	5	8	0	3	2	0	0	2	10	3	0	1	24	23	92	1,376
4:35 PM	0	18	2	6	0	2	3	2	0	2	14	3	0	3	29	14	98	1,399
4:40 PM	0	11	3	8	0	3	1	4	0	3	14	5	0	1	31	13	97	1,424
4:45 PM	0	15	4	12	0	8	2	0	0	5	17	7	0	0	25	23	118	1,455
4:50 PM	0	15	6	1	0	2	6	2	0	8	15	7	0	2	35	21	120	1,435
4:55 PM	0	16	13	9	0	0	1	2	0	3	9	4	0	1	41	21	120	1,424
5:00 PM	0	19	10	6	0	6	1	0	0	6	16	6	0	2	21	17	110	1,407
5:05 PM	0	12	6	15	0	8	8	5	0	6	15	5	0	1	28	15	124	
5:10 PM	0	23	3	14	0	11	12	2	0	8	15	4	0	2	28	13	135	
5:15 PM	0	14	2	9	0	4	3	1	0	6	14	2	0	3	30	22	110	
5:20 PM	0	7	2	15	0	2	1	0	0	6	22	3	0	1	42	22	123	
5:25 PM	0	13	3	8	0	4	2	0	0	5	19	4	0	2	54	15	129	
5:30 PM	0	15	5	5	0	6	0	0	0	8	16	1	0	2	41	16	115	
5:35 PM	0	16	4	7	0	2	3	2	0	3	16	3	0	2	45	20	123	
5:40 PM	0	17	6	8	0	3	3	0	0	6	14	6	0	2	39	24	128	
5:45 PM	0	7	4	4	0	5	2	2	0	2	13	6	0	0	35	18	98	
5:50 PM	0	13	2	11	0	3	3	0	0	14	11	2	0	3	31	16	109	
5:55 PM	0	8	4	12	0	1	1	0	0	6	15	8	0	1	36	11	103	
Count Total	0	336	107	182	0	114	85	54	0	124	360	96	0	39	772	427	2,696	
Peak Hour	0	182	64	109	0	56	42	14	0	70	188	52	0	20	429	229	1,455	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

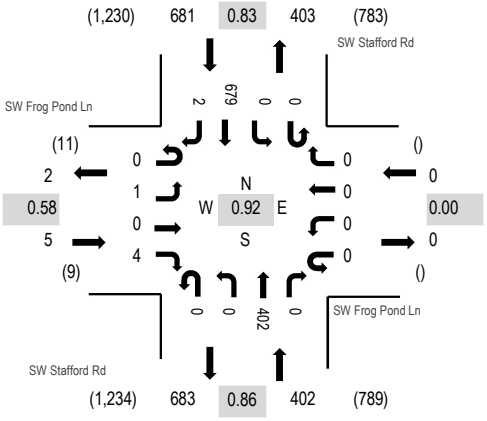
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	4	1	5	4:00 PM	0	0	0	0	0	4:00 PM	0	8	0	0	8
4:05 PM	0	0	1	0	1	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	2	1	0	4	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	1	1	0	0	2	4:15 PM	0	0	0	0	0	4:15 PM	0	1	0	0	1
4:20 PM	0	4	0	1	5	4:20 PM	0	0	0	0	0	4:20 PM	0	1	0	0	1
4:25 PM	0	1	0	1	2	4:25 PM	0	0	0	0	0	4:25 PM	0	44	0	0	44
4:30 PM	0	0	1	3	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	1	1	4:40 PM	0	0	0	0	0	4:40 PM	0	11	0	0	11
4:45 PM	0	0	0	1	1	4:45 PM	0	0	0	0	0	4:45 PM	0	9	0	0	9
4:50 PM	0	0	0	2	2	4:50 PM	0	0	0	0	0	4:50 PM	0	22	0	0	22
4:55 PM	0	1	0	1	2	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	1	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	1	0	0	1
5:05 PM	0	0	0	1	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	2	0	0	1	3	5:10 PM	0	0	0	0	0	5:10 PM	1	0	0	0	1
5:15 PM	0	0	1	2	3	5:15 PM	0	0	0	0	0	5:15 PM	0	3	0	0	3
5:20 PM	0	0	0	1	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	0	0	0	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	2	1	0	3	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	3	3	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0	5:40 PM	2	0	0	0	2
5:45 PM	0	0	1	0	1	5:45 PM	0	0	0	0	0	5:45 PM	2	0	0	0	2
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	5	11	11	20	47	Count Total	0	0	0	0	0	Count Total	5	100	0	0	105
Peak Hour	3	3	3	13	22	Peak Hour	0	0	0	0	0	Peak Hour	3	35	0	0	38

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

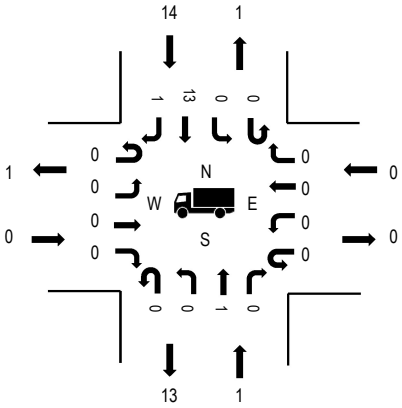
Location: 6 SW Stafford Rd & SW Frog Pond Ln PM
Date: Thursday, September 30, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:20 PM - 05:35 PM

Peak Hour

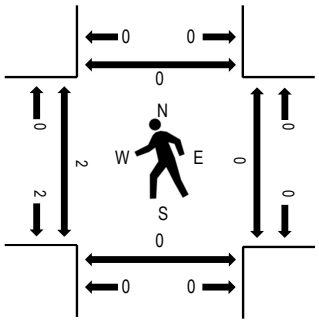
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.58
WB	0.0%	0.00
NB	0.2%	0.86
SB	2.1%	0.83
All	1.4%	0.92

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Frog Pond Ln Eastbound				SW Frog Pond Ln Westbound				SW Stafford Rd Northbound				SW Stafford Rd Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	1	0	0	0	0	0	1	38	0	0	0	47	0	87	971
4:05 PM	0	0	0	0	0	0	0	0	0	0	39	0	0	0	31	0	70	965
4:10 PM	0	0	0	0	0	0	0	0	0	1	33	0	0	0	48	0	82	983
4:15 PM	0	0	0	0	0	0	0	0	0	1	28	0	0	0	41	0	70	988
4:20 PM	0	0	0	0	0	0	0	0	0	1	39	0	0	0	52	0	92	1,004
4:25 PM	0	0	0	1	0	0	0	0	0	0	36	0	0	0	43	0	80	1,011
4:30 PM	0	0	0	1	0	0	0	0	0	2	19	0	0	0	44	1	67	1,036
4:35 PM	0	0	0	0	0	0	0	0	0	0	36	0	0	0	47	1	84	1,060
4:40 PM	0	0	0	0	0	0	0	0	0	0	33	0	0	0	44	0	77	1,064
4:45 PM	0	0	0	0	0	0	0	0	0	0	29	0	0	0	59	0	88	1,088
4:50 PM	0	0	0	2	0	0	0	0	0	0	34	0	0	0	57	0	93	1,084
4:55 PM	0	0	0	1	0	0	0	0	0	0	31	0	0	0	49	0	81	1,066
5:00 PM	0	0	0	0	0	0	0	0	0	0	38	0	0	0	43	0	81	1,057
5:05 PM	0	0	0	1	0	0	0	0	0	0	36	0	0	0	50	1	88	
5:10 PM	0	0	0	0	0	0	0	0	0	0	46	0	0	0	41	0	87	
5:15 PM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	53	1	86	
5:20 PM	0	1	0	0	0	0	0	0	0	0	28	0	0	0	70	0	99	
5:25 PM	0	0	0	0	0	0	0	0	0	0	29	0	0	0	76	0	105	
5:30 PM	0	0	0	0	0	0	0	0	0	0	31	0	0	0	60	0	91	
5:35 PM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	56	0	88	
5:40 PM	0	0	0	0	0	0	0	0	0	0	36	0	0	0	65	0	101	
5:45 PM	0	0	0	0	0	0	0	0	0	1	33	0	0	0	50	0	84	
5:50 PM	0	0	0	1	0	0	0	0	0	0	24	0	0	0	50	0	75	
5:55 PM	0	0	0	0	0	0	0	0	0	0	22	0	0	0	50	0	72	
Count Total	0	1	0	8	0	0	0	0	0	7	782	0	0	0	1,226	4	2,028	
Peak Hour	0	1	0	4	0	0	0	0	0	0	402	0	0	0	679	2	1,088	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

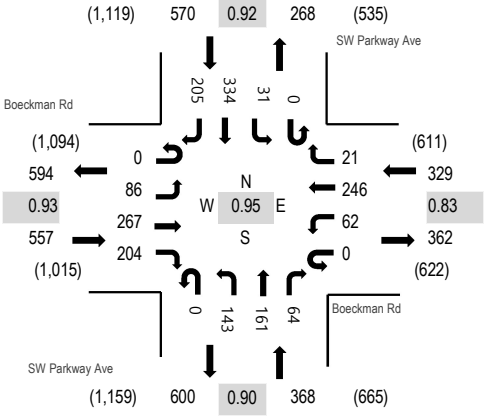
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	2	0	1	3	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	1	1	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	2	0	1	3	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	2	0	1	3	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	2	0	2	4	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	0	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	1	2	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	1	1	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	2	2	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	1	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	1	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	2	2	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	2	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	1	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	1	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	2	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	1	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0	5:40 PM	2	0	0	0	2
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	2	0	0	0	2
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	2	9	0	22	33	Count Total	0	0	0	0	0	Count Total	4	0	0	0	4
Peak Hour	0	1	0	14	15	Peak Hour	0	0	0	0	0	Peak Hour	2	0	0	0	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

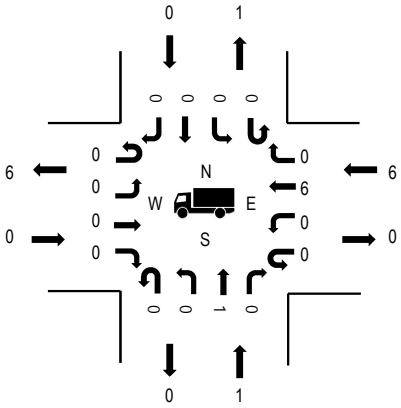
Location: 1 SW Parkway Ave & Boeckman Rd PM
Date: Wednesday, March 30, 2022
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 05:05 PM - 05:20 PM

Peak Hour

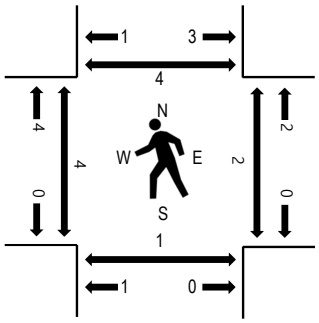
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.93
WB	1.8%	0.83
NB	0.3%	0.90
SB	0.0%	0.92
All	0.4%	0.95

Traffic Counts - Motorized Vehicles

Interval Start Time	Boeckman Rd Eastbound				Boeckman Rd Westbound				SW Parkway Ave Northbound				SW Parkway Ave Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	8	17	21	0	4	14	3	0	8	12	7	0	4	29	22	149	1,773
4:05 PM	0	9	20	20	0	1	10	5	0	10	12	5	0	0	29	13	134	1,780
4:10 PM	0	3	19	13	0	5	22	2	0	11	10	5	0	1	30	28	149	1,811
4:15 PM	0	5	16	18	0	4	25	1	0	12	12	2	0	1	35	22	153	1,809
4:20 PM	0	10	27	18	0	4	18	2	0	9	9	4	0	3	28	15	147	1,824
4:25 PM	0	6	20	19	0	3	15	2	0	9	16	5	0	2	26	12	135	1,814
4:30 PM	0	7	13	12	0	5	13	0	0	13	15	4	0	1	37	26	146	1,822
4:35 PM	0	9	33	22	0	6	22	3	0	12	13	6	0	1	27	17	171	1,821
4:40 PM	0	4	23	20	0	1	16	0	0	14	18	9	0	2	29	17	153	1,789
4:45 PM	0	7	23	8	0	3	30	2	0	12	6	7	0	2	25	14	139	1,754
4:50 PM	0	10	22	16	0	9	17	2	0	17	18	3	0	4	24	15	157	1,726
4:55 PM	0	4	18	14	0	7	15	0	0	9	14	4	0	5	25	25	140	1,668
5:00 PM	0	11	15	16	0	5	22	1	0	14	11	5	0	1	34	21	156	1,637
5:05 PM	0	6	22	25	0	4	35	4	0	8	11	7	0	3	20	20	165	
5:10 PM	0	6	16	18	0	7	14	3	0	11	18	5	0	3	34	12	147	
5:15 PM	0	6	35	16	0	8	29	2	0	15	12	5	0	4	25	11	168	
5:20 PM	0	8	16	18	0	6	23	0	0	6	16	6	0	2	25	11	137	
5:25 PM	0	11	13	17	0	6	24	2	0	12	13	2	0	1	22	20	143	
5:30 PM	0	8	20	10	0	3	18	2	0	14	19	2	0	2	29	18	145	
5:35 PM	0	11	15	16	0	8	16	3	0	7	6	6	0	3	30	18	139	
5:40 PM	0	8	17	14	0	10	13	1	0	5	9	3	0	4	21	13	118	
5:45 PM	0	3	13	10	0	6	10	4	0	6	17	2	0	1	26	13	111	
5:50 PM	0	9	8	9	0	5	5	3	0	6	12	0	0	4	25	13	99	
5:55 PM	0	10	13	12	0	1	15	2	0	6	8	8	0	2	21	11	109	
Count Total	0	179	454	382	0	121	441	49	0	246	307	112	0	56	656	407	3,410	
Peak Hour	0	86	267	204	0	62	246	21	0	143	161	64	0	31	334	205	1,824	

Location: 1 SW Parkway Ave & Boeckman Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	1	1	2	4:00 PM	0	0	0	0	0
4:05 PM	2	0	0	0	2	4:05 PM	0	0	1	0	1	4:05 PM	0	1	0	0	1
4:10 PM	0	1	0	0	1	4:10 PM	1	0	0	1	2	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	1	1
4:20 PM	0	0	2	0	2	4:20 PM	0	0	1	0	1	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	0	0	4:25 PM	0	1	0	0	1	4:25 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1	4:30 PM	0	0	1	0	1	4:30 PM	0	0	0	0	0
4:35 PM	0	0	1	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	1	1	0	2	4:40 PM	0	0	0	0	0	4:40 PM	1	0	0	0	1
4:45 PM	0	0	1	0	1	4:45 PM	0	0	0	0	0	4:45 PM	0	1	0	1	2
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	1	0	0	0	1	4:55 PM	1	0	0	1	2
5:00 PM	0	0	0	0	0	5:00 PM	1	0	0	0	1	5:00 PM	2	0	0	2	4
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	2	0	2
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	1	0	1
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	2	2	0	4
5:25 PM	0	0	0	0	0	5:25 PM	1	0	1	0	2	5:25 PM	0	0	1	0	1
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	2	0	1	2	5
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	1	1	5:45 PM	0	0	1	1	2
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	1	1	1	3
5:55 PM	0	0	2	0	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	2	2	8	0	12	Count Total	4	1	5	3	13	Count Total	6	5	9	9	29
Peak Hour	0	1	6	0	7	Peak Hour	2	1	2	0	5	Peak Hour	4	1	3	4	12

Location: 4 Parkway Center Dr & SW Elligsen Rd PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 Parkway Center Dr & SW Elligsen Rd PM

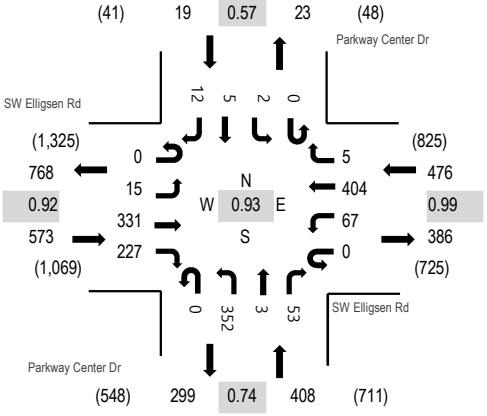
Date: Wednesday, March 30, 2022

Peak Hour: 04:15 PM - 05:15 PM

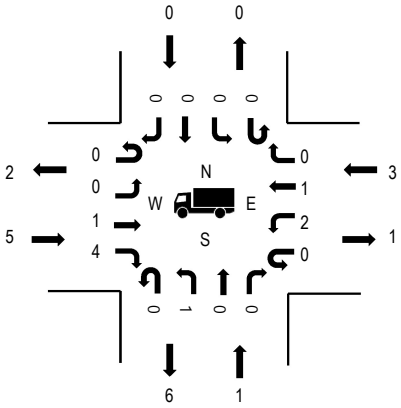
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

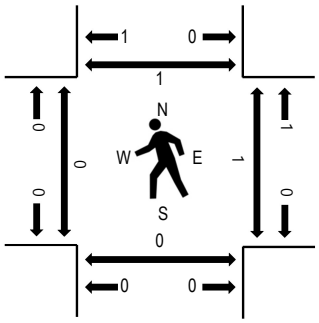
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.9%	0.92
WB	0.6%	0.99
NB	0.2%	0.74
SB	0.0%	0.57
All	0.6%	0.93

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Elligsen Rd Eastbound				SW Elligsen Rd Westbound				Parkway Center Dr Northbound				Parkway Center Dr Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	19	18	0	3	19	0	0	24	0	4	0	0	0	0	87	1,408
4:05 PM	0	1	33	13	0	5	26	0	0	23	0	10	0	0	1	2	114	1,455
4:10 PM	0	0	19	18	0	4	26	0	0	26	0	6	0	0	2	3	104	1,463
4:15 PM	0	0	34	23	0	9	37	0	0	18	0	5	0	0	0	3	129	1,476
4:20 PM	0	1	16	11	0	9	33	0	0	25	1	5	0	0	0	2	103	1,467
4:25 PM	0	2	34	31	0	4	28	0	0	28	0	6	0	0	1	1	135	1,472
4:30 PM	0	0	24	19	0	7	36	1	0	31	1	5	0	1	1	1	127	1,432
4:35 PM	0	0	19	14	0	4	39	1	0	45	0	5	0	0	0	1	128	1,388
4:40 PM	0	0	26	25	0	7	25	0	0	56	0	2	0	0	1	0	142	1,359
4:45 PM	0	1	32	15	0	2	31	0	0	21	1	5	0	0	0	1	109	1,316
4:50 PM	0	3	28	21	0	7	34	1	0	19	0	5	0	1	0	0	119	1,308
4:55 PM	0	0	26	16	0	6	35	0	0	24	0	3	0	0	0	1	111	1,253
5:00 PM	0	3	27	16	0	4	29	1	0	42	0	10	0	0	1	1	134	1,238
5:05 PM	0	3	34	17	0	3	40	1	0	23	0	1	0	0	0	0	122	
5:10 PM	0	2	31	19	0	5	37	0	0	20	0	1	0	0	1	1	117	
5:15 PM	0	3	30	18	0	7	27	0	0	22	1	9	0	0	1	2	120	
5:20 PM	0	1	28	10	0	3	34	1	0	25	0	4	0	0	0	2	108	
5:25 PM	0	6	24	19	0	5	26	0	0	12	1	2	0	0	0	0	95	
5:30 PM	0	0	11	18	0	5	26	0	0	19	1	3	0	0	0	0	83	
5:35 PM	0	4	31	11	0	1	23	0	0	18	0	6	0	0	0	5	99	
5:40 PM	0	1	21	22	0	5	28	0	0	17	0	3	0	0	0	2	99	
5:45 PM	0	1	23	19	0	4	23	0	0	27	0	3	0	0	1	0	101	
5:50 PM	0	1	15	14	0	4	13	0	0	13	0	3	0	0	0	1	64	
5:55 PM	0	3	26	15	0	3	28	0	0	15	0	6	0	0	0	0	96	
Count Total	0	36	611	422	0	116	703	6	0	593	6	112	0	2	10	29	2,646	
Peak Hour	0	15	331	227	0	67	404	5	0	352	3	53	0	2	5	12	1,476	

Location: 4 Parkway Center Dr & SW Elligsen Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

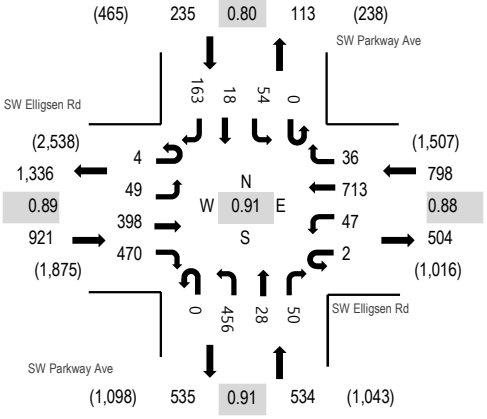
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	1	1	0	2	4:05 PM	1	0	0	0	1	4:05 PM	0	0	0	0	0
4:10 PM	0	0	1	0	1	4:10 PM	0	0	0	0	0	4:10 PM	0	1	1	0	2
4:15 PM	0	0	1	0	1	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	1	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	0	0	0	1	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	1	1	2
4:50 PM	0	1	0	0	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	1	0	1	0	2	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	0	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	3	0	2	0	5	5:20 PM	0	0	0	0	0	5:20 PM	0	0	1	0	1
5:25 PM	4	0	0	0	4	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	1	0	0	0	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	1	0	0	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	0	0	1	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	1	0	0	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	0	0	0	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	19	2	7	0	28	Count Total	1	0	0	0	1	Count Total	0	1	3	1	5
Peak Hour	5	1	3	0	9	Peak Hour	0	0	0	0	0	Peak Hour	0	0	1	1	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

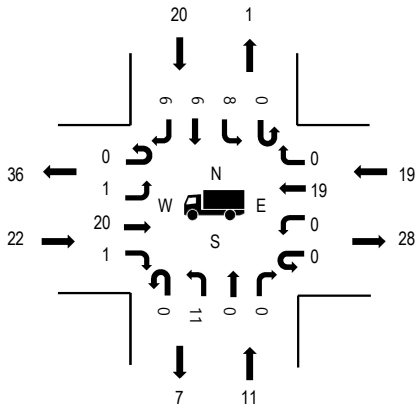
Location: 1 SW Parkway Ave & SW Elligsen Rd PM
Date: Tuesday, June 7, 2022
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour

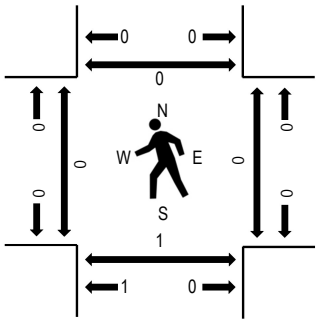
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.4%	0.89
WB	2.4%	0.88
NB	2.1%	0.91
SB	8.5%	0.80
All	2.9%	0.91

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Elligsen Rd Eastbound				SW Elligsen Rd Westbound				SW Parkway Ave Northbound				SW Parkway Ave Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	10	44	50	0	6	52	4	0	44	4	5	0	6	0	12	237	2,488
4:05 PM	0	7	36	56	0	5	56	4	0	42	2	3	0	6	2	17	236	2,463
4:10 PM	1	5	33	42	1	4	61	3	0	40	1	5	0	3	0	15	214	2,464
4:15 PM	0	3	31	30	0	6	63	5	0	38	3	7	0	5	3	18	212	2,479
4:20 PM	1	2	18	34	0	5	63	4	0	41	4	5	0	7	0	18	202	2,487
4:25 PM	0	3	23	30	0	4	64	3	0	42	1	3	0	7	3	17	200	2,463
4:30 PM	0	4	29	32	0	4	68	2	0	38	2	4	0	3	1	12	199	2,472
4:35 PM	1	5	32	32	0	5	69	3	0	34	4	7	0	3	1	9	205	2,471
4:40 PM	0	4	28	41	0	2	54	2	0	30	2	4	0	4	1	10	182	2,454
4:45 PM	1	3	32	44	1	1	51	1	0	37	2	2	0	3	2	12	192	2,467
4:50 PM	0	2	43	42	0	2	54	2	0	36	1	3	0	4	2	10	201	2,475
4:55 PM	0	1	49	37	0	3	58	3	0	34	2	2	0	3	3	13	208	2,439
5:00 PM	0	1	24	28	0	6	71	6	0	41	4	5	0	2	2	22	212	2,402
5:05 PM	0	7	34	46	0	7	68	5	0	39	2	2	0	3	4	20	237	
5:10 PM	0	8	39	46	0	6	65	6	0	33	1	2	0	3	2	18	229	
5:15 PM	0	7	38	52	0	8	51	4	0	29	3	5	0	4	4	15	220	
5:20 PM	0	5	23	33	0	5	51	3	0	31	3	3	0	3	7	11	178	
5:25 PM	0	5	45	44	0	4	53	4	0	29	2	5	0	2	4	12	209	
5:30 PM	0	3	43	32	0	6	51	3	0	40	1	2	0	4	3	10	198	
5:35 PM	0	3	28	37	0	6	43	2	0	46	3	3	0	4	4	9	188	
5:40 PM	0	6	43	34	0	3	45	1	0	42	2	7	0	2	3	7	195	
5:45 PM	0	6	44	46	0	4	40	2	0	36	2	6	0	2	2	10	200	
5:50 PM	0	3	33	31	0	2	39	1	0	31	2	7	0	2	1	13	165	
5:55 PM	0	7	33	37	0	2	35	1	0	35	1	4	0	3	2	11	171	
Count Total	4	110	825	936	2	106	1,325	74	0	888	54	101	0	88	56	321	4,890	
Peak Hour	4	49	398	470	2	47	713	36	0	456	28	50	0	54	18	163	2,488	

Location: 1 SW Parkway Ave & SW Elligsen Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

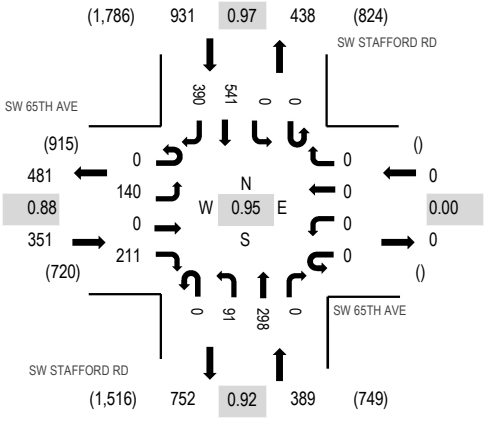
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	4	2	1	0	7	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	1	1	3	6	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	2	1	2	0	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	1	2	3	8	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	4	1	1	2	8	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	1	1	3	6	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	3	2	6	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	2	1	1	1	5	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	3	2	5	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	1	1	1	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	2	1	2	1	6	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	1	1	2	5	4:55 PM	0	0	0	0	0	4:55 PM	0	1	0	0	1
5:00 PM	0	2	3	0	5	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	1	1
5:05 PM	0	1	2	1	4	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	3	1	5	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	1	1	1	3	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	1	2	1	4	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	2	1	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	3	1	4	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	2	1	1	4	5:35 PM	0	0	0	0	0	5:35 PM	0	0	1	0	1
5:40 PM	0	2	4	1	7	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	2	1	1	4	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	1	2	1	4	5:50 PM	0	1	0	0	1	5:50 PM	0	0	0	0	0
5:55 PM	0	1	1	1	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	22	27	43	30	122	Count Total	0	1	0	0	1	Count Total	0	1	1	1	3
Peak Hour	22	11	19	20	72	Peak Hour	0	0	0	0	0	Peak Hour	0	1	0	0	1

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

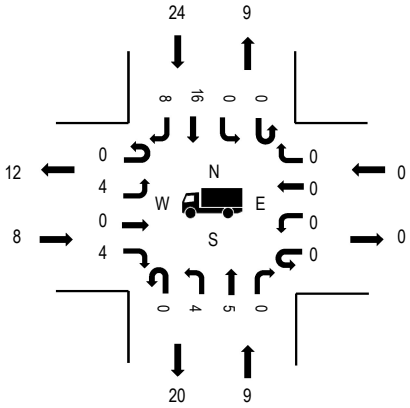
Location: 2 SW STAFFORD RD & SW 65TH AVE PM
Date: Wednesday, May 18, 2022
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:10 PM - 04:25 PM

Peak Hour

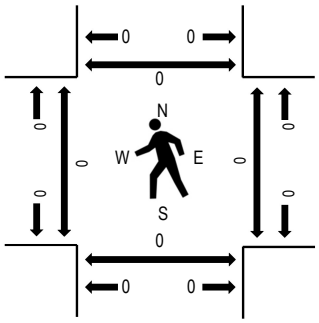
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.88
WB	0.0%	0.00
NB	2.3%	0.92
SB	2.6%	0.97
All	2.5%	0.95

