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**FIRCREST PLANNING/BUILDING DEPARTMENT
STAFF REPORT
CASE # 22-05**

Preliminary Site Plan

APPLICANT: Graves and Associates, Agent for Alliance Residential Company

OWNERS: Eaton Family IV LLC & Jet 2 Set II LLC & Eaton Group LLC

DATE OF APPLICATION: June 22, 2022

DATE OF COMPLETE APPLICATION: July 15, 2022

PROPOSAL: Preliminary Site Plan for a mixed-use development consisting of four buildings with 391 residential units and 9,968 SF of commercial space, plus publicly accessible shared open space facilities.

LOCATION: 2119 Mildred Street West

PARCEL ID: Assessor Parcel Number 0220112005

SITE AREA: 9.49 acres

COMPREHENSIVE PLAN DESIGNATION: Mixed Use (MU)

ZONING CLASSIFICATIONS: Mixed-Use Urban (MUU) and Mixed-Use Neighborhood (MUN)

ADJACENT ZONING: North: Mixed-Use Urban and Mixed-Use Neighborhood. East: Residential-30. South: Mixed-Use Neighborhood. West (City of University Place): Mixed Use – Center 110 (MU-C110).

PROPOSAL SUMMARY: The applicant proposes to redevelop a 9.49-acre (413,384 SF) site for a mixed-use development. The project would contain four new buildings containing 391 multifamily residential units and 9,968 SF of commercial space. The design includes a centrally located plaza and other publicly accessible open space totaling 47,275 SF (11.5% of the site area). Buildings A & B would be 5-story mixed-use buildings with apartments, live-work units, and ground-floor commercial space. Buildings C & D would be 4-story residential buildings with basement parking garages located at level 0 and fitness amenity/lobby areas.

The current site plan shows a total of 493 parking stalls, including 288 private stalls within surface lots, building courtyards, and parking garages, and 205 new public street stalls.

Initially, motor vehicle access to the site would be solely via Mildred Street West, which abuts the west side of the project site and represents the jurisdictional boundary between Fircrest and University Place.

The project would dedicate five new public streets to the City of Fircrest. 21st Avenue, 22nd Avenue, and 23rd Avenue would run east-west and connect directly to Mildred Street West. 65th Street and 66th Street would run north-south through the site and connect with 21st, 22nd, and 23rd streets. Rights-of-way for each new street would extend to the project site property boundaries to allow for future street connections or extensions to the north, east, and south as abutting properties redevelop.

An existing industrial building and related improvements (the former Metal Marine Pilot facility) would be demolished to accommodate the project.

NOTICE OF APPLICATION: The City issued a [Notice of Application \(NOA\)](#) on July 19, 2022, by posting the property, publishing a summary in the city's official newspaper, and mailing notice to neighboring property owners in accordance with the requirements of [FMC 22.07.003](#). No comments were received on the site plan prior to a 22-day comment period ending August 9, 2022. The City has determined that although the site plan has undergone refinement since the issuance of the NOA, the basic project design has not changed to the extent that issuance of a revised NOA is warranted.

NOTICE OF HEARING: The City issued a [Notice of Public Hearing](#) on February 15, 2023, by posting the property, publishing a summary in the city's official newspaper, and mailing a notice to neighboring property owners in accordance with the requirements of [FMC 22.07.003](#). All comments received in response to the notice will be submitted to the Examiner for consideration.

ENVIRONMENTAL DETERMINATION: The City issued a [Mitigated Determination of Nonsignificance \(MDNS\)](#) on January 30, 2023, with a 14-day comment period ending February 13, 2023. The MDNS includes the following six mitigation measures:

- 1. Project design, implementation, construction, and maintenance shall comply with the 2019 Stormwater Management Manual for Western Washington (SWMMWW). The Applicant shall ensure that erosion control measures are in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or storm drains that lead to waters of the state.*
- 2. The Applicant shall provide the City of Fircrest a Construction Stormwater Pollution Prevention Plan (CSWPPP) prepared in accordance with the SWMMWW as part of the site development permit package. Per the SWMMWW, the CSWPPP shall be completed using the Department of Ecology's Construction Stormwater General Permit CSWPPP template.*
- 3. The Applicant shall prepare a Cleanup Action Plan (CAP) and Contaminated Media Management Plan (CMMP) in accordance with Ecology requirements. The CAP shall describe the methods to remediate the known arsenic soil contamination associated with the Tacoma Smelter Plume and shall be prepared consistent with Ecology's existing guidance*

(Tacoma Smelter Plume Model Remedies Guidance, Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101). The CMMP shall describe the procedures that will be used to appropriately manage contaminated environmental media that will be encountered during the proposed project construction. The CAP shall be submitted to Ecology for review under its Voluntary Cleanup Program (VCP) prior to the start of construction. However, due to the nature of the remediation plan including using the project as a cap over smelter-plume-impacted soils, the work described in the CAP may be performed concurrent with the proposed project construction, rather than completed prior to construction. A report documenting the complete implementation of the remedial action described in the CAP will be submitted to Ecology for review and approval under the VCP (Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101).

4. Prior to demolition of any existing structures, any potentially dangerous or hazardous materials present, such as asbestos, PCB-containing lamp ballasts, fluorescent lamps, and wall thermostats containing mercury, shall be removed and disposed of in accordance with the Department of Ecology's "Dangerous Waste Rules for Demolition, Construction, and Renovation Wastes".

5. The Applicant shall install a traffic signal at the proposed intersection of 22nd Avenue/Mildred Street West per the requirements of the City of University Place.

6. Proposed intersections to be located at 21st Avenue/Mildred Street West and at 23rd Avenue/Mildred Street West shall be designed for right-in right-out only access per the Traffic Impact Analysis prepared by TranspoGroup, dated January 2023. Turn-restricting medians shall be installed at these intersections per the requirements of the City of University Place.

SEPA Appeals/Comments: No appeals were received on the environmental determination (MDNS). Comments were received from the Department of Ecology that addresses solid waste management, toxic cleanup, and water quality. These comments overlap the mitigation measures adopted in the City's MDNS for this project. The City has forwarded the Ecology comments to the applicant for its consideration and action.

PRELIMINARY SITE PLAN PROCESS: Decisions on Type III-A preliminary site plan (major) applications are made by the Examiner in accordance with [FMC 22.05](#) and [FMC 22.06](#). Per [FMC 22.72.008\(b\)](#), the major site plan review consists of two separate reviews. The initial review is conducted by the Examiner and the second review is conducted by the Director.

The plans submitted for the initial review may be conceptual in detail. However, the greater the level of detail in the plans submitted for Examiner review, the greater the level of certainty the applicant will have in preparing detailed plans for final review. When the Examiner determines that a site plan meets the criteria listed in [FMC 22.72.006](#), the Examiner will grant preliminary approval and direct the applicant to prepare and submit detailed plans to the Director for final site plan review. This second review is intended to ensure that all site planning issues identified during the Examiner's initial review are fully addressed prior to the issuance of a building permit or other construction permit.

ADMINISTRATIVE DESIGN REVIEW: In addition to the preliminary and final site plan review processes, the project will be subject to administrative design review by the Director in accordance with [FMC 22.66](#). Typically, this process runs concurrent with the final site plan review process and is intended to ensure project compliance with all applicable design

guidelines, form-based code standards and guidelines, and other development regulations. The Examiner may direct an applicant to demonstrate full code compliance through the submittal of additional detailed plans and materials that will be subject to review under the administrative design review process.

CRITERIA FOR PRELIMINARY SITE PLAN APPROVAL: [FMC 22.72.006](#) provides the following approval criteria that must be met by the proposal for the Examiner to grant approval:

- a) *The proposed use and site design will not be detrimental to the public health, safety, and welfare; injurious to property or improvements in the vicinity; or adversely affect the established character of the surrounding vicinity.*
- b) *The proposed use and site design will meet or exceed all applicable development, design, and performance standards and guidelines required for the specific use, location, or zoning classification.*
- c) *The proposed use and site design will be consistent and compatible with the goals, objectives, and policies of the comprehensive plan.*
- d) *All conditions necessary to lessen any impacts of the proposed use are measurable and can be monitored and enforced.*

STAFF ANALYSIS:

Compliance with Preliminary Site Plan Approval Criteria. Each of the approval criteria in [FMC 22.72.006](#), listed above, and the extent to which the proposal meets them, is discussed below.

Criterion (a): *The proposed use and site design will not be detrimental to the public health, safety, and welfare; injurious to property or improvements in the vicinity; or adversely affect the established character of the surrounding vicinity.*

Staff Analysis: Technical reports and agency reviews support a conclusion that the proposed use and site design will not be detrimental to the public health, safety, and welfare, or injurious to property or improvements in the vicinity – if the project is designed and constructed per suggested conditions of approval and mitigation measures. Construction of the project in a manner consistent with the Form-Based Code would ensure that the established character of the surrounding vicinity would not be adversely affected.

Traffic Impact Analysis. TranspoGroup provides a summary of project traffic impacts (January 2023), as follows:

- *The proposed project, constructing 412 multifamily homes and 12,000 square feet of retail, is estimated to generate approximately 1,976 weekday net new daily trips with 186 occurring in the AM peak hour and 208 occurring in the PM peak hour.*
- *Project traffic would represent less than approximately 4 percent of the future (2026) weekday peak hour traffic volumes at the study intersections during the weekday PM peak hour with the exception of the main central site access, where it would represent 12.9 percent.*

- *Traffic operations at each intersection include:*

- Ø All off-site intersections are forecast to operate at LOS D or better under future (2026) with-project PM peak hour conditions, meeting the City of University Place standards.
- Ø All site access points are forecast to operate at LOS B or better under future (2026) with-project PM peak hour conditions, meeting the City of University Place standards. This is under the assumption *that access at the northern and southern access points is restricted to right-in and right-out movements, and the central access is signalized under with-project conditions.*

The project MDNS includes two mitigation measures that are consistent with and support the TIA assumptions/recommendations. The City of University Place concurs with these two mitigations. In addition, University Place has approved, in concept, minor shifts in the intersection locations for 21st and 23rd at Mildred Street West, provided there will be turn-restricting medians installed to restrict turning movements at these intersections to right-in right-out only designs.

LOS at other intersections in the vicinity will remain unchanged with project completion. The project TIA has not identified the need for any additional motorized or non-motorized circulation improvements to avoid creating detrimental impacts to public health, safety, and welfare.

[Drainage Report](#). Davido Consulting Group, Inc. has prepared a drainage report (December 2022) that analyzes the project vis-à-vis the applicable requirements of the 2019 Washington State Ecology Stormwater Management Manual for Western Washington (Manual). It summarizes the Manual's "Minimum Requirements" #1-9, and the need for flow control and runoff treatment. BMPs include a stormwater detention vault. TESC measures include (but are not limited to) storm drain inlet protection, perimeter protection, construction entrance, construction fencing, and street cleaning. Appendices to the report include a Construction Stormwater Pollution Prevention Plan, an Operations & Maintenance Plan, and a Geotechnical Report. Compliance with the Manual will help ensure the project does not prove injurious to property or improvements in the vicinity.

The [project MDNS](#) includes two mitigation measures that address compliance with the Manual and requirements for the Stormwater Pollution Prevention Plan.

[Geotechnical Report](#). PanGEO, Inc. has prepared a Geotechnical Engineering Report (December 2022) that analyzes existing soil conditions and identifies design solutions that will support the proposed construction. The report does not identify any potential hazards that could prove injurious to property or improvements in the vicinity, provided its recommendations are followed during project design and construction.

[Environmental Site Assessments](#). PES Environmental, Inc. has prepared a [Phase I Environmental Site Assessment](#) (May 2022) for the project site. This extensive report summarizes site history, environmental conditions, contamination, prior cleanup efforts, regulatory actions, and business risks.

PES has also prepared a Limited Phase II Investigation (November 2022) to assess soil and groundwater conditions and potential impacts in four areas described in the Phase I report.

[The Phase II report](#) offers recommendations for contamination remediation consistent with Ecology direction.

The applicant's [SEPA Checklist](#), section No. 7, *Environmental Health* responds to the following questions:

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Applicant: The completed project would have no known environmental health hazards that could occur as a result of this proposal. Previous environmental investigations conducted at the property have indicated contaminants (petroleum hydrocarbons and limited volatile organic compounds [VOCs]) are present in soil beneath an area adjacent to the southeast corner of the existing building on the property. In addition, the investigations indicate the presence of arsenic in the fill soil place over the eastern portion of the Property. Two underground concrete vaults or underground storage associated with previous operations at the site are located east of the existing building.

- (1) Describe any known or possible contamination at the site from present or past uses.

Applicant: The property was formerly operated for the design and manufacture of marine automatic pilots and other marine navigational aids (e.g., compasses) from approximately 1957 to 2000. As indicated previously, between the years 1972 and 2000, soil fill was deposited throughout the central and eastern portions of the site. During the course of operations at the property, there have been documented releases of certain VOCs, primarily perchloroethylene (PCE) to the ground east of the existing building. In addition, a release of paraffin oil from the north adjoining property affected soil near the northern end of the property. Cleanup actions were performed in 1993, 2000, and 2012 to remove and properly dispose of all of the contaminated soil above the applicable cleanup levels in the affected areas. Low concentrations (below cleanup levels) of PCE and paraffin oil may be present in these areas. Perched groundwater in the vicinity and downgradient of these areas did not contain contamination (PCE and/or paraffin oil) at concentrations exceeding cleanup levels. The results of these cleanup actions were reported to the Washington Department of Ecology (Ecology) under its Voluntary Cleanup Program (VCP). Ecology issued an opinion letter in July 2015, indicating that the site meets the cleanup standards for PCE and petroleum hydrocarbons in soil.

Previous investigations of the fill material present in the central and eastern portions of the property indicated the presence of arsenic at concentrations exceeding the CUL predominantly at depths of 15 feet or greater and widely dispersed. The property is located in the Tacoma Smelter Plume (Asarco Area Wide Contamination Plume) and the presence of arsenic at the property is attributed to the historic operation of the Asarco Smelter Plant. The investigation also found arsenic in perched groundwater in 2 of the 6 wells tested at concentrations slightly exceeding the cleanup level. In Ecology's July 2015 opinion letter, Ecology stated that the source of the arsenic is likely attributed to the former operation of the Tacoma Asarco Smelter Plant and the fill material that was imported to the subject property as part of historical grading activities.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Applicant: Soil containing concentrations of PCE may be present in the soil near the southeast corner of the existing building and petroleum hydrocarbons may be present along the central portion of the northern property boundary. Based on the results of the previous cleanup action, the PCE and petroleum hydrocarbons are expected to be below applicable cleanup levels. Arsenic is present in the fill soil located within the central and eastern portions of the property. Arsenic is present in perched groundwater within a limited area in the eastern portion of the property. The current development design includes approximately 9,000 CYDs of cut/fill. If the existing soil is not suitable for use as fill on the property, soil removed from the property will require appropriate screening, segregation, and management to insure its proper disposal. There are two concrete vaults located east of the existing building that were previously used in the manufacturing operations which will be removed during construction. Based on the date of construction, the existing building may contain hazardous building material (e.g., asbestos or lead-based paint). Prior to construction, the building will be assessed for the presence of hazardous building materials and appropriately abated as needed.

5) Proposed measures to reduce or control environmental health hazards, if any:

Applicant: Ecology has been contacted regarding the presence of arsenic in soil and perched groundwater at the site resulting from impacts due to the Asarco Smelter Plume. A Cleanup Action Plan is being prepared to address the arsenic consistent with the requirements of Ecology's 2019 guidance document for cleanups conducted within the Tacoma Smelter plume (Tacoma Smelter Plume Model Remedies Guidance, Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101). Consistent with Ecology's guidance, the Cleanup Action Plan will utilize the impervious surfaces created by the proposed project (approximately 90 percent of the property) to cap and isolate soil containing arsenic at concentrations exceeding cleanup levels. The Cleanup Action Plan will address impacts to groundwater through an environmental covenant prohibiting the future use of groundwater at the property. The Cleanup Action Plan will be submitted to Ecology for review and approval under the VCP. In addition to the measures described above, the following measures will be implemented to control potential environmental health hazards;

- *A contaminated media management plan (CMMP) will be prepared that describes the actions that will be taken during the construction of the proposed development in response to the known soil contamination present at the property. The CMMP will include the following:*

- Ø A requirement that the earthwork contractor performing excavation activities have a health and safety plan in place that describes worker protection methods if contaminated soils are encountered;*
- Ø Procedures to properly decommission the existing concrete vaults and remove them from the property; and*
- Ø Procedures to manage contaminated soil when it is encountered during construction.*

- *Preparation of a Construction Stormwater Pollution Prevention Plan.*

At the conclusion of the implementation of the approved Cleanup Action Plan, removal and disposal of contaminated soil (if any), and removal of the concrete vaults, a report documenting the work completed will be prepared and submitted to the Department of Ecology consistent with the applicable regulations and guidance.

The project [MDNS](#) includes a mitigation measure that addresses Ecology's contamination cleanup requirements consistent with the applicant's [SEPA Checklist](#) discussion. Ecology has reviewed the mitigation measure and concurs with its content and approach.

Criterion (b): The proposed use and site design will meet or exceed all applicable development, design, and performance standards and guidelines required for the specific use, location, or zoning classification.

Staff Analysis: *Staff believes the proposed use and project design, at a conceptual level, will meet or exceed all applicable development, design, and performance standards and guidelines, as outlined below. The applicant will need to provide more information concerning the final architectural design, landscape design, lighting, and other design elements for final site plan approval and administrative design review approval.*

Applicable Development Regulations: The project site is located within the "19th and Mildred" area, which is regulated by the "[Fircrest Form-Based Code](#)" (FBC), adopted by reference in [Chapter 22.57 FMC](#), pursuant to [Ordinance 1667](#). Development within this area must comply with applicable FBC standards and guidelines as well as with additional development regulations contained in the City's Land Development Code (FMC Title 22). When provisions included in the FBC standards conflict with other requirements of this title, the FBC standards shall apply unless otherwise provided.

FMC 22.26 Sign Regulations. The preliminary site plan submittal does not contain information pertaining to the proposed outdoor signage. Approval of a master sign plan will be required per [FMC 22.26.006](#). The Director may approve, approve with conditions, modify and approve with conditions, or deny an application for a sign permit.

FMC 22.48 Mixed-Use Neighborhood District (MUN). The east half of the project site is zoned MUN. The proposed design and residential use of this portion of the site are consistent with the MUN district purpose statement and the land uses permitted under [FMC 22.48.002](#). The project design meets the development standards listed in [FMC 22.48.007](#).

FMC 22.50 Mixed-Use Urban District (MUU). The west half of the project site is zoned MUU. The proposed design and mixed residential/commercial use of this portion of the site are consistent with the MUU district purpose statement and the land uses permitted under [FMC 22.50.002](#). The project design meets the development standards listed in [FMC 22.50.008](#).

FMC 22.57 Form-Based Code. The [Fircrest FBC](#), adopted pursuant to [Chapter 22.57 FMC](#) and [Ordinance 1667](#), establishes a zoning and regulating plan, development standards, and building, frontage, street, and open space standards.

RP.1 Zoning Districts and Overlays and RP.2 Regulating Plan. The project design is consistent with the FBC Regulating Plan, which applies MUN and MUU zoning, shopfront overlay, and enhanced pavement standards, to the site. The design achieves the general intentions in Table RP.1 Summary of Zoning District related to the desired form, streetscape and public realm improvements, parking, and general use.

DS.1 Development Standards. Development standards are specified for building placement, allowed building types and height, ground floor interior ceiling height, parking, and allowed encroachments. The project design places buildings near the sidewalk/street within the maximum 10-foot property line frontage setback. The proposed five-story and four-story flex buildings, a building type allowed in the MUU and MUN zones, comply with the maximum heights allowed for each district (80 feet in the MUU and 50 feet in the MUN). Generally, the parking design meets the standards in [FMC 22.60.003](#). Full conformance can be achieved through minor modifications that can be addressed during the final site plan and administrative design review processes. The administrative design review process can be used to confirm that any proposed architectural encroachments will comply with [FBC standards](#).

BS.1 Building Standards and BS.2 Building Types. Buildings A and B are proposed to be mixed-use structures containing commercial, live-work, and residential uses at the ground floor level and residential units on the upper floors. Buildings C and D would be multifamily residential with amenity spaces comprising portions of the ground floor level. Buildings C and D would also have zero-level parking garages situated partly below grade with daylight exposures at their east elevations (65th Street frontage). Each building would comply with the FBC flex building standards in terms of proposed uses, lot dimensions, pedestrian access, frontage types, vehicle access and parking, open space, and building size and massing. In lieu of private open space, residential units would rely on shared common spaces provided adjacent to the buildings, per BS.2.H(7).

FS.1 Frontage Standards. The buildings would employ a mix of shopfront, stoop, and forecourt frontage types, each of which is allowed for flex buildings and permitted in the MUU and MUN zones. Some stoops on buildings A and B would be used in conjunction with dooryard (terrace) elements.

SS.1 Street Standards. Streets serving the site would consist of several street types. The west side of the site abuts Mildred Street West, an existing public street arterial located within the City of University Place. Much of the project frontage along this street would be subject to Mildred Street *Non-Shopfront* standards. A smaller portion of the street, located north and south of the proposed 22nd Street, would be subject to the Mildred Street *Shopfront* standards. The proposed 21st Street, 23rd Street, 65th Avenue, and 66th Avenue would be developed to *Local-Lower Intensity* street-type standards. The proposed 22nd Street would need to meet *Shopfront Overlay* standards near Buildings A and B as well as the urban green street standards provided in Urban Design Concept OS.2(1).

Except for Mildred Street West, all streets noted above will be entirely new construction, built to city street standards, and dedicated to the public. Mildred Street was redesigned and constructed by the City of University Place in 2016, considering the projected needs and demands of future redevelopment on the project site and other nearby properties. Existing Mildred Street improvements, including travel lanes and frontage improvements (sidewalks, street trees, lighting, etc.) would be utilized by the project with few modifications proposed or required for the non-shopfront frontages.

The applicant's proposed design for the *Shopfront* portions of Mildred Street West, however, does not comply with the shopfront standards in SS.1 in terms of pedestrian walkway pavements, landscaping, and possibly other elements. The applicant will need to submit a revised code-compliant design for the final site plan and design review approvals. This submittal should show existing improvements located within the ROW, including street trees, planter strips, sidewalks, etc., so that the successful integration of public street and private frontage improvements can be ensured. The City may approve minor departures from the standards, if warranted, per SS.1D.

The *Shopfront* standards require curbside parking stalls to be installed along the short segments of Mildred that are within the *Shopfront Overlay*. Fircrest requested an analysis of these segments to ascertain whether the addition of on-street parking would be advisable and warranted. [TranspoGroup prepared a memo](#) (December 22, 2022) that outlines the challenges and potential traffic safety issues that would be associated with introducing curbside parking at these locations and recommends against their inclusion. The City concurs with the TranspoGroup conclusions and does not support modifying the existing street configuration to accommodate the one or two stalls that would be feasible.

OS.1 Open Space Standards. The proposed design would devote 11.5% of the project site area to open space. This greatly exceeds the 5% minimum required. Per OS.1D, the applicant intends to provide this additional shared public open space in lieu of providing private open space for units in the development. The project will also provide 9,510 SF of private indoor open space in Buildings C and D.

Projects greater than four acres, including the Alliance Prose development, are required to generate urban design concepts for large-scale open spaces consistent with OS.2. This provision requires the submittal of an urban green street design for 22nd Street and a green, square, or plaza design with a minimum size of ½ acre to be located south of 22nd Street (planned) and west of 66th Avenue (planned). Generally, the applicant's conceptual designs meet the design goals and objectives described in OS.2(1) and OS.2(3). However, more detailed plans will need to be submitted for final site plan review approval and design review approval of specific elements.

FMC 22.58.008 Performance Standards.

[FMC 22.58.008\(d\)](#) provides the standards for refuse collection containers. All outdoor containers (including recycling containers) are required to be completely screened from public or private streets and from the adjacent property by an opaque screen. Masonry block wall, decorative metal, or other high-quality durable materials is required. Where space allows, evergreen shrubs and other landscaping shall be installed to soften the visual impact of the screening enclosure. Refuse storage areas that are visible from the upper stories of adjacent structures shall have an opaque or semi-opaque horizontal cover or screen to mitigate unsightly views. The covering structure shall be compatible with the site's architecture. If required by the sanitary sewer service provider, the trash enclosure floor shall be designed to slope to an interior trapped area floor drain and connected to a grease interceptor before plumbing to the sanitary sewer system. The floor shall be designed to contain all interior runoff and not allow outside storm rain or runoff from entering the trash enclosure.

The site plan shows refuse/recycling enclosures located immediately north of Building A, south of Building B, northeast of Building C, and southeast of Building D. Due to their

proximity to each of the four project buildings, a horizontal cover or screen will be required. Detailed plans will need to be submitted for final site plan and design review approvals to ensure code compliance. Input from Westside Disposal will be solicited to ensure that final designs will meet their service requirements for refuse and recycling collections.

[FMC 22.58.008\(g\)](#) provides the standards for screening of mechanical equipment. Roof-mounted air conditioning or heating equipment, vents, or ducts shall not be visible from the ground level of any abutting parcel or any public rights-of-way. This shall be accomplished through the extension of the main structure or roof or screening in a manner that is architecturally integrated with the main structure. The screening may require acoustical treatment to mitigate noise generation. Detailed plans will need to be submitted for final site plan and design review approvals to ensure code compliance.

[FMC 22.58.008\(k\)](#) requires stormwater facilities to be designed to meet or exceed the standards outlined in the Ecology Stormwater Management Manual for Western Washington. Consistent with NPDES Western Washington Phase II Municipal Stormwater Permit requirements, Low Impact Development (LID) designs and LID BMPs shall be required in areas where soils and geology support them. Larger projects triggering the manual's requirements for water quality treatment and/or flow control shall incorporate LID components to the extent practicable consistent with the LID Technical Guidance Manual for Puget Sound. The applicant's geotechnical report, prepared by PanGEO, Inc., found the site consisted of undocumented fill over dense to very dense glacial till deposit and concluded that infiltration is not feasible for the project.

[FMC 22.58.018 Outdoor lighting](#). The installation of outdoor lighting fixtures requires the approval of the Examiner or Director, as appropriate. Approval shall not be granted unless the proposed installation is found by the Examiner or Director to conform to all applicable provisions of this section. The applicant submitted an outdoor lighting electrical plan with photometric data and fixture schedule on February 17, 2023. Staff did not have sufficient time to review the lighting plan for code compliance prior to the issuance of this report. The City typically conducts such reviews through its final site plan review process.

FMC 22.60 Parking and Circulation. The current project design includes 391 multifamily units, for which a minimum of one off-street space per unit (391 stalls) is required, per [FMC 22.60.003\(a\)](#). In addition, a combined total of 9,895 SF of commercial space is proposed for Buildings A and B. [FMC 22.60.003\(b\)](#) requires a minimum of one space per 400 SF of commercial use, which equates to 25 stalls. Staff considers the live-work units in Buildings A and B to be "multifamily" for the purposes of parking requirements, per [FMC 22.60.003\(g\)](#). Based on these numbers, a minimum of 416 stalls are required.

Under [FMC 22.60.006](#) Maximum Parking Space Provisions, the number of stalls provided shall not exceed 120 percent of the minimum required number of stalls specified in [FMC 22.60.003](#), unless the Examiner approves a further increase when specified criteria are met. Absent any Examiner approval for additional parking, the maximum number of stalls allowed would be 499 (120% of 416 stalls). The preliminary site plan shows 493 stalls, which falls just below the 120 percent limit. Staff anticipates this number may decrease slightly as minor revisions, such as the replacement of some parking lot stalls with required tree peninsulas or islands, are approved through the final site plan and design review processes.

The applicant's site plan has undergone significant revision since concepts were first presented to the City for informal review in late 2021. Initial designs called for considerably

more surface parking than what is shown on current plans. Access to the east sides of Buildings C and D was at one time proposed to be via a private parking lot/driveway. 21st Street and 23rd Street were proposed to be Alley or Local – Delivery street types with no on-street parking.

Discussions between the applicant and City followed these early submittals, wherein the City expressed the need for the project to be redesigned to better fit the design intent of the FBC. Specifically, the City requested a reduced reliance on surface parking and the use of dedicated public streets to provide the circulation grid envisioned in the FBC's Regulating Plan. The preliminary site plan under review by the Examiner reflects this shift in emphasis – from private to public parking on public streets.

A consequence of this City-directed shift is that the off-street parking space count has been reduced significantly due to numerous parking lot/driveway stalls being converted to on-street parking, and numerous private parking lot stalls being relocated to public streets. The result is that 285 private parking stalls would be provided in surface lots behind Buildings A and B, and in courtyards and basements within Buildings C and D. 205 public stalls would be located within public street rights-of-way. Approximately 58% of the total would be private off-street stalls, with 42% being public street stalls. Of the minimum 416 stalls required, 69% would be private off-street stalls.

Section I.1C of the [FBC](#) (Relationship to Municipal Code) states, in part: *FBC standards augment and/or supersede existing regulations in Title 22 Land Development consistent with [FMC 22.57.002](#).* This section states: *"The provisions of this chapter shall augment and/or supersede existing regulations in this title. When provisions included in these form-based standards conflict with other requirements of this title, these standards shall apply unless otherwise provided."*

The City is attempting to achieve a balance between public and private stalls on this site to further the design directives of the FBC and policy direction in the Comprehensive Plan with respect to neighborhood livability, streetscape and public realm improvements, and parking design and location. This goal creates an inherent conflict with the parking count standards contained in [FMC 22.60.003](#), which establish minimum requirements for off-street parking -- not total parking.

Earlier iterations of the site plan included an off-street parking lot served by a private driveway to the east of Buildings C and D. The current plan proposes a public street, 65th Street West, to occupy the same space and serve the same functions. This design is consistent with the [FBC](#) Regulating Plan diagram (Figure RP.1), whereas the earlier parking lot/driveway design was not. If 65th Street West were reconfigured to be a private driveway/parking lot, as before, at least 64 stalls would be reclassified from public to private, resulting in 349 off-street stalls. Additionally, 66 public street stalls could be relocated from 21st and 23rd streets to expanded surface lots nearby to nearly achieve the off-street parking standard.

Staff believes, however, that the resultant site plan would be less consistent with the purpose and intent of the FBC. As such, staff recommends a determination be made per [FMC 22.57.002](#) that the FBC standards apply to parking when it comes to determining an appropriate public-private ratio.

FMC 22.62 Landscaping Regulations. The applicant has submitted an overall landscape plan and more detailed schematic landscape plans that generally meet the city's landscaping requirements with respect to the parking lot and street frontage landscaping. Final detailed landscape plans, subject to the final site plan and administrative design review approval, will need to be submitted to demonstrate code compliance in terms of final plant selection and location, walls, fencing, and other landscape elements. Additional attention will need to be paid to the locations and dimensions of the parking lot tree islands/peninsulas, parking lot and garage screening, planter strips, and plant selections that will complement off-site landscaping on the south side of 23rd Street. The final plans will need to demonstrate compliance with FBC street and open space landscaping standards as they apply to street frontage design and the urban design concepts required to be designed and constructed for the 22nd urban green street and the central plaza to be located south of 22nd Street and west of 66th Avenue.

FMC 22.64 Design Guidelines. A preliminary site plan should meet or exceed all applicable design guidelines contained in [Chapter 22.64 FMC](#). In addition, the proposal is subject to administrative design review per FMC 22.66.008 to ensure project compliance with all applicable development regulations, the design guidelines contained in [Chapter 22.64 FMC](#), and the goals, policies, and objectives of the comprehensive plan.

Administrative design review for this project consists of a two-step process that begins with a review of conceptual plans conducted concurrently with the Examiner's review of the preliminary site plan application. If the Examiner grants site plan approval for the preliminary (conceptual) design, the applicant will need to submit detailed plans for final design review by staff. This second review is intended to ensure that all design issues identified during the review of the conceptual plans are addressed prior to the issuance of building permits.

Staff has reviewed the conceptual plans for consistency with the design guidelines contained in [Chapter 22.64 FMC](#) and believes the proposal is generally consistent with the applicable guidelines listed below. Guidelines not listed are largely inapplicable to this project. Where noted below, additional design responses by the applicant will be needed to demonstrate full code compliance through the design review process. Where a conflict exists between the [Chapter 22.64 guidelines](#) and [FBC](#) design provisions, the FBC standards will apply.

- 22.64.006 Parking lots and areas – *additional attention to parking lot screening for surface lots (Buildings A and B) and garage parking areas (Buildings C and D) needed.*
- 22.64.009 Modulation and articulation.
- 22.64.010 Building scale -- *additional attention to human scale elements is needed.*
- 22.64.011 Building entries – *additional focus on accentuating entries is needed.*
- 22.64.012 Building materials.
- 22.64.014 Service equipment and activities – *additional detail on screening is needed.*
- 22.64.016 Ground floor activities.
- 22.64.017 Building frontages.
- 22.64.018 Upper floor balconies, alcoves, and decks – *none currently shown.*
- 22.64.019 Awnings and canopies – *detail needed for display window and entry coverings.*
- 22.64.020 Shopfronts – *additional attention to shopfront architectural elements including awnings, storefront window bases, and recessed entries or alcoves, is needed.*
- 22.64.025 Street access -- *additional focus on accentuating entries is needed.*
- 22.64.027 Usable open spaces.
- 22.64.029 Commercial walkways.
- 22.64.030 Commercial walkway corridors -- *additional detail on design elements is needed.*

- 22.64.031 Outdoor activity spaces -- *additional detail on design elements is needed.*
- 22.64.032 Streetscape furnishings -- *additional detail on design elements is needed.*
- 22.64.033 Public artworks – *information on outdoor artwork is needed.*
- 22.64.034 Lighting -- *additional information on lighting components is needed.*
- 22.64.035 Roadway corridors and street frontages – *detailed landscape designs needed.*
- 22.64.036 Urban buffers -- *additional attention to parking lot screening is needed.*
- 22.64.037 Sidewalks and walkways.
- 22.64.038 Buildings and yards -- *additional detail on landscape components is needed.*
- 22.64.039 Screening -- *additional detail on screening elements is needed.*
- 22.64.040 Landscape materials -- *information on native / drought tolerant plants needed.*

FMC 22.12 Concurrency Management. The City requires concurrency for arterial roads, transit, fire/EMS, law enforcement, schools, and parks, based on available and planned capacity. Concurrency is also required for water, power, sanitary sewer, fire flow, and stormwater management, based only on available capacity. Concurrency determinations are required in advance of the issuance of development permits, which the City interprets to mean “final” development permits such as building, site development, and other construction permits. The City’s preliminary concurrency review for the Alliance Prose project has not identified any capacity shortfalls in terms of the physical facilities and services needed to serve the project or deficiencies hindering the project’s ability to meet LOS standards.

Criterion (c): The proposed use and site design will be consistent and compatible with the goals, objectives, and policies of the comprehensive plan.

Staff Analysis: *The proposed redevelopment of the subject property, the project design, and public street ROW improvements, is consistent and compatible with, the Community Character, Land Use, Housing, and Transportation goals, objectives, and policies listed below. Staff believes the project will achieve and be supported by, these same goals and policies.*

Community Character Element

GOAL CC1 Facilitate the success of public places that foster community cohesiveness by ensuring well-designed spaces that support activity and community interaction.

Policy CC1.1 Continue to provide community gathering places in recreation facilities and park sites throughout the city and encourage the development of new community gathering places, especially in underserved areas of the community.

Policy CC1.2 Preserve, develop, and enhance informal community gathering places, such as plazas, mixed-use centers that include local cafes and coffee shops with comfortable outdoor seating, and spaces within parks. This can be accomplished by:

- Requiring/providing seating opportunities with multi-seasonal amenities, such as canopies or other covers from the elements and heating during periods of cooler temperatures.
- Encouraging installation of art or water features.
- Installing outdoor plantings and other landscape features
- Providing visual access to sites.
- Providing for active uses in the space.

- Promoting partnerships and implementing incentives where appropriate to create public places, such as plazas in combination with outdoor cafes.

Policy CC1.3 Ensure that public places are designed and managed to encourage high levels of activity by including:

- Multiple entrances.
- Flexible spaces.
- Linear urban parks.
- Focal points that create activity throughout the space.
- A signature attraction that provides a compelling identity.
- Multi-seasonal attractions.
- Active management of space and activities.

GOAL CC4 Adopt and implement form-based codes and design standards and guidelines that will achieve design excellence, desired urban form, and community character goals consistent with citizens' preferred design parameters.

Policy CC4.2 Apply form-based codes and design standards and guidelines through an administrative review process to help achieve or accomplish the following:

- Development that exhibits the highest standards of urban design, architecture, and landscaping at the scale of neighborhood, block, lot, and building.
- An increased focus on the design of the public realm – the public space defined by the exterior of buildings and the surrounding streets and open space.
- A human-scale character that creates a pleasant walking environment for all ages and abilities. Buildings should provide “eyes on the street”.
- Elements of design, proportion, rhythm, and massing that are desirable and appropriate for proposed structures and the site.
- Places and structures in the city that reflect the uniqueness of the community and provide meaning to its residents.
- Building scale and orientation that are appropriate to the site.
- The use of high-quality and durable materials, as well as innovative building techniques and designs.
- The use of environmentally friendly design and building techniques, such as LEED, for the construction or rehabilitation of structures.
- Minimization of negative impacts, such as glare or unsightly views of parking.
- Incorporation of historic features whenever possible.
- A design that fits with the context of the site, one that is sensitive to its surroundings and reflective of natural features and existing character.

Policy CC4.6 Encourage design and installation of landscaping that:

- Creates character and a sense of place.
- Retains and enhances existing green character.
- Preserves and utilizes native trees and plants.
- Enhances water and air quality.
- Minimizes water consumption.
- Provides aesthetic value.
- Creates spaces for recreation.
- Unifies site design.
- Softens or disguises less aesthetically pleasing features of a site.

- Provides buffers for transitions between uses or helps protect natural features.

GOAL CC5 Pay special attention to street design to create a sense of unique character that distinguishes Fircrest from neighboring communities.

Policy CC5.2 Ensure that complete street designs result in active urban streets, accessible public spaces, and safe and convenient linkages for all users, especially within the 19th and Mildred area and along Regents Boulevard.

Policy CC5.3 Use distinctive design elements to create unique identities for mixed-use areas, such as:

- Specially designed landscape.
- Unique crosswalk treatments and frequent crosswalks.
- Sidewalk design that supports a mix of commercial, residential, and other uses and activities such as outdoor café service.
- Character-defining materials and accessories, such as seating and wayfinding elements.
- Art elements.
- Pedestrian-scale lighting

Policy CC6.1 Require landscaping with a drought-tolerant native plant component (trees, shrubs, and groundcovers) to be installed when significant development activities take place.

Policy CC6.2 Landscaping should comply with applicable City standards and guidelines for plant retention, selection, installation, and maintenance. These standards are intended to maintain existing trees when practicable, better ensure that plants survive and thrive, minimize conflicts with infrastructure, and in some cases provide a substantial visual screen or buffer.

Land Use Element

Comprehensive Plan Designation: The project site is designated Mixed-Use in the Land Use Element. The proposed use and design of the site would be consistent with the allowable uses, development form, and building intensity established for Mixed-Use designation areas.

GOAL LU1 Provide sufficient land area and densities to meet Fircrest's projected needs for housing, employment, and public facilities while focusing growth in appropriate locations.

Policy LU1.5 The city should encourage infill development on suitable vacant parcels and redevelopment of underutilized parcels. Ensure that the height, bulk, and design of infill and redevelopment projects are supportive of the public realm and compatible with their surroundings.

Policy LU1.6 The city should support opportunities for shops, services, recreation, and access to healthy food sources within walking or bicycling distance of homes, workplaces, and other gathering places.

Policy LU1.7 The city should encourage project designs to encourage access by modes of

travel other than driving alone, such as walking, bicycling, and transit, and to provide connections to the non-motorized system.

GOAL LU2 Ensure that future growth and development protect and enhance the City's quality of life and character and are compatible with the existing community fabric.

Policy LU2.2 The city should apply design standards and guidelines for residential development to:

- Provide variety in building and site design and visually appealing streetscapes in residential developments of several dwellings or more.
- Minimize significant impacts, such as loss of light or privacy, from large residential infill buildings on adjacent residents.
- Promote compatibility with Fircrest's residential neighborhoods and avoid an appearance of overcrowding when rezones will increase residential development capacity or when density bonuses or flexibility in site standards are utilized.
- Emphasize features typical of single-detached dwellings, such as pitched roofs, single points of entry, and substantial window trim, as part of missing middle housing.

GOAL LU5 Achieve a mix of housing types and densities, maintain attractive and healthy residential neighborhoods, and guide new housing development into appropriate areas.

Policy LU5.2 The mix of housing within the community should include detached and attached single-family dwellings, cottage housing, live-work units, multi-family dwellings, including townhomes and units located within vertical mixed-use buildings, accessory dwelling units, residential care facilities for those who are unable to maintain independent living arrangements, and other innovative housing that is compatible with the type, scale, and character of surrounding residential development.

Policy LU5.7 Implement form-based codes and mixed-use zoning to achieve increased residential density in mixed-use and multifamily areas near arterials and transit routes, for example, the 19th and Mildred areas, to accommodate expected population and employment growth.

Policy LU5.8 Residential infill development shall be compatible with surrounding development in terms of scale, form, relationship to the street, and other design elements.

GOAL LU6 Achieve a mix of commercial land uses that serve the needs of the City's residents, businesses, and visitors while protecting and enhancing the unique character of Fircrest's residential neighborhoods.

Policy LU6.1 New and redeveloped commercial and mixed-use buildings and neighborhoods should be designed to achieve community goals for attractive streets, public spaces, and pedestrian amenities.

Policy LU6.4 The expansion of linear commercial "strips" should be discouraged, and pedestrian-oriented development should be supported.

Policy LU6.7 The visual appearance of commercial areas should be improved through public and private measures for beautification, implementation of design strategies, maintenance, and streetscape improvements. Commercial and mixed-use buildings should conform to

form-based codes and design standards and guidelines to achieve urban design objectives and ensure architectural compatibility with surrounding neighborhoods. Where commercial rehabilitation, development, or redevelopment occurs in an area with historic significance, it should be sensitive to the historic fabric of the area. New commercial and mixed-use development should incorporate landscaping, seating, and other pedestrian-supportive amenities to provide pleasant and comfortable resting, socializing, and picnicking areas for employees and shoppers.

Policy LU6.8 Commercial and mixed-use development should include high-quality, safe, and contiguous facilities for pedestrians, bicyclists, disabled persons, and users of public transit services. Fircrest should work with public transit providers to improve transit service to mixed-use and neighborhood commercial areas. Commercial and mixed-use development should be designed to provide connections, both vehicular and pedestrian, to adjoining sites to reduce personal automobile trips. Sidewalks and internal pathways should be incorporated to enhance pedestrian circulation.

Policy LU6.9 Maximum automobile parking standards should be implemented for various types of commercial development. Shared parking facilities should be encouraged. Parking areas shall include plantings of vegetation that reduce its visual impact through effective screening and the establishment of a substantial tree canopy. Form-based codes and design standards that strongly encourage the placement of parking to the side or rear of buildings should be implemented. Parking facilities should conform to the parking-related policies of the Transportation Element.

Policy LU6.10 Commercial uses should be concentrated in locations that best serve the community, complement stable residential areas, and are attractive to private investment.

Policy LU6.11 A mix of retail, office, service, and residential uses should be encouraged in mixed-use and neighborhood commercial areas.

Policy LU6.12 Redevelopment of vacant and underutilized sites should be encouraged.

Housing Element

Policy H1.4 Encourage residential development in areas that are already adequately served by utilities and transportation.

Policy H2.2 Encourage increased residential density in mixed-use and multi-family zones, especially those located within the 19th and Mildred areas, subject to compliance with appropriate form-based code standards and design guidelines. Prohibit new detached single-family development in these areas to promote more intensive use of mixed-use and multi-family properties.

Transportation Element

GOAL T1 Develop, maintain, and operate a multimodal transportation system that provides for the safe, efficient, and reliable movement of people, goods, and services.

Policy T1.1 Create a transportation network that includes vehicle, pedestrian, bicycle, and transit components located throughout the City -- and connecting to adjacent communities - - to provide for the safe, efficient, convenient, and reliable movement of people, goods, and services.

Policy T1.2 Implement form-based code street standards and complete street design standards to provide safe and convenient access for all modes of transportation. These streets will support pedestrians, bicyclists, micro-mobility and transit users, and motorists, thereby increasing capacity, increasing safety, and improving street aesthetics and walkability. Include amenities in street designs, including trees and other landscaping, street lights, benches, and waste receptacles to add to the pedestrian experience and further calm traffic.

GOAL T2 Transportation improvements within the City should ensure alternative transportation choices are available to underserved areas and provide mobility choices for people with special needs including persons with disabilities, the elderly, the young, and low-income populations.

Policy T2.2 Design and build complete streets with facilities for all modes of transportation. Connect residential neighborhoods to mixed-use areas and public transit with sidewalks, paths, and bike lanes to provide greater access to transportation choices for those who do not drive and those who have limited mobility resources.

GOAL T3 Improve the safety of the transportation system, reduce speeds, and protect the quality of life in residential and mixed-use neighborhoods.

Policy T3.4 Require shared access driveways and cross-access between developments when planning for public rights-of-way improvements and private development to reduce turning movement conflicts and enhance pedestrian and vehicular traffic safety. When street improvements are implemented, consolidate private driveway access to properties along major, secondary, and collector arterials to reduce safety hazards and increase street capacity.

Policy T3.5 Encourage the use of existing major arterials for the movement of through traffic and freight to reduce the need for new capital projects and support the reliable movement of people, goods, and services. Employ traffic calming measures on residential and mixed-use neighborhood streets to discourage or slow neighborhood through-traffic.

Policy T3.6

Use traffic circles, landscaped medians, pedestrian bump-outs, and other traffic calming measures to reduce speeds and increase safety. Where appropriate, design these facilities to provide pedestrian refuge areas that reduce pedestrian crossing distances, reduce conflict points and enhance streetscape landscaping. Use other traffic calming measures that offer pedestrian protection such as on-street parking or increase driver awareness of pedestrians through the use of textured pavement and signage.

Policy T3.7 Avoid the creation of excessively large blocks and long local access streets that are uninterrupted by intersections, mid-block neck-downs, or other traffic calming elements to discourage higher motor vehicle speeds that reduce pedestrian and bicyclist safety.

Policy T3.8 Implement form-based code street standards to ensure that street designs will avoid the construction of sidewalks next to curbs except where parking lanes will provide physical separation between traffic lanes and sidewalks. Such designs will enhance pedestrian safety, add to sidewalk users' comfort, and encourage higher pedestrian usage.

Separate pedestrians from traffic lanes by installing landscaped planter strips that include street trees, or where a more urban streetscape is desired, use contrasting paving, street trees in tree wells, and street furniture consistent with form-based code street standards.

GOAL T4 Improve vehicular and pedestrian traffic circulation within the City to enhance the quality of life.

Policy T4.1 Through redevelopment, establish a traditional urban street grid in the 19th and Mildred area and extend this grid to adjoining properties to ensure that streets and sidewalks provide access between residential and mixed-use neighborhoods and areas that are common destinations, including commercial areas, schools, and parks. Maintain and enhance continuity of the street and sidewalk pattern by avoiding dead-end and half-streets not having turnaround provisions and by requiring through-connections in new developments.

GOAL T6 Develop facilities for pedestrians and bicyclists to achieve a walkable community to support active and independent living, health, environmental quality, and cost savings for travel.

Policy T6.1 Require sidewalk facilities on all new and substantially redeveloped public streets to enhance public safety. Ensure the provision of sidewalks near schools to offer protection for children who walk to and from school. Assign high priority to projects that provide linkages to transit or complete planned pedestrian facilities or trails. Provide pedestrian facilities on non-arterial streets to supplement principal pedestrian facilities located on arterials. Ensure that crosswalks, signing, and pedestrian-activated signals conform to the Manual on Uniform Traffic Control Devices (MUTCD).

GOAL T11 Integrate land use and transportation planning to support active communities through the provision of a variety of travel choices and improve accessibility and mobility.

Policy T11.2 Use mechanisms that encourage transit use including limiting off-street parking spaces, establishing maximum parking requirements, offering commute trip reduction programs, and implementing other TDM measures. Locate higher densities and intensities of use close to transit stops to create a core area to support transit and high occupancy vehicle use. Support the development of transit centers, bus pullouts, and other transit facilities. Establish incentives for developers to provide transit and TDM-supportive amenities to further encourage transit use. Design and construct complete streets, bicycle-friendly facilities including bike-activated signals and secure bicycle racks or lockers, and pedestrian pathways.

GOAL T13 Consider benefits and impacts to health in the design of transportation infrastructure by providing opportunities for exercise and reducing exposure to air, water, and noise pollution. Policy

Policy T13.2 Design, build, and maintain bike lanes, sidewalks, paths, and trails to expand opportunities for walking and biking to improve individual and community health. Provide transportation facilities that are walkable and bicycle friendly to improve economic and living conditions so that businesses and skilled workers are attracted to the community.

Policy T13.3 Concentrate population and employment growth in the 19th and Mildred areas and other areas served by transit routes to reduce environmental impacts associated with

growth and the construction of additional infrastructure. Integrate transportation and land use planning to meet environmental goals by reducing the impacts of the transportation system such as contaminated storm water run-off, greenhouse gas emissions, noise pollution, and energy consumption.

Criterion (d): All conditions necessary to lessen any impacts of the proposed use are measurable and can be monitored and enforced.

Staff Analysis: *The Examiner may impose conditions of approval to ensure that all potential impacts resulting from the project are mitigated to a satisfactory level in compliance with applicable code requirements. Conditions may be monitored and enforced through the final site plan, administrative design review, site development permit, building permit approval processes, and subsequent site inspection process.*

RECOMMENDATION: The City recommends approval of the preliminary site plan subject to the suggested condition listed below and any additional conditions deemed warranted by the Hearing Examiner. The suggested condition is intended to highlight zoning and design-related issues that should be addressed through the final site plan review, administrative design review, site development permit, and building permit approval processes.

Condition: The applicant shall provide the City with additional detailed plans and supporting documentation to demonstrate code compliance as outlined in the staff report discussions with respect to:

- [FMC 22.26 Sign Regulations.](#)
- [FMC 22.57 Form-Based Code.](#)
- [FMC 22.58.008 Performance Standards.](#)
- [FMC 22.58.018 Outdoor lighting.](#)
- [FMC 22.60 Parking and Circulation.](#)
- [FMC 22.62 Landscaping Regulations.](#)
- [FMC 22.64 Design Guidelines.](#)

Jeff Boers
Jeff Boers
Fircrest Planning Consultant

February 23, 2023
Date

EXHIBITS: (linked to bookmarks)

1. [Land Use Application](#)
2. [Preliminary Major Site Plan Review Application](#)
3. [Site Plan and Building Elevations, Graves+Associates, January 25, 2023](#)
4. [Landscaping Plans, Fazio Associates, Inc., January 25, 2023](#)
5. [ALTA/NSPA Survey, Terrane, May 24, 2022](#)
6. [Topographic and Boundary Survey, Terrane, May 24, 2022](#)
7. [Grading Plan, Davido Consulting Group, Inc., November 17, 2022](#)

8. [Drainage Plan, Davido Consulting Group, Inc., November 17, 2022](#)
9. [Site Lighting Drawings, Cross Engineers, Inc. January 13, 2023](#)
10. [Phase I Environmental Site Assessment, PES Environmental, Inc., May 31, 2022\(Over 3,000 pages. Here is the online link: *<https://www.cityoffircrest.net/mildred-development-project/>*\)](#)
11. [Limited Phase II Investigation, PES Environmental, Inc., November 2022](#)
12. [Drainage Report, Davido Consulting Group, Inc., December 2022](#)
13. [Geotechnical Engineering Report, PanGEO, Inc., December 14, 2022](#)
14. [Traffic Impact Analysis, TranspoGroup, January 2023](#)
15. [Mildred Street Parallel Parking Memorandum, TranspoGroup, December 22, 2022](#)
16. [City of University Place Access Shift Memorandum, December 21, 2022](#)
17. [City of Fircrest Notice of Application, July 19, 2022](#)
18. [City of Fircrest MDNS, January 30, 2023](#)
19. [SEPA Environmental Checklist, June 13, 2022](#)
20. [Washington State Department of Ecology SEPA Comment Letter, February 13, 2023](#)
21. [Amended City of Fircrest Form-Based Code, November 08, 2022](#)
22. [Certificate of Water Availability](#)

Land Use Application

Type of Project

*Please check all that apply
and attach submittal sheet(s):*

- ☐ Administrative Design Review
- ☐ Administrative Use Permit
- ☐ Boundary Line Adjustment
- ☐ Amendment – Comprehensive Plan
- ☐ Amendment – Zoning Regulations
- ☐ Amendment – Zoning Map *
- ☐ Conditional Use Permit *
- ☐ Conditional Use – Amendment *
- ☐ Detached Accessory Structure *
- ☐ Development Plan – Preliminary *
- ☐ Development Plan – Final
- ☐ Development Plan – Amendment*
- ☐ Plat Subdivision – Preliminary *
- ☐ Plat Subdivision – Final *
- ☐ Plat – Alteration/Vacation *
- ☐ Reasonable Use Exception
- ☒ SEPA Checklist
- ☐ Short Plat
- ☐ Site Plan Review – Minor
- ☒ Site Plan Review – Major *
- ☐ Site Plan Review – Final
- ☐ Site Plan Review – Amendment*
- ☐ Variance – Major *
- ☐ Variance – Minor*
- ☐ Variance – Sign
- ☐ Other:

**Pre-application conference
recommended*



THE CITY OF FIRCREST

Planning and Building
115 Ramsdell St Fircrest WA 98466
253-564-8902
www.cityoffircrest.net

Applicant Name: Jon Graves Graves + Associates	
Address: 3110 Ruston Way Suite E, Tacoma WA 98402	
Representative (if different): <input type="text"/>	
Phone: (253)272-4214	Email: jcgraves@gravesassoc.com
Property Owners (if different): Garrett Hodgins	
Phone: (206)350-4851	Email: ghodgins@allresco.com

Project Address: 2119 Mildred Street W, Fircrest WA 98466	
Brief Description of Project: Mixed Use with 389 residential units of various size/layouts with ground floor retail. Parks, recreation, open space, and through street connections are proposed. Parking is both surface and structured.	
Parcel Number(s): 0220112005	Site Area (square footage): 9.49 Acres
Land Use Designation: Commercial Mixed Use	Zoning Designation: MUU/MUN
Environmental sensitive areas on or within 150': <input checked="" type="radio"/> Yes <input type="radio"/> No	
Physical Characteristics of Site: 9.49 acre site, partially developed, with notable grades on the east half	

I certify that all of the information submitted in this application including any supplemental information is true and complete to the best of my knowledge and I acknowledge that willful misrepresentation of information will result in the cancellation of this permit application. I have read this application in its entirety and understand that my submittal will be reviewed for completeness and, if found to be complete, will be processed in accordance with FMC 22.05.

Signature: <input type="text"/>	Date: <input type="text" value="6/10/2022"/>
Signature: <input type="text"/>	Date: <input type="text"/>

Major Site Plan Review - Preliminary Submittal

Submittal Items

Please included the following:

- ☒ Land Use Application
- ☒ All materials listed in FMC [22.72](#)
- ☐ Traffic Concurrency Certificate or Application
- ☐ Traffic Impact Analysis*
- ☒ Drainage Plan
- ☐ Sensitive Area Affidavit N/A
- ☐ Sensitive Area Special Study*
- ☒ Environmental Checklist*
- ☒ Certificates of Water/Sewer Availability **
- ☐ Residential Project
 - ☐ Intake fee: \$400
 - ☐ Deposit: \$1000
- ☐ Nonresidential Project
 - ☐ Intake fee: \$750
 - ☐ Deposit: \$2000

* When applicable

** As required by Public Works

The applicant shall be responsible for the actual cost incurred by the City in processing the application. The total fee shall be reduced by the amount of the deposit. The applicant shall remit to the City the amount exceed by the deposit. If the deposit fee exceeds the City's actual costs, the balance shall be refunded.



THE CITY OF FIRCREST

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Major site plan review consists of two separate reviews. The initial review (preliminary) is conducted by the hearing examiner and the second review is conducted by the director. The plans submitted for the initial review may be conceptual in detail. However, the greater the level of detail in the plans submitted for hearing examiner review, the greater the level of certainty the applicant will have in preparing detailed plans for final review.

Major Site Plan Review (please check):

- ☒ New buildings greater than 2,000 square feet of gross floor area
- ☐ Building additions which are greater than 2,000 square feet of gross floor area
- ☐ Parking lot improvements associated with development proposals listed in subsections (a) and (b) of this section.

Please demonstrate how the proposal is compliant with the following criteria: (An answer of YES is not sufficient; Use additional sheet, if necessary.)

How will the proposed use and site design not be detrimental to the public health, safety, and welfare; injurious to property or improvements in the vicinity; or adversely affect the established character of the surrounding vicinity?

Use proposed will improve public health, safety, and welfare by remediating contamination from multiple sources. In addition, use will improve property and surrounding aesthetics by removing aging abandoned structure and adding much needed area housing, commercial space, and parks/recreation/open space.

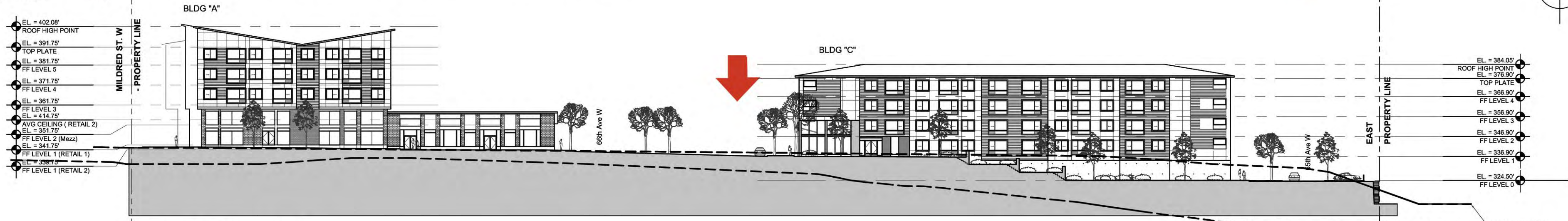
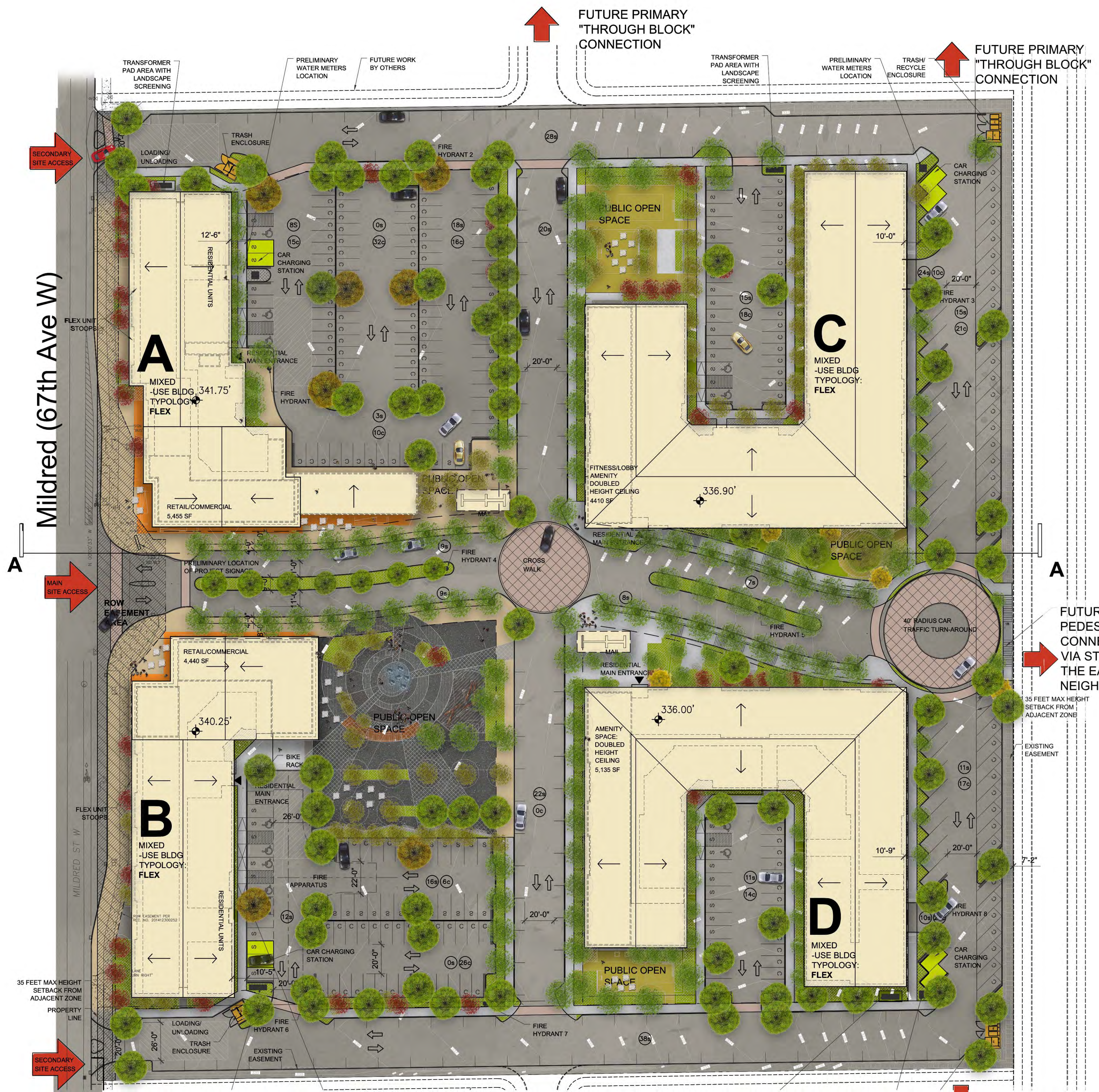
How will the proposed use and site design meet or exceed all applicable development, design and performance standards and guidelines required for the specific use, location, or zoning classification?

Proposed use and plans meet or exceed all relevant Fircrest Municipal Code guidelines and development standards relating to design, construction, and landscaping, except where text based amendments apply. Otherwise, proposed is consistent with guidelines required for both use and zoning classification/location.

How will the proposed use and site design will be consistent and compatible with the goals, objectives and policies of the comprehensive plan?

Proposed seeks to add to much needed housing density in a way that is consistent with the existing community fabric. Project proposes facilities and services to meet the needs of the community. In addition, development provides a mix of commercial/dwelling units types. Careful thought has been given to improvement with consideration to preservation of natural and built environments.

For complete development regulations, please see FMC Chapter [22.72](#).



PROJECT DATA

[illegible]

Building B	# of Units	L1	L2	L3	L4	L5	Avg Sq Ft per Unit	ratio Units/Area	Total Area Sq Ft
1 BA LOFT	11	0	1	1	2	2	965.00	1.00	7375
1 BR/1 BA	1	0	1	1	2	2	75.00	8.54	25
1 BR/1 BA (w/ push in)	26	1	1	1	8	8	740.00	31.71	19246
1 BR/2 BA	11	1	1	1	2	2	770.00	12.26	7786
Studio Loft	17	1	1	1	5	5	1008.00	20.73	18468
Studio LOFT	0	0	0	0	0	0	608.00	0.00	0
1 BA LOFT	7	0	0	0	0	0	913.00	8.54	6396
1 BR LOFT	0	0	0	0	0	0	1550.00	0.00	0
Total:	82	14	8	20	20	20	100.00	12.26	64799
Retail	2	0	0	0	0	0	443.00	0.00	0
Active Space	5	0	0	0	0	0	443.00	0.00	0
Circulation/Common Areas	5	0	0	0	0	0	443.00	0.00	0
Total:	83366								

[illegible][illegible]

Studio	72	16	16	17	17	6	505.00	18.41	36360
1 BR/1 BA	71	12	16	19	19	5	757.00	18.16	53747
1 BR/1 BA (w/ push in)	84	7	8	27	27	15	740.00	21.48	62160
1 BR+Den	52	12	12	12	12	4	779.00	13.30	45082
2 BR/2 BA	98	17	19	27	27	8	1088.00	25.06	106624
Studio LOFT							606.00		
1 BR LOFT	14	7	0	0	0	0	910.00	3.58	
2 BR LOFT							1554.00		
Total	391	71	71	102	102	38		100.00	299995

Overall Parking	Standard	Compact	Total
Total Parking Available	298		493
Parking Residential @ 1 to 1.2ratio			473
Parking Commercial/Retail @2/1000	19.936		20
ADA Parking total	22		
Residential ADA	20 *		
Residential ADA VAN (included in Res ADA)	3		
Commercial ADA	1		
Commercial ADA VAN	1		
Loading Unloading	2		
	20		493
Total parking Required			
	Difference		0











* Based on 5% of total of Residential Units
for Type A Units at 1 stall per Unit

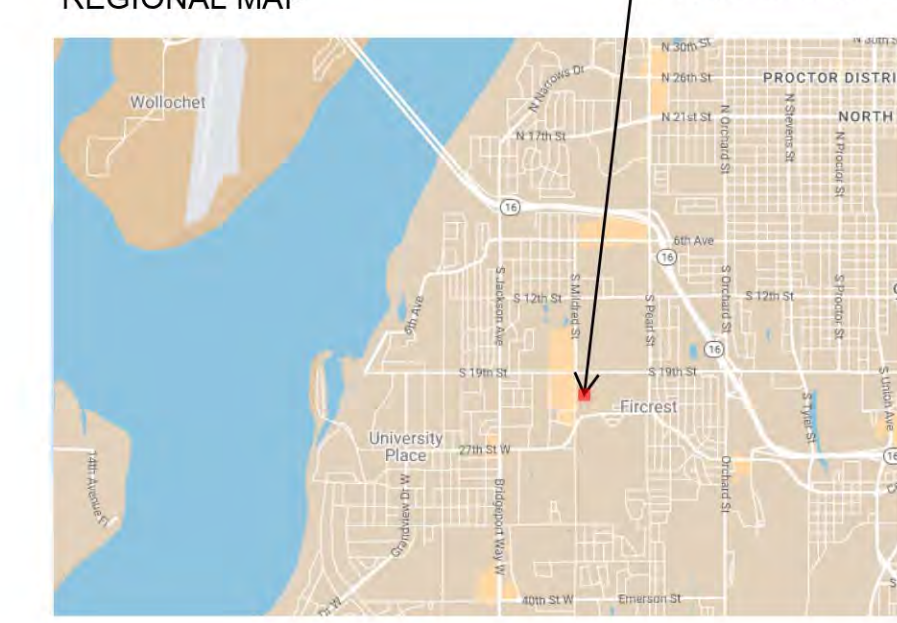
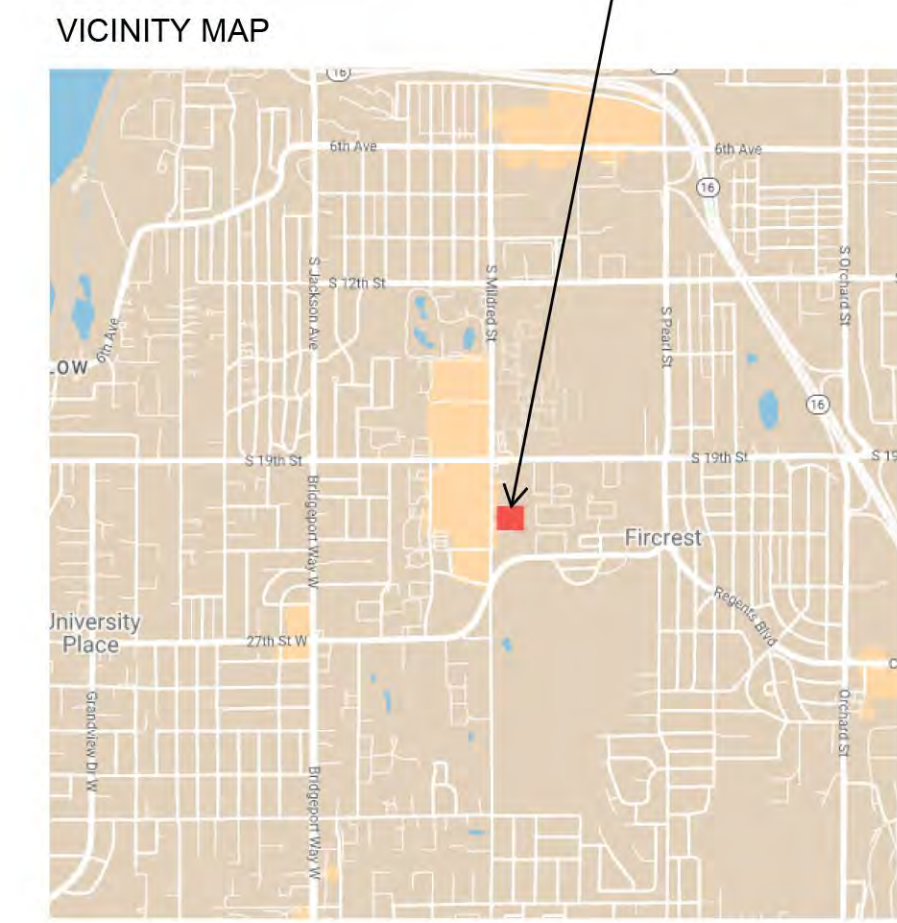
Bicycle Parking	Locker	Secured	Total
Required 1 every 12 parking stalls	0	43	43
Building A	0	12	12
Building B	0	12	12
Building C	0	14	14
Building D	0	12	12
Provided	0	50	50

ZONING MAP



-  Parcels
-  Mixed Use Urban (MUU)
-  Mixed Use Neighborhood (MUN)
-  Residential 30 (R30)
-  Parks, Recreation, and Open Space (PROS)
-  Project Site

-  CIRCULATION/BOH
-  BUILDING-PROPOSED
-  PARKING/DRIVE ASPHALT
-  SIDEWALK CONCRET
-  CROSSWALK
-  RECREATIONAL AREAS
-  PLAZA SPACES
-  LANDSCAPE
-  SHOPFRONT OVERLAY
-  EV CAR CHARGING STATION



A300- Building A- Elevations

COLORED ELEVATIONS BUILDING A

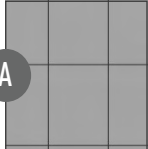
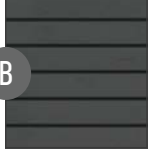
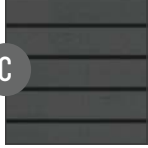




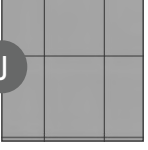
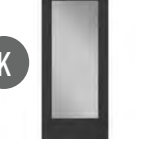
2119 MILDRED STREET W
FIRCRESST, WA
JANUARY 23.2023



SOUTH ELEVATION BUILDING - A



EAST ELEVATION BUILDING - A

MATERIALS / COLORS	
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -

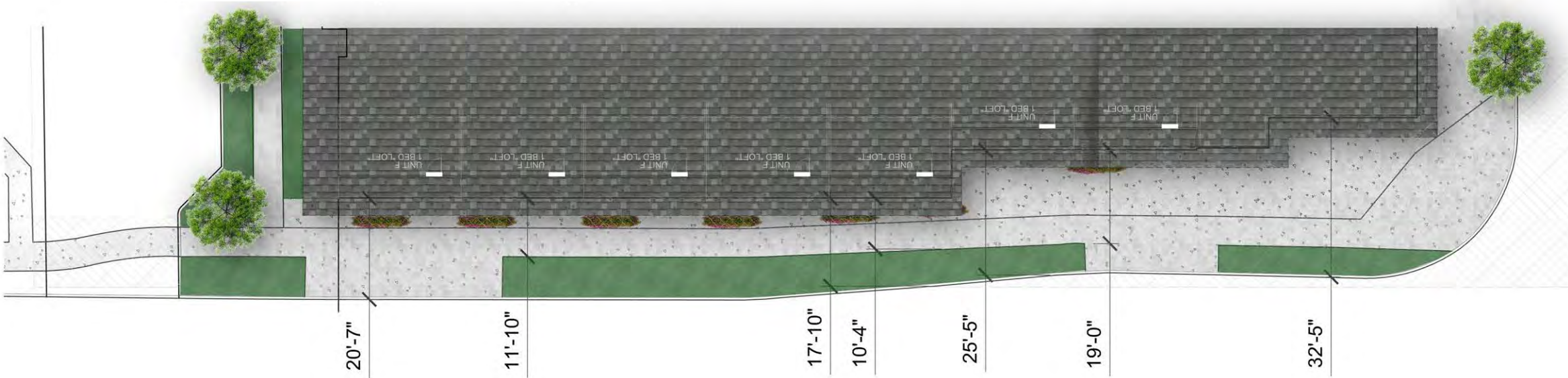


A301- Building A- Elevations

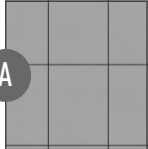
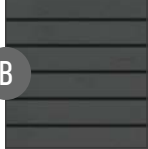
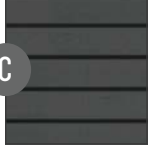




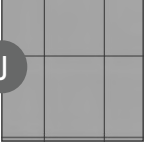
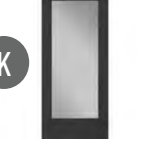
COLORED ELEVATIONS BUILDING A



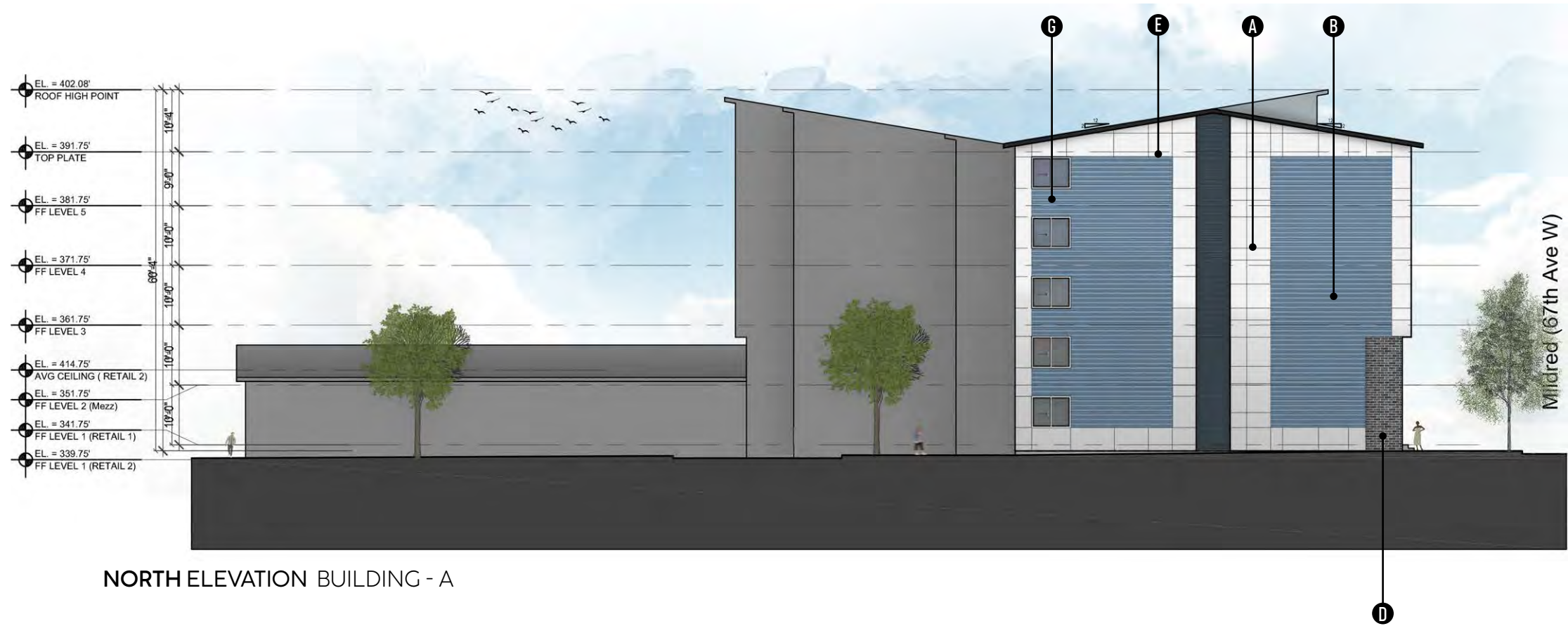
WEST ELEVATION BUILDING - A



ENLARGED PLAN BUILDING - A

MATERIALS / COLORS	
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	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -





NORTH ELEVATION BUILDING - A

MATERIALS / COLORS

		FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
		FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
		FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
		BRICK VENEER COLOR: COAL SW ID: -
		ROOF FLASHING COLOR: BLACK SW ID: -
		VINYL WINDOW COLOR: WHITE SW ID: -
		METAL DOOR COLOR: DARK GRAY SW ID: -
		FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
		FIBERGLASS DOOR COLOR: WHITE SW ID: -

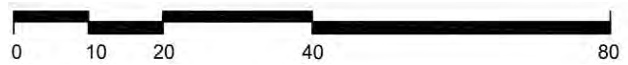


A303- Building B- Elevations

COLORED ELEVATIONS BUILDING B



MATERIALS / COLORS	
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -

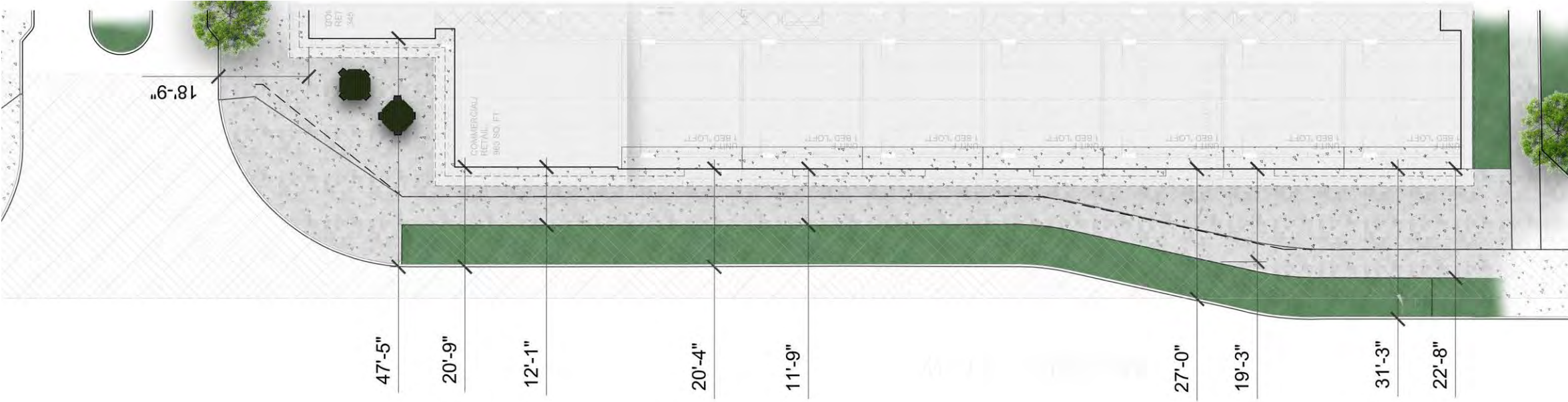


A304- Building B- Elevations

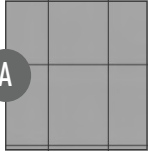
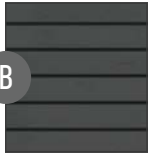
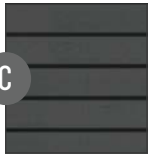




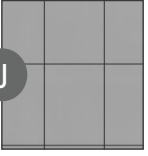

COLORED ELEVATIONS BUILDING B



WEST ELEVATION BUILDING - B



ENLARGED PLAN BUILDING - B

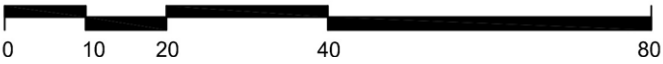
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	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -





SOUTH ELEVATION BUILDING - B

MATERIALS / COLORS	
<div>A</div>	FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
<div>B</div>	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
<div>C</div>	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
<div>D</div>	BRICK VENEER COLOR: COAL SW ID: -
<div>E</div>	ROOF FLASHING COLOR: BLACK SW ID: -
<div>G</div>	VINYL WINDOW COLOR: WHITE SW ID: -
<div>H</div>	METAL DOOR COLOR: DARK GRAY SW ID: -
<div>J</div>	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
<div>K</div>	FIBERGLASS DOOR COLOR: WHITE SW ID: -



A306- Building C- Elevations

COLORED ELEVATIONS BUILDING C

2119 MILDRED STREET W
FIRCRESST, WA
JANUARY 23, 2023

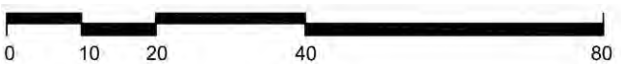


EAST ELEVATION BUILDING - C



NORTH ELEVATION BUILDING - C

MATERIALS / COLORS	
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -



A307- Building C- Elevations

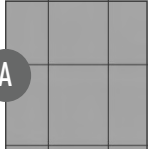
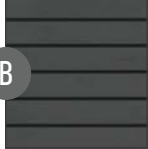
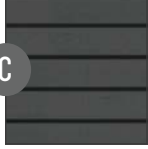




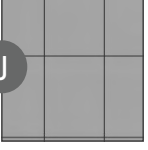
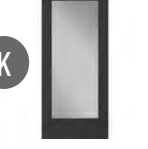
COLORED ELEVATIONS BUILDING C



WEST ELEVATION BUILDING - C



SOUTH ELEVATION BUILDING - C

MATERIALS / COLORS	
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: SNOWBOUND SW ID: SW 7004
	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -



A308- Building D- Elevations

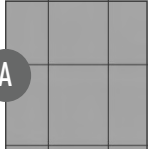
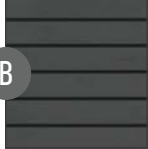
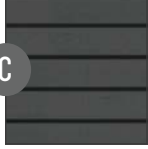




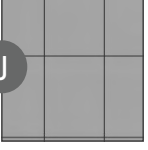
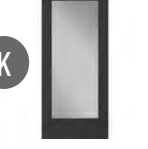
COLORED ELEVATIONS BUILDING D



EAST ELEVATION BUILDING - D



NORTH ELEVATION BUILDING - D

MATERIALS / COLORS	
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	FIBER CEMENT LAP SIDING COLOR: BLUESY NOTE SW ID: SW 9064
	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -



A309- Building D- Elevations

COLORED ELEVATIONS BUILDING D

2119 MILDRED STREET W
FIRCREST, WA
JANUARY.23.2023



WEST ELEVATION BUILDING - D

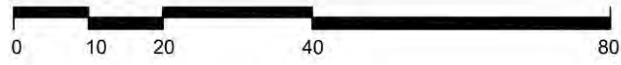
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	FIBER CEMENT LAP SIDING COLOR: SEA SERPENT SW ID: SW 7615
	BRICK VENEER COLOR: COAL SW ID: -
	ROOF FLASHING COLOR: BLACK SW ID: -
	VINYL WINDOW COLOR: WHITE SW ID: -
	METAL DOOR COLOR: DARK GRAY SW ID: -
	FIBER CEMENT ARCHITECTURAL PANEL COLOR: IRON ORE SW ID: SW 7069
	FIBERGLASS DOOR COLOR: WHITE SW ID: -



SOUTH ELEVATION BUILDING - D

PROSE FIRCRES
MIXED-USE

GRAVES + ASSOCIATES
ARCHITECTURE | INTERIORS | PROJECT MANAGEMENT



ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT

2119 MILDRED ST W
FIRCREST, WA 98466

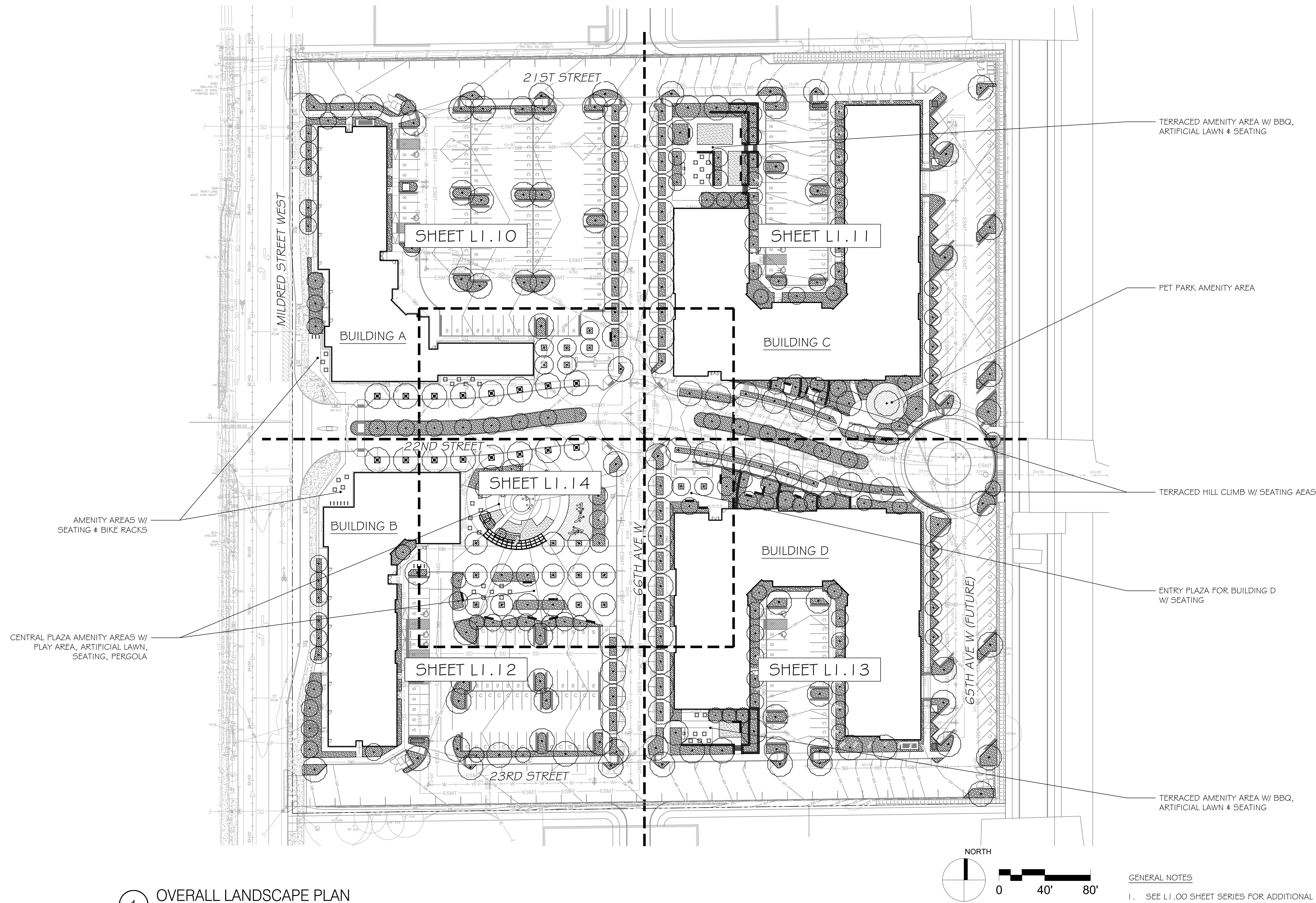
DATE	YEAR	MO	DAY
REVISIONS	DESCRIPTION		

PROJECT: 22-002
PM: R.J.F.

SITE PLAN REVIEW
12.12.2022



OVERALL
LANDSCAPE
PLAN
L1.00



1 OVERALL LANDSCAPE PLAN
1" = 40'

LANDSCAPE DATA	
TOTAL TREES	308 TREES
TOTAL PLANTING AREA	46,760 SF

GENERAL NOTES

- SEE L1.00 SHEET SERIES FOR ADDITIONAL PLANS AND INFORMATION.
- SEE L2.00 FOR PLANTING SCHEDULE.
- SEE L3.00 FOR PLANTING DETAILS.
- ALL PLANTING IN PUBLIC R.O.W. PER CITY OF FIRCREST STANDARD PLANS AND SPECIFICATIONS; CURRENTLY AN EXISTING CONDITION TO REMAIN.
- ALL PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM THAT INCLUDES TRADITIONAL IRRIGATION HEADS AND/OR DRIP IRRIGATION, SLEEVEING, LATERALS, CONTROL VALVES, GATE VALVES AND QUICK COUPLERS.
- MASTER CONTROLLER TO BE LOCATED IN BUILDING DURING CONSTRUCTION DOCUMENT PHASE.



FAZIO
ASSOCIATES INC.
LANDSCAPE ARCHITECTS
102 NW Canal Street
Seattle, WA 98107
T: 206-774-9490
www.fazioassociates.com

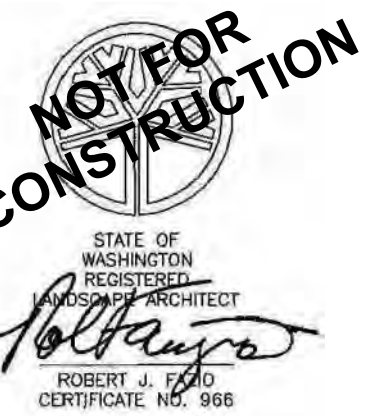
**ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT**

2119 MILDRED ST W
FIRCREST, WA 98466

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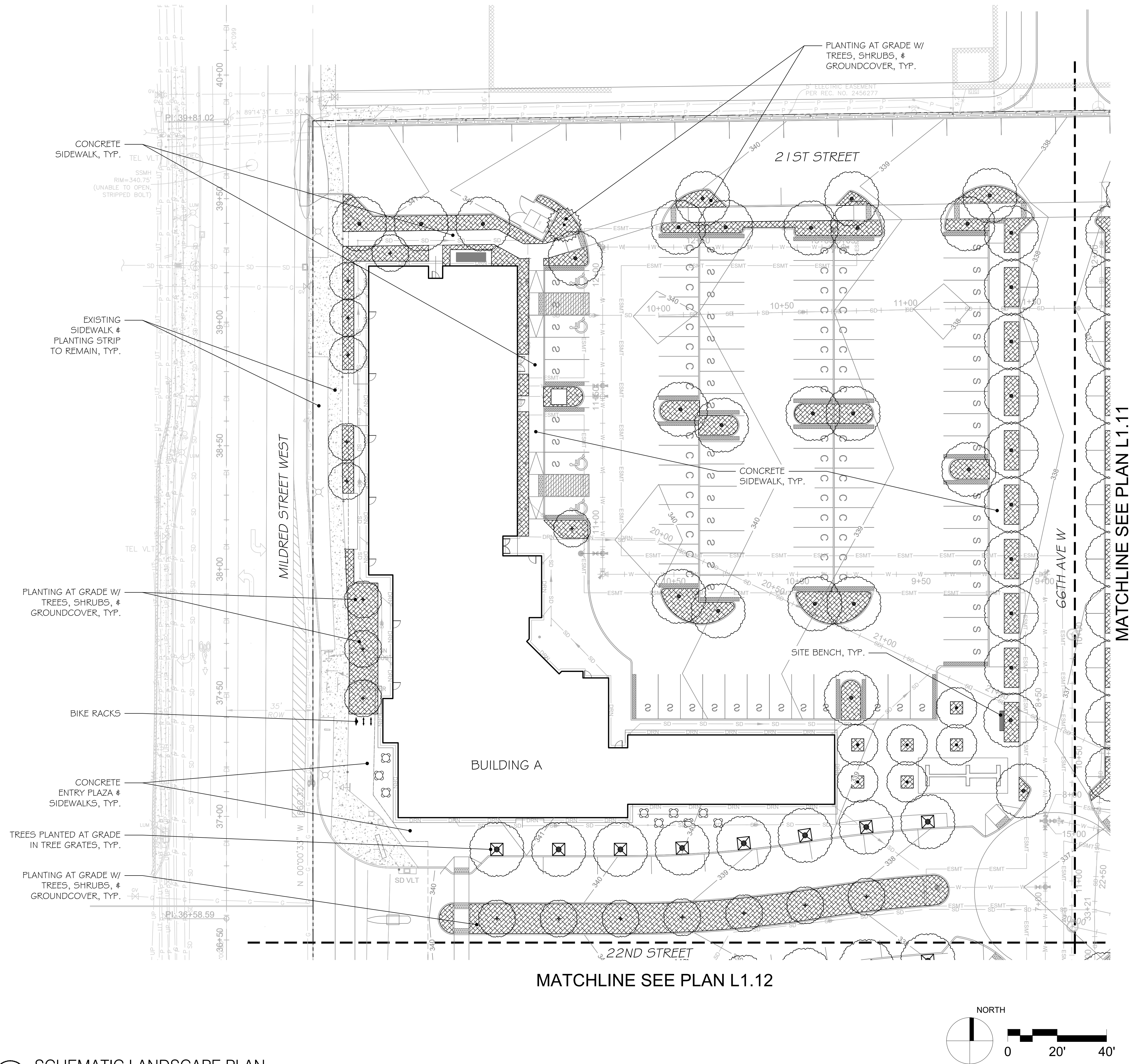
ECT: 22-002
RJF

TE PLAN REVIEW
12.12.2022



SCHEMATIC
LANDSCAPE
PLAN

L1.10



1 SCHEMATIC LANDSCAPE PLAN
1" = 20'

- ### GENERAL NOTES
1. SEE L1.00 SHEET SERIES FOR ADDITIONAL PLANS AND INFORMATION.
 2. SEE L2.00 FOR PLANTING SCHEDULE.
 3. SEE L3.00 FOR PLANTING DETAILS.
 4. ALL PLANTING IN PUBLIC R.O.W. PER CITY OF FIRCREST STANDARD PLANS AND SPECIFICATIONS; CURRENTLY AN EXISTING CONDITION TO REMAIN.
 5. ALL PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM THAT INCLUDES TRADITIONAL IRRIGATION HEADS AND/OR DRIP IRRIGATION, SLEEVING, LATERALS, CONTROL VALVES, GATE VALVES AND QUICK COUPLERS.
 6. MASTER CONTROLLER TO BE LOCATED IN BUILDING DURING CONSTRUCTION DOCUMENT PHASE.

ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT

2119 MILDRED ST W
FIRCREST, WA 98466

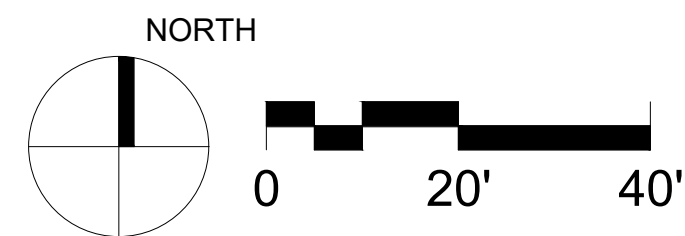
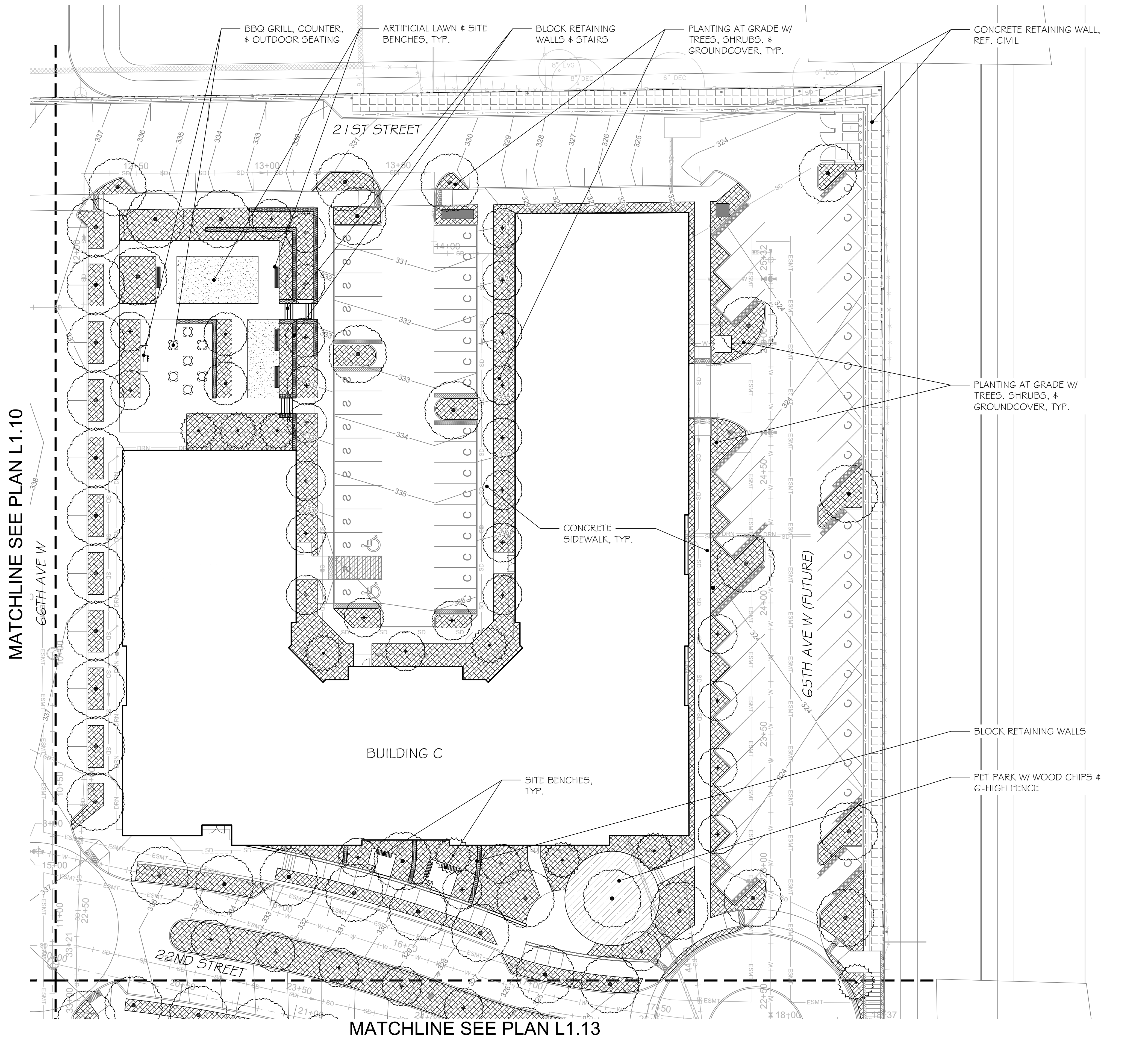
REVISIONS	DATE
DESCRIPTION	YEAR MONTH DAY

PROJECT: 22-002
PM: R.J.F

SITE PLAN REVIEW
12.12.2022



SCHEMATIC
LANDSCAPE
PLAN
L1.11



GENERAL NOTES

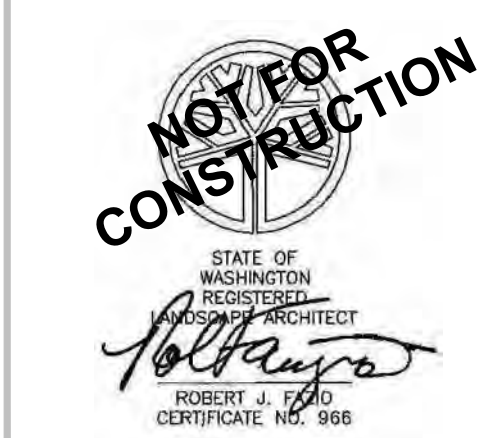
1. SEE L1.00 SHEET SERIES FOR ADDITIONAL PLANS AND INFORMATION.
2. SEE L2.00 FOR PLANTING SCHEDULE.
3. SEE L3.00 FOR PLANTING DETAILS.
4. ALL PLANTING IN PUBLIC R.O.W. PER CITY OF FIRCREST STANDARD PLANS AND SPECIFICATIONS; CURRENTLY AN EXISTING CONDITION TO REMAIN.
5. ALL PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM THAT INCLUDES TRADITIONAL IRRIGATION HEADS AND/OR DRIP IRRIGATION, SLEEVEING, LATERALS, CONTROL VALVES, GATE VALVES AND QUICK COUPLERS.
6. MASTER CONTROLLER TO BE LOCATED IN BUILDING DURING CONSTRUCTION DOCUMENT PHASE.

ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT
2119 MILDRED ST W
FIRCREST, WA 98466

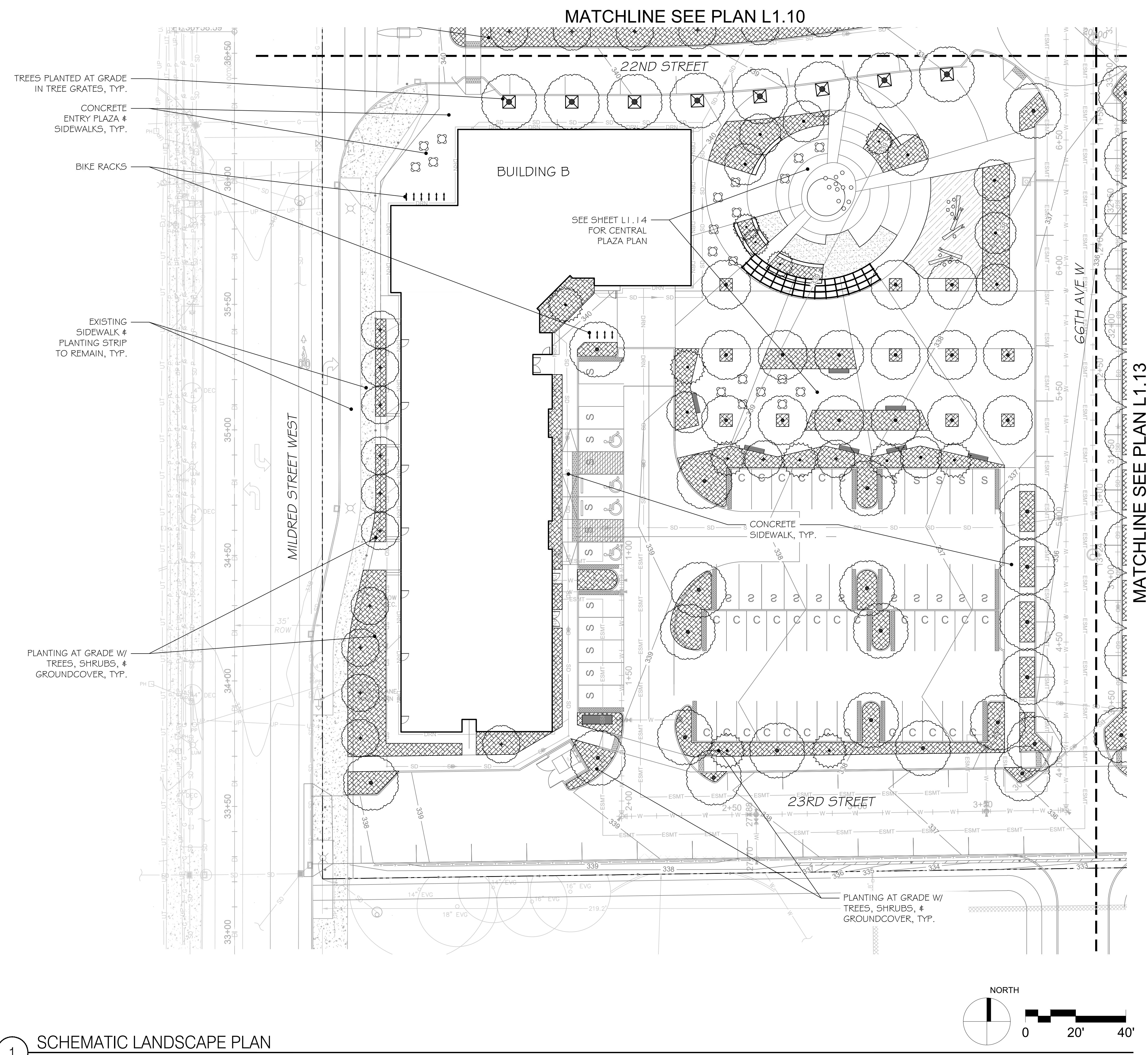
DATE	YEAR	MO	DAY
REVISIONS	DESCRIPTION		
1			

PROJECT: 22-002
PM: R.F.

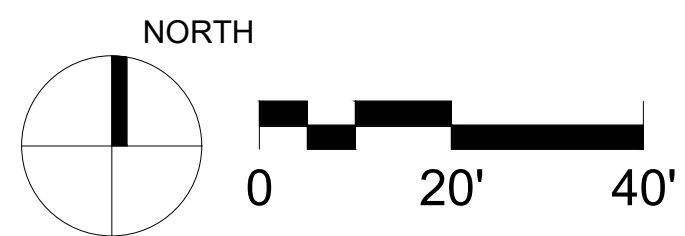
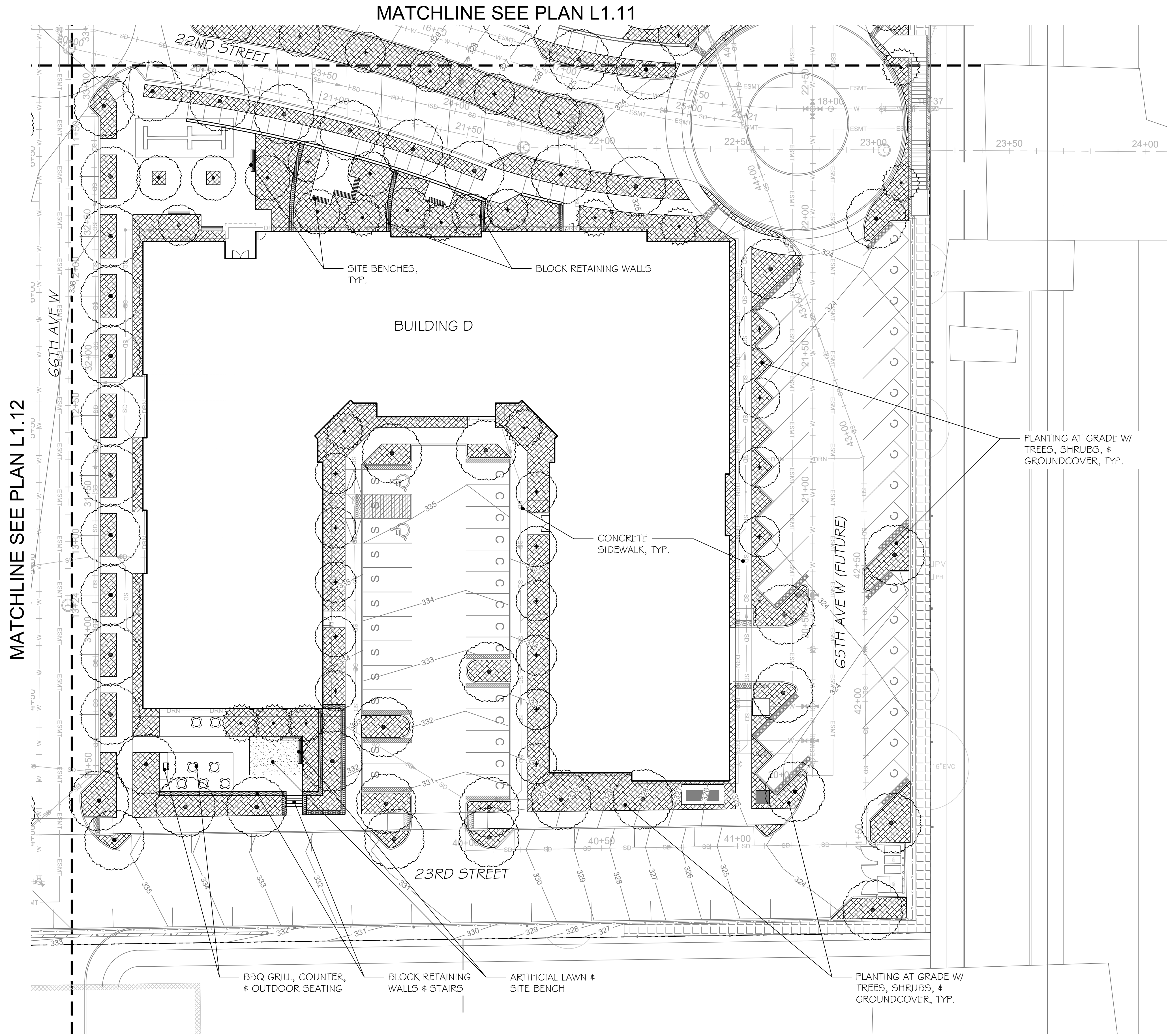
SITE PLAN REVIEW
12.12.2022



SCHEMATIC
LANDSCAPE
PLAN
L1.12



- GENERAL NOTES
- SEE L1.00 SHEET SERIES FOR ADDITIONAL PLANS AND INFORMATION.
 - SEE L2.00 FOR PLANTING SCHEDULE.
 - SEE L3.00 FOR PLANTING DETAILS.
 - ALL PLANTING IN PUBLIC R.O.W. PER CITY OF FIRCREST STANDARD PLANS AND SPECIFICATIONS; CURRENTLY AN EXISTING CONDITION TO REMAIN.
 - ALL PLANTING AREAS TO RECEIVE IRRIGATION SYSTEM THAT INCLUDES TRADITIONAL IRRIGATION HEADS AND/OR DRIP IRRIGATION, SLEEVEING, LATERALS, CONTROL VALVES, GATE VALVES AND QUICK COUPLERS.
 - MASTER CONTROLLER TO BE LOCATED IN BUILDING DURING CONSTRUCTION DOCUMENT PHASE.



GENERAL NOTES

1. SEE L1.00 SHEET SERIES FOR ADDITIONAL PLANS AND INFORMATION.
2. SEE L2.00 FOR PLANTING SCHEDULE.
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ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT
2119 MILDRED ST W
FIRCREST, WA 98466

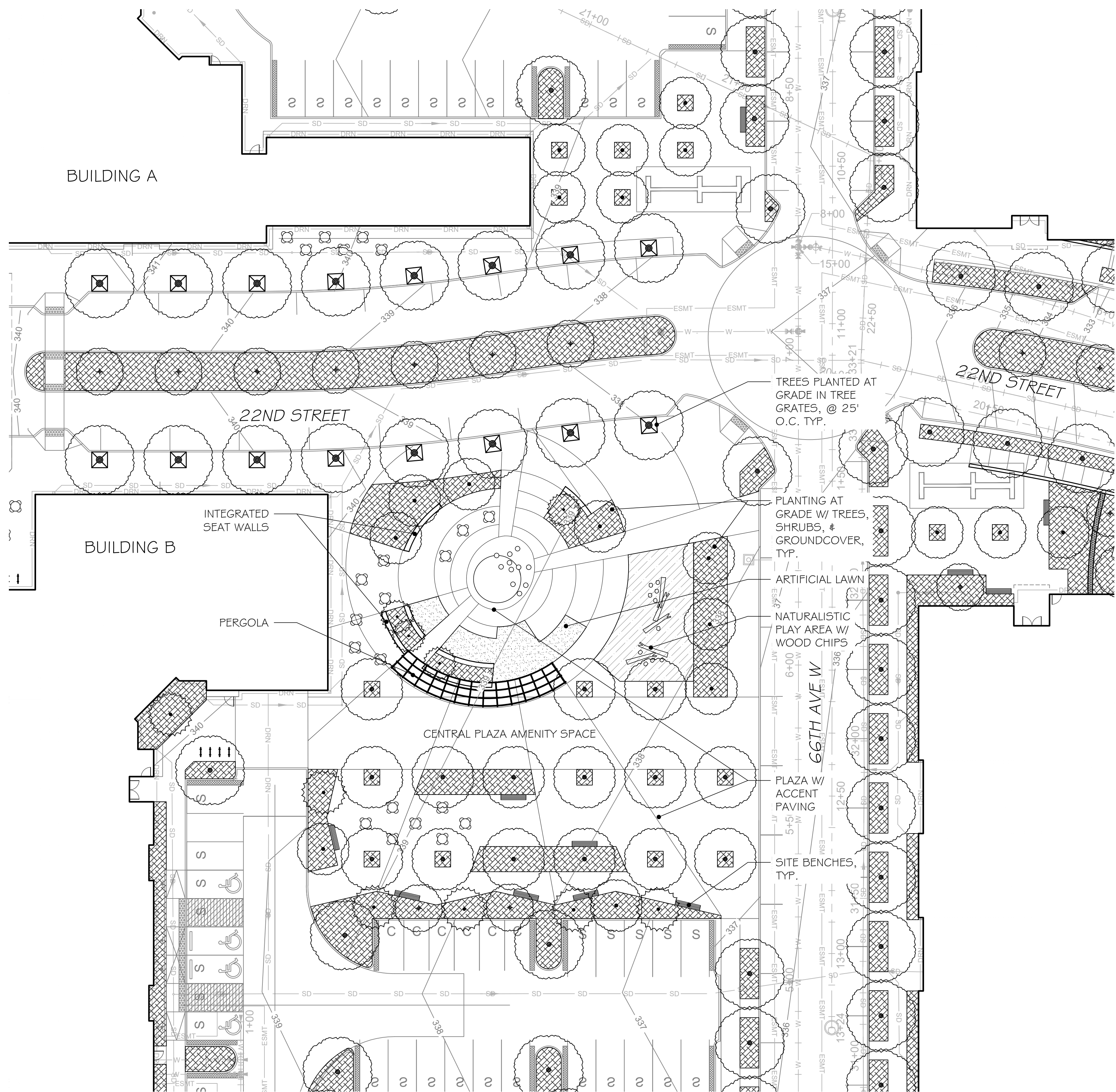
REVISIONS	DATE
DESCRIPTION	YEAR MONTH DAY

PROJECT: 22-002
PM: R.J.F.

SITE PLAN REVIEW
12.12.2022



SCHEMATIC
LANDSCAPE
PLAN
L1.13



1 SCHEMATIC LANDSCAPE PLAN
1" = 20'



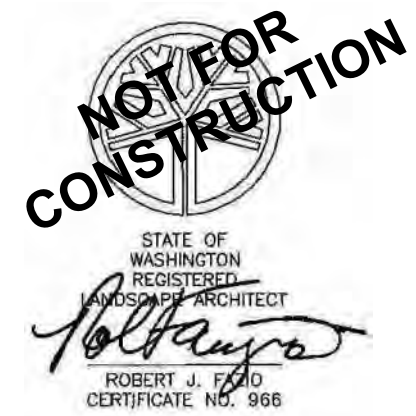
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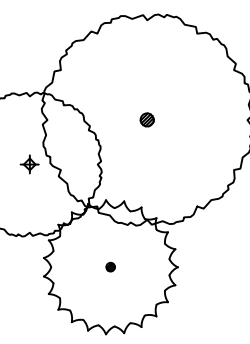

DATE	YEAR	MO	DAY

PROJECT: 22-002
PM: R.F

SITE PLAN REVIEW
12.12.2022



PLANTING SCHEDULE

SYMBOL	QTY	TYPE	SIZE
TREES FROM APPROVED CITY OF FIRCREST LIST IN "DESIGN STANDARDS AND GUIDELINES FOR STREETScape ELEMENTS"			
WWN = WESTERN WASHINGTON NATIVE WCN = WEST COAST NATIVE DT = DROUGHT TOLERANT			
		<u>TREES FOR PLANTING STRIPS 4' WIDE AND UP, OK UNDER POWER LINES</u>	
	•	TSUGA MERTENSIANA / MOUNTAIN HEMLOCK (EVERGREEN, WWN, DT)	6' MIN. HT., B#B
	•	ACER CIRCINATUM / VINE MAPLE (WWN)	2" CAL., B#B
	•	CORNUS 'MILKY WAY' / MILKY WAY DOGWOOD	2" CAL., B#B
	•	MAGNOLIA STELLATA / STAR MAGNOLIA	2" CAL., B#B
	•	STYRAX JAPONICUS / JAPANESE SNOWBELL	2" CAL., B#B
		<u>TREES FOR PLANTING STRIPS 4' WIDE AND UP</u>	
	•	ZELKOVA SERRATA / ZELKOVA (DT)	2" CAL., B#B
		<u>TREES FOR PLANTING STRIPS 6' WIDE AND UP, OK UNDER POWER LINES</u>	
	•	ACER PALMATUM / JAPANESE MAPLE	2" CAL., B#B
	•	ACER GRISEUM / PAPERBARK MAPLE	2" CAL., B#B
		<u>TREES FOR PLANTING STRIPS 6' WIDE AND UP</u>	
	•	CERCIDIPHYLLUM JAPONICUM / KATSURA	2" CAL., B#B
	•	QUERCUS PALUSTRIS / PIN OAK	2" CAL., B#B
		<u>TREES FOR PLANTING STRIPS 8' WIDE AND UP</u>	
	•	CHAMAECYPARIS LAWSONIANA / LAWSON CYPRESS (EVERGREEN, WCN, DT)	6' MIN. HT., B#B
	•	PINUS CONTORTA (EVERGREEN, WCN, DT)	6' MIN. HT., B#B
	•	ACER TRUNCATUM X PLATANOIDES 'WARRENRED' / PACIFIC SUNSET MAPLE	2" CAL., B#B
	•	GINKGO BILOBA / MAIDENHAIR TREE	2" CAL., B#B
	•	PARROTIA PERSICA / PERSIAN IRONWOOD	2" CAL., B#B
		<u>TREES FOR PLANTING STRIPS 10' WIDE AND UP</u>	
	•	THUJA PLICATA / WESTERN REDCEDAR (EVERGREEN, WWN, DT)	6' MIN. HT., B#B
	•	ACER RUBRUM / RED MAPLE	2" CAL., B#B
	•	ACER SACCARUM / SUGAR MAPLE	2" CAL., B#B
		<u>SHRUBS & GROUNDCOVER</u>	
	•	BERBERIS THUNBERGII 'ROSE GLOW' / ROSE GLOW BARBERRY	24" MIN. HT., SEE PLANS
	•	BLECHNUM SPICANT / DEER FERN	18" MIN. HT., SEE PLANS
	•	CAMELLIA SASANQUA / SASANQUA CAMELLIA	24" MIN. HT., SEE PLANS
	•	CHOISYA TERNATA 'SUNDANCE' / SUNDANCE MEXICAN ORANGE	18" MIN. HT., SEE PLANS
	•	CONRUS SERICEA / RED-OSIER DOGWOOD	18" MIN. HT., SEE PLANS
	•	CORNUS SERICEA 'KELSEY' / KELSEY DOGWOOD	18" MIN. HT., SEE PLANS
	•	GAULTHERIA SHALLON / SALAL	18" MIN. HT., SEE PLANS
	•	DAPHNE ODORA 'MARGINATA' / VARIEGATED FRAGRANT DAPHNE	24" MIN. HT., SEE PLANS
	•	LAVANDULA ANGUSTIFOLIA / ENGLISH LAVENDER	18" MIN. HT., SEE PLANS
	•	MAHONIA AQUIFOLIUM / OREGON GRAPE	20" MIN. HT., SEE PLANS
	•	MAHONIA NERVOSA / DWARF OREGON GRAPE	18" MIN. HT., SEE PLANS
	•	MAHONIA REPENS / CREEPING MAHONIA	1 GAL. @ 12" O.C.
	•	NANDINA DOMESTICA 'GULF STREAM' / COMPACT HEAVENLY BAMBOO	18" MIN. HT., SEE PLANS
	•	PHYSCARPUS OPULIFOLIUS 'DIABOLO' / DIABOLO NINEBARK	18" MIN. HT., SEE PLANS
	•	POLYSTICHUM MUNITUM / SWORD FERN	20" MIN. HT., SEE PLANS
	•	PRUNUS LAUROCERASUS 'MOUNT VERNON' / MOUNT VERNON LAUREL	1 GAL. @ 24" O.C.
	•	ROSMARINUS OFFICINALIS / ROSEMARY	24" MIN. HT., SEE PLANS
	•	SARCOCOCCA CONFUSA / SWEETBOX	18" MIN. HT., SEE PLANS
	•	SPIRAEA JAPONICA 'GOLDFLAME' / GOLDFLAME SPIREA	18" MIN. HT., SEE PLANS
	•	SYMPHORICARPOS ALBUS / SNOWBERRY	18" MIN. HT., SEE PLANS
	•	VIBURNUM TINUS / LAURUSTINUS	24" MIN. HT., SEE PLANS
	•	VINCA MINOR / DWARF PERIWINKLE	1 GAL. @ 12" O.C.

PLANTING NOTES

1. ALL PLANTING AREAS ON THE GROUND-PLANE (ALL R.O.W., PLANTERS, ETC.) SHALL HAVE A TRADITIONAL IRRIGATION SYSTEM TO BE INTEGRATED WITH A CONTROLLER. RAIN SENSORS AND OTHER EQUIPMENT WILL BE INCORPORATED INTO DESIGN TO MAXIMIZE EFFICIENCY AND LOWER OVERALL MAINTENANCE.
2. ALL SHRUBS AND GROUNDCOVERS TO BE LAYED OUT IN FIELD AND APPROVED BY A LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. AMENDED SOILS IN PLANTER STRIP PER COF STANDARDS.
4. ALL PLANTING IN PUBLIC R.O.W. PER COF STANDARD PLANS AND SPECIFICATIONS; CURRENTLY AN EXISTING CONDITION TO REMAIN.
5. SEE CIVIL SHEETS FOR PROPOSED GRADING, STREET PROFILES AND UTILITY LOCATIONS.



1900 N NORTHLAKE WAY
SUITE 237, SEATTLE, WA 98103
PHONE: 206-330-0620

FAZIO
ASSOCIATES INC.
LANDSCAPE ARCHITECTS
102 NW Canal Street
Seattle, WA 98107
T: 206-774-9490
www.fazioassociates.com

**ALLIANCE
PROSE FIRCREST
MIXED-USE PROJECT**

[illegible]

PROJECT: 22-002

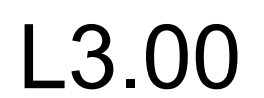
PM: RJF

SITE PLAN REVIEW
12.12.2022



PLANTING SCHEDULE

L2.00



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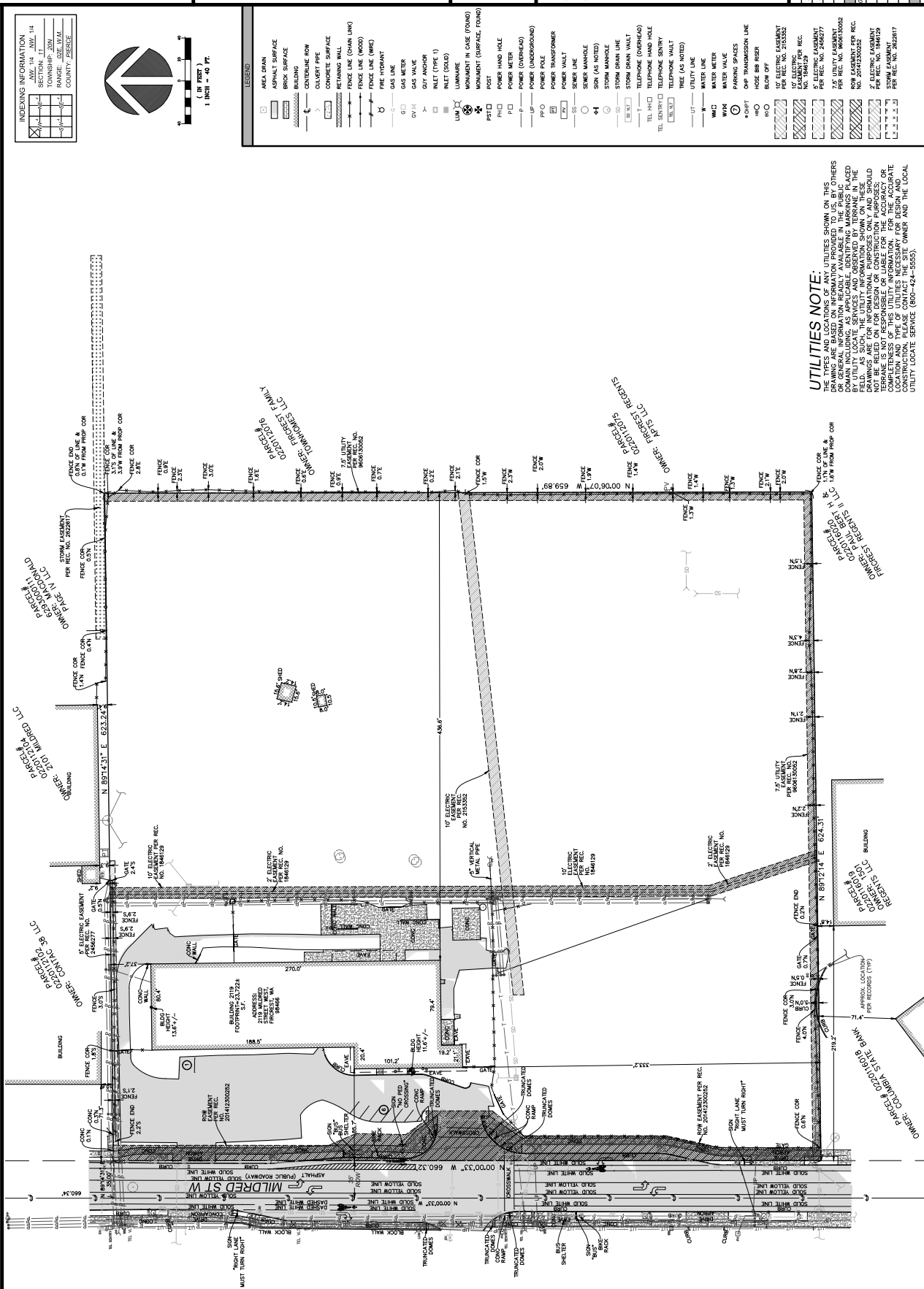
<p>ALPINE'S CANYON HILL SURVEY</p> <p>TAX PARCEL NO. 02070112005</p> <p>2119 MILDRED ST</p> <p>2119 MILDRED ST W</p> <p>FIRCREST, WA 98166</p>	<p>We are the measure terracomet</p>
--	--



10801 Main Street, Suite 102
Bellevue, WA 98004
p: 425-458-4488 | e: info@terrane.net

IB NUMBER:	212357
DATE:	12/08/2021
WAFED BY:	JAK
CHECKED BY:	JGM/DRT
SCALE:	1"= 40'
REVISION HISTORY	
24/22	OFFSITE ESMT
SHEET NUMBER	

UTILITIES NOTE:

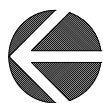


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INDEXING INFORMATION

NW 1/4	NE 1/4
SW 1/4	SE 1/4

SECTION: 11
TOWNSHIP: 20N
RANGE: 02E, W.M.
COUNTY: PIERCE



TOPOGRAPHIC & BOUNDARY SURVEY
TAX PARCEL NO. 0220112005

2119 MILDRED ST W
FIRCREST, WA 98466



TERRANE

terranet

JOB NUMBER:	212357
DATE:	12/08/2021
RAFTED BY:	JAK
CHECKED BY:	JGM/DRT
SCALE:	1"= 40'
REVISION HISTORY	
12/22	OFFSITE ESMT

STEEP SLOPE/BUFFER DISCLAIMER:

STEEP SLOPE/BUFFER DISCLAIMER: THE LOCATION AND EXTENT OF STEEP SLOPES SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. THE LOCATION AND EXTENT OF ANY CHANGES TO THE EXISTING CONSTRUCTION, THE PITCH, LOCATION AND EXTENT ARE BASED SOLELY ON OUR OWN FIELD OBSERVATIONS ON SITE AND OUR CURSORY REVIEW OF RELEVANT PUBLIC DOCUMENTS, AS SUCH, TERRAIN CANNOT BE LIABLE OR RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ANY STEEP SLOPE INFORMATION. ULTIMATELY, THE LOCATION AND EXTENT OF ANY STEEP SLOPES ASSOCIATED WITH ANY SETBACKS OR BUFFER REQUIREMENTS WILL BE DETERMINED BY THE AGENCIES AND APPROVED BY THE REVIEWING AGENCY BEFORE ANY CONSTRUCTION CAN OCCUR.

2 OF 2

2 OF 2



KEY NOTES:		
KEY	NOTE	DETAIL/ SHEET
1	PROPOSED CONTOURS	-
2	PROPOSED 10' LF. AVERAGE 4' HEIGHT STRUCTURAL RETAINING WALL ALONG EAST PROPERTY LINE	-
3	PROPOSED 375 LF. AVERAGE 3.5' HEIGHT NON-ENGINEERED RETAINING WALL	-
4	PROPOSED 400 LF. AVERAGE 3.5' HEIGHT NON-ENGINEERED RETAINING WALL	-
5	105 LF. AVERAGE 5' HEIGHT ENGINEERED RETAINING WALL	-
6	160 LF. AVERAGE 5' HEIGHT ENGINEERED RETAINING WALL	-
7	POTENTIAL STEPPED SLAB FOR THIS PORTION OF BUILDING B	-

LEGEND:

- ASPHALT CONC PAVEMENT
- CEMENT CONC PAVEMENT
- PAVERS PER LA PLANS

EARTHWORK NOTES:

THE PRELIMINARY EARTHWORK ANALYSIS WAS PERFORMED FROM EXISTING GRADE TO FINISHED GRADE ELEVATIONS AND DOES NOT INCLUDE PAVEMENT THICKNESS. EACH BUILDING IS ASSUMED TO HAVE A 12" THICK FOUNDATION.

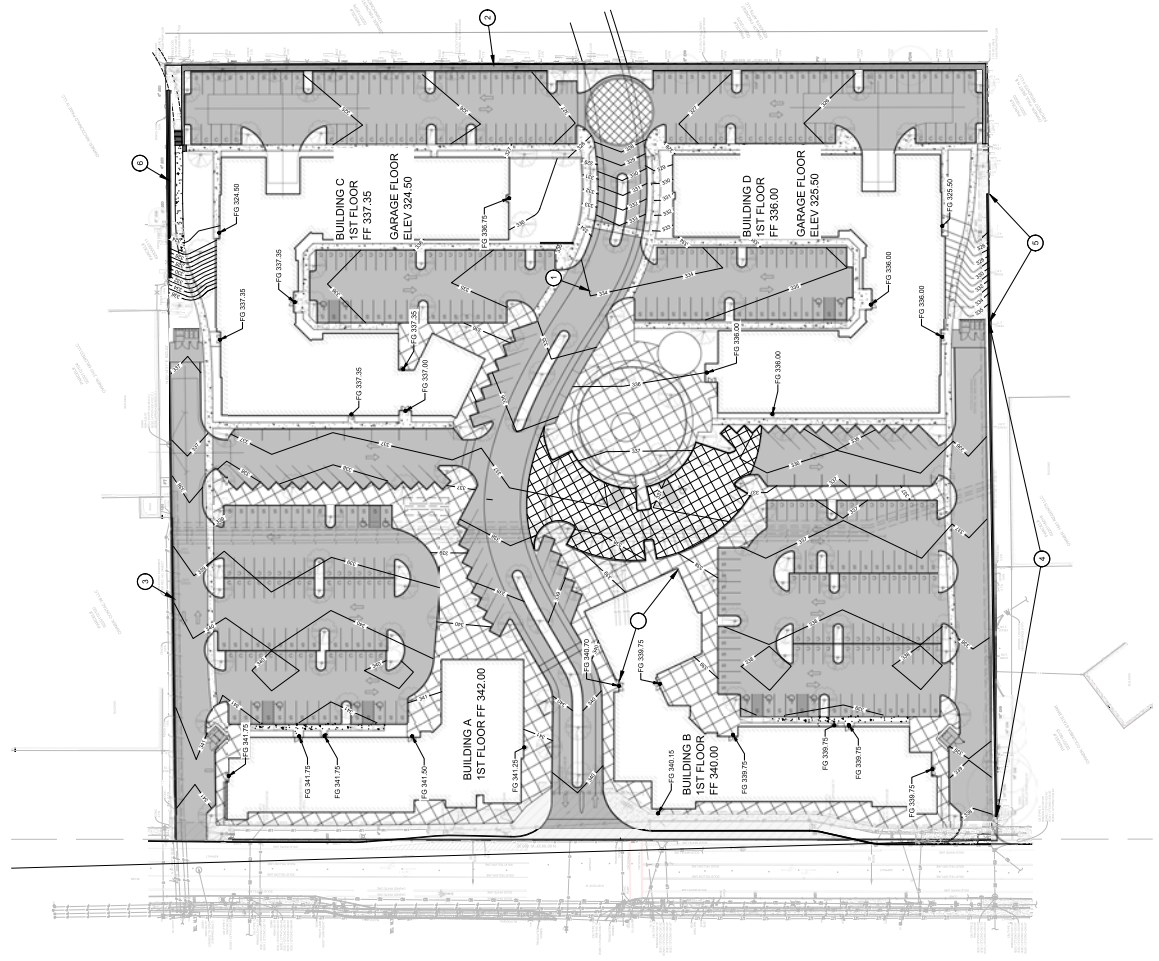
CUT/FILL SUMMARY:

PRELIMINARY CUT: 21,944 CY
PRELIMINARY FILL: 23,344 CY
PRELIMINARY NET FILL: 10,400 CY

THE ABOVE PRELIMINARY CUT/FILL NUMBERS DO NOT ACCOUNT FOR VOLUME RELATED TO DETENTION VAULTS. DETENTION VAULTS ARE ASSUMED TO HAVE 9,000 CY OF CUT.

CUT/FILL SUMMARY W/ DETENTION VAULTS:

PRELIMINARY CUT: 21,944 CY
PRELIMINARY FILL: 23,344 CY
PRELIMINARY NET CUT: 1,400 CY FILL



NO. DATE BY REVISION

2 5/16/22 A

PROJECT: ALLIANCE PROSE FIRECREST MIXED-USE
2119 MILBRED ST W, FIRECREST, WA 98146
406 BAKER BLVD
TUKWILA, WA 98148
OWNER: ALLIANCE RESIDENTIAL

PROJ. MANAGER: ES
DESIGNED BY: ES
CHECKED BY: ES
SCALE: AS SHOWN
DATE: 5/16/22
SHEET: 7 OF 7
SHEET NUMBER: C2.0

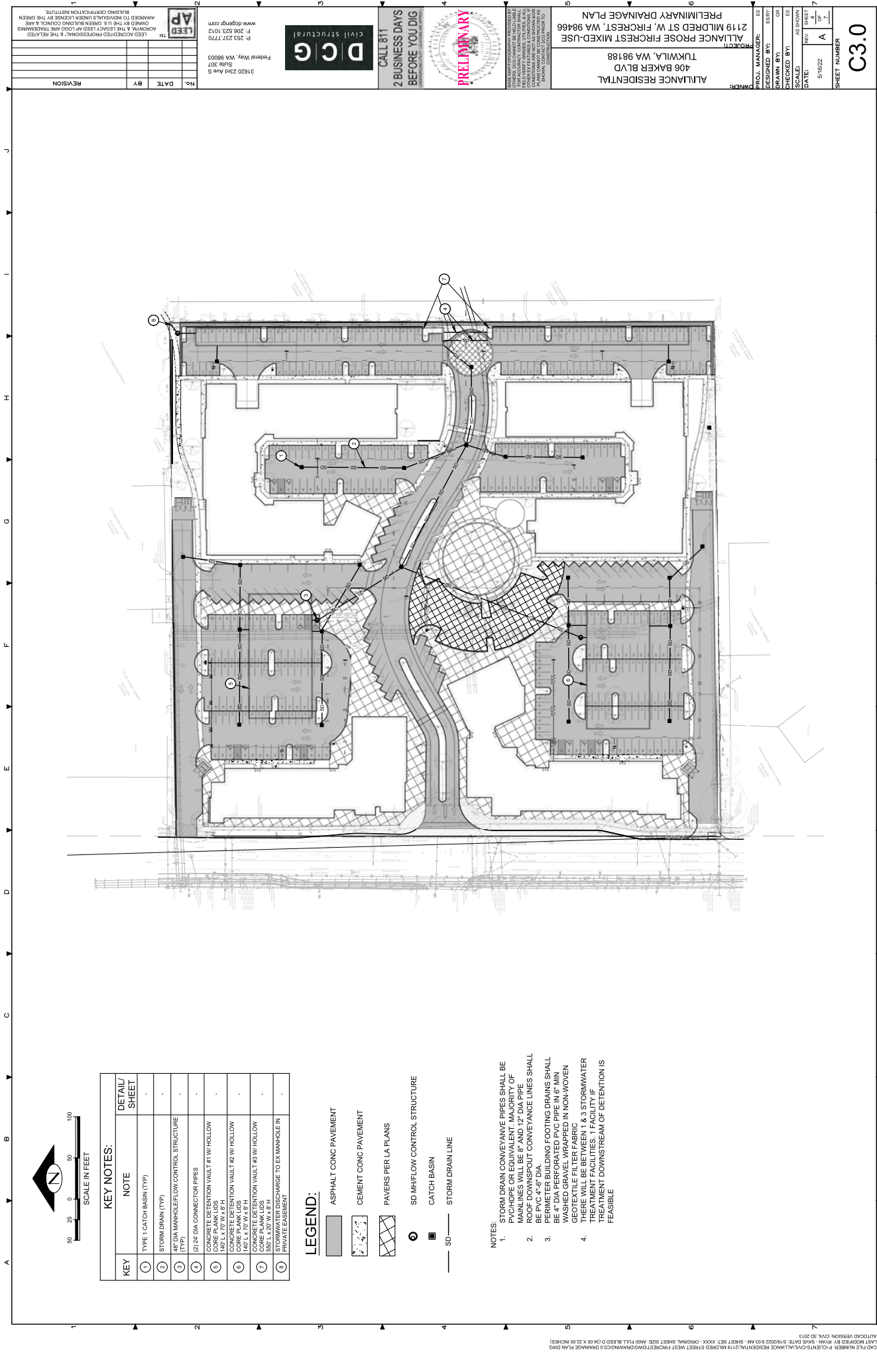
LEED AP
LEED ACCREDITED PROFESSIONAL, THE RELATED
OWNED BY THE U.S. GREEN BUILDING COUNCIL & ARE
AWARDED TO REGISTERED DESIGN FIRMS BY THE GREEN
BUILDING CERTIFICATION INSTITUTE

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Suite 307
Federal Way, WA 98003
P: 206.523.7770
F: 206.523.1012
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2 BUSINESS DAYS
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DCG
Civil Structural

PRELIMINARY

THIS PLAN IS A PRELIMINARY DESIGN. IT IS NOT TO BE USED FOR CONSTRUCTION. THE DESIGNER ASSUMES NO LIABILITY FOR ANY ERRORS OR OMISSIONS. THE CLIENT ASSUMES ALL RISK OF INADEQUACY OR INCOMPLETENESS OF THE DESIGN. THE DESIGNER'S ONLY OBLIGATION IS TO PROVIDE THE DESIGN AS SHOWN ON THESE PLANS. NO OTHER OBLIGATIONS ARE ASSUMED BY THE DESIGNER. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE DESIGNER'S DESIGN SHALL BE BASED ON THE INFORMATION PROVIDED BY THE CLIENT. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY CHANGES TO THE DESIGN OR FOR ANY DELAYS OR COSTS INCURRED BY THE CLIENT. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY INJURY TO PERSONS OR PROPERTY. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY LOSS OF PROFITS OR REVENUE. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY OTHER DAMAGES. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY OTHER LOSSES. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY OTHER DAMAGES. THE DESIGNER SHALL NOT BE RESPONSIBLE FOR ANY OTHER LOSSES.



KEY NOTES:		DETAIL/ SHEET
KEY	NOTE	
1	TYPE 1 CATCH BASIN (TYP)	-
2	STORM DRAIN (TYP)	-
3	48" DIA MANHOLE/FLOW CONTROL STRUCTURE (TYP)	-
4	(3) 24" DIA CONNECTOR PIPES	-
5	CONCRETE DETENTION VAULT #1 W/ HOLLOW CORE PLANK LIDS	-
6	140" L x 72" W x 8" H NON VOLT #2 W/ HOLLOW CORE PLANK LIDS	-
7	140" L x 72" W x 8" H CONCRETE DETENTION VAULT #3 W/ HOLLOW CORE PLANK LIDS	-
8	550" L x 20" W x 8" H CONCRETE DETENTION VAULT #4 W/ HOLLOW CORE PLANK LIDS	-
9	STORMWATER DISCHARGE TO EX MANHOLE IN PRIVATE EASEMENT	-

LEGEND:

ASPHALT CONC PAVEMENT

CEMENT CONC PAVEMENT

PAVERS PER LA PLANS

SD MH/FLOW CONTROL STRUCTURE

CATCH BASIN

SD

STORM DRAIN LINE

- NOTES:
- STORM DRAIN CONVEYANCE PIPES SHALL BE PVC/HOPE OR EQUIVALENT. MAJORITY OF MAINLINES WILL BE 8" AND 12" DIA PIPE.
 - PERMETER BUILDING FOOTING DRAINS SHALL BE 4" DIA PERFORATED PVC PIPE IN 6" MIN WASHED GRAVEL WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC.
 - THERE WILL BE BETWEEN 1 & 3 STORMWATER TREATMENT DOWNSTREAM OF DETENTION IS FEASIBLE.

NO. DATE BY REVISION

LEED AP

LEED ACCREDITED PROFESSIONAL, & THE RELATED ADVISORY & THE LEADERSHIP LEED AP LICO ARE THEREAFTER OWNED BY THE U.S. GREEN BUILDING COUNCIL, & ARE ADVANCED TO REGISTERED LEADERSHIP LICENSE BY THE GREEN BUILDING CERTIFICATION INSTITUTE

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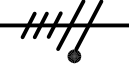


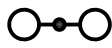




ALLIANCE RESIDENTIAL
406 BAKER BLVD
TUKWILA, WA 98188
2119 MILDRED ST W, FIRECREST, WA 98466
PRELIMINARY DRAINAGE PLAN

OWNER:
PROJ. MGR:
DESIGNED BY:
CHECKED BY:
SCALE:
DATE:
REV. SHEET
OF

ES
OK
ES
AS SHOWN
5/16/22
A
7

SHEET NUMBER
C3.0

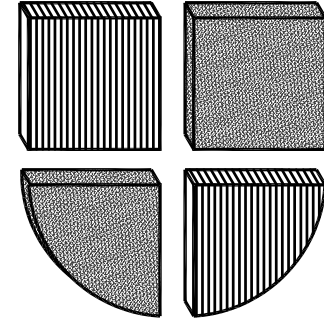
LIGHTING FIXTURE SCHEDULE				
TYPE	MANUFACTURER	LAMPS	WATTS	MOUNTING
P1	VISIONAIRE LIGHTING ODN-1-L-T3L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P1A	VISIONAIRE LIGHTING ODN-1-L-T3L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P2	VISIONAIRE LIGHTING ODN-1-L-T4L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P2A	VISIONAIRE LIGHTING ODN-1-L-T4L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P3	VISIONAIRE LIGHTING ODN-1-L-T4-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P3A	VISIONAIRE LIGHTING ODN-1-L-T4-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P4	VISIONAIRE LIGHTING ODN-1-L-T2L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (SINGLE HEAD) OR EQUAL	LED	98	POLE
P5	VISIONAIRE LIGHTING ODN-1-L-T3L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (DUAL HEAD) OR EQUAL	LED	196	POLE
P6	VISIONAIRE LIGHTING ODN-1-L-T4L-15L-3K-UNV-UAM- BZ-C2-H2-CLS (DUAL HEAD) OR EQUAL	LED	196	POLE

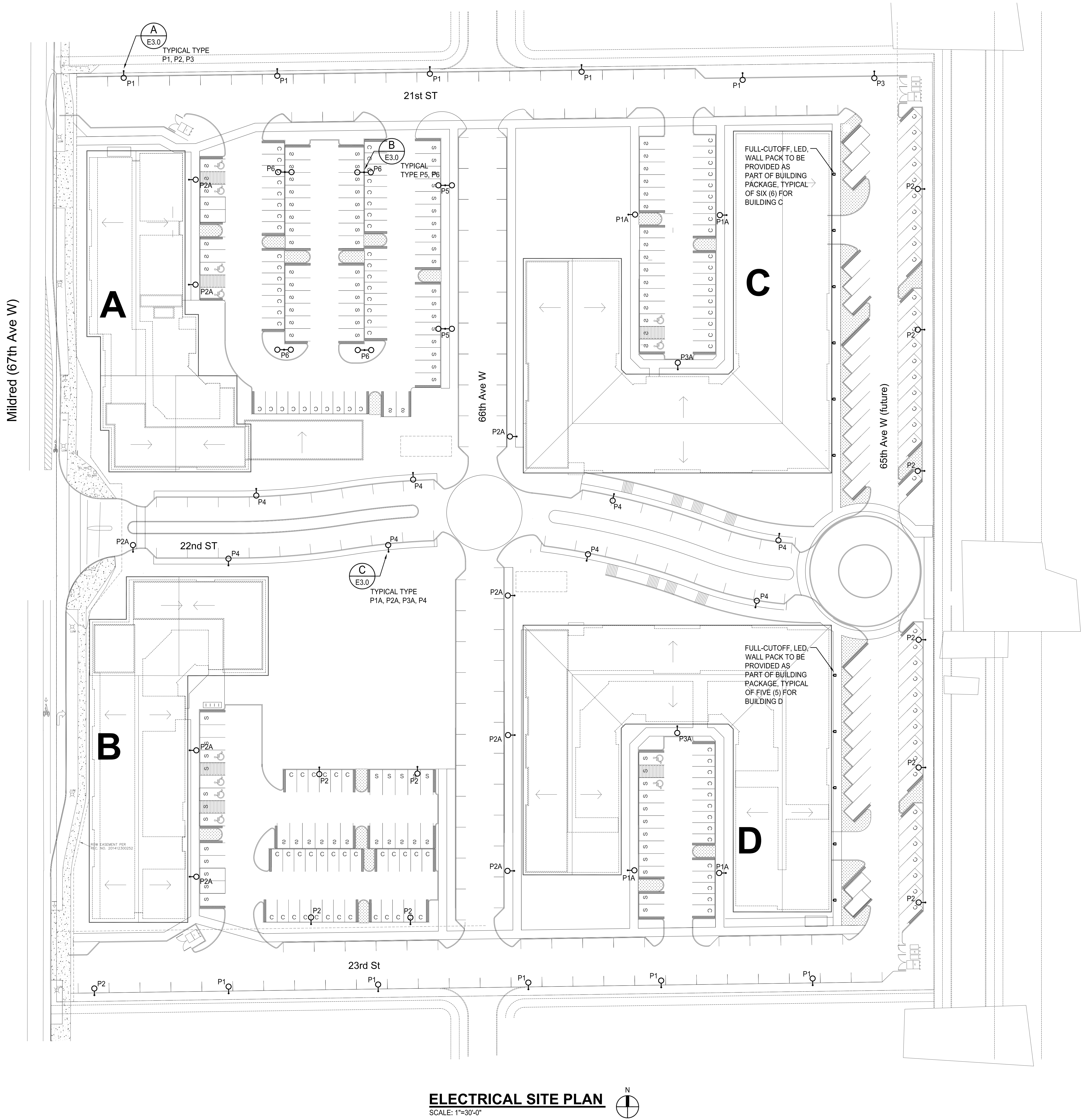
ELECTRICAL SYMBOLS LEGEND	
	DETAIL/SECTION IDENTIFICATION: A = DETAIL/SECTION LETTER, B = SHEET NUMBER WHERE DETAIL/SECTION IS DRAWN.
	CONDUIT CONCEALED. HASH MARKS INDICATE NUMBER OF #12 CONDUCTORS IN CODE SIZE CONDUIT. NO HASH MARKS INDICATES 2-#12 CONDUCTORS PLUS GROUND IN 3/4" CONDUIT, LONG HASH MARKS INDICATES NEUTRAL CONDUCTOR. ↱ INDICATES GROUND CONDUCTOR.
	A-1,3 ADJACENT TO ARROW INDICATES HOMERUN OF CONDUCTORS IN CONDUIT FOR CIRCUITS 1 AND 3 TO PANEL "A".
	SINGLE HEAD, POLE MOUNTED, LED SITE LIGHT FIXTURE.
	DOUBLE HEAD, POLE MOUNTED, LED SITE LIGHT FIXTURE.
	LED WALL MOUNT LIGHT FIXTURE.
	JUNCTION BOX.
A1	LIGHT FIXTURE TYPE. A1 = SPECIFIC LIGHTING FIXTURE REFERENCED ON LIGHTING FIXTURE SCHEDULE.
	SPECIAL RECEPTACLE. AMPERAGE AND VOLTAGE AS SHOWN.
	VAULT MOUNTED, TACOMA POWER TRANSFORMER.
(E)	EXISTING

FIRCREST MIXED-USE - SITE
2119 MILDRED ST W
FIRCREST, WA 98466

ELECTRICAL SYMBOLS LEGEND/
LIGHT FIXTURE SCHEDULE

CROSS ENGINEERS, INC
823 Martin Luther King Jr. Way
Tacoma, WA 98404
info@crossengineers.com
Phone: (253) 768-0118
Job Number: 22-121





- GENERAL LIGHTING NOTES:**
1. ALL LIGHT FIXTURES ARE LED, FULL-CUTOFF AND DARK-SKY COMPLIANT. LIGHT FIXTURES WILL BE ON FROM DUSK TO DAWN AND.

FIRCREST MIXED-USE - SITE
2119 MILDRED ST W
FIRCREST, WA 98466

ELECTRICAL SITE PLAN
OVERALL SITE

REVISIONS:

SCALE:	AS NOTED	SHEET
DATE:	1-13-2023	
DRAWN BY:	AE	E1.0
CHECKED BY:	SLH	
JOB NO.:	22-121	OF -

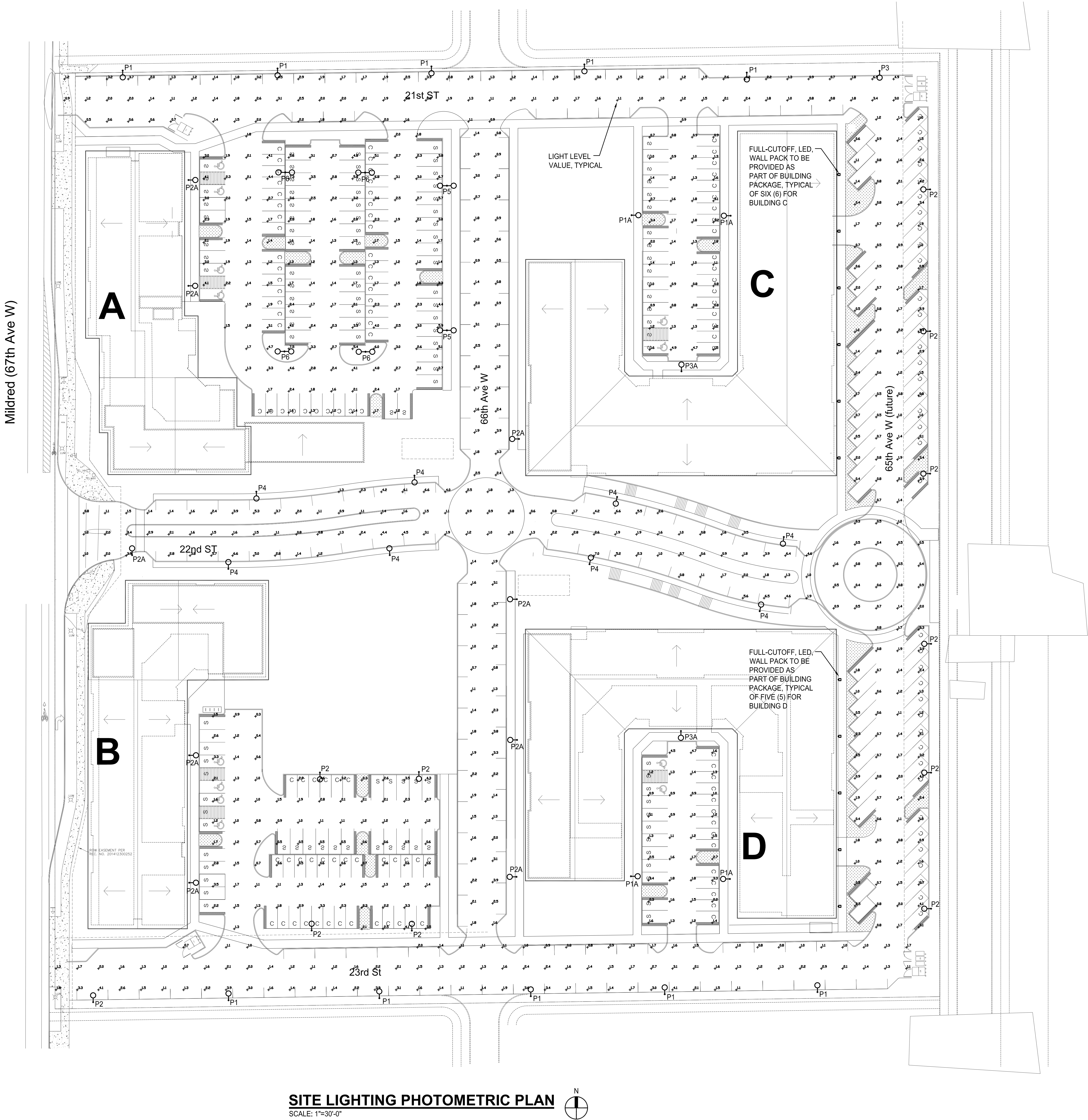
REVIEW SET

CROSS ENGINEERS, INC

923 Martin Luther King Jr. Way
Tacoma, WA 98404
info@crossengineers.com

Phone: (253) 758-0116
Fax: (253) 758-0117
Job Number: 22-121

MCE
MERIDIAN CENTER ELECTRIC



- GENERAL LIGHTING NOTES:**
- ALL LIGHT FIXTURES ARE LED, FULL-CUTOFF AND DARK-SKY COMPLIANT. LIGHT FIXTURES WILL BE ON FROM DUSK TO DAWN AND.

PHOTOMETRIC LIGHTING SUMMARY:	
BUILDING "A" PARKING LOT:	
AVERAGE = 2.6 FOOTCANDLES	
MAXIMUM = 7.5 FOOTCANDLES	
MINIMUM = 1.1 FOOTCANDLES	
AVERAGE/MIN. = 2.4:1	
BUILDING "B" PARKING LOT:	
AVERAGE = 1.6 FOOTCANDLES	
MAXIMUM = 4.6 FOOTCANDLES	
MINIMUM = 0.3 FOOTCANDLES	
AVERAGE/MIN. = 5.3:1	
BUILDING "C" PARKING LOT:	
AVERAGE = 1.5 FOOTCANDLES	
MAXIMUM = 4.9 FOOTCANDLES	
MINIMUM = 0.7 FOOTCANDLES	
AVERAGE/MIN. = 2.1:1	
BUILDING "D" PARKING LOT:	
AVERAGE = 1.7 FOOTCANDLES	
MAXIMUM = 4.7 FOOTCANDLES	
MINIMUM = 0.9 FOOTCANDLES	
AVERAGE/MIN. = 1.9:1	
21ST STREET:	
AVERAGE = 1.9 FOOTCANDLES	
MAXIMUM = 6.9 FOOTCANDLES	
MINIMUM = 0.5 FOOTCANDLES	
AVERAGE/MIN. = 3.8:1	
22ND STREET:	
AVERAGE = 2.4 FOOTCANDLES	
MAXIMUM = 7.0 FOOTCANDLES	
MINIMUM = 0.6 FOOTCANDLES	
AVERAGE/MIN. = 4.0:1	
23RD STREET:	
AVERAGE = 1.7 FOOTCANDLES	
MAXIMUM = 4.1 FOOTCANDLES	
MINIMUM = 0.7 FOOTCANDLES	
AVERAGE/MIN. = 2.4:1	
65TH STREET:	
AVERAGE = 1.3 FOOTCANDLES	
MAXIMUM = 4.4 FOOTCANDLES	
MINIMUM = 0.3 FOOTCANDLES	
AVERAGE/MIN. = 4.3:1	
66TH AVE W STREET - NORTH HALF:	
AVERAGE = 1.7 FOOTCANDLES	
MAXIMUM = 3.9 FOOTCANDLES	
MINIMUM = 0.5 FOOTCANDLES	
AVERAGE/MIN. = 3.4:1	
66TH AVE W STREET - SOUTH HALF:	
AVERAGE = 2.0 FOOTCANDLES	
MAXIMUM = 3.9 FOOTCANDLES	
MINIMUM = 0.7 FOOTCANDLES	
AVERAGE/MIN. = 2.9:1	

REVIEW SET



MERIDIAN CENTER ELECTRIC



CROSS ENGINEERS, INC
223 Martin Luther King Jr. Way
Fircrest, WA 98466
Phone: (253) 758-0116
Job Number: 22-121
info@crossengineers.com

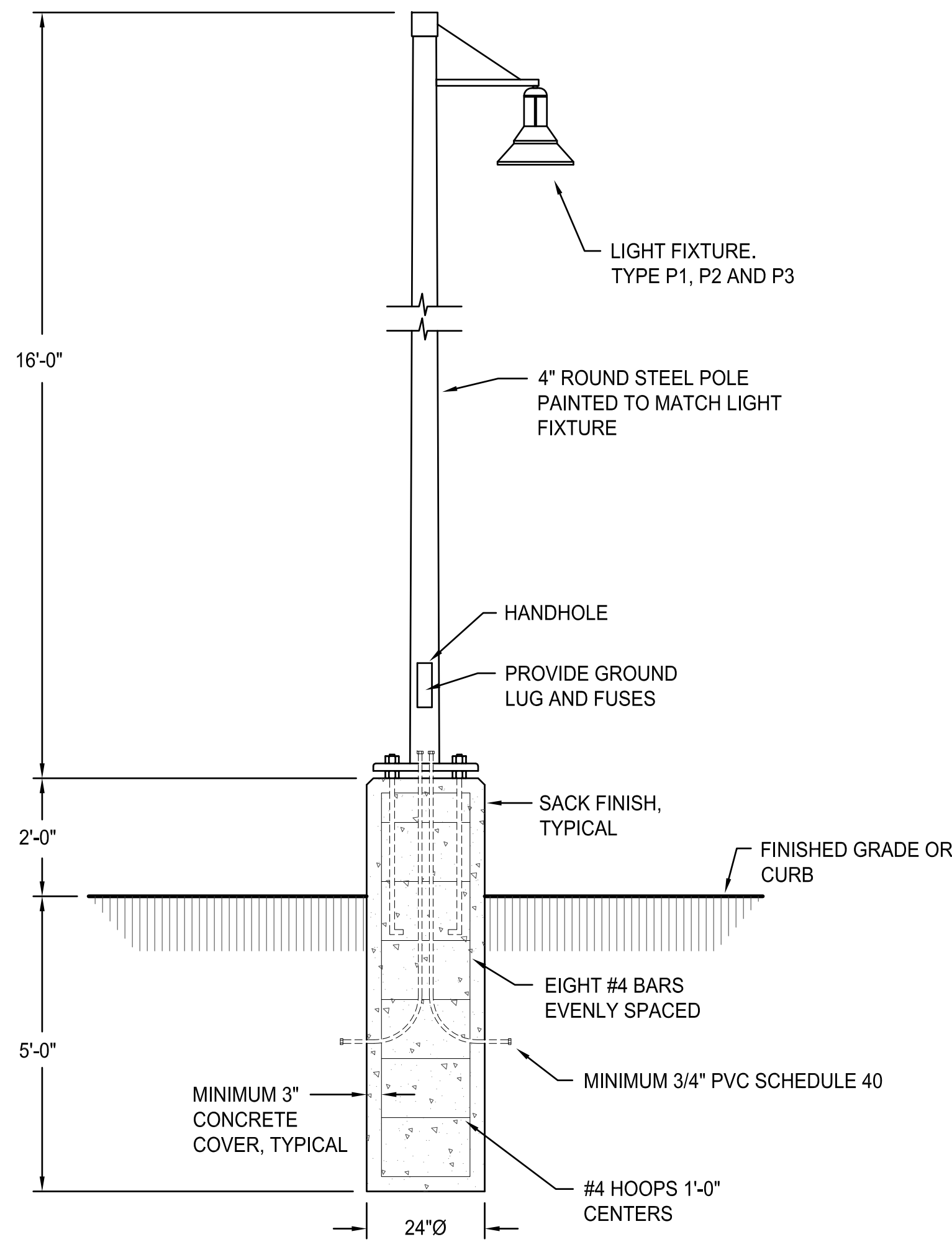
FIRCREST MIXED-USE - SITE
2119 MILDRED ST W
FIRCREST, WA 98466

SITE LIGHTING PHOTOMETRIC PLAN
OVERALL SITE

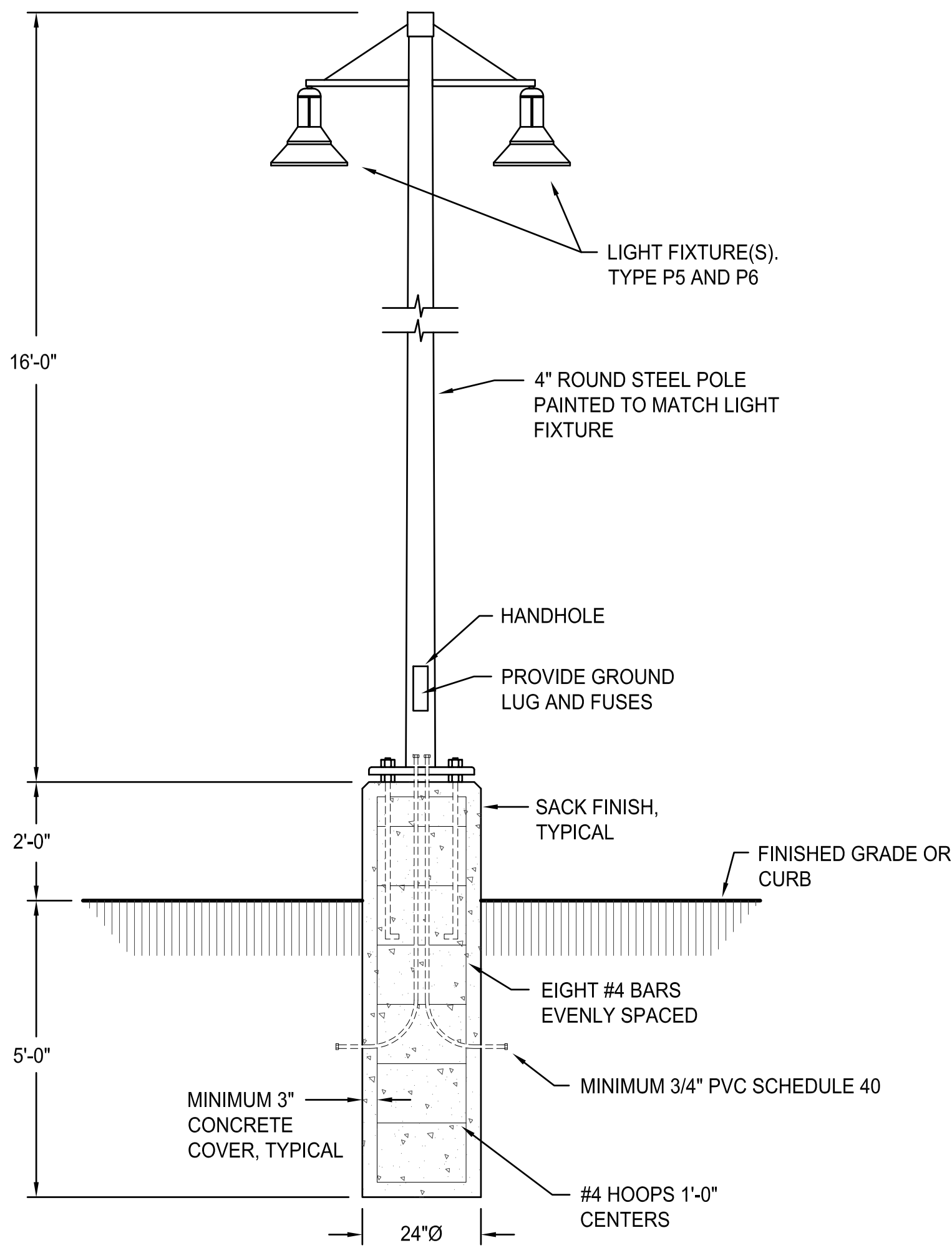
REVISIONS:

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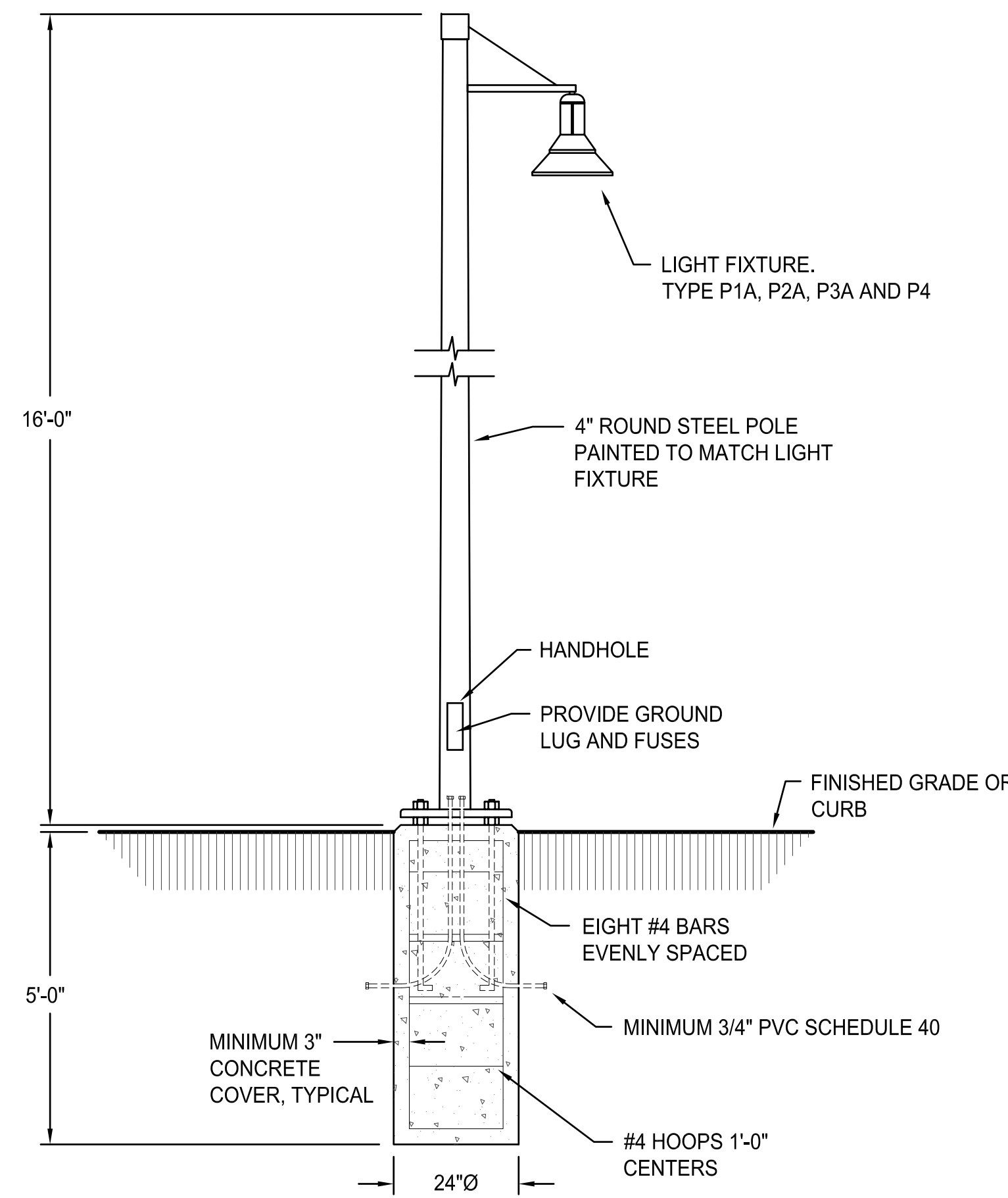
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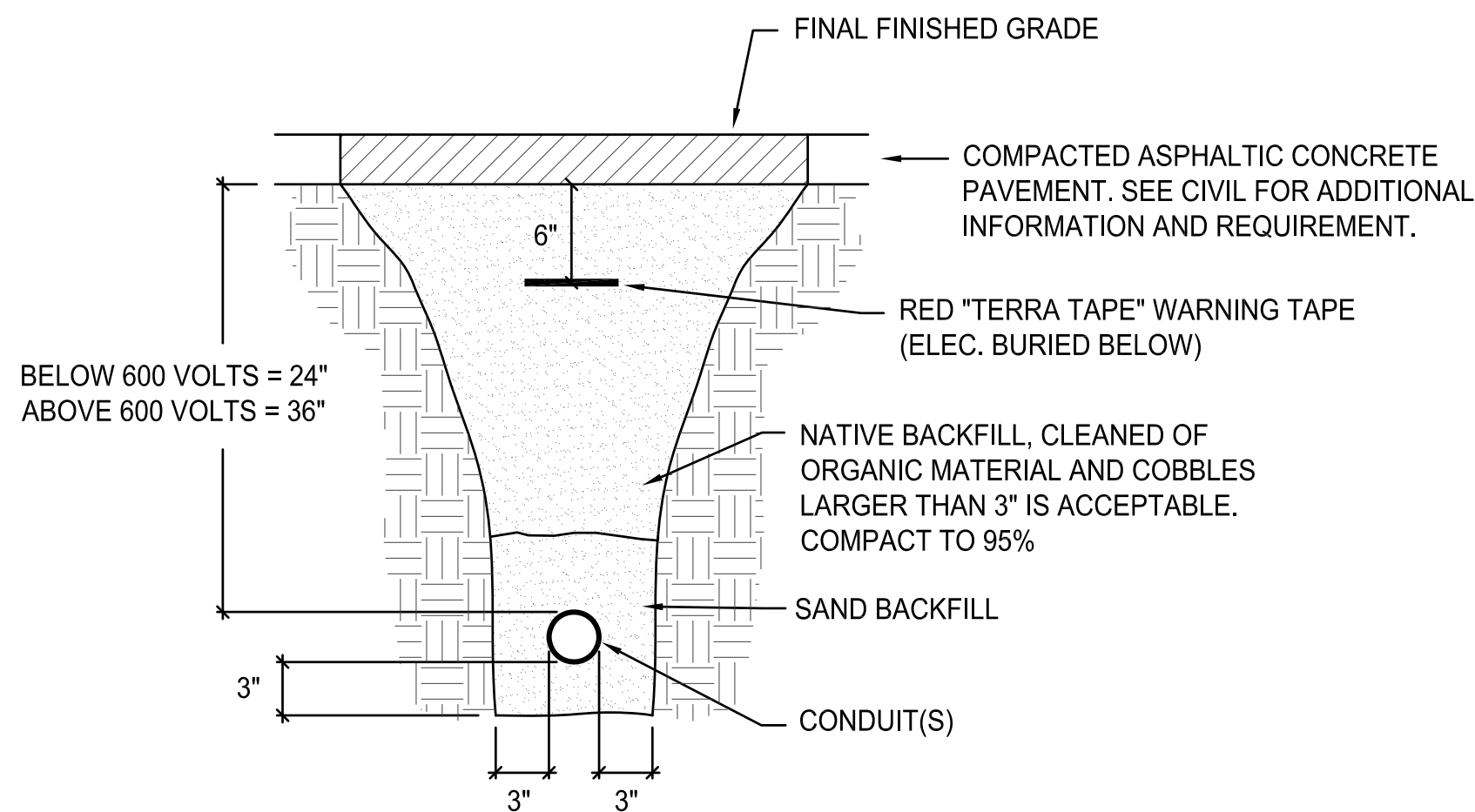
A SINGLE HEAD LIGHT POLE AND CONCRETE BASE
E3.0 NOT TO SCALE



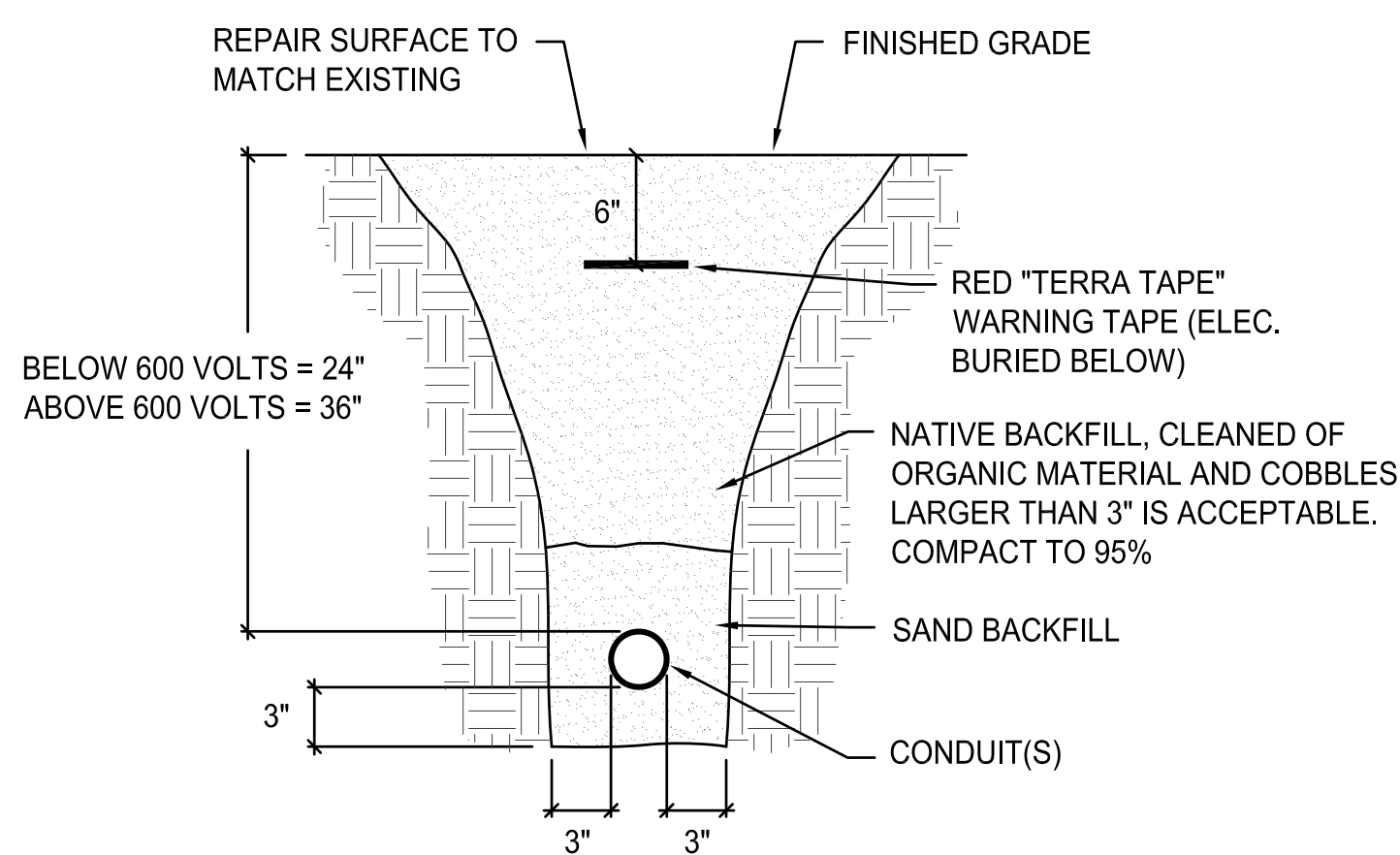
B DUAL HEAD LIGHT POLE AND CONCRETE BASE
E3.0 NOT TO SCALE



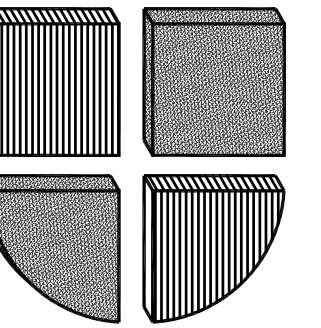
C SINGLE HEADLIGHT POLE AND CONCRETE BASE
E3.0 NOT TO SCALE



D TYPICAL CONDUIT TRENCHING- BELOW PAVEMENT
E3.0 NOT TO SCALE



E TYPICAL CONDUIT TRENCHING- BELOW GRASS/ LANDSCAPE AREA
E3.0 NOT TO SCALE





November 28, 2022

1325.023.01.003

Alliance Realty Partners, LLC
c/o Alliance Residential
1900 North Northlake Way, Suite 237
Seattle, WA 98103
Attention: Mr. Garrett Hodgins

**LIMITED PHASE II INVESTIGATION REPORT
PROSE FIRCREST APARTMENTS PROPERTY
2119 MILDRED STREET WEST
FIRCREST, WASHINGTON**

Dear Mr. Hodgins:

PES Environmental, Inc. (PES) has prepared this letter report to summarize the results of the Limited Phase II Investigation (Phase II Investigation) conducted for the Prose Fircrest Apartments Development located at 2119 Mildred Street West, Fircrest, Washington (Property, Figure 1). The work was performed on behalf of Alliance Realty Partners, LLC (Alliance) to evaluate subsurface soil and groundwater conditions across the Property as part of Alliance's due diligence related to potential purchase of the Property. The scope of work was based on preliminary findings obtained during the performance of a Phase I Environmental Site Assessment (ESA) conducted by PES during late 2021 and early 2022. The results of PES's Phase I ESA are presented in its Phase I ESA report dated May 31, 2022. The Phase II scope of work is described in PES' Change Order No. 1 submitted to Alliance and dated May 3, 2022.

PES understands that Alliance intends to redevelop the property into a multi-family housing complex with amenities and associated surface and structured parking. The development will consist of four multifamily buildings, with one building located within each quadrant of the Property, and containing a total of approximately 395 residential units. The current development grading plan includes the placement of significant quantities of imported fill over much of the Property and localized areas of excavation to meet the proposed grading plan. The plan is to re-use soil from the excavated areas as fill in other areas of the Property with a net import of approximately 6,500 cubic yards of fill material.

SITE DESCRIPTION AND BACKGROUND

The Property is comprised of one tax parcel (Pierce County Parcel 0220112005) located at 2119 Mildred Street West in Fircrest, Washington and totals 9.94 acres of land. The Property is located within the limits of the City of Fircrest, approximately 680 feet north of the intersection of Mildred Street West and Regents Boulevard West. It is currently occupied by a single vacant

industrial structure (23,728 square feet [sq. ft.]) constructed in 1959, which is in the northwest corner of the Property. The Property is bounded on the north by commercial retail properties, on the east by a residential apartment complex, on the south by a bank and office building, and on the west by Mildred Street West. Businesses located west across Mildred Street West include restaurants, an automotive service shop, a bar, and a bowling alley. Historically, the adjacent properties included a Pace Industries (Pace) aluminum die-casting manufacturing facility to the north, a gasoline station to the south, and a municipal airport to the west.

The Property is located within a region affected by airborne deposition from over 90 years of the Asarco Tacoma Smelter operations which is referred to as the Tacoma Smelter Plume. Operation of the smelter, which was located over 4 miles from the Property, resulted in widespread airborne deposition of arsenic and lead onto the ground surface. The subject property is located in the area mapped by the Washington Department of Ecology (Ecology) to potentially contain 40 to 100 milligrams per kilogram (mg/kg) arsenic in soil.

Historically, the Property appeared to be undeveloped land until at least 1957. In 1959 it was developed and operated as Metal Marine Pilot, Inc. for the design and manufacture of marine automatic pilots and other marine navigational aids (e.g., compasses). During these operations, expansions to the main building included a loading dock and additional sheds located east of the main building which were constructed for spray painting, paint storage, materials cleaning, and cardboard storage. Between the years 1972 and 2000, a large quantity of soil fill was deposited throughout the central and eastern portions of the Property to cover areas prone to seasonal flooding. The imported fill was reportedly obtained from several commercial development and roadway construction projects, as well as from the former airport property west of the site.

Metal Marine Pilot ceased operations in 2000 and the sheds were demolished in 2001, however, the main building and concrete foundations remain. Two underground storage tanks (USTs) (diesel and kerosene) were removed in 1994 and two USTs used for kerosene storage were removed in 2002. There are two 5,000-gallon concrete vaults located east of the former sheds. The concrete vaults (also referred to as “sealed recovery USTs”) were used to recover spilled liquids within the painting and materials sheds. Spilled liquids were conveyed to the concrete vaults from underground pipes originating from the floor drains in the sheds. The accumulated liquids in the concrete vaults were pumped out as needed for offsite disposal. Numerous previous environmental investigations have occurred on the Property, the majority of which focused on assessing potential impacts associated with practices and operations related to the former Metals Marine Pilot facility on the Property and the facility to the north, former Pace Industries, with a subset of the investigations assessing the fill that was placed on the eastern portion of the Property. Soil removal remedial actions were also conducted on the Property. Prior investigations were reported to Ecology and a “Partial Sufficiency and Further Action” letter was issued on July 28, 2015. This letter stated that no further action was required for certain contaminants, but that further action was necessary for metals (arsenic) in soil and groundwater. Details of the previous investigations and remedial actions are documented in the Phase I ESA report prepared by PES.

ENVIRONMENTAL ISSUES ON THE PROPERTY

The Phase I ESA prepared by PES as part of Alliance's due diligence for the Property identified the following recognized environmental conditions (RECs):

- The area of the two concrete spill collection vaults east of the main building. These concrete vaults were designed to be used to collect spills from the former painting and the materials sheds and are also described as "sealed recovery USTs." There is limited information regarding potential impacts that may exist from these concrete vaults.
- The area along the north Property boundary where a release of paraffin oil occurred from the property to the north (Pace Industries). Soil was removed from this area in 1999; however, a subsequent investigation in 2000 showed surface soil contaminated with heavy oil range organics (ORO) at a concentration above the cleanup level (CUL) in the vicinity of two soil samples collected at the north end of the Property. A 2005 investigation found soil containing ORO at depths of 10 and 12.5 feet below the ground surface (bgs) in this area.
- The area east of the main building where perchlorethylene (PCE) was reportedly dumped. Following several investigations, the PCE-contaminated soil in this area was removed in 2000 and 2012. Ecology indicated in its July 28, 2015, "Partial Sufficiency and Further Action Letter" that the PCE area was cleaned up; however, the confirmation soil sample results and the laboratory method reporting limits (MRLs) used during the 2000 cleanup exceed the current PCE cleanup level (CUL). There is a possibility that residual PCE above current CUL may still exist in the PCE area. The depth of the PCE-contaminated soil removal excavation in 2000 extended to approximately 6 to 11 feet bgs.

Additionally, the following is a potential environmental issue that was not identified as a REC, but was considered a *de minimis* condition:

- An area of oily residue from automotive repair work was observed in the south end of the main building. It is unknown whether a release has occurred to the subsurface based on the presence of this stain.

In addition to the four areas described above, the preliminary Phase I ESA identified the presence of arsenic in soil at concentrations exceeding CULs within the fill area on the eastern portion of the Property as a REC. Previous investigations also found arsenic in perched groundwater in 2 of the 6 wells tested at concentration slightly exceeding the cleanup level. In Ecology's July 2015 opinion letter, Ecology stated that the source of the arsenic is likely attributed to the former operation of the Tacoma Asarco Smelter Plant and the fill material that was imported to the subject property as part of historical grading activities. PES contacted Ms. Eva Barber at Ecology who is the Technical Assistance lead for the investigation and cleanup of sites located within the Tacoma Smelter Plume. PES reviewed the existing arsenic data with Ms. Barber and discussed the conceptual approach for further investigation and cleanup of the arsenic consistent with Ecology's Tacoma Smelter Plume Guidance Document¹. Consistent with

¹ State of Washington Department of Ecology. 2019. *Tacoma Smelter Plume Model Remedies Guidance, Sampling and Cleanup of Arsenic and Lead Contaminated Soils*. Toxics Cleanup Program. Publication Number 19-09-101. July (the "Tacoma Smelter Plume Guidance Document")

Ecology's guidance, the Cleanup Action Plan (CAP) for arsenic at the Property will utilize the impervious surfaces created by the proposed development (approximately 90 percent of the property) to cap and isolate soil containing arsenic at concentrations exceeding CULs and will address impacts to groundwater through an environmental covenant prohibiting the future use of groundwater at the property. The CAP will be based on the proposed development plans and landscaping plans, which are currently being finalized. The CAP will include a sampling plan to confirm the concentrations of arsenic in near surface soils in the landscaped areas meet CULs once the site grading has been completed. The CAP will be submitted to Ecology for review under its Voluntary Cleanup Program (VCP) prior to the start of construction. Based on the expected CAP including assessing shallow soil concentrations after site grading and construction, PES recommended no further assessment of the current arsenic concentrations at the Property at this time.

PHASE II INVESTIGATION PURPOSE

The purpose of the Phase II Investigation was to assess soil and groundwater conditions and potential impacts in the four areas described above. Specifically, the areas and associated investigation purposes were as follows:

- Concrete Vault Area –Investigate whether there has been a release from the concrete vaults to the subsurface soil.
- Paraffin Oil Area –Investigate the areas of ORO concentrations in soil exceeding the CUL that were detected in a previous investigations.
- PCE Area – Investigate and assess whether the soil in this area has been removed to below current PCE CULs. Additionally, install and sample one monitoring well (MW-1) to investigate potential PCE in groundwater.
- Oil Stain Area –Assess the soil quality beneath the concrete slab and to determine whether a release has occurred to the subsurface soil.

The Phase II investigation included subsurface utility location, direct-push technology (DPT) drilling, hollow-stem auger (HSA) drilling, the collection of soil samples for laboratory analysis, monitoring well installation, and surveying. Shallow groundwater was not encountered during the investigation and was consequently not assessed. The Phase II investigation scope of work and results are described in the following sections.

FIELD ACTIVITIES

PES conducted Phase II investigation activities at the Property in June 2022. A total of twelve borings were advanced using direct-push technology (SB-1 through SB-10, SB-12, and MW-1). The direct push boring for MW-1 was over drilled using HSA drilling equipment to allow a monitoring well to be installed (MW-1). Soil samples were collected from all twelve borings. Additionally, a thirteenth boring was hand dug to collect a soil sample from the shallow

subsurface (SB-11). The sampling locations are shown on Figure 2. Details of the field activities performed during the investigation are described below.

Utility Location

Prior to the start of drilling, PES notified the Washington Utility Notification Center of the planned work and requested that underground utilities be marked in the Property vicinity. Applied Professional Services, Inc. (APS), of North Bend, Washington, located the on-Property subsurface utilities around the planned drilling locations on June 22, 2022.

Direct-Push Borings and Soil Sampling

Cascade Drilling, Inc., (Cascade) drilled and sampled 11 direct-push soil borings (SB-1 through SB-10, and SB-12) and installed one monitoring well boring (MW-1) at the Property between June 22 and June 28, 2022 (Figure 2). One boring (SB-1) was advanced in the oil stain area inside the main building to 10 feet bgs. Four borings were advanced in the concrete vault area, three around the northern vault (SB-5 to SB-7) and one near the southern vault (SB-8), to 20 feet bgs. In the paraffin oil area, three borings (SB-9, SB-10, and SB-12) advanced to depths between 15 and 25 feet bgs. Due to time and access constraints, one location in this area (SB-11) was hand dug and a grab sample of shallow soil collected from 6 inches bgs. In the PCE area, three soil borings (SB-2 to SB-4) and one monitoring well boring (MW-1) were advanced to depths between 14 and 25 feet bgs. Direct push drilling refusal was met in SB-2, SB-4, and MW-1 at 14, 17, and 19.5 feet bgs, respectively. MW-1 was subsequently over drilled using HSA drilling equipment to a total depth of 22.5 ft.

The soil borings were advanced using a limited access direct push (Geoprobe™) drilling rig. In all borings, soil samples were collected continuously using 5-foot long core barrels lined with new acetate sleeves. PES observed the samples for lithologic characterization and field-screened the samples for the potential presence of volatile organic compounds (VOCs) using a photoionization detector (PID). Field observations, including lithologic descriptions and visual and olfactory observations, and PID readings, were recorded on a PES boring log form during drilling. Boring logs are included in Attachment A.

Soil samples were selected for laboratory analysis based on the results of field screening and to provide a profile of soil quality across the depth range explored in the borings. Where field screening indicated the presence of potential contamination in a boring, the soil sample with the highest PID measurement (or other field screening indications of contamination) was selected for analysis. Soil samples collected for VOC analysis were collected using syringe samplers and placed in laboratory-provided bottles preserved with methanol, consistent with the US Environmental Protection Agency (USEPA) Method 5035 protocols. Additional sample volume was collected in unpreserved glass soil sample jars for gasoline range organics (GRO), diesel range organics (DRO), ORO, polychlorinated biphenyls (PCBs), carcinogenic polyaromatic hydrocarbons (cPAHs), and RCRA 8 metals analyses. PES selected one to three samples from each boring to be submitted to the laboratory for analysis. Additional samples were submitted to the laboratory and held for analysis. Based on the results from the initial samples, additional “held” samples were selected for analysis. Soil sample containers were sealed, labeled, and

placed in a cooler with ice for transport to Fremont Analytical, Inc. (Fremont) using standard chain of custody protocols.

Following soil sampling, each boring was abandoned consistent with Ecology's *Minimum Standards for Construction and Maintenance of Wells* regulation (WAC 173-160). Soil cuttings generated during drilling activities were contained in three 55-gallon drums. The drums are temporarily stored on property pending offsite disposal.

