PLANNING COMMISSION REGULAR MEETING

Tuesday, November 22, 2022 at 7:00 PM

AGENDA

CALL TO ORDER AND ESTABLISHMENT OF A QUORUM.

ADOPTION OF MINUTES.

HEARING OF PUBLIC HEARING ITEMS.

1. **SUP 2022-03 Amazon Data Center** - This is a continuance of the November 15, 2022 Planning Commission Public Hearing. The Applicant is requesting a Special Use Permit for a 220,200 square foot data center on Industrial zoned property designated in the New Town Character District on the Future Land Use Map located off Blackwell Road and Lee Highway. This will be the second work session held by the Planning Commission. GPIN 6984-69-2419-000.

COMMENTS FROM THE COMMISSION.

COMMENTS FROM THE STAFF.

ADJOURN.

Community Development Department

STAFF REPORT

Commission Meeting Date:	November 15, 2022
Agenda Title:	SUP 2022-03 Amazon Data Services
Requested Action:	Hold a Public Hearing
Department / Agency Lead:	Community Development
Staff Lead:	Denise Harris, AICP

EXECUTIVE SUMMARY

The Owner/Applicant, Amazon Data Services, Inc., seeks a Special Use Permit under Article 3-4.12.3 of the Zoning Ordinance for an approximately 220,200 square foot data center on Industrial zoned parcel consisting of approximately 41.793 acre parcel identified as GPIN 6984-69-2419-000. Designated in the New Town Character District on the Future Land Use Map located off Blackwell Road and Lee Highway. The Owner/Applicant is requesting modifications for building height allowance, parking, and fence height allowance as part of the Special Use Permit.

BACKGROUND

The proposed Special Use Permit was accepted on May 6, 2022, and proceeded to a Planning Commission Work Session on July 26, 2022 and again on October, 25, 2022 after the Applicant requested a deferral. The Applicant submitted their Public Hearing materials on October 28, 2022, for a November 15, 2022, Planning Commission Public Hearing.

To date the Applicant has submitted a Special Use Permit Plan, draft Conditions of Approval, a tree survey, a Geotechnical Report, a draft Noise Study, Illustrative Elevations, a balloon test, and other supporting documents. Throughout the Planning Commission Work Sessions the topics of noise, elevations, and visibility have been raised most often. The Applicant responded by agreeing to condition illustrative elevations, landscaping and tree buffers, one access point off Blackwell Road, dimming of lights between the hours of 11 PM and dawn, and no sub-station to be located on the site. The Applicant further agreed to condition to offer to pay for the cost of undergrounding electrical lines to a future sub-station.

Based on conversations with the Planning Commission, the Applicant agreed to conditions regarding offering outreach to qualified persons residing in the Town of Warrenton for potential employment. In addition, the Applicant agreed to condition coordinating with Fauquier County Public Schools K-12 and with Laurel Ridge Community College to establish a work force development program.

The remaining issue of noise has been heavily conditioned and agreed to by the Applicant. The Applicant filed for a Zoning Determination to clarify how the Noise Ordinance is to be interpreted. The deadline for this determination is January 16, 2023. After the determination, the Applicant is required to submit a noise study demonstrating the use meet the Town of Warrenton Zoning Ordinance at time of Site Plan submission. The condition goes further to require the Applicant must conduct a separate noise study one month after commencement of the use to ensure compliance with the Zoning Ordinance. Finally, the condition states if the use exceeds noise limits at any time, the Applicant shall undertake mitigation measures to achieve compliance.

STAFF RECOMMENDATION

Hold a public hearing.

Service Level / Policy Impact

The proposed use is located within the New Town Character District of Plan Warrenton 2040.

Fiscal Impact

Currently, the Town of Warrenton Real Estate Tax is $0.0401 per $100 and Business Property Tax is $1.00 per $100. Contractors are assessed at a rate of $0.085 per $100 per gross receipts during construction. Governing bodies set the tax rate on an annual basis. There are no similar businesses in the Town and State Code §58.1-3 prohibits local tax officials from divulging any information with respect to “the transactions, property, including personal property, income or business of any person, firm or

corporation." The parcel is currently vacant. Any industrial development on it will result in an additional valuation of the property.

Legal Impact

Draft Conditions of Approval run with the land so as to bind future property owners. Any party or officer identified by title shall mean and include any successor to that person or entity's powers or responsibilities.

ATTACHMENTS

1. Staff Analysis
2. Applicant's Supporting Materials
    - Statement of Justification
    - SUP Plan
    - Illustrative Elevations
    - Existing Conditions Plan
    - Tree Study
    - Draft Noise Study
    - Geotechnical Report

Community Development

Staff Analysis

Planning Commission Public Hearing

DATE OF HEARING: NOVEMBER 15, 2022

SUMMARY

Applicant/ Owner Amazon Data Services, Inc.
Representative Walsh, Colucci, Lubeley & Walsh, P.C.

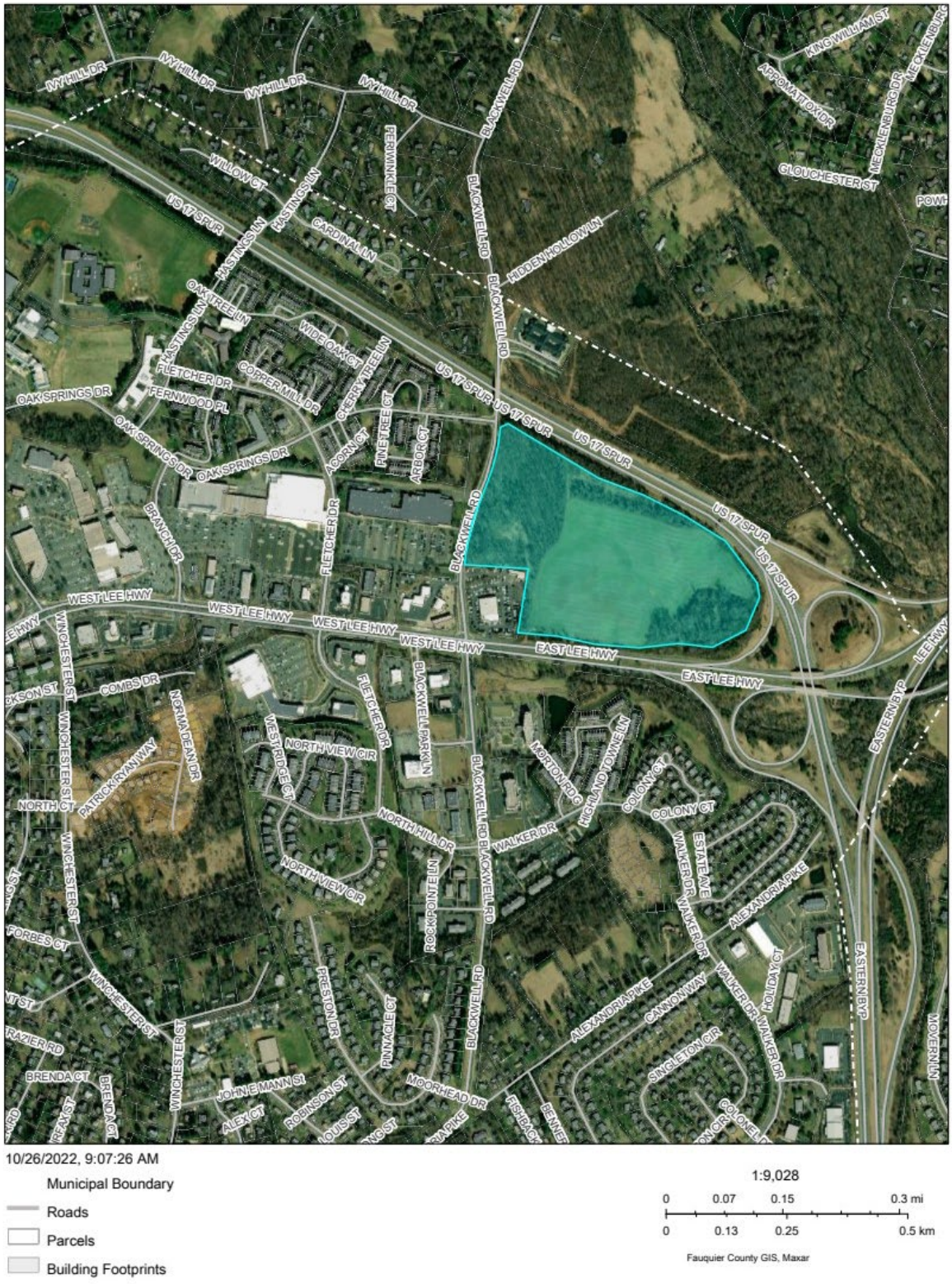
Applicant's Proposal/Request

The owner, Amazon Data Services, Inc., represented by Walsh, Colucci, Lubeley & Walsh, P.C., seeks a Special Use Permit for a 220,200 square foot data center on a 41.79-acre Industrial zoned parcel, identified as GPIN 6984-69-2419-000, designated in the New Town Character District on the Future Land Use Map located off Blackwell Road and Lee Highway. The Owner/Applicant is requesting modifications and waivers.

REFERRAL AGENCY COMMENT SUMMARY

Referral Agency	Date	Outstanding Issues
Zoning	11/1/22	Noise; conditioned to-be addressed
PW/PU	11/1/22	None for SUP; must comply at Site Plan
Police	5/27/22	None for SUP; must comply at Site Plan
Emergency Services	11/1/22	None for SUP; must comply at Site Plan
VDOT	7/7/22	Eliminate as much of guardrail on Blackwell as possible at Site Plan.

AERIAL MAP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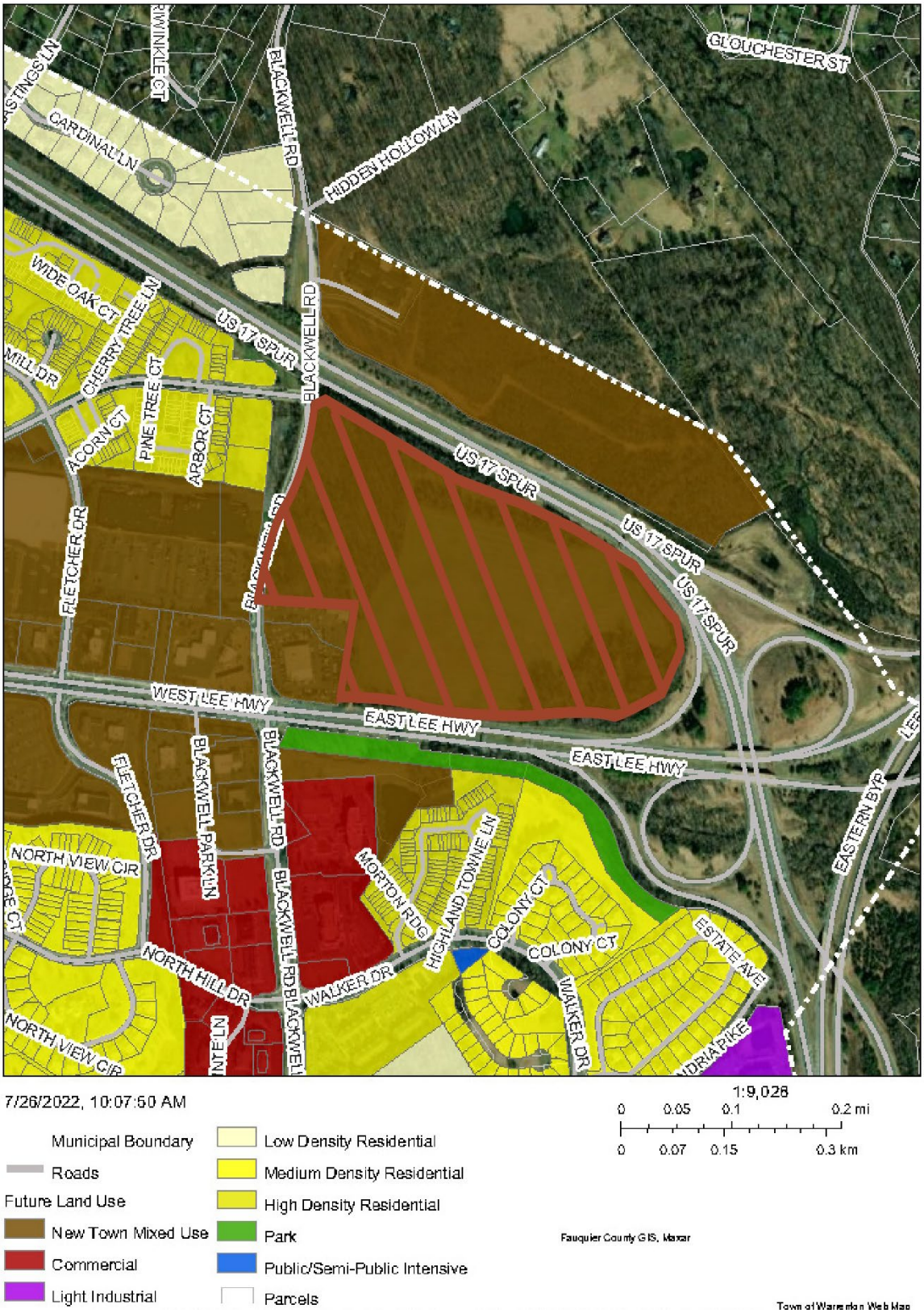
BLACKWELL RD
KING WILLIAM ST
APPOMATTOX DR
MECKLENBURG DR
GLOUCHESTER ST
WILLOW CT
FERWINKLE CT
HASTINGS LN
US 17 SPUR
CARDINAL LN
HIDDEN HOLLOW LN
OAK TREE LN
WIDE OAK CT
COPPER MILL DR
FLETCHER DR
FERNWOOD PL
OAK SPRINGS DR
PINE TREE CT
ACORN CT
ARBOR CT
BRANCH DR
WEST LEE HWY
EAST LEE HWY
WINCHESTER ST
COMBS DR
NORMA DEAN DR
PATRICK RYAN WAY
NORTH CT
NORTH VIEW CIR
WESTRIDGE CT
BLACKWELL PARK LN
MORTON RD
HIGHLAND TOWNE MT
COLONY CT
NORTH HILL DR
WALKER DR
ESTATE AVE
ALEXANDRIA PIKE
EASTERN BYP
FORBES CT
PRESTON DR
FINN GLEN CT
CANNON WAY
SINGLETON CIR
TRAZIER RD
BRENDA CT
JOHN E MANN ST
ROBINSON ST
MOORHEAD DR
ALEY CT
LOUIS ST
10/26/2022, 9:07:26 AM
Municipal Boundary
Roads
Parcels
Building Footprints
1:9,028
0 0.07 0.15 0.3 mi
0 0.13 0.25 0.5 km
Fauquier County GIS, Maxar

FUTURE LAND USE MAP



ZONING MAP

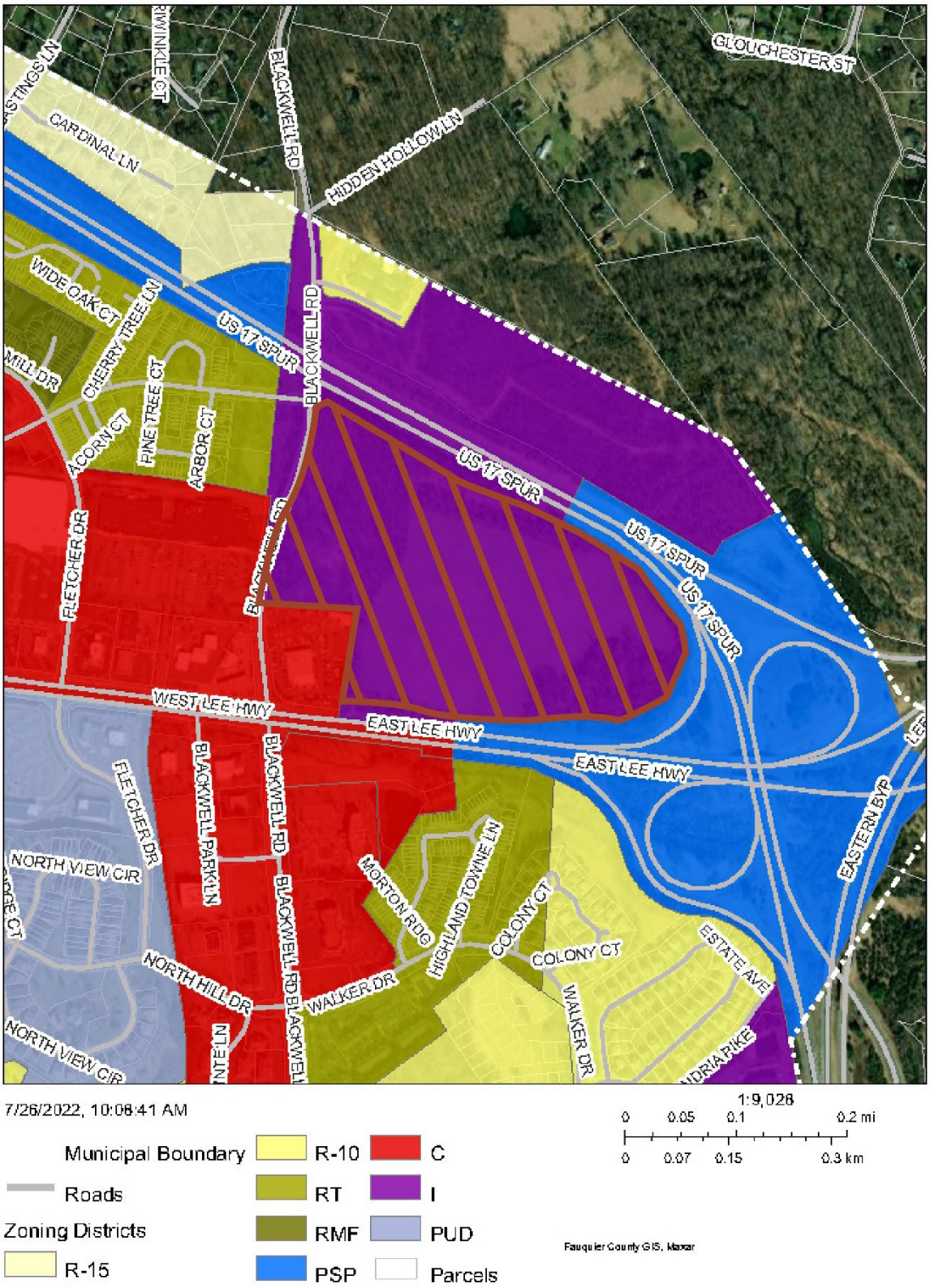

GLOUCHESTER ST
CARDINAL LN
HIDDEN HOLLOW LN
BLACKWELL RD
WIDE OAK CT
CHERRY TREE LN
MILL DR
PINE TREE CT
ACORN CT
ARBOR CT
US 17 SPUR
FLETCHER DR
WEST LEE HWY
EAST LEE HWY
BLACKWELL PARK LN
NORTH VIEW CIR
MORTON RD
HIGHLAND TOWNE LN
COLONY CT
ESTATE AVE
NORTH HILL DR
WALKER DR
EASTERN BYP
7/26/2022, 10:08:41 AM
1:9,028
0 0.05 0.1 0.2 mi
0 0.07 0.15 0.3 km
Municipal Boundary
Roads
Zoning Districts
R-15
R-10
RT
RMF
PSP
C
I
PUD
Parcels
Fauquier County GIS, Maxar

Table of Contents

I. Regulation & Planning Consistency

This section is based on relevant regulatory and planning documents. The following table summarizes the area characteristics:

Direction	Current Land Use	Future Land Use Map Designation	Zoning
North	Poet's Walk / Hwy 17 Spur	New Town Mixed Use	R 10 / Industrial / PSP
South	Country Chevrolet / Hotel / Residential Townhouses	New Town Mixed Use / High Density Residential	Commercial / RT Residential
East	Highway	N/A	PSP Public Semi-Public
West	Car Dealership / Gas Station / Commercial Retail	New Town Mixed Use / High Density Residential	RT Residential/ Commercial / PSP

A. Comprehensive Plan Analysis

The Code of Virginia §15.2223 states the Comprehensive Plan's purpose is to serve as a guide for the future. It is general in nature in that it designates the general location, character, and extent of features for the Town. While not to be confused with entitled zoning, Plan Warrenton 2040 features an overall vision of the Town. The multiple sections of the plan are extensive. Below are highlights related to the Plan.

Plan Warrenton 2040 designates this proposed parcel on the Future Land Use Map in the New Town Character District. This character district consists of mostly commercial and industrial lands on the northern side of Town from the US29/15 gateway entrance to the Business17 gateway entrance. In its entirety, it is envisioned to be "*a signature location for a regional employer and jobs center, it will contain mixed-use residential, entertainment and commercial uses organized by a compact interior street grid network and a park area that is located over an existing floodplain*," (Plan Warrenton 2040 Character District Guide Book page 15).

The intent of this district is to utilize the direct access from US 29/15 to encourage potential signature office and job centers with the characteristics of a mixed-use development. The proposal area was initially envisioned with structures up to six stories, with a minimum of thirty-five (35) feet for a single-story commercial, and lot coverage of 80% (Plan Warrenton 2040 Character District Guide Book page 20).

The New Town District provides a major economic development opportunities given its accessibility, large lots, and high visibility. Therefore, a goal for this district is to, "*Evaluate development incentives that stimulate private investment and new development*," (Plan Warrenton 2040 page 63).

Economic development is further encouraged within the Community Facilities section noting the importance of making responsible and strategic community facility investments to sustain the fiscal well-being and economic resiliency of the Town. This is further reiterated in the vision calling to, "*Provide a high quality of life to capture economic benefits through diverse businesses, employers, and residences*," (Plan

Warrenton 2040 Character District Guide Book page 19).

Quality of life is an important aspect throughout the Comprehensive Plan, noted especially in the Open Space, Parks, and Environment section as a promotion of health and wellness. A goal in this section encourages "*Preserving, enhancing, and protecting the environmental, scenic, and natural quality of the Town,*" (Plan Warrenton 2040 page 33). Strategies to this goal include utilization of nature-based systems for stormwater management and minimize the loss of existing tree cover for habitat preservation. Connectivity improvements are also noted as tools for strengthening the public health infrastructure.

Walkability and multimodal transportation are noted within the Transportation section of the Comprehensive Plan as ways to improve health and safety to promote community livability. This section encourages construction of sidewalks on both sides of an existing street, specifically introducing sidewalk linkages in Character District redevelopments. This proposal's parcel fronts the Gateway and Signature streets identified in Plan Warrenton 2040 Warrenton Street Typology and includes new bicycle/pedestrian facilities on the Desired Outcome Map (Plan Warrenton 2040 page 40).

The Applicant stated on page 3 of the October 28, 2022, letter to Denise Harris, Planning Manager, from the Applicant's representative John Foote that the comprehensive plan "is a compilation of policies…No individual site can be expected to meet all objectives in the Plan." The letter goes on to state the "2040 Plan has significant economic and fiscal goals that seeks to achieve a strong, diversified, and resilient economy…" The proposal includes no access to US29/15 as the New Town Character District Illustrative concept chows on page 19 of Plan Warrenton 2040.

Staff Findings

The application is proposing a single use, major employer on the site that will diversify the Town economic base. The secured site will not allow public access and thus no internal streets or open space. However, the Applicant is including a 5' sidewalk along the property frontage on Blackwell Road. The requested waiver to increase the height of the buildings to 37' is within the two to six stories envisioned on this parcel in the comprehensive plan (Plan Warrenton 2040 page 14). Staff has asked the Applicant to consider green infrastructure and LEED standards as encouraged in Plan Warrenton 2040. The Applicant is proposing building elevations that will incorporate a variety of materials at the gateway of Town. Staff has conditioned the consideration for additional architectural design elements in conjunction with Zoning Ordinance Article 9-26.1.F, which require these to better align with the character and goals of the Town.

B. Historic and Cultural Resources

U.S. 29/15 and US29 Business (aka Lee Highway) are designated as part of the Journey Through Hallowed Ground National Scenic Byway (JTHG NSB). The National Park Service defines byways as "a distinctive collection of American roads that tell a story and provide the visitor a unique experience." To be designated, a corridor must contain one of the following six intrinsic qualities: archaeological, cultural, historic, natural, recreational, or scenic. The JTHG NSB Corridor Management Plan (CMP) states under 4.2.15 Managing Roadside Character, "byway communities should work with utility companies to underground utility lines whenever possible." The CMP provides best practices for roadway design, gateways, and access management. The National Park Service National Scenic Byways Guide dated May 2002 stated, "Perhaps one of the underlying principles for the program has been articulated best by a byway leader who said the program is about recognition, not regulation."

Plan Warrenton 2040 dedicates a section to historic resources within the Town of Warrenton. A key aspiration of which is to, "*conserve, reuse, and promotes historic resources to enhance the Town's sense of place and grow the economy through economic activity,*" (Plan Warrenton 2040 page 16). An emphasis of this

section focuses on the existing built environment and conservation of natural resources, inside and outside of the Historic District. Preservation of the natural environment is further supported by encouraging, "*enhance[ing] the environment through preservation and sustainability best practices*," (Plan Warrenton 2040 page 17).

Staff Findings

The Virginia Department of Historic Resources database does not list any archeological or historic resources on the proposed site. There are two noted archeological sites adjacent to the north-east corner of the property on the north side of US 17. Any underground lines should avoid the proposed area to protect documented historic resources. The Town of Warrenton is pursuing a Smart Scale grant for a roundabout at Lee Highway and Blackwell Road which will help to address the gateway transition from US 29/15 to Old Town. The Applicant provides access to the site off Blackwell Road and has agreed to condition no access from the site to Lee Highway thereby eliminating the need for additional deceleration lanes or additional transportation measures that would alter the existing road. The Applicant has also indicated there is no intention to introduce new signage beyond the street address off Blackwell Road. The October 28, 2022 submission removes a potential substation from this property and the Applicant agrees to condition no substation. The Zoning Ordinance requires all electrical service lines from a sub-station to the use to be placed underground.

C. Zoning Analysis

On August 10, 2021, Town Council approved a Zoning Ordinance Amendment (ZOTA 2021-0321) to Articles 3, 9, and 12 to allow for Data Centers within the Industrial (I) Zoning District by Special Use Permit approval, subject to the requirements of §9-26.

The legislative intent of the Industrial Zoning District is "*providing for a variety of light manufacturing, fabricating, processing, wholesale distributing, and warehousing uses appropriately located for access by highways and providing a controlled environment within which signing is limited, uses are to be conducted generally within completely enclosed buildings, and a moderate amount of landscaping is required.*"

Town of Warrenton Zoning Ordinance Permissible Uses By-Right in the Industrial District

By right, this zoning district entitles the property to the following uses without legislative approval under Article 3-4.12.2:

- *Accessory buildings*
- *Active and Passive Recreation and Recreational Facilities*
- *Banks and savings and loan offices*
- *Broadcasting studios and offices*
- *Business and office supply establishments*
- *Cabinet, upholstery, and furniture shops*
- *Cafeteria or snack bar for employees*
- *Clinics, medical or dental*
- *Commercial uses constituting up to 15% of permitted site or building area*
- *Motion picture studio*
- *Nurseries and greenhouses*
- *Offices- business, professional, or administrative*
- *Off-street parking and loading subject to Article 7*
- *Open space subject to Article 9*
- *Printing, publishing, and engraving establishment; photographic processing; blueprinting; photocopying; and similar uses*
- *Private club, lodge, meeting hall, labor union, or fraternal organization or sorority*
- *Rental service establishment*
- *Retail or wholesale sales and service incidental to a*

- Conference Centers

- Contractor's office and warehouse without outdoor storage

- Crematory

- Dwellings for resident watchmen and caretakers employed on the premises

- Employment service or agency

- Flex Office and Industrial uses

- Health and Fitness Facilities

- Institutional buildings

- Janitorial service establishment

- Laboratories, research, experimental or testing, but not testing explosives, rockets, or jet engines

- Light manufacturing uses which do not create danger to health and safety in surrounding areas and which do not create offensive noise, vibration, smoke, dust, lint, odor, heat, glare, or electrical impulse than that which is generally associated with light industries

- Mobile Food Vendors subject to Article 9-24

- Monument sales establishments with incidental processing to order but not including shaping of headstones

permitted manufacturing, processing, storing, or distributing use

- Rug and carpet cleaning and storage with incidental sales of rugs and carpets

- Security service office or station

- Sign fabricating and painting

- Signs, subject to Article 6

- Studios

- Transmission and receiving towers of height not exceeding 125'

- Utilities related to and necessary for service within the Town, including poles, wires, transformers, telephone booths, and the like for electrical power distribution or communication service, and underground pipelines or conduits for local electrical, gas, sewer, or water service, but not those facilities listed as requiring a special use permit

- Wholesale establishment, storage warehouse, or distribution center. Furniture moving.

This application is for a permissible use by special use permit upon approval by the Town Council under the Town of Warrenton Zoning Ordinance Article 3-4.12.3 for a data center in the Industrial District.

Noise

The Applicant provided a Noise Study; however, in the October 28, 2022, submission it was stated the report is a preliminary draft. The Town's Zoning Ordinance Article 9-14 governs the noise regulations. It contains the following performance standards:

9-14 Performance Standards for All Non-Residential Uses

9-14.1 Performance Standards. Performance standards for each non-residential use will be in conformance with standards adopted by the Town Council and in no case shall standards relative to water, air, sound, and land pollution control be less than those standards adopted by the Virginia Department of Health, the Virginia Water Control Board, and the Virginia Air Pollution Control Board.

9-14.2 The sound pressure level of sound radiated from an establishment, measured at the lot line of the site thereof that is the nearest thereto, shall not exceed the values in any octave band of frequency that are specified in Table 9-1 below, or in Table 9-1 as modified by the correction factors set forth in Table 9-2. The sound pressure level shall be measured with a sound level meter and an associated octave band analyzer conforming to standards prescribed by the American National Standards Institute.

Table 9-1 *Maximum Permissible Sound Pressure Levels Measured* *re 0.0002 dyne per CM²*		
Frequency Band *Cycles per Second*	*Along Residential District Boundaries – Maximum Permitted Sound Level* *In Decibels*	*At Any Other Point on the Lot Boundary – Maximum Permitted Sound Level* *In Decibels*
63	*64*	*72*
125	*60*	*70*
250	*54*	*65*
500	*48*	*59*
1000	*42*	*55*
2000	*38*	*51*
4000	*34*	*47*
8000	*30*	*44*

Table 9-2 *Correction Factors*	
Condition	*Correction in Decibels*
On a site contiguous to or across a street from the boundary of any R-district established by this chapter.	*Minus 5*
Operation between the hours of 10:00 p.m. and 7:00 a.m.	*Minus 5*
Sound of impulsive character (e.g., hammering)	*Minus 5*
Sound of periodic character (e.g., sawing)	*Minus 5*
Tone (e.g., hum or screech)	*Minus 5*
Sound source operated less than:	
20% in any one hour period	*Plus 5[1]*
5% in any one hour period	*Plus 10[1]*
1% in any one hour period	*Plus 15[1]*

1. Apply only one of these corrections. All other corrections (including any one of the footnoted) are cumulative.

Staff Findings

The Applicant submitted a Zoning Determination to be able to interpret the Zoning Ordinance correctly for their noise analysis. This determination, per State Code, must be completed by January 16, 2023. Therefore, the Applicant is offering to agree to a Condition of Approval that requires a sound study demonstrating the operation of the data center meets the requirements of the Zoning Ordinance as a condition of approval of a Site Plan. The Applicant further agreed to a condition to conduct a sound study one month after the use commences to demonstrate compliance. If the use does not comply, the Applicant is required to reach compliance within 180 days. Staff finds that the proposed Conditions of Approval provide assurances that the use must meet the Zoning Ordinance prior to Site Plan approval.

Lights

The Zoning Ordinance states all lighting must be full cut-off and cast no glare on adjacent properties or on the public right-of-way. Intensities should not exceed 1.0-foot candles upon adjoining streets, commercial, and industrial properties and shall not exceed 0.5-foot candles upon adjoining residential and institutional properties (Article 9-8.6.3).

Staff Findings

All lighting requirements are required to be met under Article 9-8 at time of Site Plan Development submission. Staff cannot comment on lighting at this time as the Applicant has not provided specific lighting information. However, the draft Conditions of Approval agreed to by the Applicant state all lighting provisions will meet the requirements of §9-8, all exterior lighting will utilize LED, designed with cutoff and fully shielded fixtures, all building mounted lighting will be maximum height of 25', lights will be dimmed to 50% output between 11 PM and dawn, and parking lot lights will be a maximum height of 20'.

Building Design and Elevations

The Applicant presented at the October 18, 2022, Planning Commission work session new elevations. The Town of Warrenton Zoning Ordinance Article 9-26.1.F.1 states building facades for data centers shall include at least two of the following design elements:

- Change in building height.
- Buildings set-backs or recesses.
- Fenestration (25% minimum).
- Change in building material, pattern, texture, or color.
- Use of accent materials.

The Applicant is requesting, per Zoning Ordinance Article 9-26.1.D, to have Town Council approve a building height two feet higher than the allowed 35.'

Staff Findings

The Applicant agreed to condition the October 28, 2022 "Illustrative Elevations;" however the submittal does not include a visual from Lee Highway – the Town's gateway. Therefore, staff is proposing further design conditions specific to the building orientation to Lee Highway.

Landscaping and Tree Buffers

The Town of Warrenton Zoning Ordinance Article 9-26.1.I includes additional landscaping requirements for data centers, beyond Article 8 Landscaping Requirements. This includes any portion of the data center visible from a park or adjoining/across the street from a residential district to be screened by vegetation consisting of a double staggered row of evergreen trees planted 15 feet on center. A three-foot berm with a double staggered row of shrubs on ten-foot center may be used in place of the double staggered row of evergreen trees.

Staff Findings

The SUP Plan provides landscaping calculations that meet minimum requirements for parking and canopy. Additional information will need to be provided at time of Site Development Plan submission showing conformance with landscape species type and height requirements and minimum buffer requirements under Article 9-26. Existing vegetation is shown as to be utilized for some of the buffer requirements. No waivers of landscaping requirements have been requested. While the SUP Plan indicates a 100' buffer and tree save area, the Tree Survey report provided by the Applicant indicates a large number of trees to be removed along Blackwell Road. This report has not been updated with the October 28, 2022 submission. Staff has requested the Applicant consider a larger tree save area along Blackwell Road and adjacent to the car dealership. Another concern of staff is where the electrical lines will access the site. Dominion indicated their practice is to underground distribution lines in roads or access roads where feasible. If it is determined not feasible, an easement with no vegetation planted above it will be required to access the site. Finally, the Journey Through Hallowed Ground National Scenic Byway includes a landscape plan for the Living Legacy Project with identified tree and shrubs (e.g. red cedars, red maples, red buds, etc). Plantings along the JTHG NSB corridor are encouraged to incorporate these species as VDOT did for the interchange over US29 to Laurel Ridge Community College.

D. Electrical Power Needs

The Applicant has stated several times the use may commence on the existing power; however, it will need additional power to become fully operational. As such, the Applicant submitted a "load request" to Dominion Energy. This triggered a lengthy, and separate, review process by that company that is required to explore multiple options. Dominion has held community meetings and continues its review. At the time of the writing of this analysis, Dominion is scheduled to provide Fauquier County Board of Supervisors with an update on November 10, 2022. This process is outside of the Town and outside of the Town Council decision.

What is under consideration is how utility lines are implemented within Town boundaries. Likewise, sub-stations within the Town boundaries require Special Use Permits. However, this SUP application is specific to a data center use. The Applicant agreed to condition no sub-station will be located on the property and to offer to fund the undergrounding of utility lines from any future sub-station to the use.

Staff Findings

The Zoning Ordinance Article 9-26.1.C requires all utility lines between a sub-station and data center will be placed underground. If a future sub-station was determined by Dominion to be located within Town boundaries, it would require a separate SUP application. If Dominion determines that a future sub-station is located outside of Town boundaries, then it will fall under the purview of the jurisdiction the sub-station would be located. Regardless, all utility lines from the sub-station to the data center are required to be placed underground within the Town limits.

Public Works and Utilities will require careful planning and approval of the location of these underground facilities so as not to interfere with the provision of water, sanitary sewer and storm sewer facilities required for this property and offsite properties in the area where those underground power facilities are proposed. This is critical for sanitary and storm sewers that are typically gravity systems and are typically constrained by the vertical elevation of surface features.

E. Transportation & Circulation Analysis

Transportation is reviewed and regulated with the standards imposed by the Public Facilities Manual and Virginia Department of Transportation (VDOT). The bounding roads for the proposed parcel are Blackwell Road that is designated as a signature street; Route 17 is a limited access freeway/expressway; and the eastern end of Lee Highway is a principle arterial gateway. The Applicant states the use will generate "very little traffic" in the Statement of Justification. The full buildout is anticipated to be approximately 52 employees with a maximum of 32 employees at any given time.

The gateway into Town is the subject of a VDOT Pipeline Study and a Town of Warrenton 2022 Smart Scale application for a roundabout. Development of this site has proven problematic in the past for interested parties due to constraints that prevent transportation improvements without extensive investment.

The Applicant is proposing a single access to the site off Blackwell Road, closing the existing access point off Blackwell Road once construction is completed, and a five-foot sidewalk along the frontage of Blackwell Road. There is to be no access on to Lee Highway resulting in no additional conflict points at the entrance of Town. The site will have a 24 hour a day gated security with no public access.

Staff Findings

The proposed traffic generation for this use is less than other potential by-right industrial uses. The Applicant agrees to condition no access on to US Routes 29 nor 17. The Applicant is further asking for a reduction in the Town of Warrenton Zoning Ordinance required 22 loading spaces on site for a traditional industrial use. The Applicant is providing a five-foot-wide sidewalk along the frontage of Blackwell Street where none currently exists.

F. Environmental Analysis

Development within the Town of Warrenton is held to federal, state, and local regulations or standards including, but not limited to:

- Virginia Stormwater Management Program (VSMP) Regulations
- Article 3-5.1 Floodplain District (FPD)
- Article 4 Site Conservation Manual (SCM)
- Article 5 Stormwater Management (SWM)
- Article 10 Site Development Plan (SDP)
- Commonwealth of Virginia Erosion and Sediment Control (ESC) Law
- Virginia Erosion and Sediment Control Handbook (VESCH)
- Department of Environmental Quality (DEQ) Regulations

The Applicant submitted a Geotechnical Engineering Analysis produced by ECS Mid Atlantic, LLC dated August 15, 2022. This document conducted field and lab testing, design recommendations, and site construction recommendations. The report details a proposed retaining wall on the northeast side of the

site to expose a maximum of six feet. Page 8 of the report characterizes the subsurface as being located within the Central Blue Ridge Anticlinorium. Based on the USGS Geological Map of Virginia the site is within the Catoctin Formation – Metabasalt soils. The groundwater observations found groundwater was encountered in four of the 20 borings. Page 29 Item 5.2.3 indicates weathered rock was encountered. Rock excavations will be required for mass grading and installation of deep utilities with the likelihood that blasting and/or hoe-ramming will be required for below auger refusal depths.

The Applicant also submitted a grading plan produced by Bohler dated October 28, 2022, and a tree survey conducted by TNT Environmental dated April 5, 2022.

Grading plan, SWM, BMP, aeration condition, permeable pavers, tree save, underground utilities for this project or the substation, shall not interfere with the surface or subsurface features of the floodplain for that tributary.

Staff Findings

In general, the following measures should be incorporated to the maximum extent possible to ensure that the development of the data center is done in a sustainable manner that is consistent with the goals of the Town:

- Apply best practices for erosion control.
- Minimize land disturbance and maximize on-site tree preservation.
- Reduce the heat island effect by minimizing impervious areas and enhancing the landscaping.
- Reduce, control, and treat surface runoff through effective stormwater practices that treat the quantity and quality of runoff to comply with the Town's Municipal Separate Storm Sewer System (MS4) Stormwater Requirement and Stormwater Management Ordinance.
- Use Best Management Practices (BMP), per Virginia Stormwater BMP Clearinghouse, to meet water quality and quantity requirements.
- Incorporate permeable paving in parking areas.
- Protection of surface and groundwater quality.
- Comply with all applicable State and Federal regulations regarding spill prevention and control requirements.
- Comply with all applicable State and Federal requirements and regulations regarding wetlands preservation and mitigation.

G. Community Facilities Analysis

Public community facilities in the Town are provided by the Town, Fauquier County, and other public groups for the benefit of all residents. The availability and quality of these facilities, that include, schools, libraries, hospitals, parks, police and fire and rescue services, are evaluated when people are considering moving into the Town or nearby area. The provision of these facilities adds to the desirability of living in the Town.

Water and Sewer

The Town's Water and Sewer Capacity Evaluation of 2015 anticipated water and sewer demand of approximately 23,500 gallons per day. Per the letter provided by Mr. John Foote, Esquire, Walsh, Colucci, Lubeley, & Walsh, dated September 9th, the proposed use will require the following:

1. Domestic Water Use of: 190.5 GPD
2. Humidification of: 190.1 GPD

Total Daily Use Committed by the letter: 380.6 GPD

The initial charging of the Air-Cooling System will require 19,000 gallons of water. However, this will not create a daily demand on water use since the system is a closed system to assist with the cooling of air, such as an air conditioning system.

The Town of Warrenton Zoning Ordinance Article 9-26.B states data centers shall utilize recycled water for air chillers, in conjunction with using recycled water, for cooling purposes. Potable water is not permitted to be used for cooling.

Staff Findings

The initial charging of the air-cooling system will not create an excess daily demand on water; therefore, the average demand will not put a burden on the Town water system. The domestic water use will be determined by the number and types of bathroom fixtures, which are not provided at this time. Based on the commitments above, wastewater generation will not create an issue to the Town's wastewater infrastructure.

In regards to other public infrastructure, undergrounding of the power lines will need careful considerations and approval so as not to interfere with the water, sanitary sewer, and storm sewer facilities required for this site and off-site properties.

Emergency Services and Police

The proposed data center will be a highly secured site with guard gate security personnel 24 hours a day, security fencing surrounding the site, and a patrolled trail. The Applicant stated on page 9 of the October 28, 2022, letter to Denise Harris, Planning Manager, from the Applicant's representative John Foote that, "The security that will be provided will benefit the surrounding area…Compared to other uses it will not increase the burden of local law enforcement."

The Applicant has agreed to conditions that require coordination with the Town and Emergency Services through training, a designated point of contact, and abiding to all federal and state compliance requirements.

Staff Findings

The Town of Warrenton Police Department state the proposed data center is in a unique location that effectively insulates it from the rest of the Town. From a public safety perspective, the impact to the citizens will mostly begin and end at the entry and exit point on Blackwell Road.

H. Economic & Fiscal Analysis

The Town and Fauquier County both collect real estate and business personal property tax. The Fauquier County Commissioner of the Revenue serves as the assessor for all real and personal property located in the Town.

- Real estate is reassessed every four years.
- Business personal property assessments are updated annually. Businesses are required to file an annual declaration of business personal property with the Commissioner's office. Assets are reported at their original cost and the Commissioner's office applies a depreciation factor based on the year that the asset was acquired by the business.

- Tax rates are set by the governing bodies as part of the annual budget process. Current rates per $100 of assessed value are shown in the chart below.

Jurisdiction	Real Estate	Business Personal Property
Fauquier County	$0.903	$3.65
Town of Warrenton	$0.0401	$1.00

During the construction phase, the Town will collect Business, Professional, and Occupational License taxes from the contractors working on the construction of the building. Contractors are assessed at a rate of $0.085 per $100 of gross receipts.

There currently are no similar businesses located in the Town upon which to base a comparison for a fiscal analysis. While real estate assessments are public, personal property assessments are not. Per Code of Virginia §58.1-3, local tax officials are prohibited from divulging any information acquired with respect to, "the transactions, property, including personal property, income or business of any person, firm or corporation." As such, other jurisdictions are unable to provide fiscal information on similar businesses.

In the October 28, 2022, letter to Denise Harris, Planning Manager, from the Applicant's representative John Foote, there is a statement on page 10 that, "The Applicant will invest approximately $550,000,000 in this facility and thus in the community."

Staff Findings

The Applicant indicated in the Statement of Justification that the use will "materially grow its non-residential tax base…data centers produce a substantial revenue stream." The Applicant goes on to state "Amazon pays taxes on all of its data centers, principally consisting of an increased valuation of real property on which the facility sits, and business personal property taxes." Due to the fact the property is vacant, staff finds these statements to be true if the use is permitted.

II. Materially Relevant Data Center Considerations

This section of the report is intended to identify issues raised during the review of the proposal, which are not directly related to the policies, goals, or action strategies, but which are materially relevant to the Town's responsibilities in considering land use issues. The materially relevant issues in this case are as follows:

- Town Council Zoning Text Amendment: July 11, 2017, Town Council initiates a Zoning Ordinance Text Amendment to research industrial areas and the possibility of adding data centers. The ensuing initiation was not pursued with the Planning Commission nor Town Council. On April 13, 2021, Town Council again initiated a Zoning Ordinance Text Amendment to allow for data centers in the I – Industrial District with the approval of a Special Use Permit. On May 25, 2021, the Planning Commission held a Work Session to discuss the Zoning Ordinance Text Amendment (ZOTA 2021-0321) for allowance of data centers in the I District with a Special Use Permit. Two subsequent Planning Commission Public Hearings were held on June 15, 2021, and July 20, 2021, resulting in a vote 5-1 to recommend approval of the Zoning Ordinance Text Amendment. On August 10, 2021, Town Council held a Public Hearing for ZOTA 2021-0321. Two Warrenton residents and one non-resident spoke during the Public Hearing. Town Council voted unanimously (7-0) to approve ZMA 2021-0321.
- Dominion Energy Virginia (Dominion): According to the Dominion Energy website, in April 2022, Dominion Power initiated a public notification to address increasing demand for energy and

infrastructure needs. This process includes desktop review of existing features and constraints, such as culturally sand environmentally sensitive lands, residences, schools, and parks. Dominion explores co-locating along existing corridors like roads and other linear easements. The process includes public outreach. Dominion's approval process for energy infrastructure follows regulatory procedures with authority resting with the State Corporation Commission (SCC) that requires certification of transmission lines at or above 138 kilovolts (kV). Additionally, the PJM Interconnection is the regional transmission organization that coordinates the movement of wholesale electricity in Virginia, Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, West Virginia, and Washington, D.C. At the time of the writing of this Staff Analysis, Dominion is indicating the intent to submit to the SCC in the first quarter of 2023. The SCC review process may take a year or longer. Local permitting requirements commence after the SCC process concludes.

- Fauquier County Board of Supervisors: The Board of Supervisors Work Sessions with Dominion Energy providing updates regarding energy needs and infrastructure occurred on the following dates: April 14, 2022; June 9, 2022; May 12, 2022; September 8, 2022; July 14, 2022; August 11, 2022, and November 10, 2022.

III. Modifications/Waivers

1. A two-foot increase allowance for an eight-foot fence is requested. The maximum by-right fencing height allowed is six feet, as noted in Article 2-19 of the Zoning Ordinance.
2. A decrease in required loading spaces is requested. Twenty-two spaces are required per Article 7-18 and the Special Use Permit Plan is providing one loading space.
3. A building-height waiver allowance to increase two feet is requested. The maximum building height permitted is 35 feet (Article 9-25.1 (D)(1)) and the Applicant is requesting a modification to permit a building height of 37 feet. The setbacks to be provided by the Applicant exceed the minimum setback required for the additional building height. The Comprehensive Plan called for building heights up to 65' or 75' with a Special Use Permit in this location of the New Town Character District.

IV. ZO Article 11-3.10.3: Evaluation Criteria for Special Use Permit Applications

Standard	**Analysis**
1. Whether the proposed Special Use Permit is consistent with the Comprehensive Plan.	The Comprehensive Plan includes goals and policies for Historic Resources, Community Facilities, Housing, Open Space and Environment, Transportation, Economic and Fiscal Resilience, and Character District Plans. The New Town Character District envisions a mix of uses and a major employer for this part of the Town.
2. Whether the proposed Special Use Permit will adequately provide for safety from fire hazards and have effective measures of fire control.	The project is required to meet all building and safety codes at time of construction. The Conditions of Approval outline federal, state, and local coordination

	and compliance regulations.
3. The level and impact of any noise emanating from the site, including that generated by the proposed use, in relation to the uses in the immediate area.	A Zoning Determination has been requested by the Applicant on October 18, 2022. Compliance with the Noise Ordinance cannot be confirmed before the Zoning Determination has been completed. The Conditions of Approval call for the Applicant to demonstrate compliance at time of Site Plan and again after the use is operational. Conditions also include a process and timeline for compliance if at any time the use fails to comply in the future.
4. The glare or light that may be generated by the proposed use in relation to uses in the immediate area.	All lighting must meet the requirements under Article 9-8 at time of Site Development Plan submission. Lighting must be full cut-off and, "shall not cast glare upon adjacent property or upon a public right of way. The intensity at adjoining streets and commercial or industrial properties shall not exceed 1.0-foot candles, and the intensity at adjoining residential or institutional property boundaries shall not exceed 0.5-foot candles." No waivers of lighting requirements have been requested (Article 9-8.8). Further the Applicant agreed to a condition addressing maximum heights of lights and dimming to 50% between 11 PM and dawn.
5. The proposed location, lighting and type of signs in relation to the proposed use, uses in the area, and the sign requirements of this Ordinance.	The Applicant stated there are no signs proposed nor required for the use, aside from addressing numbers.
6. The compatibility of the proposed use with other existing or proposed uses in the neighborhood, and adjacent parcels.	The use adjacent to commercial uses, with the nearest residential uses currently located over 400 feet away on Oak Springs Drive. All landscape buffering requirements must be met at time of Site Development Plan submission.
7. The location and area footprint with dimensions (all drawn to scale), nature and height of existing or proposed buildings, structures, walls, and fences on the site and in the neighborhood.	An SUP plan has been provided showing the general location of the existing and proposed structures. • The SUP plan shows an existing fence noting maximum height of 8'. • The proposed 37' tall single-story data center building is 220,200 square feet. A 6' retaining wall is proposed at the Northeast corner of the site. There is a proposed guard booth and cargo screening building at the entrance to the site.

8. The nature and extent of existing or proposed landscaping, screening and buffering on the site and in the neighborhood.	The SUP plan shows existing tree preservation areas located throughout the site and include approximately 122,000 square feet of existing tree canopy. Additional landscaping is proposed throughout to help screen the use. Some landscaping is proposed along Blackwell Road around the entrance to the site.
9. Whether the proposed Special Use Permit will result in the preservation or destruction, loss or damage of any significant topographic or physical, natural, scenic, archaeological or historic feature.	The Applicant must meet all local, state, and federal requirements at time of Site Development Plan submission associated with environmental impacts, wetlands, etc. A Phase 1 investigation is required at time of Site Development Plan submission. Wetlands have been noted on the SUP Plan. The Virginia Department of Historic Resources database does not list any archeological or historic resources on the proposed site.
10. The timing and phasing of the proposed development and the duration of the proposed use.	A single phase is proposed with construction lasting 18 months.
11. Whether the proposed Special Use Permit at the specified location will contribute to or promote the welfare or convenience of the public.	The Applicant is proposing sidewalk extension on Blackwell Road.
12. The traffic expected to be generated by the proposed use, the adequacy of access roads and the vehicular and pedestrian circulation elements (on and off-site) of the proposed use, all in relation to the public's interest in pedestrian and vehicular safety, efficient traffic movement and access in case of fire or catastrophe.	52 maximum employees are proposed with 32 employees on site at any one time. Visitors to the site are proposed average 5-10 persons per day. The projected traffic would have minimal impact on Blackwell Road with the internal circulation designed to accommodate this need.
13. Whether the proposed use will facilitate orderly and safe road development and transportation.	The proposed SUP Plan provides adequate parking on site for employees and company vehicles per Article 7-7 of the Zoning Ordinance. Sidewalk connections are shown on the SUP Plan as to be provided along Blackwell Road and within the property from to Blackwell Road. The proposed Data Center will be a secured site restricting access to the site. A continuous internal roadway is proposed from the Blackwell Road entrance following around the building and back to the entrance. A continuous sidewalk around the entirety of the building is additionally proposed.
14. Whether, in the case of existing structures proposed to be converted to uses requiring a Special Use Permit, the structures meet all code	There are no existing structures currently on site other than some fencing.

requirements of the Town of Warrenton.	
15. Whether the proposed Special Use Permit will be served adequately by essential public facilities, services and utilities.	Public Works Department finds the initial charging of the air-cooling system will not create an excess daily demand on water and the average demand will not put a burden on the Town water system. The domestic water use will be determined by the number and types of bathroom fixtures, which are not provided at this time. The wastewater generation will not create an issue to the Town's wastewater infrastructure.
16. The effect of the proposed Special Use Permit on environmentally sensitive land or natural features, wildlife habitat and vegetation, water quality and air quality. The location of any major floodplain and steep slopes.	The site will be graded and cleared, except the buffers. A Geotechnical Report, Grading Plan, and Tree Survey were submitted with the application. Staff encourages the Applicant to consider best management practices as the Applicant will be required to follow local, state, and federal standards at Site Plan and construction.
17. Whether the proposed Special Use Permit use will provide desirable employment and enlarge the tax base by encouraging economic development activities consistent with the Comprehensive Plan.	The Applicant states the proposal invests approximately $550,000,000 which is an indirect investment into the community. Opportunity for employment and taxable revenue are also mentioned as economic benefits.
18. The effect of the proposed Special Use Permit use in enhancing affordable shelter opportunities for residents of the Town, if applicable.	Not applicable.
19. The location, character, and size of any outdoor storage.	No outdoor storage is proposed.
20. The proposed use of open space.	The Applicant states all open space on the property will be used for security fencing or left as open space following construction.
21. The location of any major floodplain and steep slopes.	No floodplain is located on site. A steep slope on the north-eastern end of the property will require a 6' retaining wall.
22. The location and use of any existing non-conforming uses and structures.	The parcel is considered vacant but has been utilized for some farming which is a non-conforming use.
23. The location and type of any fuel and fuel storage.	50,000 gallon above-ground fuel tanks are proposed on the northern end of the site.
24. The location and use of any anticipated accessory uses and structures.	A guard booth is shown at the entrance to the property.
25. The area of each proposed use.	Refuse storage shown on north side of the building. All refuse storage must be screened.

26. The proposed days/hours of operation.	The facility will operate twenty-four hours a day, each day of the year.
27. The location and screening of parking and loading spaces and/or areas.	Proposed landscaping is shown around the parking spaces. A waiver is requested for loading from the required 22 spaces to one.
28. The location and nature of any proposed security features and provisions.	The SUP plan shows a guard booth at the entrance to the site and fencing around the perimeter. The Applicant is requesting an increase of the fence height from six feet to eight feet.
29. The number of employees.	52 employees are projected at full buildout of the data center. The Applicant states an average of 32 present on site at any given time.
30. The location of any existing and/or proposed adequate on and off-site infrastructure.	The Applicant is proposing to underground all power needs from an off-site power distribution facility. A stormwater management pond is proposed on the southern edge of the parcel.
31. Any anticipated odors which may be generated by the uses on site.	None proposed.
32. Refuse and service areas.	Refuse storage shown on north side of the building. All refuse storage must be screened.

V. Draft Conditions of Approval

SPECIAL USE PERMIT CONDITIONS
Applicant: AMAZON DATA SERVICES, INC. (the "Applicant")
Owner: AMAZON DATA SERVICES, INC.
SUP2022-0003, Amazon Data Center
PIN # 6984-69-2419 (the "Property")
Special Use Permit Area: ± 41.79 acres
Zoning: INDUSTRIAL (I)
Date: November 15, 2022

In approving a Special Use Permit, the Town Council may impose such conditions, safeguards, and restrictions as may be necessary to avoid, minimize, or mitigate any potentially adverse or injurious effect of such special uses upon other properties in the neighborhood, and to carry out the general purpose and intent of this Ordinance. The Council may require a guarantee or bond to ensure that compliance with the imposed conditions. All required conditions shall be set out in the documentation approving the Special Use Permit (SUP). These conditions shall run with the land so as to bind future landowners. Any party or officer identified by title shall mean and include any successor to that person or entity's powers or responsibilities.

1. Site Development: The Property shall be developed in substantial conformance with these conditions and the Special Use Permit Plan entitled, "Special Use Permit Plan for Amazon Data Services, Inc.," prepared by Bohler Engineering, dated July 10, 2022 and revised through October 28, 2022, and consisting of 3 sheets, subject to minor modifications approved by the Town in connection with final Site Plan review and final engineering, and except as otherwise provided in these Conditions (the "SUP Plan"). The building and other structures to be constructed on the Property are referred to herein as the "Facility."

2. Use Parameters. Use Limitation: The use approved with this SUP shall be limited to a data center as set forth in § 3-4.12.3 of the Town of Warrenton Zoning Ordinance.

3. Electric Substation: There shall be no electric substation constructed on the Property.

4. Undergrounding of Electrical Lines from a Substation to the Facility: Pursuant to Warrenton Zoning Ordinance § 9-26.1(C), the distribution lines from the off-site substation serving the data center are required to be underground. Applicant will ensure payment of the undergrounding of these distribution lines with the utility company in accordance with its requirements.

5. Building Design and Elevations:

    a. The architectural design of the data center shall substantially conform to the elevations entitled "Illustrative Elevations," shown on Sheet 6 of the SUP Plan. The Elevations shall be subject to minor modification approved by the Town in connection with Site Plan review. Additional changes to the design and materials may be made provided that any such changes are approved by the Planning Director prior to the issuance of a building permit.

    b. At time of Site Plan, the Applicant shall provide all elevations for the building in compliance with the Town of Warrenton Zoning Ordinance Article 9-26.1.F. In

addition, the Applicant shall orient the building along Lee Highway to reduce the visible impact using architectural details such as a perceived reduction in massing and scale, fenestration and windows, exterior colors and materials, overhangs, canopy or porticos, recesses and/or projections, arcade, raised corniced parapets, and varying roof lines.

c. The Facility shall be no greater than 37 feet in height, as that term is defined in the Town Zoning Ordinance. The mechanical equipment installed on the roof of the building shall be screened with mechanical louver screens.

6. Signage: There shall be no signage except for a street address; provided that if any further signage is sought it shall comply with applicable sign ordinance requirements.

7. Fencing: All fencing on the Property shall be as depicted on the SUP Plan, and shall not exceed 8 feet in height. Security fencing shall be the style and type as shown on Page 2 of the Special Use Permit Plan produced by Bohler dated July 10, 2022 and updated through October 28, 2022. Chain link fencing, with or without slatted inserts, and/or barbed wire or other similar visible deterrence devices shall not be permitted where visible from the public.

8. External Fuel Storage Tanks: The Applicant shall install above-ground double-walled fuel tanks that meet the definition of secondary containment under the DEQ LPR-SRR-2019-03 - Storage Tank Program Compliance Manual, Volume V - AST Guidance, and pursuant to 40 CFR Part 112, Section 8.1.2.2, in the general locations shown on the SUP Plan, for the storage of fuel supplies necessary to maintain an Uninterruptible Power Supply in the event of a loss of external electrical power.

9. Parking: The Applicant shall provide not fewer than 56 parking spaces as shown on the SUP Plan, one of which shall be a loading space.

10. Site Maintenance: The Applicant shall maintain the Property in a clean and orderly manner, and shall provide an on-site masonry screened refuse container station in the location generally shown on the SUP Plan.

11. Access: Access to the site shall be provided as shown on the SUP Plan, subject to changes approved by the Town in consultation with the Virginia Department of Transportation. Mountable curbs shall be provided as required by the Town. There shall be no access from either Routes 17 or 29.

12. Access for Town Staff: The Town is obliged to report annually to the Virginia Department of Environmental Quality as to the ongoing operation and maintenance of stormwater management facilities installed on the Property. The Applicant shall provide the Town Manager with an on-site employee who shall serve as the sole point of contact for arranging access to the Property for the Town's conduct of such inspections, and shall keep that point of contact current at all times.

13. Water & Public Sewer Connection: The Property shall connect to public water and public sewer at the Applicant's expense. The Applicant shall limit its water use to internal domestic uses such as service to bathrooms, kitchens, humidification, and external irrigation. It shall not use public water for the general purposes of cooling the data center, but may use it for the initial charging of

the cooling system. It shall consult with the Director of the Department of Public Works and Utilities as to the scheduling of the initial charging of the system so as to minimize the impact on the Town's water system.

14. Emergency Services:

    a. The Applicant shall coordinate training between the Town's fire and rescue companies and those other companies and departments that have experience with data centers after commencement of operations at the Property and when convenient for the Town's first responders. Furthermore, upon commencement of operations at the Property, the Applicant will provide the Town's first responders its "Data Center Response Manual" for use in training for emergencies at its Facility, and shall assist in advising those first responders how to implement its provisions.

    b. The Applicant shall assure that the water line systems at the Facility have sufficient fire flows, as determined by the Town Fire Marshal.

    c. The Applicant shall maintain Facility security personnel 24 hours a day, and each day of the year.

15. Pedestrian access: The Applicant shall construct a five-foot sidewalk on the east side of Blackwell Road along its frontage on that Road.

16. Noise: The Applicant shall provide a sound study prepared by a qualified party or company approved by the Director of Community Development that demonstrates the operation of the data center will meet the requirements of § 9-14.2 of the Town of Warrenton Zoning Ordinance relating to noise, as a condition of approval of a site development plan. In addition, the Applicant shall conduct a separate sound study one month after commencement of business operations to ensure compliance with the aforesaid Section. If noise levels at any point where a measurement is required by the Ordinance to be taken do not so comply, the Applicant shall forthwith undertake such further mitigation measures as are required to achieve compliance within a reasonable time not to exceed 60 days, or, if 60 days is insufficient to achieve compliance, the Applicant shall promptly begin and diligently pursue mitigation until compliance has been achieved.

    For reference, the Town of Warrenton Zoning Ordinance § 9-14.2 states:

    9-14.2 The sound pressure level of sound radiated from an establishment, measured at the lot line of the site thereof that is the nearest thereto, shall not exceed the values in any octave band of frequency that are specified in Table 9-1 below, or in Table 9-1 as modified by the correction factors set forth in Table 9-2. The sound pressure level shall be measured with a sound level meter and an associated octave band analyzer conforming to standards prescribed by the American National Standards Institute.

Table 9-1 Maximum Permissible Sound Pressure Levels Measured re 0.0002 dyne per CM^2		
Frequency Band Cycles per Second	Along Residential District Boundaries – Maximum Permitted Sound Level In Decibels	At Any Other Point on the Lot Boundary – Maximum Permitted Sound Level In Decibels
63	64	72
125	60	70
250	54	65
500	48	59
1000	42	55
2000	38	51
4000	34	47
8000	30	44

Table 9-2 Correction Factors	
Condition	Correction in Decibels
On a site contiguous to or across a street from the boundary of any R-district established by this chapter.	Minus 5
Operation between the hours of 10:00 p.m. and 7:00 a.m.	Minus 5
Sound of impulsive character (e.g., hammering)	Minus 5
Sound of periodic character (e.g., sawing)	Minus 5
Tone (e.g., hum or screech)	Minus 5
Sound source operated less than:	
20% in any one hour period	Plus 5[1]
5% in any one hour period	Plus 10[1]
1% in any one hour period	Plus 15[1]

1. Apply only one of these corrections. All other corrections (including any one of the footnoted) are cumulative.

17. Lighting: The Applicant shall submit a Lighting Plan pursuant to the provisions of § 9-8 et seq. of the Town of Warrenton Zoning Ordinance in connection with its Site Development Plan. All exterior lighting shall utilize LED and be designed and constructed with cutoff and fully shielded fixtures that direct light downward and into the interior of the property and away from adjacent roads and adjacent properties. All building mounted lighting shall have a maximum height of 25', and the Applicant shall install controls on the site fixtures such that they dim to 50% output between 11 PM and dawn. Freestanding parking lot lights shall be a maximum of 20.'

18. Tree Save: The Applicant shall provide a tree preservation plan at time of Site Plan that seeks to minimize land disturbance and maximize on-site vegetation.

19. Best Management Practices: BMPs shall incorporate aeration for water retention using solar power.

20. Landscaping: The Applicant will follow the Zoning Ordinance Article. All plantings must consist of native, drought tolerant species appropriate for the Town of Warrenton climate.

21. Employment Opportunities: The Applicant shall provide outreach to qualified persons residing in the Town of Warrenton who may be interested in employment at the data center through a variety of media such as the conduct of a job fair, the inclusion of a direct link to potential opportunities on the Town website, or on other websites for the purpose. Such outreach shall be made reasonably in advance of the construction of the Project so that interested persons may make application for positions, not less than six months prior to the anticipated completion of construction.

22. Programs for Local Schools: The Applicant shall ensure coordination by the appropriate Amazon personnel with the Town of Warrenton and the Fauquier County School Division regarding the establishment and maintenance of educational programs in the K-12 grades, and with Laurel Ridge Community College, to establish and maintain workforce development programs for career pathways in data center construction and operations, and such other programs as the parties may deem mutually beneficial.

STATEMENT OF JUSTIFICATION
WARRENTON DATA CENTER SPECIAL USE PERMIT
Parcel ID 6984-69-2419-000
Owner/Applicant: Amazon Data Services, Inc.

October 28, 2022

Introduction. Amazon Data Services, Inc. (hereinafter, the "Applicant"), is the owner of property identified as Parcel ID 6984-69-2419-000, on the east side of Blackwell Road and north of Country Chevrolet. The parcel is approximately 41.793 acres in size (the "Property").

The Applicant seeks this SUP to allow the development of a data center (the "Project"). As is well known, the Council amended the Town's Zoning Ordinance on August 10, 2021, to include such a use by SUP in the I (Industrial) District, to which the land has been zoned for many years.

Land Use and Compatibility with Existing and Proposed Uses Adjacent and in the Vicinity and Economic Impact.

The Applicant seeks to build one single story structure of approximately 220,000 square feet. The structure is shown conceptually on the Special Use Permit Plan ("SUP Plan") prepared by Bohler Engineering and submitted herewith.

The Property is identified as a part of the New Town Warrenton District in the 2040 Comprehensive Plan, but, as noted, it has long been industrially zoned and has sat fallow for decades. The proposed data center will be so well-designed and sited in this location that it should be a welcome addition to the older uses that predominate on Blackwell Road from Lee Highway to the Giant Food Store. The buildings to the south of the site currently house Country Chevrolet, Sheetz, and the small retail center with the Tae Kwon Do dojo, The Cotton House, and Summit Motors. Across Blackwell is the Giant-anchored strip center. A data center is a comparable use – at the very least – to all, and will have visually less impact on its surroundings than any of them because of the ability to screen it substantially from view. The closest residence is approximately 400 feet from Blackwell Road, on Arbor Court, and the building will be set-back approximately 1,000 feet from Blackwell Road. With ample landscaping the data center will be well shielded from view from the west, and from the east as well. Given the site's importance as a gateway into the Town, the Applicant intends to screen the site with substantial landscaping to shield views of the buildings from the east and the west.

The Applicant wishes to locate in Warrenton and invest in the Town. Three of the goals of the 2040 Comprehensive Plan are to grow a strong, diversified, and resilient economy that supports residents and businesses alike, increase the employment base to allow residents to live and work in Warrenton, and to be proactive in the Town's Economic Development. The Project will have a positive economic impact. To that end, cloud services have become essential to the economy, and the construction of such centers is a capital intensive business.

Data centers are "the Cloud" that has become essential to almost every aspect of today's home and business life. The proposed SUP is consistent with the Town's economic objectives since the

approval of this SUP will materially grow its non-residential tax base. A data center produces a substantial revenue stream during construction, pays significant taxes thereafter, and the salaries of operational personnel once a center is completed will likely exceed the average salary of current County and Town residents. The Applicant's spending on equipment, construction labor and materials, utilities, security, data center employee salaries, and third-party services to build and operate data centers has had a major impact on Northern Virginia.

Amazon pays taxes on all of its data centers, principally consisting of an increased valuation of the real property on which the facility sits, and business personal property taxes.

At full buildout there will be approximately 52 employees at the Project, but only a maximum of 32 employees will be present on the Property at any given time, primarily during shift changes. Employees are comprised of engineering technicians, data center operators, security personnel, and logistics personnel. The estimated number of visitors, including vendors and subcontractors, is 5-10 persons per day on average.

Transportation Impact. During construction there will be construction traffic that will access the site from Broadview Avenue and Blackwell Road. Once in operation, however, there is very little traffic, and what there is will have no appreciable effect on existing conditions.

Impact on Community Facilities. The data center will utilize public water, and will require a connection to the Town's public sewer system. Details on this can be provided during the special use permit review process.

Stormwater management will be provided according to applicable regulations, and plans will be subject to review by the Town during site plan review.

None of these infrastructure facilities will require an expenditure of Town funds, since the Applicant will bear the cost of new infrastructure that will be needed and any upgrades to existing facilities.

The proposed development will have no adverse impact on schools, libraries, housing, or parks.

Fire, Rescue, and Police Services. The proposed development will have no significant impact upon the Police Department. The facility will be secured and surrounded by a security fence. Access to emergency service personnel will be assured as required by the new Ordinance provisions.

Site conditions. The proposed site is located to the northeast of the intersection of Lee Highway and Blackwell Road and spans a single parcel, which is mostly lawn with some wooded areas in the northwest and southeast portions, and elevations ranging from approximately 510 feet +/- along the north edge, to approximately 465 feet +/- in the northwest corner.

The site is located within the Central Blue Ridge Anticlinorium. According to the USGS Geological Map of Virginia (1993), the site is mapped within the Catoctin Formation – Metabasalt soils. This formation typically consists of grayish green to dark yellowish green, fine grained,

schistose chlorite and actinolite bearing metabasalt. The materials will initially weather into Silty and Clayey Sand and then into Silt and Clay with extensive weathering.

Height Modification. On August 10, 2021, the Town Council approved a zoning text amendment related to data centers that included a provision that it may "approve building heights greater than 35 feet during the review of the Special Use Permit. Buildings must be setback one (1) additional foot (horizontally) from the required setback line for each additional one (1) foot (vertically) greater than 35 feet. Building heights shall be in conformance with the Comprehensive Plan." The proposed building height in this case is 37 feet, but the building has been setback from all surrounding property lines sufficiently to accommodate the ordinance requirement. Because the increase is small but necessary to accommodate the facility, the Applicant respectfully requests the additional height.

Environmental Impact. In 2020, the Applicant became the world's largest purchaser of renewable energy. Its facilities are almost 4 times as energy efficient as other enterprise data centers because of its use of more efficient servers and increased server utilization for cutting carbon output by 88% versus enterprise centers that have been replaced.

SPECIAL USE PERMIT

FOR

WARRENTON DATA CENTER

LOCATION OF SITE

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

PARCEL ID: 6984-69-2419-000

PARCEL IDENTIFICATION TABLE

PARCEL NUMBER	OWNER	ADDRESS	AREA	CURRENT ZONE	CURRENT PLANNED LAND USE	PROPOSED PLANNED LAND USE
6984-69-2419-000	AMAZON DATA SERVICES, INC.	BLACKWELL ROAD WARRENTON, VA 20186	41.793 ACRES	INDUSTRIAL	VACANT	DATA CENTER

REFERENCES AND CONTACTS

REFERENCES
♦BOUNDARY & TOPOGRAPHIC SURVEY:
AECOM
101 RESEARCH DRIVE
COLUMBIA, SC 29203
TOPOGRAPHY CAD FILE, DATED 9/8/2021.
PROPERTY CAD FILE: "BOUNDARY", DATED 9/8/2021.

♦ARCHITECTURAL PLAN:
CORGAN
401 NORTH HOUSTON STREET
DALLAS, TX 75202
CAD FILE, DATED: 09/27/2021

GOVERNING AGENCIES
♦ TOWN OF WARRENTON
COMMUNITY DEVELOPMENT
21 MAIN STREET
WARRENTON, VA 20186-0341
CONTACT: ROB WALTON, DIRECTOR OF COMMUNITY DEVELOPMENT
PHONE: (540) 347-2405

* THE ABOVE REFERENCED DOCUMENTS ARE INCORPORATED BY REFERENCE AS PART OF THESE PLANS, HOWEVER, BOHLER ENGINEERING DOES NOT CERTIFY THE ACCURACY OF THE WORK REFERENCED OR DERIVED FROM THESE DOCUMENTS, BY OTHERS.

LOCATION MAP

SCALE: 1" = 2,000'

OWNER/DEVELOPER

AMAZON DATA SERVICES, INC.
410 TERRY AVENUE NORTH
SEATTLE, WA 98109

SHEET INDEX

SHEET TITLE	SHEET NUMBER
COVER SHEET	1
SITE DEVELOPMENT PLAN	2
LANDSCAPE PLAN	3

PREPARED BY

BOHLER

CONTACT: JOHN C. WRIGHT, P.E.

GENERAL NOTE:
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT WORK SCOPE PRIOR TO THE INITIATION OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR APPLICABLE CODES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD IN WRITING PRIOR TO THE START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF THE WORK AS DEFINED BY THE DRAWINGS AND IN FULL CONFORMANCE WITH LOCAL REGULATIONS AND CODES.

Oct 28, 2022
H:\2012\V212093\CAD\DRAWINGS\PLAN SETS\SUP\V212093 - SUPP - 3----LAYOUT 1- COVER

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	7/10/22	TOWN COMMENTS	CPH / JCW
2	9/8/22	DEVELOPER REVISIONS	CPH / JCW
3	10/28/2022	DEVELOPER REVISIONS	DSH / JCW

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PROJECT No.: V212093
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 4/13/2022
CAD I.D.: SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

AMAZON DATA SERVICES, INC.

PROPOSED DEVELOPMENT

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
10/28/2022
PROFESSIONAL ENGINEER

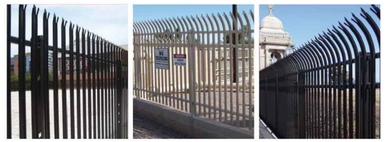
SHEET TITLE:

COVER SHEET

SHEET NUMBER:

1

REVISION 3 - 10/28/2022



SECURITY FENCE DETAIL

NOT TO SCALE

NOTE: SECURITY FENCE TO BE MAXIMUM OF 8' IN HEIGHT.

LINE TABLE		
Line #	Direction	Length
L1	S59° 17' 16"E	704.19
L2	S67° 44' 23"E	351.55
L3	S62° 10' 23"E	317.98
L4	S58° 03' 44"E	312.76
L5	S36° 58' 09"E	345.35
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L7	S20° 16' 33"W	240.65
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L10	S84° 21' 46"W	256.40
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L12	N80° 20' 43"W	200.25
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L14	N09° 41' 34"E	452.69
L15	N86° 15' 23"W	437.16
L16	N14° 49' 03"E	74.25
L17	N19° 41' 23"E	327.81
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C4	325.02	1170.87	15°54'17"	N11°44'49"E	323.98

GENERAL NOTES:

1. THIS PLAN IS BASED ON THE FOLLOWING:
   CAD FILES PREPARED BY AECOM
   DATED: 9/8/2021
   CAD FILES PREPARED BY CORGAN
   DATED: 9/27/2021
2. ZONING DATA:
   EXISTING ZONE: INDUSTRIAL - I
3. USES:
   EXISTING USE: VACANT
   PROPOSED USE: DATA CENTER WITH SPECIAL USE PERMIT
4. SITE AREA
   PIN : 6984-69-2419-000 41.793 ACRES
5. SITE WILL BE SERVICED BY TOWN WATER AND SEWER.
6. TOPOGRAPHIC INFORMATION:
   HORIZONTAL DATUM: NAD 83
   VERTICAL DATUM: NAVD 88
7. THE PROPOSED BUILDING, DIMENSIONAL ELEMENTS, AND OTHER SITE FEATURES SHOWN ARE PRELIMINARY AND SUBJECT TO CHANGE WITH FINAL ENGINEERING.
8. FIRE DEPARTMENT CONNECTION TO BE A 4" STORZ CONNECTION AND MARKED WITH SIGNAGE.

ZONING TABULATION TABLE:

SITE INFORMATION

PIN:	6984-69-2419-000	
ZONING DISTRICT:	EXISTING - INDUSTRIAL - I PROPOSED - DATA CENTER	
LAND USE:	EXISTING - VACANT PROPOSED - DATA CENTER	
BUILDING AREA:	EXISTING - N/A PROPOSED - 220,200 SF±	
SITE AREA:	41.793 AC OR 1,820,504 SF	
BUILDING HEIGHT:	REQUIRED	PROVIDED
	*35'	37'±

*MAY BE INCREASED BY TOWN COUNCIL
NOTE: BUILDING ROOF HEIGHT IS 37', STANDARD PARAPET HEIGHT IS 41', HIGHEST PARAPET HEIGHT IS 45', ROOF MOUNTED EQUIPMENT HEIGHT IS 56' - 57'.

LOT SIZE AND YARD SETBACK REQUIREMENTS:

MINIMUM LOT SIZE:	25 ACRES	
SETBACK REQUIREMENTS:		
FRONT YARD (W) BUILDING	REQUIRED 100'	PROVIDED 712.7'±
SIDE YARD (S) BUILDING	REQUIRED 100'	PROVIDED 261.7'±
SIDE YARD (E) BUILDING	REQUIRED 100'	PROVIDED 256.6'±
REAR YARD (N) BUILDING	REQUIRED 100'	PROVIDED 167.1'±

LOT COVERAGE REQUIREMENTS

	MAXIMUM	PROVIDED
PROPOSED IMPERVIOUS AREA:	75%	51%

PARKING REQUIREMENTS

DATA CENTER	REQUIRED 1 SPACE PER EMPLOYEE ON LARGEST SHIFT, PLUS 1 SPACE PER COMPANY VEHICLE ON-SITE. LARGEST SHIFT = 20 EMPLOYEES ASSUME 10 COMPANY VEHICLES TOTAL = 30 SPACES	PROVIDED 58 SPACES (2 ADA SPACES)

HATCH LEGEND

- SIDEWALK CONCRETE
- PROP BUILDING
- GRAVEL
- LIGHT DUTY ASPHALT
- HEAVY DUTY ASPHALT

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE
- PROPOSED WATER MAIN
- PROPOSED FIRE HYDRANT
- LIMITS OF DISTURBANCE

100 50 25 0 100
1"= 100'

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SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LAND PLANNING SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
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PROJECT No.:	V212093
DRAWN BY:	DSH
CHECKED BY:	JCW
DATE:	4/12/2022
CAD I.D.:	SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

AMAZON DATA SERVICES, INC.