Traffic Counts - Motorized Vehicles

Interval Start Time	SW 65TH AVE Eastbound				SW 65TH AVE Westbound				SW STAFFORD RD Northbound				SW STAFFORD RD Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	9	0	9	0	0	0	0	0	13	19	0	0	0	52	37	139	1,671
4:05 PM	0	11	0	21	0	0	0	0	0	9	24	0	0	0	34	36	135	1,659
4:10 PM	0	12	0	16	0	0	0	0	0	8	30	0	0	0	48	38	152	1,666
4:15 PM	0	18	0	13	0	0	0	0	0	1	31	0	0	0	43	42	148	1,657
4:20 PM	0	17	0	13	0	0	0	0	0	12	24	0	0	0	45	31	142	1,652
4:25 PM	0	12	0	27	0	0	0	0	0	5	22	0	0	0	36	28	130	1,651
4:30 PM	0	7	0	17	0	0	0	0	0	8	22	0	0	0	49	35	138	1,652
4:35 PM	0	10	0	30	0	0	0	0	0	7	24	0	0	0	43	21	135	1,644
4:40 PM	0	11	0	13	0	0	0	0	0	4	26	0	0	0	47	34	135	1,670
4:45 PM	0	9	0	16	0	0	0	0	0	8	28	0	0	0	50	31	142	1,656
4:50 PM	0	9	0	23	0	0	0	0	0	9	26	0	0	0	48	25	140	1,622
4:55 PM	0	15	0	13	0	0	0	0	0	7	22	0	0	0	46	32	135	1,604
5:00 PM	0	11	0	18	0	0	0	0	0	8	16	0	0	0	47	27	127	1,584
5:05 PM	0	7	0	21	0	0	0	0	0	7	26	0	0	0	52	29	142	
5:10 PM	0	13	0	16	0	0	0	0	0	12	21	0	0	0	49	32	143	
5:15 PM	0	12	0	22	0	0	0	0	0	5	25	0	0	0	41	38	143	
5:20 PM	0	17	0	13	0	0	0	0	0	15	23	0	0	0	48	25	141	
5:25 PM	0	9	0	14	0	0	0	0	0	8	20	0	0	0	55	25	131	
5:30 PM	0	12	0	26	0	0	0	0	0	7	28	0	0	0	30	27	130	
5:35 PM	0	11	0	25	0	0	0	0	0	10	17	0	0	0	48	50	161	
5:40 PM	0	9	0	25	0	0	0	0	0	8	18	0	0	0	37	24	121	
5:45 PM	0	12	0	26	0	0	0	0	0	14	10	0	0	0	33	13	108	
5:50 PM	0	11	0	15	0	0	0	0	0	7	24	0	0	0	43	22	122	
5:55 PM	0	7	0	17	0	0	0	0	0	4	27	0	0	0	43	17	115	
Count Total	0	271	0	449	0	0	0	0	0	196	553	0	0	0	1,067	719	3,255	
Peak Hour	0	140	0	211	0	0	0	0	0	91	298	0	0	0	541	390	1,671	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

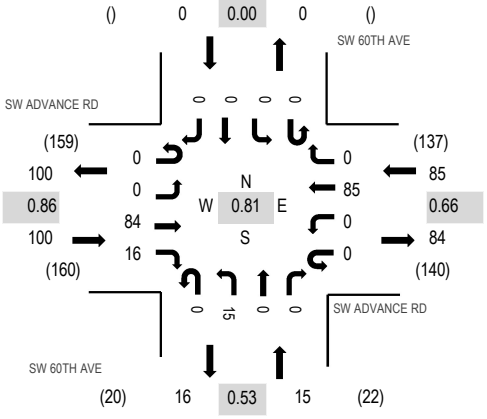
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	2	0	2	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	2	0	2	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	1	0	2	3	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	4	4	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	0	1	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	3	3	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	2	0	0	2	4	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	1	0	2	3	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	1	0	1	2	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	4	0	0	0	4	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	2	0	5	7	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	2	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	2	2	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	2	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	0	3	4	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	2	2	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	1	0	0	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	9	11	0	35	55	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	8	9	0	24	41	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

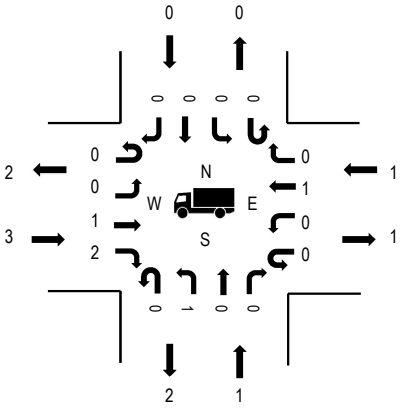
Location: 3 SW 60TH AVE & SW ADVANCE RD PM
Date: Wednesday, May 18, 2022
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 04:40 PM - 04:55 PM

Peak Hour

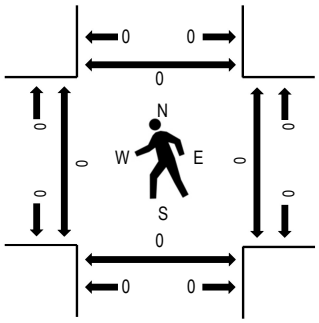
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.0%	0.86
WB	1.2%	0.66
NB	6.7%	0.53
SB	0.0%	0.00
All	2.5%	0.81

Traffic Counts - Motorized Vehicles

Interval Start Time	SW ADVANCE RD Eastbound				SW ADVANCE RD Westbound				SW 60TH AVE Northbound				SW 60TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179
4:10 PM	0	0	9	0	0	0	6	0	0	1	0	0	0	0	0	0	16	189
4:15 PM	0	0	4	2	0	0	3	0	0	0	0	0	0	0	0	0	9	193
4:20 PM	0	0	12	0	0	0	5	0	0	0	0	0	0	0	0	0	17	200
4:25 PM	0	0	6	2	0	0	3	0	0	3	0	0	0	0	0	0	14	196
4:30 PM	0	0	6	2	0	0	5	0	0	1	0	0	0	0	0	0	14	194
4:35 PM	0	0	5	1	0	0	6	0	0	1	0	0	0	0	0	0	13	193
4:40 PM	0	0	9	1	0	0	9	0	0	4	0	0	0	0	0	0	23	192
4:45 PM	0	0	2	1	0	0	14	0	0	3	0	0	0	0	0	0	20	180
4:50 PM	0	0	6	2	0	0	10	0	0	1	0	0	0	0	0	0	19	164
4:55 PM	0	0	6	1	0	0	6	0	0	0	0	0	0	0	0	0	13	161
5:00 PM	0	0	11	2	0	0	8	0	0	0	0	0	0	0	0	0	21	161
5:05 PM	0	0	5	1	0	0	4	0	0	0	0	0	0	0	0	0	10	
5:10 PM	0	0	10	0	0	0	9	0	0	1	0	0	0	0	0	0	20	
5:15 PM	0	0	6	3	0	0	6	0	0	1	0	0	0	0	0	0	16	
5:20 PM	0	0	6	1	0	0	4	0	0	2	0	0	0	0	0	0	13	
5:25 PM	0	0	3	0	0	0	6	0	0	3	0	0	0	0	0	0	12	
5:30 PM	0	0	8	0	0	0	4	0	0	1	0	0	0	0	0	0	13	
5:35 PM	0	0	5	0	0	0	7	0	0	0	0	0	0	0	0	0	12	
5:40 PM	0	0	5	0	0	0	6	0	0	0	0	0	0	0	0	0	11	
5:45 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	
5:50 PM	0	0	10	0	0	0	6	0	0	0	0	0	0	0	0	0	16	
5:55 PM	0	0	6	1	0	0	6	0	0	0	0	0	0	0	0	0	13	
Count Total	0	0	140	20	0	0	137	0	0	22	0	0	0	0	0	0	319	
Peak Hour	0	0	84	16	0	0	85	0	0	15	0	0	0	0	0	0	200	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

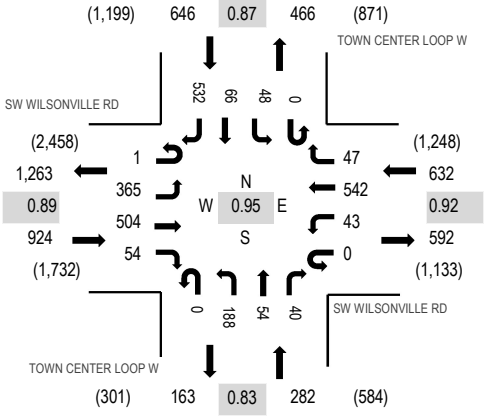
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1	4:15 PM	1	0	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	1	0	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	1	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	0	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	1	0	0	0	1	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	1	0	0	1	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	0	0	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	5	1	2	0	8	Count Total	2	1	0	0	3	Count Total	0	0	0	0	0
Peak Hour	3	1	1	0	5	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

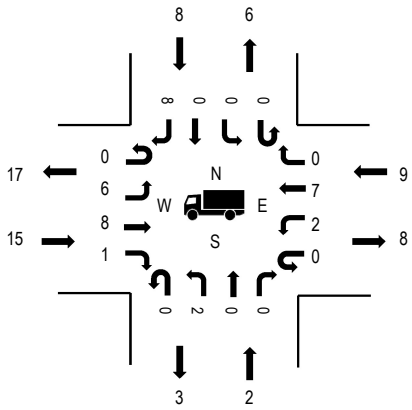
Location: 4 TOWN CENTER LOOP W & SW WILSONVILLE RD PM
Date: Wednesday, May 18, 2022
Peak Hour: 04:05 PM - 05:05 PM
Peak 15-Minutes: 04:35 PM - 04:50 PM

Peak Hour

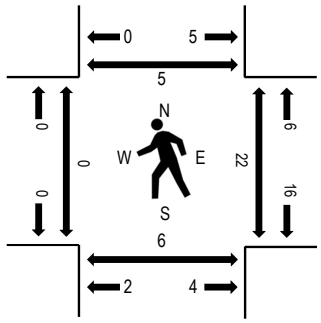
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.6%	0.89
WB	1.4%	0.92
NB	0.7%	0.83
SB	1.2%	0.87
All	1.4%	0.95

Traffic Counts - Motorized Vehicles

Interval Start Time	SW WILSONVILLE RD Eastbound				SW WILSONVILLE RD Westbound				TOWN CENTER LOOP W Northbound				TOWN CENTER LOOP W Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	27	36	3	0	0	50	0	0	15	6	1	0	1	0	27	166	2,446
4:05 PM	0	31	47	5	0	6	44	3	0	10	6	4	0	5	4	60	225	2,484
4:10 PM	0	40	40	2	0	2	24	6	0	13	7	2	0	2	7	36	181	2,468
4:15 PM	0	30	33	2	0	6	44	2	0	20	6	3	0	6	4	50	206	2,463
4:20 PM	0	32	31	2	0	4	52	3	0	16	4	5	0	2	4	39	194	2,450
4:25 PM	0	26	42	3	0	2	42	6	0	12	4	1	0	5	8	54	205	2,458
4:30 PM	0	28	40	6	0	0	38	4	0	22	4	3	0	3	6	58	212	2,454
4:35 PM	0	29	36	7	0	1	58	5	0	16	4	4	0	4	3	45	212	2,445
4:40 PM	0	45	49	2	0	4	40	3	0	17	5	2	0	2	6	35	210	2,417
4:45 PM	0	33	47	5	0	5	59	4	0	15	2	4	0	7	6	42	229	2,396
4:50 PM	0	26	46	7	0	4	38	3	0	19	4	6	0	5	8	36	202	2,386
4:55 PM	0	26	51	9	0	6	42	4	0	13	3	2	0	5	6	37	204	2,352
5:00 PM	1	19	42	4	0	3	61	4	0	15	5	4	0	2	4	40	204	2,317
5:05 PM	0	19	47	3	0	3	37	2	0	24	8	1	0	4	4	57	209	
5:10 PM	0	13	24	3	0	2	50	9	0	23	5	3	0	5	6	33	176	
5:15 PM	0	23	37	3	0	1	54	1	0	20	9	3	0	1	3	38	193	
5:20 PM	0	23	47	8	1	2	51	3	0	20	3	1	0	4	7	32	202	
5:25 PM	0	31	44	3	0	1	36	1	0	19	8	2	0	3	12	41	201	
5:30 PM	0	21	41	3	0	1	52	6	0	17	7	6	0	3	3	43	203	
5:35 PM	0	26	43	2	0	2	48	6	0	7	4	5	1	1	9	30	184	
5:40 PM	0	26	32	10	0	2	38	7	0	20	4	2	0	3	4	41	189	
5:45 PM	0	34	51	2	0	1	44	5	0	19	7	1	0	5	11	39	219	
5:50 PM	0	18	27	1	0	4	50	4	0	15	4	3	0	3	6	33	168	
5:55 PM	0	28	44	5	0	3	35	4	0	7	2	1	0	5	5	30	169	
Count Total	1	654	977	100	1	65	1,087	95	0	394	121	69	1	86	136	976	4,763	
Peak Hour	1	365	504	54	0	43	542	47	0	188	54	40	0	48	66	532	2,484	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

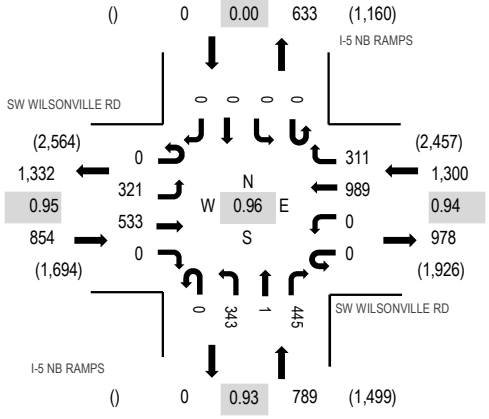
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	2	0	0	0	2	4:00 PM	0	0	0	0	0	4:00 PM	0	0	1	0	1
4:05 PM	3	0	0	0	3	4:05 PM	0	0	0	0	0	4:05 PM	0	2	1	1	4
4:10 PM	2	0	0	2	4	4:10 PM	0	0	0	0	0	4:10 PM	0	1	5	0	6
4:15 PM	2	0	0	0	2	4:15 PM	0	0	0	0	0	4:15 PM	0	1	4	0	5
4:20 PM	0	0	2	1	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	2	2	4
4:25 PM	0	1	0	1	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	2	0	2
4:40 PM	5	0	2	1	8	4:40 PM	0	0	0	0	0	4:40 PM	0	1	2	1	4
4:45 PM	0	0	2	1	3	4:45 PM	0	0	0	0	0	4:45 PM	0	0	2	0	2
4:50 PM	1	0	0	0	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	1	2	0	4	4:55 PM	0	0	0	0	0	4:55 PM	0	0	3	2	5
5:00 PM	0	0	1	1	2	5:00 PM	0	0	0	0	0	5:00 PM	0	1	2	0	3
5:05 PM	2	1	2	1	6	5:05 PM	0	0	0	0	0	5:05 PM	0	1	0	0	1
5:10 PM	3	1	2	0	6	5:10 PM	0	0	0	0	0	5:10 PM	0	0	1	0	1
5:15 PM	1	0	1	2	4	5:15 PM	1	0	0	0	1	5:15 PM	0	0	2	0	2
5:20 PM	1	0	2	0	3	5:20 PM	0	0	0	0	0	5:20 PM	0	0	3	0	3
5:25 PM	1	0	1	1	3	5:25 PM	0	0	0	1	1	5:25 PM	0	2	4	0	6
5:30 PM	0	1	0	0	1	5:30 PM	0	0	0	0	0	5:30 PM	0	1	4	1	6
5:35 PM	1	0	0	0	1	5:35 PM	1	0	0	0	1	5:35 PM	0	3	0	1	4
5:40 PM	1	0	0	1	2	5:40 PM	0	0	0	0	0	5:40 PM	0	2	3	1	6
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	2	1	3
5:55 PM	0	0	1	1	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	9	3	12
Count Total	27	5	18	14	64	Count Total	2	0	0	1	3	Count Total	0	15	52	13	80
Peak Hour	15	2	9	8	34	Peak Hour	0	0	0	0	0	Peak Hour	0	6	23	6	35

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

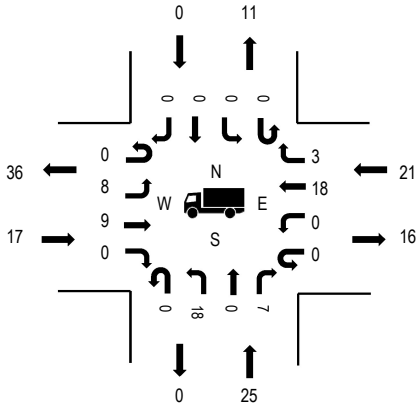
Location: 5 I-5 NB RAMPS & SW WILSONVILLE RD PM
Date: Wednesday, May 18, 2022
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:35 PM - 04:50 PM

Peak Hour

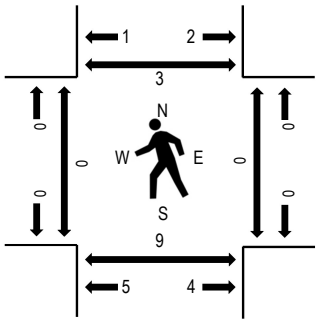
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.0%	0.95
WB	1.6%	0.94
NB	3.2%	0.93
SB	0.0%	0.00
All	2.1%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	SW WILSONVILLE RD Eastbound				SW WILSONVILLE RD Westbound				I-5 NB RAMPS Northbound				I-5 NB RAMPS Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	21	40	0	0	0	72	20	0	29	0	23	0	0	0	0	205	2,877
4:05 PM	0	29	57	0	0	0	82	32	0	13	0	38	0	0	0	0	251	2,913
4:10 PM	0	19	49	0	0	0	60	12	0	36	0	31	0	0	0	0	207	2,910
4:15 PM	0	32	44	0	0	0	64	51	0	34	0	43	0	0	0	0	268	2,943
4:20 PM	0	36	28	0	0	0	79	27	0	27	0	38	0	0	0	0	235	2,906
4:25 PM	0	28	42	0	0	0	90	19	0	19	0	35	0	0	0	0	233	2,915
4:30 PM	0	18	48	0	0	0	92	26	0	25	0	35	0	0	0	0	244	2,907
4:35 PM	0	29	40	0	0	0	70	49	0	29	0	47	0	0	0	0	264	2,904
4:40 PM	0	31	53	0	0	0	83	7	0	21	0	41	0	0	0	0	236	2,855
4:45 PM	0	22	51	0	0	0	99	19	0	40	0	34	0	0	0	0	265	2,839
4:50 PM	0	21	51	0	0	0	75	18	0	31	0	39	0	0	0	0	235	2,821
4:55 PM	0	23	53	0	0	0	69	23	0	28	0	38	0	0	0	0	234	2,781
5:00 PM	0	24	45	0	0	0	86	30	0	22	0	34	0	0	0	0	241	2,773
5:05 PM	0	24	48	0	0	0	111	7	0	26	1	31	0	0	0	0	248	
5:10 PM	0	33	30	0	0	0	71	35	0	41	0	30	0	0	0	0	240	
5:15 PM	0	20	31	0	0	0	78	34	0	33	0	35	0	0	0	0	231	
5:20 PM	0	17	58	0	0	0	82	21	0	32	0	34	0	0	0	0	244	
5:25 PM	0	16	50	0	0	0	83	13	0	24	1	38	0	0	0	0	225	
5:30 PM	0	27	44	0	0	0	67	45	0	26	0	32	0	0	0	0	241	
5:35 PM	0	29	51	0	0	0	62	23	0	25	1	24	0	0	0	0	215	
5:40 PM	0	16	41	0	0	0	88	10	0	35	0	30	0	0	0	0	220	
5:45 PM	0	25	53	0	0	0	89	14	0	27	0	39	0	0	0	0	247	
5:50 PM	0	24	35	0	0	0	57	21	0	33	0	25	0	0	0	0	195	
5:55 PM	0	25	63	0	0	0	81	11	0	18	1	27	0	0	0	0	226	
Count Total	0	589	1,105	0	0	0	1,890	567	0	674	4	821	0	0	0	0	5,650	
Peak Hour	0	321	533	0	0	0	989	311	0	343	1	445	0	0	0	0	2,943	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

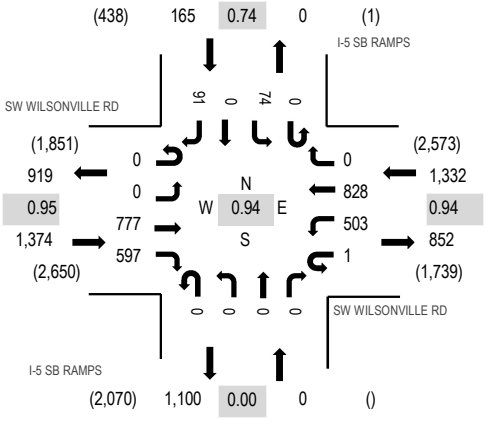
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	3	2	0	0	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	1	1
4:05 PM	3	1	0	0	4	4:05 PM	0	0	0	0	0	4:05 PM	0	1	0	1	2
4:10 PM	3	2	1	0	6	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	2	2
4:15 PM	2	4	1	0	7	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	3	1	2	0	6	4:20 PM	0	0	0	0	0	4:20 PM	0	1	0	0	1
4:25 PM	1	1	3	0	5	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	1	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	1	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	5	3	0	0	8	4:40 PM	0	0	0	0	0	4:40 PM	0	3	0	1	4
4:45 PM	1	4	5	0	10	4:45 PM	0	0	0	0	0	4:45 PM	0	4	0	0	4
4:50 PM	1	3	0	0	4	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	4	4
4:55 PM	2	1	2	0	5	4:55 PM	0	0	0	0	0	4:55 PM	0	1	0	0	1
5:00 PM	0	2	2	0	4	5:00 PM	0	0	0	0	0	5:00 PM	0	2	0	0	2
5:05 PM	1	1	3	0	5	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	4	2	0	7	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	2	1	3	0	6	5:15 PM	0	0	0	0	0	5:15 PM	0	2	0	1	3
5:20 PM	0	3	2	0	5	5:20 PM	0	0	0	0	0	5:20 PM	0	1	0	0	1
5:25 PM	0	3	2	0	5	5:25 PM	0	0	0	0	0	5:25 PM	0	2	0	0	2
5:30 PM	1	0	1	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	1	0	2	3
5:35 PM	2	1	0	0	3	5:35 PM	1	0	0	0	1	5:35 PM	0	3	0	0	3
5:40 PM	2	3	0	0	5	5:40 PM	0	0	0	0	0	5:40 PM	0	3	0	0	3
5:45 PM	2	0	1	0	3	5:45 PM	0	0	0	0	0	5:45 PM	0	1	0	2	3
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	2	0	2	5:55 PM	0	0	0	0	0	5:55 PM	0	1	0	2	3
Count Total	35	41	33	0	109	Count Total	1	0	0	0	1	Count Total	0	26	0	16	42
Peak Hour	17	25	21	0	63	Peak Hour	0	0	0	0	0	Peak Hour	0	11	0	5	16

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

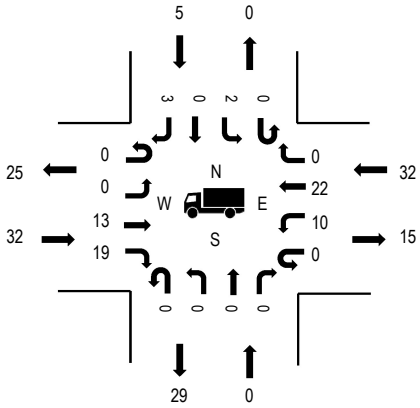
Location: 6 I-5 SB RAMPS & SW WILSONVILLE RD PM
Date: Wednesday, May 18, 2022
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:35 PM - 04:50 PM

Peak Hour

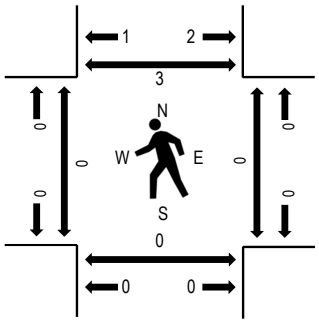
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.95
WB	2.4%	0.94
NB	0.0%	0.00
SB	3.0%	0.74
All	2.4%	0.94

Traffic Counts - Motorized Vehicles

Interval Start Time	SW WILSONVILLE RD Eastbound				SW WILSONVILLE RD Westbound				I-5 SB RAMPS Northbound				I-5 SB RAMPS Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	0	72	61	0	40	69	0	0	0	0	0	0	10	0	10	262	2,863
4:05 PM	0	0	73	49	0	38	63	0	0	0	0	0	0	7	0	5	235	2,849
4:10 PM	0	0	67	47	0	32	57	0	0	0	0	0	0	9	0	7	219	2,870
4:15 PM	0	0	65	60	0	27	77	0	0	0	0	0	0	6	0	8	243	2,871
4:20 PM	0	0	56	58	1	48	65	0	0	0	0	0	0	7	0	13	248	2,860
4:25 PM	0	0	77	36	0	51	51	0	0	0	0	0	0	3	0	8	226	2,841
4:30 PM	0	0	56	53	0	37	63	0	0	0	0	0	0	5	0	9	223	2,813
4:35 PM	0	0	71	61	0	45	86	0	0	0	0	0	0	6	0	7	276	2,870
4:40 PM	0	0	76	52	0	48	64	0	0	0	0	0	0	4	0	4	248	2,832
4:45 PM	0	0	65	40	0	47	71	0	0	0	0	0	0	8	0	7	238	2,808
4:50 PM	0	0	55	36	0	33	68	0	0	0	0	0	0	6	0	4	202	2,762
4:55 PM	0	0	77	44	0	42	69	0	0	0	0	0	0	6	0	5	243	2,811
5:00 PM	0	0	68	49	0	44	72	0	0	0	0	0	0	5	0	10	248	2,798
5:05 PM	0	0	70	50	0	44	74	0	0	0	0	0	0	9	0	9	256	
5:10 PM	0	0	41	58	0	37	68	0	0	0	0	0	0	9	0	7	220	
5:15 PM	0	0	54	38	0	52	75	0	0	0	0	0	0	3	0	10	232	
5:20 PM	0	0	66	37	0	44	55	1	0	0	0	0	0	10	0	16	229	
5:25 PM	0	0	51	36	0	38	56	0	0	0	0	0	0	8	0	9	198	
5:30 PM	0	0	88	57	0	38	71	0	0	0	0	0	0	10	0	16	280	
5:35 PM	0	0	63	42	0	33	78	0	0	0	0	0	0	6	0	16	238	
5:40 PM	0	0	60	32	0	44	60	0	0	0	0	0	0	13	0	15	224	
5:45 PM	0	0	48	31	0	27	62	0	0	0	0	0	0	9	0	15	192	
5:50 PM	0	0	70	37	0	45	72	0	0	0	0	0	0	8	0	19	251	
5:55 PM	0	0	60	37	0	35	56	0	0	0	0	0	0	22	0	20	230	
Count Total	0	0	1,549	1,101	1	969	1,602	1	0	0	0	0	0	189	0	249	5,661	
Peak Hour	0	0	777	597	1	503	828	0	0	0	0	0	0	74	0	91	2,871	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	6	0	2	3	11	4:00 PM	0	0	0	0	0	4:00 PM	1	0	0	2	3
4:05 PM	2	0	0	2	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	2	2
4:10 PM	8	0	4	2	14	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	3	0	2	1	6	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	5	0	5	0	10	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	1	0	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	2	0	1	0	3	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	7	0	0	0	7	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	1	1
4:40 PM	7	0	7	1	15	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	3	1	4	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	2	2
4:50 PM	2	0	5	1	8	4:50 PM	0	0	0	0	0	4:50 PM	1	0	0	1	2
4:55 PM	1	0	1	0	2	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	2	0	3	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	0	1	1	4	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	0	4	0	5	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	1	1
5:15 PM	3	0	4	1	8	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	4	0	4	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	0	0	0	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	2	0	1	3	6	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	2	2
5:35 PM	2	0	1	0	3	5:35 PM	1	0	0	0	1	5:35 PM	0	0	0	0	0
5:40 PM	6	0	3	1	10	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	2	2
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	1	1
5:55 PM	2	0	2	1	5	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	1	1
Count Total	64	0	53	18	135	Count Total	1	0	0	0	1	Count Total	2	0	0	15	17
Peak Hour	32	0	32	5	69	Peak Hour	0	0	0	0	0	Peak Hour	1	0	0	5	6

LOS DESCRIPTION

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of level of service has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Levels of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The Highway Capacity Manual provides level of service calculation methodology for both intersections and arterials[1]. The following two sections provide interpretations of the analysis approaches.

[1] *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000, Chapter 16 and 17.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The 2010 Highway Capacity Manual describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level-of-Service Criteria: Automobile Mode

Control Delay (s/vehicle)	**LOS by Volume-to-Capacity Ratio**	
	***v/c* ≤ 1.0**	***v/c* > 1.0**
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole

SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the HCM (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The 2000 Highway Capacity Manual provides the basis for these calculations.

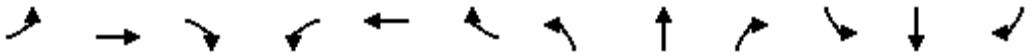
Level of Service	Delay (secs.)	Description
A	<10.00	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	10.1-20.0	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	20.1-35.0	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	35.1-55.0	**Approaching Unstable/Tolerable Delays:** The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	55.1-80.0	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	>80.0	**Forced Flow/Excessive Delays:** Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C.