Well Installation

On June 28, 2022 monitoring well boring MW-1 was drilled and soil was sampled as described above, with drilling refusal encountered at 19.5 feet bgs. The location was then over-drilled with HSA equipment to 22.5 feet bgs and a groundwater monitoring well was installed. The monitoring well was constructed using 2 inch-diameter schedule 40 polyvinyl chloride (PVC) riser with 15 feet of screen. The screened interval was placed from approximately 7 to 22 feet bgs. The annular space around the screen was backfilled with 2-12 lapis lustre sand to approximately two feet above the top of the screen. The remaining annular space above the screen was backfilled with bentonite chips and hydrated. The surface completion consisted of a flush-with-grade monument. The well completion details are shown on the MW-1 boring log included in Appendix A. No saturated soil was observed during drilling and after twenty-four hours no water had accumulated in the well. Consequently, MW-1 was not developed and no groundwater sample was collected. PES did not observe shallow groundwater in any other borings on the Property.

Well Surveying

A licensed professional surveyor was on the site on June 29, 2022, to survey the horizontal locations and elevations of the Phase II Investigation boring and well locations. All boring and well locations were surveyed relative to the Washington State Plane System North Zone (NAD 83 [HARN]) for the horizontal locations and the North American Vertical Datum of 1988 (NAVD 88) for vertical locations.

PES additionally attempted to locate existing monitoring wells MW-66 through MW-70 and MW-78. Based on previous site maps, the surveyor calculated approximate horizontal location coordinates for several of the wells and marked those locations in the field. Based on these approximate surveyed locations, PES used measurements taken from existing site maps to field locate the approximate well locations. The area surrounding the approximate well locations were visually observed and scanned with a metal detector. Near the location of MW-68 metal fragments of a well monument lid and a vertically oriented, ¾-inch PVC pipe decommissioned with bentonite were found buried approximately 6 inches bgs. The pipe was surveyed and confirmed to align with the map location of MW-68. No other wells were located. PES presumes the remaining wells were decommissioned similar to MW-68.

Laboratory Analysis

All soil sample bottles were sealed, labeled, and placed in a cooler with ice for transport to Fremont, a Washington State accredited laboratory located in Seattle, Washington. Samples were handled using standard chain-of-custody procedures.

Selected soil samples from each soil boring and monitoring well boring were analyzed for one or more of the following:

- VOCs by USEPA Method 8260D (Oil Stain and Concrete Vault Areas);
- Chlorinated VOCs (PCE, trichloroethylene [TCE], cis-1,2 Dichloroethene [cDCE], 1,1 dichloroethene [DCE], and vinyl chloride) by USEPA Method 8260D (PCE Area);
- GRO by Ecology Method NWTPH Gx (Oil Stain and Concrete Vault Areas);
- DRO and ORO by Ecology Method NWTPH-Dx (Oil Stain, Concrete Vault. and Paraffin Oil Areas);
- cPAHs by USEPA Method 8270D-SIM (Oil Stain Area);
- PCBs by USEPA Method 8082 (Oil Stain Area); and
- RCRA 8 Metals – EPA Method 6010/7470/7471 (Oil Stain and Concrete Vault Areas)

Copies of the chain-of-custody forms are attached to the laboratory reports included in Attachment B.

Data Validation Review

PES conducted a data quality review of the investigation chemistry data consistent with USEPA data review guidelines. Data completeness, holding times, laboratory instrument calibrations, surrogate recoveries, matrix spike and matrix spike duplicates, laboratory control samples, quantitation limits, method blanks, and trip blanks were reviewed. PES assigned the following data qualifiers, as needed:

- J qualifier: the analyte was positively detected but the result is an estimated value.
- R qualifier: the sample was analyzed for CVOCs past holding times and associated sample SB-1-2 CVOC results are non-detect. The results are rejected due to holding time exceedance.

PES judged all of the data acceptable for use, including the qualified data, with the exception of sample SB-1-2. This sample was knowingly analyzed for CVOCs outside of laboratory holding times to provide qualitative data regarding the potential presence of CVOCs (specifically to evaluate the presence of PCE deeper than the result detected in sample SB-1-0.5). The SB-1-2 CVOC data were used for screening purposes only. The laboratory reports are included in Attachment B and data validation memorandum is included in Attachment C.

Investigation-Derived Waste

Three 55-gallon drums of investigation-derived waste (IDW) were generated during drilling and sampling activities at the Property. All three contain soil cuttings generated during drilling. The drums are stored on property, near the southeast corner of the building awaiting offsite transport and disposal.

PHASE II INVESTIGATION RESULTS**Lithology and Hydrogeology Results**

The subsurface soil encountered during the Phase II Investigation consists of fill material underlain by sediments interpreted to be glacial till. The fill material was encountered to depths of up to 25 feet bgs, with deposits thinnest under the building and generally thicker to the east. Fill material encountered in SB-1, under the main building, extended to approximately 1 foot bgs and consisted of reddish-brown, non-cohesive, fine to coarse silty sand with small amounts of gravel. East of the building, fill material was encountered in borings SB-2, SB-3, and SB-4 to depths of 3 to 6 feet bgs and in borings SB-5 through SB-8 and MW-1 to depths of 12 to 17.5 feet bgs. Fill in these areas consisted of mixtures of reddish-brown, grayish-brown, and dark brown silty sands with low gravel content and varying amounts of organics and construction debris (concrete and asphalt rubble). Along the northern property boundary, fill material was encountered to the maximum depth explored (25 feet bgs) in borings SB-9 through SB-12 and consisted of brown and gray, non-cohesive silty sands with variable amounts of gravel, organics, and construction debris. The glacial sediments underlying the fill consisted predominantly of brown to gray, dense, fine to coarse silty sand with gravel with occasional sand and silt seams.

Previous investigations on Property encountered discontinuous perched groundwater beneath the subject property at depths of 15 to 20 feet bgs, however PES did not encounter saturated soil during the Phase II Investigation drilling and no water accumulated in the installed monitoring well (MW-1). The presence of perched water may be seasonally dependent and therefore unlikely to be encountered in the Phase II Investigation which took place in the dry season.

Soil Analytical Results

Soil boring and monitoring well locations with selected soil sampling results are shown on Figure 3. Tables 1 through 4 summarize the laboratory results for the soil samples and copies of the laboratory reports are included in Attachment B.

Concrete Vault Area

In order to evaluate whether a release from the concrete vaults to the subsurface soil had occurred, three borings were drilled near the northern vault (SB-5 to SB-7) and one was drilled near the southern vault (SB-8). Nine soil samples were analyzed for GRO, DRO, ORO, and VOCs. Additionally, two of the nine samples (SB-5-7.5 and SB-8-11) were analyzed for metals. GRO was detected in soil samples collected from SB-6 at 15.5 feet bgs, SB-7 at 15 feet bgs, and SB-8 at 11 feet bgs. ORO was detected in soil samples collected from SB-5 at 16 feet bgs, SB-6 at 15.5 feet bgs, and SB-7 at 5.5 feet bgs. Additionally, naphthalene was detected at 15.5 feet

bgs SB-6 coincident with the detection ORO. One other VOC (cis-1,2-dichlorethene [cDCE]) was detected in SB-8 at 11 feet bgs. The detected GRO, ORO, and VOCs concentrations are all below MTCA Method A CULs. DRO was not detected at or above the laboratory MRL in the analyzed soil samples. Soil analytical results for petroleum hydrocarbons and VOCs are summarized in Table 1.

Detected metals concentrations from SB-5 at 7.5 feet bgs and SB-8 at 11 feet bgs are well below MTCA Method A CULs and below the published natural background levels (*Natural Background Soil Metals Concentrations in Washington State, Puget Sound Region*, Ecology Publication 94-115, dated October 1994), where established (Table 1).

Paraffin Oil Area

Borings SB-9 to SB-12 were located drilled along the northern Property boundary in the area of the paraffin oil release to evaluate areas where a previous investigation detected ORO in soil exceeding the CUL. Seven soil samples were analyzed for DRO and ORO. ORO was detected below MTCA Method A CULs in SB-11 at half a foot bgs. ORO was not detected at or above laboratory MRLs in the other analyzed samples. DRO was not detected at or above MRLs in the analyzed soil samples. Soil analytical results for petroleum hydrocarbons are summarized in Table 1.

PCE Area

Soil samples were collected from borings SB-2 to SB-4 and MW-1 to investigate and assess whether the soil in this area had been removed to below current PCE CULs. Initially, eight soil samples were submitted for analysis of CVOCs. CVOCs were not detected at or above laboratory MRLs in soil samples from SB-2, SB-3, or SB-4 which were all located adjacent to the former painting shed (Figure 3). Previous samples in this area were analyzed with elevated MRLs (i.e., greater than 0.05 mg/kg). In MW-1 (located within the 2000 PCE cleanup area), PCE was detected slightly above the MTCA Method A CUL at 6.5 feet bgs (0.0709 mg/kg) and below the CUL at 14.5 feet bgs (0.0302 mg/kg). PES subsequently requested the samples from 2 feet and 11 feet bgs be analyzed for CVOCs. Analytical results for these two samples indicated no detectable concentrations of CVOCs. Analytical results for CVOCs are summarized in Table 1.

Oil Stain Area

Boring SB-1 was drilled and sampled in the area of the oil residue located in the south end of the existing building to investigate the soil quality beneath the building floor. Two soil samples were initially submitted for analysis. The sample collected at half a foot bgs (SB-1-0.5), immediately below the concrete slab, was analyzed for GRO, DRO, ORO, VOCs, cPAHs, PCBs, and metals. The sample collected from 7.5 feet bgs was analyzed for GRO, DRO, ORO, and VOCs. PCBs and cPAHs were not detected at or above laboratory MRLs in sample SB-1-0.5 and GRO, DRO, ORO were not detected at or above laboratory MRLs in either sample. Detected concentrations of metals in sample SB-1-0.5 are well below MTCA Method A CULs and below the published natural background levels where established. VOCs were not detected at or above MRLs in either sample except for PCE. PCE was detected in sample SB-1-0.5

(0.0794 mg/kg) slightly above the MTCA Method A CUL of 0.05 mg/kg. Though outside of the laboratory holding time, PES subsequently requested the deeper sample from 2 feet bgs (SB-1-2) be analyzed for CVOCs for qualitative assessment purposes. CVOCs were not detected in sample SB-1-2. Analytical results for petroleum hydrocarbons and VOCs are summarized in Table 1 and analytical results for metals, PCBs, and cPAHs are summarized in Tables 2, 3, and 4, respectively.

DISCUSSION OF RESULTS AND CONCLUSIONS

The section discusses the results of the Phase II investigation as they relate to the investigation objectives for each of the areas investigated. In addition, a preliminary approach for managing soil that contains detectable contamination during the redevelopment construction is presented. This latter assessment considers the CAP for arsenic described previously which includes using the impervious surfaces created by the proposed development (approximately 90 percent of the property) to cap and isolate soil containing arsenic at concentrations exceeding CULs and will address impacts to groundwater through an environmental covenant prohibiting the future use of groundwater at the property.

Concrete Vault Area

Analytical results indicate the impacted soil in this area containing low concentrations of petroleum hydrocarbons (primarily ORO) and 2 VOCs (naphthalene and cDCE). The detected concentrations are well below applicable CULs. Detections of ORO and naphthalene generally occurred at depths between 11 and 16 feet bgs, with one detection at 5.5 ft bgs. PES' observations during drilling and the sampling results indicate the presence of the petroleum hydrocarbons are sourced from the imported fill material rather than a release from the concrete vaults. The Phase II Investigation results are consistent with the results of previous sampling in this area conducted in 2005 that also found petroleum hydrocarbons (ORO) in soil typically at depths greater than 5 feet and more typically at depths of 10 to 15 ft bgs. The very low concentration of cDCE detected in soil at 11 feet bgs in SB-8 is likely related to the 2012 PCE soil removal area which met CULs. The Phase II Investigation results and those of previous investigations do not indicate that a release has occurred from either of the concrete vaults.

The soil containing detectable concentrations of ORO and VOCs is located within an area where the current development plan indicates that minimal grading is expected to occur – typically less than 5 feet of cut or fill. In addition, this location is beneath a planned paved parking area and roadway. Based on the results of investigations to date, soil from the concrete vault area can remain in place or be reused on-site. If soil from this area is exported, further characterization may be warranted to determine if the exported soil contains contaminants to determine appropriate reuse and/or disposal options.

Paraffin Oil Area

Only one sample (SB-11-0.5) of the seven soil samples collected from this area contained a concentration of ORO (172 mg/kg) which is well below the cleanup level of 2,000 mg/kg. Petroleum hydrocarbons were not detected in soil from SB-9, SB-10, nor SB-12 at depths ranging from 0.5 to 11 feet bgs. These results indicate that this area no longer

contains ORO in soil at concentrations exceeding CULs as indicated by previous investigation conducted in 2000.

This area is located in an area where the grading plan indicates soil removal up to 5 ft may occur. Based on these findings and the very low concentrations of ORO detected, the soil removed from this area can be used for fill on other locations of the Property as needed. If soil from this area is exported, further characterization may be warranted to determine if the exported soil contains contaminants to determine appropriate reuse and/or disposal options.

PCE Area

Analytical results from borings SB-2 through SB-4 indicate no CVOC concentrations in soil at or above the laboratory MRLs in the vicinity of the former paint shed. These results confirm the findings of previous investigations completed when laboratory MRLs were above current MTCA Method A CULs. Results from boring MW-1 (located with the 2000 PCE cleanup area) show that soil containing PCE at a concentration slightly exceeding the CUL is present at a depth of 6.5 ft bgs, but soil at 2 ft, 11 ft and 14.5 ft either do not have detectable PCE or the concentration is below the CUL (Table 1). These results are consistent with the information from the cleanup performed in 2000 and from the surrounding area. PES concludes that when all of the PCE data are considered, including the PCE data collected during the 2000 cleanup, the 2005 investigation, and the Phase II Investigation (borings SB-2 through SB-4 near the former painting shed, and SB-5 through SB-8 located within the Concrete Vault area), the detection of PCE in MW-1 at 6.5 ft bgs slightly exceeding the CUL is of limited extent and does not represent a threat to human health and the environment. Therefore, PES believes this area meets the cleanup standard consistent with Ecology's 2015 "Partial Sufficiency and Further Action" letter and further cleanup is not warranted. In making this conclusion, PES also considered that previous sampling of perched groundwater performed in 2005 for the wells located east (i.e., downgradient) of this location did not contain detectable PCE and there was no measurable groundwater encountered in MW-1.

The 2000 PCE cleanup area and MW-1 are located in area where minimal grading is expected to occur typically - less than 5 feet of cut or fill. Based on the current plan, the soil containing residual concentrations of PCE are unlikely to be disturbed. In addition, this location is beneath a planned paved parking area and roadway which will effectively prevent future contact with this soil after development construction is completed.

Oil Stain Area

Analytical results from boring SB-1 identified PCE concentrations exceeding the MTCA Method A CUL in soil at a depth of 0.5 feet bgs and no detectable concentrations of PCE in soil at 7.5 feet bgs. The soil sample from 2 feet bgs (SB-1-2) was analyzed outside of holding time for qualitative assessment purposes. The results of SB-1-2 indicated that CVOCs were not detected. Based on past experience, PES believes that if PCE or other CVOCs are present, the concentrations are very likely to be low even though the sample was analyzed past holding times. The PCE found in the soil at SB-1-0.5 is likely attributable to the auto repair activities that caused the oil stain and are of limited extent. The results of shallow soil samples (1 foot bgs)

collected at 5 locations within the building during a 2005 investigation did not contain detectable concentrations of PCE or other VOCs which support the limited extent conclusion.

The oil stain is located in area where site grading is expected to result in the placement of less than 5 feet of fill. This area is also near one of the four buildings to be constructed. Based on the limited extent and location near a proposed building, PES recommends that the soil exceeding the CUL be removed and disposed of at a facility permitted to accept these materials. Confirmation samples should be collected from the bottom and sidewalls of the excavation to confirm all soil exceeding the CUL has been effectively removed.

PES recommends that the CAP for the arsenic soil include the information above and that it include the actions necessary to remove the PCE contaminated soil at SB-1. The CAP should also include the procedures for addressing unanticipated conditions that may be encountered during redevelopment construction.

The following summarizes PES' conclusions/recommendations based on the results of the Limited Phase II Investigation:

- **Arsenic in Soil:** PES recommends that a CAP that describes the procedures for addressing arsenic in soil at the Property be prepared consistent with Ecology's Tacoma Smelter Plume Guidance Document. The CAP should include a sampling plan to confirm the concentrations of arsenic in near surface soils in the landscaped areas meet CULs once the site grading has been completed.
- **Concrete Vault Area:** Soil containing detectable concentrations of contaminants is unlikely to be disturbed during construction. Soil from the concrete vault area can remain in place or be reused on-site. If soil from this area is exported, further characterization may be warranted to determine if the exported soil contains contaminants to determine appropriate reuse and/or disposal options.
- **Paraffin Oil Area:** Soil in this area contains very low concentrations of ORO, well below the applicable CUL. Soil removed from this area can be used for fill on other locations of the Property as needed. If soil from this area is exported, further characterization may be warranted to determine if the exported soil contains contaminants to determine appropriate reuse and/or disposal options.
- **PCE Area:** Soil in this area containing PCE does not represent a threat to human health and the environment and, therefore, the soil in this area meets the cleanup standard. Soil in this area is unlikely to be disturbed during development construction and will be effectively capped by the site development. No further cleanup is warranted. If soil from this area is exported, further characterization may be warranted to determine if the exported soil contains contaminants to determine appropriate reuse and/or disposal options.

- **Oil Stain Area:** There is a limited area containing PCE in soil exceeding the CUL. PES recommends that the CAP for the arsenic soil include the information above and that it include the actions necessary to remove the PCE contaminated soil in this area, including the procedures for collecting confirmation soil samples to document effective removal.

PES appreciates the opportunity to assist you with this project. If you have any questions regarding this report, please feel free to contact either of us at (206) 529-3980.

Sincerely,

PES ENVIRONMENTAL, INC.

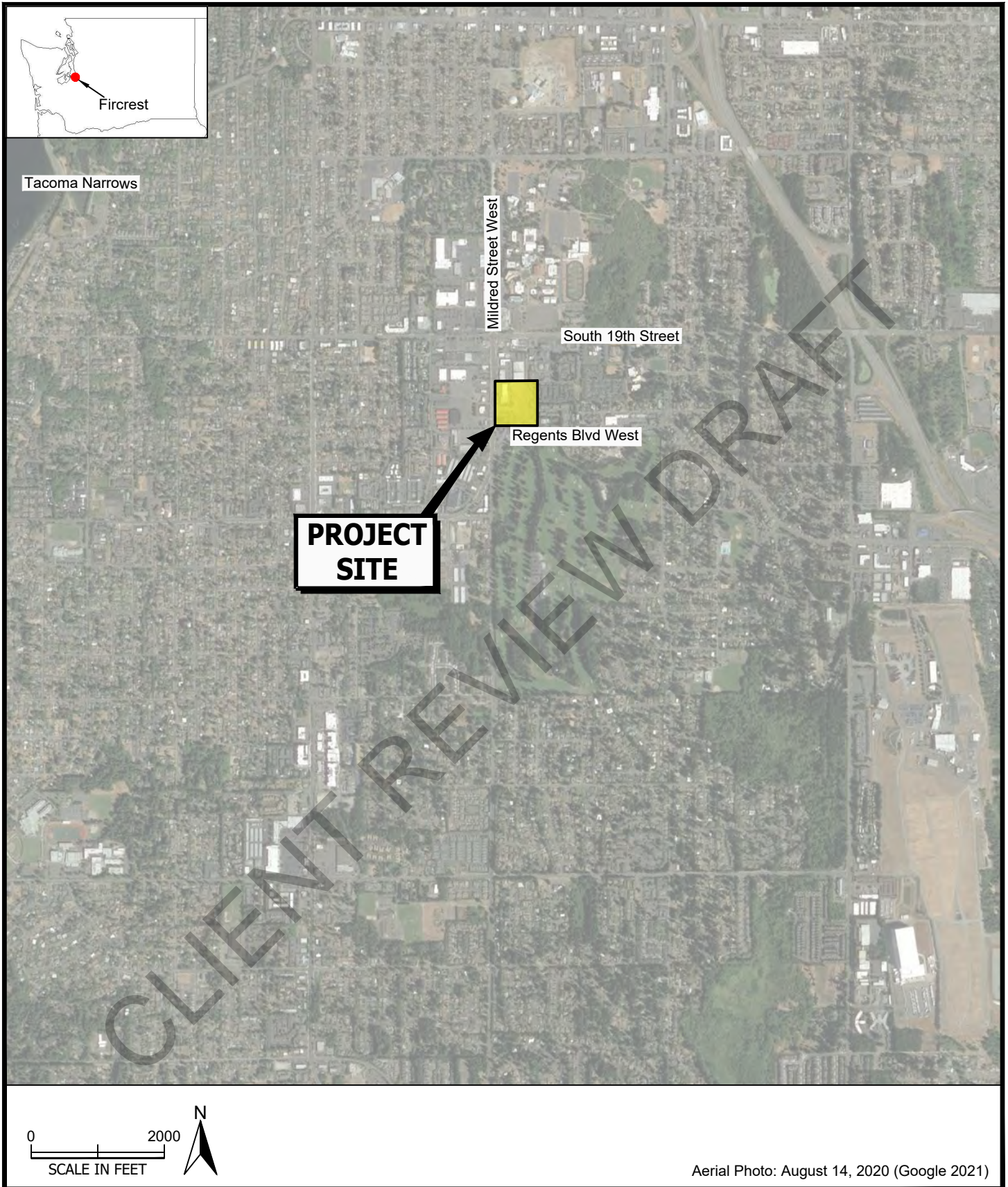
Rachel McLaughlin, L.G.
Project Geologist

Daniel Balbiani, P.E.
Principal Engineer

Enclosures: Figure 1 – Site Location
Figure 2 – Boring and Well Locations
Figure 3 – Sampling Locations and Select Soil Results

Table 1 – Petroleum Hydrocarbons and VOCs in Soil
Table 2 – Metals in Soil
Table 3 – PCBs in Soil
Table 4 – cPAHs in Soil

Attachment A – Boring Logs
Attachment B – Laboratory Reports
Attachment C – Data Validation Memorandum



PES Environmental, Inc.
Engineering & Environmental Services

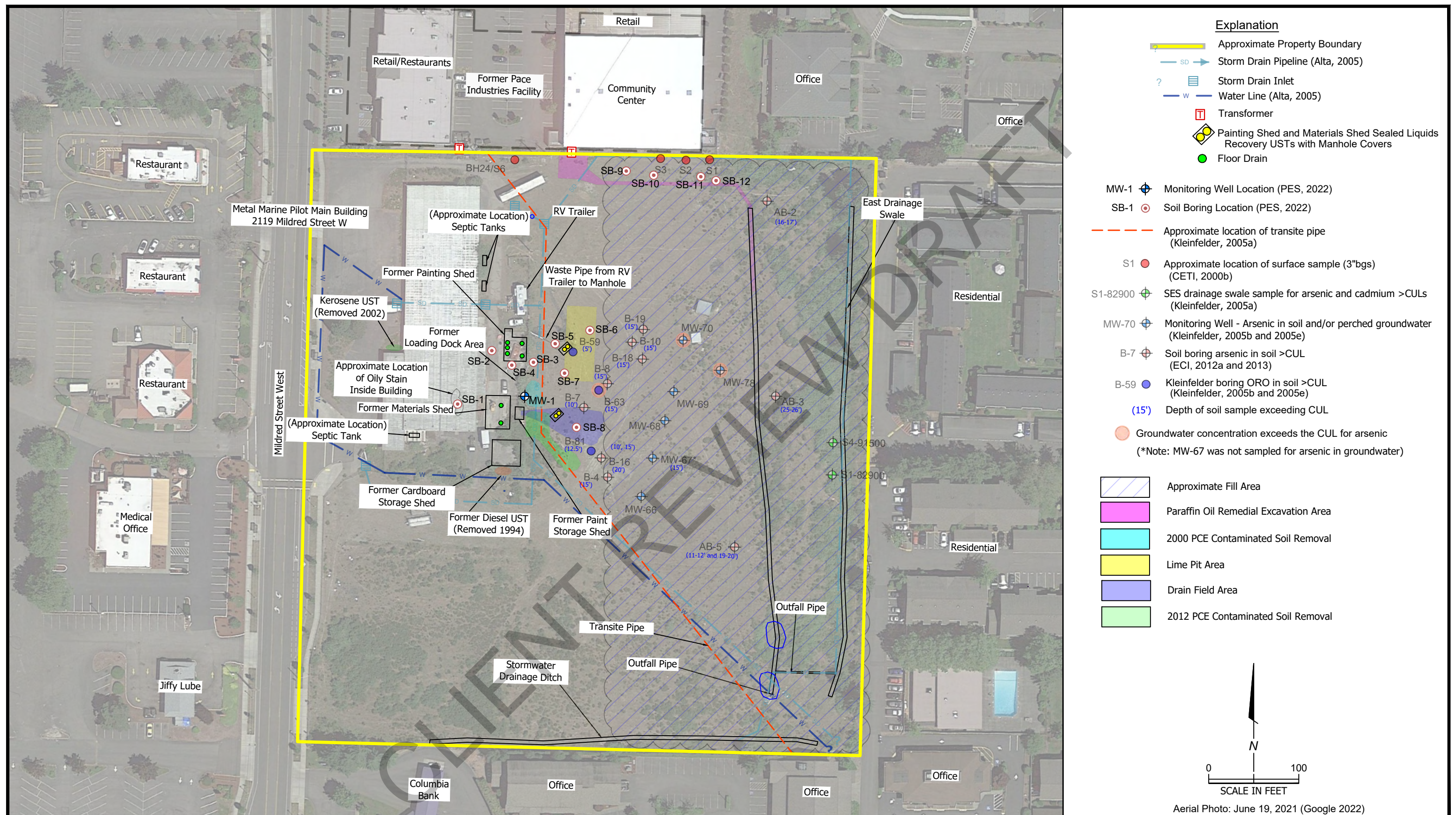
AN **NV5** COMPANY

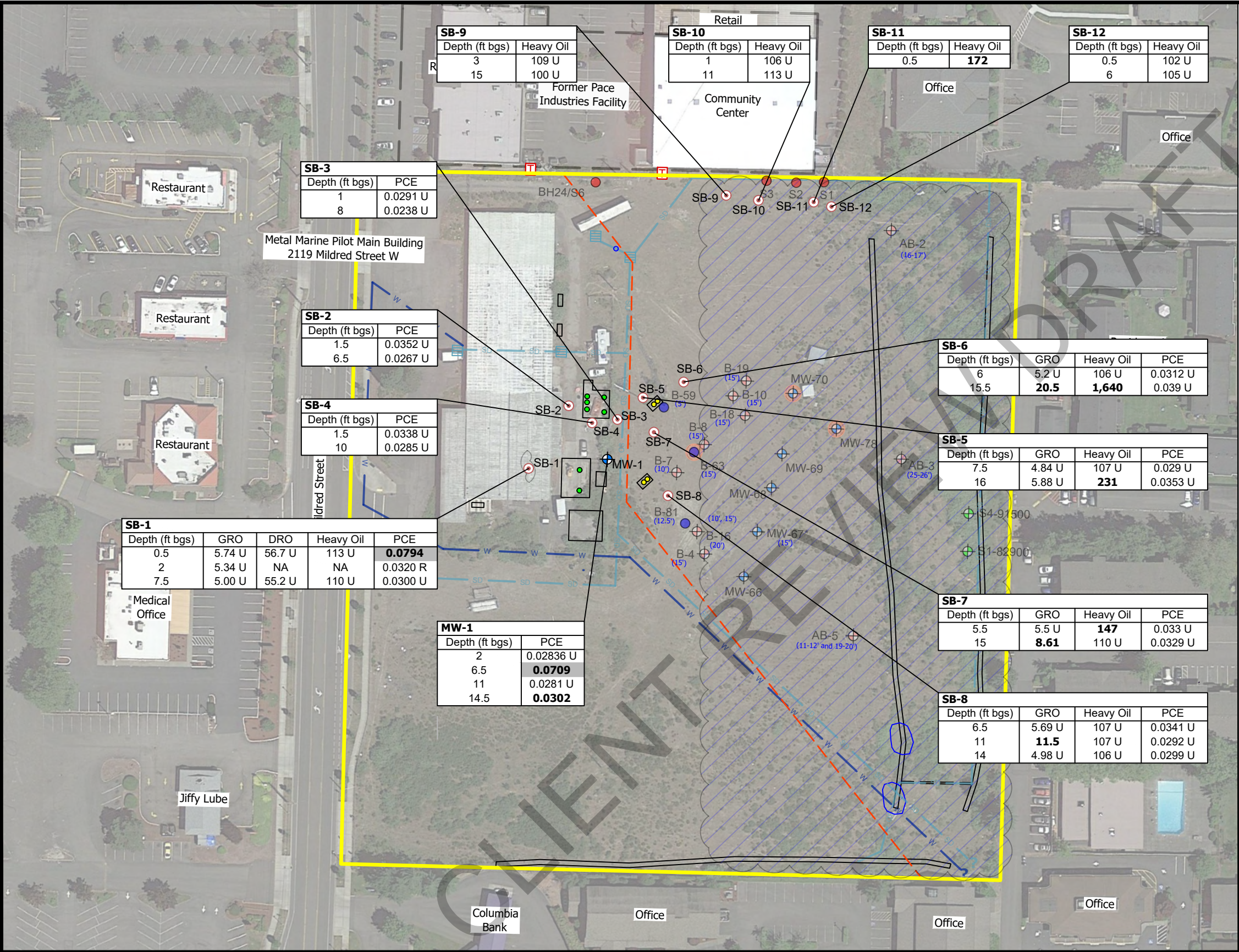
Site Location

Limited Phase II Investigation
Prose Fircrest Apartments Property
2119 Mildred Street West
Fircrest, Washington

FIGURE

1





Explanation

- Approximate Property Boundary
- Storm Drain Pipeline (Alta, 2005)
- Storm Drain Inlet
- Water Line (Alta, 2005)
- Transformer
- Painting Shed and Materials Shed Sealed Liquids Recovery UST's with Manhole Covers
- Floor Drain

MW-1 Monitoring Well Location (PES, 2022)

SB-1 Soil Boring Location (PES, 2022)

Approximate location of transite pipe (Kleinfelder, 2005a)

S1 Approximate location of surface sample (3"bgs) (CETI, 2000b)

S1-82900 SES drainage swale sample for arsenic and cadmium >CULs (Kleinfelder, 2005a)

MW-70 Monitoring Well - Arsenic in soil and/or perched groundwater (Kleinfelder, 2005b and 2005e)

B-7 Soil boring arsenic in soil >CUL (ECI, 2012a and 2013)

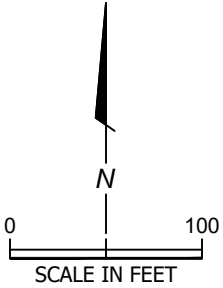
B-59 Kleinfelder boring ORO in soil >CUL (Kleinfelder, 2005b and 2005e)

(15') Depth of soil sample exceeding CUL

Groundwater concentration exceeds the CUL for arsenic (*Note: MW-67 was not sampled for arsenic in groundwater)

Approximate Fill Area

All results are in milligrams per kilogram (mg/kg)
Detections are shown in **bold**
Results that exceed applicable Cleanup Levels (CULs) are shaded
4.84 U = Analyte not detected at or above the referenced laboratory reporting limit
NA = not analyzed
GRO = gasoline range organics
DRO = diesel range organics
PCE = tetrachloroethene
bgs = below ground surface



Aerial Photo: June 19, 2021 (Google 2022)

Table 1
Petroleum Hydrocarbons and VOCs in Soil
Prose Fircrest Apartments
Fircrest, Washington

PES Environmental, Inc.,
an NV5 Company

Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Gasoline	Diesel (Fuel Oil)	Heavy Oil	Naphthalene	PCE	cDCE
MTCA Cleanup Level				100 ^a	2,000 ^a	2,000 ^a	5 ^a	0.05 ^a	160 ^b
Soil Borings									
SB-1	SB-1-0.5	06/23/22	0.5	5.74 U	56.7 U	113 U	0.115 U	0.0794	0.0287 U
	SB-100-0.5	06/23/22	0.5 (dup)	5.43 U	53.9 U	108 U	0.109 U	0.0690	0.0271 U
	SB-1-2	06/23/22	2	–	–	–	–	0.0320 R	0.0267 R
	SB-1-7.5	06/23/22	7.5	5.00 U	55.2 U	110 U	0.100 U	0.0300 U	0.0250 U
SB-2	SB-2-1.5	06/28/22	1.5	–	–	–	–	0.0352 U	0.0293 U
	SB-2-6.5	06/28/22	6.5	–	–	–	–	0.0267 U	0.0222 U
SB-3	SB-3-1	06/22/22	1	–	–	–	–	0.0291 U	0.0242 U
	SB-3-8	06/22/22	8	–	–	–	–	0.0238 U	0.0199 U
SB-4	SB-4-1.5	06/23/22	1.5	–	–	–	–	0.0338 U	0.0282 U
	SB-4-10	06/23/22	10	–	–	–	–	0.0285 U	0.0238 U
SB-5	SB-5-7.5	06/23/22	7.5	4.84 U	53.4 U	107 U	0.0968 U	0.0290 U	0.0242 U
	SB-5-16	06/23/22	16	5.88 U	54.2 U	231	0.118 U	0.0353 U	0.0294 U
SB-6	SB-6-6	06/23/22	6	5.20 U	52.9 U	106 U	0.104 U	0.0312 U	0.0260 U
	SB-6-15.5	06/23/22	15.5	20.5	51.0 U	1,640	2.23	0.0390 U	0.0325 U
SB-7	SB-7-5.5	06/23/22	5.5	5.50 U	52.9 U	147	0.110 U	0.0330 U	0.0275 U
	SB-7-15	06/23/22	15	8.61	54.9 U	110 U	0.110 U	0.0329 U	0.0274 U
SB-8	SB-8-6.5	06/23/22	6.5	5.69 U	53.5 U	107 U	0.114 U	0.0341 U	0.0284 U
	SB-8-11	06/23/22	11	11.5	53.7 U	107 U	0.0975 U	0.0292 U	0.0918
	SB-8-14	06/23/22	14	4.98 U	53.2 U	106 U	0.0995 U	0.0299 U	0.0249 U
SB-9	SB-9-3	06/22/22	3	–	54.4 U	109 U	–	–	–
	SB-9-15	06/22/22	15	–	50.0 U	100 U	–	–	–
SB-10	SB-10-1	06/22/22	1	–	53.1 U	106 U	–	–	–
	SB-10-11	06/22/22	11	–	56.4 U	113 U	–	–	–
SB-11	SB-11-0.5	06/28/22	0.5	–	52.0 U	172	–	–	–
SB-12	SB-12-0.5	06/23/22	0.5	–	51.1 U	102 U	–	–	–
	SB-12-6	06/23/22	6	–	52.6 U	105 U	–	–	–
Monitoring Wells									
MW-1	MW-1-2	06/28/22	2	–	–	–	–	0.02836 U	0.0236 U
	MW-1-6.5	06/28/22	6.5	–	–	–	–	0.0709	0.0242 U
	MW-1-11	06/28/22	11	–	–	–	–	0.0281 U	0.0234 U
	MW-1-14.5	06/28/22	14.5	–	–	–	–	0.0302	0.0196 U

Notes:

Gasoline Range Organics (GRO) analyzed by NWTPH-Gx.

Diesel (Fuel Oil) and Heavy Oil analyzed by NWTPH-Dx

Volatile Organic Compounds (VOCs) analyzed by EPA Method 8260D. Only detected VOCs shown in this table.

Analytical results reported in milligrams per kilogram (mg/kg).

Sample depth shown in feet below ground surface (ft bgs).

PCE = tetrachloroethene

cDCE = cis-1,2-Dichloroethene

a = Method A Cleanup Level from MTCA Method A Table 740-1 (WAC 173-340-900).

b = Method B Cleanup Level for direct contact, non-cancer from Ecology Cleanup Levels and Risk Calculation (CLARC) tables, Jul

(dup) = field duplicate

U = Not detected at or above the laboratory reporting limit (RL).

Results detected above the laboratory reporting limit are shown in **bold**.

– = Not available.

R = CVOC results for SB-1-2 are rejected and qualified (R) due to holding time exceedance. The sample was knowingly analyzed for CVOCs after the 14 day hold time and rejected results are for screening purposes only.

Table 2
Metals in Soil
Prose Fircrest Apartments
Fircrest, Washington

PES Environmental, Inc.,
an NV5 Company

Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
MTCA Cleanup Level				20 ^a	16,000 ^b	2 ^a	2,000 ^a	250 ^a	2 ^a	400 ^b	400 ^b
Natural Background Concentrations ^c				7	NE	1	48	24	0.07	NE	NE
SB-1	SB-1-0.5	06/23/22	0.5	2.51	78.6 J	0.173 U	22.2	2.99	0.288 U	0.975	0.13 U
	SB-100-0.5	06/23/22	0.5 (dup)	2.51	47.6 J	0.163 U	24.9	2.58	0.267 U	0.811	0.122 U
SB-5	SB-5-7.5	06/23/22	7.5	1.97	57.9	0.176 U	25.7	1.96	0.276 U	0.876	0.132 U
SB-8	SB-8-11	06/23/22	11	1.8	61.4	0.167 U	22.5	1.96	0.271 U	0.724	0.125 U
Notes: Metals analyzed by EPA Method 6020A. Mercury analyzed by EPA Method 7471. Analytical results reported in milligrams per kilogram (mg/kg). Sample depth shown in feet below ground surface (ft bgs). a = Method A Cleanup Level from MTCA Method A Table 740-1 (WAC 173-340-900). b = Method B Cleanup Level for direct contact, non-cancer from Ecology Cleanup Levels and Risk Calculation (CLARC) tables, July, 2022. c = Natural Background Soil Metals Concentration in Washington State, Puget Sound Region from Ecology Publication #94-115, (October 1994). NE = Not established (dup) = field duplicate U = Not detected at or above the laboratory reporting limit (RL). Results detected above the laboratory reporting limit are shown in bold . J = The result is an approximate concentration.											

Table 3
PCBs in Soil
Prose Fircrest Apartments
Fircrest, Washington

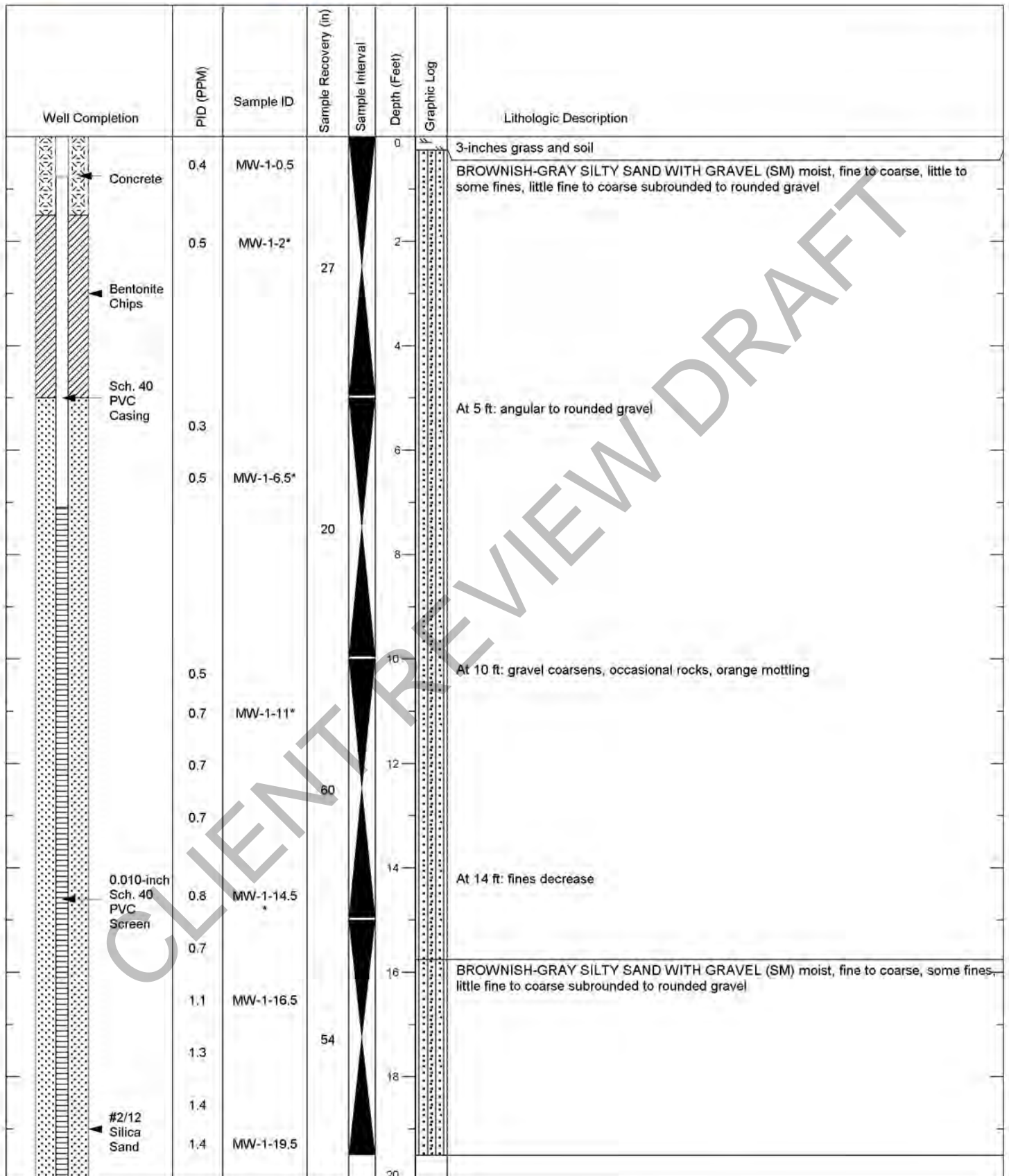
Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Aroclor									Total PCBs
				1016	1221	1232	1242	1248	1254	1260	1262	1268	
MTCA Cleanup Level				5.6 ^b	–	–	–	–	0.5 ^c	0.5 ^c	–	–	1 ^a
SB-1	SB-1-0.5	06/23/22	0.5	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U	0.0554 U
SB-1	SB-100-0.5	06/23/22	0.5	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U	0.0494 U
Notes: Analytical results in milligrams per kilogram (mg/kg). Polychlorinated Biphenyls (PCBs) analyzed by EPA Method 8082A. a = Method A Cleanup Level for unrestricted land use from MTCA Method A Table 740-1 (WAC 173-340-900). b = Method B Cleanup Level for direct contact, non-cancer from Ecology Cleanup Levels and Risk Calculation (CLARC) tables, July, 2021. c = Method B Cleanup Level for direct contact, cancer from Ecology Cleanup Levels and Risk Calculation (CLARC) tables, July, 2021. – = Not available/not established. U = Not detected at or above the reported detection limit (RDL).													

Table 4
cPAHs in Soil
Prose Fircrest Apartments
Fircrest, Washington

PES Environmental, Inc.,
an NV5 Company

Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Benzo(a)pyrene	Benz(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Total TEQ
MTCA Cleanup Level				0.19 ^a	–	–	–	–	–	–	0.19 ^a
Toxicity Equivalency Factor				1	0.1	0.1	0.1	0.01	0.1	0.1	–
SB-1	SB-1-0.5	06/23/22	0.5	0.0221 U 0.01105	0.0221 U 0.00024	0.0221 U 0.001105	0.0221 U 0.001105	0.0442 U 0.00022	0.0442 U 0.00221	0.0442 U 0.00221	0.0181 U
SB-1	SB-100-0.5 (duplicate)	06/23/22	0.5	0.0197 U 0.00985	0.0197 U 0.00022	0.0197 U 0.000985	0.0197 U 0.000012	0.0395 U 0.0002	0.0395 U 0.00198	0.0395 U 0.00198	
Notes: Carcinogenic polyaromatic hydrocarbons (cPAHs) analyzed by EPA Method 8270 (SIM). Analytical results in milligrams per kilogram (mg/kg). Sample depth shown in feet below ground surface (ft bgs). a = Method B Cleanup Level for Direct Contact, Cancer from Ecology Cleanup Levels and Risk Calculation (CLARC) tables, July, 2022. Toxicity Equivalency Factor (TEF) (unitless) from WAC 173-340-708(8)(e) in the Model Toxics Control Act (MTCA) rule. TEQ = Toxic Equivalent Concentration (cPAH concentration x TEF). Calculations not shown in this table. The TEQ for non-detect values is calculated using one-half the reporting limit, per Ecology guidelines. Total TEQ is the sum of the individual cPAHs multiplied by their respective TEF. U = Not detected at or above the laboratory reporting limit (RL).											

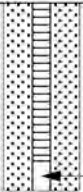
Validated through June 2022.



Project: Prose Fircrest Apartments Property
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R. McLaughlin
Ecology I.D.: BNE 585

Total Drilled Depth: 22.5 feet
Diameter of Boring: 2.25 / 8 inches
Drill Date: 6/28/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push/ HSA








Well Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
 End Cap					22 24 26 28 30 32 34 36 38 40		<p>Refusal of DPT boring at 19.5 feet bgs. Location overdrilled with HSA to 22.5 feet bgs and monitoring well installed. *Sample submitted for laboratory analysis</p> <p>Well Completion Details: Well constructed with 2-inch Schedule 40 PVC pipe and a 0.010-inch machine slotted screen with #2/12 sand filter pack.</p> <p>Total Well Depth: 22.5 feet Well Sump/End Cap: 22.1 to 22.5 feet Well Screen: 7.1 to 22.1 feet Well Riser: 0.75 to 7.1 feet Filter Pack: 5 to 22.5 feet Well Seal: 1.5 to 5 feet Surface Seal: 0 to 1.5 feet Well Monument: Flush with grade 8-inch monument</p>

Project: Prose Fircrest Apartments Property
Project Number: 1325023.01.003
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Drill Date: 6/28/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push/ HSA




Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
 Bentonite Chips	0.4	SB-1-0.5*	27		0		REDDISH-BROWN SILTY SAND (SM) moist, fine to coarse, little fines, few gravel (Fill)
	0.4	SB-100-0.5*					
	0.6	SB-1-2*			2		LIGHT GRAY SILTY SAND (SM) moist, fine to coarse, some fines, few fine to coarse subangular to subrounded gravel
					4		
	0.6				6		At 5 ft: little gravel, fines increase with depth, strongly cohesive
	0.7				8		
	0.9	SB-1-7.5*	60		10		
	0.7						
	0.5	SB-1-10					
					12		Bottom of boring at 10 feet bgs Boring backfilled with hydrated bentonite chips * Sample submitted for laboratory analysis
					14		
					16		
					18		
					20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Seattle, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 10 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push














Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
 Bentonite Chips	0.7				0		2-inches asphalt
	0.5	SB-2-1.5*			1		BROWN SILTY SAND (SM) moist, fine to medium, little fines, few fine to coarse, subangular to subrounded gravel (Fill)
			18		2		
					3		
					4		GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse, subangular to subrounded gravel
	1.3				5		
	2.4	SB-2-6.5*			6		
	0.9		43		7		At 7 ft: some fines, occasional rocks, moderately to strongly cohesive
	1.0	SB-2-8.5			8		
					9		
	0.9				10		
	1.1	SB-2-11			11		
	1.3		48		12		
	1.5	SB-2-13			13		
	0.9				14		Refusal at 14 feet bgs Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					16		
					18		
					20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R. McLaughlin
Notes:

Total Drilled Depth: 14 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/28/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push




Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	1.5	SB-3-1*	30		0		3-inches grass and soil
	2.0						LIGHT GRAY SILTY SAND (SM) moist, fine to coarse, little fines, few fine subangular to rounded gravel (Fill)
	1.1						REDDISH-BROWN SILTY SAND (SM), moist, fine to coarse, some fines, few fine subangular to to subrounded gravel (Fill)
	1.9				2		BROWN TO DARK-BROWN SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, some fines, little fine to coarse subangular to subrounded gravel (Fill)
		SB-3-5.5	38		4		REDDISH-BROWN GRAVEL WITH SAND AND SILT (GM) moist, fine to coarse, subangular to subrounded, some fine to coarse sand, little fines (Fill)
	0.3						GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fine to coarse subrounded to rounded gravel, some fines, moderately cohesive
	0.1				6		
	0.3						
	0.5	SB-3-8*	28		8		At 10 ft: few fine gravel
	0.2				10		At 11.5 ft: color transitions to brown, roots present
	0.4						
	0.9				12		
		SB-3-12	58		14		GRAY SILTY SAND (SM) moist, fine to coarse, few fine subangular to subrounded gravel, little fines
	0.8						At 15.5 ft: Broken rock
	0.9				16		GRAY SILTY SAND (SM) moist to wet, fine to medium, some fines, few gravel, fines "sticky"
	0.8						GRAY SILTY SAND (SM) moist, fine to coarse, little fine to coarse subangular to subrounded gravel, little fines
	0.7	SB-3-16			18		At 18.5 ft: color transitions to brown, some fines
	2.2				20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 25 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/22/22
Drilled By: Cascade Drilling
Drill Method: Direct Push




























Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	1.4						
	2.0	SB-3-21.5			22		At 21 ft: 6-inches moist to wet soil
	0.6		47				
	0.7						At 22.5 ft: 6-inches moist to wet soil
	0.7	SB-3-24			24		GRAY SILTY SAND (SM) moist, fine to medium, little fines
					26		Bottom of boring at 25 feet bgs Boring backfilled with bentonite chips *Sample submitted for laboratory analysis
					28		Note: boring left open until end of day to assess shallow groundwater presence. No water accumulation occurred.
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 25 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/22/22
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	0.8	SB-4-1.5*	18		0		2-inches concrete
	1.0				1		REDDISH-BROWN SILTY SAND (SM) moist, fine to coarse, some fines, few fine subrounded to rounded gravel (Fill) At 1 ft: thin dark brown organic horizon with roots and decomposition odor
					2		GRAYISH-BROWN SILTY SAND (SM) moist, fine to medium, some fines, few fine subrounded to rounded gravel (Fill)
		SB-4-5.5	60		4		REDDISH-BROWN SILTY SAND (SM) moist, fine to coarse, some fines, few fine subrounded to rounded gravel (Fill)
	1.1				5.25		At 5.25 ft: 1 inch concrete rubble
					6		GRAYISH-BROWN SILTY SAND (SM) moist, fine to coarse, little fines, few fine subangular to subrounded gravel, some orange mottling (Fill)
	0.9	SB-4-10*	42		6		GRAYISH-BROWN SANDY SILT (ML) moist, some fine to coarse sand, few fine angular to subangular gravel, some mottling, strongly cohesive
	0.9				8		GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse subrounded to rounded gravel, appears very hard- difficulty driving sampler
	0.7				10		At 10 ft: few gravel, fines increase with depth
	1.4	SB-4-11	42		12		
	1.0				14		At 14 ft: fines decrease with depth
	1.0				16		
	0.5	SB-4-13.5	42		18		
	0.6				20		
	0.3				22		
	0.4	SB-4-17	42		24		
	0.9				26		
	1.2				28		
					17		Refusal at 17 feet bgs Boring backfilled with bentonite chips *Sample submitted for laboratory analysis

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R. McLaughlin
Notes:

Total Drilled Depth: 17 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	1.9	SB-5-1	31		0		LIGHT BROWNISH-GRAY SILTY SAND (SM) moist, fine to medium, some fines, few coarse subangular to subrounded gravel (Fill)
	1.9						REDDISH-BROWN SILTY SAND (SM) moist, some fines, few gravel (Fill)
	1.5						At 1.5 ft: 2-inches thick asphalt-like layer
	1.3	SB-5-5	30		2		GRAYISH-BROWN SILTY SAND (SM) moist, fine to coarse, some fines, few fine to coarse subrounded gravel (Fill)
		SB-5-7.5*	53		4		DARK BROWN SILTY SAND WITH GRAVEL (SM) moist to wet fine to coarse, some fines, little fine to coarse subangular to rounded gravel, organics present (roots, plant material) (Fill)
	1.7						
	1.8						
	1.6	SB-5-10.5	28		6		At 6 ft: soil transitions from dark brown to light brown
	1.9						
		SB-5-14			8		GRAY SILTY SAND (SM) moist, fine to medium, little fines, few fine angular to subrounded gravel
		SB-5-16*			10		GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, some fines, little fine to coarse subangular to rounded gravel, moderately cohesive
		SB-5-17.5			12		
		SB-5-17.5			14		
		SB-5-17.5			16		GRAYISH-BROWN SILTY SAND (SM) moist, fine to coarse, some fines, few fine to coarse subrounded gravel, some mottling, resembles fill material
		SB-5-17.5			18		GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, some fines, little fine to coarse subangular to rounded gravel, moderately cohesive
		SB-5-17.5			20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push









Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
					22		Bottom of boring at 20 feet bgs. Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					24		
					26		
					28		
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	1.0	SB-6-1			0		LIGHT BROWN SILTY SAND (SM) moist, fine to medium, some fines, few coarse subangular to subrounded gravel (Fill) At 1.25 ft: 3-inches GRAY SILTY SAND (SM) moist to wet, little fines, trace gravel
	1.1				2		DARK GRAY AND BROWN SILTY SAND (SM) moist to wet, fine to coarse, little fines, few gravel (Fill)
	1.0	SB-6-6*	27		4		DARK BROWN SILTY SAND WITH GRAVEL (SM) moist to wet, fine to coarse, some fines, little fine to coarse subangular to rounded gravel fill, organics present (roots, plant material) (Fill)
	0.8				6		
	0.8				8		
	0.6				10		
	1.4	SB-6-11	26		12		
	1.4				14		
	1.3	SB-6-15.5*	29		16		At 15.25 ft: 1-inch layer of black sand and gravel with hydrocarbon-like odor
	2.0				18		
	2.3	SB-6-16	43		20		GRAY SILTY SAND (SM) moist, fine to medium, some fines, little fine to coarse subangular to subrounded gravel
	1.9				22		
	1.4	SB-6-18.5			24		At 18 ft: 3-inches sandy silt
	1.5				26		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push














Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
					22		Bottom of boring at 20 feet bgs. Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					24		
					26		
					28		
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	0.7	SB-7-0.5	32		0		GRAYISH-BROWN SILTY SAND (SM) moist, fine to medium, little fines, few fine angular to subrounded to coarse gravel (Fill)
	0.6				2		LIGHT BROWN SILTY SAND (SM) wet, fine to coarse, some fines, few fine subrounded gravel, fines "sticky" (Fill)
	0.6						
	1.2	SB-7-2.5	25		4		DARK BROWN TO BLACK SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse subangular to subrounded gravel, gravel increases with depth, asphalt rubble present (Fill)
	0.8	SB-7-5.5*			6		At 5.5 ft. 1.5-inches blueish-gray silty sand with faint hydrocarbon-like odor
	0.7						
	0.9		41		8		BROWN SILTY SAND (SM) moist, fine to coarse, some fines, trace fine subrounded gravel, occasional roots and organics-rich horizons (Fill)
					10		GRAY SILTY SAND (SM) moist, fine to medium with few coarse, some fines, few fine to coarse subangular to rounded gravel, moderately cohesive
	1.0	SB-7-10			12		
	0.9		52		14		
	1.1	SB-7-13.5			16		DARK BROWN SILTY SAND (SM) moist, fine to coarse, some fines, few fine to coarse subrounded gravel, some mottling, color transitions to gray at bottom, resembles fill
	3.7	SB-7-15*			18		
	1.1				20		GRAY SILTY SAND WITH GRAVEL (SM) moist, fine to medium, some fines, little fine to coarse subangular to subrounded gravel
	1.4	SB-7-18					
	0.9						
	1.0						

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push














Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
					22		Bottom of boring at 20 feet bgs. Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					24		
					26		
					28		
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description	
					0		3-inches brown soil with fine gravel	
	0.7	SB-8-0.5	19				BROWNISH-GRAY SILTY SAND (SM) moist, fine to coarse, little fines, few fine to coarse subrounded to rounded gravel (Fill)	
	0.7						REDDISH-BROWN SILTY SAND (SM) moist to wet, fine to coarse, little fines, few fine subrounded gravel, fines "sticky" (Fill)	
					2			GRAYISH-BROWN SILTY SAND (SM) moist, fine to coarse, little fines, few fine subrounded to rounded gravel (Fill)
	0.7	SB-8-5	32				REDDISH-BROWN SILTY SAND (SM) wet, fine to coarse, little fines, few fine subrounded gravel (Fill)	
	0.6	SB-8-6.5*					DARK GRAYISH-BROWN SILTY SAND (SM) moist to wet, fine to coarse, little fines, trace gravel (Fill)	
	0.7							DARK BROWN TO BLACK SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse angular to subrounded gravel, occasional gray silty sand inclusions, roots and plant material present (Fill)
	3.0					8		
					48		10	
	1.3	SB-8-11*						
	5.0			12				GRAY SILTY SAND (SM) moist, fine to medium, some fines, few fine to coarse subrounded to rounded gravel
	0.9		36					
	0.8	SB-8-14*						
	0.7					14		
	0.9							
	0.4	SB-8-16						
	0.3				16			
	0.4	SB-8-18			18		At 18 ft: fines decrease	
				20				

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/22
Drilled By: Cascade Drilling
Drill Method: Direct Push






Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
					22		Bottom of boring at 20 feet bgs. Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					24		
					26		
					28		
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 20 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/22
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description			
	0.7	SB-9-1	36		0		BROWN SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine subangular to subrounded gravel (Fill)			
	0.7									
	0.8	SB-9-3*			2		LIGHT GRAY SANDY SILT (ML) moist, some fines, some fine to coarse sand, orange mottling (Fill)			
	1.1						BROWN TO DARK BROWN SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse subrounded gravel (up to 1.5-inch diameter) (Fill)			
					4					
	0.2	SB-9-6.5	18		6		At 5 ft: some fines			
	0.8									
					8					
	1.8	SB-9-11.5			10		DARK GRAY SILTY SAND (SM) moist, fine to medium, some fines, few fine to coarse subrounded gravel (up to 1-inch diameter), noncohesive (Fill)			
	6.1									
	8.1				12					
		SB-9-15*			14		At 15 ft: fines increasing with depth, faint unidentifiable odor			
	23									
	19.6				16		At 16.5 ft: 1.5-inches LIGHT GRAY SILT (ML)			
	17.3									
	4.9				18					
			27		20		GRAY SILTY SAND (SM) moist, fine to medium, little fines, few fine to coarse subrounded gravel, noncohesive, faint hydrocarbon-like odor			

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 25 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/22/22
Drilled By: Cascade Drilling
Drill Method: Direct Push










Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	3.7						GRAY SILTY SAND (SM) continued
	1.2	SB-9-21.5			22		
	1.2		33		24		
					26		Bottom of boring at 25 feet bgs Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					28		
					30		
					32		
					34		
					36		
					38		
					40		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 25 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/22/22
Drilled By: Cascade Drilling
Drill Method: Direct Push



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
 Bentonite Chips	0.9	SB-10-1*	24		0		LIGHT BROWN SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, little fines, little fine to coarse gravel (Fill)
	1.1				1		
	0.4				2		
		SB-10-5	15		3		DARK BROWN SILTY SAND (SM) moist, fine to coarse, little fines, few fine to coarse gravel (Fill)
	3.0				4		
	2.2				6		
		SB-10-11*	10		7		DARK GRAY SILTY SAND WITH GRAVEL (SM) moist to wet, fine to coarse, some fines, little gravel (Fill)
	NR				10		
					12		
					14		
Bottom of boring at 15 feet bgs Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis NR = Not Recorded Note: Poor recovery due to presence of cobbles and rocks							
					16		
					18		
					20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes: Drove two holes 1 foot apart due to poor recovery

Total Drilled Depth: 15 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/22/22
Drilled By: Cascade Drilling
Drill Method: Direct Push







Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
	0.6	SB-11-0.5*			0		BROWN SILTY SAND WITH GRAVEL (SM), dry to moist, fine to coarse, little fines, little fine to coarse gravel, abundant cobbles (Fill) Location hand dug and grab sample collected from 0.5 feet bgs *Sample submitted for analysis
					2		
					4		
					6		
					8		
					10		
					12		
					14		
					16		
					18		
					20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 0.5 feet
Diameter of Boring: NA
Drill Date: 6/23/2022
Drilled By: Cascade Drilling
Drill Method: Shovel



Boring Completion	PID (PPM)	Sample ID	Sample Recovery (in)	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
 Bentonite Chips	2.2	SB-12-0.5*			0		LIGHT BROWNISH-GRAY SILTY SAND (SM) moist, fine to medium, little fines, few fine angular to subrounded to coarse gravel (Fill)
	2.3				2		BROWN SILTY SAND WITH GRAVEL (SM) moist, fine to coarse, some fines, little gravel, cobbles present (Fill)
			15		2		
					4		
	2.2	SB-12-6*			5.5		At 5.5 ft: 5-inch layer of concrete rubble, little gravel
	2.4				6		
			16		8		
					10		
	2.1	SB-12-11			12		
	2.7				14		
			14		14		
					16		Bottom of boring at 15 feet bgs Poor recovery due to presence of cobbles Boring backfilled with hydrated bentonite chips *Sample submitted for laboratory analysis
					18		
					20		

Project: Prose Fircrest Apartments
Project Number: 1325023.01.003
Site Location: Fircrest, WA
Logged By: R McLaughlin
Notes:

Total Drilled Depth: 15 feet
Diameter of Boring: 2.25 inches
Drill Date: 6/23/22
Drilled By: Cascade Drilling
Drill Method: Direct Push



Fremont
Analytical

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PES Environmental, Inc.

Dan Balbiani
2101 Fourth Avenue, Suite 1310
Seattle, WA 98121

RE: Prose Fircrest

Work Order Number: 2206436

July 18, 2022

Attention Dan Balbiani:

Fremont Analytical, Inc. received 59 sample(s) on 6/24/2022 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Gasoline by NWTPH-Gx

Mercury by EPA Method 7471B

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample Moisture (Percent Moisture)

Total Metals by EPA Method 6020B

Volatile Organic Compounds by EPA Method 8260D

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

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CLIENT REVIEW DRAFT

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Revision v1

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CLIENT: PES Environmental, Inc.
Project: Prose Fircrest
Work Order: 2206436

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2206436-001	SB-100-0.5	06/23/2022 8:00 AM	06/24/2022 12:55 PM
2206436-002	SB-1-0.5	06/23/2022 9:30 AM	06/24/2022 12:55 PM
2206436-003	SB-1-2	06/23/2022 9:40 AM	06/24/2022 12:55 PM
2206436-004	SB-1-7.5	06/23/2022 9:50 AM	06/24/2022 12:55 PM
2206436-005	SB-1-10	06/23/2022 9:53 AM	06/24/2022 12:55 PM
2206436-006	SB-4-1.5	06/23/2022 10:10 AM	06/24/2022 12:55 PM
2206436-007	SB-4-5.5	06/23/2022 10:30 AM	06/24/2022 12:55 PM
2206436-008	SB-4-10	06/23/2022 10:35 AM	06/24/2022 12:55 PM
2206436-009	SB-4-11	06/23/2022 10:50 AM	06/24/2022 12:55 PM
2206436-010	SB-4-13.5	06/23/2022 10:55 AM	06/24/2022 12:55 PM
2206436-011	SB-4-17	06/23/2022 11:16 AM	06/24/2022 12:55 PM
2206436-012	SB-5-1	06/23/2022 2:40 PM	06/24/2022 12:55 PM
2206436-013	SB-5-5	06/23/2022 2:45 PM	06/24/2022 12:55 PM
2206436-014	SB-5-7.5	06/23/2022 2:50 PM	06/24/2022 12:55 PM
2206436-015	SB-5-10.5	06/23/2022 2:50 PM	06/24/2022 12:55 PM
2206436-016	SB-5-14	06/23/2022 2:55 PM	06/24/2022 12:55 PM
2206436-017	SB-5-16	06/23/2022 3:00 PM	06/24/2022 12:55 PM
2206436-018	SB-5-17.5	06/23/2022 3:05 PM	06/24/2022 12:55 PM
2206436-019	SB-6-1	06/23/2022 1:55 PM	06/24/2022 12:55 PM
2206436-020	SB-6-6	06/23/2022 2:02 PM	06/24/2022 12:55 PM
2206436-021	SB-6-11	06/23/2022 2:10 PM	06/24/2022 12:55 PM
2206436-022	SB-6-15.5	06/23/2022 2:30 PM	06/24/2022 12:55 PM
2206436-023	SB-6-16	06/23/2022 2:20 PM	06/24/2022 12:55 PM
2206436-024	SB-6-18.5	06/23/2022 2:25 PM	06/24/2022 12:55 PM
2206436-025	SB-7-0.5	06/23/2022 1:05 PM	06/24/2022 12:55 PM
2206436-026	SB-7-2.5	06/23/2022 1:10 PM	06/24/2022 12:55 PM
2206436-027	SB-7-5.5	06/23/2022 1:15 PM	06/24/2022 12:55 PM
2206436-028	SB-7-10	06/23/2022 1:25 PM	06/24/2022 12:55 PM
2206436-029	SB-7-13.5	06/23/2022 1:30 PM	06/24/2022 12:55 PM
2206436-030	SB-7-15	06/23/2022 1:36 PM	06/24/2022 12:55 PM
2206436-031	SB-7-18	06/23/2022 1:40 PM	06/24/2022 12:55 PM
2206436-032	SB-8-0.5	06/23/2022 11:40 AM	06/24/2022 12:55 PM
2206436-033	SB-8-5	06/23/2022 11:50 AM	06/24/2022 12:55 PM
2206436-034	SB-8-6.5	06/23/2022 11:55 AM	06/24/2022 12:55 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest
Work Order: 2206436

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2206436-035	SB-8-11	06/23/2022 12:45 PM	06/24/2022 12:55 PM
2206436-036	SB-8-14	06/23/2022 12:50 PM	06/24/2022 12:55 PM
2206436-037	SB-8-16	06/23/2022 12:55 PM	06/24/2022 12:55 PM
2206436-038	SB-8-18	06/23/2022 1:00 PM	06/24/2022 12:55 PM
2206436-039	SB-12-0.5	06/23/2022 3:10 PM	06/24/2022 12:55 PM
2206436-040	SB-12-6	06/23/2022 3:20 PM	06/24/2022 12:55 PM
2206436-041	SB-12-11	06/23/2022 3:25 PM	06/24/2022 12:55 PM
2206436-042	SB-3-1	06/22/2022 10:08 AM	06/24/2022 12:55 PM
2206436-043	SB-3-5.5	06/22/2022 10:33 AM	06/24/2022 12:55 PM
2206436-044	SB-3-8	06/22/2022 10:45 AM	06/24/2022 12:55 PM
2206436-045	SB-3-10	06/22/2022 11:05 AM	06/24/2022 12:55 PM
2206436-046	SB-3-12	06/22/2022 11:08 AM	06/24/2022 12:55 PM
2206436-047	SB-3-16	06/22/2022 11:22 AM	06/24/2022 12:55 PM
2206436-048	SB-3-20	06/22/2022 11:25 AM	06/24/2022 12:55 PM
2206436-049	SB-3-21.5	06/22/2022 11:47 AM	06/24/2022 12:55 PM
2206436-050	SB-3-24	06/22/2022 11:50 AM	06/24/2022 12:55 PM
2206436-051	SB-9-1	06/22/2022 12:38 PM	06/24/2022 12:55 PM
2206436-052	SB-9-3	06/22/2022 12:40 PM	06/24/2022 12:55 PM
2206436-053	SB-9-6.5	06/22/2022 12:50 PM	06/24/2022 12:55 PM
2206436-054	SB-9-11.5	06/22/2022 12:53 PM	06/24/2022 12:55 PM
2206436-055	SB-9-15	06/22/2022 1:37 PM	06/24/2022 12:55 PM
2206436-056	SB-9-21.5	06/22/2022 2:00 PM	06/24/2022 12:55 PM
2206436-057	SB-10-1	06/22/2022 2:05 PM	06/24/2022 12:55 PM
2206436-058	SB-10-5	06/22/2022 2:15 PM	06/24/2022 12:55 PM
2206436-059	SB-10-11	06/22/2022 2:30 PM	06/24/2022 12:55 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2206436-001A) required Acid Cleanup Procedure (Using Method No 3665A).

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2206436-002A) required Acid Cleanup Procedure (Using Method No 3665A).

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2206436-001A) required Florisil Cleanup Procedure (Using Method No 3620C).

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2206436-002A) required Florisil Cleanup Procedure (Using Method No 3620C).

7/18/22: Revision 1 includes additional analysis requested by the client.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 37015 Analyst: OK

Aroclor 1016	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1221	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1232	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1242	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1248	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1254	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1260	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1262	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1268	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Total PCBs	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Surr: Decachlorobiphenyl	62.9	9.77 - 154		%Rec	1	7/5/2022 4:53:05 PM
Surr: Tetrachloro-m-xylene	62.1	24.2 - 187		%Rec	1	7/5/2022 4:53:05 PM

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.9		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Heavy Oil	ND	108		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Total Petroleum Hydrocarbons	ND	162		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Surr: 2-Fluorobiphenyl	79.2	50 - 150		%Rec	1	7/6/2022 2:07:58 PM
Surr: o-Terphenyl	78.6	50 - 150		%Rec	1	7/6/2022 2:07:58 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 37014 Analyst: OK

Benz(a)anthracene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Chrysene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(b)fluoranthene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(k)fluoranthene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(a)pyrene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Indeno(1,2,3-cd)pyrene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Dibenz(a,h)anthracene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Surr: 2-Fluorobiphenyl	72.3	69.4 - 124		%Rec	1	7/6/2022 11:08:04 AM
Surr: Terphenyl-d14 (surr)	92.8	68.7 - 149		%Rec	1	7/6/2022 11:08:04 AM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.43		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Surr: Toluene-d8	97.6	65 - 135		%Rec	1	7/5/2022 2:49:46 PM
Surr: 4-Bromofluorobenzene	93.0	65 - 135		%Rec	1	7/5/2022 2:49:46 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0543	Q	mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloromethane	ND	0.0869	Q	mg/Kg-dry	1	7/5/2022 2:49:46 PM
Vinyl chloride	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromomethane	ND	0.163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trichlorofluoromethane (CFC-11)	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloroethane	ND	0.130		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloroethene	ND	0.109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Acetone	ND	0.543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methylene chloride	ND	0.0163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
trans-1,2-Dichloroethene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methyl tert-butyl ether (MTBE)	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloroethane	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
cis-1,2-Dichloroethene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
(MEK) 2-Butanone	ND	0.489		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloroform	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,1-Trichloroethane (TCA)	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloropropene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Carbon tetrachloride	ND	0.0814		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichloroethane (EDC)	ND	0.0250		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Benzene	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trichloroethene (TCE)	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichloropropane	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromodichloromethane	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Dibromomethane	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
cis-1,3-Dichloropropene	ND	0.0869		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Toluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trans-1,3-Dichloropropylene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0814		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,2-Trichloroethane	ND	0.0185		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3-Dichloropropane	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Tetrachloroethene (PCE)	0.0690	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Dibromochloromethane	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dibromoethane (EDB)	ND	0.0109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
2-Hexanone (MBK)	ND	0.0652		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chlorobenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,1,2-Tetrachloroethane	ND	0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Ethylbenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
m,p-Xylene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
o-Xylene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Styrene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Isopropylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromoform	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,2,2-Tetrachloroethane	ND	0.0163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
n-Propylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3,5-Trimethylbenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
2-Chlorotoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
4-Chlorotoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
tert-Butylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,3-Trichloropropane	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,4-Trichlorobenzene	ND	0.0434		mg/Kg-dry	1	7/5/2022 2:49:46 PM
sec-Butylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
4-Isopropyltoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3-Dichlorobenzene	ND	0.0380		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,4-Dichlorobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
n-Butylbenzene	ND	0.0434		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichlorobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dibromo-3-chloropropane	ND	0.0652		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,4-Trimethylbenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Hexachloro-1,3-butadiene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Naphthalene	ND	0.109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,3-Trichlorobenzene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Surr: Dibromofluoromethane	88.9	74.9 - 120		%Rec	1	7/5/2022 2:49:46 PM
Surr: Toluene-d8	93.9	76.7 - 125		%Rec	1	7/5/2022 2:49:46 PM
Surr: 1-Bromo-4-fluorobenzene	93.0	63.3 - 136		%Rec	1	7/5/2022 2:49:46 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018

Analyst: SS

Mercury	ND	0.267		mg/Kg-dry	1	7/5/2022 2:44:28 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001

Analyst: EH

Arsenic	2.51	0.0977		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Barium	47.6	0.489		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Cadmium	ND	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Chromium	24.9	0.326		mg/Kg-dry	1	7/5/2022 2:40:30 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Lead	2.58	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Selenium	0.811	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Silver	ND	0.122		mg/Kg-dry	1	7/5/2022 2:40:30 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	6.96			wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 37015 Analyst: OK

Aroclor 1016	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1221	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1232	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1242	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1248	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1254	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1260	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1262	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1268	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Total PCBs	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Surr: Decachlorobiphenyl	65.8	9.77 - 154		%Rec	1	7/5/2022 5:02:53 PM
Surr: Tetrachloro-m-xylene	63.8	24.2 - 187		%Rec	1	7/5/2022 5:02:53 PM

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	56.7		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Heavy Oil	ND	113		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Total Petroleum Hydrocarbons	ND	170		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Surr: 2-Fluorobiphenyl	74.3	50 - 150		%Rec	1	7/6/2022 2:41:03 PM
Surr: o-Terphenyl	76.1	50 - 150		%Rec	1	7/6/2022 2:41:03 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 37014 Analyst: OK

Benz(a)anthracene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Chrysene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(b)fluoranthene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(k)fluoranthene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(a)pyrene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Indeno(1,2,3-cd)pyrene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Dibenz(a,h)anthracene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Surr: 2-Fluorobiphenyl	74.7	69.4 - 124		%Rec	1	7/6/2022 12:33:22 PM
Surr: Terphenyl-d14 (surr)	92.8	68.7 - 149		%Rec	1	7/6/2022 12:33:22 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.74		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Surr: Toluene-d8	97.4	65 - 135		%Rec	1	7/5/2022 3:52:39 PM
Surr: 4-Bromofluorobenzene	95.8	65 - 135		%Rec	1	7/5/2022 3:52:39 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0574	Q	mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloromethane	ND	0.0918	Q	mg/Kg-dry	1	7/5/2022 3:52:39 PM
Vinyl chloride	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromomethane	ND	0.172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trichlorofluoromethane (CFC-11)	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloroethane	ND	0.138		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloroethene	ND	0.115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Acetone	ND	0.574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methylene chloride	ND	0.0172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
trans-1,2-Dichloroethene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methyl tert-butyl ether (MTBE)	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloroethane	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
cis-1,2-Dichloroethene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
(MEK) 2-Butanone	ND	0.516		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloroform	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,1-Trichloroethane (TCA)	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloropropene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Carbon tetrachloride	ND	0.0860		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichloroethane (EDC)	ND	0.0264		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Benzene	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trichloroethene (TCE)	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichloropropane	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromodichloromethane	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Dibromomethane	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
cis-1,3-Dichloropropene	ND	0.0918		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Toluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trans-1,3-Dichloropropylene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0860		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,2-Trichloroethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3-Dichloropropane	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Tetrachloroethene (PCE)	0.0794	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Dibromochloromethane	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dibromoethane (EDB)	ND	0.0115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
2-Hexanone (MBK)	ND	0.0688		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chlorobenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,1,2-Tetrachloroethane	ND	0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Ethylbenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
m,p-Xylene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
o-Xylene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Styrene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Isopropylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromoform	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,2,2-Tetrachloroethane	ND	0.0172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
n-Propylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3,5-Trimethylbenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
2-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
4-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
tert-Butylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,3-Trichloropropane	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,4-Trichlorobenzene	ND	0.0459		mg/Kg-dry	1	7/5/2022 3:52:39 PM
sec-Butylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
4-Isopropyltoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3-Dichlorobenzene	ND	0.0401		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,4-Dichlorobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
n-Butylbenzene	ND	0.0459		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichlorobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dibromo-3-chloropropane	ND	0.0688		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,4-Trimethylbenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Hexachloro-1,3-butadiene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Naphthalene	ND	0.115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,3-Trichlorobenzene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Surr: Dibromofluoromethane	88.3	74.9 - 120		%Rec	1	7/5/2022 3:52:39 PM
Surr: Toluene-d8	94.4	76.7 - 125		%Rec	1	7/5/2022 3:52:39 PM
Surr: 1-Bromo-4-fluorobenzene	95.8	63.3 - 136		%Rec	1	7/5/2022 3:52:39 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018

Analyst: SS

Mercury	ND	0.288		mg/Kg-dry	1	7/5/2022 2:51:17 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001

Analyst: EH

Arsenic	2.51	0.104		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Barium	78.6	0.520		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Cadmium	ND	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Chromium	22.2	0.347		mg/Kg-dry	1	7/5/2022 2:43:20 PM



Analytical Report

Work Order: 2206436
Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Lead	2.99	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Selenium	0.975	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Silver	ND	0.130		mg/Kg-dry	1	7/5/2022 2:43:20 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.2			wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:40:00 AM

Project: Prose Fircrest

Lab ID: 2206436-003

Matrix: Soil

Client Sample ID: SB-1-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37134

Analyst: TN

Vinyl chloride	ND	0.0267	H	mg/Kg-dry	1	7/15/2022 11:44:41 PM
1,1-Dichloroethene	ND	0.107	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
trans-1,2-Dichloroethene	ND	0.0320	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
cis-1,2-Dichloroethene	ND	0.0267	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Trichloroethene (TCE)	ND	0.0214	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Tetrachloroethene (PCE)	ND	0.0320	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Surr: Dibromofluoromethane	108	74.9 - 120	H	%Rec	1	7/15/2022 12:05:05 AM
Surr: Toluene-d8	102	76.7 - 125	H	%Rec	1	7/15/2022 12:05:05 AM
Surr: 1-Bromo-4-fluorobenzene	97.6	63.3 - 136	H	%Rec	1	7/15/2022 12:05:05 AM

Sample Moisture (Percent Moisture)

Batch ID: R76885

Analyst: me

Percent Moisture	6.16	0.500		wt%	1	7/15/2022 3:45:25 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	55.2		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Heavy Oil	ND	110		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Total Petroleum Hydrocarbons	ND	166		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Surr: 2-Fluorobiphenyl	81.7	50 - 150		%Rec	1	7/6/2022 2:52:13 PM
Surr: o-Terphenyl	81.8	50 - 150		%Rec	1	7/6/2022 2:52:13 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.00		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 4:24:00 PM
Surr: 4-Bromofluorobenzene	92.4	65 - 135		%Rec	1	7/5/2022 4:24:00 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0500	Q	mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloromethane	ND	0.0800	Q	mg/Kg-dry	1	7/5/2022 4:24:00 PM
Vinyl chloride	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromomethane	ND	0.150		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trichlorofluoromethane (CFC-11)	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloroethane	ND	0.120		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloroethene	ND	0.100		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Acetone	ND	0.500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methylene chloride	ND	0.0150		mg/Kg-dry	1	7/5/2022 4:24:00 PM
trans-1,2-Dichloroethene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloroethane	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
cis-1,2-Dichloroethene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
(MEK) 2-Butanone	ND	0.450		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloroform	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,1-Trichloroethane (TCA)	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloropropene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Carbon tetrachloride	ND	0.0750		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichloroethane (EDC)	ND	0.0230		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Benzene	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trichloroethene (TCE)	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichloropropane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromodichloromethane	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Dibromomethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
cis-1,3-Dichloropropene	ND	0.0800		mg/Kg-dry	1	7/5/2022 4:24:00 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trans-1,3-Dichloropropylene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0750		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,2-Trichloroethane	ND	0.0170		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3-Dichloropropane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Tetrachloroethene (PCE)	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Dibromochloromethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dibromoethane (EDB)	ND	0.0100		mg/Kg-dry	1	7/5/2022 4:24:00 PM
2-Hexanone (MBK)	ND	0.0600		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chlorobenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,1,2-Tetrachloroethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Ethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
m,p-Xylene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
o-Xylene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Styrene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Isopropylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromoform	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,2,2-Tetrachloroethane	ND	0.0150		mg/Kg-dry	1	7/5/2022 4:24:00 PM
n-Propylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3,5-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
2-Chlorotoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
4-Chlorotoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
tert-Butylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,3-Trichloropropane	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,4-Trichlorobenzene	ND	0.0400		mg/Kg-dry	1	7/5/2022 4:24:00 PM
sec-Butylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
4-Isopropyltoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3-Dichlorobenzene	ND	0.0350		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,4-Dichlorobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
n-Butylbenzene	ND	0.0400		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichlorobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dibromo-3-chloropropane	ND	0.0600		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,4-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Hexachloro-1,3-butadiene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Naphthalene	ND	0.100		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,3-Trichlorobenzene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Surr: Dibromofluoromethane	92.2	74.9 - 120		%Rec	1	7/5/2022 4:24:00 PM
Surr: Toluene-d8	96.5	76.7 - 125		%Rec	1	7/5/2022 4:24:00 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	92.3	63.3 - 136	%Rec	1	7/5/2022 4:24:00 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	8.14	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 10:10:00 AM

Project: Prose Fircrest

Lab ID: 2206436-006

Matrix: Soil

Client Sample ID: SB-4-1.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Vinyl chloride	ND	0.0282		mg/Kg-dry	1	7/5/2022 4:55:23 PM
1,1-Dichloroethene	ND	0.113		mg/Kg-dry	1	7/5/2022 4:55:23 PM
trans-1,2-Dichloroethene	ND	0.0338		mg/Kg-dry	1	7/5/2022 4:55:23 PM
cis-1,2-Dichloroethene	ND	0.0282		mg/Kg-dry	1	7/5/2022 4:55:23 PM
Trichloroethene (TCE)	ND	0.0225		mg/Kg-dry	1	7/5/2022 4:55:23 PM
Tetrachloroethene (PCE)	ND	0.0338		mg/Kg-dry	1	7/5/2022 4:55:23 PM
Surr: Dibromofluoromethane	92.8	74.9 - 120		%Rec	1	7/5/2022 4:55:23 PM
Surr: Toluene-d8	96.4	76.7 - 125		%Rec	1	7/5/2022 4:55:23 PM
Surr: 1-Bromo-4-fluorobenzene	92.2	63.3 - 136		%Rec	1	7/5/2022 4:55:23 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.2	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 10:35:00 AM

Project: Prose Fircrest

Lab ID: 2206436-008

Matrix: Soil

Client Sample ID: SB-4-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Vinyl chloride	ND	0.0238		mg/Kg-dry	1	7/5/2022 5:28:03 PM
1,1-Dichloroethene	ND	0.0951		mg/Kg-dry	1	7/5/2022 5:28:03 PM
trans-1,2-Dichloroethene	ND	0.0285		mg/Kg-dry	1	7/5/2022 5:28:03 PM
cis-1,2-Dichloroethene	ND	0.0238		mg/Kg-dry	1	7/5/2022 5:28:03 PM
Trichloroethene (TCE)	ND	0.0190		mg/Kg-dry	1	7/5/2022 5:28:03 PM
Tetrachloroethene (PCE)	ND	0.0285		mg/Kg-dry	1	7/5/2022 5:28:03 PM
Surr: Dibromofluoromethane	91.9	74.9 - 120		%Rec	1	7/5/2022 5:28:03 PM
Surr: Toluene-d8	95.6	76.7 - 125		%Rec	1	7/5/2022 5:28:03 PM
Surr: 1-Bromo-4-fluorobenzene	93.2	63.3 - 136		%Rec	1	7/5/2022 5:28:03 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	8.63	0.500		wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.4		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Total Petroleum Hydrocarbons	ND	160		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Surr: 2-Fluorobiphenyl	83.5	50 - 150		%Rec	1	7/6/2022 3:03:12 PM
Surr: o-Terphenyl	85.2	50 - 150		%Rec	1	7/6/2022 3:03:12 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	4.84		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 5:59:19 PM
Surr: 4-Bromofluorobenzene	93.7	65 - 135		%Rec	1	7/5/2022 5:59:19 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0484	Q	mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloromethane	ND	0.0775	Q	mg/Kg-dry	1	7/5/2022 5:59:19 PM
Vinyl chloride	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromomethane	ND	0.145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trichlorofluoromethane (CFC-11)	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloroethane	ND	0.116		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloroethene	ND	0.0968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Acetone	ND	0.484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methylene chloride	ND	0.0145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
trans-1,2-Dichloroethene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methyl tert-butyl ether (MTBE)	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloroethane	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
cis-1,2-Dichloroethene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
(MEK) 2-Butanone	ND	0.436		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloroform	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,1-Trichloroethane (TCA)	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloropropene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Carbon tetrachloride	ND	0.0726		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichloroethane (EDC)	ND	0.0223		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Benzene	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trichloroethene (TCE)	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichloropropane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromodichloromethane	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Dibromomethane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
cis-1,3-Dichloropropene	ND	0.0775		mg/Kg-dry	1	7/5/2022 5:59:19 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trans-1,3-Dichloropropylene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0726		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,2-Trichloroethane	ND	0.0165		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3-Dichloropropane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Tetrachloroethene (PCE)	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Dibromochloromethane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dibromoethane (EDB)	ND	0.00968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
2-Hexanone (MBK)	ND	0.0581		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chlorobenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,1,2-Tetrachloroethane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Ethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
m,p-Xylene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
o-Xylene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Styrene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Isopropylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromoform	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,2,2-Tetrachloroethane	ND	0.0145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
n-Propylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3,5-Trimethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
2-Chlorotoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
4-Chlorotoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
tert-Butylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,3-Trichloropropane	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,4-Trichlorobenzene	ND	0.0387		mg/Kg-dry	1	7/5/2022 5:59:19 PM
sec-Butylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
4-Isopropyltoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3-Dichlorobenzene	ND	0.0339		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,4-Dichlorobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
n-Butylbenzene	ND	0.0387		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichlorobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dibromo-3-chloropropane	ND	0.0581		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,4-Trimethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Hexachloro-1,3-butadiene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Naphthalene	ND	0.0968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,3-Trichlorobenzene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Surr: Dibromofluoromethane	88.6	74.9 - 120		%Rec	1	7/5/2022 5:59:19 PM
Surr: Toluene-d8	94.4	76.7 - 125		%Rec	1	7/5/2022 5:59:19 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	93.7	63.3 - 136	%Rec	1	7/5/2022 5:59:19 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018 Analyst: SS