PROPOSED DEVELOPMENT

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
10/28/2022
PROFESSIONAL ENGINEER

SHEET TITLE:

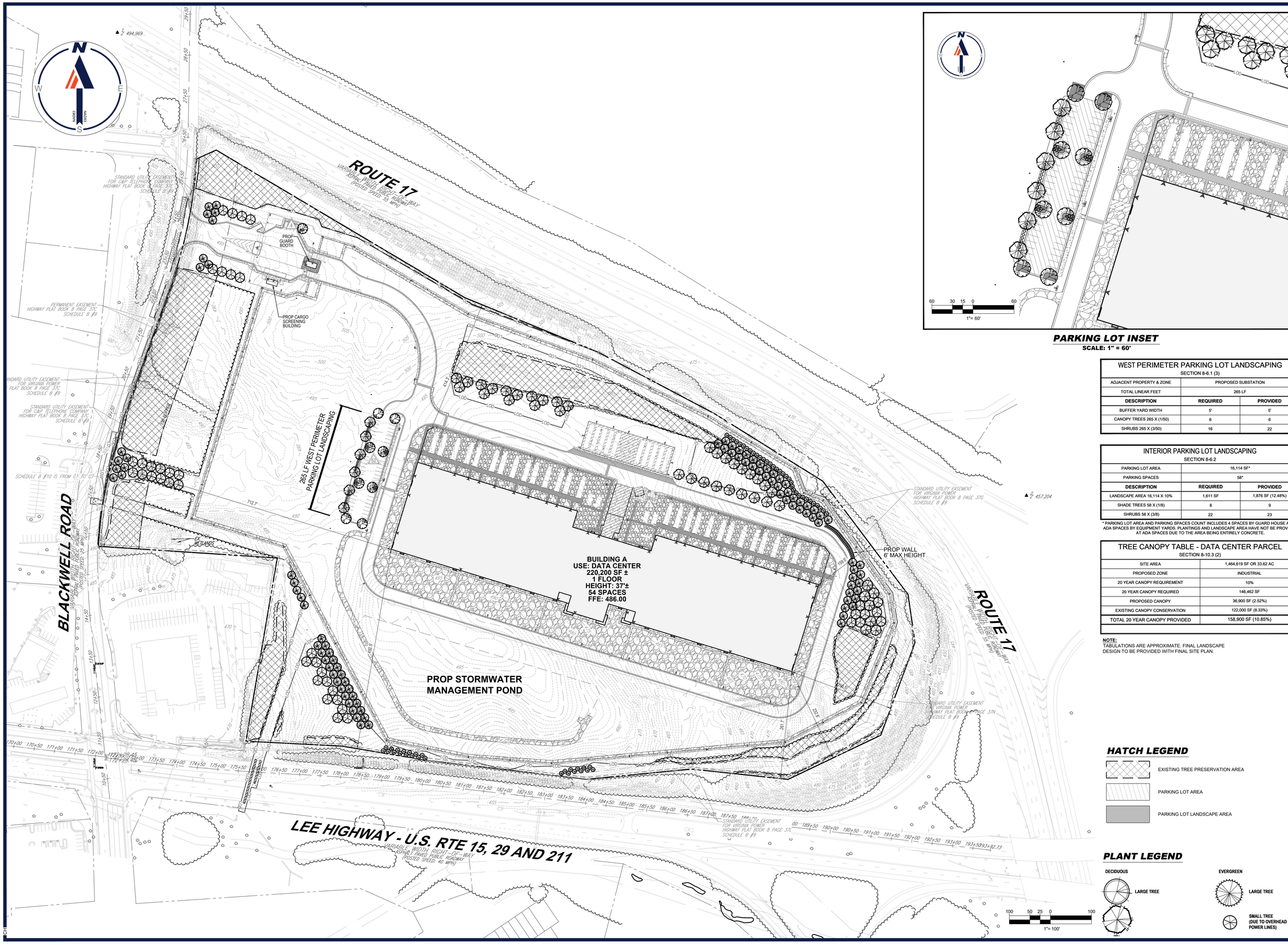
SITE DEVELOPMENT PLAN

SHEET NUMBER:

2

REVISION 3 - 10/28/2022

Oct 28, 2022
H:\21\V212093\CAD\DRAWINGS\PLAN SETS\SUP\V212093 - SUPP - 3---LAYOUT 2 - SITE DEVELOPMENT PLAN
CHRISTOPHER PHILLIPS



PARKING LOT INSET
SCALE: 1" = 60'

WEST PERIMETER PARKING LOT LANDSCAPING
SECTION 8-6.1 (3)

ADJACENT PROPERTY & ZONE	PROPOSED SUBSTATION	
TOTAL LINEAR FEET	265 LF	
DESCRIPTION	**REQUIRED**	**PROVIDED**
BUFFER YARD WIDTH	5'	5'
CANOPY TREES 265 X (1/50)	6	6
SHRUBS 265 X (3/50)	16	22

INTERIOR PARKING LOT LANDSCAPING
SECTION 8-6.2

PARKING LOT AREA	16,114 SF*	
PARKING SPACES	58*	
DESCRIPTION	**REQUIRED**	**PROVIDED**
LANDSCAPE AREA 16,114 X 10%	1,611 SF	1,876 SF (12.48%)
SHADE TREES 58 X (1/8)	8	9
SHRUBS 58 X (3/8)	22	23

* PARKING LOT AREA AND PARKING SPACES COUNT INCLUDES 4 SPACES BY GUARD HOUSE AND 2 ADA SPACES BY EQUIPMENT YARDS. PLANTINGS AND LANDSCAPE AREA HAVE NOT BE PROVIDED AT ADA SPACES DUE TO THE AREA BEING ENTIRELY CONCRETE.

TREE CANOPY TABLE - DATA CENTER PARCEL
SECTION 8-10.3 (2)

SITE AREA	1,464,619 SF OR 33.62 AC
PROPOSED ZONE	INDUSTRIAL
20 YEAR CANOPY REQUIREMENT	10%
20 YEAR CANOPY REQUIRED	146,462 SF
PROPOSED CANOPY	36,900 SF (2.52%)
EXISTING CANOPY CONSERVATION	122,000 SF (8.33%)
TOTAL 20 YEAR CANOPY PROVIDED	158,900 SF (10.85%)

NOTE:
TABULATIONS ARE APPROXIMATE. FINAL LANDSCAPE DESIGN TO BE PROVIDED WITH FINAL SITE PLAN.

HATCH LEGEND
- EXISTING TREE PRESERVATION AREA
- PARKING LOT AREA
- PARKING LOT LANDSCAPE AREA

PLANT LEGEND
DECIDUOUS
- LARGE TREE
- SMALL TREE (DUE TO OVERHEAD POWER LINES)

EVERGREEN
- LARGE TREE
- SMALL TREE (DUE TO OVERHEAD POWER LINES)

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LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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PROJECT No.: V212093
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 4/12/2022
CAD I.D.: LSCP -2

PROJECT:

SPECIAL USE PERMIT

FOR

AMAZON DATA SERVICES, INC.

PROPOSED DEVELOPMENT

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
NICHOLAS T GEORGAS
Cert. No. 001653
10/28/2022
LANDSCAPE ARCHITECT

SHEET TITLE:

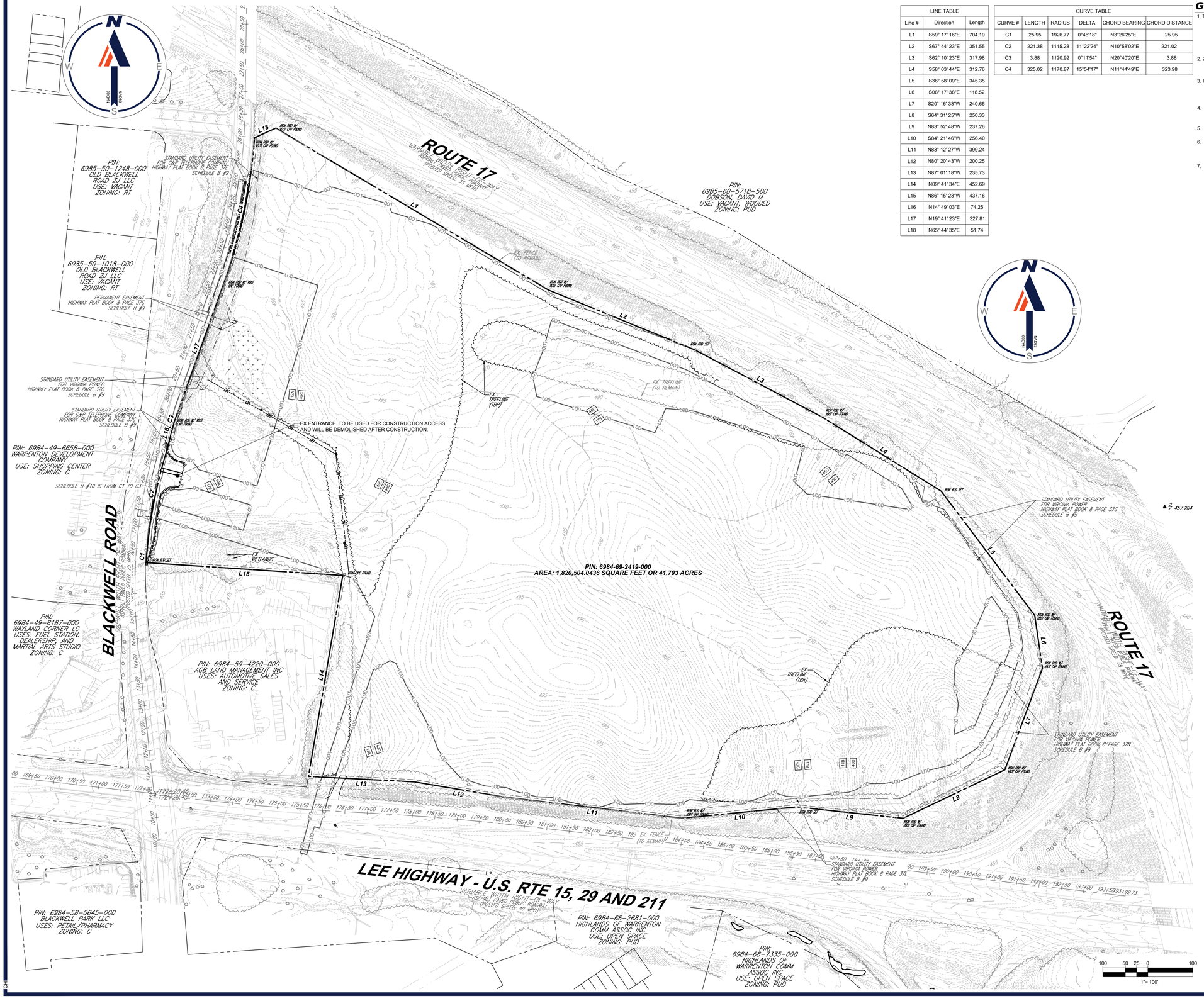
LANDSCAPE PLAN

SHEET NUMBER:

3

REVISION 3 - 10/28/2022

Oct 28, 2022
H:\TV\V212093\CAD\DRAWINGS\PLAN SETS\SUP\V212093_LSCP -3---LAYOUT 3 - LANDSCAPE PLAN
CHH



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   EXISTING USE: VACANT
   PROPOSED USE: DATA CENTER WITH SPECIAL USE PERMIT
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   VERTICAL DATUM: NAVD 88
7. THE PROPOSED BUILDING, DIMENSIONAL ELEMENTS, AND OTHER SITE FEATURES SHOWN ARE PRELIMINARY AND SUBJECT TO CHANGE WITH FINAL ENGINEERING.

SOILS LEGEND	
	SOILS BOUNDARY
XxX	SOILS TYPE

LEGEND

LOD — LIMITS OF DISTURBANCE

EXISTING WETLANDS

100 50 25 0 100
1"= 100'

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SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
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PROJECT No.:	V212093
DRAWN BY:	DSH
CHECKED BY:	JCW
DATE:	4/12/2022
CAD I.D.:	SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

AMAZON DATA SERVICES, INC.

PROPOSED DEVELOPMENT

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

SHEET TITLE:

EXISTING CONDITIONS EXHIBIT

SHEET NUMBER:

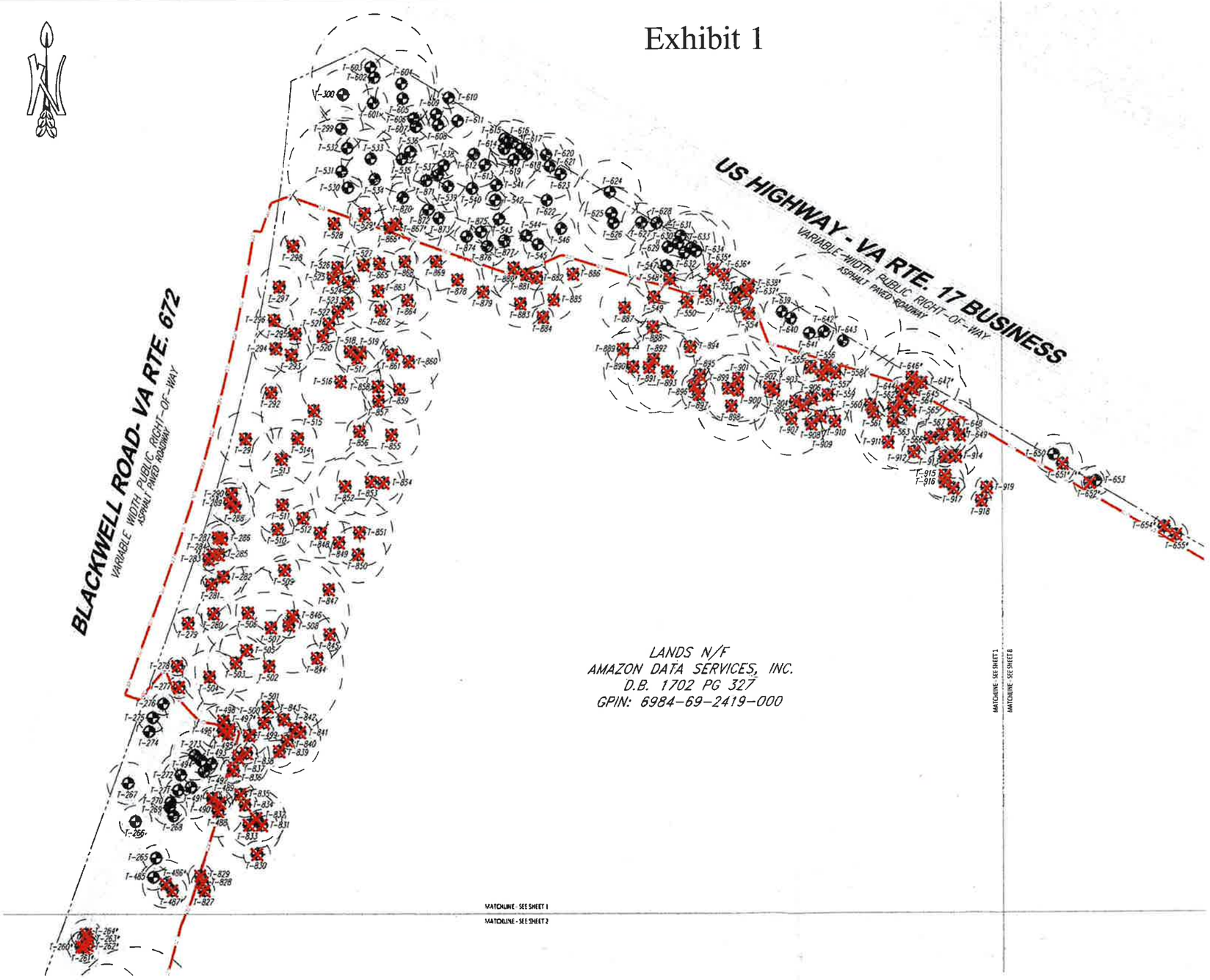
1

REVISION 3 - 10/28/2022

Oct 28, 2022
H:\DIV2\V212093\CAD\DRAWINGS\PLAN SETS\SUP\V212093_SUPP -3 -----LAYOUT: DO NOT PRINT - EX. CONDITIONS
CH

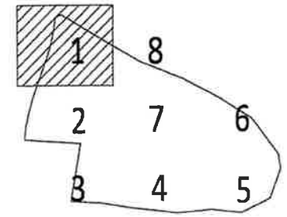
Illustrative Building Elevations
Corgan
October 28, 2022

Exhibit 1



LEGEND

- CRITICAL ROOT ZONE (CRZ)
- T-XXX — TREE LOCATION
- T-XXX — TREE TO BE REMOVED



TREE INVENTORY NOTES:

1. **SHARED/ROW TREES SHALL NOT BE REMOVED WITHOUT WRITTEN PERMISSION FROM AFFECTED ADJACENT PROPERTY OWNERS.
2. *TREES NOTED FOR REMOVAL WITHIN THE SAVE AREAS SHALL BE DONE SO BY HAND WITHOUT THE USE OF HEAVY MACHINERY.
3. OFFSITE TREES WERE ASSESSED FROM THE SUBJECT PROPERTY SO NOT TO TRESPASS ONTO ADJACENT PROPERTY. DBH MEASUREMENTS AND TREE LOCATIONS ARE APPROXIMATE.
4. TREES LOCATED WITHIN OR ON THE LIMITS OF DISTURBANCE, OR RATED AS BEING "POOR" IN CONDITION, ARE RECOMMENDED FOR REMOVAL BY TNT ARBORISTS DUE TO THE LIKELIHOOD OF TREE FAILURE. HOWEVER, AT THE DISCRETION OF THE APPLICANT, SOME OF THESE MAY BE PRESERVED DURING CONSTRUCTION WITH THE APPROVAL OF URBAN FORESTRY.

SCALE (IN FEET)
15 30
30 0

ENVIRONMENTAL
4455 Brookfield Corporate Drive, Suite 100
Chantilly, VA 20151
PH: 703-466-5123 WWW.TNTENVIRONMENTALINC.COM

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON

TREE REMOVAL BASE

REVISIONS

DATE	COMMENTS

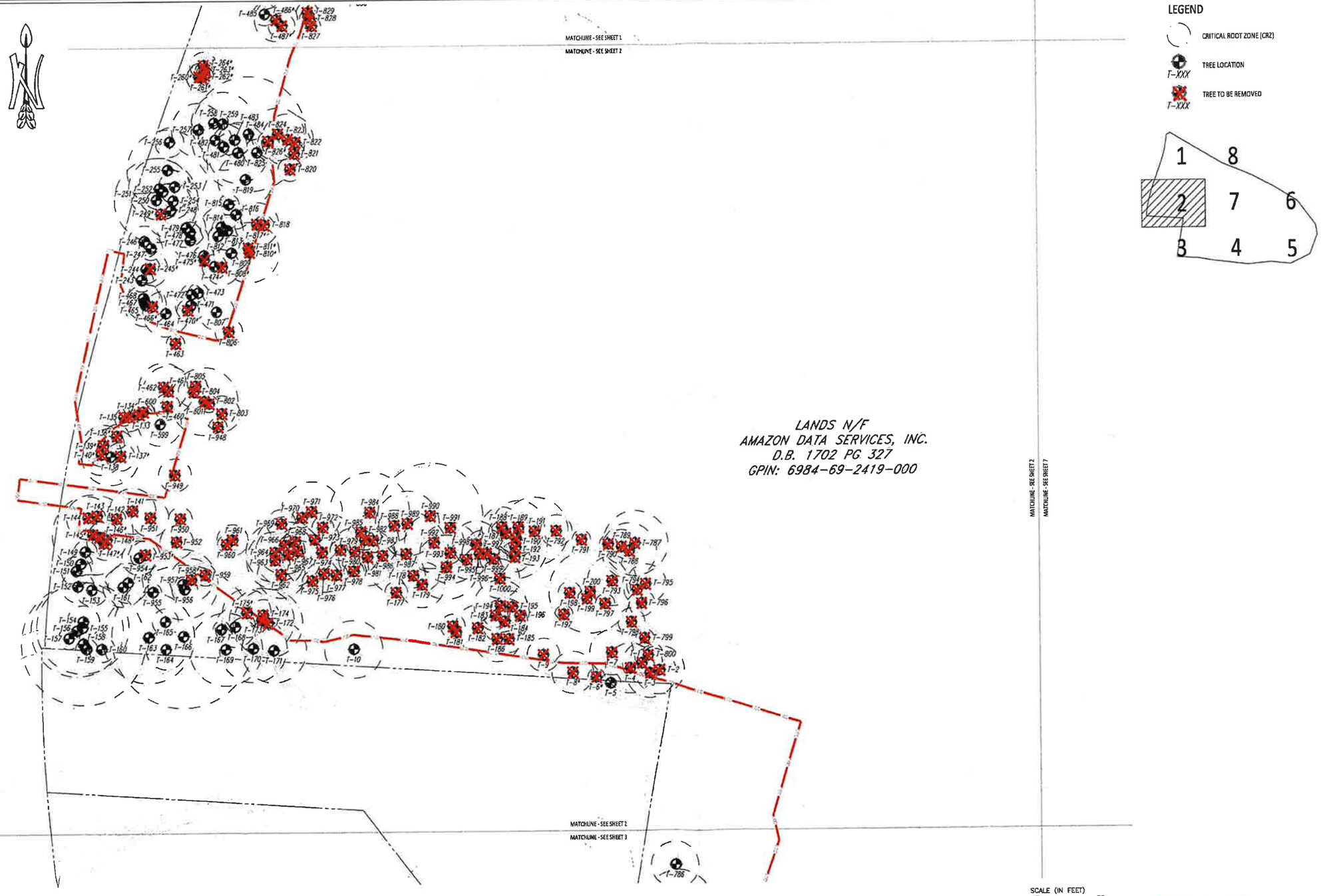
SHEET 1 OF 11

SCALE: 1" = 30'

PROJECT DATE: 04/05/22

DRAFT: EFW | CHECK: AMS

FILE NUMBER: 2724



LEGEND

- CRITICAL ROOT ZONE (CRZ)
- TREE LOCATION T-XXX
- TREE TO BE REMOVED T-XXX

SCALE (IN FEET)
15 30
30 0

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BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON

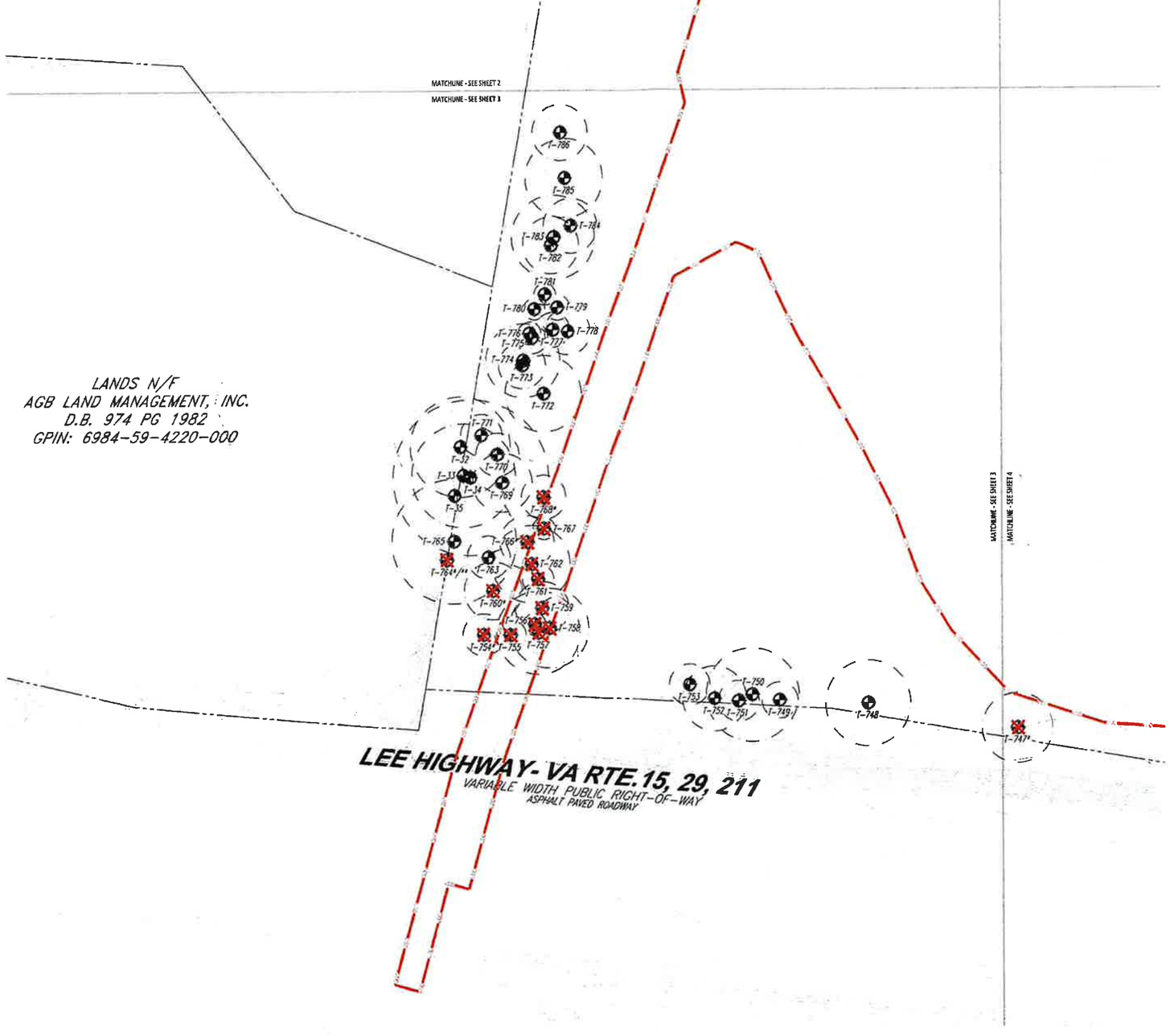
TREE REMOVAL BASE

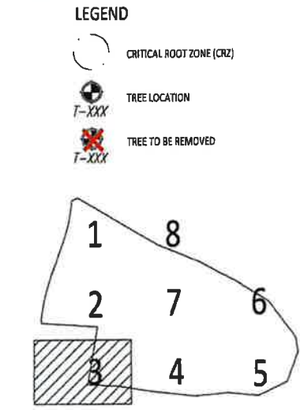
REVISIONS

DATE	COMMENTS

SHEET 2 OF 11
SCALE: 1" = 30'
PROJECT DATE: 04/05/22
DRAFT: EFW
CHECK: AMS
FILE NUMBER: 2724

Kenneth M. Sarsen
Certified Arborist
Certification # MA-4127A





TREE INVENTORY NOTES:
1. **SHARED/ROW TREES SHALL NOT BE REMOVED WITHOUT WRITTEN PERMISSION FROM AFFECTED ADJACENT PROPERTY OWNERS.
2. *TREES NOTED FOR REMOVAL WITHIN THE SAVE AREAS SHALL BE DONE SO BY HAND WITHOUT THE USE OF HEAVY MACHINERY.
3. OFFSITE TREES WERE ASSESSED FROM THE SUBJECT PROPERTY SO NOT TO TRESPASS ONTO ADJACENT PROPERTY. DBH MEASUREMENTS AND TREE LOCATIONS ARE APPROXIMATE.
4. TREES LOCATED WITHIN OR ON THE LIMITS OF DISTURBANCE, OR RATED AS BEING "POOR" IN CONDITION, ARE RECOMMENDED FOR REMOVAL BY TNT ARBORISTS DUE TO THE LIKELIHOOD OF TREE FAILURE. HOWEVER, AT THE DISCRETION OF THE APPLICANT, SOME OF THESE MAY BE PRESERVED DURING CONSTRUCTION WITH THE APPROVAL OF URBAN FORESTRY.

SCALE (IN FEET)
15 30
30 0

Kenneth M. Sareen
Certified Arborist
Certification # MA 4723A

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Chantilly, VA 20151
PH: 703-466-5123 WWW.TNTENVIRONMENTALINC.COM

BLACKWELL ROAD
& LEE HIGHWAY
TOWN OF WARRENTON

TREE REMOVAL
BASE

REVISIONS
DATE | COMMENTS

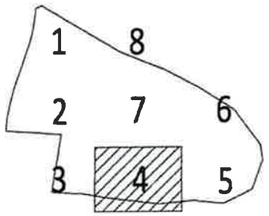
SHEET 3 OF 11
SCALE: 1" = 30'
PROJECT DATE: 04/05/22
DRAFT: BTW | CHECK: AMS
FILE NUMBER: 2724

LEGEND

CRITICAL ROOT ZONE (CRZ)

T-XXX TREE LOCATION

T-XXX TREE TO BE REMOVED



MATCHLINE - SEE SHEET 7

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 3

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 5

T-748

T-747*

SCALE (IN FEET)
15 30
30 0

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Arinash M. Sareen
Certified Arborist
Certification # MA-4729A

ISA

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BLACKWELL ROAD
& LEE HIGHWAY
TOWN OF WARRENTON

TREE REMOVAL
BASE

REVISIONS

DATE	COMMENTS

SHEET 4 OF 11

SCALE: 1" = 30'

PROJECT DATE: 04/05/22

DRAFT: EFW | CHECK: AMS

FILE NUMBER: 2724

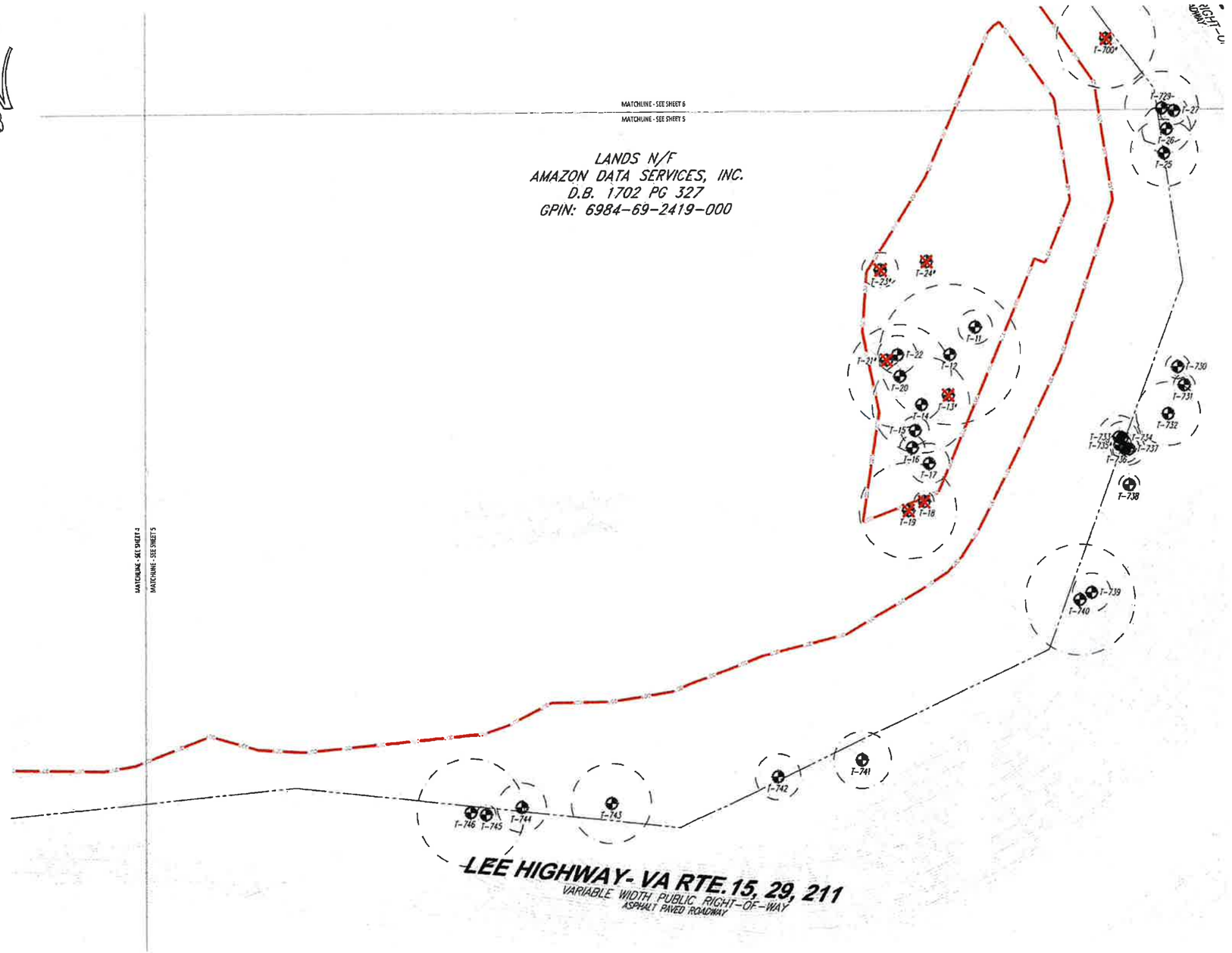
MATCHLINE - SEE SHEET 6

MATCHLINE - SEE SHEET 5

LANDS N/F
AMAZON DATA SERVICES, INC.
D.B. 1702 PG 327
GPIN: 6984-69-2419-000

MATCHLINE - SEE SHEET 4

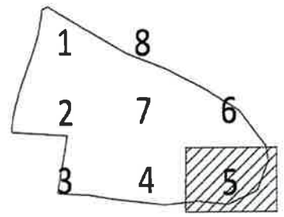
MATCHLINE - SEE SHEET 5



LEE HIGHWAY- VA RTE.15, 29, 211
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY
ASPHALT PAVED ROADWAY

LEGEND

- CRITICAL ROOT ZONE (CRZ)
- T-XXX — TREE LOCATION
- T-XXX — TREE TO BE REMOVED



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BASE

REVISIONS

DATE	COMMENTS

SHEET 5 OF 11
SCALE: 1" = 30'
PROJECT DATE: 04/05/22
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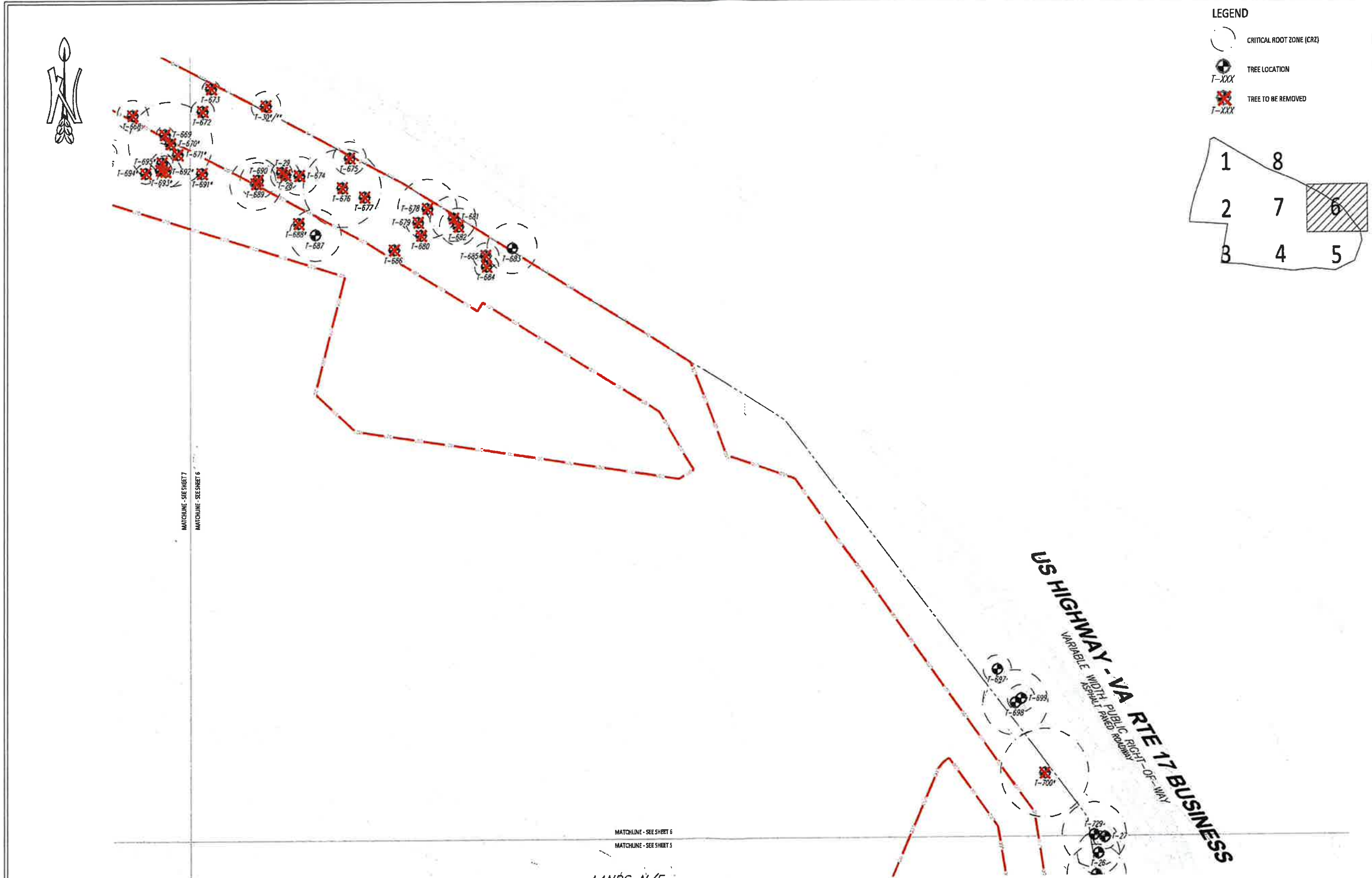

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Certified Arborist

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BLACKWELL ROAD & LEE HIGHWAY

TOWN OF WARRENTON

TREE REMOVAL BASE

REVISIONS

DATE	COMMENTS

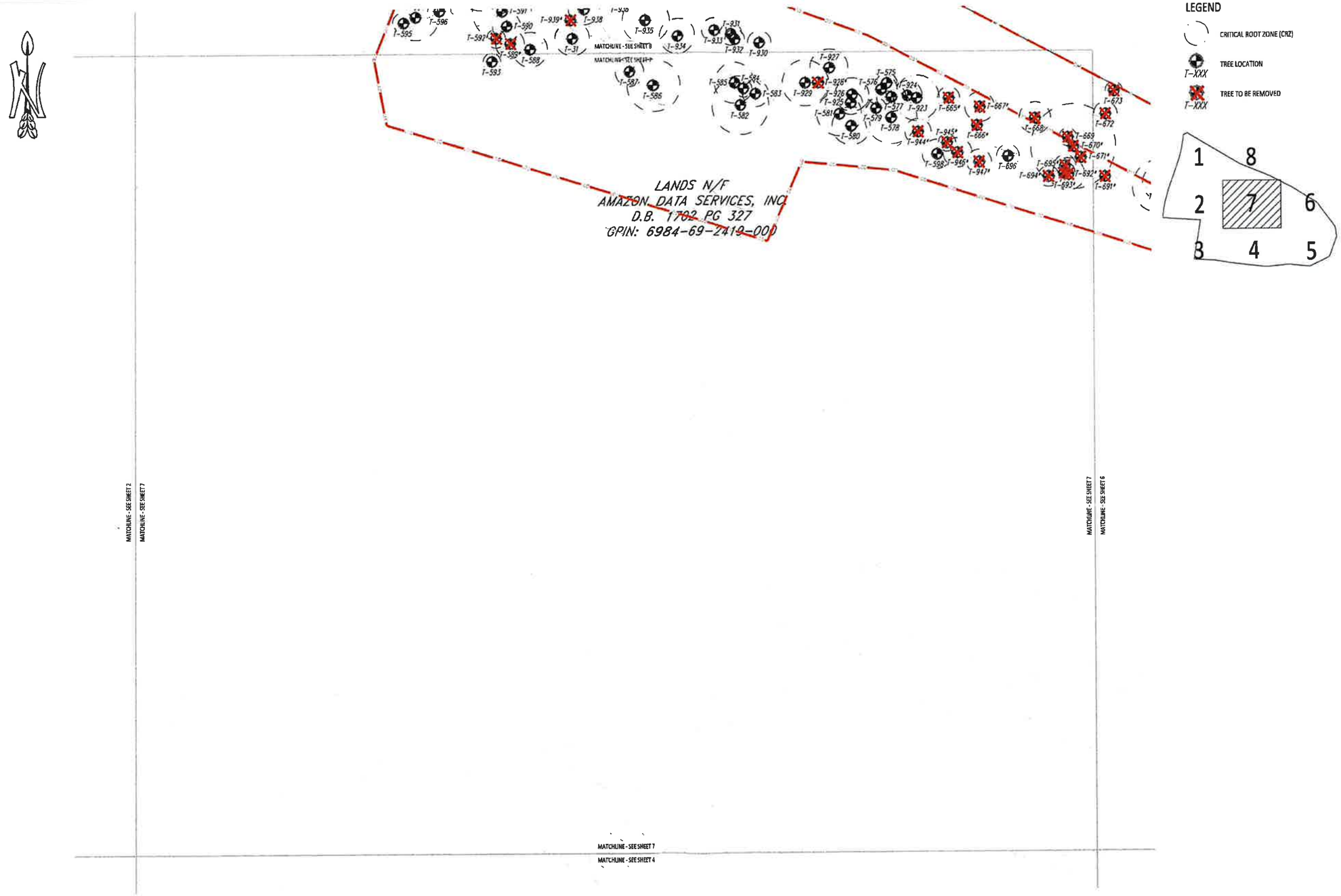
SHEET 6 OF 11

SCALE: 1" – 30'

PROJECT DATE: 04/05/22

DRAFT: EFW CHECK: AMS

FILE NUMBER: 2724



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SCALE (IN FEET)
15 30
30 0

Kenneth M. Sargent
Certified Arborist
Certification # MA-4729A

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REVISIONS
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SHEET 7 OF 11
SCALE: 1" – 30'
PROJECT DATE: 04/05/22
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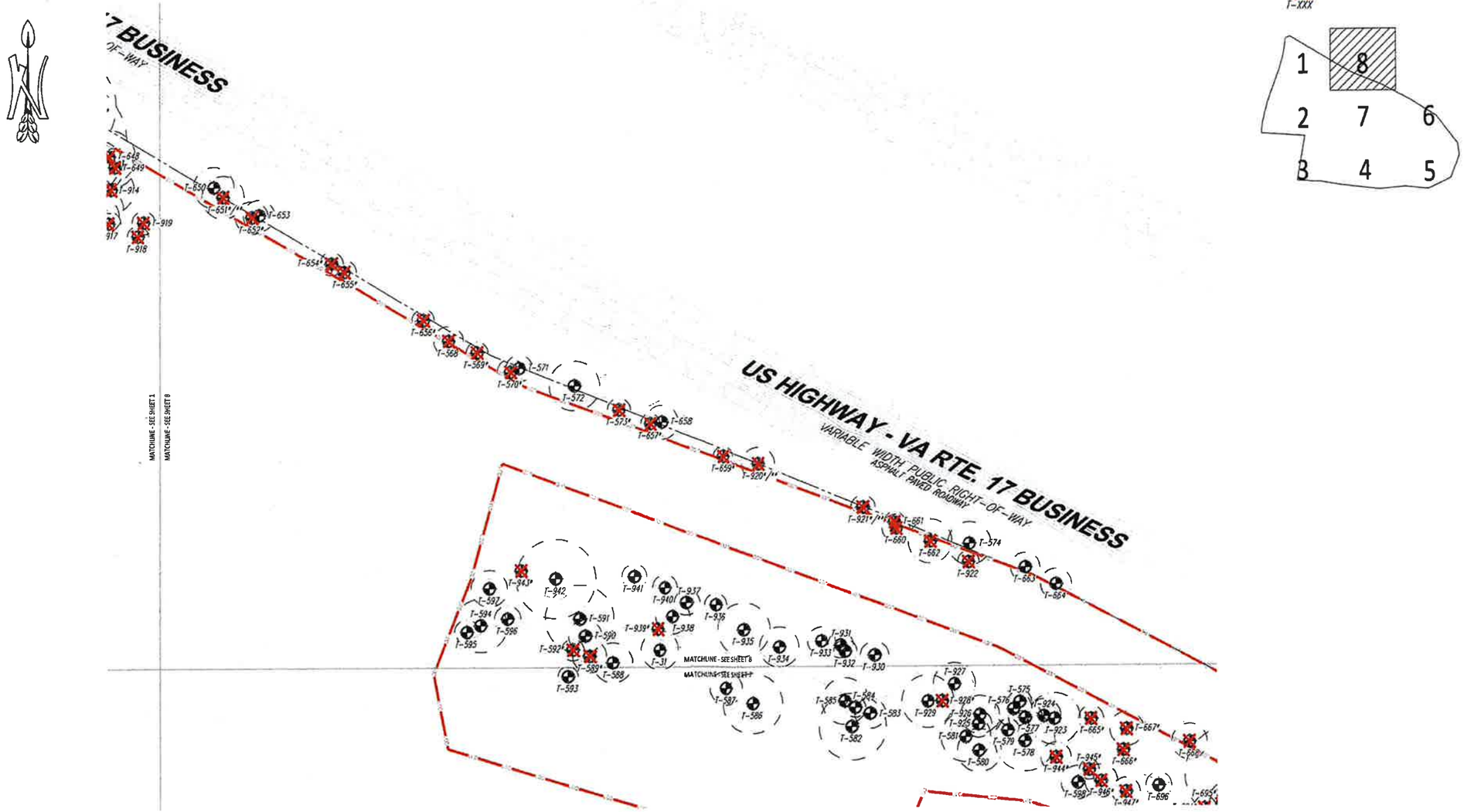
FILE NUMBER: 2724



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TOWN OF WARRENTON

TREE REMOVAL BASE

REVISIONS

DATE	COMMENTS

SHEET 8 OF 11

SCALE: 1" = 30'

PROJECT DATE: 04/05/22

DRAFT: EFW | CHECK: ANS

FILE NUMBER: 2724

Sarah M. Sweet
Certified Arborist
Certification # MA-4727A

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
1	Black Walnut	14.0	14.0	Fair	X		Dead and broken limbs
2	Black Walnut	16.8	16.8	Fair	X		CODIT, tower wound, and dead limbs
3	Black Walnut	17.3	17.3	Fair	X		Vines, and dead limbs
4	Hackberry	17.5	17.5	Fair	X		Watersprouts, dead limbs, and lean in growth
5	Pignut Hickory	7.0	7.0	Poor		Offsite	Double trunk, dead limbs, topped, and vines
6	Black Walnut	6.0	6.0	Poor	X*		Mechanical damage to lower stem, and root flare
7	Hackberry	15.7	15.7	Fair	X		Vines
8	Black Walnut	14.6	14.6	Fair	X*		Vines, dead limbs, and small cavities
9	Pignut Hickory	11.5	11.5	Fair	X		Vines, and dead limbs
10	Black Walnut	20.2	20.2	Fair			Dead limbs, vines, and watersprouts
11	Black Locust	10.4	10.4	Fair			Vines
12	Red Maple	43.0	43.0	Fair			Multi-trunk, vines, watersprouts, and some deadwood
13	Dead	-	-	-	X*		
14	Red Maple	29.7	29.7	Fair			Vines, and dead limbs
15	Black Cherry	8.7	8.7	Fair			Lean in growth
16	Black Locust	7.6	7.6	Fair			Vines, and dead limbs
17	Black Locust	12.4	12.4	Fair			Double trunk, and vines
18	Black Locust	6.1	6.1	Fair	X		Vines, and lean in growth
19	Black Locust	29.5	29.5	Fair	X		Multi-trunk, and vines
20	Red Maple	31.5	31.5	Fair			Multi-trunk
21	Dead	-	-	-	X*		
22	Black Locust	11.7	11.7	Fair			Multi-trunk, and vines
23	White Ash	10.8	10.8	Fair	X*		
24	Dead	-	-	-	X*		
25	Bradford Pear	20.6	20.6	Fair		ROW	
26	Black Walnut	14.9	14.9	Fair		ROW	Dead limbs, and watersprouts
27	Tree of Heaven	8.3	8.3	Fair		ROW	
28	Black Walnut	10.2	10.2	Poor	X		Vines, and dead limbs
29	Black Walnut	7.2	7.2	Poor	X		Vines, dead limbs, and hollow
30	Black Walnut	10.2	10.2	Poor	X*/**	ROW	Dead limbs, and vines
31	Black Walnut	11.7	11.7	Fair			Vines, and dead limbs
32	Tulip Poplar	29.0	29.0	Fair		Offsite	Multi-trunk, watersprouts, and broken leader
33	Boxelder	30.0	30.0	Fair			Multi-trunk, and ivy
34	Boxelder	45.0	45.0	Fair			Multi-trunk, and ivy
35	Dead	-	-	-		Offsite	
133	Black Locust	6.0	6.0	Fair	X		Dead limbs, dieback, vines, and watersprouts
134	Black Locust	10.0	10.0	Fair	X		Dead limbs, dieback, vines, and watersprouts
135	Black Locust	6.0	6.0	Poor	X		Dead limbs, dieback, vines, and watersprouts
136	Black Locust	8.5	8.5	Fair	X*		Dead limbs, dieback, vines, and watersprouts
137	Black Locust	10.0	10.0	Poor	X*		Dead limbs, dieback, vines, and watersprouts
138	Tulip Poplar	20.0	20.0	Fair			Dead limbs, dieback, vines, and watersprouts
139	Pignut Hickory	14.5	14.5	Fair	X*		Dead limbs, dieback, vines, and watersprouts
140	Pignut Hickory	14.3	14.3	Fair	X*		Dead limbs, dieback, vines, and watersprouts
141	Black Locust	16.0	16.0	Poor	X		Dead limbs, dieback, vines, and watersprouts
142	Hackberry	6.3	6.3	Fair	X		Dead limbs, dieback, vines, and watersprouts
143	Tulip Poplar	5.5	5.5	Fair	X		Dead limbs, double trunk, dieback, vines, and watersprouts
144	Pignut Hickory	15.0	15.0	Fair	X		Dead limbs, double trunk, dieback, vines, and watersprouts
145	Tulip Poplar	28.0	28.0	Fair	X*		Dead limbs, dieback, vines, and watersprouts
146	Tulip Poplar	11.0	11.0	Fair	X*		Dead limbs, dieback, vines, and watersprouts
147	Black Locust	8.0	8.0	Poor	X*		Dead limbs, dieback, vines, and watersprouts
148	Black Locust	14.0	14.0	Poor	X*		Dead limbs, dieback, vines, and watersprouts
149	Pignut Hickory	8.0	8.0	Fair			Dead limbs, dieback, vines, and watersprouts
150	Pignut Hickory	8.0	8.0	Fair			Dead limbs, dieback, vines, and watersprouts
151	Pignut Hickory	10.3	10.3	Fair			Dead limbs, dieback, vines, and watersprouts
152	Black Locust	11.2	11.2	Fair			Dead limbs, dieback, vines, and watersprouts
153	Pignut Hickory	11.1	11.1	Fair			Dead limbs, dieback, vines, and watersprouts
154	Tulip Poplar	11.3	11.3	Fair			Dead limbs, dieback, vines, and watersprouts
155	Tulip Poplar	32.0	32.0	Fair			Dead limbs, dieback, vines, and watersprouts
156	Tulip Poplar	32.0	32.0	Poor			Dead limbs, dieback, vines, and watersprouts
157	Black Locust	7.5	7.5	Fair			Dead limbs, dieback, vines, and watersprouts
158	Red Maple	43.0	43.0	Fair			Dead limbs, multi-trunk, dieback, vines, and watersprouts
159	Red Maple	7.5	7.5	Poor			Dead limbs, dieback, vines, and watersprouts
160	Pignut Hickory	9.0	9.0	Fair			Dead limbs, dieback, vines, and watersprouts
161	Pignut Hickory	14.0	14.0	Fair			Dead limbs, dieback, vines, and watersprouts
162	Pignut Hickory	14.0	14.0	Fair			Dead limbs, dieback, vines, and watersprouts
163	White Oak	32.0	32.0	Fair			Dead limbs, dieback, vines, and watersprouts
164	Red Maple	14.0	14.0	Poor			Dead limbs, dieback, vines, and watersprouts
165	Pignut Hickory	9.2	9.2	Fair			Dead limbs, dieback, vines, and watersprouts
166	Northern Red Oak	50.0	50.0	Fair			Dead limbs, dieback, vines, and watersprouts
167	Pignut Hickory	6.0	6.0	Fair			Dead limbs, dieback, vines, and watersprouts
168	Tulip Poplar	14.0	14.0	Fair			Dead limbs, double trunk, dieback, vines, and watersprouts
169	Tulip Poplar	25.5	25.5	Fair			Dead limbs, dieback, vines, and watersprouts
170	Tulip Poplar	23.5	23.5	Fair			Dead limbs, dieback, vines, and watersprouts
171	Tulip Poplar	22.5	22.5	Fair			Dead limbs, watersprouts, and vines
172	Tulip Poplar	24.0	24.0	Fair	X		Dead limbs, watersprouts, and vines
173	Tulip Poplar	22.5	22.5	Fair	X		Dead limbs, watersprouts, and vines
174	Tulip Poplar	11.0	11.0	Fair	X		Dead limbs, watersprouts, and vines
175	Tulip Poplar	17.0	17.0	Fair	X*		Dead limbs, watersprouts, and vines
177	Black Walnut	8.0	8.0	Fair	X		Dead limbs, watersprouts, and vines
178	Black Walnut	8.5	8.5	Fair	X		Dead limbs, watersprouts, and vines
179	Tulip Poplar	16.0	16.0	Fair	X		Dead limbs, watersprouts, and vines
180	Pignut Hickory	8.5	8.5	Poor	X		Dead limbs, watersprouts, and vines
181	Dead	-	-	-	X		Dead limbs, watersprouts, and vines
182	Black Walnut	16.0	16.0	Poor	X		Dead limbs, watersprouts, and vines
183	Tulip Poplar	8.5	8.5	Fair	X		Dead limbs, watersprouts, and vines
184	Black Walnut	16.0	16.0	Fair	X		Dead limbs, watersprouts, and vines
185	Pignut Hickory	9.5	9.5	Fair	X		Dead limbs, watersprouts, and vines
186	Pignut Hickory	16.0	16.0	Fair	X		Dead limbs, watersprouts, and vines
187	Tulip Poplar	12.2	12.2	Fair	X		Crooked trunk, and co-dominant stems
188	Tulip Poplar	13.9	13.9	Fair	X		Covered in dense vines
189	Tulip Poplar	18.4	18.4	Good	X		
190	Tulip Poplar	13.1	13.1	Good	X		A few small broken limbs
191	Tulip Poplar	23.7	23.7	Fair	X		Poor branch formation , and covered in dense vines
192	Tulip Poplar	22.0	22.0	Fair	X		Co-dominant stems
193	Tulip Poplar	10.5	10.5	Fair	X		Broken leader, and covered in vines
194	Tulip Poplar	18.3	18.3	Fair	X		Covered in vines, and several dead and broken limbs
195	Flowering Dogwood	11.0	11.0	Poor	X		Double trunk, and mostly dead
196	Black Walnut	7.3	7.3	Fair	X		Co-dominant stems, and covered in vines
197	Pignut Hickory	6.3	6.3	Fair	X		Covered in vines
198	Pignut Hickory	8.0	8.0	Good	X		Covered in vines
199	Pignut Hickory	6.4	6.4	Fair	X		One-sided
200	Tulip Poplar	29.0	29.0	Fair	X		Several dead and broken limbs
243	Black Oak	8.0	8.0	Fair			Some dead limbs, and vines up trunk
244	Black Oak	9.8	9.8	Fair			Some dead limbs, and mostly one-sided
245	Dead	-	-	-	X*		
246	Black Locust	11.0	11.0	Fair			Several dead limbs, and vines up trunk
247	Black Locust	8.2	8.2	Fair			Several dead limbs, and vines up trunk
248	Northern Red Oak	19.1	19.1	Poor			Mostly dead
249	Dead	-	-	-	X*		
250	Tulip Poplar	29.2	29.2	Fair			Some dead limbs, and vines up trunk
251	Cottonwood	17.3	17.3	Good			
252	Tulip Poplar	21.4	21.4	Good			Some dead limbs
253	Tulip Poplar	11.4	11.4	Fair			Cavity up trunk
254	Tulip Poplar	12.4	12.4	Fair			Some dead limbs

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
255	Tulip Poplar	28.2	28.2	Good			Some dead limbs
256	Black Locust	10.2	10.2	Poor			Mostly one-sided, several dead limbs, and vines in canopy
257	Tulip Poplar	18.6	18.6	Poor			Deadwood at base, and vines in canopy
258	Black Cherry	10.2	10.2	Fair			Dense vines up trunk, and irregular growth
259	Tulip Poplar	22.0	22.0	Good			Some dead limbs
260	Tree of Heaven	8.3	8.3	Poor	X*		Several dead limbs, vines up trunk and in canopy. Recommended for removal due to invasive nature.
261	Tree of Heaven	10.1	10.1	Poor	X*		Several dead limbs, vines up trunk and in canopy. Recommended for removal due to invasive nature.
262	Tree of Heaven	6.3	6.3	Poor	X*		Several dead limbs, vines up trunk and in canopy. Recommended for removal due to invasive nature.
263	Tree of Heaven	6.5	6.5	Poor	X*		Several dead limbs, vines up trunk and in canopy. Recommended for removal due to invasive nature.
264	Tree of Heaven	9.4	9.4	Poor	X*		Several dead limbs, vines up trunk and in canopy. Recommended for removal due to invasive nature.
265	Black Locust	8.4	8.4	Poor			Several dead limbs, and vines up trunk
266	Green Ash	10.3	10.3	Poor			Several dead limbs, and vines up trunk
267	Tulip Poplar	13.3	13.3	Fair			Vines up trunk
268	Black Locust	8.3	8.3	Fair			Some dead limbs
269	Black Locust	11.3	11.3	Poor			Several dead limbs, and vines up trunk
270	Black Locust	10.3	10.3	Poor			Several dead limbs, and vines up trunk
271	Black Locust	7.8	7.8	Poor			Several dead limbs, and vines up trunk
272	Black Locust	14.2	14.2	Fair			Double trunk, vines up trunk, and leaning
273	Tulip Poplar	15.6	15.6	Fair			Triple trunk, one dead leader, and some dead limbs
274	Black Locust	8.1	8.1	Poor			Several dead limbs, and vines up trunk
275	American Sycamore	9.1	9.1	Fair			Vines up trunk
276	Tulip Poplar	7.1	7.1	Fair			Vines up trunk
277	Tulip Poplar	7.1	7.1	Fair	X		Vines up trunk
278	Tulip Poplar	6.2	6.2	Good	X		
279	Tulip Poplar	9.0	9.0	Good	X		Vines at base
280	Tulip Poplar	10.8	10.8	Good	X		
281	Red Maple	6.8	6.8	Fair	X		Mostly one-sided, and vines up trunk
282	American Sycamore	13.2	13.2	Good	X		
283	Cottonwood	7.3	7.3	Good	X		
284	Tulip Poplar	6.2	6.2	Good	X		
285	Tulip Poplar	12.3	12.3	Good	X		
286	Tulip Poplar	9.0	9.0	Good	X		
287	Tulip Poplar	10.2	10.2	Good	X		
288	Tulip Poplar	12.2	12.2	Good	X		
289	Tulip Poplar	12.6	12.6	Good	X		
290	Tulip Poplar	9.8	9.8	Good	X		
291	Tulip Poplar	17.4	17.4	Good	X		Vines up trunk
292	Bradford Pear	6.3	6.3	Fair	X		Vines in canopy
293	Tulip Poplar	11.8	11.8	Good	X		
294	American Sycamore	14.0	14.0	Fair	X		Vines up trunk
295	Tulip Poplar	6.6	6.6	Good	X		
296	Tulip Poplar	11.9	11.9	Good	X		Vines at base
297	Tulip Poplar	13.4	13.4	Fair	X		Some dead limbs, and vines up trunk
298	Cottonwood	7.6	7.6	Poor	X		Dense vines in canopy
299	Pignut Hickory	14.2	14.2	Fair			Vines in canopy
300	Pignut Hickory	16.3	16.3	Fair			Double trunk, some dead limbs, and vines up trunk
460	Black Gum	9.2	9.2	Fair	X		Vines, and dead limbs
461	Red Maple	17.7	17.7	Fair	X		Vines, and slight lean in growth
462	Red Maple	17.0	17.0	Fair	X		Multi-trunk, and vines
463	American Sycamore	6.4	6.4	Good	X		Vines
464	Kwanzan Cherry	16.2	16.2	Good			Vines
465	Kwanzan Cherry	14.6	14.6	Fair			Vines, and dead limbs
466	Dead	-	-	-	X*		
467	Kwanzan Cherry	12.4	12.4	Fair			Vines, and dead limbs
468	Kwanzan Cherry	11.2	11.2	Fair			Vines, and dead limbs
470	Tree of Heaven	7.6	7.6	Fair	X*		Lean. Recommended for removal due to invasive nature.
471	Black Locust	10.6	10.6	Fair			
472	Black Cherry	7.4	7.4	Fair			
473	Green Ash	7.0	7.0	Poor			Emerald Ash Borer
474	Black Locust	8.7	8.7	Fair			
475	Dead	-	-	-	X*		
476	Green Ash	7.2	7.2	Fair			Dead limbs
477	American Sycamore	12.8	12.8	Poor			Many small cavities, and vines
478	Tulip Poplar	7.0	7.0	Fair			Vines
479	American Sycamore	13.5	13.5	Fair			Vines
480	Tulip Poplar	21.1	21.1	Good			Double trunk
481	Tulip Poplar	16.2	16.2	Good			
482	Tulip Poplar	12.0	12.0	Fair			Watersprouts, and vines
483	Tulip Poplar	11.3	11.3	Good			Watersprouts
484	Tulip Poplar	40.0	40.0	Fair			Double trunk, dead limbs, and vines
485	Black Walnut	8.0	8.0	Fair			Vines, and dead limbs
486	Black Locust	15.0	15.0	Poor	X*		Multi-trunk ,and vines
487	Tree of Heaven	9.2	9.2	Poor	X*		Topped. Recommended for removal due to invasive nature.
488	Silver Maple	16.2	16.2	Fair	X		Dead limbs, and watersprouts
489	Red Maple	8.0	8.0	Fair	X		Dead limbs, and watersprouts
490	Eastern Redcedar	6.0	6.0	Fair	X		
491	Tulip Poplar	20.0	20.0	Fair			Vines
492	Tulip Poplar	17.0	17.0	Good			
493	Red Maple	8.0	8.0	Good			
494	Eastern Redcedar	8.0	8.0	Fair			Double trunk
495	Tulip Poplar	9.0	9.0	Good	X*		
496	Tulip Poplar	17.0	17.0	Good	X*		
497	Red Maple	6.5	6.5	Good	X*		
498	Tulip Poplar	18.2	18.2	Good	X		
499	Tulip Poplar	12.5	12.5	Good	X		
500	Tulip Poplar	10.2	10.2	Poor	X		Large cavity at base
501	Pin Oak	7.3	7.3	Fair	X		Vines
502	Cottonwood	47.1	47.1	Fair	X		Multi-trunk, and dead limbs
503	Red Maple	18.3	18.3	Fair	X		Multi-trunk, dead limbs, and deadwood
504	Red Maple	17.2	17.2	Fair	X		Multi-trunk
505	Red Maple	17.0	17.0	Good	X		Vines
506	Red Maple	29.5	29.5	Fair	X		Double trunk, and dead limbs
507	Green Ash	11.2	11.2	Poor	X		Emerald Ash Borer
508	Green Ash	8.0	8.0	Poor	X		Emerald Ash Borer
509	Green Ash	9.5	9.5	Fair	X		Lean in growth
510	Mockernut Hickory	10.5	10.5	Good	X		
511	White Oak	19.0	19.0	Fair	X		Dead limbs, and deadwood
512	Mockernut Hickory	8.5	8.5	Good	X		Dead limbs
513	White Oak	20.0	20.0	Fair	X		Dead limbs, and deadwood
514	Red Maple	12.0	12.0	Good	X		
515	White Oak	33.0	33.0	Fair	X		Dead limbs, and deadwood
516	White Oak	26.0	26.0	Fair	X		Dead limbs, and deadwood
517	Tulip Poplar	6.2	6.2	Fair	X		Vines, and dead limbs
518	Tulip Poplar	9.0	9.0	Fair	X		Vines, and dead limbs
519	Tulip Poplar	16.1	16.1	Good	X		
520	White Oak	9.0	9.0	Fair	X		Dead limbs, and deadwood
521	White Oak	6.2	6.2	Fair	X		Dead limbs, and deadwood
522	White Oak	8.0	8.0	Fair	X		Dead limbs, and deadwood
523	Mockernut Hickory	8.5	8.5	Fair	X		Dead limbs, and deadwood
524	Tulip Poplar	7.0	7.0	Fair	X		Dead limbs, and deadwood
525	Tulip Poplar	14.0	14.0	Fair	X		Dead limbs, and deadwood
526	Tulip Poplar	14.0	14.0	Fair	X		Dead limbs, and deadwood
527	Mockernut Hickory	11.0	11.0	Fair	X		Dead limbs, and deadwood
528	Northern Red Oak	32.0	32.0	Fair	X		Dead limbs, and deadwood

ENVIRONMENTAL
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BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON

EXISTING VEGETATION INVENTORY

REVISIONS

DATE	COMMENTS

SHEET 9 OF 11

SCALE: NTS

PROJECT DATE: 04/05/22

DRAFT: EFW | CHECK: AMS

FILE NUMBER: 2724

Kenneth M. Simon
Certified Arborist
Certification # MA-4727A

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
529	White Oak	11.0	11.0	Fair	X*		Watersprouts
530	Mockernut Hickory	9.0	9.0	Fair			
531	White Oak	14.0	14.0	Fair			Double trunk, dead limbs, and deadwood
532	White Oak	7.5	7.5	Fair			Dead limbs, and deadwood
533	Mockernut Hickory	19.0	19.0	Fair			Dead limbs, and deadwood
534	White Oak	20.0	20.0	Fair			Dead limbs, and deadwood
535	Northern Red Oak	21.0	21.0	Fair			Dead limbs, and deadwood
536	Pignut Hickory	7.0	7.0	Fair			Dead limbs, and deadwood
537	Tulip Poplar	19.0	19.0	Fair			Dead limbs, and deadwood
538	Pignut Hickory	8.5	8.5	Fair			Dead limbs, and deadwood
539	Pignut Hickory	16.2	16.2	Fair			Dead limbs, and deadwood
540	Pignut Hickory	21.0	21.0	Fair			Dead limbs, and deadwood
541	Pignut Hickory	13.2	13.2	Fair			Dead limbs, and deadwood
542	Tulip Poplar	6.0	6.0	Fair			Dead limbs, and deadwood
543	Tulip Poplar	18.0	18.0	Fair			Dead limbs, vines, and deadwood
544	Tulip Poplar	21.0	21.0	Good			
545	Tulip Poplar	9.0	9.0	Fair			Vines, and dead limbs
546	Pignut Hickory	9.0	9.0	Fair			Dead limbs, and vines
547	Tulip Poplar	24.0	24.0	Good			
548	Tulip Poplar	15.0	15.0	Fair	X*		Dead limbs, and small cavity at base
549	Tulip Poplar	18.7	18.7	Fair	X		Double trunk, and dead limbs
550	Northern Red Oak	18.0	18.0	Poor	X		Vines, dead limbs, and deadwood
551	Northern Red Oak	14.0	14.0	Fair	X*		Dead limbs
552	Black Cherry	10.0	10.0	Fair	X*		Dead limbs, and deadwood
553	Black Cherry	10.0	10.0	Fair			Dead limbs, and deadwood
554	Black Cherry	9.0	9.0	Fair	X		Dead limbs, and deadwood
555	Tree of Heaven	9.0	9.0	Fair	X		Dead limbs, deadwood, and watersprouts
556	Tulip Poplar	19.0	19.0	Fair	X		Dead limbs, and deadwood
557	Tulip Poplar	12.0	12.0	Fair	X		Dead limbs, and deadwood
558	Northern Red Oak	7.2	7.2	Fair	X		
559	Dead	-	-	-	X		
560	Dead	-	-	-	X		
561	Black Gum	7.2	7.2	Fair	X		Dead limbs
562	Black Walnut	10.5	10.5	Fair	X		Dead limbs, and deadwood
563	White Oak	9.0	9.0	Fair	X		Dead limbs, and deadwood
564	White Oak	8.0	8.0	Fair	X		Dead limbs, and watersprouts
565	Tulip Poplar	18.0	18.0	Fair	X		Dead limbs, and deadwood
566	Tulip Poplar	9.0	9.0	Fair	X		Dead limbs
567	Tulip Poplar	16.0	16.0	Fair	X		Dead limbs, and watersprouts
568	Tulip Poplar	9.0	9.0	Good	X		Vines
569	Black Walnut	6.5	6.5	Fair	X*		Vines, and dead limbs
570	Black Walnut	8.0	8.0	Fair	X*		Vines
571	Black Walnut	8.0	8.0	Fair			Dead limbs, and watersprouts
572	Black Cherry	15.0	15.0	Fair		ROW	Lean in growth, vines, and dead limbs
573	Black Walnut	7.0	7.0	Fair	X*		
574	Black Cherry	13.0	13.0	Poor		ROW	Dead limbs
575	Black Walnut	7.0	7.0	Poor			Dead limbs, vines, and deadwood
576	Black Walnut	11.0	11.0	Fair			Dead limbs
577	Black Cherry	10.0	10.0	Poor			Deadwood, dead limbs, and conks
578	Black Cherry	18.0	18.0	Poor			Dead limbs, deadwood, and dead leader
579	Black Walnut	7.0	7.0	Good			Vines
580	Black Walnut	13.0	13.0	Fair			Vines, and dead limbs
581	Black Walnut	15.0	15.0	Fair			Vines, and dead limbs
582	Black Walnut	20.0	20.0	Fair			Vines, and dead limbs
583	Hackberry	9.0	9.0	Fair			Vines, and dead limbs
584	Black Walnut	6.0	6.0	Fair			
585	Black Walnut	14.0	14.0	Poor			Topped
586	Black Walnut	18.0	18.0	Fair			Dead limbs, deadwood, and vines
587	Black Walnut	10.0	10.0	Fair			Dead limbs, deadwood, and vines
588	Black Walnut	12.0	12.0	Fair			Dead limbs, deadwood, and vines
589	Tree of Heaven	10.0	10.0	Poor	X*		Dead limbs, deadwood, small cavity, and vines. Recommended for removal due to invasive nature.
590	Black Walnut	9.8	9.8	Fair			Dead limbs, deadwood, and vines
591	Black Walnut	20.5	20.5	Fair			Dead limbs, deadwood, and vines
592	Tree of Heaven	6.5	6.5	Fair	X*		Dead limbs, deadwood, and vines. Recommended for removal due to invasive nature.
593	Black Walnut	6.0	6.0	Fair			Dead limbs, dieback, vines, and watersprouts
594	Black Walnut	16.0	16.0	Fair			Dead limbs, dieback, vines, and watersprouts
595	Black Walnut	7.5	7.5	Fair			Dead limbs, dieback, vines, and watersprouts
596	Black Walnut	8.0	8.0	Fair			Dead limbs, dieback, vines, and watersprouts
597	Black Walnut	11.0	11.0	Fair			Dead limbs, dieback, vines, and watersprouts
598	Black Walnut	10.0	10.0	Fair			Dead limbs, dieback, vines, and watersprouts
599	Tulip Poplar	15.1	15.1	Fair			Dead limbs, dieback, vines, and watersprouts
600	Tulip Poplar	7.6	7.6	Fair	X		Dead limbs, dieback, vines, and watersprouts
601	Pignut Hickory	9.3	9.3	Good			
602	White Oak	40.2	40.2	Poor			Cavity at base, several dead limbs, and hollow sound
603	Tulip Poplar	6.3	6.3	Good			
604	Pignut Hickory	21.0	21.0	Good			
605	Pignut Hickory	17.4	17.4	Poor			Deadwood up trunk, fungal growth up trunk, and several dead limbs
606	Tulip Poplar	8.4	8.4	Good			
607	Tulip Poplar	8.6	8.6	Good			Sweeping growth
608	Pignut Hickory	6.7	6.7	Good			
609	Pignut Hickory	9.8	9.8	Good			
610	Tulip Poplar	7.0	7.0	Good		Shared	Some vines up trunk
611	Tulip Poplar	11.3	11.3	Good			One-sided with some vines
612	Pignut Hickory	21.1	21.1	Good			Some dead limbs
613	Tulip Poplar	7.8	7.8	Good			
614	Tulip Poplar	6.7	6.7	Good			Sweeping growth
615	Tulip Poplar	11.2	11.2	Poor			Large cavity near base
616	Tulip Poplar	14.4	14.4	Good			Mostly one-sided
617	Tulip Poplar	6.8	6.8	Good			Mostly one-sided
618	Tulip Poplar	12.2	12.2	Good			Vines up trunk, and mostly one-sided
619	Tulip Poplar	15.6	15.6	Good			
620	Tulip Poplar	11.3	11.3	Poor		ROW	Decay at base
621	Tulip Poplar	20.8	20.8	Fair			Vines in canopy, and some dead limbs
622	Tulip Poplar	15.2	15.2	Good			Vines up trunk
623	White Oak	6.7	6.7	Fair			Vines up trunk, and some dead limbs
624	Tulip Poplar	20.0	20.0	Good		ROW	Vines up trunk
625	White Oak	16.6	16.6	Fair			Vines up trunk, swelling at base, and some dead limbs
626	Northern Red Oak	22.9	22.9	Fair			Vines up trunk, and several dead limbs
627	Pignut Hickory	12.3	12.3	Fair			Vines up trunk, and several dead limbs
628	Pignut Hickory	8.8	8.8	Good		Shared	
629	Tulip Poplar	14.2	14.2	Good			
630	Tulip Poplar	23.4	23.4	Fair			Several dead limbs
631	Northern Red Oak	9.1	9.1	Fair		Shared	Mostly one-sided, and vines in canopy
632	Tulip Poplar	12.1	12.1	Good			Vines up trunk
633	Tulip Poplar	21.1	21.1	Poor			Missing top
634	Tulip Poplar	25.4	25.4	Good			Some dead limbs
635	Dead	-	-	-	X*		
636	Dead	-	-	-	X*		
637	Dead	-	-	-	X*		
638	Dead	-	-	-	X*		
639	Pignut Hickory	11.4	11.4	Good			Vines up trunk
640	Tulip Poplar	28.4	28.4	Good			Some dead limbs
641	Tulip Poplar	17.4	17.4	Good			Some dead limbs
642	Tulip Poplar	49.8	49.8	Good			Double trunk, and some dead limbs

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
643	Black Walnut	15.6	15.6	Fair			Some dead limbs
644	White Oak	8.8	8.8	Good	X		
645	Black Walnut	22.3	22.3	Fair	X		Some dead limbs
646	White Oak	30.3	30.3	Fair	X*		Several dead limbs, and mostly one-sided
647	Black Cherry	8.2	8.2	Fair	X*		Some dead limbs
648	Tulip Poplar	18.0	18.0	Fair	X		Vines in canopy
649	Green Ash	11.6	11.6	Fair	X		Vines in canopy
650	Tulip Poplar	12.3	12.3	Fair		ROW	Dense vines up trunk and in canopy
651	Tulip Poplar	12.8	12.8	Fair	X*/**	Shared	Dense vines up trunk and in canopy
652	Tulip Poplar	9.8	9.8	Fair	X*		Dense vines up trunk and in canopy
653	Mulberry	9.3	9.3	Poor		ROW	Dense vines up trunk and in canopy
654	Green Ash	7.0	7.0	Poor	X*		Dense vines up trunk and in canopy
655	Green Ash	7.4	7.4	Poor	X*		Dense vines up trunk and in canopy
656	Black Walnut	6.7	6.7	Fair	X*		Vines in canopy
657	Black Walnut	6.0	6.0	Poor	X*		Dense vines in canopy
658	Boxelder	10.2	10.2	Poor		ROW	Dense vines in canopy
659	Black Walnut	6.0	6.0	Fair	X*		Dense vines in canopy
660	Black Walnut	8.4	8.4	Fair	X		Dense vines in canopy
661	Black Walnut	6.2	6.2	Fair	X		Dense vines in canopy
662	Black Walnut	13.7	13.2	Fair	X		Dense vines in canopy
663	Black Cherry	8.8	8.8	Poor		ROW	Dense vines in canopy
664	Black Cherry	9.3	9.3	Poor		ROW	Dense vines in canopy
665	Black Walnut	7.6	7.6	Poor	X*		Dense vines in canopy
666	Dead	-	-	-	X*		
667	Hackberry	10.2	10.2	Poor	X*		Failed top, and dense vines
668	Tulip Poplar	10.8	10.8	Fair	X		Dense vines up trunk
669	Black Walnut	6.1	6.1	Poor	X		Failing trunk, and dense vines up trunk
670	Tulip Poplar	29.0	29.0	Fair	X*		Dense vines up trunk
671	Dead	-	-	-	X*		
672	Black Walnut	8.1	8.1	Fair	X		Vines in canopy
673	Black Walnut	6.0	6.0	Fair	X		Vines up trunk
674	Black Walnut	13.2	13.2	Fair	X		Vines up trunk
675	Black Cherry	11.4	11.4	Fair	X		Vines up trunk
676	Tulip Poplar	27.0	27.0	Fair	X		Vines up trunk
677	Dead	-	-	-	X		
678	Tulip Poplar	20.1	20.1	Fair	X		Dense vines up trunk
679	Black Cherry	8.5	8.5	Fair	X		Dense vines up trunk
680	Dead	-	-	-	X		
681	Black Walnut	15.7	15.7	Fair	X		Dense vines up trunk
682	Black Walnut	12.8	12.8	Fair	X		Dense vines up trunk
683	Boxelder	17.4	17.4	Fair		ROW	Double trunk, and dense vines up trunk
684	Black Walnut	8.4	8.4	Fair	X		Dense vines up trunk
685	Black Walnut	9.0	9.0	Fair	X		Dense vines up trunk
686	Dead	-	-	-	X		
687	Black Walnut	17.9	17.9	Fair			Dense vines up trunk
688	Dead	-	-	-	X*		
689	Black Walnut	18.0	18.0	Fair	X		Dense vines up trunk
690	Black Walnut	12.4	12.4	Fair	X		Dense vines up trunk
691	Dead	-	-	-	X*		
692	Tree of Heaven	11.1	11.1	Fair	X*		Dense vines up trunk. Recommended for removal due to invasive nature.
693	Tree of Heaven	7.8	7.8	Fair	X*		Dense vines up trunk. Recommended for removal due to invasive nature.
694	Tree of Heaven	7.0	7.0	Fair	X*		Dense vines up trunk. Recommended for removal due to invasive nature.
695	Tree of Heaven	7.4	7.4	Fair	X*		Dense vines up trunk. Recommended for removal due to invasive nature.
696	Black Cherry	7.9	7.9	Poor			Mostly dead
697	Eastern Redcedar	9.7	9.7	Fair		ROW	Double trunk, and dense vines up trunk
698	Black Cherry	22.5	22.5	Fair		ROW	Vines up trunk
699	Slippery Elm	9.4	9.4	Fair		ROW	Vines up trunk
700	Bradford Pear	30.5	30.5	Fair	X*		Double trunk, and poorly pruned for powerlines. Recommended for removal due to invasive nature.
729	Black Walnut	22.4	22.4	Fair		ROW	Vines up trunk
730	Eastern Redcedar	7.4	7.4	Fair		ROW	Several small dead limbs
731	Eastern Redcedar	6.5	6.5	Fair		ROW	Several small dead limbs
732	Tulip Poplar	19.5	19.5	Good		ROW	
733	Black Cherry	13.2	13.2	Poor			Mostly dead, and vines up trunk
734	Eastern Redcedar	10.1	10.1	Poor			Mostly dead, and many dead limbs
735	Tree of Heaven	7.1	7.1	Fair	X*		Poorly pruned for powerlines. Recommended for removal due to invasive nature.
736	Persimmon	8.7	8.7	Fair		ROW	Vines up trunk
737	Black Cherry	9.8	9.8	Poor		ROW	Poor form, and watersprouts
738	Persimmon	6.4	6.4	Fair		ROW	Vines up trunk
739	Tulip Poplar	11.8	11.8	Fair		ROW	Vines up trunk
740	Tulip Poplar	34.0	34.0	Good		ROW	Double trunk, and vines up trunk
741	Bradford Pear	17.4	17.4	Fair		ROW	Double trunk, and vines up trunk
742	Red Maple	14.0	14.0	Fair			Vines up trunk, and in canopy
743	Black Cherry	24.4	24.4	Fair			Poorly pruned for powerlines, and vines in canopy
744	Black Cherry	15.1	15.1	Fair			Poorly pruned for powerlines, and vines in canopy
745	Red Maple	6.1	6.1	Fair		ROW	Vines up trunk, and some dead limbs
746	Red Maple	33.0	33.0	Fair		ROW	Multi-trunk, poorly pruned for powerlines, and several dead limbs
747	Black Cherry	20.2	20.2	Poor	X*		Deadwood at base, dense vines, and many dead limbs
748	Red Maple	24.8	24.8	Fair			Multi-trunk, several dead limbs, and vines up trunk
749	Red Maple	10.4	10.4	Fair			Vines in canopy
750	Black Cherry	27.0	27.0	Fair			Double trunk, some dead limbs, and vines up trunk
751	Eastern Redcedar	11.8	11.8	Fair			Vines up trunk, and some dead limbs
752	Tulip Poplar	18.8	18.8	Fair			Pruned for powerlines, one-sided, and English ivy up trunk
753	Black Cherry	13.9	13.9	Poor			Dense vines up trunk, and many dead limbs
754	Boxelder	12.1	12.1	Poor	X*		Mostly dead
755	Boxelder	8.8	8.8	Fair	X		Dense vines up trunk
756	Slippery Elm	6.4	6.4	Fair	X		Vines in canopy
757	American Sycamore	24.0	24.0	Fair	X		Dense vines up trunk
758	American Sycamore	23.0	23.0	Fair	X		Dense vines up trunk
759	Tulip Poplar	15.4	15.4	Poor	X		Failed crown, vines up trunk, and poor form
760	Boxelder	16.7	16.7	Poor	X*		Mostly dead
761	Persimmon	9.0	9.0	Fair	X		Vines up trunk
762	Tulip Poplar	22.3	22.3	Fair	X		Several dead limbs
763	Boxelder	12.4	12.4	Fair			Dense vines in canopy
764	Dead				X*/**	Shared	
765	Black Cherry	16.0	16.0	Poor			Mostly dead
766	Tulip Poplar	15.4	15.4	Fair	X*		Dense vines in canopy
767	Boxelder	6.4	6.4	Fair			Vines up trunk
768	Black Walnut	12.8	12.8	Fair	X*		Vines up trunk
769	Boxelder	17.0	17.0	Fair			Corrected growth some dead limbs, and vines in canopy
770	Boxelder	12.4	12.4	Fair			Dense vines up trunk
771	Hackberry	12.1	12.1	Fair			Dense vines up trunk
772	Boxelder	22.0	22.0	Fair			Dense vines up trunk
773	Boxelder	13.4	13.4	Poor			Mostly dead
774	Hackberry	21.2	21.2	Fair			Dense vines up trunk
775	Boxelder	9.2	9.2	Fair			Dense vines up trunk
776	Hackberry	6.6	6.6	Fair			Vines up trunk
777	Hackberry	10.0	10.0	Fair			Vines up trunk
778	Black Walnut	13.4	13.4	Fair			Vines up trunk, and pruned for powerlines
779	Boxelder	7.3	7.3	Poor			Poorly pruned for powerlines, and many dead limbs
780	Hackberry	6.2	6.2	Fair			Dense vines up trunk
781	Hackberry	6.2	6.2	Fair			Dense vines up trunk
782	Hackberry	16.3	16.3	Fair			Vines up trunk
783	Tulip Poplar	24.2	24.2	Poor			Deadwood up trunk, and vines in canopy
784	Tulip Poplar	15.8	15.8	Poor			Poorly pruned for powerlines, hollow sound, and many dead limbs
785	Black Walnut	22.8	22.8	Fair			Vines up trunk