EXISTING 2022 HCM REPORTS

HCM 6th Signalized Intersection Summary
1: I-5 SB Ramp & Elligsen Rd

WV Frog Pond East & South Master Pl
Existing 2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱				↰	↰	↱
Traffic Volume (veh/h)	0	1001	858	0	698	349	0	0	0	385	58	562
Future Volume (veh/h)	0	1001	858	0	698	349	0	0	0	385	58	562
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	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
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1856	0	1826	1900				1856	1870	1678
Adj Flow Rate, veh/h	0	1076	0	0	751	0				458	0	547
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	0	5	3	0	5	0				3	2	15
Cap, veh/h	0	1740		0	1740					1492	0	600
Arrive On Green	0.00	0.50	0.00	0.00	1.00	0.00				0.42	0.00	0.42
Sat Flow, veh/h	0	3561	1572	0	3561	1610				3534	0	1422
Grp Volume(v), veh/h	0	1076	0	0	751	0				458	0	547
Grp Sat Flow(s),veh/h/ln	0	1735	1572	0	1735	1610				1767	0	1422
Q Serve(g_s), s	0.0	23.5	0.0	0.0	0.0	0.0				9.0	0.0	37.9
Cycle Q Clear(g_c), s	0.0	23.5	0.0	0.0	0.0	0.0				9.0	0.0	37.9
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1740		0	1740					1492	0	600
V/C Ratio(X)	0.00	0.62		0.00	0.43					0.31	0.00	0.91
Avail Cap(c_a), veh/h	0	1740		0	1740					1818	0	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.9	0.0	0.0	0.0	0.0				20.1	0.0	28.5
Incr Delay (d2), s/veh	0.0	1.7	0.0	0.0	0.7	0.0				0.1	0.0	13.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.3	0.0	0.0	0.2	0.0				3.6	0.0	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.6	0.0	0.0	0.7	0.0				20.2	0.0	42.3
LnGrp LOS	A	C		A	A					C	A	D
Approach Vol, veh/h		1076			751						1005	
Approach Delay, s/veh		20.6			0.7						32.3	
Approach LOS		C			A						C	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		56.7		48.3		56.7						
Change Period (Y+Rc), s		5.0		4.0		5.0						
Max Green Setting (Gmax), s		42.0		54.0		42.0						
Max Q Clear Time (g_c+I1), s		25.5		39.9		2.0						
Green Ext Time (p_c), s		5.1		4.4		3.9						

Intersection Summary		
HCM 6th Ctrl Delay		19.5
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

User approved changes to right turn type.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: I-5 NB Ramp & Elligsen Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱	↰↰		↱			
Traffic Volume (veh/h)	0	748	638	0	735	577	312	0	224	0	0	0
Future Volume (veh/h)	0	748	638	0	735	577	312	0	224	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1826	0	1870	1870	1826	0	1856			
Adj Flow Rate, veh/h	0	779	0	0	766	0	325	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	2	5	0	2	2	5	0	3			
Cap, veh/h	0	2800		0	2800		426	0				
Arrive On Green	0.00	1.00	0.00	0.00	1.00	0.00	0.13	0.00	0.00			
Sat Flow, veh/h	0	3647	1547	0	3647	1585	3374	0	1572			
Grp Volume(v), veh/h	0	779	0	0	766	0	325	0	0			
Grp Sat Flow(s),veh/h/ln	0	1777	1547	0	1777	1585	1687	0	1572			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2800		0	2800		426	0				
V/C Ratio(X)	0.00	0.28		0.00	0.27		0.76	0.00				
Avail Cap(c_a), veh/h	0	2800		0	2800		1253	0				
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	0.78	0.00	0.00	0.89	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	44.3	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.2	0.0	2.9	0.0	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			
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.1	0.0	4.2	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.2	0.0	0.0	0.2	0.0	47.2	0.0	0.0			
LnGrp LOS	A	A		A	A		D	A				
Approach Vol, veh/h		779			766			325				
Approach Delay, s/veh		0.2			0.2			47.2				
Approach LOS		A			A			D				

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		87.7				87.7		17.3				
Change Period (Y+Rc), s		5.0				5.0		4.0				
Max Green Setting (Gmax), s		57.0				57.0		39.0				
Max Q Clear Time (g_c+I1), s		2.0				2.0		11.8				
Green Ext Time (p_c), s		4.1				4.0		1.5				

Intersection Summary		
HCM 6th Ctrl Delay		8.4
HCM 6th LOS		A

Notes

Unsignalized Delay for [NBR, EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Parkway Ave & Elligsen Rd

WV Frog Pond East & South Master Pl
Existing 2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	473	450	47	693	36	456	28	50	54	18	163
Future Volume (veh/h)	49	473	450	47	693	36	456	28	50	54	18	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1900	1900	1856	1900	1870	1900	1900	1678	1411	1841
Adj Flow Rate, veh/h	54	520	306	52	762	35	523	0	8	59	20	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	5	0	0	3	0	2	0	0	15	33	4
Cap, veh/h	70	1894	1168	68	2702	124	640	0	289	82	68	3
Arrive On Green	0.07	0.91	0.91	0.07	1.00	1.00	0.18	0.00	0.18	0.05	0.05	0.05
Sat Flow, veh/h	1781	3469	1609	1810	4964	227	3563	0	1610	1598	1332	67
Grp Volume(v), veh/h	54	520	306	52	518	279	523	0	8	59	0	21
Grp Sat Flow(s),veh/h/ln	1781	1735	1609	1810	1689	1814	1781	0	1610	1598	0	1399
Q Serve(g_s), s	3.1	1.9	1.6	3.0	0.0	0.0	14.8	0.0	0.4	3.8	0.0	1.5
Cycle Q Clear(g_c), s	3.1	1.9	1.6	3.0	0.0	0.0	14.8	0.0	0.4	3.8	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.13	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	70	1894	1168	68	1838	988	640	0	289	82	0	72
V/C Ratio(X)	0.78	0.27	0.26	0.77	0.28	0.28	0.82	0.00	0.03	0.72	0.00	0.29
Avail Cap(c_a), veh/h	161	1894	1168	267	1838	988	950	0	429	228	0	200
HCM Platoon Ratio	1.67	1.67	1.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.90	0.90	0.90	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.6	2.2	0.8	48.1	0.0	0.0	41.4	0.0	35.5	49.1	0.0	48.0
Incr Delay (d2), s/veh	15.8	0.3	0.5	15.0	0.3	0.6	3.5	0.0	0.0	11.3	0.0	2.2
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	0.6	0.8	1.6	0.1	0.2	6.8	0.0	0.2	1.8	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	2.5	1.3	63.1	0.3	0.6	44.9	0.0	35.5	60.4	0.0	50.2
LnGrp LOS	E	A	A	E	A	A	D	A	D	E	A	D
Approach Vol, veh/h		880			849			531			80	
Approach Delay, s/veh		5.9			4.3			44.8			57.7	
Approach LOS		A			A			D			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	62.3		10.4	8.6	62.2		23.9
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0
Max Green Setting (Gmax), s	15.5	27.0		15.0	9.5	33.0		28.0
Max Q Clear Time (g_c+I1), s	5.0	3.9		5.8	5.1	2.0		16.8
Green Ext Time (p_c), s	0.1	3.9		0.1	0.0	3.7		2.1

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
4: Parkway Center Dr & Elligsen Rd

WV Frog Pond East & South Master Pl
Existing 2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	331	221	67	412	5	352	3	53	2	5	12
Future Volume (veh/h)	15	331	221	67	412	5	352	3	53	2	5	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1900	1900	1870	1856	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	16	356	171	72	443	5	378	3	4	2	5	0
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, %	0	0	2	3	0	0	0	0	0	0	0	0
Cap, veh/h	706	1158	1182	733	2396	27	480	101	134	13	33	0
Arrive On Green	0.06	1.00	1.00	0.08	0.66	0.66	0.14	0.14	0.14	0.01	0.02	0.00
Sat Flow, veh/h	1810	1900	1584	1767	3656	41	3510	737	982	535	1338	0
Grp Volume(v), veh/h	16	356	171	72	219	229	378	0	7	7	0	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1584	1767	1805	1893	1755	0	1719	1873	0	0
Q Serve(g_s), s	0.3	0.0	0.0	1.3	5.0	5.0	10.9	0.0	0.4	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	0.0	1.3	5.0	5.0	10.9	0.0	0.4	0.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.57	0.29		0.00
Lane Grp Cap(c), veh/h	706	1158	1182	733	1183	1240	480	0	235	47	0	0
V/C Ratio(X)	0.02	0.31	0.14	0.10	0.18	0.19	0.79	0.00	0.03	0.15	0.00	0.00
Avail Cap(c_a), veh/h	805	1158	1182	783	1183	1240	970	0	475	143	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.6	0.0	0.0	4.8	7.1	7.1	43.8	0.0	39.3	50.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.2	0.0	0.3	0.3	1.1	0.0	0.0	0.5	0.0	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	0.1	0.2	0.1	0.4	1.8	1.9	4.7	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.6	0.7	0.2	4.8	7.4	7.4	45.0	0.0	39.3	50.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		543			520			385			7	
Approach Delay, s/veh		0.7			7.1			44.8			50.9	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	68.0		6.6	7.2	72.8		18.4
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	40.0		6.5	8.0	42.0		28.0
Max Q Clear Time (g_c+I1), s	3.3	2.0		2.4	2.3	7.0		12.9
Green Ext Time (p_c), s	0.0	0.5		0.0	0.0	0.3		0.3

Intersection Summary		
HCM 6th Ctrl Delay		14.9
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	59.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	211	91	298	541	390
Future Vol, veh/h	140	211	91	298	541	390
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	2	4	2	3	2
Mvmt Flow	147	222	96	314	569	411

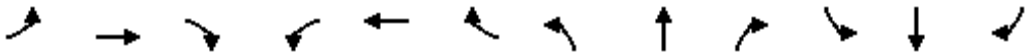
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1281	775	980	0	-	0
Stage 1	775	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.43	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	182	398	696	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	157	398	696	-	-	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	390	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	280.3	2.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	696	-	247	-	-
HCM Lane V/C Ratio	0.138	-	1.496	-	-
HCM Control Delay (s)	11	-	280.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.5	-	21.7	-	-

HCM 6th Signalized Intersection Summary
6: Parkway Ave & Boeckman Rd

WV Frog Pond East & South Master Pl
Existing 2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	267	204	62	246	21	143	161	64	31	334	205
Future Volume (veh/h)	86	267	204	62	246	21	143	161	64	31	334	205
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.99
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	1900	1900	1900	1900	1870	1900	1900	1885	1900	1900	1900	1900
Adj Flow Rate, veh/h	91	281	183	65	259	18	151	169	51	33	352	191
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, %	0	0	0	0	2	0	0	1	0	0	0	0
Cap, veh/h	372	321	209	215	499	35	299	562	170	522	415	225
Arrive On Green	0.05	0.30	0.30	0.04	0.29	0.28	0.08	0.41	0.40	0.03	0.36	0.35
Sat Flow, veh/h	1810	1061	691	1810	1724	120	1810	1381	417	1810	1156	627
Grp Volume(v), veh/h	91	0	464	65	0	277	151	0	220	33	0	543
Grp Sat Flow(s),veh/h/ln	1810	0	1751	1810	0	1844	1810	0	1797	1810	0	1783
Q Serve(g_s), s	2.5	0.0	18.0	1.8	0.0	9.0	3.6	0.0	5.9	0.8	0.0	20.2
Cycle Q Clear(g_c), s	2.5	0.0	18.0	1.8	0.0	9.0	3.6	0.0	5.9	0.8	0.0	20.2
Prop In Lane	1.00		0.39	1.00		0.06	1.00		0.23	1.00		0.35
Lane Grp Cap(c), veh/h	372	0	529	215	0	534	299	0	732	522	0	640
V/C Ratio(X)	0.24	0.00	0.88	0.30	0.00	0.52	0.51	0.00	0.30	0.06	0.00	0.85
Avail Cap(c_a), veh/h	477	0	635	343	0	669	364	0	802	675	0	796
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	23.8	19.2	0.0	21.3	15.9	0.0	14.4	14.1	0.0	21.3
Incr Delay (d2), s/veh	0.3	0.0	11.0	0.6	0.0	0.6	1.0	0.0	0.3	0.0	0.0	7.9
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	1.0	0.0	8.3	0.7	0.0	3.6	1.3	0.0	2.2	0.3	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	0.0	34.9	19.8	0.0	21.9	16.9	0.0	14.7	14.2	0.0	29.2
LnGrp LOS	B	A	C	B	A	C	B	A	B	B	A	C
Approach Vol, veh/h		555			342			371			576	
Approach Delay, s/veh		32.0			21.5			15.6			28.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	29.7	6.9	25.7	5.9	33.2	7.8	24.8
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5
Max Green Setting (Gmax), s	8.0	31.5	8.0	25.5	8.0	31.5	8.0	25.5
Max Q Clear Time (g_c+I1), s	5.6	22.2	3.8	20.0	2.8	7.9	4.5	11.0
Green Ext Time (p_c), s	0.1	3.1	0.0	1.1	0.0	1.7	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	250	45	63	255	57	29	92	71	102	155	71
Future Vol, veh/h	53	250	45	63	255	57	29	92	71	102	155	71
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	2	2	2	3	5	0	3	0	0	1	0
Mvmt Flow	59	278	50	70	283	63	32	102	79	113	172	79
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	22.5	23.8	15.2	17
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	56%	0%	85%	0%	82%	0%	69%
Vol Right, %	0%	44%	0%	15%	0%	18%	0%	31%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	163	53	295	63	312	102	226
LT Vol	29	0	53	0	63	0	102	0
Through Vol	0	92	0	250	0	255	0	155
RT Vol	0	71	0	45	0	57	0	71
Lane Flow Rate	32	181	59	328	70	347	113	251
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.077	0.395	0.131	0.675	0.155	0.708	0.26	0.525
Departure Headway (Hd)	8.627	7.847	8.004	7.415	7.982	7.355	8.257	7.533
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	414	456	446	485	448	489	434	477
Service Time	6.414	5.634	5.782	5.192	5.759	5.131	6.037	5.313
HCM Lane V/C Ratio	0.077	0.397	0.132	0.676	0.156	0.71	0.26	0.526
HCM Control Delay	12.1	15.7	12	24.4	12.2	26.2	13.9	18.4
HCM Lane LOS	B	C	B	C	B	D	B	C
HCM 95th-tile Q	0.2	1.9	0.4	5	0.5	5.5	1	3

HCM 6th Signalized Intersection Summary
8: Wilsonville Rd/Stafford Rd & Boeckman Rd/Advance Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	65	111	57	43	14	71	204	53	20	438	234
Future Volume (veh/h)	186	65	111	57	43	14	71	204	53	20	438	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.93		0.90	0.90		0.88	1.00		0.97	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	1885	1870	1885	1826	1900	1900	1885	1885	1870	1826	1885	1856
Adj Flow Rate, veh/h	188	66	18	58	43	1	72	206	45	20	442	216
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	2	1	5	0	0	1	1	2	5	1	3
Cap, veh/h	483	384	297	362	246	6	271	681	149	551	512	250
Arrive On Green	0.12	0.21	0.21	0.05	0.13	0.13	0.05	0.46	0.45	0.02	0.43	0.42
Sat Flow, veh/h	1795	1870	1445	1739	1842	43	1795	1491	326	1739	1195	584
Grp Volume(v), veh/h	188	66	18	58	0	44	72	0	251	20	0	658
Grp Sat Flow(s),veh/h/ln	1795	1870	1445	1739	0	1885	1795	0	1817	1739	0	1778
Q Serve(g_s), s	4.9	1.7	0.6	1.7	0.0	1.2	1.3	0.0	5.2	0.4	0.0	20.0
Cycle Q Clear(g_c), s	4.9	1.7	0.6	1.7	0.0	1.2	1.3	0.0	5.2	0.4	0.0	20.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.18	1.00		0.33
Lane Grp Cap(c), veh/h	483	384	297	362	0	252	271	0	829	551	0	762
V/C Ratio(X)	0.39	0.17	0.06	0.16	0.00	0.17	0.27	0.00	0.30	0.04	0.00	0.86
Avail Cap(c_a), veh/h	555	743	574	409	0	590	308	0	1277	635	0	1251
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	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	19.4	19.0	20.5	0.0	22.8	12.5	0.0	10.2	9.6	0.0	15.5
Incr Delay (d2), s/veh	0.4	0.2	0.1	0.2	0.0	0.2	0.4	0.0	0.2	0.0	0.0	3.6
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	1.9	0.7	0.2	0.6	0.0	0.5	0.5	0.0	1.8	0.1	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	19.6	19.1	20.6	0.0	23.1	12.9	0.0	10.4	9.6	0.0	19.1
LnGrp LOS	B	B	B	C	A	C	B	A	B	A	A	B
Approach Vol, veh/h		272			102			323			678	
Approach Delay, s/veh		17.9			21.7			11.0			18.8	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	29.5	11.2	11.9	5.1	31.1	7.0	16.2
Change Period (Y+Rc), s	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.0	41.3	9.1	18.1	4.0	41.3	4.1	23.1
Max Q Clear Time (g_c+I1), s	3.3	22.0	6.9	3.2	2.4	7.2	3.7	3.7
Green Ext Time (p_c), s	0.0	3.0	0.1	0.1	0.0	1.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	17.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	84	16	2	85	15	2
Future Vol, veh/h	84	16	2	85	15	2
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	81	81	81	81	81	81
Heavy Vehicles, %	1	12	0	1	7	0
Mvmt Flow	104	20	2	105	19	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	124	0	223	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	-	-	4.1	-	6.47	6.2
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	2.2	-	3.563	3.3
Pot Cap-1 Maneuver	-	-	1475	-	754	944
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1475	-	753	944
Mov Cap-2 Maneuver	-	-	-	-	753	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	771	-	-	1475	-
HCM Lane V/C Ratio	0.027	-	-	0.002	-
HCM Control Delay (s)	9.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	6	4	400	686	11
Future Vol, veh/h	12	6	4	400	686	11
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	25	0	2	0
Mvmt Flow	13	7	4	435	746	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1197	754	760	0	-	0
Stage 1	754	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	207	412	757	-	-	-
Stage 1	468	-	-	-	-	-
Stage 2	651	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	205	411	756	-	-	-
Mov Cap-2 Maneuver	205	-	-	-	-	-
Stage 1	464	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.9	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	756	-	246	-	-
HCM Lane V/C Ratio	0.006	-	0.08	-	-
HCM Control Delay (s)	9.8	0	20.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	2	410	693	2
Future Vol, veh/h	1	4	2	410	693	2
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	50
Mvmt Flow	1	4	2	446	753	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1206	756	757	0	-	0
Stage 1	756	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	205	411	863	-	-	-
Stage 1	467	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	204	410	862	-	-	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	465	-	-	-	-	-
Stage 2	646	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	862	-	341	-	-
HCM Lane V/C Ratio	0.003	-	0.016	-	-
HCM Control Delay (s)	9.2	0	15.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	409	2	2	693
Future Vol, veh/h	2	2	409	2	2	693
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	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	2	2	445	2	2	753

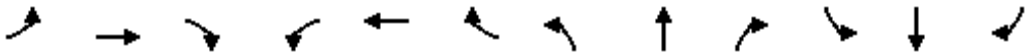
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1203	446	0	0	447	0
Stage 1	446	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	206	617	-	-	1124	-
Stage 1	649	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	205	617	-	-	1124	-
Mov Cap-2 Maneuver	205	-	-	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	466	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	308	1124	-
HCM Lane V/C Ratio	-	-	0.014	0.002	-
HCM Control Delay (s)	-	-	16.9	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

HCM 6th Signalized Intersection Summary
13: I-5 SB Ramp & Wilsonville Rd

WV Frog Pond East & South Master Pl
Existing 2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	780	597	503	829	0	0	0	0	74	2	91
Future Volume (veh/h)	0	780	597	503	829	0	0	0	0	74	2	91
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.97
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1870	1856	1870	1856	0				1856	1900	1856
Adj Flow Rate, veh/h	0	830	0	535	882	0				80	0	9
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	3	2	3	0				3	0	3
Cap, veh/h	0	3357		631	3089	0				180	0	155
Arrive On Green	0.00	0.66	0.00	0.12	0.59	0.00				0.05	0.00	0.05
Sat Flow, veh/h	0	5274	1572	3456	3618	0				3534	0	3039
Grp Volume(v), veh/h	0	830	0	535	882	0				80	0	9
Grp Sat Flow(s),veh/h/ln	0	1702	1572	1728	1763	0				1767	0	1520
Q Serve(g_s), s	0.0	7.3	0.0	16.7	13.6	0.0				2.4	0.0	0.3
Cycle Q Clear(g_c), s	0.0	7.3	0.0	16.7	13.6	0.0				2.4	0.0	0.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3357		631	3089	0				180	0	155
V/C Ratio(X)	0.00	0.25		0.85	0.29	0.00				0.44	0.00	0.06
Avail Cap(c_a), veh/h	0	3357		785	3089	0				610	0	525
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.7	0.0	46.8	5.6	0.0				50.7	0.0	49.7
Incr Delay (d2), s/veh	0.0	0.2	0.0	6.8	0.2	0.0				1.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	0.0	8.0	5.7	0.0				1.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.9	0.0	53.5	5.8	0.0				52.4	0.0	49.8
LnGrp LOS	A	A		D	A	A				D	A	D
Approach Vol, veh/h		830			1417						89	
Approach Delay, s/veh		7.9			23.9						52.1	
Approach LOS		A			C						D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.1	76.3		9.6		100.4
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	25.0	54.0		19.0		75.0
Max Q Clear Time (g_c+I1), s	18.7	9.3		4.4		15.6
Green Ext Time (p_c), s	1.4	4.4		0.2		4.8

Intersection Summary	
HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: I-5 NB Ramp & Wilsonville Rd

WV Frog Pond East & South Master Pl
Existing 2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	533	0	0	989	311	343	2	445	0	0	0
Future Volume (veh/h)	321	533	0	0	989	311	343	2	445	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1885	1826	1900	1870			
Adj Flow Rate, veh/h	334	555	0	0	1030	0	358	0	180			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	1	5	0	2			
Cap, veh/h	407	2822	0	0	3268		463	0	412			
Arrive On Green	0.24	1.00	0.00	0.00	1.00	0.00	0.13	0.00	0.13			
Sat Flow, veh/h	3456	3647	0	0	5274	1598	3478	0	3089			
Grp Volume(v), veh/h	334	555	0	0	1030	0	358	0	180			
Grp Sat Flow(s),veh/h/ln	1728	1777	0	0	1702	1598	1739	0	1545			
Q Serve(g_s), s	10.1	0.0	0.0	0.0	0.0	0.0	10.9	0.0	5.9			
Cycle Q Clear(g_c), s	10.1	0.0	0.0	0.0	0.0	0.0	10.9	0.0	5.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	407	2822	0	0	3268		463	0	412			
V/C Ratio(X)	0.82	0.20	0.00	0.00	0.32		0.77	0.00	0.44			
Avail Cap(c_a), veh/h	785	2822	0	0	3268		949	0	842			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	0.73	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	41.0	0.0	0.0	0.0	0.0	0.0	46.1	0.0	43.9			
Incr Delay (d2), s/veh	2.5	0.2	0.0	0.0	0.2	0.0	1.7	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.9	0.1	0.0	0.0	0.1	0.0	4.8	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	0.2	0.0	0.0	0.2	0.0	47.8	0.0	44.3			
LnGrp LOS	D	A	A	A	A		D	A	D			
Approach Vol, veh/h		889			1030			538				
Approach Delay, s/veh		16.4			0.2			46.6				
Approach LOS		B			A			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		91.3			16.9	74.4		18.7				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		53.0			25.0	43.0		30.0				
Max Q Clear Time (g_c+I1), s		2.0			12.1	2.0		12.9				
Green Ext Time (p_c), s		6.1			0.9	12.8		1.7				

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Town Center Lp West & Wilsonville Rd

WV Frog Pond East & South Master Pl
Existing 2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	504	54	43	564	47	188	54	40	48	66	548
Future Volume (veh/h)	365	504	54	43	564	47	188	54	40	48	66	548
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.95	1.00		0.92
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	1826	1885	1900	1885	1900	1900	1900	1900	1870
Adj Flow Rate, veh/h	384	531	51	45	594	44	198	57	16	51	139	116
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	5	1	0	1	0	0	0	0	2
Cap, veh/h	445	1912	183	57	1648	122	462	181	51	189	199	153
Arrive On Green	0.26	1.00	1.00	0.03	0.49	0.48	0.13	0.13	0.13	0.10	0.10	0.10
Sat Flow, veh/h	3456	3275	314	1739	3377	250	3591	1408	395	1810	1900	1465
Grp Volume(v), veh/h	384	287	295	45	315	323	198	0	73	51	139	116
Grp Sat Flow(s),veh/h/ln	1728	1777	1812	1739	1791	1835	1795	0	1804	1810	1900	1465
Q Serve(g_s), s	11.7	0.0	0.0	2.8	12.0	12.1	5.6	0.0	4.0	2.9	7.8	8.5
Cycle Q Clear(g_c), s	11.7	0.0	0.0	2.8	12.0	12.1	5.6	0.0	4.0	2.9	7.8	8.5
Prop In Lane	1.00		0.17	1.00		0.14	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	445	1037	1058	57	874	896	462	0	232	189	199	153
V/C Ratio(X)	0.86	0.28	0.28	0.79	0.36	0.36	0.43	0.00	0.31	0.27	0.70	0.76
Avail Cap(c_a), veh/h	534	1037	1058	111	874	896	914	0	459	296	311	240
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	0.0	52.8	17.5	17.5	44.2	0.0	43.5	45.4	47.6	47.9
Incr Delay (d2), s/veh	11.0	0.6	0.6	16.0	1.2	1.1	0.5	0.0	0.6	0.6	3.3	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	4.9	0.2	0.2	1.5	5.1	5.2	2.5	0.0	1.9	1.3	3.8	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.0	0.6	0.6	68.9	18.6	18.7	44.7	0.0	44.1	45.9	50.9	53.4
LnGrp LOS	D	A	A	E	B	B	D	A	D	D	D	D
Approach Vol, veh/h		966			683			271			306	
Approach Delay, s/veh		20.6			22.0			44.5			51.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.6	68.2		15.5	18.1	57.7		18.7
Change Period (Y+Rc), s	4.0	4.5		4.5	4.0	4.5		4.5
Max Green Setting (Gmax), s	7.6	40.0		17.5	17.0	30.0		28.0
Max Q Clear Time (g_c+I1), s	4.8	2.0		10.5	13.7	14.1		7.6
Green Ext Time (p_c), s	0.0	3.9		0.5	0.5	3.5		0.9

Intersection Summary	
HCM 6th Ctrl Delay	28.1
HCM 6th LOS	C

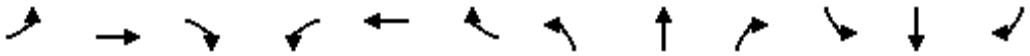
Notes

User approved volume balancing among the lanes for turning movement.