Mercury	ND	0.276	mg/Kg-dry	1	7/5/2022 2:56:27 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Arsenic	1.97	0.106	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Barium	57.9	0.529	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Cadmium	ND	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Chromium	25.7	0.352	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Lead	1.96	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Selenium	0.876	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Silver	ND	0.132	mg/Kg-dry	1	7/5/2022 2:46:09 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	9.93	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	54.2		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Heavy Oil	231	108		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Total Petroleum Hydrocarbons	231	163		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Surr: 2-Fluorobiphenyl	83.5	50 - 150		%Rec	1	7/6/2022 3:14:11 PM
Surr: o-Terphenyl	88.2	50 - 150		%Rec	1	7/6/2022 3:14:11 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.88		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 6:30:37 PM
Surr: 4-Bromofluorobenzene	92.2	65 - 135		%Rec	1	7/5/2022 6:30:37 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0588	Q	mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloromethane	ND	0.0942	Q	mg/Kg-dry	1	7/5/2022 6:30:37 PM
Vinyl chloride	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromomethane	ND	0.177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trichlorofluoromethane (CFC-11)	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloroethane	ND	0.141		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloroethene	ND	0.118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Acetone	ND	0.588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methylene chloride	ND	0.0177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
trans-1,2-Dichloroethene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methyl tert-butyl ether (MTBE)	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloroethane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
cis-1,2-Dichloroethene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
(MEK) 2-Butanone	ND	0.530		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloroform	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,1-Trichloroethane (TCA)	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloropropene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Carbon tetrachloride	ND	0.0883		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichloroethane (EDC)	ND	0.0271		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Benzene	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trichloroethene (TCE)	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichloropropane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromodichloromethane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Dibromomethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
cis-1,3-Dichloropropene	ND	0.0942		mg/Kg-dry	1	7/5/2022 6:30:37 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trans-1,3-Dichloropropylene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0883		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,2-Trichloroethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3-Dichloropropane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Tetrachloroethene (PCE)	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Dibromochloromethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dibromoethane (EDB)	ND	0.0118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
2-Hexanone (MBK)	ND	0.0706		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chlorobenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,1,2-Tetrachloroethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Ethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
m,p-Xylene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
o-Xylene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Styrene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Isopropylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromoform	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,2,2-Tetrachloroethane	ND	0.0177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
n-Propylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3,5-Trimethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
2-Chlorotoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
4-Chlorotoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
tert-Butylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,3-Trichloropropane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,4-Trichlorobenzene	ND	0.0471		mg/Kg-dry	1	7/5/2022 6:30:37 PM
sec-Butylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
4-Isopropyltoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3-Dichlorobenzene	ND	0.0412		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,4-Dichlorobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
n-Butylbenzene	ND	0.0471		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichlorobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dibromo-3-chloropropane	ND	0.0706		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,4-Trimethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Hexachloro-1,3-butadiene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Naphthalene	ND	0.118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,3-Trichlorobenzene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Surr: Dibromofluoromethane	93.7	74.9 - 120		%Rec	1	7/5/2022 6:30:37 PM
Surr: Toluene-d8	96.1	76.7 - 125		%Rec	1	7/5/2022 6:30:37 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene 92.2 63.3 - 136 %Rec 1 7/5/2022 6:30:37 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture 8.43 0.500 wt% 1 7/5/2022 5:18:46 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	52.9		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Heavy Oil	ND	106		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Surr: 2-Fluorobiphenyl	73.0	50 - 150		%Rec	1	7/6/2022 3:36:15 PM
Surr: o-Terphenyl	77.6	50 - 150		%Rec	1	7/6/2022 3:36:15 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.20		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Surr: Toluene-d8	96.5	65 - 135		%Rec	1	7/5/2022 7:01:58 PM
Surr: 4-Bromofluorobenzene	92.3	65 - 135		%Rec	1	7/5/2022 7:01:58 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0520	Q	mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloromethane	ND	0.0832	Q	mg/Kg-dry	1	7/5/2022 7:01:58 PM
Vinyl chloride	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromomethane	ND	0.156		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trichlorofluoromethane (CFC-11)	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloroethane	ND	0.125		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloroethene	ND	0.104		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Acetone	ND	0.520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methylene chloride	ND	0.0156		mg/Kg-dry	1	7/5/2022 7:01:58 PM
trans-1,2-Dichloroethene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methyl tert-butyl ether (MTBE)	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloroethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
cis-1,2-Dichloroethene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
(MEK) 2-Butanone	ND	0.468		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloroform	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,1-Trichloroethane (TCA)	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloropropene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Carbon tetrachloride	ND	0.0780		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichloroethane (EDC)	ND	0.0239		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Benzene	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trichloroethene (TCE)	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichloropropane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromodichloromethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Dibromomethane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
cis-1,3-Dichloropropene	ND	0.0832		mg/Kg-dry	1	7/5/2022 7:01:58 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trans-1,3-Dichloropropylene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0780		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,2-Trichloroethane	ND	0.0177		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3-Dichloropropane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Tetrachloroethene (PCE)	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Dibromochloromethane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dibromoethane (EDB)	ND	0.0104		mg/Kg-dry	1	7/5/2022 7:01:58 PM
2-Hexanone (MBK)	ND	0.0624		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chlorobenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,1,2-Tetrachloroethane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Ethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
m,p-Xylene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
o-Xylene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Styrene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Isopropylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromoform	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,2,2-Tetrachloroethane	ND	0.0156		mg/Kg-dry	1	7/5/2022 7:01:58 PM
n-Propylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3,5-Trimethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
2-Chlorotoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
4-Chlorotoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
tert-Butylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,3-Trichloropropane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,4-Trichlorobenzene	ND	0.0416		mg/Kg-dry	1	7/5/2022 7:01:58 PM
sec-Butylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
4-Isopropyltoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3-Dichlorobenzene	ND	0.0364		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,4-Dichlorobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
n-Butylbenzene	ND	0.0416		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichlorobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dibromo-3-chloropropane	ND	0.0624		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,4-Trimethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Hexachloro-1,3-butadiene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Naphthalene	ND	0.104		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,3-Trichlorobenzene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Surr: Dibromofluoromethane	92.4	74.9 - 120		%Rec	1	7/5/2022 7:01:58 PM
Surr: Toluene-d8	95.1	76.7 - 125		%Rec	1	7/5/2022 7:01:58 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	92.3	63.3 - 136	%Rec	1	7/5/2022 7:01:58 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.0	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	51.0		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Heavy Oil	1,640	102		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Total Petroleum Hydrocarbons	1,640	153		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Surr: 2-Fluorobiphenyl	89.7	50 - 150		%Rec	1	7/6/2022 4:27:54 PM
Surr: o-Terphenyl	96.8	50 - 150		%Rec	1	7/6/2022 4:27:54 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	20.5	6.49		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Surr: Toluene-d8	96.6	65 - 135		%Rec	1	7/5/2022 7:33:21 PM
Surr: 4-Bromofluorobenzene	95.3	65 - 135		%Rec	1	7/5/2022 7:33:21 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0649	Q	mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloromethane	ND	0.104	Q	mg/Kg-dry	1	7/5/2022 7:33:21 PM
Vinyl chloride	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromomethane	ND	0.195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trichlorofluoromethane (CFC-11)	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloroethane	ND	0.156		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloroethene	ND	0.130		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Acetone	ND	0.649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methylene chloride	ND	0.0195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
trans-1,2-Dichloroethene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methyl tert-butyl ether (MTBE)	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloroethane	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
cis-1,2-Dichloroethene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
(MEK) 2-Butanone	ND	0.584		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloroform	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,1-Trichloroethane (TCA)	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloropropene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Carbon tetrachloride	ND	0.0974		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichloroethane (EDC)	ND	0.0299		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Benzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trichloroethene (TCE)	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichloropropane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromodichloromethane	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
cis-1,3-Dichloropropene	ND	0.104		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Toluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trans-1,3-Dichloropropylene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0974		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,2-Trichloroethane	ND	0.0221		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3-Dichloropropane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Tetrachloroethene (PCE)	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Dibromochloromethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dibromoethane (EDB)	ND	0.0130		mg/Kg-dry	1	7/5/2022 7:33:21 PM
2-Hexanone (MBK)	ND	0.0779		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chlorobenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,1,2-Tetrachloroethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Ethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
m,p-Xylene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
o-Xylene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Styrene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Isopropylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromoform	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,2,2-Tetrachloroethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
n-Propylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3,5-Trimethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
2-Chlorotoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
4-Chlorotoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
tert-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,3-Trichloropropane	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,4-Trichlorobenzene	ND	0.0519		mg/Kg-dry	1	7/5/2022 7:33:21 PM
sec-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
4-Isopropyltoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3-Dichlorobenzene	ND	0.0454		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,4-Dichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
n-Butylbenzene	ND	0.0519		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dibromo-3-chloropropane	ND	0.0779		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,4-Trimethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Hexachloro-1,3-butadiene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Naphthalene	2.23	1.30	D	mg/Kg-dry	10	7/6/2022 2:20:25 PM
1,2,3-Trichlorobenzene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	91.4	74.9 - 120	%Rec	1	7/5/2022 7:33:21 PM
Surr: Toluene-d8	95.3	76.7 - 125	%Rec	1	7/5/2022 7:33:21 PM
Surr: 1-Bromo-4-fluorobenzene	95.3	63.3 - 136	%Rec	1	7/5/2022 7:33:21 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	7.83	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	52.9		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Heavy Oil	147	106		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Surr: 2-Fluorobiphenyl	73.9	50 - 150		%Rec	1	7/6/2022 4:49:58 PM
Surr: o-Terphenyl	78.0	50 - 150		%Rec	1	7/6/2022 4:49:58 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.50		mg/Kg-dry	1	7/6/2022 1:49:03 PM
Surr: Toluene-d8	97.6	65 - 135		%Rec	1	7/6/2022 1:49:03 PM
Surr: 4-Bromofluorobenzene	92.3	65 - 135		%Rec	1	7/6/2022 1:49:03 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0550	Q	mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloromethane	ND	0.0880	Q	mg/Kg-dry	1	7/5/2022 8:04:42 PM
Vinyl chloride	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromomethane	ND	0.165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trichlorofluoromethane (CFC-11)	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloroethane	ND	0.132		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloroethene	ND	0.110		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Acetone	ND	0.550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methylene chloride	ND	0.0165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
trans-1,2-Dichloroethene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methyl tert-butyl ether (MTBE)	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloroethane	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
cis-1,2-Dichloroethene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
(MEK) 2-Butanone	ND	0.495		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloroform	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,1-Trichloroethane (TCA)	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloropropene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Carbon tetrachloride	ND	0.0825		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichloroethane (EDC)	ND	0.0253		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Benzene	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trichloroethene (TCE)	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichloropropane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromodichloromethane	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Dibromomethane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
cis-1,3-Dichloropropene	ND	0.0880		mg/Kg-dry	1	7/5/2022 8:04:42 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trans-1,3-Dichloropropylene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0825		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,2-Trichloroethane	ND	0.0187		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3-Dichloropropane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Tetrachloroethene (PCE)	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Dibromochloromethane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dibromoethane (EDB)	ND	0.0110		mg/Kg-dry	1	7/5/2022 8:04:42 PM
2-Hexanone (MBK)	ND	0.0660		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chlorobenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,1,2-Tetrachloroethane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Ethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
m,p-Xylene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
o-Xylene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Styrene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Isopropylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromoform	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,2,2-Tetrachloroethane	ND	0.0165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
n-Propylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3,5-Trimethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
2-Chlorotoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
4-Chlorotoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
tert-Butylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,3-Trichloropropane	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,4-Trichlorobenzene	ND	0.0440		mg/Kg-dry	1	7/5/2022 8:04:42 PM
sec-Butylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
4-Isopropyltoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3-Dichlorobenzene	ND	0.0385		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,4-Dichlorobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
n-Butylbenzene	ND	0.0440		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichlorobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dibromo-3-chloropropane	ND	0.0660		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,4-Trimethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Hexachloro-1,3-butadiene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Naphthalene	ND	0.110		mg/Kg-dry	1	7/6/2022 1:49:03 PM
1,2,3-Trichlorobenzene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Surr: Dibromofluoromethane	94.2	74.9 - 120		%Rec	1	7/5/2022 8:04:42 PM
Surr: Toluene-d8	109	76.7 - 125		%Rec	1	7/5/2022 8:04:42 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	95.3	63.3 - 136	%Rec	1	7/5/2022 8:04:42 PM
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Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.9	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	54.9		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Heavy Oil	ND	110		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Total Petroleum Hydrocarbons	ND	165		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Surr: 2-Fluorobiphenyl	70.5	50 - 150		%Rec	1	7/6/2022 5:12:06 PM
Surr: o-Terphenyl	75.1	50 - 150		%Rec	1	7/6/2022 5:12:06 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	8.61	5.48		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Surr: Toluene-d8	97.3	65 - 135		%Rec	1	7/5/2022 8:35:59 PM
Surr: 4-Bromofluorobenzene	95.5	65 - 135		%Rec	1	7/5/2022 8:35:59 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0548	Q	mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloromethane	ND	0.0877	Q	mg/Kg-dry	1	7/5/2022 8:35:59 PM
Vinyl chloride	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromomethane	ND	0.164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trichlorofluoromethane (CFC-11)	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloroethane	ND	0.132		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloroethene	ND	0.110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Acetone	ND	0.548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methylene chloride	ND	0.0164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
trans-1,2-Dichloroethene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methyl tert-butyl ether (MTBE)	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloroethane	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
cis-1,2-Dichloroethene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
(MEK) 2-Butanone	ND	0.493		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloroform	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,1-Trichloroethane (TCA)	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloropropene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Carbon tetrachloride	ND	0.0822		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichloroethane (EDC)	ND	0.0252		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Benzene	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trichloroethene (TCE)	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichloropropane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromodichloromethane	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
cis-1,3-Dichloropropene	ND	0.0877		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Toluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trans-1,3-Dichloropropylene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0822		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,2-Trichloroethane	ND	0.0186		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3-Dichloropropane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Tetrachloroethene (PCE)	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Dibromochloromethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dibromoethane (EDB)	ND	0.0110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
2-Hexanone (MBK)	ND	0.0658		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chlorobenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,1,2-Tetrachloroethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Ethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
m,p-Xylene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
o-Xylene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Styrene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Isopropylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromoform	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,2,2-Tetrachloroethane	ND	0.0164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
n-Propylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3,5-Trimethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
2-Chlorotoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
4-Chlorotoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
tert-Butylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,3-Trichloropropane	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,4-Trichlorobenzene	ND	0.0438		mg/Kg-dry	1	7/5/2022 8:35:59 PM
sec-Butylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
4-Isopropyltoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3-Dichlorobenzene	ND	0.0384		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,4-Dichlorobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
n-Butylbenzene	ND	0.0438		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichlorobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dibromo-3-chloropropane	ND	0.0658		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,4-Trimethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Hexachloro-1,3-butadiene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Naphthalene	ND	0.110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,3-Trichlorobenzene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	87.7	74.9 - 120	%Rec	1	7/5/2022 8:35:59 PM
Surr: Toluene-d8	92.4	76.7 - 125	%Rec	1	7/5/2022 8:35:59 PM
Surr: 1-Bromo-4-fluorobenzene	95.4	63.3 - 136	%Rec	1	7/5/2022 8:35:59 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.6	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.5		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Total Petroleum Hydrocarbons	ND	161		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Surr: 2-Fluorobiphenyl	74.4	50 - 150		%Rec	1	7/6/2022 5:34:25 PM
Surr: o-Terphenyl	77.8	50 - 150		%Rec	1	7/6/2022 5:34:25 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.69		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Surr: Toluene-d8	96.3	65 - 135		%Rec	1	7/5/2022 9:07:20 PM
Surr: 4-Bromofluorobenzene	94.0	65 - 135		%Rec	1	7/5/2022 9:07:20 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0569	Q	mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloromethane	ND	0.0910	Q	mg/Kg-dry	1	7/5/2022 9:07:20 PM
Vinyl chloride	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromomethane	ND	0.171		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trichlorofluoromethane (CFC-11)	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloroethane	ND	0.136		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloroethene	ND	0.114		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Acetone	ND	0.569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methylene chloride	ND	0.0171		mg/Kg-dry	1	7/5/2022 9:07:20 PM
trans-1,2-Dichloroethene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methyl tert-butyl ether (MTBE)	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloroethane	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
cis-1,2-Dichloroethene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
(MEK) 2-Butanone	ND	0.512		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloroform	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,1-Trichloroethane (TCA)	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloropropene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Carbon tetrachloride	ND	0.0853		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichloroethane (EDC)	ND	0.0262		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Benzene	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trichloroethene (TCE)	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichloropropane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromodichloromethane	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Dibromomethane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
cis-1,3-Dichloropropene	ND	0.0910		mg/Kg-dry	1	7/5/2022 9:07:20 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trans-1,3-Dichloropropylene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0853		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,2-Trichloroethane	ND	0.0193		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3-Dichloropropane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Tetrachloroethene (PCE)	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Dibromochloromethane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dibromoethane (EDB)	ND	0.0114		mg/Kg-dry	1	7/5/2022 9:07:20 PM
2-Hexanone (MBK)	ND	0.0682		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chlorobenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,1,2-Tetrachloroethane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Ethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
m,p-Xylene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
o-Xylene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Styrene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Isopropylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromoform	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,2,2-Tetrachloroethane	ND	0.0171		mg/Kg-dry	1	7/5/2022 9:07:20 PM
n-Propylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3,5-Trimethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
2-Chlorotoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
4-Chlorotoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
tert-Butylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,3-Trichloropropane	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,4-Trichlorobenzene	ND	0.0455		mg/Kg-dry	1	7/5/2022 9:07:20 PM
sec-Butylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
4-Isopropyltoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3-Dichlorobenzene	ND	0.0398		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,4-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
n-Butylbenzene	ND	0.0455		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dibromo-3-chloropropane	ND	0.0682		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,4-Trimethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Hexachloro-1,3-butadiene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Naphthalene	ND	0.114		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,3-Trichlorobenzene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Surr: Dibromofluoromethane	90.8	74.9 - 120		%Rec	1	7/5/2022 9:07:20 PM
Surr: Toluene-d8	95.7	76.7 - 125		%Rec	1	7/5/2022 9:07:20 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	93.9	63.3 - 136	%Rec	1	7/5/2022 9:07:20 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.4	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.7		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Total Petroleum Hydrocarbons	ND	161		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Surr: 2-Fluorobiphenyl	72.0	50 - 150		%Rec	1	7/6/2022 6:41:08 PM
Surr: o-Terphenyl	76.2	50 - 150		%Rec	1	7/6/2022 6:41:08 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	11.5	4.87		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Surr: Toluene-d8	96.0	65 - 135		%Rec	1	7/5/2022 9:38:43 PM
Surr: 4-Bromofluorobenzene	97.5	65 - 135		%Rec	1	7/5/2022 9:38:43 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0487	Q	mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloromethane	ND	0.0780	Q	mg/Kg-dry	1	7/5/2022 9:38:43 PM
Vinyl chloride	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromomethane	ND	0.146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trichlorofluoromethane (CFC-11)	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloroethane	ND	0.117		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloroethene	ND	0.0975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Acetone	ND	0.487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methylene chloride	ND	0.0146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
trans-1,2-Dichloroethene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methyl tert-butyl ether (MTBE)	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloroethane	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
cis-1,2-Dichloroethene	0.0918	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
(MEK) 2-Butanone	ND	0.439		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloroform	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,1-Trichloroethane (TCA)	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloropropene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Carbon tetrachloride	ND	0.0731		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichloroethane (EDC)	ND	0.0224		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Benzene	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trichloroethene (TCE)	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichloropropane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromodichloromethane	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
cis-1,3-Dichloropropene	ND	0.0780		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Toluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trans-1,3-Dichloropropylene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0731		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,2-Trichloroethane	ND	0.0166		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3-Dichloropropane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Tetrachloroethene (PCE)	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Dibromochloromethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dibromoethane (EDB)	ND	0.00975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
2-Hexanone (MBK)	ND	0.0585		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chlorobenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,1,2-Tetrachloroethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Ethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
m,p-Xylene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
o-Xylene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Styrene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Isopropylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromoform	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,2,2-Tetrachloroethane	ND	0.0146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
n-Propylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3,5-Trimethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
2-Chlorotoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
4-Chlorotoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
tert-Butylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,3-Trichloropropane	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,4-Trichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 9:38:43 PM
sec-Butylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
4-Isopropyltoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,4-Dichlorobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
n-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichlorobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dibromo-3-chloropropane	ND	0.0585		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,4-Trimethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Hexachloro-1,3-butadiene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Naphthalene	ND	0.0975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,3-Trichlorobenzene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	92.3	74.9 - 120	%Rec	1	7/5/2022 9:38:43 PM
Surr: Toluene-d8	93.6	76.7 - 125	%Rec	1	7/5/2022 9:38:43 PM
Surr: 1-Bromo-4-fluorobenzene	97.4	63.3 - 136	%Rec	1	7/5/2022 9:38:43 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018 Analyst: SS

Mercury	ND	0.271	mg/Kg-dry	1	7/5/2022 2:58:08 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Arsenic	1.80	0.100	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Barium	61.4	0.500	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Cadmium	ND	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Chromium	22.5	0.333	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Lead	1.96	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Selenium	0.724	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Silver	ND	0.125	mg/Kg-dry	1	7/5/2022 2:48:59 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.6	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.2		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Heavy Oil	ND	106		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Total Petroleum Hydrocarbons	ND	160		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Surr: 2-Fluorobiphenyl	74.4	50 - 150		%Rec	1	7/6/2022 6:52:14 PM
Surr: o-Terphenyl	75.3	50 - 150		%Rec	1	7/6/2022 6:52:14 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	4.98		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Surr: Toluene-d8	96.3	65 - 135		%Rec	1	7/6/2022 12:47:04 AM
Surr: 4-Bromofluorobenzene	92.5	65 - 135		%Rec	1	7/6/2022 12:47:04 AM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0498	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloromethane	ND	0.0796	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Vinyl chloride	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromomethane	ND	0.149		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trichlorofluoromethane (CFC-11)	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloroethane	ND	0.119		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloroethene	ND	0.0995		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Acetone	ND	0.498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methylene chloride	ND	0.0149		mg/Kg-dry	1	7/6/2022 12:47:04 AM
trans-1,2-Dichloroethene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methyl tert-butyl ether (MTBE)	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloroethane	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
cis-1,2-Dichloroethene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
(MEK) 2-Butanone	ND	0.448		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloroform	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,1-Trichloroethane (TCA)	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloropropene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Carbon tetrachloride	ND	0.0746		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichloroethane (EDC)	ND	0.0229		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Benzene	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trichloroethene (TCE)	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichloropropane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromodichloromethane	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Dibromomethane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
cis-1,3-Dichloropropene	ND	0.0796		mg/Kg-dry	1	7/6/2022 12:47:04 AM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trans-1,3-Dichloropropylene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methyl Isobutyl Ketone (MIBK)	ND	0.0746		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,2-Trichloroethane	ND	0.0169		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3-Dichloropropane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Tetrachloroethene (PCE)	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Dibromochloromethane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dibromoethane (EDB)	ND	0.00995		mg/Kg-dry	1	7/6/2022 12:47:04 AM
2-Hexanone (MBK)	ND	0.0597	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chlorobenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,1,2-Tetrachloroethane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Ethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
m,p-Xylene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
o-Xylene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Styrene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Isopropylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromoform	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,2,2-Tetrachloroethane	ND	0.0149		mg/Kg-dry	1	7/6/2022 12:47:04 AM
n-Propylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3,5-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
2-Chlorotoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
4-Chlorotoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
tert-Butylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,3-Trichloropropane	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,4-Trichlorobenzene	ND	0.0398		mg/Kg-dry	1	7/6/2022 12:47:04 AM
sec-Butylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
4-Isopropyltoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3-Dichlorobenzene	ND	0.0348		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,4-Dichlorobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
n-Butylbenzene	ND	0.0398		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichlorobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dibromo-3-chloropropane	ND	0.0597		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,4-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Hexachloro-1,3-butadiene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Naphthalene	ND	0.0995		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,3-Trichlorobenzene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Surr: Dibromofluoromethane	91.9	74.9 - 120		%Rec	1	7/6/2022 12:47:04 AM
Surr: Toluene-d8	95.2	76.7 - 125		%Rec	1	7/6/2022 12:47:04 AM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	92.5	63.3 - 136	%Rec	1	7/6/2022 12:47:04 AM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	10.1	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:10:00 PM

Project: Prose Fircrest

Lab ID: 2206436-039

Matrix: Soil

Client Sample ID: SB-12-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	51.1		mg/Kg-dry	1	7/6/2022 7:03:20 PM
Heavy Oil	ND	102		mg/Kg-dry	1	7/6/2022 7:03:20 PM
Total Petroleum Hydrocarbons	ND	153		mg/Kg-dry	1	7/6/2022 7:03:20 PM
Surr: 2-Fluorobiphenyl	72.5	50 - 150		%Rec	1	7/6/2022 7:03:20 PM
Surr: o-Terphenyl	76.5	50 - 150		%Rec	1	7/6/2022 7:03:20 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	7.66	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:20:00 PM

Project: Prose Fircrest

Lab ID: 2206436-040

Matrix: Soil

Client Sample ID: SB-12-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	52.6		mg/Kg-dry	1	7/6/2022 7:14:25 PM
Heavy Oil	ND	105		mg/Kg-dry	1	7/6/2022 7:14:25 PM
Total Petroleum Hydrocarbons	ND	158		mg/Kg-dry	1	7/6/2022 7:14:25 PM
Surr: 2-Fluorobiphenyl	74.1	50 - 150		%Rec	1	7/6/2022 7:14:25 PM
Surr: o-Terphenyl	77.0	50 - 150		%Rec	1	7/6/2022 7:14:25 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.1	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 10:08:00 AM

Project: Prose Fircrest

Lab ID: 2206436-042

Matrix: Soil

Client Sample ID: SB-3-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Vinyl chloride	ND	0.0242		mg/Kg-dry	1	7/6/2022 1:18:25 AM
1,1-Dichloroethene	ND	0.0969		mg/Kg-dry	1	7/6/2022 1:18:25 AM
trans-1,2-Dichloroethene	ND	0.0291		mg/Kg-dry	1	7/6/2022 1:18:25 AM
cis-1,2-Dichloroethene	ND	0.0242		mg/Kg-dry	1	7/6/2022 1:18:25 AM
Trichloroethene (TCE)	ND	0.0194		mg/Kg-dry	1	7/6/2022 1:18:25 AM
Tetrachloroethene (PCE)	ND	0.0291		mg/Kg-dry	1	7/6/2022 1:18:25 AM
Surr: Dibromofluoromethane	90.2	74.9 - 120		%Rec	1	7/6/2022 1:18:25 AM
Surr: Toluene-d8	92.1	76.7 - 125		%Rec	1	7/6/2022 1:18:25 AM
Surr: 1-Bromo-4-fluorobenzene	95.4	63.3 - 136		%Rec	1	7/6/2022 1:18:25 AM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	14.6	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 10:45:00 AM

Project: Prose Fircrest

Lab ID: 2206436-044

Matrix: Soil

Client Sample ID: SB-3-8

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Vinyl chloride	ND	0.0199		mg/Kg-dry	1	7/6/2022 1:49:47 AM
1,1-Dichloroethene	ND	0.0794		mg/Kg-dry	1	7/6/2022 1:49:47 AM
trans-1,2-Dichloroethene	ND	0.0238		mg/Kg-dry	1	7/6/2022 1:49:47 AM
cis-1,2-Dichloroethene	ND	0.0199		mg/Kg-dry	1	7/6/2022 1:49:47 AM
Trichloroethene (TCE)	ND	0.0159		mg/Kg-dry	1	7/6/2022 1:49:47 AM
Tetrachloroethene (PCE)	ND	0.0238		mg/Kg-dry	1	7/6/2022 1:49:47 AM
Surr: Dibromofluoromethane	92.4	74.9 - 120		%Rec	1	7/6/2022 1:49:47 AM
Surr: Toluene-d8	96.9	76.7 - 125		%Rec	1	7/6/2022 1:49:47 AM
Surr: 1-Bromo-4-fluorobenzene	93.6	63.3 - 136		%Rec	1	7/6/2022 1:49:47 AM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	8.84	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 12:40:00 PM

Project: Prose Fircrest

Lab ID: 2206436-052

Matrix: Soil

Client Sample ID: SB-9-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	54.4		mg/Kg-dry	1	7/6/2022 7:36:37 PM
Heavy Oil	ND	109		mg/Kg-dry	1	7/6/2022 7:36:37 PM
Total Petroleum Hydrocarbons	ND	163		mg/Kg-dry	1	7/6/2022 7:36:37 PM
Surr: 2-Fluorobiphenyl	76.1	50 - 150		%Rec	1	7/6/2022 7:36:37 PM
Surr: o-Terphenyl	78.9	50 - 150		%Rec	1	7/6/2022 7:36:37 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	12.3	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 1:37:00 PM

Project: Prose Fircrest

Lab ID: 2206436-055

Matrix: Soil

Client Sample ID: SB-9-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	50.0		mg/Kg-dry	1	7/6/2022 7:47:50 PM
Heavy Oil	ND	100		mg/Kg-dry	1	7/6/2022 7:47:50 PM
Total Petroleum Hydrocarbons	ND	150		mg/Kg-dry	1	7/6/2022 7:47:50 PM
Surr: 2-Fluorobiphenyl	80.4	50 - 150		%Rec	1	7/6/2022 7:47:50 PM
Surr: o-Terphenyl	82.6	50 - 150		%Rec	1	7/6/2022 7:47:50 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	9.04	0.500		wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 2:05:00 PM

Project: Prose Fircrest

Lab ID: 2206436-057

Matrix: Soil

Client Sample ID: SB-10-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.1		mg/Kg-dry	1	7/6/2022 7:58:57 PM
Heavy Oil	ND	106		mg/Kg-dry	1	7/6/2022 7:58:57 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	7/6/2022 7:58:57 PM
Surr: 2-Fluorobiphenyl	77.4	50 - 150		%Rec	1	7/6/2022 7:58:57 PM
Surr: o-Terphenyl	78.7	50 - 150		%Rec	1	7/6/2022 7:58:57 PM

Sample Moisture (Percent Moisture)

Batch ID: R76629 Analyst: ALB

Percent Moisture	11.6	0.500		wt%	1	7/6/2022 9:37:47 AM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/22/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-059

Matrix: Soil

Client Sample ID: SB-10-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	56.4		mg/Kg-dry	1	7/6/2022 8:10:03 PM
Heavy Oil	ND	113		mg/Kg-dry	1	7/6/2022 8:10:03 PM
Total Petroleum Hydrocarbons	ND	169		mg/Kg-dry	1	7/6/2022 8:10:03 PM
Surr: 2-Fluorobiphenyl	75.1	50 - 150		%Rec	1	7/6/2022 8:10:03 PM
Surr: o-Terphenyl	77.5	50 - 150		%Rec	1	7/6/2022 8:10:03 PM

Sample Moisture (Percent Moisture)

Batch ID: R76629 Analyst: ALB

Percent Moisture	12.1	0.500		wt%	1	7/6/2022 9:37:47 AM
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Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Total Metals by EPA Method 6020B

Sample ID: MB-37001		SampType: MBLK		Units: mg/Kg		Prep Date: 7/1/2022			RunNo: 76612			
Client ID: MBLKS		Batch ID: 37001					Analysis Date: 7/5/2022			SeqNo: 1572156		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Arsenic	ND	0.0923									
Barium	ND	0.462									
Cadmium	ND	0.154									
Chromium	ND	0.308									
Lead	ND	0.154									
Selenium	ND	0.154									
Silver	ND	0.115									

Sample ID: LCS-37001		SampType: LCS		Units: mg/Kg		Prep Date: 7/1/2022			RunNo: 76612		
Client ID: LCSS		Batch ID: 37001					Analysis Date: 7/5/2022			SeqNo: 1572157	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	38.9	0.0976	40.65	0	95.6	80	120				
Barium	42.2	0.488	40.65	0	104	80	120				
Cadmium	2.08	0.163	2.033	0	102	80	120				
Chromium	40.2	0.325	40.65	0	98.8	80	120				
Lead	20.8	0.163	20.33	0	103	80	120				
Selenium	3.77	0.163	4.065	0	92.8	80	120				
Silver	2.04	0.122	2.033	0	101	80	120				

Sample ID: 2206511-001AMS		SampType: MS		Units: mg/Kg		Prep Date: 7/1/2022			RunNo: 76612			
Client ID: BATCH		Batch ID: 37001					Analysis Date: 7/5/2022			SeqNo: 1572160		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Arsenic	37.3	0.0896	37.31	0.4480	98.7	75	125				
Barium	51.9	0.448	37.31	12.58	105	75	125				
Cadmium	1.93	0.149	1.866	0.05880	100	75	125				
Chromium	39.2	0.299	37.31	4.481	93.1	75	125				
Lead	19.5	0.149	18.66	1.070	98.5	75	125				
Selenium	3.94	0.149	3.731	0	106	75	125				
Silver	1.93	0.112	1.866	0.1161	97.1	75	125				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Total Metals by EPA Method 6020B

Sample ID: 2206511-001AMS		SampType: MS		Units: mg/Kg		Prep Date: 7/1/2022			RunNo: 76612			
Client ID: BATCH		Batch ID: 37001					Analysis Date: 7/5/2022			SeqNo: 1572160		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sample ID: 2206511-001AMSD		SampType: MSD		Units: mg/Kg		Prep Date: 7/1/2022			RunNo: 76612		
Client ID: BATCH		Batch ID: 37001					Analysis Date: 7/5/2022			SeqNo: 1572161	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	38.0	0.0909	37.88	0.4480	99.1	75	125	37.28	1.91	20	
Barium	52.3	0.455	37.88	12.58	105	75	125	51.86	0.825	20	
Cadmium	2.00	0.152	1.894	0.05880	103	75	125	1.930	3.57	20	
Chromium	40.7	0.303	37.88	4.481	95.7	75	125	39.21	3.79	20	
Lead	19.9	0.152	18.94	1.070	99.3	75	125	19.46	2.16	20	
Selenium	3.90	0.152	3.788	0	103	75	125	3.942	1.11	20	
Silver	1.95	0.114	1.894	0.1161	96.8	75	125	1.927	1.20	20	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Mercury by EPA Method 7471B

Sample ID: MB-37018	SampType: MBLK	Units: mg/Kg				Prep Date: 7/5/2022			RunNo: 76618		
Client ID: MBLKS	Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572348		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.250									

Sample ID: LCS-37018	SampType: LCS	Units: mg/Kg				Prep Date: 7/5/2022			RunNo: 76618		
Client ID: LCSS	Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572350		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.504	0.250	0.5000	0	101	80	120				

Sample ID: 2206436-001ADUP	SampType: DUP	Units: mg/Kg-dry				Prep Date: 7/5/2022			RunNo: 76618		
Client ID: SB-100-0.5	Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572355		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.254						0		20	

Sample ID: 2206436-001AMS	SampType: MS	Units: mg/Kg-dry				Prep Date: 7/5/2022			RunNo: 76618		
Client ID: SB-100-0.5	Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572357		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.589	0.265	0.5300	0.03188	105	70	130				

Sample ID: 2206436-001AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 7/5/2022			RunNo: 76618		
Client ID: SB-100-0.5	Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572359		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.560	0.268	0.5363	0.03188	98.5	70	130	0.5893	5.12	20	



Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Mercury by EPA Method 7471B

Sample ID: 2207024-005ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76618			
Client ID: BATCH		Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572379		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury	ND	0.300						0		20		

Sample ID: 2207024-005AMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76618			
Client ID: BATCH		Batch ID: 37018					Analysis Date: 7/5/2022			SeqNo: 1572380		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury	0.592	0.299	0.5976	0.04123	92.1	70	130					

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: MB-37029	SampType: MBLK	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76665			
Client ID: MBLKS	Batch ID: 37029				Analysis Date: 7/6/2022			SeqNo: 1573327			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	50.0									
Heavy Oil	ND	100									
Total Petroleum Hydrocarbons	ND	150									
Surr: 2-Fluorobiphenyl	7.88		10.00		78.8	50	150				
Surr: o-Terphenyl	7.97		10.00		79.7	50	150				

Sample ID: LCS-37029		SampType: LCS		Units: mg/Kg		Prep Date: 7/5/2022		RunNo: 76665			
Client ID: LCSS		Batch ID: 37029				Analysis Date: 7/6/2022		SeqNo: 1573328			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Petroleum Hydrocarbons	476	150	500.0	0	95.3	65.4	132				
Surr: 2-Fluorobiphenyl	8.45		10.00		84.5	50	150				
Surr: o-Terphenyl	9.58		10.00		95.8	50	150				

Sample ID: 2206436-001AMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76665			
Client ID: SB-100-0.5		Batch ID: 37029					Analysis Date: 7/6/2022			SeqNo: 1573330		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Total Petroleum Hydrocarbons	517	159	531.6	0	97.3	51.3	140				
Surr: 2-Fluorobiphenyl	9.21		10.63		86.6	50	150				
Surr: o-Terphenyl	10.1		10.63		94.7	50	150				

Sample ID: 2206436-001AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 7/5/2022				RunNo: 76665		
Client ID: SB-100-0.5	Batch ID: 37029					Analysis Date: 7/6/2022				SeqNo: 1573331		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Total Petroleum Hydrocarbons	481	159	529.5	0	90.8	51.3	140	517.3	7.30	30	
Surr: 2-Fluorobiphenyl	8.39		10.59		79.2	50	150		0		
Surr: o-Terphenyl	9.57		10.59		90.4	50	150		0		



Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: 2206436-040ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76665			
Client ID: SB-12-6		Batch ID: 37029				Analysis Date: 7/6/2022		SeqNo: 1573347			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	51.0						0		30	
Heavy Oil	ND	102						0		30	
Total Petroleum Hydrocarbons	ND	153						0		30	
Surr: 2-Fluorobiphenyl	7.39		10.21		72.4	50	150		0		
Surr: o-Terphenyl	7.60		10.21		74.4	50	150		0		

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: MB-37014		SampType: MBLK		Units: µg/Kg		Prep Date: 7/5/2022			RunNo: 76726			
Client ID: MBLKS		Batch ID: 37014					Analysis Date: 7/8/2022			SeqNo: 1574579		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Benz(a)anthracene	ND	20.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	20.0									
Benzo(k)fluoranthene	ND	20.0									
Benzo(a)pyrene	ND	20.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Surr: 2-Fluorobiphenyl	972		1,000		97.2	69.4	124				
Surr: Terphenyl-d14 (surr)	1,150		1,000		115	68.7	149				

Sample ID: 2206436-001AMS		SampType: MS		Units: µg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76726			
Client ID: SB-100-0.5		Batch ID: 37014					Analysis Date: 7/8/2022			SeqNo: 1574582		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Benz(a)anthracene	1,930	20.0	2,003	4.978	96.0	53.4	112				
Chrysene	1,870	40.1	2,003	0	93.3	52	105				
Benzo(b)fluoranthene	1,970	20.0	2,003	0	98.2	51.3	119				
Benzo(k)fluoranthene	1,910	20.0	2,003	0	95.4	50.3	108				
Benzo(a)pyrene	1,830	20.0	2,003	0	91.5	48.5	106				
Indeno(1,2,3-cd)pyrene	1,960	40.1	2,003	0	98.0	42.1	113				
Dibenz(a,h)anthracene	1,910	40.1	2,003	0	95.1	40.4	114				
Surr: 2-Fluorobiphenyl	864		1,002		86.3	69.4	124				
Surr: Terphenyl-d14 (surr)	937		1,002		93.5	68.7	149				

Sample ID: 2206436-001AMSD		SampType: MSD		Units: µg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76726			
Client ID: SB-100-0.5		Batch ID: 37014					Analysis Date: 7/8/2022			SeqNo: 1574583		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Benz(a)anthracene	1,900	19.9	1,987	4.978	95.3	53.4	112	1,929	1.58	30	
Chrysene	1,830	39.7	1,987	0	91.9	52	105	1,869	2.35	30	
Benzo(b)fluoranthene	1,930	19.9	1,987	0	96.9	51.3	119	1,968	2.21	30	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 2206436-001AMSD		SampType: MSD		Units: µg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76726			
Client ID: SB-100-0.5		Batch ID: 37014				Analysis Date: 7/8/2022		SeqNo: 1574583			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(k)fluoranthene	1,870	19.9	1,987	0	94.1	50.3	108	1,912	2.27	30	
Benzo(a)pyrene	1,790	19.9	1,987	0	89.9	48.5	106	1,832	2.56	30	
Indeno(1,2,3-cd)pyrene	1,910	39.7	1,987	0	96.4	42.1	113	1,963	2.49	30	
Dibenz(a,h)anthracene	1,860	39.7	1,987	0	93.7	40.4	114	1,905	2.28	30	
Surr: 2-Fluorobiphenyl	828		993.3		83.4	69.4	124		0		
Surr: Terphenyl-d14 (surr)	896		993.3		90.2	68.7	149		0		

Sample ID: LCS-37014		SampType: LCS		Units: µg/Kg		Prep Date: 7/5/2022		RunNo: 76726			
Client ID: LCSS		Batch ID: 37014				Analysis Date: 7/11/2022		SeqNo: 1574763			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	2,260	20.0	2,000	0	113	62.8	123				
Chrysene	2,280	40.0	2,000	0	114	56.7	124				
Benzo(b)fluoranthene	2,270	20.0	2,000	0	113	66.1	120				
Benzo(k)fluoranthene	2,250	20.0	2,000	0	112	60.5	115				
Benzo(a)pyrene	2,060	20.0	2,000	0	103	59	108				
Indeno(1,2,3-cd)pyrene	2,000	40.0	2,000	0	100	55.8	123				
Dibenz(a,h)anthracene	1,950	40.0	2,000	0	97.5	56.4	123				
Surr: 2-Fluorobiphenyl	922		1,000		92.2	69.4	124				
Surr: Terphenyl-d14 (surr)	1,040		1,000		104	68.7	149				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: MB-37015	SampType: MBLK	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76624			
Client ID: MBLKS	Batch ID: 37015				Analysis Date: 7/5/2022			SeqNo: 1572412			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0500									
Aroclor 1221	ND	0.0500									
Aroclor 1232	ND	0.0500									
Aroclor 1242	ND	0.0500									
Aroclor 1248	ND	0.0500									
Aroclor 1254	ND	0.0500									
Aroclor 1260	ND	0.0500									
Aroclor 1262	ND	0.0500									
Aroclor 1268	ND	0.0500									
Total PCBs	ND	0.0500									
Surr: Decachlorobiphenyl	120		200.0		60.0	9.77	154				
Surr: Tetrachloro-m-xylene	125		200.0		62.6	24.2	187				

Sample ID: 2206436-002AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 7/5/2022	RunNo: 76624							
Client ID: SB-1-0.5	Batch ID: 37015		Analysis Date: 7/5/2022	SeqNo: 1572416							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.704	0.0541	1.081	0	65.2	55.6	188				
Aroclor 1260	0.622	0.0541	1.081	0	57.5	54.5	178				
Surr: Decachlorobiphenyl	139		216.2		64.3	9.77	154				
Surr: Tetrachloro-m-xylene	137		216.2		63.4	24.2	187				

Sample ID: 2206436-002AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 7/5/2022			RunNo: 76624		
Client ID: SB-1-0.5	Batch ID: 37015					Analysis Date: 7/5/2022			SeqNo: 1572417		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.690	0.0547	1.094	0	63.0	55.6	188	0.7044	2.13	30	
Aroclor 1260	0.614	0.0547	1.094	0	56.1	54.5	178	0.6219	1.24	30	
Surr: Decachlorobiphenyl	136		218.9		61.9	9.77	154		0		
Surr: Tetrachloro-m-xylene	135		218.9		61.8	24.2	187		0		

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: LCS-37015	SampType: LCS	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76624			
Client ID: LCSS	Batch ID: 37015				Analysis Date: 7/6/2022			SeqNo: 1572519			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.810	0.0500	1.000	0	81.0	75.7	162				
Aroclor 1260	0.747	0.0500	1.000	0	74.7	57.8	183				
Surr: Decachlorobiphenyl	161		200.0		80.7	9.77	154				
Surr: Tetrachloro-m-xylene	156		200.0		77.9	24.2	187				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: LCS-37024		SampType: LCS			Units: mg/Kg		Prep Date: 7/5/2022			RunNo: 76622		
Client ID: LCSS		Batch ID: 37024			Analysis Date: 7/5/2022			SeqNo: 1572389				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	22.2	5.00	25.00	0	88.7	65	135				
Surr: Toluene-d8	1.16		1.250		92.9	65	135				
Surr: 4-Bromofluorobenzene	1.23		1.250		98.2	65	135				

Sample ID: MB-37024	SampType: MBLK	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76622			
Client ID: MBLKS	Batch ID: 37024				Analysis Date: 7/5/2022			SeqNo: 1572358			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	5.00									
Surr: Toluene-d8	1.22		1.250		97.4	65	135				
Surr: 4-Bromofluorobenzene	1.16		1.250		92.4	65	135				

Sample ID: 2206526-015BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 7/5/2022				RunNo: 76622		
Client ID: BATCH	Batch ID: 37024	Analysis Date: 7/5/2022				SeqNo: 1572354					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	3.27						0		30	
Surr: Toluene-d8	0.800		0.8187		97.7	65	135		0		
Surr: 4-Bromofluorobenzene	0.773		0.8187		94.5	65	135		0		

Sample ID: 2206436-001BDUP	SampType: DUP	Units: mg/Kg-dry				Prep Date: 7/5/2022				RunNo: 76622		
Client ID: SB-100-0.5	Batch ID: 37024					Analysis Date: 7/5/2022				SeqNo: 1572349		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.43						0		30	
Surr: Toluene-d8	1.33		1.357		97.7	65	135		0		
Surr: 4-Bromofluorobenzene	1.29		1.357		94.7	65	135		0		

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: 2206436-020BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76622			
Client ID: SB-6-6		Batch ID: 37024					Analysis Date: 7/5/2022			SeqNo: 1572587		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	26.6	5.20	26.01	0	102	65	135				
Surr: Toluene-d8	1.22		1.300		94.1	65	135				
Surr: 4-Bromofluorobenzene	1.25		1.300		96.3	65	135				

Sample ID: 2206436-003BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/14/2022			RunNo: 76879			
Client ID: SB-1-2		Batch ID: 37134					Analysis Date: 7/15/2022			SeqNo: 1578178		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.34						0		30	H
Surr: Toluene-d8	1.41		1.334		106	65	135		0		H
Surr: 4-Bromofluorobenzene	1.33		1.334		99.4	65	135		0		H

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37024	SampType: LCS	Units: mg/Kg				Prep Date: 7/5/2022			RunNo: 76621		
Client ID: LCSS	Batch ID: 37024	Analysis Date: 7/5/2022						SeqNo: 1572333			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.685	0.0500	1.000	0	68.5	80	120				S
Chloromethane	0.763	0.0800	1.000	0	76.3	80	120				S
Vinyl chloride	0.947	0.0250	1.000	0	94.7	80	120				
Bromomethane	1.17	0.150	1.000	0	117	80	120				
Trichlorofluoromethane (CFC-11)	0.971	0.0500	1.000	0	97.1	80	120				
Chloroethane	0.940	0.120	1.000	0	94.0	80	120				
1,1-Dichloroethene	0.930	0.100	1.000	0	93.0	80	120				
Acetone	2.41	0.500	2.500	0	96.2	80	120				
Methylene chloride	1.19	0.0150	1.000	0	119	80	120				
trans-1,2-Dichloroethene	1.11	0.0300	1.000	0	111	80	120				
Methyl tert-butyl ether (MTBE)	1.09	0.0300	1.000	0	109	80	120				
1,1-Dichloroethane	0.914	0.0250	1.000	0	91.4	80	120				
cis-1,2-Dichloroethene	0.967	0.0250	1.000	0	96.7	80	120				
(MEK) 2-Butanone	2.24	0.450	2.500	0	89.8	80	120				
Chloroform	0.937	0.0250	1.000	0	93.7	80	120				
1,1,1-Trichloroethane (TCA)	0.917	0.0250	1.000	0	91.7	80	120				
1,1-Dichloropropene	0.879	0.0250	1.000	0	87.9	80	120				
Carbon tetrachloride	0.934	0.0750	1.000	0	93.4	80	120				
1,2-Dichloroethane (EDC)	0.874	0.0230	1.000	0	87.4	80	120				
Benzene	0.940	0.0200	1.000	0	94.0	80	120				
Trichloroethene (TCE)	1.03	0.0200	1.000	0	103	80	120				
1,2-Dichloropropane	0.962	0.0200	1.000	0	96.2	80	120				
Bromodichloromethane	0.994	0.0250	1.000	0	99.4	80	120				
Dibromomethane	0.995	0.0200	1.000	0	99.5	80	120				
cis-1,3-Dichloropropene	0.944	0.0800	1.000	0	94.4	80	120				
Toluene	1.00	0.0300	1.000	0	100	80	120				
Trans-1,3-Dichloropropylene	0.897	0.0500	1.000	0	89.7	80	120				
Methyl Isobutyl Ketone (MIBK)	2.07	0.0750	2.500	0	83.0	80	120				
1,1,2-Trichloroethane	0.986	0.0170	1.000	0	98.6	80	120				
1,3-Dichloropropane	0.942	0.0200	1.000	0	94.2	80	120				
Tetrachloroethene (PCE)	1.02	0.0300	1.000	0	102	80	120				
Dibromochloromethane	1.09	0.0200	1.000	0	109	80	120				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37024	SampType: LCS	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: LCSS	Batch ID: 37024	Analysis Date: 7/5/2022						SeqNo: 1572333			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane (EDB)	0.986	0.0100	1.000	0	98.6	80	120				
2-Hexanone (MBK)	2.02	0.0600	2.500	0	80.8	80	120				
Chlorobenzene	0.993	0.0250	1.000	0	99.3	80	120				
1,1,1,2-Tetrachloroethane	1.02	0.0200	1.000	0	102	80	120				
Ethylbenzene	0.970	0.0250	1.000	0	97.0	80	120				
m,p-Xylene	2.00	0.0500	2.000	0	99.9	80	120				
o-Xylene	0.998	0.0250	1.000	0	99.8	80	120				
Styrene	0.995	0.0250	1.000	0	99.5	80	120				
Isopropylbenzene	0.963	0.0300	1.000	0	96.3	80	120				
Bromoform	1.07	0.0250	1.000	0	107	80	120				
1,1,2,2-Tetrachloroethane	0.858	0.0150	1.000	0	85.8	80	120				
n-Propylbenzene	0.962	0.0300	1.000	0	96.2	80	120				
Bromobenzene	1.01	0.0300	1.000	0	101	80	120				
1,3,5-Trimethylbenzene	0.985	0.0250	1.000	0	98.5	80	120				
2-Chlorotoluene	0.963	0.0300	1.000	0	96.3	80	120				
4-Chlorotoluene	0.972	0.0300	1.000	0	97.2	80	120				
tert-Butylbenzene	0.971	0.0300	1.000	0	97.1	80	120				
1,2,3-Trichloropropane	0.850	0.0250	1.000	0	85.0	80	120				
1,2,4-Trichlorobenzene	0.938	0.0400	1.000	0	93.8	80	120				
sec-Butylbenzene	0.977	0.0300	1.000	0	97.7	80	120				
4-Isopropyltoluene	0.994	0.0300	1.000	0	99.4	80	120				
1,3-Dichlorobenzene	1.02	0.0350	1.000	0	102	80	120				
1,4-Dichlorobenzene	1.01	0.0300	1.000	0	101	80	120				
n-Butylbenzene	0.972	0.0400	1.000	0	97.2	80	120				
1,2-Dichlorobenzene	1.02	0.0300	1.000	0	102	80	120				
1,2-Dibromo-3-chloropropane	0.858	0.0600	1.000	0	85.8	80	120				
1,2,4-Trimethylbenzene	0.985	0.0250	1.000	0	98.5	80	120				
Hexachloro-1,3-butadiene	1.01	0.0500	1.000	0	101	80	120				
Naphthalene	0.832	0.100	1.000	0	83.2	80	120				
1,2,3-Trichlorobenzene	0.902	0.0500	1.000	0	90.2	80	120				
Surr: Dibromofluoromethane	1.19		1.250		95.1	74.9	120				
Surr: Toluene-d8	1.24		1.250		99.2	76.7	125				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37024	SampType: LCS	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: LCSS	Batch ID: 37024	Analysis Date: 7/5/2022						SeqNo: 1572333			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1-Bromo-4-fluorobenzene	1.21		1.250		97.1	63.3	136				

NOTES:

S - Outlying spike recovery observed (low bias). Samples will be qualified with a Q.

Sample ID: MB-37024	SampType: MBLK	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: MBLKS	Batch ID: 37024				Analysis Date: 7/5/2022			SeqNo: 1572332			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0500									Q
Chloromethane	ND	0.0800									Q
Vinyl chloride	ND	0.0250									
Bromomethane	ND	0.150									
Trichlorofluoromethane (CFC-11)	ND	0.0500									
Chloroethane	ND	0.120									
1,1-Dichloroethene	ND	0.100									
Acetone	ND	0.500									
Methylene chloride	ND	0.0150									
trans-1,2-Dichloroethene	ND	0.0300									
Methyl tert-butyl ether (MTBE)	ND	0.0300									
1,1-Dichloroethane	ND	0.0250									
cis-1,2-Dichloroethene	ND	0.0250									
(MEK) 2-Butanone	ND	0.450									
Chloroform	ND	0.0250									
1,1,1-Trichloroethane (TCA)	ND	0.0250									
1,1-Dichloropropene	ND	0.0250									
Carbon tetrachloride	ND	0.0750									
1,2-Dichloroethane (EDC)	ND	0.0230									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0250									
Dibromomethane	ND	0.0200									

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: MB-37024	SampType: MBLK	Units: mg/Kg		Prep Date: 7/5/2022		RunNo: 76621					
Client ID: MBLKS	Batch ID: 37024			Analysis Date: 7/5/2022		SeqNo: 1572332					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,3-Dichloropropene	ND	0.0800									
Toluene	ND	0.0300									
Trans-1,3-Dichloropropylene	ND	0.0500									
Methyl Isobutyl Ketone (MIBK)	ND	0.0750									
1,1,2-Trichloroethane	ND	0.0170									
1,3-Dichloropropane	ND	0.0200									
Tetrachloroethene (PCE)	ND	0.0300									
Dibromochloromethane	ND	0.0200									
1,2-Dibromoethane (EDB)	ND	0.0100									
2-Hexanone (MBK)	ND	0.0600									
Chlorobenzene	ND	0.0250									
1,1,1,2-Tetrachloroethane	ND	0.0200									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Styrene	ND	0.0250									
Isopropylbenzene	ND	0.0300									
Bromoform	ND	0.0250									
1,1,2,2-Tetrachloroethane	ND	0.0150									
n-Propylbenzene	ND	0.0300									
Bromobenzene	ND	0.0300									
1,3,5-Trimethylbenzene	ND	0.0250									
2-Chlorotoluene	ND	0.0300									
4-Chlorotoluene	ND	0.0300									
tert-Butylbenzene	ND	0.0300									
1,2,3-Trichloropropane	ND	0.0250									
1,2,4-Trichlorobenzene	ND	0.0400									
sec-Butylbenzene	ND	0.0300									
4-Isopropyltoluene	ND	0.0300									
1,3-Dichlorobenzene	ND	0.0350									
1,4-Dichlorobenzene	ND	0.0300									
n-Butylbenzene	ND	0.0400									

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: MB-37024	SampType: MBLK	Units: mg/Kg	Prep Date: 7/5/2022	RunNo: 76621							
Client ID: MBLKS	Batch ID: 37024		Analysis Date: 7/5/2022	SeqNo: 1572332							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

1,2-Dichlorobenzene	ND	0.0300									
1,2-Dibromo-3-chloropropane	ND	0.0600									
1,2,4-Trimethylbenzene	ND	0.0250									
Hexachloro-1,3-butadiene	ND	0.0500									
Naphthalene	ND	0.100									
1,2,3-Trichlorobenzene	ND	0.0500									
Surr: Dibromofluoromethane	1.15		1.250		91.8	74.9	120				
Surr: Toluene-d8	1.20		1.250		96.3	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.15		1.250		92.4	63.3	136				

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample ID: 2206526-015BDUP	SampType: DUP	Units: mg/Kg-dry	Prep Date: 7/5/2022	RunNo: 76621							
Client ID: BATCH	Batch ID: 37024		Analysis Date: 7/5/2022	SeqNo: 1572330							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dichlorodifluoromethane (CFC-12)	ND	0.0327						0		30	Q
Chloromethane	ND	0.0524						0		30	Q
Vinyl chloride	ND	0.0164						0		30	
Bromomethane	ND	0.0982						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0327						0		30	
Chloroethane	ND	0.0786						0		30	
1,1-Dichloroethene	ND	0.0655						0		30	
Acetone	ND	0.327						0		30	
Methylene chloride	ND	0.00982						0		30	
trans-1,2-Dichloroethene	ND	0.0196						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0196						0		30	
1,1-Dichloroethane	ND	0.0164						0		30	
cis-1,2-Dichloroethene	ND	0.0164						0		30	
(MEK) 2-Butanone	ND	0.295						0		30	
Chloroform	ND	0.0164						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0164						0		30	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206526-015BDUP	SampType: DUP	Units: mg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76621					
Client ID: BATCH	Batch ID: 37024			Analysis Date: 7/5/2022		SeqNo: 1572330					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	0.0164						0		30	
Carbon tetrachloride	ND	0.0491						0		30	
1,2-Dichloroethane (EDC)	ND	0.0151						0		30	
Benzene	ND	0.0131						0		30	
Trichloroethene (TCE)	ND	0.0131						0		30	
1,2-Dichloropropane	ND	0.0131						0		30	
Bromodichloromethane	ND	0.0164						0		30	
Dibromomethane	ND	0.0131						0		30	
cis-1,3-Dichloropropene	ND	0.0524						0		30	
Toluene	ND	0.0196						0		30	
Trans-1,3-Dichloropropylene	ND	0.0327						0		30	
Methyl Isobutyl Ketone (MIBK)	ND	0.0491						0		30	
1,1,2-Trichloroethane	ND	0.0111						0		30	
1,3-Dichloropropane	ND	0.0131						0		30	
Tetrachloroethene (PCE)	ND	0.0196						0		30	
Dibromochloromethane	ND	0.0131						0		30	
1,2-Dibromoethane (EDB)	ND	0.00655						0		30	
2-Hexanone (MBK)	ND	0.0393						0		30	
Chlorobenzene	ND	0.0164						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0131						0		30	
Ethylbenzene	ND	0.0164						0		30	
m,p-Xylene	ND	0.0327						0		30	
o-Xylene	ND	0.0164						0		30	
Styrene	ND	0.0164						0		30	
Isopropylbenzene	ND	0.0196						0		30	
Bromoform	ND	0.0164						0		30	
1,1,2,2-Tetrachloroethane	ND	0.00982						0		30	
n-Propylbenzene	ND	0.0196						0		30	
Bromobenzene	ND	0.0196						0		30	
1,3,5-Trimethylbenzene	ND	0.0164						0		30	
2-Chlorotoluene	ND	0.0196						0		30	
4-Chlorotoluene	ND	0.0196						0		30	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206526-015BDUP	SampType: DUP	Units: mg/Kg-dry				Prep Date: 7/5/2022			RunNo: 76621		
Client ID: BATCH	Batch ID: 37024					Analysis Date: 7/5/2022			SeqNo: 1572330		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
tert-Butylbenzene	ND	0.0196						0		30	
1,2,3-Trichloropropane	ND	0.0164						0		30	
1,2,4-Trichlorobenzene	ND	0.0262						0		30	
sec-Butylbenzene	ND	0.0196						0		30	
4-Isopropyltoluene	ND	0.0196						0		30	
1,3-Dichlorobenzene	ND	0.0229						0		30	
1,4-Dichlorobenzene	ND	0.0196						0		30	
n-Butylbenzene	ND	0.0262						0		30	
1,2-Dichlorobenzene	ND	0.0196						0		30	
1,2-Dibromo-3-chloropropane	ND	0.0393						0		30	
1,2,4-Trimethylbenzene	ND	0.0164						0		30	
Hexachloro-1,3-butadiene	ND	0.0327						0		30	
Naphthalene	ND	0.0655						0		30	
1,2,3-Trichlorobenzene	ND	0.0327						0		30	
Surr: Dibromofluoromethane	0.740		0.8187		90.4	74.9	120		0		
Surr: Toluene-d8	0.764		0.8187		93.3	76.7	125		0		
Surr: 1-Bromo-4-fluorobenzene	0.773		0.8187		94.4	63.3	136		0		

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample ID: 2206436-001BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: SB-100-0.5	Batch ID: 37024				Analysis Date: 7/5/2022			SeqNo: 1572327			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0543						0		30	Q
Chloromethane	ND	0.0869						0		30	Q
Vinyl chloride	ND	0.0271						0		30	
Bromomethane	ND	0.163						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0543						0		30	
Chloroethane	ND	0.130						0		30	
1,1-Dichloroethene	ND	0.109						0		30	
Acetone	ND	0.543						0		30	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-001BDUP	SampType: DUP	Units: mg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76621					
Client ID: SB-100-0.5	Batch ID: 37024			Analysis Date: 7/5/2022		SeqNo: 1572327					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	0.0163						0		30	
trans-1,2-Dichloroethene	ND	0.0326						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0326						0		30	
1,1-Dichloroethane	ND	0.0271						0		30	
cis-1,2-Dichloroethene	ND	0.0271						0		30	
(MEK) 2-Butanone	ND	0.489						0		30	
Chloroform	ND	0.0271						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0271						0		30	
1,1-Dichloropropene	ND	0.0271						0		30	
Carbon tetrachloride	ND	0.0814						0		30	
1,2-Dichloroethane (EDC)	ND	0.0250						0		30	
Benzene	ND	0.0217						0		30	
Trichloroethene (TCE)	ND	0.0217						0		30	
1,2-Dichloropropane	ND	0.0217						0		30	
Bromodichloromethane	ND	0.0271						0		30	
Dibromomethane	ND	0.0217						0		30	
cis-1,3-Dichloropropene	ND	0.0869						0		30	
Toluene	ND	0.0326						0		30	
Trans-1,3-Dichloropropylene	ND	0.0543						0		30	
Methyl Isobutyl Ketone (MIBK)	ND	0.0814						0		30	
1,1,2-Trichloroethane	ND	0.0185						0		30	
1,3-Dichloropropane	ND	0.0217						0		30	
Tetrachloroethene (PCE)	0.0692	0.0326						0.06901	0.342	30	
Dibromochloromethane	ND	0.0217						0		30	
1,2-Dibromoethane (EDB)	ND	0.0109						0		30	
2-Hexanone (MBK)	ND	0.0652						0		30	
Chlorobenzene	ND	0.0271						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0217						0		30	
Ethylbenzene	ND	0.0271						0		30	
m,p-Xylene	ND	0.0543						0		30	
o-Xylene	ND	0.0271						0		30	
Styrene	ND	0.0271						0		30	

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-001BDUP	SampType: DUP	Units: mg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76621					
Client ID: SB-100-0.5	Batch ID: 37024			Analysis Date: 7/5/2022		SeqNo: 1572327					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.0326						0		30	
Bromoform	ND	0.0271						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0163						0		30	
n-Propylbenzene	ND	0.0326						0		30	
Bromobenzene	ND	0.0326						0		30	
1,3,5-Trimethylbenzene	ND	0.0271						0		30	
2-Chlorotoluene	ND	0.0326						0		30	
4-Chlorotoluene	ND	0.0326						0		30	
tert-Butylbenzene	ND	0.0326						0		30	
1,2,3-Trichloropropane	ND	0.0271						0		30	
1,2,4-Trichlorobenzene	ND	0.0434						0		30	
sec-Butylbenzene	ND	0.0326						0		30	
4-Isopropyltoluene	ND	0.0326						0		30	
1,3-Dichlorobenzene	ND	0.0380						0		30	
1,4-Dichlorobenzene	ND	0.0326						0		30	
n-Butylbenzene	ND	0.0434						0		30	
1,2-Dichlorobenzene	ND	0.0326						0		30	
1,2-Dibromo-3-chloropropane	ND	0.0652						0		30	
1,2,4-Trimethylbenzene	ND	0.0271						0		30	
Hexachloro-1,3-butadiene	ND	0.0543						0		30	
Naphthalene	ND	0.109						0		30	
1,2,3-Trichlorobenzene	ND	0.0543						0		30	
Surr: Dibromofluoromethane	1.19		1.357		87.6	74.9	120		0		
Surr: Toluene-d8	1.28		1.357		94.1	76.7	125		0		
Surr: 1-Bromo-4-fluorobenzene	1.29		1.357		94.7	63.3	136		0		

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-020BMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: SB-6-6	Batch ID: 37024	Analysis Date: 7/5/2022						SeqNo: 1572570			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.357	0.0520	1.040	0	34.3	7.77	152				
Chloromethane	0.554	0.0832	1.040	0	53.2	34.2	141				
Vinyl chloride	0.671	0.0260	1.040	0	64.5	49.3	143				
Bromomethane	0.898	0.156	1.040	0	86.3	47.1	163				
Trichlorofluoromethane (CFC-11)	1.02	0.0520	1.040	0	98.2	60.8	139				
Chloroethane	0.753	0.125	1.040	0	72.4	48.9	150				
1,1-Dichloroethene	1.04	0.104	1.040	0	100	68.8	133				
Acetone	3.40	0.520	2.601	0	131	70	145				
Methylene chloride	1.02	0.0156	1.040	0	98.0	70.1	131				
trans-1,2-Dichloroethene	0.924	0.0312	1.040	0	88.8	75.9	128				
Methyl tert-butyl ether (MTBE)	0.950	0.0312	1.040	0	91.3	66.4	139				
1,1-Dichloroethane	0.915	0.0260	1.040	0	88.0	72.3	131				
cis-1,2-Dichloroethene	0.997	0.0260	1.040	0	95.9	79.9	123				
(MEK) 2-Butanone	2.53	0.468	2.601	0	97.1	67.8	139				
Chloroform	0.969	0.0260	1.040	0	93.2	77.8	126				
1,1,1-Trichloroethane (TCA)	0.944	0.0260	1.040	0	90.7	78.5	126				
1,1-Dichloropropene	0.909	0.0260	1.040	0	87.4	76.7	127				
Carbon tetrachloride	0.952	0.0780	1.040	0	91.5	75.7	127				
1,2-Dichloroethane (EDC)	0.907	0.0239	1.040	0	87.2	73.9	128				
Benzene	0.965	0.0208	1.040	0	92.7	76.9	128				
Trichloroethene (TCE)	1.02	0.0208	1.040	0	98.1	76.1	134				
1,2-Dichloropropane	0.952	0.0208	1.040	0	91.5	74	129				
Bromodichloromethane	0.968	0.0260	1.040	0	93.1	77.1	124				
Dibromomethane	0.998	0.0208	1.040	0	95.9	79.1	124				
cis-1,3-Dichloropropene	0.941	0.0832	1.040	0	90.4	74.5	122				
Toluene	1.01	0.0312	1.040	0	97.3	79.5	127				
Trans-1,3-Dichloropropylene	0.925	0.0520	1.040	0	88.9	72.9	123				
Methyl Isobutyl Ketone (MIBK)	2.27	0.0780	2.601	0	87.3	63.8	142				
1,1,2-Trichloroethane	1.07	0.0177	1.040	0	103	76.9	126				
1,3-Dichloropropane	1.01	0.0208	1.040	0	97.5	74	128				
Tetrachloroethene (PCE)	1.08	0.0312	1.040	0	104	78.3	129				
Dibromochloromethane	1.09	0.0208	1.040	0	105	73.3	127				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-020BMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 7/5/2022			RunNo: 76621			
Client ID: SB-6-6	Batch ID: 37024	Analysis Date: 7/5/2022						SeqNo: 1572570			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane (EDB)	1.06	0.0104	1.040	0	102	76	126				
2-Hexanone (MBK)	1.97	0.0624	2.601	0	75.6	60.7	146				
Chlorobenzene	1.05	0.0260	1.040	0	101	81.8	123				
1,1,1,2-Tetrachloroethane	1.04	0.0208	1.040	0	100	79.4	124				
Ethylbenzene	1.03	0.0260	1.040	0	99.1	81.6	130				
m,p-Xylene	2.14	0.0520	2.080	0	103	80.6	128				
o-Xylene	1.07	0.0260	1.040	0	102	80.1	126				
Styrene	1.06	0.0260	1.040	0	102	81.4	125				
Isopropylbenzene	1.05	0.0312	1.040	0	101	80.7	131				
Bromoform	1.10	0.0260	1.040	0	105	70.5	132				
1,1,2,2-Tetrachloroethane	0.971	0.0156	1.040	0	93.3	60.1	136				
n-Propylbenzene	1.04	0.0312	1.040	0	100	79.4	136				
Bromobenzene	1.08	0.0312	1.040	0	104	78.9	125				
1,3,5-Trimethylbenzene	1.06	0.0260	1.040	0	102	78.7	131				
2-Chlorotoluene	1.04	0.0312	1.040	0	99.5	79.5	130				
4-Chlorotoluene	1.04	0.0312	1.040	0	100	79.8	128				
tert-Butylbenzene	1.08	0.0312	1.040	0	104	78.1	131				
1,2,3-Trichloropropane	0.958	0.0260	1.040	0	92.1	70.2	131				
1,2,4-Trichlorobenzene	1.01	0.0416	1.040	0	96.8	76	129				
sec-Butylbenzene	1.08	0.0312	1.040	0	104	76.5	136				
4-Isopropyltoluene	1.10	0.0312	1.040	0	105	75.7	135				
1,3-Dichlorobenzene	1.07	0.0364	1.040	0	102	83.2	124				
1,4-Dichlorobenzene	1.06	0.0312	1.040	0	102	82.9	125				
n-Butylbenzene	1.04	0.0416	1.040	0	100	77.8	130				
1,2-Dichlorobenzene	1.06	0.0312	1.040	0	102	82.8	125				
1,2-Dibromo-3-chloropropane	0.936	0.0624	1.040	0	90.0	64.2	137				
1,2,4-Trimethylbenzene	1.06	0.0260	1.040	0	102	77.4	131				
Hexachloro-1,3-butadiene	1.10	0.0520	1.040	0	106	70.9	136				
Naphthalene	0.966	0.104	1.040	0	92.8	59.4	152				
1,2,3-Trichlorobenzene	1.02	0.0520	1.040	0	98.4	68.5	138				
Surr: Dibromofluoromethane	1.27		1.300		98.0	74.9	120				
Surr: Toluene-d8	1.22		1.300		94.1	76.7	125				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-020BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76621			
Client ID: SB-6-6		Batch ID: 37024					Analysis Date: 7/5/2022			SeqNo: 1572570		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Surr: 1-Bromo-4-fluorobenzene	1.28	1.300	98.5	63.3	136
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Sample ID: LCS-37134		SampType: LCS		Units: µg/L		Prep Date: 7/14/2022			RunNo: 76878		
Client ID: LCSS		Batch ID: 37134					Analysis Date: 7/14/2022			SeqNo: 1578172	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

1,1-Dichloroethene	0.837	0.100	1.000	0	83.7	80	120
trans-1,2-Dichloroethene	0.864	0.0300	1.000	0	86.4	80	120
cis-1,2-Dichloroethene	1.08	0.0250	1.000	0	108	80	120
Trichloroethene (TCE)	1.07	0.0200	1.000	0	107	80	120
Tetrachloroethene (PCE)	1.01	0.0300	1.000	0	101	80	120
Surr: Dibromofluoromethane	1.36		1.250		109	74.9	120
Surr: Toluene-d8	1.29		1.250		103	76.7	125
Surr: 1-Bromo-4-fluorobenzene	1.32		1.250		106	63.3	136

Sample ID: MB-37134	SampType: MBLK	Units: mg/Kg	Prep Date: 7/14/2022	RunNo: 76878							
Client ID: MBLKS	Batch ID: 37134		Analysis Date: 7/14/2022	SeqNo: 1578171							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

1,1-Dichloroethene	ND	0.100					
trans-1,2-Dichloroethene	ND	0.0300					
cis-1,2-Dichloroethene	ND	0.0250					
Trichloroethene (TCE)	ND	0.0200					
Tetrachloroethene (PCE)	ND	0.0300					
Surr: Dibromofluoromethane	1.28		1.250		103	74.9	120
Surr: Toluene-d8	1.28		1.250		103	76.7	125
Surr: 1-Bromo-4-fluorobenzene	1.26		1.250		101	63.3	136

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206436-003BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/14/2022		RunNo: 76878			
Client ID: SB-1-2		Batch ID: 37134				Analysis Date: 7/15/2022		SeqNo: 1578166			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	ND	0.107						0		30	H
trans-1,2-Dichloroethene	ND	0.0320						0		30	H
cis-1,2-Dichloroethene	ND	0.0267						0		30	H
Trichloroethene (TCE)	ND	0.0214						0		30	H
Tetrachloroethene (PCE)	ND	0.0320						0		30	H
Surr: Dibromofluoromethane	1.45		1.334		109	74.9	120		0		H
Surr: Toluene-d8	1.41		1.334		106	76.7	125		0		H
Surr: 1-Bromo-4-fluorobenzene	1.31		1.334		97.9	63.3	136		0		H

Sample ID: 2207049-011BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/14/2022		RunNo: 76878			
Client ID: BATCH		Batch ID: 37134				Analysis Date: 7/15/2022		SeqNo: 1578168			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	0.873	0.0277	1.108	0	78.8	49.3	143				
1,1-Dichloroethene	0.935	0.111	1.108	0	84.4	68.8	133				
trans-1,2-Dichloroethene	1.02	0.0332	1.108	0	92.4	75.9	128				
cis-1,2-Dichloroethene	1.27	0.0277	1.108	0	115	79.9	123				
Trichloroethene (TCE)	1.29	0.0222	1.108	0	117	76.1	134				
Tetrachloroethene (PCE)	1.38	0.0332	1.108	0.1560	110	78.3	129				
Surr: Dibromofluoromethane	1.53		1.385		111	74.9	120				
Surr: Toluene-d8	1.47		1.385		106	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.40		1.385		101	63.3	136				

Sample ID: LCS-37134		SampType: LCS		Units: µg/L		Prep Date: 7/14/2022		RunNo: 76878			
Client ID: LCSS		Batch ID: 37134				Analysis Date: 7/15/2022		SeqNo: 1578449			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	0.904	0.0250	1.000	0	90.4	80	120				
Surr: Dibromofluoromethane	1.36		1.250		109	74.9	120				
Surr: Toluene-d8	1.30		1.250		104	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.27		1.250		102	63.3	136				

Work Order: 2206436
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37134		SampType: LCS		Units: µg/L		Prep Date: 7/14/2022			RunNo: 76878		
Client ID: LCSS		Batch ID: 37134					Analysis Date: 7/15/2022			SeqNo: 1578449	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: MB-37134		SampType: MBLK		Units: mg/Kg		Prep Date: 7/14/2022		RunNo: 76878			
Client ID: MBLKS		Batch ID: 37134				Analysis Date: 7/15/2022		SeqNo: 1578451			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Vinyl chloride	ND	0.0250									
Surr: Dibromofluoromethane	1.36		1.250		108	74.9	120				
Surr: Toluene-d8	1.28		1.250		102	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.24		1.250		98.9	63.3	136				

Sample ID: 2206436-003BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 7/14/2022			RunNo: 76878			
Client ID: SB-1-2	Batch ID: 37134				Analysis Date: 7/16/2022			SeqNo: 1578447			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Vinyl chloride	ND	0.0267						0		30	H
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Client Name: PES

Work Order Number: 2206436

Logged by: Clare Griggs

Date Received: 6/24/2022 12:55:00 PM

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☒
6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☒ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☒ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
10. Are samples properly preserved? Yes ☒ No ☐
11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
14. Does paperwork match bottle labels? Yes ☒ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
16. Is it clear what analyses were requested? Yes ☒ No ☐
17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:

Date:

By Whom:

 Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

19. Additional remarks:

Rachel M. authorized expired hold time for SB-1-2 add on via email on 7/11 -BB

Item Information

Item #	Temp °C
Sample	5.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 1 of 6

Project Name:

PROSE FIRECREST

Project No:

1325.023.004 D1 (K)

Collected by:

R. McLaughlin/N. Wisdom

Location:

FIRECREST, WA

Report To (PM):

D. BALBIANI

PM Email:

DANIEL.BALBIANI@NVS.COM

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Laboratory Project No (Internal): 2206436

Special Remarks:

Hold all - analysis selection to be sent Monday 6/27/22

Client:

FES ENVIRONMENTAL

Address:

2101 4th Ave Ste 1315

City, State, Zip:

SEATTLE WA 98121

Telephone:

206 529 3980

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	ED8 (8011)	Comments
SB-100-0.5	6/23/22	800	S	3													
SB-1-0.5		0930															
SB-1-2		940															
SB-1-7.5		950															
SB-1-10		953															
SB-4-1.5		1010															
SB-4-5.5		1030															
SB-4-10		1035															
SB-4-11		1050															
SB-4-13.5	6/23/22	1055	S	3													

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide Iodide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

- ☐ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day (specify)



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Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 2 of: 6
Project Name: PROSE FIREREST

Laboratory Project No (Internal): 2206436
Special Remarks:

Client: PES ENVIRONMENTAL

Project No: 1325.023.01

Address: SEE / PG

Collected by: R. McLaughlin / N. Wisdom

City, State, Zip: PG

Location: SEE / PG

Telephone: 1

Report To (PM): 1

Fax: 1

PM Email: 1

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	ED8 (801)	Hold	Comments
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1	SB-4-17	6/23/22	1116	S	3													
2	SB-5-1		1440															
3	SB-5-5		1445															
4	SB-5-7.5		1450															
5	SB-5-10.5		1450															
6	SB-5-14		1455															
7	SB-5-16		1500															
8	SB-5-17.5		1505															
9	SB-6-1		1355															
10	SB-6-6	6/23/22	1402	S	3													

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Relinquished (Signature) R. McLaughlin Print Name R. McLaughlin Date/Time 6/24/22 1300

Relinquished (Signature) Heather Chen Print Name Heather Chen Date/Time 6/24/22 12:55



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Seattle, WA 98103
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Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22
Page: 3 of 6

Project Name: PROSE FIREREST

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project No:

Address:

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Fax:

PM Email:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Special Remarks:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)**	EDB (8011)	Comments
-------------	-------------	-------------	-----------------------	------------	-----------------------	------	------------------------------	-----------------------------------	--------------------------------------	------------------------	-----------------------	-----------------------	-----------------------------	---------------------------	---------------	------------	----------

1	SB-6-11	6/23/22	1410	S	3												
2	SB-6-15,5		1430														
3	SB-6-16		1420														
4	SB-6-18,5		1425														
5	SB-7-0.5		1305														
6	SB-7-2.5		1310														
7	SB-7-5.5		1315														
8	SB-7-10		1325														
9	SB-7-13.5		1330														
10	SB-7-15	6/23/22	1336	S	3												

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Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

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Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)



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Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22

Page: 4 of 6

Project Name:

PROSE FIRECREST

Laboratory Project No (Internal): 2206436

Client: RES ENVIRONMENTAL

Project No:

Address:

SEE PG

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Fax:

PM Email:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Special Remarks:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Metals (IC)**	Anions (IC)**	EDB (8011)	Comments
-------------	-------------	-------------	-----------------------	------------	-----------------------	------	------------------------------	-----------------------------------	--------------------------------------	------------------------	-----------------------	-----------------------	-----------------------------	---------------------------	---------------	---------------	------------	----------

1 SB-7-18

6/23/22

1340

S

3

7

2 SB-8-0.5

1140

1150

S

3

3 SB-8-5

1150

1155

S

3

4 SB-8-6.5

1245

1250

S

3

5 SB-8-11

1255

1300

S

3

6 SB-8-14

1510

1520

S

3

7 SB-8-16

1510

1520

S

3

8 SB-8-18

1510

1520

S

3

9 SB-12-0.5

1510

1520

S

3

10 SB-12-6

1510

1520

S

3

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 5 of 6
Project Name: PROSE FIRECREST

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project No:

SEE

Address:

SEE

Collected by:

PG

City, State, Zip:

PG

Location:

PG

Telephone:

PG

Report To (PM):

PG

Fax:

PG

PM Email:

PG

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name

Sample Date

Sample Time

Sample Type (Matrix)*

of Cont.

VOCs (EPA 8260 / 624)
BTEX
Gasoline Range Organics (GX)
Hydrocarbon Identification (HCID)
Diesel/Heavy Oil Range Organics (DX)
SVOCs (EPA 8270 / 625)
PAHs (EPA 8270 - SIM)
PCBs (EPA 8082 / 608)
Metals** (EPA 6020 / 200.8)
Total (T) | Dissolved (D)
Anions (IC)***
EDB (8011)
HOLD

Comments

1 SB-12-11

6/23/22

1525

S

3

X

2 SB-3-1

6/22/22

1008

S

1

X

3 SB-3-5.5

1033

S

1

X

4 SB-3-8

1045

S

1

X

5 SB-3-10

1105

S

1

X

6 SB-3-12

1108

S

1

X

7 SB-3-16

1122

S

1

X

8 SB-3-20

1125

S

1

X

9 SB-3-21.5

1147

S

1

X

10 SB-3-24

6/22/22

1150

S

3

X

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Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22

Page: 6 of 6

Project Name: PROSE FIRECREST

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project No:

Address:

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Fax:

PM Email:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Special Remarks:

Sample Name

Sample Date

Sample Time

Sample Type (Matrix)*

of Cont.

VOGs (EPA 8260 / 624)

BTEX

Gasoline Range Organics (GX)

Hydrocarbon Identification (HCID)

Diesel/Heavy Oil Range Organics (DX)

SVOCs (EPA 8270 / 625)

PAHs (EPA 8082 - SIM)

PCBs (EPA 8082 / 608)

Metals** (EPA 6020 / 200.8)

Total (T) Dissolved (D)

Anions (IC)***

EDB (8011)

HPLC

Comments

1 SB-9-1

6/22/22

1238

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2 SB-9-3

6/22/22

1240

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3 SB-9-6.5

6/22/22

1250

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4 SB-9-11.5

6/22/22

1253

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5 SB-9-15

6/22/22

1337

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6 SB-9-21.5

6/22/22

1400

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7 SB-10-1

6/22/22

1405

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8 SB-10-5

6/22/22

1415

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9 SB-10-11

6/22/22

1430

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3

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10

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

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Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)



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Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Client: **PES ENVIRONMENTAL**
Address: **2101 4th Ave Ste 1310**
City, State, Zip: **SEATTLE WA 98121**
Telephone: **206 529 3980**
Fax: **---**

Date: **6/24/22** Page: **1** of: **6**
Project Name: **PROSE FIRCREST**
Project No: **1325.023.001 DI (RND)**
Collected by: **R.M. Laughlin / N. Wisdom**
Location: **FIRCREST, WA**
Report To (PM): **D BALBIANI**
PM Email: **DANIEL.BALBIANI@NVS.COM**

Laboratory Project No (Internal): **2206A36**
Special Remarks: **Hold all - analysis selection to be sent Monday 6/27/22**
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 824)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DO)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metal** (EPA 6060 / 200.8)	Total (T) - Dissolved (D)	Anions (IC)***	EDS (8011)	Comments
1 SB-100-0.5	6/23/22	800	S	3	X	X	X	X	X	X	X	X	X	X	X	X	
2 SB-1-0.5		0930		1	X	X	X	X	X	X	X	X	X	X	X	X	
3 SB-1-2		940		1													
4 SB-1-7.5		950		1	X	X	X										
5 SB-1-10		953		1													
6 SB-4-1.5		1010		1												X	
7 SB-4-5.5		1030		1													
8 SB-4-10		1035		1												X	
9 SB-4-11		1050		1													
10 SB-4-13.5	6/23/22	1055	S	3													

*CVOGS = SELECT LIST
PCE, TCE, VC, CIS, TRANS, +
1,1-DCE

HOLD
CVOGS by 8260

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Metals (Circle): MTCA-5 **RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☒ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature):
Print Name: **R.M. Laughlin**
Date/Time: **6/24/22 1300**

Received (Signature):
Print Name: **Yeyi Chen**
Date/Time: **6/24/22 12:55**



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 2 of: 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Special Remarks:

Address: SEE PG

Project No: 1325.023.01

Collected by: R. McLaughlin / N. Wisdom

City, State, Zip: SEE PG

Location: SEE PG

Telephone: 1

Report To (PM):

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: 1

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (Dx)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total Pb / Dissolved (d)	Anions (IC)***	EDB (8011)	Hold	Comments
1 SB-4-17	6/23/22	1116	S	3													X	
2 SB-5-1		1440																
3 SB-5-5		1445																
4 SB-5-7.5		1450			X	X	X			X								
5 SB-5-10.5		1450																
6 SB-5-14		1455																
7 SB-5-16		1500			X	X	X											
8 SB-5-17.5		1505																
9 SB-6-1		1355																
10 SB-6-6	6/23/22	1402	S	3	X	X	X										X	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☒ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day (specify)

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Relinquished (Signature) R. McLaughlin Print Name R. McLaughlin Date/Time 6/24/22 1300

Relinquished (Signature) Print Name Date/Time

Received (Signature) Yeyichen Print Name Yeyi Date/Time 6/24/22 12:55

Received (Signature) Print Name Date/Time



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Analytical

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Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 23 of 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Address:

Project No:

City, State, Zip:

Collected by:

Telephone:

Location:

Fax:

Report To (PM):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8270 - SIM)	Metals** (EPA 8062 / 608)	Total Pb (EPA 8210 / 200.8)	Anions (IC)***	EDB (8011)	Comments	
1 SB-6-11	6/23/22	1410	S	3													X	
2 SB-6-15.5		1430			X	X	X											
3 SB-6-16		1420																
4 SB-6-18.5		1425																
5 SB-7-0.5		1305																
6 SB-7-2.5		1310																
7 SB-7-5.5		1315			X	X	X											
8 SB-7-10		1325																
9 SB-7-13.5		1330																
10 SB-7-15	6/23/22	1336	S	3	X	X	X										X	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

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Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 4 of 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Address: SEE PG

City, State, Zip: PG

Telephone: 1

Fax: 1

Project Name: PROSE FIRCREST

Project No: SEE PG

Collected by: SEE PG

Location: 1

Report To (PM): 1

PM Email: 1

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	Preliminary													Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☒ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)
Print Name R. McLaughlin
Date/Time 6/24/22 1300

Received (Signature)
Print Name Yeyi
Date/Time 6/24/22 12:55



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 5 of 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRCREST

Special Remarks:

*CUDCS SELECT LIST =
PCE, TCE, VC, 1,1-DCE, &
TRANS

Address: SEE

Project No: SEE

City, State, Zip: PG

Collected by: PG

Telephone: 1

Location: 1

Fax: 1

Report To (PM): 1

PM Email:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	ANALYSIS METHODS													Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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☐ 2 Day (specify)

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Relinquished (Signature) R. McLaughlin 6/24/22 1300
Print Name Date/Time

Received (Signature) Yeyi Chen 6/24/22 12:55
Print Name Date/Time



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 6 of 6

Laboratory Project No (internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Address: SEE PG

Project No: SEE PG

City, State, Zip: PG

Collected by: PG

Telephone: 1

Location: 1

Fax:

Report To (PM):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email:

Pw Email:																	
Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metal** (EPA 6020 / 200.8)	Total P / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments	
1 SB-9-1	6/22/22	1238	S	3													
2 SB-9-3		1240															
3 SB-9-6.5		1250															
4 SB-9-11.5		1253															
5 SB-9-15		1337															
6 SB-9-21.5		1400															
7 SB-10-1		1405															
8 SB-10-5		1415															
9 SB-10-11	6/22/22	1430	S	3													
10																	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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Turn-around Time:

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☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

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Relinquished (Signature) R. McLaughlin
Print Name R. McLaughlin
Date/Time 6/24/22 1300

Received (Signature) Yeyi Chen
Print Name Yeyi
Date/Time 6/24/22 12:55



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Client: **PES ENVIRONMENTAL**
Address: **2101 4th Ave Ste 1310**
City, State, Zip: **SEATTLE WA 98121**
Telephone: **206 529 3980**
Fax: **—**

Date: **6/24/22** Page: **1** of: **6**
Project Name: **PROSE FIRECREST**
Project No: **1325.023.001 DI (RND)**
Collected by: **R.M. Laughlin / N. Wisdom**
Location: **FIRECREST, WA**
Report To (PM): **D. BALBIANI**
PM Email: **DANIEL.BALBIANI@NVS.COM**

Laboratory Project No (Internal): **2206A36**
Special Remarks: **Hold all - analysis selection to be sent Monday 6/27/22**
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	DATE: 6/23/22 BY: JMS													Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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1 SB-100-0.5	6/23/22	800	S	3	X	X	X	X	X	X				X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

*CVOGS = SELECT LIST
PCE, TCE, VC, CIS, TRANS, +
1,1-DCE
run per R.M. 7/11/22 -BB

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Metals (Circle): MTCA-5 **RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☒ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature): Print Name: **R.M. Laughlin** Date/Time: **6/24/22 1300**

Received (Signature): Print Name: **Yeyi Chen** Date/Time: **6/24/22 12:55**



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 2 of: 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Special Remarks:

Address: SEE PG

Project No: 1325.023.01

Collected by: R. McLaughlin / N. Wisdom

City, State, Zip: SEE PG

Location: SEE PG

Telephone: 1

Report To (PM):

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: 1

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total Pb / Dissolved Pb	Anions (IC)***	EDB (8011)	Hold	Comments
1 SB-4-17	6/23/22	1116	S	3												X	
2 SB-5-1		1440															
3 SB-5-5		1445															
4 SB-5-7.5		1450			X	X	X			X							
5 SB-5-10.5		1450															
6 SB-5-14		1455															
7 SB-5-16		1500			X	X	X										
8 SB-5-17.5		1505															
9 SB-6-1		1355															
10 SB-6-6	6/23/22	1402	S	3	X	X	X									X	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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Turn-around Time:

☒ Standard ☐ Next Day
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Relinquished (Signature) R. McLaughlin Print Name R. McLaughlin Date/Time 6/24/22 1300

Received (Signature) Yeyi Chen Print Name Yeyi Date/Time 6/24/22 12:55



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 23 of 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Address:

Project No: SEE PG

City, State, Zip:

Collected by: SEE PG

Telephone:

Location: 1

Fax:

Report To (PM):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 8210 / 200.8)	Total Pb	Anions (IC)***	EDB (8011)	Comments	
1 SB-6-11	6/23/22	1410	S	3													X	
2 SB-6-15.5		1430			X	X	X											
3 SB-6-16		1420																
4 SB-6-18.5		1425																
5 SB-7-0.5		1305																
6 SB-7-2.5		1310																
7 SB-7-5.5		1315			X	X	X											
8 SB-7-10		1325																
9 SB-7-13.5		1330																
10 SB-7-15	6/23/22	1336	S	3	X	X	X										X	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☐ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22

Page: 4 of 6

Laboratory Project No (Internal): 2206436

Project Name: PROSE FIRCREST

Special Remarks:

Client: PES ENVIRONMENTAL

Project No:

Address:

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Fax:

PM Email:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCS (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DO)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8270 - SIM)	Metals** (EPA 8082 / 608)	Total Pb (EPA 6020 / 200.8)	Anions (IC***)	EDB (8011)	Comments	
1 SB-7-18	6/23/22	1340	S	3													X	
2 SB-8-0.5		1140																
3 SB-8-5		1150																
4 SB-8-6.5		1155			X	X	X											
5 SB-8-11		1245			X	X	X						X					
6 SB-8-14		1250			X	X	X											
7 SB-8-16		1255																
8 SB-8-18		1300																
9 SB-12-0.5		1510																
10 SB-12-6	6/23/22	1520	S	3														

*Matrix: A = Air, AG = Aqueous, S = Soil

Hold

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☒ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

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Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time

Relinquished (Signature)

Print Name

Date/Time

Received (Signature)

Print Name

Date/Time



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 5 of 6

Laboratory Project No (Internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Special Remarks:

*CUDCS SELECT LIST =
PCE, TCE, VC, 1,1-DCE, &
TRANS

Address: SEE

Project No: SEE

City, State, Zip: PG

Collected by: PG

Telephone: 1

Location: 1

Fax: 1

Report To (PM): 1

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	ANALYSIS														Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
					VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total Hg Dissolved Pb	Anions (IC)**	EDB (8011)	Hold	CVDs by 8260																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
1 SB-12-11	6/23/22	1525	S	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</

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Turn-around Time:

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☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

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Relinquished (Signature) R. McLaughlin 6/24/22 1300
Print Name Date/Time

Received (Signature) Yeyi Chen 6/24/22 12:55
Print Name Date/Time



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/24/22 Page: 6 of 6

Laboratory Project No (internal): 2206436

Client: PES ENVIRONMENTAL

Project Name: PROSE FIRECREST

Address: SEE PG

Project No: SEE PG

City, State, Zip: PG

Collected by: PG

Telephone: 1

Location: 1

Fax:

Report To (PM):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	FWL Email:													Comments	
					VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)			
1 SB-9-1	6/22/22	1238	S	3															
2 SB-9-3	↓	1240	↓	↓															
3 SB-9-6.5		1250	↓	↓															
4 SB-9-11.5		1253	↓	↓															
5 SB-9-15		1337	↓	↓															
6 SB-9-21.5	↓	1400	↓	↓															
7 SB-10-1		1405	↓	↓															
8 SB-10-5		1415	↓	↓															
9 SB-10-11		6/22/22	1430	S	3														
10																			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

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Turn-around Time:

☐ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)

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Relinquished (Signature)
Print Name R. McLaughlin
Date/Time 6/24/22 1300

Received (Signature)
Print Name Yeyi
Date/Time 6/24/22 12:55



Fremont
Analytical

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
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info@fremontanalytical.com

PES Environmental, Inc.

Dan Balbiani
2101 Fourth Avenue, Suite 1310
Seattle, WA 98121

RE: Prose Fircrest

Work Order Number: 2206505

July 18, 2022

Attention Dan Balbiani:

Fremont Analytical, Inc. received 14 sample(s) on 6/29/2022 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample Moisture (Percent Moisture)

Volatile Organic Compounds by EPA Method 8260D

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Revision v1

www.fremontanalytical.com

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest
Work Order: 2206505

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2206505-001	SB-2-1.5	06/28/2022 11:30 AM	06/29/2022 4:13 PM
2206505-002	SB-2-6.5	06/28/2022 11:40 AM	06/29/2022 4:13 PM
2206505-003	SB-2-8.5	06/28/2022 11:50 AM	06/29/2022 4:13 PM
2206505-004	SB-2-11	06/28/2022 1:40 PM	06/29/2022 4:13 PM
2206505-005	SB-2-13	06/28/2022 1:45 AM	06/29/2022 4:13 PM
2206505-006	MW-1-0.5	06/28/2022 10:45 AM	06/29/2022 4:13 PM
2206505-007	MW-1-2	06/28/2022 10:50 AM	06/29/2022 4:13 PM
2206505-008	MW-1-6.5	06/28/2022 10:55 AM	06/29/2022 4:13 PM
2206505-009	MW-1-11	06/28/2022 11:05 AM	06/29/2022 4:13 PM
2206505-010	MW-1-14.5	06/28/2022 11:10 AM	06/29/2022 4:13 PM
2206505-011	MW-1-16.5	06/28/2022 11:20 AM	06/29/2022 4:13 PM
2206505-012	MW-1-19.5	06/28/2022 11:25 AM	06/29/2022 4:13 PM
2206505-013	SB-11-0.5	06/28/2022 4:50 PM	06/29/2022 4:13 PM
2206505-014	SB-101-19.5	06/28/2022 9:00 AM	06/29/2022 4:13 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

7/18/22: Revision 1 includes additional analysis requested by the client.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate



Analytical Report

Work Order: 2206505
Date Reported: 7/18/2022

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-001

Client Sample ID: SB-2-1.5

Collection Date: 6/28/2022 11:30:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0293		mg/Kg-dry	1	7/5/2022 11:14:28 PM
1,1-Dichloroethene	ND	0.117		mg/Kg-dry	1	7/8/2022 12:20:59 AM
trans-1,2-Dichloroethene	ND	0.0352		mg/Kg-dry	1	7/5/2022 11:14:28 PM
cis-1,2-Dichloroethene	ND	0.0293		mg/Kg-dry	1	7/5/2022 11:14:28 PM
Trichloroethene (TCE)	ND	0.0235		mg/Kg-dry	1	7/5/2022 11:14:28 PM
Tetrachloroethene (PCE)	ND	0.0352		mg/Kg-dry	1	7/5/2022 11:14:28 PM
Surr: Dibromofluoromethane	95.6	74.9 - 120		%Rec	1	7/5/2022 11:14:28 PM
Surr: Toluene-d8	97.5	76.7 - 125		%Rec	1	7/5/2022 11:14:28 PM
Surr: 1-Bromo-4-fluorobenzene	95.8	63.3 - 136		%Rec	1	7/5/2022 11:14:28 PM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	16.0	0.500		wt%	1	7/6/2022 9:37:47 AM
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Lab ID: 2206505-002

Client Sample ID: SB-2-6.5

Collection Date: 6/28/2022 11:40:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0222		mg/Kg-dry	1	7/5/2022 11:45:02 PM
1,1-Dichloroethene	ND	0.0888		mg/Kg-dry	1	7/8/2022 12:52:21 AM
trans-1,2-Dichloroethene	ND	0.0267		mg/Kg-dry	1	7/5/2022 11:45:02 PM
cis-1,2-Dichloroethene	ND	0.0222		mg/Kg-dry	1	7/5/2022 11:45:02 PM
Trichloroethene (TCE)	ND	0.0178		mg/Kg-dry	1	7/5/2022 11:45:02 PM
Tetrachloroethene (PCE)	ND	0.0267		mg/Kg-dry	1	7/5/2022 11:45:02 PM
Surr: Dibromofluoromethane	95.0	74.9 - 120		%Rec	1	7/5/2022 11:45:02 PM
Surr: Toluene-d8	97.3	76.7 - 125		%Rec	1	7/5/2022 11:45:02 PM
Surr: 1-Bromo-4-fluorobenzene	94.9	63.3 - 136		%Rec	1	7/5/2022 11:45:02 PM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	11.5	0.500		wt%	1	7/6/2022 9:37:47 AM
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CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-007

Collection Date: 6/28/2022 10:50:00 AM

Client Sample ID: MW-1-2

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37073

Analyst: TN

Vinyl chloride	ND	0.0236		mg/Kg-dry	1	7/11/2022 3:04:18 PM
1,1-Dichloroethene	ND	0.0944	Q	mg/Kg-dry	1	7/11/2022 3:04:18 PM
trans-1,2-Dichloroethene	ND	0.0283		mg/Kg-dry	1	7/11/2022 3:04:18 PM
cis-1,2-Dichloroethene	ND	0.0236		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Trichloroethene (TCE)	ND	0.0189		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Tetrachloroethene (PCE)	ND	0.0283		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Surr: Dibromofluoromethane	95.3	74.9 - 120		%Rec	1	7/11/2022 3:04:18 PM
Surr: Toluene-d8	97.4	76.7 - 125		%Rec	1	7/11/2022 3:04:18 PM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.3 - 136		%Rec	1	7/11/2022 3:04:18 PM

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria.

Sample Moisture (Percent Moisture)

Batch ID: R76885

Analyst: me

Percent Moisture	8.07	0.500		wt%	1	7/15/2022 3:45:25 PM
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Lab ID: 2206505-008

Collection Date: 6/28/2022 10:55:00 AM

Client Sample ID: MW-1-6.5

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0242		mg/Kg-dry	1	7/6/2022 12:15:26 AM
1,1-Dichloroethene	ND	0.0967		mg/Kg-dry	1	7/8/2022 1:23:43 AM
trans-1,2-Dichloroethene	ND	0.0290		mg/Kg-dry	1	7/6/2022 12:15:26 AM
cis-1,2-Dichloroethene	ND	0.0242		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Trichloroethene (TCE)	ND	0.0193		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Tetrachloroethene (PCE)	0.0709	0.0290		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Surr: Dibromofluoromethane	95.4	74.9 - 120		%Rec	1	7/6/2022 12:15:26 AM
Surr: Toluene-d8	97.7	76.7 - 125		%Rec	1	7/6/2022 12:15:26 AM
Surr: 1-Bromo-4-fluorobenzene	96.9	63.3 - 136		%Rec	1	7/6/2022 12:15:26 AM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	9.80	0.500		wt%	1	7/6/2022 9:37:47 AM
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Analytical Report

Work Order: 2206505
Date Reported: 7/18/2022

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-009

Client Sample ID: MW-1-11

Collection Date: 6/28/2022 11:05:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37073

Analyst: TN

Vinyl chloride	ND	0.0234		mg/Kg-dry	1	7/11/2022 3:34:55 PM
1,1-Dichloroethene	ND	0.0935	Q	mg/Kg-dry	1	7/11/2022 3:34:55 PM
trans-1,2-Dichloroethene	ND	0.0281		mg/Kg-dry	1	7/11/2022 3:34:55 PM
cis-1,2-Dichloroethene	ND	0.0234		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Trichloroethene (TCE)	ND	0.0187		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Tetrachloroethene (PCE)	ND	0.0281		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Surr: Dibromofluoromethane	96.8	74.9 - 120		%Rec	1	7/11/2022 3:34:55 PM
Surr: Toluene-d8	98.2	76.7 - 125		%Rec	1	7/11/2022 3:34:55 PM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.3 - 136		%Rec	1	7/11/2022 3:34:55 PM

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria.