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BLACKWELL ROAD
& LEE HIGHWAY
TOWN OF WARRENTON

EXISTING VEGETATION INVENTORY

Kenneth A. Sweet
Certified Arborist
Certification # MA-4727A

REVISIONS

DATE	COMMENTS

SHEET 10 OF 11

SCALE: NTS

PROJECT DATE: 04/05/22

DRAFT: EFW | CHECK: AMS

FILE NUMBER: 2774

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
786	Black Walnut	16.2	16.2	Fair			Some dead limbs
787	Tulip Poplar	27.7	27.7	Fair	X		Ivy, and dead limbs
788	American Sycamore	19.5	19.5	Fair	X		Vines and dead limbs
789	Tulip Poplar	12.0	12.0	Fair	X		Vines
790	Eastern Redcedar	6.0	6.0	Fair	X		Topped, broken leader, and vines
791	Eastern Redcedar	6.5	6.5	Poor	X		Topped, and vines
792	Eastern Redcedar	11.1	11.1	Poor	X		Vines, and dead limbs
793	Tulip Poplar	17.4	17.4	Fair	X		Vines
794	Black Walnut	9.5	9.5	Fair	X		Vines, and dead limbs
795	Black Walnut	13.8	13.8	Fair	X		Vines, and dead limbs
796	Eastern Redcedar	9.3	9.3	Fair	X		Dead and broken limbs
797	Pignut Hickory	6.7	6.7	Fair	X		Lean in growth, and vines
798	Black Walnut	9.7	9.7	Fair	X		Dead limbs
799	Eastern Redcedar	6.4	6.4	Good	X		
800	Hackberry	9.8	9.8	Fair	X		Watersprouts, and dead limbs
801	Tulip Poplar	23.7	23.7	Fair	X		Dense vines up trunk
802	Red Maple	6.0	6.0	Fair	X		Growing into trunk of T-801
803	Tulip Poplar	12.5	12.5	Fair	X		Dense vines up trunk
804	Red Maple	10.8	10.8	Fair	X		Dense vines up trunk
805	Red Maple	8.0	8.0	Fair	X		Poor form, and lean in growth
806	Red Maple	9.5	9.5	Fair	X		Poor form, covered in dense vines, and lean in growth
807	Red Maple	12.5	12.5	Fair			Double trunk, co-dominant stems, and covered in dense vines
808	Tulip Poplar	12.3	12.3	Poor	X*		Poor form, broken co-stem, and covered in dense vines
809	American Sycamore	12.5	12.5	Good			
810	American Sycamore	21.0	21.0	Good	X*		Vines in canopy
811	Pignut Hickory	6.5	6.5	Fair	X*		Broken top, and vines up trunk
812	American Sycamore	7.0	7.0	Good			
813	Tulip Poplar	11.1	11.1	Good			
814	American Sycamore	14.6	14.6	Fair			Lean in growth, and vines on trunk
815	Pignut Hickory	7.1	7.1	Fair			Vines on trunk, and a few broken limbs
816	American Sycamore	9.8	9.8	Good			Vines on trunk
817	Tulip Poplar	15.3	15.3	Fair	X*		Codominant stems, and vines on trunk
818	Tulip Poplar	6.8	6.8	Fair	X		Vines on trunk, and several dead and broken limbs
819	American Sycamore	19.1	19.1	Fair			Dense vines on trunk and in canopy
820	American Sycamore	8.3	8.3	Good	X		
821	Tulip Poplar	7.6	7.6	Poor	X		Broken top, and dense vines up trunk
822	Tulip Poplar	11.0	11.0	Fair	X		Vines up trunk
823	Tulip Poplar	18.0	18.0	Fair	X		Vines up trunk
824	Tulip Poplar	18.3	18.3	Fair	X		Vines up trunk
825	American Sycamore	9.5	9.5	Good			Lean in growth
826	Pignut Hickory	7.0	7.0	Good	X*		
827	Tree of Heaven	6.5	6.5	Fair	X		Poor form, and covered in vines
828	Tree of Heaven	7.0	7.0	Fair	X		Poor form, and covered in vines
829	Tree of Heaven	7.6	7.6	Fair	X		Poor form, and covered in vines
830	Red Maple	8.5	8.5	Poor	X		Cavity, dead and broken limbs, and poor form
831	Dead	-	-	-	X		
832	Cottonwood	18.5	18.5	Fair	X		Poor form, and covered in dense vines
833	American Sycamore	21.0	21.0	Good	X		
834	Red Maple	7.9	7.9	Fair	X		Poor form, and vines in canopy
835	Red Maple	8.7	8.7	Fair	X		Co-dominant stems, and several dead and broken limbs
836	Dead	-	-	-	X		
837	Cottonwood	19.8	19.8	Fair	X		Several large dead and broken limbs
838	Red Maple	6.8	6.8	Fair	X		Vines up trunk
839	White Oak	10.0	10.0	Fair/Poor	X		Double trunk, dead co-stems, some broken limbs, and vines in canopy
840	Cottonwood	21.0	21.0	Fair	X		A few dead and broken limbs
841	Mockernut Hickory	6.9	6.9	Poor	X		Double trunk, dead co-stem, poor form, and vines up canopy
842	Northern Red Oak	14.0	14.0	Poor	X		High dieback, hypoxylon canker on limbs
843	Northern Red Oak	8.5	8.5	Fair	X		Vines in canopy
844	Pignut Hickory	9.3	9.3	Fair	X		Dense vines up trunk
845	Tulip Poplar	10.5	10.5	Good	X		Vines up trunk and in canopy
846	White Oak	36.0	36.0	Poor	X		Large cavity, and large dead and broken limbs
847	Dead	-	-	-	X		
848	Mockernut Hickory	15.8	15.8	Good	X		
849	Mockernut Hickory	13.5	13.5	Good	X		
850	Mockernut Hickory	17.8	17.8	Good	X		Vines in canopy
851	Mockernut Hickory	21.4	21.4	Good	X		
852	White Oak	18.1	18.1	Fair	X		A few dead and broken limbs
853	Northern Red Oak	21.6	21.6	Poor	X		High amount of dieback, large dead and broken limbs, and rot throughout
854	Mockernut Hickory	11.5	11.5	Good	X		
855	Tulip Poplar	18.0	18.0	Fair	X		Co-dominant stems, included bark, and several small dead and broken limbs
856	Tulip Poplar	8.0	8.0	Fair	X		Dead co-stem, and several small broken limbs
857	Tulip Poplar	9.0	9.0	Good	X		
858	White Oak	10.5	10.5	Fair	X		Lean in growth
859	Mockernut Hickory	21.5	21.5	Good	X		
860	Mockernut Hickory	20.0	20.0	Good	X		
861	Mockernut Hickory	6.3	6.3	Good	X		
862	Mockernut Hickory	7.0	7.0	Good	X		Dead tree hooked onto T-862
863	White Oak	25.5	25.5	Fair	X		Several dead and broken limbs
864	Mockernut Hickory	15.0	15.0	Fair	X		Many broken limbs in lower canopy
865	Northern Red Oak	23.9	23.9	Fair	X		Several dead and broken limbs
866	Tulip Poplar	7.5	7.5	Good	X*		
867	Northern Red Oak	30.0	30.0	Fair	X*		Several dead and broken limbs
868	Mockernut Hickory	8.5	8.5	Good	X		
869	Tulip Poplar	18.5	18.5	Good	X		
870	Mockernut Hickory	9.7	9.7	Good			
871	Mockernut Hickory	8.2	8.2	Good			
872	Northern Red Oak	18.9	18.9	Fair			Several large dead and broken limbs
873	White Oak	12.4	12.4	Fair			Co-dominant stems, and a few small dead limbs
874	Tulip Poplar	7.5	7.5	Good			
875	Tulip Poplar	7.0	7.0	Fair			Co-dominant stems, and one large dead limb
876	White Oak	12.8	12.8	Fair			Many watersprouts
877	Tulip Poplar	11.0	11.0	Fair			Co-dominant stems
878	White Oak	14.0	14.0	Fair	X		Several dead and broken limbs
879	Dead	-	-	-	X		
880	White Oak	20.0	20.0	Fair	X*		Co-dominant stems, and a few dead and broken limbs
881	Mockernut Hickory	21.5	21.5	Fair	X		Lean in growth, and several dead and broken limbs
882	Mockernut Hickory	7.9	7.9	Good	X		
883	Mockernut Hickory	15.0	15.0	Fair	X		Several dead and broken limbs, and vines in canopy
884	American Elm	6.8	6.8	Fair	X		A few dead and broken limbs
885	Tulip Poplar	12.8	12.8	Fair	X		Crooked trunk, and a few dead and broken limbs
886	White Oak	8.5	8.5	Fair	X		Several dead and broken limbs, and dense vines in canopy
887	Mockernut Hickory	15.8	15.8	Fair	X		Co-dominant stems, and several small broken limbs
888	Mockernut Hickory	9.5	9.5	Good	X		Vines on trunk
889	Tulip Poplar	10.0	10.0	Fair	X		Vines up trunk
890	Tulip Poplar	12.0	12.0	Good	X		
891	Tulip Poplar	29.0	29.0	Poor	X		Several large dead and broken limbs
892	Tulip Poplar	16.5	16.5	Fair	X		Crooked trunk
893	Tulip Poplar	26.0	26.0	Fair	X		A few dead and broken limbs
894	American Elm	6.3	6.3	Good	X		
895	Mockernut Hickory	6.4	6.4	Good	X		
896	Mockernut Hickory	7.8	7.8	Fair/Poor	X		Cavity in trunk
897	Mockernut Hickory	10.5	10.5	Fair	X		Several dead and broken limbs
898	Tulip Poplar	22.5	22.5	Good	X		
899	Tulip Poplar	20.8	20.8	Good	X		Crooked trunk
900	Tulip Poplar	22.8	22.8	Good	X		

Tree Number	Common Name	Size (inches DBH)	Critical Root Zone (feet)	Condition	Remove	Offsite or Shared	Notes & Arborist Recommendations
901	Tulip Poplar	27.5	27.5	Good	X		
902	Tulip Poplar	6.5	6.5	Good	X		Vines on trunk
903	Cottonwood	11.9	11.9	Fair	X		Crooked trunk, and poor form
904	Mockernut Hickory	12.4	12.4	Poor	X		Cavity in trunk, and poor form
905	Pignut Hickory	8.8	8.8	Good	X		
906	Tulip Poplar	25.3	25.3	Fair	X		Co-dominant stems
907	Tulip Poplar	23.4	23.4	Poor	X		Cavity with weep wounds
908	Dead	-	-	-	X		
909	Black Walnut	9.5	9.5	Fair	X		Poor form, and several dead and broken limbs
910	Pignut Hickory	8.8	8.8	Good	X		
911	White Oak	17.4	17.4	Fair	X		Crooked trunk, and several dead and broken limbs
912	Hackberry	7.5	7.5	Fair	X		Several small dead and broken limbs
913	Black Gum	7.0	7.0	Poor	X		Poor form, many dead and broken limbs, and leaning
914	Black Gum	14.0	14.0	Poor	X		Double trunk, weak crotch, many watersprouts, dead and broken limbs, and dead co-stem
915	Tulip Poplar	14.4	14.4	Fair	X		Poor form, crooked trunk, and several broken limbs
916	Tulip Poplar	12.0	12.0	Poor	X		Cavities throughout, and co-dominant stems
917	Mockernut Hickory	7.5	7.5	Poor	X		Covered in dense vines, and many dead and broken limbs
918	Mockernut Hickory	6.4	6.4	Fair	X		Covered in vines
919	Mockernut Hickory	7.0	7.0	Fair	X		Twisted trunk
920	Mockernut Hickory	10.0	10.0	Poor	X*/**	Shared	Topped, and covered in dense vines
921	American Elm	7.0	7.0	Poor	X*/**	Shared	Partially toped, and covered in dense vines
922	Mockernut Hickory	6.5	6.5	Fair	X		Double trunk, and covered in dense vines
923	Black Cherry	15.5	15.5	Poor			Double trunk, covered in dense vines, and many dead and broken limbs
924	Black Walnut	10.2	10.2	Fair			Covered in vines
925	Black Walnut	8.0	8.0	Fair			Covered in vines
926	Black Walnut	11.5	11.5	Fair			Covered in vines
927	Black Walnut	12.8	12.8	Poor			Large dead and broken limbs, and covered in dense vines
928	Dead	-	-	-	X*		
929	Black Walnut	15.8	15.8	Poor			Large dead and broken limbs, and covered in dense vines
930	Black Walnut	8.2	8.2	Poor			Covered in dense vines, and topped
931	Black Walnut	7.8	7.8	Poor			Covered in dense vines, and topped
932	Black Walnut	7.0	7.0	Poor			Covered in dense vines, and topped
933	Black Walnut	8.5	8.5	Poor			Covered in dense vines, and topped
934	Black Walnut	12.0	12.0	Poor			Poor form, and covered in dense vines
935	Black Walnut	16.0	16.0	Poor			Covered in dense vines, and several cavities throughout
936	Black Walnut	6.8	6.8	Poor			Covered in dense vines, and poor form
937	Black Walnut	7.5	7.5	Poor			Covered in dense vines, and poor form
938	Black Walnut	10.5	10.5	Poor			Covered in dense vines, and poor form
939	Dead	-	-	-	X*		
940	Black Walnut	7.8	7.8	Poor			Covered in dense vines, and poor form
941	Black Walnut	7.5	7.5	Poor			Covered in dense vines, and poor form
942	Black Walnut	23.8	23.8	Poor			Covered in dense vines, large broken limbs, and some dead limbs
943	Dead	-	-	-	X*		Double trunk, covered in dense vines, large broken limbs, and some dead limbs
944	Black Walnut	9.0	9.0	Poor	X*		Topped, and covered in dense vines
945	Black Walnut	6.0	6.0	Poor	X*		Topped, and covered in dense vines
946	Kwanzan Cherry	10.0	10.0	Poor	X*		Poor form, covered in dense vines, and uprooting
947	Black Walnut	8.5	8.5	Poor	X*		Co-dominant stems, covered in dense vines, and partially topped
948	Red Maple	6.5	6.5	Fair	X		Crooked trunk, and vines on trunk
949	Red Maple	11.5	11.5	Fair	X		Covered in dense vines, and several dead and broken limbs
950	Black Cherry	8.3	8.3	Fair	X		Crooked trunk, and covered in dense vines
951	Red Maple	13.1	13.1	Fair	X		Double trunk, dead and broken limbs, and vines in canopy
952	Red Maple	11.7	11.7	Fair	X		Double trunk, included bark, and vines in canopy
953	Black Locust	10.2	10.2	Poor	X*		Topped, and covered in vines
954	Black Locust	12.0	12.0	Fair			Covered in dense vines
955	Pignut Hickory	6.0	6.0	Good			Co-dominant stems
956	American Sycamore	9.0	9.0	Good			Lean in growth
957	Tulip Poplar	24.5	24.5	Fair			Vines on trunk, and a few dead and broken limbs
958	American Sycamore	15.0	15.0	Good	X*		
959	Pignut Hickory	7.5	7.5	Good	X		Vines on trunk
960	Tulip Poplar	6.5	6.5	Poor	X		Cavity in base, and dense vines up truck
961	Tulip Poplar	10.8	10.8	Fair	X		Vines on trunk
962	Tulip Poplar	16.5	16.5	Good	X		
963	Tulip Poplar	20.0	20.0	Good	X		
964	Tulip Poplar	20.5	20.5	Good	X		
965	American Sycamore	23.0	23.0	Good	X		
966	Tulip Poplar	20.0	20.0	Fair	X		Co-dominant stems
967	Tulip Poplar	14.0	14.0	Good	X		
968	Tulip Poplar	10.0	10.0	Fair	X		Covered in dense vines
969	Tulip Poplar	10.0	10.0	Fair	X		Poor form
970	Tulip Poplar	7.0	7.0	Fair	X		Poor form
971	Tulip Poplar	21.0	21.0	Fair	X		A few dead and broken limbs
972	Red Maple	7.5	7.5	Fair	X		Poor form, and vines up trunk
973	Tulip Poplar	17.0	17.0	Good	X		
974	Tulip Poplar	27.8	27.8	Fair	X		Co-dominant stems
975	Red Maple	7.0	7.0	Good	X		
976	Dead	-	-	-	X		
977	Tulip Poplar	8.0	8.0	Fair	X		Covered in dense vines
978	Pignut Hickory	7.1	7.1	Good	X		
979	Pignut Hickory	7.2	7.2	Good	X		
980	Tulip Poplar	17.0	17.0	Good	X		
981	Tulip Poplar	20.0	20.0	Fair	X		Co-dominant stems
982	American Sycamore	7.0	7.0	Good	X		
983	American Sycamore	18.5	18.5	Good	X		
984	Tulip Poplar	28.0	28.0	Fair	X		Dense vines in canopy
985	Dead	-	-	-	X		
986	Tulip Poplar	9.0	9.0	Fair	X		A few dead and broken limbs
987	American Sycamore	30.0	30.0	Fair	X		Covered in dense vines, a few broken limbs, and shallow roots
988	Tulip Poplar	11.0	11.0	Good	X		Vines up trunk
989	Tulip Poplar	22.5	22.5	Fair	X		Co-dominant stems
990	Tulip Poplar	36.8	36.8	Fair	X		Double trunk, covered in dense vines, and some broken limbs
991	Dead	-	-	-	X		
992	American Sycamore	20.7	20.7	Fair	X		Covered in dense vines
993	Tulip Poplar	21.2	21.2	Fair	X		Co-dominant stems, and vines up trunk
994	Tulip Poplar	22.5	22.5	Fair	X		Co-dominant stems, and vines up trunk
995	Tulip Poplar	13.5	13.5	Good	X		Vines on trunk
996	Tulip Poplar	13.7	13.7	Good	X		Vines on trunk
997	Tulip Poplar	17.0	17.0	Good	X		Vines on trunk
998	Tulip Poplar	16.3	16.3	Fair	X		Covered in dense vines, and some broken limbs
999	Tulip Poplar	9.5	9.5	Fair	X		Covered in dense vines, and some broken limbs
1000	Tulip Poplar	13.8	13.8	Fair	X		Co-dominant stems

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BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON

EXISTING VEGETATION INVENTORY

REVISIONS

DATE	COMMENTS

SHEET 11 OF 11

SCALE: NTS

PROJECT DATE: 04/05/22

DRAFT: EPW | CHECK: AMS

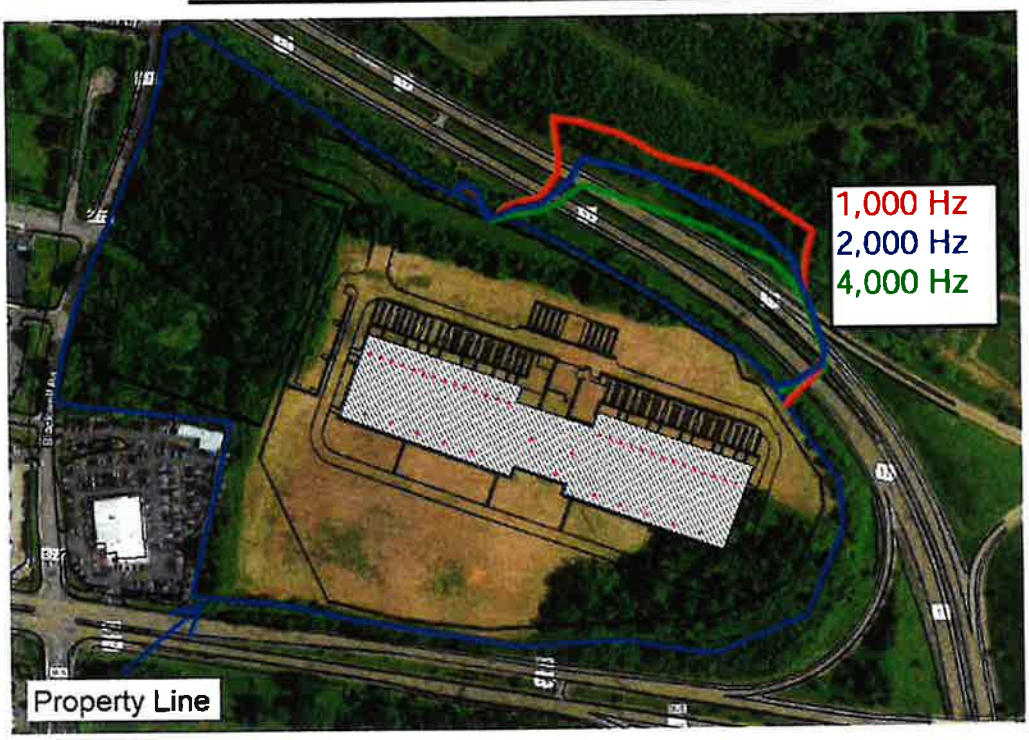
FILE NUMBER: 2724

Exhibits 4 and 5

Town Limits

Limit	Correction	63	125	250	500	1000	2000	4000	8000
Base Limits	n/a	72	70	65	59	55	51	47	44
Daytime	-5 R-District	67	65	60	54	50	46	42	39
Nighttime	-5 R-District -5 10pm-7am	62	60	55	49	45	41	37	34
Daytime Industrial	n/a	72	70	65	59	55	51	47	44
Nighttime Industrial	**-5 10pm-7am**	**67**	**65**	**60**	**54**	**50**	**46**	**42**	**39**
Generator	-5 R-District +5 20% of 1 hr	72	70	65	59	55	51	47	44

Locations Exceeding at Property Line



- Noise Levels
  - Noise from chillers will exceed town limit @ 1,000 – 4,000 Hz at northeast property line for nighttime limits.
  - All other frequencies will be contained within the property line.
  - Daytime limits at all frequencies will be contained within the property line.
- Impact
  - Impact is not possible on Route 17, as there is no one to hear noise.
  - For Industrial land impacted, noise will be equal to traffic noise (per measurements at site).
- Mitigation
  - Either involves a roof barrier taller than equipment (~16-20' tall) or baffles incorporated into sheaths, which would impact airflow.

Summary

- Daytime Model
  - Will exceed town limit @ 1,000 – 4,000 Hz northeast of Route 17, but there is not residential present.
  - Town limit shown to be met.
- Nighttime Model
  - Will exceed town limit @ 500 – 4,000 Hz northeast of Route 17, but there is not residential present.
  - Town limit shown to be met.
- Generator
  - Town limit shown to be met.
- Measurements
  - All measurements in residential areas shown to meet Town Limit. M3 (north of site) is the loudest, but is not impacting residences.
  - M1
    - Data center quieter than background noise except during evening hours.
    - Quieter than town limit except for 2,000 Hz by 1 dB.
  - M2
    - Data center quieter than background noise except during evening hours.
    - Quieter than town limit except for 1,000 – 2,000 Hz, by 1 dB.
  - M3
    - For low frequencies, quieter except during evening hours. For mid to high frequencies, equal to or higher background noise.
    - Quieter than town limit except for 1,000 – 4,000 Hz, by 9 dB.
  - M4
    - Data center quieter than background noise.
    - Quieter than town limit.
  - M5
    - For low frequencies, quieter except during evening hours.
    - Quieter than town limit.

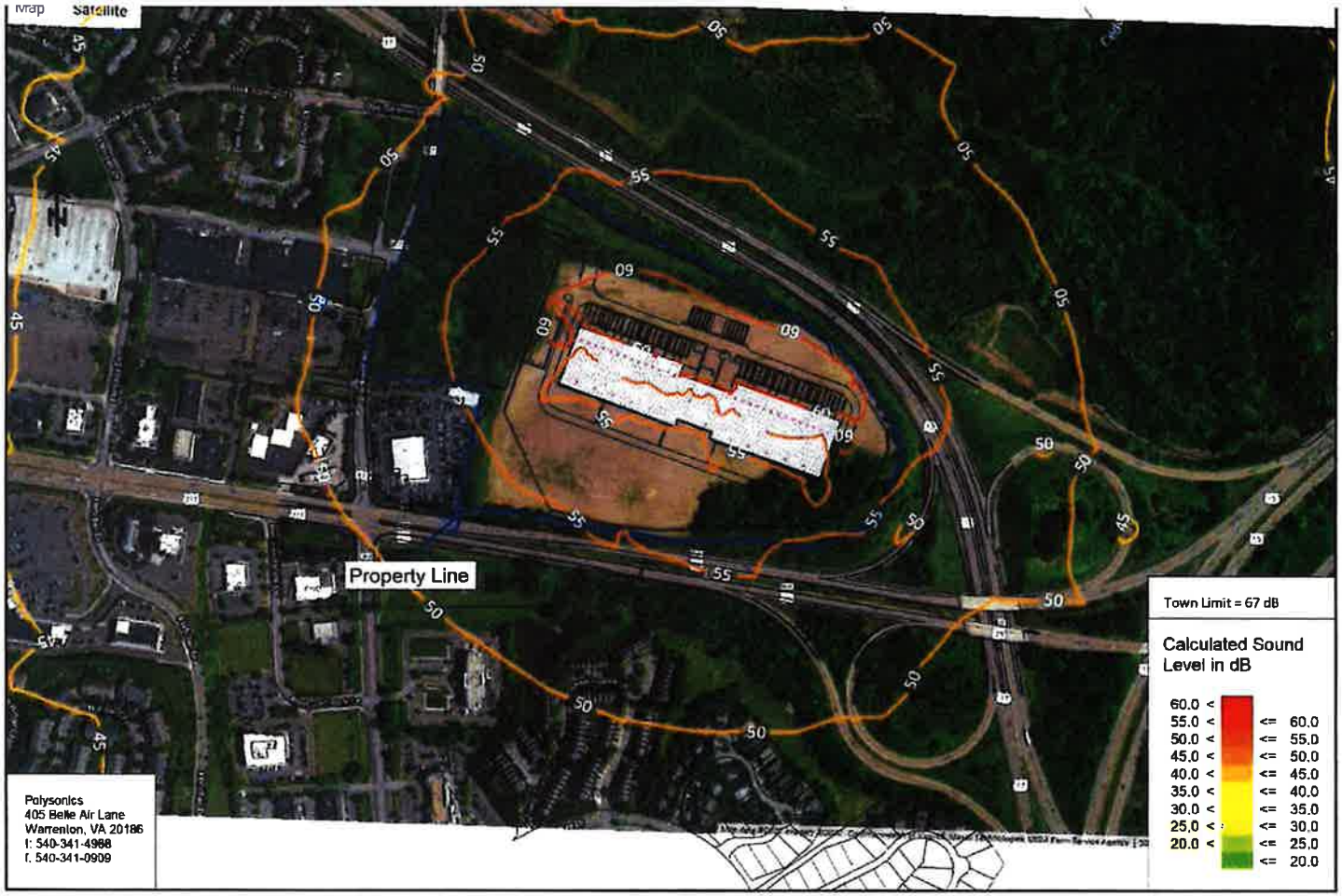
Town Limits

Limit	Correction	63	125	250	500	1000	2000	4000	8000
Base Limits	n/a	72	70	65	59	55	51	47	44
Daytime	-5 R-District	67	65	60	54	50	46	42	39
Nighttime	-5 R-District -5 10pm-7am	62	60	55	49	45	41	37	34
Generator	-5 R-District +5 20% of 1 hr	72	70	65	59	55	51	47	44

Daytime Model

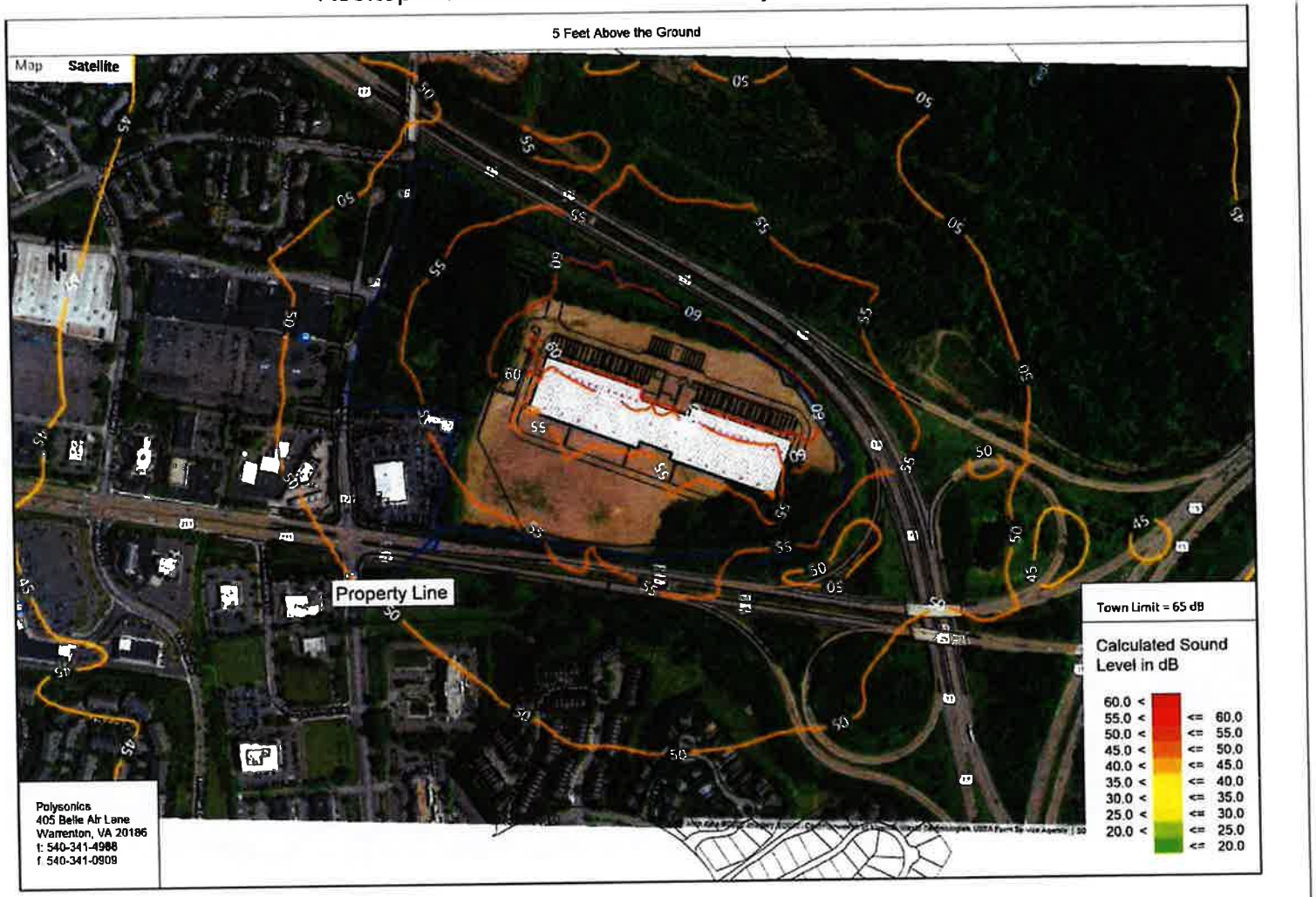
Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 63 Hz



Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 125 Hz

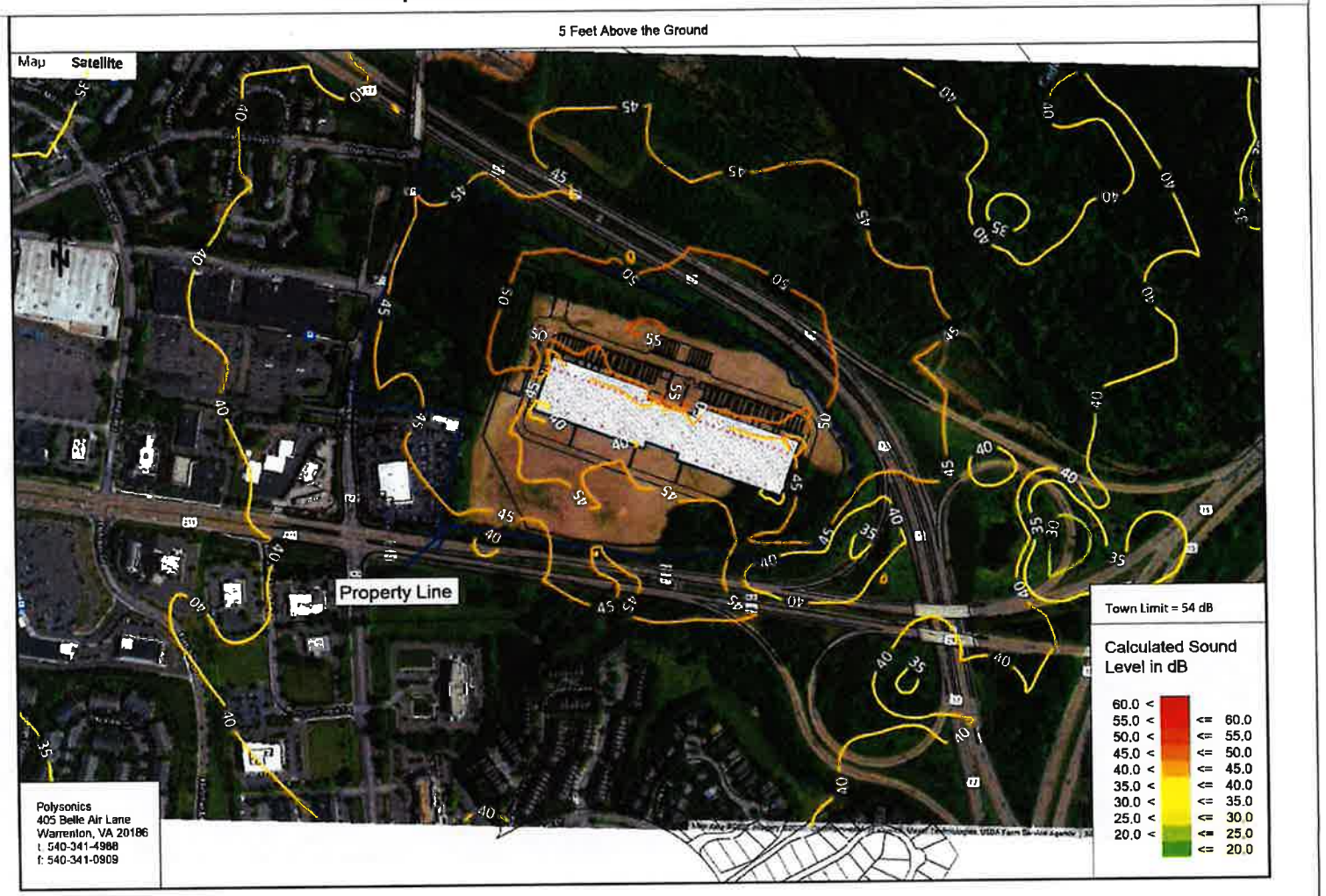


Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 250 Hz

Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 500 Hz

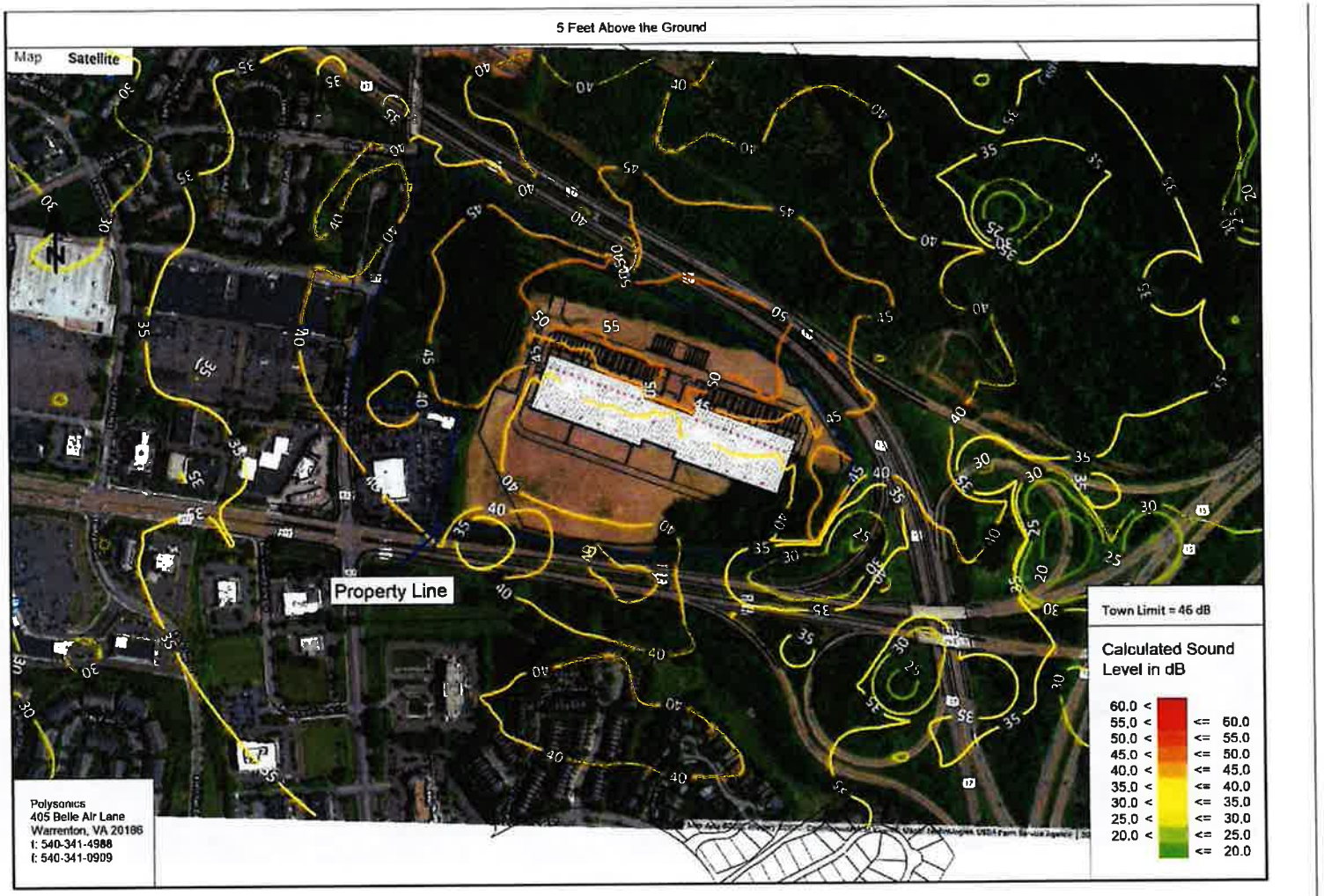


Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 1000 Hz

Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 2000 Hz



Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 4000 Hz

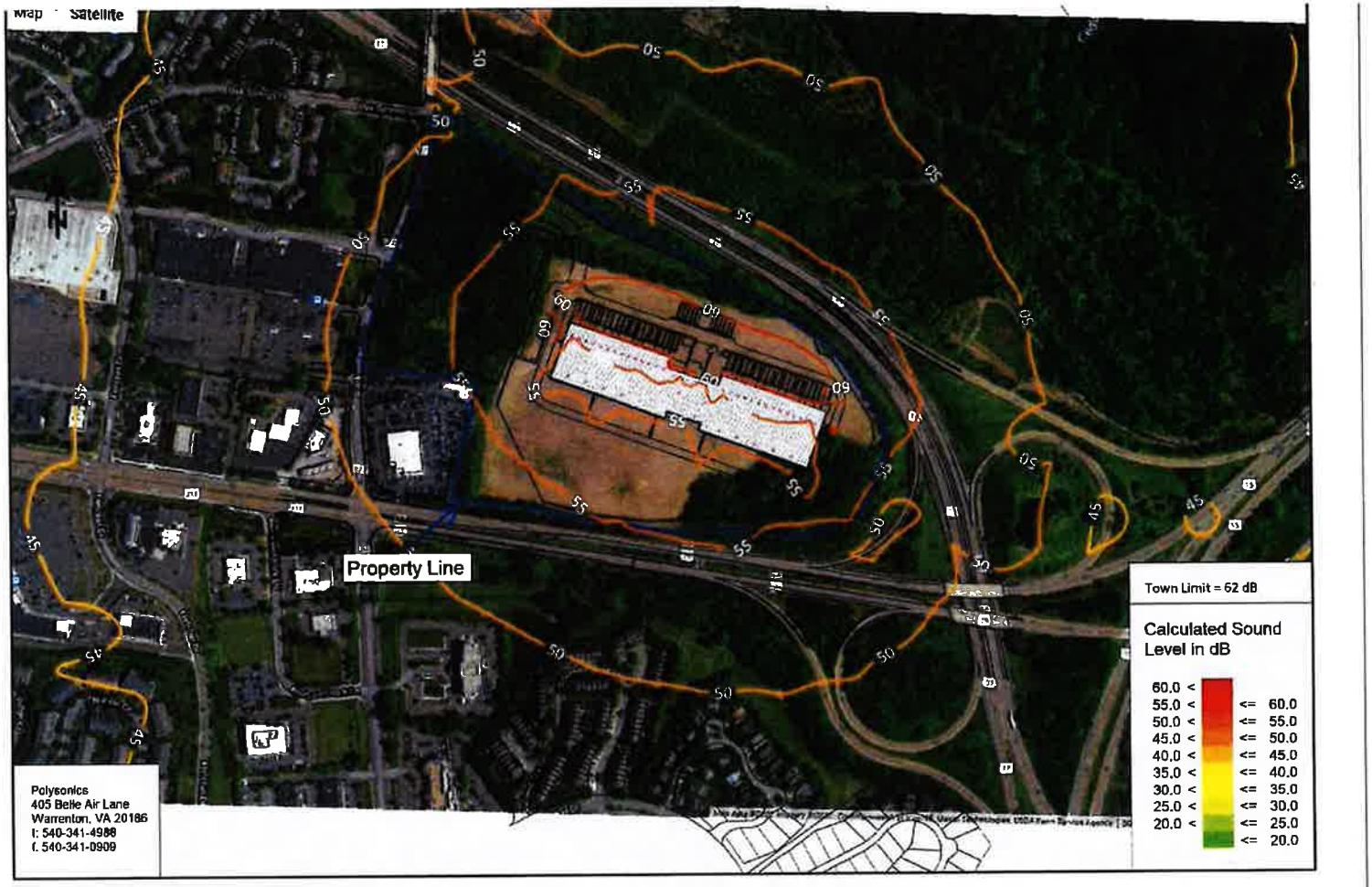
Warrenton Data Center

Rooftop Mechanical Noise Levels Daytime - 8000 Hz

Nighttime Model

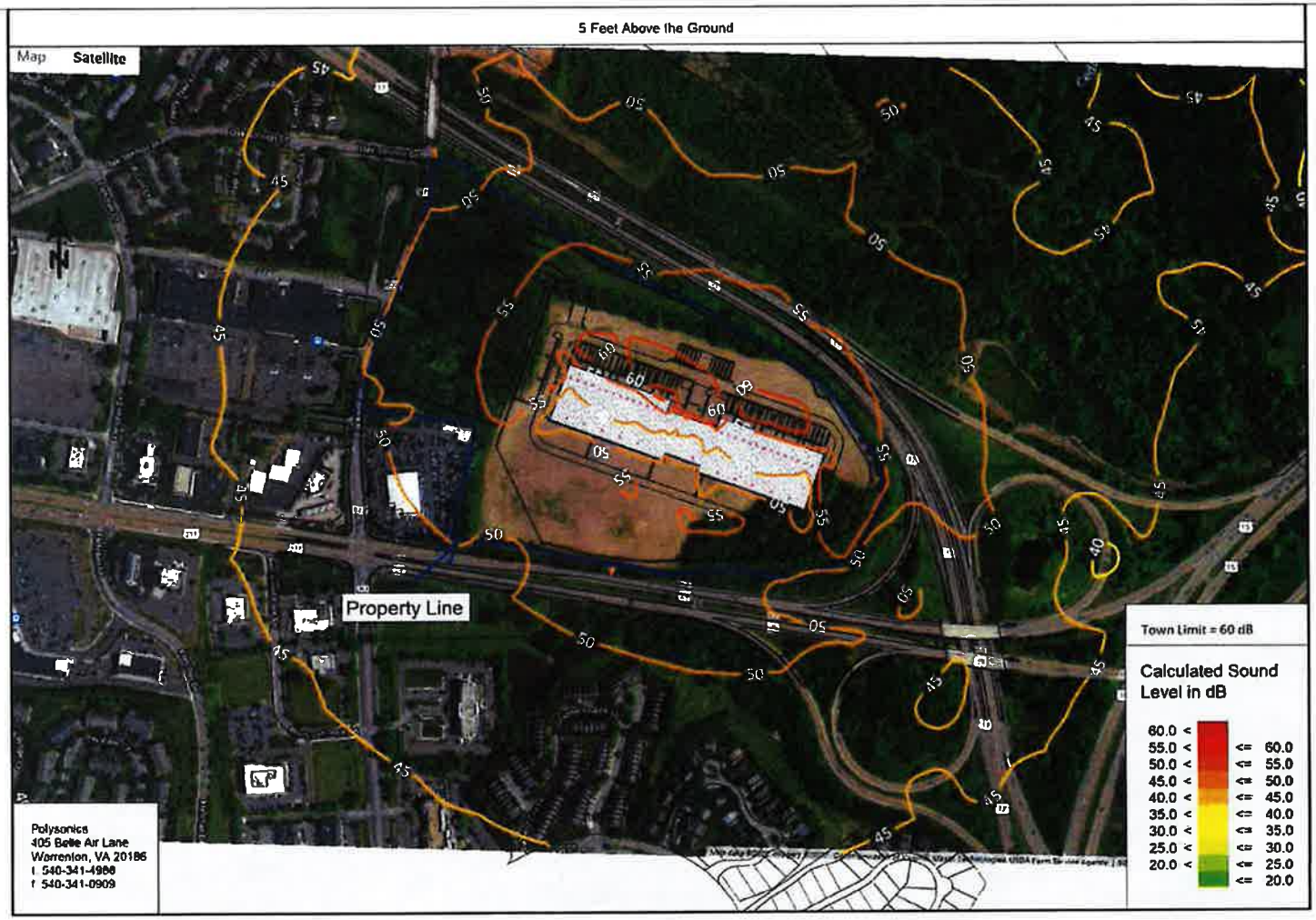
Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 63 Hz



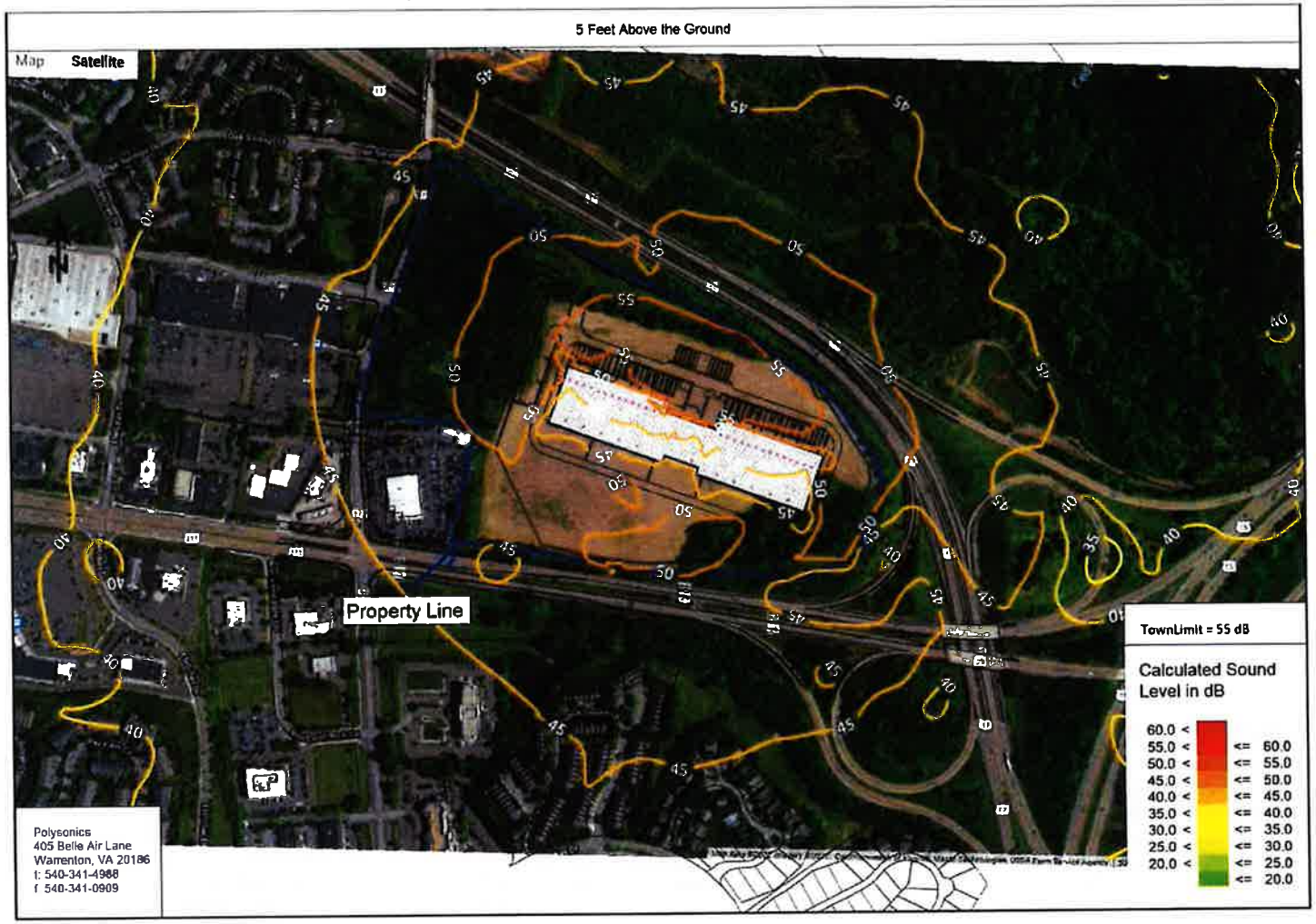
Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 125 Hz



Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 250 Hz

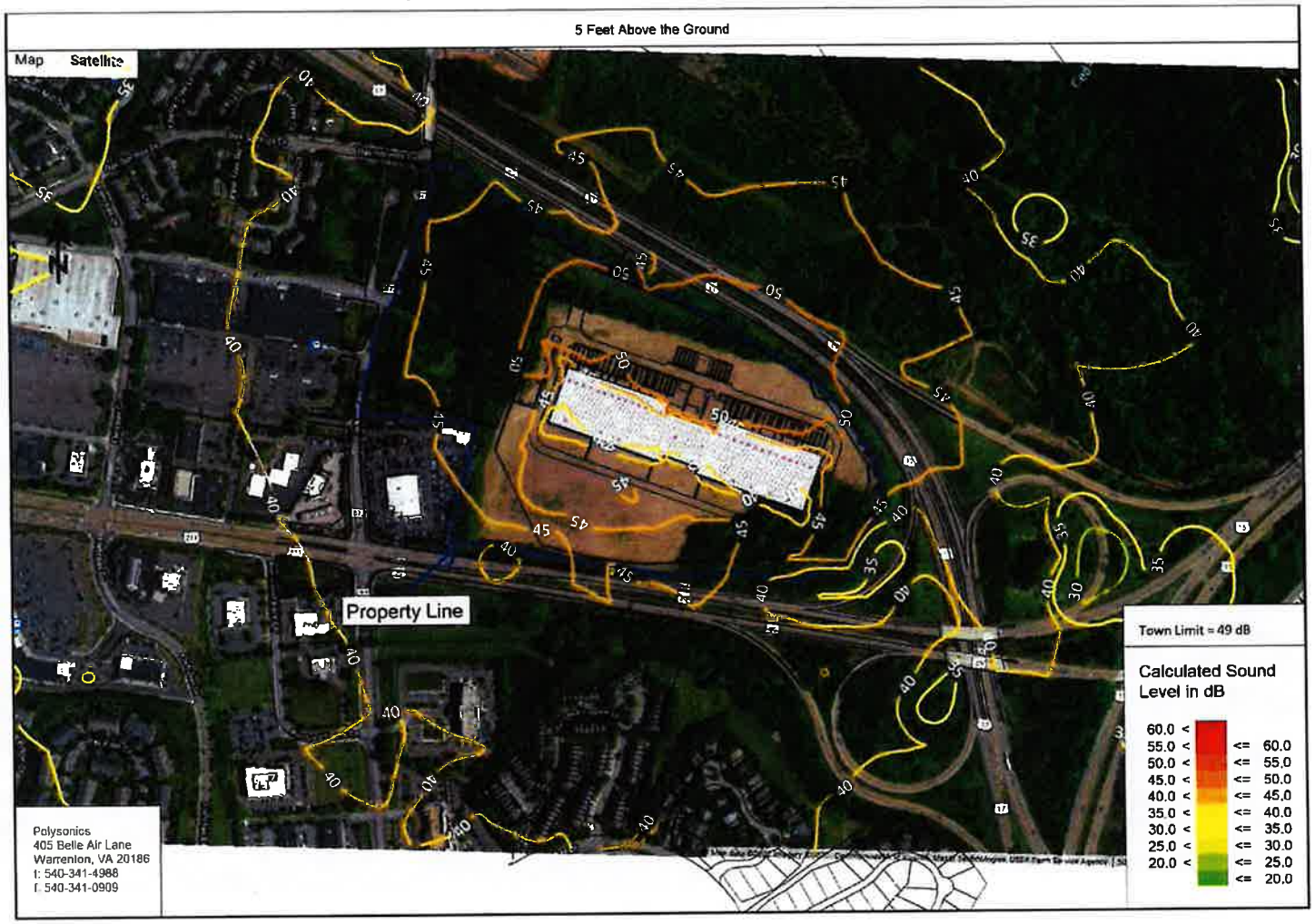


Adjacent Property Owners List
Generated and Reviewed with PWC Real Estate Assessments Website on August 26, 2022

idx	Identifier	PropAdd1	PropAdd2	MailTo1	MailTo2	MailTo3	MailAdd1	MailAdd2	Source
1	7397-84-4736	13000 GATEWAY CEN	GAINESVILLE, VA	LOWES HOME CENTERS INC ATTN: SR VICE PRES C			1000 LOWI	MOORESV	Prince William County
2	7397-93-1744	7450 LIMESTONE DR	GAINESVILLE, VA	VGCC LC			12500 FAIF	FAIRFAX, V	Prince William County
3	7497-03-0650.00	7475 LIMESTONE DR	GAINESVILLE, VA	UNIT OWNERS GATEWAY CROSSING RETAIL CONI			12500 FAIF	FAIRFAX, V	Prince William County
4	7397-93-8571.00	7481 LIMESTONE DR	GAINESVILLE, VA	GATEWAY CENTER LC			12500 FAIF	FAIRFAX, V	Prince William County
5	7497-03-0758.00	7485 LIMESTONE DR	GAINESVILLE, VA	FAUQUIER BANK			10 COURTI	WARRENT	Prince William County
6	7397-93-8854.00	7489 LIMESTONE DR	GAINESVILLE, VA	H3L1 INVESTMENT LLC ATTN KYUNG SIN LEE & LE			14256-A W	CENTREVIL	Prince William County
7	7397-94-3859	5291 WELLINGTON BR	GAINESVILLE, VA	GATEWAY BRANCH OUTDOORS LC			12500 FAIF	FAIRFAX, V	Prince William County
8	7397-93-0796	5300 WELLINGTON BR	GAINESVILLE, VA	DTE WSSI FACILITY LLC C/O THE DAVEY TREE EXPE			1500 N MA	KENT, OH	Prince William County
9	7397-94-5516	5351 WELLINGTON BR	GAINESVILLE, VA	GATEWAY BRANCH LC			12500 FAIF	FAIRFAX, V	Prince William County
10	7497-04-1151	5399 WELLINGTON BR	GAINESVILLE, VA	NORTHERN VIRGINIA ELECTRIC COOP PLANT ACC			PO BOX 27	MANASSA	Prince William County
1	Gateway Crossing Retail C	12500 Fair Lake Circle	Fairfax, VA 22033	Gateway Crossing Retail CUO			12500 Fair	Fairfax, VA	Planned Development District
				Walsh, Colucci, Lubeley & Walsh, P.C. (c/o Jessica Pfeiffer)			4310 Princ	Prince William, VA 22192	

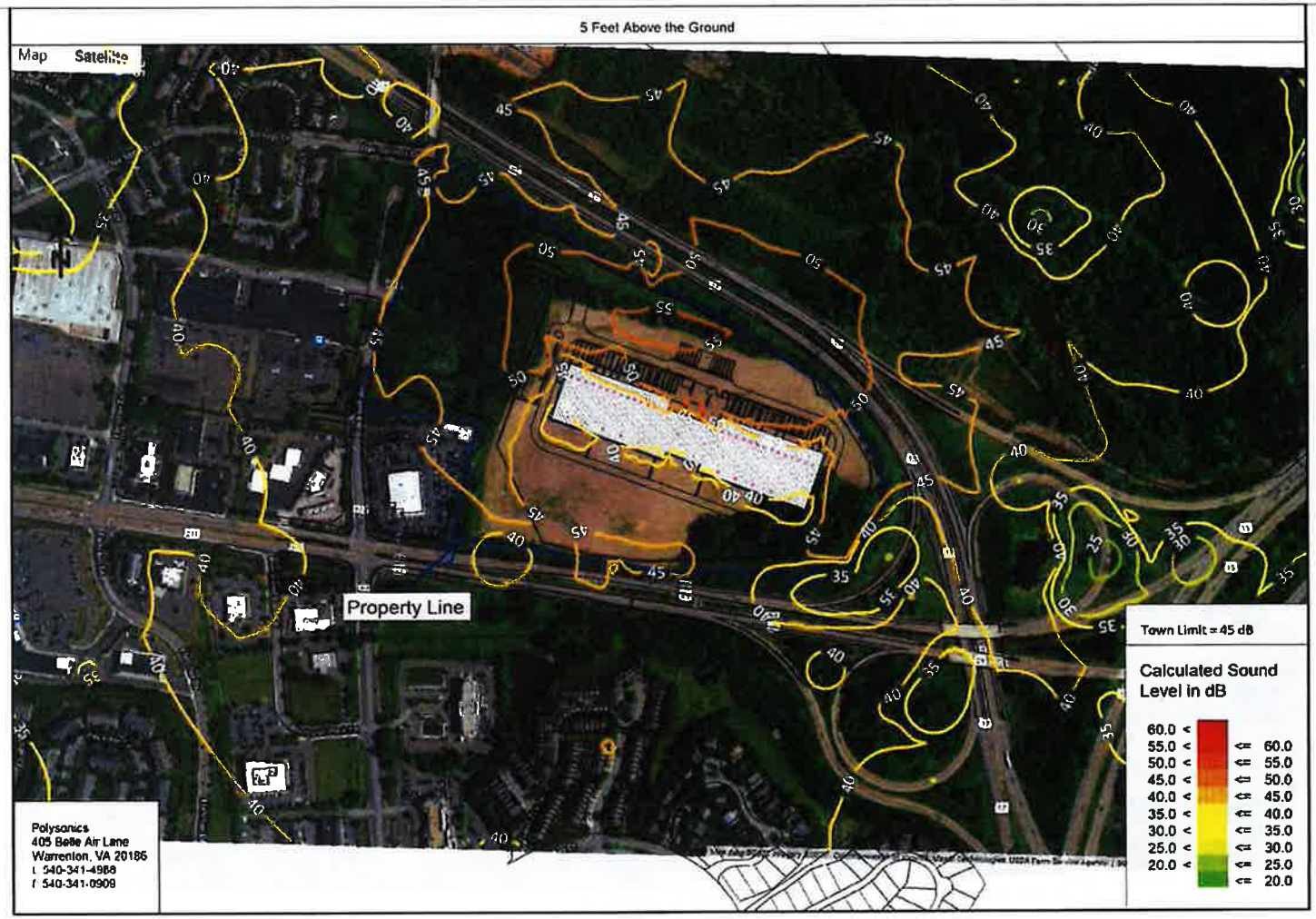
Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 500 Hz



Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 1000 Hz



Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 2000 Hz

Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 4000 Hz

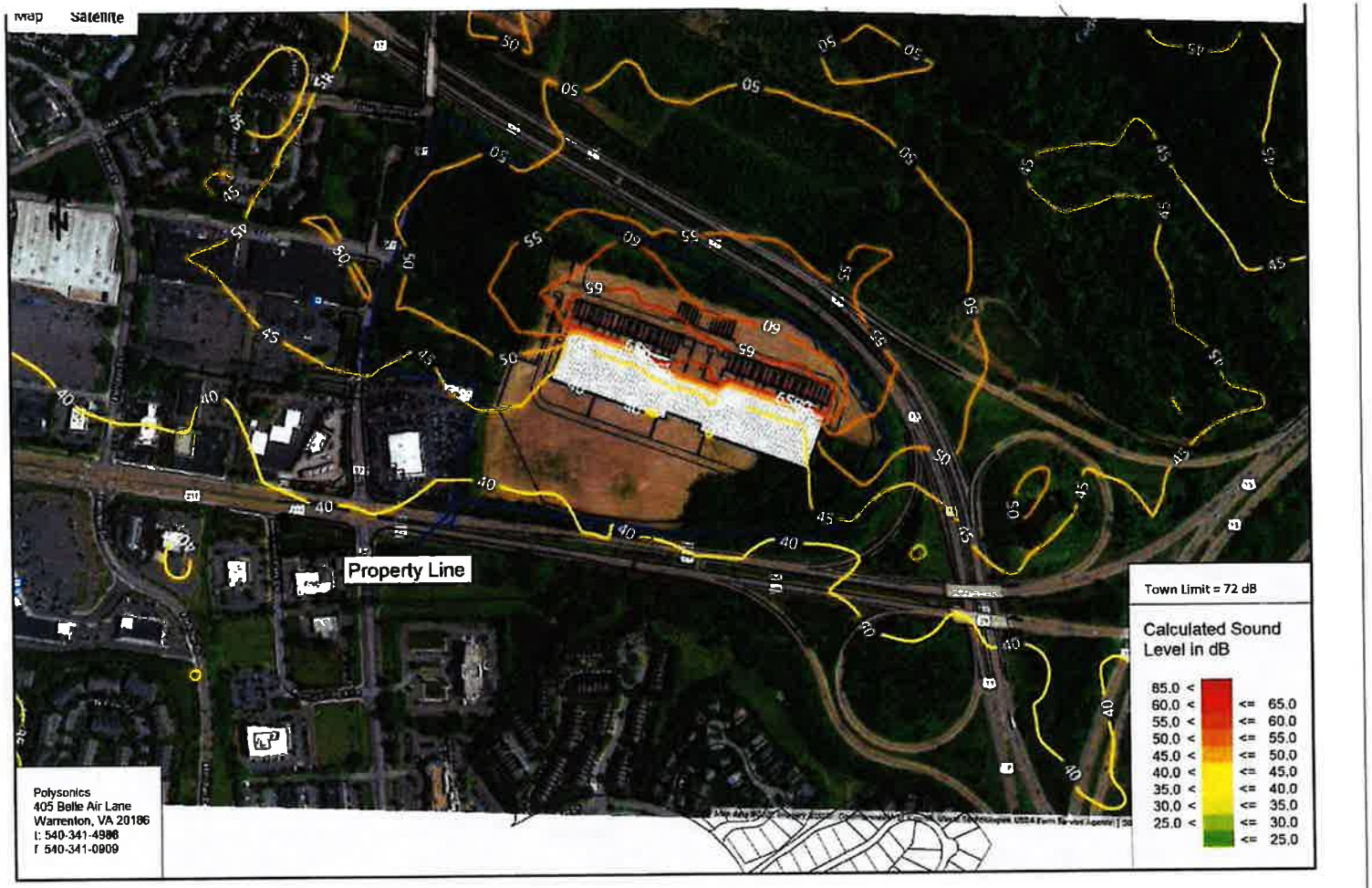
Warrenton Data Center

Rooftop Mechanical Noise Levels Nighttime - 8000 Hz

Generator Model

Warrenton Data Center

Generator Noise Levels - 63 Hz



Warrenton Data Center

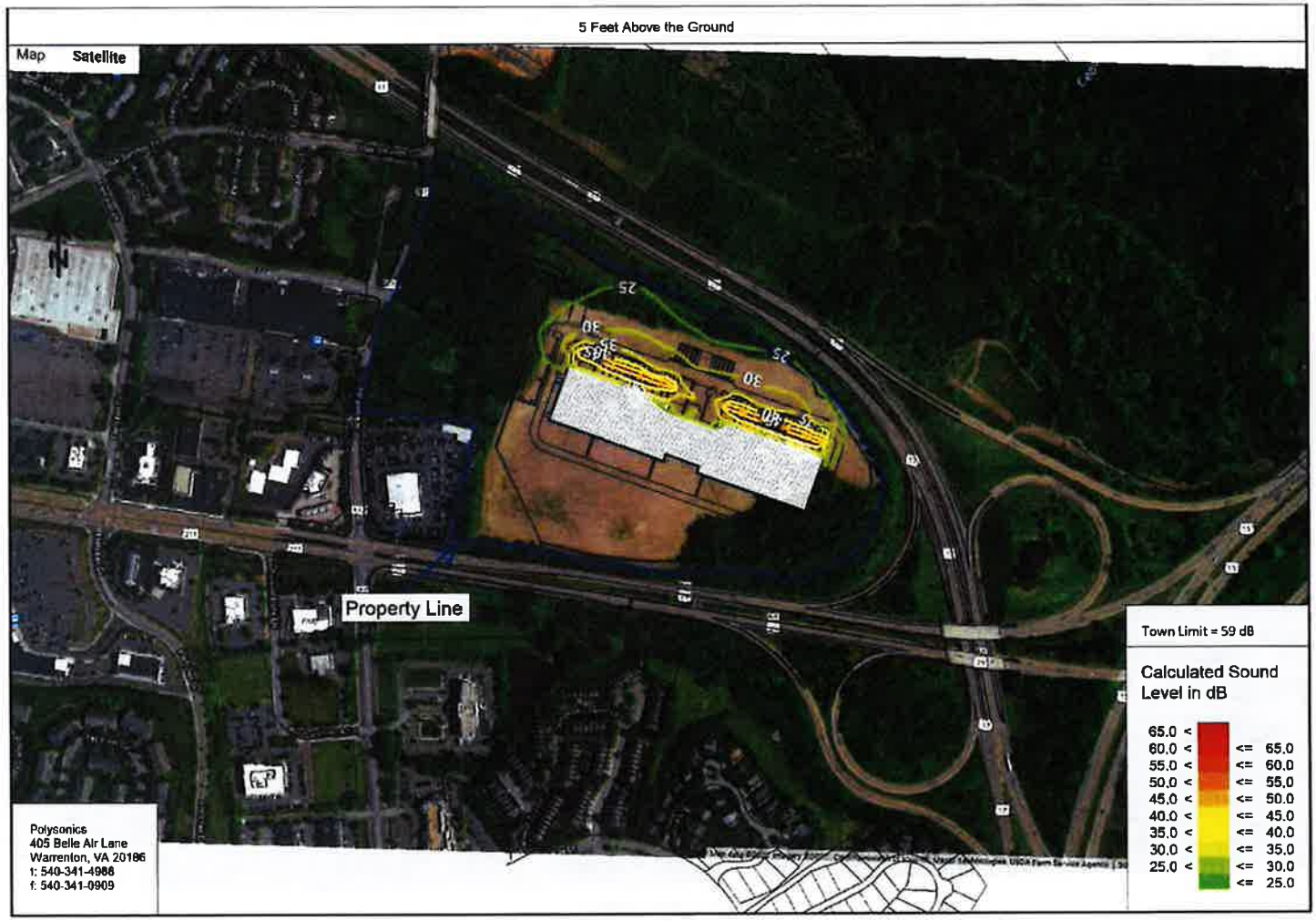
Generator Noise Levels - 125 Hz

Warrenton Data Center

Generator Noise Levels - 250 Hz

Warrenton Data Center

Generator Noise Levels - 500 Hz

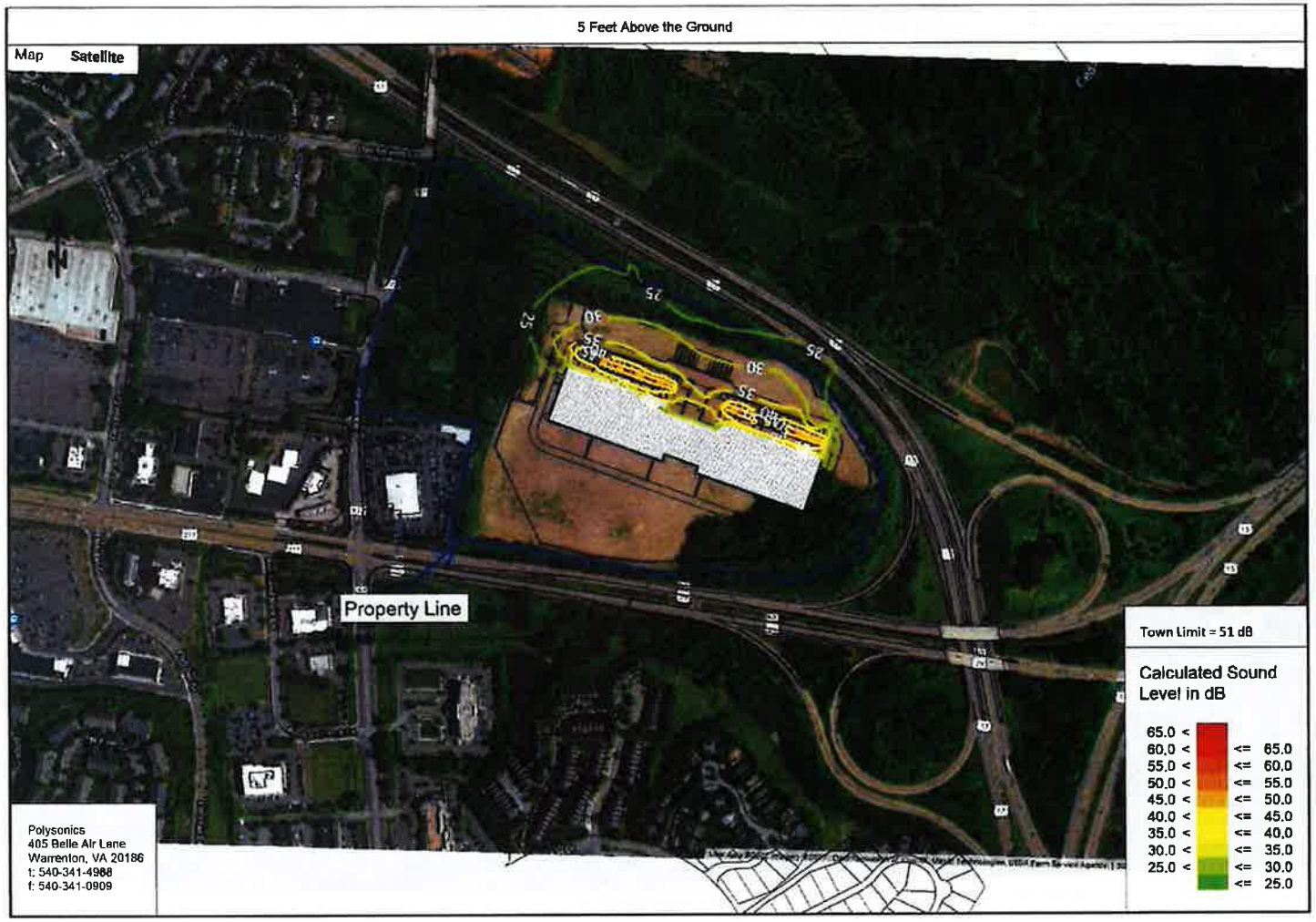


Warrenton Data Center

Generator Noise Levels - 1000 Hz

Warrenton Data Center

Generator Noise Levels - 2000 Hz



Warrenton Data Center

Generator Noise Levels - 4000 Hz

Warrenton Data Center

Generator Noise Levels - 8000 Hz

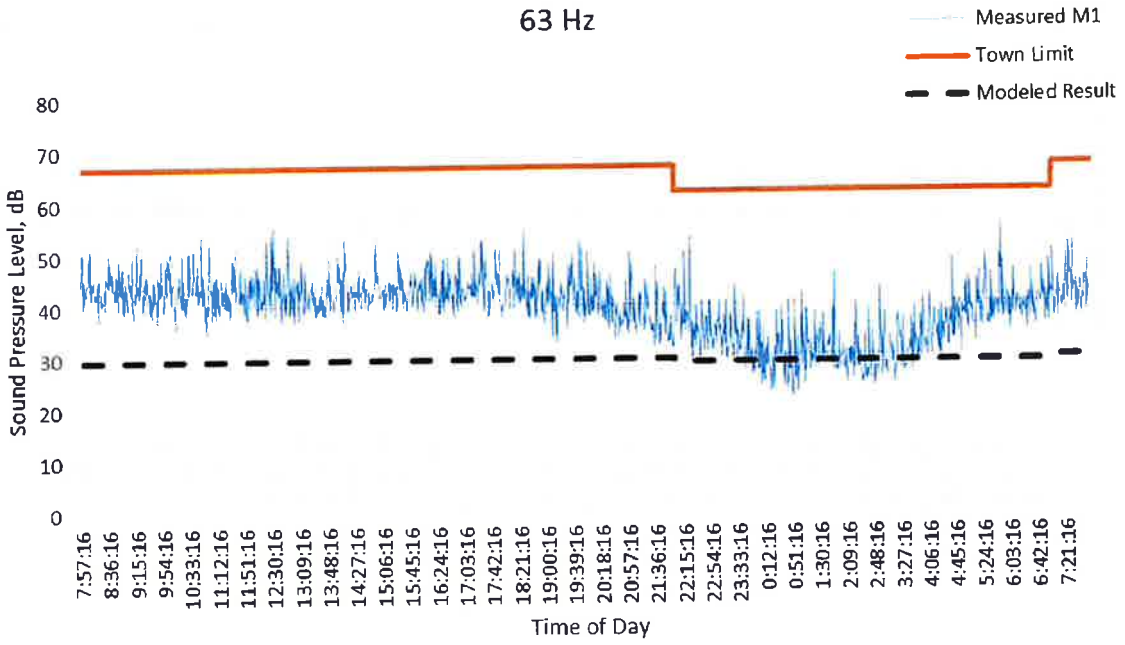
Measurement Map

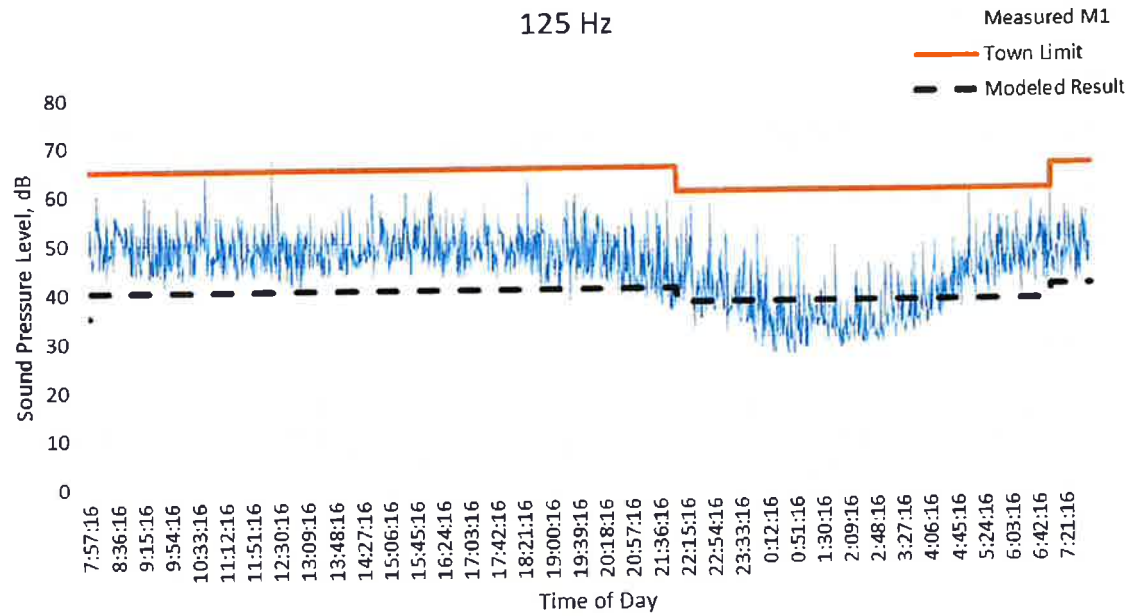

CM1
CM2
CM3
CM4
CM5
Google Earth

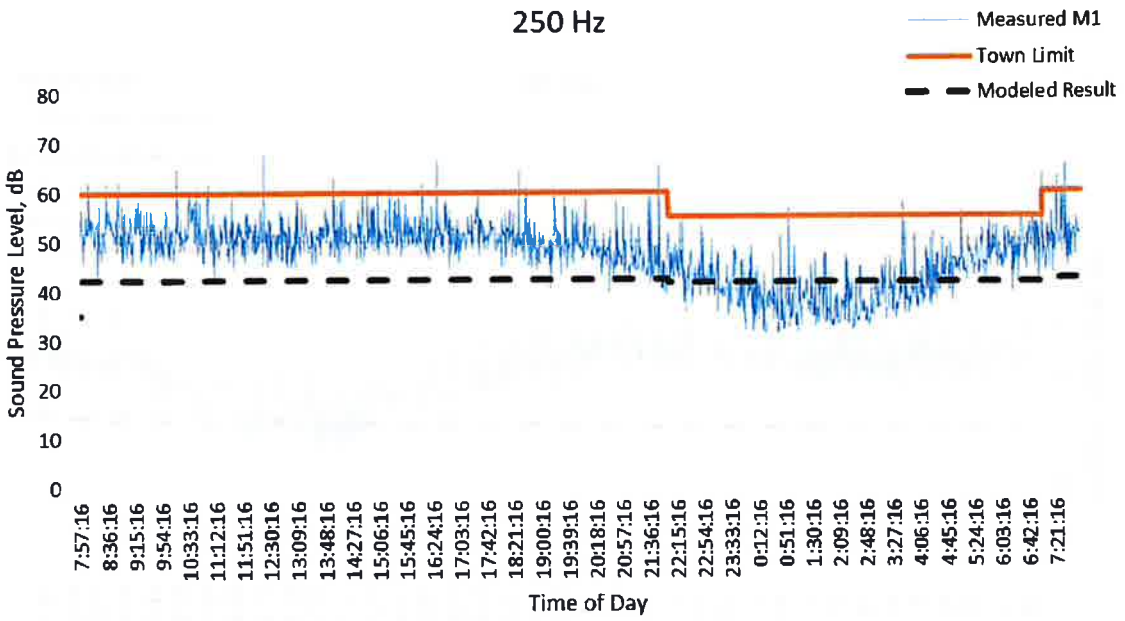
Measurement Summary

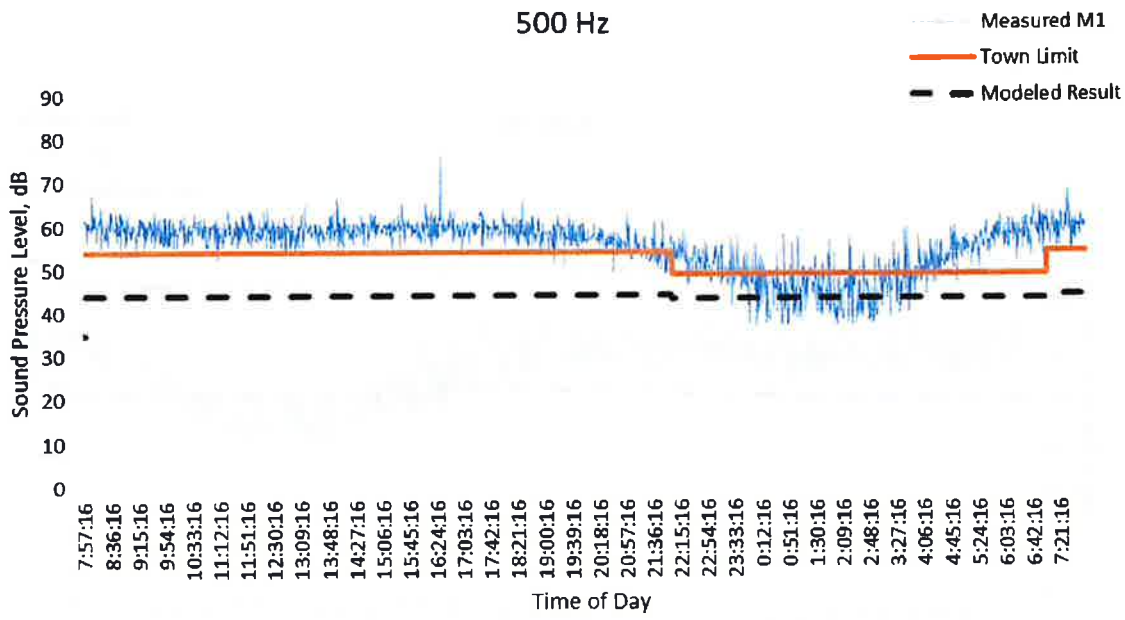
Loc.	Day/ Night	Data	63	125	250	500	1000	2000	4000	8000
M1	Day	Lowest Measured	32	35	40	48	58	52	38	25
		Town Limit	67	65	60	54	50	46	42	39
		SoundPlan	30	40	42	44	48	44	39	17
	Night	Lowest Measured	22	26	31	36	36	28	24	19
		Town Limit	62	60	55	49	45	41	37	34
		SoundPlan	29	37	42	43	**46**	**42**	36	17
M2	Day	Lowest Measured	32	36	34	40	49	46	37	24
		Town Limit	67	65	60	54	50	46	42	39
		SoundPlan	27	38	40	42	47	44	39	16
	Night	Lowest Measured	23	27	27	32	32	23	25	19
		Town Limit	62	60	55	49	45	41	37	34
		SoundPlan	26	35	39	41	**46**	**42**	36	16
M3	Day	Lowest Measured	28	35	34	38	42	37	32	20
		Town Limit	67	65	60	54	50	46	42	39
		SoundPlan	32	45	46	49	**55**	**52**	**48**	32
	Night	Lowest Measured	22	30	31	33	34	32	31	19
		Town Limit	62	60	55	49	45	41	37	34
		SoundPlan	31	42	45	48	**53**	**50**	**45**	32
M4	Day	Lowest Measured	30	37	41	45	53	50	42	26
		Town Limit	67	65	60	54	50	46	42	39
		SoundPlan	25	37	38	41	47	43	35	3
	Night	Lowest Measured	22	30	33	34	35	26	37	19
		Town Limit	62	60	55	49	45	41	37	34
		SoundPlan	24	34	38	41	45	41	32	3
M5	Day	Lowest Measured	27	28	31	37	42	37	30	20
		Town Limit	67	65	60	54	50	46	42	39
		SoundPlan	23	34	37	39	44	42	32	0
	Night	Lowest Measured	22	25	28	29	29	27	23	19
		Town Limit	62	60	55	49	45	41	37	34
		SoundPlan	23	31	36	38	43	40	30	0