ID	Software/Method	Intersection	Control Type	LOS	Delay	V/C Ratio
1	Synchro HCM 6th Signal	I-5 SB Ramp & Elligsen Rd	Signal	B	19.5	0.74
2	Synchro HCM 6th Signal	I-5 NB Ramp & Elligsen Rd	Signal	A	8.4	0.34
3	Synchro HCM 6th Signal	Parkway Ave & Elligsen Rd	Signal	B	15.9	0.32
4	Synchro HCM 6th Signal	Parkway Center Dr & Elligsen Rd	Signal	B	14.9	0.40
6	Synchro HCM 6th Signal	Parkway Ave & Boeckman Rd	Signal	C	25.6	0.84
8	Synchro HCM 6th Signal	Wilsonville Rd/Stafford Rd & Boeckman Rd/A	Signal	B	17.0	0.65
13	Synchro HCM 6th Signal	I-5 SB Ramp & Wilsonville Rd	Signal	B	19.3	0.38
14	Synchro HCM 6th Signal	I-5 NB Ramp & Wilsonville Rd	Signal	B	16.2	0.44
15	Synchro HCM 6th Signal	Town Center Lp West & Wilsonville Rd	Signal	C	28.1	0.38

FUTURE BASELINE 2040 HCM REPORTS

HCM 6th Signalized Intersection Summary
1: I-5 SB Ramp & Elligsen Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1315	1105	0	1030	370	0	0	0	480	70	830
Future Volume (veh/h)	0	1315	1105	0	1030	370	0	0	0	480	70	830
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.98
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1826	1856	0	1826	1900				1856	1870	1678
Adj Flow Rate, veh/h	0	1384	0	0	1084	0				558	0	798
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	0	5	0				3	2	15
Cap, veh/h	0	2019		0	2019					1208	0	951
Arrive On Green	0.00	0.58	0.00	0.00	1.00	0.00				0.34	0.00	0.34
Sat Flow, veh/h	0	3561	1572	0	3561	1610				3534	0	2784
Grp Volume(v), veh/h	0	1384	0	0	1084	0				558	0	798
Grp Sat Flow(s),veh/h/ln	0	1735	1572	0	1735	1610				1767	0	1392
Q Serve(g_s), s	0.0	29.1	0.0	0.0	0.0	0.0				13.0	0.0	27.8
Cycle Q Clear(g_c), s	0.0	29.1	0.0	0.0	0.0	0.0				13.0	0.0	27.8
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2019		0	2019					1208	0	951
V/C Ratio(X)	0.00	0.69		0.00	0.54					0.46	0.00	0.84
Avail Cap(c_a), veh/h	0	2019		0	2019					1447	0	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.86	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.3	0.0	0.0	0.0	0.0				27.0	0.0	31.9
Incr Delay (d2), s/veh	0.0	1.9	0.0	0.0	0.9	0.0				0.3	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.0	0.0	0.0	0.2	0.0				5.4	0.0	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.2	0.0	0.0	0.9	0.0				27.3	0.0	36.8
LnGrp LOS	A	B		A	A					C	A	D
Approach Vol, veh/h		1384			1084						1356	
Approach Delay, s/veh		17.2			0.9						32.9	
Approach LOS		B			A						C	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	65.1	39.9	65.1
Change Period (Y+Rc), s	5.0	4.0	5.0
Max Green Setting (Gmax), s	53.0	43.0	53.0
Max Q Clear Time (g_c+I1), s	31.1	29.8	2.0
Green Ext Time (p_c), s	7.8	6.1	6.4

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

User approved changes to right turn type.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: I-5 NB Ramp & Elligsen Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱	↰↰		↱			
Traffic Volume (veh/h)	0	905	890	0	920	535	480	0	270	0	0	0
Future Volume (veh/h)	0	905	890	0	920	535	480	0	270	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1826	0	1870	1870	1826	0	1856			
Adj Flow Rate, veh/h	0	943	0	0	958	0	500	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	2	5	0	2	2	5	0	3			
Cap, veh/h	0	2598		0	2598		618	0				
Arrive On Green	0.00	1.00	0.00	0.00	1.00	0.00	0.18	0.00	0.00			
Sat Flow, veh/h	0	3647	1547	0	3647	1585	3374	0	1572			
Grp Volume(v), veh/h	0	943	0	0	958	0	500	0	0			
Grp Sat Flow(s),veh/h/ln	0	1777	1547	0	1777	1585	1687	0	1572			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	14.9	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	14.9	0.0	0.0			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2598		0	2598		618	0				
V/C Ratio(X)	0.00	0.36		0.00	0.37		0.81	0.00				
Avail Cap(c_a), veh/h	0	2598		0	2598		1253	0				
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	0.67	0.00	0.00	0.86	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	41.1	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.3	0.0	2.6	0.0	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			
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.1	0.0	6.3	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.3	0.0	0.0	0.3	0.0	43.7	0.0	0.0			
LnGrp LOS	A	A		A	A		D	A				
Approach Vol, veh/h		943			958			500				
Approach Delay, s/veh		0.3			0.3			43.7				
Approach LOS		A			A			D				

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		81.8				81.8		23.2				
Change Period (Y+Rc), s		5.0				5.0		4.0				
Max Green Setting (Gmax), s		57.0				57.0		39.0				
Max Q Clear Time (g_c+I1), s		2.0				2.0		16.9				
Green Ext Time (p_c), s		5.2				5.3		2.3				

Intersection Summary		
HCM 6th Ctrl Delay		9.3
HCM 6th LOS		A

Notes

Unsignalized Delay for [NBR, EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Parkway Ave & Elligsen Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	625	470	50	795	45	460	30	55	70	20	200
Future Volume (veh/h)	80	625	470	50	795	45	460	30	55	70	20	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1900	1900	1856	1900	1870	1900	1900	1678	1411	1841
Adj Flow Rate, veh/h	88	687	314	55	874	44	529	0	8	77	22	2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	5	0	0	3	0	2	0	0	15	33	4
Cap, veh/h	111	1839	1142	72	2507	126	640	0	289	103	82	7
Arrive On Green	0.13	1.00	1.00	0.01	0.17	0.17	0.18	0.00	0.18	0.06	0.06	0.06
Sat Flow, veh/h	1781	3469	1609	1810	4940	248	3563	0	1610	1598	1274	116
Grp Volume(v), veh/h	88	687	314	55	597	321	529	0	8	77	0	24
Grp Sat Flow(s),veh/h/ln	1781	1735	1609	1810	1689	1811	1781	0	1610	1598	0	1390
Q Serve(g_s), s	5.0	0.0	0.0	3.2	16.4	16.5	15.0	0.0	0.4	5.0	0.0	1.7
Cycle Q Clear(g_c), s	5.0	0.0	0.0	3.2	16.4	16.5	15.0	0.0	0.4	5.0	0.0	1.7
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	111	1839	1142	72	1714	919	640	0	289	103	0	90
V/C Ratio(X)	0.79	0.37	0.27	0.76	0.35	0.35	0.83	0.00	0.03	0.75	0.00	0.27
Avail Cap(c_a), veh/h	198	1839	1142	267	1714	919	882	0	399	228	0	199
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.3	0.0	0.0	51.3	28.4	28.4	41.5	0.0	35.5	48.3	0.0	46.8
Incr Delay (d2), s/veh	10.6	0.5	0.5	13.2	0.5	0.9	4.7	0.0	0.0	10.3	0.0	1.6
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	2.4	0.1	0.2	1.7	7.5	8.2	7.0	0.0	0.2	2.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	0.5	0.5	64.5	28.8	29.3	46.2	0.0	35.5	58.6	0.0	48.3
LnGrp LOS	E	A	A	E	C	C	D	A	D	E	A	D
Approach Vol, veh/h		1089			973			537			101	
Approach Delay, s/veh		5.0			31.0			46.0			56.2	
Approach LOS		A			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	60.7		11.8	11.1	58.3		23.9				
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0				
Max Green Setting (Gmax), s	15.5	29.0		15.0	11.7	32.8		26.0				
Max Q Clear Time (g_c+I1), s	5.2	2.0		7.0	7.0	18.5		17.0				
Green Ext Time (p_c), s	0.1	5.1		0.2	0.1	3.6		1.8				

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
4: Parkway Center Dr & Elligsen Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	455	265	120	460	5	415	5	115	5	5	15
Future Volume (veh/h)	30	455	265	120	460	5	415	5	115	5	5	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1900	1900	1870	1856	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	32	489	190	129	495	5	446	5	13	5	5	0
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, %	0	0	2	3	0	0	0	0	0	0	0	0
Cap, veh/h	659	1101	1164	586	2267	23	546	72	188	27	27	0
Arrive On Green	0.06	0.77	0.77	0.08	0.62	0.62	0.16	0.16	0.16	0.01	0.03	0.00
Sat Flow, veh/h	1810	1900	1584	1767	3661	37	3510	466	1211	927	927	0
Grp Volume(v), veh/h	32	489	190	129	244	256	446	0	18	10	0	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1584	1767	1805	1893	1755	0	1677	1854	0	0
Q Serve(g_s), s	0.7	9.4	2.2	2.6	6.2	6.3	12.9	0.0	1.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.7	9.4	2.2	2.6	6.2	6.3	12.9	0.0	1.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.72	0.50		0.00
Lane Grp Cap(c), veh/h	659	1101	1164	586	1118	1172	546	0	261	53	0	0
V/C Ratio(X)	0.05	0.44	0.16	0.22	0.22	0.22	0.82	0.00	0.07	0.19	0.00	0.00
Avail Cap(c_a), veh/h	734	1101	1164	590	1118	1172	903	0	431	141	0	0
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.5	6.1	2.2	6.5	8.8	8.8	42.9	0.0	37.8	50.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.3	0.1	0.4	0.4	1.2	0.0	0.0	0.6	0.0	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	3.2	1.1	0.9	2.4	2.5	5.6	0.0	0.4	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.5	7.3	2.4	6.5	9.3	9.2	44.0	0.0	37.9	50.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		711			629			464			10	
Approach Delay, s/veh		6.0			8.7			43.8			50.8	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.8	64.8		7.0	8.6	69.0		20.3
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	44.0		6.5	8.0	44.0		26.0
Max Q Clear Time (g_c+I1), s	4.6	11.4		2.6	2.7	8.3		14.9
Green Ext Time (p_c), s	0.0	0.6		0.0	0.0	0.4		0.3

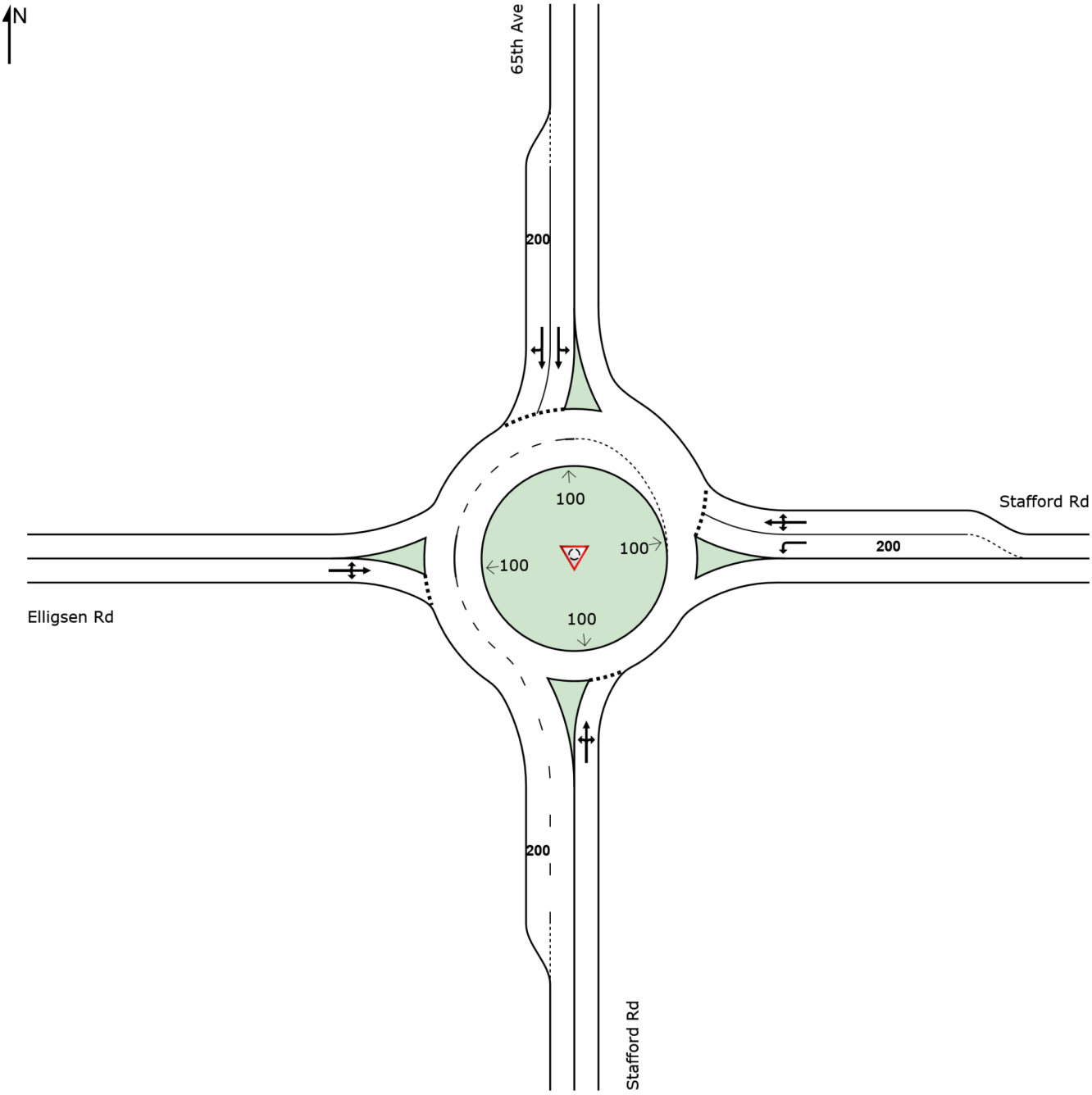
Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

SITE LAYOUT

Site: [Stafford Rd/65th Ave - Baseline (Site Folder: Stafford Rd/65th Ave)]

Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: [Stafford Rd/65th Ave - Baseline (Site Folder: Stafford Rd/65th Ave)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Stafford Rd														
3	L2	25	2.0	26	2.0	0.584	12.0	LOS B	5.7	144.1	0.71	0.78	1.02	31.6
8	T1	165	2.0	174	2.0	0.584	12.0	LOS B	5.7	144.1	0.71	0.78	1.02	31.6
18	R2	330	2.0	347	2.0	0.584	12.0	LOS B	5.7	144.1	0.71	0.78	1.02	30.7
Approach		520	2.0	547	2.0	0.584	12.0	LOS B	5.7	144.1	0.71	0.78	1.02	31.0
East: Stafford Rd														
1	L2	610	2.0	642	2.0	0.618	12.0	LOS B	6.7	169.4	0.68	0.73	0.99	29.6
6	T1	395	2.0	416	2.0	0.502	9.4	LOS A	3.3	82.6	0.59	0.52	0.65	33.0
16	R2	100	2.0	105	2.0	0.502	9.4	LOS A	3.3	82.6	0.59	0.52	0.65	32.0
Approach		1105	2.0	1163	2.0	0.618	10.8	LOS B	6.7	169.4	0.64	0.64	0.84	30.9
North: 65th Ave														
7	L2	35	2.0	37	2.0	0.707	24.6	LOS C	5.1	128.3	0.84	1.10	1.76	27.0
4	T1	420	2.0	442	2.0	0.707	23.3	LOS C	5.1	128.3	0.81	1.03	1.57	27.7
14	R2	65	2.0	68	2.0	0.340	13.1	LOS B	1.4	34.8	0.73	0.78	0.91	30.4
Approach		520	2.0	547	2.0	0.707	22.1	LOS C	5.1	128.3	0.80	1.00	1.50	28.0
West: Elligsen Rd														
5	L2	105	2.0	111	2.0	0.839	37.2	LOS D	8.1	206.5	0.90	1.36	2.49	23.2
2	T1	195	2.0	205	2.0	0.839	37.2	LOS D	8.1	206.5	0.90	1.36	2.49	23.2
12	R2	120	2.0	126	2.0	0.839	42.9	LOS D	8.1	206.5	0.90	1.36	2.49	22.7
Approach		420	2.0	442	2.0	0.839	38.8	LOS D	8.1	206.5	0.90	1.36	2.49	23.0
All Vehicles		2565	2.0	2700	2.0	0.839	17.9	LOS B	8.1	206.5	0.73	0.86	1.28	28.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Processed: Tuesday, August 23, 2022 1:25:55 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Synchro\Wilsonville Frog Pond East & South Master Plan - Future 2040.sip9

HCM 6th Signalized Intersection Summary
6: Parkway Ave & Boeckman Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	305	315	75	340	30	200	220	65	35	385	260
Future Volume (veh/h)	145	305	315	75	340	30	200	220	65	35	385	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.96	1.00		0.99	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	1900	1900	1900	1900	1870	1900	1900	1885	1900	1900	1900	1900
Adj Flow Rate, veh/h	153	321	105	79	358	24	211	232	57	37	405	247
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, %	0	0	0	0	2	0	0	1	0	0	0	0
Cap, veh/h	330	554	177	282	563	38	330	706	173	575	468	286
Arrive On Green	0.09	0.21	0.20	0.05	0.17	0.16	0.09	0.48	0.48	0.03	0.42	0.42
Sat Flow, veh/h	1810	2664	853	1810	3371	225	1810	1457	358	1810	1104	673
Grp Volume(v), veh/h	153	215	211	79	188	194	211	0	289	37	0	652
Grp Sat Flow(s),veh/h/ln	1810	1805	1712	1810	1777	1819	1810	0	1814	1810	0	1777
Q Serve(g_s), s	4.8	7.5	7.8	2.5	6.9	7.0	4.3	0.0	6.9	0.8	0.0	23.5
Cycle Q Clear(g_c), s	4.8	7.5	7.8	2.5	6.9	7.0	4.3	0.0	6.9	0.8	0.0	23.5
Prop In Lane	1.00		0.50	1.00		0.12	1.00		0.20	1.00		0.38
Lane Grp Cap(c), veh/h	330	375	356	282	297	304	330	0	879	575	0	754
V/C Ratio(X)	0.46	0.57	0.59	0.28	0.63	0.64	0.64	0.00	0.33	0.06	0.00	0.87
Avail Cap(c_a), veh/h	369	580	550	395	571	584	374	0	913	727	0	894
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	25.1	25.3	23.1	27.3	27.4	14.7	0.0	11.2	11.1	0.0	18.5
Incr Delay (d2), s/veh	0.8	1.0	1.2	0.4	1.7	1.7	2.6	0.0	0.3	0.0	0.0	8.4
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	1.9	3.1	3.0	1.0	2.9	3.0	1.6	0.0	2.4	0.3	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	26.1	26.5	23.5	29.0	29.0	17.2	0.0	11.5	11.1	0.0	26.9
LnGrp LOS	C	C	C	C	C	C	B	A	B	B	A	C
Approach Vol, veh/h		579			461			500			689	
Approach Delay, s/veh		25.2			28.1			13.9			26.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	33.9	7.6	18.6	6.1	38.1	10.5	15.8
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5
Max Green Setting (Gmax), s	8.0	34.9	8.0	22.1	8.0	34.9	8.0	22.1
Max Q Clear Time (g_c+I1), s	6.3	25.5	4.5	9.8	2.8	8.9	6.8	9.0
Green Ext Time (p_c), s	0.1	3.8	0.0	1.5	0.0	2.4	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
7: Canyon Creek Rd & Boeckman Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	265	45	85	330	70	40	120	105	115	165	75
Future Volume (veh/h)	55	265	45	85	330	70	40	120	105	115	165	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	0.99		0.97
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	1900	1870	1870	1870	1856	1826	1900	1856	1900	1900	1885	1900
Adj Flow Rate, veh/h	61	294	42	94	367	69	44	133	76	128	183	63
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	2	2	3	5	0	3	0	0	1	0
Cap, veh/h	335	481	69	414	478	90	345	205	117	390	307	106
Arrive On Green	0.05	0.30	0.29	0.06	0.32	0.30	0.04	0.19	0.17	0.08	0.23	0.22
Sat Flow, veh/h	1810	1600	229	1781	1518	285	1810	1103	630	1810	1328	457
Grp Volume(v), veh/h	61	0	336	94	0	436	44	0	209	128	0	246
Grp Sat Flow(s),veh/h/ln	1810	0	1828	1781	0	1803	1810	0	1733	1810	0	1786
Q Serve(g_s), s	1.0	0.0	6.9	1.6	0.0	9.5	0.9	0.0	4.9	2.5	0.0	5.4
Cycle Q Clear(g_c), s	1.0	0.0	6.9	1.6	0.0	9.5	0.9	0.0	4.9	2.5	0.0	5.4
Prop In Lane	1.00		0.13	1.00		0.16	1.00		0.36	1.00		0.26
Lane Grp Cap(c), veh/h	335	0	550	414	0	568	345	0	323	390	0	412
V/C Ratio(X)	0.18	0.00	0.61	0.23	0.00	0.77	0.13	0.00	0.65	0.33	0.00	0.60
Avail Cap(c_a), veh/h	581	0	1388	631	0	1369	609	0	997	573	0	1027
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	13.1	10.2	0.0	13.5	14.0	0.0	16.5	13.2	0.0	15.0
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.3	0.0	2.2	0.2	0.0	2.2	0.5	0.0	1.4
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	0.3	0.0	2.3	0.5	0.0	3.2	0.3	0.0	1.9	0.9	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	0.0	14.2	10.5	0.0	15.7	14.1	0.0	18.6	13.7	0.0	16.4
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h		397			530			253			374	
Approach Delay, s/veh		13.7			14.8			17.9			15.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	12.1	6.7	17.1	5.6	14.0	6.1	17.7
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5
Max Green Setting (Gmax), s	8.0	24.5	8.0	32.5	8.0	24.5	8.0	32.5
Max Q Clear Time (g_c+I1), s	4.5	6.9	3.6	8.9	2.9	7.4	3.0	11.5
Green Ext Time (p_c), s	0.1	0.7	0.1	1.3	0.0	0.8	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
8: Wilsonville Rd/Stafford Rd & Boeckman Rd/Advance Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	70	115	60	60	30	100	225	65	45	465	330
Future Volume (veh/h)	205	70	115	60	60	30	100	225	65	45	465	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.92		0.90	0.87		0.85	1.00		0.98	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	1885	1870	1885	1826	1900	1900	1885	1885	1870	1826	1885	1856
Adj Flow Rate, veh/h	207	71	20	61	61	8	101	227	56	45	470	308
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	2	1	5	0	0	1	1	2	5	1	3
Cap, veh/h	427	358	275	307	175	23	238	728	180	589	516	338
Arrive On Green	0.13	0.19	0.19	0.05	0.11	0.10	0.05	0.50	0.49	0.03	0.49	0.48
Sat Flow, veh/h	1795	1870	1436	1739	1607	211	1795	1452	358	1739	1062	696
Grp Volume(v), veh/h	207	71	20	61	0	69	101	0	283	45	0	778
Grp Sat Flow(s),veh/h/ln	1795	1870	1436	1739	0	1817	1795	0	1810	1739	0	1758
Q Serve(g_s), s	6.8	2.3	0.8	2.2	0.0	2.5	2.0	0.0	6.6	0.9	0.0	28.9
Cycle Q Clear(g_c), s	6.8	2.3	0.8	2.2	0.0	2.5	2.0	0.0	6.6	0.9	0.0	28.9
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.20	1.00		0.40
Lane Grp Cap(c), veh/h	427	358	275	307	0	198	238	0	907	589	0	854
V/C Ratio(X)	0.48	0.20	0.07	0.20	0.00	0.35	0.42	0.00	0.31	0.08	0.00	0.91
Avail Cap(c_a), veh/h	490	624	479	336	0	424	252	0	1069	629	0	1038
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	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.6	24.1	23.5	26.1	0.0	29.2	15.3	0.0	10.5	8.9	0.0	16.9
Incr Delay (d2), s/veh	0.6	0.2	0.1	0.2	0.0	0.8	0.9	0.0	0.2	0.0	0.0	10.4
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	2.7	1.0	0.3	0.9	0.0	1.1	0.7	0.0	2.3	0.3	0.0	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	24.3	23.6	26.3	0.0	30.0	16.2	0.0	10.7	8.9	0.0	27.3
LnGrp LOS	C	C	C	C	A	C	B	A	B	A	A	C
Approach Vol, veh/h		298			130			384			823	
Approach Delay, s/veh		22.8			28.3			12.1			26.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	38.4	13.2	11.7	6.3	39.5	7.4	17.5
Change Period (Y+Rc), s	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.0	41.3	11.2	16.0	4.0	41.3	4.1	23.1
Max Q Clear Time (g_c+I1), s	4.0	30.9	8.8	4.5	2.9	8.6	4.2	4.3
Green Ext Time (p_c), s	0.0	3.0	0.1	0.1	0.0	1.1	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	100	25	5	95	25	30	30	5	30	30	5
Future Vol, veh/h	5	100	25	5	95	25	30	30	5	30	30	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	12	0	1	0	7	0	0	0	0	0
Mvmt Flow	6	111	28	6	106	28	33	33	6	33	33	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	134	0	0	139	0	0	289	283	125	289	283	120
Stage 1	-	-	-	-	-	-	137	137	-	132	132	-
Stage 2	-	-	-	-	-	-	152	146	-	157	151	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.17	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.563	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1463	-	-	1457	-	-	653	629	931	667	629	937
Stage 1	-	-	-	-	-	-	854	787	-	876	791	-
Stage 2	-	-	-	-	-	-	839	780	-	850	776	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1463	-	-	1457	-	-	619	624	931	632	624	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	619	624	-	632	624	-
Stage 1	-	-	-	-	-	-	851	784	-	872	788	-
Stage 2	-	-	-	-	-	-	796	777	-	806	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	11.4	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	638	1463	-	-	1457	-	-	644
HCM Lane V/C Ratio	0.113	0.004	-	-	0.004	-	-	0.112
HCM Control Delay (s)	11.4	7.5	0	-	7.5	0	-	11.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	5	15	20	10	20	15	400	45	70	805	45
Future Vol, veh/h	25	5	15	20	10	20	15	400	45	70	805	45
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	10	0	0	0	2	0
Mvmt Flow	27	5	16	22	11	22	16	435	49	76	875	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1562	1570	902	1554	1570	460	926	0	0	484	0	0
Stage 1	1054	1054	-	492	492	-	-	-	-	-	-	-
Stage 2	508	516	-	1062	1078	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.2	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.29	-	-	2.2	-	-
Pot Cap-1 Maneuver	92	112	339	93	112	605	706	-	-	1089	-	-
Stage 1	276	305	-	562	551	-	-	-	-	-	-	-
Stage 2	551	538	-	273	297	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	70	93	338	74	93	605	705	-	-	1089	-	-
Mov Cap-2 Maneuver	70	93	-	74	93	-	-	-	-	-	-	-
Stage 1	267	260	-	545	534	-	-	-	-	-	-	-
Stage 2	504	521	-	218	253	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	72.6	56.3	0.3	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	705	-	-	99	122	1089	-	-
HCM Lane V/C Ratio	0.023	-	-	0.494	0.445	0.07	-	-
HCM Control Delay (s)	10.2	0	-	72.6	56.3	8.6	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	2	0.2	-	-

Intersection	
Int Delay, s/veh	36.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	75	10	10	10	10	50	5	420	20	85	900	100
Future Vol, veh/h	75	10	10	10	10	50	5	420	20	85	900	100
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	10
Mvmt Flow	82	11	11	11	11	54	5	457	22	92	978	109

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1730	1708	1035	1706	1751	468	1089	0	0	479	0	0
Stage 1	1219	1219	-	478	478	-	-	-	-	-	-	-
Stage 2	511	489	-	1228	1273	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 70	92	284	73	87	599	648	-	-	1094	-	-
Stage 1	223	255	-	572	559	-	-	-	-	-	-	-
Stage 2	549	553	-	220	241	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 46	71	284	51	67	599	647	-	-	1094	-	-
Mov Cap-2 Maneuver	~ 46	71	-	51	67	-	-	-	-	-	-	-
Stage 1	220	199	-	566	553	-	-	-	-	-	-	-
Stage 2	484	547	-	156	188	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s$	610.5	45.1	0.1	0.7
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	647	-	-	53	163	1094	-	-
HCM Lane V/C Ratio	0.008	-	-	1.948	0.467	0.084	-	-
HCM Control Delay (s)	10.6	0	-	$ 610.5	45.1	8.6	0	-
HCM Lane LOS	B	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	10.1	2.2	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.5

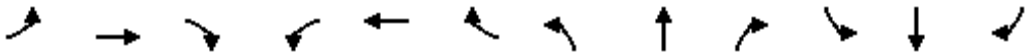
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	5	5	5	5	10	5	535	5	10	1075	10
Future Vol, veh/h	10	5	5	5	5	10	5	535	5	10	1075	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	2	0
Mvmt Flow	11	5	5	5	5	11	5	582	5	11	1168	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1799	1793	1174	1796	1796	585	1179	0	0	587	0	0
Stage 1	1196	1196	-	595	595	-	-	-	-	-	-	-
Stage 2	603	597	-	1201	1201	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	63	82	236	63	81	515	600	-	-	998	-	-
Stage 1	229	262	-	494	496	-	-	-	-	-	-	-
Stage 2	489	495	-	228	260	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	56	78	236	56	77	515	600	-	-	998	-	-
Mov Cap-2 Maneuver	56	78	-	56	77	-	-	-	-	-	-	-
Stage 1	226	254	-	488	490	-	-	-	-	-	-	-
Stage 2	468	489	-	211	252	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	70.3	43.5	0.1	0.1
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	600	-	-	76	115	998	-	-
HCM Lane V/C Ratio	0.009	-	-	0.286	0.189	0.011	-	-
HCM Control Delay (s)	11.1	0	-	70.3	43.5	8.6	0	-
HCM Lane LOS	B	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	0.7	0	-	-

HCM 6th Signalized Intersection Summary
13: I-5 SB Ramp & Wilsonville Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	820	655	540	1015	0	0	0	0	80	5	115
Future Volume (veh/h)	0	820	655	540	1015	0	0	0	0	80	5	115
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.97
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1870	1856	1870	1856	0				1856	1900	1856
Adj Flow Rate, veh/h	0	863	0	568	1068	0				88	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	3	2	3	0				3	0	3
Cap, veh/h	0	3331		644	3086	0				184	0	158
Arrive On Green	0.00	0.65	0.00	0.37	1.00	0.00				0.05	0.00	0.05
Sat Flow, veh/h	0	5274	1572	3456	3618	0				3534	0	3039
Grp Volume(v), veh/h	0	863	0	568	1068	0				88	0	13
Grp Sat Flow(s),veh/h/ln	0	1702	1572	1728	1763	0				1767	0	1520
Q Serve(g_s), s	0.0	7.8	0.0	16.9	0.0	0.0				2.7	0.0	0.4
Cycle Q Clear(g_c), s	0.0	7.8	0.0	16.9	0.0	0.0				2.7	0.0	0.4
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3331		644	3086	0				184	0	158
V/C Ratio(X)	0.00	0.26		0.88	0.35	0.00				0.48	0.00	0.08
Avail Cap(c_a), veh/h	0	3331		817	3086	0				610	0	525
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.88	0.88	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.0	0.0	33.4	0.0	0.0				50.7	0.0	49.6
Incr Delay (d2), s/veh	0.0	0.2	0.0	8.3	0.3	0.0				1.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	0.0	6.2	0.1	0.0				1.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.2	0.0	41.6	0.3	0.0				52.6	0.0	49.9
LnGrp LOS	A	A		D	A	A				D	A	D
Approach Vol, veh/h		863			1636						101	
Approach Delay, s/veh		8.2			14.6						52.3	
Approach LOS		A			B						D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.5	75.8		9.7		100.3
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	26.0	53.0		19.0		75.0
Max Q Clear Time (g_c+I1), s	18.9	9.8		4.7		2.0
Green Ext Time (p_c), s	1.6	4.6		0.3		6.3