Sample Moisture (Percent Moisture)

Batch ID: R76891

Analyst: AP

Percent Moisture	9.07	0.500		wt%	1	7/18/2022 9:42:17 AM
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Lab ID: 2206505-010

Client Sample ID: MW-1-14.5

Collection Date: 6/28/2022 11:10:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0196		mg/Kg-dry	1	7/6/2022 12:45:58 AM
1,1-Dichloroethene	ND	0.0783		mg/Kg-dry	1	7/8/2022 1:55:02 AM
trans-1,2-Dichloroethene	ND	0.0235		mg/Kg-dry	1	7/6/2022 12:45:58 AM
cis-1,2-Dichloroethene	ND	0.0196		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Trichloroethene (TCE)	ND	0.0157		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Tetrachloroethene (PCE)	0.0302	0.0235		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Surr: Dibromofluoromethane	95.5	74.9 - 120		%Rec	1	7/6/2022 12:45:58 AM
Surr: Toluene-d8	97.6	76.7 - 125		%Rec	1	7/6/2022 12:45:58 AM
Surr: 1-Bromo-4-fluorobenzene	93.4	63.3 - 136		%Rec	1	7/6/2022 12:45:58 AM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	5.15	0.500		wt%	1	7/6/2022 9:37:47 AM
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Analytical Report

Work Order: 2206505
Date Reported: 7/18/2022

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-013

Collection Date: 6/28/2022 4:50:00 PM

Client Sample ID: SB-11-0.5

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029

Analyst: KJ

Diesel (Fuel Oil)	ND	52.0		mg/Kg-dry	1	7/6/2022 8:21:06 PM
Heavy Oil	172	104		mg/Kg-dry	1	7/6/2022 8:21:06 PM
Total Petroleum Hydrocarbons	172	156		mg/Kg-dry	1	7/6/2022 8:21:06 PM
Surr: 2-Fluorobiphenyl	92.3	50 - 150		%Rec	1	7/6/2022 8:21:06 PM
Surr: o-Terphenyl	97.0	50 - 150		%Rec	1	7/6/2022 8:21:06 PM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	4.65	0.500		wt%	1	7/6/2022 9:37:47 AM
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Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: MB-37029	SampType: MBLK	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76665			
Client ID: MBLKS	Batch ID: 37029				Analysis Date: 7/6/2022			SeqNo: 1573327			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	50.0									
Heavy Oil	ND	100									
Total Petroleum Hydrocarbons	ND	150									
Surr: 2-Fluorobiphenyl	7.88		10.00		78.8	50	150				
Surr: o-Terphenyl	7.97		10.00		79.7	50	150				

Sample ID: LCS-37029	SampType: LCS	Units: mg/Kg			Prep Date: 7/5/2022			RunNo: 76665			
Client ID: LCSS	Batch ID: 37029				Analysis Date: 7/6/2022			SeqNo: 1573328			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Petroleum Hydrocarbons	476	150	500.0	0	95.3	65.4	132				
Surr: 2-Fluorobiphenyl	8.45		10.00		84.5	50	150				
Surr: o-Terphenyl	9.58		10.00		95.8	50	150				

Sample ID: 2206436-001AMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/5/2022			RunNo: 76665			
Client ID: BATCH		Batch ID: 37029					Analysis Date: 7/6/2022			SeqNo: 1573330		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Total Petroleum Hydrocarbons	517	159	531.6	0	97.3	51.3	140				
Surr: 2-Fluorobiphenyl	9.21		10.63		86.6	50	150				
Surr: o-Terphenyl	10.1		10.63		94.7	50	150				

Sample ID: 2206436-001AMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 7/5/2022			RunNo: 76665			
Client ID: BATCH	Batch ID: 37029				Analysis Date: 7/6/2022			SeqNo: 1573331			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Petroleum Hydrocarbons	481	159	529.5	0	90.8	51.3	140	517.3	7.30	30	
Surr: 2-Fluorobiphenyl	8.39		10.59		79.2	50	150		0		
Surr: o-Terphenyl	9.57		10.59		90.4	50	150		0		



Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: 2206436-040ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/5/2022		RunNo: 76665			
Client ID: BATCH		Batch ID: 37029				Analysis Date: 7/6/2022		SeqNo: 1573347			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	51.0						0		30	
Heavy Oil	ND	102						0		30	
Total Petroleum Hydrocarbons	ND	153						0		30	
Surr: 2-Fluorobiphenyl	7.39		10.21		72.4	50	150		0		
Surr: o-Terphenyl	7.60		10.21		74.4	50	150		0		

Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37008	SampType: LCS	Units: µg/L				Prep Date: 7/1/2022			RunNo: 76608		
Client ID: LCSS	Batch ID: 37008					Analysis Date: 7/5/2022			SeqNo: 1572036		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.13	0.0250	1.000	0	113	80	120				
1,1-Dichloroethene	1.13	0.100	1.000	0	113	80	120				
trans-1,2-Dichloroethene	1.07	0.0300	1.000	0	107	80	120				
cis-1,2-Dichloroethene	1.10	0.0250	1.000	0	110	80	120				
Trichloroethene (TCE)	1.09	0.0200	1.000	0	109	80	120				
Tetrachloroethene (PCE)	1.10	0.0300	1.000	0	110	80	120				
Surr: Dibromofluoromethane	1.24		1.250		99.0	74.9	120				
Surr: Toluene-d8	1.26		1.250		101	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.31		1.250		105	63.3	136				

Sample ID: MB-37008	SampType: MBLK	Units: mg/Kg			Prep Date: 7/1/2022			RunNo: 76608			
Client ID: MBLKS	Batch ID: 37008				Analysis Date: 7/5/2022			SeqNo: 1572035			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0250									
1,1-Dichloroethene	ND	0.100									Q
trans-1,2-Dichloroethene	ND	0.0300									
cis-1,2-Dichloroethene	ND	0.0250									
Trichloroethene (TCE)	ND	0.0200									
Tetrachloroethene (PCE)	ND	0.0300									
Surr: Dibromofluoromethane	1.20		1.250		96.0	74.9	120				
Surr: Toluene-d8	1.23		1.250		98.4	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.21		1.250		96.9	63.3	136				

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria (1,1-Dichloroethene).

Sample ID: 2207021-006BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 7/1/2022		RunNo: 76608			
Client ID: BATCH		Batch ID: 37008				Analysis Date: 7/5/2022		SeqNo: 1572716			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.21	0.0223	0.8900	0	136	49.3	143				
1,1-Dichloroethene	1.25	0.0890	0.8900	0	140	68.8	133				S

Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2207021-006BMS	SampType: MS	Units: mg/Kg-dry				Prep Date: 7/1/2022			RunNo: 76608		
Client ID: BATCH	Batch ID: 37008	Analysis Date: 7/5/2022						SeqNo: 1572716			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	1.08	0.0267	0.8900	0	122	75.9	128				
cis-1,2-Dichloroethene	1.09	0.0223	0.8900	0	122	79.9	123				
Trichloroethene (TCE)	1.13	0.0178	0.8900	0	127	76.1	134				
Tetrachloroethene (PCE)	1.06	0.0267	0.8900	0	119	78.3	129				
Surr: Dibromofluoromethane	1.12		1.113		100	74.9	120				
Surr: Toluene-d8	1.11		1.113		100	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.18		1.113		106	63.3	136				
NOTES:											
S - Outlying spike recovery(ies) observed.											

Sample ID: 2206477-003BDUP	SampType: DUP	Units: mg/Kg-dry		Prep Date: 7/1/2022		RunNo: 76608					
Client ID: BATCH	Batch ID: 37008	Analysis Date: 7/5/2022		SeqNo: 1572704							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0211						0		30	
1,1-Dichloroethene	ND	0.0843						0		30	Q
trans-1,2-Dichloroethene	ND	0.0253						0		30	
cis-1,2-Dichloroethene	ND	0.0211						0		30	
Trichloroethene (TCE)	ND	0.0169						0		30	
Tetrachloroethene (PCE)	ND	0.0253						0		30	
Surr: Dibromofluoromethane	1.02		1.054		96.6	74.9	120		0		
Surr: Toluene-d8	1.04		1.054		98.6	76.7	125		0		
Surr: 1-Bromo-4-fluorobenzene	1.04		1.054		98.7	63.3	136		0		
NOTES:											
Q - Initial calibration verification for this analyte exceeds acceptance criteria (1,1-Dichloroethene).											

Sample ID: 2206480-003BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 7/1/2022			RunNo: 76608			
Client ID: BATCH	Batch ID: 37008				Analysis Date: 7/5/2022			SeqNo: 1572711			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0268						0		30	
1,1-Dichloroethene	ND	0.107						0		30	Q
trans-1,2-Dichloroethene	ND	0.0321						0		30	

Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2206480-003BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 7/1/2022			RunNo: 76608			
Client ID: BATCH	Batch ID: 37008				Analysis Date: 7/5/2022			SeqNo: 1572711			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.0268						0		30	
Trichloroethene (TCE)	ND	0.0214						0		30	
Tetrachloroethene (PCE)	ND	0.0321						0		30	
Surr: Dibromofluoromethane	1.27		1.339		95.0	74.9	120		0		
Surr: Toluene-d8	1.30		1.339		97.1	76.7	125		0		
Surr: 1-Bromo-4-fluorobenzene	1.29		1.339		96.1	63.3	136		0		
NOTES:											
Q - Initial calibration verification for this analyte exceeds acceptance criteria (1,1-Dichloroethene).											

Sample ID: LCS-37008	SampType: LCS	Units: µg/L			Prep Date: 7/1/2022			RunNo: 76703			
Client ID: LCSS	Batch ID: 37008				Analysis Date: 7/7/2022			SeqNo: 1574239			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	1.08	0.100	1.000	0	108	80	120				
Surr: Dibromofluoromethane	1.17		1.250		93.6	74.9	120				
Surr: Toluene-d8	1.16		1.250		92.8	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.24		1.250		99.5	63.3	136				

Sample ID: MB-37008	SampType: MBLK	Units: µg/L		Prep Date: 7/1/2022	RunNo: 76703						
Client ID: MBLKS	Batch ID: 37008	Analysis Date: 7/7/2022			SeqNo: 1574238						
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	ND	0.100									
Surr: Dibromofluoromethane	1.09		1.250		87.4	74.9	120				
Surr: Toluene-d8	1.16		1.250		92.8	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.23		1.250		98.4	63.3	136				

Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-37073	SampType: LCS	Units: µg/L				Prep Date: 7/11/2022			RunNo: 76753		
Client ID: LCSS	Batch ID: 37073					Analysis Date: 7/11/2022			SeqNo: 1575066		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.19	0.0250	1.000	0	119	80	120				
1,1-Dichloroethene	0.956	0.100	1.000	0	95.6	80	120				
trans-1,2-Dichloroethene	1.08	0.0300	1.000	0	108	80	120				
cis-1,2-Dichloroethene	1.07	0.0250	1.000	0	107	80	120				
Trichloroethene (TCE)	1.06	0.0200	1.000	0	106	80	120				
Tetrachloroethene (PCE)	1.09	0.0300	1.000	0	109	80	120				
Surr: Dibromofluoromethane	1.25		1.250		99.6	74.9	120				
Surr: Toluene-d8	1.22		1.250		97.9	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.32		1.250		106	63.3	136				

Sample ID: MB-37073	SampType: MBLK	Units: mg/Kg			Prep Date: 7/11/2022			RunNo: 76753			
Client ID: MBLKS	Batch ID: 37073				Analysis Date: 7/11/2022			SeqNo: 1575065			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0250									
1,1-Dichloroethene	ND	0.100									Q
trans-1,2-Dichloroethene	ND	0.0300									
cis-1,2-Dichloroethene	ND	0.0250									
Trichloroethene (TCE)	ND	0.0200									
Tetrachloroethene (PCE)	ND	0.0300									
Surr: Dibromofluoromethane	1.19		1.250		95.3	74.9	120				
Surr: Toluene-d8	1.21		1.250		96.6	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.21		1.250		96.5	63.3	136				

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample ID: 2207078-001BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 7/11/2022			RunNo: 76753		
Client ID: BATCH		Batch ID: 37073		Analysis Date: 7/11/2022					SeqNo: 1575060		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0280						0		30	
1,1-Dichloroethene	ND	0.112						0		30	Q

Work Order: 2206505
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2207078-001BDUP	SampType: DUP	Units: mg/Kg-dry				Prep Date: 7/11/2022			RunNo: 76753		
Client ID: BATCH	Batch ID: 37073	Analysis Date: 7/11/2022						SeqNo: 1575060			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	ND	0.0337						0		30	
cis-1,2-Dichloroethene	ND	0.0280						0		30	
Trichloroethene (TCE)	ND	0.0224						0		30	
Tetrachloroethene (PCE)	ND	0.0337						0		30	
Surr: Dibromofluoromethane	1.35		1.402		96.2	74.9	120		0		
Surr: Toluene-d8	1.36		1.402		97.3	76.7	125		0		
Surr: 1-Bromo-4-fluorobenzene	1.34		1.402		95.6	63.3	136		0		

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria.

Sample ID: 2207123-001BMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 7/11/2022			RunNo: 76753			
Client ID: BATCH	Batch ID: 37073				Analysis Date: 7/11/2022			SeqNo: 1575063			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.33	0.0253	1.013	0	131	49.3	143				
1,1-Dichloroethene	1.40	0.101	1.013	0	138	68.8	133				S
trans-1,2-Dichloroethene	1.23	0.0304	1.013	0	122	75.9	128				
cis-1,2-Dichloroethene	1.20	0.0253	1.013	0	118	79.9	123				
Trichloroethene (TCE)	1.21	0.0203	1.013	0	119	76.1	134				
Tetrachloroethene (PCE)	1.23	0.0304	1.013	0	122	78.3	129				
Surr: Dibromofluoromethane	1.27		1.266		100	74.9	120				
Surr: Toluene-d8	1.24		1.266		98.1	76.7	125				
Surr: 1-Bromo-4-fluorobenzene	1.32		1.266		104	63.3	136				

NOTES:

S - Outlying spike recovery(ies) observed.

Client Name: PES
 Logged by: Elisabeth Samoray

Work Order Number: 2206505
 Date Received: 6/29/2022 4:13:00 PM

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
 2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☒
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >2°C to 6°C * Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☒ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified: Date:
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	5.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/29/22 Page: 1 of 2
Project Name: PROSE FIRECREST
Project No: 1325.023.01

Laboratory Project No (Internal): 2206505
Special Remarks:

civoc's select list: PCE;
TCE, C15-1,2; TRANS-1,1-DCE;
VC

Client: PES ENVIRONMENTAL
Address: 2101 4th Ave Ste 1310
City, State, Zip: SEATTLE, WA
Telephone: 206 529 3980
Fax:
Location: SEATTLE Firecrest, WA
Report To (PM): R. D. Balbiani
PM Email: DANIEL.BALBIANI

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	CVOC's	HLPD	Comments
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1	SB-2-1.5	6/28/22	1130	S	3											X		
2	SB-2-6.5		1140													X		
3	SB-2-8.5		1150													X		
4	SB-2-11		1340													X		
5	SB-2-13		1345													X		
6	MW-1-0.5		1045													X		
7	MW-1-2		1050													X		
8	MW-1-6.5		1055													X		
9	MW-1-11		1105													X		
10	MW-1-14.5	6/28/22	1110	S	3											X		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn
***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature) Print Name: R. D. Balbiani Date/Time: 6/29/22 1556
Received (Signature) Print Name: Yeh Chen Date/Time: 6/29/22 16:13

Turn-around Time:
☒ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day (specify)



3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/29/22 Page: 1 of 2
Project Name: PROSE FIRECREST

Project No: 1325.023.01

Collected by: R. McLAUGHLIN

Location: SEATTLE FIRECREST, WA

Report To (PM): R. D. Balbiani

PM Email: DANIEL.BALBIANI

Laboratory Project No (Internal): 2206505

Special Remarks: CVOCS select list: PCE; TCE; C15-1,2; TRANS-1,1-DCE; VC

Run per R.M. 7/11/2022 -BB

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: PES ENVIRONMENTAL
Address: 2101 4th Ave Ste 1310
City, State, Zip: SEATTLE, WA
Telephone: 206 529 3980
Fax: _____

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	CVOCS	HLPLD	Comments	
SB-2-1.5	6/28/22	1130	S	3												X			
SB-2-6.5		1140														X			
SB-2-8.5		1150														X			
SB-2-11		1340														X			
SB-2-13		1345														X			
MW-1-0.5		1045														X			
MW-1-2		1050														X			
MW-1-6.5		1055														X			
MW-1-11		1105														X			
MW-1-14.5	6/28/22	1110	S	3												X			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature) _____ Print Name _____ Date/Time _____
Received (Signature) _____ Print Name _____ Date/Time _____

Relinquished (Signature) _____ Print Name _____ Date/Time _____
Received (Signature) _____ Print Name _____ Date/Time _____

MEMORANDUM

TO: Project File **DATE:** July 22, 2022

FROM: Jessie Compeau

SUBJECT: Laboratory Data Validation Review

PROJECT: Prose Fircrest Data Validation

PROJECT #: 443021-1325023.01.004

TASK: EIM Data Validation Level EPA2A for June 2022 – Soil Samples

LAB: Fremont Work Orders: 2206436 and 2206505

Seventy-three samples (including two field duplicates) were collected as part of an ongoing Phase 2 Investigation for the Prose Fircrest Property (Site) in Fircrest, Washington. Soil samples were collected on June 22, 23, and 28, 2022. The samples were delivered to Fremont Analytical (Fremont) of Seattle, WA for laboratory analysis. Forty-three soil samples were placed on hold. Selected samples were analyzed for the following:

- Volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260D (62 compounds);
- Chlorinated VOCs (cVOCs) by USEPA Method 8260D (6 compounds);
- Semivolatile Organic Compounds (SVOCs) – polycyclic aromatic hydrocarbons (PAHs) using Selected Ion Monitoring (SIM) by USEPA Method 8270D-SIM (7 compounds);
- Total petroleum hydrocarbons (TPH) as gasoline (TPH-Gx) by NWTPH-Gx and TPH as diesel and heavy oil (TPH-Dx) by NWTPH-Dx (diesel range organic and heavy range organic per analytical methods stipulated by Washington State Department of Ecology;
- Polychlorinated Biphenyls (PCBs – 9 Aroclors) by EPA Method 8082;
- Metals – (arsenic, barium, cadmium, chromium, lead, selenium, and silver) by USEPA Method 6020B (ICP-MS);
- Mercury by USEPA Method 7471B;
- Total Solids by USEPA Method 8000D.

The quality assurance review is summarized below.

DATA QUALIFICATIONS

Guidelines established by USEPA for a limited data validation review of analytical data along with Fremont control limit criteria were used to validate the data. The comments presented in this memorandum refer to the laboratory's performance in meeting the quality control criteria outlined in the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2020) and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020).

DATA VALIDATION

Completeness

All samples were collected and analyzed as requested with the following discussions:

- Work Order 2206436: Review of revised chain of custodies shows that chlorinated volatile organic compounds (cVOCs) were requested on selected samples on June 29, 2022 (PES confirmed revision date).
- Work Order 2206436: PES requested VOC analysis on sample SB-1-2 past the recommended holding time on July 11, 2022. Refer to holding time discussion for additional information.
- Work Order 2206505: PES requested VOC analysis on samples MW-1-2 and MW-1-11 on July 11, 2022.

Sample Collection and Preservation

Samples were collected in laboratory-supplied sample containers preserved as appropriate for the individual analyses conducted. The samples were packed on ice in coolers and shipped by courier to the analytical laboratory. Cooler and samples were received below the EPA recommended preservation temperature of 6°C. No data were qualified based upon the sample collection and preservation information.

Holding Times

USEPA Method 8260D:

All samples were analyzed for VOCs within the USEPA recommended holding time of fourteen days for soils from the date of sample collection. All holding time criteria were met with the following exceptions:

- Work Order 2206436: Sample SB-1-2 was collected on June 23 and analyzed for VOCs 8 days past holding time on July 15, 2022. **Associated sample SB-1-2 VOC results are non-detect and are rejected (R).**

NWTPH-Gx Method:

All samples were analyzed for gasoline within the WA State recommended holding time of fourteen days for soils from the date of sample collection. All holding time criteria were met.

USEPA Methods 8270D-SIM and 8082:

All samples were extracted within the WA State recommended holding time of fourteen days for soils from the date of sample collection to extraction. All samples were analyzed within forty days from the date of extraction. All holding time criteria were met.

NWTPH-Dx Method:

All samples were extracted within the WA State recommended holding time of fourteen days for soils from the date of sample collection to extraction. All samples were analyzed within forty days from the date of extraction. All holding time criteria were met.

USEPA Method 6020B:

All water samples were analyzed within the USEPA recommended holding time for metals of 180 days for soils from the date of sample collection. All holding time criteria were met.

USEPA Method 7471B:

The samples were analyzed within the USEPA recommended holding time for mercury of twenty-eight days for soils from the date of sample collection. All holding time criteria were met.

Total Solids by USEPA Method 8000D:

Samples were analyzed within the USEPA recommended holding time of seven days for total solids. All holding time criteria were met.

Initial and Continuing Calibration

Calibration data for this project are not required for this deliverable however Fremont's notes indicate the following:

- Work Order 2206436 - *USEPA Method 8260D – Analytical Batch 37024*: Continuing calibration verification (CCV) issue was noted by Fremont for a few compounds (dichlorodifluoromethane (CFC-12), chloromethane, and in one case 2-hexanone (MBK)) associated with this analytical batch. These compounds are qualified by the laboratory "Q" to indicate that percent difference CCV is below laboratory acceptance criteria and showing low bias. **Associated results are estimated and qualified (J/UJ) due to the CCV issue.**
- Work Order 2206505 - *USEPA Method 8260D – Analytical Batch 37008*: Continuing calibration verification (CCV) issues were noted by Fremont for 1,1-dichloroethene associated with the analytical batch. This compound is qualified by the laboratory "Q" to indicate that percent difference CCV is above laboratory acceptance criteria with a potential high bias. No action is needed since the compound is not detected in the associated samples.
- Work Order 2206505 - *USEPA Method 8260D – Analytical Batch 37073*: Continuing calibration verification (CCV) issues were noted by Fremont for 1,1-dichloroethene associated with the analytical batch. This compound is qualified by the laboratory "Q" to indicate that percent difference CCV is below laboratory acceptance criteria and with a potential low bias. **Associated 1,1-dichloroethene results for samples MW-1-2 and MW-1-11 are non-detected, estimated and qualified (UJ).**

Method Blank Results

USEPA Method 8260D:

Laboratory method blanks were included with the analytical batches per method requirement. The target analytes were not detected in the method blanks at or above the reporting limits (RLs).

NWTPH-Gx Method:

Laboratory method blanks were included with the analytical batch per method requirement. The target analyte (gasoline) is not detected in the method blanks at or above the RLs.

USEPA Method 8270D-SIM:

A laboratory method blank is included with the analytical batch per method requirement. The target analytes are not detected in the method blank at or above the RL.

USEPA Method 8082:

A laboratory method blank is included with the analytical batch per method requirement. The target analytes are not detected in the method blank at or above the RLs.

NWTPH-Dx Method:

Laboratory method blanks were included with the analytical batches per method requirement. The target analytes (diesel, heavy oil, and TPH) were not detected in the method blanks at or above the RLs.

USEPA Method 6020B:

A laboratory method blank was included with the analytical batch per method requirement. The target analytes (metals) were not detected in the method blanks at or above the RLs.

USEPA Method 7471B:

A laboratory method blank was included with the analytical batch per method requirement. The target analyte (mercury) was not detected in the method blank at or above the RL.

Trip Blank Results

USEPA Method 8260D and NWTPH-Gx:

Trip blanks were not collected. No action is taken other than to note this.

Field, Rinsate, or Equipment Blank Results

Field, rinsate, or equipment blanks were not collected.

Field Duplicate Analyses

Field duplicate pair was submitted and analyzed. Field duplicate sample pair is as follows:

- Work Order 2206436: Sample SB-1-0.5 and field duplicate SB-100-0.5
- Work Order 2206505: Sample MW-1-19.5 and field duplicate SB-101-19.5. Sample and field duplicate were placed on hold.

Target analyte results are comparable and within a relative percent difference (RPD) of 30% (\pm 1x RL for soil results <5X the RL) for the field duplicate pair with the following exceptions:

- Work Order 2206436: **Barium results for samples SB-1-0.5 and field duplicate SB-100-0.5 are qualified as estimated (J) due to elevated RPD value.**

Laboratory Duplicate Analyses

USEPA Method 8260D:

Laboratory duplicate samples were performed on client samples SB-1-2, SB-100-0.5, and on non-client samples within the analytical batches. Relative percent differences (RPDs) for VOCs are within the laboratory control criteria of 30%.

NWTPH-Gx Method:

Laboratory duplicate sample analyses were performed on client samples SB-1-2 and SB-100-0.5. RPDs for gasoline are within the laboratory control criteria of 30%.

USEPA Method 8270D-SIM:

Laboratory duplicate samples were not analyzed. Refer to MS/MSD results for precision data

USEPA Method 8082:

Laboratory duplicate samples were not analyzed. Refer to MS/MSD results for precision data.

NWTPH-Dx Method:

Laboratory duplicate sample analyses were performed on client sample SB-12-6 and on a non-client sample within the analytical batch. RPDs for diesel, heavy oil, and TPH are within the laboratory control criteria of 30%.

USEPA Method 6020B:

Laboratory duplicate analysis were not performed. Refer to MS/MSD results for precision data.

USEPA Method 7471B:

Laboratory duplicate analyses were performed on sample SB-100-0.5 and on a non-client sample within the analytical batch. RPDs for mercury are within the laboratory control criteria of 20%.

Total Solids by USEPA Method 8000D:

Laboratory duplicate sample analyses were not performed. No action is taken other than to note this.

Surrogate Recoveries

USEPA Method 8260D:

The surrogate recovery results for the samples, laboratory control samples, laboratory duplicate samples, matrix spike samples, and blanks are within the laboratory surrogate control limits for all analyses.

NWTPH-Gx Method:

The surrogate recovery results for the samples, laboratory control samples, laboratory duplicate samples, matrix spike samples, and the blanks are within the laboratory surrogate control limits with the following exception:

USEPA Method 8270D-SIM:

The surrogate recovery results for the samples, laboratory control samples, matrix spike samples, and method blanks are within the laboratory surrogate control limits.

USEPA Method 8082:

The surrogate recovery results for the samples, laboratory control samples, matrix spike samples, and method blanks are within the laboratory surrogate control limits.

NWTPH-Dx Method:

The surrogate recovery results for the samples, laboratory control samples, matrix spike samples, and method blanks are within the laboratory surrogate control limits.

Laboratory Control Samples

USEPA Method 8260D:

Laboratory control samples (LCSs) were analyzed by USEPA Method 8260D method. The LCS or LCS/LCSD %Rs for the target compounds are within the laboratory control criteria with the following exceptions:

- Work Order 2206436 - Analytical batch 37024: LCS % recoveries for dichlorodifluoromethane (CFC-12) and chloromethane are below criteria. No action is needed since these compounds are already qualified due to low CCV recoveries.

NWTPH-Gx Method:

LCS was analyzed by the NWTPH-Gx method along with the analytical batch. The LCS %R for the target compound is within the laboratory control criteria.

USEPA Method 8270D-SIM:

An LCS was analyzed by USEPA Method 8270D-SIM along with the analytical batch. The LCS %Rs for the target compounds are within the laboratory control criteria.

USEPA Method 8082:

An LCS was analyzed by USEPA Method 8082-SIM along with the analytical batch. The LCS %Rs for the target compounds are within the laboratory control criteria.

NWTPH-Dx Method:

LCSs were analyzed by the NWTPH-Dx method along with the analytical batch. The LCS %Rs for the target compounds are within the laboratory control criteria.

USEPA Method 6020B:

A LCS was analyzed by the USEPA Method 6020B along with the analytical batch. The LCS %Rs for the control analytes are within the laboratory control criteria.

USEPA Method 7471B:

A LCS was analyzed by the USEPA Method 7471B along with the analytical batch. The LCS %R for the control analyte is within the laboratory control criteria.

Matrix Spike/Matrix Spike Duplicates

USEPA Method 8260D:

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed on client sample SB-6-6 and on non-client soil samples. MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria with the following exceptions:

- Work Orders 2206505 - Analytical batches 37008 and 37073: Matrix spike analysis were performed on non-client soil samples. Matrix spike recovery for 1,1-dichloroethene exceeds acceptance criteria. No action is taken on this basis since the spikes were performed on non-client samples.

NWTPH-Gx Method:

MS analyses was performed on client sample SB-1-2. MS % R is acceptable and within laboratory control limit criteria.

USEPA Method 8270D-SIM:

MS/MSD analyses was performed on client sample SB-100-0.5. MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria.

USEPA Method 8082:

MS/MSD analyses was performed on client sample SB-1-0.5. MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria.

NWTPH-Dx Method:

MS/MSD analyses were performed on client soil sample SB-100-0.5 and on a non-client sample within the analytical batch. MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria.

USEPA Method 6020B:

MS/MSD analyses were performed on a non-client sample. The MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria.

USEPA Method 7471B:

MS/MSD analyses were performed on client soil sample SB-100-0.5 and on a non-client soil sample within the analytical batch. The MS/MSD % Rs and RPDs are acceptable and within laboratory control limit criteria.

Other Quality Control Issues

No laboratory quality control issues were identified in the laboratory reports with the following discussion:

- Electronic data deliverables (EDDs) for these Work Orders were provided by the laboratory and data validator qualifiers were entered into the EDDs.

Compound Identification

NWTPH-Gx Method

Gasoline range organics (GROs) were reported for soil samples SB-7-15 and SB-8-11. GRO indicates the presence of unresolved compounds eluting from ~C6-C12.

Quantitation Limits

The RLs used for this sample group are acceptable for the project. Several samples were diluted due to elevated concentrations of various target analytes. No action was taken other than to note this.

Data Assessment

The laboratory data reported for this project were reviewed based on the criteria outlined in:

- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2020); and
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2020).

Data qualifiers are assigned and laboratory report pages with qualifiers are attached. All data, including qualified data, are judged to be acceptable for their intended use with the following exception:

- Work Order 2206436: Sample SB-1-2 was collected on June 23 and analyzed for cVOCs 8 days past holding time on July 15, 2022. **Associated sample SB-1-2 VOC results are non-detect and are rejected (R).**



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 37015 Analyst: OK

Aroclor 1016	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1221	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1232	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1242	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1248	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1254	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1260	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1262	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Aroclor 1268	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Total PCBs	ND	0.0494		mg/Kg-dry	1	7/5/2022 4:53:05 PM
Surr: Decachlorobiphenyl	62.9	9.77 - 154		%Rec	1	7/5/2022 4:53:05 PM
Surr: Tetrachloro-m-xylene	62.1	24.2 - 187		%Rec	1	7/5/2022 4:53:05 PM

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.9		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Heavy Oil	ND	108		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Total Petroleum Hydrocarbons	ND	162		mg/Kg-dry	1	7/6/2022 2:07:58 PM
Surr: 2-Fluorobiphenyl	79.2	50 - 150		%Rec	1	7/6/2022 2:07:58 PM
Surr: o-Terphenyl	78.6	50 - 150		%Rec	1	7/6/2022 2:07:58 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 37014 Analyst: OK

Benz(a)anthracene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Chrysene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(b)fluoranthene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(k)fluoranthene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Benzo(a)pyrene	ND	19.7		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Indeno(1,2,3-cd)pyrene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Dibenz(a,h)anthracene	ND	39.5		µg/Kg-dry	1	7/6/2022 11:08:04 AM
Surr: 2-Fluorobiphenyl	72.3	69.4 - 124		%Rec	1	7/6/2022 11:08:04 AM
Surr: Terphenyl-d14 (surr)	92.8	68.7 - 149		%Rec	1	7/6/2022 11:08:04 AM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.43		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Surr: Toluene-d8	97.6	65 - 135		%Rec	1	7/5/2022 2:49:46 PM
Surr: 4-Bromofluorobenzene	93.0	65 - 135		%Rec	1	7/5/2022 2:49:46 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0543	Q	mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloromethane	ND	UJ	0.0869	Q	mg/Kg-dry	1	7/5/2022 2:49:46 PM
Vinyl chloride	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromomethane	ND		0.163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trichlorofluoromethane (CFC-11)	ND		0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloroethane	ND		0.130		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloroethene	ND		0.109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Acetone	ND		0.543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methylene chloride	ND		0.0163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
trans-1,2-Dichloroethene	ND		0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methyl tert-butyl ether (MTBE)	ND		0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloroethane	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
cis-1,2-Dichloroethene	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
(MEK) 2-Butanone	ND		0.489		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chloroform	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,1-Trichloroethane (TCA)	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1-Dichloropropene	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Carbon tetrachloride	ND		0.0814		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichloroethane (EDC)	ND		0.0250		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Benzene	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trichloroethene (TCE)	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichloropropane	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromodichloromethane	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Dibromomethane	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
cis-1,3-Dichloropropene	ND		0.0869		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Toluene	ND		0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Trans-1,3-Dichloropropylene	ND		0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Methyl Isobutyl Ketone (MIBK)	ND		0.0814		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,2-Trichloroethane	ND		0.0185		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3-Dichloropropane	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Tetrachloroethene (PCE)	0.0690		0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Dibromochloromethane	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dibromoethane (EDB)	ND		0.0109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
2-Hexanone (MBK)	ND		0.0652		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Chlorobenzene	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,1,2-Tetrachloroethane	ND		0.0217		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Ethylbenzene	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
m,p-Xylene	ND		0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
o-Xylene	ND		0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Styrene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Isopropylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromoform	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,1,2,2-Tetrachloroethane	ND	0.0163		mg/Kg-dry	1	7/5/2022 2:49:46 PM
n-Propylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Bromobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3,5-Trimethylbenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
2-Chlorotoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
4-Chlorotoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
tert-Butylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,3-Trichloropropane	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,4-Trichlorobenzene	ND	0.0434		mg/Kg-dry	1	7/5/2022 2:49:46 PM
sec-Butylbenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
4-Isopropyltoluene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,3-Dichlorobenzene	ND	0.0380		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,4-Dichlorobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
n-Butylbenzene	ND	0.0434		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dichlorobenzene	ND	0.0326		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2-Dibromo-3-chloropropane	ND	0.0652		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,4-Trimethylbenzene	ND	0.0271		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Hexachloro-1,3-butadiene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Naphthalene	ND	0.109		mg/Kg-dry	1	7/5/2022 2:49:46 PM
1,2,3-Trichlorobenzene	ND	0.0543		mg/Kg-dry	1	7/5/2022 2:49:46 PM
Surr: Dibromofluoromethane	88.9	74.9 - 120		%Rec	1	7/5/2022 2:49:46 PM
Surr: Toluene-d8	93.9	76.7 - 125		%Rec	1	7/5/2022 2:49:46 PM
Surr: 1-Bromo-4-fluorobenzene	93.0	63.3 - 136		%Rec	1	7/5/2022 2:49:46 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018

Analyst: SS

Mercury	ND	0.267		mg/Kg-dry	1	7/5/2022 2:44:28 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001

Analyst: EH

Arsenic	2.51	0.0977		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Barium	47.6 J	0.489		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Cadmium	ND	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Chromium	24.9	0.326		mg/Kg-dry	1	7/5/2022 2:40:30 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 8:00:00 AM

Project: Prose Fircrest

Lab ID: 2206436-001

Matrix: Soil

Client Sample ID: SB-100-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Lead	2.58	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Selenium	0.811	0.163		mg/Kg-dry	1	7/5/2022 2:40:30 PM
Silver	ND	0.122		mg/Kg-dry	1	7/5/2022 2:40:30 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	6.96			wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 37015 Analyst: OK

Aroclor 1016	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1221	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1232	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1242	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1248	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1254	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1260	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1262	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Aroclor 1268	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Total PCBs	ND	0.0554		mg/Kg-dry	1	7/5/2022 5:02:53 PM
Surr: Decachlorobiphenyl	65.8	9.77 - 154		%Rec	1	7/5/2022 5:02:53 PM
Surr: Tetrachloro-m-xylene	63.8	24.2 - 187		%Rec	1	7/5/2022 5:02:53 PM

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	56.7		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Heavy Oil	ND	113		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Total Petroleum Hydrocarbons	ND	170		mg/Kg-dry	1	7/6/2022 2:41:03 PM
Surr: 2-Fluorobiphenyl	74.3	50 - 150		%Rec	1	7/6/2022 2:41:03 PM
Surr: o-Terphenyl	76.1	50 - 150		%Rec	1	7/6/2022 2:41:03 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 37014 Analyst: OK

Benz(a)anthracene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Chrysene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(b)fluoranthene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(k)fluoranthene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Benzo(a)pyrene	ND	22.1		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Indeno(1,2,3-cd)pyrene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Dibenz(a,h)anthracene	ND	44.2		µg/Kg-dry	1	7/6/2022 12:33:22 PM
Surr: 2-Fluorobiphenyl	74.7	69.4 - 124		%Rec	1	7/6/2022 12:33:22 PM
Surr: Terphenyl-d14 (surr)	92.8	68.7 - 149		%Rec	1	7/6/2022 12:33:22 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.74		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Surr: Toluene-d8	97.4	65 - 135		%Rec	1	7/5/2022 3:52:39 PM
Surr: 4-Bromofluorobenzene	95.8	65 - 135		%Rec	1	7/5/2022 3:52:39 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0574	Q	mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloromethane	ND	UJ	0.0918	Q	mg/Kg-dry	1	7/5/2022 3:52:39 PM
Vinyl chloride	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromomethane	ND		0.172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trichlorofluoromethane (CFC-11)	ND		0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloroethane	ND		0.138		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloroethene	ND		0.115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Acetone	ND		0.574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methylene chloride	ND		0.0172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
trans-1,2-Dichloroethene	ND		0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methyl tert-butyl ether (MTBE)	ND		0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloroethane	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
cis-1,2-Dichloroethene	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
(MEK) 2-Butanone	ND		0.516		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chloroform	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,1-Trichloroethane (TCA)	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1-Dichloropropene	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Carbon tetrachloride	ND		0.0860		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichloroethane (EDC)	ND		0.0264		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Benzene	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trichloroethene (TCE)	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichloropropane	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromodichloromethane	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Dibromomethane	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
cis-1,3-Dichloropropene	ND		0.0918		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Toluene	ND		0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Trans-1,3-Dichloropropylene	ND		0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Methyl Isobutyl Ketone (MIBK)	ND		0.0860		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,2-Trichloroethane	ND		0.0195		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3-Dichloropropane	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Tetrachloroethene (PCE)	0.0794		0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Dibromochloromethane	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dibromoethane (EDB)	ND		0.0115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
2-Hexanone (MBK)	ND		0.0688		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Chlorobenzene	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,1,2-Tetrachloroethane	ND		0.0229		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Ethylbenzene	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
m,p-Xylene	ND		0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
o-Xylene	ND		0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Styrene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Isopropylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromoform	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,1,2,2-Tetrachloroethane	ND	0.0172		mg/Kg-dry	1	7/5/2022 3:52:39 PM
n-Propylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Bromobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3,5-Trimethylbenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
2-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
4-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
tert-Butylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,3-Trichloropropane	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,4-Trichlorobenzene	ND	0.0459		mg/Kg-dry	1	7/5/2022 3:52:39 PM
sec-Butylbenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
4-Isopropyltoluene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,3-Dichlorobenzene	ND	0.0401		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,4-Dichlorobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
n-Butylbenzene	ND	0.0459		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dichlorobenzene	ND	0.0344		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2-Dibromo-3-chloropropane	ND	0.0688		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,4-Trimethylbenzene	ND	0.0287		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Hexachloro-1,3-butadiene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Naphthalene	ND	0.115		mg/Kg-dry	1	7/5/2022 3:52:39 PM
1,2,3-Trichlorobenzene	ND	0.0574		mg/Kg-dry	1	7/5/2022 3:52:39 PM
Surr: Dibromofluoromethane	88.3	74.9 - 120		%Rec	1	7/5/2022 3:52:39 PM
Surr: Toluene-d8	94.4	76.7 - 125		%Rec	1	7/5/2022 3:52:39 PM
Surr: 1-Bromo-4-fluorobenzene	95.8	63.3 - 136		%Rec	1	7/5/2022 3:52:39 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018

Analyst: SS

Mercury	ND	0.288		mg/Kg-dry	1	7/5/2022 2:51:17 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001

Analyst: EH

Arsenic	2.51	0.104		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Barium	78.6	0.520	J	mg/Kg-dry	1	7/5/2022 2:43:20 PM
Cadmium	ND	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Chromium	22.2	0.347		mg/Kg-dry	1	7/5/2022 2:43:20 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:30:00 AM

Project: Prose Fircrest

Lab ID: 2206436-002

Matrix: Soil

Client Sample ID: SB-1-0.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Lead	2.99	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Selenium	0.975	0.173		mg/Kg-dry	1	7/5/2022 2:43:20 PM
Silver	ND	0.130		mg/Kg-dry	1	7/5/2022 2:43:20 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.2			wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:40:00 AM

Project: Prose Fircrest

Lab ID: 2206436-003

Matrix: Soil

Client Sample ID: SB-1-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37134

Analyst: TN

Vinyl chloride	ND	R	0.0267	H	mg/Kg-dry	1	7/15/2022 11:44:41 PM
1,1-Dichloroethene	ND		0.107	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
trans-1,2-Dichloroethene	ND		0.0320	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
cis-1,2-Dichloroethene	ND		0.0267	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Trichloroethene (TCE)	ND		0.0214	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Tetrachloroethene (PCE)	ND		0.0320	H	mg/Kg-dry	1	7/15/2022 12:05:05 AM
Surr: Dibromofluoromethane	108	74.9 - 120		H	%Rec	1	7/15/2022 12:05:05 AM
Surr: Toluene-d8	102	76.7 - 125		H	%Rec	1	7/15/2022 12:05:05 AM
Surr: 1-Bromo-4-fluorobenzene	97.6	63.3 - 136		H	%Rec	1	7/15/2022 12:05:05 AM

Sample Moisture (Percent Moisture)

Batch ID: R76885

Analyst: me

Percent Moisture	6.16	0.500		wt%	1	7/15/2022 3:45:25 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	55.2		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Heavy Oil	ND	110		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Total Petroleum Hydrocarbons	ND	166		mg/Kg-dry	1	7/6/2022 2:52:13 PM
Surr: 2-Fluorobiphenyl	81.7	50 - 150		%Rec	1	7/6/2022 2:52:13 PM
Surr: o-Terphenyl	81.8	50 - 150		%Rec	1	7/6/2022 2:52:13 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.00		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 4:24:00 PM
Surr: 4-Bromofluorobenzene	92.4	65 - 135		%Rec	1	7/5/2022 4:24:00 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0500	UJ	Q	mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloromethane	ND	0.0800	UJ	Q	mg/Kg-dry	1	7/5/2022 4:24:00 PM
Vinyl chloride	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromomethane	ND	0.150			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trichlorofluoromethane (CFC-11)	ND	0.0500			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloroethane	ND	0.120			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloroethene	ND	0.100			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Acetone	ND	0.500			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methylene chloride	ND	0.0150			mg/Kg-dry	1	7/5/2022 4:24:00 PM
trans-1,2-Dichloroethene	ND	0.0300			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.0300			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloroethane	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
cis-1,2-Dichloroethene	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
(MEK) 2-Butanone	ND	0.450			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chloroform	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,1-Trichloroethane (TCA)	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1-Dichloropropene	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Carbon tetrachloride	ND	0.0750			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichloroethane (EDC)	ND	0.0230			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Benzene	ND	0.0200			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trichloroethene (TCE)	ND	0.0200			mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichloropropane	ND	0.0200			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromodichloromethane	ND	0.0250			mg/Kg-dry	1	7/5/2022 4:24:00 PM
Dibromomethane	ND	0.0200			mg/Kg-dry	1	7/5/2022 4:24:00 PM
cis-1,3-Dichloropropene	ND	0.0800			mg/Kg-dry	1	7/5/2022 4:24:00 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Trans-1,3-Dichloropropylene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0750		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,2-Trichloroethane	ND	0.0170		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3-Dichloropropane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Tetrachloroethene (PCE)	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Dibromochloromethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dibromoethane (EDB)	ND	0.0100		mg/Kg-dry	1	7/5/2022 4:24:00 PM
2-Hexanone (MBK)	ND	0.0600		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Chlorobenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,1,2-Tetrachloroethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Ethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
m,p-Xylene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
o-Xylene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Styrene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Isopropylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromoform	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,1,2,2-Tetrachloroethane	ND	0.0150		mg/Kg-dry	1	7/5/2022 4:24:00 PM
n-Propylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Bromobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3,5-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
2-Chlorotoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
4-Chlorotoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
tert-Butylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,3-Trichloropropane	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,4-Trichlorobenzene	ND	0.0400		mg/Kg-dry	1	7/5/2022 4:24:00 PM
sec-Butylbenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
4-Isopropyltoluene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,3-Dichlorobenzene	ND	0.0350		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,4-Dichlorobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
n-Butylbenzene	ND	0.0400		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dichlorobenzene	ND	0.0300		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2-Dibromo-3-chloropropane	ND	0.0600		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,4-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Hexachloro-1,3-butadiene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Naphthalene	ND	0.100		mg/Kg-dry	1	7/5/2022 4:24:00 PM
1,2,3-Trichlorobenzene	ND	0.0500		mg/Kg-dry	1	7/5/2022 4:24:00 PM
Surr: Dibromofluoromethane	92.2	74.9 - 120		%Rec	1	7/5/2022 4:24:00 PM
Surr: Toluene-d8	96.5	76.7 - 125		%Rec	1	7/5/2022 4:24:00 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 9:50:00 AM

Project: Prose Fircrest

Lab ID: 2206436-004

Matrix: Soil

Client Sample ID: SB-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	92.3	63.3 - 136	%Rec	1	7/5/2022 4:24:00 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	8.14	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.4		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Total Petroleum Hydrocarbons	ND	160		mg/Kg-dry	1	7/6/2022 3:03:12 PM
Surr: 2-Fluorobiphenyl	83.5	50 - 150		%Rec	1	7/6/2022 3:03:12 PM
Surr: o-Terphenyl	85.2	50 - 150		%Rec	1	7/6/2022 3:03:12 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	4.84		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 5:59:19 PM
Surr: 4-Bromofluorobenzene	93.7	65 - 135		%Rec	1	7/5/2022 5:59:19 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0484	Q	mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloromethane	ND	UJ	0.0775	Q	mg/Kg-dry	1	7/5/2022 5:59:19 PM
Vinyl chloride	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromomethane	ND		0.145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trichlorofluoromethane (CFC-11)	ND		0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloroethane	ND		0.116		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloroethene	ND		0.0968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Acetone	ND		0.484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methylene chloride	ND		0.0145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
trans-1,2-Dichloroethene	ND		0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methyl tert-butyl ether (MTBE)	ND		0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloroethane	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
cis-1,2-Dichloroethene	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
(MEK) 2-Butanone	ND		0.436		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chloroform	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,1-Trichloroethane (TCA)	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1-Dichloropropene	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Carbon tetrachloride	ND		0.0726		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichloroethane (EDC)	ND		0.0223		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Benzene	ND		0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trichloroethene (TCE)	ND		0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichloropropane	ND		0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromodichloromethane	ND		0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Dibromomethane	ND		0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
cis-1,3-Dichloropropene	ND		0.0775		mg/Kg-dry	1	7/5/2022 5:59:19 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Trans-1,3-Dichloropropylene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0726		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,2-Trichloroethane	ND	0.0165		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3-Dichloropropane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Tetrachloroethene (PCE)	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Dibromochloromethane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dibromoethane (EDB)	ND	0.00968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
2-Hexanone (MBK)	ND	0.0581		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Chlorobenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,1,2-Tetrachloroethane	ND	0.0194		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Ethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
m,p-Xylene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
o-Xylene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Styrene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Isopropylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromoform	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,1,2,2-Tetrachloroethane	ND	0.0145		mg/Kg-dry	1	7/5/2022 5:59:19 PM
n-Propylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Bromobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3,5-Trimethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
2-Chlorotoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
4-Chlorotoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
tert-Butylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,3-Trichloropropane	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,4-Trichlorobenzene	ND	0.0387		mg/Kg-dry	1	7/5/2022 5:59:19 PM
sec-Butylbenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
4-Isopropyltoluene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,3-Dichlorobenzene	ND	0.0339		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,4-Dichlorobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
n-Butylbenzene	ND	0.0387		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dichlorobenzene	ND	0.0290		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2-Dibromo-3-chloropropane	ND	0.0581		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,4-Trimethylbenzene	ND	0.0242		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Hexachloro-1,3-butadiene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Naphthalene	ND	0.0968		mg/Kg-dry	1	7/5/2022 5:59:19 PM
1,2,3-Trichlorobenzene	ND	0.0484		mg/Kg-dry	1	7/5/2022 5:59:19 PM
Surr: Dibromofluoromethane	88.6	74.9 - 120		%Rec	1	7/5/2022 5:59:19 PM
Surr: Toluene-d8	94.4	76.7 - 125		%Rec	1	7/5/2022 5:59:19 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-014

Matrix: Soil

Client Sample ID: SB-5-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	93.7	63.3 - 136	%Rec	1	7/5/2022 5:59:19 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018 Analyst: SS

Mercury	ND	0.276	mg/Kg-dry	1	7/5/2022 2:56:27 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Arsenic	1.97	0.106	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Barium	57.9	0.529	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Cadmium	ND	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Chromium	25.7	0.352	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Lead	1.96	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Selenium	0.876	0.176	mg/Kg-dry	1	7/5/2022 2:46:09 PM
Silver	ND	0.132	mg/Kg-dry	1	7/5/2022 2:46:09 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	9.93	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	54.2		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Heavy Oil	231	108		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Total Petroleum Hydrocarbons	231	163		mg/Kg-dry	1	7/6/2022 3:14:11 PM
Surr: 2-Fluorobiphenyl	83.5	50 - 150		%Rec	1	7/6/2022 3:14:11 PM
Surr: o-Terphenyl	88.2	50 - 150		%Rec	1	7/6/2022 3:14:11 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.88		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	7/5/2022 6:30:37 PM
Surr: 4-Bromofluorobenzene	92.2	65 - 135		%Rec	1	7/5/2022 6:30:37 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0588	Q	mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloromethane	ND	0.0942	Q	mg/Kg-dry	1	7/5/2022 6:30:37 PM
Vinyl chloride	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromomethane	ND	0.177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trichlorofluoromethane (CFC-11)	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloroethane	ND	0.141		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloroethene	ND	0.118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Acetone	ND	0.588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methylene chloride	ND	0.0177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
trans-1,2-Dichloroethene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methyl tert-butyl ether (MTBE)	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloroethane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
cis-1,2-Dichloroethene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
(MEK) 2-Butanone	ND	0.530		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chloroform	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,1-Trichloroethane (TCA)	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1-Dichloropropene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Carbon tetrachloride	ND	0.0883		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichloroethane (EDC)	ND	0.0271		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Benzene	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trichloroethene (TCE)	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichloropropane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromodichloromethane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Dibromomethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
cis-1,3-Dichloropropene	ND	0.0942		mg/Kg-dry	1	7/5/2022 6:30:37 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Trans-1,3-Dichloropropylene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0883		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,2-Trichloroethane	ND	0.0200		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3-Dichloropropane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Tetrachloroethene (PCE)	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Dibromochloromethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dibromoethane (EDB)	ND	0.0118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
2-Hexanone (MBK)	ND	0.0706		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Chlorobenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,1,2-Tetrachloroethane	ND	0.0235		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Ethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
m,p-Xylene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
o-Xylene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Styrene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Isopropylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromoform	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,1,2,2-Tetrachloroethane	ND	0.0177		mg/Kg-dry	1	7/5/2022 6:30:37 PM
n-Propylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Bromobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3,5-Trimethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
2-Chlorotoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
4-Chlorotoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
tert-Butylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,3-Trichloropropane	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,4-Trichlorobenzene	ND	0.0471		mg/Kg-dry	1	7/5/2022 6:30:37 PM
sec-Butylbenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
4-Isopropyltoluene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,3-Dichlorobenzene	ND	0.0412		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,4-Dichlorobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
n-Butylbenzene	ND	0.0471		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dichlorobenzene	ND	0.0353		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2-Dibromo-3-chloropropane	ND	0.0706		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,4-Trimethylbenzene	ND	0.0294		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Hexachloro-1,3-butadiene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Naphthalene	ND	0.118		mg/Kg-dry	1	7/5/2022 6:30:37 PM
1,2,3-Trichlorobenzene	ND	0.0588		mg/Kg-dry	1	7/5/2022 6:30:37 PM
Surr: Dibromofluoromethane	93.7	74.9 - 120		%Rec	1	7/5/2022 6:30:37 PM
Surr: Toluene-d8	96.1	76.7 - 125		%Rec	1	7/5/2022 6:30:37 PM



Analytical Report

Work Order: 2206436
Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 3:00:00 PM

Project: Prose Fircrest

Lab ID: 2206436-017

Matrix: Soil

Client Sample ID: SB-5-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene 92.2 63.3 - 136 %Rec 1 7/5/2022 6:30:37 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture 8.43 0.500 wt% 1 7/5/2022 5:18:46 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	52.9		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Heavy Oil	ND	106		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	7/6/2022 3:36:15 PM
Surr: 2-Fluorobiphenyl	73.0	50 - 150		%Rec	1	7/6/2022 3:36:15 PM
Surr: o-Terphenyl	77.6	50 - 150		%Rec	1	7/6/2022 3:36:15 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.20		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Surr: Toluene-d8	96.5	65 - 135		%Rec	1	7/5/2022 7:01:58 PM
Surr: 4-Bromofluorobenzene	92.3	65 - 135		%Rec	1	7/5/2022 7:01:58 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0520	UJ	Q	mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloromethane	ND	0.0832	UJ	Q	mg/Kg-dry	1	7/5/2022 7:01:58 PM
Vinyl chloride	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromomethane	ND	0.156			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trichlorofluoromethane (CFC-11)	ND	0.0520			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloroethane	ND	0.125			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloroethene	ND	0.104			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Acetone	ND	0.520			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methylene chloride	ND	0.0156			mg/Kg-dry	1	7/5/2022 7:01:58 PM
trans-1,2-Dichloroethene	ND	0.0312			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methyl tert-butyl ether (MTBE)	ND	0.0312			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloroethane	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
cis-1,2-Dichloroethene	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
(MEK) 2-Butanone	ND	0.468			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chloroform	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,1-Trichloroethane (TCA)	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1-Dichloropropene	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Carbon tetrachloride	ND	0.0780			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichloroethane (EDC)	ND	0.0239			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Benzene	ND	0.0208			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trichloroethene (TCE)	ND	0.0208			mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichloropropane	ND	0.0208			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromodichloromethane	ND	0.0260			mg/Kg-dry	1	7/5/2022 7:01:58 PM
Dibromomethane	ND	0.0208			mg/Kg-dry	1	7/5/2022 7:01:58 PM
cis-1,3-Dichloropropene	ND	0.0832			mg/Kg-dry	1	7/5/2022 7:01:58 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Trans-1,3-Dichloropropylene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0780		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,2-Trichloroethane	ND	0.0177		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3-Dichloropropane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Tetrachloroethene (PCE)	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Dibromochloromethane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dibromoethane (EDB)	ND	0.0104		mg/Kg-dry	1	7/5/2022 7:01:58 PM
2-Hexanone (MBK)	ND	0.0624		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Chlorobenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,1,2-Tetrachloroethane	ND	0.0208		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Ethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
m,p-Xylene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
o-Xylene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Styrene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Isopropylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromoform	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,1,2,2-Tetrachloroethane	ND	0.0156		mg/Kg-dry	1	7/5/2022 7:01:58 PM
n-Propylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Bromobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3,5-Trimethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
2-Chlorotoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
4-Chlorotoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
tert-Butylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,3-Trichloropropane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,4-Trichlorobenzene	ND	0.0416		mg/Kg-dry	1	7/5/2022 7:01:58 PM
sec-Butylbenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
4-Isopropyltoluene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,3-Dichlorobenzene	ND	0.0364		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,4-Dichlorobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
n-Butylbenzene	ND	0.0416		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dichlorobenzene	ND	0.0312		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2-Dibromo-3-chloropropane	ND	0.0624		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,4-Trimethylbenzene	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Hexachloro-1,3-butadiene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Naphthalene	ND	0.104		mg/Kg-dry	1	7/5/2022 7:01:58 PM
1,2,3-Trichlorobenzene	ND	0.0520		mg/Kg-dry	1	7/5/2022 7:01:58 PM
Surr: Dibromofluoromethane	92.4	74.9 - 120		%Rec	1	7/5/2022 7:01:58 PM
Surr: Toluene-d8	95.1	76.7 - 125		%Rec	1	7/5/2022 7:01:58 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:02:00 PM

Project: Prose Fircrest

Lab ID: 2206436-020

Matrix: Soil

Client Sample ID: SB-6-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	92.3	63.3 - 136	%Rec	1	7/5/2022 7:01:58 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.0	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	51.0		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Heavy Oil	1,640	102		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Total Petroleum Hydrocarbons	1,640	153		mg/Kg-dry	1	7/6/2022 4:27:54 PM
Surr: 2-Fluorobiphenyl	89.7	50 - 150		%Rec	1	7/6/2022 4:27:54 PM
Surr: o-Terphenyl	96.8	50 - 150		%Rec	1	7/6/2022 4:27:54 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	20.5	6.49		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Surr: Toluene-d8	96.6	65 - 135		%Rec	1	7/5/2022 7:33:21 PM
Surr: 4-Bromofluorobenzene	95.3	65 - 135		%Rec	1	7/5/2022 7:33:21 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0649	Q	mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloromethane	ND	UJ	0.104	Q	mg/Kg-dry	1	7/5/2022 7:33:21 PM
Vinyl chloride	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromomethane	ND		0.195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trichlorofluoromethane (CFC-11)	ND		0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloroethane	ND		0.156		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloroethene	ND		0.130		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Acetone	ND		0.649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methylene chloride	ND		0.0195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
trans-1,2-Dichloroethene	ND		0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methyl tert-butyl ether (MTBE)	ND		0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloroethane	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
cis-1,2-Dichloroethene	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
(MEK) 2-Butanone	ND		0.584		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chloroform	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,1-Trichloroethane (TCA)	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1-Dichloropropene	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Carbon tetrachloride	ND		0.0974		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichloroethane (EDC)	ND		0.0299		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Benzene	ND		0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trichloroethene (TCE)	ND		0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichloropropane	ND		0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromodichloromethane	ND		0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
cis-1,3-Dichloropropene	ND	0.104		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Toluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Trans-1,3-Dichloropropylene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0974		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,2-Trichloroethane	ND	0.0221		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3-Dichloropropane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Tetrachloroethene (PCE)	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Dibromochloromethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dibromoethane (EDB)	ND	0.0130		mg/Kg-dry	1	7/5/2022 7:33:21 PM
2-Hexanone (MBK)	ND	0.0779		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Chlorobenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,1,2-Tetrachloroethane	ND	0.0260		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Ethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
m,p-Xylene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
o-Xylene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Styrene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Isopropylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromoform	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,1,2,2-Tetrachloroethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 7:33:21 PM
n-Propylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Bromobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3,5-Trimethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
2-Chlorotoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
4-Chlorotoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
tert-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,3-Trichloropropane	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,4-Trichlorobenzene	ND	0.0519		mg/Kg-dry	1	7/5/2022 7:33:21 PM
sec-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
4-Isopropyltoluene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,3-Dichlorobenzene	ND	0.0454		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,4-Dichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
n-Butylbenzene	ND	0.0519		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2-Dibromo-3-chloropropane	ND	0.0779		mg/Kg-dry	1	7/5/2022 7:33:21 PM
1,2,4-Trimethylbenzene	ND	0.0325		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Hexachloro-1,3-butadiene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM
Naphthalene	2.23	1.30	D	mg/Kg-dry	10	7/6/2022 2:20:25 PM
1,2,3-Trichlorobenzene	ND	0.0649		mg/Kg-dry	1	7/5/2022 7:33:21 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 2:30:00 PM

Project: Prose Fircrest

Lab ID: 2206436-022

Matrix: Soil

Client Sample ID: SB-6-15.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	91.4	74.9 - 120	%Rec	1	7/5/2022 7:33:21 PM
Surr: Toluene-d8	95.3	76.7 - 125	%Rec	1	7/5/2022 7:33:21 PM
Surr: 1-Bromo-4-fluorobenzene	95.3	63.3 - 136	%Rec	1	7/5/2022 7:33:21 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	7.83	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	52.9		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Heavy Oil	147	106		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	7/6/2022 4:49:58 PM
Surr: 2-Fluorobiphenyl	73.9	50 - 150		%Rec	1	7/6/2022 4:49:58 PM
Surr: o-Terphenyl	78.0	50 - 150		%Rec	1	7/6/2022 4:49:58 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.50		mg/Kg-dry	1	7/6/2022 1:49:03 PM
Surr: Toluene-d8	97.6	65 - 135		%Rec	1	7/6/2022 1:49:03 PM
Surr: 4-Bromofluorobenzene	92.3	65 - 135		%Rec	1	7/6/2022 1:49:03 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0550	Q	mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloromethane	ND	UJ	0.0880	Q	mg/Kg-dry	1	7/5/2022 8:04:42 PM
Vinyl chloride	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromomethane	ND		0.165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trichlorofluoromethane (CFC-11)	ND		0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloroethane	ND		0.132		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloroethene	ND		0.110		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Acetone	ND		0.550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methylene chloride	ND		0.0165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
trans-1,2-Dichloroethene	ND		0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methyl tert-butyl ether (MTBE)	ND		0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloroethane	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
cis-1,2-Dichloroethene	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
(MEK) 2-Butanone	ND		0.495		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chloroform	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,1-Trichloroethane (TCA)	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1-Dichloropropene	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Carbon tetrachloride	ND		0.0825		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichloroethane (EDC)	ND		0.0253		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Benzene	ND		0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trichloroethene (TCE)	ND		0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichloropropane	ND		0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromodichloromethane	ND		0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Dibromomethane	ND		0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
cis-1,3-Dichloropropene	ND		0.0880		mg/Kg-dry	1	7/5/2022 8:04:42 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Trans-1,3-Dichloropropylene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0825		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,2-Trichloroethane	ND	0.0187		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3-Dichloropropane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Tetrachloroethene (PCE)	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Dibromochloromethane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dibromoethane (EDB)	ND	0.0110		mg/Kg-dry	1	7/5/2022 8:04:42 PM
2-Hexanone (MBK)	ND	0.0660		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Chlorobenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,1,2-Tetrachloroethane	ND	0.0220		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Ethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
m,p-Xylene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
o-Xylene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Styrene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Isopropylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromoform	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,1,2,2-Tetrachloroethane	ND	0.0165		mg/Kg-dry	1	7/5/2022 8:04:42 PM
n-Propylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Bromobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3,5-Trimethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
2-Chlorotoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
4-Chlorotoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
tert-Butylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,3-Trichloropropane	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,4-Trichlorobenzene	ND	0.0440		mg/Kg-dry	1	7/5/2022 8:04:42 PM
sec-Butylbenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
4-Isopropyltoluene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,3-Dichlorobenzene	ND	0.0385		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,4-Dichlorobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
n-Butylbenzene	ND	0.0440		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dichlorobenzene	ND	0.0330		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2-Dibromo-3-chloropropane	ND	0.0660		mg/Kg-dry	1	7/5/2022 8:04:42 PM
1,2,4-Trimethylbenzene	ND	0.0275		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Hexachloro-1,3-butadiene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Naphthalene	ND	0.110		mg/Kg-dry	1	7/6/2022 1:49:03 PM
1,2,3-Trichlorobenzene	ND	0.0550		mg/Kg-dry	1	7/5/2022 8:04:42 PM
Surr: Dibromofluoromethane	94.2	74.9 - 120		%Rec	1	7/5/2022 8:04:42 PM
Surr: Toluene-d8	109	76.7 - 125		%Rec	1	7/5/2022 8:04:42 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:15:00 PM

Project: Prose Fircrest

Lab ID: 2206436-027

Matrix: Soil

Client Sample ID: SB-7-5.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	95.3	63.3 - 136	%Rec	1	7/5/2022 8:04:42 PM
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Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.9	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	54.9		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Heavy Oil	ND	110		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Total Petroleum Hydrocarbons	ND	165		mg/Kg-dry	1	7/6/2022 5:12:06 PM
Surr: 2-Fluorobiphenyl	70.5	50 - 150		%Rec	1	7/6/2022 5:12:06 PM
Surr: o-Terphenyl	75.1	50 - 150		%Rec	1	7/6/2022 5:12:06 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	8.61	5.48		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Surr: Toluene-d8	97.3	65 - 135		%Rec	1	7/5/2022 8:35:59 PM
Surr: 4-Bromofluorobenzene	95.5	65 - 135		%Rec	1	7/5/2022 8:35:59 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0548	Q	mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloromethane	ND	UJ	0.0877	Q	mg/Kg-dry	1	7/5/2022 8:35:59 PM
Vinyl chloride	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromomethane	ND		0.164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trichlorofluoromethane (CFC-11)	ND		0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloroethane	ND		0.132		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloroethene	ND		0.110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Acetone	ND		0.548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methylene chloride	ND		0.0164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
trans-1,2-Dichloroethene	ND		0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methyl tert-butyl ether (MTBE)	ND		0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloroethane	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
cis-1,2-Dichloroethene	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
(MEK) 2-Butanone	ND		0.493		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chloroform	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,1-Trichloroethane (TCA)	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1-Dichloropropene	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Carbon tetrachloride	ND		0.0822		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichloroethane (EDC)	ND		0.0252		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Benzene	ND		0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trichloroethene (TCE)	ND		0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichloropropane	ND		0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromodichloromethane	ND		0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
cis-1,3-Dichloropropene	ND	0.0877		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Toluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Trans-1,3-Dichloropropylene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0822		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,2-Trichloroethane	ND	0.0186		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3-Dichloropropane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Tetrachloroethene (PCE)	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Dibromochloromethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dibromoethane (EDB)	ND	0.0110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
2-Hexanone (MBK)	ND	0.0658		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Chlorobenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,1,2-Tetrachloroethane	ND	0.0219		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Ethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
m,p-Xylene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
o-Xylene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Styrene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Isopropylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromoform	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,1,2,2-Tetrachloroethane	ND	0.0164		mg/Kg-dry	1	7/5/2022 8:35:59 PM
n-Propylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Bromobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3,5-Trimethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
2-Chlorotoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
4-Chlorotoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
tert-Butylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,3-Trichloropropane	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,4-Trichlorobenzene	ND	0.0438		mg/Kg-dry	1	7/5/2022 8:35:59 PM
sec-Butylbenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
4-Isopropyltoluene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,3-Dichlorobenzene	ND	0.0384		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,4-Dichlorobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
n-Butylbenzene	ND	0.0438		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dichlorobenzene	ND	0.0329		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2-Dibromo-3-chloropropane	ND	0.0658		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,4-Trimethylbenzene	ND	0.0274		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Hexachloro-1,3-butadiene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM
Naphthalene	ND	0.110		mg/Kg-dry	1	7/5/2022 8:35:59 PM
1,2,3-Trichlorobenzene	ND	0.0548		mg/Kg-dry	1	7/5/2022 8:35:59 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 1:36:00 PM

Project: Prose Fircrest

Lab ID: 2206436-030

Matrix: Soil

Client Sample ID: SB-7-15

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	87.7	74.9 - 120	%Rec	1	7/5/2022 8:35:59 PM
Surr: Toluene-d8	92.4	76.7 - 125	%Rec	1	7/5/2022 8:35:59 PM
Surr: 1-Bromo-4-fluorobenzene	95.4	63.3 - 136	%Rec	1	7/5/2022 8:35:59 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.6	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.5		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Total Petroleum Hydrocarbons	ND	161		mg/Kg-dry	1	7/6/2022 5:34:25 PM
Surr: 2-Fluorobiphenyl	74.4	50 - 150		%Rec	1	7/6/2022 5:34:25 PM
Surr: o-Terphenyl	77.8	50 - 150		%Rec	1	7/6/2022 5:34:25 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	5.69		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Surr: Toluene-d8	96.3	65 - 135		%Rec	1	7/5/2022 9:07:20 PM
Surr: 4-Bromofluorobenzene	94.0	65 - 135		%Rec	1	7/5/2022 9:07:20 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0569	UJ	Q	mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloromethane	ND	0.0910	UJ	Q	mg/Kg-dry	1	7/5/2022 9:07:20 PM
Vinyl chloride	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromomethane	ND	0.171			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trichlorofluoromethane (CFC-11)	ND	0.0569			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloroethane	ND	0.136			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloroethene	ND	0.114			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Acetone	ND	0.569			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methylene chloride	ND	0.0171			mg/Kg-dry	1	7/5/2022 9:07:20 PM
trans-1,2-Dichloroethene	ND	0.0341			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methyl tert-butyl ether (MTBE)	ND	0.0341			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloroethane	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
cis-1,2-Dichloroethene	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
(MEK) 2-Butanone	ND	0.512			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chloroform	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,1-Trichloroethane (TCA)	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1-Dichloropropene	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Carbon tetrachloride	ND	0.0853			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichloroethane (EDC)	ND	0.0262			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Benzene	ND	0.0227			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trichloroethene (TCE)	ND	0.0227			mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichloropropane	ND	0.0227			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromodichloromethane	ND	0.0284			mg/Kg-dry	1	7/5/2022 9:07:20 PM
Dibromomethane	ND	0.0227			mg/Kg-dry	1	7/5/2022 9:07:20 PM
cis-1,3-Dichloropropene	ND	0.0910			mg/Kg-dry	1	7/5/2022 9:07:20 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Trans-1,3-Dichloropropylene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0853		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,2-Trichloroethane	ND	0.0193		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3-Dichloropropane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Tetrachloroethene (PCE)	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Dibromochloromethane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dibromoethane (EDB)	ND	0.0114		mg/Kg-dry	1	7/5/2022 9:07:20 PM
2-Hexanone (MBK)	ND	0.0682		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Chlorobenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,1,2-Tetrachloroethane	ND	0.0227		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Ethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
m,p-Xylene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
o-Xylene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Styrene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Isopropylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromoform	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,1,2,2-Tetrachloroethane	ND	0.0171		mg/Kg-dry	1	7/5/2022 9:07:20 PM
n-Propylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Bromobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3,5-Trimethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
2-Chlorotoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
4-Chlorotoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
tert-Butylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,3-Trichloropropane	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,4-Trichlorobenzene	ND	0.0455		mg/Kg-dry	1	7/5/2022 9:07:20 PM
sec-Butylbenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
4-Isopropyltoluene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,3-Dichlorobenzene	ND	0.0398		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,4-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
n-Butylbenzene	ND	0.0455		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2-Dibromo-3-chloropropane	ND	0.0682		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,4-Trimethylbenzene	ND	0.0284		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Hexachloro-1,3-butadiene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Naphthalene	ND	0.114		mg/Kg-dry	1	7/5/2022 9:07:20 PM
1,2,3-Trichlorobenzene	ND	0.0569		mg/Kg-dry	1	7/5/2022 9:07:20 PM
Surr: Dibromofluoromethane	90.8	74.9 - 120		%Rec	1	7/5/2022 9:07:20 PM
Surr: Toluene-d8	95.7	76.7 - 125		%Rec	1	7/5/2022 9:07:20 PM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 11:55:00 AM

Project: Prose Fircrest

Lab ID: 2206436-034

Matrix: Soil

Client Sample ID: SB-8-6.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene	93.9	63.3 - 136	%Rec	1	7/5/2022 9:07:20 PM
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NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	11.4	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.7		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Heavy Oil	ND	107		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Total Petroleum Hydrocarbons	ND	161		mg/Kg-dry	1	7/6/2022 6:41:08 PM
Surr: 2-Fluorobiphenyl	72.0	50 - 150		%Rec	1	7/6/2022 6:41:08 PM
Surr: o-Terphenyl	76.2	50 - 150		%Rec	1	7/6/2022 6:41:08 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	11.5	4.87		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Surr: Toluene-d8	96.0	65 - 135		%Rec	1	7/5/2022 9:38:43 PM
Surr: 4-Bromofluorobenzene	97.5	65 - 135		%Rec	1	7/5/2022 9:38:43 PM

NOTES:

GRO - Indicates the presence of unresolved compounds in the gasoline range.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	UJ	0.0487	Q	mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloromethane	ND	UJ	0.0780	Q	mg/Kg-dry	1	7/5/2022 9:38:43 PM
Vinyl chloride	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromomethane	ND		0.146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trichlorofluoromethane (CFC-11)	ND		0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloroethane	ND		0.117		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloroethene	ND		0.0975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Acetone	ND		0.487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methylene chloride	ND		0.0146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
trans-1,2-Dichloroethene	ND		0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methyl tert-butyl ether (MTBE)	ND		0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloroethane	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
cis-1,2-Dichloroethene	0.0918		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
(MEK) 2-Butanone	ND		0.439		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chloroform	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,1-Trichloroethane (TCA)	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1-Dichloropropene	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Carbon tetrachloride	ND		0.0731		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichloroethane (EDC)	ND		0.0224		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Benzene	ND		0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trichloroethene (TCE)	ND		0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichloropropane	ND		0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromodichloromethane	ND		0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Dibromomethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
cis-1,3-Dichloropropene	ND	0.0780		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Toluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Trans-1,3-Dichloropropylene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Methyl Isobutyl Ketone (MIBK)	ND	0.0731		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,2-Trichloroethane	ND	0.0166		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3-Dichloropropane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Tetrachloroethene (PCE)	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Dibromochloromethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dibromoethane (EDB)	ND	0.00975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
2-Hexanone (MBK)	ND	0.0585		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Chlorobenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,1,2-Tetrachloroethane	ND	0.0195		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Ethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
m,p-Xylene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
o-Xylene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Styrene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Isopropylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromoform	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,1,2,2-Tetrachloroethane	ND	0.0146		mg/Kg-dry	1	7/5/2022 9:38:43 PM
n-Propylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Bromobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3,5-Trimethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
2-Chlorotoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
4-Chlorotoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
tert-Butylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,3-Trichloropropane	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,4-Trichlorobenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 9:38:43 PM
sec-Butylbenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
4-Isopropyltoluene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,3-Dichlorobenzene	ND	0.0341		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,4-Dichlorobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
n-Butylbenzene	ND	0.0390		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dichlorobenzene	ND	0.0292		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2-Dibromo-3-chloropropane	ND	0.0585		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,4-Trimethylbenzene	ND	0.0244		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Hexachloro-1,3-butadiene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM
Naphthalene	ND	0.0975		mg/Kg-dry	1	7/5/2022 9:38:43 PM
1,2,3-Trichlorobenzene	ND	0.0487		mg/Kg-dry	1	7/5/2022 9:38:43 PM



Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:45:00 PM

Project: Prose Fircrest

Lab ID: 2206436-035

Matrix: Soil

Client Sample ID: SB-8-11

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: Dibromofluoromethane	92.3	74.9 - 120	%Rec	1	7/5/2022 9:38:43 PM
Surr: Toluene-d8	93.6	76.7 - 125	%Rec	1	7/5/2022 9:38:43 PM
Surr: 1-Bromo-4-fluorobenzene	97.4	63.3 - 136	%Rec	1	7/5/2022 9:38:43 PM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Mercury by EPA Method 7471B

Batch ID: 37018 Analyst: SS

Mercury	ND	0.271	mg/Kg-dry	1	7/5/2022 2:58:08 PM
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Total Metals by EPA Method 6020B

Batch ID: 37001 Analyst: EH

Arsenic	1.80	0.100	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Barium	61.4	0.500	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Cadmium	ND	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Chromium	22.5	0.333	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Lead	1.96	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Selenium	0.724	0.167	mg/Kg-dry	1	7/5/2022 2:48:59 PM
Silver	ND	0.125	mg/Kg-dry	1	7/5/2022 2:48:59 PM

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	13.6	0.500	wt%	1	7/5/2022 5:18:46 PM
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Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 37029 Analyst: KJ

Diesel (Fuel Oil)	ND	53.2		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Heavy Oil	ND	106		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Total Petroleum Hydrocarbons	ND	160		mg/Kg-dry	1	7/6/2022 6:52:14 PM
Surr: 2-Fluorobiphenyl	74.4	50 - 150		%Rec	1	7/6/2022 6:52:14 PM
Surr: o-Terphenyl	75.3	50 - 150		%Rec	1	7/6/2022 6:52:14 PM

Gasoline by NWTPH-Gx

Batch ID: 37024 Analyst: TN

Gasoline	ND	4.98		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Surr: Toluene-d8	96.3	65 - 135		%Rec	1	7/6/2022 12:47:04 AM
Surr: 4-Bromofluorobenzene	92.5	65 - 135		%Rec	1	7/6/2022 12:47:04 AM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Dichlorodifluoromethane (CFC-12)	ND	0.0498	UJ	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloromethane	ND	0.0796	UJ	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Vinyl chloride	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromomethane	ND	0.149			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trichlorofluoromethane (CFC-11)	ND	0.0498			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloroethane	ND	0.119			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloroethene	ND	0.0995			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Acetone	ND	0.498			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methylene chloride	ND	0.0149			mg/Kg-dry	1	7/6/2022 12:47:04 AM
trans-1,2-Dichloroethene	ND	0.0299			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methyl tert-butyl ether (MTBE)	ND	0.0299			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloroethane	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
cis-1,2-Dichloroethene	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
(MEK) 2-Butanone	ND	0.448			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chloroform	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,1-Trichloroethane (TCA)	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1-Dichloropropene	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Carbon tetrachloride	ND	0.0746			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichloroethane (EDC)	ND	0.0229			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Benzene	ND	0.0199			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trichloroethene (TCE)	ND	0.0199			mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichloropropane	ND	0.0199			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromodichloromethane	ND	0.0249			mg/Kg-dry	1	7/6/2022 12:47:04 AM
Dibromomethane	ND	0.0199			mg/Kg-dry	1	7/6/2022 12:47:04 AM
cis-1,3-Dichloropropene	ND	0.0796			mg/Kg-dry	1	7/6/2022 12:47:04 AM



Analytical Report

Work Order: 2206436

Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024

Analyst: TN

Toluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Trans-1,3-Dichloropropylene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Methyl Isobutyl Ketone (MIBK)	ND	0.0746		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,2-Trichloroethane	ND	0.0169		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3-Dichloropropane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Tetrachloroethene (PCE)	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Dibromochloromethane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dibromoethane (EDB)	ND	0.00995		mg/Kg-dry	1	7/6/2022 12:47:04 AM
2-Hexanone (MBK)	ND	0.0597	Q	mg/Kg-dry	1	7/6/2022 12:47:04 AM
Chlorobenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,1,2-Tetrachloroethane	ND	0.0199		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Ethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
m,p-Xylene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
o-Xylene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Styrene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Isopropylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromoform	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,1,2,2-Tetrachloroethane	ND	0.0149		mg/Kg-dry	1	7/6/2022 12:47:04 AM
n-Propylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Bromobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3,5-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
2-Chlorotoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
4-Chlorotoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
tert-Butylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,3-Trichloropropane	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,4-Trichlorobenzene	ND	0.0398		mg/Kg-dry	1	7/6/2022 12:47:04 AM
sec-Butylbenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
4-Isopropyltoluene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,3-Dichlorobenzene	ND	0.0348		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,4-Dichlorobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
n-Butylbenzene	ND	0.0398		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dichlorobenzene	ND	0.0299		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2-Dibromo-3-chloropropane	ND	0.0597		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,4-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Hexachloro-1,3-butadiene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Naphthalene	ND	0.0995		mg/Kg-dry	1	7/6/2022 12:47:04 AM
1,2,3-Trichlorobenzene	ND	0.0498		mg/Kg-dry	1	7/6/2022 12:47:04 AM
Surr: Dibromofluoromethane	91.9	74.9 - 120		%Rec	1	7/6/2022 12:47:04 AM
Surr: Toluene-d8	95.2	76.7 - 125		%Rec	1	7/6/2022 12:47:04 AM



Analytical Report

Work Order: 2206436
Date Reported: 7/18/2022

Client: PES Environmental, Inc.

Collection Date: 6/23/2022 12:50:00 PM

Project: Prose Fircrest

Lab ID: 2206436-036

Matrix: Soil

Client Sample ID: SB-8-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37024 Analyst: TN

Surr: 1-Bromo-4-fluorobenzene 92.5 63.3 - 136 %Rec 1 7/6/2022 12:47:04 AM

NOTES:

Q - Associated calibration verification is below acceptance criteria. Result may be low-biased.

Sample Moisture (Percent Moisture)

Batch ID: R76623 Analyst: ALB

Percent Moisture	10.1	0.500	wt%	1	7/5/2022 5:18:46 PM
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Analytical Report

Work Order: 2206505
Date Reported: 7/18/2022

CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-007

Client Sample ID: MW-1-2

Collection Date: 6/28/2022 10:50:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37073

Analyst: TN

Vinyl chloride	ND	0.0236		mg/Kg-dry	1	7/11/2022 3:04:18 PM
1,1-Dichloroethene	ND	0.0944	Q	mg/Kg-dry	1	7/11/2022 3:04:18 PM
trans-1,2-Dichloroethene	ND	0.0283		mg/Kg-dry	1	7/11/2022 3:04:18 PM
cis-1,2-Dichloroethene	ND	0.0236		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Trichloroethene (TCE)	ND	0.0189		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Tetrachloroethene (PCE)	ND	0.0283		mg/Kg-dry	1	7/11/2022 3:04:18 PM
Surr: Dibromofluoromethane	95.3	74.9 - 120		%Rec	1	7/11/2022 3:04:18 PM
Surr: Toluene-d8	97.4	76.7 - 125		%Rec	1	7/11/2022 3:04:18 PM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.3 - 136		%Rec	1	7/11/2022 3:04:18 PM

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria.

Sample Moisture (Percent Moisture)

Batch ID: R76885

Analyst: me

Percent Moisture	8.07	0.500		wt%	1	7/15/2022 3:45:25 PM
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Lab ID: 2206505-008

Client Sample ID: MW-1-6.5

Collection Date: 6/28/2022 10:55:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0242		mg/Kg-dry	1	7/6/2022 12:15:26 AM
1,1-Dichloroethene	ND	0.0967		mg/Kg-dry	1	7/8/2022 1:23:43 AM
trans-1,2-Dichloroethene	ND	0.0290		mg/Kg-dry	1	7/6/2022 12:15:26 AM
cis-1,2-Dichloroethene	ND	0.0242		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Trichloroethene (TCE)	ND	0.0193		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Tetrachloroethene (PCE)	0.0709	0.0290		mg/Kg-dry	1	7/6/2022 12:15:26 AM
Surr: Dibromofluoromethane	95.4	74.9 - 120		%Rec	1	7/6/2022 12:15:26 AM
Surr: Toluene-d8	97.7	76.7 - 125		%Rec	1	7/6/2022 12:15:26 AM
Surr: 1-Bromo-4-fluorobenzene	96.9	63.3 - 136		%Rec	1	7/6/2022 12:15:26 AM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	9.80	0.500		wt%	1	7/6/2022 9:37:47 AM
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Work Order: **2206505**
 Date Reported: **7/18/2022**
CLIENT: PES Environmental, Inc.
Project: Prose Fircrest

Lab ID: 2206505-009

Collection Date: 6/28/2022 11:05:00 AM

Client Sample ID: MW-1-11

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37073

Analyst: TN

Vinyl chloride	ND	0.0234		mg/Kg-dry	1	7/11/2022 3:34:55 PM
1,1-Dichloroethene	ND	0.0935	Q	mg/Kg-dry	1	7/11/2022 3:34:55 PM
trans-1,2-Dichloroethene	ND	0.0281		mg/Kg-dry	1	7/11/2022 3:34:55 PM
cis-1,2-Dichloroethene	ND	0.0234		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Trichloroethene (TCE)	ND	0.0187		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Tetrachloroethene (PCE)	ND	0.0281		mg/Kg-dry	1	7/11/2022 3:34:55 PM
Surr: Dibromofluoromethane	96.8	74.9 - 120		%Rec	1	7/11/2022 3:34:55 PM
Surr: Toluene-d8	98.2	76.7 - 125		%Rec	1	7/11/2022 3:34:55 PM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.3 - 136		%Rec	1	7/11/2022 3:34:55 PM

NOTES:

Q - Initial calibration verification for this analyte exceeds acceptance criteria.

Sample Moisture (Percent Moisture)

Batch ID: R76891

Analyst: AP

Percent Moisture	9.07	0.500		wt%	1	7/18/2022 9:42:17 AM
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Lab ID: 2206505-010

Collection Date: 6/28/2022 11:10:00 AM

Client Sample ID: MW-1-14.5

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 37008

Analyst: TN

Vinyl chloride	ND	0.0196		mg/Kg-dry	1	7/6/2022 12:45:58 AM
1,1-Dichloroethene	ND	0.0783		mg/Kg-dry	1	7/8/2022 1:55:02 AM
trans-1,2-Dichloroethene	ND	0.0235		mg/Kg-dry	1	7/6/2022 12:45:58 AM
cis-1,2-Dichloroethene	ND	0.0196		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Trichloroethene (TCE)	ND	0.0157		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Tetrachloroethene (PCE)	0.0302	0.0235		mg/Kg-dry	1	7/6/2022 12:45:58 AM
Surr: Dibromofluoromethane	95.5	74.9 - 120		%Rec	1	7/6/2022 12:45:58 AM
Surr: Toluene-d8	97.6	76.7 - 125		%Rec	1	7/6/2022 12:45:58 AM
Surr: 1-Bromo-4-fluorobenzene	93.4	63.3 - 136		%Rec	1	7/6/2022 12:45:58 AM

Sample Moisture (Percent Moisture)

Batch ID: R76629

Analyst: ALB

Percent Moisture	5.15	0.500		wt%	1	7/6/2022 9:37:47 AM
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DRAINAGE REPORT

Prose Fircrest

Parcel #: 0220112005

***Address: 2119 Mildred St W
Fircrest, Wa 98466***

December 2022

Owner:

*Alliance Residential
1900 N Northlake Way Suite 237
Seattle, Wa 98103*

*For Submittal to:
City of Fircrest*



DAVIDO CONSULTING GROUP, INC.
CIVIL ■ STRUCTURAL

CERTIFICATE OF ENGINEER

The technical material and data contained within this report has been prepared by or under the direction of the following registered professional engineer(s), licensed in accordance with the laws of the State of Washington to practice in the State of Washington.



QUICK REFERENCE PROJECT INFORMATION

General Project Information

Project Description	The demolition of an building and the construction of 4 multi-family buildings with associated parking, landscaping, and amenities. Site improvements include drainage, site design, grading, paving, utilities, and landscaping.
Project Address	2119 Mildred St W in Fircrest Wa
Project Size	Existing Site = 399,391 SF (9.18 acres) Developed Site (On-site) = 399,391 SF (9.18 acres)
Owner/Developer	Alliance Residential 1900 N Northlake Way Suite 237 Seattle, Wa 98103 Phone: (206) 330-0620
Consulting Engineer	Eric Schossow, PE Davido Consulting Group, Inc. 31620 23 rd Ave S. Suite 307 Federal Way, Wa 98003 Phone: (206) 523-0024 ext. 401

Drainage

Drainage Requirements	2019 Washington State Department of Ecology (WSDOE) Manual (which is hereafter referred to as “The Manual”) <ul style="list-style-type: none">• Minimum Requirements #1-9• Flow Control is required (>10,000 SF effective impervious surfaces; see Section 2.7)• Runoff Treatment is required (>5,000 SF Pollution Generating Impervious Surfaces; see Section 2.6)	
Tributary Drainage Area & Land Cover Summary	<i>Existing Conditions:</i> Building Asphalt Pavement Shrubs Fill Material Walking paths	<i>Developed Conditions (On-site):</i> Total Impervious = 338,046 SF Total PGIS = 149,805 SF Landscape Surface = 61,345 SF Total = 399,391 SF (9.18 Acres)
Soils	A geotechnical analysis was performed by PanGEO, Inc.. See Section 3.2 for additional information and APPENDIX A for the full geotechnical report.	
Stormwater BMPs	Stormwater Detention Vault	
ESC Measures	TESC measures include (but are not limited to) storm drain inlet protection, perimeter protection, construction entrance, construction fencing, and street cleaning.	

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1. PROJECT OVERVIEW

The project involves the demolition of an existing building for the construction of 4 new multi-family buildings. The project is located at 2119 Mildred St. W. in Fircrest, Wa (Parcel #0220112005). Improvements also include site grading, new driveways, drainage, water, sanitary sewer, and dry utilities. Vehicular access to the site will be via two new paved driveways and one existing driveway to remain off Mildred St. W. The project site is bounded on the east by townhomes and apartments, to the south by Columbia Bank, to the north by commercial businesses, and to the west by Mildred St. W.

The project location is shown in Figure 1. The proposed project has been designed to meet the requirements of the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (hereby referred to as “The Manual”).



Figure 1 Site Location (via Pierce County Public GIS Map)

1.1 General Description of Project

The project involves the demolition of an existing building and hardscape for the construction of 4 new multi-family buildings. The project is located at 2119 Mildred St. W. in Fircrest, Wa (Parcel #0220112005). Improvements also include site grading, new driveways, drainage, water, sanitary sewer, and dry utilities. Vehicular access to the site will be via two newly paved driveways off Mildred St. W.

1.2 Existing Site Conditions

The existing site is covered with an existing building, asphalt pavement, cement concrete pavement, shrubs, and fill material. There are no known environmentally critical areas on the site according to the Pierce County Public GIS Maps. However, portions of the site contain contaminated soils

1.3 Developed Site Conditions

The proposed site improvements include the construction of 4 new multi-family buildings and associated utility and site improvements. See TABLE 1 and TABLE 2 for a breakdown of land cover for on-site and ROW areas.

TABLE 1 On-site Project Site Area and Size of Improvements

	Developed	
	SF	Acres
Impervious Areas:		
Proposed Buildings	95,621	2.20
Proposed Walking Paths	86,102	1.98
Proposed PGIS	149,805	3.44
Total On-site Impervious Surface:	399,391	9.18
Total New/Replaced On-site Impervious Surface:	338,046	7.76
Total On-site Pollution Generating Impervious Surface:	149,805	3.44
Total New/Replaced On-site Pollution Generating Impervious Surface:	149,805	3.44
Total On-site Pervious Surface	61,345	1.42
Landscaping/Grass	61,345	1.42
Total Project Site Area (On-site Area Only)	399,391	9.18

TABLE 2 ROW Project Site Area and Size of Improvements

	Developed	
	SF	Acres
Impervious Areas:		
Concrete Driveway	900	0.021
Concrete Walkways	0	0
Total New/Replaced Impervious Surface:	900	0.021
Total New/Replaced Pollution Generating Impervious Surface:	900	0.021
New Grass/Trees/Landscape	0	0
Total ROW Project Site	900	0.021

1.4 Existing Stormwater Runoff Conditions

Runoff from the existing site is collected by a system of roof downspouts and catch basins. All stormwater runoff from the site discharges into the existing storm drain NE of the project site.

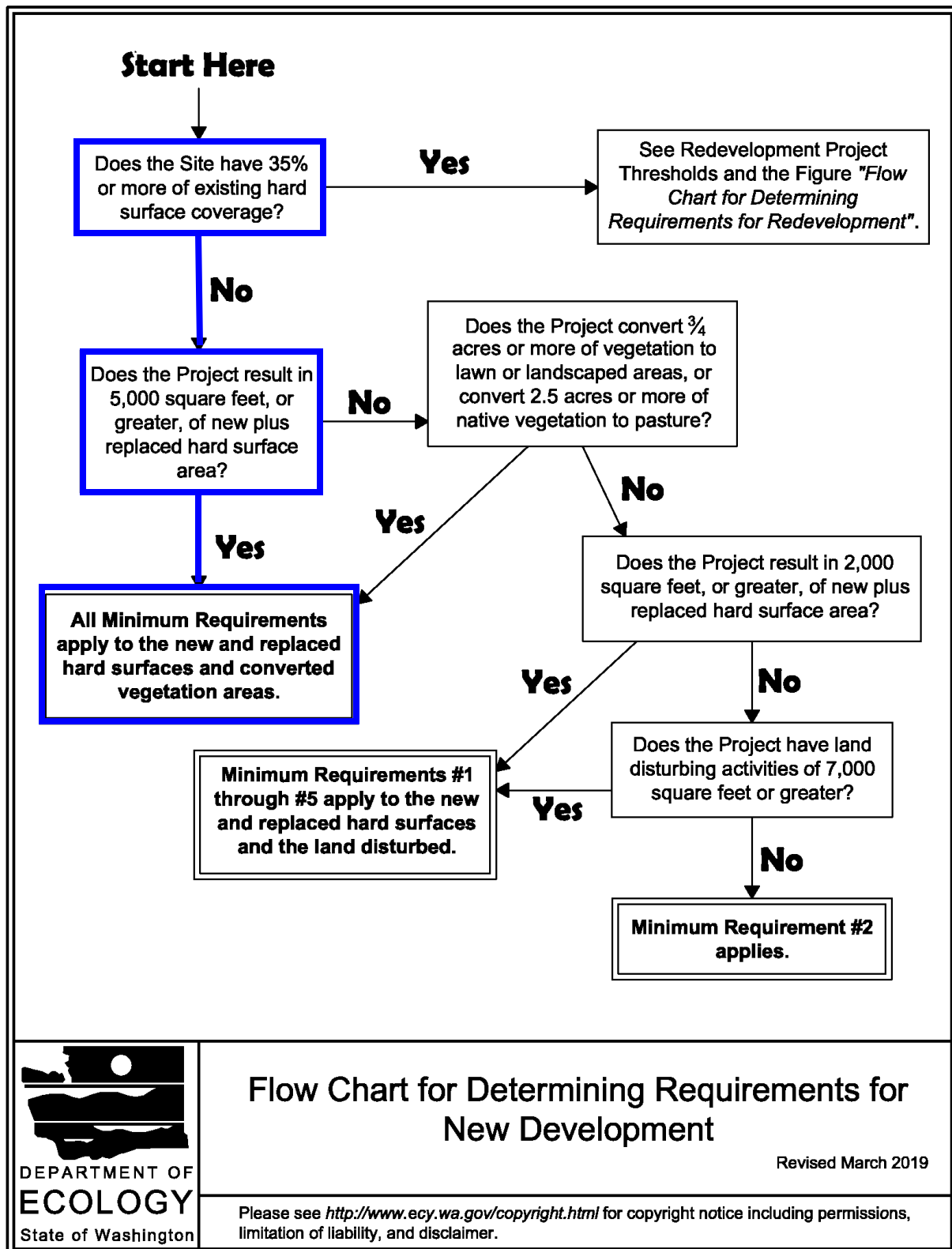
1.5 Postdeveloped Stormwater Runoff Conditions

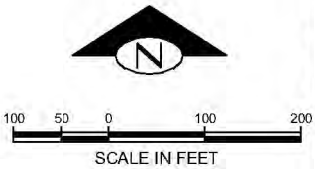
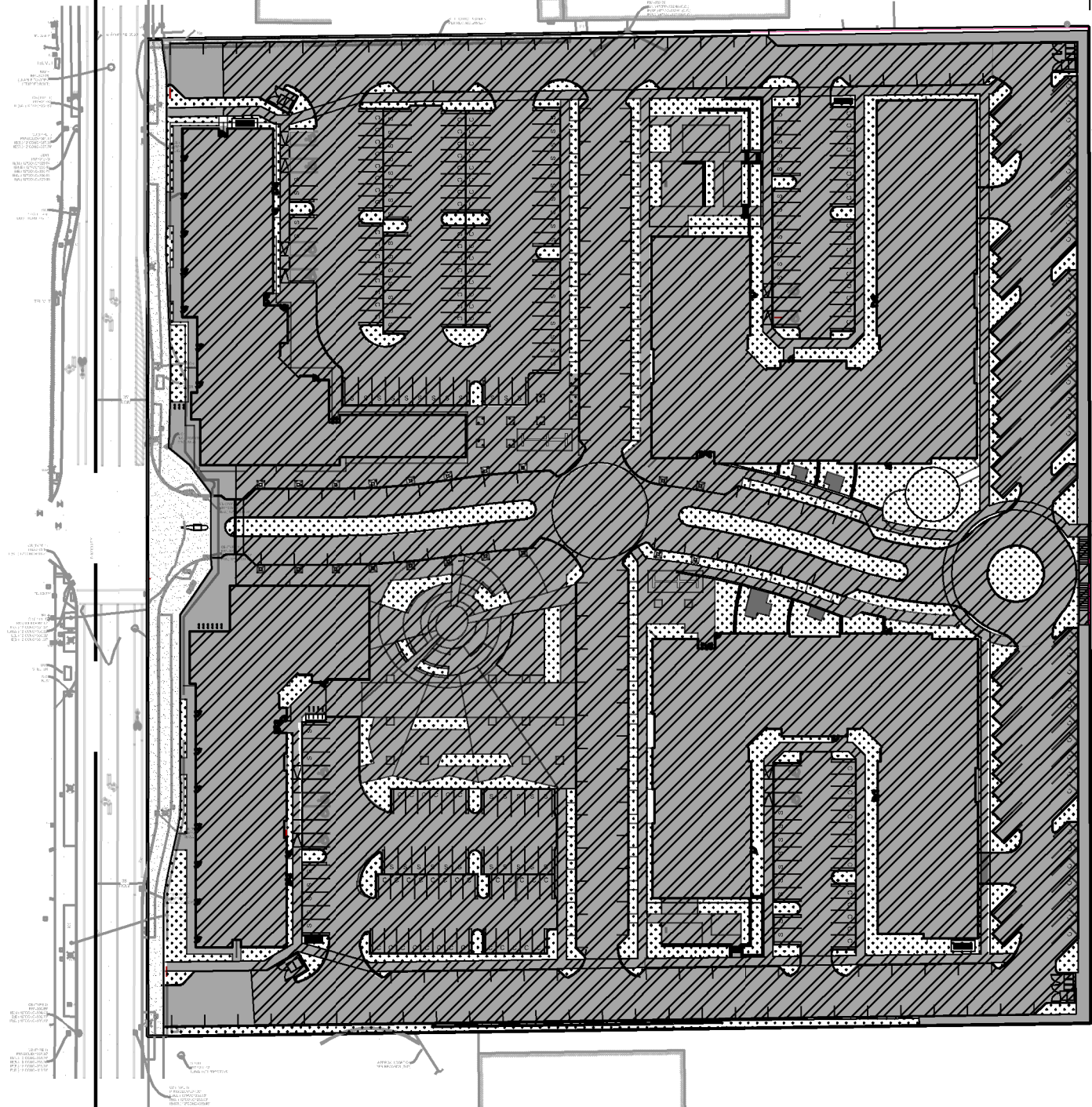
Stormwater runoff from site impervious surfaces will be routed to the proposed stormwater detention facility under the NE building's parking garage. There are some landscaped areas along the perimeter of the site that are impractical to collect and have been modeled as bypass in WWHM. See Figure 3 for the Drainage Graphic. Building footing drains will be routed to a catch basin before connecting to the on-site storm system. Overflows from the detention facility (if any) will be routed through the top of the flow control riser and routed to the existing 18" storm line NE of the project site.