M1 Results


63 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
20:18:16
20:57:16
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


125 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
20:18:16
20:57:16
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


250 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
20:18:16
20:57:16
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


500 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
90
80
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
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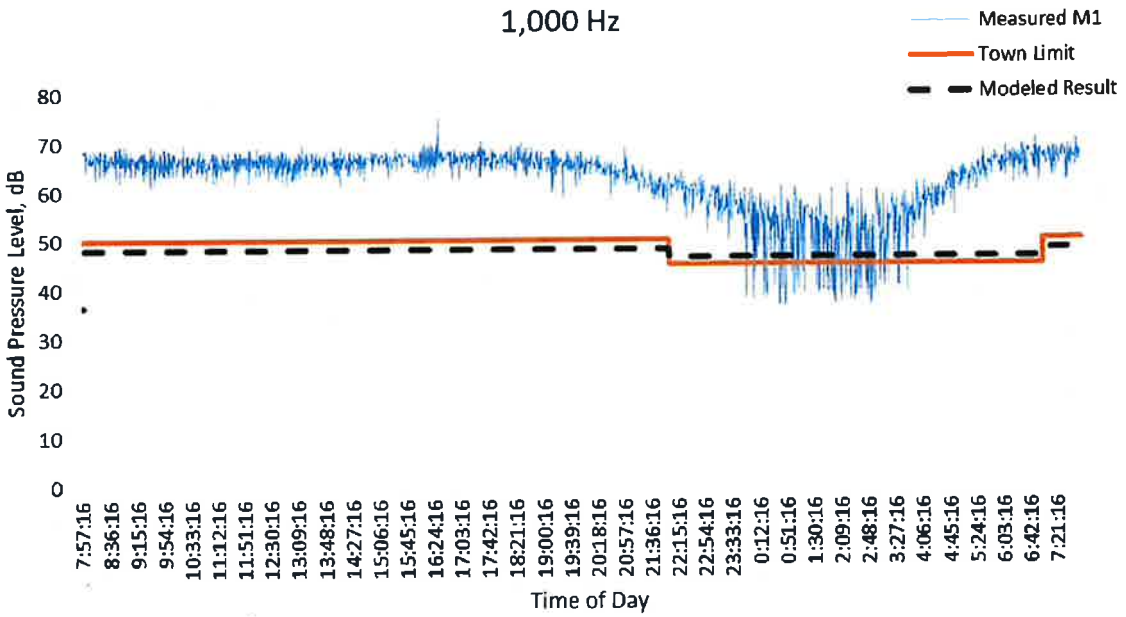
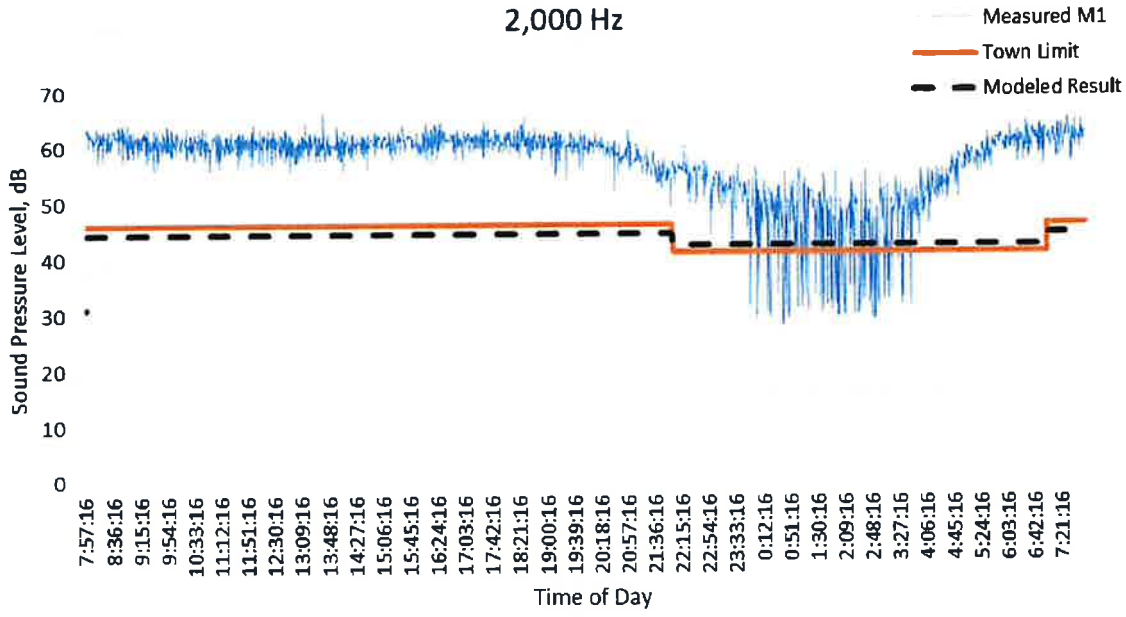
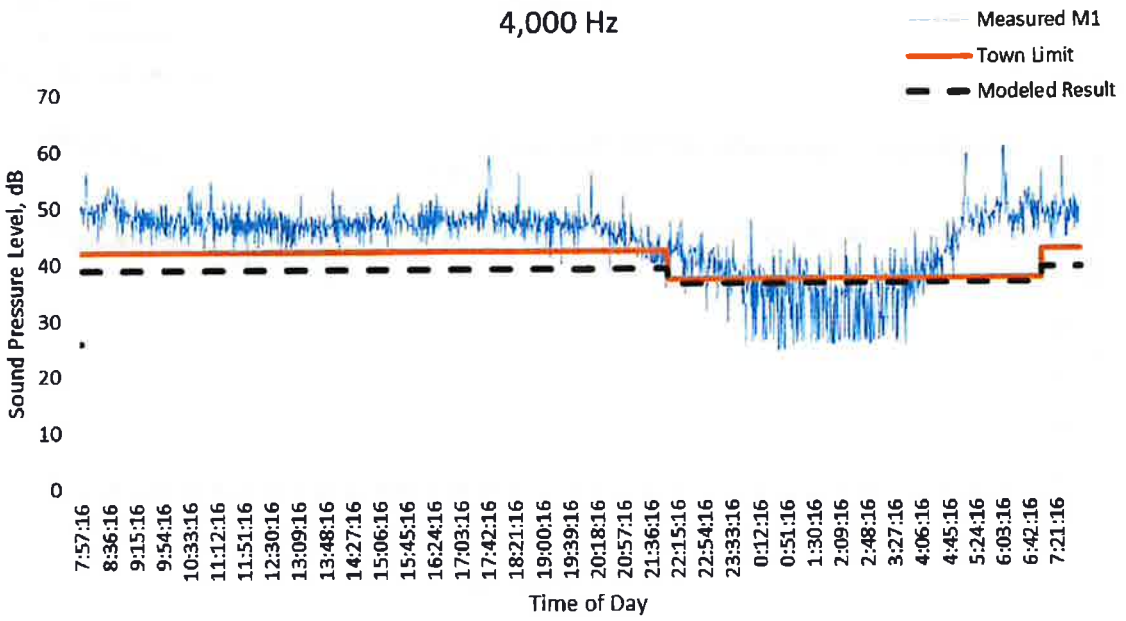
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


1,000 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
20:18:16
20:57:16
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


2,000 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
20:18:16
20:57:16
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


4,000 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
14:27:16
15:06:16
15:45:16
16:24:16
17:03:16
17:42:16
18:21:16
19:00:16
19:39:16
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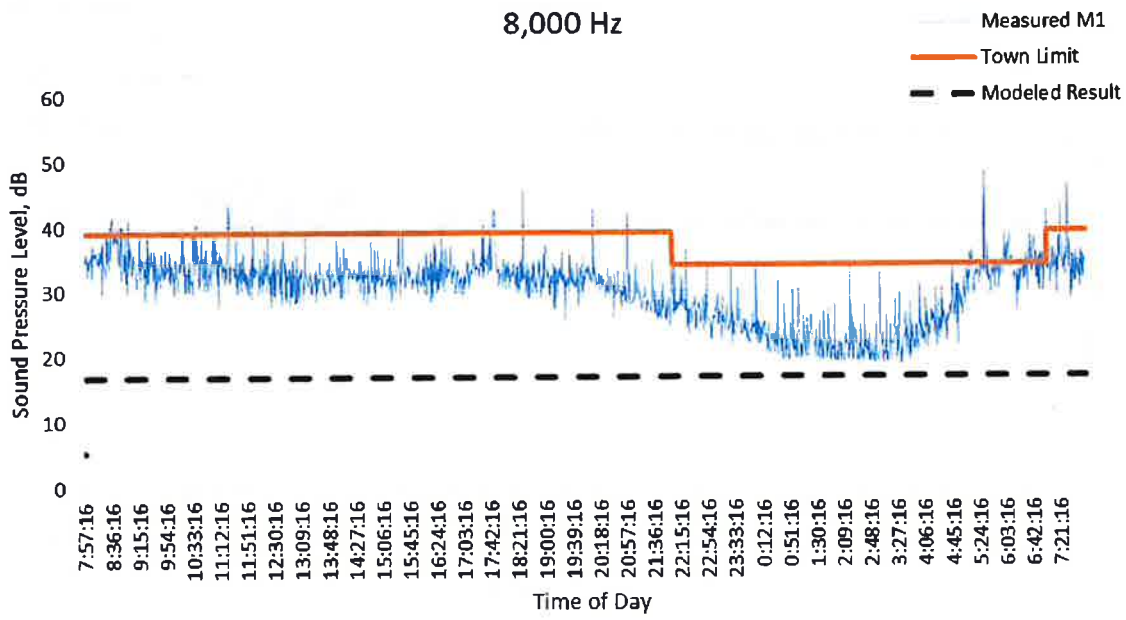
21:36:16
22:15:16
22:54:16
23:33:16
0:12:16
0:51:16
1:30:16
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day


8,000 Hz
Measured M1
Town Limit
Modeled Result
Sound Pressure Level, dB
60
50
40
30
20
10
0
7:57:16
8:36:16
9:15:16
9:54:16
10:33:16
11:12:16
11:51:16
12:30:16
13:09:16
13:48:16
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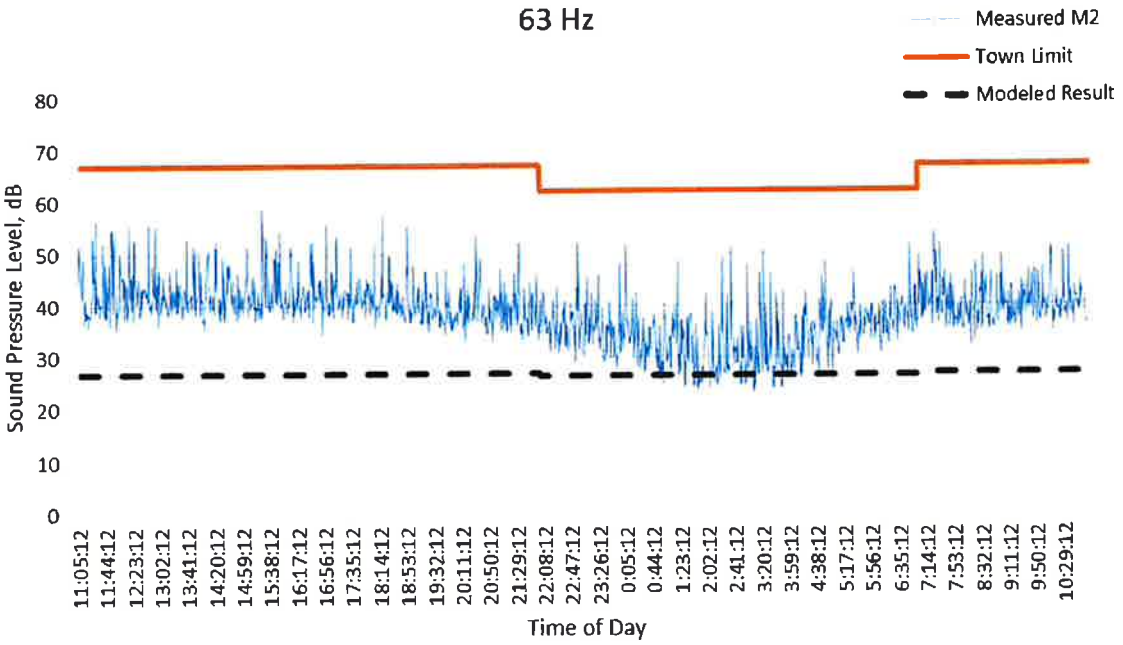
2:09:16
2:48:16
3:27:16
4:06:16
4:45:16
5:24:16
6:03:16
6:42:16
7:21:16
Time of Day

M2 Results


63 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
11:05:12
11:44:12
12:23:12
13:02:12
13:41:12
14:20:12
14:59:12
15:38:12
16:17:12
16:56:12
17:35:12
18:14:12
18:53:12
19:32:12
20:11:12
20:50:12
21:29:12
22:08:12
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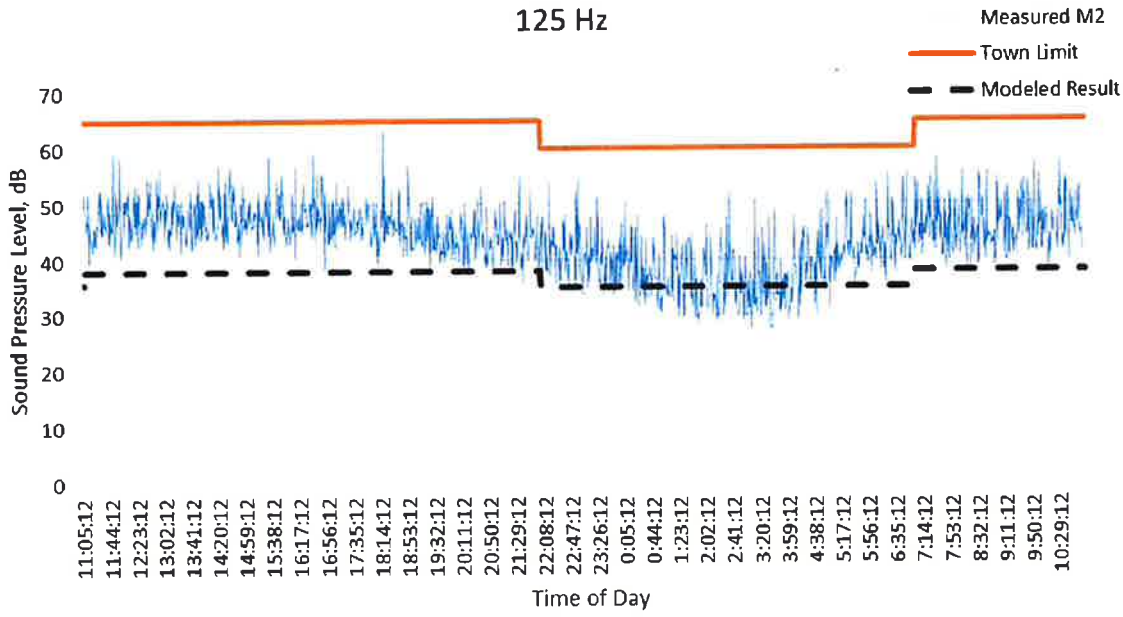
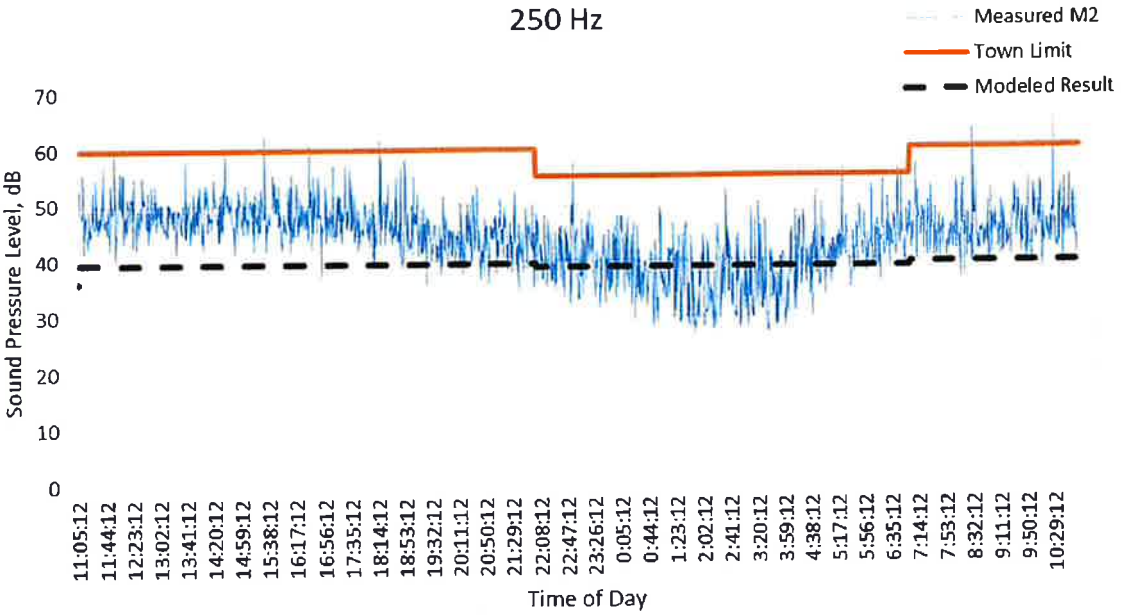
1:23:12
2:02:12
2:41:12
3:20:12
3:59:12
4:38:12
5:17:12
5:56:12
6:35:12
7:14:12
7:53:12
8:32:12
9:11:12
9:50:12
10:29:12
Time of Day


125 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
11:05:12
11:44:12
12:23:12
13:02:12
13:41:12
14:20:12
14:59:12
15:38:12
16:17:12
16:56:12
17:35:12
18:14:12
18:53:12
19:32:12
20:11:12
20:50:12
21:29:12
22:08:12
22:47:12
23:26:12
0:05:12
0:44:12
1:23:12
2:02:12
2:41:12
3:20:12
3:59:12
4:38:12
5:17:12
5:56:12
6:35:12
7:14:12
7:53:12
8:32:12
9:11:12
9:50:12
10:29:12
Time of Day


250 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
11:05:12
11:44:12
12:23:12
13:02:12
13:41:12
14:20:12
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18:14:12
18:53:12
19:32:12
20:11:12
20:50:12
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0:44:12
1:23:12
2:02:12
2:41:12
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5:17:12
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8:32:12
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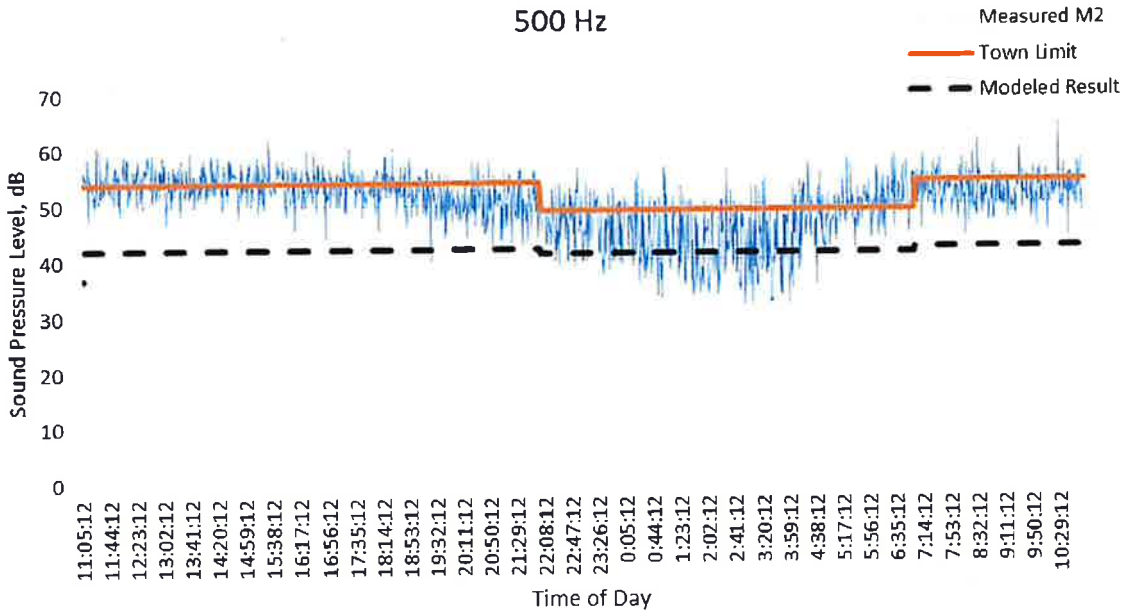
10:29:12
Time of Day


500 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
11:05:12
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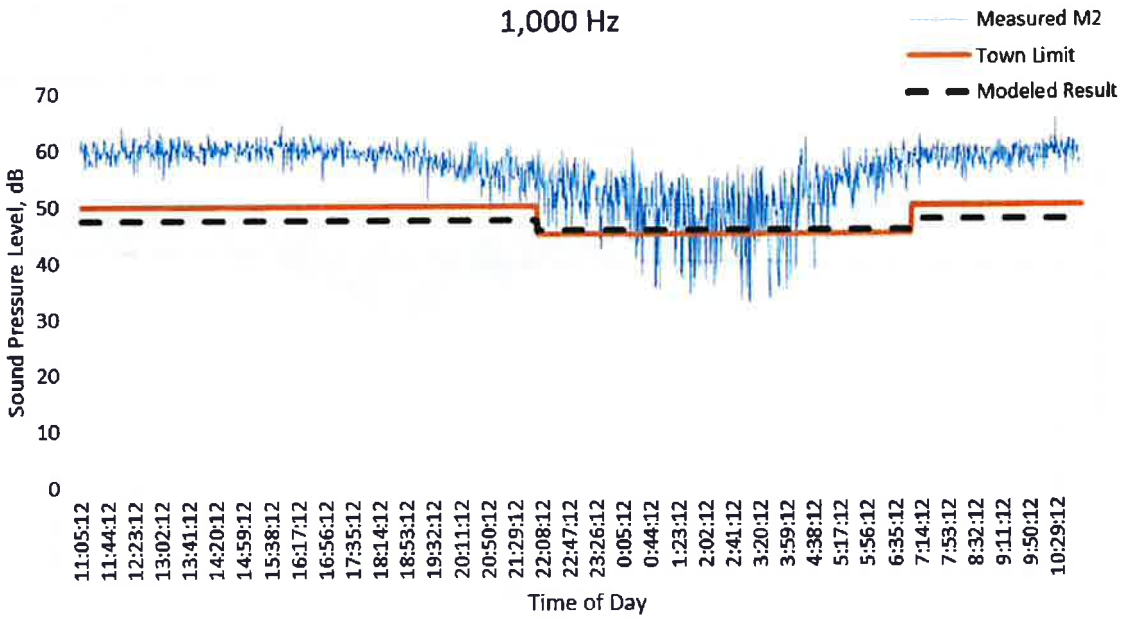
Time of Day


1,000 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
11:05:12
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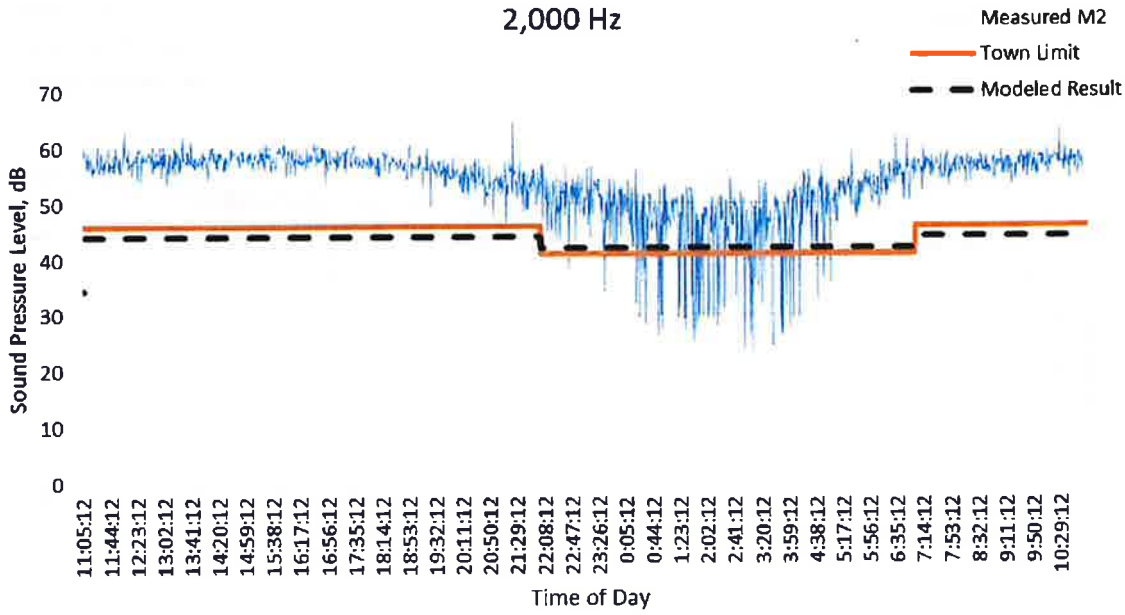
Time of Day


2,000 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
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40
30
20
10
0
11:05:12
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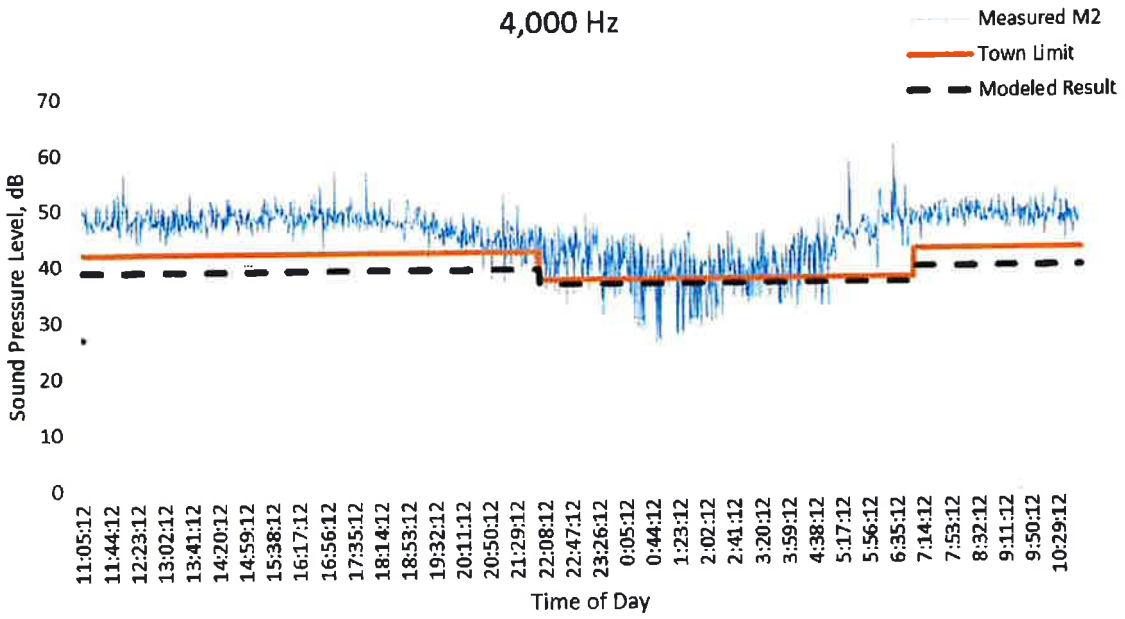
Time of Day


4,000 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
70
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50
40
30
20
10
0
11:05:12
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5:17:12
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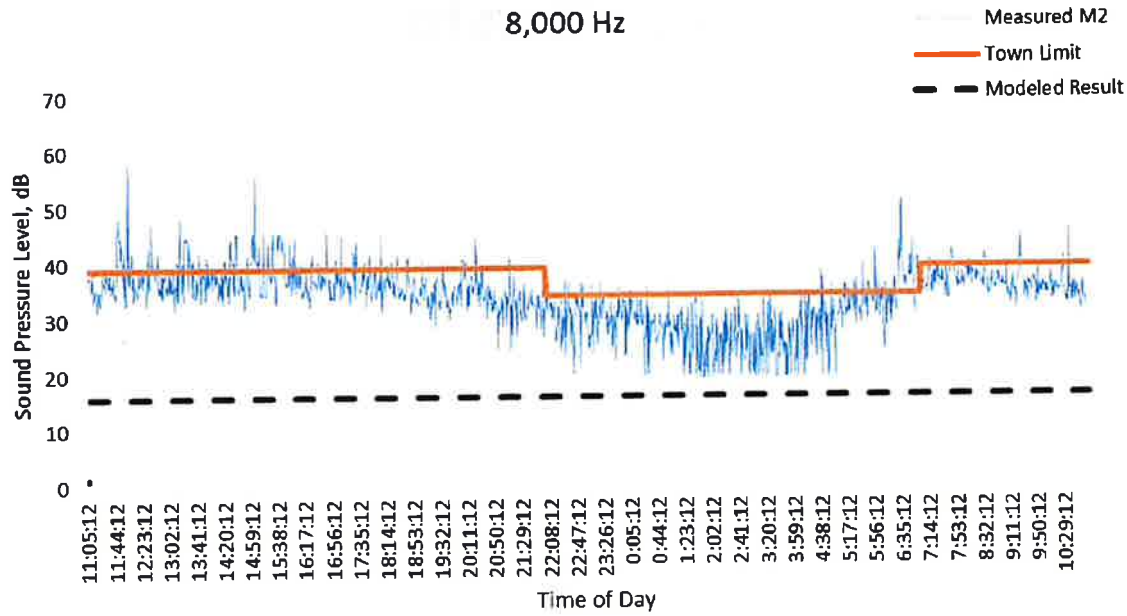
9:50:12
10:29:12
Time of Day


8,000 Hz
Measured M2
Town Limit
Modeled Result
Sound Pressure Level, dB
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40
30
20
10
0
11:05:12
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5:17:12
5:56:12
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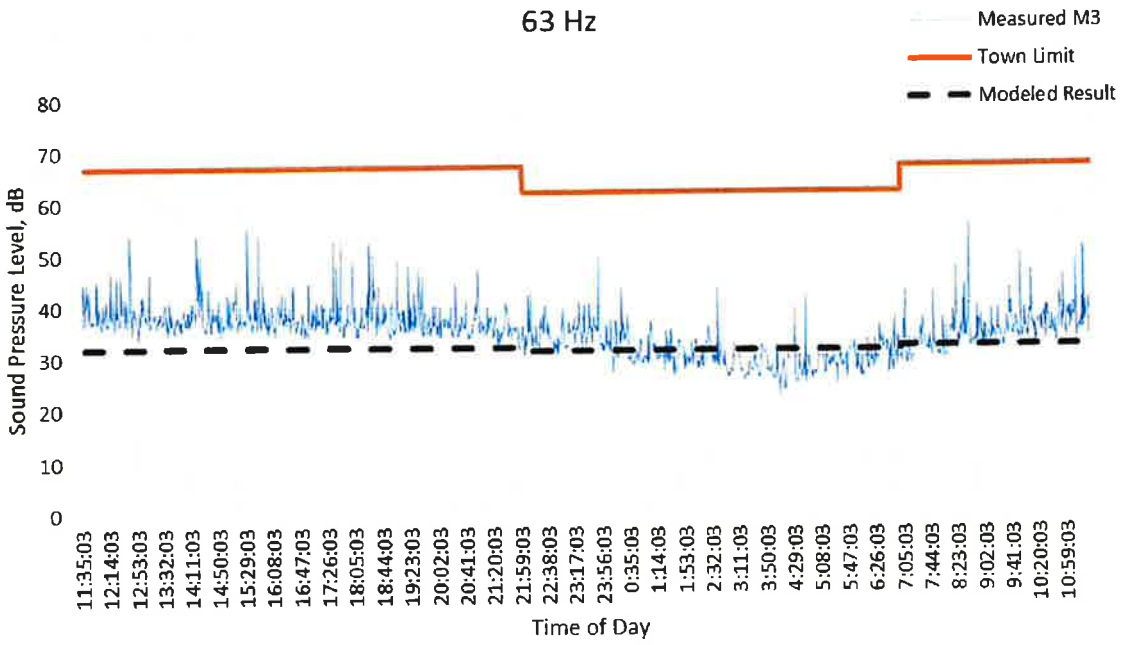
9:50:12
10:29:12
Time of Day

M3 Results


63 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
80
70
60
50
40
30
20
10
0
11:35:03
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2:32:03
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3:50:03
4:29:03
5:08:03
5:47:03
6:26:03
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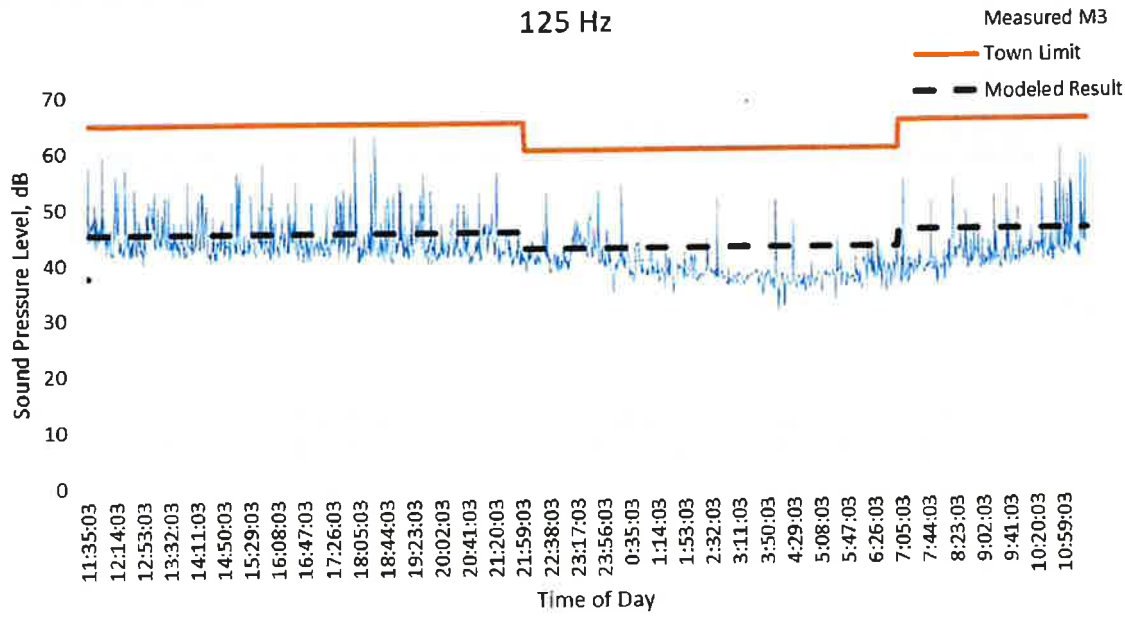
7:44:03
8:23:03
9:02:03
9:41:03
10:20:03
10:59:03
Time of Day


125 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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40
30
20
10
0
11:35:03
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17:26:03
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5:08:03
5:47:03
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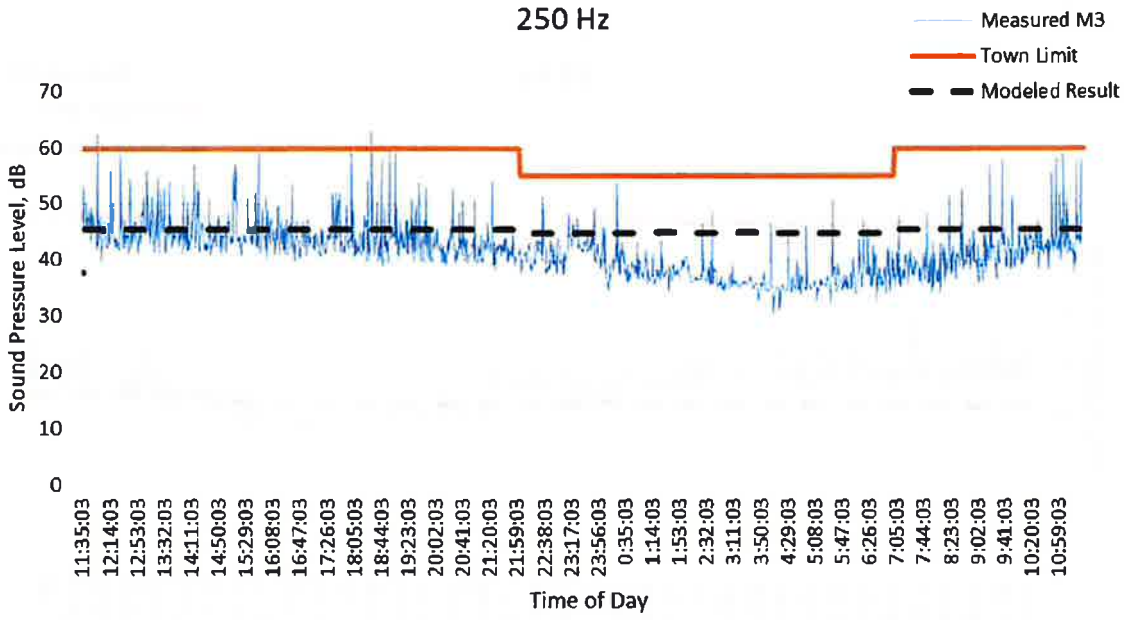
Time of Day


250 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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30
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10
0
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5:08:03
5:47:03
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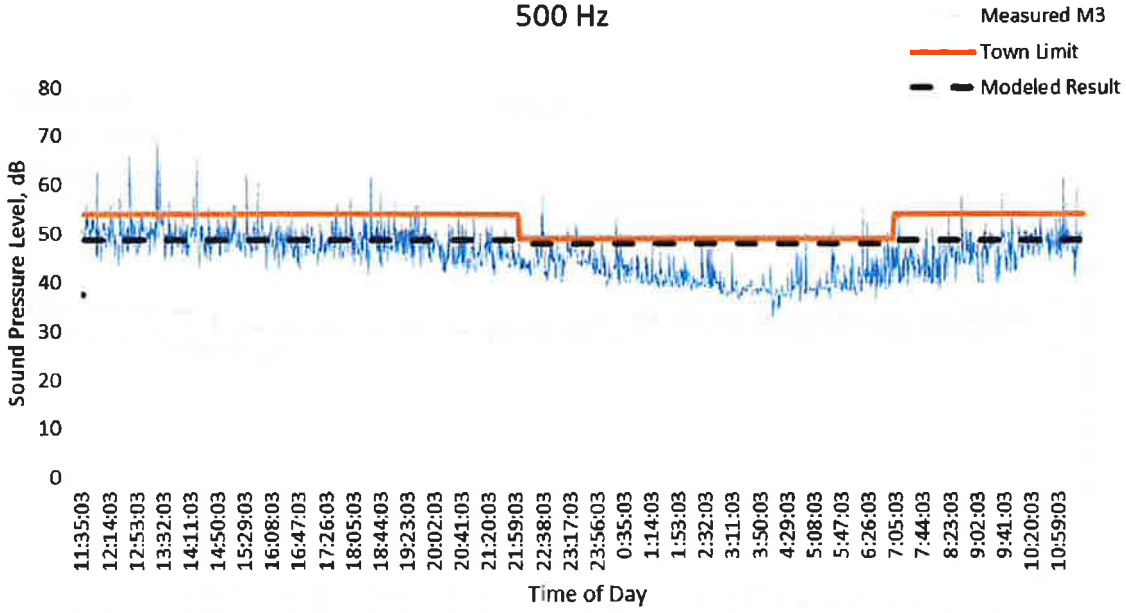
Time of Day


500 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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50
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20
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0
11:35:03
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18:44:03
19:23:03
20:02:03
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5:08:03
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9:41:03
10:20:03
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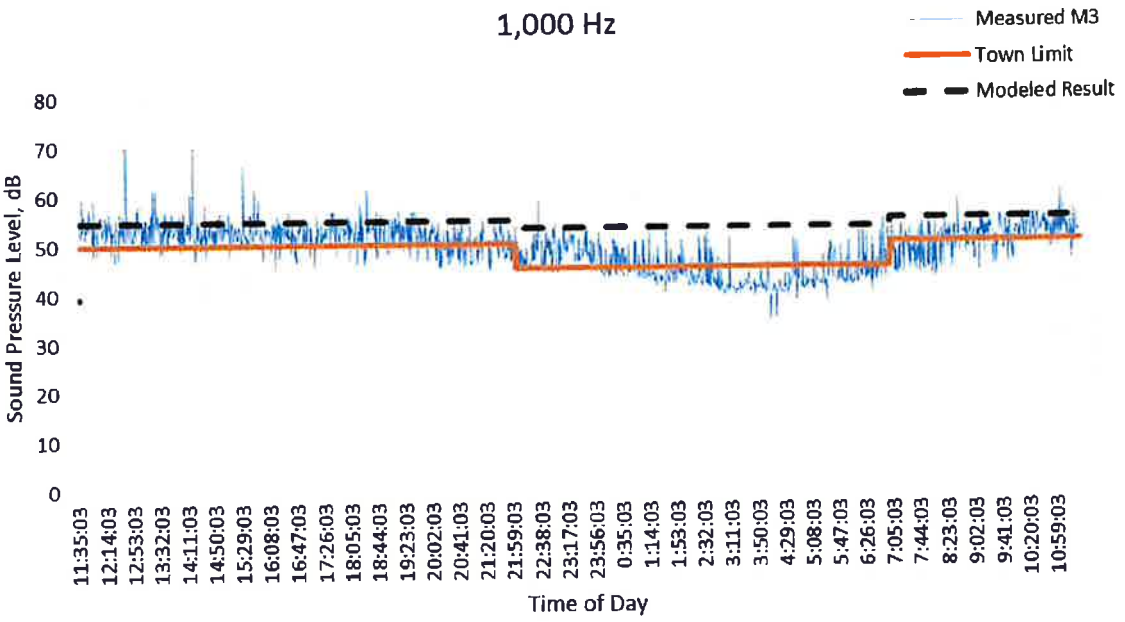
Time of Day


1,000 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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50
40
30
20
10
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11:35:03
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5:08:03
5:47:03
6:26:03
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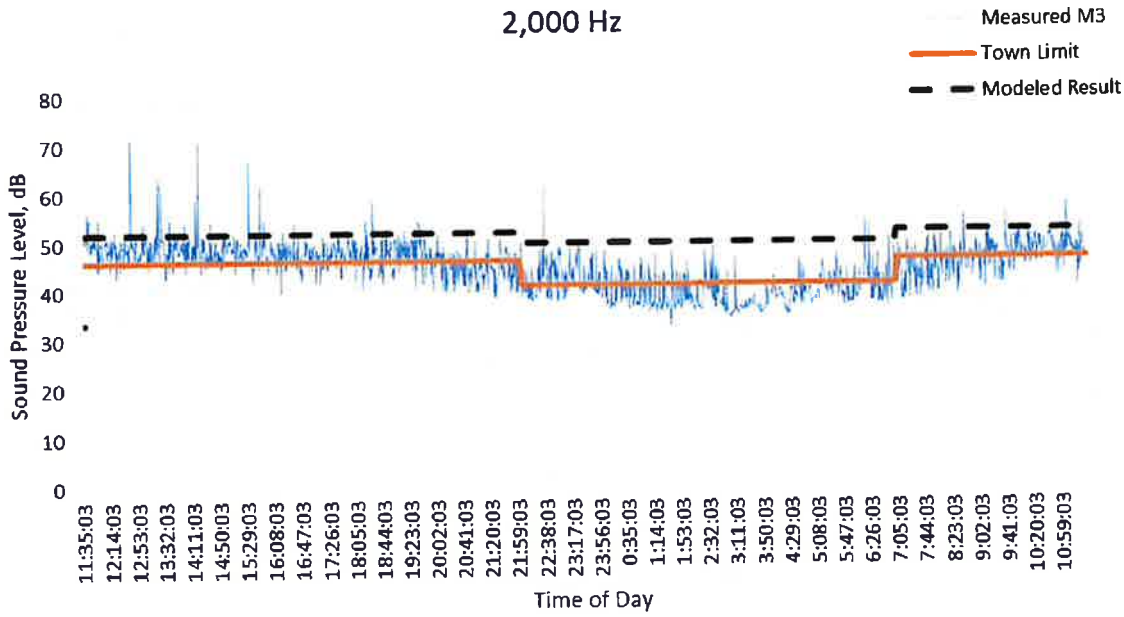
10:59:03
Time of Day


2,000 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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60
50
40
30
20
10
0
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5:08:03
5:47:03
6:26:03
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9:41:03
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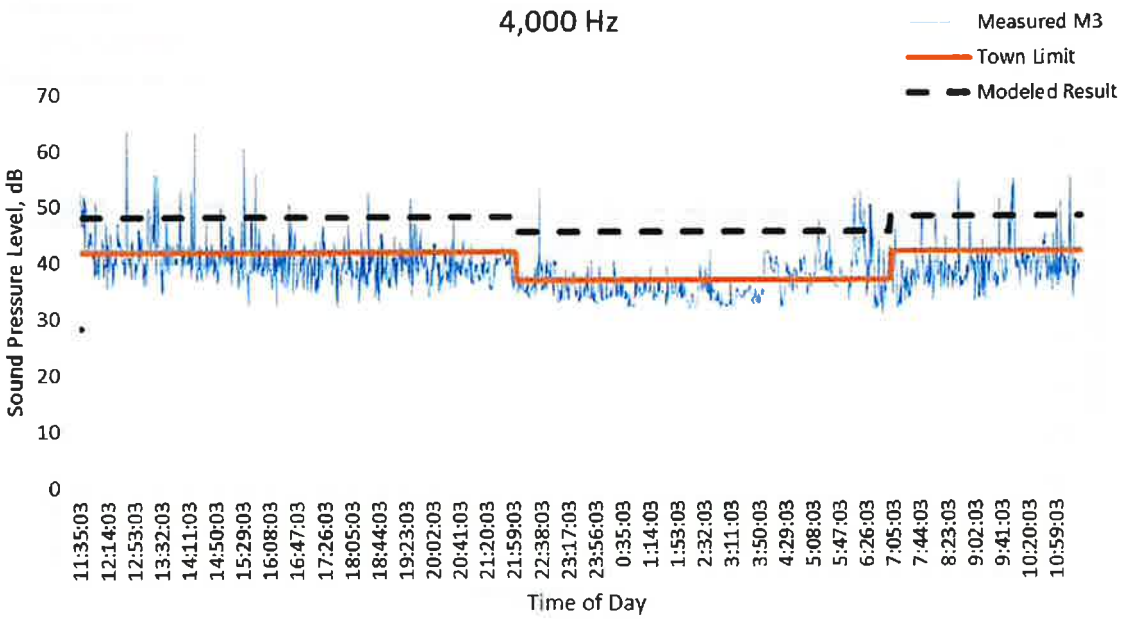
Time of Day


4,000 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
70
60
50
40
30
20
10
0
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5:08:03
5:47:03
6:26:03
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7:44:03
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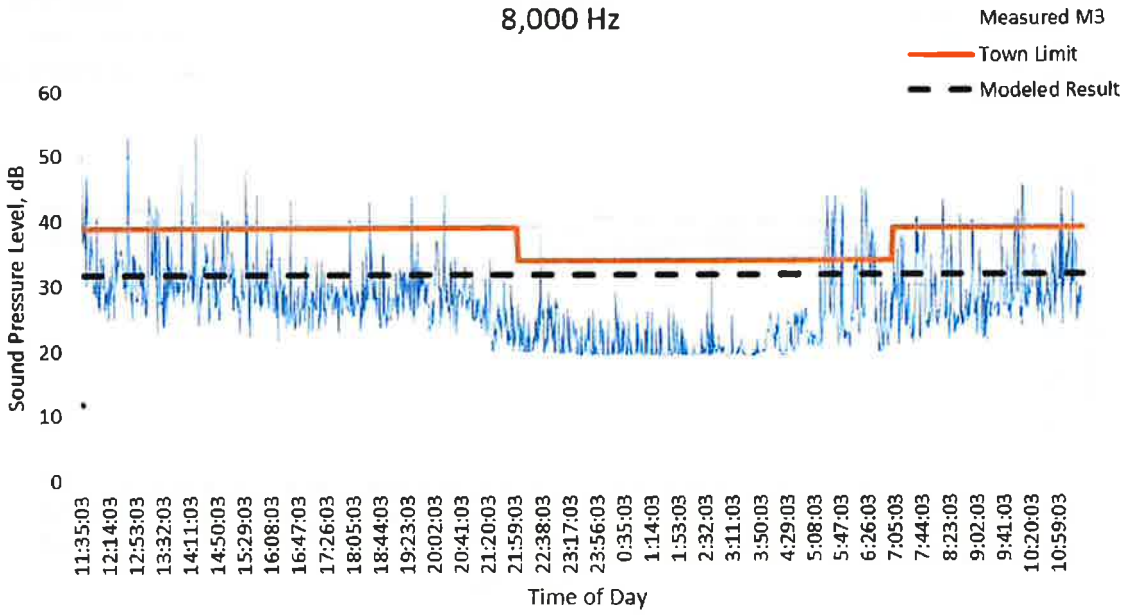
9:02:03
9:41:03
10:20:03
10:59:03
Time of Day


8,000 Hz
Measured M3
Town Limit
Modeled Result
Sound Pressure Level, dB
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50
40
30
20
10
0
11:35:03
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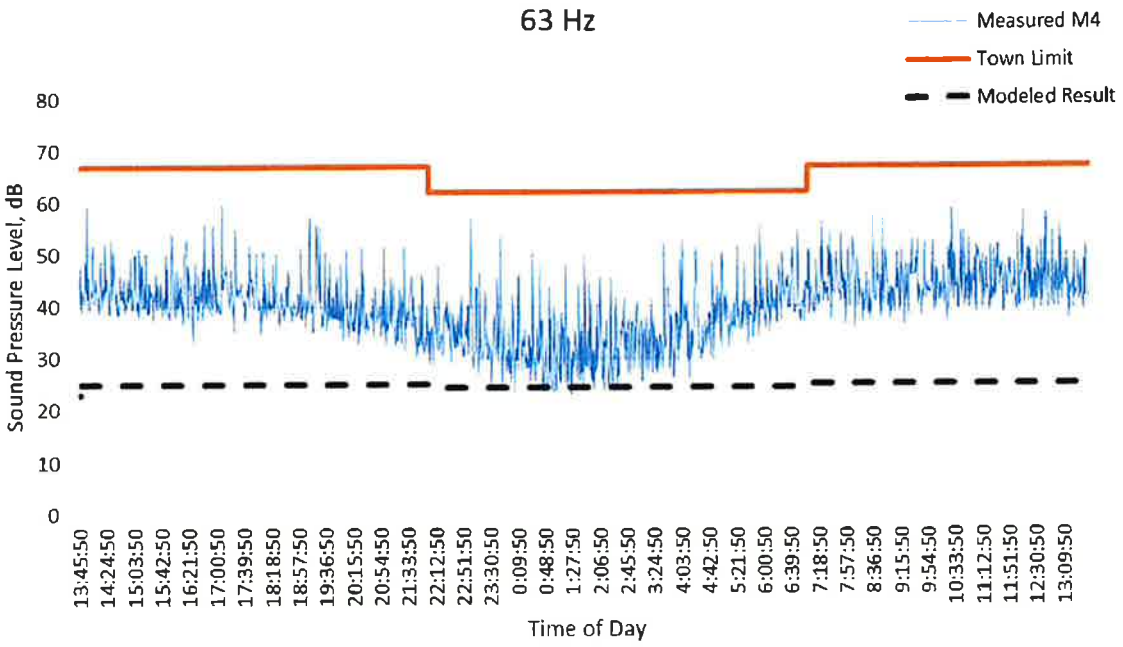
Time of Day

M4 Results


63 Hz
Measured M4
Town Limit
Modeled Result
Sound Pressure Level, dB
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40
30
20
10
0
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18:57:50
19:36:50
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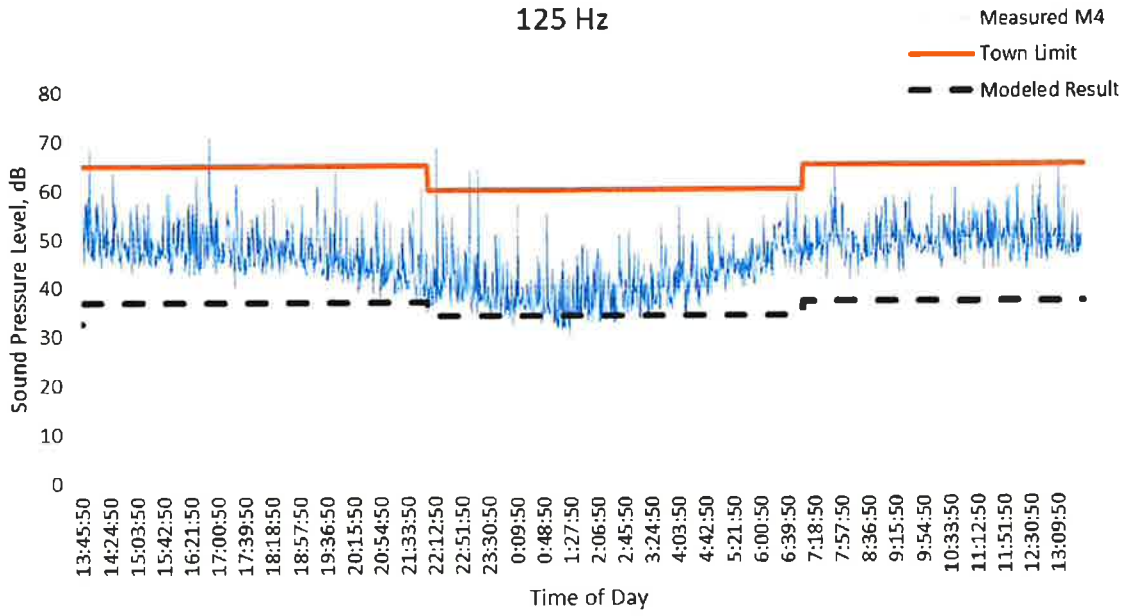
13:09:50
Time of Day


125 Hz
Measured M4
Town Limit
Modeled Result
Sound Pressure Level, dB
80
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60
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40
30
20
10
0
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14:24:50
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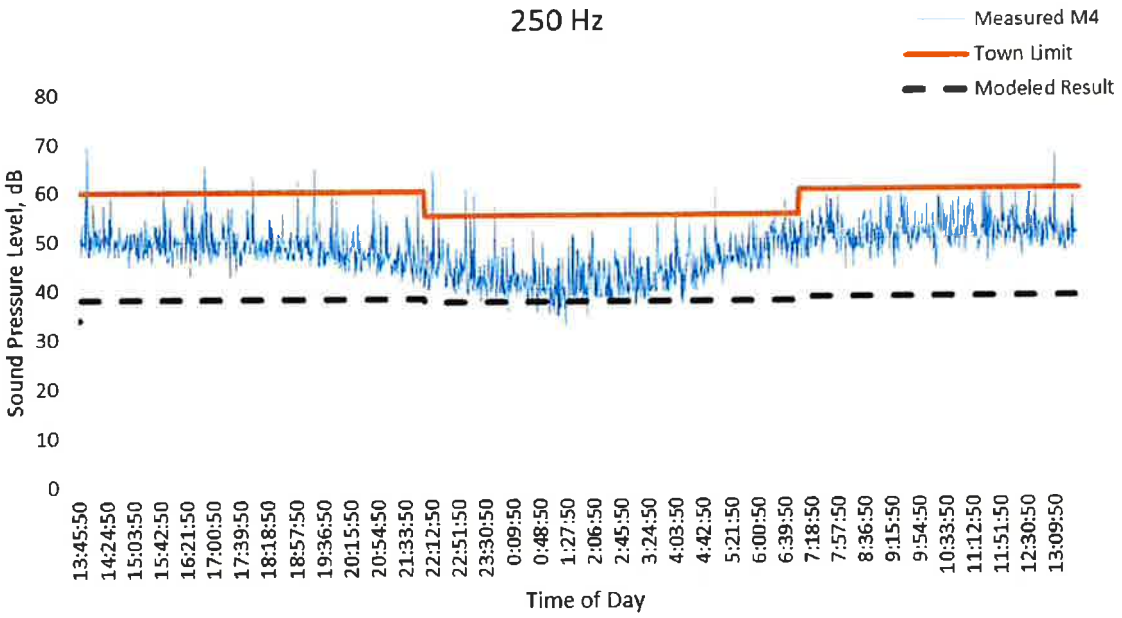
13:09:50
Time of Day


250 Hz
Measured M4
Town Limit
Modeled Result
Sound Pressure Level, dB
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60
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40
30
20
10
0
13:45:50
14:24:50
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16:21:50
17:00:50
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18:57:50
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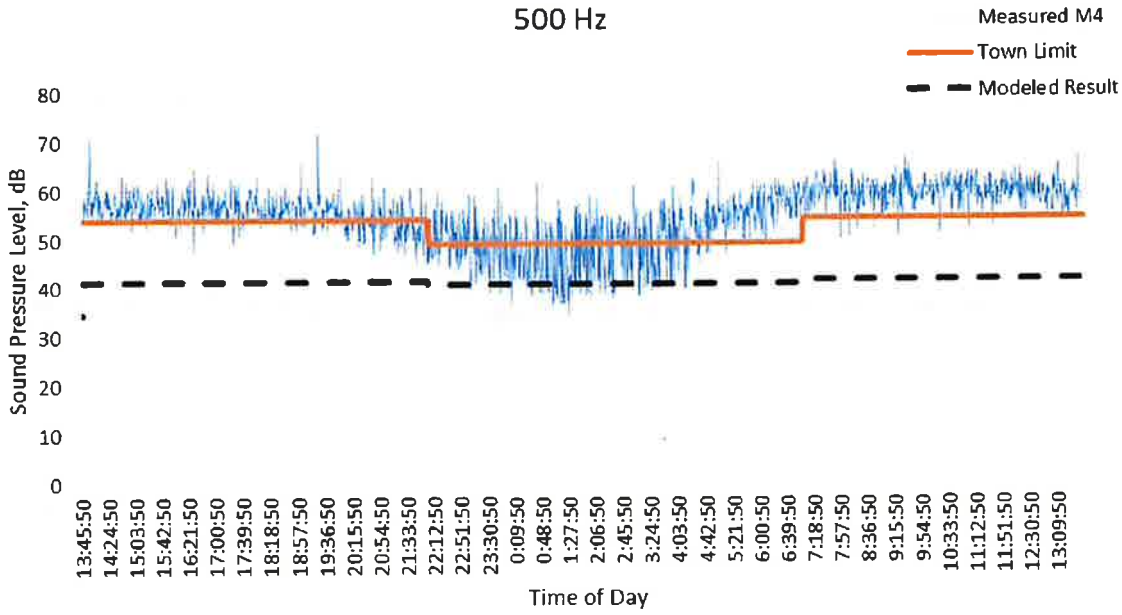
13:09:50
Time of Day


500 Hz
Measured M4
Town Limit
Modeled Result
Sound Pressure Level, dB
80
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60
50
40
30
20
10
0
13:45:50
14:24:50
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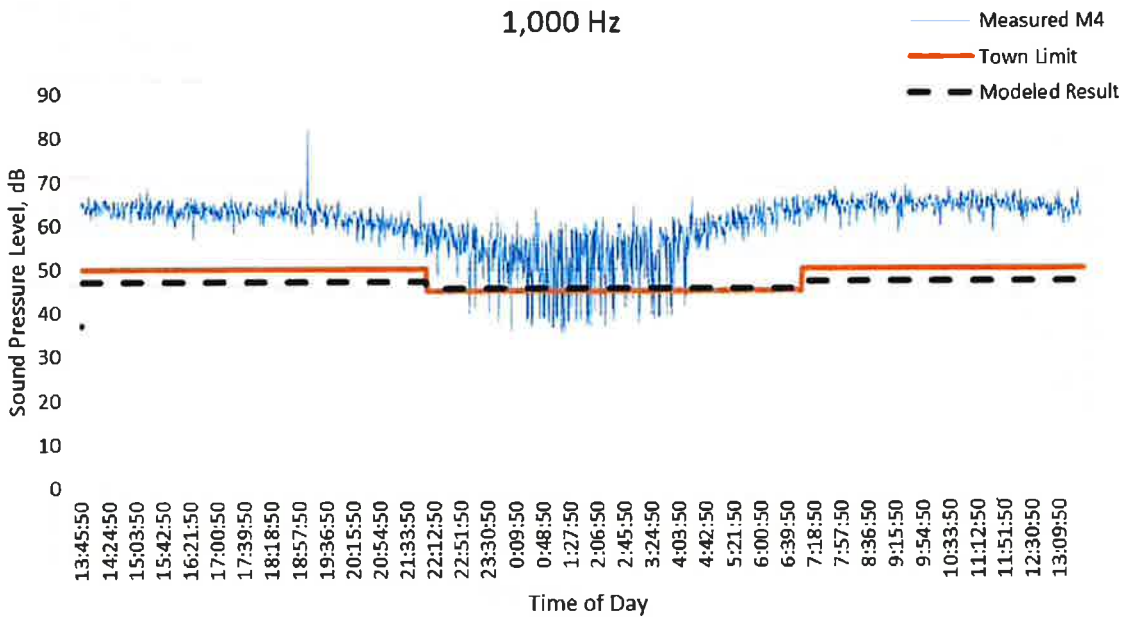
Time of Day