Intersection Summary		
HCM 6th Ctrl Delay		14.0
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: I-5 NB Ramp & Wilsonville Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	540	0	0	1100	335	455	10	505	0	0	0
Future Volume (veh/h)	360	540	0	0	1100	335	455	10	505	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1885	1826	1900	1870			
Adj Flow Rate, veh/h	375	562	0	0	1146	0	481	0	264			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	1	5	0	2			
Cap, veh/h	446	2680	0	0	3006		602	0	541			
Arrive On Green	0.26	1.00	0.00	0.00	0.59	0.00	0.17	0.00	0.17			
Sat Flow, veh/h	3456	3647	0	0	5274	1598	3478	0	3124			
Grp Volume(v), veh/h	375	562	0	0	1146	0	481	0	264			
Grp Sat Flow(s),veh/h/ln	1728	1777	0	0	1702	1598	1739	0	1562			
Q Serve(g_s), s	11.3	0.0	0.0	0.0	13.1	0.0	14.6	0.0	8.4			
Cycle Q Clear(g_c), s	11.3	0.0	0.0	0.0	13.1	0.0	14.6	0.0	8.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	446	2680	0	0	3006		602	0	541			
V/C Ratio(X)	0.84	0.21	0.00	0.00	0.38		0.80	0.00	0.49			
Avail Cap(c_a), veh/h	723	2680	0	0	3006		1043	0	937			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	0.23	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.7	0.0	0.0	0.0	12.0	0.0	43.6	0.0	41.1			
Incr Delay (d2), s/veh	3.3	0.2	0.0	0.0	0.1	0.0	1.5	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.3	0.1	0.0	0.0	4.7	0.0	6.3	0.0	3.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.0	0.2	0.0	0.0	12.1	0.0	45.2	0.0	41.5			
LnGrp LOS	D	A	A	A	B		D	A	D			
Approach Vol, veh/h		937			1146			745				
Approach Delay, s/veh		17.3			12.1			43.9				
Approach LOS		B			B			D				

Timer - Assigned Phs	2			5	6		8				
Phs Duration (G+Y+Rc), s	87.0			18.2	68.8		23.0				
Change Period (Y+Rc), s	4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s	52.0			23.0	42.0		33.0				
Max Q Clear Time (g_c+I1), s	2.0			13.3	15.1		16.6				
Green Ext Time (p_c), s	6.1			0.9	12.3		2.4				

Intersection Summary		
HCM 6th Ctrl Delay	22.2	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Town Center Lp West & Wilsonville Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	930	115	0	865	50	195	25	90	65	125	375
Future Volume (veh/h)	0	930	115	0	865	50	195	25	90	65	125	375
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.97
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	0	1870	1870	0	1885	1900	1885	1900	1900	1900	1900	1870
Adj Flow Rate, veh/h	0	979	106	0	911	49	205	26	39	68	132	353
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, %	0	2	2	0	1	0	1	0	0	0	0	2
Cap, veh/h	0	1396	151	0	1031	55	237	370	555	96	208	557
Arrive On Green	0.00	0.10	0.10	0.00	0.30	0.29	0.13	0.54	0.54	0.05	0.46	0.46
Sat Flow, veh/h	0	4841	505	0	3545	186	1795	681	1021	1810	448	1198
Grp Volume(v), veh/h	0	713	372	0	473	487	205	0	65	68	0	485
Grp Sat Flow(s),veh/h/ln	0	1702	1773	0	1791	1845	1795	0	1701	1810	0	1646
Q Serve(g_s), s	0.0	22.3	22.4	0.0	27.7	27.7	12.3	0.0	2.0	4.1	0.0	24.6
Cycle Q Clear(g_c), s	0.0	22.3	22.4	0.0	27.7	27.7	12.3	0.0	2.0	4.1	0.0	24.6
Prop In Lane	0.00		0.28	0.00		0.10	1.00		0.60	1.00		0.73
Lane Grp Cap(c), veh/h	0	1017	530	0	535	551	237	0	925	96	0	765
V/C Ratio(X)	0.00	0.70	0.70	0.00	0.88	0.88	0.87	0.00	0.07	0.71	0.00	0.63
Avail Cap(c_a), veh/h	0	1331	693	0	700	721	237	0	925	156	0	765
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.95	0.95	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	44.8	44.9	0.0	36.7	36.8	46.8	0.0	12.0	51.2	0.0	22.3
Incr Delay (d2), s/veh	0.0	0.9	1.7	0.0	9.8	9.5	26.9	0.0	0.1	9.2	0.0	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	0.0	10.3	10.9	0.0	13.2	13.6	7.3	0.0	0.8	2.1	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	45.7	46.5	0.0	46.5	46.3	73.7	0.0	12.1	60.4	0.0	26.3
LnGrp LOS	A	D	D	A	D	D	E	A	B	E	A	C
Approach Vol, veh/h		1085			960			270			553	
Approach Delay, s/veh		46.0			46.4			58.9			30.5	
Approach LOS		D			D			E			C	

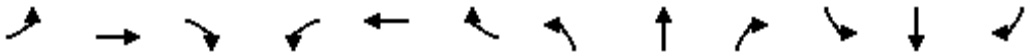
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	63.8		36.9	18.0	55.1		36.9				
Change Period (Y+Rc), s	4.0	4.5		4.5	4.0	4.5		4.5				
Max Green Setting (Gmax), s	9.3	45.5		42.5	14.0	40.5		42.5				
Max Q Clear Time (g_c+I1), s	6.1	4.0		24.4	14.3	26.6		29.7				
Green Ext Time (p_c), s	0.0	0.2		3.8	0.0	1.5		2.7				

Intersection Summary		
HCM 6th Ctrl Delay		44.3
HCM 6th LOS		D

ID	Software/Method	Intersection	Control Type	LOS	Delay	V/C Ratio
1	Synchro HCM 6th Signal	I-5 SB Ramp & Elligsen Rd	Signal	B	18.1	0.73
2	Synchro HCM 6th Signal	I-5 NB Ramp & Elligsen Rd	Signal	A	9.3	0.45
3	Synchro HCM 6th Signal	Parkway Ave & Elligsen Rd	Signal	C	24.4	0.52
4	Synchro HCM 6th Signal	Parkway Center Dr & Elligsen Rd	Signal	B	16.9	0.55
6	Synchro HCM 6th Signal	Parkway Ave & Boeckman Rd	Signal	C	23.5	0.82
7	Synchro HCM 6th Signal	Canyon Creek Rd & Boeckman Rd	Signal	B	15.2	0.57
8	Synchro HCM 6th Signal	Wilsonville Rd/Stafford Rd & Boeckman Rd/	Signal	C	22.5	0.79
13	Synchro HCM 6th Signal	I-5 SB Ramp & Wilsonville Rd	Signal	B	14.0	0.40
14	Synchro HCM 6th Signal	I-5 NB Ramp & Wilsonville Rd	Signal	C	22.2	0.52
15	Synchro HCM 6th Signal	Town Center Lp West & Wilsonville Rd	Signal	D	44.3	0.82

ANTICIPATED BUILD 2040 HCM REPORTS

HCM 6th Signalized Intersection Summary
1: I-5 SB Ramp & Elligsen Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1325	1105	0	1030	370	0	0	0	480	70	830
Future Volume (veh/h)	0	1325	1105	0	1030	370	0	0	0	480	70	830
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.98
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1826	1856	0	1826	1900				1856	1870	1678
Adj Flow Rate, veh/h	0	1395	0	0	1084	0				558	0	798
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	0	5	0				3	2	15
Cap, veh/h	0	2019		0	2019					1208	0	951
Arrive On Green	0.00	0.58	0.00	0.00	1.00	0.00				0.34	0.00	0.34
Sat Flow, veh/h	0	3561	1572	0	3561	1610				3534	0	2784
Grp Volume(v), veh/h	0	1395	0	0	1084	0				558	0	798
Grp Sat Flow(s),veh/h/ln	0	1735	1572	0	1735	1610				1767	0	1392
Q Serve(g_s), s	0.0	29.5	0.0	0.0	0.0	0.0				13.0	0.0	27.8
Cycle Q Clear(g_c), s	0.0	29.5	0.0	0.0	0.0	0.0				13.0	0.0	27.8
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2019		0	2019					1208	0	951
V/C Ratio(X)	0.00	0.69		0.00	0.54					0.46	0.00	0.84
Avail Cap(c_a), veh/h	0	2019		0	2019					1447	0	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.86	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.3	0.0	0.0	0.0	0.0				27.0	0.0	31.9
Incr Delay (d2), s/veh	0.0	2.0	0.0	0.0	0.9	0.0				0.3	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.1	0.0	0.0	0.2	0.0				5.4	0.0	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.3	0.0	0.0	0.9	0.0				27.3	0.0	36.8
LnGrp LOS	A	B		A	A					C	A	D
Approach Vol, veh/h		1395			1084						1356	
Approach Delay, s/veh		17.3			0.9						32.9	
Approach LOS		B			A						C	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	65.1	39.9	65.1
Change Period (Y+Rc), s	5.0	4.0	5.0
Max Green Setting (Gmax), s	53.0	43.0	53.0
Max Q Clear Time (g_c+I1), s	31.5	29.8	2.0
Green Ext Time (p_c), s	7.8	6.1	6.4

Intersection Summary	
HCM 6th Ctrl Delay	18.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

User approved changes to right turn type.

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: I-5 NB Ramp & Elligsen Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱	↰↰		↱			
Traffic Volume (veh/h)	0	915	890	0	925	535	475	0	275	0	0	0
Future Volume (veh/h)	0	915	890	0	925	535	475	0	275	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1826	0	1870	1870	1826	0	1856			
Adj Flow Rate, veh/h	0	953	0	0	964	0	495	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	0	2	5	0	2	2	5	0	3			
Cap, veh/h	0	2603		0	2603		613	0				
Arrive On Green	0.00	1.00	0.00	0.00	1.00	0.00	0.18	0.00	0.00			
Sat Flow, veh/h	0	3647	1547	0	3647	1585	3374	0	1572			
Grp Volume(v), veh/h	0	953	0	0	964	0	495	0	0			
Grp Sat Flow(s),veh/h/ln	0	1777	1547	0	1777	1585	1687	0	1572			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	14.8	0.0	0.0			
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	14.8	0.0	0.0			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2603		0	2603		613	0				
V/C Ratio(X)	0.00	0.37		0.00	0.37		0.81	0.00				
Avail Cap(c_a), veh/h	0	2603		0	2603		1253	0				
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	0.67	0.00	0.00	0.85	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	41.2	0.0	0.0			
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.3	0.0	2.6	0.0	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			
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.1	0.0	6.2	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.3	0.0	0.0	0.3	0.0	43.8	0.0	0.0			
LnGrp LOS	A	A		A	A		D	A				
Approach Vol, veh/h		953			964			495				
Approach Delay, s/veh		0.3			0.3			43.8				
Approach LOS		A			A			D				

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		81.9				81.9		23.1				
Change Period (Y+Rc), s		5.0				5.0		4.0				
Max Green Setting (Gmax), s		57.0				57.0		39.0				
Max Q Clear Time (g_c+I1), s		2.0				2.0		16.8				
Green Ext Time (p_c), s		5.3				5.4		2.3				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

Unsignalized Delay for [NBR, EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Parkway Ave & Elligsen Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	635	470	50	800	45	460	30	55	70	20	200
Future Volume (veh/h)	85	635	470	50	800	45	460	30	55	70	20	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1900	1900	1856	1900	1870	1900	1900	1678	1411	1841
Adj Flow Rate, veh/h	93	698	314	55	879	44	529	0	8	77	22	2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	5	0	0	3	0	2	0	0	15	33	4
Cap, veh/h	117	1839	1142	72	2492	124	640	0	289	103	82	7
Arrive On Green	0.13	1.00	1.00	0.01	0.17	0.17	0.18	0.00	0.18	0.06	0.06	0.06
Sat Flow, veh/h	1781	3469	1609	1810	4941	247	3563	0	1610	1598	1274	116
Grp Volume(v), veh/h	93	698	314	55	600	323	529	0	8	77	0	24
Grp Sat Flow(s),veh/h/ln	1781	1735	1609	1810	1689	1811	1781	0	1610	1598	0	1390
Q Serve(g_s), s	5.3	0.0	0.0	3.2	16.5	16.6	15.0	0.0	0.4	5.0	0.0	1.7
Cycle Q Clear(g_c), s	5.3	0.0	0.0	3.2	16.5	16.6	15.0	0.0	0.4	5.0	0.0	1.7
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	117	1839	1142	72	1703	913	640	0	289	103	0	90
V/C Ratio(X)	0.79	0.38	0.27	0.76	0.35	0.35	0.83	0.00	0.03	0.75	0.00	0.27
Avail Cap(c_a), veh/h	204	1839	1142	267	1703	913	882	0	399	228	0	199
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	0.0	51.3	28.6	28.6	41.5	0.0	35.5	48.3	0.0	46.8
Incr Delay (d2), s/veh	10.2	0.5	0.5	13.2	0.5	0.9	4.7	0.0	0.0	10.3	0.0	1.6
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	2.5	0.1	0.2	1.7	7.5	8.2	7.0	0.0	0.2	2.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	0.5	0.5	64.5	29.1	29.5	46.2	0.0	35.5	58.6	0.0	48.3
LnGrp LOS	E	A	A	E	C	C	D	A	D	E	A	D
Approach Vol, veh/h		1105			978			537			101	
Approach Delay, s/veh		5.1			31.2			46.0			56.2	
Approach LOS		A			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.7	60.7		11.8	11.4	58.0		23.9
Change Period (Y+Rc), s	4.5	5.0		5.0	4.5	5.0		5.0
Max Green Setting (Gmax), s	15.5	29.0		15.0	12.0	32.5		26.0
Max Q Clear Time (g_c+I1), s	5.2	2.0		7.0	7.3	18.6		17.0
Green Ext Time (p_c), s	0.1	5.1		0.2	0.1	3.6		1.8

Intersection Summary	
HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
4: Parkway Center Dr & Elligsen Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	445	280	125	465	5	415	5	110	5	5	15
Future Volume (veh/h)	35	445	280	125	465	5	415	5	110	5	5	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1900	1900	1870	1856	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	38	478	206	134	500	5	446	5	13	5	5	0
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, %	0	0	2	3	0	0	0	0	0	0	0	0
Cap, veh/h	659	1100	1164	587	2254	23	546	72	188	27	27	0
Arrive On Green	0.06	0.77	0.77	0.08	0.62	0.62	0.16	0.16	0.16	0.01	0.03	0.00
Sat Flow, veh/h	1810	1900	1584	1767	3662	37	3510	466	1211	927	927	0
Grp Volume(v), veh/h	38	478	206	134	246	259	446	0	18	10	0	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1584	1767	1805	1893	1755	0	1677	1854	0	0
Q Serve(g_s), s	0.8	9.1	2.4	2.8	6.4	6.4	12.9	0.0	1.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.8	9.1	2.4	2.8	6.4	6.4	12.9	0.0	1.0	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.72	0.50		0.00
Lane Grp Cap(c), veh/h	659	1100	1164	587	1111	1165	546	0	261	53	0	0
V/C Ratio(X)	0.06	0.43	0.18	0.23	0.22	0.22	0.82	0.00	0.07	0.19	0.00	0.00
Avail Cap(c_a), veh/h	727	1100	1164	590	1111	1165	903	0	431	141	0	0
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.4	6.1	2.2	6.5	9.0	9.0	42.9	0.0	37.8	50.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.3	0.1	0.5	0.4	1.2	0.0	0.0	0.6	0.0	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	3.1	1.2	0.9	2.5	2.6	5.6	0.0	0.4	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	7.2	2.5	6.6	9.4	9.4	44.0	0.0	37.9	50.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	D	D	A	A
Approach Vol, veh/h		722			639			464			10	
Approach Delay, s/veh		5.9			8.8			43.8			50.8	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.8	64.8		7.0	9.0	68.6		20.3				
Change Period (Y+Rc), s	5.0	5.0		5.5	5.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	44.0		6.5	8.0	44.0		26.0				
Max Q Clear Time (g_c+I1), s	4.8	11.1		2.6	2.8	8.4		14.9				
Green Ext Time (p_c), s	0.0	0.6		0.0	0.0	0.4		0.3				

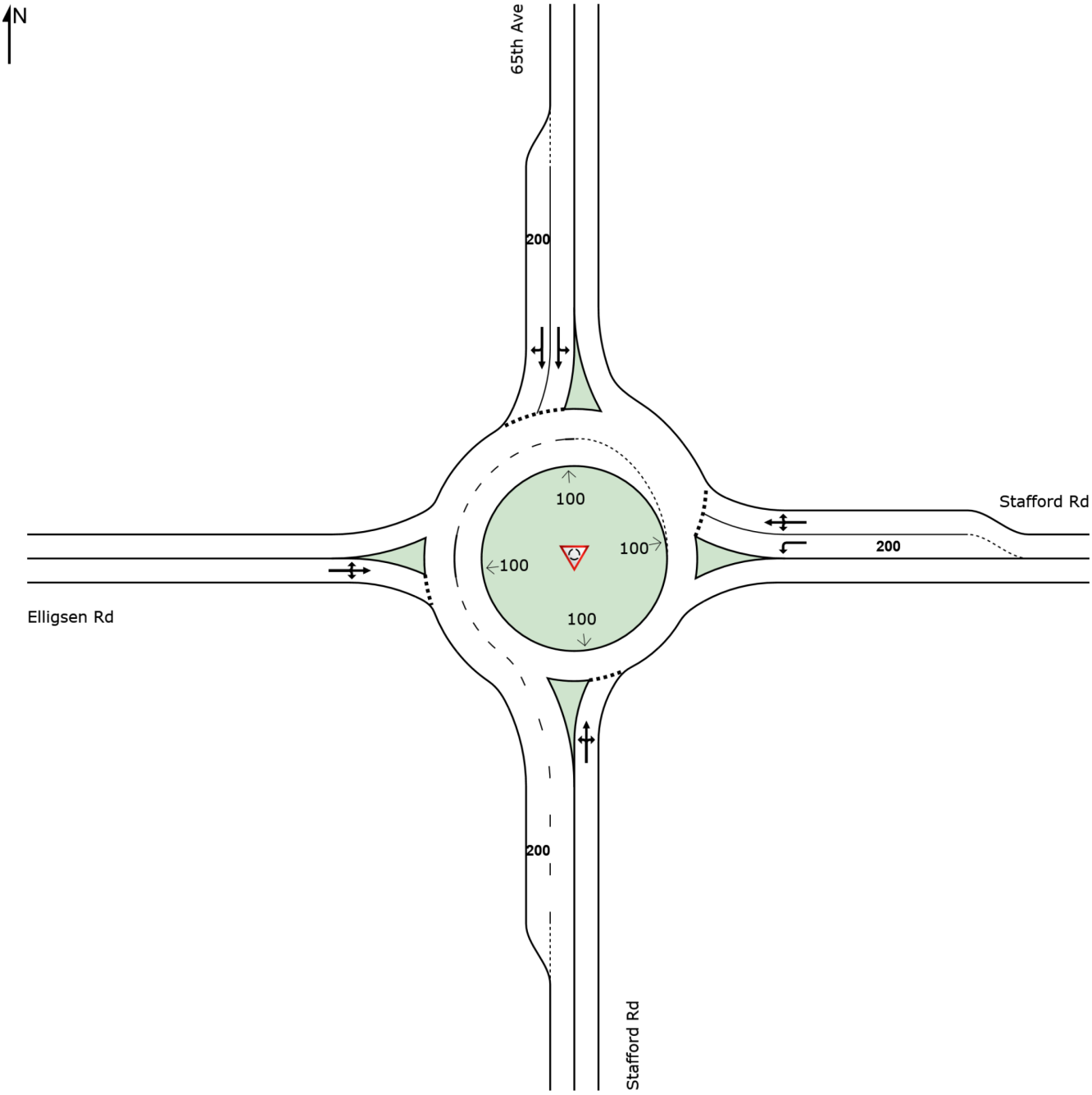
Intersection Summary		
HCM 6th Ctrl Delay		16.8
HCM 6th LOS		B

SITE LAYOUT

Site: [Stafford Rd/65th Ave - Build (Site Folder: Stafford Rd/65th Ave)]

Site Category: -
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Created: Tuesday, August 23, 2022 1:56:54 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Synchro\Wilsonville Frog Pond East & South

MOVEMENT SUMMARY

Site: [Stafford Rd/65th Ave - Build (Site Folder: Stafford Rd/65th Ave)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Stafford Rd														
3	L2	35	2.0	37	2.0	0.648	13.8	LOS B	7.8	199.0	0.77	0.89	1.22	30.8
8	T1	215	2.0	226	2.0	0.648	13.8	LOS B	7.8	199.0	0.77	0.89	1.22	30.8
18	R2	330	2.0	347	2.0	0.648	13.8	LOS B	7.8	199.0	0.77	0.89	1.22	30.0
Approach		580	2.0	611	2.0	0.648	13.8	LOS B	7.8	199.0	0.77	0.89	1.22	30.3
East: Stafford Rd														
1	L2	585	2.0	616	2.0	0.628	12.8	LOS B	6.8	173.3	0.72	0.84	1.15	29.3
6	T1	425	2.0	447	2.0	0.575	11.4	LOS B	5.2	132.0	0.67	0.74	0.98	32.0
16	R2	110	2.0	116	2.0	0.575	11.4	LOS B	5.2	132.0	0.67	0.74	0.98	31.1
Approach		1120	2.0	1179	2.0	0.628	12.1	LOS B	6.8	173.3	0.70	0.79	1.06	30.5
North: 65th Ave														
7	L2	35	2.0	37	2.0	0.848	37.8	LOS D	8.6	218.1	0.90	1.38	2.56	23.3
4	T1	515	2.0	542	2.0	0.848	33.9	LOS C	8.6	218.1	0.87	1.26	2.21	24.6
14	R2	65	2.0	68	2.0	0.408	14.8	LOS B	1.8	45.4	0.75	0.83	1.04	29.7
Approach		615	2.0	647	2.0	0.848	32.1	LOS C	8.6	218.1	0.86	1.22	2.11	25.0
West: Elligsen Rd														
5	L2	105	2.0	111	2.0	0.831	38.0	LOS D	7.4	188.3	0.91	1.34	2.44	23.0
2	T1	190	2.0	200	2.0	0.831	38.0	LOS D	7.4	188.3	0.91	1.34	2.44	23.0
12	R2	95	2.0	100	2.0	0.831	43.8	LOS D	7.4	188.3	0.91	1.34	2.44	22.5
Approach		390	2.0	411	2.0	0.831	39.4	LOS D	7.4	188.3	0.91	1.34	2.44	22.9
All Vehicles		2705	2.0	2847	2.0	0.848	21.0	LOS C	8.6	218.1	0.78	0.99	1.53	27.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
6: Parkway Ave & Boeckman Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	320	325	80	345	30	195	215	65	35	375	260
Future Volume (veh/h)	145	320	325	80	345	30	195	215	65	35	375	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.99	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	1900	1900	1900	1900	1870	1900	1900	1885	1900	1900	1900	1900
Adj Flow Rate, veh/h	153	337	119	84	363	24	205	226	56	37	395	246
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, %	0	0	0	0	2	0	0	1	0	0	0	0
Cap, veh/h	332	540	187	276	571	38	332	697	173	575	460	287
Arrive On Green	0.09	0.21	0.20	0.05	0.17	0.16	0.09	0.48	0.47	0.03	0.42	0.41
Sat Flow, veh/h	1810	2605	901	1810	3375	222	1810	1454	360	1810	1094	681
Grp Volume(v), veh/h	153	231	225	84	190	197	205	0	282	37	0	641
Grp Sat Flow(s),veh/h/ln	1810	1805	1701	1810	1777	1820	1810	0	1814	1810	0	1775
Q Serve(g_s), s	4.7	8.1	8.4	2.7	6.9	7.0	4.2	0.0	6.7	0.8	0.0	22.8
Cycle Q Clear(g_c), s	4.7	8.1	8.4	2.7	6.9	7.0	4.2	0.0	6.7	0.8	0.0	22.8
Prop In Lane	1.00		0.53	1.00		0.12	1.00		0.20	1.00		0.38
Lane Grp Cap(c), veh/h	332	374	352	276	300	308	332	0	870	575	0	747
V/C Ratio(X)	0.46	0.62	0.64	0.30	0.63	0.64	0.62	0.00	0.32	0.06	0.00	0.86
Avail Cap(c_a), veh/h	373	586	552	386	577	591	380	0	923	730	0	903
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	25.1	25.3	22.7	26.9	27.0	14.5	0.0	11.2	11.1	0.0	18.4
Incr Delay (d2), s/veh	0.7	1.2	1.4	0.5	1.6	1.6	2.0	0.0	0.3	0.0	0.0	7.8
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	1.9	3.3	3.3	1.1	2.9	3.0	1.5	0.0	2.3	0.3	0.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	26.3	26.8	23.1	28.5	28.6	16.4	0.0	11.5	11.1	0.0	26.2
LnGrp LOS	C	C	C	C	C	C	B	A	B	B	A	C
Approach Vol, veh/h		609			471			487			678	
Approach Delay, s/veh		25.4			27.6			13.6			25.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	33.3	7.8	18.4	6.0	37.4	10.4	15.8
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5
Max Green Setting (Gmax), s	8.0	34.9	8.0	22.1	8.0	34.9	8.0	22.1
Max Q Clear Time (g_c+I1), s	6.2	24.8	4.7	10.4	2.8	8.7	6.7	9.0
Green Ext Time (p_c), s	0.1	4.0	0.0	1.6	0.0	2.3	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
7: Canyon Creek Rd & Boeckman Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	290	45	80	330	65	40	120	120	150	185	85
Future Volume (veh/h)	55	290	45	80	330	65	40	120	120	150	185	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.97
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	1900	1870	1870	1870	1856	1826	1900	1856	1900	1900	1885	1900
Adj Flow Rate, veh/h	61	322	42	89	367	63	44	133	87	167	206	74
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	2	2	3	5	0	3	0	0	1	0
Cap, veh/h	321	478	62	375	474	81	345	198	130	418	337	121
Arrive On Green	0.05	0.30	0.28	0.06	0.31	0.30	0.04	0.19	0.18	0.10	0.26	0.25
Sat Flow, veh/h	1810	1620	211	1781	1542	265	1810	1042	682	1810	1312	471
Grp Volume(v), veh/h	61	0	364	89	0	430	44	0	220	167	0	280
Grp Sat Flow(s),veh/h/ln	1810	0	1831	1781	0	1807	1810	0	1724	1810	0	1783
Q Serve(g_s), s	1.1	0.0	8.0	1.6	0.0	9.9	0.9	0.0	5.4	3.2	0.0	6.3
Cycle Q Clear(g_c), s	1.1	0.0	8.0	1.6	0.0	9.9	0.9	0.0	5.4	3.2	0.0	6.3
Prop In Lane	1.00		0.12	1.00		0.15	1.00		0.40	1.00		0.26
Lane Grp Cap(c), veh/h	321	0	541	375	0	555	345	0	328	418	0	458
V/C Ratio(X)	0.19	0.00	0.67	0.24	0.00	0.77	0.13	0.00	0.67	0.40	0.00	0.61
Avail Cap(c_a), veh/h	553	0	1286	582	0	1269	595	0	946	587	0	1018
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	14.2	11.1	0.0	14.4	14.4	0.0	17.2	12.6	0.0	15.0
Incr Delay (d2), s/veh	0.3	0.0	1.5	0.3	0.0	2.4	0.2	0.0	2.4	0.6	0.0	1.3
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	2.8	0.5	0.0	3.4	0.3	0.0	2.1	1.1	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.8	0.0	15.6	11.4	0.0	16.7	14.6	0.0	19.6	13.2	0.0	16.3
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h		425			519			264			447	
Approach Delay, s/veh		15.1			15.8			18.8			15.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	12.7	6.7	17.4	5.7	15.7	6.2	18.0
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5
Max Green Setting (Gmax), s	9.0	24.5	8.0	31.5	8.0	25.5	8.0	31.5
Max Q Clear Time (g_c+I1), s	5.2	7.4	3.6	10.0	2.9	8.3	3.1	11.9
Green Ext Time (p_c), s	0.2	0.8	0.1	1.4	0.0	1.0	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
8: Wilsonville Rd/Stafford Rd & Boeckman Rd/Advance Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	110	115	65	65	35	95	260	85	60	455	325
Future Volume (veh/h)	245	110	115	65	65	35	95	260	85	60	455	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.92		0.90	0.87		0.84	1.00		0.97	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	1885	1870	1885	1826	1900	1900	1885	1885	1870	1826	1885	1856
Adj Flow Rate, veh/h	247	111	24	66	66	12	96	263	74	61	460	301
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	2	1	5	0	0	1	1	2	5	1	3
Cap, veh/h	446	376	290	299	154	28	235	681	192	534	506	331
Arrive On Green	0.15	0.20	0.20	0.05	0.10	0.09	0.05	0.48	0.48	0.04	0.48	0.47
Sat Flow, veh/h	1795	1870	1442	1739	1512	275	1795	1406	396	1739	1063	695
Grp Volume(v), veh/h	247	111	24	66	0	78	96	0	337	61	0	761
Grp Sat Flow(s),veh/h/ln	1795	1870	1442	1739	0	1787	1795	0	1802	1739	0	1758
Q Serve(g_s), s	8.2	3.6	1.0	2.4	0.0	2.9	2.0	0.0	8.5	1.3	0.0	28.6
Cycle Q Clear(g_c), s	8.2	3.6	1.0	2.4	0.0	2.9	2.0	0.0	8.5	1.3	0.0	28.6
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.22	1.00		0.40
Lane Grp Cap(c), veh/h	446	376	290	299	0	181	235	0	873	534	0	837
V/C Ratio(X)	0.55	0.30	0.08	0.22	0.00	0.43	0.41	0.00	0.39	0.11	0.00	0.91
Avail Cap(c_a), veh/h	511	617	476	321	0	370	250	0	1053	563	0	1027
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	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.7	24.3	23.2	26.7	0.0	30.2	15.5	0.0	11.7	9.4	0.0	17.4
Incr Delay (d2), s/veh	0.8	0.3	0.1	0.3	0.0	1.2	0.8	0.0	0.3	0.1	0.0	10.2
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	3.3	1.5	0.3	1.0	0.0	1.3	0.7	0.0	3.0	0.4	0.0	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	24.6	23.3	26.9	0.0	31.4	16.3	0.0	12.0	9.5	0.0	27.7
LnGrp LOS	C	C	C	C	A	C	B	A	B	A	A	C
Approach Vol, veh/h		382			144			433			822	
Approach Delay, s/veh		23.1			29.4			13.0			26.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	38.1	14.8	11.3	6.8	38.7	7.7	18.4
Change Period (Y+Rc), s	4.0	4.5	4.5	4.5	4.0	4.5	4.5	4.5
Max Green Setting (Gmax), s	4.0	41.3	12.9	14.3	4.0	41.3	4.1	23.1
Max Q Clear Time (g_c+I1), s	4.0	30.6	10.2	4.9	3.3	10.5	4.4	5.6
Green Ext Time (p_c), s	0.0	2.9	0.2	0.1	0.0	1.4	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	110	80	5	95	30	45	50	5	30	70	10
Future Vol, veh/h	10	110	80	5	95	30	45	50	5	30	70	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	12	0	1	0	7	0	0	0	0	0
Mvmt Flow	11	122	89	6	106	33	50	56	6	33	78	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	139	0	0	211	0	0	368	340	167	355	368	123
Stage 1	-	-	-	-	-	-	189	189	-	135	135	-
Stage 2	-	-	-	-	-	-	179	151	-	220	233	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.17	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.563	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1457	-	-	1372	-	-	579	585	882	604	564	933
Stage 1	-	-	-	-	-	-	801	748	-	873	789	-
Stage 2	-	-	-	-	-	-	811	776	-	787	716	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1457	-	-	1372	-	-	505	577	882	550	556	933
Mov Cap-2 Maneuver	-	-	-	-	-	-	505	577	-	550	556	-
Stage 1	-	-	-	-	-	-	794	741	-	865	785	-
Stage 2	-	-	-	-	-	-	718	772	-	717	710	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.3	13.2	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	551	1457	-	-	1372	-	-	575
HCM Lane V/C Ratio	0.202	0.008	-	-	0.004	-	-	0.213
HCM Control Delay (s)	13.2	7.5	0	-	7.6	0	-	12.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	10	15	30	10	35	15	440	85	100	795	45
Future Vol, veh/h	25	10	15	30	10	35	15	440	85	100	795	45
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	10	0	0	0	2	0
Mvmt Flow	27	11	16	33	11	38	16	478	92	109	864	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1690	1711	891	1676	1689	524	915	0	0	570	0	0
Stage 1	1109	1109	-	556	556	-	-	-	-	-	-	-
Stage 2	581	602	-	1120	1133	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.2	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.29	-	-	2.2	-	-
Pot Cap-1 Maneuver	75	92	344	76	94	557	713	-	-	1013	-	-
Stage 1	257	288	-	519	516	-	-	-	-	-	-	-
Stage 2	503	492	-	253	280	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	69	343	52	71	557	712	-	-	1013	-	-
Mov Cap-2 Maneuver	50	69	-	52	71	-	-	-	-	-	-	-
Stage 1	248	224	-	502	499	-	-	-	-	-	-	-
Stage 2	443	476	-	179	218	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	137.6	133	0.3	1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	712	-	-	73	96	1013	-	-
HCM Lane V/C Ratio	0.023	-	-	0.744	0.849	0.107	-	-
HCM Control Delay (s)	10.2	0	-	137.6	133	9	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3.5	4.7	0.4	-	-