2. MINIMUM REQUIREMENTS

The minimum requirements applicable to this project were determined using *Figure I-3.1 – Flow Chart for Determining Minimum Requirements for New Development* from the Stormwater Manual, as shown on the next sheet.

Figure I-3.1: Flow Chart for Determining Requirements for New Development





LEGEND:

- TOTAL IMPERVIOUS SURFACE:
338,046 SF, 7.76 AC.
- IMPERVIOUS AREA ROUTED TO
DETENTION POND:
321,092 SF, 7.37 AC
- IMPERVIOUS SURFACE ROUTED AS
BYPASS:
16,954 SF, 0.39 AC
- UNDISTURBED AREA (WITHIN 15'
UTILITY EASEMENT)
11,884 SF, 0.273 AC (NOT COUNTED
TOWARD SITE AREA)
- LANDSCAPED AREA
61,345, 1.42 AC
- LANDSCAPE AREA ROUTED TO
DETENTION POND:
58,345 SF, 1.35 AC
- LANDSCAPE AREA ROUTED AS BYPASS
3,000 SF 0.07 ACRES

NOTE: ALL AREAS COLLECTED AND ROUTED TO
THE DETENTION FACILITY WILL BE ROUTED TO A
TREATMENT FACILITY DOWNSTREAM OF THE
DETENTION FACILITY

FIGURE 3 - DRAINAGE GRAPHIC

SCALE: 1" = 100'

DATE: 11/15/2022

DCG

civil structural

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No.	DATE	BY	REVISION

As shown in Figure I-3.1, all Minimum Requirements apply to the new and replaced hard surface and converted vegetation areas. The project meets the Stormwater Manual minimum requirements as summarized in the following sections.

2.1 Minimum Requirement #1: Preparation of Stormwater Site Plans

The Stormwater Site Plan was prepared in accordance with Volume 1 Chapter 1-2 of the Stormwater Manual and includes the minimum requirements applicable to the subject site based on thresholds of new and replaced site impervious coverage.

2.2 Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan

The Construction Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with Volume 1 Chapter 1-2 of the Stormwater Manual, utilizing the Department of Ecology's (DOE) Construction Stormwater General Permit SWPPP template for the building permit submittal. As the site disturbance is more than one acre, a Stormwater Permit through the DOE is will be required.

2.3 Minimum Requirement #3: Source Control of Pollution

All known available and reasonable source control BMPs will be utilized on the project site to minimize stormwater from coming in contact with pollutants. The silt fence and inlet protection serve as source control of pollution. Other source control BMPs will be utilized depending on construction conditions.

In order to control pollutants, proper maintenance and cleaning of debris, sediments, and oil from stormwater collection and conveyance systems is required per the operation and maintenance recommendations found in Volume 5 of the Stormwater Manual. Source Control BMPs are also outlined and talked about in more detail in the CSWPPP.

2.4 Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

The site will continue to discharge to the outfall location which currently exists. There are no outfalls or natural drainage systems on-site.

2.5 Minimum Requirement #5: On-Site Stormwater Management

This project is required to either implement the LID performance standard or use List #2 to determine BMPs feasible for each surface. As shown in Table I-3.2 of The Manual, List #2 applies to this project. This project complies with List #2 as described below:

Lawn and landscaped areas:

All disturbed pervious surfaces will be amended in accordance with the Post-Construction Soil Quality and Depth requirements as listed under BMP T5.13 in Chapter 5 of Volume V.

Roof:

1. Full dispersion – Infeasible as the 100-foot native vegetative flow path cannot be met.
2. Bioretention – Infeasible as the Geotech recommends infiltration not be used as the site has very low infiltration potential.

3. Downspout Dispersion – Infeasible as the vegetated flow paths cannot be met.
4. Perforated Stub-out Connections – Infeasible as the geotechnical report mentions the site has low infiltration potential.

Other Hard Surfaces:

1. Full dispersion - Infeasible as the 100-foot native vegetative flow path cannot be met.
2. Permeable Pavement – Infeasible as the Geotech recommends infiltration not be used on this site.
3. Bioretention - Infeasible as the Geotech recommends infiltration not be used as the site has very low infiltration potential.
4. Sheet Flow Dispersion – This BMP is infeasible for the at grade surfaces as they cannot meet the required vegetated flow path.

2.6 Minimum Requirement #6: Runoff Treatment

Runoff from pollution generating surfaces requires treatment as the new/replaced PGIS will be greater than 5,000 SF. There is one on-site treatment facility proposed that will treat all stormwater runoff post detention. This facility will treat near 100% of the on-site PGIS as well as other hard surfaces routed to it. See Figure 4 for PGIS graphic.

2.7 Minimum Requirement #7: Flow Control

Flow control is required for this project. In accordance with the Department of Ecology flow control requirements, developed runoff must not exceed the pre-developed peaks and durations for the range of pre-developed discharge rates from 50% of the 2-yr peak flow up to the full 50-yr peak flow.

A detention vault and flow control structure has been sized appropriately and will be located under building C's parking garage to meet this requirement. See Appendix B for the WWHM flow control analysis and Figure 3 for the drainage graphic.

2.8 Minimum Requirement #8: Wetlands Protection

There are no wetlands within the vicinity of the site according to the Pierce County's Public GIS Map. Therefore, this requirement is not applicable.

2.9 Minimum Requirement #9: Operation and Maintenance

An operation and maintenance manual consistent with Volume V has been provided in Appendix E.

3. SITE AND BASIN ASSESSMENT

The proposed project aims to preserve natural resources and maintain or restore natural hydrologic conditions on the site. The existing site conditions are summarized in the following sections.

Existing Site Conditions:

A. Topography

The general topography of the existing site shows the grade sloping down from west to east at a gentle slope for the eastern portion of the site. The western portion of the site also slopes down from west to east at approximately a 30-40% slope with a vertical drop of about 30'. The overall vertical difference from the west to east property lines is about 40'.

B. Existing ground cover

The existing site's ground cover contains a building, an asphalt parking area, cement concrete pavement, shrubs, and fill material.

C. Natural features of the parcel

The pervious area on the existing site consists of random fill material.

D. Offsite drainage to the property

There is no existing offsite drainage that makes its way onto the project site.

E. Environmentally sensitive areas on or down gradient of the property

According to the Pierce County Public GIS Maps and project survey, there are no environmental critical areas on the project site. However, portions of the site contain contaminated soils.

F. Drains, channels, and swales, within the project site and immediately adjacent

There is a storm line that runs east/west north of the project site. There is also an existing man-made swale/stormwater retention area at the eastern end of the site that spans along the eastern property line.

G. Points of exit for existing drainage from the property

According to the survey, stormwater runoff from the entire site eventually makes its way into the storm drain northeast of the project site.

H. Known historical drainage problems

There are no known historical drainage problems associated with the site.

I. Existing Structures/Improvements

Existing structures include a building, sanitary, and drainage structures.

J. New Structures Improvements

Proposed improvements include 4 new multi-family buildings, with associated walking paths and roads.

K. Future Structures/Improvements Planned

This site will contain new public roadways that will have dead-ends at the property lines of this site. Future projects adjacent to this site will build off these proposed public roadways.

L. Remaining Undisturbed Land

There will be no undisturbed land on the project site. The only undisturbed area will be a large portion of Mildred St. W. west of the project site.

3.1 Existing Vs. Proposed Flow Analysis

An existing vs. proposed flow analysis has been submitted for this project as the project proposes to discharge stormwater offsite to the existing drainage system northeast of the project site.

There was no visual indication of conveyance system capacity problems, localized flooding, erosion impacts, or violations of surface water quality standards discovered to our knowledge. Additionally, there was no evidence of damage to the drainage system. However, the City of Fircrest's public works department has mentioned a storm line downstream has experienced capacity problems in the past.

A flow analysis for the existing and proposed drainage has been performed and is included in Appendix F of this report.

3.2 Soils/Infiltration Rates

A geotechnical analysis was performed and a report was prepared by PanGEO, Inc in July of 2022. The found undocumented fill over dense to very dense glacial till deposit and concluded that infiltration is not feasible for this project.

See Appendix A for the full geotechnical investigation.

3.3 Critical Areas and Flood Plain

There are no critical areas on the site according to the Pierce County Public GIS Maps. However, portions of the site contain contaminated soils

3.4 Assessment Summary

The area of study for this project was the project site itself. A detention vault will be utilized to mitigate the runoff from the proposed surfaces. Design criteria and how they are incorporated into the plans are discussed in the following sections.

Design Criteria:

A. Conserve existing habitat and vegetation

There are no habitats or vegetation to be conserved on the project site. The entire site is proposed to be developed.

B. Protect areas conducive to infiltration and preserve these areas during site design and construction

Infiltration is not feasible for this site and will not be incorporated.

C. Limit ground disturbance areas to road, utility, building pad, landscape areas, and the minimum additional area needed to maneuver equipment

Ground disturbance will be limited on-site as much as possible. A temporary construction entrance made of quarry spalls connecting to Mildred St. W. will be in place prior to construction to limit ground disturbance while leaving the site. In addition, the portion of Mildred St. W. adjacent to the project site is to be swept daily, or more often as needed, to remove sediment tracked from the project site.

D. Reduce impervious surfaces

Although the amount of impervious surfaces will increase from the existing conditions, the stormwater flowrates will be significantly reduced due the implementation of a stormwater detention system.

E. Place structures as close to the public access point as possible to minimize road/driveway length

Proposed structures are located on-site in a manner to reduce the driveway length while still achieving the overall project goals.

F. Limit vehicular and pedestrian infrastructure to the minimum functional needs

Vehicular and pedestrian infrastructure have been limited to the minimum functional needs.

G. Utilize porous paving options wherever possible

Permeable pavement is not feasible for this project and is not incorporated.

H. Slope paved areas to facilitate drainage to stormwater management areas

All on-site hard surfaces and landscaped areas have been designed to slope toward catch basins and area drains. Drainage collected in the catch basins or area drains will route stormwater to the detention facility at the northeast area of the site.

I. Reduce building footprints whenever possible. Utilize basements or taller structures with lofts or second stories to achieve square footage goals

Building footprints were reduced as much as possible while achieving the overall project goals.

J. Orient buildings on slopes with long-axis along topographic contours to reduce grading requirements

The proposed buildings are oriented as closely as possible with the long-axis along topographic contours.

K. Compost amend disturbed soils according to BMP T5.13 in the Stormwater Manual: Volume V

All disturbed soils that will remain pervious will be amended in accordance with BMP T5.13 in the Stormwater Manual.

3.5 Facility Sizing and Downstream Analysis

See Section 5 for further information on the sizing of the detention facility. See Section 3.1 for a discussion on the downstream analysis.

4. CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (CSWPPP)

The CSWPPP has been prepared in accordance with the Stormwater Manual as part of the building permit package. Per the Stormwater Manual, the CSWPPP is required to be completed using the Department of Ecology's Construction Stormwater General Permit CSWPPP template. See Appendix D for the CSWPPP.

TABLE 3 Proposed ESC Measures
(All ESC Measures Shall Comply with the Stormwater Manual)

	ESC Measure	Comment
1	Identify Project Limits	Mark by fencing or other means to contain the grubbing and grading activities.
2	Catch Basin Inlet Protection	Install catch basin inlet protection in any drainage structures that may collect any stormwater flowing from the construction site.
3	Phase Grubbing and Grading	Phase clearing so that only those areas that are actively being worked are uncovered. From October 1 through April 30, no soils shall remain exposed for more than 2 days. From May 1 through September 30, no soils shall remain exposed for more than 7 days.
4	Install Straw Wattles	Install straw wattles around disturbed areas where sediment could be transported off-site. Adjust straw wattles as required by site conditions and construction sequencing.
5	Sod/Seed Exposed Areas	Cleared areas will be sod/seeded as soon as possible after grading completed (few weeks).
6	Soil Removal	Remove excess soil from the site as soon as possible after backfilling.
7	Protect Adjacent Properties	Adjacent properties shall be protected from sediment deposition by appropriate use of vegetative buffer strips, sediment barriers or filters, dikes or mulching, or by a combination of these measures and other appropriate BMPs.
8	Street Cleaning	Provide for periodic street cleaning to remove any sediment that may have been tracked out. Sediment should be removed by shoveling or sweeping and carefully removed to a suitable disposal area where it will not be re-eroded.
9	Inspect ESC BMPs	Inspect all erosion and sediment control BMPs installed regularly, especially after any large storm. Maintenance, including removal and proper disposal of sediment should be done as necessary.

4.1 Rainy Season Requirements

The construction of this project will be managed to minimize the amount of time that exposed soil is receptive to rainfall. This will help minimize stormwater runoff and erosion. Compost socks, silt fencing, and/or straw wattles will be placed around the site where needed to control the flow rate and disperse stormwater leaving the site. Mulching will be used to help stabilize the soil, especially when rain is anticipated.

4.2 Seasonal Suspension Plan

N/A. Construction is not anticipated to come to a halt at any time during the year unless specifically directed by the city of Fircrest and/or the construction inspector.

5. PERMANENT STORMWATER CONTROL

Total areas for impervious surfaces and pollution-generating impervious surfaces are shown in TABLE 1 and TABLE 2. The stormwater requirement thresholds are as follows:

- On-site stormwater management BMPs per Section 2.5.5 of the Stormwater manual.
- Flow Control is required for the site
- Water quality treatment is required for the site.

The following sections address and summarize site specifics and requirements:

5.1 Flow Control

As this project exceeds the thresholds listed in section I-3.4.7 of The Manual, flow control is required. The proposed project will provide a detention vault which will collect stormwater from on-site impervious and pervious surfaces. Overflow from the detention facility will be routed to the existing 18" storm main north east of the project site.

Runoff from the proposed buildings will be captured via roof gutters and will be routed to the detention facility located in the northeastern portion of the project site. Stormwater runoff from the walkways and on-site roads will sheet flow into proposed collection structures.

5.1.1 WWHM2012 Modeling

The detention system is configured to provide a developed discharge duration match to predeveloped conditions for the range of the predeveloped discharge rates from 50% of the 2-year storm through the 50-year storm. This was accomplished using the WWHM2012 modeling software. See APPENDIX B for the results.

5.1.2 Drainage Improvements Within the ROW

There are no drainage improvements within the ROW anticipated for this project.

5.2 Water Quality

Enhanced water quality treatment is required for this project as greater than 5,000 square feet of new and replaced pollution generating impervious surface (PGIS) will be added, as specified in Section I-3.4.6 of The Manual. The project proposes a total of 149,805 SF of PGIS. The treatment facility will be BioClean's Modular Wetlands Stormwater Biofiltration System. This has been sized using WWHM and by BioClean. See Figure 3 for a Drainage graphic, and Appendix B for details.

5.3 Source Control

In order to control pollutants, proper maintenance and cleaning of debris, sediments, and oil from stormwater collection and conveyance systems is required per the operation and maintenance recommendations found in Volume 5 Section 4.6 of the Stormwater Manual in addition to the BMPs in Volume IV Section 2.2. See Appendix E for operation and maintenance requirements pertaining to the project.

5.4 Conveyance System Analysis and Design

The on-site conveyance system is comprised of several new Type I catch basins, storm drain cleanouts, area drains, and 6 to 18 inch storm drainpipes. Conveyance calculations were performed for the project site utilizing the WSDOT Hydraulic Manual Section 6-5 (excel worksheet) to determine pipe capacity and velocities within the mainline storm system. Each corresponding "Leg" was analyzed to ensure minimum pipe velocities were met as well as adequate capacity within the pipe. See Appendix C for the conveyance spreadsheet and associated graphic.

6. SPECIAL REPORTS AND STUDIES

6.1 Geotechnical Report

A Subsurface Report and Infiltration Checklist was performed by PanGEO, Inc. and the associated report is included in APPENDIX A.

7. OTHER PERMITS

There are no other permits anticipated for this project.

APPENDIX A Geotechnical Report

GEOTECHNICAL ENGINEERING REPORT - DRAFT

PROPOSED DEVELOPMENT – PROSE FIRCREST

2119 MILDRED STREET WEST

FIRCREST, WASHINGTON

Project No. 21-529

July 19, 2022



Prepared for:

Alliance Residential Company



3213 Eastlake Avenue E, Suite B
Seattle, WA 98102-3513
Tel: 206.262.0370

*Geotechnical & Earthquake
Engineering Consultants*

July 19, 2022
File No. 21-529

Garrett Hodgins
Alliance Residential Company | Pacific Northwest
1900 N Northlake Way, Suite 237
Seattle, WA 98103

**Subject: Geotechnical Engineering Report - DRAFT
Proposed Development – Prose Fircrest
2119 Mildred Street West, Fircrest, Washington**

Dear Garrett:

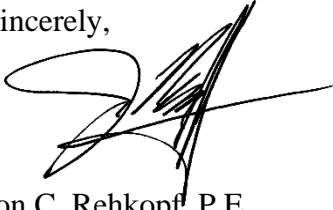
As requested, PanGEO, Inc. completed a geotechnical engineering study to assist you and your project team with the design and construction of the proposed development in Fircrest, Washington. The results of our study are summarized in the attached draft report. We will finalize this draft report once we receive review comments from the project team.

In summary, the site is underlain by as much as about 35 feet of undocumented fill soil over dense to very dense native silty sand with gravel (glacial till). The fill soils are generally loose, and will not provide adequate support for the proposed structures. In our opinion, where more than about five feet of loose fill is present, such as within the eastern half of the site, a feasible foundation system consists of supporting the structures on a shallow foundation bearing on ground improved with aggregate piers. Along the west side of the site, where the fill is generally less than five feet thick, we anticipate that the building footings can be deepened to reach the native soils, or the unsuitable fill soils may be over-excavated and replaced with lean-mix concrete or structural fill.

The re-use of on-site fill soils may be possible below proposed landscaping or pavement areas during periods of dry weather, but will be difficult or impossible to re-use during periods of wet weather. The on-site soils may be amended with cement to allow their re-use during wet times of the year.

We appreciate the opportunity to work with you on this project. Please do not hesitate to contact us with any questions.

Sincerely,

A handwritten signature in black ink, appearing to be 'J. Rehkopf', with a large, stylized flourish extending from the end.

Jon C. Rehkopf, P.E.
Principal Geotechnical Engineer
(JRehkopf@pangeoinc.com)

Encl.: Geotechnical Engineering Report - DRAFT

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Figure 1	Vicinity Map
Figure 2	Site and Exploration Plan
Figure 3	Approximate Elevation of Glacial Till Contact
Figure 4	Cross Section A-A' & B-B'
Figures 5A-5E	Cross Sections C-C'

LIST OF APPENDICES:

Appendix A: Previous Subsurface Explorations – Kleinfelder (2005)

Appendix B: Previous Subsurface Explorations – Terracon (2008)

GEOTECHNICAL ENGINEERING REPORT - DRAFT
PROPOSED DEVELOPMENT – PROSE FIRCREST
2119 MILDRED STREET WEST
FIRCREST, WASHINGTON

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering study that was undertaken to support the design and construction of the proposed Prose Fircrest development along Mildred Street West in Fircrest, Washington. Our study was performed in general accordance with our mutually agreed scope of work as outlined in our consulting agreement for the project dated November 19, 2021.

Our service scope included reviewing readily available geologic data at the project site which included the results of two previous geotechnical studies that were conducted for the project site, conducting a site reconnaissance, and conducting engineering analyses to develop the geotechnical recommendations outlined in this report. PanGEO will finalize this report once we receive comments from the project team, and the design concept has been finalized.

2.0 SITE AND PROJECT DESCRIPTION

The subject site consists of a generally square-shaped parcel located at 2119 Mildred Street West, in Fircrest, Washington, as depicted in Figure 1. The site has an area of about 9½ acres, and is currently developed with a one-story structure in the northwest portion of the site. The remainder of the site is undeveloped, but has received a significant amount of undocumented fill soils.

The western approximately two-thirds of the site is generally flat, with an elevation around 335 feet to 340 feet (NGVD 1929) with a gentle slope down to the east, while the remainder of the site slopes steeper down to the east to the eastern property line which has an elevation of about 315 feet (NGVD 1929).

An aerial photo of the project site depicting site features is shown in the attached Figure 2, *Site and Existing Exploration Plan*. Plates 1 and 2 on the following page depict current site conditions.



Plate 1. Looking northeast from Mildred Street West at the existing structure located along the west side of the subject property.



Plate 2. Looking north along eastern portion of site, from near the center of site. Note the sloping topography down to the east.

The current develop plan consists of the construction of four primary structures that will be surrounded with open spaces and at-grade surface parking lots and drive lanes. The western two structures (Buildings A and B) will consist of five levels, and will be constructed along Mildred Street West. Buildings A and B will be at-grade structures without basements. We understand that the finished floor elevation of Building A will be around elevation 342 feet, and the finished floor elevation for Building B will be around elevation 340 feet.

The two eastern structures, designated Building C and D, will contain underground parking in a daylight basement along the east side of the structure. We understand Buildings C and D will contain four levels, and will have a basement finished floor elevation between about 324 feet and 325 feet.

We understand that a large stormwater detention vault that will service the majority of the site will be located below the basement floor of building C, and will have a bottom elevation around 303 feet.

A site retaining wall up to about 15-feet tall will be needed along the eastern property line to allow for the change in grade between the proposed eastern parking lot and the existing ground surface along the eastern property line.

A preliminary site plan is shown on the following page depicting the proposed buildings and site features.

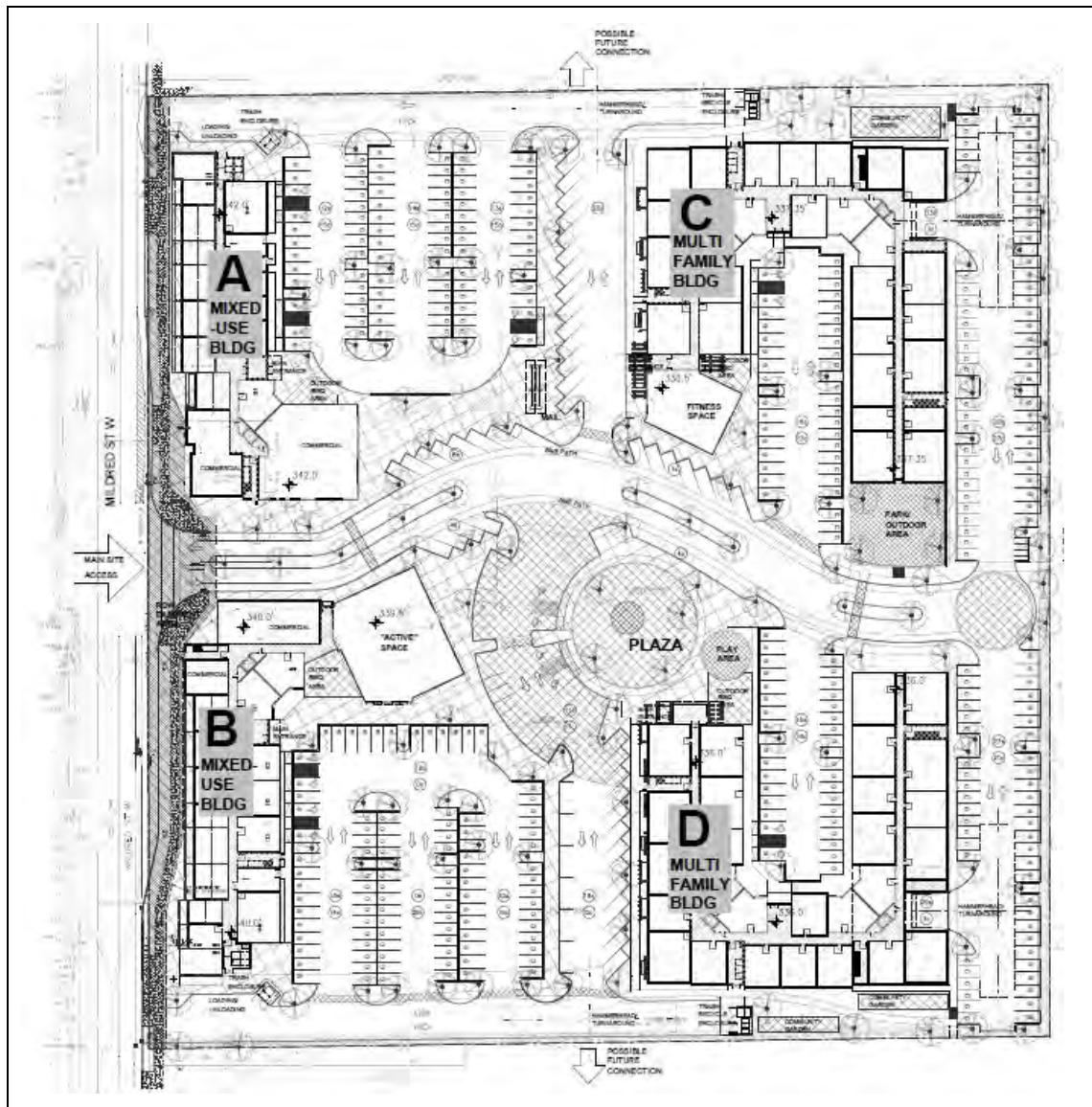


Plate 3. Proposed site plan modified from Sheet AS-100 of the schematic design set dated 5-20-22, prepared by Graves + Associates. (North is to the top of the plan)

3.0 SUBSURFACE EXPLORATIONS

In preparing this report we reviewed two previously completed geotechnical studies performed at the site. The previous studies included drilling over 60 test borings at the site. The existing geotechnical information reviewed included the following:

- Final geotechnical report prepared by Kleinfelder (2005) for the subject site that included 56 test borings spaced relatively equally across the site. The report also included laboratory tests of representative soil samples; and
- Preliminary geotechnical report prepared by Terracon (2008) for the subject site that included 9 test borings generally located in the northern half of the subject site.

The approximate locations of the previous explorations are presented in Figures 2 and 3 of this report, and the summary logs are included in Appendix A and B.

Laboratory Testing - The results of previous laboratory tests can be found in Appendix A.

4.0 SUBSURFACE CONDITIONS

4.1 GEOLOGY

Based on a review of the geologic map of the project area (Schuster et. al. 2015), the site is underlain by deposits of the Vashon Stade of the Fraser Glaciation including recessional outwash soils (map unit Qgo). Recessional outwash is described as silt, clay, sand and gravel deposited by glacial meltwater, variable sorted, loose to compact, massive to well stratified, with horizontal to steeply dipping beds. Vashon glacial till (map unit Qgt) is also mapped in close proximity to the north, west and south side of the project site. Vashon glacial till typically consists of an over-consolidated heterogeneous mixture of sand, silt and gravel deposited directly below the glacial ice sheet during the Vashon Stade of the Fraser Glaciation. Glacial till typically exhibits low compressibility and high strength characteristics.

4.2 SOIL

Based on the results of previous explorations at the site, the site soils consist of a thin to thick layer of generally loose undocumented fill over dense glacial till. The subsurface conditions encountered in the explorations differed slightly from the mapped geology in that glacial till was not mapped directly on the subject property.

The site subsurface conditions are summarized below, and logs of the subsurface explorations at the site are included in Appendix A and B. In addition, the attached Figure 3 shows the anticipated elevation of the native glacial till soils across the site, and Figures

4 and 5 include subsurface profiles across the site depicting the anticipated depth of the fill soils and elevation of the native glacial till.

Unit 1: Undocumented Fill – The site is underlain by undocumented fill soils that range in thickness from only about 2 to 5 feet thick along the western side of the site, to up to about 35 feet deep within the eastern portion of the site. Based on our review of the test borings logs, the fill material consists of a mixture of silty sand, sandy silt and silt with various amounts of gravel and debris such as concrete fragments, bricks, wood, organics, and other deleterious materials. The density of the fill is generally very loose to medium dense.

Unit 2: Glacial Till – Underlying the fill soil is a dense to very dense silty sand with varying amounts of gravel that was interpreted to be glacial till. The very dense glacial till was encountered to the termination depth of the test borings. Cobbles and boulders are common in glacial till deposits, as are pockets of clean sand and gravel.

4.3 GROUNDWATER

Significant groundwater was not encountered in the previous test borings. Occasionally perched groundwater was noted in the fill soils, on-top of the dense glacial till soils, or within sandy or gravelly zones of the native glacial till. It should be noted that groundwater depths are likely to vary depending on seasonal precipitation, local subsurface conditions, and other factors. Groundwater levels and seepage rates are normally highest during the winter and early spring.

5.0 SEISMIC CONSIDERATIONS

5.1 SEISMIC DESIGN PARAMETERS

The seismic design of the building will be accomplished in accordance with the 2018 International Building Code (IBC). Based on the results of the previous subsurface explorations, as well as our understanding of the geology of the area, we anticipate that a Site Class C would be appropriate for Buildings A and B located on the west side of the subject site. Due to the thick fill soils on the eastern portion of the site, we recommend a Site Class D (stiff soil) would be appropriate for Buildings C and D.

5.2 SOIL LIQUEFACTION POTENTIAL

Liquefaction occurs when saturated sands are subjected to cyclic loading, which causes the pore water pressure to increase in the soils thereby reducing the inter-granular stresses. As the inter-granular stresses are reduced, the shearing resistance between soil particles decreases. If pore pressures develop to the point where the effective stresses acting between the grains become zero, the soil particles will be in suspension and behave like a viscous fluid. Typically loose, saturated, granular soils such as sand and silt, that have a low enough permeability to prevent drainage during cyclic loading, have the greatest potential for liquefaction, while more dense soil deposits with higher silt or clay contents have a lesser potential. Soil liquefaction may cause the temporary loss/reduction of foundation capacity and settlement.

Due to the dense to very dense soils underlying the site, and the lack of groundwater at shallow depths, in our opinion the risk of soil liquefaction is low, and special design considerations for soil liquefaction are not required for the proposed project

6.0 GEOTECHNICAL RECOMMENDATIONS

6.1 BUILDINGS A & B

We understand the proposed first floors for buildings A and B will be near existing grade. Based on the results of the test borings at the site, we anticipate that dense native soils will be present at or within about 2 to 5 feet of existing grade. Figure 3 depicts the anticipated elevation of the glacial till bearing soils at the site. If the glacial till is not present at the design footing subgrade elevation, the footings can either be deepened to bear on the dense native soils, or the undocumented fill can be over-excavated and replaced with lean-mix concrete or properly compacted structural fill. The over-excavation would need to only occur below the footings, and the lean-mix backfill would need to extend about 6-inches wider than the proposed footings.

6.1.1 Allowable Bearing Pressure

We recommend that the footings be designed for a maximum allowable bearing pressure of 6,000 psf. This recommendation is applicable for footings founded on undisturbed, dense to very dense glacial till soil. If footings are supported on structural fill placed over

dense, undisturbed glacial till, the structural fill should consist of lean-mix concrete (minimum 1½ sack mix). If compacted granular structural fill is placed below the footings, a reduced allowable bearing pressure of 4,000 psf should be used for design. The granular structural fill should extend wider than the footings by a horizontal distance equal to half of the over-excavation depth.

For allowable stress design, the recommended allowable bearing pressure may be increased by 1/3 for transient conditions such as wind and seismic loadings.

All footings should have a minimum width of 24 inches. Exterior foundation elements should be placed at a minimum depth of 18 inches below final exterior grade. Interior spread foundations should be placed at a minimum depth of 12 inches below the top of slab.

6.1.2 Foundation Performance

Total and differential settlements are anticipated to be within tolerable limits for footings designed and constructed as discussed above. Footing settlement under static loading conditions is estimated to be less than approximately ½ inch, and differential settlement between adjacent columns should be less than about ¼ inch. Most settlement will occur during construction as loads are applied.

6.1.3 Lateral Resistance

Lateral forces from wind or seismic loading may be resisted by the combination of passive earth pressures acting against the embedded portions of the foundations and by friction acting on the base of the foundations. Passive resistance values may be determined using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value includes a factor of safety of at least 1.5 assuming that properly compacted structural fill will be placed adjacent to the sides of the footings. A coefficient of friction of 0.35 may be used to determine the frictional resistance at the base of the footings. This coefficient includes a factor of safety of approximately 1.5.

6.1.4 Footing Construction Considerations

All footing subgrades should be carefully prepared. Any loose soil should be removed from the footing excavations or re-compacted. Footing subgrades should be observed by

PanGEO to confirm that the exposed footing subgrade is consistent with the expected conditions and adequate to support the design bearing pressure.

6.1.5 Subgrade Protection

The contractor should be aware that the site soils are highly sensitive to moisture, and will become disturbed and soft when exposed to inclement weather conditions. As a result, depending on the groundwater and weather conditions at the time of footing construction, and the actual soil conditions encountered, it may be necessary to place 2 to 4 inches of clean crushed rock or lean-mix concrete (1½ sack) on the exposed footing subgrade to protect it against moisture and disturbance.

If groundwater seepage is encountered, the contractor should be prepared to dewater the footing excavations using sumps and pumps to allow for proper subgrade preparation. In addition, the contractor should consider proper sequencing of earthwork activities during wet weather to minimize moisture exposure of footing and floor subgrade soils.

6.1.6 Slab On Grade

Conventional slab on grade construction may be used for the floor slabs. Due to the potential for up to 4 or 5 feet of loose undocumented fill below the floor slab, to increase the performance of the floor slab, and reduce the potential for cracking, we recommend that a minimum of 2 feet of undocumented fill be removed and replaced with properly compacted structural fill. Prior to re-compaction, any existing loose soil in the over-excavation should be compacted to a firm and unyielding condition. Based on the subgrade preparation recommended above, the floor slab design may be accomplished using a modulus of subgrade reaction of 150 pci.

We recommend that the slab on grade be constructed on a minimum 4-inch thick capillary break placed on the undisturbed native soil or properly compacted structural fill over native soil. The capillary break should have no more than 10 percent passing the No. 40 sieve and less than 2 percent by weight of the material passing the U.S. Standard No. 200 sieve. If portions of the basement floor will house any equipment or facilities that are sensitive to moisture, we recommend that a minimum 10-mil polyethylene vapor barrier be placed below the subject portions of the slab.

6.2 BUILDINGS C & D

We understand the proposed basement floors for buildings C and D will be around elevation 324 to 325 feet, and the first floors of the buildings will be around elevation 336 and 337 feet. Based on the results of the test borings at the site, we anticipate that from about 15 to 25 feet of undocumented fill will be present below the proposed structures. One exception is below the proposed detention vault under building C, which may likely reach bearing soils without the need for ground improvement. Due to the loose and variable nature of the fill soils, the fill will not be suitable to support the proposed structures due to the potential for long term settlement.

In our opinion a feasible foundation support option from a geotechnical standpoint is to install aggregate piers to improve the bearing capacity of the existing fill soils, and to reduce the potential for settlement to a tolerable level. Conventional shallow foundations could then be constructed over the improved ground.

Another option consisting of a deep foundation, such as augercast or driven piles, was considered; however, in our opinion piles would not be as cost-effective as ground improvement using aggregate piers.

6.2.1 Ground Improvement with Aggregate Piers

In our opinion, a feasible soil improvement technique consists of improving the loose to medium dense undocumented fill consisting of sand, silty sand and silt below the proposed structure with aggregate piers. Aggregate piers consist of compacting columns of well-graded crushed rock to increase the bearing capacity of poor soils, and to reduce settlements.

Because specialty contractors install aggregate piers using a proprietary system, the contractor determines the lengths and spacing of piers, the allowable soil bearing pressure of the improved soil, improved soil characteristics and anticipated settlements. Specifically, the specialty contractor is responsible for the ground improvement design, and will provide design drawings and calculations stamped by a registered professional engineer.

We anticipate that the aggregate piers would need to extend through the undocumented fill to reach the undisturbed native soils approximately 15 to 25 feet below the proposed

structures. The actual depth of ground improvements should be determined by the design-build contractor to meet the project specifications.

6.2.2 Spread Footings

In our opinion it would be feasible to support the new structure on conventional spread and strip footings bearing on closely spaced ground improvement elements. We anticipate that the ground improvement can be designed to provide an allowable bearing capacity in the range of 4 to 6 ksf, depending on the spacing of aggregate piers. A discussion with the design-build contractor is recommended before selecting the allowable bearing pressure to size the footings.

6.2.3 Lateral Resistance

Lateral forces from wind or seismic loading may be resisted by a combination of passive earth pressures acting against the embedded portions of the foundation, and by friction acting on the base of the foundation. Passive resistance values may be determined using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value includes a factor of safety of at least 1.5 assuming that properly compacted structural fill will be placed adjacent to the sides of the foundation, and level ground surface adjacent to the footings.

A friction coefficient of 0.4 may be used to determine the frictional resistance at the base of the foundation. This coefficient includes a factor of safety of approximate 1.5.

6.2.4 Slab on Grade

The thick layer of loose undocumented fill below the basement floor slabs has the potential to settle and cause cracking of the floors. As such, to increase the performance of the floor slabs and reduce the potential for settlement, we recommend that ground improvement elements be installed below the floor slab to provide adequate support for the slab on grade. Ground improvement elements to support a floor slab are typically much more widely spaced than ground improvement elements below footings.

We recommend that the slab on grade be constructed on a minimum 4-inch thick capillary break placed on the undisturbed native soil or properly compacted structural fill over native soil. The capillary break should have no more than 10 percent passing the No. 40 sieve and less than 2 percent by weight of the material passing the U.S. Standard No. 200 sieve. If

portions of the basement floor will house any equipment or facilities that are sensitive to moisture, we recommend that a minimum 10-mil polyethylene vapor barrier be placed below the subject portions of the slab.

6.3 BASEMENT WALLS

Presented below are our geotechnical recommendations for the design and construction of the proposed basement walls.

6.3.1 Lateral Earth Pressures

The basement walls braced against rotation may be designed for an earth pressure based upon an equivalent fluid weight of 50 pcf (at-rest condition). For the seismic condition, we recommend including an incremental uniform lateral earth pressure of 10H psf (where H is the height of the below grade portion of the wall) as an ultimate seismic load. The recommended lateral pressures assume that the backfill behind the wall consists of a free draining and properly compacted fill with adequate drainage provisions to prevent the development of hydrostatic pressure.

Buried Structures (Elevator Pits, Detention Vaults, etc.) - There is potential for groundwater to accumulate next to buried structures such as elevator pits and detention vaults. If it is not feasible to incorporate footing drains for elevator pits, detention vaults, etc., we recommend that an equivalent fluid weight of 90 pcf be applied for wall design. The recommended 90 pcf includes both the soil pressure and the effects of hydrostatic pressure. Buoyancy force should also be considered in the design of these structures where drainage provisions are not present.

6.3.2 Wall Surcharge

The basement walls should be designed to accommodate traffic surcharge pressures if the traffic load is located within the height dimension of the wall. As minimum, the traffic surcharge should be considered to be a 75 psf uniform horizontal pressure for roadway traffic, and 25 psf if the traffic is limited to lightweight passenger vehicles. Similarly, surcharge loads from construction equipment or soil/material stockpiles should be considered in the basement wall design.

6.3.3 Lateral Resistance

Please see Sections 6.1.3 and 6.2.3 above for a discussion of lateral resistance.

6.3.4 Wall Drainage/Damp Proofing

We recommend that provisions for permanent control of subsurface water be incorporated into the design and construction of the basement walls. Prefabricated drainage mats, such as Mirafi 6000 or equivalent, may be installed behind the basement walls. For backfilled walls, a footing drain consisting of a 4-inch diameter perforated PVC pipe embedded in at least 12 inches of washed gravel wrapped with a geotextile fabric should be placed at the base of the wall footings.

Waterproofing considerations are beyond our scope of work. We recommend that a building envelope specialist be consulted to determine appropriate damp-proofing or water-proofing measures.

6.3.5 Wall Backfill

Where wall backfill will be needed, free draining granular soils such as Gravel Borrow (Section 9-03.14(1) WSDOT) are recommended. We do not recommend using the onsite soils for wall backfill due to its relatively high fines content.

Wall backfill should be moisture conditioned to near its optimum moisture content, placed in loose, horizontal lifts less than 8 to 12 inches in thickness, and systematically compacted to a dense and relatively unyielding condition. If density tests will be performed, the test results should indicate at least 95 percent of the maximum dry density, as determined using test method ASTM D 1557. Within 5 feet of the wall, the backfill should be compacted to at least 90 percent of the maximum dry density.

6.4 SUBSURFACE DRAINAGE PROVISIONS

Footing drains should be installed around the perimeter of the buildings, at or just below the invert of the foundation. The footing drains should consist of a 4-inch diameter perforated drainpipe placed behind and at the base of the footings, embedded in 12 to 18 inches of clean crushed rock or pea gravel wrapped with a layer of filter fabric.

Under no circumstances should roof downspout drain lines be connected to the footing drain systems. Roof downspouts must be separately tightlined to appropriate discharge locations. Cleanouts should be installed at strategic locations to allow for periodic maintenance of the footing drain and downspout tightline systems.

6.5 PERMANENT DRAINAGE & INFILTRATION CONSIDERATIONS

Permanent control of surface water and roof runoff should be incorporated in the final grading design. In addition to these sources, irrigation and rain water infiltrating into landscaped and planter areas adjacent to paved areas or building foundations should also be controlled. All collected runoff should be directed into conduits that carry the water away from the pavement or structure and into storm drain systems or other appropriate outlets. Adequate surface gradients should be incorporated into the grading design such that surface runoff is directed away from structures.

Based on the presence of undocumented fill over dense to very dense glacial till, in our opinion infiltration is not feasible for the project.

6.6 PAVEMENT DESIGN & CONSIDERATIONS

We understand that asphalt paved parking lots and drive lanes will be constructed around the proposed buildings. Assuming the pavement will generally be used by light passenger cars and trucks, as a minimum, we recommend that the pavement section consist of 3-inches HMA, overlying a 6-inch thick layer of crushed surfacing base course (CSBC), overlying properly compacted structural fill. For pavement areas that will receive regular loading of heavy trucks, including delivery trucks or garbage trucks, we recommend a heavier pavement section consisting of a minimum of 4 inches of HMA over 6-inches of CSBC. As a pavement alternative, the layer of crushed rock maybe substituted for a minimum 12-inch thick layer of cement treated base, as described in the *Section 6.6.2* below. If ATB (Asphalt Treated Base) is to be used as a temporary pavement during construction, and then incorporated into the final pavement design, the bottom one inch of HMA may be replaced with 2 inches of ATB. Alternatively, half of the HMA pavement section could be placed early in the project for construction access. Prior to final paving, any areas of pavement that have become distressed from construction traffic will need to be locally repaired.

It should be noted that actual pavement performance will depend on a number of factors, including the actual traffic loading conditions. The recommended pavement section will need to be revised if the traffic level will be more or less than our assumed value.

6.6.1 Pavement Subgrade Preparation

Following the stripping operation and excavations necessary to achieve construction subgrade elevations, the ground surface where structural fill, or pavements are to be placed should be observed by PanGEO. Proof-rolling should be performed to identify soft or unstable areas. Proof-rolling should be performed using a full loaded, tandem-axle dump truck with a minimum gross weight of 20 tons. Other equipment can be used, provided the subgrade loading is equivalent. The dump truck should make several overlapping passes in perpendicular directions over a given area. Soft or yielding areas identified during proof-rolling should be moisture conditioned as needed and re-compacted in place.

If soft areas are still yielding after re-compaction, they should be over-excavated and replaced with structural fill to a depth that will provide a stable pavement base. The optional use of a geotextile subgrade stabilization fabric, such as Mirafi 600X, or an equivalent product placed directly on the over-excavated surface may help to bridge excessively unstable areas. Over-excavated areas should be and backfilled with 1¼-inch Crushed Surfacing Base Course, or WSDOT gravel borrow to the requirements of structural fill. The subgrade preparation should be observed by PanGEO to verify the adequacy of the prepared subgrade.

Both the structural fill and crushed rock base should be compacted to a minimum of 95% of the materials maximum dry density (Modified Proctor ASTM D-1557). Any soft or loose areas of subgrade soils should be re-compacted or over-excavated prior to structural fill placement.

6.6.2 Cement Treated Base

Cement Treated Base (CTB) is a mixture of aggregate material and/or soils combined with a pre-determined amount of cement and water, which hardens after placement and compaction. After sufficient hardening, a tack coat and HMA wearing course is placed over the CTB to complete the pavement structure. For this project, the existing fill soils should be suitable for cement treatment. The existing soils will be mixed with a pre-

determined quantity of cement and water and then compacted. Conventional rollers are used to compact the CTB mixture immediately after the mixing is completed. CTB can be an economical option as it eliminates the need to import base course and can reduce or eliminate the need to export the on-site soils.

If CTB is used for the pavement section, we recommend at least 3 inches of HMA over 12 inches of CTB. We recommend 5% cement by weight be mixed with the fill soil. Assuming a fill soil unit weight of about 125 pcf, a minimum of 6¼ pounds of Type 1 Portland cement should be added to the soil mixture per square foot of 12-inch thick CTB layer. Type 3 cement is also acceptable, however, because Type 3 cement hydrates faster, we suggest Type 1 cement be used so more time is available to properly compact the CTB. We typically do not recommend a layer of crushed rock between the HMA and CTB due to the potential risk of water becoming trapped in the gravel layer.

In our opinion it would be acceptable to reuse the existing asphalt at the site in the cement treated soils. If the asphalt pavement is pulverized for re-use in the CTB construction, we recommend that at least 95% passes a 2-inch sieve, and at least 55% passes a No. 4 sieve. No more than 50% of the final mixed materials should contain more than 50% of the existing bituminous materials. We also recommend that the final mixed materials be moisture conditioned to within 3% of its optimum moisture content (i.e. optimum moisture content before addition of cement) and be compacted to at least 95% of its maximum density as determined using ASTM D1557 (Modified Proctor).

In our opinion cement treatment would also be suitable below the footprints of building C & D to not only provide a stable working surface for the ground improvement contractor, but also to provide a firm subgrade to support the building floor slab.

6.7 SITE RETAINING WALLS

We understand that an approximately 15-foot-tall site retaining wall will be located along the majority of the eastern property line of the site. Many different wall types are feasible at this location, including MSE (Mechanically Stabilized Walls), gravity walls, cast-in-place concrete walls, or soldier pile walls. We understand that the final wall configuration and layout is still being developed, but that the wall will likely consist of an MSE wall. MSE walls can have a variety of facing elements such as precast-concrete blocks or panels, geotextile wrapped faces, or wire mesh. We offer the following general recommendations

for MSE walls along the east property line of the site, and we will provide final recommendations once the wall configuration has been finalized.

6.7.1 Ground Improvement

Based on the results of the existing test borings along the east property line, up to about 10 feet of loose undocumented fill is present below the proposed base of wall elevation. As such, we recommend that ground improvement elements, such as aggregate piers, be installed below the proposed retaining wall to provide adequate support. The spacing of the ground improvement elements will depend on the wall design. The length of the ground improvement elements should be quite short, on the order of 10 feet below the bottom of the wall. The ground improvement below the wall will also improve the global stability of the wall which could result in a more efficient wall design.

6.7.2 MSE Walls

An MSE wall or SEW (Structural Earth Wall) consists of placing a reinforcing mesh onto lifts of compacted structural fill to create a reinforced earth mass that functions as the retaining structure. The face of the reinforced fill can receive a variety of treatments depending on cost and aesthetics. We recommend that the wall installer design the walls and provide detailed design drawings for wall construction based on the actual wall manufacturer selected for final design. PanGEO will be available to review the final wall design.

When the layouts for these walls have been finalized, and before this report is issued in final form, critical height cross-sections will be needed in order to perform overall (global) stability analyses. The following recommendations for minimum wall geometry are based on our experience with walls in similar conditions, but may need revision based on the final layout of the wall geometries.

The following recommendations should be satisfied to provide external stability of the proposed MSE walls. We recommend that MSE walls be constructed in accordance with Section 6-13 of the Standard Specifications (WSDOT, 2022), with the following information included in the project plans.

1. The wall may be constructed near vertical, without a specified batter.

2. The wall should be placed on a level foundation in the horizontal direction perpendicular to the wall face.
3. The reinforcing length should not be less than 70 percent of the wall height, with a minimum reinforcing length of 8 feet. The recommended minimum reinforcing length may need to be increased to maintain adequate external stability based on final design configurations. Greater reinforcing lengths may be needed to provide adequate internal stability.
4. The minimum embedment of the walls should be 2 feet below adjacent finish grade, or 10% of the height of the wall, whichever is greater.
5. The uppermost reinforcing layer should be placed no lower than 2 feet below the top of wall. Welded wire faced systems should include a top mat at the top of the wall.
6. Special drainage elements, such heel drains should be considered based on the final design of the wall.

6.7.3 MSE Walls Backfill

The structural fill in the reinforced zone of the MSE wall should consist of imported granular structural fill such as WSDOT gravel borrow, or equivalent. Due to the high silt content of the on-site soils, the on-site soil should not be reused in the reinforcement zone.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 DEMOLITION, SITE STRIPPING AND GRADING

All footings and floor slabs of the existing buildings, as well as asphalt, building debris and concrete rubble should be removed from the site prior to the start of excavations or grading, unless the existing pavement will be grinded and re-used within cement treated soils. The existing subsurface explorations encountered scatted debris such as concrete and brick fragments within the undocumented fill, and such debris should be expected. Any debris uncovered in the on-site fill during grading should be separated and removed from the site.

We anticipate that topsoil and organic rich soils extend about 8 below the ground surface in the currently vegetated areas of the site. The organic material should be removed prior to placing fill for parking areas, the building pad, or to raise site grades. The organic rich soil should not be re-used in structural areas such as below pavements, the building footprint, or other structural elements. The organic rich soils may be “wasted” in landscaping areas where fill is needed, and ground settlements are not a concern.

7.2 TEMPORARY EXCAVATIONS

In general, maximum temporary excavation depths are expected to be about 10 to 15 feet for the proposed basements and stormwater vault. Temporary excavations greater than 4 feet deep should be properly sloped or shored. All temporary excavations should be performed in accordance with Part N of WAC (Washington Administrative Code) 296-155. The contractor is responsible for maintaining safe excavation slopes and/or shoring. For planning purposes, the temporary excavations may be sloped to as steep as 1H:1V (Horizontal:Vertical). The temporary cut slopes should be re-evaluated by a representative of PanGEO during construction based on actual observed soil conditions.

During periods of precipitation, the temporary cuts should be protected with plastic sheeting. If areas of seepage are encountered during construction, the slopes may need to be flattened.

We recommend that heavy construction equipment, building materials and excavated soil should not be allowed within a distance equal to $\frac{1}{2}$ the slope height from the top of any excavation, or 4-foot minimum. The setback distance of heavy point loads, such as crane or pump truck outriggers, should be evaluated on a case-by-case basis.

7.3 SITE CONDITIONS AND CONSTRUCTION WORKING SURFACE

The site soils are anticipated to be highly moisture sensitive due to their high silt content, and will become disturbed when wet. As such, we anticipate that the exposed soils at the site may need to be improved during wet weather to create a working surface for construction equipment. One option to improve the stability of the site is to install a thick working surface of quarry spalls over geotextile fabric. Another option is to treat the soils with cement, as described above in *Section 6.6.2*. The proper measures needed to stabilize

the subgrade will be in part depend on the actual soil conditions exposed at the bottom of the excavation, and the contractor's construction methods and sequence.

7.4 PAVEMENT SUBGRADE PREPARATION

Following the stripping operation and excavations necessary to achieve construction subgrade elevations, the ground surface where structural fill or pavements are to be placed should be observed by PanGEO. Proof-rolling should be performed to identify soft or unstable areas. Proof-rolling should be performed using a fully loaded, tandem-axle dump truck with a minimum gross weight of 20 tons. Other equipment can be used, provided the subgrade loading is equivalent. The dump truck should make several overlapping passes in perpendicular directions over a given area. Soft or yielding areas identified during proof-rolling should be moisture conditioned as needed and re-compacted in place.

If soft areas are still yielding after re-compaction, they should be over-excavated and replaced with structural fill to a depth that will provide a stable pavement base. The optional use of a geotextile subgrade stabilization fabric, such as Mirafi 600X, or an equivalent product placed directly on the over-excavated surface may help to bridge excessively unstable areas. Over-excavated areas should be and backfilled with 1¼-inch Crushed Surfacing Base Course, or WSDOT gravel borrow (WSDOT 9-03.14(1)) compacted to the requirements of structural fill. The subgrade preparation should be observed by PanGEO to verify the adequacy of the prepared subgrade.

7.5 STRUCTURAL FILL AND COMPACTION

If structural fill is needed at the site, we recommend using a granular fill material such as Gravel Borrow (WSDOT 9-03.14(1)), or other approved equivalent. Alternatively, in our opinion, the on-site material, may be re-used as structural fill below pavements and sidewalks provided that it can be adequately compacted. We do not recommend the re-use of on-site material below building footings.

Based on the relatively high fines content of the on-site soils, we anticipate that cement treatment will be needed to adequately re-use the on-site soils other than in the summer when the soils can be dried to near optimum moisture content. It should be noted that the on-site fill includes scattered debris, which should be screened from the fill prior to using

as structural fill. Recommendations for cement treatment are provided in *Section 6.6.2* of this report.

The structural fill should be moisture conditioned to near optimum moisture content, placed in loose, horizontal lifts less than 8 inches in thickness, and systematically compacted to a dense and unyielding condition, and to at least 95 percent of the maximum dry density, as determined using test method ASTM D 1557.

7.6 EROSION AND DRAINAGE CONSIDERATIONS

Surface runoff can be controlled during construction by careful grading practices. This may include the construction of shallow, upgrade perimeter ditches or low earthen berms to collect runoff and prevent water from entering the excavation. All collected water should be directed to a positive and permanent discharge system such as a storm sewer. It should be noted that some of the site soils are prone to surficial erosion. Special care should be taken to avoid surface water on open cut excavations, and exposed slopes should be protected with plastic sheeting.

Permanent control of surface water and roof runoff should be incorporated in the final grading design. In addition to these sources, irrigation and rain water infiltrating into any landscape and/or planter areas adjacent to paved areas or building foundations should also be controlled. Water should not be allowed to pond immediately adjacent to buildings or paved areas. All collected runoff should be directed into conduits that carry the water away from pavements or the structure and into storm drain systems or other appropriate outlets. Adequate surface gradients should be incorporated into the grading design such that surface runoff is directed away from structures.

7.7 WET WEATHER EARTHWORK AND EROSION CONSIDERATIONS

The fill soils at the site are expected to contain a moderate to high amount of fines, and are therefore considered moisture sensitive. As a result, it may be more economical to perform earthwork in the drier summer months to reduce the potential of site soils becoming soft due to excessive moisture. Any softened soils should be removed and replaced with structural fill.

General recommendations relative to earthwork performed in wet weather or in wet conditions are presented below:

- Because site soils are considered moisture sensitive, all subgrade surfaces should be protected against inclement weather.
- Earthwork may need to be performed in small areas to minimize subgrade exposure to wet weather. Excavation or the removal of unsuitable soil should be followed promptly by the placement and compaction of structural fill. The size and type of construction equipment used may have to be limited to reduce soil disturbance.
- During wet weather, the allowable fines content of the structural fill should be reduced to no more than 5 percent by weight based on the portion passing $\frac{3}{4}$ -inch sieve. The fines should be non-plastic.
- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water, and to prevent surface water from entering the excavations.
- Bales of straw and/or geotextile silt fences should be strategically located to control erosion and the movement of sediment. Erosion control measures should be installed along all the property boundaries.
- Excavation slopes and soils stockpiled on site should be covered with plastic sheeting.
- Under no circumstances should soil be left uncompacted and exposed to moisture.

8.0 LIMITATIONS

We have prepared this report for use by Alliance Residential and the project team. Recommendations contained in this report are based on a site reconnaissance, a review of existing subsurface explorations, and our understanding of the project. The study was performed using a mutually agreed-upon scope of work.

Variations in soil conditions may exist between the explorations and the actual conditions underlying the site. The nature and extent of soil variations may not be evident until

construction occurs. If any soil conditions are encountered at the site that are different from those described in this report, we should be notified immediately to review the applicability of our recommendations. Additionally, we should also be notified to review the applicability of our recommendations if there are any changes in the project scope.

The scope of our work does not include services related to construction safety precautions. Our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design. Additionally, the scope of our work specifically excludes the assessment of environmental characteristics, particularly those involving hazardous substances. We are not mold consultants nor are our recommendations to be interpreted as being preventative of mold development. A mold specialist should be consulted for all mold-related issues.

This report may be used only by the client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both off and on-site), or other factors including advances in our understanding of applied science, may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 24 months from its issuance. PanGEO should be notified if the project is delayed by more than 24 months from the date of this report so that we may review the applicability of our conclusions considering the time lapse.

It is the client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk. Any party other than the client who wishes to use this report shall notify PanGEO of such intended use and for permission to copy this report. Based on the intended use of the report, PanGEO may require that additional work be performed and that an updated report be reissued. Noncompliance with any of these requirements will release PanGEO from any liability resulting from the use this report.

Within the limitation of scope, schedule and budget, PanGEO engages in the practice of geotechnical engineering and endeavors to perform its services in accordance with generally accepted professional principles and practices at the time the Report or its contents were prepared. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you on this project. Please feel free to contact our office with any questions you have regarding our study, this report, or any geotechnical engineering related project issues.

Sincerely,

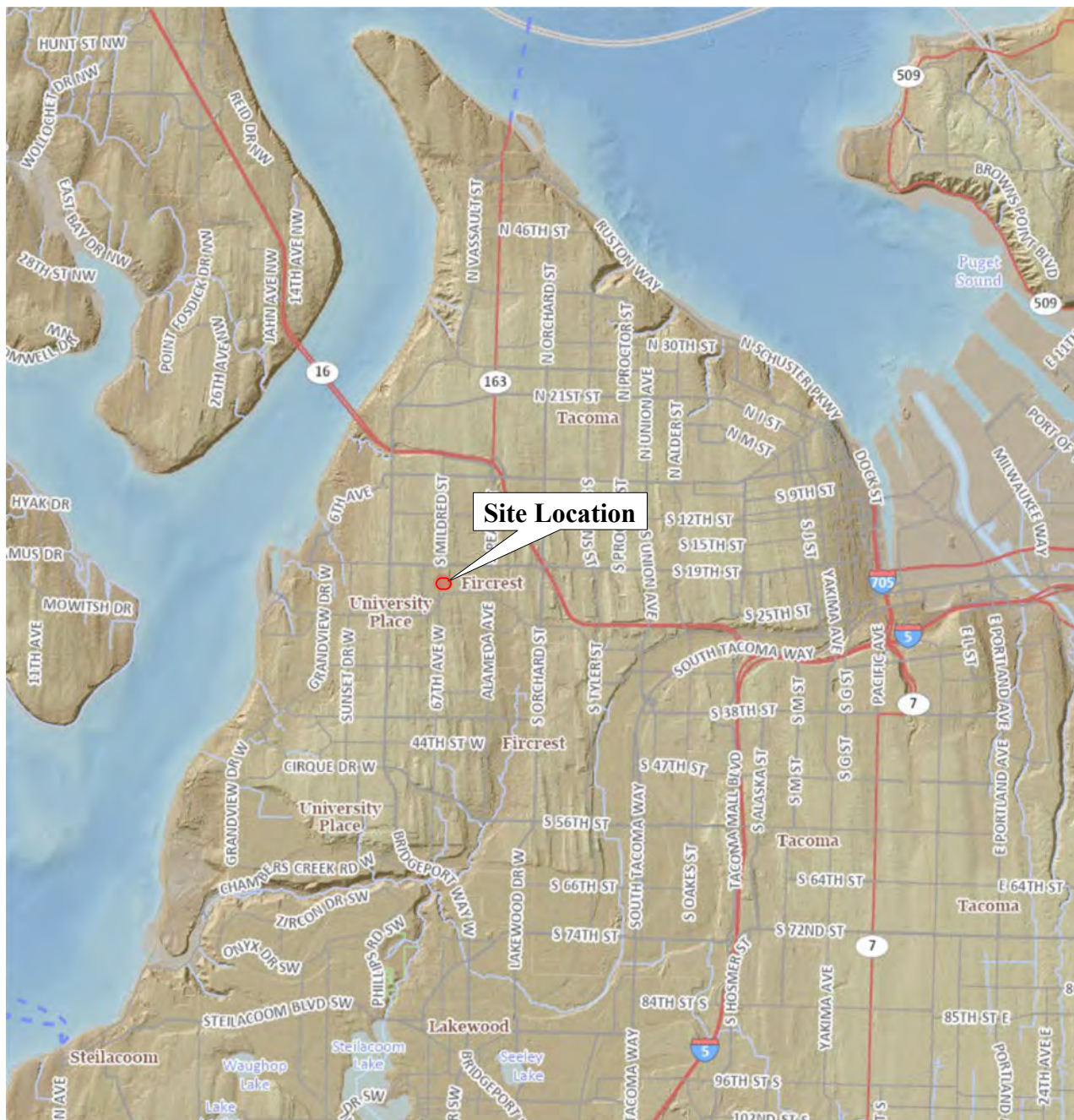
PanGEO, Inc.

DRAFT

Jon C. Rehkopf, P.E.
Principal Geotechnical Engineer

9.0 REFERENCES

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- Kleinfelder (2005). *Summary Boring Logs B-1 through B-56, Proposed Retail Development, 2119 Mildred Street, Fircrest, Washington*, February 2005.
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- Terracon (2008). *Summary Boring Logs B-1 through B-9, WinCo Foods, Inc., 2119 Mildred Street West, Fircrest, Washington*, May 2008.
- Washington State Department of Transportation (WSDOT), 2022, Geotechnical Design Manual, M 46-03-13, Olympia, Washington.



Reference: Pierce County Public GIS



No Scale

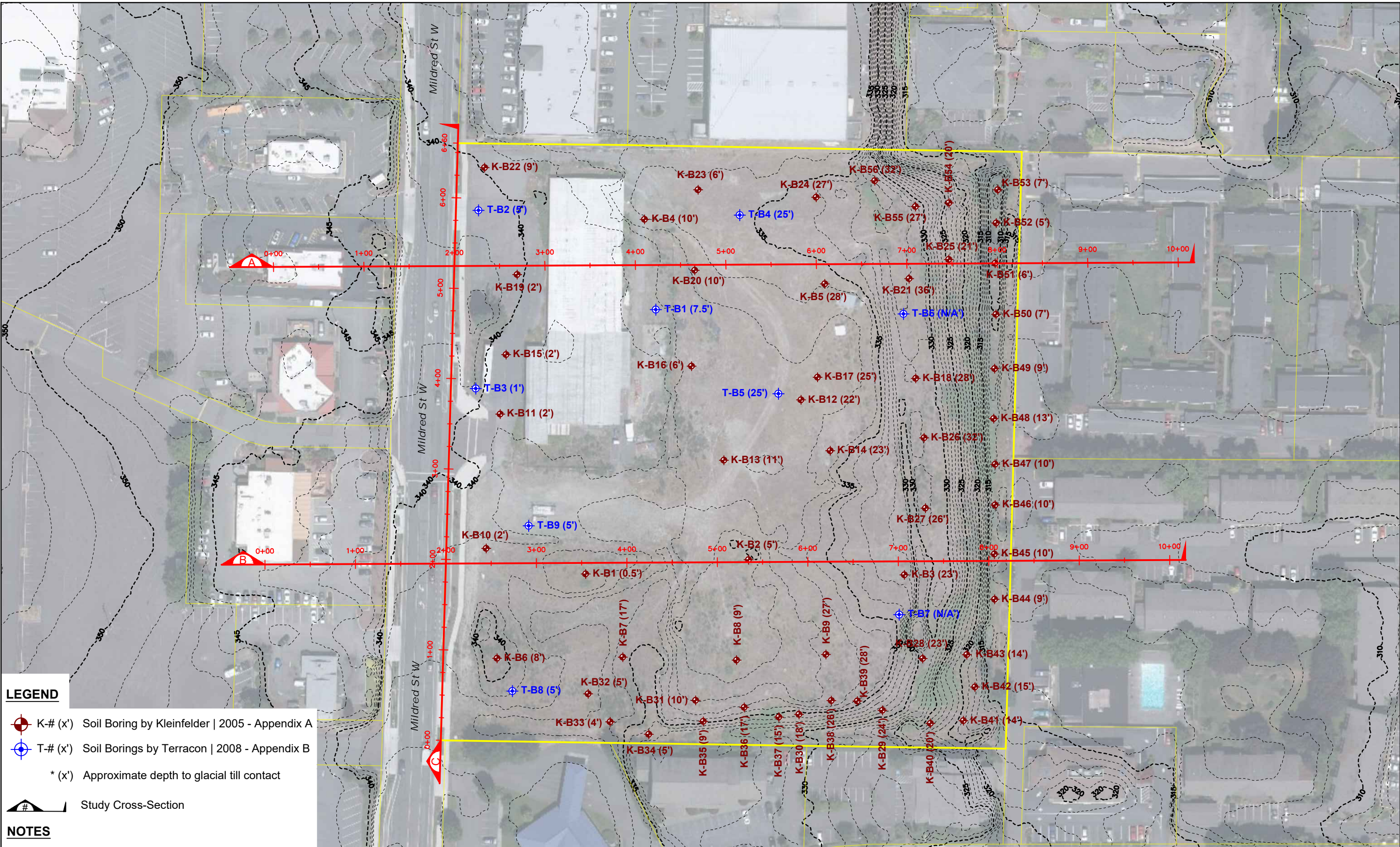


Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

VICINITY MAP

Project No. **21-529**

Figure No. **1**

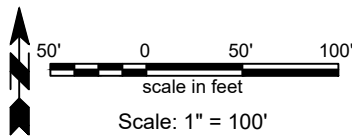


LEGEND

- K-# (x') Soil Boring by Kleinfelder | 2005 - Appendix A
- T-# (x') Soil Borings by Terracon | 2008 - Appendix B
- * (x') Approximate depth to glacial till contact
- Study Cross-Section

NOTES

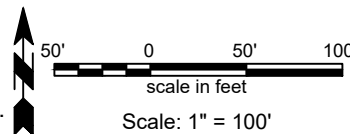
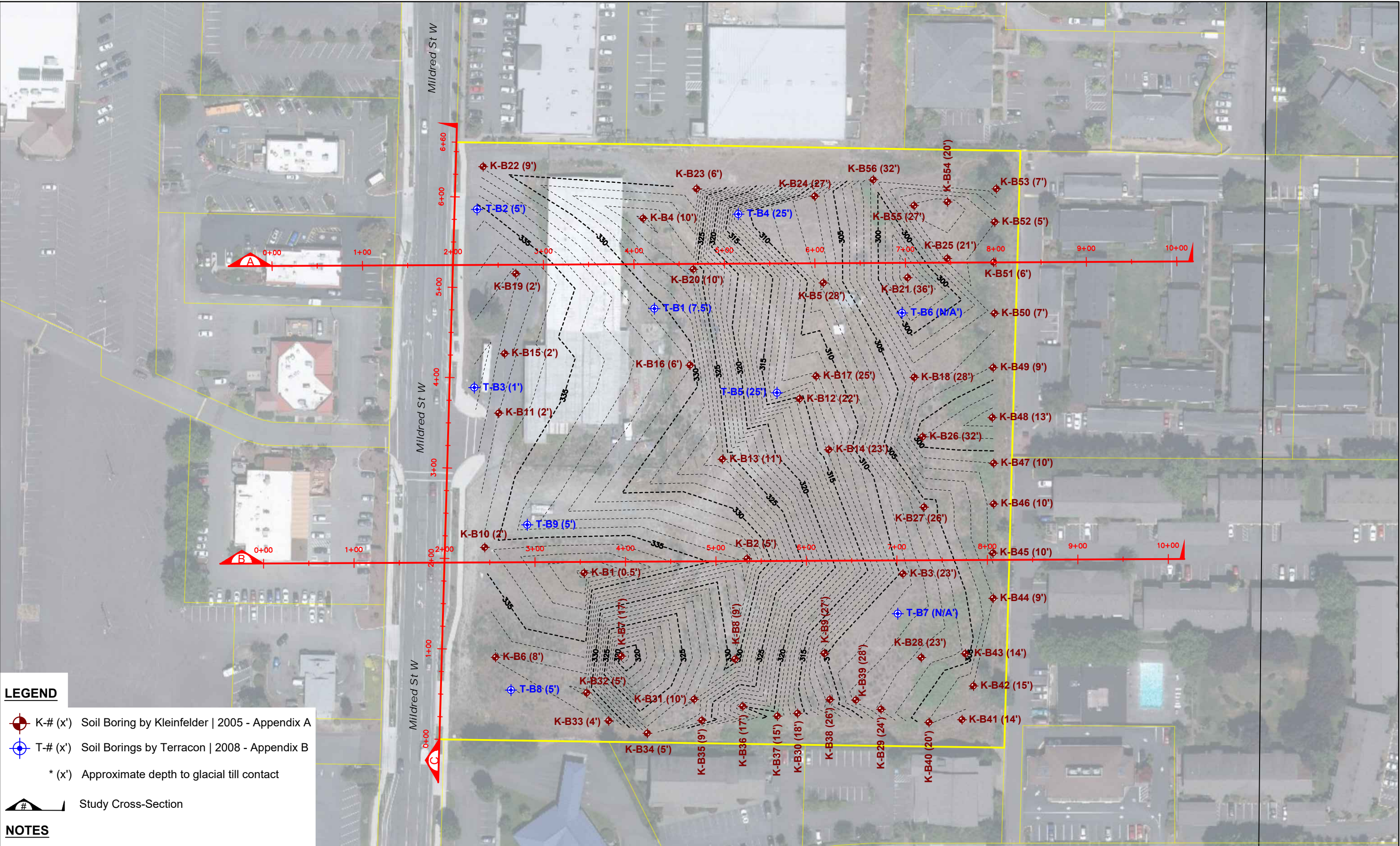
1. Aerial background, dated 2018, obtained from Pierce County GIS website.
2. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
3. Additional features are based on GIS data obtained from Pierce County and WA DNR websites.
4. Topology and GIS features are provided for relative information only and are not a substitution for field survey.
5. Locations of subsurface explorations are approximate and based on the relative locations of known site features.
6. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

SITE AND EXISTING EXPLORATION PLAN

PROJECT NO.	FIGURE NO.
21-529	2



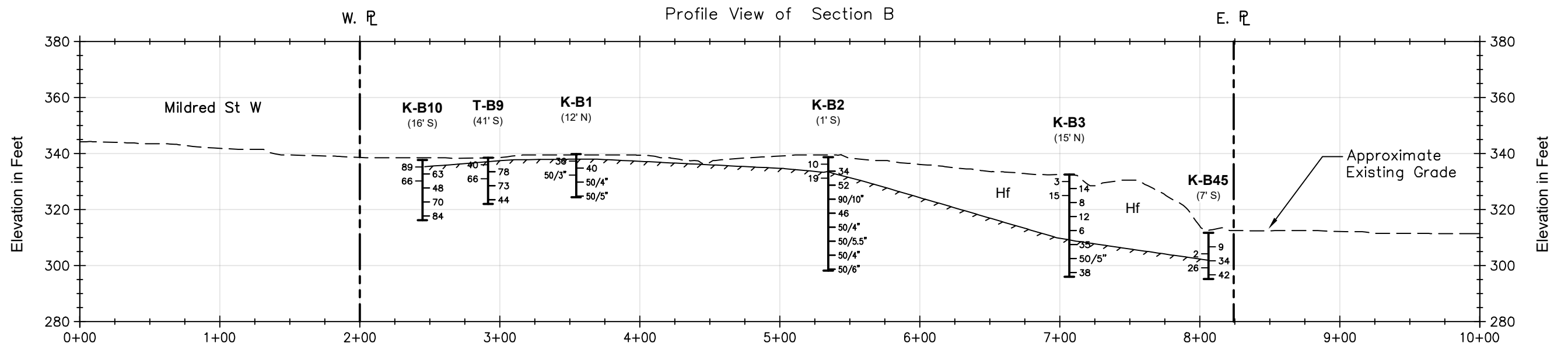
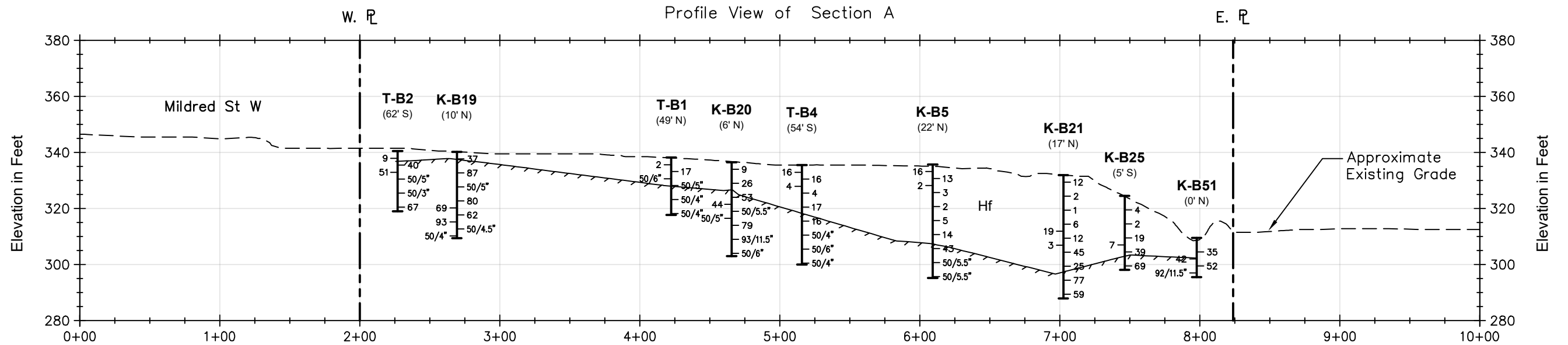
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INCORPORATED

Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

APPROXIMATE ELEVATION OF
GLACIAL TILL CONTACT

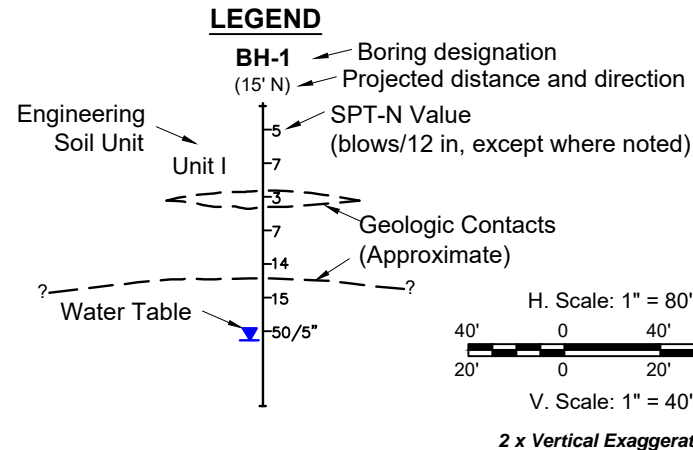
PROJECT NO.
21-529

FIGURE NO.
3



NOTES

1. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
2. Locations of glacial till contact are approximate and based on subsurface explorations by others.
3. Locations of subsurface explorations are approximate and based on the relative locations of known site features.
4. Geologic contacts between explorations are inferred.
5. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department.



- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

ENGINEERING SOIL UNITS

See text of report for soil unit descriptions.

- Hf Fill
- Qvt Vashon Glacial Till



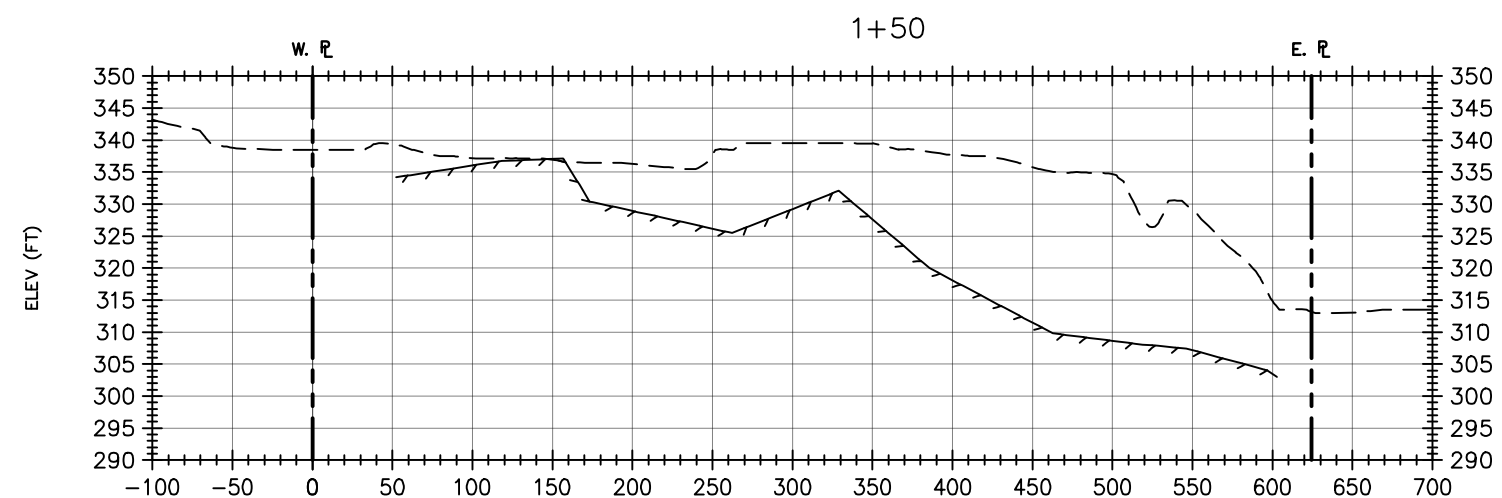
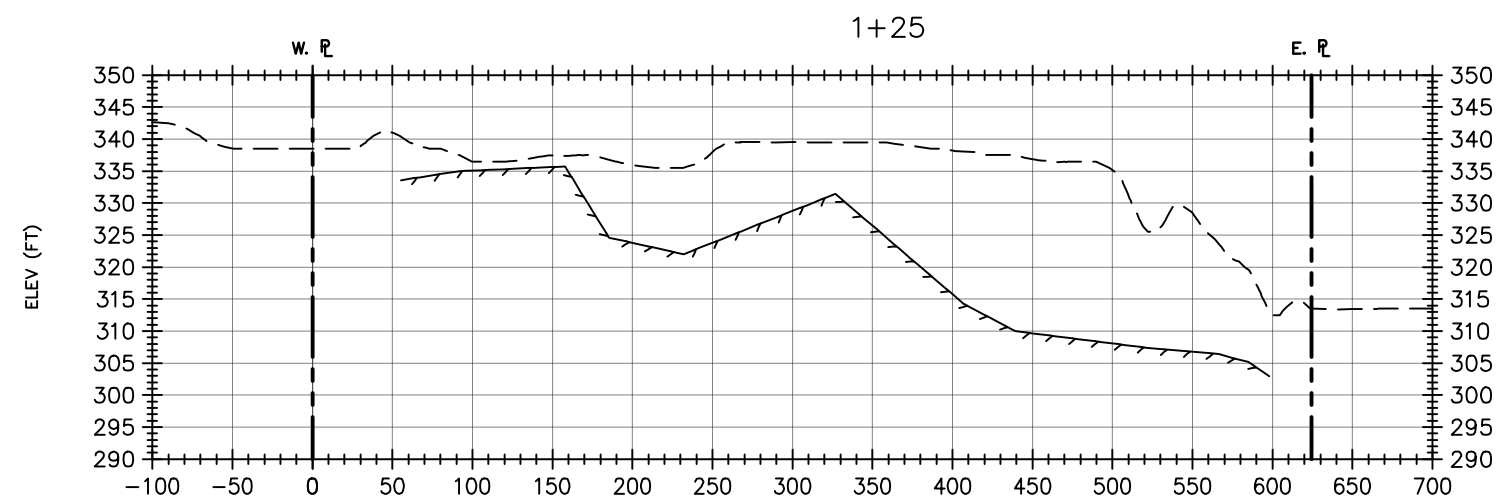
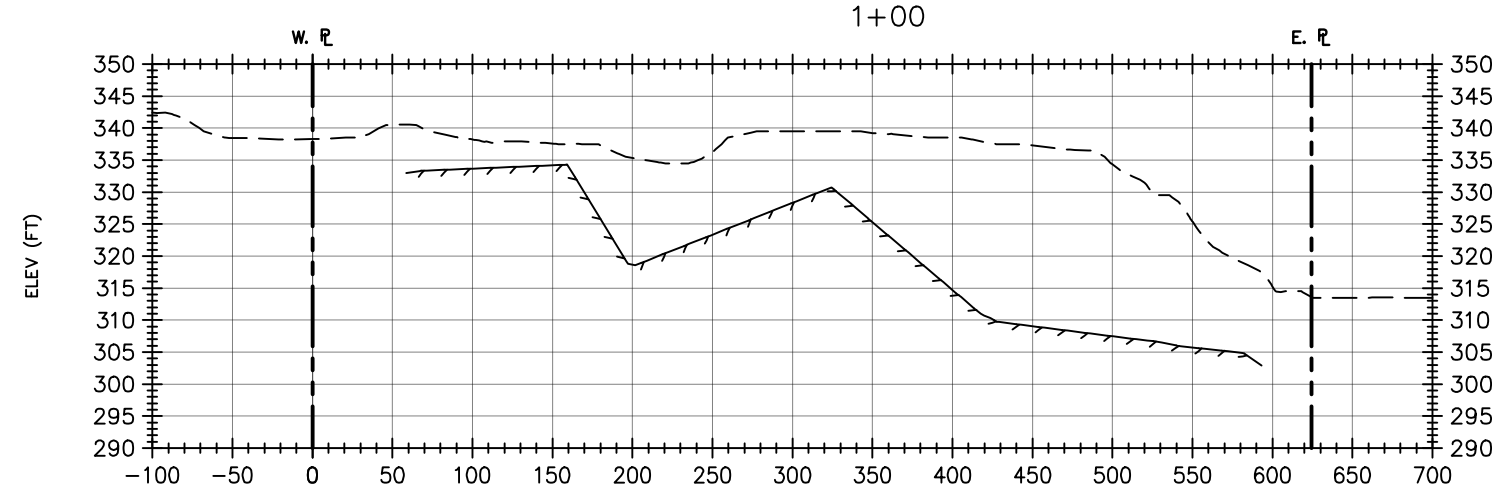
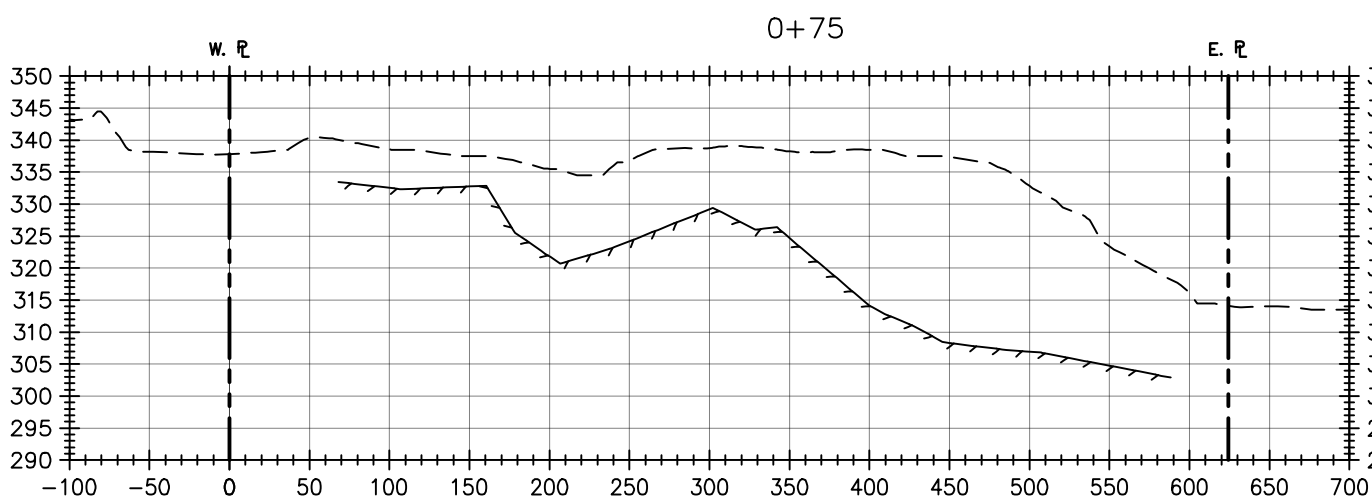
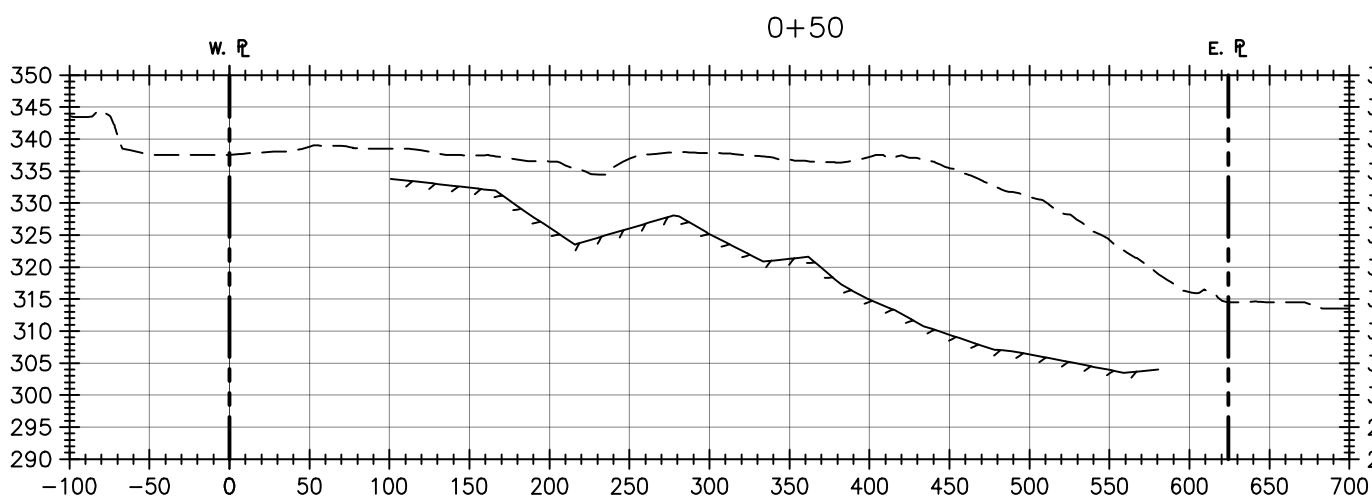
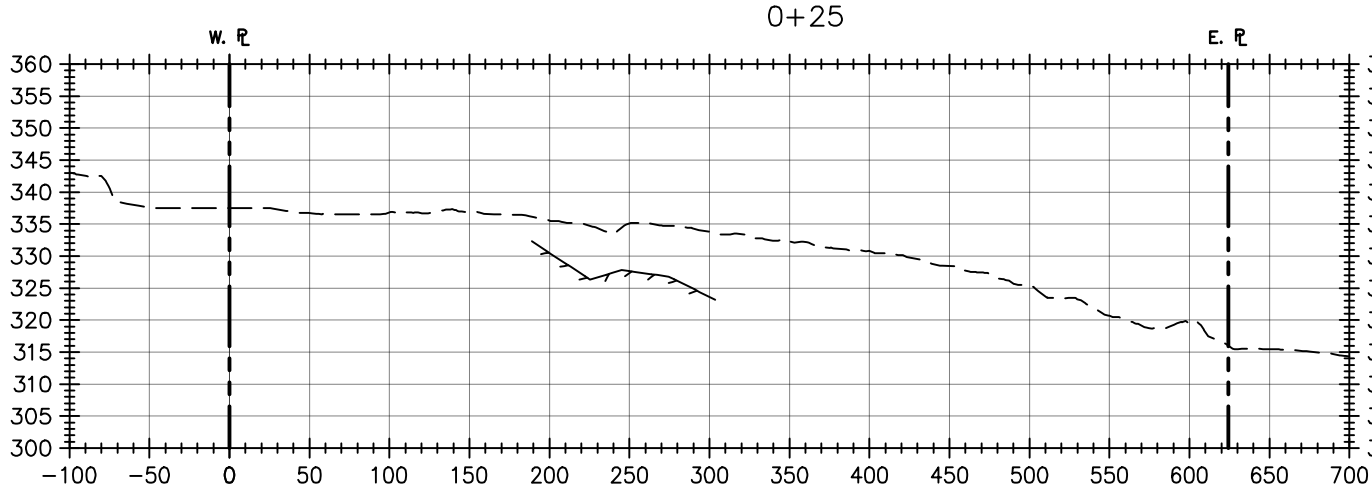
Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

CROSS-SECTIONS
Study Sections A & B

PROJECT NO.
21-529

FIGURE NO.
4

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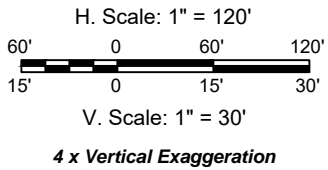