1,000 Hz
Measured M4
Town Limit
Modeled Result
Sound Pressure Level, dB
90
80
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60
50
40
30
20
10
0
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18:57:50
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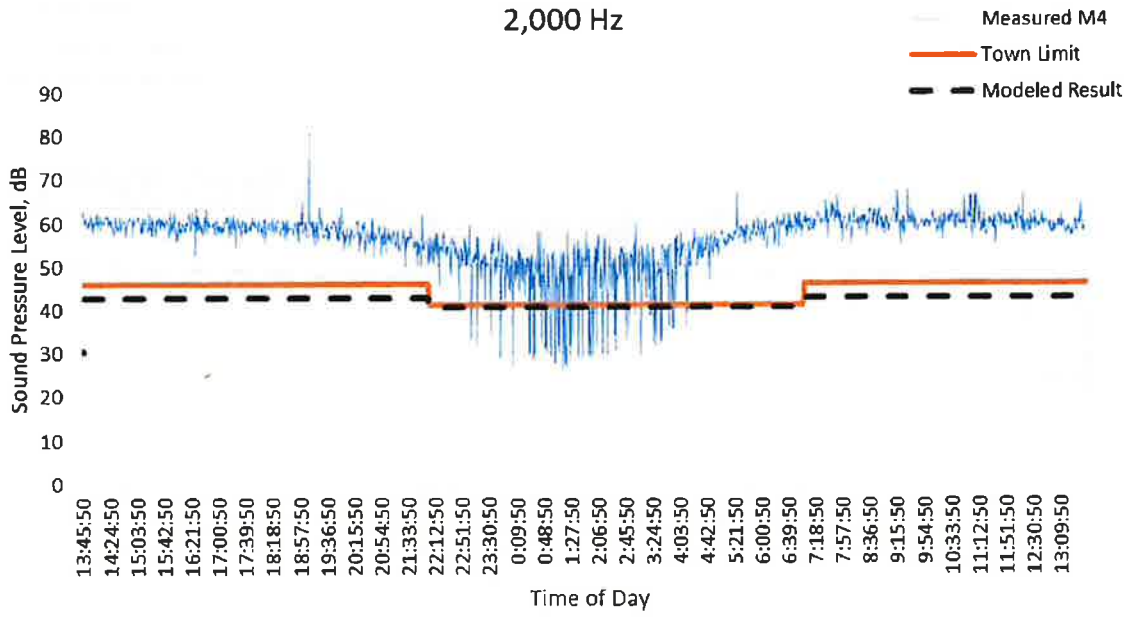
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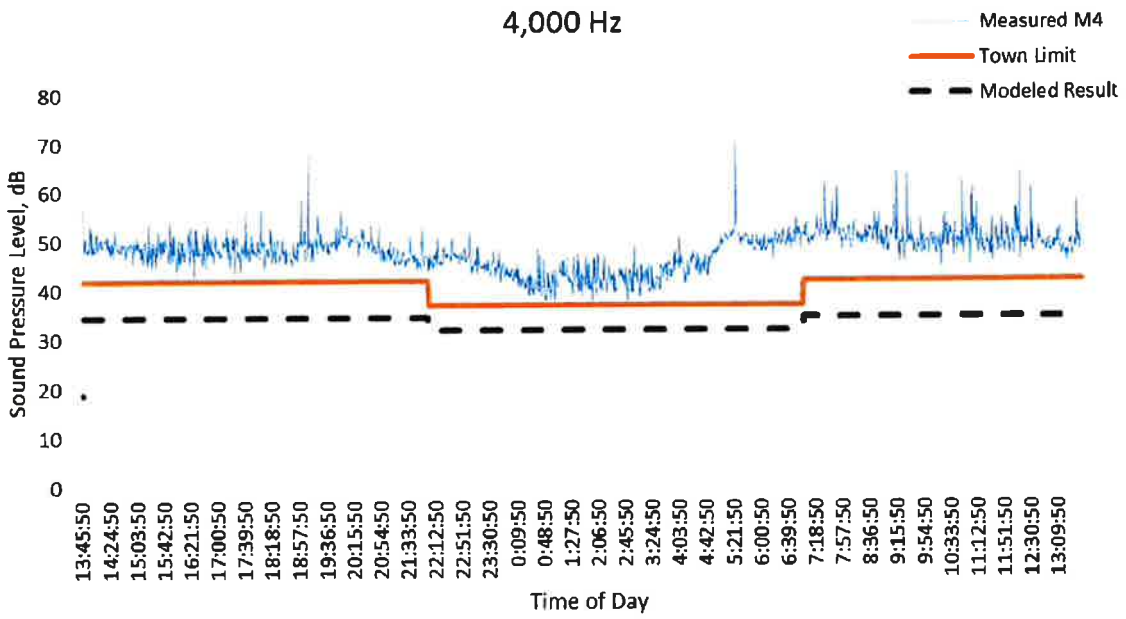
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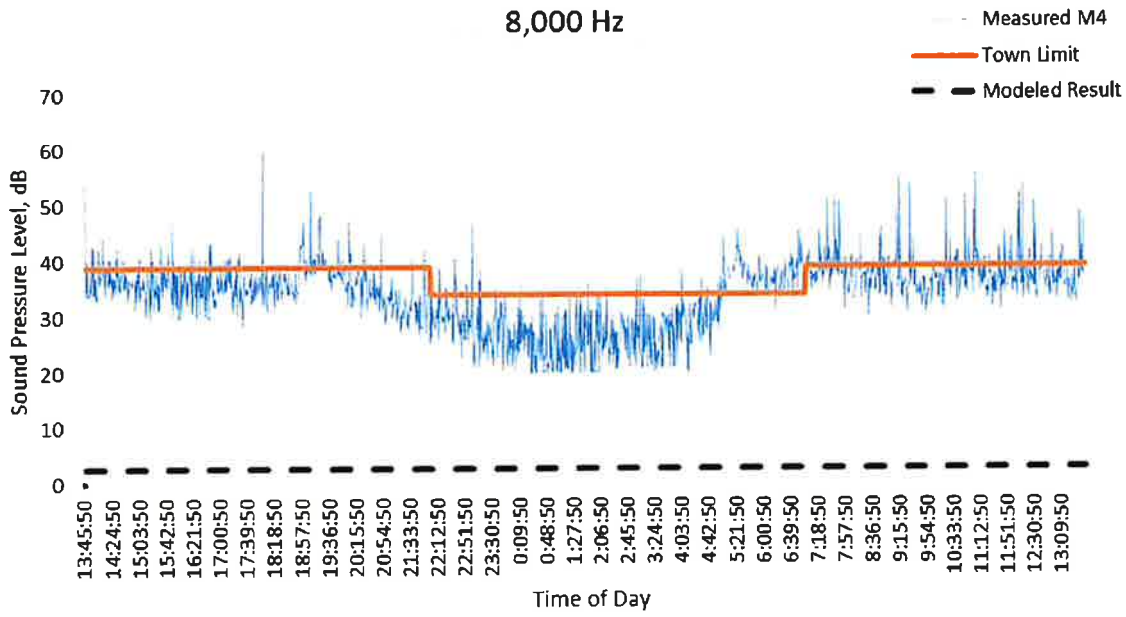
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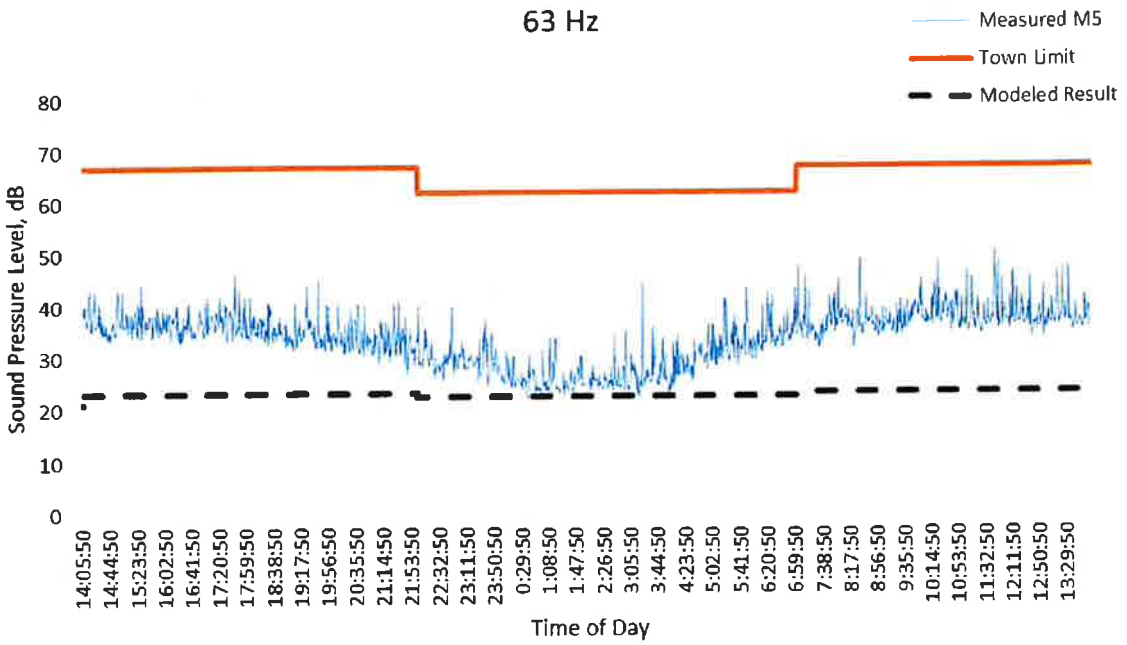
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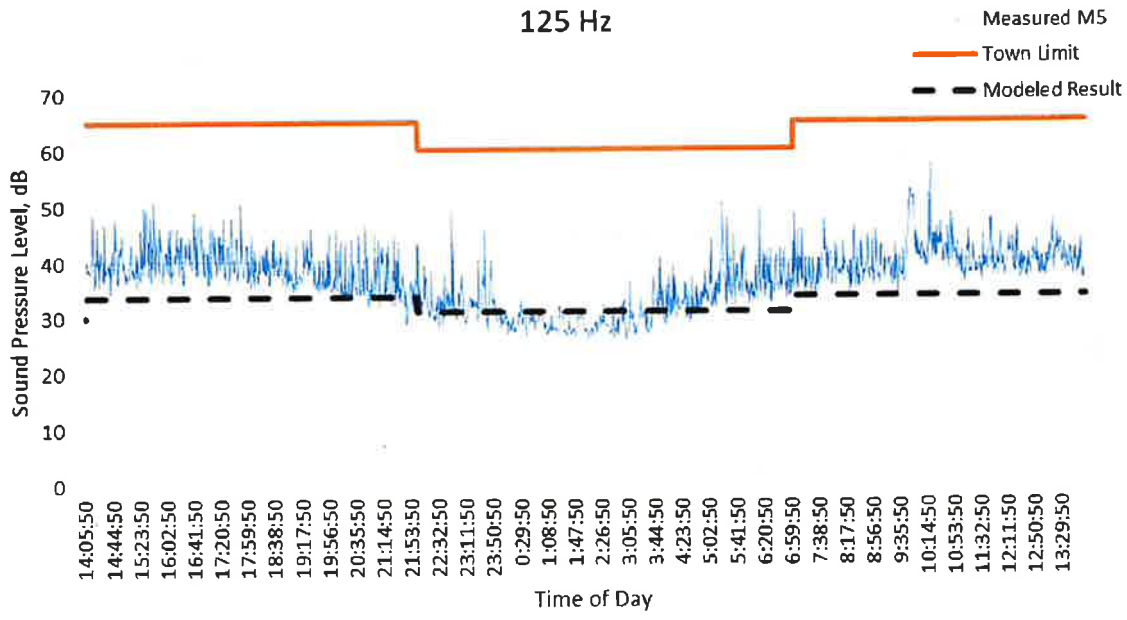
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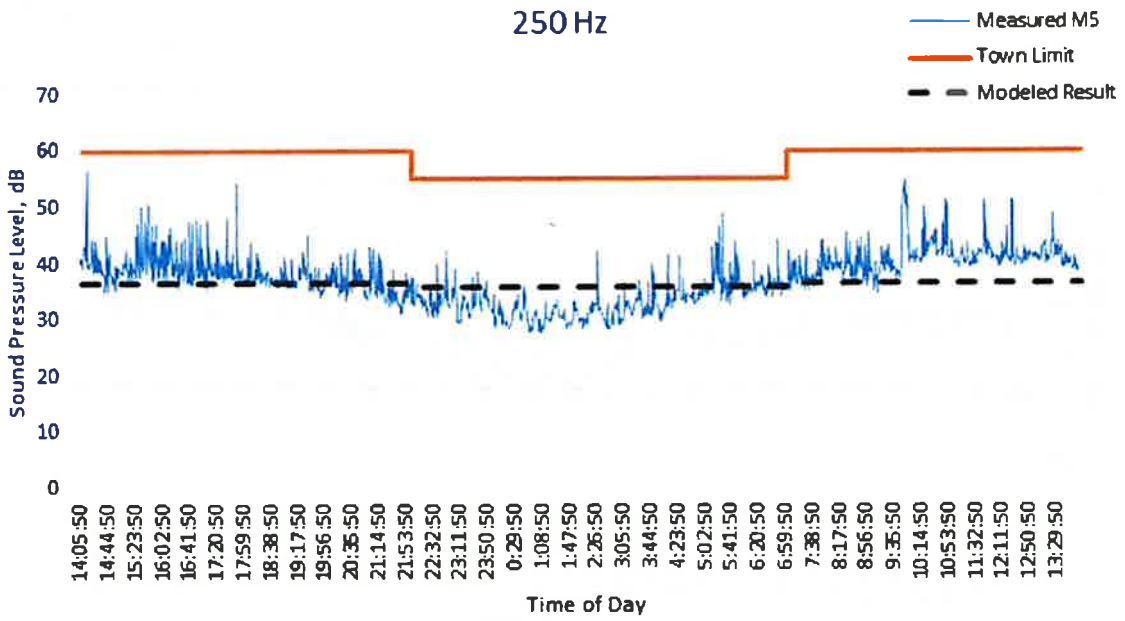
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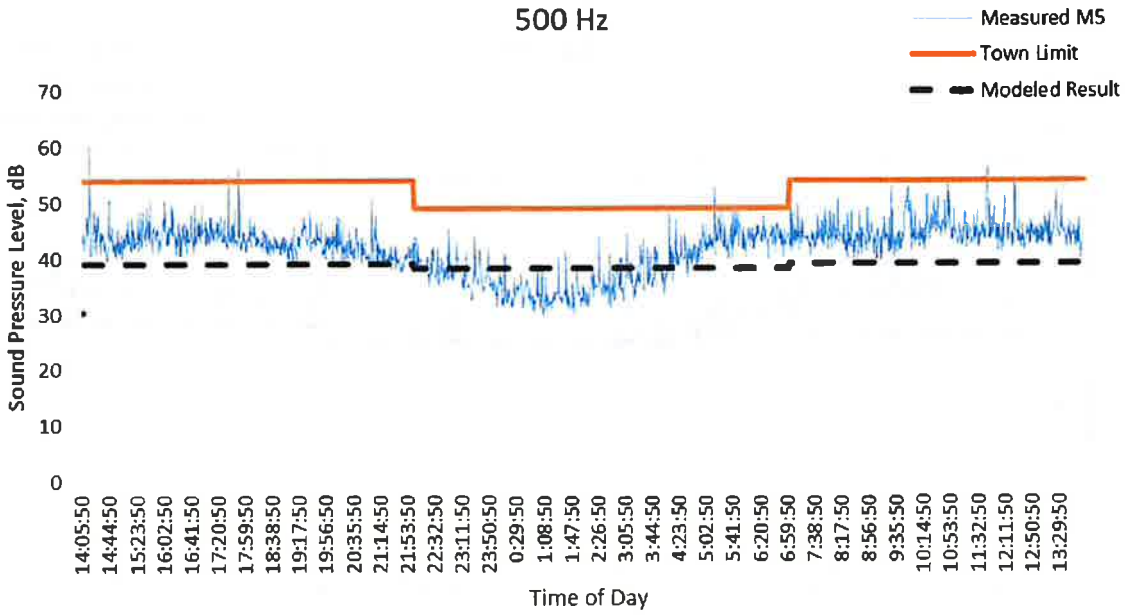
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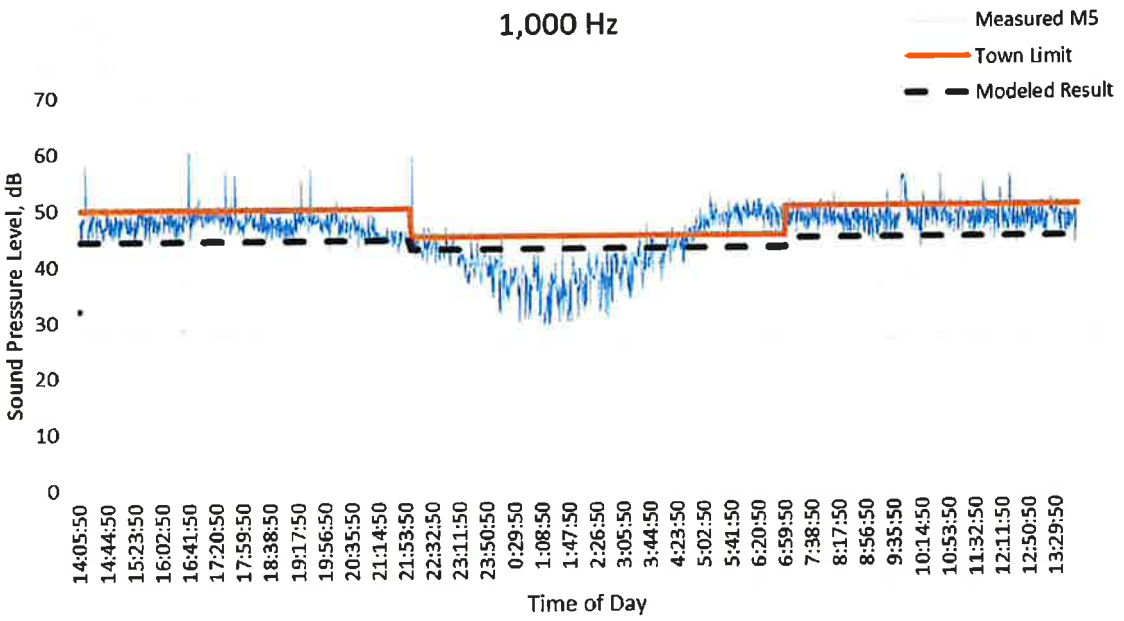
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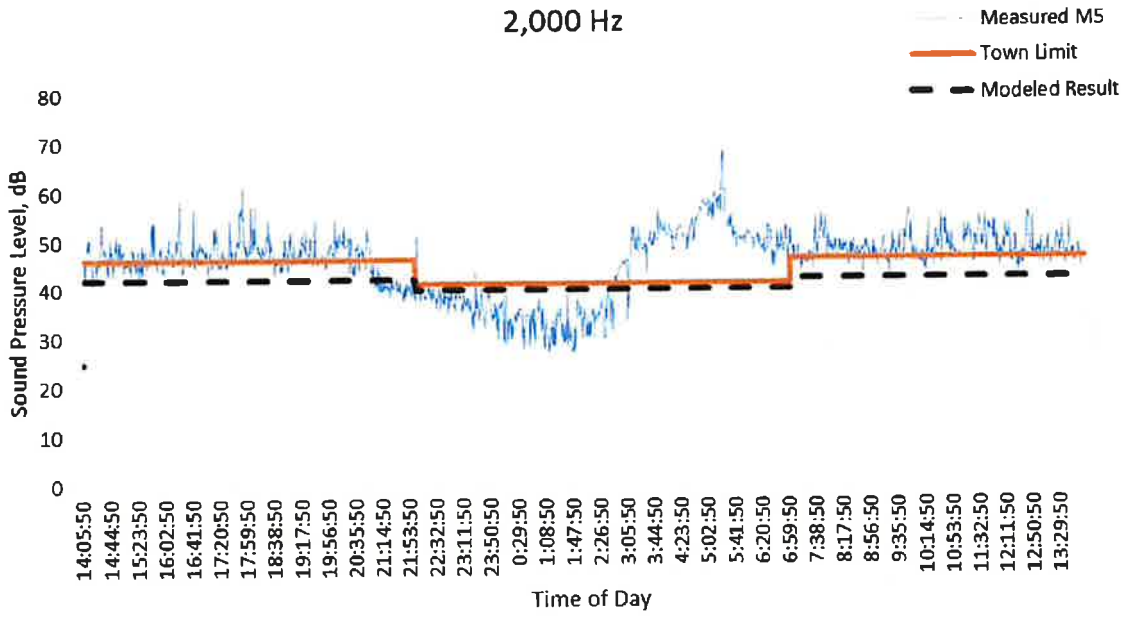
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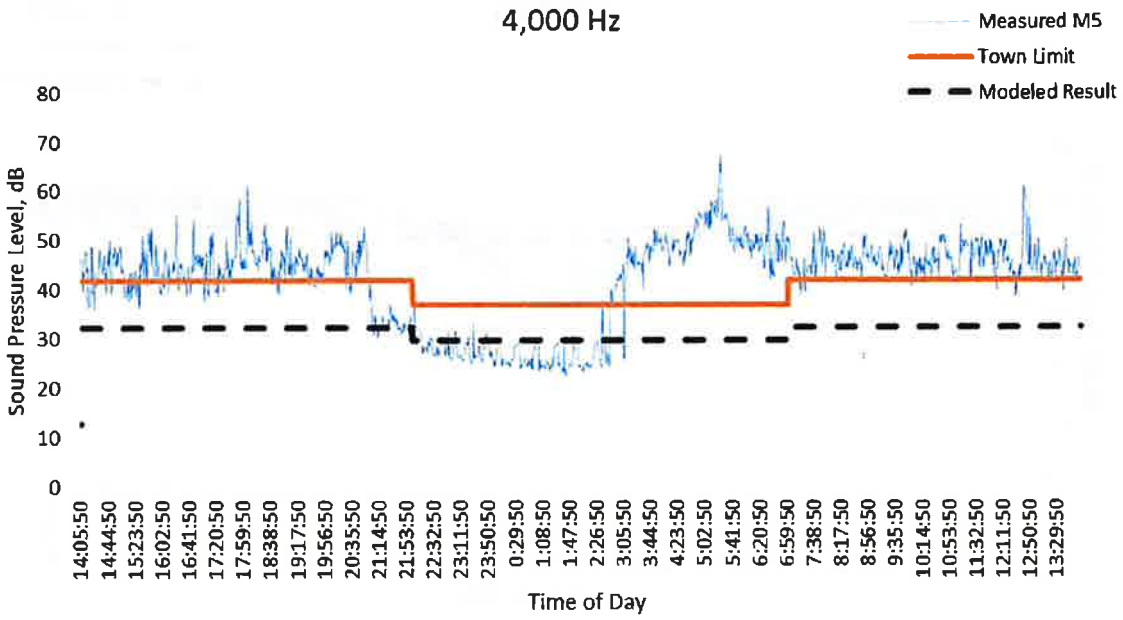
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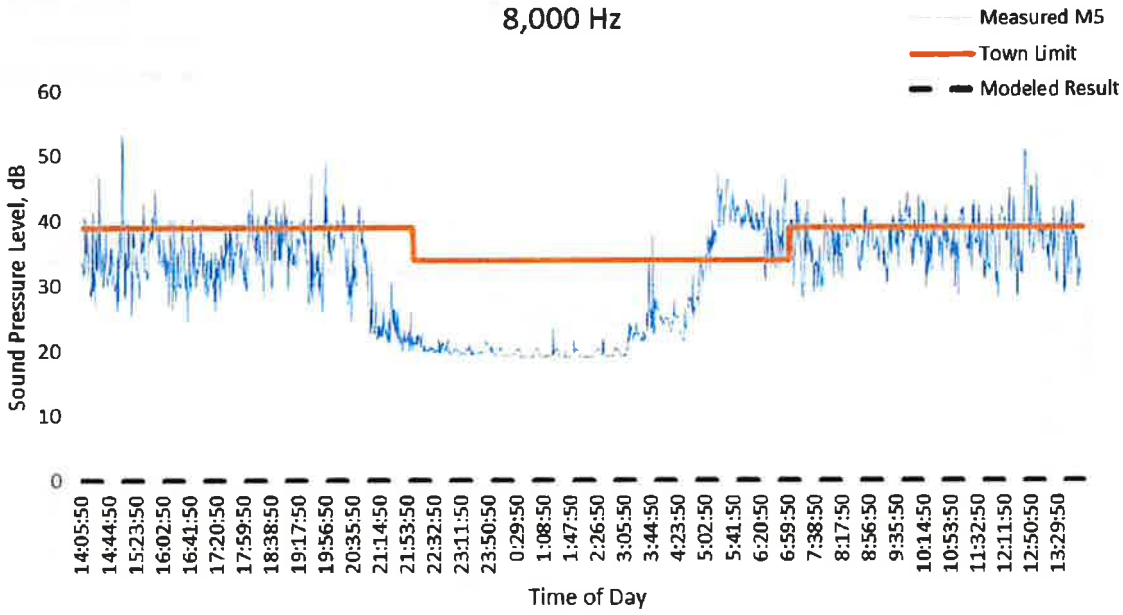
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Exhibit 6

ECS MID-ATLANTIC, LLC

Geotechnical Engineering Report

Warrenton Data Center

Lee Highway and Blackwell Road
Warrenton, Virginia 20186

ECS Project No. 01:31153

Revised August 15, 2022

ECS MID-ATLANTIC, LLC
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities

Revised August 15, 2022

Ms. Patricia Krinke
Bohler Engineering
28 Blackwell Park Lane, Suite 201
Warrenton, Virginia 20186

ECS Project No. 01:31153

Reference: Geotechnical Engineering Report
Warrenton Data Center
Lee Highway and Blackwell Road
Warrenton, Virginia 20186

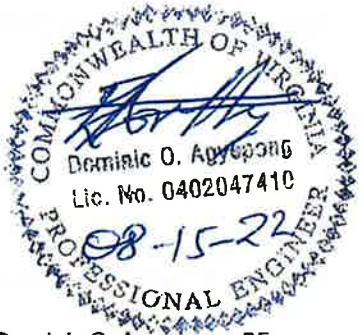
Dear Ms. Krinke:

ECS Mid-Atlantic, LLC (ECS) has completed the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our Proposal No. 01:63686-GP1, dated May 4, 2021. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration conducted and our design and construction recommendations.

It has been our pleasure to be of service to Bohler Engineering during the design phase of this project. We would welcome the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS MID-ATLANTIC, LLC



John A. Short, EIT
Project Manager
JAShort@ecslimited.com

Dominic O. Agyepong, PE
Principal Engineer
DAgyepong@ecslimited.com

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APPENDICES

EXECUTIVE SUMMARY

This Executive Summary is intended as a brief overview of the primary geotechnical conditions that are expected to affect design and construction. Information gleaned from this Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

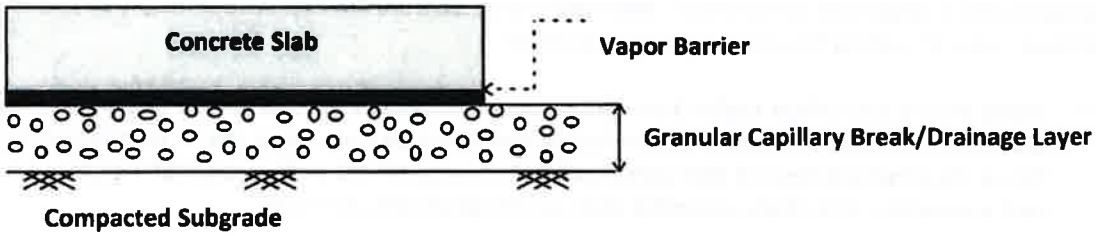
- Based on the subsurface exploration completed we anticipate the site will be suitable for the proposed development. We do not anticipate conditions on the project site to adversely affect future development beyond the typical difficulties encountered in this geographic region (i.e., rock excavation, potentially expansive soils, and moisture sensitive soils).
- For shallow foundation design we recommend the following design parameters:

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure (Stratum I Soil/Structural Fill)	3,000 psf	3,000 psf
Net Allowable Bearing Pressure (Stratum II- Weathered Rock Areas)	8,000 psf	8,000 psf
Minimum Width	24 inches	24 inches
Minimum Footing Embedment Depth (below slab or finished grade)	24 inches	24 inches

Deep foundation systems such as Drilled Shaft foundations or Auger Cast-In-Place (ACIP) Pile foundations can be utilized for heavily loaded structures. Deep foundations may be designed for an allowable bearing pressure on the order of 50 tons to 100 tons, if extended at least 3 drilled shaft diameters into the relatively unweathered rock. Actual designs will be provided in the final geotechnical report.

- Provided subgrades and structural fills are prepared as discussed herein, the proposed floor slabs can be constructed as **Ground Supported Slabs (or Slab-on-Grade).**

- The following graphic depicts our soil-supported slab recommendations:



1. Drainage Layer Thickness: 6 inches minimum.
2. Drainage Layer Material: 6 Inches of VDOT #57 stone, VDOT 21-A/21-B

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report. Floor slabs placed in areas where expansive soils (CH/MH) are encountered should be underlain by at least 2 feet of compacted suitable fill.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, k_1 of 150 pci (lbs./cu. inch).

Based on report, the anticipated geotechnical issues be considered during design included issues related to shallow bedrock, perched groundwater, potentially expansive and moisture sensitive soils, and deep foundations (drilled shafts) for the buildings.

- **Satisfactory Structural Fill Materials:** Materials satisfactory for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	**Property**
Building and Structural Areas	LL < 40, PI<15
Pavement Areas	LL < 45, PI<20
Max. Particle Size	4 inches
Fines Content (% passing #200 sieve)	Max. 25 %
Max. organic content	5% by dry weight

- Compaction Methodologies:

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Standard Proctor, ASTM D698/ Virginia Test Method (VTM-1)
Required Compaction	95% of Max. Dry Density for fill less than 10 feet
	98% of Max. Dry Density for fill greater than 10 feet
Moisture Content	-2 to +3 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

- Building and site retaining walls and foundations (soil bearing, lateral earth pressures, subgrade modulus, coefficients of friction, etc.)

- Site Soil Design Parameters

Material	Unit Weight (pcf)	Angle of Internal Friction (phi)	At-Rest Pressure (psf per vertical foot of wall)	Active Pressure (psf per vertical foot of wall)	Passive Pressure (psf per vertical foot of wall)
CH	115	12	90	75	175
ML	120	25	70	50	300
SM	125	30	65	45	375
Weathered Rock	135	45	40	25	400

Material	Compacted or In-Situ Soil Moist Unit Weight (δ)	Angle of Internal Friction (ø)	Cohesion (C)	Coefficient of Earth Pressure at Rest (K_o)	Coefficient of Active Earth Pressure (Ka)	Coefficient of Passive Earth Pressure (K_p)
CH	115	12	0	0.79	0.66	1.52
ML	120	25	0	0.58	0.41	2.46
SM	125	30	0	0.50	0.33	3.0
Weathered Rock	135	45	0	0.29	0.17	5.82

- For sliding coefficient:

Sliding Friction Coefficient [Concrete on Soil] (μ)	0.30
Skin Friction [Concrete cast against Soil] (F_s) [1]	250 psf

- Potentially expansive soils (CH/MH) are common in the local geology characterized at this site. Expansive soils should not be reused as engineered fill in the building pad, nor as fill for roadway, curb, gutter, and sidewalk subgrade, within utility trenches, or within embankment slopes. Expansive soils (CH/MH) should be undercut to 4 feet below finished exterior grade or to 2 feet below the bottom of footing, whichever is deeper, and backfilled with controlled, compacted fill where encountered. In proposed pavement areas, we recommend undercutting and replacement of the expansive soils (CH/MH) to provide at least 2 feet of non-expansive soil fill below the pavement subgrade.

- Based on the soil conditions encountered (shallow rock and low permeability soils), stormwater management facilities that require infiltration are not feasible for this site.

- Considering the shallow weathered rock surface encountered at this site and our experience with other projects in the area, we recommend that the design for the building be based on a seismic site classification of **Site Class C**.

- Preliminary pavement section designs based on laboratory data and assumed design parameters are included within the report. We recommend pavement designs be developed in accordance with applicable VDOT requirements. Finalized designs should be based on anticipated traffic loading conditions and actual soil subgrade conditions. For design purposes, we recommend using a design California Bearing Ratio (CBR) value of 4 for the on-site clayey, silty, and sandy soil materials. Additionally, we recommend a Resiliency Factor (RF) of 1.5 be utilized for design of the proposed pavements.

- Groundwater on this site can be characterized as being broadly perched above less permeable materials and shallow rock. The depth at which perched water is present on the site varies with surface elevation. In low-lying areas, the presence of perched water is more pronounced. In higher areas and on ridge lines, perched water may be present, including above design cut elevations, but is less concentrated. Soils at contact with perched water levels were very moist to wet. In most cases, moisture then decreased with depth. The permanent groundwater able is significantly below the anticipated extents of excavation for this project.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design and construction of an industrial site which includes one data center building, a guard house facility, a stormwater management pond, a substation area, associated pavement infrastructure, and mass grading for the overall site. The recommendations developed for this report are based on project information supplied by Bohler Engineering.

Our services were provided in accordance with our Proposal No. No. 01:63686-GP1, dated May 4, 2021. This report contains the procedures and results of our subsurface exploration program, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field and laboratory test procedures.
- A review of surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Copies of our soil test boring logs.
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills.
- Recommended foundation types.
- General recommendations for pavement design including a recommended design CBR value.
- Evaluation and recommendations relative to groundwater control.
- Recommendations for design and construction of drainage structures and stormwater management facilities.
- An evaluation of potential soil and rock excavation issues.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION & CURRENT SITE CONDITIONS

The proposed project site is located to the northeast of the intersection of Lee Highway and Blackwell Road in Warrenton, Fauquier County, Virginia. The subject property spans a single parcel (GPIN: 6984-69-2419) which, at the time of this exploration, is primarily occupied by active farmland with some wooded areas in the northwest and southeast portions, and site elevations range from approximate EL. 510± feet along the north edge of the site to approximate EL. 465± feet in the northeast corner. The southwest corner of the site is bordered by an existing car dealership. An aerial view of the site is pictured below.

Figure 2.1.1 Site Location

2.2 PROPOSED CONSTRUCTION

It is our understanding that the development will include the construction of one 214,388 sq. ft., 1-story data center building (FFE = EL. 486.0 feet), a guard house facility, a stormwater management pond, a 6-acre substation area, a retaining wall with a maximum exposed height of 6 feet, and associated pavement infrastructure. Based on current proposed grading information, it is our understanding that soils fill on the order of 21± feet and cuts on the order of 40± feet will be required in order to establish final site grades.

The description of the proposed project is based on the information provided to us by your office or other design team members at this time. If any of the information is inaccurate, either due to misunderstanding or due to design changes that may occur later, we recommend that we be contacted to provide additional or alternate recommendations that may be required.

2.2.1 Structural Information/Loads

A maximum structural column loading of 450 kips has been provided by the structural engineer at this time and it is our understanding that shallow foundations are considered feasible in design for support of the main building. If additional/revised maximum structural loading becomes available, ECS should be informed so that we may confirm or re-evaluate our recommendations.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our overall scope of work included drilling a total of 20 soil borings. Thirteen borings were performed in the vicinity of the data center building and guard house structural footprints, two borings were performed within the proposed stormwater pond, and five borings were performed within proposed pavement areas.

A track-mounted drill rig was utilized to drill the soil test borings. Borings were advanced to depths on the order of up to 80± feet below the existing ground surface. The subsurface exploration was completed under the general supervision of an ECS geotechnical engineer.

Boring locations were identified in the field by ECS personnel using GPS techniques prior to mobilization of our drilling equipment. The approximate as-drilled boring locations are shown on the Boring Location Diagram in Appendix A. Ground surface elevations noted on our boring logs were interpolated from the provided existing contour mapping.

Standard penetration tests (SPTs) were conducted in the borings at regular intervals in general accordance with ASTM D 1586. Representative samples were obtained during these tests and were used to classify the soils encountered. The standard penetration resistances obtained provide a general indication of soil shear strength and compressibility.

Rock sampling was performed at Borings B-3 and B-10 in accordance with ASTM D-2113 using a diamond-studded bit fastened to the end of a hollow double-tube core barrel. The core barrel was drilled into the rock up to five feet at a time, and the samples were removed for measurement of sample recovery. The recovery is determined as the ratio of sample length recovered to the distance drilled.

The core samples were stored in boxes and returned to our laboratory for identification and determination of the Rock Quality Designation (RQD). The RQD is determined as the ratio of intact rock in NX or NQ core sections 4 inches or longer to the distance drilled. Percentages of recovery and RQD are given on the boring logs included in the Appendix of this report and summarized within the table below.

Boring No.	Depth of Core Run (feet)	REC (%)	RQD (%)
B-3	39.0-44.0	32	13
	44.0-49.0	53	7
B-10	23.5-28.5	87	17
	28.5-33.5	100	22

3.1 SUBSURFACE CHARACTERIZATION

The project site is located within the Central Blue Ridge Anticlinorium. Based on the USGS Geological Map of Virginia (1993), the site is mapped within the Catoctin Formation – Metabasalt soils. This formation typically consists of grayish green to dark yellowish green, fine-grained, schistose chlorite and actinolite

bearing metabasalt. The materials will initially weather into Silty and Clayey SAND and then into SILT and CLAY with extensive weathering.

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil and rock strata. Please refer to the boring logs in Appendix B.

Table 3.1.1 – Subsurface Soil Summary

Approximate Depth (ft)	Stratum	Description	Ranges of SPT[1] N-values (bpf)
0-0.5 (Surface cover)	n/a	Topsoil, Roots, and Organics	N/A
0.3-32.0	I	- Very Loose to Very Dense SAND (SM) and SILT (ML) with varying amounts of parent rock fragments - Firm to Very Stiff CLAY (CL, CH, MH)	4 to 50/4
3.0-80.0	II	- Very Dense Weathered Rock with varying amounts of parent rock fragments	60 to 50/0

Notes: (1) Standard Penetration Test

3.2 GROUNDWATER OBSERVATIONS

Groundwater was encountered in 4 of the 20 borings (B-1, B-2, B-3, and B-5) drilled as part of this geotechnical study ranging from depths of 23± to 53± feet below the existing ground surface. Perched water occurs as precipitation that enters the site, either directly or from overland flow from adjacent properties, begins to percolate through the near surface soils. Once the water percolation reaches the bedrock, which is virtually impermeable, it begins to flow at the intersection of the rock and the soil. This groundwater flow continues down gradient with the water table occasionally surfacing to form as springs and intermittent streams. Only in the lowest lying areas and adjacent to existing creeks is a shallow groundwater table in a continuous condition. Otherwise, it is related to precipitation, although springs may exist in the lower lying areas for extended periods of time without recharge from rainfall. Therefore, the groundwater conditions at this site are expected to be significantly influenced by surface water runoff and precipitation.

Because of the perched nature of the groundwater at this site, long term groundwater conditions can be deceptive. Although the true groundwater table can exist several hundred feet below the existing ground surface, groundwater located in streams and creeks, because of perched overland flow, creates the presence of an effective near surface groundwater table. Because the water is perched and flows at the interface between the soil and bedrock, water exiting fracture channels and cracks is common. Therefore, although all building excavations may appear dry at the time of completion, it is very common for fracture patterns in the rock, because of natural conditions or blasting to become natural pathways for ground water flow.

The highest groundwater observations are normally encountered in the late winter and early spring. Variations in the location of the long-term water table may occur because of changes in precipitation, evapo-transpiration, surface water runoff, and other factors not immediately apparent at the time of this

exploration. The site may also be subject to severe desiccation during extended dry periods. Therefore, earthwork operations, especially in the winter and spring months are more likely to encounter difficulties with perched conditions than those operations undertaken in the summer or fall.

3.3 LABORATORY TESTING

Representative soil samples were selected tested in our laboratory to check field classification and to evaluate pertinent engineering properties. The laboratory testing program included visual classifications (ASTM D4318), moisture content tests (ASTM D2216), Atterberg Limits tests (ASTM D4318), washed sieve grain size analyses (ASTM D412), thermal resistivity testing (ASTM D5334), and California Bearing Ratio testing.

Each soil sample was visually classified on the basis of texture and plasticity in accordance with the Unified Soil Classification System. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. A brief explanation of the Unified Soil Classification System is included in Appendix B of this report. The various soil types were grouped into the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs and profiles are approximate; in situ, the transitions may be gradual, rather than distinct.

4.0 DESIGN RECOMMENDATIONS

The design recommendations outlined in this report are based on the 20 soil test borings performed within the proposed development limits. The following sections provide recommendations for foundation design, soil supported floor slabs, seismic design parameters, pavements, and stormwater management facilities.

4.1 BUILDING FOUNDATIONS

4.1.1 Shallow Foundations (Option)

Provided subgrades and structural fills are prepared as recommended in this report, the buildings, structures, and lightly-loaded substation features may be supported by shallow foundations including column footings and continuous wall footings. We recommend the foundation design use the following parameters:

Table 4.1.1.1 Shallow Foundation Design

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure (Stratum I Soil/Structural Fill) (1)	3,000 psf	3,000 psf
Net Allowable Bearing Pressure (Stratum II)[1]	8,000 psf	8,000 psf
Minimum Width	24 inches	24 inches
Minimum Footing Embedment Depth (below slab or finished grade) (2)	24 inches	24 inches
Estimated Total Settlement (3)	Less than 1 inch	Less than 1 inch
Estimated Differential Settlement (4)	Less than 0.5 inches between columns	Less than 0.5 inches

Notes:

(1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
(2) For frost penetration requirements.
(3) Based on assumed structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
(4) Based on maximum column/wall loads and variability in borings. Differential settlement should be re-evaluated once the foundation plans are more complete.

Potential Undercuts: Most of the natural soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structures. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with lean concrete ($f'_c \geq 1{,}000$ psi at 28 days) up to the original design bottom of footing elevation; the original footing shall be constructed on top of the hardened lean concrete. Additional undercutting of foundations may be required if highly plastic soils or undocumented fill soils are present below the foundation. Please see the High Plasticity Soils section of this report.

For building and site retaining walls and foundations (soil bearing, lateral earth pressures, subgrade modulus, coefficients of friction, etc.).

- Site Soil Design Parameters

Material	Unit Weight (pcf)	Angle of Internal Friction (phi)	At-Rest Pressure (psf per vertical foot of wall)	Active Pressure (psf per vertical foot of wall)	Passive Pressure (psf per vertical foot of wall)
CH	115	12	90	75	175
ML	120	25	70	50	300
SM	125	30	65	45	375
Weathered Rock	135	45	40	25	400

Material	Compacted or In-Situ Soil Moist Unit Weight (δ)	Angle of Internal Friction (ø)	Cohesion (C)	Coefficient of Earth Pressure at Rest (K_o)	Coefficient of Active Earth Pressure (Ka)	Coefficient of Passive Earth Pressure (K_p)
CH	115	12	0	0.79	0.66	1.52
ML	120	25	0	0.58	0.41	2.46
SM	125	30	0	0.50	0.33	3.0
Weathered Rock	135	45	0	0.29	0.17	5.82

- For sliding coefficient:

Sliding Friction Coefficient [Concrete on Soil] (μ)	0.30
Skin Friction [Concrete cast against Soil] (F_s) [1]	250 psf

4.1.2 Drilled Shafts (Option)

In the event maximum structural loads for the building are considered to be excessive for shallow foundation system design, the building as well as typical more heavily-loaded substation structures (e.g. transmission line towers, etc.) can be designed to bear on drilled shaft foundations. **For preliminary design purposes only,** we estimated that drilled shafts may be designed to bear in rock sockets having a depth of at least 1 shaft diameter with a design capacity of 60 ksf. An average rock unconfined strength of 4,000 psi may be utilized for preliminary design purposes. Rock suitable for end bearing can generally be identified in the field during drilling by observing drill cuttings which appear generally dry and to consist of rock fragments, a pronounced grinding of the auger teeth and visible dust noted during drilling. Based on the rock depths encountered, we estimate the shaft lengths will vary across the site between 15 feet to over 40 feet in some areas. **Additional borings and rock coring data will be required to determine final tip elevations for each drilled shaft location.** Project planning and estimates should account for potential variability of drilled shaft length throughout the project.

The actual structural designs of the drilled shaft foundation system (including final pier locations, pier lengths, pier dimensions, and spacing) shall be designed and submitted, separately, for review approval and appropriate permit to Prince William County Building Division prior to construction.

We recommend all drilled shaft excavations be observed and approved by the GER prior to concrete placement. We recommend a pre-production meeting be held prior to drilling operations to review the shaft termination criteria with the GER and drilling contractor. Termination criteria shall be determined by the GER based on the final structural design and type of rig.

4.1.3 Auger Cast-In-Place (ACIP) Pile Foundations (Option)

Auger Cast-In-Place (ACIP) piles are installed by drilling a hollow stem auger with a closed tip. Upon reaching the bearing stratum, the plug is removed, and a sand-cement grout is placed under pressure through the hollow stem as the augers are withdrawn (tremie placement). The upper portion of the pile is terminated approximately 6 inches above the bottom of the proposed pile cap. ACIP foundations may be preliminarily designed for an allowable bearing pressure on the order of 50 tons to 100 tons. We estimate the shaft lengths will vary across the site between 25 feet to over 60 feet in some areas. **Additional borings and rock coring data will be required to determine final tip elevations for each ACIP location.** Project planning and estimates should account for potential variability of drilled shaft length throughout the project.

Auger cast-in-place piles greater than 18 inches in diameter will require special equipment to be installed and generally cannot be drilled more than 60 feet in the ground. Please note top of pile elevations were used in calculations and were estimated to be two feet below the finished floor elevations.

The actual structural designs of the ACIP foundation system (including final pier locations, pier lengths, pier dimensions, and spacing) shall be designed and submitted, separately, for review approval and appropriate permit to Prince William County Building Division prior to construction.

We recommend a series of three widely spaced auger probe/test piles be installed under the observation of the geotechnical engineer. Based on these observations, at least one pile should be selected for load testing, by the geotechnical engineer. The purpose of the test piles is to confirm our assumption of pile capacity (which is related to our design safety factor) and to allow observation of the subsurface conditions encountered by the augers.

The single test pile should be load tested in axial compression. The primary objective of the load test program is to observe the load-settlement response of an individual pile in order to verify that the contractor's construction procedures and installation equipment can produce an acceptable pile foundation. The geotechnical engineer should be retained to select the location of the test, observe and document the installation of the test pile and reaction piles, perform the load test and interpret the results, and develop recommendations concerning installation procedure and design tip elevations of production piles. Significant differences from accepted procedures or expected results should be brought to the attention of the Structural Consultant.

The axial compressive pile load test should be performed in general accordance with procedures outlined in ASTM D1143, Paragraphs 5.1 and 5.3. The test pile should eventually be loaded to plunging failure, which can be described as a total pile butt displacement on the order of 15% of the pile diameter, or about

2 inches. Accurate systems referenced to a stationary reference beam supported well away from the zone of influence of the test pile and reaction piles (if applicable). We recommend the load test be performed no sooner than five days after the installation of the test pile, unless the contractor can establish sufficient grout strength only after three days.

Auger cast piles may also be utilized to anchor the reaction frame system for the pile load test. However, these anchor piles may be pulled upward during loading. Upward movement of the piles beyond that of elastic elongation would reduce the downward axial capacity of these piles. Therefore, these anchor piles should not be used as production piles.

4.2 SLABS ON GRADE

Provided subgrades and structural fills are prepared as discussed herein, the proposed floor slabs can be constructed as Ground Supported Slabs (or Slab-on-Grade). The following graphic depicts our soil-supported slab recommendations:

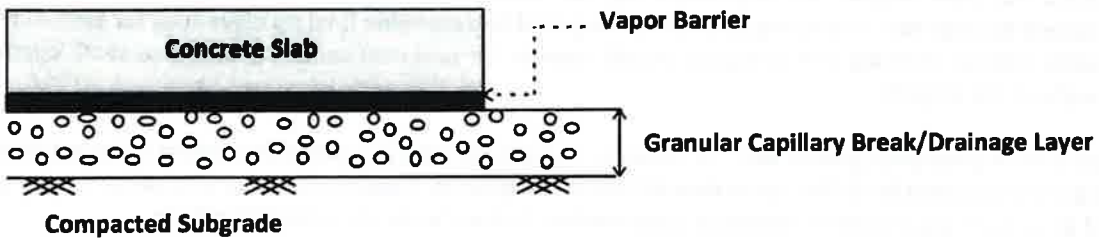


Figure 4.2.1

1. Drainage Layer Thickness: 6 inches minimum.
2. Drainage Layer Material: 6 inches of VDOT #57 stone, VDOT 21-A/21-B

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted structural fill in accordance with the recommendations included in this report. Floor slabs placed in areas where expansive soils (CH/MH) are encountered should be underlain by at least 2 feet of compacted suitable fill.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, k_1 of 150 pci (lbs./cu. inch).

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the

use of a free-floating slab such as in a drop down footing/monolithic slab configuration, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.

4.3 BELOW GRADE WALLS

Any below grade walls that will be backfilled with soil or aggregate should be designed to withstand lateral earth pressures and surcharge loads. For below grade walls that are properly drained, the walls may be designed for an equivalent fluid pressure of 60 pounds per square foot (psf) per foot of wall height. The 60 psf horizontal pressure reflects the moderate strength low plasticity silty and clayey soils present with the wall influence zones. A Lateral Earth Pressure Diagram illustrating our general recommendations regarding the application of lateral earth pressure are included in the Appendix D of this report and in Figure 4.3.1.

The following Figure depicts the suggested lateral earth pressure condition for a "drained condition" with restrained wall top:

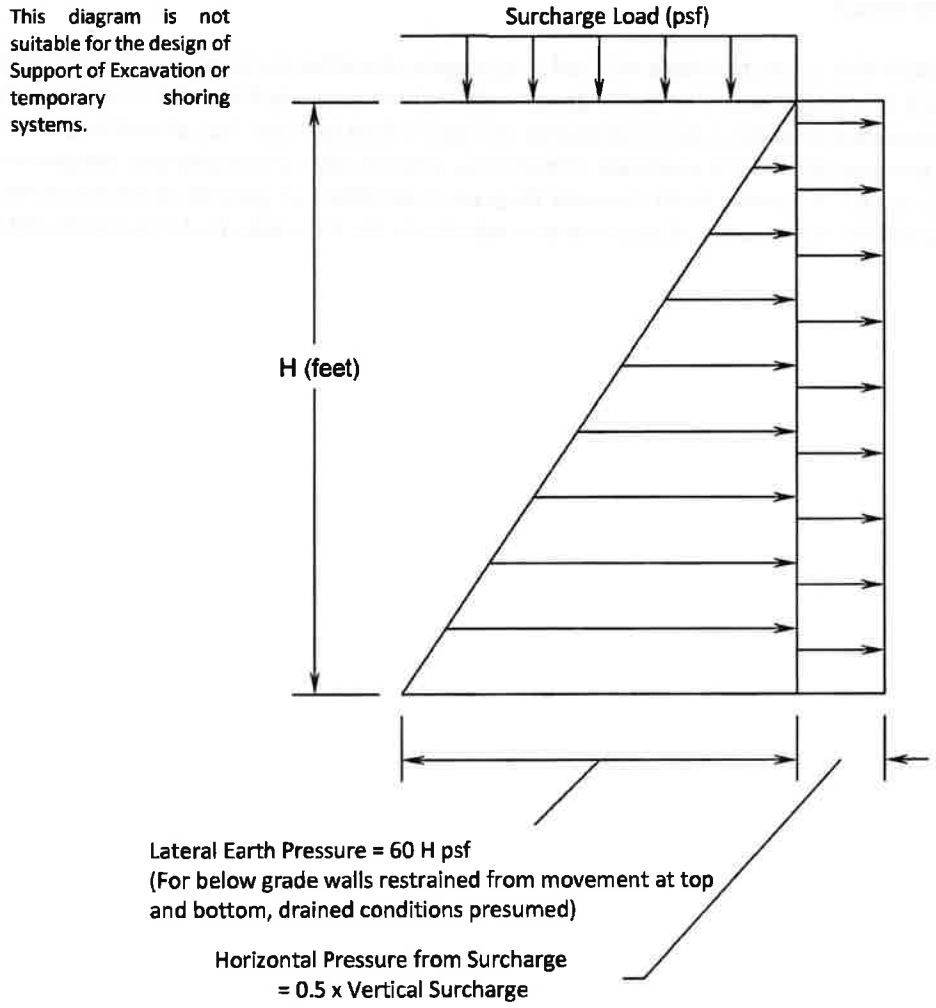


Figure 4.3.1

Any surcharge loads imposed within a 45 degree slope of the base of the wall should be considered in the below grade wall design. The influence of these surcharge loads on the below grade walls should be based on an at-rest pressure coefficient, k_0, of 0.5 in the case of restrained walls.

Backfill materials should consist of inorganic materials, free of debris and be free draining. The fill placed adjacent to the below grade walls should not be over-compacted. Heavy earthwork equipment should maintain a minimum horizontal distance away from the below grade walls of 1 foot per foot of vertical wall height. Lighter compaction equipment should be used close to the below grade walls and the thickness of the lifts should be no more than 6 inches where light weight compaction equipment is used.

To reduce excessive pressures against the below grade walls, and to reduce the settlement of the wall backfill, it is recommended that the wall backfill be compacted to between 92% and 95% of the maximum dry density determined in accordance with ASTM D 698 or VTM-1. Where the fill will be supporting pavement or other structures, the fill should be compacted to near 95% of this specification. Backfill materials which are placed behind below-grade walls should be free of organic materials and debris, free-draining, non-frost susceptible, and should not include any high plasticity Elastic SILT (MH) or Fat CLAY (CH) materials.

Depending upon the excavation methods employed at the time of installation, it may be advantageous to discontinue use of soil as structural backfill and substitute using open graded stone such as VDOT No. 57 stone. The use of No. 57 stone should help with any problems that should be encountered when attempting to backfill and compact soils. The top 2 feet of backfill should be suitable soils placed and compacted in accordance with the section titled Fill Placement. We recommend filter fabric be placed between the VDOT No. 57 stone and the compacted soil to reduce the risk of the soil fines migrating into the voids in the VDOT No. 57 stone. The GER should be contacted prior to employing the use of open graded stone to backfill around these structures.

Suitable manmade drainage materials may be used in lieu of the free draining granular backfill, adjacent to the below grade walls. These materials should be covered with a filter fabric having an Apparent Opening Size (AOS) consistent with the size of the soils to be retained. The material should be placed in accordance with the manufacturer's recommendations and connected to either the perimeter drainage system or the underslab granular mat, which in turn should be properly drained. The ground surface adjacent to the below grade walls should be kept properly graded to prevent ponding of water adjacent to below grade walls.

4.4 SEISMIC DESIGN CONSIDERATIONS

The International Building Code (IBC) 2012 and Chapter 20 of ASCE 7 require site classification for seismic design based on the upper 100 feet of a soil profile. Three methods are utilized in classifying sites, namely the shear wave velocity (v_s) method; the undrained shear strength (s_u) method; and the Standard Penetration Test Resistance (N-value) method. Where site specific data are not available to a depth of 100 feet, appropriate soil properties are permitted to be estimated by the registered design professional preparing the soils report based on known geologic conditions. The seismic site class definitions for the weighted average of either the SPT N-values or the shear wave velocities in the upper 100 feet of the soil profile are presented in Chapter 20 of ASCE 7 and in the table below.

Table 4.4.1: Seismic Site Classification

Site Class	Soil Profile Name	Shear Wave Velocity, Vs, (ft./s)	N value (bpf)
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50
D	Stiff Soil Profile	600 ≤ Vs ≤ 1,200 fps	15 to 60
E	Soft Soil Profile	Vs < 600 fps	<15

In the absence of actual shear wave (V_s) data, we utilized the Standard Penetration Test (SPT) N-values recorded from the borings. Considering the shallow rock surface encountered at this site and our experience with other projects in the area, we recommend that the design for the building be based on a seismic site classification of **Site Class C**.

Considering that the foundation will bear in or close to bedrock, a Site Class B may be possible; however, site specific seismic testing to determine the shear wave velocity of the rock would be required to evaluate this site classification. If it is determined by the structural engineer that an increase in the site class for the project site will result in significant economic savings in the final design, we would be pleased to provide additional site-specific seismic testing services.

4.5 PAVEMENTS

The pavement design recommendations shall conform to the latest VDOT Road and Bridge Standards and Specifications. For the design and construction of exterior pavements, we recommend that all the procedures outlined in the Subgrade Preparation and Earthwork Operations and Fill Placement and Compaction sections be followed through the establishment of roadway section subgrade elevations.

We recommend that topsoil, existing fill material, construction debris, and any other soft or unsuitable materials be removed from the pavement area. The stripped surface should be proofrolled and carefully observed at the time of construction in order to aid in identifying the localized soft or unsuitable materials which should be removed. If high plasticity soils are exposed during the final grading of the paved areas, we recommend that these areas be over-excavated of the high plasticity soil to a depth of 2 feet and replaced with engineered fill.

An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the deterioration of the pavement can be expected. Furthermore, good drainage should reduce the possibility of the subgrade materials becoming saturated over a long period of time. We would be pleased to be of further assistance to you in the design of the project pavements by providing additional recommendations during construction of the project.

It is common practice to install only the base aggregate and the base course asphalt during initial construction, and then the final topping surface asphalt much later in the construction process. Often, depending upon the sequence and timing of construction, the final pavement surface may not be placed until several months to even years after the initial base asphalt is placed. Studies have shown that the most critical load conditions for most development occur during the construction phase. In particular, the pavement system is subjected to loading that includes construction equipment, low-boys, concrete trucks, pre-fabricated joist and dry wall deliveries, and other heavy, high concentrated truck loading which does not occur once the development is finished. Not only does this represent the highest traffic loading condition, but it occurs at a time when the pavement section is not at its full strength, simply because the surface asphalt has not been placed.

Although it is usually not economically feasible to increase the pavement section to satisfy this potential design issue, it should be recognized that prudent steps can be taken to help reduce failures of the pavement system during the construction. For example, we recommend using intermediate type asphalt for the base layer of asphalt to reduce the amount of surface water infiltration into the pavement subbase.

Furthermore, any areas that are low and will have a tendency to pond water should be drained to the extent feasible. This should normally be undertaken in areas that are relatively low and wet, or in areas where there is known to be a concentration of construction traffic. These concentrations should be considered to be the initial entryways to the site, the travelways and any other high-construction traffic areas.

Depending upon the time in which the temporary construction is used as a service road, some failures should be expected. If the construction pavement system fails, it will be necessary to remove this failed section and replace it with the initial design section or an equivalent repaired section.

If pavements will be constructed early during site development to accommodate construction traffic, consideration must be given to the construction of heavier pavement sections, capable of accommodating the much heavier loads normally associated with these activities. The design of actual pavement sections is beyond the scope of this report. We recommend final pavement designs be developed in accordance with applicable VDOT and Prince William County requirements, as appropriate. Such a design should be developed considering anticipated traffic loading conditions, soil subgrade conditions, and CBR value.

Rutting of pavement and ultimately pavement failure are typically experienced due to front loading garbage trucks imposing concentrated wheel loads on pavements. Therefore, we recommend that the pavement in any trash pick-up areas consist of a reinforced concrete pavement underlain by VDOT 21A subbase. Design of concrete pavements is beyond the scope of this report. We recommend concrete pavement designs be developed in accordance with applicable VDOT and Prince William County requirements. Such a design should be based on anticipated traffic loading conditions and soil subgrade conditions.

A design CBR value of 4 is recommended based on laboratory testing performed on samples obtained from Borings B-14 and B-15 during our subsurface exploration. Additionally, we recommend that a Resiliency Factor (RF) of 1.5 be utilized for design purposes of the pavements. If the results of the CBR tests taken during construction differ from that mentioned above, the pavement design should be modified as necessary.

New Asphalt Pavement Section: We have assumed that asphalt (light-duty and heavy-duty) and concrete (heavy-duty) pavement section designs for the parking lot and access roadway pavement areas will be based upon 20-year and 30-year design lives with assumed ESALs of 19,300/610,000 for light/heavy-duty Flexible Pavements and 1,400,000 for Rigid Pavement. If these assumptions are found to be inaccurate for the finalized project average daily traffic values, ECS shall be informed in order to revise pavement section design accordingly.

We have also assumed other design parameters in table below.

Table 4.5.1 Pavement Design Parameters

Reliability	90%
Overall Standard Deviation	0.49
Effective Subgrade Resilient Modulus	6,000 psi
Initial Serviceability	4.2
Terminal Serviceability	2.8

The following sections are expected to provide adequate support for standard-duty pavement and heavy-duty pavements for the newly constructed pavement areas that will be part of the development of the project site.

Table 4.5.2 Design Pavement Sections

Pavement Material	**Pavement Thickness (inches)**		
	Standard-Duty - Asphalt	**Heavy-Duty - Asphalt**	**Heavy-Duty - Concrete**
Surface Course	1.5	1.5	---
Intermediate Course		2.0	---
Base Course	3.0	3.0	---
Portland Cement Concrete	---	---	8.0
Aggregate Base Material	6.0	8.0	8.0
Total Pavement Section Thickness	**10.5**	**14.5**	**16.0**

It should be recognized that construction loading conditions may be more severe than in-service conditions and the Geotechnical Engineer should be advised of any traffic loading conditions that become available in order to confirm and/or modify the pavement section recommendations.

New Concrete Pavement Section: The heavy-duty concrete pavement section should consist of a minimum of 8 inches of air-entrained Portland cement concrete having a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). The concrete pavement shall be underlain by a minimum of 8 inches of compacted dense-graded aggregate base course stone (VDOT 21-A). The rigid concrete pavement section should be provided with construction joints at appropriate intervals per typical concrete pavement construction requirements.

Exterior Concrete Slabs on Grade (Sidewalks, Curbs, Gutters, and Dumpster Pads): The exterior concrete slabs recommendations should conform to the latest VDOT Road and Bridge Standards and Specifications. For the construction of exterior concrete, we recommend that topsoil and any other soft or unsuitable materials be removed from the paved area. The stripped surface should be proofrolled and carefully

observed at the time of construction in order to aid in identifying the localized soft or unsuitable materials which should be removed.

We recommend that exterior concrete slabs such as sidewalks, curbs and gutter be underlain by a minimum of 4 inches of granular material having a maximum aggregate size of 1.5 inches and no more than 2% passing the #200 sieve. This granular layer will reduce the potential for frost heaving of the exterior slabs. Exterior concrete exposed to the weather should be air-entrained.

4.6 SITE RETAINING WALL

One retaining wall with a maximum exposed wall height of 6 feet is proposed along the northeast edge of the site. While design details for the wall are not available at this time, general recommendations have been provided below.

Since retaining walls are free to rotate at the top, they effectively mobilize more of the shear strength of the retained soil than conventional basement or loading dock walls. For the design of permanent site retaining walls with level backfill, we recommend an equivalent fluid pressure of 45 psf per vertical foot of wall. At the areas of the walls such as corners where rotation will be limited, we recommend an equivalent fluid pressure of 60 psf per vertical foot of wall since rotation is restricted in these areas. This lateral earth pressure assumes that low-plasticity materials with a LL equal to or less than 40 and a PI less than 15, unless the material can be shown to have a very low expansion potential, are used for the wall backfill and that drainage of the backfill is provided as discussed below. A Lateral Earth Pressure Diagram has been included in the Appendix to further detail the anticipated earth pressure distribution behind the wall. The design should also account for any surcharge loads that are within a 45° slope from the base of the wall, and any slope of the backfill. The retaining wall should be designed so that the resultant of the overturning forces remains in the central one-third of the footing.

The foundations for proposed retaining wall should be designed for a maximum allowable soil bearing pressure of 3,000 psf, provided that the footings are founded within firm natural soils or engineered fill placed over firm natural soils. Special care should be taken to confirm soft existing soils are removed prior to the placement of structural fill on the established foundation subgrades.

Sliding resistance of the retaining wall can be achieved either through the use of a shear key (for concrete retaining walls only) or through the frictional forces developed at the base of the retaining wall. A shear key, if installed, can be designed for a passive pressure of 300 psf per foot of depth. This assumes that the soils at the base of the retaining wall are approved, firm natural soils or compacted structural fill. A frictional resistance coefficient of 0.3 can be utilized for sliding resistance design for the retaining wall. The structural design of proposed retaining walls should be approved prior to site implementation.

The recommendations presented herein assume that the backfill behind the retaining wall is properly drained. Suitable man-made drainage materials may be used in lieu of the free draining granular backfill, adjacent to the wall. These materials should be covered with a filter fabric having an Apparent Opening Size (AOS) consistent with the size of the soils to be retained and should be placed in accordance with the manufacturer's requirements. Drainage of the backfill may be accomplished through the use of 4-inch diameter weep holes at 8 feet spacing, through the wall, immediately above proposed grade at the front of the wall. Alternatively, a longitudinal drain line could be used behind the retaining wall. The drain should consist of a 6-inch perforated pipe surrounded by a minimum of 6 inches of VDOT No. 57 stone.

The No. 57 stone should be completely wrapped in a filtration geotextile such as Mirafi 140N. The geotextile used should be reviewed and approved by the geotechnical engineer. The ground surface adjacent to the retaining wall should be kept properly graded to prevent ponding of water adjacent to the wall or drainage of water over the front of the wall.

The land above the recommended geogrid reinforcement layers must be designated as a "soil reinforcement zone easement" and any future landscaping or planting should be coordinated such that it does not disturb the soil reinforcement system and/or will not affect the retaining wall stability. The geogrid layers will be installed in conjunction with the wall construction and thus will precede the excavations for plant material and landscaping. Trees and other plant material that might impact the geogrid reinforcing shall be kept outside the soil reinforcement zone easement.

The construction sequence will be important in areas where construction of the wall will either be in conflict or be too close to any existing storm pipes and structures. We recommend that in such cases, the storm pipes and the structures be installed first or simultaneously with the construction of the wall, since excavation for the storm pipes and structures after construction of the wall may jeopardize the stability of the wall. The wall designer should consider the presence of the storm structures in his or her design and should include standard or specific details for placement of wall backfill around these structures in design. In cases where storm sewer pipes penetrate and/or are located underneath the proposed wall, we recommend the provision of an encasement/liner or a grade beam in order to allow the pipes to be removed for maintenance without affecting the wall stability. If the storm line extends through the face of the wall, then block units should be saw cut within 1/2-inch of the pipe. Details for the pipe outlet and casing as well as wall sections with the pipe in the reinforcing zone should be included in the retaining wall design.

4.7 STORM WATER MANAGEMENT PONDS

One storm water management pond is currently proposed for the site. At the time of this report, specific details regarding water surface elevations and locations and elevations of pond structures were not available. As such, it is the intent of this section to provide general recommendations for design and construction of the pond. Once detailed pond designs and grading is available, ECS should be contacted to provide updated recommendations and, if necessary, global stability analyses for the pond.

4.7.1 Earthwork Operations

Subgrade preparation operations should consist of stripping all vegetation, rootmat, and topsoil and any other soft or unsuitable material from the dam embankment. Where possible, stripping limits for the proposed grading of the dam should be extended at least 10 feet beyond the toe.

After stripping to the desired grade and prior to new fill placement, the exposed soils should be carefully examined to identify any localized loose, yielding or otherwise unsuitable materials by an experienced geotechnical engineer or his authorized representative. After examining the exposed soils, loose and yielding areas can be identified by proofrolling with an approved piece of equipment, such as a loaded dump truck having an axle weight of at least 10 tons. Any soft or unsuitable materials encountered during this proofrolling should be removed and replaced with an approved backfill.

4.7.2 Embankment Fill Placement

The on-site materials may be reused as engineered fill if they do not contain organics or foreign debris, are not highly plastic, are not environmentally impacted, and conform to the criteria outlined below for acceptable soil types for construction. Based on observations made during the subsurface exploration program and following visual observation of the recovered soil samples, some of the natural soils may be suitable for reuse as engineered fill materials; however additional laboratory testing will be required for confirmation of soils to be used as engineered fill. Under no circumstances should CH soils be used as fill material in proposed structural areas.

The preparation of fill subgrades should be observed on a full-time basis. These observations should be performed by the Geotechnical Engineer of Record, or their representative, to ensure all unsuitable materials have been removed, and the subgrade is suitable for support of the proposed construction and/or fills. In some areas, excessively soft and/or wet soils may be encountered for fill subgrades, especially in the winter or early spring months. All soft areas should be excavated and removed.

Upon achieving competent subgrade materials, the excavated area should be filled, where appropriate, to planned grades with an approved controlled, compacted fill. All fill and backfill placed within the embankments and around the structures should be placed in lifts not exceeding 8-inches in loose thickness and moisture conditioned to within 2 percentage points on the wet side of the optimum moisture content. We recommend that the lifts be compacted to at least 95 % of their maximum dry density, as determined by ASTM D-698, Standard Proctor, for the full depth of the fill. Acceptable soil types for construction of the embankment on the upstream and downstream side (excluding the clay liner) include soils having a USCS designation of ML and CL; and SM and SC having a minimum of 25% passing No. 200 sieve. The on-site SM and SC soils tested do generally meet these requirements and should be suitable for use as fill.

The timing for placement of backfill for the embankment should be planned to minimize the risk of piping of soil based on laboratory tests performed on the material proposed for use prior to construction (additional observations and analyses may be required for the clay liner placement).

It is recommended that new fill soils be **benched** into the existing soils to verify adequate soil bonding of these materials. If the top of an exposed layer is too smooth, it should be rerolled with a sheepsfoot roller, or scarified prior to the placement of the next lift of fill. Although it is desirable to seal off fill surfaces on a daily basis using a steel drum or rubber tired roller, these surfaces should be scarified the following day prior to fill activities to minimize the creation of planes of seepage within the embankment structure.

Fill materials should not be placed on frozen soils or frost-heaved soils and/or soils which have been recently subjected to precipitation. All frozen soils should be removed prior to continuation of fill operations. Borrow fill materials, if required, should not contain frozen materials at the time of placement. All frost-heaved soils should be removed prior to placement of controlled, compacted fill, granular subbase materials, foundation or slab concrete, and asphalt pavement materials. Soil bridging lifts within the proposed embankment should not be used since excessive settlement of the structure can occur. Also, trees should not be planted on the existing dam embankment.

4.7.3 Facility Outlets

The principal outlet pipes penetrating the embankment dams should be provided with seepage control measures consisting of a concrete cradle and downstream collection drain. Primary outlet conduits, which penetrate the facility embankments, should be constructed on a concrete cradle along the upstream two-thirds of the conduit length. The downstream one-third of the principal spillway pipe should be surrounded with a 12-inch thick layer of open graded coarse aggregate (VDOT No. 78) wrapped with a suitable nonwoven geotextile with an Apparent Opening Size (AOS) of 70. (The coarse aggregate should conform to the current VDOT Road and Bridge Specifications Section 203 and the geotextile with Section 245.) The gravel layer below and around the conduit at the downstream end will serve to collect any seepage along the conduit. This drainage blanket should be daylighted at the slope face or tied into the stormwater discharge structure.

4.7.4 Foundations for Drainage Control Structures

Based on the results of our subsurface exploration and our engineering analysis, we recommend that any proposed stormwater discharge control structures be supported on spread footing foundations bearing either on suitable firm natural soils or on new engineered fill constructed over suitable natural soils. Assuming subgrades are prepared according to the recommendations above, the foundations may be designed for a net allowable soil bearing pressure of 2,000 pounds per square foot (psf).

If unsuitable soil types or bearing conditions are found to exist at the foundation level, then the base of the excavation should be lowered to suitable materials. As an alternative, the original bottom-of-footing level can be restored by the placement of "lean" (1,000 psi) concrete after removal of the unsuitable soils.

Fill materials should be placed in accordance with the Compaction section of this report. The soil will be moisture and disturbance sensitive; therefore, excavation for the outlet structures should proceed in an expeditious manner in order to reduce exposure of the bedding soils. The foundation excavation should be observed and the bearing pressure of the footing subgrade tested by an authorized representative of the GER.

Granular bedding should not be used to support foundations or pipes penetrating the facility embankments. Granular soils should only be used where specifically designed for drainage. Conduits penetrating the embankments should be supported by properly placed soil or natural soils trimmed to fit the pipe diameter, or concrete fill, such as lean concrete or "flowable" fill, to control seepage along such conduits which could otherwise result in a soil piping failure. The upstream two thirds of the primary discharge pipe should be placed over a concrete cradle as described in the previous section.

4.7.5 Pond Liner (Wet Ponds Only)

In order to maintain the permanent pool elevations, we recommend the use of a clay or synthetic liner to minimize the potential for seepage through the silty and clayey sand materials and weathered rock.

The liner should be present along the entire pond bottom, including embankment slopes up to the 10-yr storm elevation on the impounded side only. The liner should consist of an 18-inch thick layer of material meeting the specification of the most recent edition of the BMP Clearinghouse (Table 14.4). The liner should consist of soil with a minimum of 30% clay particles, by weight. The material should also have a

minimum Plasticity Index of 15 and a minimum Liquid Limit of 30. We recommend the liner have a maximum permeability of $1x10^{-7}$ ft/sec and should be compacted to 90% to 95% of the maximum dry density as determined by the Standard Proctor Method (ASTM D698). Generally, a soil material classified as Lean CLAY (CL) and having less than 10% retained on the #4 sieve should meet this requirement. Fat CLAY (CH) is not recommended for use as a liner due to concerns over shrinkage cracks. We also recommend the soils for the liner be installed at 2 to 3 percentage points wet of the optimum moisture content. Clay liner materials should be kept moist during and after installation to reduce the potential for desiccation and cracking. It is recommended that new clay liner soils be benched into the existing soils to verify adequate soil bonding of these materials.

4.8 SOIL THERMAL RESISTIVITY

Soil thermal resistivity testing was performed on remolded samples obtained from depths ranging from 1± feet to 6± feet below site grades. The samples were compacted to approximately 95% of the maximum dry density as determined by the Standard Proctor Method (ASTM D698). Tests were performed in general accordance with ASTM D5334. Tests were performed at various moisture contents to develop a dry-out curve. Based on the test results, we recommend the following maximum resistivity values at each location be used for design:

Sample No.	Recommended Max. Rho (°C*cm/W)
B-2	220
B-7	190
B-11	205

Based on the test results, we recommend a **single maximum resistivity value of 220** be used for design of general site duct banks. Laboratory test results for each sample are included in the Appendix of this report.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping all vegetation, rootmat, topsoil, existing fill, and any soft or unsuitable materials from the 10-foot expanded building and 5-foot expanded pavement limits, and 5 feet beyond the toe of structural fills. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. Root balls may extend as deep as about 2 feet and will require additional localized stripping depth to completely remove the organics. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of structural fill or construction of structures.

5.1.2 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are unstable or "pumping" subgrade those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.1.3 Site Temporary Dewatering

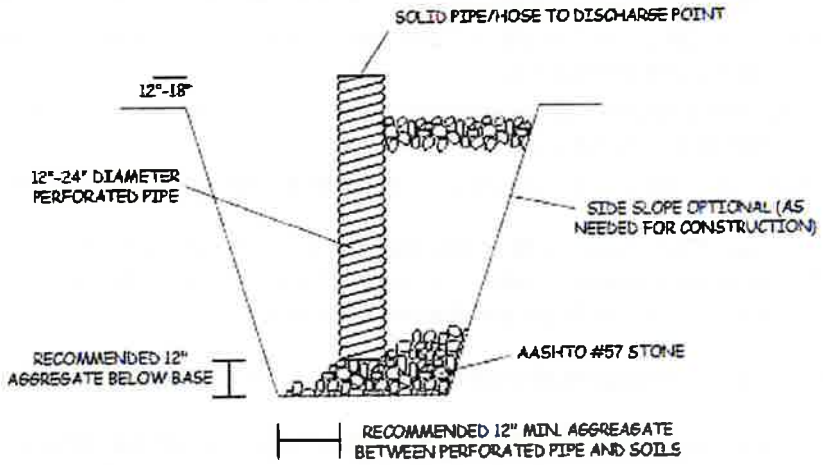
Groundwater on this site can be characterized as being broadly perched above less permeable materials and shallow rock. The depth at which perched water is present on the site varies with surface elevation. In low-lying areas the presence of perched water is more pronounced. In higher areas and on ridge lines, perched water may be present, including above design cut elevations, but is less concentrated. Soils at contact with perched water levels were very moist to wet. In most cases, moisture then decreased with depth.

The contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. Soil sampling is not continuous, and thus soil and groundwater conditions may vary between sampling intervals (typically 5 feet). If the contractor believes additional subsurface information is needed to assess dewatering needs, they should obtain such information at their own expense. ECS makes no warranties or guarantees regarding the adequacy of the provided information to determine dewatering requirements; such recommendations are beyond our scope of services.

Dewatering systems are a critical component of many construction projects. Dewatering systems must be selected, designed, and maintained by a qualified and experienced (specialty or other) contractor familiar with the succinct geotechnical and other aspects of the project. The failure to properly design and maintain a dewatering system for a given project can result in delayed construction, unnecessary foundation subgrade undercuts, detrimental phenomena such as 'running sand' conditions, internal erosion (i.e., 'piping'), the migration of 'fines' down-gradient towards the dewatering system, localized settlement of nearby infrastructure, foundations, slabs-on-grade and pavements, etc. Water discharged from any site dewatering system shall be discharged in accordance with all local, state and federal requirements.

Strategies for Addressing Perched Groundwater:

The typical primary strategy for addressing perched groundwater seeping into excavations is pumping from trench (or French) and sump pits with sump pumps. A typical sump pump drain (found in a sump pit or along a French drain) is depicted below. The inlet of the sump pump is placed at the bottom of the corrugated pipe and the discharge end of the sump is directed to an appropriate stormwater drain.



Sump Pit/Pump Diagram

Details of a typical French drainage installation are included in Appendix D. A typical French drain consists of an 18 to 24-inch wide by 18 to 24-inch deep bed of AASHTO #57 (or similar open graded aggregate) aggregate wrapped in a medium duty, non-woven geotextile and (sometimes) containing a 6-inch diameter, Schedule 40 PVC perforated or slotted pipe. Actual dimensions should be as determined necessary by ECS during construction. After the installation has been completed, the geotextile should be wrapped over the top of the aggregate and pipe followed by placement of backfill. The top of the drain should be positioned at least 18 inches below the design subgrade elevations. Drains should not be routed within the expanded building limits.

Pumping wells or a vacuum system could also be used to address perched groundwater. These techniques often are only effective during the initial depletion of the perched water quantity and may quickly be ineffective at addressing accumulation of water from rain, snow, etc.

5.2 EARTHWORK OPERATIONS

5.2.1 High Plasticity Soils

Within the proposed project limits, potentially expansive soils (CH/MH) were encountered during this exploration; these types of soils are common in this area, and, based on the regional geology as well as results from past ECS subsurface explorations performed on nearby sites, these and other high plasticity soils are believed to present at the site at locations which may not have been evaluated during this subsurface exploration. Care should be taken to limit moisture variations in order to reduce potential volume changes. If the field work is conducted during the winter or early spring months, it is expected that even the low-plasticity clay/silt soils at the surface may need to be removed or dried prior to fill placement. If expansive clays and clay-silt mixtures are encountered, they should not be used as fill for roadway, curb, gutter, and sidewalk subgrade, within utility trenches, or within embankment slopes. For suitability of natural soils to be used in structural areas (i.e. foundations and floor slabs), soils meeting all four of the following provisions shall be considered expansive per IBC 2012, except that tests to show compliance with items 1, 2, and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. *Plasticity Index (PI) of 15 or greater, determined in accordance with ASTM D 4318.*
2. *More than 10 percent of the soil particles pass a No. 200 sieve (0.75 µm), determined in accordance with ASTM D 422.*
3. *More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.*
4. *Expansion Index greater than 20, determined in accordance with ASTM D4829.*

If the Plasticity Index (PI) of the soil is 20 or less and the Liquid Limit (LL) is 45 or less, the Plasticity Index Corrected (PI cor) or the Expansion Index Corrected (E1 cor) may be substituted in the definition of Expansive Soil. Where PI cor and E1 cor are determined as follows:

PI cor = PI x (% Passing No.40 sieve)/100 and EI cor = EI x (% Passing No. 4 Sieve)/100

These soils should not be reused as engineered fill. When these soils are encountered in cut areas, they should be undercut to 4 feet below finished exterior grade or to 2 feet below the bottom of footing, whichever is deeper, and backfilled with controlled, compacted fill. If the bottom of the plastic soils extends to depths less than 4 feet below the finished exterior grade, the undercutting and replacement may be limited to the depth of the high plasticity soils.

Alternatively, the footings can be "stepped down" to bear either at 4 feet below exterior grade or at 2 feet below normal footing subgrade, whichever is deeper, bearing on the plastic soils. If the plastic soils are found to be less than 4 feet in thickness, the footing needs bear only below the plastic soils and the frost line.

Floor slabs placed in areas where highly plastic soils are encountered should be underlain by at least 2 feet of compacted suitable fill. In proposed pavement areas, we recommend undercutting and replacement of the expansive soils in order to provide at least 2 feet of non-expansive soil fill below the pavement subgrade.

5.2.2 Existing Man-Placed Fill

Existing man-placed fill was not encountered below the existing ground surface within any of the borings evaluated for this exploration. However, it should be noted that the general site is bordered by some developed areas and fill may be present in areas of the site not explored during our current study or adjacent to utilities or structures at the site. Existing fill material should be considered undocumented fill and will have to be removed and reworked or replaced within structural areas. Any encountered trash or unsuitable fill materials should be completely removed within structural areas and should not be used in structural fill areas.

If areas of existing fill are encountered at a subsequent time during site development, it may be feasible to remove and re-compact the existing fill materials; however, further laboratory testing should be performed at that time to confirm if the fill materials satisfy the requirements for an engineered fill. Some moisture conditioning of the soils may be necessary prior to placement in order to achieve proper compaction. Additionally, the amount of debris present in existing fill materials can frequently be difficult to evaluate with soil borings. Therefore, test pits may be warranted to confirm the fill does not contain unacceptable debris prior to reuse in engineered fill. Some screening may be required to remove any debris prior to placement of these soils, so the planning of earthwork operations should recognize and account for these efforts and increased costs.

5.2.3 Weathered Rock and Rock Excavation Operations

Weathered rock was encountered as shallow as 3.0± feet below the existing ground surface. Rock excavation will be required for mass grading and installation of any deep utilities. Typically, for excavations in relatively unweathered rock material, ripping is practical for excavations extending down to about 2 feet below the depth of auger refusal. However, blasting or hoe-ramming for removal of weathered rock or intact rock will likely be required below auger refusal depths.

For the construction planning and final pay quantities, we recommend that the following definition be utilized in the project specification to define rock:

> "For footings, trenches and pits, rock shall be defined as those materials that cannot be excavated with a Caterpillar Model No. 320L track-type hydraulic excavator, equipped with a 42-inch wide short-tip radius rock bucket, rated at not less than 120 hp flywheel power with a maximum drawbar pull force of not less than 39,700 lbs. Boulders or masses of rock exceeding one-half cubic yard in volume shall also be considered rock excavation. This classification does not include materials such as loose rock, concrete, or other materials that can be removed by means other than drilling and blasting, hoe-ramming, or rock trenching, but which for reasons of economy in excavating, the contractor chooses to remove by drilling and blasting, hoe-ramming, or rock trenching techniques."

Refusal materials (intact rock) normally require blasting in deep excavations. Blasting in utility trenches should be done carefully to avoid damage to the surrounding materials. When the material to be excavated requires blasting, the contractor should comply with the requirements of the county.

5.2.4 Structural Fill

Product Submittals: Prior to placement of structural fill, representative bulk samples (about 50 pounds) of on-site and off-site borrow should be submitted to ECS for laboratory testing, which will include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Structural Fill Materials: Fill material underneath the proposed structures and pavements should consist of an approved material (CL, ML, SC, SM or more granular), free of debris, organics, and cobbles greater than 4 inches. The structural fill in the "active zone" under the building pad should have Liquid Limit (LL) no greater than 40 and Plasticity Index (PI) less than 15, and shall be non-expansive in addition to meeting all the other requirements for a suitable structural fill material. The "active zone" is defined by PWC as a buffer of at least four feet below the final exterior grades or two feet below the bottom of the foundation, whichever is greater. Fill below the "active zone" for structures, and below subgrade for slopes and pavement (curb and gutter, sidewalk, etc.) should have LL and PI no greater than 45 and 20, respectively, unless it can be shown to have very low expansion potential. If no structural fill is required, the upper two feet of existing soil shall meet these criteria. Under no circumstances should high plasticity (CH, MH) soil be used as fill material in proposed structural areas.

The low plasticity natural soils at this site are expected to be suitable for use as controlled fill; however, they may require moisture content adjustments, via discing or other drying techniques or spraying of water to the soil prior to their use as controlled fill material. Additionally, any debris or other unsuitable materials must be removed, as necessary, from the on-site materials prior to their reuse as engineered fill. The planning of earthwork operations should recognize and account for these efforts and increased costs. Suitable structural fill soils should have the index properties shown in the tables below.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	Property
Building and Structural Areas	LL < 40, PI<15
Pavement Areas	LL < 45, PI<20
Max. Particle Size	4 inches
Fines Content (% passing #200 sieve)	Max. 25 %
Max. organic content	5% by dry weight

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Standard Proctor, ASTM D698/ Virginia Test Method (VTM-1)
Required Compaction	95% of Max. Dry Density for fill less than 10 feet
	98% of Max. Dry Density for fill greater than 10 feet
Moisture Content	-2 to +3 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

Flowable Fill/Lean Concrete Fill Recommendations: Low strength flowable fill/lean concrete materials are also considered suitable for use as fill to restore site grades to final slab-on-grade elevations for conduit installation. Prior to the placement of these materials, subgrades shall be observed and approved in accordance with the requirements presented in this report. Fill areas shall be limited to locations where compaction of approved structural fill soils will not result in adequate parameters/values, and fill depths shall be limited to depths to which consolidation will not be permissible. The flowable fill shall be approved by the design team to ensure placement, curing, and resistivity values are achieved. Other approved structural fill materials shall not be layered between multiple lifts of flowable fill.

On-Site Borrow Suitability: Significant natural deposits of soils classified in our boring logs as Silty SAND/Sandy SILT (SM/ML) have been identified as being present on the site. These occur mostly at relatively shallow depth below the surface where residual soils are mostly weathered.

Non-Durable Rock: Nondurable rock materials removed in ripping excavations may be used as fill if suitably broken down by mechanical compaction effort. Durability is the term used to describe the ability of a rock or rock-like material to withstand long term chemical or mechanical weathering without size degradation. Any weathered rock excavated from the site and used as engineered fill should have a well-graded grain size distribution with rock and soil particles ranging from clay or silt size particles to a maximum size of 4 inches in diameter. Particles larger than this should be broken by mechanical compaction equipment to achieve the desired grain size distribution, and the samples should have a minimum of 20% passing the #200 sieve and 50% passing the #40 sieve. Variations from these recommendations should be approved by the GER, at the time the samples are prepared.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

Fill Equilibrium Monitoring: Up to approximately 21± feet of new fill will be required to reach planned grades in some areas. With this extensive fill and predominately fine-grained soils anticipated for its construction, settlement monitoring prior to commencing foundation construction is recommended in order to confirm the fill has reached equilibrium. Likewise, it would be prudent to place the extensive new fill for the building as early as possible in the site development phase so that any residual, fill-induced settlement can occur without major impacts to the building construction schedule.

We believe that the majority of the fill-induced settlement will occur within the fill itself, rather than over a deep soft soil layer. Therefore, a monitoring program utilizing near-surface settlement plates or

monuments should be implemented near or immediately upon the conclusion of the fill placement. The frequency of monitoring should be on a weekly basis, but this should be adjusted as necessary by the GER based upon settlement rates. The GER will also determine the duration of the settlement monitoring based on settlement rates and trends. Typically, the fill-induced settlement rates are highest during the fill placement and begin to taper off shortly after ceasing any fill placement. Fill-induced settlements will practically stop within two or so months after the completion of any fill placement. Construction can begin when subsequent readings indicate settlement of the fill under its own weight has virtually ceased.

5.2.5 Temporary and Permanent Slopes

Because of the erodibility of the natural soil at the site, special care should be taken to prevent erosion. We recommend that temporary slopes established during construction be constructed no steeper than 1H:1V and maintained for no more than 30 days.

Landscape berms can be constructed as steep as 2H:1V; however, it should be noted that the site soil is highly erodible and that adequate measures must be taken to prevent erosion of slopes steeper than 3H:1V. All slopes must be protected from erosion by a ground cover of adequate vegetation and erosion control measures. All excavations should be performed in accordance with the current OSHA and VOSHA regulations.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick "mud mat" of "lean" concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally suitable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Any loose or unsuitable materials encountered should be removed and replaced with suitable compacted structural fill or pipe stone bedding material.

Utility Backfilling: The granular bedding material (often VDOT #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend

that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for Structural Fill and Fill Placement.