Intersection	
Int Delay, s/veh	121.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	75	10	10	20	10	80	5	450	45	165	910	100
Future Vol, veh/h	75	10	10	20	10	80	5	450	45	165	910	100
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	10
Mvmt Flow	82	11	11	22	11	87	5	489	49	179	989	109

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1977	1952	1046	1937	1982	514	1100	0	0	538	0	0
Stage 1	1404	1404	-	524	524	-	-	-	-	-	-	-
Stage 2	573	548	-	1413	1458	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 47	65	280	50	62	564	642	-	-	1040	-	-
Stage 1	175	208	-	540	533	-	-	-	-	-	-	-
Stage 2	508	520	-	173	196	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	35	280	24	33	564	641	-	-	1040	-	-
Mov Cap-2 Maneuver	~ 19	35	-	24	33	-	-	-	-	-	-	-
Stage 1	173	113	-	534	527	-	-	-	-	-	-	-
Stage 2	416	514	-	82	107	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2017.7	$ 318.8	0.1	1.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	641	-	-	22	86	1040	-	-
HCM Lane V/C Ratio	0.008	-	-	4.694	1.39	0.172	-	-
HCM Control Delay (s)	10.7	0	-	$ 2017.7	$ 318.8	9.2	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	13.1	9.1	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	5	5	10	5	25	5	585	15	40	1160	35
Future Vol, veh/h	15	5	5	10	5	25	5	585	15	40	1160	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	2	0
Mvmt Flow	16	5	5	11	5	27	5	636	16	43	1261	38

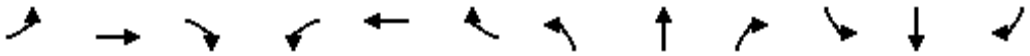
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2036	2028	1280	2025	2039	644	1299	0	0	652	0	0
Stage 1	1366	1366	-	654	654	-	-	-	-	-	-	-
Stage 2	670	662	-	1371	1385	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	43	58	204	43	57	476	540	-	-	944	-	-
Stage 1	184	217	-	459	466	-	-	-	-	-	-	-
Stage 2	450	462	-	182	213	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	48	204	33	47	476	540	-	-	944	-	-
Mov Cap-2 Maneuver	32	48	-	33	47	-	-	-	-	-	-	-
Stage 1	181	181	-	452	459	-	-	-	-	-	-	-
Stage 2	413	455	-	143	178	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	188.1	82.1	0.1	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	540	-	-	42	87	944	-	-
HCM Lane V/C Ratio	0.01	-	-	0.647	0.5	0.046	-	-
HCM Control Delay (s)	11.7	0	-	188.1	82.1	9	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.4	2.1	0.1	-	-

HCM 6th Signalized Intersection Summary
13: I-5 SB Ramp & Wilsonville Rd

WV Frog Pond East & South Master Pl
Future 2040 Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	825	660	545	1015	0	0	0	0	80	5	115
Future Volume (veh/h)	0	825	660	545	1015	0	0	0	0	80	5	115
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.97
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1870	1856	1870	1856	0				1856	1900	1856
Adj Flow Rate, veh/h	0	868	0	574	1068	0				88	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	2	3	2	3	0				3	0	3
Cap, veh/h	0	3323		650	3086	0				184	0	158
Arrive On Green	0.00	0.65	0.00	0.38	1.00	0.00				0.05	0.00	0.05
Sat Flow, veh/h	0	5274	1572	3456	3618	0				3534	0	3039
Grp Volume(v), veh/h	0	868	0	574	1068	0				88	0	13
Grp Sat Flow(s),veh/h/ln	0	1702	1572	1728	1763	0				1767	0	1520
Q Serve(g_s), s	0.0	7.9	0.0	17.1	0.0	0.0				2.7	0.0	0.4
Cycle Q Clear(g_c), s	0.0	7.9	0.0	17.1	0.0	0.0				2.7	0.0	0.4
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3323		650	3086	0				184	0	158
V/C Ratio(X)	0.00	0.26		0.88	0.35	0.00				0.48	0.00	0.08
Avail Cap(c_a), veh/h	0	3323		817	3086	0				610	0	525
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.88	0.88	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.1	0.0	33.2	0.0	0.0				50.7	0.0	49.6
Incr Delay (d2), s/veh	0.0	0.2	0.0	8.5	0.3	0.0				1.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	0.0	6.3	0.1	0.0				1.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.3	0.0	41.7	0.3	0.0				52.6	0.0	49.9
LnGrp LOS	A	A		D	A	A				D	A	D
Approach Vol, veh/h		868			1642						101	
Approach Delay, s/veh		8.3			14.7						52.3	
Approach LOS		A			B						D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.7	75.6		9.7		100.3
Change Period (Y+Rc), s	4.0	4.0		4.0		4.0
Max Green Setting (Gmax), s	26.0	53.0		19.0		75.0
Max Q Clear Time (g_c+I1), s	19.1	9.9		4.7		2.0
Green Ext Time (p_c), s	1.6	4.7		0.3		6.3

Intersection Summary		
HCM 6th Ctrl Delay		14.0
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
14: I-5 NB Ramp & Wilsonville Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	355	550	0	0	1110	335	450	5	510	0	0	0
Future Volume (veh/h)	355	550	0	0	1110	335	450	5	510	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1885	1826	1900	1870			
Adj Flow Rate, veh/h	370	573	0	0	1156	0	473	0	287			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	1	5	0	2			
Cap, veh/h	441	2686	0	0	3022		596	0	536			
Arrive On Green	0.26	1.00	0.00	0.00	0.59	0.00	0.17	0.00	0.17			
Sat Flow, veh/h	3456	3647	0	0	5274	1598	3478	0	3124			
Grp Volume(v), veh/h	370	573	0	0	1156	0	473	0	287			
Grp Sat Flow(s),veh/h/ln	1728	1777	0	0	1702	1598	1739	0	1562			
Q Serve(g_s), s	11.2	0.0	0.0	0.0	13.1	0.0	14.3	0.0	9.2			
Cycle Q Clear(g_c), s	11.2	0.0	0.0	0.0	13.1	0.0	14.3	0.0	9.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	441	2686	0	0	3022		596	0	536			
V/C Ratio(X)	0.84	0.21	0.00	0.00	0.38		0.79	0.00	0.54			
Avail Cap(c_a), veh/h	723	2686	0	0	3022		1043	0	937			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	0.26	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.9	0.0	0.0	0.0	11.8	0.0	43.7	0.0	41.6			
Incr Delay (d2), s/veh	3.0	0.2	0.0	0.0	0.1	0.0	1.5	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.3	0.1	0.0	0.0	4.7	0.0	6.2	0.0	3.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	0.2	0.0	0.0	11.9	0.0	45.2	0.0	42.1			
LnGrp LOS	D	A	A	A	B		D	A	D			
Approach Vol, veh/h		943			1156			760				
Approach Delay, s/veh		17.0			11.9			44.0				
Approach LOS		B			B			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		87.1			18.0	69.1		22.9				
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0				
Max Green Setting (Gmax), s		51.0			23.0	42.0		33.0				
Max Q Clear Time (g_c+I1), s		2.0			13.2	15.1		16.3				
Green Ext Time (p_c), s		6.3			0.9	12.5		2.5				

Intersection Summary	
HCM 6th Ctrl Delay	22.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
15: Town Center Lp West & Wilsonville Rd

WV Frog Pond East & South Master Pl
Future 2040 Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	945	115	0	870	50	200	25	90	65	125	375
Future Volume (veh/h)	0	945	115	0	870	50	200	25	90	65	125	375
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.97
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	0	1870	1870	0	1885	1900	1885	1900	1900	1900	1900	1870
Adj Flow Rate, veh/h	0	995	106	0	916	49	211	26	39	68	132	349
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, %	0	2	2	0	1	0	1	0	0	0	0	2
Cap, veh/h	0	1408	150	0	1038	56	247	369	553	96	207	546
Arrive On Green	0.00	0.10	0.10	0.00	0.30	0.30	0.14	0.54	0.54	0.05	0.46	0.46
Sat Flow, veh/h	0	4850	498	0	3546	185	1795	681	1021	1810	452	1195
Grp Volume(v), veh/h	0	723	378	0	475	490	211	0	65	68	0	481
Grp Sat Flow(s),veh/h/ln	0	1702	1775	0	1791	1845	1795	0	1701	1810	0	1646
Q Serve(g_s), s	0.0	22.6	22.7	0.0	27.8	27.8	12.6	0.0	2.0	4.1	0.0	24.6
Cycle Q Clear(g_c), s	0.0	22.6	22.7	0.0	27.8	27.8	12.6	0.0	2.0	4.1	0.0	24.6
Prop In Lane	0.00		0.28	0.00		0.10	1.00		0.60	1.00		0.73
Lane Grp Cap(c), veh/h	0	1024	534	0	538	555	247	0	922	96	0	753
V/C Ratio(X)	0.00	0.71	0.71	0.00	0.88	0.88	0.85	0.00	0.07	0.71	0.00	0.64
Avail Cap(c_a), veh/h	0	1362	710	0	716	738	253	0	922	156	0	753
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	44.8	44.9	0.0	36.6	36.6	46.3	0.0	12.1	51.2	0.0	22.9
Incr Delay (d2), s/veh	0.0	0.8	1.6	0.0	9.3	9.1	23.3	0.0	0.1	9.2	0.0	4.1
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	0.0	10.4	11.0	0.0	13.2	13.6	7.3	0.0	0.8	2.1	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	45.7	46.5	0.0	45.9	45.7	69.6	0.0	12.2	60.4	0.0	27.0
LnGrp LOS	A	D	D	A	D	D	E	A	B	E	A	C
Approach Vol, veh/h		1101			965			276			549	
Approach Delay, s/veh		46.0			45.8			56.1			31.2	
Approach LOS		D			D			E			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	63.6		37.1	18.6	54.3		37.1				
Change Period (Y+Rc), s	4.0	4.5		4.5	4.0	4.5		4.5				
Max Green Setting (Gmax), s	9.3	44.5		43.5	15.0	38.5		43.5				
Max Q Clear Time (g_c+I1), s	6.1	4.0		24.7	14.6	26.6		29.8				
Green Ext Time (p_c), s	0.0	0.2		3.9	0.0	1.4		2.8				

Intersection Summary		
HCM 6th Ctrl Delay		44.1
HCM 6th LOS		D

ID	Software/Method	Intersection	Control Type	LOS	Delay	V/C Ratio
1	Synchro HCM 6th Signal	I-5 SB Ramp & Elligsen Rd	Signal	B	18.2	0.73
2	Synchro HCM 6th Signal	I-5 NB Ramp & Elligsen Rd	Signal	A	9.2	0.45
3	Synchro HCM 6th Signal	Parkway Ave & Elligsen Rd	Signal	C	24.5	0.53
4	Synchro HCM 6th Signal	Parkway Center Dr & Elligsen Rd	Signal	B	16.8	0.54
6	Synchro HCM 6th Signal	Parkway Ave & Boeckman Rd	Signal	C	23.3	0.81
7	Synchro HCM 6th Signal	Canyon Creek Rd & Boeckman Rd	Signal	B	15.9	0.60
8	Synchro HCM 6th Signal	Wilsonville Rd/Stafford Rd & Boeckman Rd/	Signal	C	22.6	0.81
13	Synchro HCM 6th Signal	I-5 SB Ramp & Wilsonville Rd	Signal	B	14.0	0.40
14	Synchro HCM 6th Signal	I-5 NB Ramp & Wilsonville Rd	Signal	C	22.1	0.52
15	Synchro HCM 6th Signal	Town Center Lp West & Wilsonville Rd	Signal	D	44.1	0.82

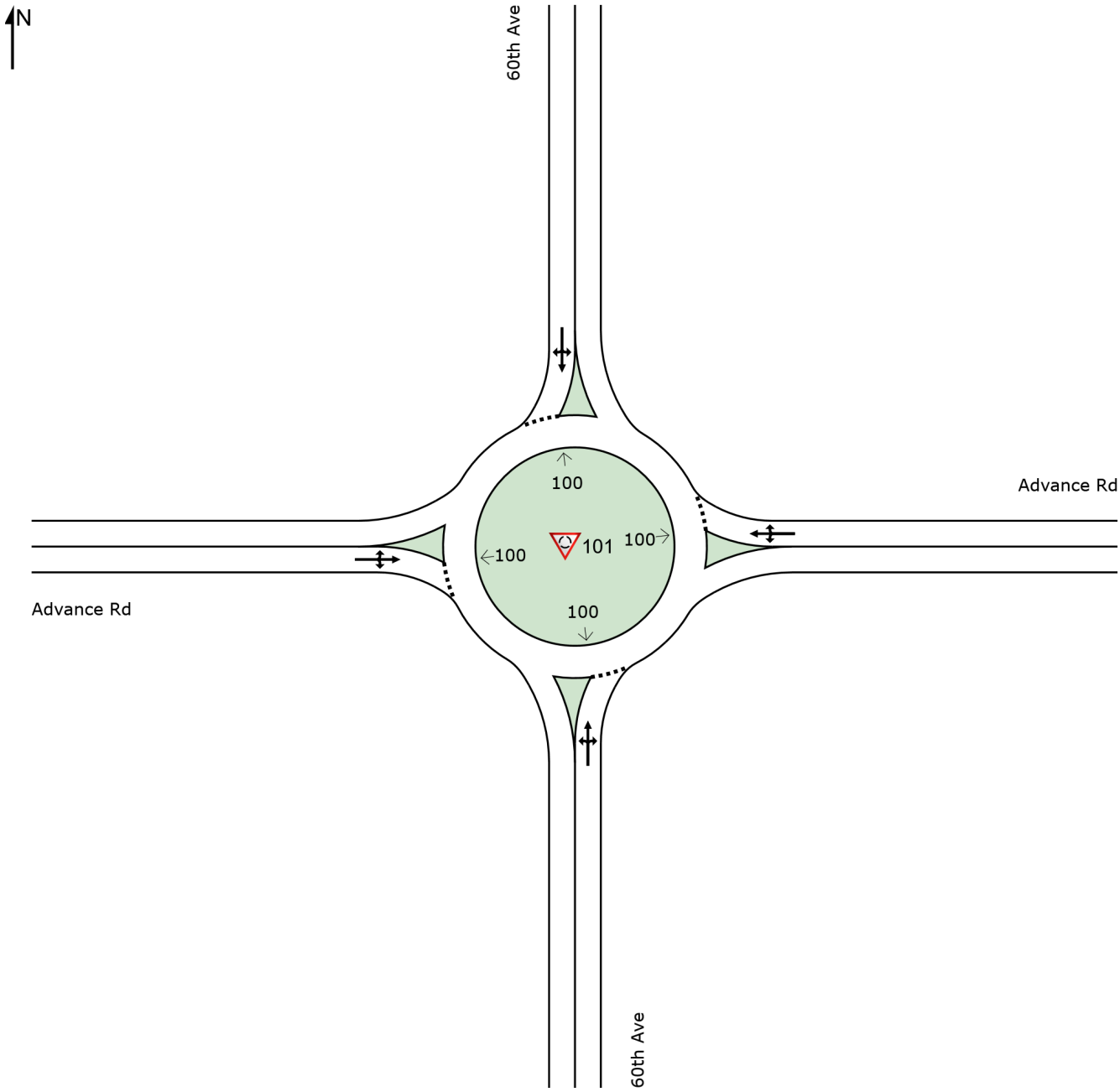
RECOMMENDED IMPROVEMENTS HCM REPORTS

SITE LAYOUT

Site: 101 [Advance Rd/60th Ave (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Created: Tuesday, August 23, 2022 12:43:05 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Mitigation_Final_\WV FP East & South - Final Roundabout Alternatives.sip9

MOVEMENT SUMMARY

Site: 101 [Advance Rd/60th Ave (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 60th Ave														
3	L2	45	7.0	50	7.0	0.099	4.2	LOS A	0.4	10.9	0.32	0.18	0.32	34.4
8	T1	50	0.0	56	0.0	0.099	3.9	LOS A	0.4	10.9	0.32	0.18	0.32	37.1
18	R2	5	0.0	6	0.0	0.099	3.9	LOS A	0.4	10.9	0.32	0.18	0.32	37.8
Approach		100	3.2	111	3.2	0.099	4.0	LOS A	0.4	10.9	0.32	0.18	0.32	35.9
East: Advance Rd														
1	L2	5	0.0	6	0.0	0.119	4.0	LOS A	0.5	13.7	0.27	0.14	0.27	40.8
6	T1	95	1.0	106	1.0	0.119	4.0	LOS A	0.5	13.7	0.27	0.14	0.27	37.2
16	R2	30	0.0	33	0.0	0.119	4.0	LOS A	0.5	13.7	0.27	0.14	0.27	39.4
Approach		130	0.7	144	0.7	0.119	4.0	LOS A	0.5	13.7	0.27	0.14	0.27	37.8
North: 60th Ave														
7	L2	30	0.0	33	0.0	0.105	4.0	LOS A	0.5	11.8	0.32	0.18	0.32	39.4
4	T1	70	0.0	78	0.0	0.105	4.0	LOS A	0.5	11.8	0.32	0.18	0.32	37.7
14	R2	10	0.0	11	0.0	0.105	4.0	LOS A	0.5	11.8	0.32	0.18	0.32	33.6
Approach		110	0.0	122	0.0	0.105	4.0	LOS A	0.5	11.8	0.32	0.18	0.32	37.7
West: Advance Rd														
5	L2	10	0.0	11	0.0	0.191	4.6	LOS A	0.9	23.3	0.28	0.15	0.28	34.8
2	T1	110	1.0	122	1.0	0.191	4.7	LOS A	0.9	23.3	0.28	0.15	0.28	36.2
12	R2	80	12.0	89	12.0	0.191	5.0	LOS A	0.9	23.3	0.28	0.15	0.28	32.3
Approach		200	5.4	222	5.4	0.191	4.8	LOS A	0.9	23.3	0.28	0.15	0.28	34.5
All Vehicles		540	2.7	600	2.7	0.191	4.3	LOS A	0.9	23.3	0.29	0.16	0.29	36.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

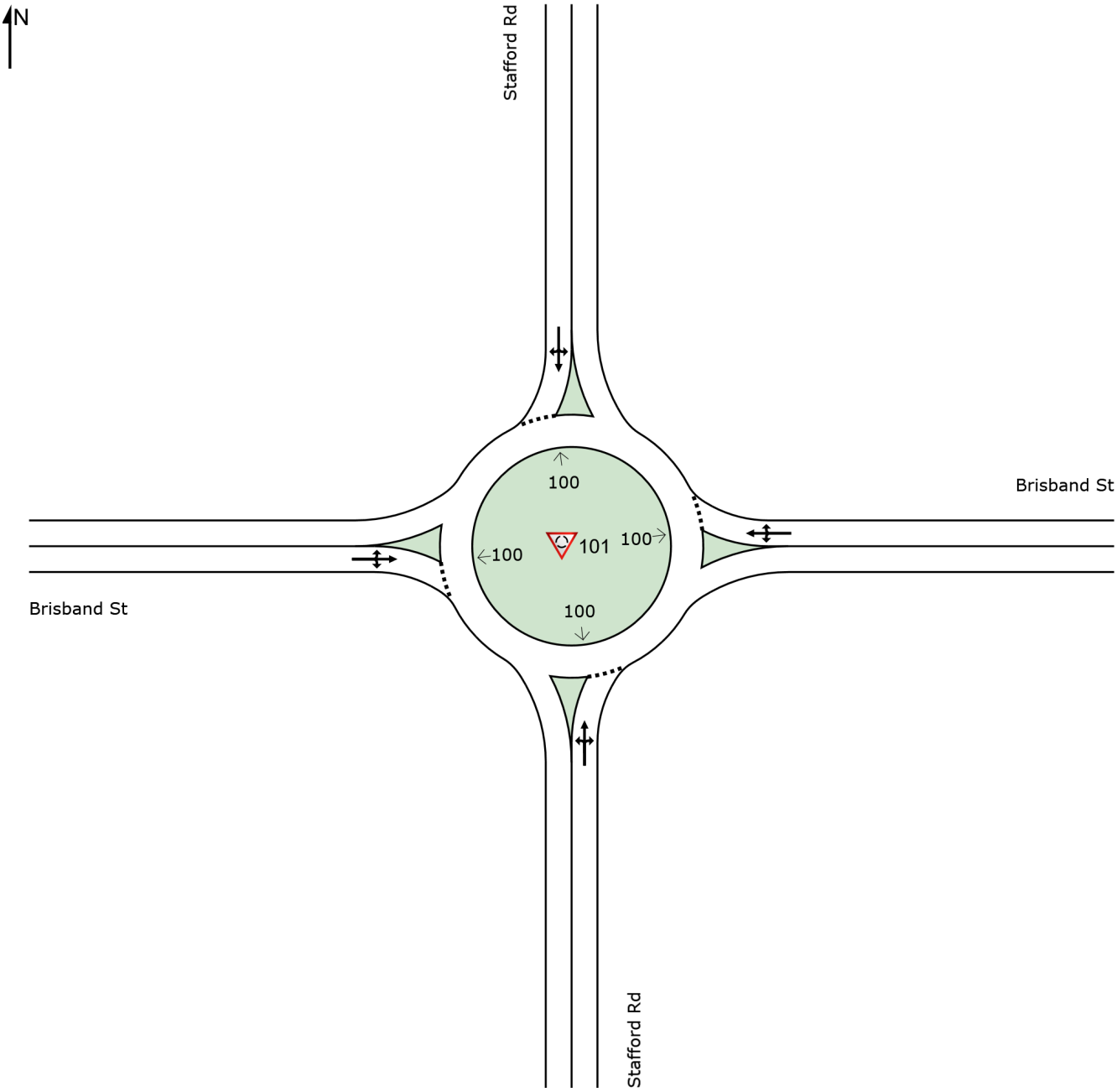
Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Processed: Tuesday, August 23, 2022 12:30:07 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Mitigation_Final_\WV FP East & South - Final Roundabout Alternatives.sip9

SITE LAYOUT

Site: 101 [Stafford Rd/Brisband St (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Created: Tuesday, August 23, 2022 12:43:04 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Mitigation_Final_\WV FP East & South - Final Roundabout Alternatives.sip9

MOVEMENT SUMMARY

Site: 101 [Stafford Rd/Brisband St (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Stafford Rd														
3	L2	15	10.0	16	10.0	0.494	8.9	LOS A	3.4	85.7	0.51	0.35	0.51	33.2
8	T1	440	0.0	463	0.0	0.494	8.6	LOS A	3.4	85.7	0.51	0.35	0.51	35.8
18	R2	85	0.0	89	0.0	0.494	8.6	LOS A	3.4	85.7	0.51	0.35	0.51	36.5
Approach		540	0.3	568	0.3	0.494	8.6	LOS A	3.4	85.7	0.51	0.35	0.51	35.8
East: Brisband St														
1	L2	45	0.0	47	0.0	0.125	5.8	LOS A	0.5	13.0	0.55	0.49	0.55	38.0
6	T1	15	0.0	16	0.0	0.125	5.8	LOS A	0.5	13.0	0.55	0.49	0.55	34.9
16	R2	35	0.0	37	0.0	0.125	5.8	LOS A	0.5	13.0	0.55	0.49	0.55	36.8
Approach		95	0.0	100	0.0	0.125	5.8	LOS A	0.5	13.0	0.55	0.49	0.55	37.1
North: Stafford Rd														
7	L2	100	0.0	105	0.0	0.780	16.1	LOS C	10.8	273.4	0.66	0.35	0.66	33.1
4	T1	780	2.0	821	2.0	0.780	16.1	LOS C	10.8	273.4	0.66	0.35	0.66	31.6
14	R2	45	0.0	47	0.0	0.780	16.1	LOS C	10.8	273.4	0.66	0.35	0.66	28.8
Approach		925	1.7	974	1.7	0.780	16.1	LOS C	10.8	273.4	0.66	0.35	0.66	31.6
West: Brisband St														
5	L2	50	0.0	53	0.0	0.168	9.4	LOS A	0.6	16.0	0.68	0.68	0.68	31.1
2	T1	15	0.0	16	0.0	0.168	9.4	LOS A	0.6	16.0	0.68	0.68	0.68	32.3
12	R2	15	0.0	16	0.0	0.168	9.4	LOS A	0.6	16.0	0.68	0.68	0.68	30.3
Approach		80	0.0	84	0.0	0.168	9.4	LOS A	0.6	16.0	0.68	0.68	0.68	31.2
All Vehicles		1640	1.0	1726	1.0	0.780	12.7	LOS B	10.8	273.4	0.60	0.37	0.60	33.1