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

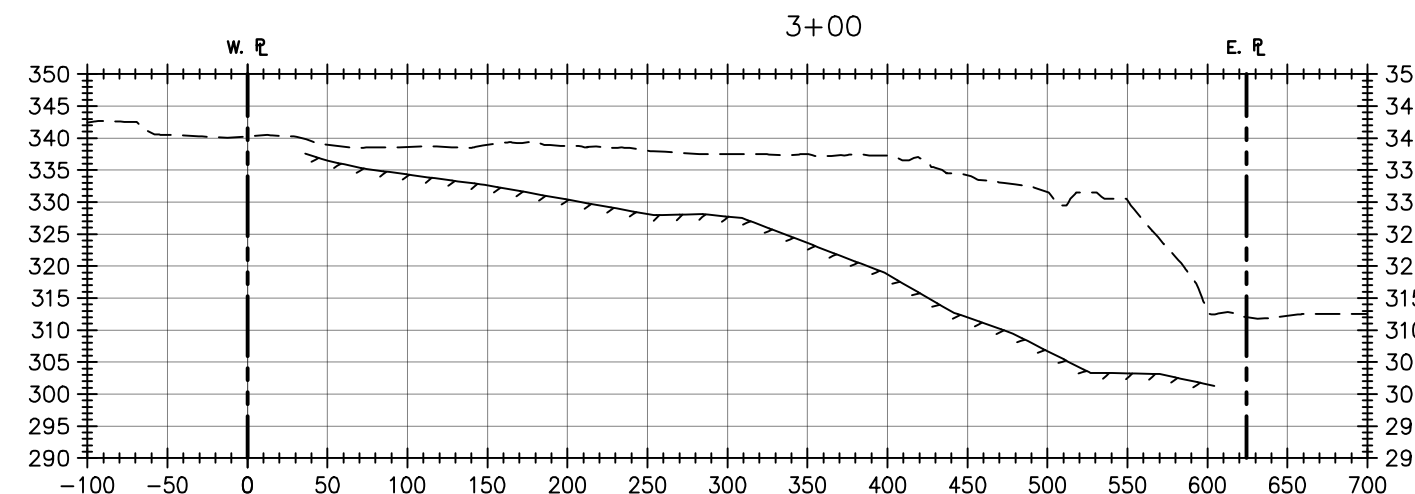
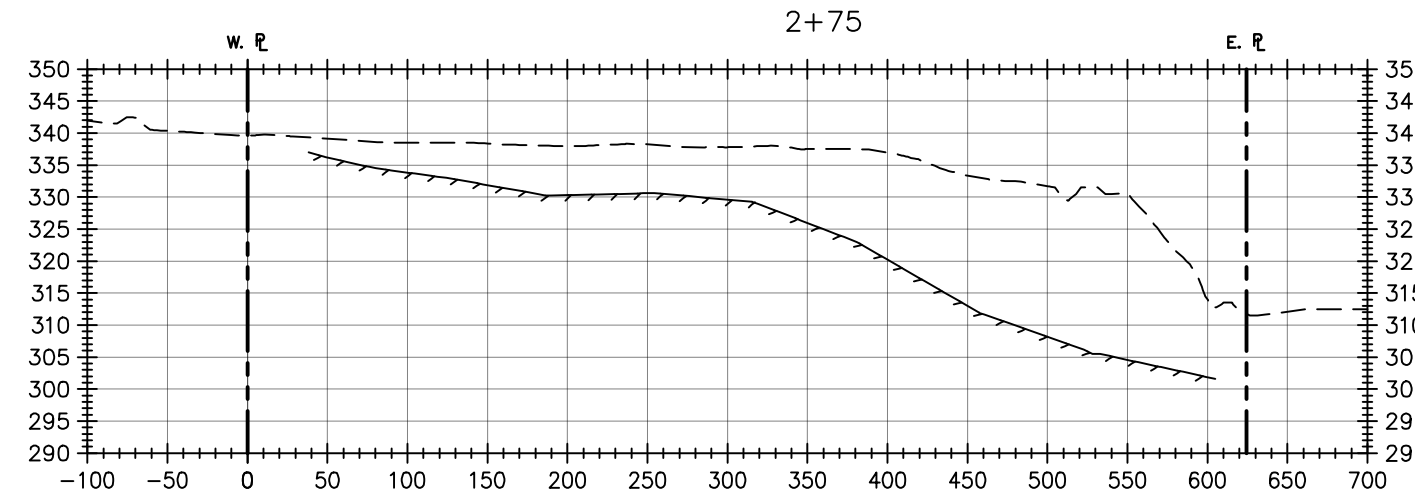
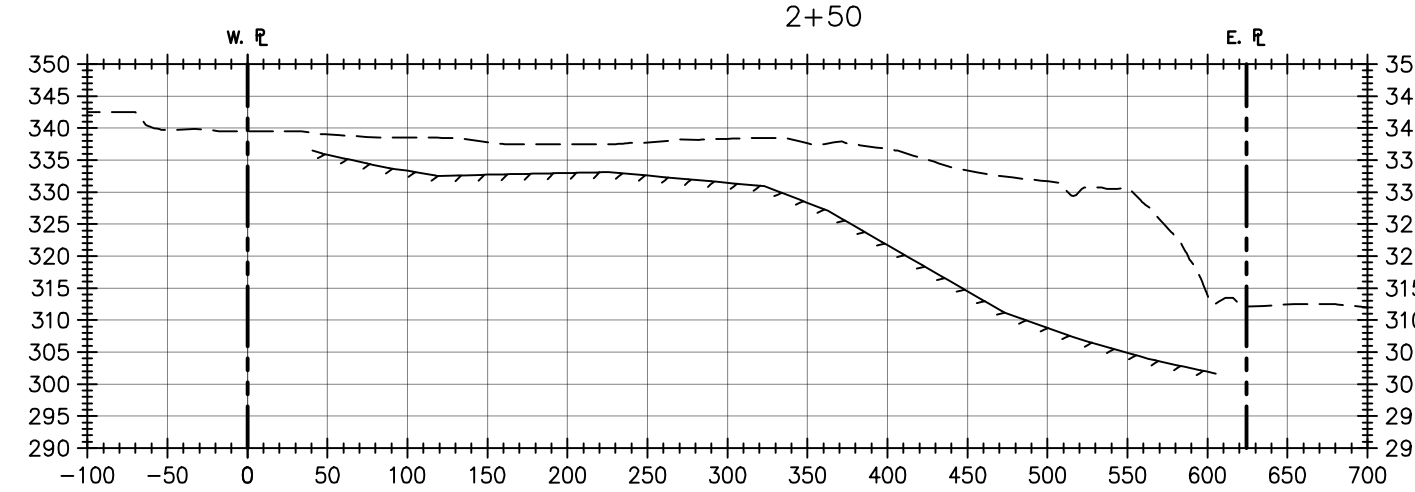
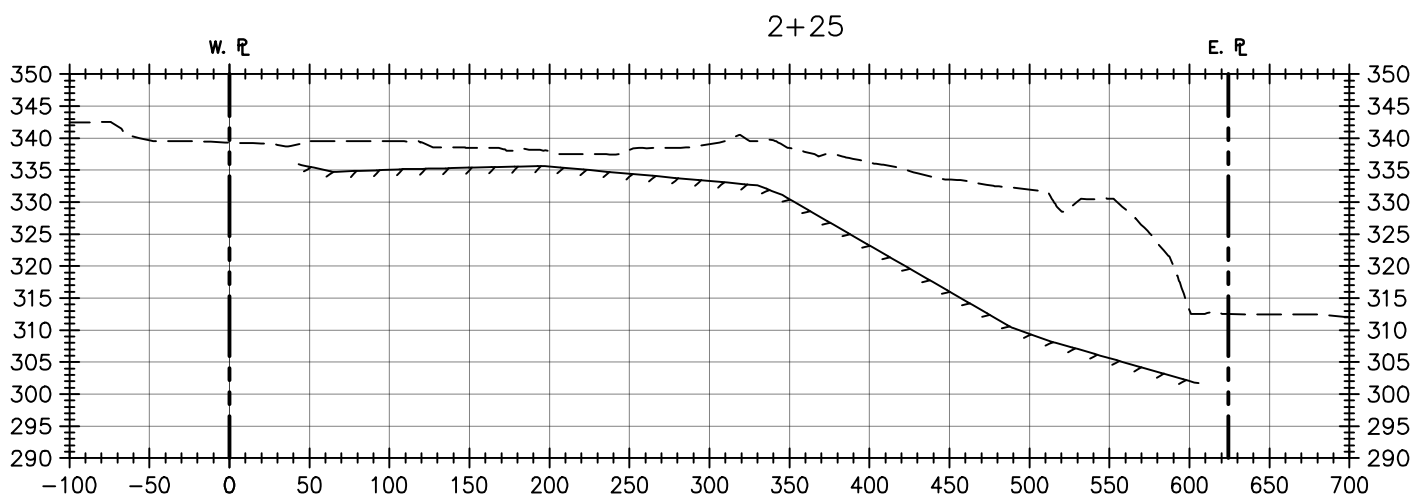
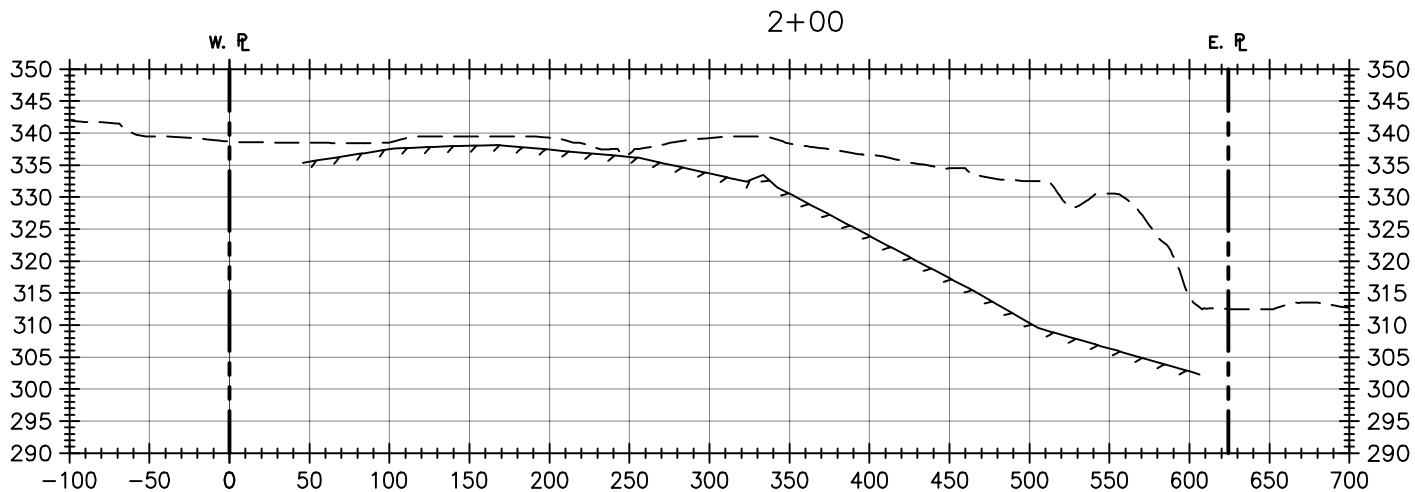
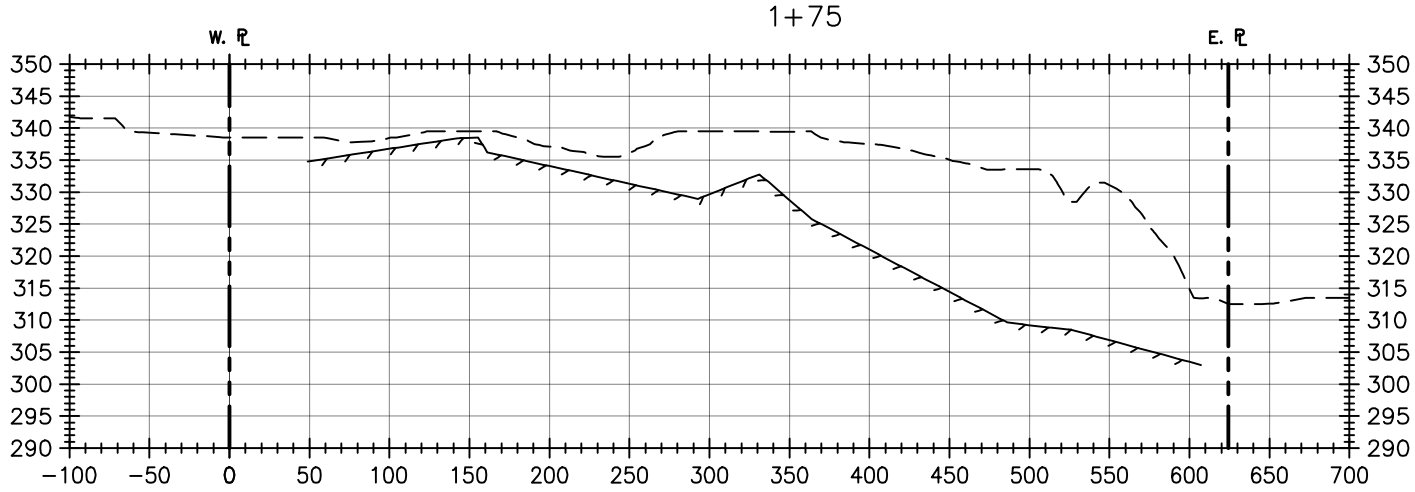
NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 0+00 TO 1+50	
		PROJECT NO. 21-529	FIGURE NO. 5A

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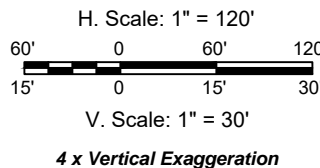


LEGEND

- — — Approximate Existing Ground Surface
- / — / — Approximate Glacial Till Contact

NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



PanGEO
INCORPORATED

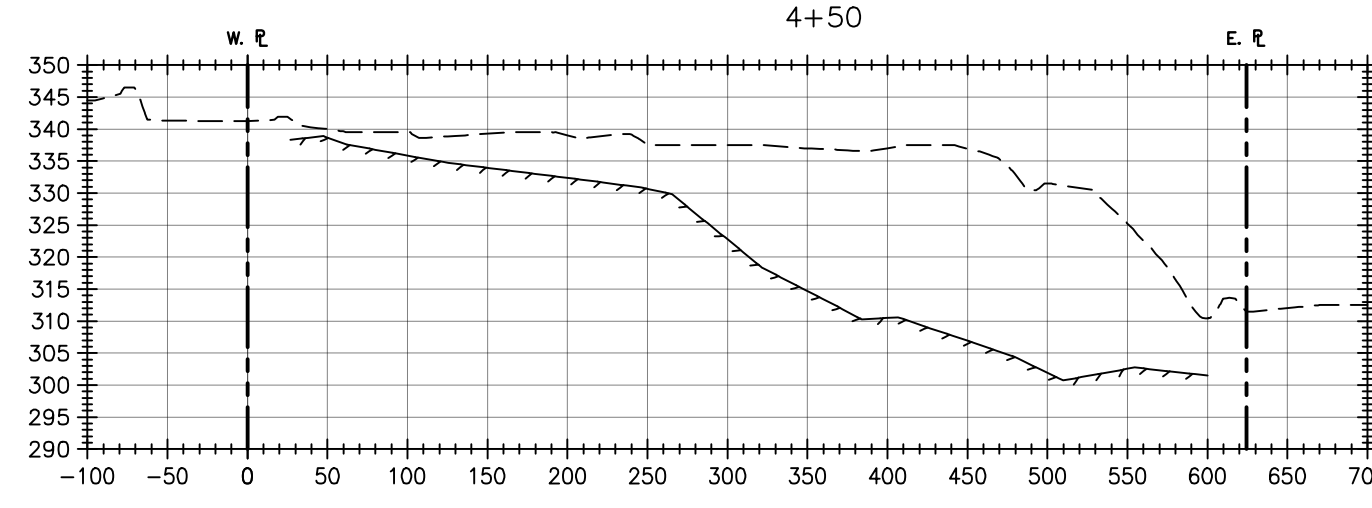
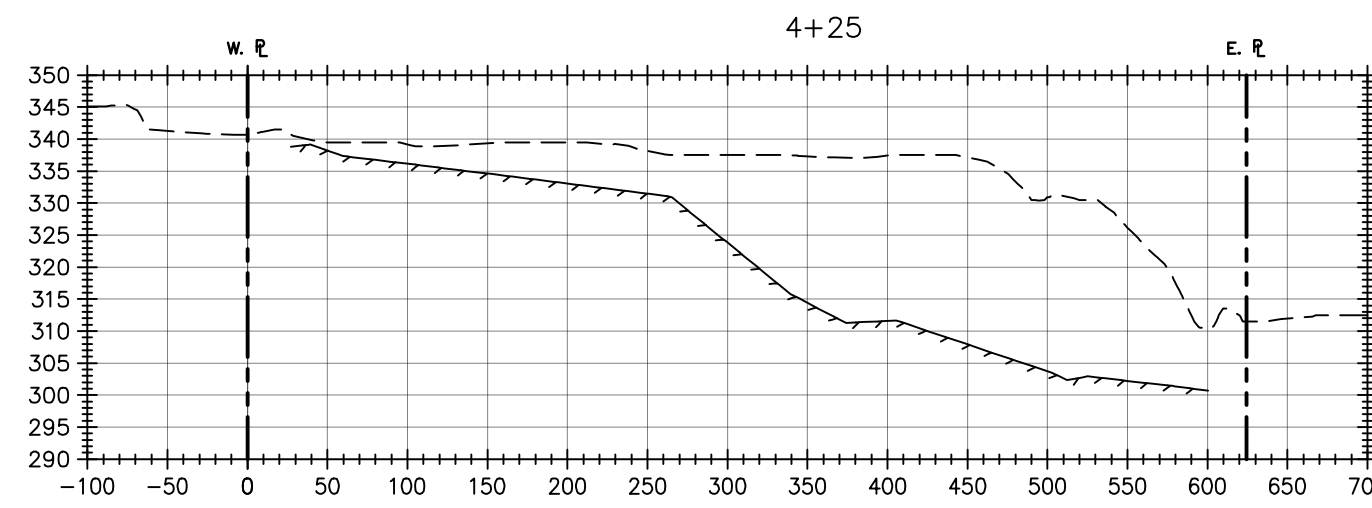
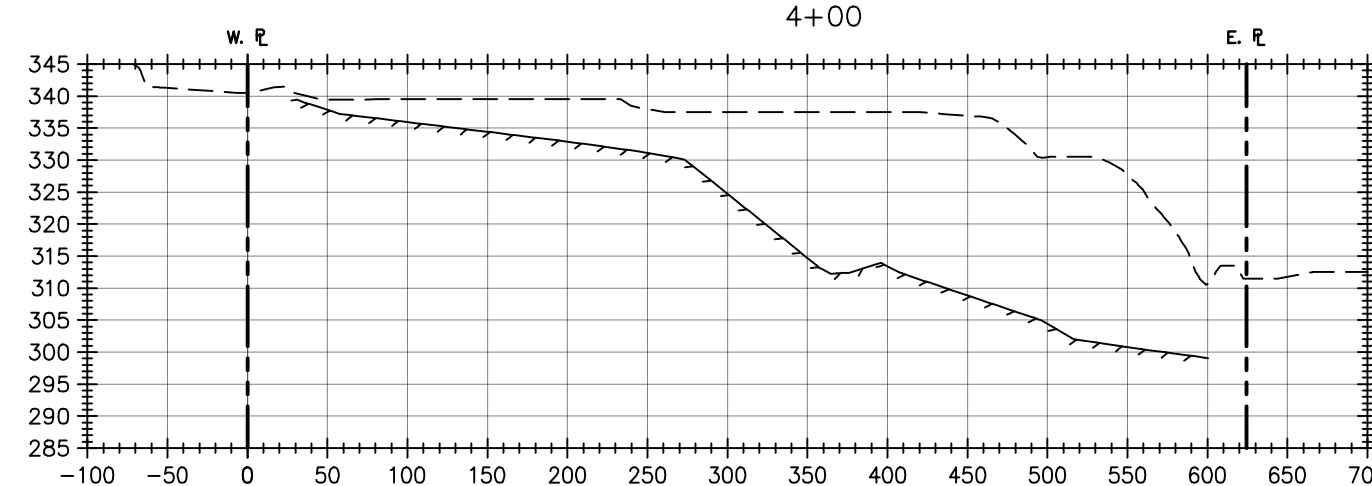
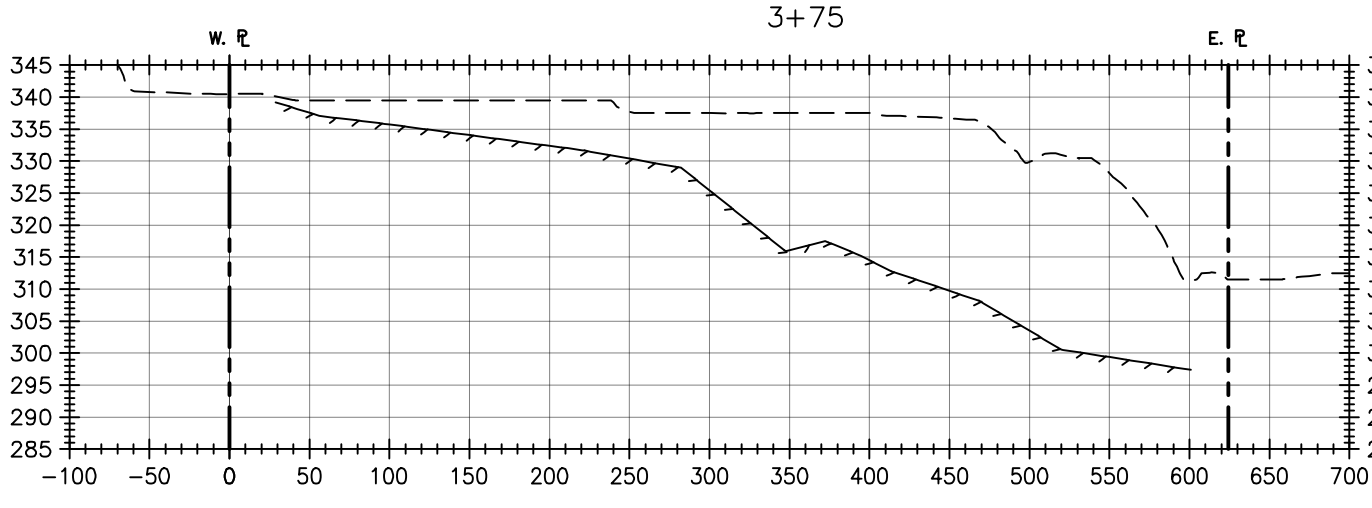
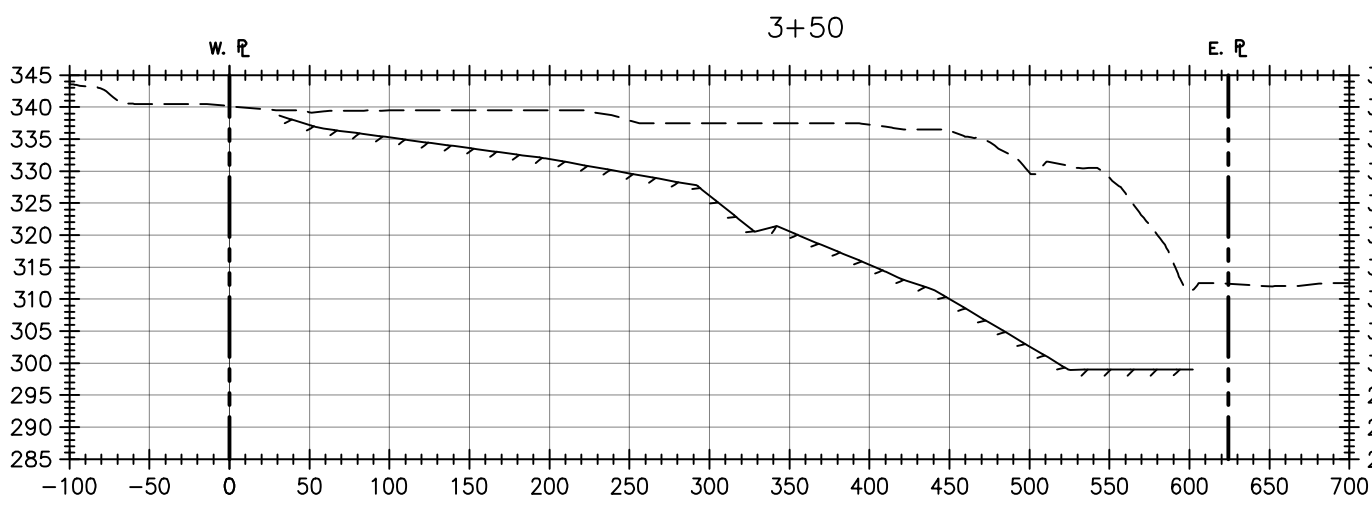
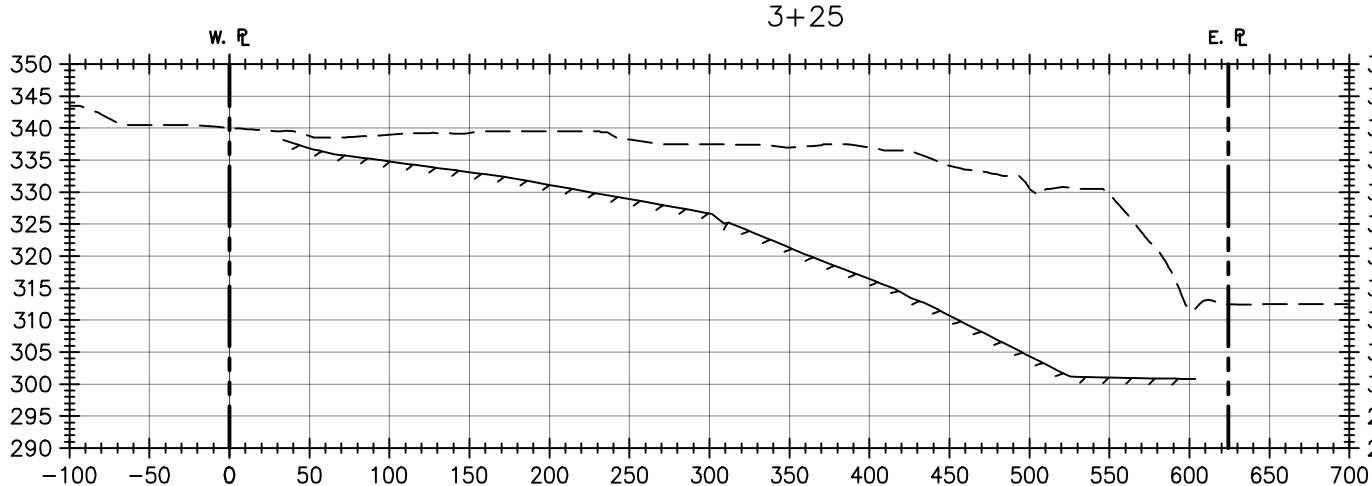
Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

CROSS-SECTIONS
SECTION C | 1+75 TO 3+00

PROJECT NO.
21-529

FIGURE NO.
5B

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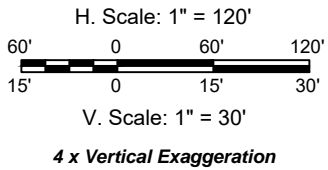


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

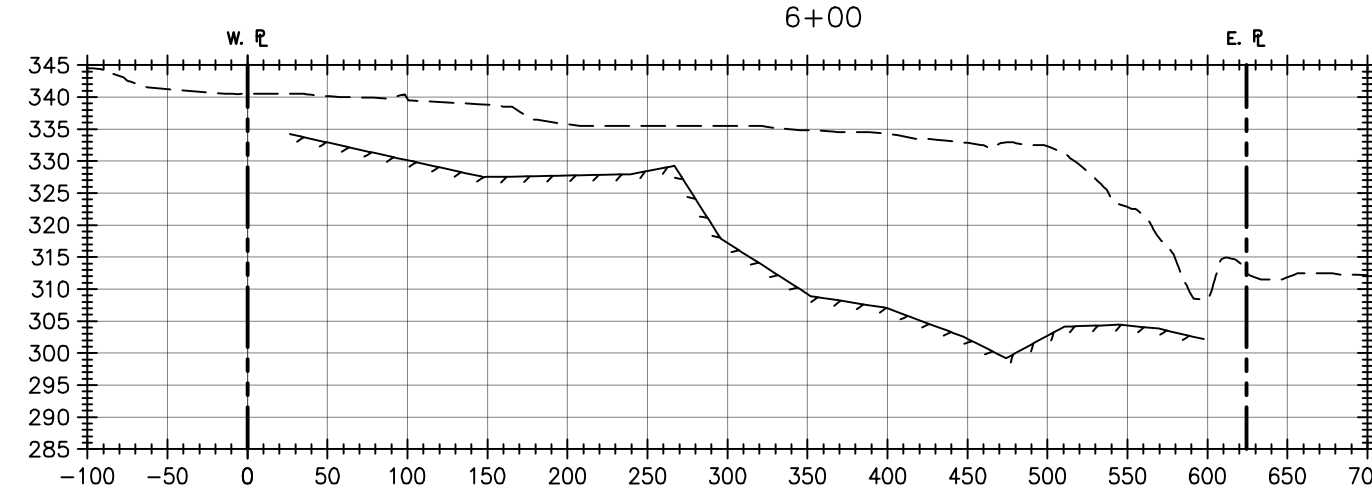
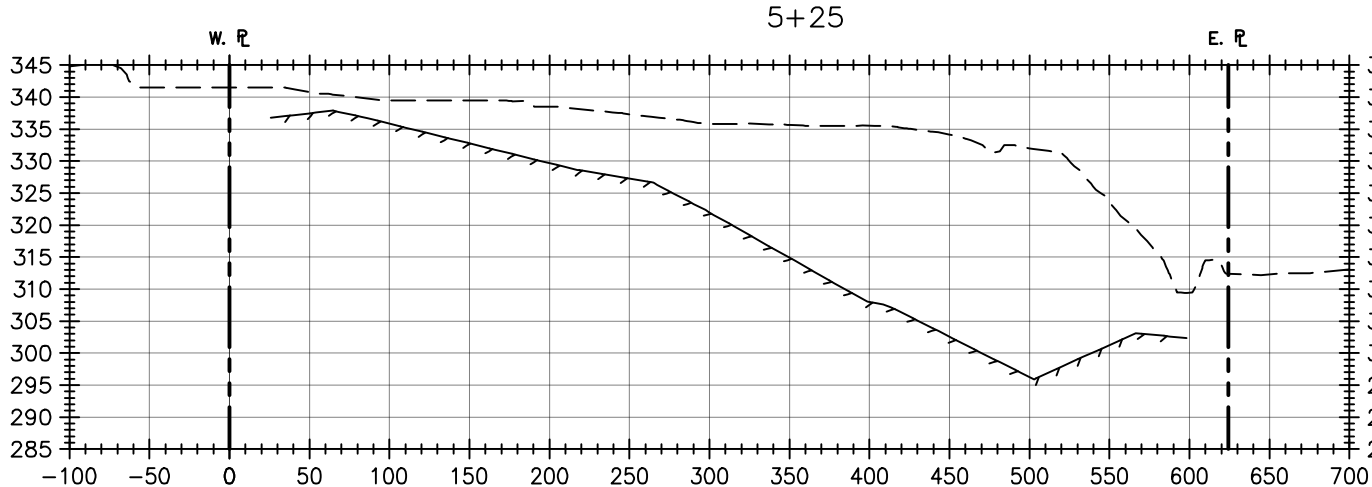
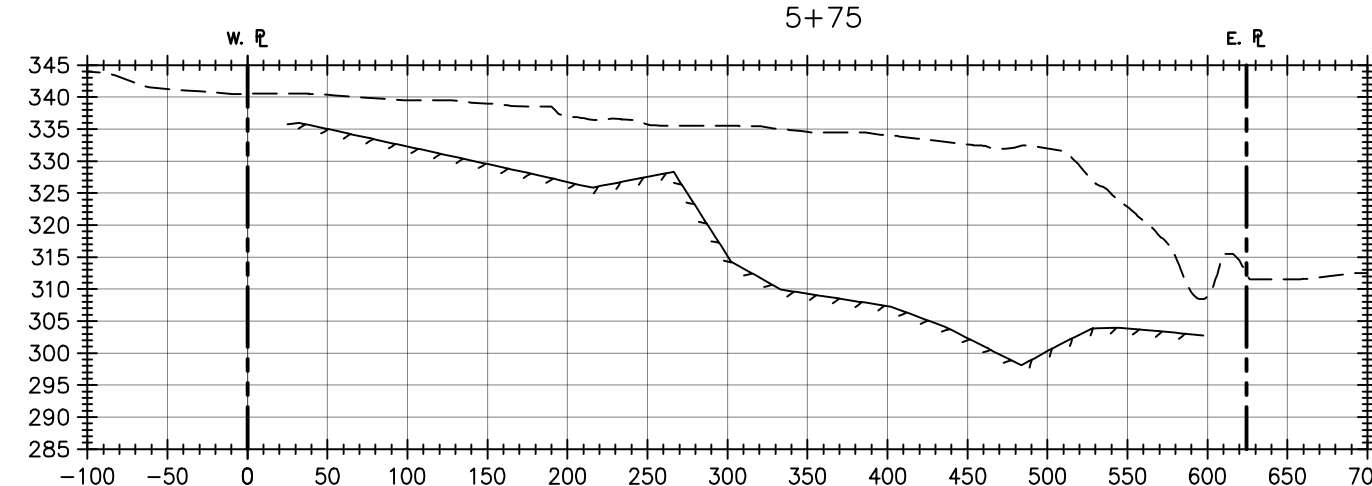
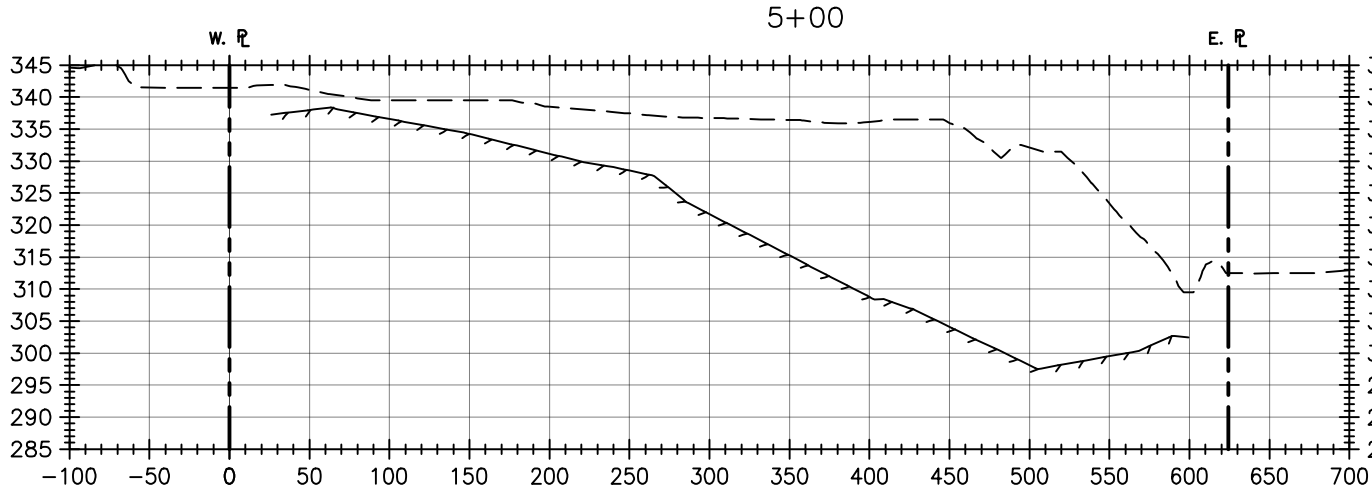
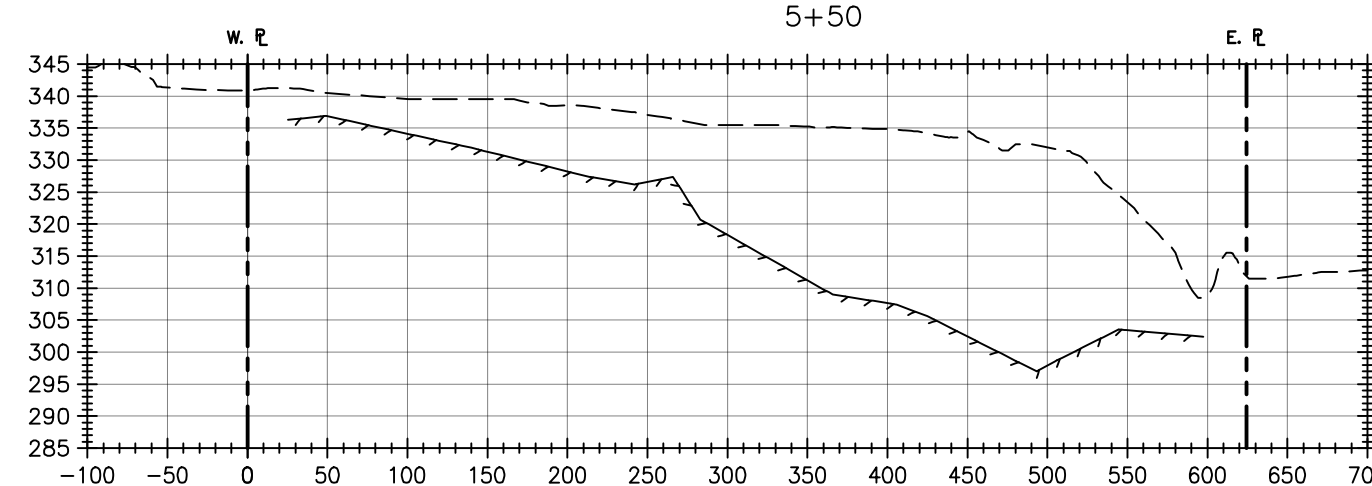
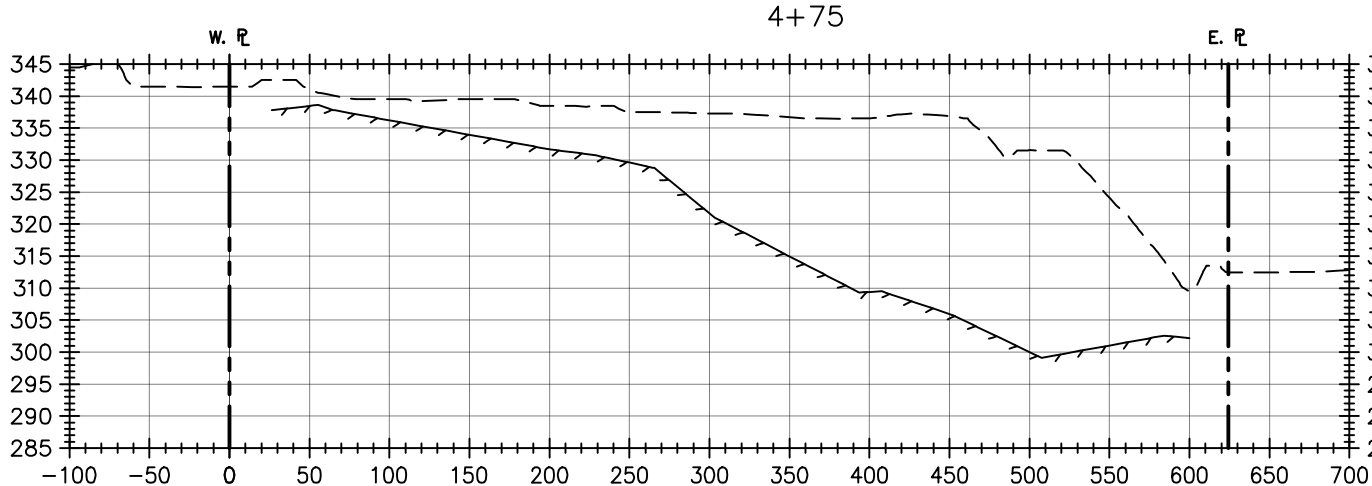
NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 3+25 TO 4+50	
		PROJECT NO. 21-529	FIGURE NO. 5C

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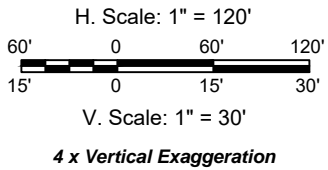


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

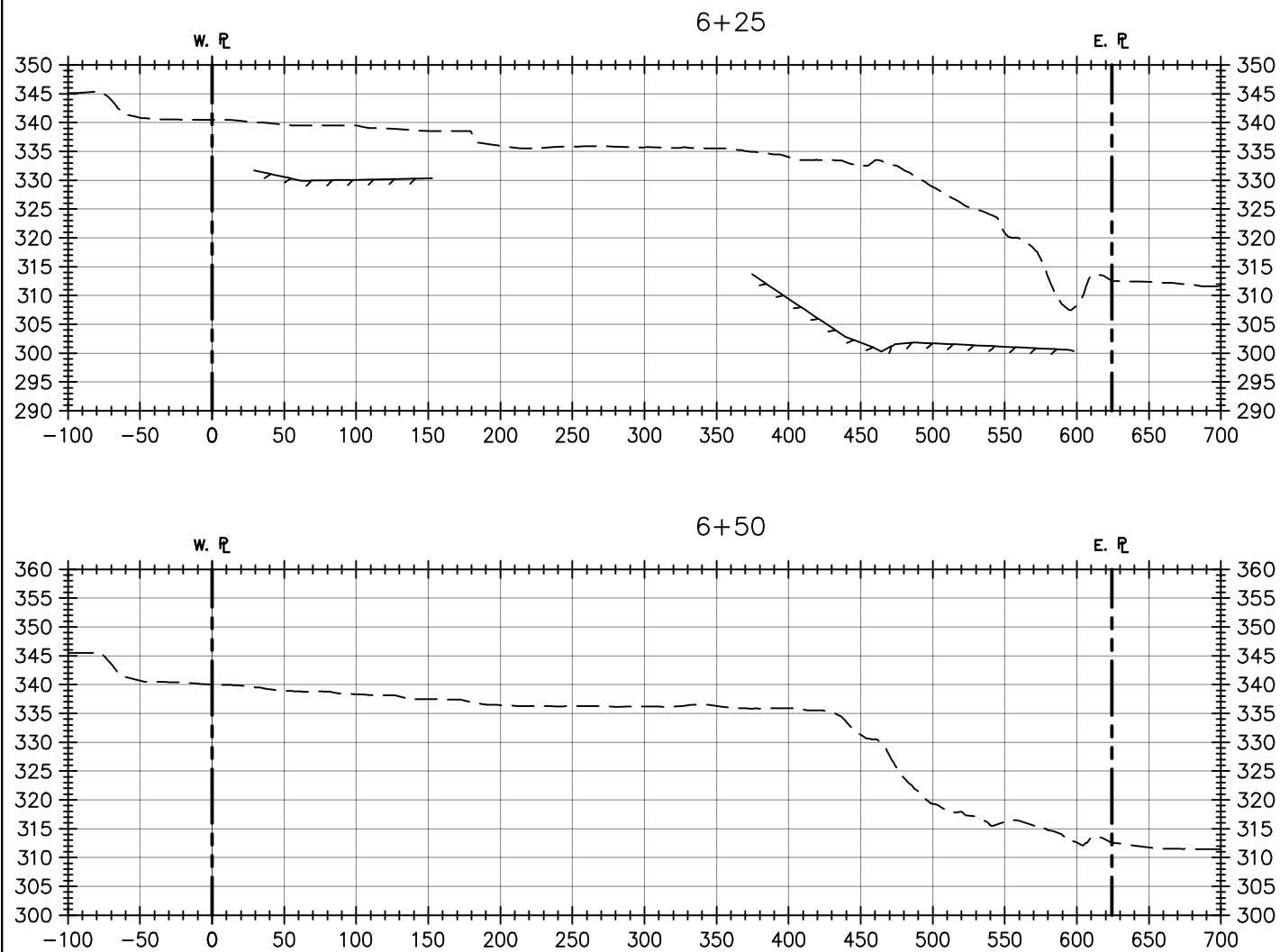
NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 4+75 TO 6+00	
		PROJECT NO. 21-529	FIGURE NO. 5D

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Checked by: JCR
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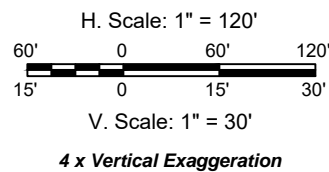


LEGEND

- — — Approximate Existing Ground Surface
- /// Approximate Glacial Till Contact

NOTES

1. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
2. Locations of glacial till contact are approximate and based on subsurface explorations by others.
3. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 6+25 TO 6+50	
		PROJECT NO. 21-529	FIGURE NO. 5E

APPENDIX A

EXISTING SUBSURFACE EXPLORATIONS

(Kleinfelder, 2005)

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOIL MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, 0% TO 15% FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, 0% TO 15% FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, SILTY GRAVEL-SAND MIXTURES
				GC	CLAYEY GRAVELS, CLAYEY GRAVEL-SAND MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, 0% TO 15% FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, 0% TO 15% FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SILTY SAND-GRAVEL MIXTURES
				SC	CLAYEY SANDS, CLAYEY SAND-GRAVEL MIXTURES
FINE GRAINED SOIL MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
Project: 54568 August 2005

SOIL CLASSIFICATION LEGEND

APPENDIX
A-1

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS		
0									Surface: grass
								SM	Topsoil. SILTY SAND (SM): gray-brown, moist, dense, fine-grained, trace gravel. (GLACIAL TILL)
5								10 16 20	S1-1
								12 18 22	S1-2
								30 50/3"	S1-3
10								16 50/4"	S1-4
15								50/5"	S1-5

Boring was completed to a depth of 15.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 2-28-05
LOGGED BY: I. LaVielle
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.8
TOTAL DEPTH (feet): 15.4
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
B-1

Appendix

A - 2

PAGE 1 of 1

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)			NAME	SYMBOL
0											Surface: grass	
											SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, loose, medium- to coarse-grained. (FILL)
5								5	S2-1			
								4				
								6				
								8	S2-2	SM		
								12				
								22				
								8	S2-3			
								10				
								9				
10								14	S2-4			
								32				
								20				
								29	S2-5			
								40				
								50/4"				
20								9	S2-6	ML		
								20				
								26				
25												

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVieille
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 338.7
 TOTAL DEPTH (feet): 40.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
 B-2

Appendix
 A -3a

PAGE 1 of 2


THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								20	X	S2-7	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, medium- to coarse-grained. (GLACIAL TILL)
								50/4"				
30								50/5.5"	X	S2-8		
35								24	X	S2-9		
								50/4"				
40								50/6"	X	S2-10		
40.5												
<p>Boring was completed to a depth of 40.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

* SAMPLER TYPE	<input checked="" type="checkbox"/> Cal. (3"OD) Split Spoon	<input checked="" type="checkbox"/> SPT (2" OD) Split Spoon	<input type="checkbox"/> Core Sample	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Grab	<input type="checkbox"/> No Recovery
**HAMMER WEIGHT	300 lbs (30" Drop)	140 lbs (30" Drop)				

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-2	Appendix A -3b PAGE 2 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		BLOWS/6 in** (uncorrected)	SAMPLER #	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)					
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very loose, medium-grained. (FILL)
1									1	S3-1			
2									2				
3									1				
4									4	S3-2			- grades to medium dense.
5									6				
6									8				
7									9	S3-3			
8									10				
9									5				
10									3	S3-4			grades to black, low plasticity, some wood debris and organics.
11									5				
12									3				
13													
14									1	S3-5			- grades to with lenses of sandy silt.
15									5				
16									7				
17													
18													
19													
20									4	S3-6			
21									4				
22									2		SM		SILTY SAND (SM): brown, moist, medium dense, fine-grained, with organics. (RELIC TOPSOIL)
23													
24											SM		SILTY SAND WITH GRAVEL (SM): gray-brown, moist, dense, medium-grained. (GLACIAL TILL)
25													

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 332.5
 TOTAL DEPTH (feet): 36.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-3

Appendix

A -4a

PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY					FIELD	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25								7 13 22			- grades to trace gravel, lenses of sand.
30								25 50/5"			- grades to very dense.
35								9 17			- grades to lenses of wet, fine-grained, gray sand.
36.5								21			

Boring was completed to a depth of 36.5 feet below ground surface. Groundwater was encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3" OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
B-3

Appendix

A -4b

PAGE 2 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: asphaltic concrete pavement	
										SM	Asphaltic concrete pavement (2 inches thick).
											SILTY SAND WITH GRAVEL (SM): gray-brown, moist to dry, very dense, fine- to coarse-grained. (GLACIAL TILL) - grades to with cobbles. - grades to brown, moist.
6							6	X	S4-1		
13							13	X			
50/3"							50/3"				
18							18	X	S4-2		
50/5"							50/5"				
24							24	X	S4-3		
50/3"							50/3"				- grades to gray-pink.
21							21	X	S4-4	SP-SM	SAND WITH SILT (SP-SM): gray, moist, very dense, fine-grained. (GLACIAL TILL)
37							37	X			
43							43	X			
50/5.5"							50/5.5"		S4-5	SM	SILTY SAND WITH GRAVEL (SM): gray, moist, very dense, fine- to coarse-grained. (GLACIAL TILL)
20											
20.5							50/5.5"	X	S4-6		

Boring was completed to a depth of 20.5 feet below ground surface. No groundwater encountered. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.8
 TOTAL DEPTH (feet): 20.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-4

Appendix

A - 5

PAGE 1 of 1

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:


BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
0											Surface: grass	
											Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to coarse-grained. (FILL)	
4							4	X	S5-1			
10							10	X				
6							6	X				
12							12	X	S5-2			
7							7	X				
6							6	X			- grades to with cobbles.	
1							1	X	S5-3			
1							1	X			- grades to dark brown, very loose, with roots and other organics.	
1							1	X				
2							2	X	S5-4			
2							2	X			- asphaltic concrete and wood debris encountered during drilling.	
1							1	X				
0							0	X	S5-5			
1							1	X			- grades to wet.	
1							1	X				
5							5	X	S5-6			
4							4	X				
1							1	X			- groundwater seepage encountered during drilling.	
25												

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.7
 TOTAL DEPTH (feet): 40.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A


KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING
 PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-5

Appendix
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	NAME
25												- grades to black, with lenses of gray silty sand.
30											SM	SILTY SAND WITH GRAVEL (SM): gray, moist, dense, fine- to coarse-grained. (GLACIAL TILL)
35												
40												
40.5												
<p>Boring was completed to a depth of 40.5 feet below ground surface. Groundwater seepage was encountered at 23 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

* SAMPLER TYPE	<input checked="" type="checkbox"/> Cal. (3" OD) Split Spoon	<input checked="" type="checkbox"/> SPT (2" OD) Split Spoon	<input type="checkbox"/> Core Sample	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Grab	<input type="checkbox"/> No Recovery
**HAMMER WEIGHT	300 lbs (30" Drop)	140 lbs (30" Drop)				

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-5	Appendix A -6b PAGE 2 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY						FIELD		C.S.C.S.		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL
0													Surface: grass
													Topsoil. SILTY SAND (SM): brown, moist, loose, fine-grained, trace wood fragments. (FILL)
													- grades to light brown, fine- to medium-grained.
5													- grades to light gray to brown, medium dense, trace gravel.
10													SILTY SAND WITH GRAVEL (SM): green-gray to gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
													- grades to dense.
15													
20													SILT WITH SAND (ML): light gray, moist, hard. (GLACIAL TILL)
21													SILTY SAND WITH GRAVEL (SM): olive gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)

Boring was completed to a depth of 21 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DATE DRILLED: 4-27-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 340.9
TOTAL DEPTH (feet): 21.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A




KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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**Proposed Retail Development
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BORING LOG
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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					% PASSING No. 200 SIEVE	OTHER TESTS
0										Surface: grass	
0			7.7		22		7	X	S7-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive gray to brown, moist, very dense, fine- to medium-grained. (FILL)
5							37	X			
							50/5"	X			
							50/6"	X	S7-2		- grades to light gray.
							19	X	S7-3		- grades to olive gray, moist to dry, some gravel.
							50/5"	X			
10							30	X	S7-4		
							50/4"	X			
15							0	X	S7-5	SM	SILTY SAND (SM): olive gray to brown, moist, medium dense, fine-grained, some gravel. (FILL)
							10	X			
							4	X			
20							5	X	S7-6		An apparent void was encountered at a depth of 15 feet below the existing ground surface. SILTY SAND (SM): olive-gray, moist, dense, fine-grained, som gravel. (GLACIAL TILL)
21.5							16	X			
							14	X			
<p>Boring was completed to a depth of 21.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
DATE DRILLED: 4-26-05 LOGGED BY: D. Divine REVIEWED BY: J. Schmidt			SURFACE ELEVATION (feet): 335.2 TOTAL DEPTH (feet): 21.5 DIAMETER OF BORING (in): 8 inches			DRILLING METHOD: HSA DRILLER: Holt Drilling CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-7				Appendix A - 8 PAGE 1 of 1	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	SAMPLE NUMBER	TESTS		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	
0											Surface: grass
											SM Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, moist, loose, fine- to medium-grained. (FILL)
5									5 5 3	S8-1	
10									10 42 50/5"	S8-2	SM SILTY SAND WITH GRAVEL (SM): olive gray, moist, very dense, fine- to medium-grained, with small seams of wet. (GLACIAL TILL)
15									7 29 45	S8-3	
20									16 37 50/3"	S8-4	SM SILT WITH SAND (ML): light gray to olive gray, moist, hard. (GLACIAL TILL)
									33 40 50	S8-5	SILTY SAND WITH GRAVEL (SM): light gray to brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
25											

DATE DRILLED: 4-27-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.7
 TOTAL DEPTH (feet): 41.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
25							33		S8-6		
							40				
							50/5"				
							36		S8-7		
							41				
							50/5"				
30							26		S8-8		
							50/6"				
35							50/5"		S8-9		
40							25		S8-10		
41							50/6"				

Boring was completed to a depth of 41 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3" OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Proposed Retail Development
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Appendix
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	NAME	SYMBOL
0									Surface: grass
5			10.9		25		4 10 6	S9-1	SM Topsoil. SILTY SAND (SM): olive-gray to brown, moist, medium dense, fine- to medium-grained, some gravel. (FILL)
10							12 7 6	S9-2	- grades to dark brown, loose to medium dense, fine-grained, trace wood fragments.
15							1 1 1	S9-3	- grades to loose.
20							2 2 1	S9-4	SP SAND WITH GRAVEL (SP): gray, moist, loose, fine-grained, trace fines. (FILL)
25							0 1 1	S9-5	SM SILTY SAND WITH GRAVEL (SM): olive-gray, moist, very dense, fine- to medium-grained. (FILL)

DATE DRILLED: 4-26-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.1
 TOTAL DEPTH (feet): 41.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL	
25								5			- grades to loose. SM SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								4			
								1			
								4			
								6			
								9			
								5			
								18			
								25			
30											- grades to loose. SM SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								21			
								50/5.5"			
35											- grades to loose. SM SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
40											- grades to loose. SM SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
41.5											- grades to loose. SM SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)

Boring was completed to a depth of 41.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER TYPE

Cal. (3" OD) Split Spoon

SPT (2" OD) Split Spoon

Core Sample

Shelby Tube

Grab

No Recovery

**HAMMER WEIGHT

300 lbs (30" Drop)

140 lbs (30" Drop)



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
 2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
0											Surface: grass	
											SM	Topsoil.
											SM	SILTY SAND WITH GRAVEL (SM): light brown, moist, medium dense, fine- to medium-grained.
												(FILL)
												SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
29										S10-1		
39												
50												
14										S10-2		- grades to olive gray to brown.
23												
40												
20										S10-3		- grades to olive gray.
24												
42												
17										S10-4		- grades to dense.
23												
25												
10										S10-5		- grades to very dense.
32												
38												
15										S10-6		
40												
21.5												
												Boring was completed to a depth of 21.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.
DATE DRILLED: 4-27-05			SURFACE ELEVATION (feet): 337.7			DRILLING METHOD: HSA						
LOGGED BY: D. Divine			TOTAL DEPTH (feet): 21.5			DRILLER: Holt Drilling						
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A						
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-10			Appendix A -11 PAGE 1 of 1			

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY						FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in ** (uncorrected)	SAMPLER *		NAME	SYMBOL
0												Surface: asphaltic concrete pavement	
											SP-SM	Asphaltic concrete pavement (1.5 inches thick).	
											SM	(Base course gravel.)	
												SAND WITH SILT AND GRAVEL (SP-SM): brown, dry to moist, medium dense, fine- to medium-grained.	
												(FILL)	
												SILTY SAND WITH GRAVEL (SM): gray-brown, moist, dense, fine- to medium-grained.	
												(GLACIAL TILL)	
												- grades to wet.	
												- grades to gray, moist.	
												- grades to gray-brown, very dense.	
5													
											5	X	S11-1
											20	X	
											22	X	
											15	X	S11-2
											29	X	
											45	X	
											48	X	S11-3
											50/3"	X	
10													
											11	X	S11-4
											30	X	
											37	X	
											15	X	S11-5
											22	X	
											36	X	
15													
											12	X	S11-6
											30	X	
19											34	X	

Boring was completed to a depth of 19 feet.

DATE DRILLED: 5-3-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.0
TOTAL DEPTH (feet): 19.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

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**Proposed Retail Development
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
			8.7		18		4		S12-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive gray, moist, medium dense, fine- to medium-grained. (FILL)
5							4				
							2				
							1		S12-2		- grades to wet, very loose.
							0				
							2				
							6		S12-3		- grades to dark brown, medium dense, groundwater seepage encountered.
							10				
							9				- grades to olive gray.
10							3		S12-4		- grades to moist, loose.
							2				
							2				
							50/2"		S12-5		- sampler pounding on piece of Portland cement concrete driller reported as approximately 1 to 2 feet in dimension.
							8		S12-6		- grades to olive gray to light brown, medium dense.
							9				
							5				
20											
							1		S12-7	SM	SILTY SAND WITH GRAVEL (SM): olive gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)
							8				
24							35				

Boring was completed to a depth of 24 feet
below ground surface. Groundwater

DATE DRILLED: 4-28-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.6
TOTAL DEPTH (feet): 24.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY		FIELD		U.S.C.S.		SOIL DESCRIPTION			
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *
<p>seepage was encountered at a depth of 7.5 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
<p style="text-align: center; font-size: 2em; opacity: 0.5;">Trial Version www.nuance.com</p>											
<p>* SAMPLER TYPE <input checked="" type="checkbox"/> Cal. (3" OD) Split Spoon <input checked="" type="checkbox"/> SPT (2" OD) Split Spoon <input type="checkbox"/> Core Sample <input checked="" type="checkbox"/> Shelby Tube <input type="checkbox"/> Grab <input type="checkbox"/> No Recovery</p> <p>**HAMMER WEIGHT 300 lbs (30" Drop) 140 lbs (30" Drop)</p>											
<p>KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING</p> <p>PROJECT NUMBER: 54568</p>						<p>Proposed Retail Development 2119 Mildred Street Fircrest, Washington</p> <p>BORING LOG B-12</p>			<p>Appendix A 13b</p> <p>PAGE 2 of 2</p>		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	C.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL	
0												Surface: grass
0												Topsoil.
												SILTY GRAVEL WITH SAND (GM):
												light brown, moist, very loose, fine-grained.
												(FILL)
5			9.1		14		2	X	S13-1			
							1	X				
							1	X				
10							3	X	S13-2			- grades to light gray to olive-gray, moist to
							10	X				wet, medium dense, trace wood fragments.
							15	X				
15							10	X	S13-3			SILTY SAND WITH GRAVEL (SM):
							18	X				light gray, moist, dense, fine- to
							26	X				medium-grained, seams of sand with silt.
												(GLACIAL TILL)
20							30	X	S13-4			- grades to very dense.
							50/6"	X				
							11	X	S13-5			SILT WITH SAND (ML): light gray to
							12	X				olive gray, moist, very stiff.
							15	X				(GLACIAL TILL)
							12	X	S13-6			SILTY SAND WITH GRAVEL (SM):
							23	X				light gray, moist, dense, fine- to
							21	X				medium-grained.
												(GLACIAL TILL)
25												

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.3
 TOTAL DEPTH (feet): 39.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
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 Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				NAME	SYMBOL	
25									19		S13-7			- grades to very dense.
									40					
									48					
									13		S13-8			- grades to dense.
									19					
									14					
30														
									11		S13-9			
									19					
									17					
35														
									6		S13-10	ML		SILT WITH SAND (ML): light brown, moist, stiff to very stiff. (GLACIAL TILL)
									7					
39														

Boring was completed to a depth of 39 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3"OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
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BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL	
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, moist, very loose, fine- to medium-grained. (FILL)
1									1			
1									1			
0									0			
5												
11									11			
30									30			- grades to olive gray, wet, dense. Groundwater seepage encountered during drilling.
17									17			
10												
15												
3									3			- grades to moist, loose.
2									2			
2									2			
15												
9									9			- grades to light gray with dark brown lenses, medium dense, trace wood debris and roots.
6									6			
5									5			
20												
4									4			
6									6			
4									4			
2									2			
21									21			
21									21			
25										SM		SILTY SAND WITH GRAVEL (SM): light gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.7
 TOTAL DEPTH (feet): 38.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	NAME	
25								16 43 50/5.5'	S14-7				- grades to very dense.
30								16 32 36	S14-8				- grades to olive gray.
35								18 50/6"	S14-9				
38.4								15 50/5"	S14-10				

Boring was completed to a depth of 38.4 feet below ground surface. Groundwater seepage was encountered at a depth of 8 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

*** SAMPLER TYPE**
☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT**
 300 lbs (30" Drop) 140 lbs (30" Drop)


KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING
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Proposed Retail Development
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: asphaltic concrete pavement	
									SP-SM	Asphaltic concrete pavement (2 inches thick).
									SM	Base course gravel.
										SAND WITH SILT AND GRAVEL (SP-SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
								17	S15-1	SILTY SAND WITH GRAVEL (SM): gray-brown, dry, dense, fine- to medium-grained. (GLACIAL TILL) - grades to dry to moist, very dense.
								27		
								28		
5										
								16	S15-2	
								29		
								47		
10										
								40	S15-3	
								50/2.5"		
15										
								50/5"	S15-4	
20										
								32	S15-5	
								50/4"		
								50/4.5"	S15-6	
25										

DATE DRILLED: 5-3-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.4
 TOTAL DEPTH (feet): 31.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25								13			- grades to dense, seams of sand with silt and gravel.
								17			
								25			
								50/2.5			- grades to very dense.
30								13			- grades to dry, very dense, seams of silt and sand with silt.
								35			
31.4								50/4.5			

Boring was completed to a depth of 31.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips, and capped with Portland cement concrete.

* SAMPLER
TYPE

☒ Cal. (3" OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray to light brown, moist, loose, fine- to medium-grained. (FILL)
							1	X	S16-1		
							4	X			
							2	X			
5											
							27	X	S16-2	SM	SILTY SAND WITH GRAVEL (SM): light brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
							45	X			
							36	X			
10											
							16	X	S16-3		
							30	X			
							25	X			
15							16	X	S16-4		- grades to light gray.
							50/6"	X			
							16	X	S16-5		
							35	X			
							32	X			
20							34	X	S16-6		
							38	X			
							32	X			
							20	X	S16-7		
							50/6"	X			
25											

DATE DRILLED: 4-28-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.1
 TOTAL DEPTH (feet): 33.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
25										
30										
33.4										

29
50/6" S16-834
50/5" S16-9

Boring was completed to a depth of 33.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPECal. (3"OD)
Split SpoonSPT (2" OD)
Split SpoonCore
SampleShelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray to brown, moist, very loose, fine- to medium-grained. (FILL)
3								S17-1		
2										
1										
5										
1								S17-2		
1										
12										- grades to dark brown, medium dense, with wood fragments and roots.
10										
3								S17-3		
3										- grades to olive-gray, loose.
2										
15										
4								S17-4		
5										- grades to olive-gray to light brown, loose to medium dense.
5										
20										
3								S17-5		
6										- grades to dark brown, trace wood fragments.
4										
1								S17-6		
6										- grades to dark brown to olive-gray, moist to wet, medium dense, seams of relic topsoil up to 3 inches thick.
10										
25									SM	SILTY SAND WITH GRAVEL (SM):

DATE DRILLED: 4-27-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.2
 TOTAL DEPTH (feet): 38.3
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		
25									
30									
35									
38.3									

20
50/6" S17-7

30
30
43 S17-8

20
50/4" S17-9

33
50/3" S17-10

light gray, moist, very dense, fine- to medium-grained.
(GLACIAL TILL)

- groundwater seepage encountered during drilling.

- grades to olive gray.

Boring was completed to a depth of 38.3 feet below ground surface. Groundwater seepage was encountered at a depth of 29 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											SM Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very loose, fine- to medium-grained. (FILL)
1								1	S18-1		
1								1			
1								1			
5											
								0	S18-2		
								0			- grades to brown, some gravel.
								1			
10											
								0	S18-3		
								0			
								1			
15											
								2	S18-4		
								4			- grades to dark brown, medium dense, trace roots and wood fragments.
								5			
20								2	S18-5		
								5			- grades to olive-gray to brown.
								6			
								5	S18-6		
								20			- grades to dense.
								12			- grades to gray, dry.
25											

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.0
 TOTAL DEPTH (feet): 38.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS /	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
25									5	X	S18-7			- grades to olive-gray, moist, loose.
									6	X				
									1	X				
									3	X	S18-8			
									12	X				
									16	X				
30												SM		SILTY SAND WITH GRAVEL (SM): olive-gray, moist, medium dense, fine- to medium-grained. (GLACIAL TILL) - grades to dense.
									12	X	S18-9			
									20	X				
									16	X				
35														
									16	X	S18-10			- grades to light brown to light gray, very dense.
38.9									45	X				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* SAMPLER
TYPE

**Cal. (3" OD)
Split Spoon**

☐ SPT (2" OD)
Split Spoon

Core Sample

Shelby Tube

Grab

No Recovery

**HAMMER WEIGHT

**300 lbs
(30" Drop)**

140 lbs
(30" Drop)

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

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**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington**

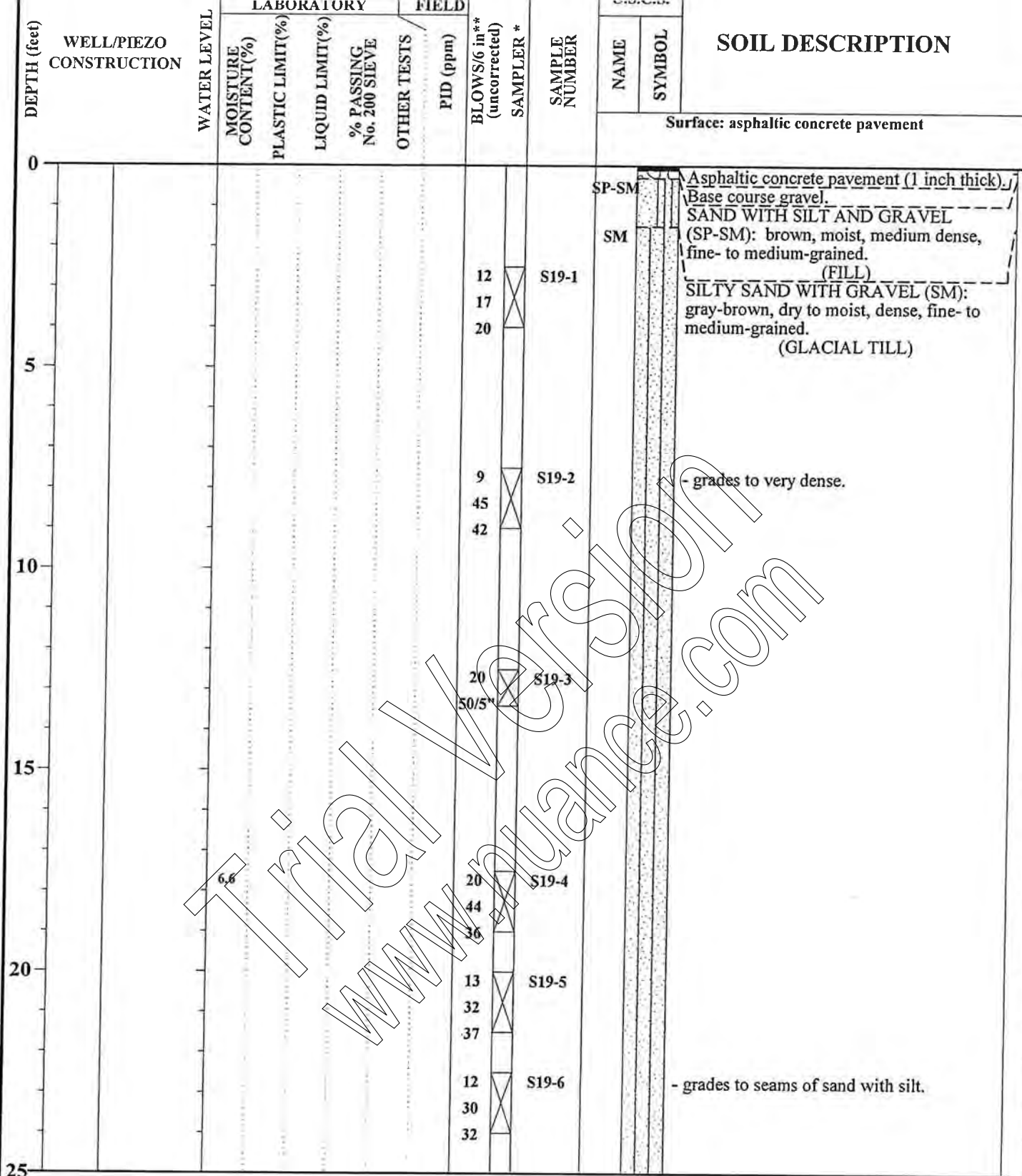
BORING LOG

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DATE DRILLED: 5-3-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 340.2
 TOTAL DEPTH (feet): 30.8
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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 2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *	
25												
									16	X	S19-7	
									43	X		
									50	X		
									20	X	S19-8	
									50/4.5"	X		
30												
30.8									19	X	S19-9	
									50/4"	X		
												- grades to fine-grained.

Boring was completed to a depth of 30.8 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips, and capped with Portland cement concrete.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, loose, fine- to medium-grained. (FILL)
3								S20-1		
5										
1								S20-2		- grades to medium dense.
0										
26										
10									SM	SILTY SAND WITH GRAVEL (SM): olive-gray to brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
16								S20-3		
26										
27										
15								S20-4		- grades to dense.
10										
17										
27										
22								S20-5		- grades to very dense.
50/5.5"										
30								S20-6		
50/5"										
10								S20-7		
32										
47										
25										

DATE DRILLED: 4-28-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.5
 TOTAL DEPTH (feet): 33.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____


[illegible]

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* SAMPLER
TYPE

 Cal. (3"OD)
Split Spoon

 SPT (2" OD)
Split Spoon

Core Sample

**Shelby
Tube**

Grab

No Recovery

**HAMMER WEIGHT

**300 lbs
(30" Drop)**

**140 lbs
(30" Drop)**

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

PROJECT NUMBER: 54568

**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington**

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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					NAME	SYMBOL	
0													Surface: grass
													Topsoil.
													SILTY SAND WITH GRAVEL (SM): light brown, moist, medium dense, fine- to medium-grained. (FILL)
2								2	X	S21-1			
7								7	X				
5								5	X				
								1	X	S21-2			- grades to very loose.
								1	X				
								1	X				
10													
								1	X	S21-3			- grades to dark brown, trace wood fragments.
								0	X				
								1	X				
15													- groundwater seepage encountered during drilling.
								2	X	S21-4			- grades to wet, loose.
								4	X				
								2	X				
20								6	X	S21-5			- grades to dark brown to olive-gray, moist, medium dense.
								10	X				
								9	X				
								5	X	S21-6			- grades to brown to olive-gray, some gravel.
								7	X				
								5	X				
25													

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.9
 TOTAL DEPTH (feet): 44.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington

BORING LOG
B-21

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
25									1	S21-7	- grades to very loose.
									2		
									1		
									2	S21-8	- grades to olive-gray, moist to wet, medium dense.
									1		
									44		
30											- groundwater seepage encountered during drilling.
									10	S21-9	
									9		
									16		- grades to light gray.
35											
									15	S21-10	
									30		Silty Sand with Gravel (SM): olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
									47		
40											
									27	S21-11	
									29		
44									30		

Boring was completed to a depth of 44 feet below ground surface. Groundwater seepage was encountered at 15 and 34 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
0											Surface: asphaltic concrete pavement
			6.2								SM Asphaltic concrete pavement (2 inches thick). (Base course gravel). SILTY SAND WITH GRAVEL (SM): red-brown, moist, medium dense, fine- to medium-grained, with bark and wood fragments. (FILL) - grades to gray-brown, dry to moist, very dense, no visible organics.
5											
10											
15											
19											

DATE DRILLED: 5-3-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.8
 TOTAL DEPTH (feet): 19.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)	
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): dark gray to olive-gray, moist, loose, fine- to medium-grained, plastic debris encountered in sampler. (FILL)
3								X	S23-1				
4								X					- garbage encountered in cuttings.
6								X	S23-2		SM		SILTY SAND WITH GRAVEL (SM): light brown to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
13								X	S23-3				- grades to light brown to olive-gray, dense.
24								X					
16								X	S23-4				- grades to olive gray, very dense.
22								X					
37								X	S23-5				
25								X					
37								X	S23-6				
38								X					
27								X	S23-7				
50/5"								X					
22								X					
50/6"								X					

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
B-23**

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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					NAME	SYMBOL	
25													
								22	X	S23-8			
								47	X				
								40	X				
30													
								35	X	S23-9			
								30	X				
34								21	X				

Boring was completed to a depth of 34 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
B-23

Appendix
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

2000 STANDARD IN/OUT 54568 GPJ 2000REV.GDT 6/8/05

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	C.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE				OTHER TESTS	PID (ppm)	
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray, moist, medium dense, fine- to medium-grained. (FILL)
3									S24-1			
9												
4												
5												
10									S24-2			grades to olive-gray to dark brown, loose, fine- to coarse-grained.
15									S24-3			- grades to dark brown, very loose, some organics.
20									S24-4			- grades to olive-gray, medium dense, fine- to medium-grained.
25									S24-5			- grades to olive-gray to dark brown, loose, with wood fragments and roots, lenses of gray silty sand.
									S24-6			

DATE DRILLED: 4-28-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 334.0
TOTAL DEPTH (feet): 39.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	U.S.C.S.		SOIL DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)			SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Boring was completed to a depth of 39 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3" OD)
Split Spoon

☐ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		U.S.C.S.		SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
0										Surface: grass
										SM Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained. (FILL)
5								3 2 2	S25-1	- grades to gray-brown, trace roots.
10								1 1 1	S25-2	- grades to dark brown, wet, very loose, with wood fragments and roots.
15								6 16 3	S25-3	- grades to gray, moist, loose.
								3 5 2	S25-4	- grades to lenses of dark brown, wet organic silt.
20								2 10 29	S25-5	
								4 30 39	S25-6	SM SILTY SAND WITH GRAVEL (SM): gray, wet, dense, fine- to medium-grained, low plasticity. (GLACIAL TILL) - grades to moist, very dense, lenses of silt, seams of sand with silt.
25										

DATE DRILLED: 4-28-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 324.5
 TOTAL DEPTH (feet): 26.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

Trial Version

www.nuance.com

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
25									19		S25-7			
26.4									37					

Boring was completed to a depth of 26.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.


* SAMPLER TYPE

☒ Cal. (3"OD) Split Spoon
 ☒ SPT (2" OD) Split Spoon
 ☐ Core Sample
 ☐ Shelby Tube
 ☐ Grab
 ☐ No Recovery

**HAMMER WEIGHT

300 lbs (30" Drop)

140 lbs (30" Drop)

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-25	Appendix A 26b PAGE 2 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.
 APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0										Surface: grass
			9.7							
5										
10										
15										
20										
25										

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.0
 TOTAL DEPTH (feet): 44.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25											
								2	S26-6		- grades to gray-brown with gray mottling, medium dense, low plasticity.
								4			
								8			
30											
								12	S26-7	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								21			
								39			
35								25	S26-8		
								50/5.5"			
								17	S26-9		
								31			
								30			
40								6	S26-10		
								35			
								50/5"			
								8	S26-11		
								33			
44								50/5.5"			

Boring was completed to a depth of 44 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, wet, very loose, fine- to medium-grained, trace roots. (FILL)
1								1	S27-1	
0								0		
1								1		
5										
								1	S27-2	
								1		
								2		- grades to dark brown to gray, trace roots.
10										
								7	S27-3	
								7		- large gravel or cobbles encountered during sampling.
								5		
15										
								1	S27-4	
								1		- log encountered during sampling.
								2		
20										
								1	S27-5	
								1		- grades to gray-brown, wet, very loose, trace roots and wood fragments.
								1		
25										

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.8
 TOTAL DEPTH (feet): 43.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
 2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION		
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *	NAME
25												
								19	X	S27-6	SM	SILTY SAND WITH GRAVEL (SM): gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								34	X			
								40				
30												
								12	X	S27-7		- grades to wet, dense, seams of sand with silt and sandy silt.
								14	X			
								21				
								24	X	S27-8		- grades to dry to moist, very dense.
35								50/4"				
								28	X	S27-9		- grades to moist to wet.
								50/4"				
								50/1"		S27-10		
40												
								29	X	S27-11		- grades to moist.
								50/5"				

Boring was completed to a depth of 43.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

 Cal. (3" OD)
Split Spoon

 **SPT (2" OD)
Split Spoon**

Core Sample


**Shelby
Tube**

Grab

 **No
Recovery**

****HAMMER WEIGHT**

300 lbs
(30" Drop)

**140 lbs
(30" Drop)**

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

PROJECT NUMBER: 54568

**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington**

BORING LOG

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION		
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS					PID (ppm)	BLOWS/6 in ** (uncorrected)
0											Surface: grass		
0									SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained, occasional 2- to 4-inch quarry spall encountered. (FILL)		
5								2 1 2	S28-1		- grades to very loose, no quarry spalls.		
10								3 2 2	S28-2		- grades to loose.		
15								3 3 3	S28-3		- grades to dark brown, moist to wet, with wood fragments.		
20								1 1 9	S28-4		- grades to gray, wet, medium dense, fine- to medium-grained, no visible organics.		
25									SM		SILTY SAND WITH GRAVEL (SM): gray, dry, very dense, fine- to coarse-grained. (GLACIAL TILL)		
DATE DRILLED: 4-28-05 SURFACE ELEVATION (feet): 329.7 DRILLING METHOD: HSA LOGGED BY: F. Reinart TOTAL DEPTH (feet): 43.9 DRILLER: Holt Drilling REVIEWED BY: J. Schmidt DIAMETER OF BORING (in): 8 inches CASING SIZE: N/A													
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568									Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-28			Appendix A 29a PAGE 1 of 2	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION		
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								21 46 50/5.5"	S28-5		
30								1 30 50/4"	S28-6		
35								13 43 40/4.5"	S28-7		
								3 50/6"	S28-8		
40								20 38 50/5.5"	S28-9		
								7 46 50/5"	S28-10		
43.9											

Boring was completed to a depth of 43.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3"OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
0											Surface: grass	
											SM Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, som roots. (FILL)	
5							5	X	S29-1		- grades to loose.	
							3	X				
							3	X				
10							2	X	S29-2		- grades to very loose.	
							1	X				
							2	X				
15							2	X	S29-3		- grades to dark brown, wet, loose, fine-grained, no visible gravel.	
							2	X				
							2	X				
20							3	X	S29-4			
							2	X				
							6	X				
25											SM SILTY SAND WITH GRAVEL (SM): gray, moist, very dense, fine- to	

DATE DRILLED: 4-25-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 330.9
 TOTAL DEPTH (feet): 45.8
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-29	Appendix A 30a PAGE 1 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

 APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION					
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL
25									11	X	S29-5		
									50/6"	X			
30									50/6"	X	S29-6		
35									2	X	S29-7		
									33	X			
									41	X			
									3	X	S29-8		
									26	X			
									50	X			
40									34	X	S29-9		
									50/2.5"	X			
									2	X	S29-10		
									35	X			
									50/4"	X			
45									22	X	S29-11		
45.8									50/3"	X			
<p>Boring was completed to a depth of 45.8 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>													
<p>* SAMPLER TYPE </p>													

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____




KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
5		14.2						1 5 3	S30-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to medium-grained. (FILL) - grades to wet. - grades to dark brown, moist, loose, fine-grained, with roots and wood fragments.
10								4 5 5	S30-2		grades to medium dense, some organics.
15								2 2 2	S30-3		- grades to brown, moist to wet, loose, with wood fragments.
20								5 5 7	S30-4	SP-SM	SAND WITH SILT (SP-SM): gray, moist, medium dense, fine-grained. (FILL)
21.4								1 17 47	S30-5	SM	SILTY SAND WITH GRAVEL (SM): gray, wet, very dense, fine-grained. (GLACIAL TILL)
								20 36	S30-6		
<p>Boring was completed to a depth of 21.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
DATE DRILLED: 4-25-05 LOGGED BY: F. Reinart REVIEWED BY: J. Schmidt			SURFACE ELEVATION (feet): 333.9 TOTAL DEPTH (feet): 21.4 DIAMETER OF BORING (in): 8 inches			DRILLING METHOD: HSA DRILLER: Holt Drilling CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-30				Appendix A -31 PAGE 1 of 1	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
5											Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, loose, fine- to medium-grained. (FILL)
								5	S31-1		
								5			
								5			
								3	S31-2		- grades to brown to gray, moist to wet, loose.
								4			
								3			
								2	S31-3		- grades to brown, very loose
								1			
								1			
10								20	S31-4		SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
11								50/6"			

Boring was completed to a depth of 11 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 338.1
 TOTAL DEPTH (feet): 11.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											Topsoil.
											SILTY SAND WITH GRAVEL (SM):
											brown, moist, loose, fine- to
											medium-grained.
											(FILL)
5											
											SILTY SAND WITH GRAVEL (SM):
											brown, moist, dense, fine- to
											medium-grained.
											(GLACIAL TILL)
											grades to light gray-brown, very dense.
10											
11.5											

50/5.5"

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.8
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY					FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)			NAME	SYMBOL
0											Surface: grass	
											SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, medium dense, fine- to medium-grained. (FILL)
								7	X	S33-1		
								8	X			
								11	X			
5								8	X	S33-2	SM	SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								15	X			
								29	X			
								25	X	S33-3		grades to light brown, moist, very dense.
								38	X			
								50	X			
10								21	X	S33-4		grades to light gray to brown, fine-grained.
11.5								22	X			
								44	X			

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.6
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL	
0												Surface: grass
										SM		Topsoil.
												SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
5												
										SM		SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
10												
11.2												

50/2"

Boring was completed to a depth of 11.2 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 332.7
 TOTAL DEPTH (feet): 11.2
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											Topsoil.
								5		S35-1	SM SILTY SAND WITH GRAVEL (SM): light gray-brown, moist, medium dense, fine- to medium-grained. (FILL)
								7			
								11			
5								10		S35-2	- grades to black, with organics and asphaltic concrete fragments.
								9			
								3			
								4		S35-3	- grades to light brown to light gray, no visible organics or debris.
								5			
								11			
10								32		S35-4	SM SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, wet to moist, very dense, fine-grained. (GLACIAL TILL)
11								50/6"			

Boring was completed to a depth of 38.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.5
 TOTAL DEPTH (feet): 11.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION		
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *	NAME
0											Surface: grass	
											Topsoil.	
			8.5					2	X	S36-1	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, loose, fine- to medium-grained. (FILL) - grades to moist to wet, medium dense.
								3	X			
								11	X			
5												
								6	X	S36-2		- grades to brown, moist.
								6	X			
								6	X			
10												
								3	X	S36-3		- grades to loose.
								5	X			
								4	X			
15												
								15	X	S36-4	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, wet, very dense, fine- to medium-grained. (GLACIAL TILL) - grades to gray to gray-brown, moist to wet. - grades to moist, with seams of wet sand.
								33	X			
								37	X			
20								28	X	S36-5		
								33	X			
								42	X			
								22	X	S36-6		- grades to moist.
								50/6"	X			
25												

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.0
 TOTAL DEPTH (feet): 26.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY		FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE		OTHER TESTS	PID (ppm)	
25										
26							19	X	S36-7	
							50/6"	X		

Boring was completed to a depth of 26 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0											Surface: grass
									SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray, moist, medium dense, fine- to medium-grained. (FILL)
5							5 5 5	S37-1			
10							3 2 3	S37-2			- grades to dark brown, loose.
15							14 20 17	S37-3			SILT (ML): light gray to olive gray, moist, hard, trace sand. (GLACIAL TILL)
20							28 47 50	S37-4	SM		SILTY SAND WITH GRAVEL (SM): light gray, dry, very dense, fine- to medium-grained. (GLACIAL TILL)
25							39 50/3"	S37-5			- grades to olive-gray, moist.

DATE DRILLED: 4-26-05	SURFACE ELEVATION (feet): 334.0	DRILLING METHOD: HSA
LOGGED BY: D. Divine	TOTAL DEPTH (feet): 30.4	DRILLER: Holt Drilling
REVIEWED BY: J. Schmidt	DIAMETER OF BORING (in): 8 inches	CASING SIZE: N/A

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-37	Appendix A 38a PAGE 1 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
25								25		
								50/6"	X	S37-6
								50/6"	X	S37-7
30								50/5"	X	S37-8
30.4										

Boring was completed to a depth of 30.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION				
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	NAME	SYMBOL
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown to light gray, moist, medium dense, fine- to medium-grained, lenses of wet. (FILL)
5									3 4 10	S38-1			
10									6 3 3	S38-2			- grades to loose, some wood fragments.
15									6 4 4	S38-3			
20									6 6 8	S38-4			- grades to olive-gray to light gray, moist, medium dense.
25											SP		SAND (SP): light gray, wet, medium dense to dense, fine-grained, trace fines.
DATE DRILLED: 4-25-05		SURFACE ELEVATION (feet): 337.5		DRILLING METHOD: HSA									
LOGGED BY: D. Divine		TOTAL DEPTH (feet): 36.5		DRILLER: Holt Drilling									
REVIEWED BY: J. Schmidt		DIAMETER OF BORING (in): 8 inches		CASING SIZE: N/A									
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING				Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-38				Appendix A 39a PAGE 1 of 2					

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
25												
												(FILL)
											ML	SILT (ML): light gray, wet, hard.
											SM	(GLACIAL TILL)
												SILTY SAND WITH GRAVEL (SM):
												light gray, moist, very dense, fine- to
												medium-grained.
												(GLACIAL TILL)
30												
35												
36.5												

Boring was completed to a depth of 36.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

*** SAMPLER TYPE**
☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT**
 300 lbs (30" Drop) 140 lbs (30" Drop)

KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington

BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *
0											Surface: grass
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very loose, fine- to medium-grained. (FILL)
5								1 1 1	S39-1		
10								1 1 1	S39-2		- grades to moist to wet.
15								1 1 1	S39-3		- grades to dark brown, wet, fine-grained, some gravel, with bark and wood fragments.
20								1 3 1	S39-4		- grades to gray to brown, moist, fine- to medium-grained, trace organics.
25											

DATE DRILLED: 4-26-05	SURFACE ELEVATION (feet): 335.5	DRILLING METHOD: HSA
LOGGED BY: D. Divine	TOTAL DEPTH (feet): 41.0	DRILLER: Holt Drilling
REVIEWED BY: J. Schmidt	DIAMETER OF BORING (in): 8 inches	CASING SIZE: N/A

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-39	Appendix A 40a PAGE 1 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25												
								4	X	S39-5	SP	SAND (SP): light gray, moist, loose, fine-grained. (FILL)
								4	X			
								4	X			
											SM	SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
30								20	X	S39-6		
								29	X			
								47	X			
								50/6"	X	S39-7		
35								18	X	S39-8		
								29	X			
								32	X			
								31	X	S39-9		
								50/6"	X			
40								25	X	S39-10		
41								50/6"	X			

Boring was completed to a depth of 41 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3"OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
B-39

Appendix

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0											Surface: grass
											Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, with roots. (FILL)
5								3 6 7	S40-1		
10								2 2 2	S40-2		- grades to brown to gray-brown, loose, trace roots.
15								1 1 2	S40-3		- grades to wet, very loose, trace wood fragments.
								1 2 3	S40-4		- grades to gray, loose.
20								9 18 25	S40-5	SP-SM	SAND WITH SILT AND GRAVEL (SP-SM): gray, wet, dense, medium-grained. (GLACIAL TILL)
25								3 34 50/3"	S40-6	SM	SILTY SAND WITH GRAVEL (SM): gray, moist to wet, very dense, fine- to medium-grained. (GLACIAL TILL)

DATE DRILLED: 4-25-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 323.9
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25								13		S40-7		
25.9								50/5"				

Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
5							1 1 2		S41-1		- grades to very loose.
10							1 2 2		S41-2	OL SM	ORGANIC SILT (OL): dark brown, moist, soft, trace sand. (FILL) SILTY SAND WITH GRAVEL (SM): brown, wet, loose, fine- to medium-grained. (FILL)
15							12 30 32		S41-3	SP-SM	SAND WITH SILT AND GRAVEL (SP-SM): gray, moist, very dense, medium-grained. (GLACIAL TILL)
							3 17 50/5"		S41-4	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist to wet, very dense, fine- to medium-grained, lenses of gray-brown sand with silt. (GLACIAL TILL)
20							22 50/3"		S41-5		
25							2 27 50		S41-6		

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 318.5
 TOTAL DEPTH (feet): 26.3
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____


DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
25												
26.3							25 36	X	S41-7			
<p>Boring was completed to a depth of 26.3 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

50/4"

*** SAMPLER TYPE**

☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT** 300 lbs (30" Drop) 140 lbs (30" Drop)

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-41	Appendix A 42b PAGE 2 of 2
	PROJECT NUMBER: 54568	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0										Surface: grass
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray-brown, moist, medium dense, fine- to medium-grained. (FILL)
5		13.9						3 6 5	S42-1	
10								4 4 2	S42-2	- grades to dark brown, loose, with wood fragments.
15								11 18 30	S42-3	SM SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								3 20 33	S42-4	- grades to wet, very dense.
20								20 32	S42-5	
								50/4.5"		
25								7 50/5"	S42-6	- grades to dry to moist, with lenses of light brown silt.

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 317.9
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25								20		S42-7		
25.9								50/5"				

Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

Proposed Retail Development
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Fircrest, Washington

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PROJECT NUMBER: 54568

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	SAMPLE NUMBER	SOIL DESCRIPTION					
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	NAME	SYMBOL	Surface: grass
0													SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
5								4 4 14	S43-1					- grades to dark brown, moist, with organics.
10								4 3 5	S43-2					- grades to light brown to brown, moist to wet, loose, no visible organics.
15								11 35 41	S43-3				SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								10 31 46	S43-4					
20								10 34 44	S43-5					- grades to with lenses of wet sand.
								2 30 50/4.5"	S43-6					
25														

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 319.8
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								21				- grades to gray-brown with yellow-brown mottling, dry to moist. Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.
25.9								50/5"	X	S43-7		

Trial Version
www.nuance.com

* SAMPLER TYPE: ☒ Cal. (3"OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

**HAMMER WEIGHT: 300 lbs (30" Drop) 140 lbs (30" Drop)

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-43	Appendix A 44b PAGE 2 of 2
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PROJECT NUMBER: 54568

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY			FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE				OTHER TESTS	PID (ppm)
0										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained, trace roots. (FILL)
5							6	X	S44-1		
							4	X			
							3	X			
							10	X	S44-2		- grades to brown, wet.
							10	X		SM	SILTY SAND WITH GRAVEL (SM): gray-brown, wet, dense, fine-grained. (GLACIAL TILL)
10							17	X			
							5	X	S44-3		- grades to moist to wet.
							17	X			
							18	X			
							3	X	S44-4		
							13	X			
							25	X			
15							11	X	S44-5		- grades to with lenses of sand with silt.
							19	X			
16.5							22	X			

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 312.0
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained. (FILL)
5							2	X	S45-1		
							5	X			
							4	X			
							1	X	S45-2		
							0	X			
							2	X			- grades to dark brown, wet, very loose, with wood fragments.
10							6	X	S45-3	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, dense, fine- to medium-grained. (GLACIAL TILL)
							16	X			
							18	X			
							5	X	S45-4		- grades to wet, medium dense, with lenses of sand with silt.
							12	X			
							14	X			
15							10	X	S45-5		- grades to dense.
							17	X			
16.5							25	X			

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 311.7
TOTAL DEPTH (feet): 16.5
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	NAME	SYMBOL	
0											Surface: grass
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense to dense, fine- to medium-grained, cobbles encountered during drilling. (FILL)
5											
10											
15											
16.5											

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 311.6
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION					
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL
0													Surface: grass
5		11.6						2	X	S47-1		SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, occasional 2- to 4-inch quarry spall encountered during drilling. (FILL) - grades to moist to wet, loose, trace roots.
10								0	X	S47-2			- grades to brown with orange-brown mottling, wet, very loose, trace organics.
15								11	X	S47-3	SM	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, dense, fine- to medium-grained, with lenses of sand with silt. (GLACIAL TILL) - grades to gray.
16.5								13	X	S47-5			- grades to very dense.
<p>Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>													

DATE DRILLED: 4-27-05	SURFACE ELEVATION (feet): 311.0	DRILLING METHOD: HSA
LOGGED BY: F. Reinart	TOTAL DEPTH (feet): 16.5	DRILLER: Holt Drilling
REVIEWED BY: J. Schmidt	DIAMETER OF BORING (in): 8 inches	CASING SIZE: N/A

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-47	Appendix A -48 PAGE 1 of 1
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		BLOWS/6 in ** (uncorrected)	SAMPLER #	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)					
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray-brown, moist to wet, loose, fine- to medium-grained. (FILL)
5									1 3 1	S48-1			- grades to wet, very loose, trace organics.
									0 1 5	S48-2			- grades to gray, wet, loose, fine- to medium-grained, low plasticity.
10									6 11 12	S48-3			- grades to medium dense.
									3 17 26	S48-4	SM		SILTY SAND WITH GRAVEL (SM): gray, wet, dense, fine- to medium-grained, with seams of sand with silt. (GLACIAL TILL)
15									11 18	S48-5			
16.5									23				

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 310.3
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-48

Appendix

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

**WELL/PIEZO
CONSTRUCTION**

WATER LEVEL

MOISTURE
CONTENT(%)

PLASTIC LIMIT(%)

LIQUID LIMIT(%)

% PASSING
No. 200 SIEVE

OTHER TESTS

FID (ppm)	BLOWS/6 in **
1.0	1.0
2.0	2.0
3.0	3.0
4.0	4.0
5.0	5.0
6.0	6.0
7.0	7.0
8.0	8.0
9.0	9.0
10.0	10.0
11.0	11.0
12.0	12.0
13.0	13.0
14.0	14.0
15.0	15.0
16.0	16.0
17.0	17.0
18.0	18.0
19.0	19.0
20.0	20.0
21.0	21.0
22.0	22.0
23.0	23.0
24.0	24.0
25.0	25.0
26.0	26.0
27.0	27.0
28.0	28.0
29.0	29.0
30.0	30.0
31.0	31.0
32.0	32.0
33.0	33.0
34.0	34.0
35.0	35.0
36.0	36.0
37.0	37.0
38.0	38.0
39.0	39.0
40.0	40.0
41.0	41.0
42.0	42.0
43.0	43.0
44.0	44.0
45.0	45.0
46.0	46.0
47.0	47.0
48.0	48.0
49.0	49.0
50.0	50.0
51.0	51.0
52.0	52.0
53.0	53.0
54.0	54.0
55.0	55.0
56.0	56.0
57.0	57.0
58.0	58.0
59.0	59.0
60.0	60.0
61.0	61.0
62.0	62.0
63.0	63.0
64.0	64.0
65.0	65.0
66.0	66.0
67.0	67.0
68.0	68.0
69.0	69.0
70.0	70.0
71.0	71.0
72.0	72.0
73.0	73.0
74.0	74.0
75.0	75.0
76.0	76.0
77.0	77.0
78.0	78.0
79.0	79.0
80.0	80.0
81.0	81.0
82.0	82.0
83.0	83.0
84.0	84.0
85.0	85.0
86.0	86.0
87.0	87.0
88.0	88.0
89.0	89.0
90.0	90.0
91.0	91.0
92.0	92.0
93.0	93.0
94.0	94.0
95.0	95.0
96.0	96.0
97.0	97.0
98.0	98.0
99.0	99.0
100.0	100.0

(uncorrected)
SAMPLER *

**SAMPLE
NUMBER**

NAME _____

SYMBOL

SOIL DESCRIPTION

Surface: grass

SM

Topsoil.
SILTY SAND WITH GRAVEL (SM):
brown, wet, very loose, fine- to
medium-grained, with wood fragments and
roots.

(FILL)

SM

SILTY SAND WITH GRAVEL (SM):
gray to gray-brown, dry to moist, very
dense, fine- to medium-grained.
(GLACIAL TILL)

- grades to moist to wet.

- grades to dry to moist.

Boring was completed to a depth of 16.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 309.9
TOTAL DEPTH (feet): 16.4
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0											Surface: grass
5		15.4						1 2 10 4 15 24 12 23 32 13 40 50/5"	S50-1 S50-2 S50-3 S50-4 S50-5	SM SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, wet, loose, fine- to medium-grained. (FILL) - grades to brown, medium dense, trace organics. SILTY SAND WITH GRAVEL (SM): gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL) - grades to gray to gray-brown, moist, very dense. - grades to dry to moist.
10								8 24 36			
16.5											

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 309.5
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL
0											Surface: grass
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, wet, loose, fine- to medium-grained. (FILL) - grades to brown.
5											
										SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL) - grades to gray to gray-brown, moist to wet, dense, with lenses of sand with silt.
10											
14											

Boring was completed to a depth of 14 feet below ground surface. Groundwater seepage was encountered at a depth of 10 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 308.3
 TOTAL DEPTH (feet): 14.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											Topsoil.
								1	S52-1	SM	SILTY SAND WITH GRAVEL (SM): brown, wet, very loose, fine- to medium-grained, trace roots. (FILL)
								1			
								13			- grades to yellow brown, moist to wet, medium dense, some gravel.
5								5	S52-2	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								12			
								19			
								4	S52-3		- grades to wet, with lenses of sand with silt.
								10			
								21			
10								2	S52-4		- grades to moist to wet, very dense.
								22			
11.5								50/5.5"			

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater seepage was encountered at a depth of 7.5 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 308.0
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, wet, loose, fine- to medium-grained. (FILL)
5								1 4 2	S53-1	
								4 11 14	S53-2	- grades to gray-brown, medium dense, with lenses of sand with silt.
10								3 19 30	S53-3	10 SILTY SAND WITH GRAVEL (SM): gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
11.5								11 36	S53-4	- grades to very dense.