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Bohler. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

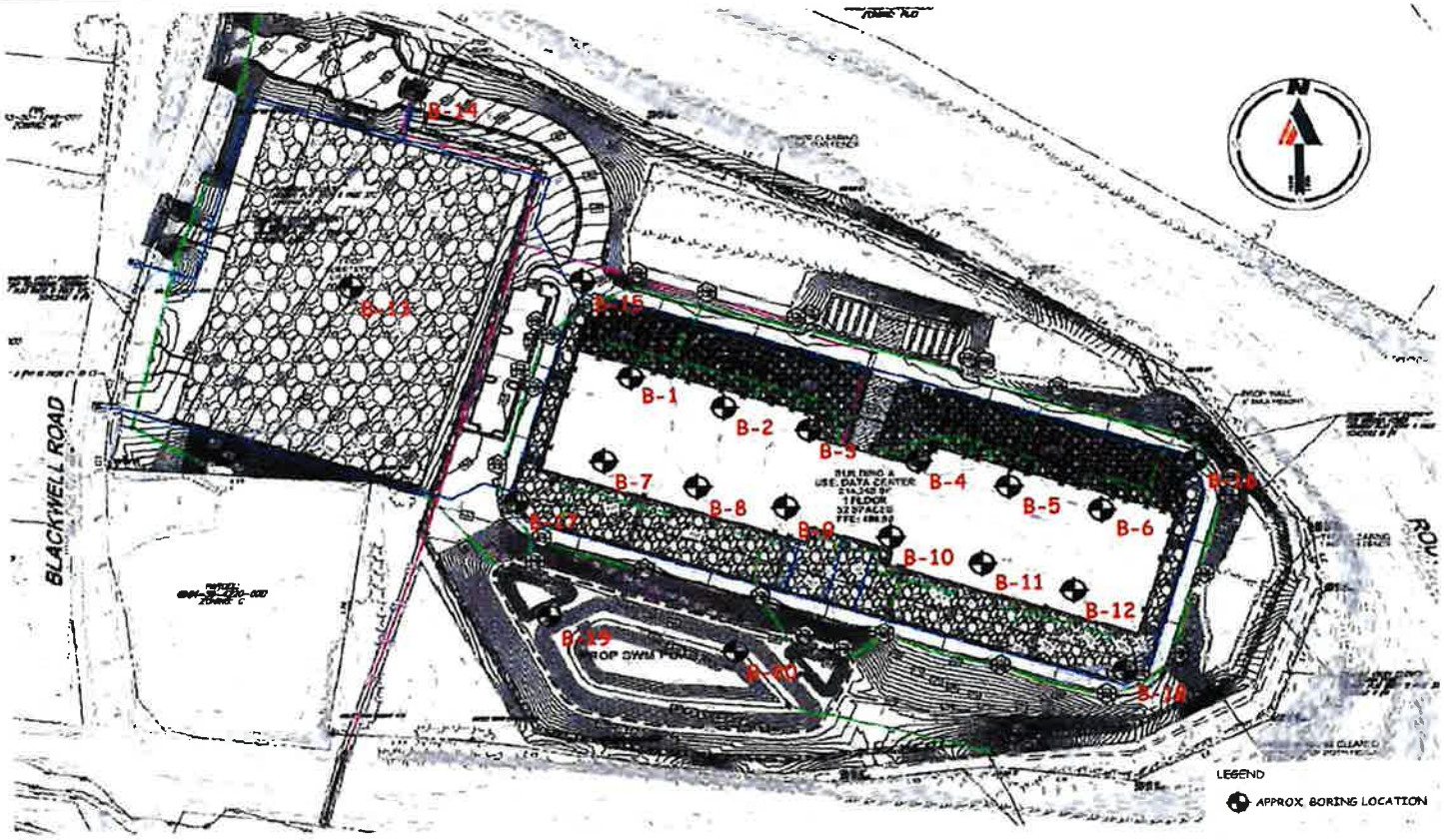
APPENDIX A – Diagrams & Reports

Site Location Diagram
Boring Location Diagram

SITE LOCATION DIAGRAM
WARRENTON DATA CENTER

LEE HIGHWAY AND BLACKWELL ROAD, WARRENTON, VIRGINIA
BOHLER ENGINEERING

ENGINEER	DOA
SCALE	AS NOTED
PROJECT NO.	01:31153
SHEET	1 OF 1
DATE	11/10/2021



Proposed Boring Location Diagram Bohler Engineering	ECS	**Warrenton Data Center** Warrenton, Virginia	ENGINEER: JAS6 SCALE: NTS PROJ NO.: 01:31153 SHEET: 1 DATE: 3/18/2022

APPENDIX B – Field Operations

Reference Notes for Boring Logs
Subsurface Exploration Procedure Notes
Boring Logs B-1 through B-20

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	FILL[3] MAN-PLACED SOILS
GW	WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
GP	POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
GM	SILTY GRAVEL gravel-sand-silt mixtures
GC	CLAYEY GRAVEL gravel-sand-clay mixtures
SW	WELL-GRADED SAND gravelly sand, little or no fines
SP	POORLY-GRADED SAND gravelly sand, little or no fines
SM	SM SILTY SAND sand-silt mixtures
SC	CLAYEY SAND sand-clay mixtures
ML	SILT non-plastic to medium plasticity
MH	ELASTIC SILT high plasticity
CL	LEAN CLAY low to medium plasticity
CH	FAT CLAY high plasticity
OL	ORGANIC SILT or CLAY non-plastic to low plasticity
OH	ORGANIC SILT or CLAY high plasticity
PT	PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION		
DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	<5	<5
Dual Symbol (ex: SW-SM)	10	10
With	15 - 25	15 - 25
Adjective (ex: "Silty")	>30	>30

WATER LEVELS[6]	
	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 16.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 12 inches (in 3 or 4 Increments of 6 inches each)

- Auger is advanced* and an additional SPT is performed
- One SPT test is typically performed for every two to five feet

- Obtain two-inch diameter soil sample

**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-01**	**1 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **492**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [4"]			
	S-1	SS	18	12	(SM) SILTY SAND, brown, moist, loose			3-3-4 (7)
	S-2	SS	18	16	(CH) SANDY FAT CLAY, brown and gray, moist, firm			4-4-5 (9)
5	S-3	SS	18	10	(SM) SILTY SAND, brown, moist, medium dense		487	5-5-7 (12)
	S-4	SS	9	0	WEATHERED ROCK, light brown, moist, very dense			32-50/3" (50/3")
10							482	
	S-5	SS	16	13				29-38-50/4" (88/10")
15							477	
	S-6	SS	3	3				50/3" (50/3")
20							472	
	S-7	SS	2	2		▽		50/2" (50/2")
25							467	
	S-8	SS	5	5				50/5" (50/5")
30							462	

CONTINUED ON NEXT PAGE

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**23.0**	BORING STARTED:	**Sep 21 2021**	CAVE IN DEPTH:	**47.0**
▼ WL (Completion)	**34.0**	BORING COMPLETED:	**Sep 21 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-01**	**2 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:		LOSS OF CIRCULATION	
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **492**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	5	5	WEATHERED ROCK, light brown, moist, very dense	▼	457	50/5" (50/5")
40	S-10	SS	15	15			452	24-43-50/3" (93/9")
45	S-11	SS	10	10			447	32-50/4" (50/4")
50	S-12	SS	4	4			442	50/4" (50/4")
55	S-13	SS	4	4			437	50/4" (50/4")
60	S-14	SS	3	3	END OF BORING AT 58.8 FT		432	50/3" (50/3")

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

16.5

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**23.0**	BORING STARTED:	**Sep 21 2021**	CAVE IN DEPTH:	**47.0**
▼ WL (Completion)	**34.0**	BORING COMPLETED:	**Sep 21 2021**	HAMMER TYPE:	**Auto**
▽ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-02**	**1 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **480**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

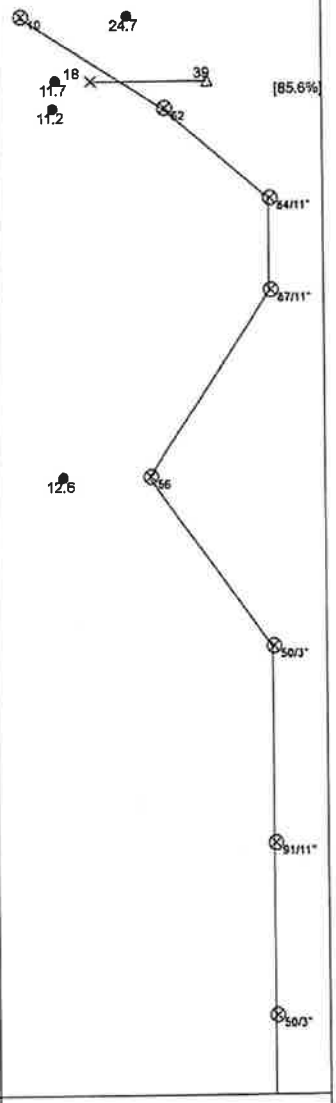
RQD

REC

CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [3"]			
	S-1	SS	18	12	(SM) SILTY SAND, brown, moist, loose			2-3-7 (10)
	~~D35~~	~~BG1~~	~~60~~		WEATHERED ROCK, light brown, greenish gray, and black, moist, very dense			
5	191 S-2	SS	18	18			475	17-24-38 (62)
	S-3	SS	17	17				19-34-50/5" (84/11")
	S-4	SS	17	17			470	20-37-50/5" (87/11")
10								
	S-5	SS	18	18				17-24-32 (56)
15							465	
	S-6	SS	9	9				24-50/3" (50/3")
20							460	
	S-7	SS	17	15				30-41-50/5" (91/11")
25							455	
	S-8	SS	9	9				45-50/3" (50/3")
30							450	



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**45.0**	BORING STARTED:	**Sep 27 2021**	CAVE IN DEPTH:	**52.0**
WL (Completion)	**53.0**	BORING COMPLETED:	**Sep 27 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-02**	**2 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **480**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	11	10	WEATHERED ROCK, light brown, greenish gray, and black, moist, very dense		445	38-50/5" (50/5")
40	S-10	SS	4	4			440	50/4" (50/4")
45	S-11	SS	5	5		▽	435	50/5" (50/5")
50	S-12	SS	3	3			430	50/3" (50/3")
55	S-13	SS	4	4		▼	425	50/4" (50/4")
60	S-14	SS	3	3	END OF BORING AT 58.8 FT		420	50/3" (50/3")

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**45.0**	BORING STARTED:	**Sep 27 2021**	CAVE IN DEPTH:	**52.0**
▼ WL (Completion)	**53.0**	BORING COMPLETED:	**Sep 27 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-03**	**1 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **475**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [6"]			
	S-1	SS	18	12	(ML) SANDY SILT, light brown, moist, loose to medium dense			3-3-3 (6)
	S-2	SS	18	18			470	4-5-7 (12)
5	S-3	SS	18	12				6-7-9 (16)
	S-4	SS	4	4	WEATHERED ROCK, light brown to gray, moist, very dense			50/4" (50/4")
10							465	
	S-5	SS	11	11				39-50/5" (50/5")
15							460	
	S-6	SS	5	5				50/5" (50/5")
20							455	
	S-7	SS	5	5				50/5" (50/5")
25							450	
	S-8	SS	2	2		▽		50/2" (50/2")
30							445	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

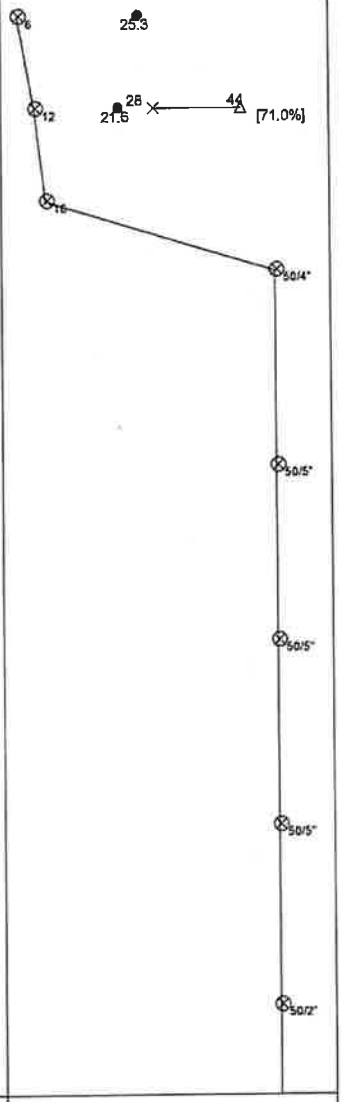
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**29.0**	BORING STARTED:	**Oct 04 2021**	CAVE IN DEPTH:	**36.0**
▼ WL (Completion)	**35.0**	BORING COMPLETED:	**Oct 04 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-03**	**2 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **475**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	3	3	WEATHERED ROCK, light brown to gray, moist, very dense	▼	440	50/3" (50/3")
	S-10	SS	2	2				50/2" (50/2")
40	S-11	RC	60	19	SCHIST, [REC=32%,RQD=13%], Highly Weathered, Very Hard, Light Gray		435	
45	S-12	RC	60	32	SCHIST, [REC=53%,RQD=7%], Highly Weathered, Very Hard, Brownish Gray		430	
50					**AUGER REFUSAL AT 49.0 FT**		425	
55							420	
60							415	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

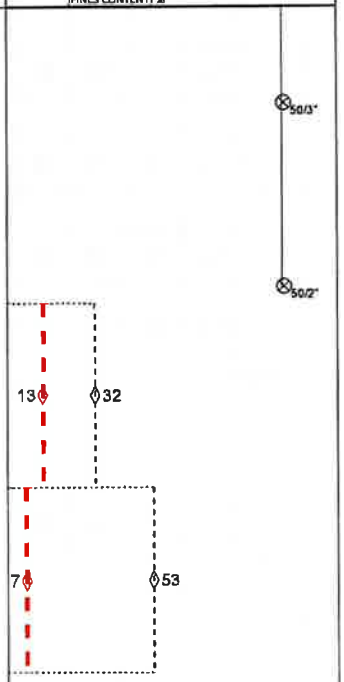
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

FINES CONTENT| %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**29.0**	BORING STARTED:	**Oct 04 2021**	CAVE IN DEPTH:	**36.0**
▼ WL (Completion)	**35.0**	BORING COMPLETED:	**Oct 04 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-04**	**1 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **483**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

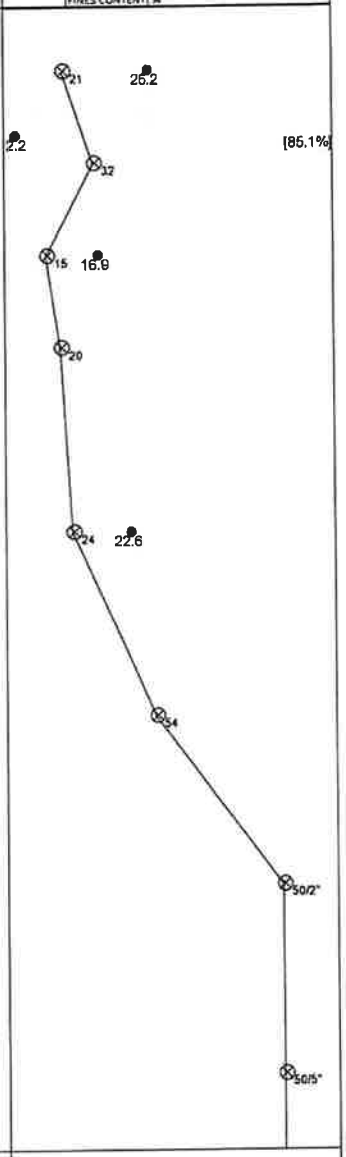
⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	18	(ML) SILT, brown to light brown, moist, medium dense to very dense			5-5-16 (21)
	~~D3S-188~~	~~BG1~~ SS	~~60~~ 18	18				11-13-19 (32)
5	~~S-2~~						478	
	S-3	SS	18	18				5-7-8 (15)
	S-4	SS	18	18				7-10-10 (20)
10							473	
	S-5	SS	18	18				11-11-13 (24)
15							468	
	S-6	SS	18	18				21-23-31 (54)
20							463	
	S-7	SS	8	8	WEATHERED ROCK, brownish gray, moist, very dense			47-50/2" (50/2")
25							458	
	S-8	SS	11	11				36-50/5" (50/5")
30							453	



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**17.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-04**	**2 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **483**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	1	1	WEATHERED ROCK, brownish gray, moist, very dense **AUGER REFUSAL AT 33.6 FT**		448	50/1" (50/1")
40							443	
45							438	
50							433	
55							428	
60							423	

Plastic Limit Water Content Liquid Limit
X——●——△
⊗ STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
○ CALIBRATED PENETROMETER TON/SF
(FINES CONTENT) %

⊗ 50/1"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**17.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-05**	**1 of 3**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482** / BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]		
	S-1	SS	18	10	(ML) SANDY SILT, reddish brown, moist, loose		3-3-5 (8)
	S-2	SS	18	18			4-5-4 (9)
5					(ML) SILT, brown and black, moist, medium dense to very dense	477	
	S-3	SS	18	18			3-5-7 (12)
	S-4	SS	18	18			6-9-9 (18)
10						472	
	S-5	SS	18	18			21-27-35 (62)
15						467	
	S-6	SS	5	5	(ML) SANDY SILT WITH GRAVEL, contains quartz fragments, light brownish gray, moist, very dense		50/5" (50/5")
20						462	
	S-7	SS	18	18	(ML) SILT, light brown, moist, medium dense to dense		9-10-13 (23)
25						457	
	S-8	SS	18	18			16-19-22 (41)
30						452	

Plastic Limit | Water Content | Liquid Limit

STANDARD PENETRATION BLOWS/FT

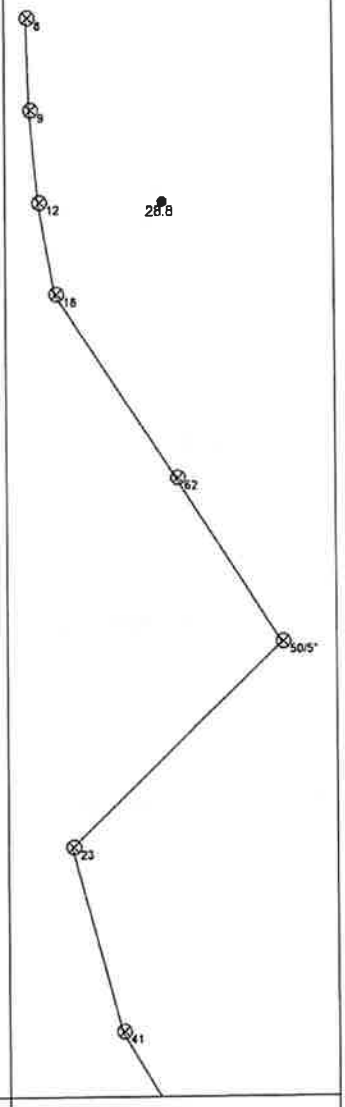
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered) **53.0**	BORING STARTED: **Sep 28 2021**		CAVE IN DEPTH: **49.0**
▼ WL (Completion) **48.0**	BORING COMPLETED: **Sep 28 2021**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD: **3.25 HSA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-05**	**2 of 3**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482**

LOSS OF CIRCULATION

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	18	18	(ML) SILT, light brown, moist, medium dense to dense WEATHERED ROCK, brownish gray, moist, very dense		447	21-38-43 (81)
40	S-10	SS	11	11			442	46-50/5" (50/5")
45	S-11	SS	5	5			437	50/5" (50/5")
50	S-12	SS	3	3			432	50/3" (50/3")
55	S-13	SS	2	2			427	50/2" (50/2")
60	S-14	SS	2	2			422	50/2" (50/2")

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

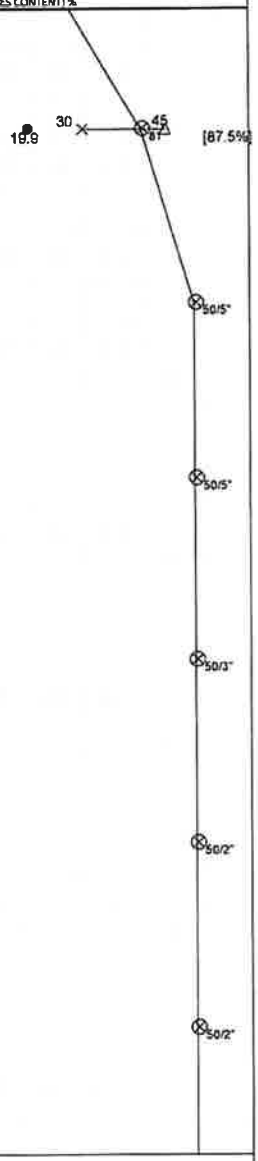
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**53.0**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**49.0**
WL (Completion)	**48.0**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-05**	**3 of 3**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
65	S-15	SS	5	5	WEATHERED ROCK, brownish gray, moist, very dense		417	50/5" (50/5")
70	S-16	SS	1	1			412	50/1" (50/1")
75	S-17	SS	3	3			407	50/3" (50/3")
80	S-18	SS	1	1	END OF BORING AT 78.6 FT		402	50/1" (50/1")
85							397	
90							392	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**53.0**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**49.0**
WL (Completion)	**48.0**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-06**	**1 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	12	(ML) SANDY SILT, reddish brown, moist, loose			4-5-5 (10)
	S-2	SS	18	10	(ML) SILT, light brown, moist, loose to medium dense		477	3-5-6 (11)
5	S-3	SS	18	18				3-4-4 (8)
	S-4	SS	18	18			472	7-7-7 (14)
10					WEATHERED ROCK, light brown and gray, moist, very dense			
	S-5	SS	18	18			467	22-27-33 (60)
15								
	S-6	SS	11	11			462	33-50/5" (50/5")
20								
	S-7	SS	16	16			457	27-39-50/4" (89/10")
25								
	S-8	SS	9	9			452	20-50/3" (50/3")
30								

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

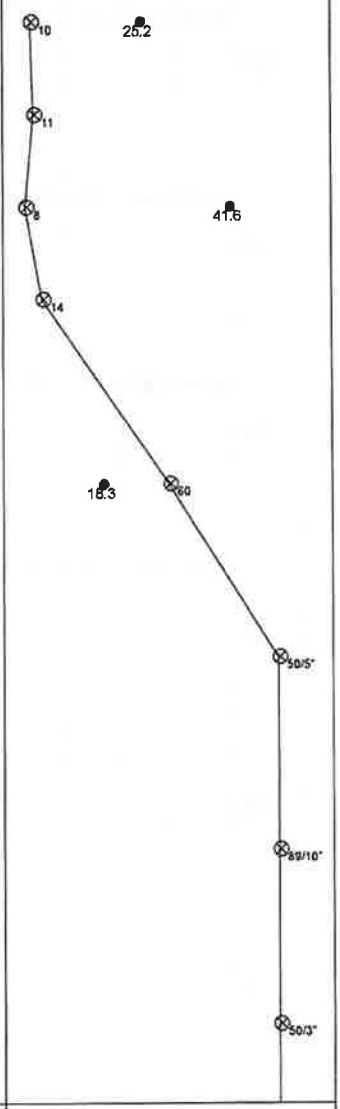
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**20.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-06**	**2 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	1	1	WEATHERED ROCK, light brown and gray, moist, very dense		447	50/1" (50/1")
					AUGER REFUSAL AT 33.6 FT			
40							442	
45							437	
50							432	
55							427	
60							422	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %

50/1"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 28 2021**	CAVE IN DEPTH:	**20.0**
WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 28 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-07**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **492**

LOSS OF CIRCULATION

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

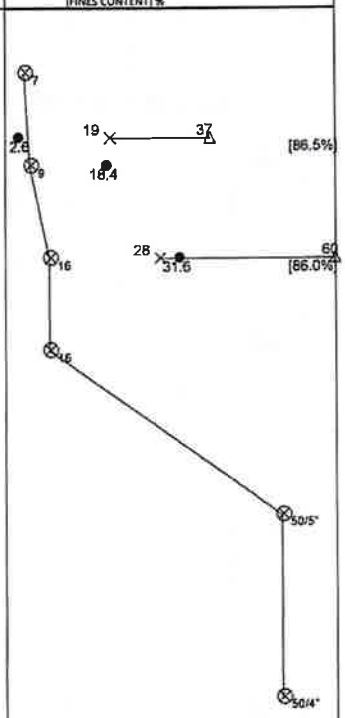
RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	9	(ML) SANDY SILT, reddish brown, moist, loose			3-3-4 (7)
	~~D35-193~~ S-2	~~BG1~~ SS	~~60~~ 18	12				3-4-5 (9)
5					(CH) FAT CLAY, light brown and gray, moist, very stiff		487	
	S-3	SS	18	18				7-7-9 (16)
	S-4	SS	18	16	(ML) SANDY SILT, brown and gray, moist, medium dense			4-7-9 (16)
10							482	
	S-5	SS	5	5	WEATHERED ROCK, light brown to gray, moist, very dense			50/5" (50/5")
15							477	
	S-6	SS	4	4				50/4" (50/4")
20					AUGER REFUSAL AT 20.0 FT		472	
25							467	
30							462	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 29 2021**	CAVE IN DEPTH:	**13.5**
WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 29 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-08**	**1 of 3**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **487**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	18	(ML) SANDY SILT, reddish brown, moist, loose			3-3-3 (6)
	S-2	SS	18	18				2-3-3 (6)
5					(ML) SILT, light brown and gray, moist, loose to medium dense		482	
	S-3	SS	18	18				3-4-5 (9)
	S-4	SS	18	18				4-5-6 (11)
10							477	
	S-5	SS	18	18				6-7-9 (16)
15							472	
	S-6	SS	18	18				7-8-10 (18)
20							467	
	S-7	SS	18	18				8-11-12 (23)
25							462	
	S-8	SS	18	18				9-10-13 (23)
30							457	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

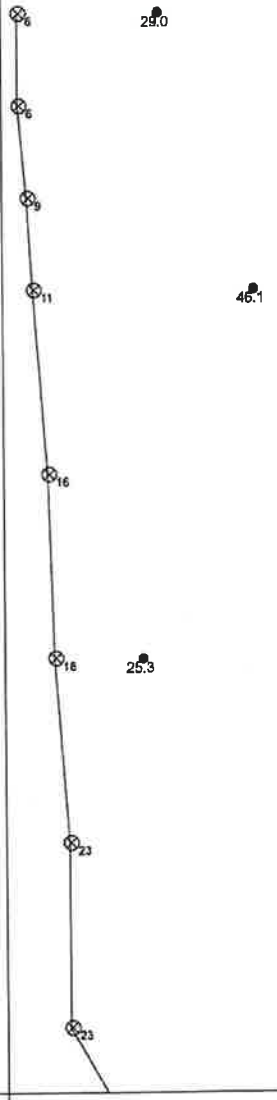
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 02 2021**	CAVE IN DEPTH:	**53.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 02 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-08**	**2 of 3**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **487**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					(ML) SILT, light brown and gray, moist, loose to medium dense			
					WEATHERED ROCK, brownish gray, moist, very dense			
35	S-9	SS	18	18			452	11-24-37 (61)
40	S-10	SS	17	17			447	14-23-50/5" (73/11")
45	S-11	SS	5	5			442	50/5" (50/5")
50	S-12	SS	3	3			437	50/3" (50/3")
55	S-13	SS	4	4			432	50/4" (50/4")
60	S-14	SS	3	3			427	50/3" (50/3")

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

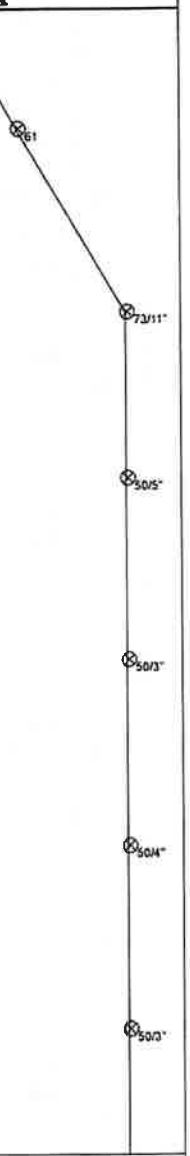
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 02 2021**	CAVE IN DEPTH:	**53.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 02 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-08**	**3 of 3**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **487**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
65	S-15	SS	5	5	WEATHERED ROCK, brownish gray, moist, very dense		422	50/5" (50/5")
70	S-16	SS	2	2			417	50/2" (50/2")
75	S-17	SS	4	4			412	50/4" (50/4")
80	S-18	SS	5	5			407	50/5" (50/5")
85					END OF BORING AT 80.0 FT		402	
90							397	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	Dry	BORING STARTED:	Oct 02 2021	CAVE IN DEPTH:	53.0
▼ WL (Completion)	Dry	BORING COMPLETED:	Oct 02 2021	HAMMER TYPE:	Auto
⧩ WL (Seasonal High Water)		EQUIPMENT: ATV	LOGGED BY:	DRILLING METHOD:	3.25 HSA
⧩ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-09**	**1 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **478**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [6"]			
	S-1	SS	18	9	(ML) SANDY SILT, reddish brown, moist, loose			2-2-3 (5)
	~~D35-189~~	~~BG1~~ SS	~~60~~ 18	13	(CL) LEAN CLAY, reddish brown, moist, firm			3-4-5 (9)
5	~~S-2~~						473	
	S-3	SS	18	14	(ML) SANDY SILT, reddish brown, moist, loose			4-4-4 (8)
	S-4	SS	18	18	(ML) SILT, light brown, moist, dense to very dense			13-19-26 (45)
10							468	
	S-5	SS	18	17				11-15-27 (42)
15							463	
	~~S-6~~	~~SS~~	~~4~~	~~4~~				50/4" (50/4")
20							458	
	S-7	SS	18	18				14-15-17 (32)
25							453	
	~~S-8~~	~~SS~~	~~5~~	~~5~~	WEATHERED ROCK, light gray, brown, and black, moist, very dense			50/5" (50/5")
30							448	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

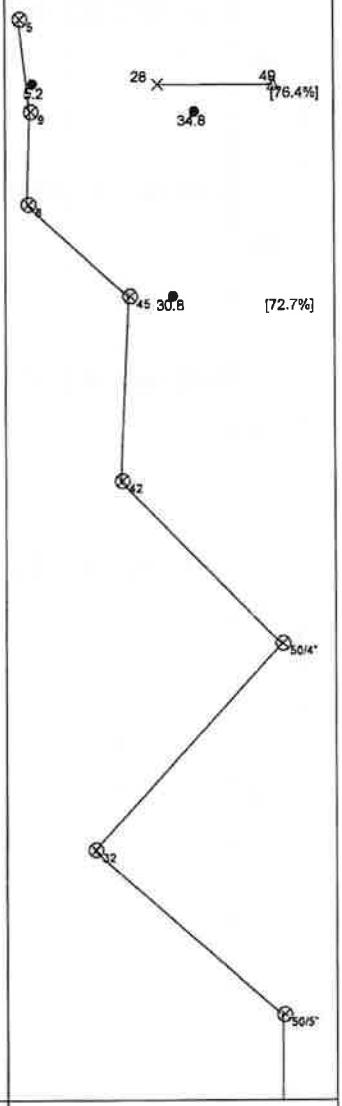
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 29 2021**	CAVE IN DEPTH:	**27.0**
WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 29 2021**	HAMMER TYPE:	**Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-09**	**2 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **478**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
35	S-9	SS	14	14	WEATHERED ROCK, light gray, brown, and black, moist, very dense		443	17-26-50/2" (76/8")
					AUGER REFUSAL AT 34.8 FT			
40	S-10	SS	0	0			438	50/0" (50/0")
45							433	
50							428	
55							423	
60							418	

⊗76/8"

⊗50/0"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 29 2021**	CAVE IN DEPTH:	**27.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 29 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-10**	**1 of 2**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **469**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [6"]			
	S-1	SS	18	12	(SM) SILTY SAND, reddish brown, moist, very loose to loose			1-2-2 (4)
	S-2	SS	18	18				2-2-3 (5)
5							464	
	S-3	SS	18	18	(ML) SANDY SILT WITH GRAVEL, contains quartz fragments, light brown, moist, loose			5-4-5 (9)
	S-4	SS	5	5	WEATHERED ROCK, light brown to grayish brown, moist, very dense			50/5" (50/5")
10							459	
	S-5	SS	5	5				50/5" (50/5")
15							454	
	S-6	SS	3	3				50/3" (50/3")
20							449	
	S-7	SS	0	0	SCHIST, [REC=87%,RQD=17%], Highly Weathered, Very Hard, Grayish Brown			50/0" (50/0")
25	S-8	RC	60	52			444	
					SCHIST, [REC=100%,RQD=22%], Highly Weathered, Very Hard, Grayish Brown			
30	S-9	RC	60	60			439	

CONTINUED ON NEXT PAGE

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

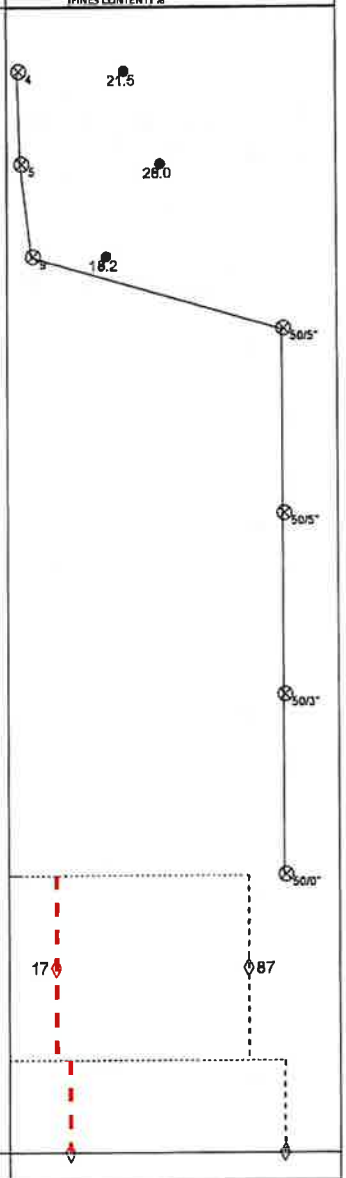
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 05 2021**	CAVE IN DEPTH:	**19.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 05 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-10**	**2 of 2**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **469**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					SCHIST, [REC=100%,RQD=22%], Highly Weathered, Very Hard, Grayish Brown			22 / 100
					AUGER REFUSAL AT 33.5 FT			
35							434	
40							429	
45							424	
50							419	
55							414	
60							409	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 05 2021**	CAVE IN DEPTH:	**19.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 05 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-11**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **468**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	8	(ML) SILT, brownish gray, moist, loose to dense			3-3-4 (7)
	~~D35-194~~	~~BG1~~ SS	~~60~~ 18	12				5-6-9 (15)
5	~~S-2~~						463	
	S-3	SS	18	16				7-10-12 (22)
	S-4	SS	18	18				11-12-16 (28)
10							458	
	S-5	SS	18	18				10-15-19 (34)
15					WEATHERED ROCK, gray, moist, very dense		453	
	~~S-6~~	~~SS~~	~~5~~	~~5~~				50/5" (50/5")
20							448	
	~~S-7~~	~~SS~~	~~3~~	~~3~~				50/3" (50/3")
25					**END OF BORING AT 25.0 FT**		443	
30							438	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

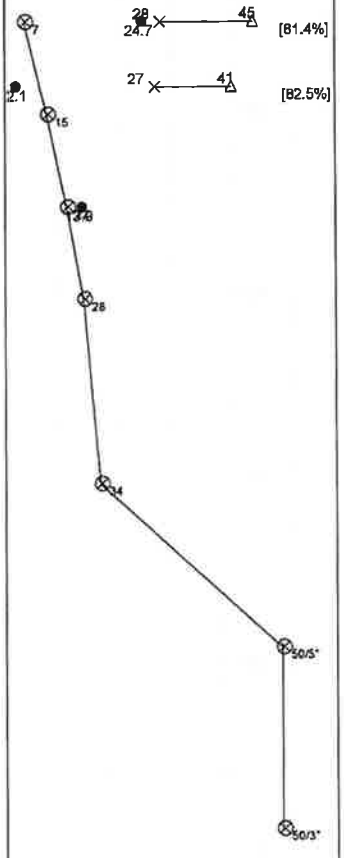
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 29 2021**	CAVE IN DEPTH:	**12.7**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 29 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-12**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **474**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

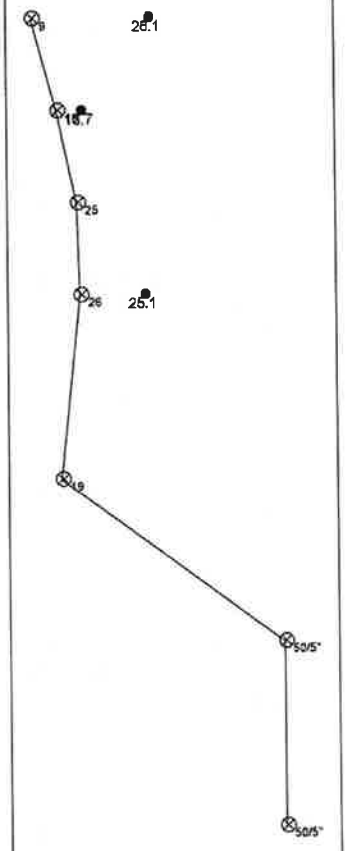
STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [6"]			
	S-1	SS	18	18	(SM) SILTY SAND, reddish brown, moist, loose			3-4-5 (9)
	S-2	SS	18	18	(ML) SANDY SILT, reddish brown, moist, medium dense			6-7-11 (18)
5							469	
	S-3	SS	18	18	(ML) SILT, light brown, moist, medium dense			10-13-12 (25)
	S-4	SS	18	18				10-11-15 (26)
10							464	
	S-5	SS	18	18				11-8-11 (19)
15							459	
	S-6	SS	5	5	WEATHERED ROCK, light brown and gray, moist, very dense			50/5" (50/5")
20							454	
	S-7	SS	5	5				50/5" (50/5")
25					END OF BORING AT 23.9 FT		449	
30							444	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 02 2021**	CAVE IN DEPTH:	**14.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 02 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-13**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **490**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [4"]			
	S-1	SS	18	10	(ML) SILT WITH SAND, reddish brown, moist, loose to medium dense			3-3-5 (8)
	S-2	SS	18	12				2-3-6 (9)
5	S-3	SS	18	18			485	7-8-11 (19)
	S-4	SS	4	4	(SM) SILTY SAND WITH GRAVEL, gray and dark brown, moist, medium dense to very dense			50/4" (50/4")
10							480	
	S-5	SS	18	18				12-13-15 (28)
15							475	
	S-6	SS	18	18				10-12-17 (29)
20							470	
	S-7	SS	2	2	WEATHERED ROCK, dark brownish gray, moist, very dense			50/2" (50/2")
25							465	
	S-8	SS	0	0	**AUGER REFUSAL AT 27.0 FT**			50/0" (50/0")
30							460	

Plastic Limit — Water Content — Liquid Limit

STANDARD PENETRATION BLOWS/FT

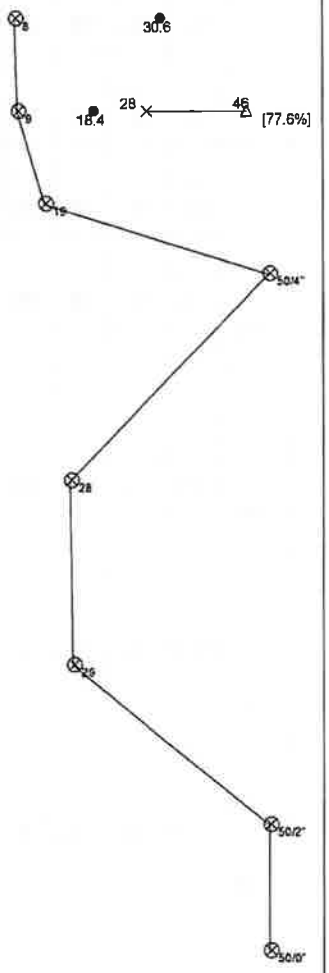
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

(FINES CONTENT) %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 30 2021**	CAVE IN DEPTH:	**18.5**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 30 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-14**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **500**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness (3")			
	S-1	SS	18	18	(MH) ELASTIC SILT, light brown, moist, firm to stiff			3-4-4 (8)
	~~D35~~ 186	~~BG1~~ SS	~~60~~ 18	18				2-4-5 (9)
5	~~S-2~~				(SM) SILTY SAND, brown, moist, medium dense to dense		495	
	S-3	SS	18	18				5-9-11 (20)
	S-4	SS	18	18				10-12-19 (31)
10					WEATHERED ROCK, reddish brown and black, moist, very dense		490	
	~~S-5~~	~~SS~~	~~5~~	~~5~~				50/5" (50/5")
15							485	
	~~S-6~~	~~SS~~	~~2~~	~~2~~	END OF BORING AT 18.7 FT			50/2" (50/2")
20							480	
25							475	
30							470	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

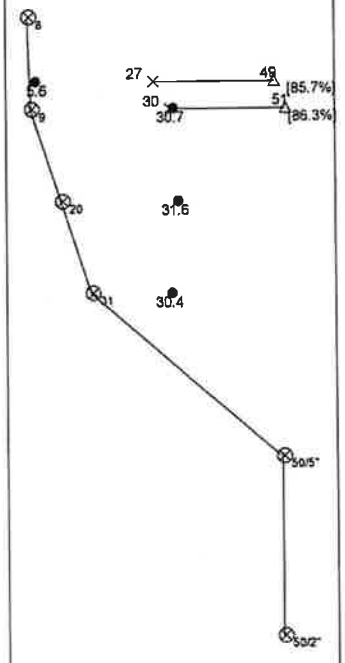
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 30 2021**	CAVE IN DEPTH:	**11.5**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 30 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-15**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **497**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [4"]			
	S-1	SS	18	12	(CL) LEAN CLAY WITH SAND, grayish brown, moist, stiff			3-4-6 (10)
	~~D35-187~~	~~BG1~~ SS	~~60~~ 18	17				4-4-7 (11)
5	~~S-2~~				(ML) SANDY SILT WITH GRAVEL, light brown and gray, moist, very dense		492	
	S-3	SS	18	18				23-24-29 (53)
	S-4	SS	15	14	WEATHERED ROCK, grayish brown to gray, moist, very dense			15-34-50/3" (84/9")
10							487	
	~~S-5~~	~~SS~~	~~3~~	~~3~~				50/3" (50/3")
15							482	
	~~S-6~~	~~SS~~	~~1~~	~~1~~	**AUGER REFUSAL AT 16.1 FT**			50/1" (50/1")
20							477	
25							472	
30							467	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

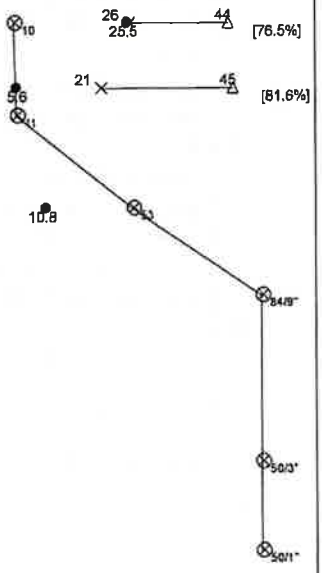
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Sep 30 2021**	CAVE IN DEPTH:	**10.3**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Sep 30 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)					

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-16**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **475**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [6"]			
	S-1	SS	18	18	(SM) SILTY SAND, brown, moist, loose			3-5-5 (10)
	S-2	SS	18	18	(ML) SANDY SILT, light brown and gray, moist, medium dense		470	5-4-7 (11)
5	S-3	SS	18	18				6-6-8 (14)
	S-4	SS	18	18			465	5-7-11 (18)
10								
	S-5	SS	18	14			460	10-13-17 (30)
15								
	S-6	SS	4	4	WEATHERED ROCK, light brown, moist, very dense		455	50/4" (50/4")
20								
	S-7	SS	5	5				50/5" (50/5")
25					END OF BORING AT 24.0 FT		450	
30							445	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

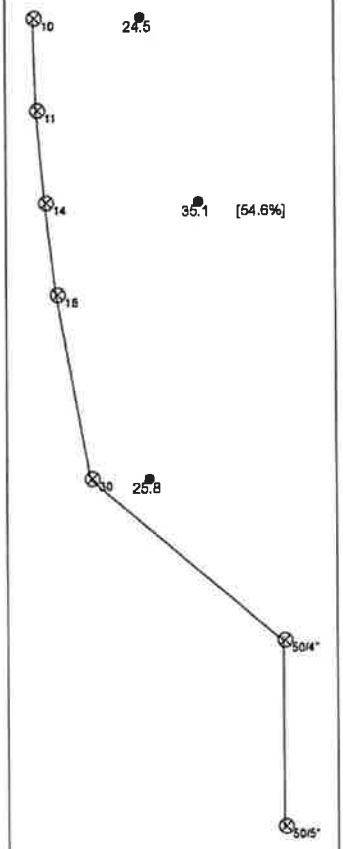
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 02 2021**	CAVE IN DEPTH:	**14.7**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 02 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-17**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Warrenton Data Center	**All American Geotech, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
Lee Highway and Blackwell Road, Warrenton, Virginia 20186			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **492**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [3"]		492	
	S-1	SS	18	20	(SM) SILTY SAND, reddish brown, moist, loose			4-4-4 (8)
	S-2	SS	18	18				3-4-4 (8)
5							487	
	S-3	SS	18	18	(ML) SANDY SILT, brown and gray, moist, very loose			1-2-2 (4)
	S-4	SS	5	5	WEATHERED ROCK, dark gray, moist, very dense			50/5" (50/5")
10							482	
	S-5	SS	3	3				50/3" (50/3")
					END OF BORING AT 13.8 FT			
15							477	
20							472	
25							467	
30							462	

Plastic Limit — Water Content — Liquid Limit (X — ● — Δ)

⊗ STANDARD PENETRATION BLOWS/FT

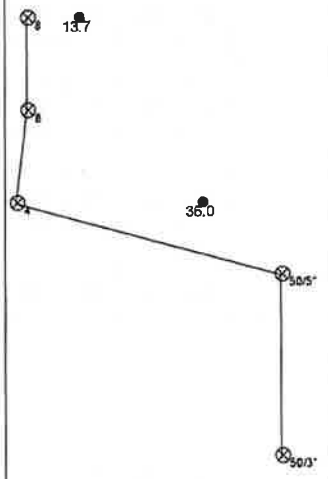
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Oct 02 2021**		CAVE IN DEPTH: **7.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Oct 02 2021**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD: **3.25 HSA**
▽ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-18**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **482**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [6"]			
	S-1	SS	18	18	(SM) SILTY SAND, reddish brown, moist, loose to medium dense			3-3-4 (7)
	S-2	SS	18	18			477	4-5-7 (12)
5	S-3	SS	18	18				7-9-13 (22)
	S-4	SS	18	18	(ML) SILT, light brown, moist, dense		472	15-15-22 (37)
10	S-5	SS	5	5	WEATHERED ROCK, light brown to grayish brown, moist, very dense		467	50/5" (50/5")
15	S-6	SS	4	4			462	50/4" (50/4")
20					END OF BORING AT 18.9 FT			
25							457	
30							452	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

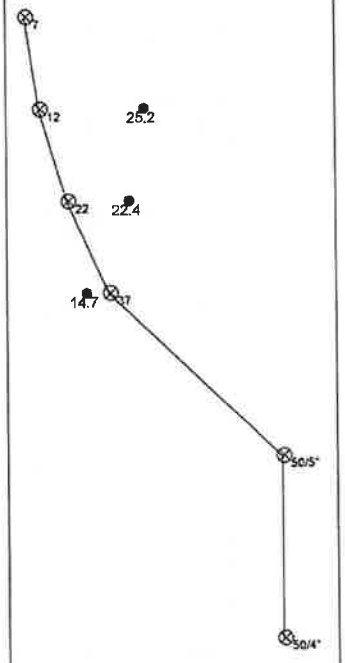
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 01 2021**	CAVE IN DEPTH:	**14.5**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 01 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-19**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **490**

BOTTOM OF CASING

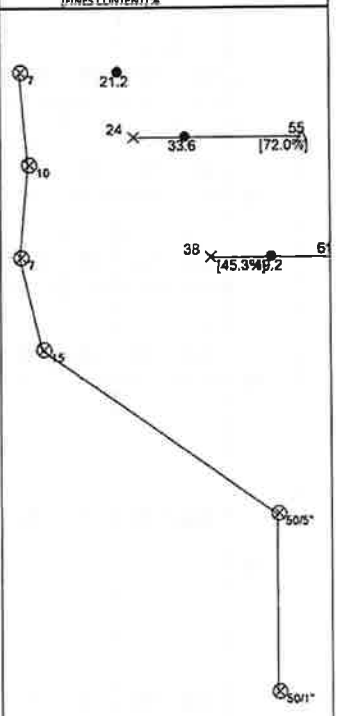
Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

CALIBRATED PENETROMETER TON/SF (FINES CONTENT) %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [4"]			
	S-1	SS	18	18	(CL) SANDY LEAN CLAY, reddish brown, moist, firm			4-4-3 (7)
	~~D35-190 S-2~~	~~BG1~~ SS	~~60~~ 18	18	(GM) SILTY GRAVEL WITH SAND, reddish brown and brown, moist, loose to medium dense			3-4-6 (10)
5	S-3	SS	18	18			485	3-3-4 (7)
	S-4	SS	18	18				9-7-8 (15)
10							480	
	S-5	SS	5	5	WEATHERED ROCK, light brown and dark gray, moist, very dense			50/5" (50/5")
15							475	
	S-6	SS	1	1	END OF BORING AT 18.6 FT			50/1" (50/1")
20							470	
25							465	
30							460	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered) **Dry**	BORING STARTED: **Oct 01 2021**		CAVE IN DEPTH: **14.5**
▼ WL (Completion) **Dry**	BORING COMPLETED: **Oct 01 2021**		HAMMER TYPE: **Auto**
⧩ WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD: **3.25 HSA**
⧩ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Bohler Engineering	**01:31153**	**B-20**	**1 of 1**
PROJECT NAME: **Warrenton Data Center**	DRILLER/CONTRACTOR: **All American Geotech, Inc.**		
SITE LOCATION: **Lee Highway and Blackwell Road, Warrenton, Virginia 20186**			LOSS OF CIRCULATION
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION: **490**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

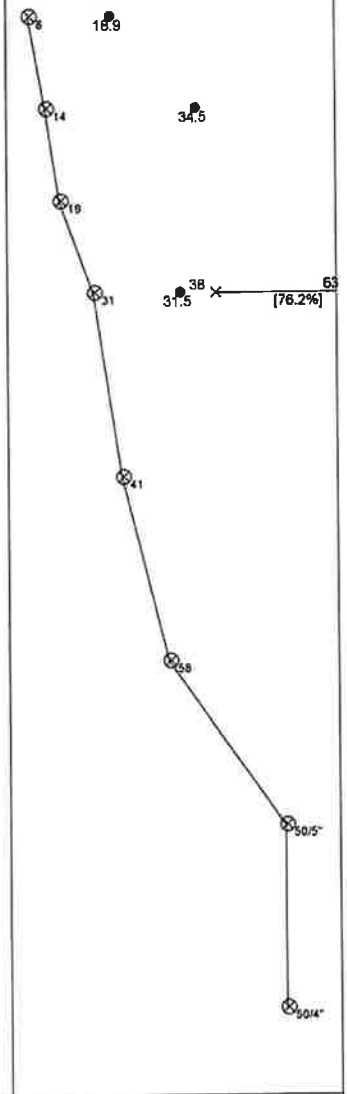
RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness [4"]			
	S-1	SS	18	10	(SM) SILTY SAND, brown, moist, loose			4-4-4 (8)
	S-2	SS	18	18	(ML) SILT, reddish brown to grayish brown, moist, medium dense to very dense			5-7-7 (14)
5	S-3	SS	18	18			485	7-9-10 (19)
	S-4	SS	18	18	(MH) ELASTIC SILT WITH SAND, yellowish brown, moist, hard to very hard			14-15-16 (31)
10	S-5	SS	18	18			480	8-15-26 (41)
15	S-6	SS	18	18			475	17-23-35 (58)
20	S-7	SS	5	5	WEATHERED ROCK, light brown and gray, moist, very dense		470	50/5" (50/5")
25	S-8	SS	4	4			465	50/4" (50/4")
30					**END OF BORING AT 28.9 FT**		460	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Oct 01 2021**	CAVE IN DEPTH:	**23.0**
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Oct 01 2021**	HAMMER TYPE:	**Auto**
▼ WL (Seasonal High Water)		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	**3.25 HSA**
▽ WL (Stabilized)		**ATV**			

GEOTECHNICAL BOREHOLE LOG

APPENDIX C – Laboratory Testing

Laboratory Test Results Summary
Plasticity Charts
Grain Size Analysis
Standard Proctor Test Results
California Bearing Ratio Test Results
Thermal Resistivity Test Results

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	S-10	38.5-39.75	16.5	ML	NP	NP	NP	75.6					
B-01	S-2	3.5-5	15.1										
B-02	S-1	1-2.5	24.7										
B-02	S-2	3.5-5	11.2										
B-02	S-5	13.5-15	12.6										
B-03	S-1	1-2.5	25.3										
B-03	S-2	3.5-5	21.6	ML	44	28	16	71.0					
B-04	S-1	1-2.5	26.2										
B-04	S-3	6-7.5	16.9										
B-04	S-5	13.5-15	22.6										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Warrenton Data Center
Client:

Project No.: 01:31153
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-05	S-3	6-7.5	28.8										
B-05	S-9	33.5-35	19.9	ML	45	30	15	87.5					
B-06	S-1	1-2.5	25.2										
B-06	S-3	6-7.5	41.6										
B-06	S-5	13.5-15	18.3										
B-07	S-2	3.5-5	18.4										
B-07	S-3	6-7.5	31.6	CH	60	28	32	86.0					
B-08	S-1	1-2.5	29.0										
B-08	S-4	8.5-10	46.1										
B-08	S-6	18.5-20	25.3										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

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Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-09	S-2	3.5-5	34.8										
B-09	S-4	8.5-10	30.8	ML	NP	NP	NP	72.7					
B-10	S-1	1-2.5	21.5										
B-10	S-2	3.5-5	28.0										
B-10	S-3	6-7.5	18.2										
B-11	S-1	1-2.5	24.7	ML	45	28	17	81.4					
B-11	S-3	6-7.5	13.9										
B-12	S-1	1-2.5	26.1										
B-12	S-2	3.5-5	13.7										
B-12	S-4	8.5-10	25.1										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

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Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-13	S-1	1-2.5	30.6										
B-13	S-2	3.5-5	18.4	ML	46	28	18	77.6					
B-14	S-2	3.5-5	30.7	MH	51	30	21	86.3					
B-14	S-3	6-7.5	31.6										
B-14	S-4	8.5-10	30.4										
B-15	S-1	1-2.5	25.5	CL	44	26	18	76.5					
B-15	S-3	6-7.5	10.8										
B-16	S-1	1-2.5	24.5										
B-16	S-3	6-7.5	35.1	ML	NP	NP	NP	54.6					
B-16	S-5	13.5-15	25.8										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

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jvong	Htran	Dtran	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-17	S-1	1-2.5	13.7										
B-17	S-3	6-7.5	36.0										
B-18	S-2	3.5-5	25.2										
B-18	S-3	6-7.5	22.4										
B-18	S-4	8.5-10	14.7										
B-19	S-1	1-2.5	21.2										
B-19	S-3	6-7.5	49.2	GM	61	38	23	45.3					
B-20	S-1	1-2.5	18.9										
B-20	S-2	3.5-5	34.5										
B-20	S-4	8.5-10	31.5	MH	63	38	25	76.2					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

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jvong	Htran	Dtran	

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-02	D3S-191	1-6	11.7	CL	39	18	21	85.6	122.1	15.2			
B-04	D3S-188	1-6	2.2	ML	NP	NP	NP	85.1	112.3	15.8			
B-07	D3S-193	1-6	2.6	CL	37	19	18	86.5	112.2	17.7			
B-09	D3S-189	1-6	5.2	ML	49	28	21	76.4	99.5	21.6			
B-11	D3S-194	1-6	2.1	ML	41	27	14	82.5	119.2	13.8			
B-14	D3S-186	1-6	5.6	CL	49	27	22	85.7	102.3	22.4	5	4.7	
B-15	D3S-187	1-6	5.6	CL	45	21	24	81.6	111.0	17.7	7.6	6.6	
B-19	D3S-190	1-6	33.6	CH	55	24	31	72.0	101.9	24.2			

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Warrenton Data Center
Client:

Project No.: 01:31153
Date Reported:

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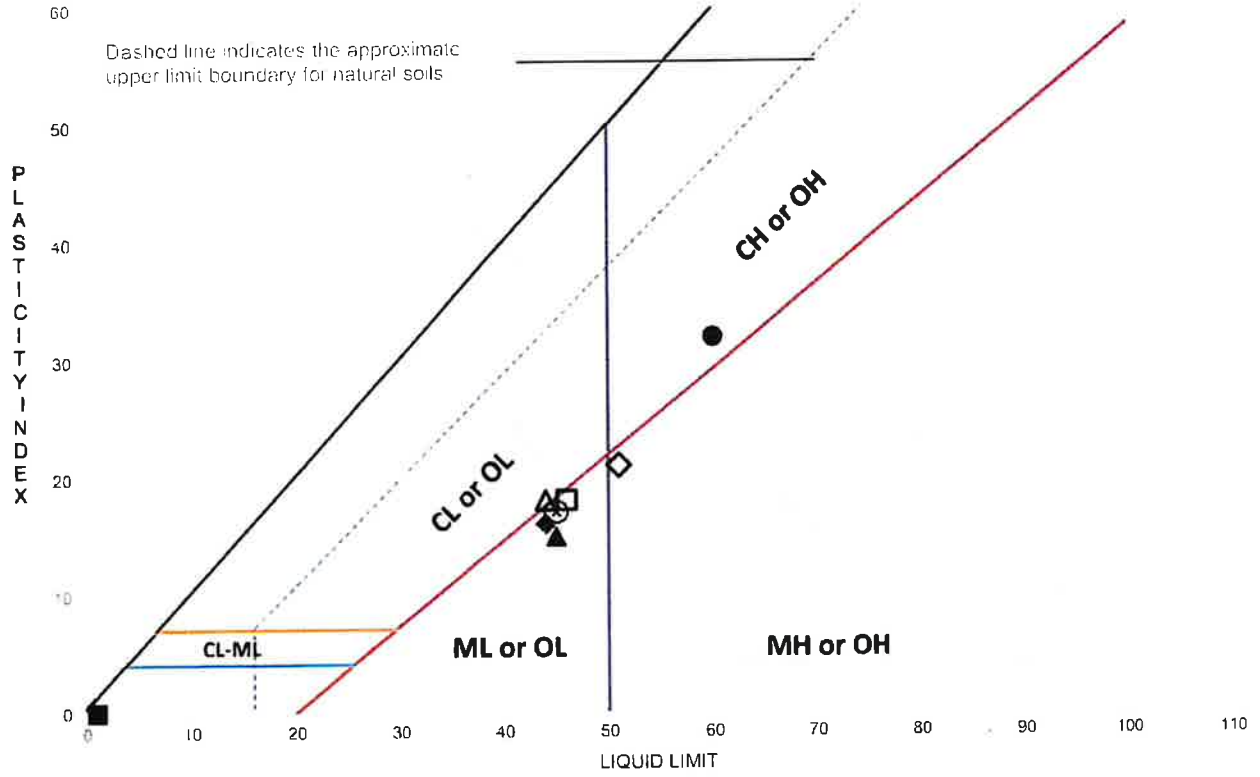
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-01	S-10	38.5-39.75	NP	NP	NP	95.3	75.6	A-4	ML	Silt with Sand Trace Mica Yellow Light Brown
◆	B-03	S-2	3.5-5	44	28	16	91.7	71.0	A-7-6	ML	Silt with Sand Trace Mica Yellow Light Brown
▲	B-05	S-9	33.5-35	45	30	15	99.5	87.5	A-7-5	ML	Silt Trace Mica Yellow Light Brown
●	B-07	S-3	6-7.5	60	28	32	93.9	86.0	A-7-6	CH	Fat Clay Light Brown
✱	B-09	S-4	8.5-10	NP	NP	NP	95.9	72.7	A-4	ML	Silt with Sand Trace Mica Yellow Light Brown
⊗	B-11	S-1	1-2.5	45	28	17	95.3	81.4	A-7-6	ML	Silt with Sand Trace Mica Brown
□	B-13	S-2	3.5-5	46	28	18	89.9	77.6	A-7-6	ML	Silt with Sand Trace Mica Yellowish Light Brown
◇	B-14	S-2	3.5-5	51	30	21	94.7	86.3	A-7-5	MH	Elastic Silt Trace Mica Light Brown
△	B-15	S-1	1-2.5	44	26	18	85.8	76.5	A-7-6	CL	Lean Clay with Sand Light Brown
×	B-16	S-3	6-7.5	NP	NP	NP	85.3	54.6	A-4	ML	Sandy Silt Trace Mica Yellowish Light Brown

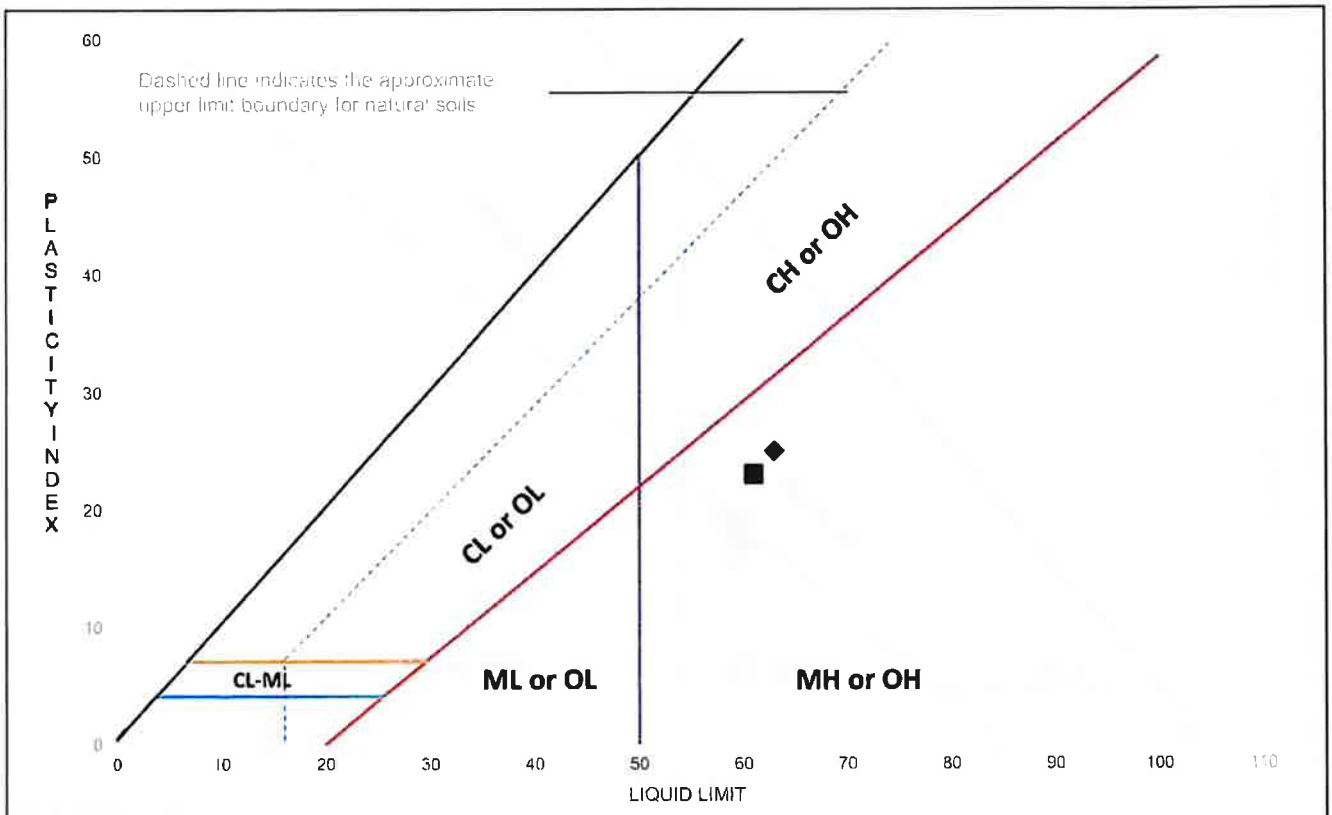
Project: Warrenton Data Center
Client:

Project No.: 01:31153
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-19	S-3	6-7.5	61	38	23	53.5	45.3	A-7-5	GM	Silty Gravel with Sand Trace Mica Yellowish Brown
◆	B-20	S-4	8.5-10	63	38	25	88.6	76.2	A-7-5	MH	Elastic Silt with Sand Trace Mica Yellowish Light Brown

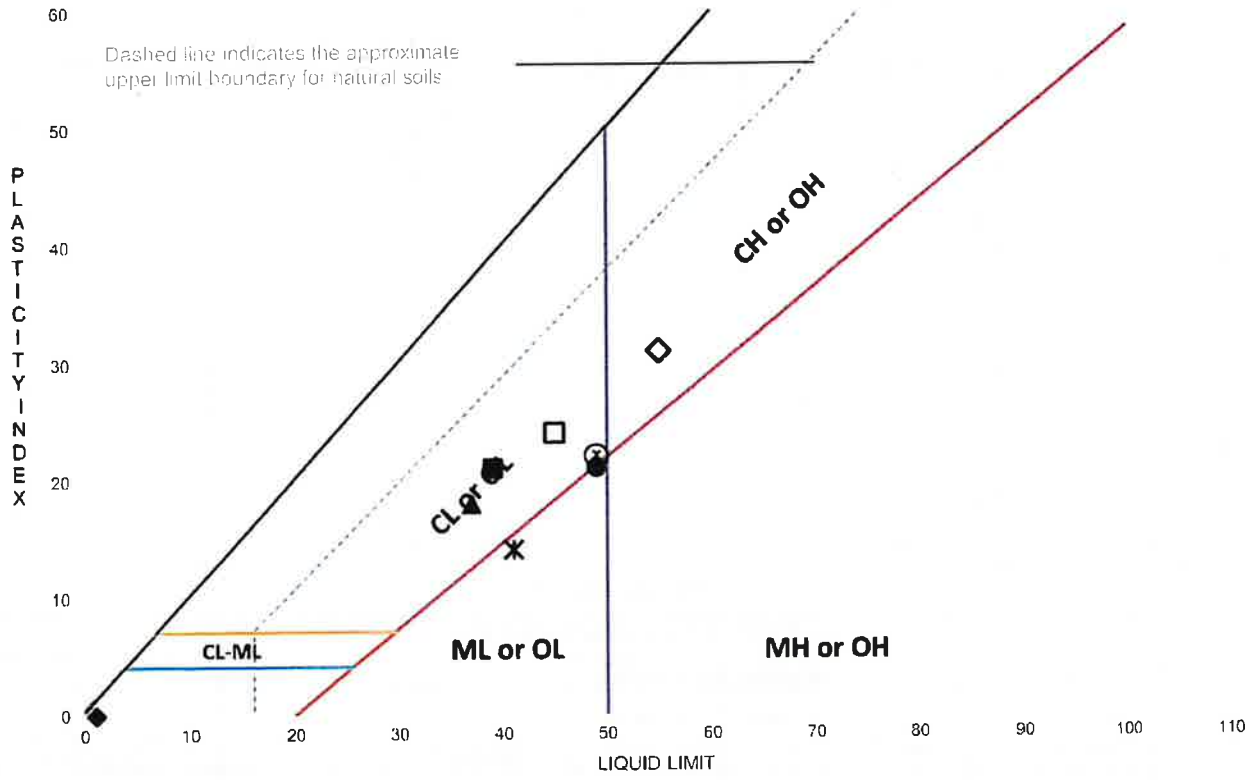
Project: Warrenton Data Center
Client:

Project No.: 01:31153
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-02	D3S-191	1-6	39	18	21	98.8	85.6	A-6	CL	Lean Clay Yellowish Brown
◆	B-04	D3S-188	1-6	NP	NP	NP	97.9	85.1	A-4	ML	Silt Trace Mica Yellowish Brown
▲	B-07	D3S-193	1-6	37	19	18	96.0	86.5	A-6	CL	Lean Clay Trace Mica Brown
●	B-09	D3S-189	1-6	49	28	21	91.1	76.4	A-7-6	ML	Silt with Sand Brwon
✱	B-11	D3S-194	1-6	41	27	14	97.9	82.5	A-7-6	ML	Silt with Sand Trace Mica Yellowish Brown
⊗	B-14	D3S-186	1-6	49	27	22	95.3	85.7	A-7-6	CL	Lean Clay with Sand Yellowisht Brown
□	B-15	D3S-187	1-6	45	21	24	92.4	81.6	A-7-6	CL	Lean Clay with Sand Yellowish Brown
◇	B-19	D3S-190	1-6	55	24	31	80.6	72.0	A-7-6	CH	Fat Clay with Sand Brown

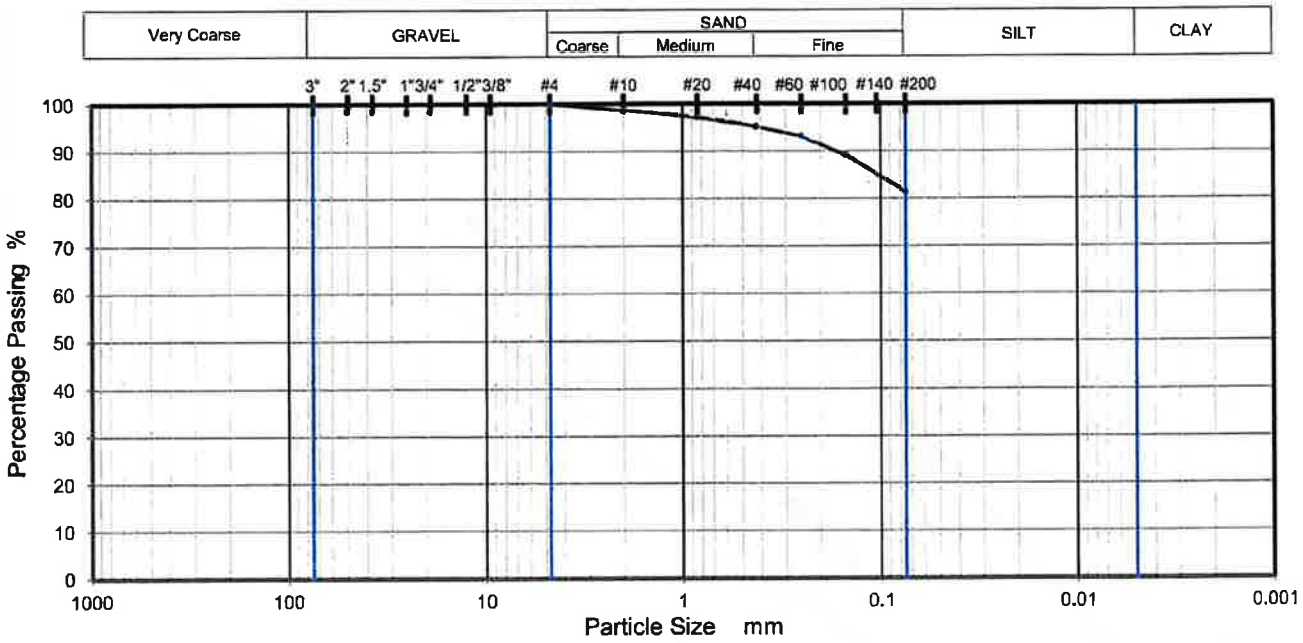
Project: Warrenton Dela Center
Client:

Project No.: 01:31153
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by	
jvong	Htran	Dtran	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	98.6		
#20	97.2		
#40	95.3		
#60	93.3		
#100	89.1		
#200	81.4		

Dry Mass of sample, g: 40.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.4
Medium Sand, #10 to #40	3.3
Fine Sand, #40 to #200	13.9
Fines <#200	81.4

USCS	ML	Liquid Limit	45	D90	0.167	D50		D10	
AASHTO	A-7-6	Plastic Limit	28	D85	0.104	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	17	D60		D15		Cc	

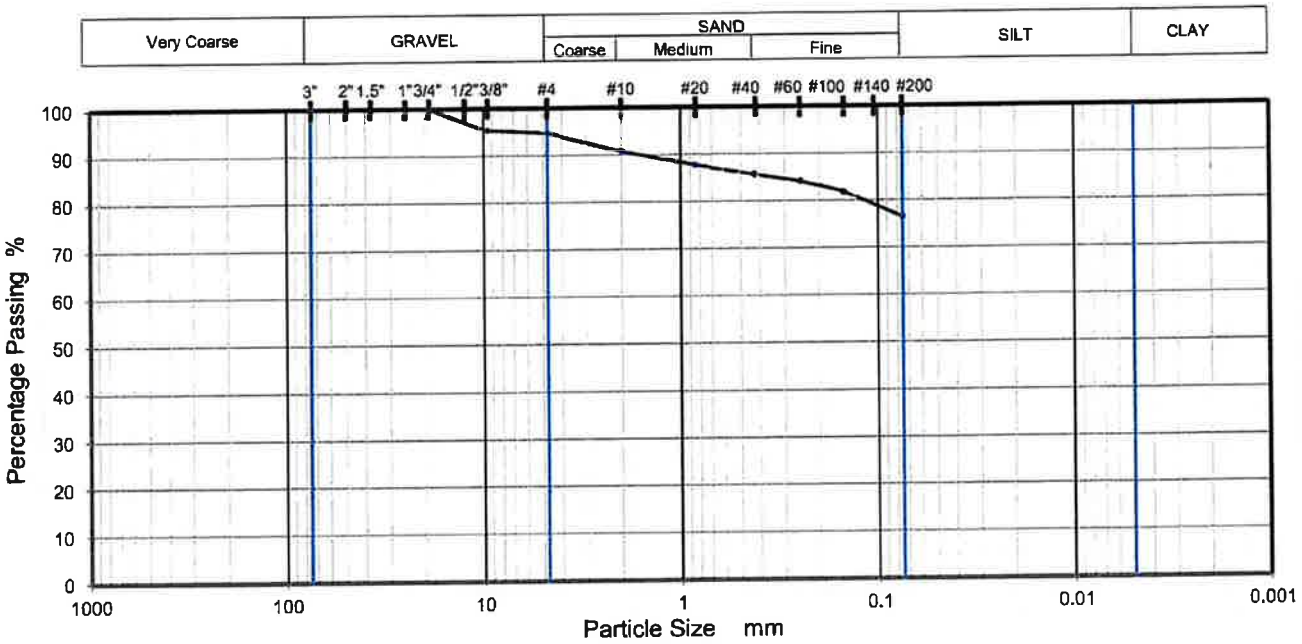
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Brown
Sample Source: B-11

Project No.: 01:31153
Depth (ft): 1 - 2.5
Sample No.: S-1
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
3/4"	100.0		
3/8"	95.4		
#4	94.8		
#10	90.8		
#20	87.8		
#40	85.8		
#60	84.3		
#100	82.0		
#200	76.5		

Dry Mass of sample, g: 42.3

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	5.2
Coarse Sand, #4 to #10 sieve	4.0
Medium Sand, #10 to #40	5.0
Fine Sand, #40 to #200	9.3
Fines <#200	76.5

USCS	CL	Liquid Limit	44	D90	1.592	D50		D10	
AASHTO	A-7-6	Plastic Limit	26	D85	0.320	D30		Cu	
USCS Group Name	Lean clay with sand	Plasticity Index	18	D60		D15		Cc	

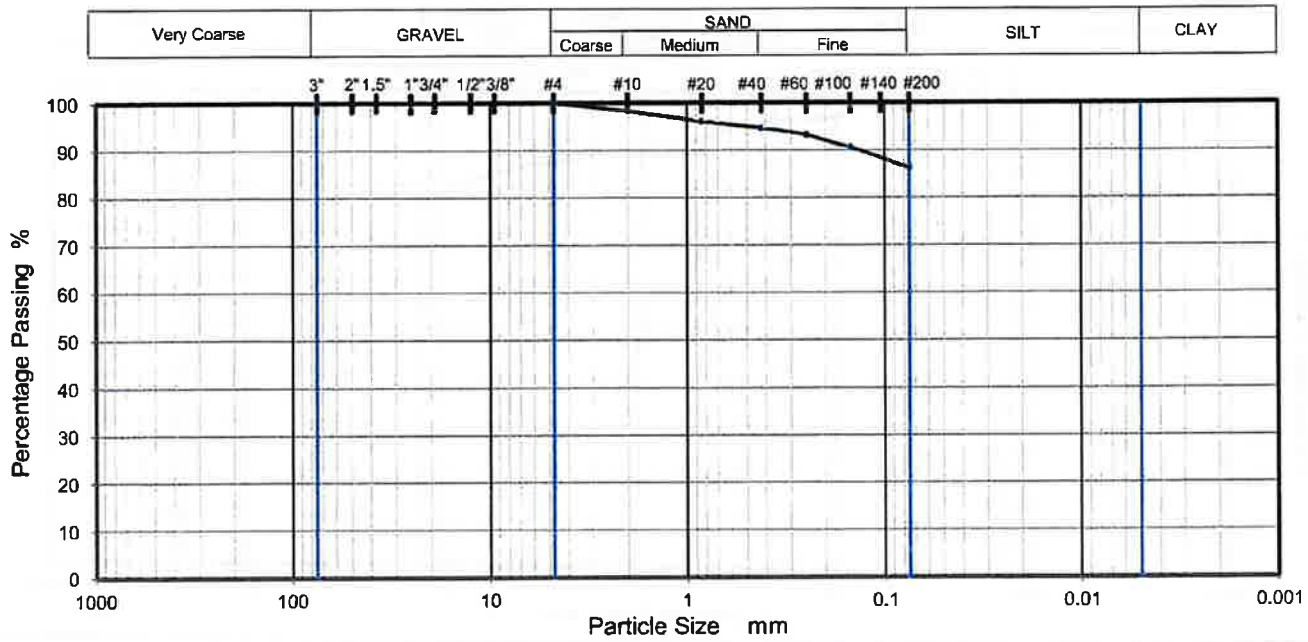
Project: Warrenton Data Center
Client:
Sample Description: Lean Clay with Sand Light Brown
Sample Source: B-15

Project No.: 01:31153
Depth (ft): 1 - 2.5
Sample No.: S-1
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	98.3		
#20	96.1		
#40	94.7		
#60	93.4		
#100	90.7		
#200	86.3		

Dry Mass of sample, g: 43.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.7
Medium Sand, #10 to #40	3.6
Fine Sand, #40 to #200	8.4
Fines <#200	86.3

USCS	MH	Liquid Limit	51	D90	0.134	D50		D10	
AASHTO	A-7-5	Plastic Limit	30	D85		D30		Cu	
USCS Group Name	Elastic silt	Plasticity Index	21	D60		D15		Cc	

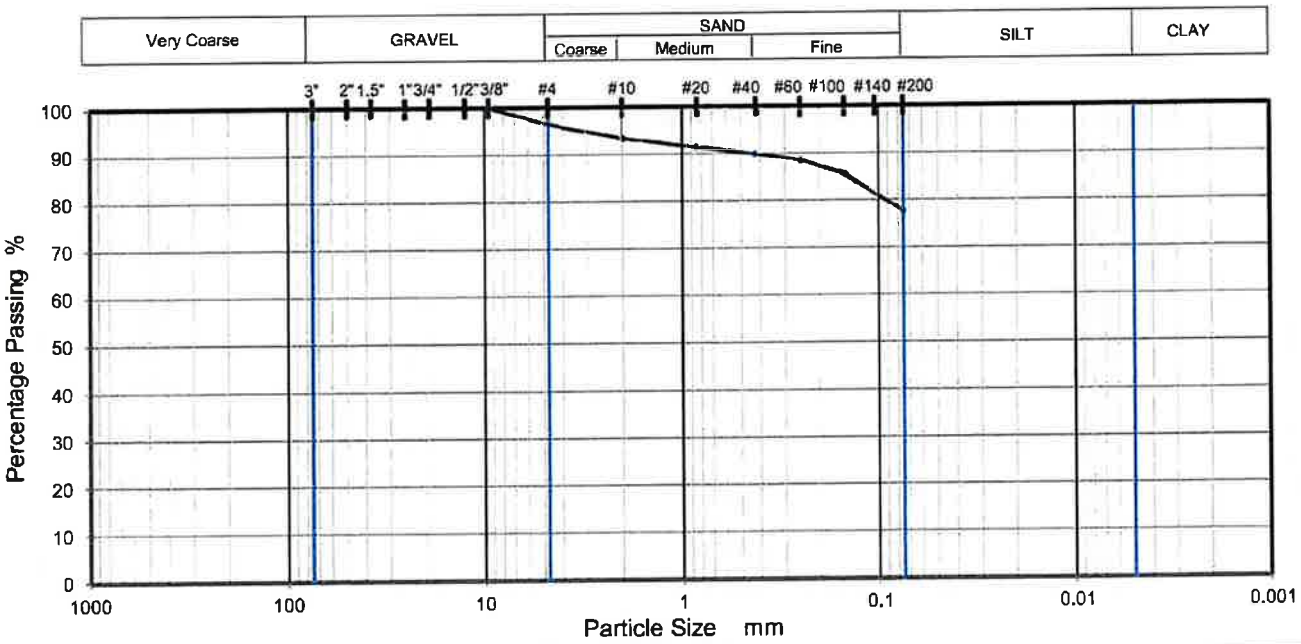
Project: Warrenton Data Center
Client:
Sample Description: Elastic Silt Trace Mica Light Brown
Sample Source: B-14