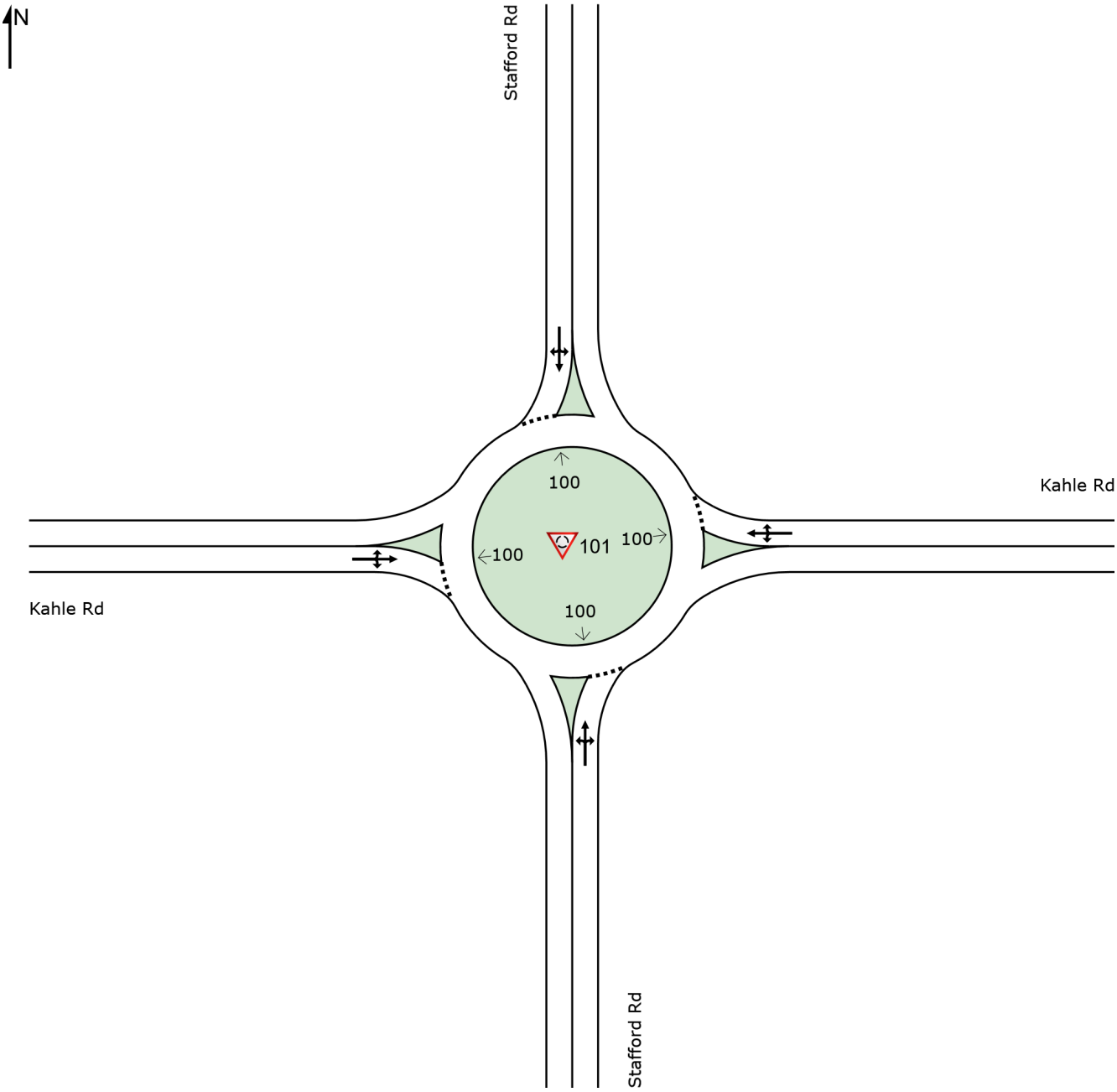
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Stafford Rd/Kahle Rd (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Created: Tuesday, August 23, 2022 12:43:03 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Mitigation_Final_\WV FP East & South - Final Roundabout Alternatives.sip9

MOVEMENT SUMMARY

Site: 101 [Stafford Rd/Kahle Rd (Site Folder: East & South Master Plan - Future 2040 Mitigation)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Stafford Rd														
3	L2	5	0.0	5	0.0	0.489	8.2	LOS A	3.4	86.9	0.42	0.25	0.42	33.6
8	T1	535	2.0	563	2.0	0.489	8.3	LOS A	3.4	86.9	0.42	0.25	0.42	35.7
18	R2	15	0.0	16	0.0	0.489	8.2	LOS A	3.4	86.9	0.42	0.25	0.42	36.7
Approach		555	1.9	584	1.9	0.489	8.3	LOS A	3.4	86.9	0.42	0.25	0.42	35.7
East: Kahle Rd														
1	L2	15	0.0	16	0.0	0.074	5.8	LOS A	0.3	7.3	0.58	0.52	0.58	38.6
6	T1	10	0.0	11	0.0	0.074	5.8	LOS A	0.3	7.3	0.58	0.52	0.58	35.4
16	R2	25	0.0	26	0.0	0.074	5.8	LOS A	0.3	7.3	0.58	0.52	0.58	37.4
Approach		50	0.0	53	0.0	0.074	5.8	LOS A	0.3	7.3	0.58	0.52	0.58	37.3
North: Stafford Rd														
7	L2	40	0.0	42	0.0	0.993	41.1	LOS E	126.9	3219.2	1.00	0.58	1.33	24.4
4	T1	1160	2.0	1221	2.0	0.993	41.1	LOS E	126.9	3219.2	1.00	0.58	1.33	23.6
14	R2	35	0.0	37	0.0	0.993	41.1	LOS E	126.9	3219.2	1.00	0.58	1.33	22.0
Approach		1235	1.9	1300	1.9	0.993	41.1	LOS E	126.9	3219.2	1.00	0.58	1.33	23.6
West: Kahle Rd														
5	L2	65	0.0	68	0.0	0.231	13.9	LOS B	0.8	21.0	0.78	0.78	0.78	29.0
2	T1	10	0.0	11	0.0	0.231	13.9	LOS B	0.8	21.0	0.78	0.78	0.78	30.0
12	R2	5	0.0	5	0.0	0.231	13.9	LOS B	0.8	21.0	0.78	0.78	0.78	28.3
Approach		80	0.0	84	0.0	0.231	13.9	LOS B	0.8	21.0	0.78	0.78	0.78	29.1
All Vehicles		1920	1.8	2021	1.8	0.993	29.6	LOS D	126.9	3219.2	0.81	0.49	1.03	26.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: DKS ASSOCIATES | Licence: PLUS / Enterprise | Processed: Tuesday, August 23, 2022 12:29:02 PM
Project: S:\Projects\2021\21108-000 (Wilsonville Frog Pond East & South Master Plan)\03_Analysis\Mitigation_Final_\WV FP East & South - Final Roundabout Alternatives.sip9

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	10	0	0	80	5	475	45	165	915	100
Future Vol, veh/h	0	0	10	0	0	80	5	475	45	165	915	100
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	10
Mvmt Flow	0	0	11	0	0	87	5	516	49	179	995	109

Major/Minor	Minor2		Minor1			Major1				Major2		
Conflicting Flow All	-	-	1052	-	-	541	1106	0	0	565	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.2	-	-	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	0	0	278	0	0	545	639	-	-	1017	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	278	-	-	545	638	-	-	1017	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	12.9	0.1	1.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	638	-	-	278	545	1017	-	-
HCM Lane V/C Ratio	0.009	-	-	0.039	0.16	0.176	-	-
HCM Control Delay (s)	10.7	-	-	18.5	12.9	9.3	-	-
HCM Lane LOS	B	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0.6	-	-

Technical Memorandum

Date: September 6, 2022

Project: Wilsonville Frog Pond East and South Master Plan

To: Andrew Parish – APG/MIG
Joe Dills – APG/MIG

From: Mike Carr, PE – Murraysmith
Julia King, EIT – Murraysmith
Joshua Owens, PE – Murraysmith

Re: Proposed Infrastructure Plans - Water, Wastewater, Stormwater Systems

Introduction

This technical memorandum provides a summary of new water, wastewater, and stormwater infrastructure necessary for the development of Wilsonville Frog Pond East and South areas, to be documented in the area's Master Plan. Analyses were performed to estimate sizes and propose layouts of the proposed systems, using applicable City standards for the systems. The planned infrastructure will also be used for cost estimates and preparation of infrastructure funding strategies.

Background

In 2015, the Frog Pond Area Plan (FPAP) was adopted by the City of Wilsonville. The Frog Pond area consists of three separate neighborhoods: West, East, and South. A master plan for Frog Pond West was developed in 2017 and development in Frog Pond West began soon after. Based on current information from the City, it is estimated that 80% of the parcels in Frog Pond West are currently, or soon to be, under development.

In 2018, the Frog Pond East and South areas were brought into the regional Urban Growth Boundary (UGB). The City initiated master planning in 2020. To date, the master plan process has prepared a draft preferred land use plan. The preferred alternative identifies residential uses of varied housing types, a neighborhood commercial area, streets and trails, and parks and open space. For the purpose of this infrastructure analysis, the plan is assumed to include 1,800 total housing units in the combined East and South neighborhoods. Infrastructure plans were developed for the preferred alternative and are further described in the individual sections below.

The City has also identified a higher-density scenario which calls for 2,384 total units (20 units per net residential acre) in the combined East and South neighborhoods. This scenario represents a very robust buildout of housing, especially middle housing. Infrastructure needs for the higher-

density alternative were estimated to determine the difference in needs between the two alternative plans. These are also described below.

Proposed Water System

The water purveyor for the Frog Pond area is the City of Wilsonville. The City's *Water System Master Plan* (WSMP), adopted September 6, 2012, is the current basis for domestic water and fire system planning within the Frog Pond East and South. The recommendations provided in the 2015 FPAP for water system improvements still apply for the recommended development concepts for Frog Pond East and South. These areas will be extensions of water pressure Zone B which operates in an elevation range from 100 feet to 285 feet and has a hydraulic grade of 400 feet.

Distribution System

Figure 1 shows the proposed preliminary water system layout for the East and South neighborhoods, including off-site improvements needed to serve the area. The existing 12-inch waterline in Boeckman Road is the primary backbone connection for Frog Pond East and South to the City's water supply and storage system. A looped system consisting of 12-inch and 8-inch distribution mains is proposed for supply of domestic water to Frog Pond East and South. The 12-inch main network provides a redundant capacity of 1,500 gallons per minute (gpm) for fire flow to all areas. In accordance with City Public Works Standards, 12-inch mains are also required for the commercial main street area proposed along Brisband Road in Frog Pond East. For all residential zones, 8-inch mains are required, with all lines interconnected as a network to minimize dead ends.

The plan calls for new 12-inch waterlines extending north in Stafford Road and east in Advance Road to extend the distribution system into Frog Pond East and South, connecting to the existing 12-inch waterlines in Boeckman Road and Advance Road. Additional points of connection will also be made to proposed waterlines planned to be installed in Frog Pond Lane and Brisband Road as part of the Frog Pond West development.

The northernmost neighborhoods in Frog Pond East along SW Kahle Road need to be connected to the City's existing water system with a 12-inch loop that connects to the south side of the BPA easement in two locations, one being a connection at the intersection of Stafford Road and SW Kahle Roads, and the other to the 12-inch waterline in the commercial main street. The loop could be constructed across the BPA easement either in the proposed road extending northeast from Frog Pond Lane, or it could cross the BPA easement further to the east via the proposed pedestrian bridge over the main fork of the Newland Creek. The decision on where to route the loop will depend on what areas are developed first and whether the pedestrian bridge is built. In either scenario the 12-inch mainline along SW Stafford Road and SW Kahle Road will be required.

The WSMP recommended two additional connections to the existing distribution system to reliably serve Frog Pond East and South through buildout. The first is a 12-inch connection to the Canyon Creek Road waterline via a crossing of Boeckman Creek at the west end of Frog Pond Lane, for connection to the Stafford Road waterline in conjunction with development in Frog Pond East.

The second is a crossing of Meridian Creek with a 12-inch main, south of the Meridian Creek Middle School, installed in conjunction with development of Frog Pond South. Both creek crossings are assumed to be below grade directionally drilled pipelines; however, they may be installed on future pedestrian bridges where under consideration by the City.

Storage System

The WSMP identified an overall water storage deficiency in the City which will be further increased by development in Frog Pond East and South. The WSMP proposed a 3.0-million-gallon West Side Tank and 24-inch transmission main project to provide sufficient storage for the City. The City has this project budgeted in the City's current 5-Year Capital Improvement Program, with design expected to begin in FY2022/23. The project is anticipated to be completed in 2025.

The extent of the storage deficiency and its impact on development of Frog Pond East and South is unknown at this time, since the WSMP is 10 years old and significant development has occurred in the City in that period. Additional analysis may be conducted to determine what, if any, impact any development in Frog Pond East and South prior to implementation of the new water tank would have on the existing water system and its customers.

The water system layout and sizing is primarily dependent on the street network to distribute fire flow to the designated land use types. Given the higher-density scenario using the same land use pattern and street plan, it is estimated that waterline sizes and costs would remain the same as with the preferred water system layout.

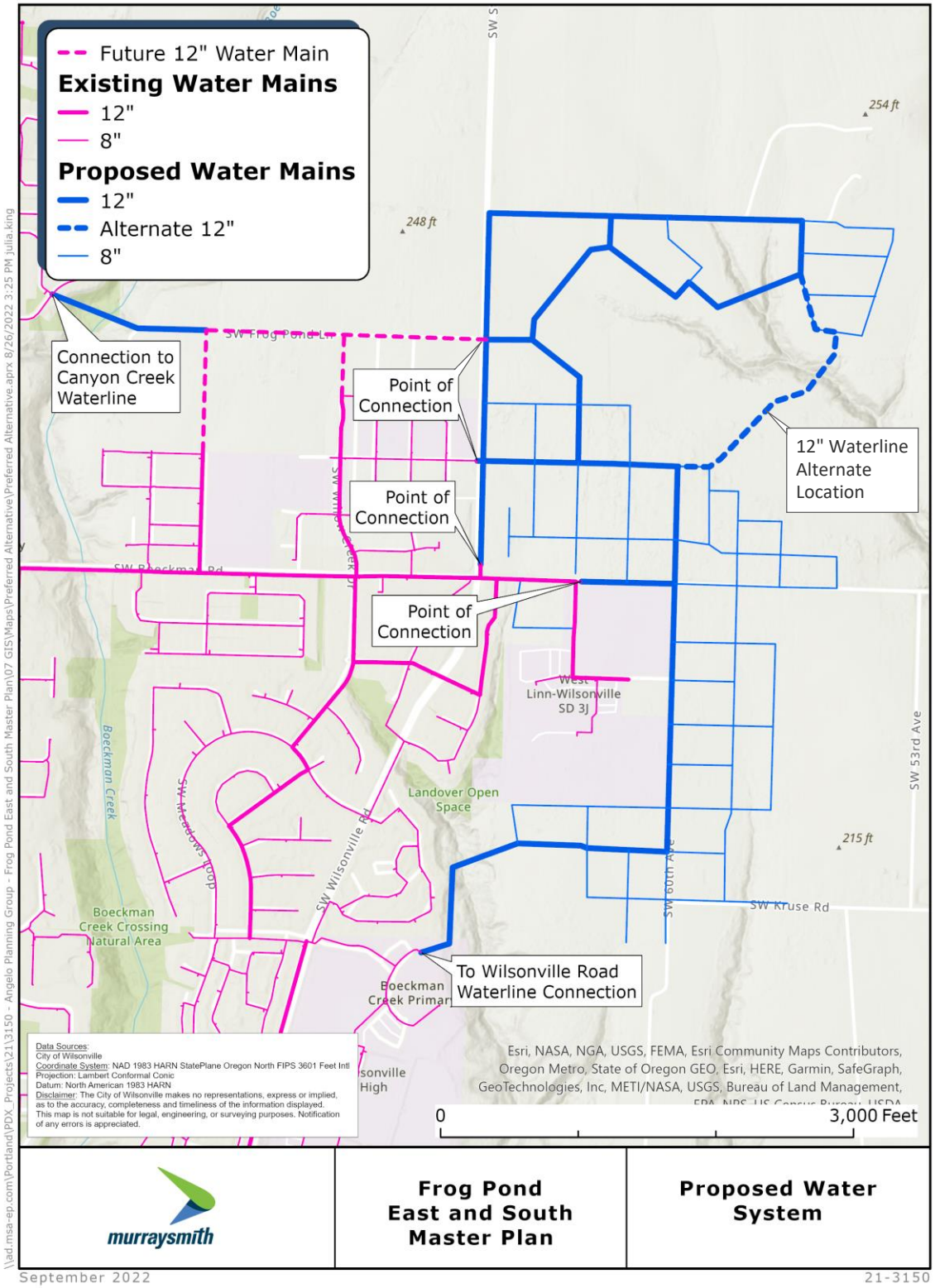
Proposed Wastewater System

The City of Wilsonville will provide sanitary sewer service for the Frog Pond East and South area as an extension of the City's existing collection system. The City's *Wastewater Collection System Master Plan* (WCSMP), adopted in 2014, is the current basis for wastewater system planning within the City. The 2015 FPAP and subsequent studies provide the specific framework for wastewater system planning in the Frog Pond East and South area, along with design criteria from the 2017 Public Works Standards.

Figure 2 shows the proposed preliminary wastewater system layout for the Frog Pond East and South neighborhoods.

The area was divided into five sewer basins, one for each of the four lift stations required and one that flows by gravity out of the Frog Pond area. Basin peak flows were calculated using preliminary land use data provided by MIG and unit flow values determined from the WCSMP. Residences were assumed to have 2.48 people per unit and an average sewer production rate of 67 gallons per person per day. Commercial sectors were assumed to generate 1,000 gallons per acre per day and schools were estimated to generate 25 gallons per day per person. Average dry weather flows were used with a peaking factor of 2 to estimate the peak dry weather flows. Wet weather flows were estimated to have an infiltration and inflow rate of 1,800 gallons per acre per day over the entire basin. Detailed calculations can be found in Appendix A.

Figure 1 – Preliminary Water System Layout



Each basin was analyzed for both the preferred housing scenario of 1,800 total units, and the higher-density scenario of 2,384 total units. The four lift station basins will each require an 8-inch gravity pipe to convey wastewater to the lift station at an assumed slope of 0.5%, and a 4-inch force main discharge to the downstream basin. These requirements are the same for both housing scenarios. **Table 1** shows the peak wet weather flow for each lift station basin and the required pipe sizes.

Table 1 - Lift Station Basins

Basin	Total Peak Flow for 1,800 Units (cfs)	Total Peak Flow for 1,800 Units (gpm)	Total Peak Flow for 2,384 Units (gpm)	Recommended Lift Station Design Capacity (gpm)	Force Main Size (in)	Gravity Sewer Size (in)
LS1	0.130	58	70	135	4	8
LS2	0.159	71	86	135	4	8
LS3	0.123	55	67	135	4	8
LS4	0.489	220	260	260	4	8

Table 1 shows that the recommended capacity for LS1, LS2 and LS3 lift stations is 135 gpm, which is the minimum size required to meet design criteria for 4-inch sewage force mains. This is the same for both housing scenarios. Capacity of LS4 would increase somewhat, from 220 gpm in the preferred scenario, to 260 gpm in the higher-density scenario. This change is estimated to be relatively insignificant in the overall cost of constructing the wastewater facilities for LS4 basin.

The main trunk traveling north to south on SW Stafford Road conveys sewage from both lift station 1 and 2 and a portion of the gravity basin. This pipe has the capacity to carry both housing density scenarios at an 8-inch size; however, this pipe is identified in the WCSMP as a 12-inch line for future extension to the north.

Extension of the Boeckman Road Trunk Sewer east on Advance Road is needed to convey sewage from both Lift Stations 3 and 4 and a portion of the gravity basin. A 10-inch size is required to provide capacity necessary for both housing density scenarios.

All wastewater from Frog Pond East and South is to be conveyed to the wastewater treatment plant through connection to the existing Boeckman Road Trunk Sewer, which flows west to the existing Boeckman Creek Interceptor Sewer and the Memorial Park Pump Station. The Boeckman Road Trunk Sewer is being upsized to 18-inch diameter as part of improvements to Boeckman Road, including Boeckman Dip Bridge, with completion anticipated for 2024.

The Boeckman Creek Interceptor Sewer is a 12-inch to 18-inch diameter pipe extending from Boeckman Road to the Memorial Park Pump Station. Capacity of the Boeckman Interceptor was determined to be sufficient for full buildout of Frog Pond West but will be insufficient to serve full build-out of Frog Pond East and South. The WCSMP recommends the Boeckman Creek Interceptor

Sewer be upsized for buildout of Frog Pond East and South. The City is currently planning to upsize the Boeckman Interceptor in conjunction with a regional trail in the creek corridor. Design of the project will begin in 2022, with construction anticipated to be completed in the fall of 2025.

Though the Boeckman Creek Interceptor will not have sufficient capacity for full buildout of Frog Pond East and South, there will be some capacity available for initial development in the area, depending on how much capacity has been taken up by Frog Pond West. A specific amount has not been calculated. With the Frog Pond West area nearing full development, it is recommended the City reevaluate the remaining capacity in the downstream Boeckman Creek system to estimate how many new dwelling units in Frog Pond East and South can be reliably connected before the planned interceptor improvements are complete.

The WCSMP estimated that the sewer line on SW Kahle Road would need to be a 10-inch pipeline; however based on updated loading conditions, calculations show an 8-inch pipe will be adequate to convey the flow from the areas tributary to the Kahle Road sewer line.

Proposed Stormwater System

<<To Follow - Stormwater Infrastructure Plan is still in development as of September 6, 2022>>

References

Angelo Planning Group. (2015). *Frog Pond Area Plan.*

City of Wilsonville. (2017). *Public Works Standards.*

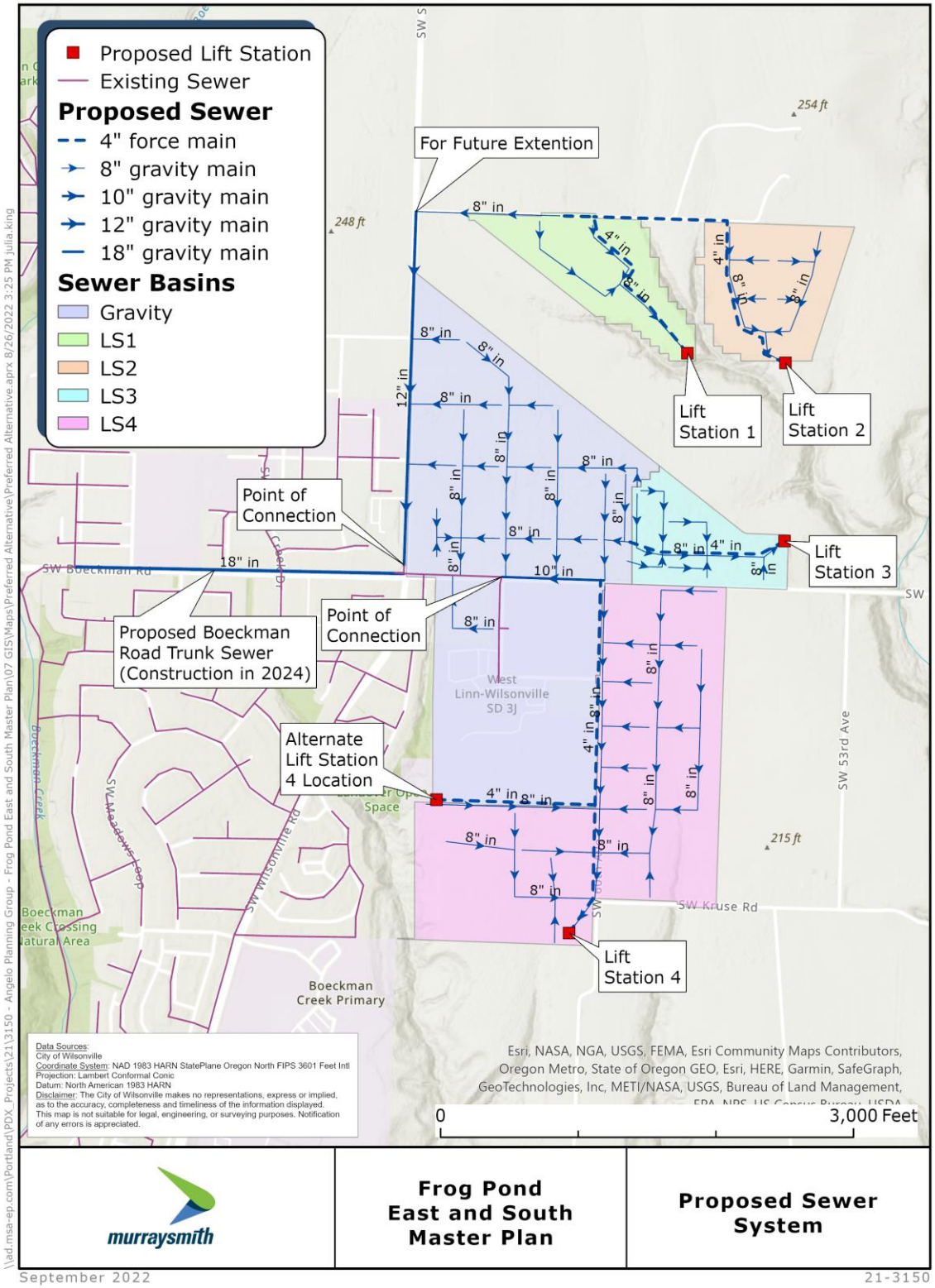
Keller Associates. (2012). *Water System Master Plan.*

Murraysmith. (2014). *Wastewater Collection System Master Plan.*

Murraysmith. (2021). *Findings of HB 2001 Sensitivity Analysis.*

URS. (2012). *Stormwater Master Plan.*

Figure 2 – Preliminary Wastewater System Layout



Appendix A

Project: 21-3150 Frog Pond Master Plan
Date: 8/26/2022
Author: JK
Decription: Frog Pond East and South sewer basin land use and flow calculations for 1,800 total residential units

Assumptions		
Category	Average Sewer GPD	
Person	67	gallons/person/day
Commercial	1000	gallons/acre/day
School	25	gallons/person/day
I&I	1800	gallons/acre/day

Gravity Pipe Assumptions	
Slope	0.005
Manning's n	0.013

Diameter	Max Flow in Pipe (cfs)
4	0.135
6	0.398
8	0.857
10	1.553

Basin	Total Area (ac)	MF Units	SFA Units	SFD Units	Total Residentital Units	Commecial Area (ac)	School Area (ac)	School Students and Employees	Park/Street Area (ac)	Residential Area (ac)
Gravity	105.0	174	308	274	756	4.9	27.1	1305	27.9	45.0
LS1	18.1	0	63	93	155	0.0	0.0	0	0.4	17.7
LS2	20.7	0	86	111	197	0.0	0.0	0	1.0	19.7
LS3	15.4	0	72	84	156	0.0	0.0	0	1.4	14.0
LS4	76.7	48	212	276	536	0.0	0.0	0	25.1	51.6
Totals	235.9	222	740	837	1,800	4.9	27.1	1305	55.9	148.0

Basin	Average Dry Weather Flow (gpm)	Peak Average Dry Weather Flow (gpm)	Peak I&I Flow (gpm)	Total Peak Flow (gpm)	Total Peak Flow (cfs)	Force Main Size (in)	Force Main Velocity	Does Gravity Flow fit in 8in	Does Gravity Flow fit in 10 in
Gravity	96.6	193.3	131.3	324.5	0.723	N/A	N/A	Yes	Yes
LS1	17.9	35.9	22.6	58.5	0.130	4	1.49	Yes	Yes
LS2	22.7	45.4	25.8	71.2	0.159	4	1.82	Yes	Yes
LS3	18.0	36.0	19.2	55.2	0.123	4	1.41	Yes	Yes
LS4	61.8	123.6	95.9	219.5	0.489	4	5.61	Yes	Yes

Trunk	Total Peak Flow (cfs)	Does Gravity Flow fit in 8in	Does Gravity Flow fit in 10in
SW Stafford Road Trunk (cfs)	0.651	Yes	Yes
Boeckman Trunk Extension (cfs)	0.974	Pipe Overcapacity	Yes

Project: 21-3150 Frog Pond Master Plan
Date: 8/26/2022
Author: JK
Decription: Frog Pond East and South sewer basin land use and flow calculations for 2,384 total residential units

Flow Assumptions		
Category	Average Sewer GPD	
Person	67	gallons/person/day
Commercial	1000	gallons/acre/day
School	25	gallons/person/day
I&I	1800	gallons/acre/day

Pipe Assumptions	
Slope	0.005
Manning's n	0.013

Diameter	Max Flow in Pipe (cfs)
4	0.135
6	0.398
8	0.857
10	1.553

Basin	Residential Units (32% increase)	Commercial Area	School Students and Employees
Gravity	1,001	4.9	1305
LS1	206	0.0	0
LS2	261	0.0	0
LS3	207	0.0	0
LS4	709	0.0	0
Total	2,384	4.9	1305

Basin	Average Dry Weather Flow (gpm)	Peak Average Dry Weather Flow (gpm)	Peak I&I Flow (gpm)	Total Peak Flow (gpm)	Total Peak Flow (cfs)	Force Main Size (in)	Force Main Velocity	Does Gravity Flow fit in 8in	Does Gravity Flow fit in 10in
Gravity	124.9	249.9	131.3	381.1	0.849	N/A	N/A	Yes	Yes
LS1	23.7	47.5	22.6	70.1	0.156	4	1.79	Yes	Yes
LS2	30.1	60.1	25.8	86.0	0.192	4	2.19	Yes	Yes
LS3	23.8	47.7	19.2	66.9	0.149	4	1.71	Yes	Yes
LS4	81.9	163.7	95.9	259.7	0.579	4	6.63	Yes	Yes

Trunk	Total Peak Flow (cfs)	Does Gravity Flow fit in 8in	Does Gravity Flow fit in 10in
SW Stafford Road Trunk (cfs)	0.772	Yes	Yes
Boeckman Trunk Extension (cfs)	1.152	Pipe Overcapacity	Yes

ECONorthwest
ECONOMICS · FINANCE · PLANNING

DATE: January 31, 2022
TO: Dan Pauly, Kim Rybold, City of Wilsonville
FROM: Becky Hewitt, Kaitlin La Bonte, Ariel Kane ECONorthwest
SUBJECT: Frog Pond East and South Accessory Dwelling Units Memorandum

Section 1. Introduction

Accessory Dwelling Units (ADUs) offer an opportunity to seamlessly integrate additional, smaller units within neighborhoods while staying with traditional single-family development and financing models. There are many reasons why people may be interested in building or living in ADUs. For residents, ADUs tend to be a more affordable flexible housing option. For homeowners, ADUs provide opportunities to house family members or earn additional income. As ADUs grow in popularity and recognition, many jurisdictions are considering ways to encourage ADU development.