Project No.: 01:31153
Depth (ft): 3.5 - 5
Sample No.: S-2
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
3/8"	100.0		
#4	96.5		
#10	93.5		
#20	91.4		
#40	89.9		
#60	88.6		
#100	85.7		
#200	77.6		

Dry Mass of sample, g: 41.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	3.5
Coarse Sand, #4 to #10 sieve	3.0
Medium Sand, #10 to #40	3.6
Fine Sand, #40 to #200	12.3
Fines <#200	77.6

USCS	ML	Liquid Limit	46	D90	0.445	D50		D10	
AASHTO	A-7-6	Plastic Limit	28	D85	0.141	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	18	D60		D15		Cc	

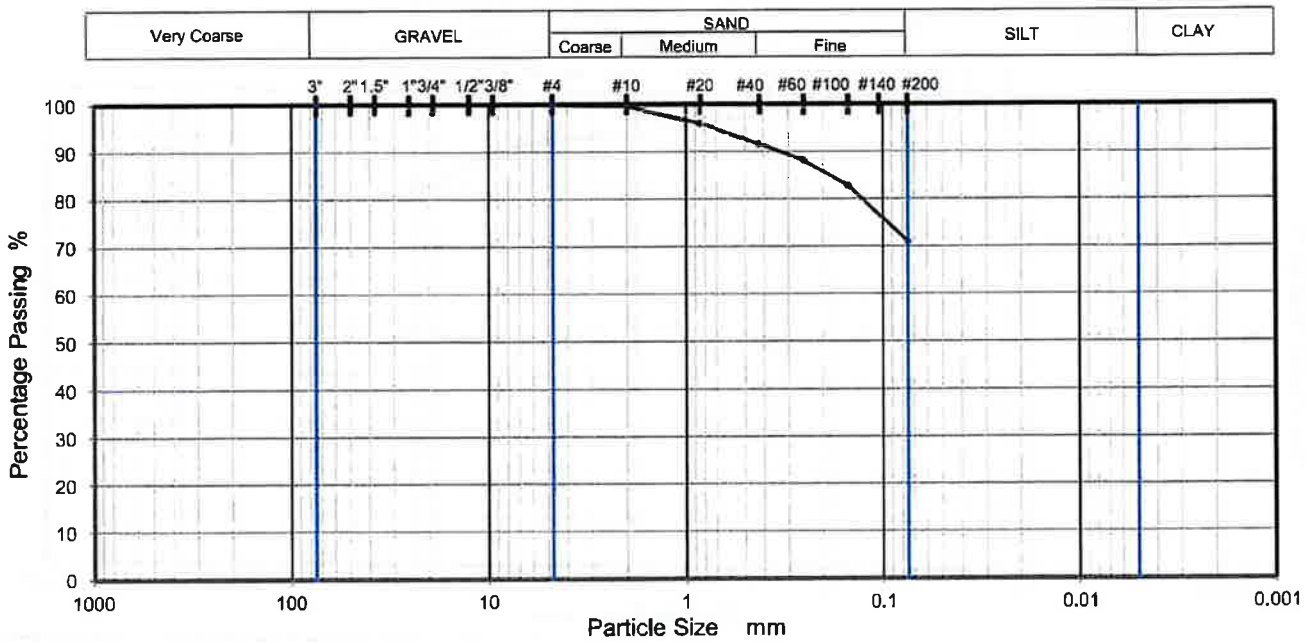
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Yellowish Light Brown
Sample Source: B-13

Project No.: 01:31153
Depth (ft): 3.5 - 5
Sample No.: S-2
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.6		
#20	96.1		
#40	91.7		
#60	88.2		
#100	82.9		
#200	71.0		

Dry Mass of sample, g: 40.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.4
Medium Sand, #10 to #40	7.9
Fine Sand, #40 to #200	20.7
Fines <#200	71.0

USCS	ML	Liquid Limit	44	D90	0.328	D50		D10	
AASHTO	A-7-6	Plastic Limit	28	D85	0.184	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	16	D60		D15		Cc	

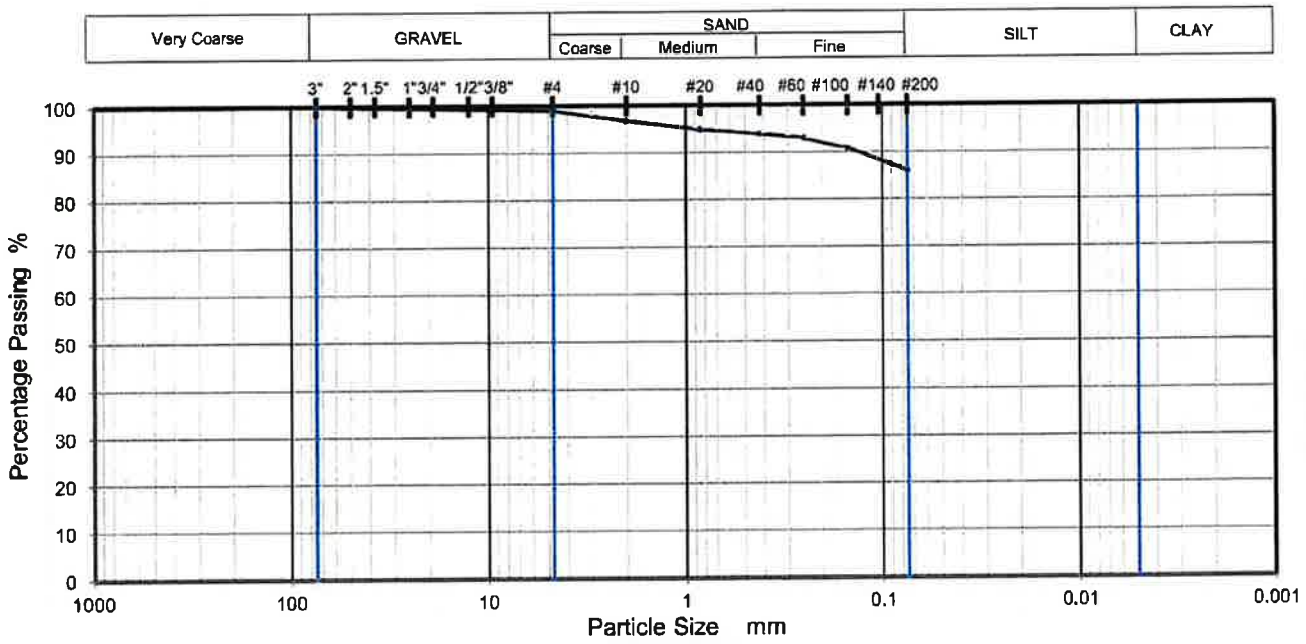
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Yellow Light Brown
Sample Source: B-03

Project No.: 01:31153
Depth (ft): 3.5 - 5
Sample No.: S-2
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	99.0		
#10	96.7		
#20	94.9		
#40	93.9		
#60	93.0		
#100	90.9		
#200	86.0		

Dry Mass of sample, g: 42.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	1.0
Coarse Sand, #4 to #10 sieve	2.3
Medium Sand, #10 to #40	2.8
Fine Sand, #40 to #200	7.9
Fines <#200	86.0

USCS	CH	Liquid Limit	60	D90	0.132	D50		D10	
AASHTO	A-7-6	Plastic Limit	28	D85		D30		Cu	
USCS Group Name	Fat clay	Plasticity Index	32	D60		D15		Cc	

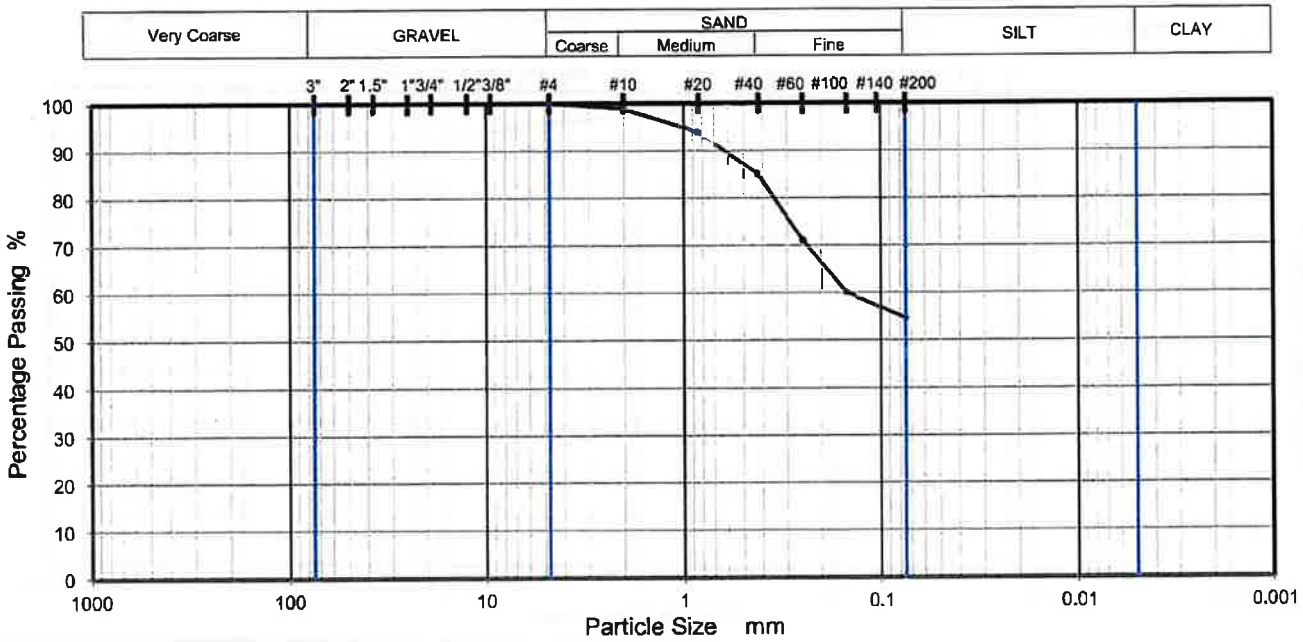
Project: Warrenton Data Center
Client:
Sample Description: Fat Clay Light Brown
Sample Source: B-07

Project No.: 01:31153
Depth (ft): 6 - 7.5
Sample No.: S-3
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	98.9		
#20	94.1		
#40	85.3		
#60	71.2		
#100	60.1		
#200	54.6		

Dry Mass of sample, g: 41.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.1
Medium Sand, #10 to #40	13.6
Fine Sand, #40 to #200	30.7
Fines <#200	54.6

USCS	ML	Liquid Limit	NP	D90	0.615	D50		D10	
AASHTO	A-4	Plastic Limit	NP	D85	0.420	D30		Cu	
USCS Group Name	Sandy silt	Plasticity Index	NP	D60	0.148	D15		Cc	

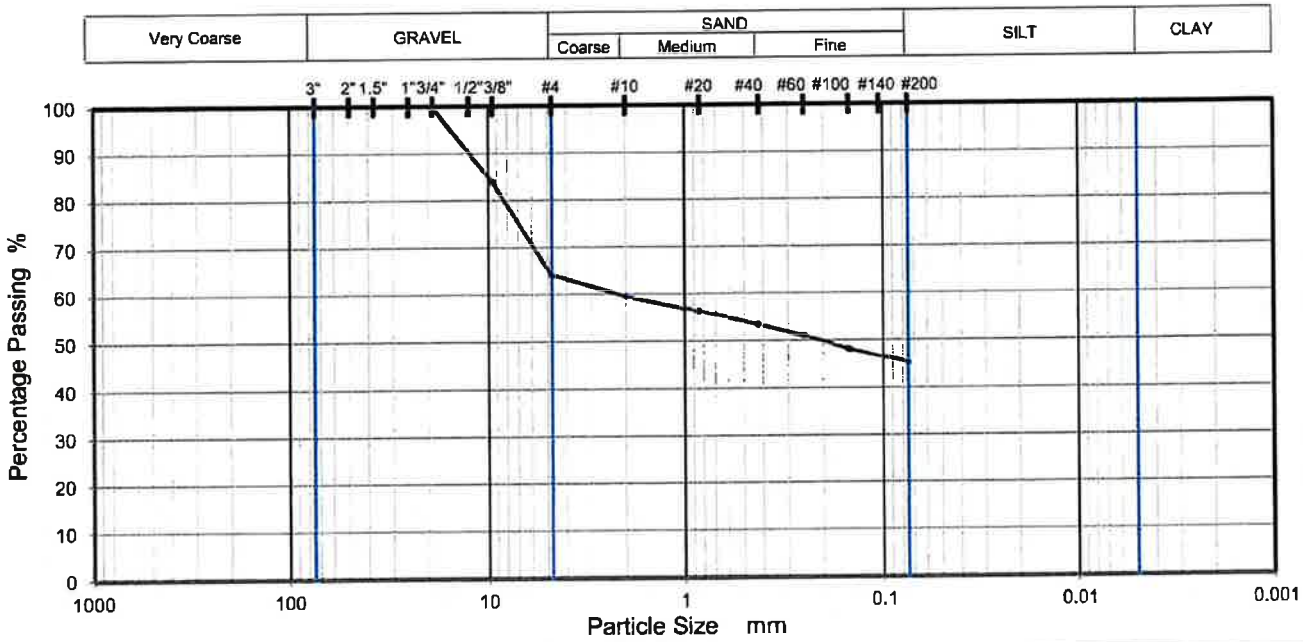
Project: Warrenton Data Center
Client:
Sample Description: Sandy Silt Trace Mica Yellowish Light Brown
Sample Source: B-16

Project No.: 01:31153
Depth (ft): 6 - 7.5
Sample No.: S-3
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
3/4"	100.0		
3/8"	83.9		
#4	64.1		
#10	59.5		
#20	56.3		
#40	53.5		
#60	51.0		
#100	48.3		
#200	45.3		

Dry Mass of sample, g: 41.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	35.9
Coarse Sand, #4 to #10 sieve	4.6
Medium Sand, #10 to #40	6.0
Fine Sand, #40 to #200	8.2
Fines <#200	45.3

USCS	GM	Liquid Limit	61	D90	12.350	D50	0.207	D10	
AASHTO	A-7-5	Plastic Limit	38	D85	9.961	D30		Cu	
USCS Group Name	Silty gravel with sand	Plasticity Index	23	D60	2.197	D15		Cc	

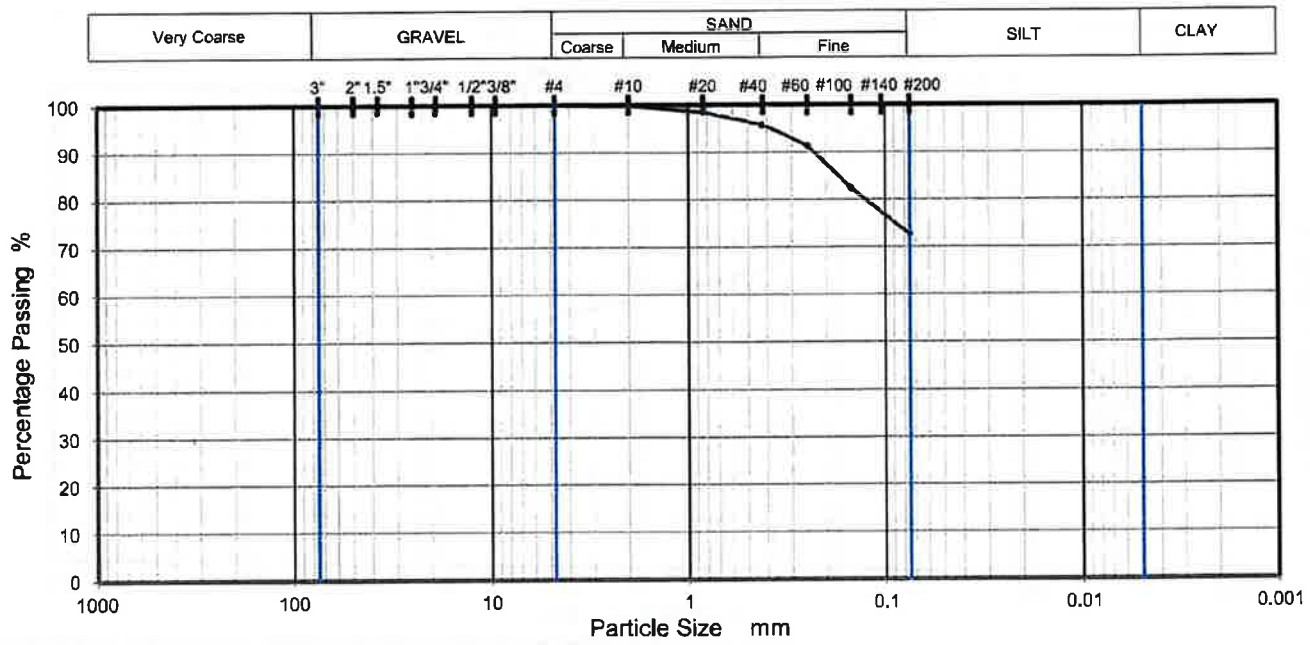
Project: Warrenton Data Center
Client:
Sample Description: Silty Gravel with Sand Trace Mica Yellowish Brown
Sample Source: B-19

Project No.: 01:31153
Depth (ft): 6 - 7.5
Sample No.: S-3
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.8		
#20	98.5		
#40	95.9		
#60	91.5		
#100	82.4		
#200	72.7		

Dry Mass of sample, g: 41.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.2
Medium Sand, #10 to #40	3.9
Fine Sand, #40 to #200	23.2
Fines <#200	72.7

USCS	ML	Liquid Limit	NP	D90	0.230	D50		D10	
AASHTO	A-4	Plastic Limit	NP	D85	0.174	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	NP	D60		D15		Cc	

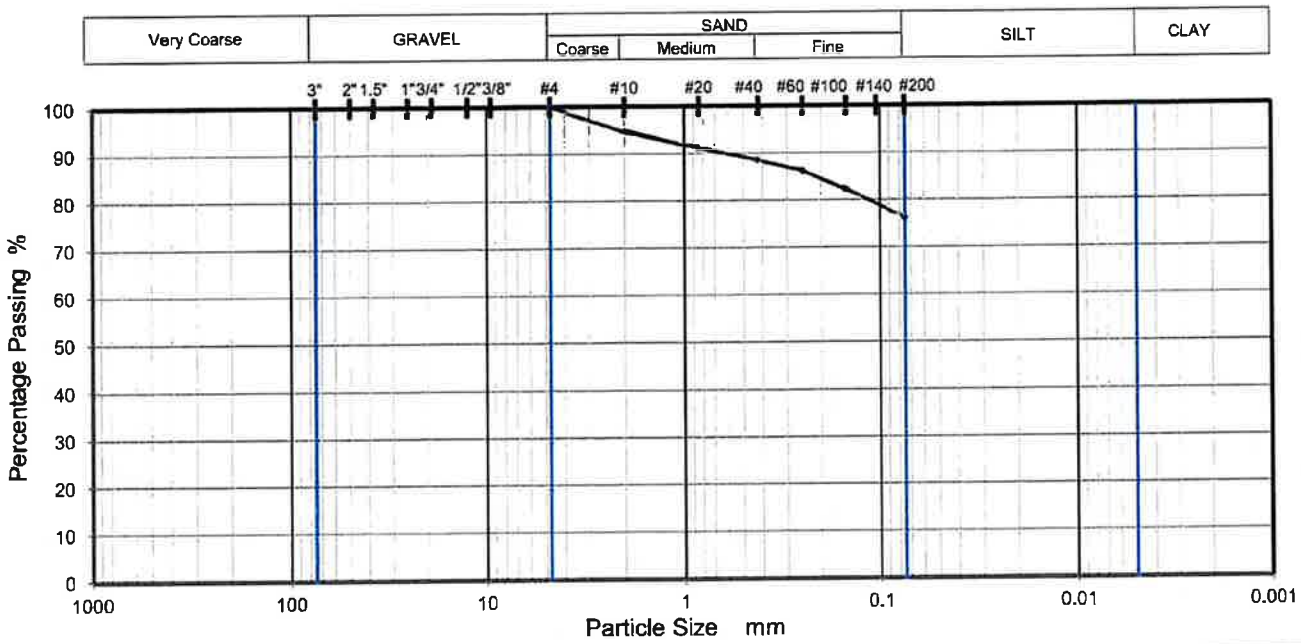
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Yellow Light Brown
Sample Source: B-09

Project No.: 01:31153
Depth (ft): 8.5 - 10
Sample No.: S-4
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	94.8		
#20	91.2		
#40	88.6		
#60	86.4		
#100	82.4		
#200	76.2		

Dry Mass of sample, g: 44.4

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	5.2
Medium Sand, #10 to #40	6.2
Fine Sand, #40 to #200	12.4
Fines <#200	76.2

USCS	MH	Liquid Limit	63	D90	0.617	D50		D10	
AASHTO	A-7-5	Plastic Limit	38	D85	0.209	D30		Cu	
USCS Group Name	Elastic silt with sand	Plasticity Index	25	D60		D15		Cc	

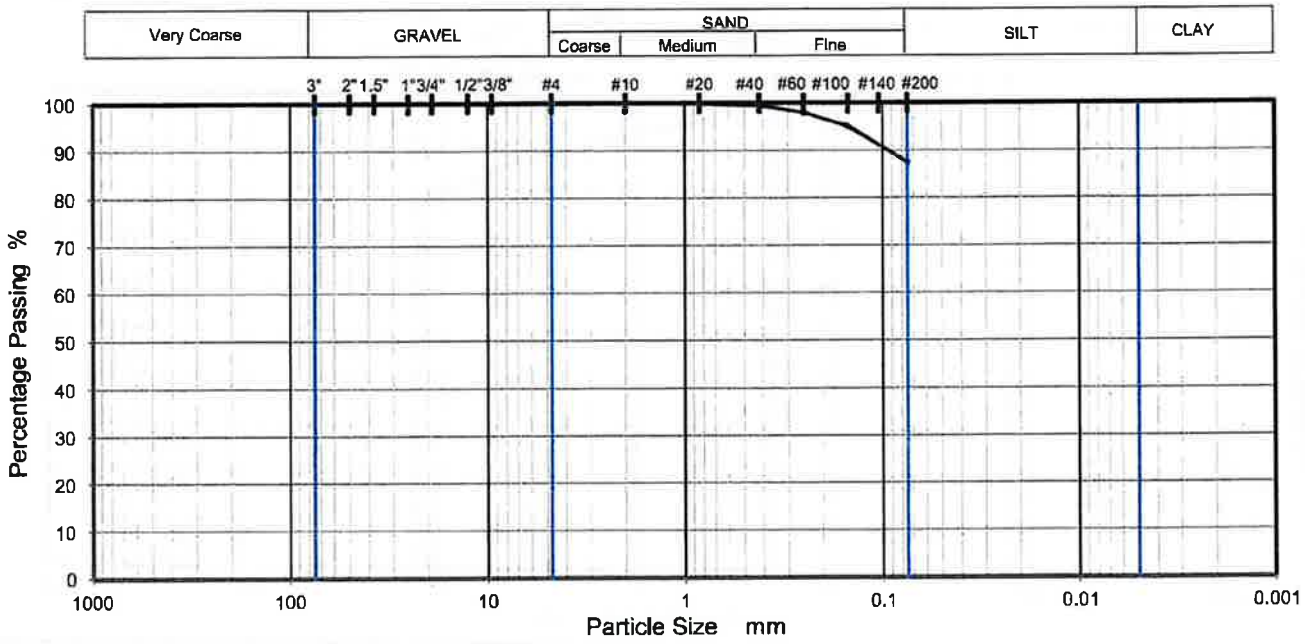
Project: Warrenton Data Center
Client:
Sample Description: Elastic Silt with Sand Trace Mica Yellowish Light Brown
Sample Source: B-20

Project No.: 01:31153
Depth (ft): 8.5 - 10
Sample No.: S-4
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.5		
#60	98.1		
#100	95.2		
#200	87.5		

Dry Mass of sample, g: 41.8

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.0
Medium Sand, #10 to #40	0.5
Fine Sand, #40 to #200	12.0
Fines <#200	87.5

USCS	ML	Liquid Limit	45	D90	0.094	D50		D10	
AASHTO	A-7-5	Plastic Limit	30	D85		D30		Cu	
USCS Group Name	Silt	Plasticity Index	15	D60		D15		Cc	

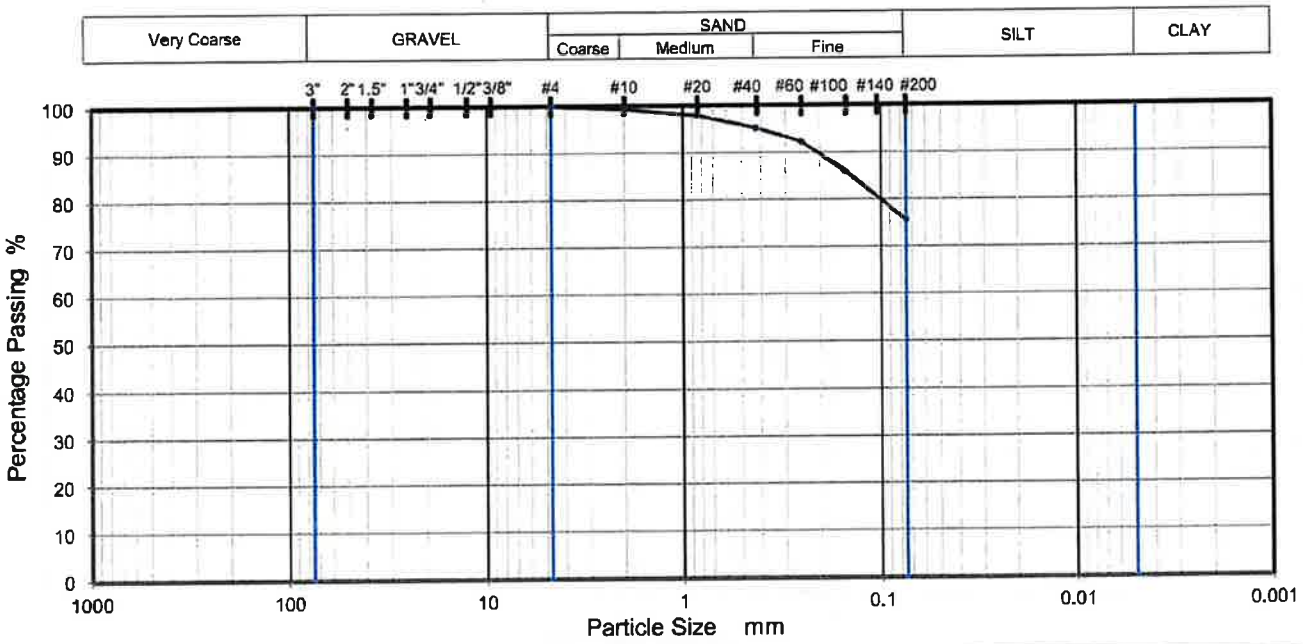
Project: Warrenton Data Center
Client:
Sample Description: Silt Trace Mica Yellow Light Brown
Sample Source: B-05

Project No.: 01:31153
Depth (ft): 33.5 - 35
Sample No.: S-9
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.3		
#20	97.9		
#40	95.3		
#60	92.4		
#100	86.1		
#200	75.6		

Dry Mass of sample, g: 41.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.7
Medium Sand, #10 to #40	4.0
Fine Sand, #40 to #200	19.7
Fines <#200	75.6

USCS	ML	Liquid Limit	NP	D90	0.206	D50		D10	
AASHTO	A-4	Plastic Limit	NP	D85	0.140	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	NP	D60		D15		Cc	

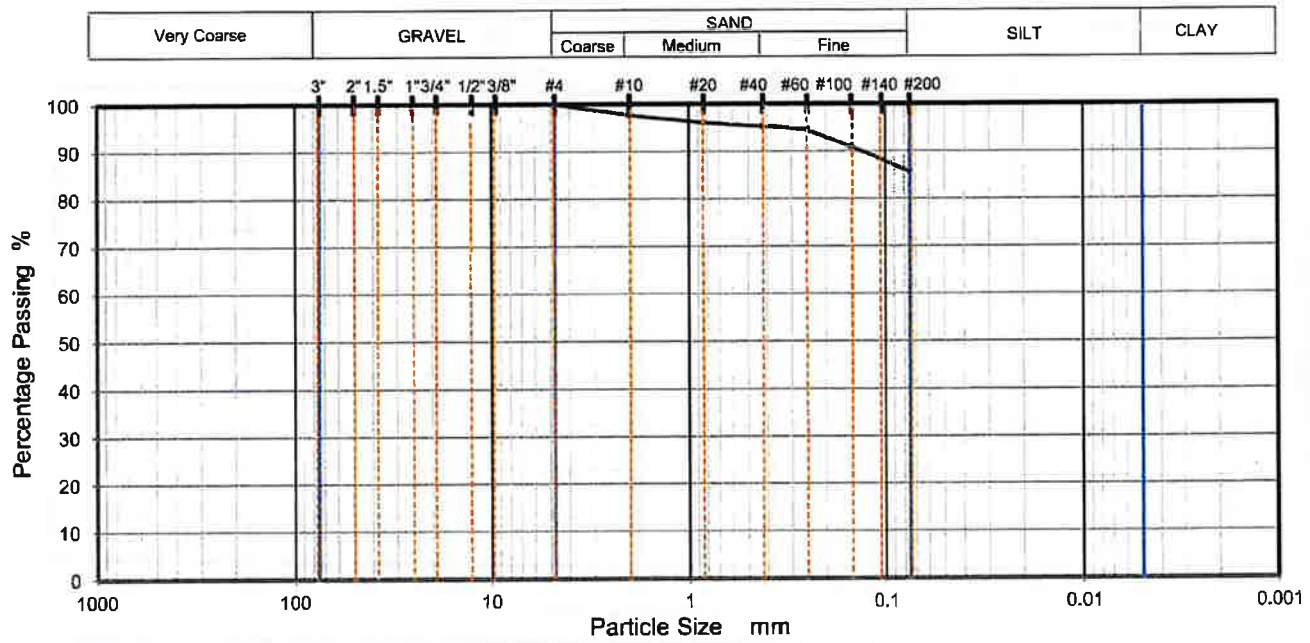
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Yellow Light Brown
Sample Source: B-01

Project No.: 01:31153
Depth (ft): 38.5 - 39.75
Sample No.: S-10
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	97.6		
#20	96.1		
#40	95.3		
#60	94.5		
#100	91.0		
#200	85.7		

Dry Mass of sample, g: 53.3

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	2.4
Medium Sand, #10 to #40	2.3
Fine Sand, #40 to #200	9.6
Fines <#200	85.7

USCS	CL	Liquid Limit	49	D90	0.132	D50		D10	
AASHTO	A-7-6	Plastic Limit	27	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	22	D60		D15		Cc	

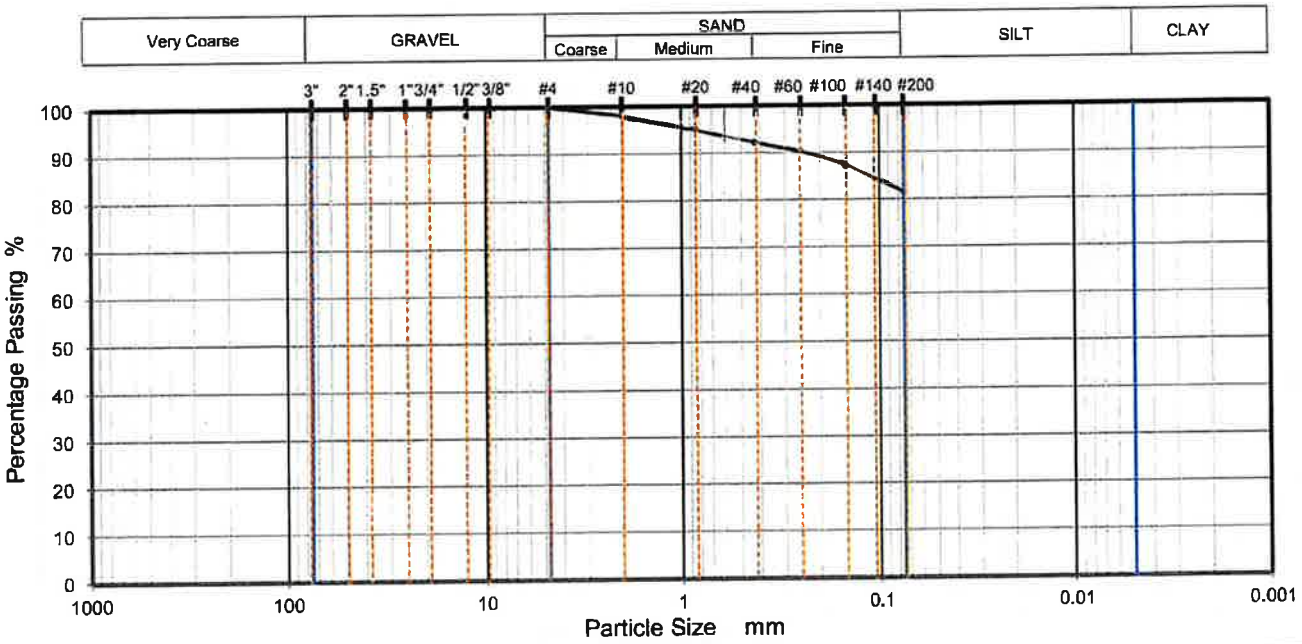
Project: Warrenton Data Center
Client:
Sample Description: Lean Clay with Sand Yellowisht Brown
Sample Source: B-14

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-186
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	98.1		
#20	95.1		
#40	92.4		
#60	90.3		
#100	87.6		
#200	81.6		

Dry Mass of sample, g: 64.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.9
Medium Sand, #10 to #40	5.7
Fine Sand, #40 to #200	10.8
Fines <#200	81.6

USCS	CL	Liquid Limit	45	D90	0.236	D50		D10	
AASHTO	A-7-6	Plastic Limit	21	D85	0.111	D30		Cu	
USCS Group Name	Lean clay with sand	Plasticity Index	24	D60		D15		Cc	

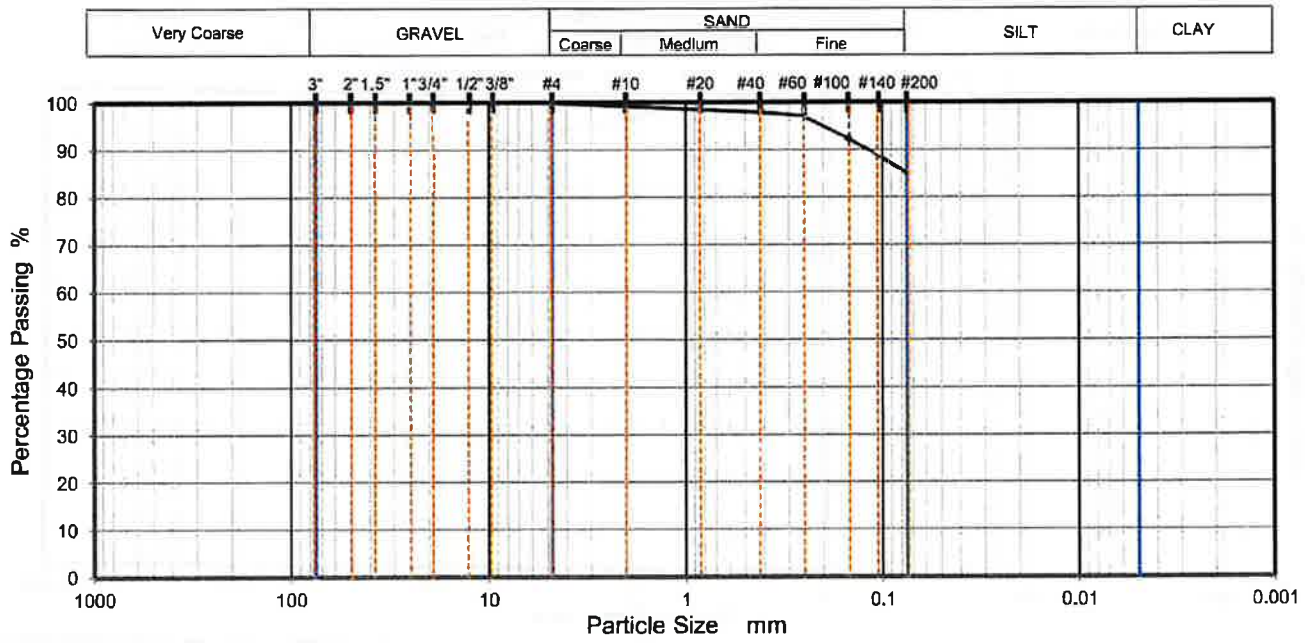
Project: Warrenton Data Center
Client:
Sample Description: Lean Clay with Sand Yellowish Brown
Sample Source: B-15

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-187
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	100.0		
#4	100.0		
#10	99.2		
#20	98.5		
#40	97.9		
#60	97.1		
#100	92.5		
#200	85.1		

Dry Mass of sample, g: 54.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.8
Medium Sand, #10 to #40	1.3
Fine Sand, #40 to #200	12.8
Fines <#200	85.1

USCS	ML	Liquid Limit	NP	D90	0.119	D50		D10	
AASHTO	A-4	Plastic Limit	NP	D85		D30		Cu	
USCS Group Name	Silt	Plasticity Index	NP	D60		D15		Cc	

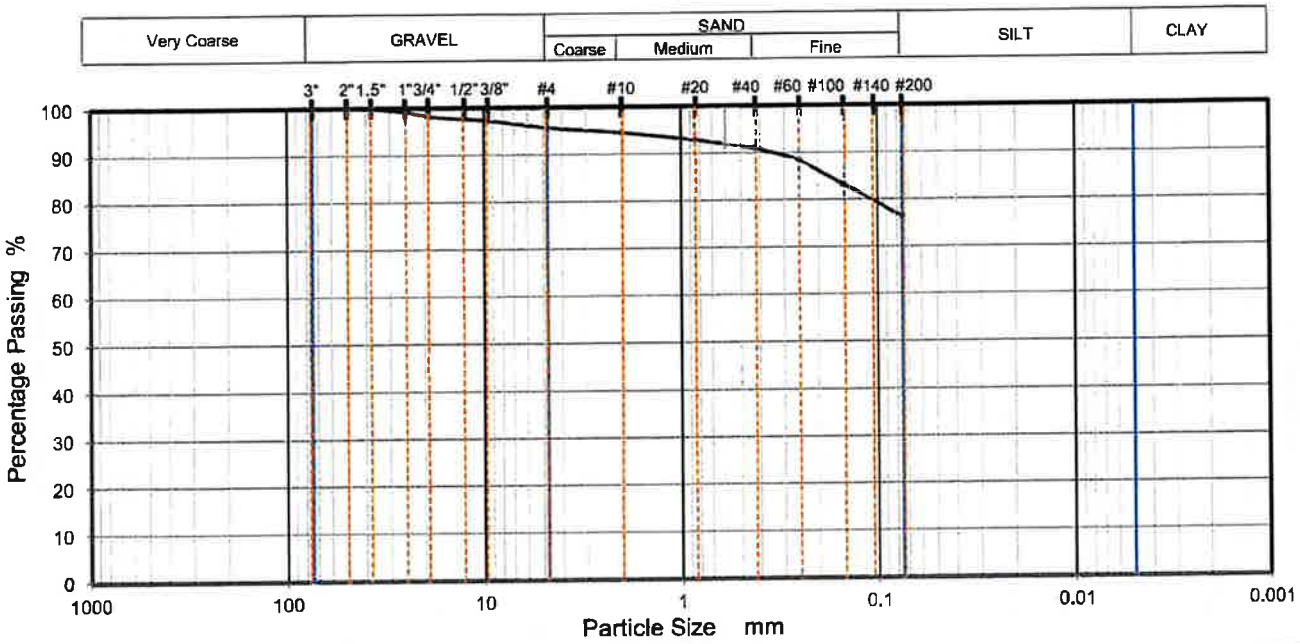
Project: Warrenton Data Center
Client:
Sample Description: Silt Trace Mica Yellowish Brown
Sample Source: B-04

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-188
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	99.2		
3/4"	98.2		
3/8"	97.3		
#4	95.7		
#10	94.6		
#20	92.9		
#40	91.1		
#60	88.6		
#100	83.4		
#200	76.4		

Dry Mass of sample, g: 5235.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	4.3
Coarse Sand, #4 to #10 sieve	1.1
Medium Sand, #10 to #40	3.5
Fine Sand, #40 to #200	14.7
Fines <#200	76.4

USCS	ML	Liquid Limit	49	D90	0.337	D50		D10	
AASHTO	A-7-6	Plastic Limit	28	D85	0.176	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	21	D60		D15		Cc	

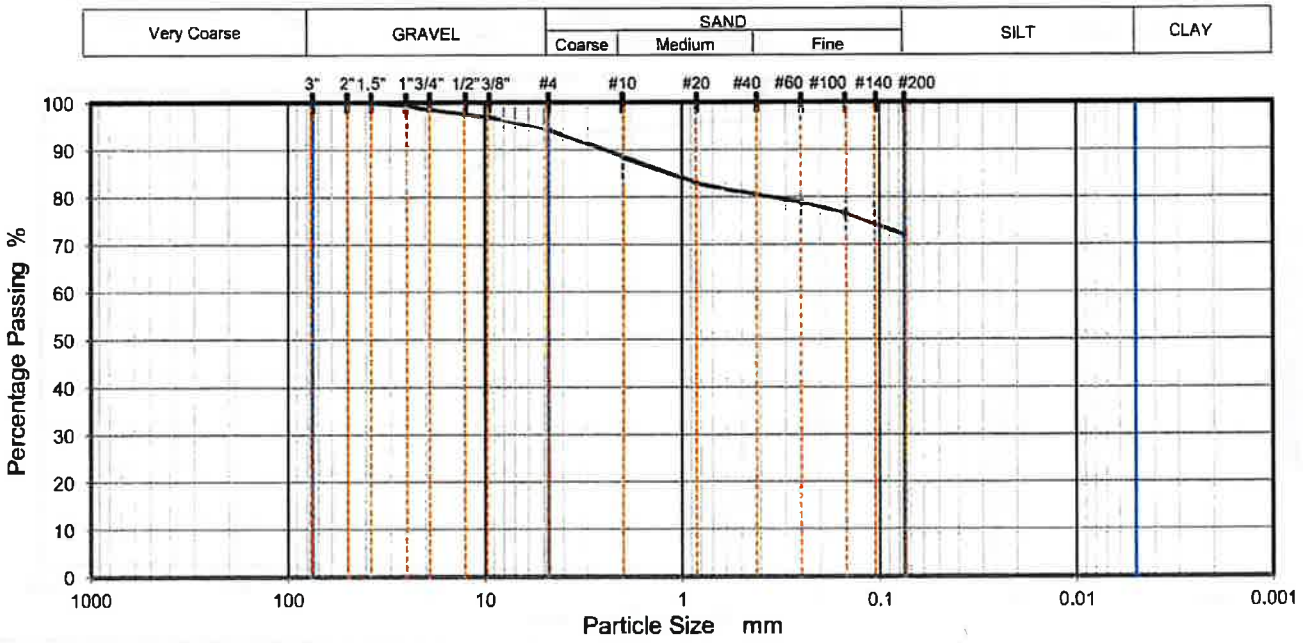
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Brwon
Sample Source: B-09

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-189
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	99.4		
3/4"	98.5		
3/8"	96.9		
#4	94.4		
#10	88.7		
#20	83.1		
#40	80.6		
#60	79.0		
#100	76.7		
#200	72.0		

Dry Mass of sample, g: 10996.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	5.6
Coarse Sand, #4 to #10 sieve	5.7
Medium Sand, #10 to #40	8.1
Fine Sand, #40 to #200	8.6
Fines <#200	72.0

USCS	CH	Liquid Limit	55	D90	2.436	D50		D10	
AASHTO	A-7-6	Plastic Limit	24	D85	1.136	D30		Cu	
USCS Group Name	Fat clay with sand	Plasticity Index	31	D60		D15		Cc	

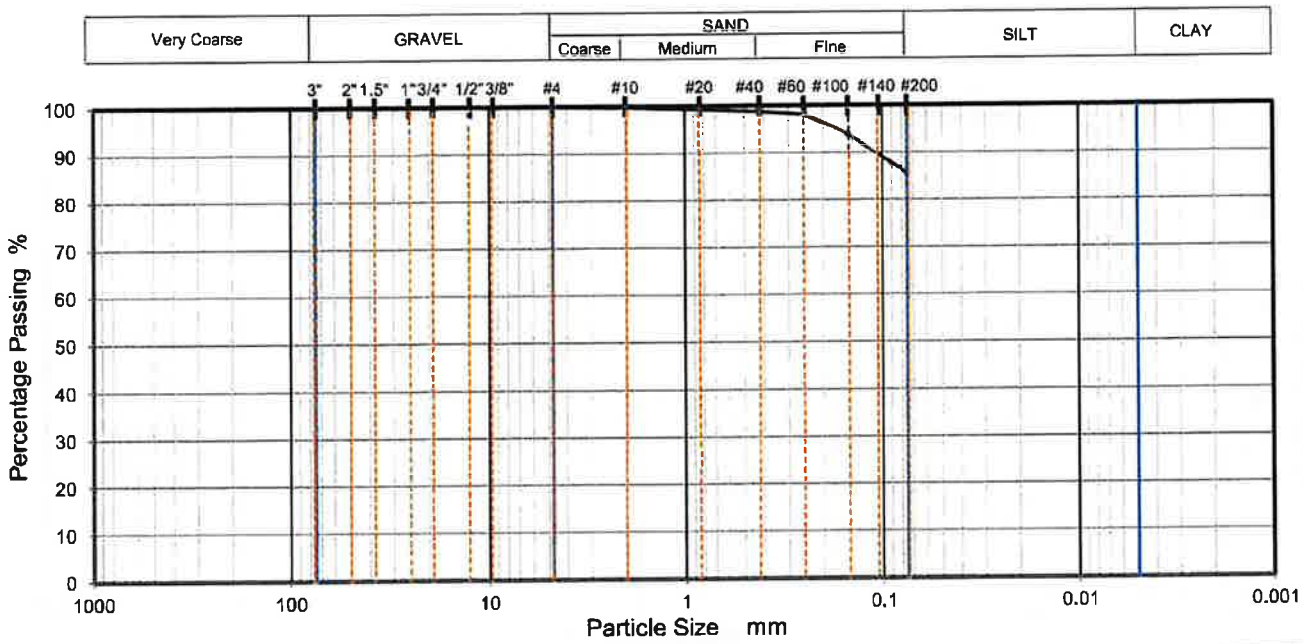
Project: Warrenton Data Center
Client:
Sample Description: Fat Clay with Sand Brown
Sample Source: B-19

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-190
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.8		
#20	99.3		
#40	98.8		
#60	98.1		
#100	94.0		
#200	85.6		

Dry Mass of sample, g: 54.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.2
Medium Sand, #10 to #40	1.0
Fine Sand, #40 to #200	13.2
Fines <#200	85.6

USCS	CL	Liquid Limit	39	D90	0.108	D50		D10	
AASHTO	A-6	Plastic Limit	18	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	21	D60		D15		Cc	

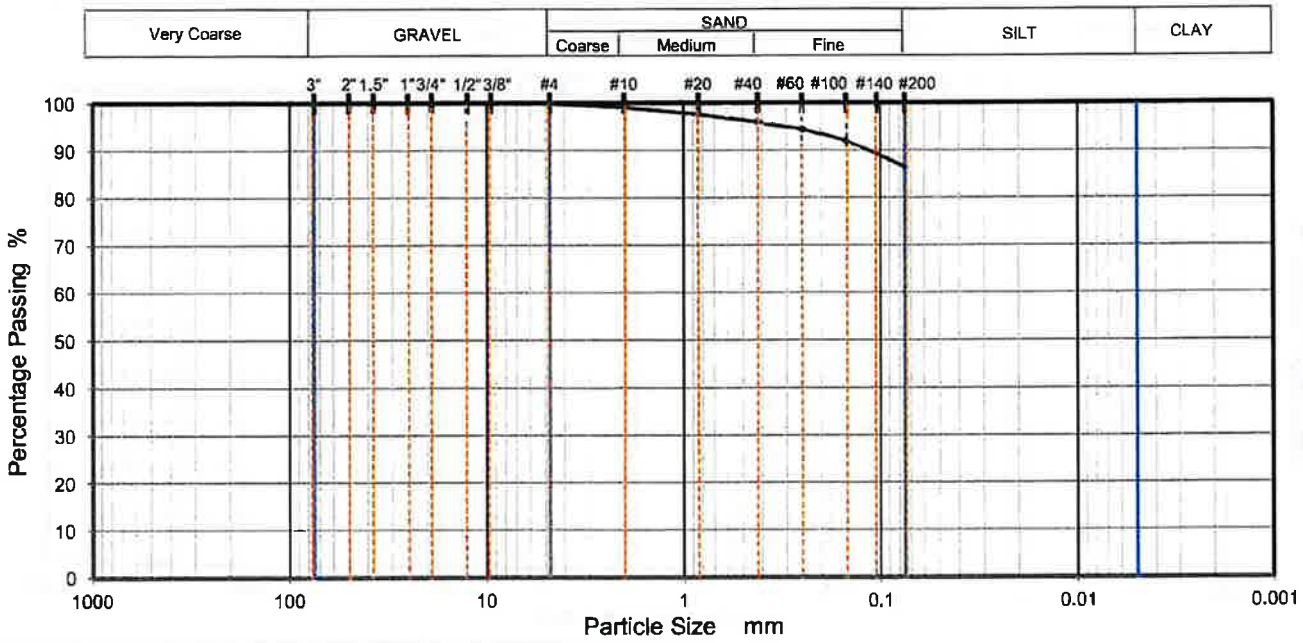
Project: Warrenton Data Center
Client:
Sample Description: Lean Clay Yellowish Brown
Sample Source: B-02

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-191
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.1		
#20	97.6		
#40	96.0		
#60	94.6		
#100	92.2		
#200	86.5		

Dry Mass of sample, g: 64.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.9
Medium Sand, #10 to #40	3.1
Fine Sand, #40 to #200	9.5
Fines <#200	86.5

USCS	CL	Liquid Limit	37	D90	0.115	D50		D10	
AASHTO	A-6	Plastic Limit	19	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	18	D60		D15		Cc	

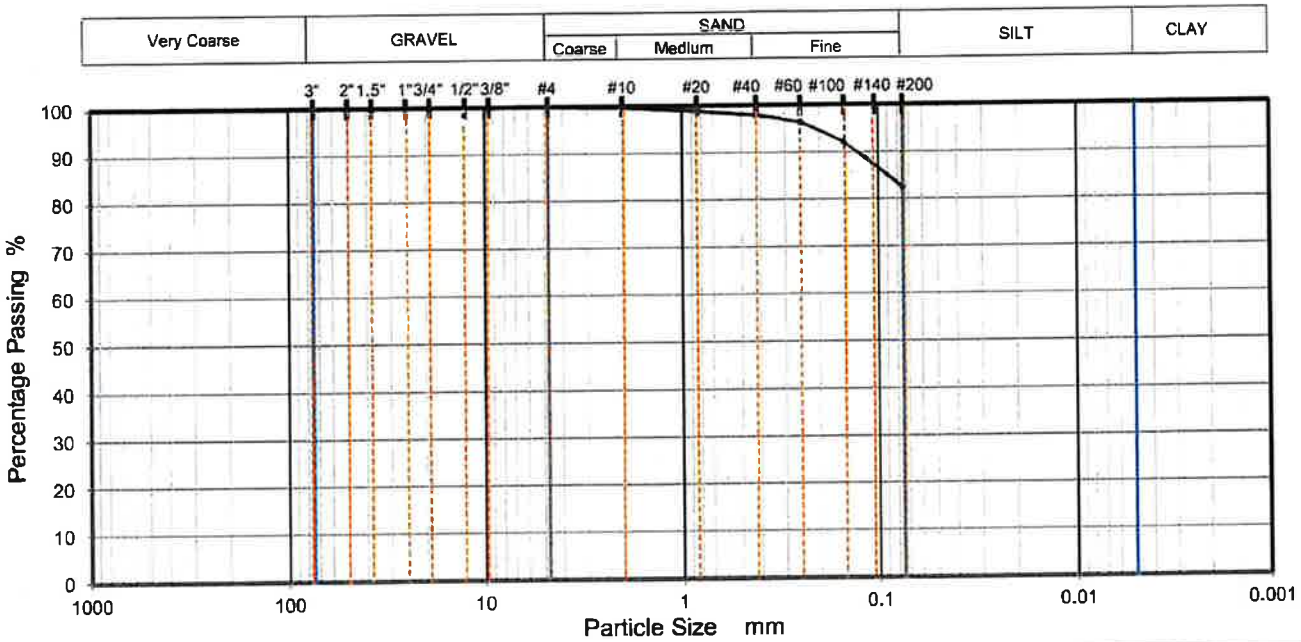
Project: Warrenton Data Center
Client:
Sample Description: Lean Clay Trace Mica Brown
Sample Source: B-07

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-193
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
#4	100.0		
#10	99.7		
#20	98.9		
#40	97.9		
#60	96.5		
#100	92.3		
#200	82.5		

Dry Mass of sample, g: 51.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.3
Medium Sand, #10 to #40	1.8
Fine Sand, #40 to #200	15.4
Fines <#200	82.5

USCS	ML	Liquid Limit	41	D90	0.128	D50		D10	
AASHTO	A-7-6	Plastic Limit	27	D85	0.090	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	14	D60		D15		Cc	

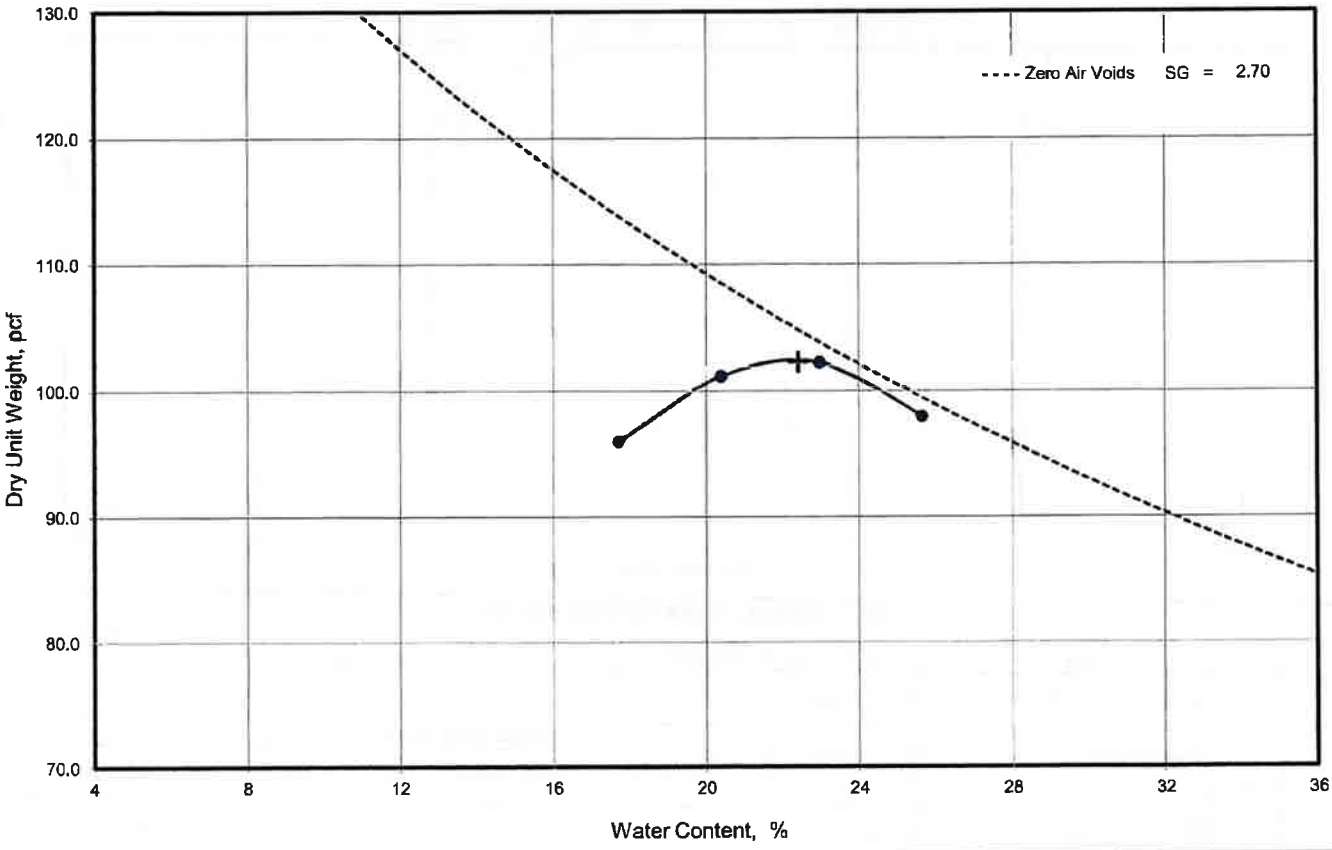
Project: Warrenton Data Center
Client:
Sample Description: Silt with Sand Trace Mica Yellowish Brown
Sample Source: B-11

Project No.: 01:31153
Depth (ft): 1 - 6
Sample No.: D3S-194
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**22.4**	%
Maximum Dry Unit Weight		**102.3**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation
Type of rammer	Manual - 5.5lbf (24.5N)
Test Specfication / Method	ASTM D698-12e2-method A
Specific gravity - D854 water pycnometer	2.70 Assumed
Coarse Aggregate Specific Gravity -	

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Lean Clay with Sand Yellowisht Brown	5.6	49	22	85.7	CL	A-7-6

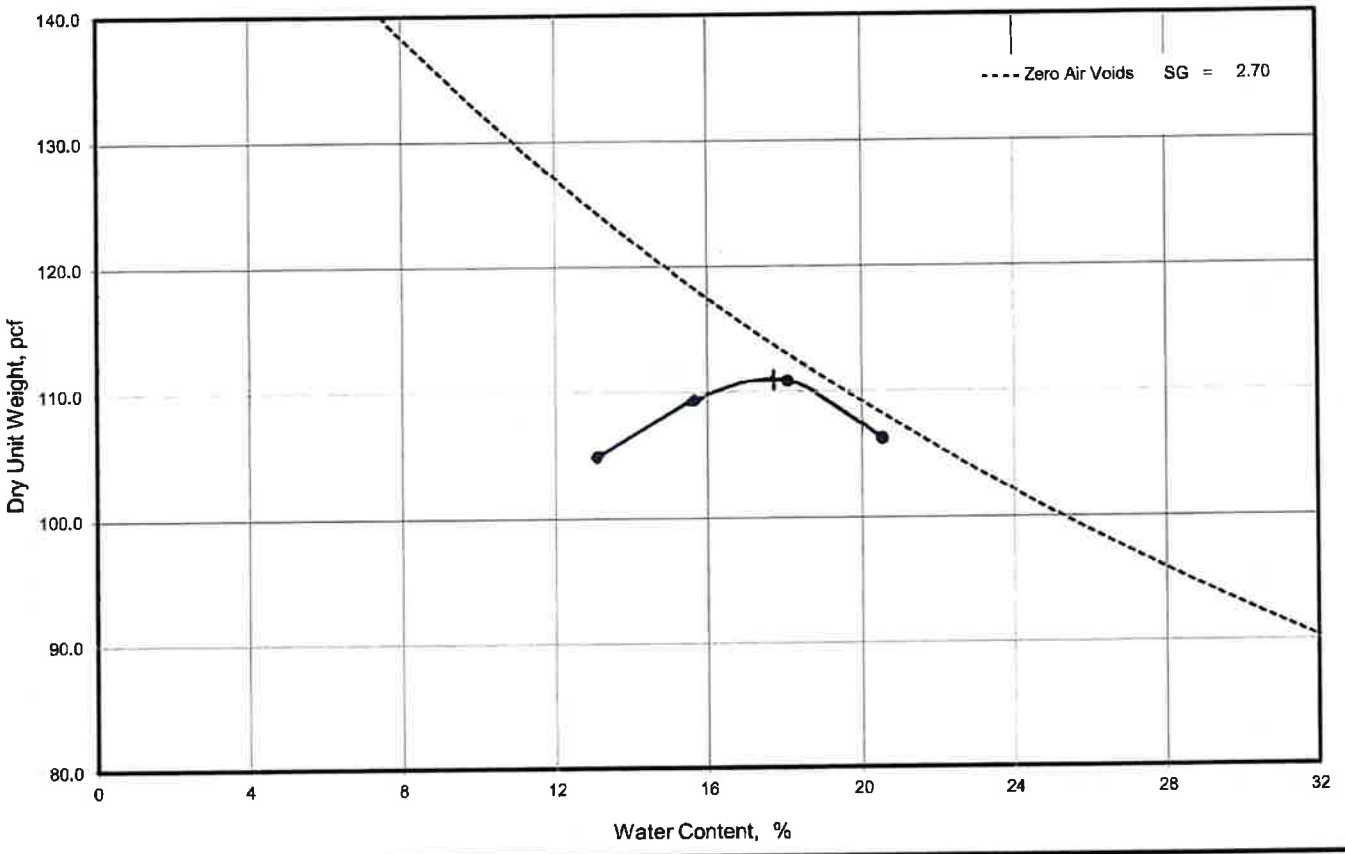
Project: Warrenton Data Center
Client:
Sample / Source B-14
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-186
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**17.7**	%
Maximum Dry Unit Weight		**111.0**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation
Type of rammer	Manual - 5.5lbf (24.5N)
Test Specfication / Method	ASTM D698-12e2-method A
Specific gravity - D854 water pycnometer	2.70 Assumed
Coarse Aggregate Specific Gravity -	

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Lean Clay with Sand Yellowish Brown	5.6	45	24	81.6	CL	A-7-6

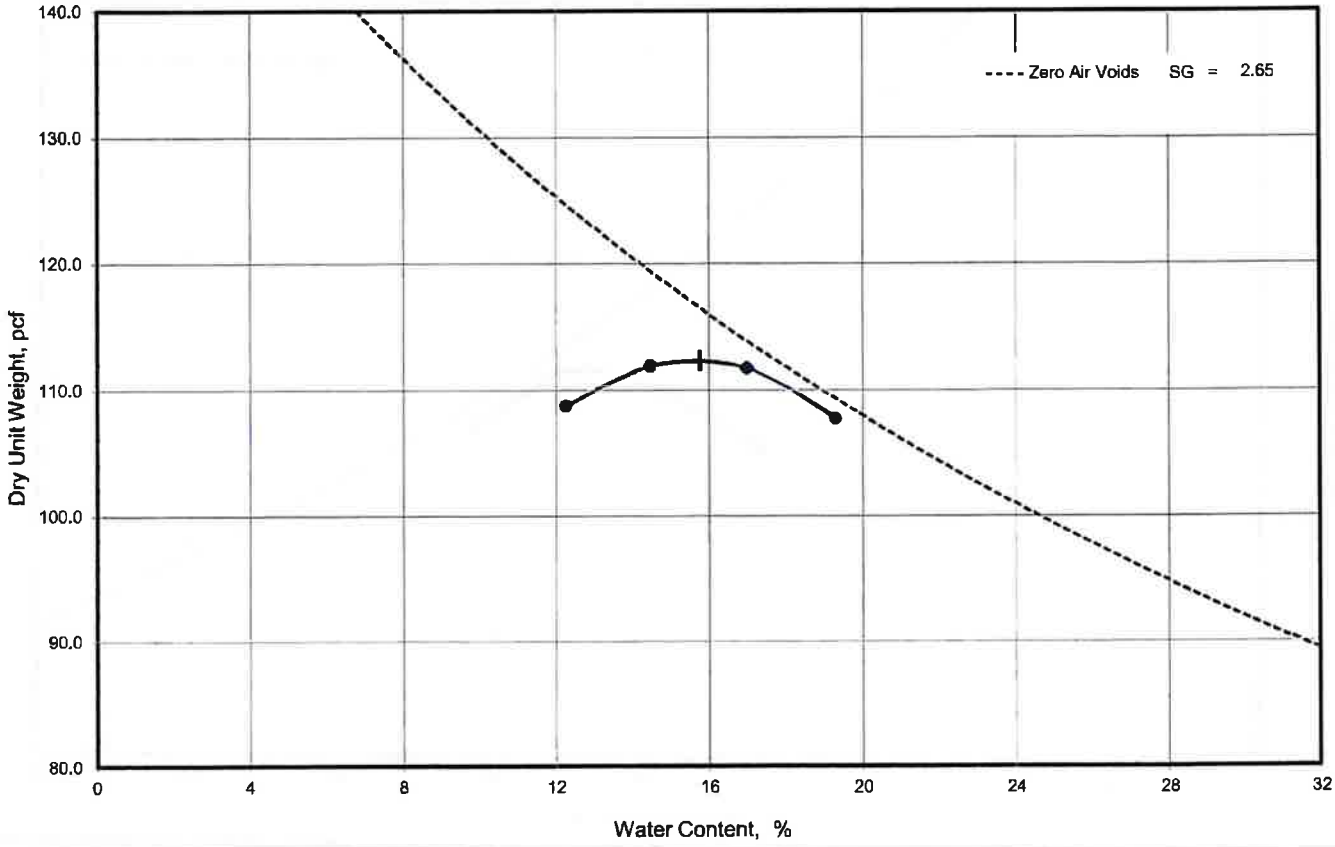
Project: Warrenton Data Center
Client:
Sample / Source B-15
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-187
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**15.8**	%
Maximum Dry Unit Weight		**112.3**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation	
Type of rammer	Manual - 5.5lbf (24.5N)	
Test Specfication / Method	ASTM D698-12e2-method A	
Specific gravity - D854 water pycnometer	2.65	Assumed
Coarse Aggregate Specific Gravity -		

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Silt Trace Mica Yellowish Brown	2.2	NP	NP	85.1	ML	A-4

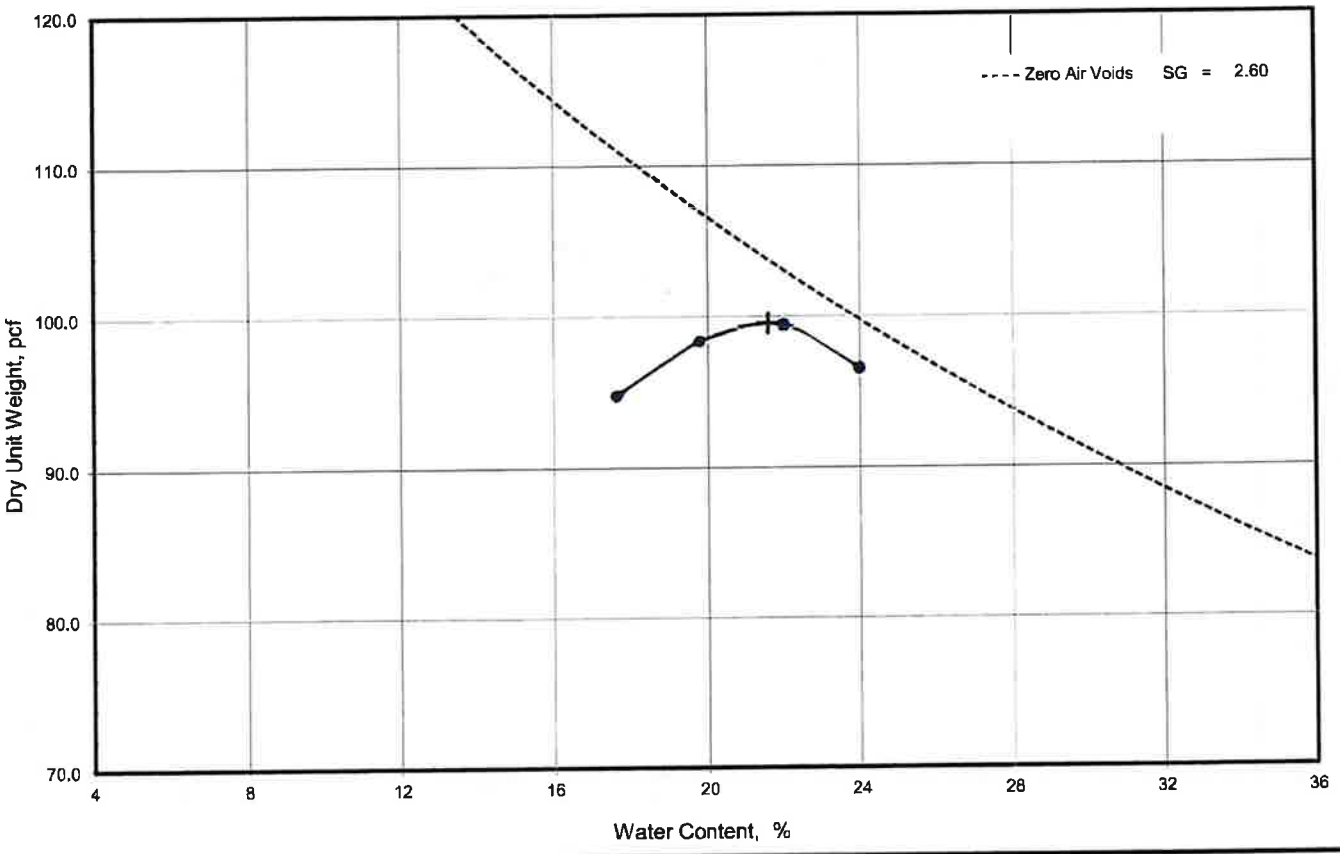
Project: Warrenton Data Center
Client:
Sample / Source B-04
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-188
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**21.6**	%
Maximum Dry Unit Weight		**99.5**	pcf
Cumulative material retained on:	3/4 in. sieve	1.8	%
	3/8 in. sieve	2.7	%
	#4 sieve	4.3	%

Preparation	ASTM moist preparation	
Type of rammer	Manual - 5.5lbf (24.5N)	
Test Specfication / Method	ASTM D698-12e2-method A	
Specific gravity - D854 water pycnometer	2.60	Assumed
Coarse Aggregate Specific Gravity -		Assumed

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Silt with Sand Brown	5.2	49	21	76.4	ML	A-7-6

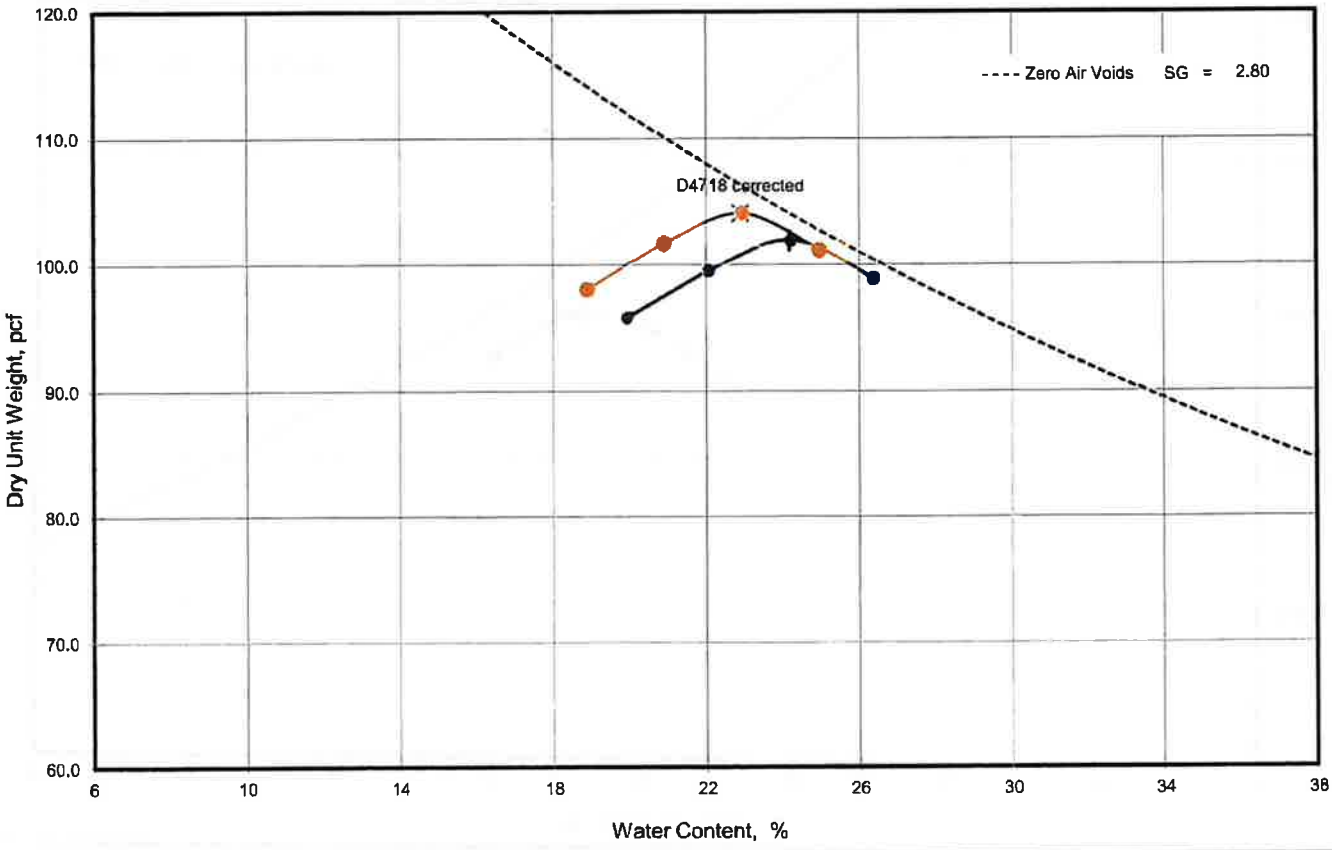
Project: Warrenton Data Center
Client:
Sample / Source B-09
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-189
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**24.2**	%
Maximum Dry Unit Weight		**101.9**	pcf
Corrected Opt. Moisture Content		22.9	%
Corrected Max. Dry Density		104.0	pcf
Cumulative material retained on:	3/4 in. sieve	1.5	%
	3/8 in. sieve	3.1	%
	#4 sieve	5.6	%

5.58 % retained on #4 sieve.

Preparation	ASTM moist preparation	
Type of rammer	Manual - 5.5lbf (24.5N)	
Test Specfication / Method	ASTM D698-12e2-method A	
Specific gravity - D854 water pycnometer	2.80	Assumed
Coarse Aggregate Specific Gravity -	2.60	Assumed

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Fat Clay with Sand Brown	33.6	55	31	72.0	CH	A-7-6

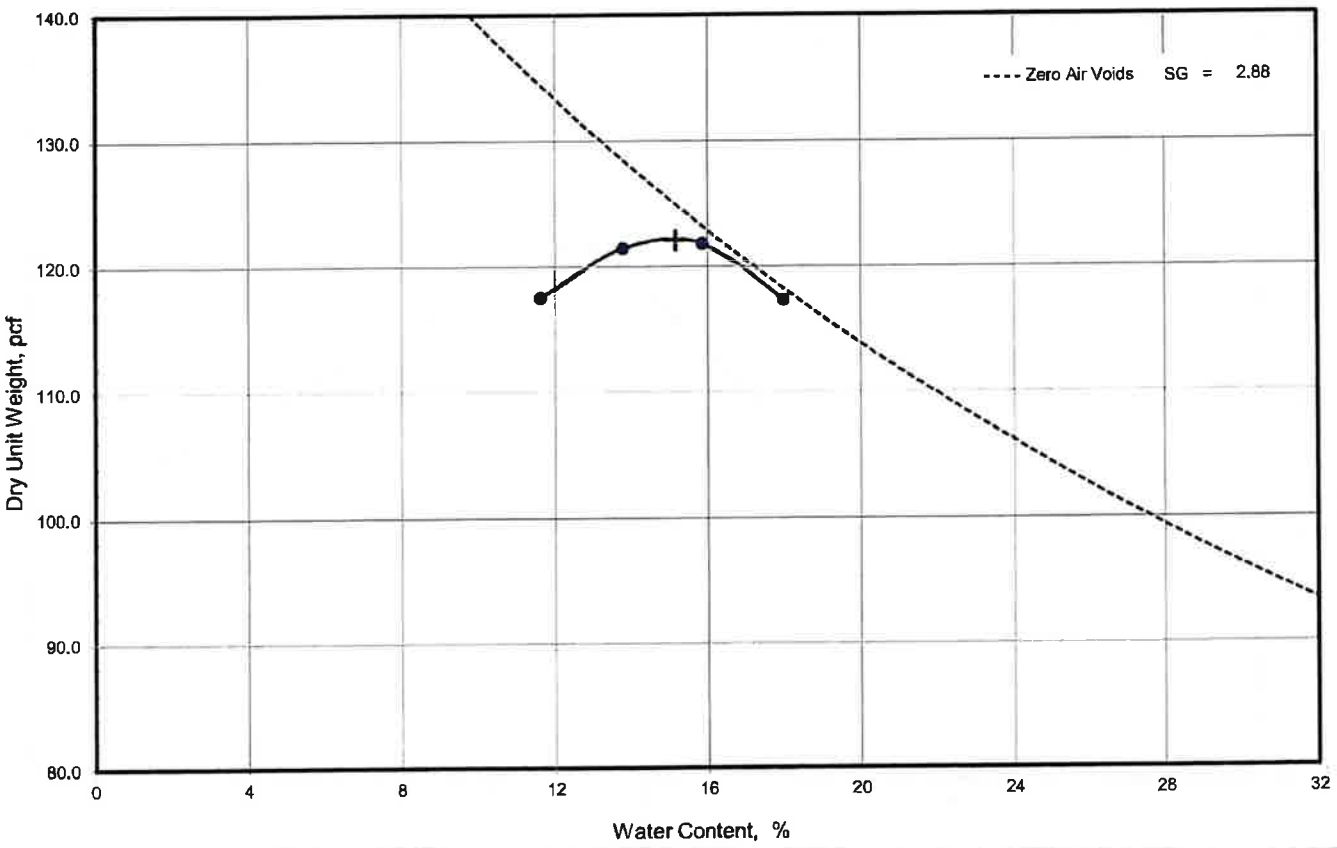
Project: Warrenton Data Center
Client:
Sample / Source B-19
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-190
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**15.2**	%
Maximum Dry Unit Weight		**122.1**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation
Type of rammer	Manual - 5.5lbf (24.5N)
Test Specfication / Method	ASTM D698-12e2-method A
Specific gravity - D854 water pycnometer	2.88 Historical
Coarse Aggregate Specific Gravity -	

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Lean Clay Yellowish Brown	11.7	39	21	85.6	CL	A-6

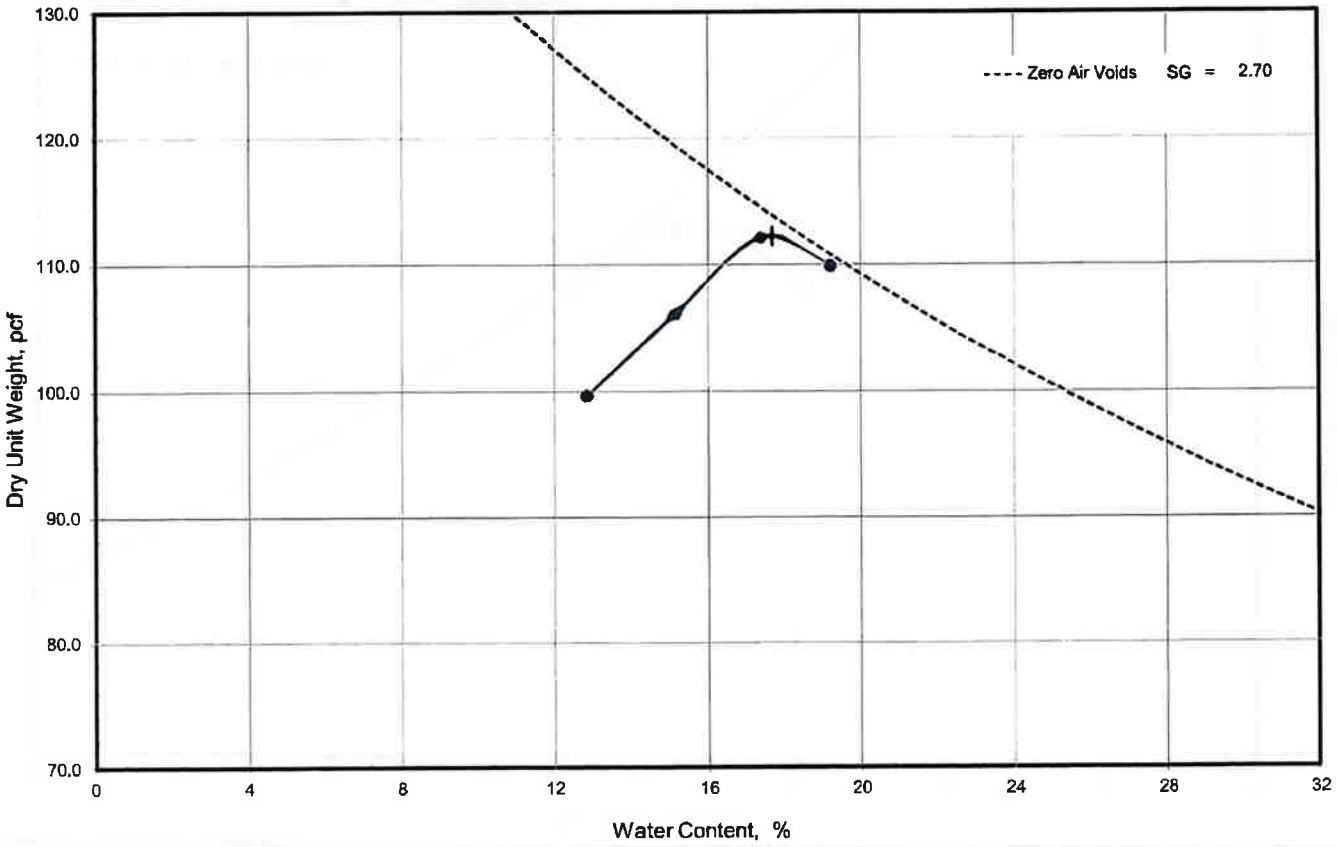
Project: Warrenton Data Center
Client:
Sample / Source B-02
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-191
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**17.7**	%
Maximum Dry Unit Weight		**112.2**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation
Type of rammer	Manual - 5.5lbf (24.5N)
Test Specfication / Method	
Specific gravity - D854 water pycnometer	2.70 Historical
Coarse Aggregate Specific Gravity -	

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Lean Clay Trace Mica Brown	2.6	37	18	86.5	CL	A-6

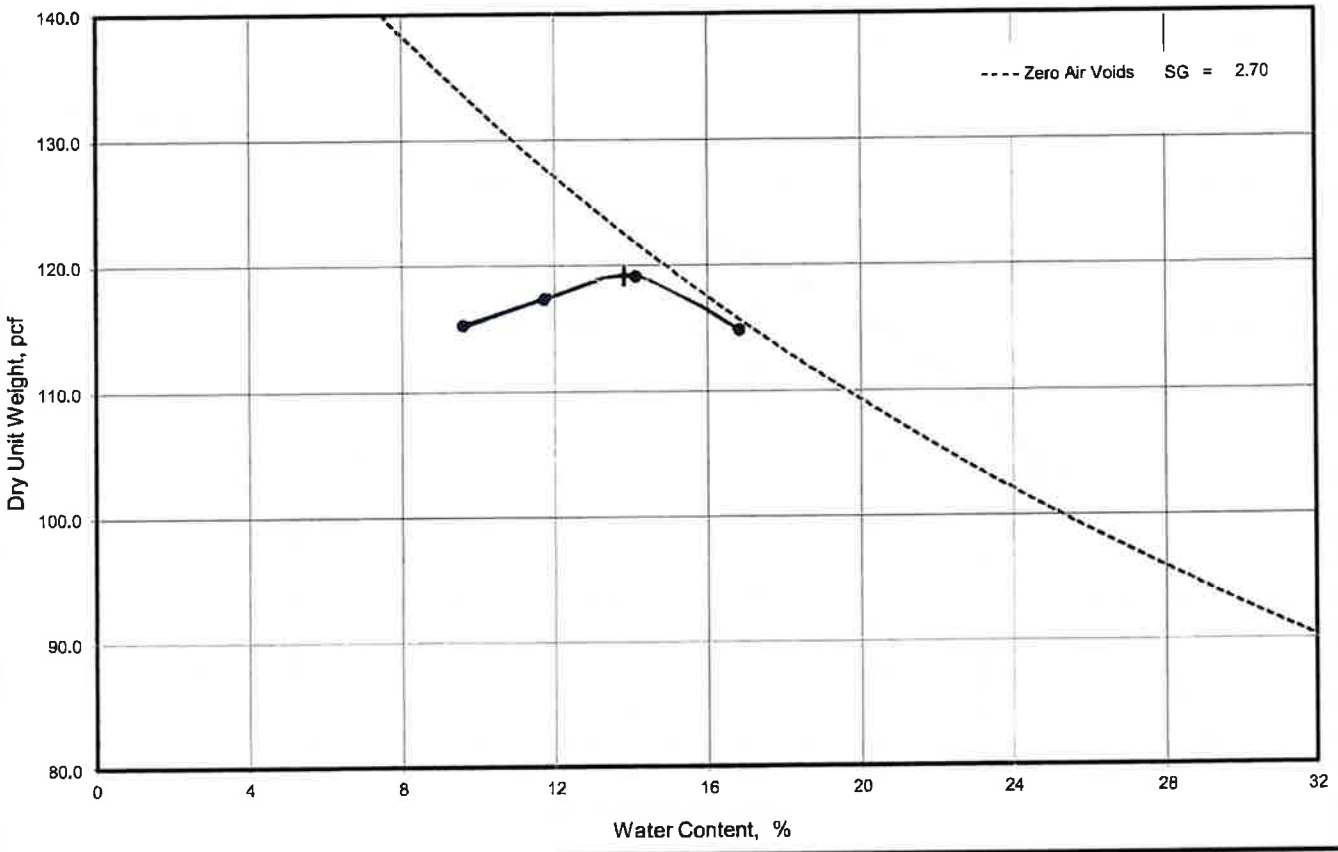
Project: Warrenton Data Center
Client:
Sample / Source B-07
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-193
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content		**13.8**	%
Maximum Dry Unit Weight		**119.2**	pcf
Cumulative material retained on:	3/4 in. sieve	0.0	%
	3/8 in. sieve	0.0	%
	#4 sieve	0.0	%

Preparation	ASTM moist preparation
Type of rammer	
Test Specfication / Method	ASTM D698-12e2-method A
Specific gravity - D854 water pycnometer	2.70 Historical
Coarse Aggregate Specific Gravity -	

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Silt with Sand Trace Mica Yellowish Brown	2.1	41	14	82.5	ML	A-7-6

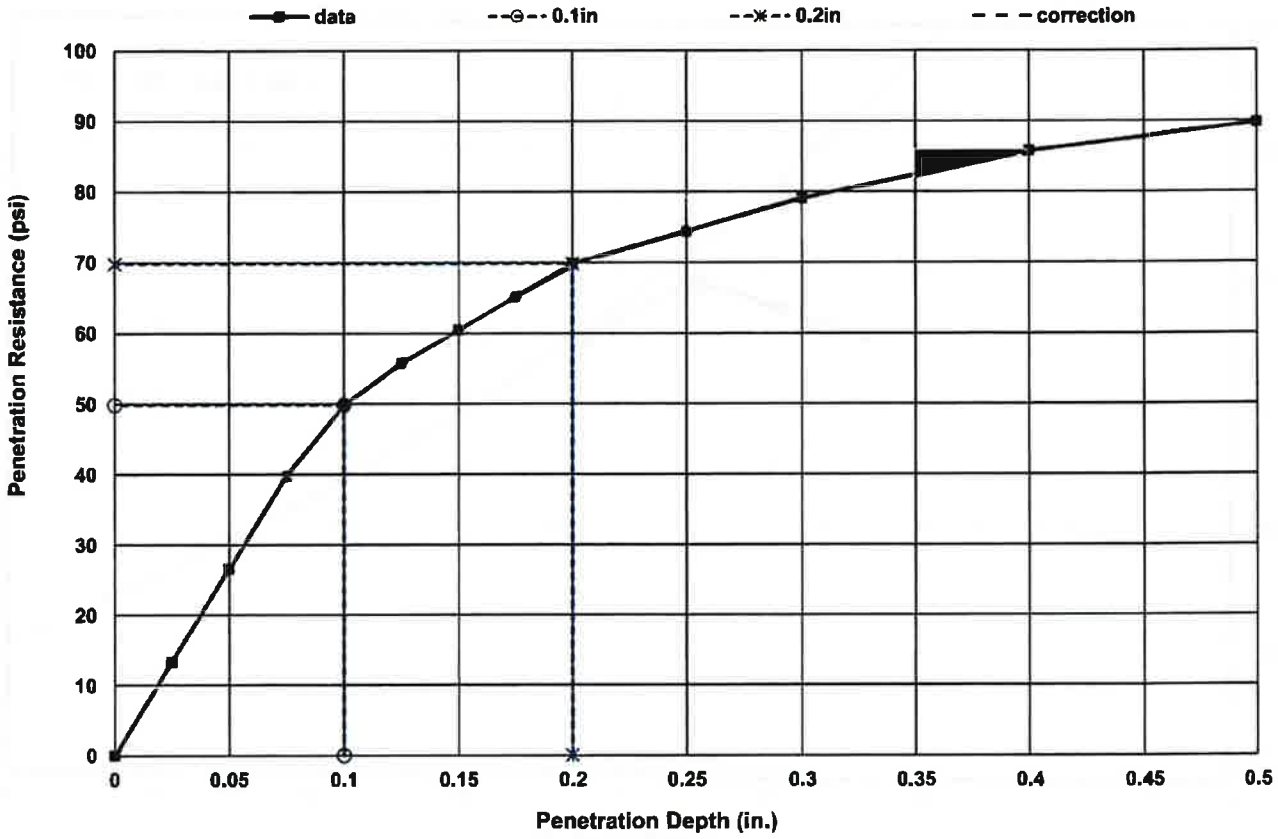
Project: Warrenton Data Center
Client:
Sample / Source B-11
Test Reference/No.:

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-194
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

California Bearing Ratios (CBR) of Laboratory-Compacted Soils



TEST RESULTS (ASTM D1883-16)

Molded			Soaked			CBR (%)		Linearty Correction (in.)	Surcharge (lbs.)		Swell (%)	
Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.1 in.	0.2 in.					
101.8	99.5	22.3	91.1	89.1	33.8	5.0	4.7	0.00	10		2.22	
Material Description					AASHTO	USCS	MAX. Dens. (pcf)	Optimum Moisture (%)	LL	PI	% Fines	% Gravel
Lean Clay with Sand Yellowish Brown					A-7-6	CL	102.3	22.4	49	22	85.7	0.0

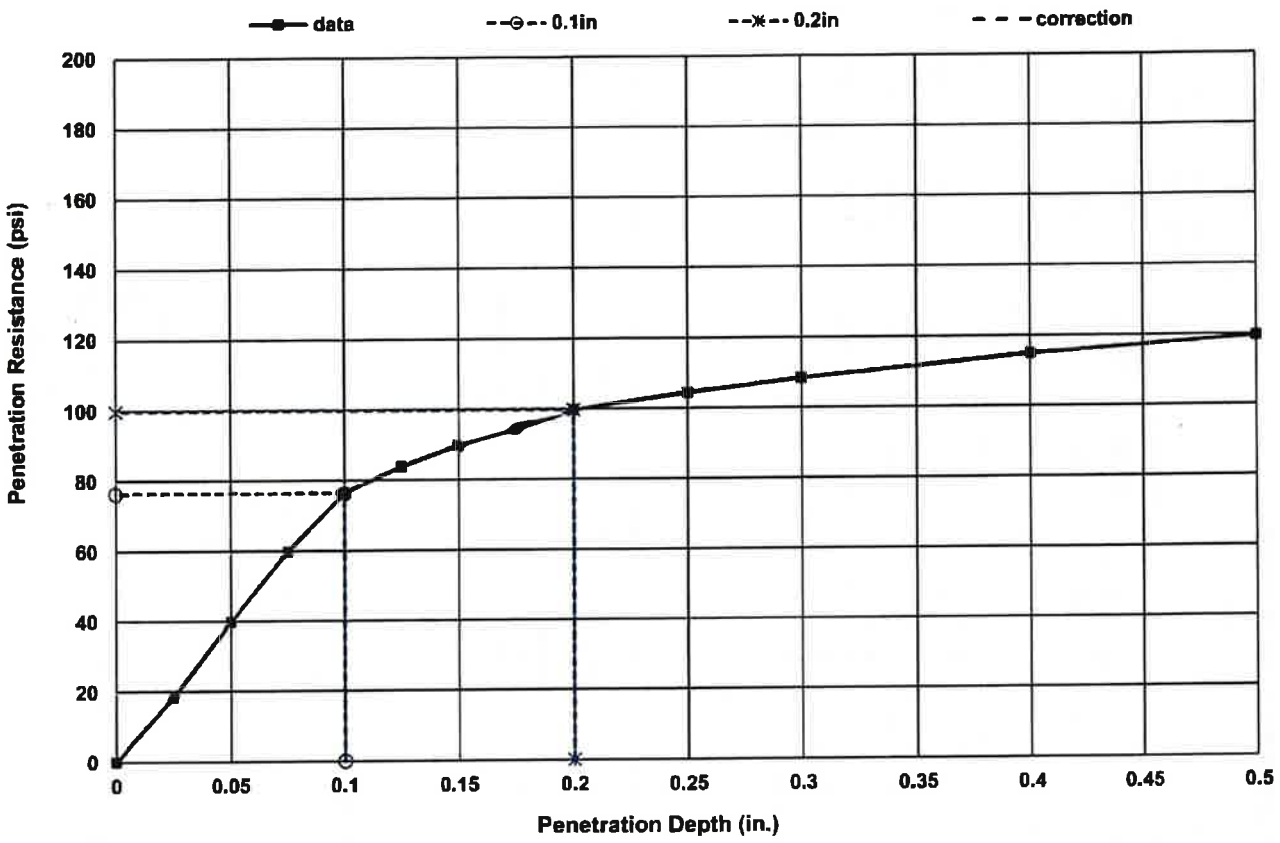
Project: Warrenton Data Center
Client:
Sample / Source B-14
Test Reference/No.: 1

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-186
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

California Bearing Ratios (CBR) of Laboratory-Compacted Soils



TEST RESULTS (ASTM D1883-16)

Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)		Swell (%)	
Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.1 in.	0.2 in.					
110.5	99.5	17.6	100.2	90.3	27.3	7.6	6.6	0.00	10		1.85	
Material Description					AASHTO	USCS	MAX. Dens. (pcf)	Optimum Moisture (%)	LL	PI	% Fines	% Gravel
Lean Clay with Sand Yellowish Brown					A-7-6	CL	111	17.7	45	24	81.6	0.0

Project: Warrenton Data Center
Client:
Sample / Source B-15
Test Reference/No.: 1

Project No.: 01:31153
Depth (ft.): 1 - 6
Sample No.: D3S-187
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	14026 Thunderbolt Place Suite 100 Chantilly, VA 20151-3232	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334

Test Point	Moisture Content %	Corrected Conductivity									Average Conductivity	Average Resistivity
		1st Reading			2nd Reading			3rd Reading				
		K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Rho=°C·cm/W
Dry Point	0.39	0.450	0.0024	21.3	0.467	0.0042	20.8	0.476	0.0042	20.9	0.464	215.471
Moist Point 1	5.60	0.836	0.0017	21.6	0.849	0.0026	21.3	0.845	0.0018	21.1	0.843	118.624
Moist Point 2	10.30	1.238	0.0020	19.4	1.294	0.0016	19.3	1.283	0.0015	19.3	1.272	78.642
Moist Point 3	12.41	1.353	0.0012	19.2	1.382	0.0013	19.1	1.359	0.0011	19.1	1.365	73.286
Moist Point 4	14.36	1.593	0.0029	19.1	1.480	0.0012	19	1.485	0.0012	19	1.519	65.821
Moist Point 5	16.26	1.534	0.0015	18.9	1.516	0.0013	18.9	1.473	0.0010	18.8	1.508	66.332
Moist Point 6												
Moist Point 7												
Moist Point 8												
Moist Point 9												

K Material (Standard)	0.2730
K Measured	0.2980
Calibration Factor	0.9161

Volume of Mold (cf)	0.0333
Volume of Mold (M^3)	0.00094
Weight of Test Sample (lb)	3.888
Mass of Dry Soil (kg)	1.764

LL	39
PI	21
USCS Symbol	CL

Test Material screened with #4 sieve.

Needle Insertion Metho Pre-drill

Test performed at: 95 % compactive effort @ blows per layer.

Project: Warrenton Data Center

Client:

Sample / Source: B-02

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-191

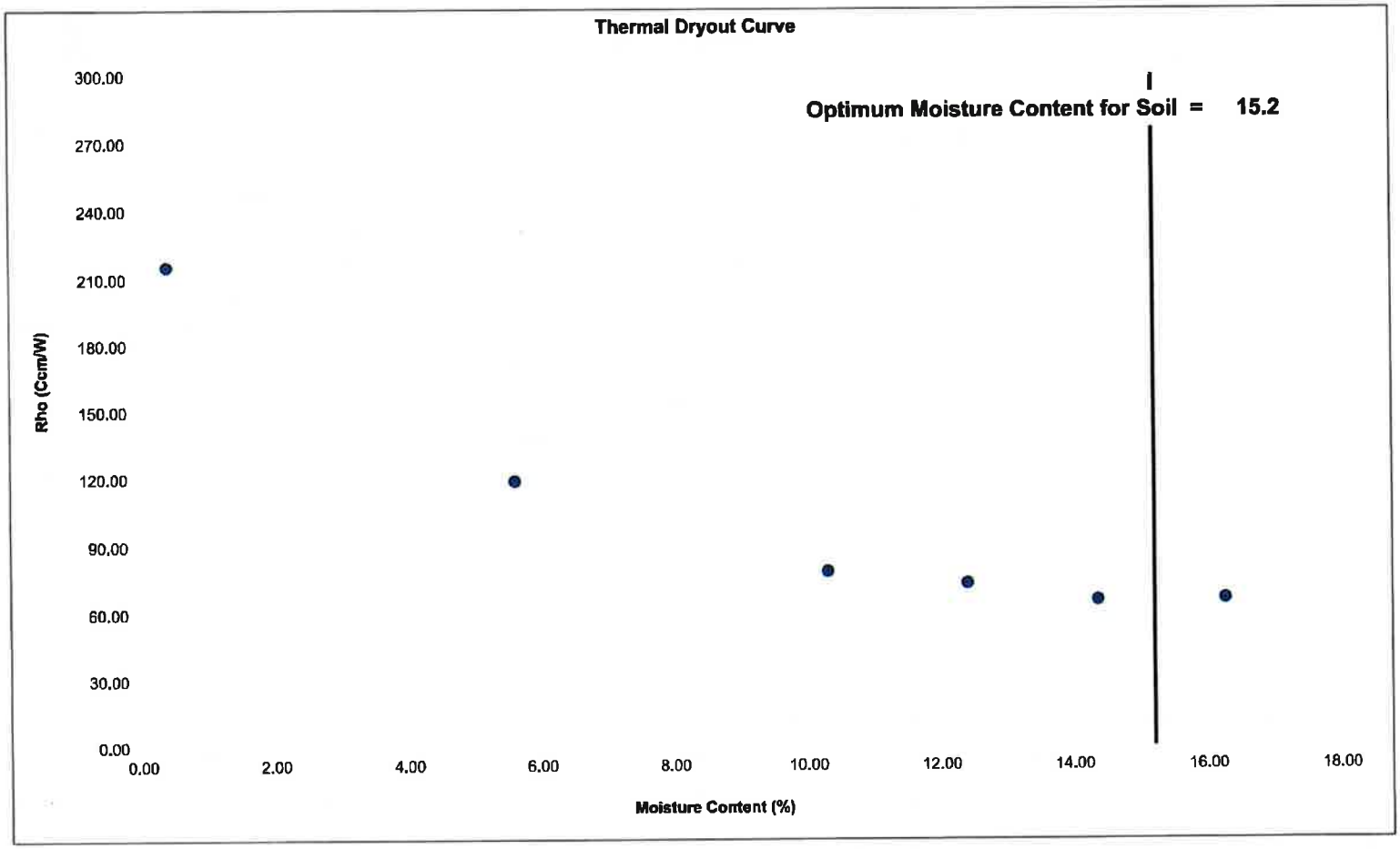
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	026 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334



Project: Warrenton Data Center

Client:

Sample / Source: B-02

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-191

Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	026 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334

Test Point	Moisture Content %	Corrected Conductivity									Average Conductivity	Average Resistivity
		1st Reading			2nd Reading			3rd Reading				
		K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Rho=°C-cm/W
Dry Point	0.00	0.548	0.0045	22	0.531	0.0030	20.8	0.535	0.0035	20.8	0.538	185.874
Moist Point 1	6.39	1.010	0.0012	20.8	1.058	0.0018	20.4	1.068	0.0019	20.4	1.045	95.668
Moist Point 2	13.78	1.625	0.0013	19.5	1.572	0.0014	19.5	1.580	0.0015	19.5	1.593	62.786
Moist Point 3	15.45	1.692	0.0032	18.8	1.692	0.0016	18.6	1.637	0.0012	18.6	1.674	59.751
Moist Point 4	17.15	1.909	0.0016	18.7	1.852	0.0016	18.7	1.772	0.0010	18.7	1.845	54.214
Moist Point 5	19.24	1.936	0.0013	18.7	1.895	0.0012	18.7	1.867	0.0011	18.7	1.899	52.648
Moist Point 6												
Moist Point 7												
Moist Point 8												
Moist Point 9												

K Material (Standard)	0.2730
K Measured	0.2980
Calibration Factor	0.9161

Volume of Mold (cf)	0.0333
Volume of Mold (M^3)	0.00094
Weight of Test Sample (lb)	3.573
Mass of Dry Soil (kg)	1.621

LL	37
PI	18
USCS Symbol	CL

Test Material screened with #4 sieve.

Needle Insertion Metho: Pre-drill

Test performed at: 95 % compactive effort @ blows per layer.

Project: Warrenton Data Center

Client:

Sample / Source: B-07

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-193

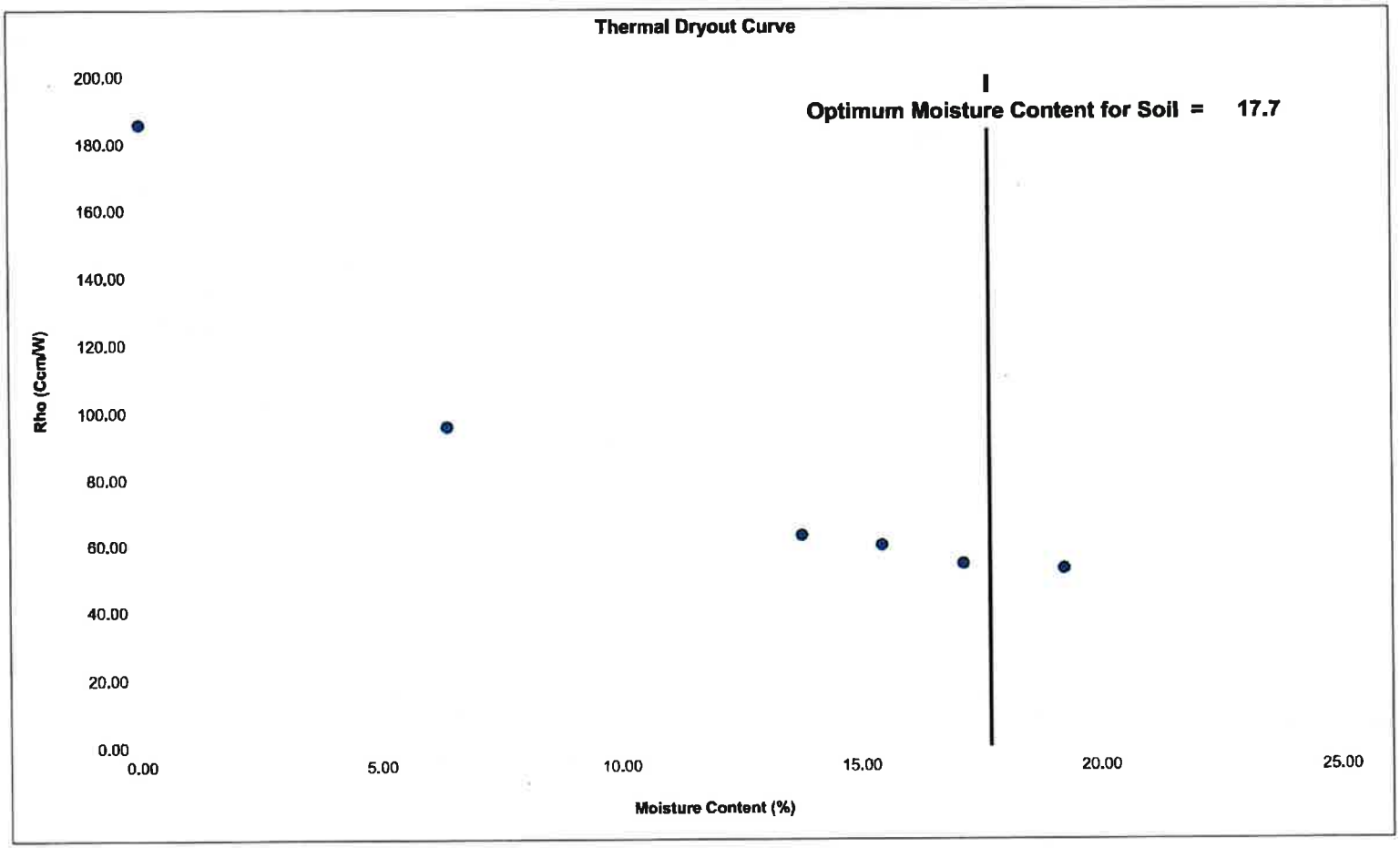
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	026 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334



Project: Warrenton Data Center

Client:

Sample / Source: B-07

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-193

Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	026 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334

Test Point	Moisture Content %	Corrected Conductivity									Average Conductivity	Average Resistivity
		1st Reading			2nd Reading			3rd Reading				
		K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Error Value	Initial Temp	K=W/mK	Rho=°C·cm/W
Dry Point	0.04	0.494	0.0025	22	0.485	0.0033	22	0.489	0.0050	21.8	0.490	204.274
Moist Point 1	6.58	0.919	0.0026	20.3	0.916	0.0018	20.3	0.895	0.0019	20.5	0.910	109.864
Moist Point 2	9.60	1.332	0.0015	19.6	1.322	0.0015	19.5	1.355	0.0018	19.7	1.337	74.812
Moist Point 3	11.77	1.471	0.0022	18.8	1.481	0.0031	18.9	1.471	0.0022	18.5	1.474	67.835
Moist Point 4	14.23	1.741	0.0018	18.5	1.723	0.0018	18.7	1.731	0.0020	18.6	1.732	57.749
Moist Point 5	16.89	1.837	0.0015	18.8	1.843	0.0015	18.6	1.838	0.0012	18.5	1.839	54.365
Moist Point 6												
Moist Point 7												
Moist Point 8												
Moist Point 9												

K Material (Standard)	0.2730
K Measured	0.2935
Calibration Factor	0.9302

Volume of Mold (cf)	0.0333
Volume of Mold (M^3)	0.00094
Weight of Test Sample (lb)	4.326
Mass of Dry Soil (kg)	1.962

LL	41
PI	14
USCS Symbol	ML

Test Material screened with #4 sieve.

Needle Insertion Metho Pre-drill

Test performed at: 95 % compactive effort @ blows per layer.

Project: Warrenton Data Center

Client:

Sample / Source: B-11

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-194

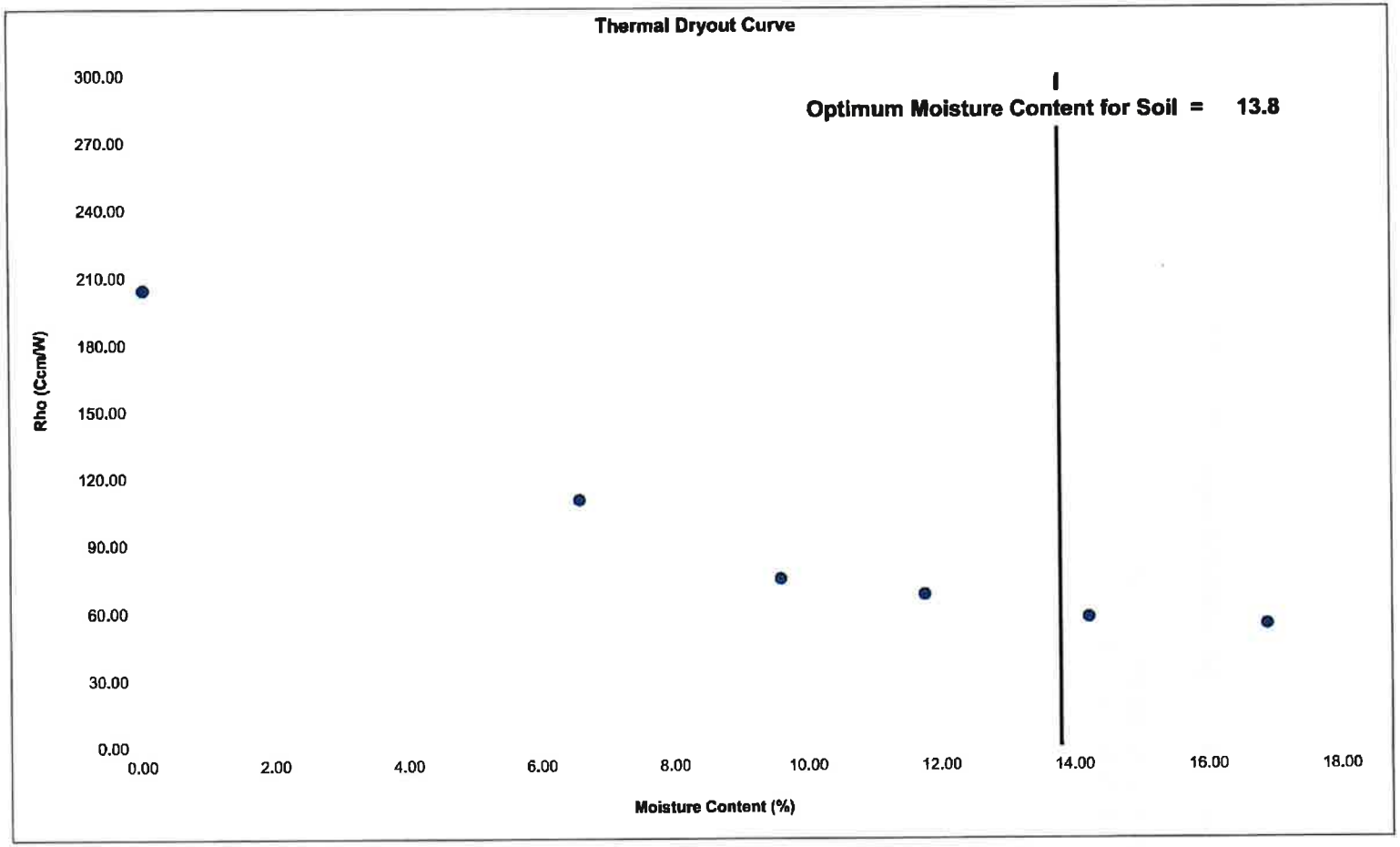
Date Reported:

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	026 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

Determination of thermal properties using a thermal needle probe

Thermal Conductivity of Soil/Soft Rock ASTM D5334



Project: Warrenton Data Center

Client:

Sample / Source: B-11

Project No.: 01:31153

Depth (ft.): 1 - 6

Sample No.: D3S-194

Date Reported:

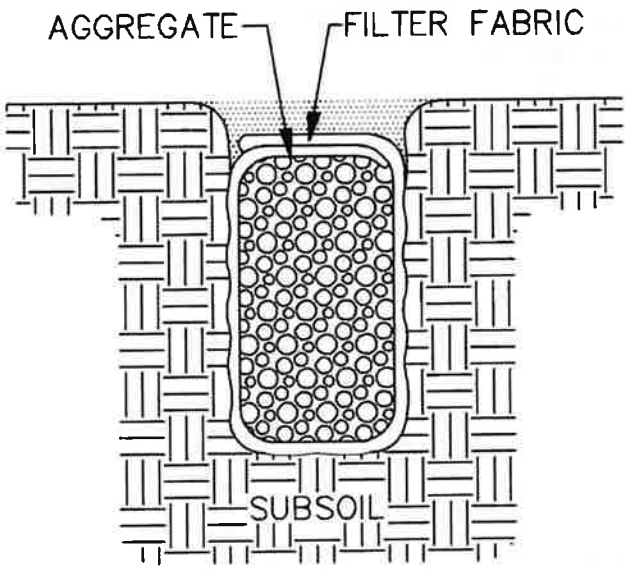
Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - Chantilly	025 Thunderbolt Place Suite 100 Chantilly, VA 20151-32	(703)471-8400 (703)834-5527

Tested by	Checked by	Approved by		Remarks
jvong	Htran	Dtran		

APPENDIX D – Supplemental Report Documents

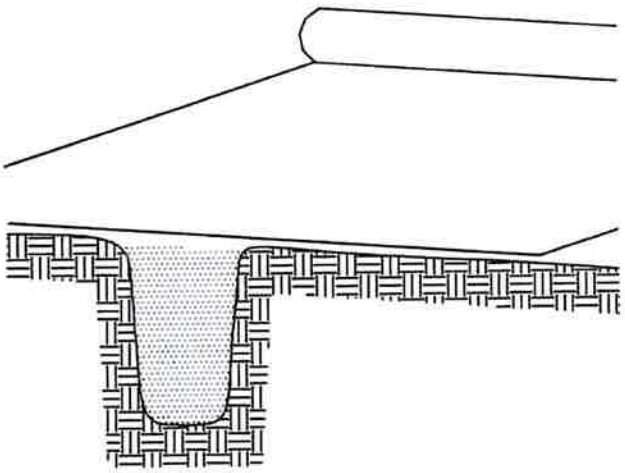
French Drain Installation Procedure
Zone of Influence Diagram

FINAL CONFIGURATION



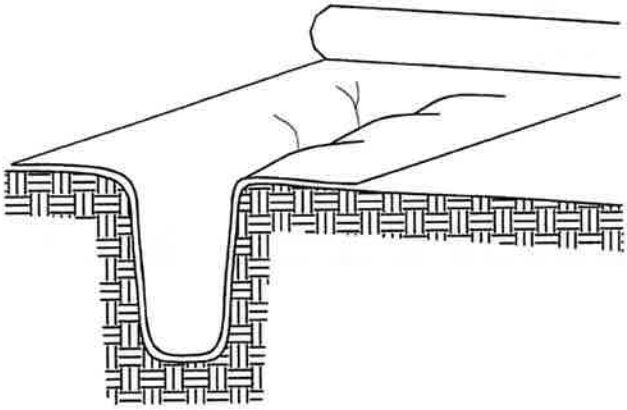
SUBDRAIN USING FILTER FABRIC

STEP 1



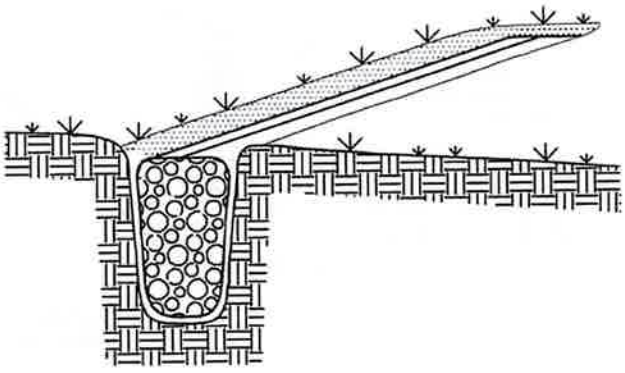
FABRIC IS UNROLLED
DIRECTLY OVER TRENCH

STEP 2



THE TRENCH IS FILLED
WITH AGGREGATE

STEP 3



THE FABRIC IS LAPPED CLOSED
AND COVERED WITH SOIL

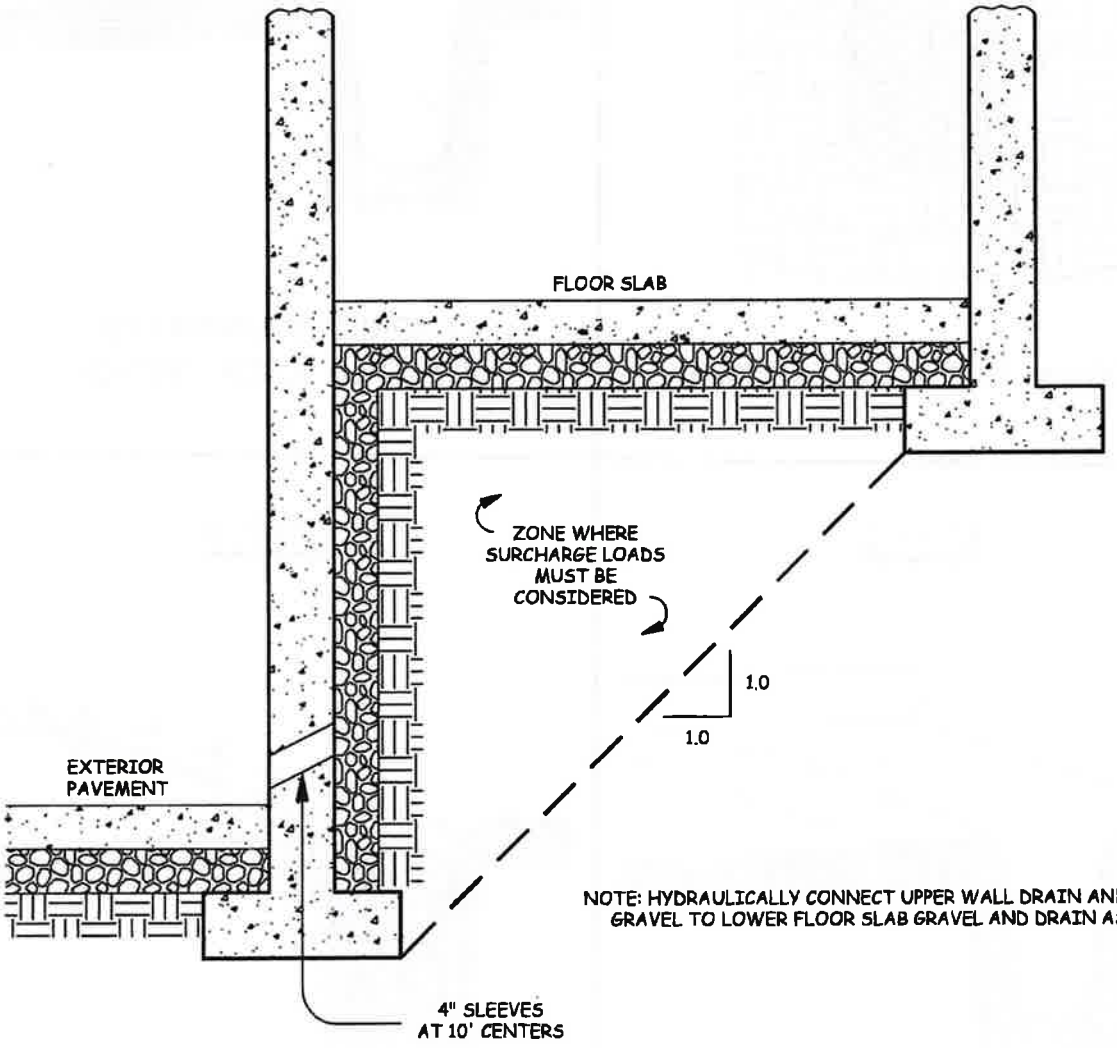
ECS LLC MID-ATLANTIC
9409 Innovation Drive
Manassas, Virginia 20110
703-396-6259
Fax 703-396-6298

FRENCH DRAIN © INSTALLATION PROCEDURE

ZONE OF INFLUENCE DIAGRAM

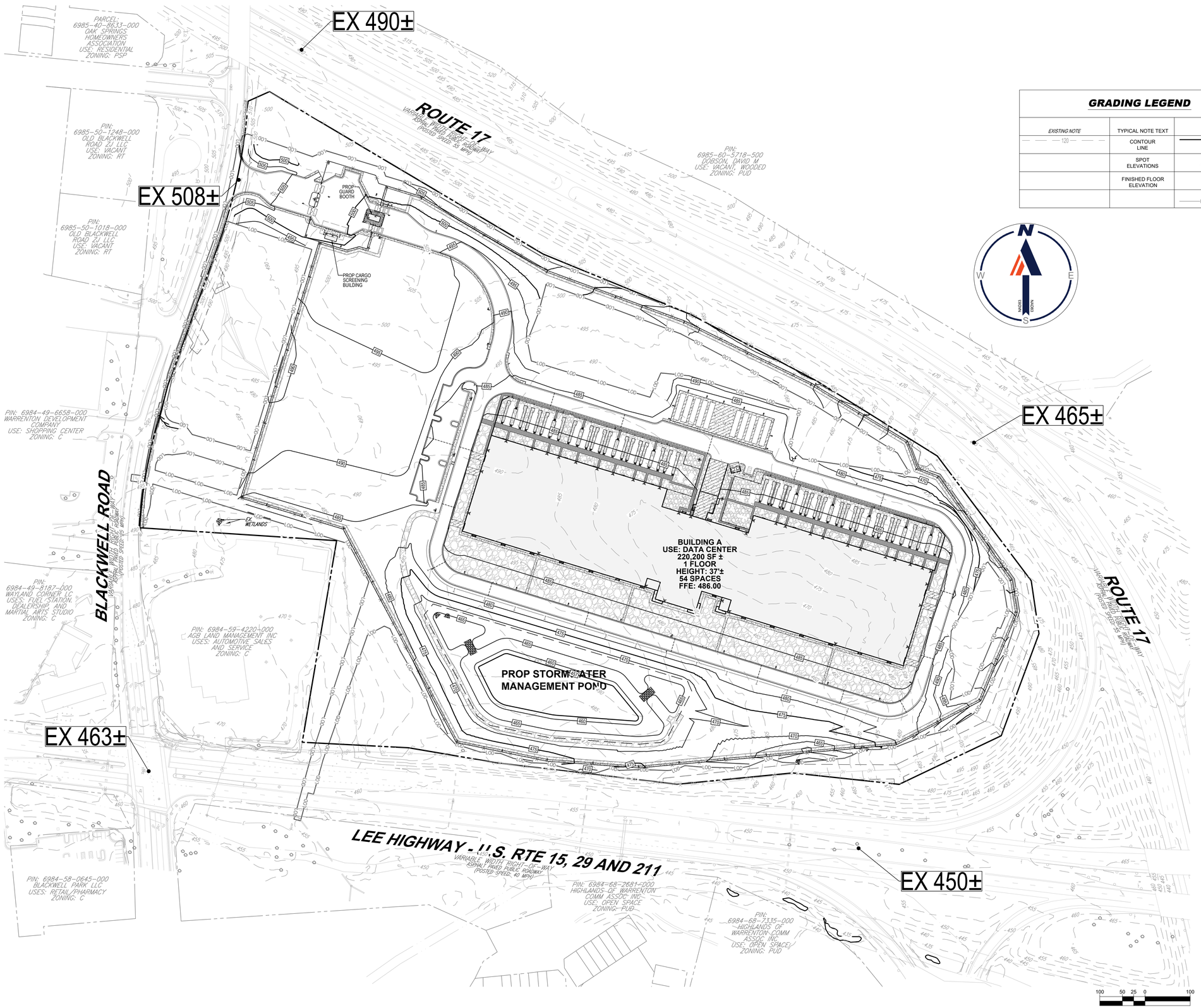
(EXTERIOR WALLS)

NOT TO SCALE



NOTE: HYDRAULICALLY CONNECT UPPER WALL DRAIN AND UNDERSLAB GRAVEL TO LOWER FLOOR SLAB GRAVEL AND DRAIN AS SHOWN.

ECS LLC MID-ATLANTIC



GRADING LEGEND

EXISTING NOTE	TYPICAL NOTE TEXT	PROPOSED NOTE
120	CONTOUR LINE	120
	SPOT ELEVATIONS	TC 516.00
	FINISHED FLOOR ELEVATION	FFE:
		LOD LOD

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LAND PLANNING DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811 Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

FOR EXHIBIT PURPOSES ONLY

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: V212093
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 10/28/2022
CAD I.D.: EXHK - 0

PROJECT:

EXHIBIT

FOR

AMAZON DATA SERVICES, INC.

PROPOSED DEVELOPMENT

BLACKWELL ROAD & LEE HIGHWAY
TOWN OF WARRENTON
FAUQUIER COUNTY, VIRGINIA 20186

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

SHEET TITLE:

GRADING EXHIBIT

SHEET NUMBER:

1

ORG. DATE - 10/28/2022

Oct 28, 2022
11:21 V:\212093\CAD\DRAWINGS\EXHIBITS\PLANNING COMMISION GRADING EXHIBIT\V212093 - EXHK - 0---LAYOUT 1 - GRADING EXHIBIT

WALSH COLUCCI
LUBELEY & WALSH PC

John H. Foote
(703) 680-4664
jfoote@thelandlawyers.com
Fax: (703) 680-6067

October 28, 2022

Via Hand Delivery and E-mail

Denise M. Harris, Planning Manager
Community Development Department
21 Main Street
Warrenton, VA 20186

Re: Special Use Permit #SUP2022-00003, Warrenton Data Center

Dear Mrs. Harris:

As a follow-up to the Planning Commission work session on October 25th, enclosed please find seven (7) complete packages of the following documents:

1. One (1) copy of the Land Development Application. *Please note that this is in the process of being executed by the owner and will be provided to you as soon as it is executed;*

2. One (1) copy of the Land Use Application: Affidavit. *Please note that this is in the process of being executed by the owner and will be provided to you as soon as it is executed;*

3. One (1) copy of the Statement of Justification, revised as of October 28, 2022;

4. One (1) copy of the revised draft Special Use Permit Conditions, dated October 28, 2022, for your consideration

5. One (1) 11"x17" copy of the building renderings entitled "Illustrative Building Elevations," prepared by Corgan, dated October 28, 2022;

6. One (1) full size copy and a reduction of the special use permit plan entitled "Special Use Permit for Warrenton Data Center," prepared by

Bohler Engineering, dated April 1, 2022, last revised October 28, 2022**,** and consisting of three sheets;

7. One (1) 11"x17" copy of the plan entitled "Illustrative Plan," prepared by Bohler Engineering, dated October 28, 2022; and

8. One (1) full size copy and a reduction of the existing conditions plan entitled "Existing Conditions Plan for Warrenton Data Center," prepared by Bohler Engineering, dated October 28, 2022.

This list does not include the geotechnical report entitled "Geotechnical Engineering Report – Warrenton Data Center," prepared by ECS Mid-Atlantic, LLC, revised August 15, 2022, because this document has not changed. Also, the noise study that was previously submitted, was you are now aware, only a preliminary version of that document and not a final report, but is in any event out of date, as the Applicant is seeking a zoning determination related to noise and has included a specific condition to address noise ordinance compliance. With the changes to the Special Use Permit Plan, the Tree Study is out of date and the Special Use Permit Plan should be used for these purposes.

As the cover letter with this submission observes, there are some additional conditions to the SUP proposed. Perhaps the most significant is a commitment from the Applicant that while it will still be necessary to clear a portion of the area formerly reserved for Future Use for security fencing, as shown on the revised SUP Plan, **the Applicant proposes a condition that there be no electric substation permitted on the site. It also proposes to request and pay for the undergrounding of all electrical lines extending from the off-site substation serving the Facility to the Facility itself.** Although final decision on this rests with others, the Applicant is committed to seeking a resolution that is acceptable to the community.

AWS, as the Applicant for this Special Use Permit, has compiled responses to the 32 criteria that the Town's Zoning Ordinance indicates are relevant for consideration in connection with a Special Use Permit application. Much of this information has already been provided to the Town in the submissions made, but this is a summary of those responses and in some cases additional information.

1. Whether the proposed Special Use Permit is consistent with the Comprehensive Plan.	The Applicant has addressed this question, in its September 9, 2022 letter. The Applicant also provided explanation to the Planning Commission at the September 27th Work Session that there were two Future Land Use Maps on the Town's website. One is found as the "Future Land Use Plan" on the page containing the link to Plan Warrenton 2040, and the second is found deep in the Plan itself,

	and we erroneously used the one on the website page. The property is correctly shown on the Future Land Use Map as New Town Mixed Use, is zoned Industrial, and the Town has one Industrial zoning classification. The New Town District contemplates Class A Office, a Future University satellite campus, and an Employment Center. The site remains, however, located within the Lee Highway Urban Development Area (UDA). The Plan also anticipates direct access to Route 29 for such uses, though the subject property does not provide any such access, and traffic analysis has suggested that no such access would be desirable. One of the explicit Goals and Policies of the Lee Highway UDA is to evaluate development incentives that stimulate private investment and new development. This data center will be a new development on vacant industrial land and will put the land to a productive use that has escaped every other potential purchaser that has evaluated it over the last three plus decades. <u>A Comprehensive Plan cannot be evaluated solely by looking at colored land use maps.</u> It is a compilation of policies. The New Town Warrenton Character District, covering a substantial area is, among other things, intended to create a mix of uses, green space and public amenities, as well as provide a location for a major employer. No individual site can be expected to meet all objectives in the Plan, and the New Town District is a place in which the Town seeks a signature job center. The Applicant in this case is indeed a major employer. Traffic burden when the facility is fully operational will be very low. The physical design of the data center is intended to have

	the least possible impact on those residential areas in the vicinity, with substantial screening and buffering areas as depicted on the Landscape Plan, and where the facility itself is situated on the Property. A degree of that design must accept the requirements of form following function, so the applicant has provided significantly enhanced architecture in response to staff and Planning Commission input, and to satisfy the purpose and intent of § 9-26.1(F) of the Town Zoning Ordinance with respect to Building Facades at data center developments. The 2040 Plan has significant economic and fiscal goals that seek to achieve a strong, diversified, and resilient economy that supports both residents and businesses and increases the employment base. The Town proposes that it be proactive in its own economic development, and this unique development advances each of these goals. **** Please note that the Applicant has proposed new conditions that are directed at employment opportunities for residents of the Town and for coordination with the local schools and community college for training programs. These conditions have been added at the express request of the Planning Commission. **** The local tax revenues generated by a data center will assist in promoting a diverse, equitable, and stable tax base to maintain a healthy economy, with exceptionally little impact on Town services. While there were comments presented at the Work Session to the effect that the new Plan envisioned the development of the site with a greater mix of uses than that which is sought in this Application, the data center will, as have other such centers, provide indirect jobs and new business.

	The site has previously been evaluated by at least two major retailers. Projects did not materialize because Blackwell Road cannot handle a significant, sustained, traffic burden that would come with any mixed use project at the site. There is insufficient right-of-way, and it would be exceptionally difficult and costly, to improve it. An estimate for the reconstruction of the intersection of Blackwell and Lee Highway alone is set at a high end of $3.5M. Furthermore, Blackwell Road at the site is identified as a Signature Street in the Complete Streets Recommendations, a classification that does not contemplate significant reconstruction. The proposed data center is a light industrial use. This corresponds to the fact that the proposed use with SUP is compatible with the economic goals outlined in the 2040 Plan. Additionally, there is a very limited supply of industrially zoned land in the Town.
2. Whether the proposed Special Use Permit will adequately provide for safety from fire hazards and have effective measures of fire control.	The facility is designed to provide fire protection by the use of sprinklers and fire extinguishers. Significantly, the Applicant has proposed conditions of the special use permit that it will coordinate training between the Town's fire and rescue companies and those other companies and departments that have experience with data centers and will do so when convenient for the first responders locally when operations commence. Upon commencement of operations the Applicant will provide the Town's first responders its "Data Center Response Manual" for use in training for emergencies at its Facility, and shall assist in advising those first responders how to implement its provisions.

	The Applicant must ensure as a condition of site development plan approval that the water line systems at the Facility have sufficient fire flows, as determined by the Town Fire Marshal and it will maintain Facility security personnel 24 hours a day, each day of the year.
3. The level and impact of any noise emanating from the site, including that generated by the proposed use, in relation to the uses in the immediate area.	The Applicant is aware of the concerns over noise, and legitimate response to the "noise study" initially submitted. As we advised the Planning Commission, that "study" was only a preliminary draft that did not include descriptive information or complete data. Unfortunately, neither the Applicant nor this firm were told this, and thought it to be the "report." Staff's and commission concerns as to the data caused the Applicant and its consultants to engage in further analysis and the research further the Town's noise ordinance provisions, which are not self-explanatory. As you are aware, the Applicant has submitted a zoning determination request as to how certain aspects of the ordinance are to be applied and interpreted. Because of this confluence of factors, the Applicant cannot at this submission confirm compliance with the ordinance, given that what compliance means in some cases is yet to be determined. But the Applicant is committed to that compliance once it is determined and to the community's assurance that applicable operating standards are met. To that end, it has proposed a condition of the SUP that requires that it provide a sound study that demonstrates the operation of the data center will meet the requirements of the Town's applicable noise ordinance as a condition of approval of a site development plan. In addition, however, in order to ensure operational compliance, the Applicant would have to conduct a separate sound study one

	month after commencement of business operations to ensure the ordinance is met in real time and if noise levels at any point where a measurement is required do not so comply, the Applicant would have a period of time to undertake such further mitigation measures as are required to achieve compliance. The sound studies contemplated by the proposed condition would be done by a company approved by the Director of Community Development.
4. The glare or light that may be generated by the proposed use in relation to uses in the immediate area.	The Applicant has proposed a condition of the special use permit that it will submit a Lighting Plan pursuant to the provisions of § 9-8 et seq. of the Warrenton Zoning Ordinance in connection with its Site Development Plan, and that all exterior lighting shall utilize LED and be designed and constructed with cutoff and fully shielded fixtures that direct light downward and into the interior of the property and away from adjacent roads and adjacent properties. All building mounted lighting shall have a maximum height of 25', and the Applicant shall install controls on the site fixtures such that they dim to 50% output between 11 PM and dawn.
5. The proposed location, lighting and type of signs in relation to the proposed use, uses in the area, and the sign requirements of this Ordinance.	The Applicant confirms that there is no signage associated with the proposed use, with the possible exception of an address sign on the building.
6. The compatibility of the proposed use with other existing or proposed uses in the neighborhood, and adjacent parcels.	The surrounding area consists of a significant highway, a good deal of existing and much older retail and commercial, and residential uses. It is bordered on the southwest by a car dealership, and on the east by a major interchange. The building will be screened to the extent possible by existing and added landscaping.

	While new plantings will require time to establish anticipated coverage, this is true of every newly developed property, and there will be more landscaping on this site than any other in the vicinity. It is possible, moreover, that with the elimination of the substation site it is now possible to preserve more of the existing vegetation on the Blackwell Road side of the building. The building cannot be entirely screened from view, but the Applicant has sought to soften the visual impact in material ways. Thus, the proposed renderings for the building greatly improve the exterior look of the structure, and to the extent that it can be seen the Applicant submits that it is different from, and more visually attractive than, any other similar facility in the region. Aesthetics, of course, are in the eye of the beholder, and so the Applicant asks only that it be viewed without bias. The data center, once in operation, will have little traffic and almost no demand on public services. Once in operation it will produce revenue for the Town and the County.
7. The location and area footprint with dimensions (all drawn to scale), nature and height of existing or proposed buildings, structures, walls, and fences on the site and in the neighborhood.	Please see the SUP Plan dated October 28, 2022, that has been submitted today. Changes have been made in response to comments that have been received from staff and Commissioners.
8. The nature and extent of existing or proposed landscaping, screening and buffering on the site and in the neighborhood.	Please see the Landscape Plan that is part of the SUP Plan submitted with this application.
9. The timing and phasing of the proposed development and the duration of the proposed use.	The building will be constructed in a single phase once all of the necessary permits have been obtained. It will take approximately 18 months to complete.

10. Whether the proposed Special Use Permit will result in the preservation or destruction, loss or damage of any significant topographic or physical, natural, scenic, archaeological or historic feature.	The approval of this Special Use Permit will not result either in the preservation or the destruction, loss or damage of any such feature. The site is unused and has been for decades. Where trees can be saved, they will be, as shown on the Landscape Plan. The elimination of the substation permits the retention of trees along Blackwell Road.
11. Whether the proposed Special Use Permit at the specified location will contribute to or promote the welfare or convenience of the public.	The security that will be provided will benefit surrounding area (a data center is a vigilant neighbor). Compared to other uses it will not increase the burden of local law enforcement. It will be convenient for employment opportunities given the newly proposed conditions regarding employment for residents of the Town and education programs in the schools servicing the Town. The Applicant is also extending the sidewalk along its entire frontage on Blackwell Road.
12. The traffic expected to be generated by the proposed use, the adequacy of access roads and the vehicular and pedestrian circulation elements (on and off-site) of the proposed use, all in relation to the public's interest in pedestrian and vehicular safety, efficient traffic movement and access in case of fire or catastrophe.	Data centers generate very little traffic after construction is completed. The Applicant is extending sidewalk on the east side of Blackwell Road. The site will be accessible to first responders in the event of a fire or other catastrophe. Access will be provided at the single point shown on the SUP Plan, with a construction access that will be closed once construction is finished.
13. Whether the proposed use will facilitate orderly and safe road development and transportation.	The low level of traffic after operations commence that is associated with the use means that it will have essentially no impact on the Town’s roads and streets.
14. Whether, in the case of existing structures proposed to be converted to uses requiring a Special Use Permit, the structures meet all code requirements of the Town of Warrenton.	Not applicable.

15. Whether the proposed Special Use Permit will be served adequately by essential public facilities, services and utilities.	The Applicant has been advised by the Town's Public Works and Utilities Department that it can be served adequately by public sewer and water and that there is adequate capacity to do so.
16. The effect of the proposed Special Use Permit on environmentally sensitive land or natural features, wildlife habitat and vegetation, water quality and air quality.	The western side of the site was operated as a junkyard from 1963-1997 and has been vacant since. The central portion of the site was operated as agricultural since 1952. The site does have contaminated soils (petroleum, not heavy metals) and the Applicant will remove, characterize, and effect the appropriate disposal of those soils as part of its development plan. Except for these contaminated soils there are no environmentally sensitive land or natural features, wildlife habitat and vegetation on the site and the use will have no adverse effect on water or air quality. The Applicant has identified the area of potentially jurisdictional wetlands. All stormwater must be managed consistently with State requirements and reviewed by the Town.
17. Whether the proposed Special Use Permit use will provide desirable employment and enlarge the tax base by encouraging economic development activities consistent with the Comprehensive Plan.	The Applicant will invest approximately $550,000,000 in this facility and thus in the community. It paid a very substantial sum for the site itself, which increases its taxable value. The use of the property for data centers is indeed a use that generates income for its employees and tax revenue for the jurisdictions. Please see our letter to the County dated September 9, 2022, for more on the issue of taxation of data center property. With respect to employment specifically, the Applicant now proposes a condition of the special use permit in response to a request

	from the Planning Commission to make job opportunities directly available to Warrenton residents.
18. The effect of the proposed Special Use Permit use in enhancing affordable shelter opportunities for residents of the Town, if applicable.	Not applicable.
19. The location, character, and size of any outdoor storage.	No outdoor storage is planned.
20. The proposed use of open space.	All open space on the property will be used for security fencing, or left as open space following construction.
21. The location of any major floodplain and steep slopes.	There is no floodplain, but there is a small area of steep slope that has been identified by the engineers on the eastern end of the site, and that will require a retaining wall.
22. The location and use of any existing non-conforming uses and structures.	There are no existing nonconforming structures.
23. The location and type of any fuel and fuel storage.	There will be 10 diesel fuel storage tanks on site as shown on the SUP Plan. AWS Data Centers (DC) adhere to the Federal Spill Prevention and Control Countermeasure Plan (SPCC) Regulations, as well as State and County rules for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. *See* 40 CFR Part 112. AWS DC's SPCC Plans are certified by a professional engineer, who assures that all passive and active control measures for oil containment, storage, and discharge comply with Local, State and Federal regulations. AWS DC's SPCC Plans list a combination of active and passive containment measures needed to meet the requirements of 40 CFR 112.7(c). All affected AWS employees are trained annually on the SPCC mitigation

	measures. AWS DC's double-walled storage tanks have inner and outer tank walls that meet the definition of secondary containment under the DEQ LPR-SRR-2019-03 - Storage Tank Program Compliance Manual, Volume V - AST Guidance, and under 40 CFR Part 112, Section 8.1.2.2; therefore, tertiary containment is not required. AWS's fuel oil loading and unloading operations fall under the general secondary containment requirements of 40 CFR Part 112.7(c). Oil water separators are not required under 40 CFR 112.7(c) of the SPCC Rule, and at the State and County level are only mentioned as a recommendation, not a mandate.
24. The location and use of any anticipated accessory uses and structures.	The only accessory structure is the guardhouse shown on the SUP Plan.
25. The area of each proposed use.	This is shown on the SUP Plan.
26. The proposed days/hours of operation.	The facility will operate twenty-four hours a day, each day of the year.
27. The location and screening of parking and loading spaces and/or areas.	All parking is shown on the SUP Plan.
28. The location and nature of any proposed security features and provisions.	The site is secure facility, with fencing on all sides, which will be patrolled by professional security personnel. It is gated and access will be through the guardhouse area only. Specific features and provisions consist of security lights and cameras but the Applicant has agreed to conditions of the SUP that mitigate the offsite impact of any such equipment.
29. The number of employees.	At full buildout there will be approximately 52 employees, but an average of 32 employees will be present at any given time, primarily during shift changes. Overlap could occur at shift change. Employees are comprised of engineering technicians, data center operators, security personnel, and

	logistics personnel. The estimated number of visitors, including vendors and subcontractors, is 5-10 persons per day.
30. The location of any existing and/or proposed adequate on and off-site infrastructure.	Eventually, the Applicant will require additional power from Dominion Energy, but it has advised the Town that it can commence operations with the existing power that is available to it. As noted, there will be no substation on site.
31. Any anticipated odors which may be generated by the uses on site.	No odors are associated with this use.
32. Refuse and service areas.	There is no more than domestic refuse generated at the site, and there is a shielded site shown on the SUP Plan for the location of one or more roll off boxes. Refuse will be removed on a regular schedule so that there is no on-site accumulation.

Please do not hesitate to contact me should you have any questions or need additional information.

Very truly yours,

WALSH, COLUCCI, LUBELEY & WALSH, P.C.

John H. Foote

John H. Foote, Esq.

Enclosures
cc: Jay Reinke
Taylor Hicks
Umar Shahid
John Wright/Connor Hedges
Mike Halls

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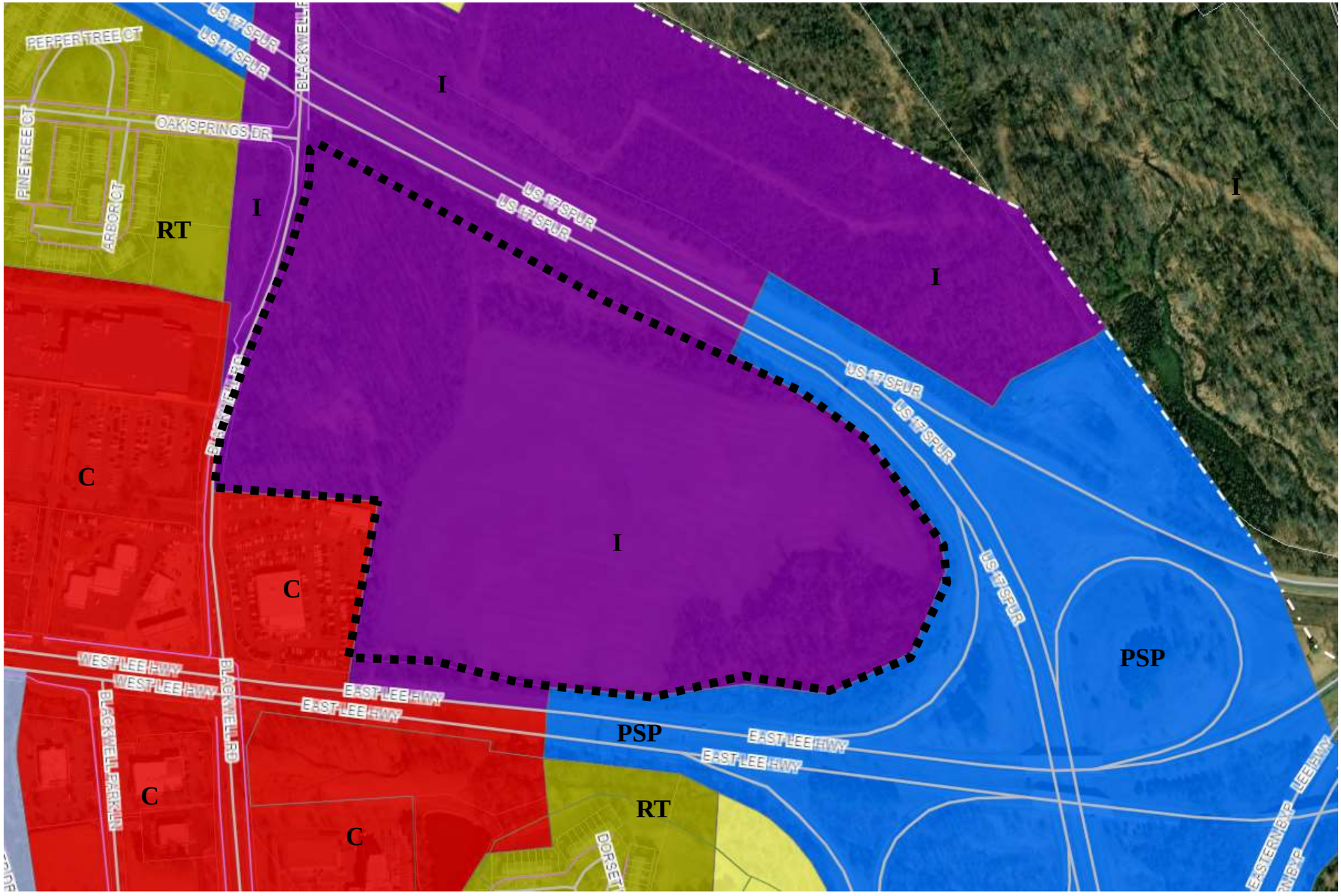
Special Use Permit #SUP2022-00003, Warrenton Data Center

November 15, 2022

PLANNING COMMISSION HEARING

PROPERTY LOCATION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US 17 SPUR
BLACKWELL RD
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OAK SPRINGS DR
PINE TREE CT
ARBOR CT
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ZONING

Future Land Use

- Greenway and Wellness Mixed Use
- Health and Wellness Mixed Use
- Old Town Mixed Use
- New Town Mixed Use
- Office
- Re-Planned Commercial
- Commercial
- Light Industrial
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Park
- Public/Semi-Public Non-Intensive
- Public/Semi-Public Intensive

FUTURE LAND USE PLAN

3-4.12.2 Permitted Uses (by-right)

- Accessory buildings
- Active and Passive Recreation and Recreational Facilities
- Banks and savings and loan offices
- Broadcasting studios and offices
- Business and office supply establishments
- Cabinet, upholstery, and furniture shops
- Cafeteria or snack bar for employees
- Clinics, medical or dental
- Commercial uses constituting up to 15% of permitted site or building area
- Conference Centers
- Contractor's office and warehouse without outdoor storage
- Crematory
- Dwellings for resident watchmen and caretakers employed on the premises
- Employment service or agency
- Flex Office and Industrial uses
- Health and Fitness Facilities
- Institutional buildings
- Janitorial service establishment
- Laboratories, research, experimental or testing, but not testing explosives, rockets, or jet engines
- Light manufacturing uses which do not create danger to health and safety in surrounding areas and which do not create offensive noise, vibration, smoke, dust, lint, odor, heat, glare, or electrical impulse than that which is generally associated with light industries
- Mobile Food Vendors subject to Article 9-24
- Monument sales establishments with incidental processing to order but not including shaping of headstones
- Motion picture studio
- Nurseries and greenhouses
- Offices- business, professional, or administrative
- Off-street parking and loading subject to Article 7
- Open space subject to Article 9
- Printing, publishing, and engraving establishment; photographic processing; blueprinting; photocopying; and similar uses
- Private club, lodge, meeting hall, labor union, or fraternal organization or sorority
- Rental service establishment
- Retail or wholesale sales and service incidental to a permitted manufacturing, processing, storing, or distributing use
- Rug and carpet cleaning and storage with incidental sales of rugs and carpets
- Security service office or station
- Sign fabricating and painting
- Signs, subject to Article 6
- Studios
- Transmission and receiving towers of height not exceeding one hundred twenty-five (125) feet
- Utilities related to and necessary for service within the Town, including poles, wires, transformers, telephone booths, and the like for electrical power distribution or communication service, and underground pipelines or conduits for local electrical, gas, sewer, or water service, but not those facilities listed as requiring a special use permit
- Wholesale establishment, storage warehouse, or distribution center. furniture moving

INDUSTRIAL DISTRICT PERMITTED USES

- Special Use Permit Pre-Application Meeting - November 21, 2021
- Special Use Permit Pre-Application Follow-up Meeting - December 17, 2021
- Special Use Permit Submission - April 8, 2022
- Notice of Completeness - May 6, 2022
- Special Use Permit Agency Comments Received by Applicant - June 7, 2022
- Post Submission Meeting - July 11, 2022
- Resubmission - July 18, 2022
- Planning Commission Work Session - July 26, 2022
- Post Work Session Submission - September 9, 2022
- Balloon Test - September 15, 2022
- Meeting regarding Noise Ordinance - October 3, 2022
- Zoning Determination Letter Submitted - October 18, 2022
- Planning Commission Work Session - October 25, 2022
- Final Submission for Planning Commission Hearing - October 28, 2022
- Planning Commission Hearing - November 15, 2022

PUBLIC PROCESS TIMELINE – 12+ MONTHS

- Condition #3 – No electric substation on the Property
- Condition #4 – Undergrounding of Electrical Lines
- Condition #15 – Installation of Sidewalk on Blackwell Road
- Conditions #16 – Noise Compliance Assurances
- Condition #17 – Lighting Assurances
- Condition #18 – Tree Save Commitments
- Condition #21 – Employment Opportunities
- Condition #22 – Programs for Local Schools

KEY CONDITIONS

3. Electric Substation: There shall be no electric substation constructed on the Property.

4. Undergrounding of Electrical Lines from a Substation to the Facility: Pursuant to Warrenton Zoning Ordinance § 9-26.1(C), the distribution lines from the off-site substation serving the data center are required to be underground. Applicant will ensure payment of the undergrounding of these distribution lines with the utility company in accordance with its requirements.

KEY CONDITIONS

16. Noise: The Applicant shall provide a sound study prepared by a qualified party or company approved by the Director of Community Development that demonstrates the operation of the data center will meet the requirements of § 9-14.2 of the Town of Warrenton Zoning Ordinance relating to noise, as a condition of approval of a site development plan. In addition, the Applicant shall conduct a separate sound study one month after commencement of business operations to ensure compliance with the aforesaid Section. If noise levels at any point where a measurement is required by the Ordinance to be taken do not so comply, the Applicant shall forthwith undertake such further mitigation measures as are required to achieve compliance within a reasonable time not to exceed 60 days, or, if 60 days is insufficient to achieve compliance, the Applicant shall promptly begin and diligently pursue mitigation until compliance has been achieved.

21. Employment Opportunities: The Applicant shall provide outreach to qualified persons residing in the Town of Warrenton who may be interested in employment at the data center through a variety of media such as the conduct of a job fair, the inclusion of a direct link to potential opportunities on the Town website, or on other websites for the purpose. Such outreach shall be made reasonably in advance of the construction of the Project so that interested persons may make application for positions, not less than six months prior to the anticipated completion of construction.

22. Programs for Local Schools: The Applicant shall ensure coordination by the appropriate Amazon personnel with the Town of Warrenton and the Fauquier County School Division regarding the establishment and maintenance of educational programs in the K-12 grades, and with Laurel Ridge Community College, to establish and maintain workforce development programs for career pathways in data center construction and operations, and such other programs as the parties may deem mutually beneficial.

BUILDING ELEVATIONS AND RENDERINGS

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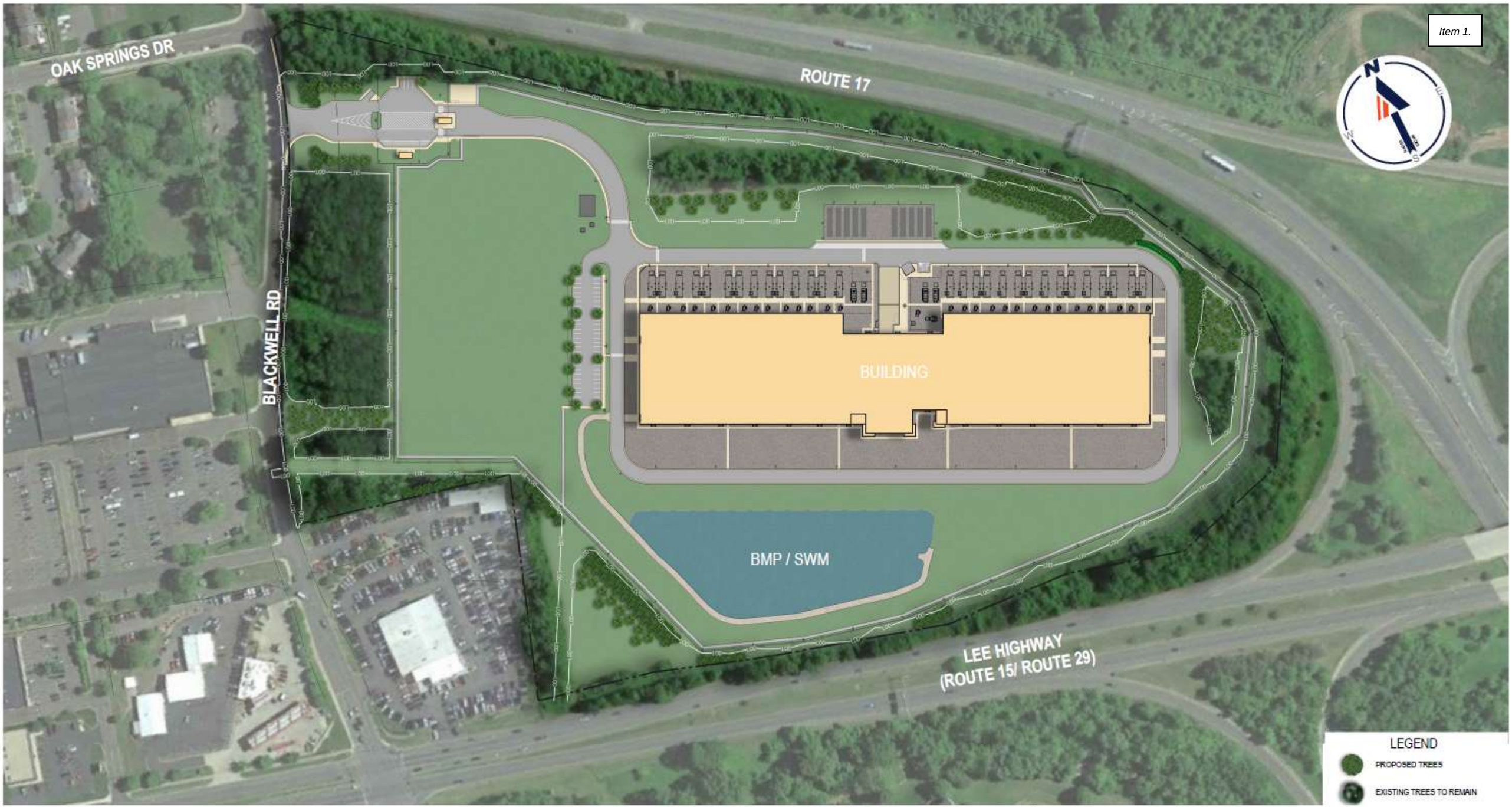

ILLUSTRATIVE PLAN

THANK YOU

November 15, 2022

PLANNING COMMISSION HEARING


BUILDING 16

- Town Council considers data center ordinance January 2018 - no action
- WCL&W contacts Town Attorney regarding possibility of data center ordinance amendment to permit by special use permit and is advised to await completion of the new Comprehensive Plan - April 2021
- Town Council initiates consideration of Zoning Text Amendment for data centers on the night the new Plan is adopted – April 13, 2021
- Planning Commission Work Session on Data Centers – May 25, 2021 – No draft ordinance yet presented
- Draft Ordinance prepared by Town Staff based on recommended language from WCLW and Staff rewrite – June 2021
- Planning Commission Public Hearing on draft ordinance requiring SUP for a data center on I zoned property – June 15, 2021
- Second Planning Commission Public Hearing on draft Ordinance – July 18, 2021
- Town Council Public Hearing on draft Ordinance August 10, 2021 – two speakers in support, one speaker in opposition – unanimously adopted
- Special Use Permit Pre-Application Meeting - November 21, 2021
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TIMELINE

3-4.12 I Industrial District

3-4.12.1 Legislative Intent

It is the intent of this district to implement the Town's Comprehensive Plan by providing for a variety of light manufacturing, fabricating, processing, wholesale distributing, and warehousing uses appropriately located for access by highways and providing a controlled environment within which signing is limited, uses are to be conducted generally within completely enclosed buildings, and a moderate amount of landscaping is required. In order to preserve the land for industry, to reduce extraneous traffic, and avoid future conflicts between industry and other uses, business and service uses are limited primarily to those which will be useful to employees in the district and future residential uses are restricted.

INDUSTRIAL DISTRICT