In bringing the Frog Pond East and South areas into the Urban Growth Boundary (UGB), Metro required that the city explore ways to encourage the construction of ADUs in the expansion area. In Frog Pond East and South, the challenges to encouraging ADU development are different from infill development scenarios. Strategies to promote ADU development in an infill context typically focus on facilitating development for homeowners. In a greenfield development context such as Frog Pond, the City's strategies should focus on ways to influence homebuilders' floorplans to encourage building ADUs at the time of construction or encouraging home and lot designs that provide opportunities for ADU additions later.

This memorandum is intended to assist the City of Wilsonville in planning for residential development in Frog Pond East and South in a way that would be supportive of ADU development in the planning area's residential neighborhoods. Using available survey data and stakeholder interviews, this memorandum provides some insight into the likely demand and market for ADUs in the region and describes ways to City could facilitate ADU development as the planning area is built out.

Section 2. Who do ADUs serve?

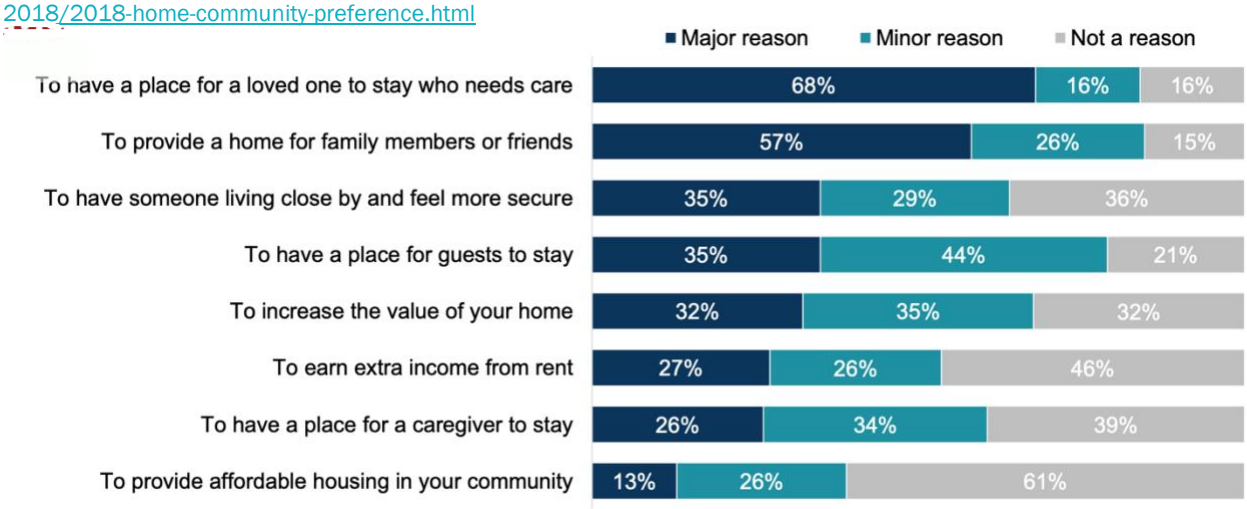
Who wants ADUs and why?

A 2018 American Association of Retired Persons (AARP) Home and Community Preferences Survey[1] found that 33% of adults aged 18 and older who did not have an ADU on their property would consider adding an ADU (27% unsure). As shown in Exhibit 1, of those who would consider adding an ADU, having a place for a loved one to stay who needs care was a major

[1] This survey was conducted by NORC at the University of Chicago with funding from AARP in March and April 2018. 2,287 participants completed the survey, the final total of the national sample was 1,947.

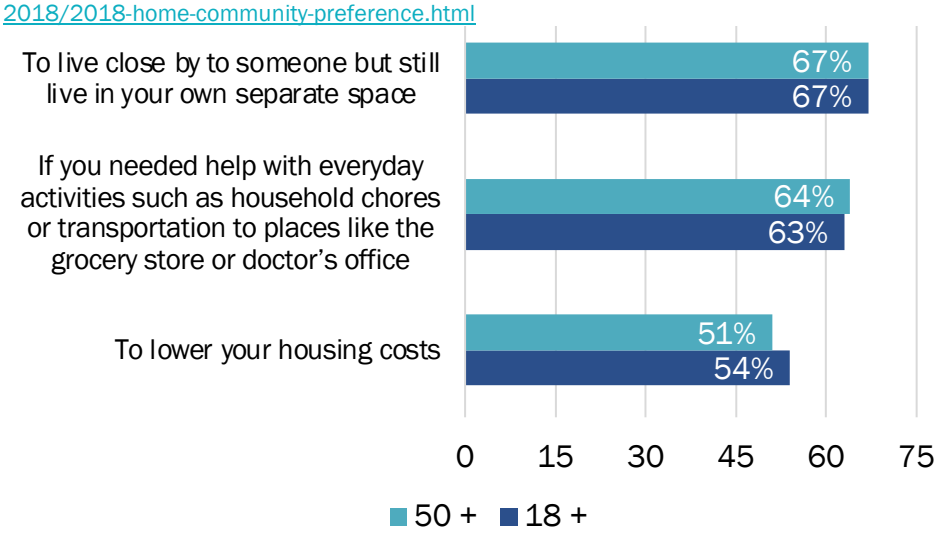
reason for 68% of respondents; providing a home for family members or friends was a major reason for 57%.

Exhibit 1. Major Reasons for Considering Building an ADU
Source: 2018 AARP Home and Community Preferences Survey, www.aarp.org/research/topics/community/info-2018/2018-home-community-preference.html



Out of the adults surveyed, 67% said they would consider living in an ADU to live close to someone but still have their own space, 63% said they would consider it if they needed help with everyday activities, and 54% said they could consider it to lower their housing costs. This is shown in Exhibit 2.

Exhibit 2. Top Three Reasons for Considering Living in an ADU by Age Group
Source: 2018 AARP Home and Community Preferences Survey, www.aarp.org/research/topics/community/info-2018/2018-home-community-preference.html

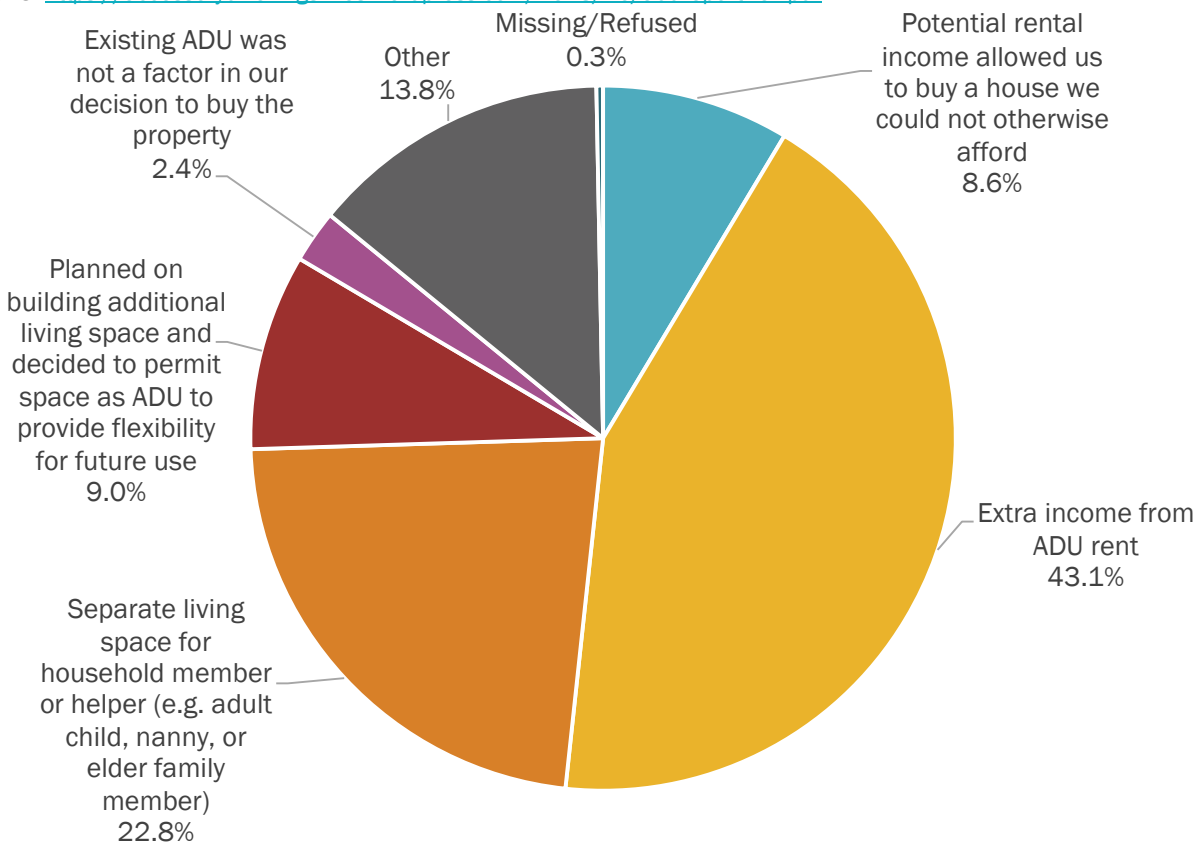


In a 2013 survey of Portland, Eugene, and Ashland homeowners with existing ADUs, 43% of Portland respondents said that the extra income from ADU rent was a primary reason for

building an ADU or for purchasing a property with an existing ADU. Other reasons are shown in Exhibit 3.

Exhibit 3. Portland Homeowners primary reason for building an ADU or purchasing the property with an existing ADU.

Source: Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon Final Methodology and Data Report, 2013 https://accessorydwellings.files.wordpress.com/2013/10/adureportfrev.pdf



What might an ADU rent for in Frog Pond East and South?

In the 2013 survey of Portland property owners with ADUs, the mean rental income received was between $811 and $880 (Exhibit 4). While these rents are now well out of date, the range of rents is worth noting: from as little as $385 per month, to as much as $1,800 per month.

Exhibit 4. Portland Rent Received Monthly for ADU, 2013
Source: Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon Final Methodology and Data Report, 2013 https://accessorydwellings.files.wordpress.com/2013/10/adureportfrev.pdf

	N	Minimum	Maximum	Mean	Std. Deviation
How much rent do you receive monthly for.your ADU?	143	$385	$1,800	$880.20	$239.42
If rent includes utilities, how much is the rent without utilities?	78	$200	$1,700	$811.85	$248.09

Based on analysis of recent ADU listings in Portland, Milwaukie, Canby, Oregon City, Beaverton and Hillsboro, ADU rents were generally between $1,050 and $2,000 per month. Rents varied by structure type, number of bedrooms and unit size, with the average rent overall being $1,540. Detached ADUs tended to have higher rents, with smaller footprints. Basement ADU rents tended to be lower, at an average of $1,275 (see Exhibit 5).

Exhibit 5. ADU Rents in Portland Metro Area by Structure and Bedroom
Source: ECONorthwest Analysis of Craigslist, Apartments.com data, 2021

Structure	Bedrooms	Most rent for	Average Rent	Most units are
Attached	Studio	$1,475	$1,475	500 SF
	1 Bedroom	$1,450 - $1,625	$1,540	650 - 800 SF
	2 Bedrooms	$1,595	$1,595	610 SF
	Overall	$1,450 - $1,625	$1,540	500 - 800 SF
Basement	Studio	$1,350 - $1,450	$1,400	500 - 750 SF
	1 Bedroom	$1,050 - $1,250	$1,150	500 - 1,500 SF
	Overall	$1,050 - $1,400	$1,275	500 - 1,500 SF
Detached	Studio	$1,450	$1,450	450 SF
	2 Bedrooms	$1,500 - $2,000	$1,700	750 - 950 SF
	Overall	$1,450 - $2,000	$1,650	500 - 950 SF
Overall	Studio	$1,350 - $1,475	$1,430	500 - 600 SF
	1 Bedroom	$1,050 - $1,625	$1,350	350 - 800 SF
	2 Bedrooms	$1,500 - $2,000	$1,690	600 - 750 SF
	Overall	$1,050 - $2,000	$1,540	500 - 1,000 SF

Overall, while the variability is high due to a small set of observations spread across a wide area in many different forms and ages of homes, this suggests that ADU rents might be similar to rents for newer market-rate apartments.

What might an ADU sell for in Frog Pond East and South?

Some ADUs are sold separately from the main home as condominiums rather than being rented out or managed by the owner of the main home. These sales transactions are difficult to isolate, and there are no known examples in Wilsonville or surrounding areas. Examples of new construction small, detached condominium units in Portland have mostly sold for $300,000 to

$400,000—roughly 60-70% of the sale price of the main house on the same lot where both were new construction. Given this pattern and the estimated sale prices for new homes in the Frog Pond area with larger lots generally being between $600,000 and $800,000, the price range for ADUs in the Frog Pond area may be similar to that seen in Portland. This is also similar to the pricing for newer two- to three-bedroom condominium units in Wilsonville.

Section 3. Opportunities and Barriers for ADU development

Regulatory Barriers

The City of Wilsonville recently updated its ADU regulations to comply with state and regional requirements. ECONorthwest reviewed the current regulations to identify any requirements that could still create challenges for ADU construction in Frog Pond East and South. The primary code standards identified as potential obstacles included:

- Lot coverage and setback standards in several existing residential zones may limit the ability to build detached ADUs.
- ADUs are not allowed for townhouses (unless those townhouses meet the single-family minimum lot size). Some developers have created floor plans for townhouses with ADUs that can be sold separately and some with a flexible ground-floor space with separate entrance that can either be used as a home office or an ADU. This model is not currently allowed in Wilsonville, but could be appropriate for portions of Frog Pond East and South.

Exhibit 6: Example of townhouse with ADU / ground floor flexible space
Source: Redfin.com

Financial and Other Factors

ECONorthwest interviewed several homebuilders who are likely to develop portions of Frog Pond East and South when master planning is complete. Some indicated interest in building ADUs. They noted several factors that will influence their decision-making about whether or not to include ADUs in their floor plans:

- When building detached ADUs with single-family homes, this can require a larger lot and push the price-point for the home above what most households can afford. (Providing flexibility for ADUs on lot coverage and setback standards could help address this concern to some extent.)
- Being able to sell the ADU separately helps keep the cost down for both units. One developer's model has been to sell all units with a three-year owner occupancy requirement, including the ADUs, to ensure that they are not used as investment properties. (Another Metro requirement for Frog Pond East and South is that the City ensure that any future homeowners associations will not require owner occupancy of homes that have accessory dwelling units. This could preclude this aspect of the model, and may, ironically, discourage building ADUs for some builders.)
- Local fees are an important factor in whether developers will build ADUs. (Wilsonville does not charge SDCs for ADUs.)

Section 4. ADU Strategies

Regulatory strategies:

- Providing greater flexibility on lot coverage and setbacks for detached ADUs could make it easier to add them to a lot with less effect on the size or location of the main home.
- Allowing ADUs with townhouses (regardless of lot size) in areas where higher density is appropriate could expand opportunities to add ADUs.
- Wilsonville already allows land divisions for ADUs to be sold on a separate lot from the main home, which is mostly applicable to detached ADUs, but could be an incentive for homebuilders along with the lack of SDC fees.
- Allowing larger ADUs (the current limit is 800 square feet) could make the existing financial and regulatory incentives stronger, but would also make them even more similar to two-unit cluster housing, which is also allowed.

Financial strategies:

- The primary financial incentive that has been used to encourage ADU production is waiver of SDCs. As noted above, Wilsonville already has this option in place, and has for many years.

- Establishing a set of pre-approved building plans for homes and townhouses with ADUs, or other similar measures to streamline the review process for development, could make some difference to homebuilders. However, with a greenfield development, there are many other review and permitting processes that will tend to take longer than the building permit review, meaning that streamlining one part of the process is likely to have a minimal impact.
- A marketing approach in which the City would help direct media attention to new homes built with ADUs could provide some incentive for builders, who would benefit from the free publicity, though the City would have to approach this carefully to avoid the appearance of bias towards a particular developer.

Section 5. Conclusions and Next Steps

ADUs in Frog Pond East and South could provide additional options for small rental and/or for-sale units at price-points similar to multifamily housing but at a neighborhood scale. This makes them an important part of the mix in this area, particularly if opportunities for multifamily development in the area are limited. Past surveys suggest that people value ADUs for intergenerational households, flexible space for guests or family members, and for rental income that can help them afford their own housing costs. These factors primarily apply when ADUs are owned along with the main home and managed by the homeowner, but this may or may not be the case when ADUs can also be sold as separate units. Subsequent additional outreach will gather additional information about community perspectives and preferences which could also influence the City's approach to ADUs.

Frog Pond East and South's greenfield context means that encouraging ADU construction in Frog Pond East and South will require influencing large professional homebuilders rather than individual homeowners. The City already has many important incentives in place, including exempting ADUs from SDCs and allowing land divisions to split them from the main house. While the City has seen little ADU production, this may be a factor of private restrictions that prohibit ADUs in some areas of Wilsonville. These restrictions are no longer allowed, and will not constrain ADUs in Frog Pond East and South.

Removing subtler regulatory obstacles including lot coverage, setbacks, and allowing ADUs with townhouses could help address some of the considerations that homebuilders noted would affect their interest in developing homes with ADUs. Metro's requirement that the City prevent homeowners' associations from requiring owner occupancy for units with ADUs could inadvertently serve as a deterrent to one model of building homes with ADUs that is intended to prevent the homes from becoming investor properties. The City may want to explore with Metro whether this condition could be modified to allow a temporary restriction to owner occupancy for a certain period after initial construction.

PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

INFORMATIONAL

5. City Council Action Minutes (August 1 & 15, 2022) *(No staff presentation)*

City Council Meeting Action Minutes
August 1, 2022

City Council members present included:
Mayor Fitzgerald
Council President Akervall
Councilor Lehan
Councilor West
Councilor Linville

Staff present included:
Amanda Guile-Hinman, City Attorney
Kimberly Veliz, City Recorder
Jeanna Troha, Assistant City Manager
Delora Kerber, Public Works Director
Martin Montalvo, Public Works Ops. Manager
Mark Ottenad, Public/Government Affairs Director
Mike Nacrelli, Civil Engineer
Cindy Luxhoj, Associate Planner
Zach Weigel, City Engineer
Martin Montalvo, Public Works Ops. Manager
Zoe Mombert, Assistant to the City Manager
Ryan Adams, Assistant City Attorney

AGENDA ITEM	ACTIONS
WORK SESSION	**START:** 5:05 p.m.
A. Public Works Complex Construction Contract	Council was informed of Resolution No. 2988, which authorizes the City Manager to execute a construction contract with Emerick Construction Company for construction of the Public Works Complex Project.
B. Waste Water Treatment Plant Master Plan	Staff shared tenets of a draft Wastewater Treatment Master Plan that accommodates the City's projected 20-year growth, addresses seismic resiliency and identifies assets to be upgraded and/or replaced.
C. 2023 League of Oregon Cities Legislative Priorities Ballot	The City's lobbyist sought the Council's direction to finalize the legislative priorities to be listed on the League of Oregon Cities' (LOC) legislative priority ballot.
REGULAR MEETING	
<u>Mayor's Business</u>	
A. July 30, 2022 Curtailment Event	Staff explained the water pump failure at the Willamette River Water Treatment Plant (WRWTP) and the subsequent Water Curtailment Notice for the cities of Wilsonville and Sherwood.
B. Upcoming Meetings	Upcoming meetings were announced by the Mayor as well as the regional meetings she attended on behalf of the City.

Communications A. Tourism Promotion Committee Marketing	City Council heard highlights about the City's current promotional activities displayed on ExploreWilsonville.com, which are designed to attract visitors for overnight lodging.
Consent Agenda A. **Resolution No. 2988** Authorizing the City Manager to execute a construction contract with Emerick Construction Company for construction of the Public Works Complex Project (Capital Improvement Project #8113). B. **Resolution No. 2991** A Resolution Of The City Of Wilsonville Authorizing The City Manager To Execute The Second Amendment To Construction Contract With Moore Excavation, Inc. For The 5th Street / Kinsman Road Extension Project. C. Minutes of the July 18, 2022 City Council Meeting.	The Consent Agenda was approved 5-0.
New Business A. None.	
Continuing Business A. None.	
Public Hearing A. **Ordinance No. 865** An Ordinance Of The City Of Wilsonville Approving A Zone Map Amendment From The Future Development Agricultural – Holding (FDA-H) Zone To The Planned Development Industrial (PDI) Zone On Approximately 0.55 Acre Located At 28505 SW Boones Ferry Road; The Land Is More Particularly Described As Tax Lot 800, Section 14A, Township 3 South, Range 1 West, Willamette Meridian, Clackamas County, Oregon. Davidsons Boones Ferry Industrial LLC, Owner/Applicant.	After a public hearing was conducted, Ordinance No. 865 was approved on first reading by a vote of 5-0.
City Manager's Business	No report.
Legal Business	No report.

URBAN RENEWAL AGENCY	
URA Consent Agenda A. **URA Resolution No. 327** A Resolution Of The City Of Wilsonville Urban Renewal Agency Authorizing The City Manager To Execute The Second Amendment To Construction Contract With Moore Excavation, Inc. For The 5th Street / Kinsman Road Extension Project. B. Minutes of the June 20, 2022 Urban Renewal Agency Meeting.	The URA Consent Agenda was approved 5-0.
New Business A. None.	
URA Public Hearing A. None.	
EXECUTIVE SESSION	Pursuant to ORS 192.660(2)(h) Legal Counsel/Litigation
ADJOURN	9:01 p.m.

City Council Meeting Action Minutes
August 15, 2022

City Council members present included:
Mayor Fitzgerald
Council President Akervall
Councilor Lehan
Councilor West – Arrived 5:09 p.m.
Councilor Linville

Staff present included:
Bryan Cosgrove, City Manager
Amanda Guile-Hinman, City Attorney
Kimberly Veliz, City Recorder
Jeanna Troha, Assistant City Manager
Cricket Jones, Finance Operations Supervisor
Amy Pepper, Engineering Manager
Ryan Adams, Assistant City Attorney
Nick McCormick, Legal Intern
Masha Mironova, Administration Intern
Matt Lorenzen, Economic Development Manager
Dan Pauly, Planning Manager
Bill Evans, Communications & Marketing Manager
Keith Katko, Assistant Finance Director
Andy Stone, IT Director
Zoe Mombert, Assistant to the City Manager

AGENDA ITEM	ACTIONS
WORK SESSION	**START:** 5:04 p.m.
A. Utility Billing Update	Staff detailed work currently underway to implement a new Utility Billing system.
B. Code Revisions Related to Camping	Council heard an informational session to discuss the recent passage of Oregon laws and court rulings related to local laws regulating camping.
C. Wilsonville Framework for Inclusive Engagement	Council discussed the Wilsonville Framework for Inclusive Engagement, which is a resource for the City's ongoing public engagement efforts.
D. Vertical Housing Calculation Methodology	Staff presented on Resolution No. 2992, which clarifies the tax exemption calculation methodology to be utilized under the City's Vertical Housing Development Zone (VHDZ) program.
REGULAR MEETING	
<u>Mayor's Business</u> A. Upcoming Meetings	Upcoming meetings were announced by the Mayor as well as the regional meetings she attended on behalf of the City.
<u>Communications</u> A. Community Survey Results	Staff presented on the 2022 National Citizen Survey (NCS), performed by National Research Center and Polco.

Consent Agenda A. **Resolution No. 2990** Authorizing The City Manager To Execute A Systems Development Charges Refund Agreement With Coffee Creek Logistics Holdings, LLC For The Construction Of Oversized Public Sewer And Water Infrastructure Improvements. B. **Resolution No. 2992** A Resolution Of The City Of Wilsonville Clarifying The Tax Exemption Calculation Methodology To Be Utilized Under The City's Vertical Housing Development Zone Program. C. Authorize the City Manager to Sign an Intergovernmental Agreement (IGA) Between Clackamas County Sheriff's Office, West Linn - Wilsonville School District and City of Wilsonville for School Resource Officer Program. D. Minutes of the August 15, 2022 Council Meeting.	The Consent Agenda was approved 5-0.
New Business A. None.	
Continuing Business A. **Ordinance No. 865** An Ordinance Of The City Of Wilsonville Approving A Zone Map Amendment From The Future Development Agricultural – Holding (FDA-H) Zone To The Planned Development Industrial (PDI) Zone On Approximately 0.55 Acre Located At 28505 SW Boones Ferry Road; The Land Is More Particularly Described As Tax Lot 800, Section 14A, Township 3 South, Range 1 West, Willamette Meridian, Clackamas County, Oregon. Davidsons Boones Ferry Industrial LLC, Owner/Applicant.	Ordinance No. 865 was adopted on second reading by a vote of 5-0.
Public Hearing A. None.	
City Manager's Business	Shared staff was looking into the tree issue at the City Hall parking lot mentioned by Councilor Lehan. They would also investigate the tree issue mentioned by Councilor Lehan on Kinsman Road.

	Lastly, Council was reminded they had be invited to a local resident's centenary birthday party.
Legal Business	No report.
EXECUTIVE SESSION	Pursuant to ORS 192.660(2)(h) Legal Counsel /Litigation
ADJOURN	8:18 p.m.

PLANNING COMMISSION

WEDNESDAY, SEPTEMBER 14, 2022

INFORMATIONAL

6. 2022 PC Work Program *(No staff presentation)*

2022 DRAFT PC WORK PROGRAM SCHEDULE

Updated 08/01/2022

AGENDA ITEMS			
Date	**Informational**	**Work Sessions**	**Public Hearings**
JANUARY 12	**CANCELLED**		
January CCI Frog Pond East and South Community Forum 1			
FEBRUARY 9	•	• Frog Pond East and South MP	
MARCH 9	•	• Boeckman Road Corridor Overview	
APRIL 13	•	• Airport Related Comprehensive Plan Amendments • Frog Pond East and South MP	
MAY 11	• Town Center Infrastructure Funding Plan and Urban Renewal Strategic Plan Update	• Outreach Framework	
JUNE 8		• Frog Pond East and South MP	
JULY 13	• Outreach Framework	• Wastewater Treatment Plant Master Plan • Frog Pond East and South MP	
AUGUST 10		• Transit Master Plan • Frog Pond East and South MP	
SEPTEMBER 14		• Airport Good-Neighbor Policies • Wastewater Treatment Plant Master Plan • Frog Pond East and South MP	
OCTOBER 12		• TC Infrastructure Funding Plan • Transit Master Plan • Frog Pond East and South MP	• Wastewater Treatment Plant Master Plan
NOVEMBER 9			• Airport Good-Neighbor Policies • Frog Pond East and South MP
DECEMBER 8			
JAN. 11, 2023			

2022 Projects		Future/Potential Fill In Projects	
• Annual Housing Report	• Transit Center TOD	• Recreation in Industrial Zones	• Mobile Food Vendor Standards
• TC Programming Plan			• Basalt Creek Zoning
• TC Ec Dev/Business Retention			• Basalt Creek Infra.
• Airport Comp Plan Element			

N:\planning\Planning Public\.Planning Commission\Scheduling\2022 PC WORK PROGRAM SCHEDULE.docx