50/5.5"

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 307.3
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *
0											Surface: grass
											Topsoil.
											SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to medium-grained. (FILL)
5		8.6						7 4 3	S54-1		- grades to brown, loose, trace roots.
10								6 4 2	S54-2		
15								3 4 6	S54-3		- grades to gray-brown to gray, moist to wet, medium dense.
								0 1 1	S54-4		- grades to brown, wet, very loose.
20								10 14 18	S54-5	SM	SILTY SAND WITH GRAVEL (SM): gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)
								2 14 38	S54-6		- grades to wet, very dense, seams of sand with silt.
25											

DATE DRILLED: 4-28-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 324.6
 TOTAL DEPTH (feet): 26.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		
25									
26.5									

16
43
50

S54-7

- grades to gray to gray-brown with
yellow-brown mottling, moist.

Boring was completed to a depth of 26.5
feet below ground surface. Groundwater
was not encountered during drilling.
Boring was backfilled with a mixture of
cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
									SM		Topsoil. SILTY SAND WITH GRAVEL (SM): gray, moist, loose, fine- to medium-grained. (FILL)
								3 3 1	S55-1		- grades to very loose.
5											
								1 1 1	S55-2		
10											
								2 2 5	S55-3		- grades to loose.
15											
								1 1 5	S55-4		- grades to brown to gray, wet, with wood fragments.
20											
								1 5 7	S55-5		- grades to dark brown. - grades to gray.
25											
								6 7 5	S55-6		- grades to gray with gray-brown mottling, moist, medium dense.
DATE DRILLED: 5-2-05 LOGGED BY: F. Reinart REVIEWED BY: J. Schmidt SURFACE ELEVATION (feet): 331.2 TOTAL DEPTH (feet): 29.0 DIAMETER OF BORING (in): 8 inches DRILLING METHOD: HSA DRILLER: Holt Drilling CASING SIZE: N/A											
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568								Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-55			Appendix A 56a PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)
25									1
									3
									2
									15
									19
29									19

S55-7

S55-8

SM

- grades to brown to gray, wet, loose, fine-grained.

SILTY SAND WITH GRAVEL (SM):
gray, moist, dense, fine-grained.
(GLACIAL TILL)

Boring was completed to a depth of 29 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE
☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, dry, medium dense, fine- to medium-grained, trace roots. (FILL)
5								2 2 2	S56-1			- grades to loose.
10								1 1 2	S56-2			- grades to brown, wet, very loose, trace roots.
15								1 0 2	S56-3			- grades to with wood fragments. - grades to gray, wet, loose.
								2 2 2	S56-4			- grades to gray to gray-brown with black mottling, no odor (0.0 using PID).
								2 6 5	S56-5			- grades to medium dense, no black mottling.
20								7 11 5	S56-6			
25												
DATE DRILLED: 4-28-05			SURFACE ELEVATION (feet): 332.6			DRILLING METHOD: HSA						
LOGGED BY: F. Reinart			TOTAL DEPTH (feet): 35.7			DRILLER: Holt Drilling						
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A						
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING									Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-56			Appendix A 57a PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		
25									
30									
35									
35.7									

2
2
3

5
9
18

44
50/2"

S56-7

S56-8

S56-9

SM

- grades to brown, wet, loose, fine-grained, with roots.

- grades to gray, medium dense, fine- to medium-grained.

SILTY SAND WITH GRAVEL (SM):
gray, wet, dense, fine- to medium-grained.
(GLACIAL TILL)

- grades to dry to moist, very dense.

Boring was completed to a depth of 35.7 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

APPENDIX B

GEOTECHNICAL LABORATORY TESTING

B.1 GENERAL

We conducted laboratory tests on several representative soil samples to better identify the soil classification of the units encountered and to evaluate the material's general physical properties and engineering characteristics. A brief description of the tests performed for this study is provided below. The results of laboratory tests performed on specific samples are provided at the appropriate sample depths on the individual boring logs. However, it is important to note that these test results may not accurately represent in situ soil conditions. All of our recommendations are based on our interpretation of these test results and their use in guiding our engineering judgment. Kleinfelder cannot be responsible for the interpretation of these data by others.

In accordance with your requirements, the soil samples for this project will be retained a period of 6 months following completion of this report, or until the foundation installation is complete, unless we are otherwise directed in writing.

B.2 SOIL CLASSIFICATION

Soil samples were visually examined in the field by our representative at the time they were obtained. They were subsequently packaged and returned to our laboratory where they were reexamined and the original description checked and verified or modified. With the help of information obtained from the other classification tests, described below, the samples were described in general accordance with the Unified Classification System, ASTM Standard D2487. The resulting descriptions are provided at the appropriate locations on the individual boring logs, located in Appendix A, and are qualitative only.

B.3 MOISTURE CONTENT

Moisture content tests were performed on 15 samples obtained from the borings. The purpose of these tests is to approximately ascertain the in-place moisture content of the soil sample at the time it was collected. The moisture content is determined in general accordance with ASTM Standard D2216. The information obtained assists us by providing qualitative information regarding soil compressibility. The results of these tests are presented at the appropriate sample depths on the boring logs.

B.4 GRAIN-SIZE DISTRIBUTION

Detailed grain-size distribution analyses were conducted in general accordance with ASTM Standard D422 on 5 representative soil samples to determine the grain-size distribution of the on-site soil. The information gained from this analysis allows us to provide a detailed description and classification of the in-place materials. In turn, this information helps us to understand how the in-place materials will react to conditions such as heavy seepage, traffic action, loading, potential liquefaction, and so forth. The results of these tests are presented in this Appendix.

B.5 MODIFIED PROCTOR

We performed one compaction test on a composite bulk sample obtained from borings performed in the proposed parking lot. The test was performed in accordance with ASTM Standard D1557 (Modified Proctor). The test was performed to obtain a compaction value for the on-site soils for use in performing a California Bearing Ratio test. The results of this test is presented in this Appendix.

B.6 CALIFORNIA BEARING RATIO

We performed one CBR test on a composite bulk sample obtained from borings performed in the proposed parking lot. The test was performed in general accordance with ASTM Standard D1883. A CBR value of 19 was obtained from this test.

B.7 DIRECT SHEAR

We performed a direct shear test on one relatively undisturbed samples to determine the shear strength of the in-place native soil. The test was performed in general accordance with ASTM Standard D3080 on a sample at the field moisture conditions. A normal load, appropriate to the anticipated foundation conditions, was applied to the test sample and the sample was then sheared under a constant strain control. The results of this test is presented in this Appendix.

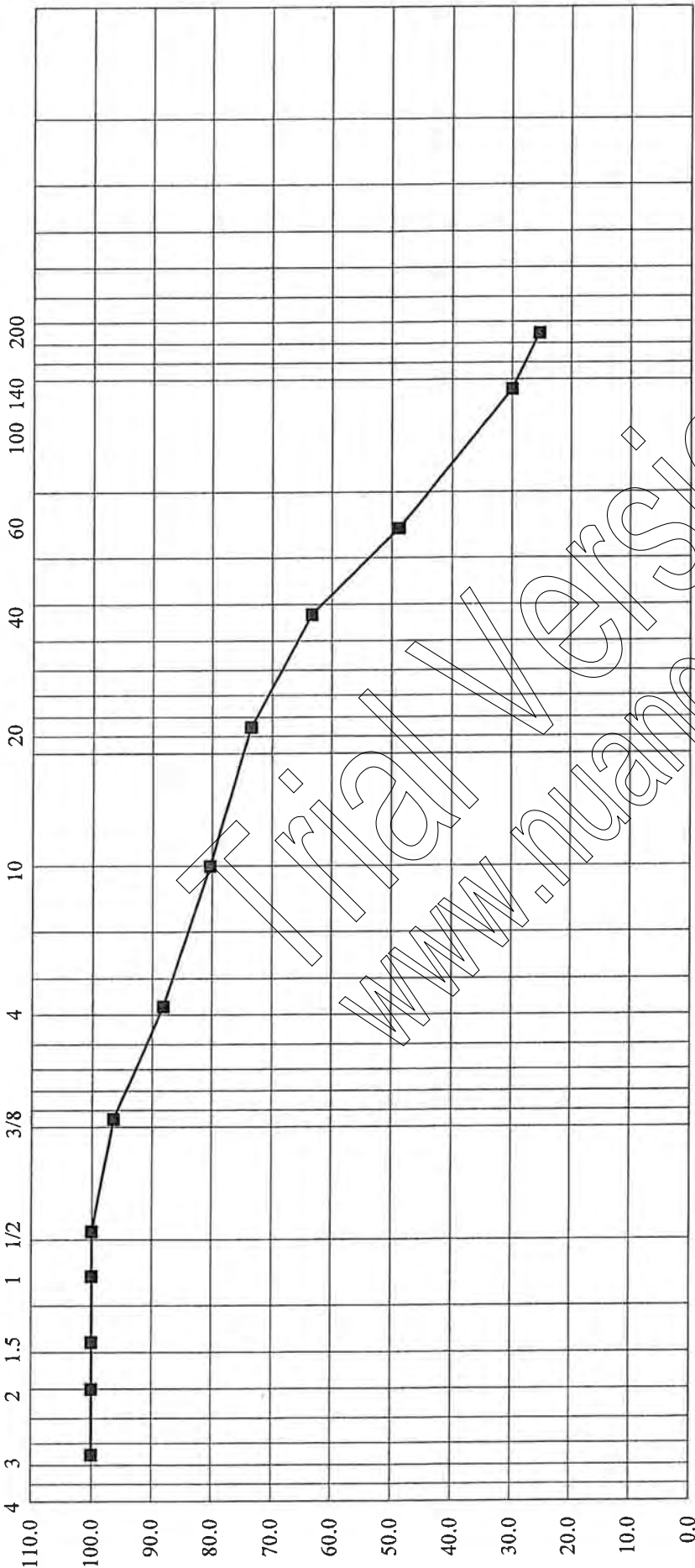
US SIEVE OPENINGS IN INCHES

US SIEVE NUMBERS

|

HYDROMETER

|



100.00

10.00

1.00

0.10

0.01

Grain Size in Millimeters

GRAVEL		SAND		FINES (SILTS OR CLAYS)
coarse	fine	coarse	medium	

Sa. No. S9-1

Boring B-9 / 5'

Desc. SM

Silty Sand



2405 140th Ave. NE
Suite A 101
Bellevue, WA 98005
(452) 562-4200

Sieve Analysis

Proposed Retail Development

L05S

Project Number

54568 / 3

Technician

F. Bengco

Approved

G. Hayre

Date

5/31/2005

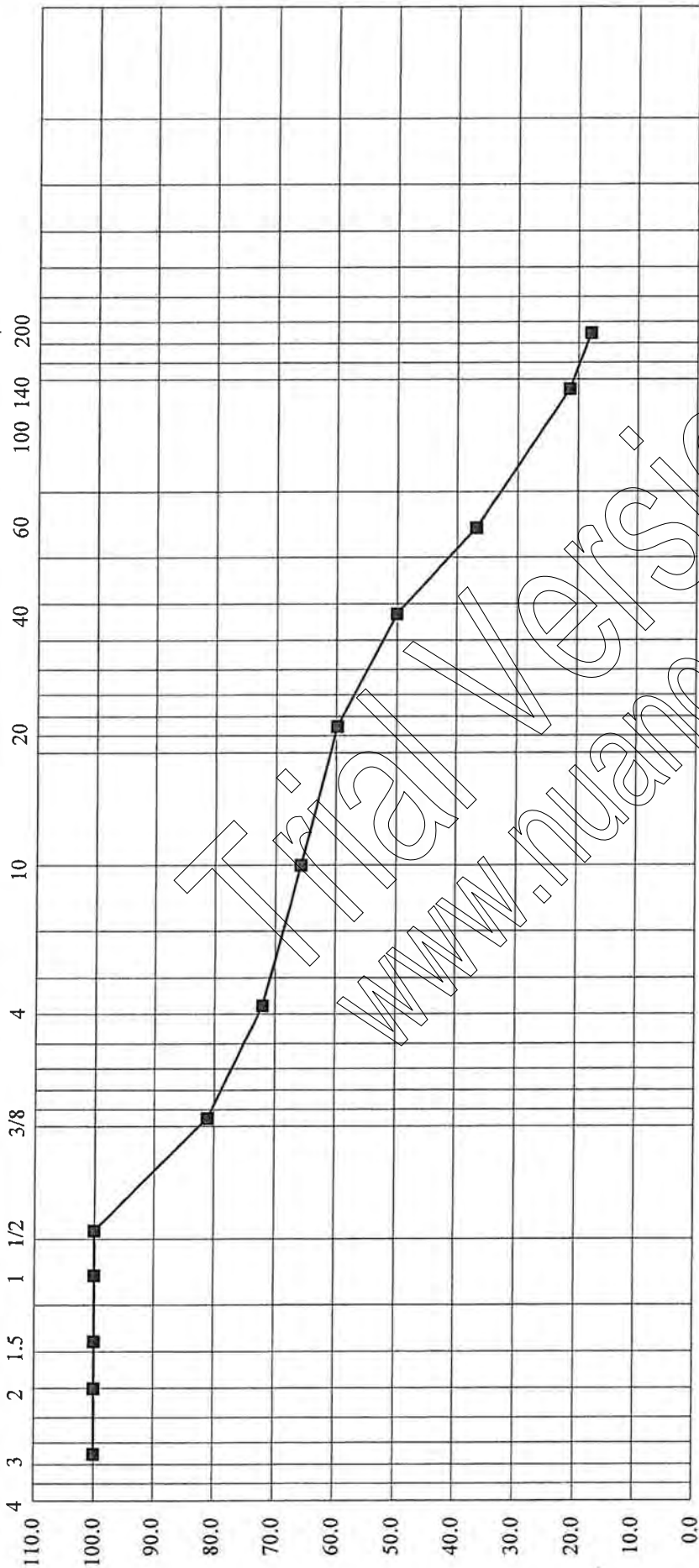
Revised

M. Monserud

Date

6/7/2005

US SIEVE OPENINGS IN INCHES | US SIEVE NUMBERS | HYDROMETER



0.01

0.10


1.00

10.00

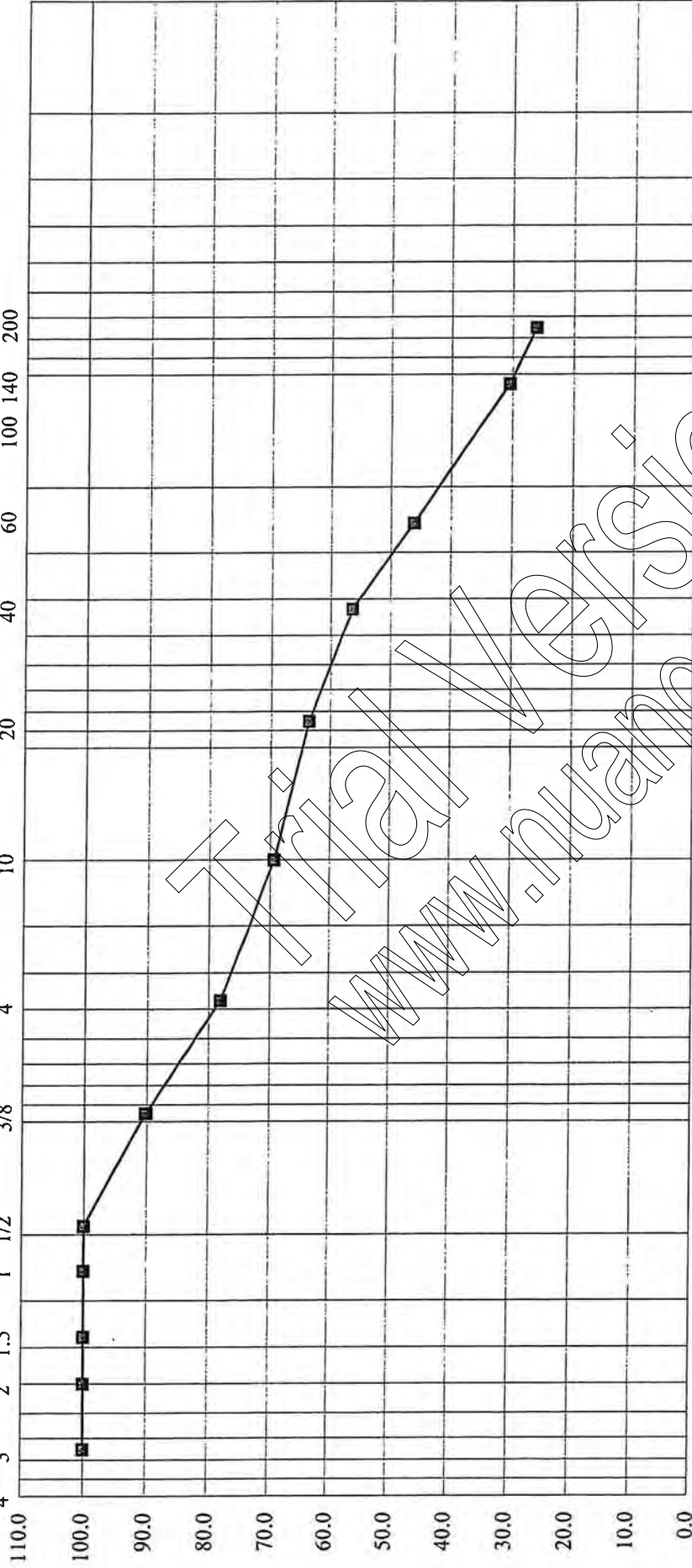
100.00

Grain Size in Millimeters

GRAVEL		SAND		FINES (SILTS OR CLAYS)
coarse	fine	coarse	medium	


Sa. No. S12-1 Boring B-12 / 2.5' Desc. SM Silty Sand with Gravel		 2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200		Sieve Analysis Proposed Retail Development L06S	
Project Number 54568 / 3		Technician F. Bengco		Approved G. Hayre	
Date 5/31/2005		Revised M. Monserud		Date 6/7/2005	

US SIEVE OPENINGS IN INCHES | US SIEVE NUMBERS | HYDROMETER



100.00 10.00 1.00 0.10 0.01

GRAVEL		SAND		FINES (SILTS OR CLAYS)
coarse	fine	coarse	medium	

Sa. No.	NAT-1	 2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200		Sieve Analysis Architects BCRA		L03S	
Test Pit	Native 2.5'			Proposed Retail Development			
Desc.	SM			Technician	Approved	Revised	Date
Silty Sand with Gravel		Project Number	54568	F. Bengco	G. Hayre	M. Monserud	6/8/2005

SAMPLE DATA

Sampled Location:	NAT-1
Sample No.:	Native 2.5'
Depth:	2.5'
Soil Description	Silty Sand with Gravel
USCS	SM
Specific Gravity	N/A

TEST DATA

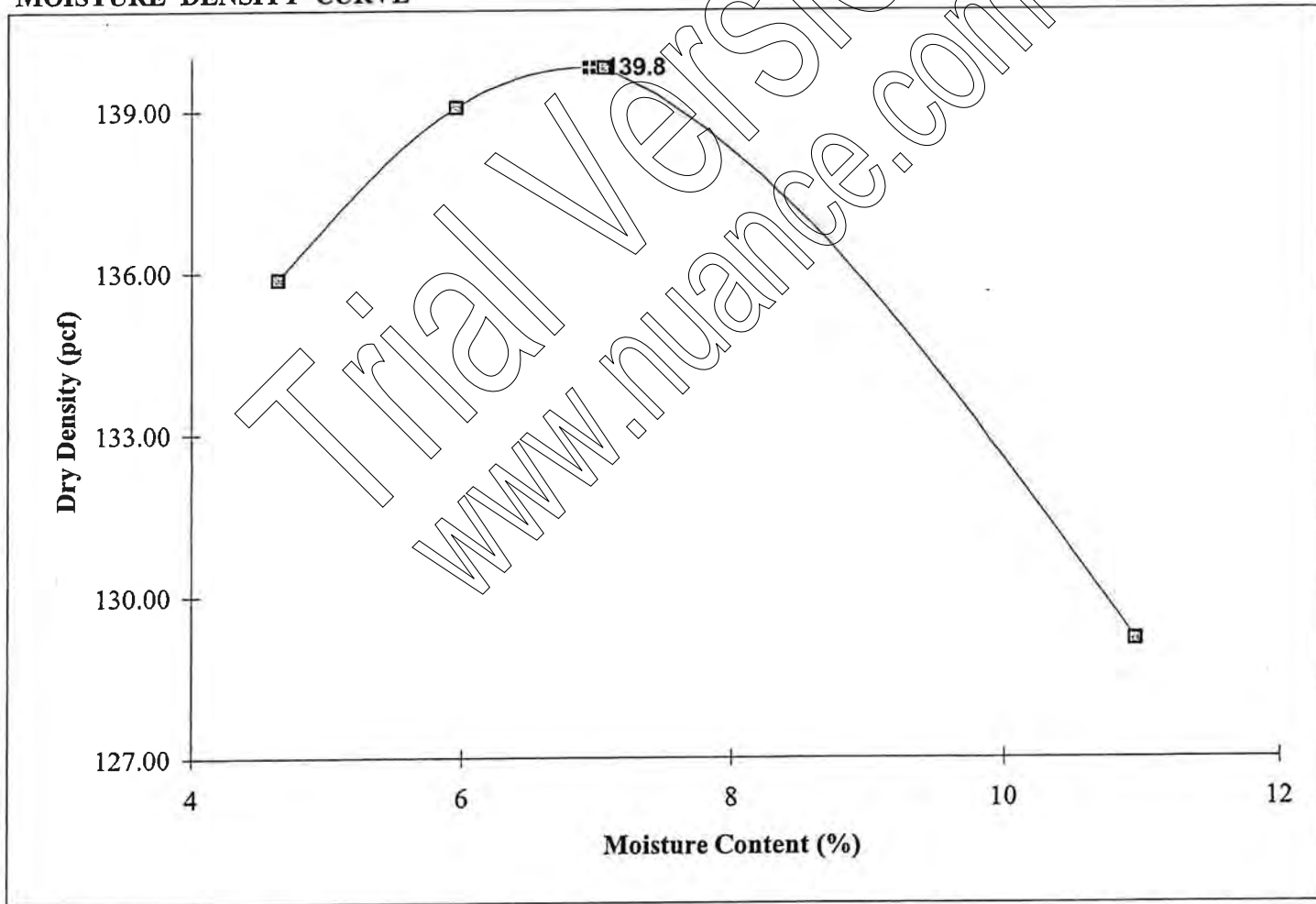
Trial	Moisture Content (%)	Dry Density (pcf)	Wet Density (pcf)	Comp. Strength (psi)
1	4.6	135.9	142.2	0
2	6.0	139.1	147.3	0
3	7.0	139.8	149.6	0
4	11.0	129.2	143.3	0
Optium	6.9	139.8		NT

PROCEDURE

Standard	ASTM D - 1557		
Method Used	A	B	C
Preparation Procedure	Wet		Dry
Automatic Hammer			

RESULTS

Max. Dry Density:	139.8 pcf
Optimum Moisture:	6.9 %
Comp. Str. @ Max. Dens.:	NT psi
95 % of Max. Density:	132.8 pcf

MOISTURE DENSITY CURVE

2405 140th Ave. NE
Suite A 101
Bellevue, WA 98005
(425) 562-4200

Moisture-Density: Untreated Soil

Architects BCRA
Proposed Retail Development

L01MD

Project Number
54568

Technician
F. Bengco

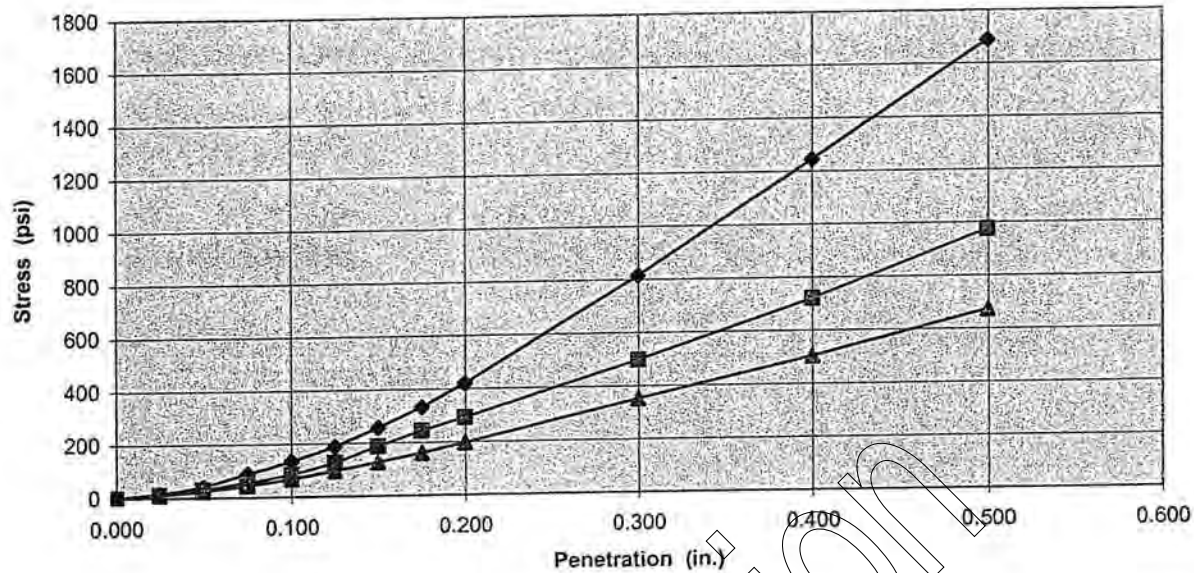
Approved
G. Hayre

Date
05/25/05

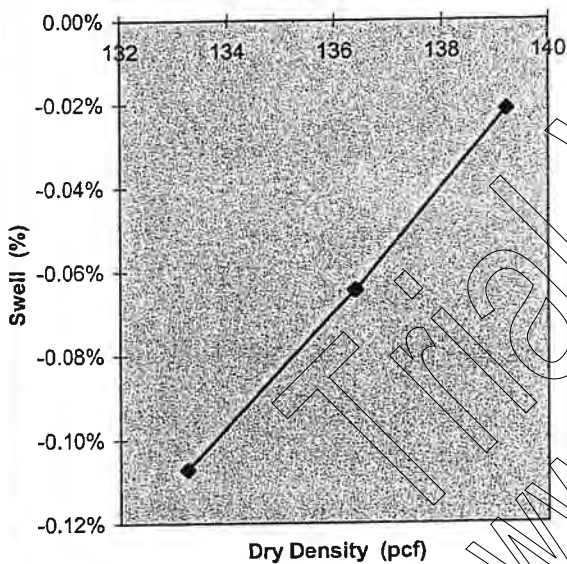
Revised
M. Monserud

Date
6/8/2005

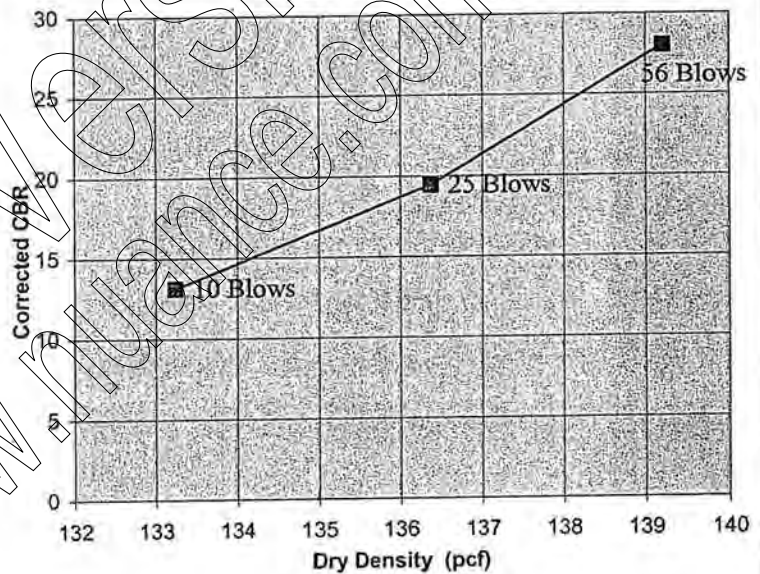
Corrected Load Penetration Curves



Swell



Dry Density vs Corr. CBR



CBR	19
100% DD	136.4 pcf

TEST PIT	SAMPLE DEPTH	USCS	SOIL DESCRIPTION
Native 2.5'		SM	Silty Sand with Gravel

ASTM D 1883 (Nat. WC)

Kleinfelder, Inc.

2405 140th Ave. NE, Ste. A-101
Bellevue, WA 98005
(425) 562-4200

California Bearing Ratio: Untreated

Architects BCRA

Proposed Retail Development

L01CBR

Project Number
54568

Technician
F. Bengco

Approved
C. Mlodzik

Date
06/03/05

Revised
C. Mlodzik

Date
6/3/2005



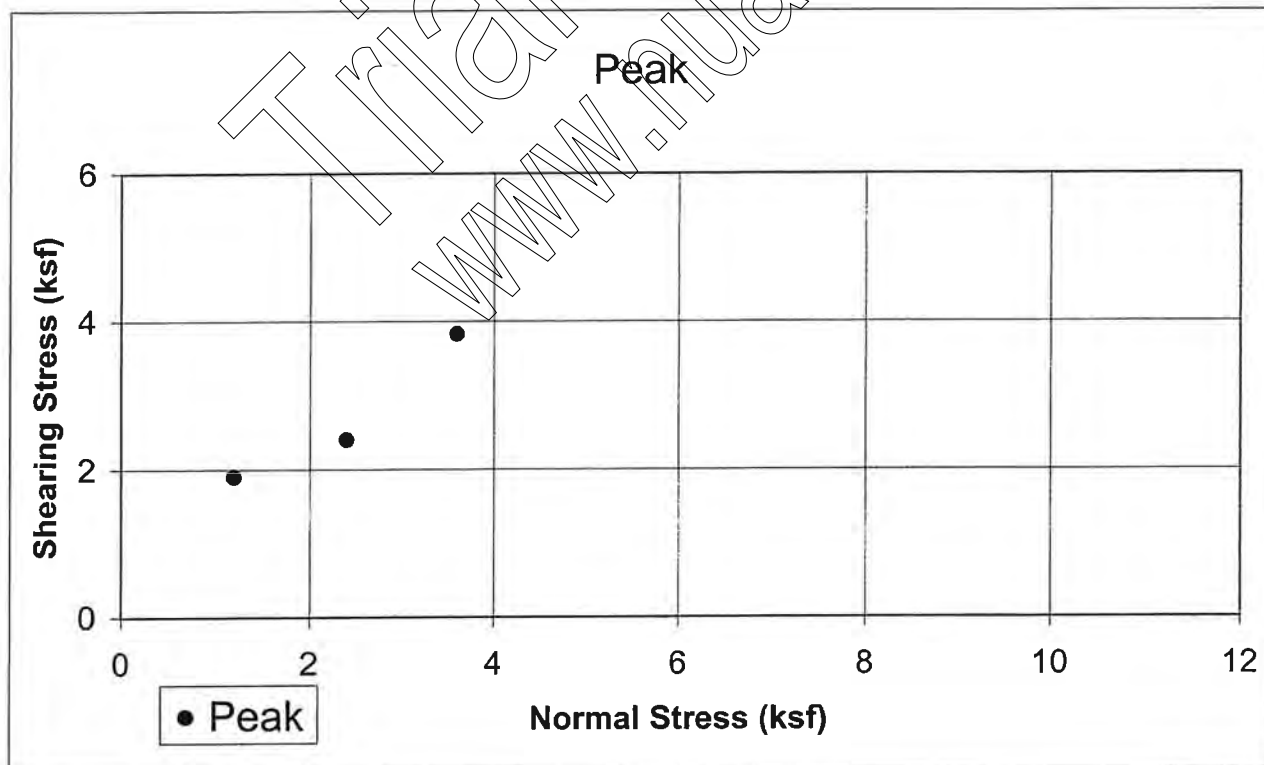
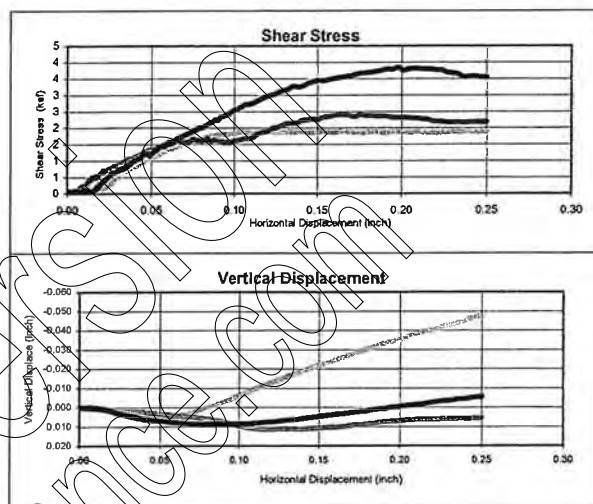
KLEINFELDER

PROJECT: Fircrest Retail Development BCRA
LOCATION: Tacoma, WA
MATERIAL: SM
SAMPLE SOURCE: B-11-7.5'
SAMPLE PREP.: Remolded

JOB NO: 54568
W.O. NUMBER:
LAB NO: L01DS
DATE SAMPLED:

DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS (ASTM D3080)

Initial thickness of specimen (in.): 1.00
Initial diameter of specimen (in.): 2.50
Rate of deformation (in/min): 0.016
Direct shear point: 1 2 3
Dry mass of specimen (g): 11.9 8.3 12.9
Initial Moisture Content: 5.4% 4.8% 6.3%
Initial Wet Density (lb per cu.ft): Recompacted Material
Initial Dry Density (lb per cu.ft): Recompacted Material
Final Moisture Content: 5.4% 4.8% 6.3%
Final Wet Density (lb per cu.ft): Recompacted Material
Final Dry Density (lb per cu.ft): Recompacted Material
Normal Stress (kips per sq. ft): 1.20 2.40 3.60
Max Shearing Stress (kips / sq. ft): 1.90 2.40 3.83
Vert Deformation @ Max Shear (in): -0.045 0.010 0.000
Horiz Deformation @ Max Shear (in): 0.240 0.166 0.198
Shearing device used:
Created by DigiShear Version 3.1.3; Copyright 2004, GEOTAC



NOTE: Soil that was used for point 1 was reused for points 2 and 3 also soil that was used for points 1 and 2 was reused for point 3.

APPENDIX B

EXISTING SUBSURFACE EXPLORATIONS

(Terracon, 2008)

Page 1 of 1

WinCo Foods, Inc.

PROJECT

WinCo Firecrest

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

*CME 140H SPT hammer

Terracon

LOG OF BORING NO. B-2

Page 1 of 1

CLIENT		PROJECT							
WinCo Foods, Inc.		WinCo Fircrest							
SITE		PROJECT							
2119 Mildred Street West Fircrest, Washington		WinCo Fircrest							
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
0.2	Approximately 2 Inches of Asphalt								
1	GRAVEL, WITH SAND Gray, Medium Dense, Dry (Fill)								
	SILTY SAND, WITH GRAVEL Orangish Brown, Loose, Moist (Fill)			S1	SS	6	9		
5	SILTY SAND, WITH GRAVEL Gray, Dense, Moist (Glacial Till)	5		S2	SS	3	40		
7.5	SAND, WITH GRAVEL Brown, Very Dense, Moist			S3	SS	12	51		
8.5	GRAVELLY SILTY SAND Gray, Very Dense, Moist to Wet (Glacial Till)								
9	SAND, WITH GRAVEL Brown, Very Dense, Moist			S4	SS	6	50/5		
	GRAVELLY SILTY SAND Gray, Very Dense, Moist (Glacial Till)								
15	SILTY SAND, WITH GRAVEL Light Gray, Very Dense, Dry, Cobbles (Glacial Till)	15		S5	SS	3	50/3		
	Gray, Moist	20		S6	SS	15	67		
21.5	Bottom of Boring								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED		5-19-08	
BORING COMPLETED		5-19-08	
RIG	Track Rig	DRILLER	Boretac
LOGGED	AJD	JOB #	B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-3

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.2 Approximately 2 Inches of Asphalt

0.5 GRAVEL, WITH SAND

Gray, Medium Dense, Dry (Fill)

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

5

GRAVELLY SAND, WITH SILT

Gray, Very Dense, Moist, Cobbles (Glacial Till)

10

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

15

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

20

20.5 SILTY SAND, WITH GRAVEL

Gray, Very Dense, Moist (Glacial Till)

Bottom of Boring

5

S1

SS

12

71

10

S2

SS

3

50/3

S3

SS

NR

50/4

S4

SS

18

96/11

15

S5

SS

9

50/6

20

S6

SS

6

50/5

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Borettec

LOGGED

AJD

JOB #

B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-4

Page 1 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.3 Approximately 3 Inches of Topsoil
SILTY SAND, TRACE GRAVEL
Brownish Gray, Medium Dense, Moist (Fill)

S1 SS 12 16

5 GRAVELLY SAND, WITH SILT
Dark Gray, Medium Dense, Moist (Fill)

S2 SS 3 16

7.5 SILT, WITH SAND
Black, Loose, Moist, Organics (Fill)

S3 SS 9 4

10 SILTY SAND, WITH GRAVEL
Gray, Loose, Wet (Fill)

S4 SS 6 4

15 SILTY SAND, TRACE CLAY AND GRAVEL
Dark Brown, Medium Dense, Moist (Fill)

S5 SS 3 17

20 SILTY SAND, TRACE GRAVEL
Dark Brown, Medium Dense, Moist, Trace
Organics (Probable Fill)

S6 SS 9 16

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL ∇ ∇

WL ∇ ∇

WL ∇ ∇

Terracon

BORING STARTED 5-19-08

BORING COMPLETED 5-19-08

RIG Track Rig DRILLER Boretac

LOGGED AJD JOB # B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-4

Page 2 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

30

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

SILTY SAND WITH GRAVEL

Gray, Very Dense, Moist (Glacial Till)

35.5

Bottom of Boring

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED 5-19-08

BORING COMPLETED 5-19-08


RIG Track Rig DRILLER Boretac

LOGGED AJD JOB # B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-5

Page 1 of 2

CLIENT		WinCo Foods, Inc.								
SITE		2119 Mildred Street West Fircrest, Washington								
PROJECT		WinCo Fircrest								
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	0.3 <u>Approximately 3 Inches of Topsoil</u> <u>SILTY SAND, WITH GRAVEL</u> Gray, Medium Dense, Moist (Fill)									
			S1	SS	6	10				
	Grayish Brown, Wet	5		S2	SS	3	11			
	7.5 <u>SANDY SILT, WITH GRAVEL</u> Dark Brown, Medium Dense, Wet to Saturated, Organics (Fill)			S3	SS	12	11			
	10 <u>SILTY SAND, TRACE GRAVEL</u> Dark Brown, Loose, Wet, Organics (Fill)	10		S4	SS	12	7			
	15 <u>SAND, WITH SILT, TRACE GRAVEL</u> Gray, Loose, Wet to Saturated, Asphalt (Fill)	15		S5	SS	9	7			
20 <u>SILTY SAND, TRACE GRAVEL</u> Dark Brown, Loose, Wet, Organics (Fill)	20		S6	SS	12	8				
25		25								
Continued Next Page										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED	5-19-08
BORING COMPLETED	5-19-08
RIG Track Rig	DRILLER Borettec
LOGGED AJD	JOB # B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-5

Page 2 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

30

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

35

SILTY SAND, TRACE GRAVEL

Gray, Very Dense, Moist (Glacial Till)

Brownish Gray, Wet

41.5

Bottom of Boring

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretac

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON GDT 5/27/08

LOG OF BORING NO. B-6

Page 1 of 1

CLIENT		WinCo Foods, Inc.							
SITE		2119 Mildred Street West Fircrest, Washington		PROJECT					
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	0.3 <u>Approximately 3 Inches of Topsoil</u>								
	<u>SILTY SAND, WITH GRAVEL</u>								
	Brown, Medium Dense, Moist (Fill)								
				S1	SS	6	12		
		5		S2	SS	6	8		
	Asphalt Debris			S3	SS	6	6		
		10		S4	SS	6	6		
	15 <u>SILTY SAND, TRACE GRAVEL</u>	15		S5	SS	3	4		
	Brown, Loose, Moist, Organics (Fill)								
	16.5 Bottom of Boring								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▼	▼
WL	▼	▼
WL		

Terracon

BORING STARTED		5-19-08	
BORING COMPLETED		5-19-08	
RIG	Track Rig	DRILLER	Boretac
LOGGED	AJD	JOB #	B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-7

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.5

Approximately 6 Inches of Topsoil
SILTY SAND
Brown, Loose, Moist, Organics (Fill)

5

SILTY SAND, TRACE GRAVEL
Dark Brown, Loose to Medium Dense,
Moist (Fill)

10

SAND, WITH SILT
Gray, Loose, Moist (Fill)

16.5

Trace Gravel
Bottom of Boring

5

10

15

S1

SS

3

5

S2

SS

3

16

S3

SS

3

5

S4

SS

3

7

S5

SS

3

9

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretac

LOGGED

AJD

JOB #

B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-8

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.5

Approximately 6 Inches of Topsoil
SAND, WITH SILT AND GRAVEL
Brown, Moist, Medium Dense

5

SILTY SAND, TRACE GRAVEL
Gray, Dense, Moist (Possible Glacial Till)

7.5

GRAVELLY SILTY SAND
Gray, Very Dense, Moist (Glacial Till)

15.5

Bottom of Boring

5

10

15

S1

SS

6

11

S2

SS

9

36

S3

SS

9

50/4

S4

SS

6

50/6

S5

SS

3

50/5

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretec

LOGGED

AJD

JOB #

B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-9

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

0.6

GRAVEL, WITH SAND

Gray, Medium Dense, Dry (Fill)

SAND, WITH SILT AND GRAVEL

Brown, Dense, Moist

5

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

Approximately 3 Inch Lense of Sand

5

S1

SS

3

40

S2

SS

9

78

S3

SS

12

66

S4

SS

15

73

S5

SS

18

44

16.5

Bottom of Boring

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretec

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	N/E:	Not Encountered
WCI:	Wet Cave in	WD:	While Drilling		
DCI:	Dry Cave in	BCR:	Before Casing Removal		
AB:	After Boring	ACR:	After Casing Removal		

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

<u>Unconfined Compressive Strength, Qu, psf</u>	<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Consistency</u>
< 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	4 - 8	Medium Stiff
2,000 - 4,000	8 - 15	Stiff
4,000 - 8,000	15 - 30	Very Stiff
8,000+	> 30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Relative Density</u>
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
> 50	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifiers	> 12

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	> 30

Terracon

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel ^F	
		Gravels with Fines More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand ^I	
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand ^I	
		Sands with Fines More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}	
			Fines Classify as CL or CH	SC	Clayey sand ^{G,H,I}	
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}	
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K,L,M}	
		organic	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K,L,M,N}
			Liquid limit - not dried			Organic silt ^{K,L,M,O}
	Silt and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{K,L,M}	
			PI plots below "A" line	MH	Elastic Silt ^{K,L,M}	
		organic	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K,L,M,P}
			Liquid limit - not dried			Organic silt ^{K,L,M,O}
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat	

^ABased on the material passing the 3-in. (75-mm) sieve

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^DSands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^KIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

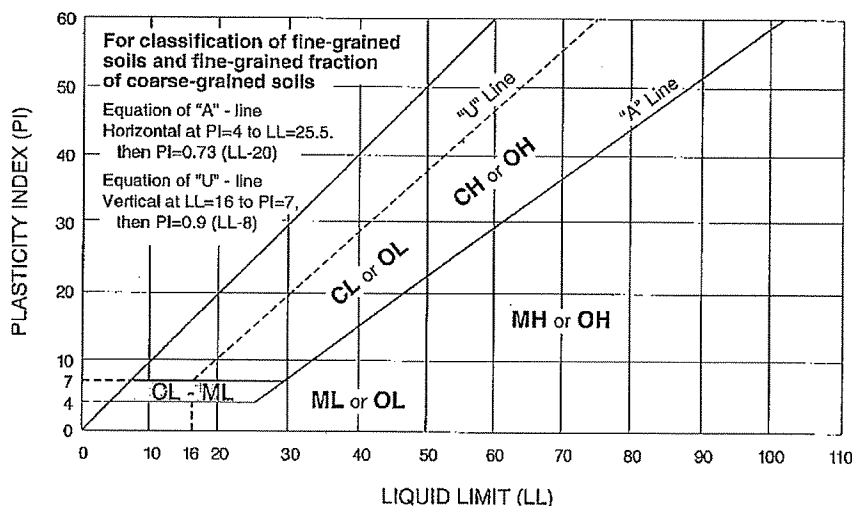
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



Terracon

APPENDIX B Flow Control & Water Quality Results

WWHM2012
PROJECT REPORT

General Model Information

Project Name: 20221115_Permit
Site Name:
Site Address:
City:
Report Date: 11/15/2022
Gage:
Data Start: 10/01/1901
Data End: 09/30/2059
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Forest, Mod 9.18

Pervious Total 9.18

Impervious Land Use acre

Impervious Total 0

Basin Total 9.18

Element Flows To:
Surface Interflow Groundwater

Mitigated Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
A B, Lawn, Mod 1.35

Pervious Total 1.35

Impervious Land Use acre
ROADS MOD 7.37

Impervious Total 7.37

Basin Total 8.72

Element Flows To:		
Surface	Interflow	Groundwater
Vault 1	Vault 1	

Basin 2

Bypass: Yes

GroundWater: No

Pervious Land Use acre
A B, Lawn, Mod 0.07

Pervious Total 0.07

Impervious Land Use acre
ROADS MOD 0.39

Impervious Total 0.39

Basin Total 0.46

Element Flows To:		
Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

Width: 64 ft.
Length: 235 ft.
Depth: 17 ft.
Discharge Structure
Riser Height: 16.5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.020 ft.
Notch Height: 4.400 ft.
Orifice 1 Diameter: 1.025 in. Elevation: 0 ft.
Element Flows To:
Outlet 1 Outlet 2

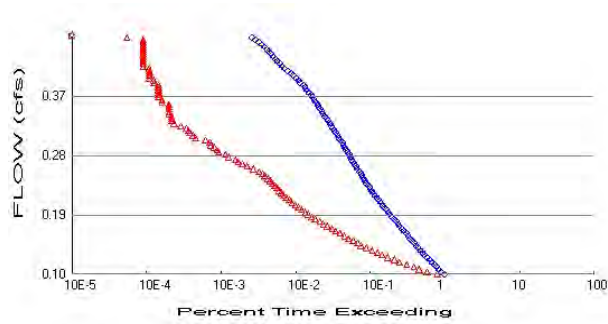
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.345	0.000	0.000	0.000
0.1889	0.345	0.065	0.012	0.000
0.3778	0.345	0.130	0.017	0.000
0.5667	0.345	0.195	0.021	0.000
0.7556	0.345	0.260	0.024	0.000
0.9444	0.345	0.326	0.027	0.000
1.1333	0.345	0.391	0.030	0.000
1.3222	0.345	0.456	0.032	0.000
1.5111	0.345	0.521	0.035	0.000
1.7000	0.345	0.587	0.037	0.000
1.8889	0.345	0.652	0.039	0.000
2.0778	0.345	0.717	0.041	0.000
2.2667	0.345	0.782	0.042	0.000
2.4556	0.345	0.847	0.044	0.000
2.6444	0.345	0.913	0.046	0.000
2.8333	0.345	0.978	0.048	0.000
3.0222	0.345	1.043	0.049	0.000
3.2111	0.345	1.108	0.051	0.000
3.4000	0.345	1.173	0.052	0.000
3.5889	0.345	1.239	0.054	0.000
3.7778	0.345	1.304	0.055	0.000
3.9667	0.345	1.369	0.056	0.000
4.1556	0.345	1.434	0.058	0.000
4.3444	0.345	1.500	0.059	0.000
4.5333	0.345	1.565	0.060	0.000
4.7222	0.345	1.630	0.062	0.000
4.9111	0.345	1.695	0.063	0.000
5.1000	0.345	1.760	0.064	0.000
5.2889	0.345	1.826	0.065	0.000
5.4778	0.345	1.891	0.066	0.000
5.6667	0.345	1.956	0.067	0.000
5.8556	0.345	2.021	0.069	0.000
6.0444	0.345	2.087	0.070	0.000
6.2333	0.345	2.152	0.071	0.000
6.4222	0.345	2.217	0.072	0.000
6.6111	0.345	2.282	0.073	0.000
6.8000	0.345	2.347	0.074	0.000

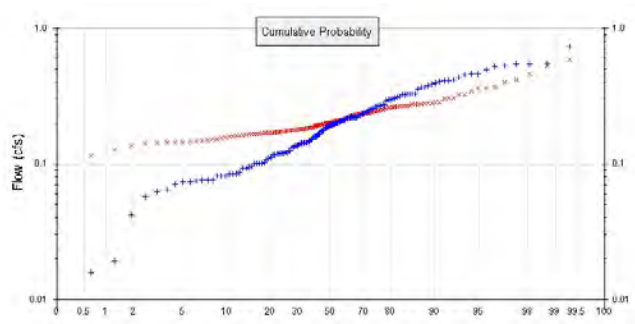
6.9889	0.345	2.413	0.075	0.000
7.1778	0.345	2.478	0.076	0.000
7.3667	0.345	2.543	0.077	0.000
7.5556	0.345	2.608	0.078	0.000
7.7444	0.345	2.673	0.079	0.000
7.9333	0.345	2.739	0.080	0.000
8.1222	0.345	2.804	0.081	0.000
8.3111	0.345	2.869	0.082	0.000
8.5000	0.345	2.934	0.083	0.000
8.6889	0.345	3.000	0.084	0.000
8.8778	0.345	3.065	0.084	0.000
9.0667	0.345	3.130	0.085	0.000
9.2556	0.345	3.195	0.086	0.000
9.4444	0.345	3.260	0.087	0.000
9.6333	0.345	3.326	0.088	0.000
9.8222	0.345	3.391	0.089	0.000
10.011	0.345	3.456	0.090	0.000
10.200	0.345	3.521	0.091	0.000
10.389	0.345	3.587	0.091	0.000
10.578	0.345	3.652	0.092	0.000
10.767	0.345	3.717	0.093	0.000
10.956	0.345	3.782	0.094	0.000
11.144	0.345	3.847	0.095	0.000
11.333	0.345	3.913	0.096	0.000
11.522	0.345	3.978	0.096	0.000
11.711	0.345	4.043	0.097	0.000
11.900	0.345	4.108	0.098	0.000
12.089	0.345	4.173	0.099	0.000
12.278	0.345	4.239	0.104	0.000
12.467	0.345	4.304	0.114	0.000
12.656	0.345	4.369	0.125	0.000
12.844	0.345	4.434	0.138	0.000
13.033	0.345	4.500	0.151	0.000
13.222	0.345	4.565	0.167	0.000
13.411	0.345	4.630	0.184	0.000
13.600	0.345	4.695	0.234	0.000
13.789	0.345	4.760	0.260	0.000
13.978	0.345	4.826	0.287	0.000
14.167	0.345	4.891	0.316	0.000
14.356	0.345	4.956	0.346	0.000
14.544	0.345	5.021	0.377	0.000
14.733	0.345	5.087	0.410	0.000
14.922	0.345	5.152	0.443	0.000
15.111	0.345	5.217	0.478	0.000
15.300	0.345	5.282	0.514	0.000
15.489	0.345	5.347	0.551	0.000
15.678	0.345	5.413	0.588	0.000
15.867	0.345	5.478	0.627	0.000
16.056	0.345	5.543	0.667	0.000
16.244	0.345	5.608	0.708	0.000
16.433	0.345	5.674	0.750	0.000
16.622	0.345	5.739	1.443	0.000
16.811	0.345	5.804	3.394	0.000
17.000	0.345	5.869	5.405	0.000
17.189	0.345	5.934	6.616	0.000
17.378	0.000	0.000	7.407	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated



Predeveloped Landuse Totals for POC #1

Total Pervious Area: 9.18
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 1.42
Total Impervious Area: 7.76

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.19534
5 year	0.305542
10 year	0.365639
25 year	0.42693
50 year	0.463412
100 year	0.493436

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.202556
5 year	0.25947
10 year	0.300986
25 year	0.357914
50 year	0.403674
100 year	0.452405

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.142	0.204
1903	0.118	0.229
1904	0.227	0.269
1905	0.093	0.170
1906	0.042	0.166
1907	0.297	0.203
1908	0.220	0.174
1909	0.217	0.179
1910	0.299	0.204
1911	0.195	0.208

1912	0.737	0.361
1913	0.308	0.183
1914	0.075	0.584
1915	0.124	0.163
1916	0.193	0.241
1917	0.064	0.126
1918	0.207	0.183
1919	0.153	0.144
1920	0.197	0.194
1921	0.220	0.182
1922	0.220	0.224
1923	0.177	0.174
1924	0.081	0.233
1925	0.101	0.141
1926	0.192	0.192
1927	0.121	0.178
1928	0.150	0.175
1929	0.314	0.250
1930	0.197	0.268
1931	0.183	0.180
1932	0.143	0.166
1933	0.138	0.182
1934	0.405	0.344
1935	0.188	0.151
1936	0.163	0.191
1937	0.271	0.233
1938	0.159	0.166
1939	0.010	0.172
1940	0.176	0.279
1941	0.084	0.266
1942	0.265	0.226
1943	0.136	0.210
1944	0.266	0.302
1945	0.221	0.209
1946	0.135	0.200
1947	0.076	0.144
1948	0.416	0.209
1949	0.356	0.260
1950	0.101	0.162
1951	0.124	0.275
1952	0.549	0.306
1953	0.490	0.280
1954	0.176	0.168
1955	0.144	0.172
1956	0.071	0.147
1957	0.251	0.169
1958	0.523	0.236
1959	0.324	0.264
1960	0.086	0.160
1961	0.325	0.398
1962	0.175	0.180
1963	0.084	0.135
1964	0.092	0.417
1965	0.364	0.324
1966	0.102	0.153
1967	0.160	0.208
1968	0.160	0.199
1969	0.159	0.179

1970	0.249	0.200
1971	0.392	0.200
1972	0.254	0.531
1973	0.324	0.307
1974	0.189	0.237
1975	0.411	0.277
1976	0.218	0.261
1977	0.073	0.143
1978	0.367	0.245
1979	0.101	0.193
1980	0.208	0.234
1981	0.199	0.213
1982	0.081	0.168
1983	0.325	0.232
1984	0.133	0.214
1985	0.216	0.252
1986	0.194	0.160
1987	0.375	0.236
1988	0.234	0.159
1989	0.210	0.142
1990	0.238	0.176
1991	0.186	0.268
1992	0.267	0.244
1993	0.259	0.211
1994	0.388	0.193
1995	0.074	0.167
1996	0.434	0.219
1997	0.163	0.186
1998	0.194	0.203
1999	0.016	0.215
2000	0.148	0.189
2001	0.075	0.157
2002	0.304	0.269
2003	0.235	0.195
2004	0.219	0.217
2005	0.462	0.462
2006	0.120	0.195
2007	0.121	0.233
2008	0.205	0.200
2009	0.141	0.153
2010	0.120	0.198
2011	0.097	0.197
2012	0.141	0.179
2013	0.110	0.171
2014	0.082	0.167
2015	0.157	0.261
2016	0.062	0.191
2017	0.298	0.268
2018	0.549	0.285
2019	0.529	0.276
2020	0.165	0.208
2021	0.268	0.203
2022	0.111	0.249
2023	0.226	0.325
2024	0.542	0.359
2025	0.199	0.179
2026	0.325	0.280
2027	0.117	0.222

2028	0.101	0.113
2029	0.220	0.179
2030	0.409	0.252
2031	0.135	0.115
2032	0.074	0.166
2033	0.118	0.177
2034	0.116	0.149
2035	0.461	0.233
2036	0.243	0.169
2037	0.057	0.240
2038	0.205	0.195
2039	0.019	0.367
2040	0.106	0.173
2041	0.143	0.187
2042	0.454	0.227
2043	0.217	0.214
2044	0.292	0.202
2045	0.199	0.152
2046	0.233	0.193
2047	0.172	0.169
2048	0.222	0.159
2049	0.199	0.209
2050	0.143	0.180
2051	0.207	0.248
2052	0.119	0.200
2053	0.213	0.165
2054	0.271	0.284
2055	0.084	0.180
2056	0.094	0.235
2057	0.146	0.147
2058	0.185	0.242
2059	0.327	0.276

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.7374	0.5841
2	0.5493	0.5308
3	0.5486	0.4618
4	0.5417	0.4173
5	0.5287	0.3984
6	0.5230	0.3672
7	0.4901	0.3614
8	0.4625	0.3594
9	0.4612	0.3437
10	0.4542	0.3246
11	0.4337	0.3238
12	0.4159	0.3067
13	0.4113	0.3057
14	0.4090	0.3017
15	0.4052	0.2848
16	0.3924	0.2845
17	0.3883	0.2799
18	0.3754	0.2798
19	0.3666	0.2789
20	0.3641	0.2765
21	0.3563	0.2761
22	0.3269	0.2760

23	0.3254	0.2752
24	0.3252	0.2695
25	0.3252	0.2694
26	0.3244	0.2684
27	0.3236	0.2683
28	0.3137	0.2677
29	0.3084	0.2663
30	0.3043	0.2635
31	0.2995	0.2606
32	0.2979	0.2606
33	0.2967	0.2597
34	0.2924	0.2524
35	0.2712	0.2524
36	0.2709	0.2496
37	0.2683	0.2487
38	0.2666	0.2479
39	0.2658	0.2452
40	0.2652	0.2445
41	0.2586	0.2425
42	0.2544	0.2407
43	0.2506	0.2400
44	0.2494	0.2370
45	0.2431	0.2362
46	0.2382	0.2361
47	0.2347	0.2353
48	0.2340	0.2339
49	0.2332	0.2331
50	0.2269	0.2329
51	0.2257	0.2328
52	0.2222	0.2325
53	0.2211	0.2323
54	0.2204	0.2289
55	0.2204	0.2267
56	0.2199	0.2263
57	0.2198	0.2236
58	0.2193	0.2222
59	0.2183	0.2185
60	0.2173	0.2174
61	0.2167	0.2151
62	0.2158	0.2144
63	0.2131	0.2138
64	0.2105	0.2126
65	0.2078	0.2113
66	0.2071	0.2097
67	0.2066	0.2094
68	0.2053	0.2092
69	0.2048	0.2087
70	0.1993	0.2082
71	0.1991	0.2080
72	0.1990	0.2078
73	0.1986	0.2039
74	0.1974	0.2039
75	0.1966	0.2035
76	0.1952	0.2028
77	0.1938	0.2028
78	0.1936	0.2016
79	0.1931	0.2004
80	0.1917	0.2002

81	0.1891	0.2001
82	0.1879	0.1997
83	0.1865	0.1997
84	0.1853	0.1992
85	0.1826	0.1976
86	0.1773	0.1966
87	0.1765	0.1954
88	0.1761	0.1951
89	0.1747	0.1945
90	0.1717	0.1937
91	0.1647	0.1930
92	0.1634	0.1928
93	0.1630	0.1925
94	0.1604	0.1923
95	0.1596	0.1914
96	0.1592	0.1911
97	0.1590	0.1895
98	0.1567	0.1867
99	0.1528	0.1864
100	0.1499	0.1830
101	0.1475	0.1830
102	0.1463	0.1821
103	0.1443	0.1820
104	0.1432	0.1801
105	0.1429	0.1800
106	0.1426	0.1798
107	0.1418	0.1795
108	0.1410	0.1794
109	0.1406	0.1793
110	0.1379	0.1791
111	0.1365	0.1788
112	0.1351	0.1785
113	0.1348	0.1776
114	0.1325	0.1774
115	0.1243	0.1762
116	0.1243	0.1746
117	0.1215	0.1744
118	0.1206	0.1739
119	0.1202	0.1728
120	0.1200	0.1718
121	0.1191	0.1718
122	0.1183	0.1713
123	0.1180	0.1701
124	0.1169	0.1693
125	0.1164	0.1691
126	0.1111	0.1691
127	0.1098	0.1681
128	0.1062	0.1676
129	0.1021	0.1675
130	0.1013	0.1673
131	0.1010	0.1663
132	0.1007	0.1662
133	0.1006	0.1660
134	0.0969	0.1656
135	0.0942	0.1646
136	0.0929	0.1633
137	0.0921	0.1619
138	0.0861	0.1603

139	0.0839	0.1598
140	0.0839	0.1592
141	0.0837	0.1589
142	0.0818	0.1572
143	0.0813	0.1532
144	0.0810	0.1530
145	0.0755	0.1516
146	0.0755	0.1508
147	0.0754	0.1488
148	0.0744	0.1472
149	0.0735	0.1467
150	0.0735	0.1443
151	0.0708	0.1437
152	0.0644	0.1433
153	0.0624	0.1424
154	0.0573	0.1413
155	0.0415	0.1354
156	0.0192	0.1257
157	0.0156	0.1149
158	0.0099	0.1130

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0977	53933	43290	80	Pass
0.1014	49456	31839	64	Pass
0.1051	45534	25108	55	Pass
0.1088	42930	21191	49	Pass
0.1124	39584	16958	42	Pass
0.1161	36576	13640	37	Pass
0.1198	34492	11651	33	Pass
0.1235	31911	9551	29	Pass
0.1272	29517	7895	26	Pass
0.1309	27839	6903	24	Pass
0.1346	25861	5778	22	Pass
0.1383	24105	4876	20	Pass
0.1420	22548	4169	18	Pass
0.1457	21440	3726	17	Pass
0.1494	20044	3264	16	Pass
0.1531	18736	2795	14	Pass
0.1568	17822	2496	14	Pass
0.1605	16670	2170	13	Pass
0.1642	15490	1898	12	Pass
0.1679	14742	1704	11	Pass
0.1716	13773	1476	10	Pass
0.1753	12931	1294	10	Pass
0.1789	12282	1168	9	Pass
0.1826	11512	1011	8	Pass
0.1863	10748	903	8	Pass
0.1900	10061	813	8	Pass
0.1937	9579	748	7	Pass
0.1974	8980	657	7	Pass
0.2011	8393	600	7	Pass
0.2048	8000	548	6	Pass
0.2085	7529	491	6	Pass
0.2122	7058	454	6	Pass
0.2159	6715	413	6	Pass
0.2196	6310	379	6	Pass
0.2233	5983	355	5	Pass
0.2270	5767	332	5	Pass
0.2307	5466	309	5	Pass
0.2344	5198	290	5	Pass
0.2381	4905	268	5	Pass
0.2418	4711	253	5	Pass
0.2454	4497	237	5	Pass
0.2491	4304	212	4	Pass
0.2528	4156	198	4	Pass
0.2565	3935	177	4	Pass
0.2602	3724	149	4	Pass
0.2639	3567	124	3	Pass
0.2676	3381	107	3	Pass
0.2713	3224	94	2	Pass
0.2750	3126	86	2	Pass
0.2787	3015	70	2	Pass
0.2824	2887	63	2	Pass
0.2861	2756	51	1	Pass
0.2898	2636	49	1	Pass

0.2935	2511	45	1	Pass
0.2972	2399	40	1	Pass
0.3009	2323	39	1	Pass
0.3046	2209	34	1	Pass
0.3082	2081	25	1	Pass
0.3119	2017	23	1	Pass
0.3156	1910	21	1	Pass
0.3193	1816	20	1	Pass
0.3230	1718	19	1	Pass
0.3267	1649	16	0	Pass
0.3304	1590	13	0	Pass
0.3341	1502	12	0	Pass
0.3378	1447	12	0	Pass
0.3415	1365	12	0	Pass
0.3452	1287	11	0	Pass
0.3489	1243	11	0	Pass
0.3526	1181	11	0	Pass
0.3563	1115	11	0	Pass
0.3600	1075	11	1	Pass
0.3637	1027	9	0	Pass
0.3674	977	9	0	Pass
0.3711	929	8	0	Pass
0.3747	890	8	0	Pass
0.3784	824	8	0	Pass
0.3821	781	8	1	Pass
0.3858	743	8	1	Pass
0.3895	696	8	1	Pass
0.3932	636	7	1	Pass
0.3969	604	7	1	Pass
0.4006	559	6	1	Pass
0.4043	511	6	1	Pass
0.4080	479	6	1	Pass
0.4117	432	6	1	Pass
0.4154	394	6	1	Pass
0.4191	361	5	1	Pass
0.4228	340	5	1	Pass
0.4265	313	5	1	Pass
0.4302	297	5	1	Pass
0.4339	278	5	1	Pass
0.4376	256	5	1	Pass
0.4412	240	5	2	Pass
0.4449	227	5	2	Pass
0.4486	210	5	2	Pass
0.4523	194	5	2	Pass
0.4560	176	5	2	Pass
0.4597	159	5	3	Pass
0.4634	142	3	2	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1


On-line facility volume: 0.1562 acre-feet

On-line facility target flow: 0.0812 cfs.

Adjusted for 15 min: 0.0812 cfs.

Off-line facility target flow: 0.0539 cfs.

Adjusted for 15 min: 0.0539 cfs.



Water Quality Info

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	<input type="checkbox"/>	2752.44			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		2752.44	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

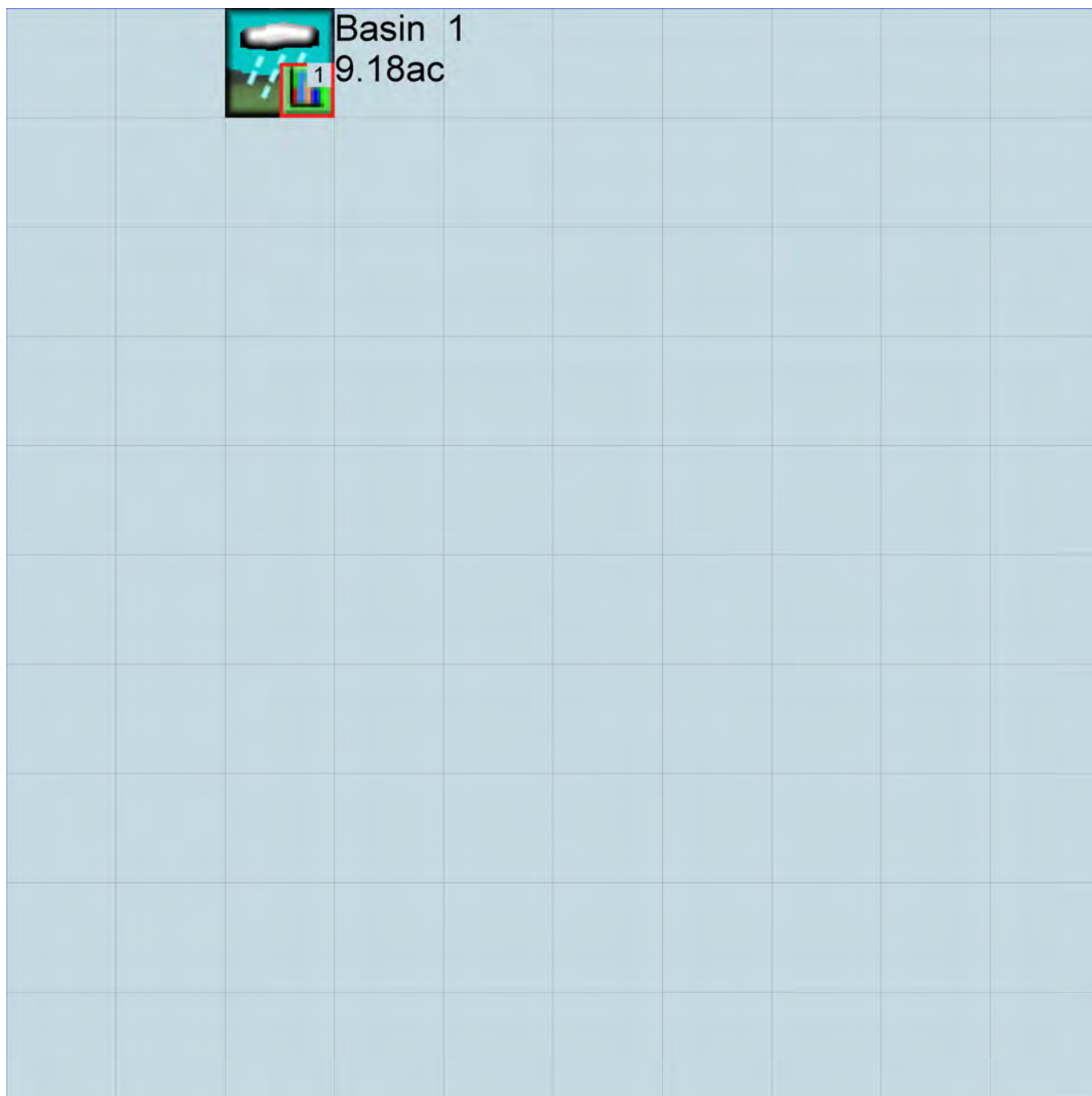
No PERLND changes have been made.

IMPLND Changes

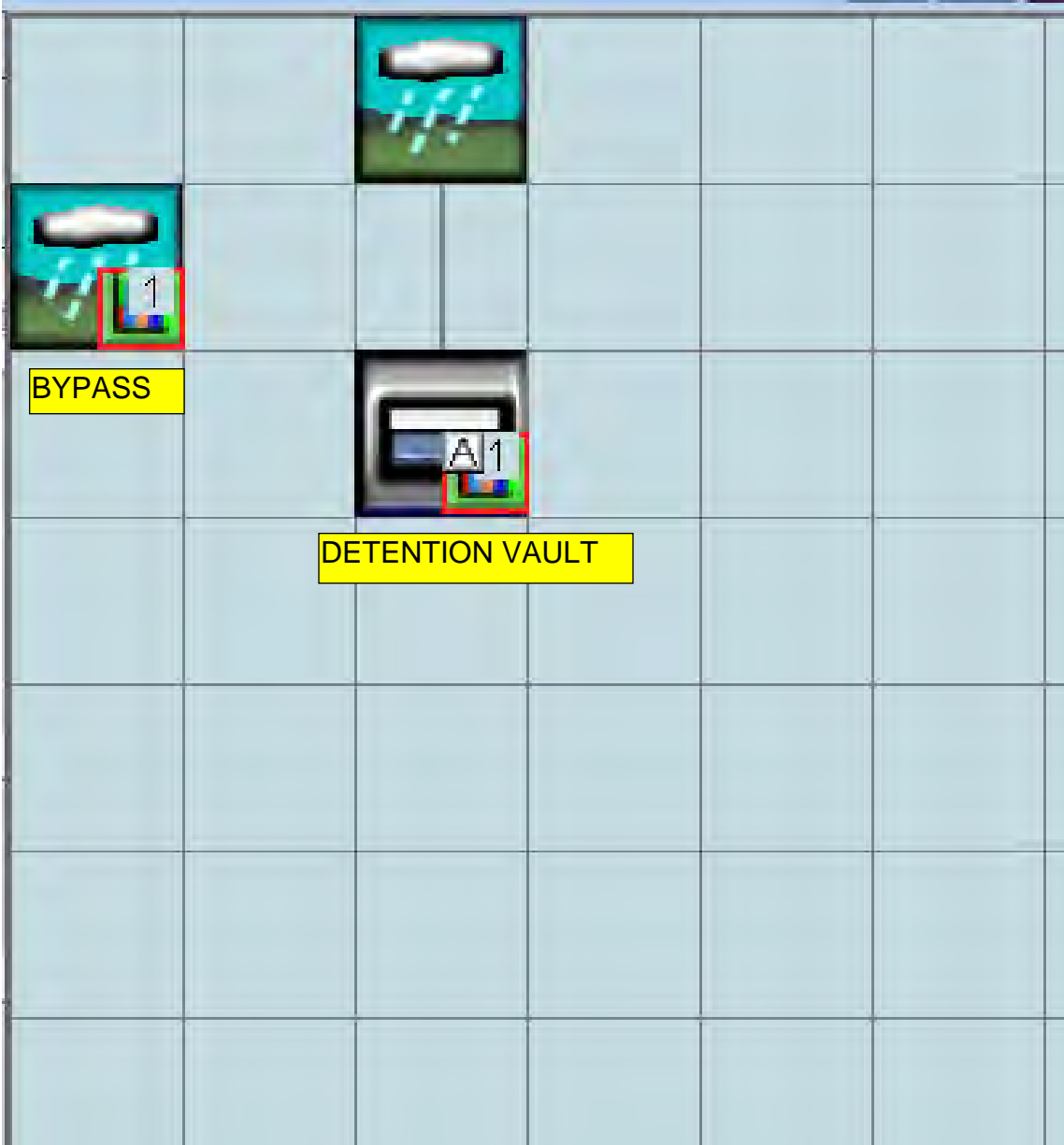
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Disclaimer

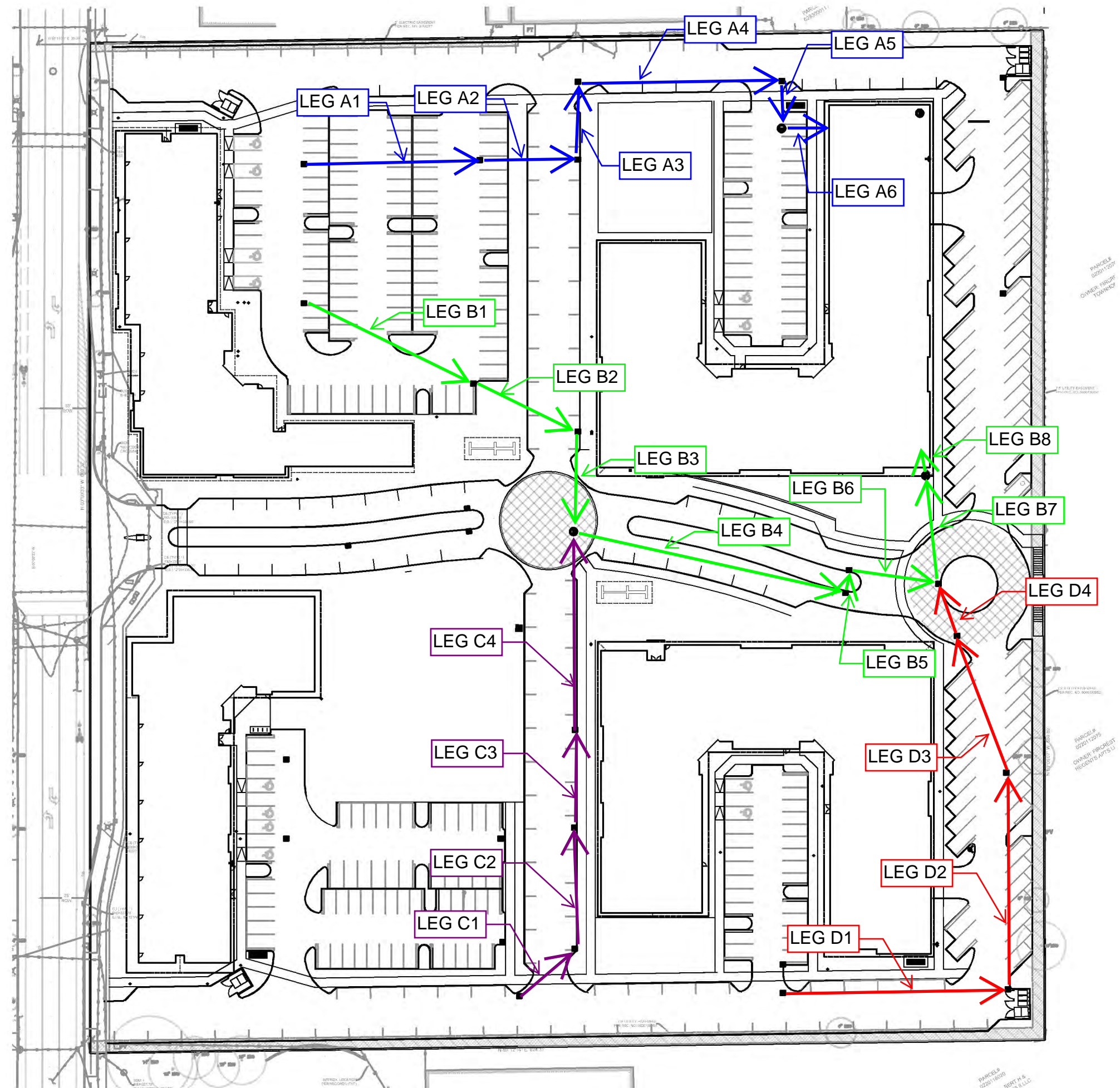
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APPENDIX C Conveyance Calculations



STORM SEWER DESIGN (English Units)

This spreadsheet accomplishes a storm sewer design using the rational method. Enter the data in the non-shaded areas only. Please use one spreadsheet per stormsewer run.

Project Name:	Prose Fircrest
---------------	----------------

Designed By:	Ryan Yokum, EIT
Project Office:	DCG

m =	5.7	n =	0.533	Design Storm Event =	10	Pavement thickness (ft) =	0.5	Pipe Thickness (inches) =	0.5
-----	-----	-----	-------	----------------------	----	---------------------------	-----	---------------------------	-----

Discharge	Drain Design
-----------	--------------

[illegible]

Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	Tc Across Area A (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length**** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)	Upstr. Ground Elev. (ft)	Downstr. Ground Elev. (ft)	Upstr. Pipe Cover (ft)	Downstr. Pipe Cover (ft)
1	2	3	4	5	6	7	8	8a	9	10	11	12	13	14	14a	15	16	17	17a	17b	18	19	20	21	22	23	24	25
A1			Road/Roof	0.34	0.90	0.30	0.30	5.0	5.0	2.42	0.73	0.00	0.73	8	0.011	0.0108	4.25	1.48	VELOCITY OK	ADEQUATE PIPE CAPACITY	115	1.24	336.27	335.03	339.76	337.80	2.28	1.56
A2			Road	0.27	0.90	0.24	0.55	5.0	5.5	2.31	1.26	0.00	1.26	8	0.011	0.0202	5.81	2.03	VELOCITY OK	ADEQUATE PIPE CAPACITY	64	1.29	335.03	333.74	337.80	336.66	1.56	1.71
A3			Road	0.12	0.90	0.11	0.65	5.0	5.6	2.27	1.48	0.00	1.48	8	0.011	0.0204	5.84	2.04	VELOCITY OK	ADEQUATE PIPE CAPACITY	51	1.04	333.74	332.70	336.66	337.06	1.71	3.15
A4			Road	0.24	0.90	0.22	0.87	5.0	5.8	2.24	1.95	0.00	1.95	8	0.011	0.0425	8.44	2.94	VELOCITY OK	ADEQUATE PIPE CAPACITY	134	5.70	332.70	327.00	337.06	330.29	3.15	2.08
A5			Road	0.16	0.90	0.15	1.02	5.0	6.0	2.18	2.22	0.00	2.22	8	0.011	0.0500	9.15	3.19	VELOCITY OK	ADEQUATE PIPE CAPACITY	31	1.55	327.00	325.45	330.29	330.94	2.08	4.28
A6			Road	0.41	0.90	0.37	1.39	5.0	6.1	2.17	3.01	0.56	3.57	10	0.011	0.0200	6.71	3.66	VELOCITY OK	ADEQUATE PIPE CAPACITY	32	0.64	320.00	319.36	330.94	OUTLET	9.57	#VALUE!

STORM SEWER DESIGN (English Units)

This spreadsheet accomplishes a storm sewer design using the rational method. Enter the data in the non-shaded areas only.

Please use one spreadsheet per stormsewer run.

Project Name:	Prose Fircrest
----------------------	-----------------------

Designed By: Eric Schossow, PE

Project Office: DCG

m =	5.7
-----	-----

5.7

n =

0.533

Design Storm Event =

10

Pavement thickness (ft) =	0.5
---------------------------	-----

0.5

Pipe Thickness (inches) =	0.5
---------------------------	-----

0.5

Location			Discharge																	Drain Profile									
Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum CA (acre)	Tc Across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)	Upstr. Ground Elev. (ft)	Downstr. Ground Elev. (ft)	Upstr. Pipe Cover (ft)	Downstr. Pipe Cover (ft)	
1	2	3	4	5	6	7	8	8a	9	10	11	12	13	14	14a	15	16	17	17a	17b	18	19	20	21	22	23	24	25	
D1			Road	0.27	0.90	0.24	0.24	5.0	5.0	2.42	0.58	1.13	1.71	8	0.012	0.0410	7.59	2.65	VELOCITY OK	ADEQUATE PIPE CAPACITY	147	6.02	326.00	319.98	330.95	323.26	3.74	2.07	
D2			Road/Roof	0.26	0.90	0.24	0.48	5.0	5.3	2.34	1.11	0.00	2.24	12	0.012	0.0050	3.47	2.73	VELOCITY OK	ADEQUATE PIPE CAPACITY	142	0.71	319.98	319.27	323.26	323.25	1.74	2.44	
D3			Road	0.21	0.90	0.19	0.66	5.0	6.0	2.19	1.45	0.00	2.58	12	0.012	0.0050	3.47	2.73	VELOCITY OK	ADEQUATE PIPE CAPACITY	96	0.48	319.27	318.79	323.25	323.91	2.44	3.58	
D4			Roof	0.17	0.90	0.16	0.82	5.0	6.5	2.11	1.73	0.00	2.86	15	0.012	0.0050	4.03	4.94	VELOCITY OK	ADEQUATE PIPE CAPACITY	36	0.18	318.79	318.61	323.91	323.20	3.33	2.80	

APPENDIX D Construction Stormwater Pollution Prevention Plan

November 16, 2022

Stormwater Pollution Prevention Plan (SWPPP)

for

**Prose Fircrest
2119 Mildred St W
Fircrest, WA 98466**

Prepared for:

**The Washington State Department of Ecology
Northwest Region**

Permittee / Owner	Developer	Operator / Contractor
Alliance Residential Company	TBD	TBD

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
TBD	TBD	TBD

SWPPP Prepared By

Name	Organization	Contact Phone Number
Ryan Yokum	David Consulting Group, Inc.	206-523-0024

SWPPP Preparation Date

November 16, 2022

Project Construction Dates

Activity / Phase	Start Date	End Date
TBD	TBD	TBD

Certification of Professional Engineer

I hereby state that this Construction Stormwater Pollution Prevention Plan for the Prose Fircrest project has been prepared by me, under my supervision, and meets the standards of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Fircrest does not and will not assume liability for the sufficiency, suitability, or performance of Construction SWPPP BMP'S prepared by me.



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List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO₂	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

1 Project Information

Project/Site Name: Prose Fircrest

Street/Location: 2119 Mildred St W

City: Fircrest State: WA

Zip code: 98466

1.1 Existing Conditions

Total acreage (including support activities such as off-site equipment staging yards, material storage areas, borrow areas).

- Total acreage: 9.18 acres
- Disturbed acreage: 9.18 acres
- Existing structures: 1 existing building and associated parking lot
- Landscape topography: The site topography is generally flat with a steep area on the eastern portion of the site.
- Drainage patterns: There are no existing stormwater BMP's currently on-site.
- Existing Vegetation: The site contains vegetation on the southwest and eastern portion of the site.
- Critical Areas: (wetlands, streams, high erosion risk, steep or difficult to stabilize slopes): None
- List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: None

1.2 Proposed Construction Activities

Description of site development:

Development of the site will include four (4) new multi-family use buildings with a footprint of approximately 95,621 SF, with associated utilities and frontage improvements. Right-of-Way ("ROW") improvements associated with the site will consist of two newly paved driveways providing vehicular access to the site via Mildred St W.

Description of Construction Activities:

- Site preparation
- Excavation
- Utility improvements
- ROW improvements
- Construction of flow control systems
- Site grading
- Asphalt and concrete paving

Description of site drainage including flow from and onto adjacent properties:

The project will be comprised of three main phases, with different BMP's implemented in each phase as described below. (It is to be noted that these are general construction activities and actual BMP's are described in detail in the 13 Elements per Section 2 of this document.)

- **Phase 1: Demolition**
Initial construction activities begin. Contractor shall setup pre-con meeting with the City, flag off clearing limits, and post sign on project site with name and phone number of TESC Supervisor. Contractor shall install construction fencing and inlet protection measures as well as temporary construction entrance to begin demolition work. Install perimeter protection (silt fencing) around project.
- **Phase 2: Mass Excavation**
Monitor and modify existing BMP's as required for initial earthwork excavation. Cover and maintain slopes as required. Install sediment trap, sedimentation pond, and interceptor swales to control flowrates within the project. Complete construction entrance, wheel wash. Maintain erosion control measures, including covering exposed dirt and stabilization of areas that reach final grade.
- **Phase 3: Vertical Construction:**
Monitor and adjust existing BMP's as required. Stabilize soils that have reached final grade. Remove temporary sediment trap and sedimentation tanks and manage stormwater through alternative BMP's (wattles etc) as required. Remove all BMP's at the completion of the project.

Description of final stabilization:

No area of the site will be destabilized under final project conditions, and most of the site will consist of the proposed building footprint. Remaining areas outside of the building will be paved walking areas.

Contaminated Site Information:

To the best of our knowledge, there are no contaminants identified or located on-site.

2 Construction Stormwater Best Management Practices (BMPs)

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e. hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

2.1 The 13 Elements

2.1.1 Element 1: Preserve Vegetation / Mark Clearing Limits

The BMP listed below has been selected with the goal of minimizing the impact on native vegetation and soils. Natural vegetation will be cleared from the entire site, but clearing will be completed in phases so as to minimize the area being disturbed at once.

Native topsoil and soil from the duff layer should be retained and stockpiled on-site where feasible so that it can be reused for site grading and landscaping immediately after soils disturbances are completed.

List and describe BMPs:

- **BMP C103: High Visibility Fence**
High Visibility Fence or Temporary Chain-link Construction Fencing will be installed around the perimeter of the site or work area prior to beginning site clearing/grading.
- **BMP C233: Silt Fence**
A Silt Fence will be installed around the perimeter of the site or work area prior to beginning site clearing/grading.

Installation Schedules:

- **BMP C103: High Visibility Fence (or Temporary Chain-link Construction Fencing)** will be installed around the perimeter of the site or work area prior to beginning site clearing/grading.
- **BMP C233: Silt Fence**
A Silt Fence will be installed around the perimeter of the site or work area prior to beginning site clearing/grading.

Inspection and Maintenance Plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.2 Element 2: Establish Construction Access

A stabilized construction entrance/exit that is supplemented by a wheel wash will be the primary means for minimizing dust generation and vehicles tracking sediment off-site. Street sweeping and street cleaning may be necessary as required to remove tracked sediment. If sediment is tracked off-site, public roads shall be cleaned thoroughly at the end of each day as a minimum, or more frequently during wet weather. Sediment shall be removed from roads by shoveling or sweeping, and be transported to a controlled sediment disposal area. All wheel wash wastewater shall be controlled on-site and cannot be discharged into waters of the State.

List and describe BMPs:

- **BMP C105: Stabilized Construction Entrance/Exit**
A stabilized construction entrances/exits will be installed on-site, providing access from the alley located at the north end of the property that intersects with E C Street. The location(s) of construction access may be modified as necessary to accommodate phasing of the site work.
- **BMP C106: Wheel Wash**
If necessary, a wheel wash will be provided at construction entrances/exits.
- **BMP C107: Construction Road/Parking Area Stabilization**
On-site areas of frequent construction traffic and/or parking will be stabilized.

Installation Schedules:

- **BMP C105: Stabilized Construction Entrance/Exit**
Construction access shall be established prior to beginning site clearing/grading activities.
- **BMP C106: Wheel Wash**
Wheel wash shall be provided prior to beginning any concrete work on-site, or earlier if off-site sediment tracking occurs and wheel washing to remove sediment is necessary.
- **BMP C107: Construction Road/Parking Area Stabilization**
Construction Road/Parking Area Stabilization shall be provided prior to the beginning of construction traffic, and adjusted throughout the project as on-site parking becomes clearer.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.3 Element 3: Control Flow Rates

Will you construct stormwater retention and/or detention facilities?

☒ Yes ☐ No

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?

☐ Yes ☒ No

List and describe BMPs:

- **BMP C207: Check Dams**
Check dams will be installed along the inceptor swale in order to reduce the velocity of stormwater flow.
- **BMP C235: Wattles**
If necessary, staw wattles will be installed along theeastern perimeter of the site at the bottom of slopes or where erosion or flow is prevalent.
- **Note:** Contractor shall monitor site flows and incorporate temporary sediment ponds and/or interceptor swales as required to manage temporary stormwater flows.

Installation Schedules:

- **BMP C207: Check Dams**
Check dams shall be implemented as needed during construction activities to control flow rates and sediment transport.
- **BMP C235: Wattles**
Staw wattles shall be implemented as needed during construction activities to control flow rates and sediment transport.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.4 Element 4: Install Sediment Controls

The BMP's listed below will be utilized to minimize sediment discharges from the site, and be installed prior to starting construction activities. Silt fences will encircle the entire site, and serve to filter out sediment from stormwater runoff at the project limits. If the listed BMP's are deemed ineffective or inappropriate during construction, the CESCL should promptly initiate the implementation of one or more alternative BMP's listed in Vol II of the 2012 Stormwater Management Manual for Western Washington.

Sediment will be removed from paved areas in and adjacent to construction work areas manually or using mechanical sweepers, as needed, to minimize tracking of sediments on vehicle tires away from the site, and to minimize wash-off of sediments from adjacent streets in runoff. Whenever possible, sediment laden water shall be discharged into relatively level vegetated areas (BMP C236) located on-site in areas that have yet to be cleared.

List and describe BMPs:

- **BMP C233: Silt Fence**
A silt fence will be installed around the perimeter of the site to filter construction stormwater runoff.
- **BMP C235: Wattles**
Straw wattles will be installed along site perimeter at the bottom of slopes or where erosion or flow is prevalent.
- **BMP C240: Temporary Sediment Pond**
A temporary sediment pond will be constructed on the eastern portion of the site and will be used for collection of sediment and stormwater.

Installation schedules:

- **BMP C233: Silt Fence**
Silt fence should be installed prior to beginning site clearing/grading activities.
- **BMP C235: Wattles**
Straw wattles shall be implemented as needed during construction activities to control flow rates and sediment transport
- **BMP C241: Temporary Sediment Pond**
The temporary sediment pond will be constructed at the beginning of the site clearing/grading phase. Pond size and location may need to be modified depending on the phase and site of work.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.5 Element 5: Stabilize Soils

Exposed soils that are anticipated to remain unworked for shorter periods of time shall be stabilized using the BMP's listed below.

West of the Cascade Mountains Crest

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days

Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

Anticipated project dates: Start date: TBD

End date: TBD

Will you construct during the wet season?

☒ Yes ☐ No

List and describe BMPs:

- **BMP C120: Temporary and Permanent Seeding**
Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion. Temporary seeding should be used to stabilize large areas of exposed soils that are anticipated to remain unworked for a long period of time.
- **BMP C121: Mulching**
Mulching soils provides immediate temporary protection from erosion. Mulching is to be utilized in combination with other BMP's to stabilize exposed soils that are anticipated to remain unworked for a shorter period of time.
- **BMP C122: Nets and Blankets**
Utilize nets and blankets in combination with other BMP's to stabilize stockpiles from erosion or to minimize the disturbance of steep slopes during excavation
- **BMP C123: Plastic Covering**
Utilize plastic covering in combination with other BMP's to stabilize exposed soils that are anticipated to remain unworked for shorter periods of time. If plastic covering is used, ensure that the increase in runoff from plastic-covered areas can be accommodated by downstream sediment controls.

Installation Schedules:

Sediment control BMPs shall be installed on exposed soils in accordance with the schedule shown in the table above. Note that the requirement of stabilizing stockpiles also applies to any stockpiles of vegetation or other organic material.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.6 Element 6: Protect Slopes

Destabilized steep slopes are not anticipated during construction. If temporary steep slopes are created during site grading activities or excavation, refer to the BMP listed in Section 2.1.5. In addition, the following BMPs may be employed:

Will steep slopes be present at the site during construction?

☒ Yes ☐ No

List and describe BMPs:

BMP C120: Temporary and Permanent Seeding

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion. Temporary seeding should be used to stabilize large areas of exposed soils that are anticipated to remain unworked for a long period of time.

BMP C121: Mulching

Mulching soils provides immediate temporary protection from erosion. Mulching is to be utilized in combination with other BMP's to stabilize exposed soils that are anticipated to remain unworked for a shorter period of time.

Installation Schedules:

Slope protection BMP's shall be installed on temporary steep slopes in accordance with the table in Section 2.1.5 if needed during clearing/grading or during construction phases.

Inspection and Maintenance Plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff

Project CESCL

2.1.7 Element 7: Protect Drain Inlets

All operable storm drain inlets will be protected throughout the course of the project. Inlet protection BMP's will be utilized in combination with sediment controls listed in Section 2.1.4 to minimize the amount of sediment that enters the stormwater conveyance system. Inlets will be inspected weekly at a minimum, and daily during storm events. Protection devices will be cleaned (or removed and replaced) when sediment has filled the device by one third (1/3), or as specified by the manufacturer.

List and describe BMPs:

- **BMP C220: Storm Drain Inlet Protection**
Storm drain inlet protection shall be installed on all existing storm drain inlets in and around the project area, and on all proposed inlets once they have been installed. Refer to the project TESC plans for inlet protection locations.

Installation Schedules:

- **BMP C220: Storm Drain Inlet Protection**
Inlet protection shall be installed on existing inlets within the project vicinity prior to beginning site clearing and grading activities. Inlet protection shall be installed on proposed inlets as soon as the inlets are installed. Alternatively, inlet protection installation for proposed inlets can be delayed until the inlets begin receiving runoff if all sediment is removed from the structure prior to operation.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

2.1.8 Element 8: Stabilize Channels and Outlets

Not applicable. No existing channels or outfalls are located on the project site.

2.1.9 Element 9: Control Pollutants

The following pollutants are anticipated to be present on-site:

Table 1 – Pollutants

Pollutant (and source, if applicable)
Oil/gasoline (Construction equipment and traffic)
Chemicals (Fertilizer/pesticides, cleaning supplies)
Dust (Demolition activities and site grading)
Process water (Concrete removal and pouring)
Solid waste (Materials packaging)

All pollutants – including waste materials and demolition debris – that occur on-site shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris.

List and describe BMPs:

- Demolition:
 - BMP C140: Dust Control
Dust released from demolished sidewalks, buildings, or structures will be controlled using Dust Control measures.
 - BMP C220: Storm Drain Inlet Protection
Storm drain inlets vulnerable to stormwater discharge carrying dust, soil, or debris will be protected using Storm Drain Inlet Protection (as described above in Section 3.1.7).
 - BMP C152: Sawcutting and Surfacing Pollution Prevention
Process water and slurry resulting from sawcutting and surfacing operations will be prevented from entering the waters of the State by implementing sawcutting and Surfacing Pollution Prevention measures.
- Chemical storage:
 - BMP C153: Material Delivery, Storage, and Containment
Any chemicals stored in the construction areas will conform to the appropriate source control BMPs listed in Vol IV of the Washington State DOE Stormwater Manual for Western Washington (SWMMWW). All chemicals shall have cover, containment, and protection provided on site.
 - Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application procedures and rates shall be followed.
- Concrete and grout:
 - BMP C151: Concrete Handling

Process water and slurry resulting from concrete work will be prevented from entering the waters of the State by implementing Concrete Handling measures.

- A CO2 system will be implemented to mitigate any high pH water that may be encountered (requires DOE approval).
- Sanitary wastewater:
 - Portable sanitation facilities will be firmly secured, regularly maintained, and emptied when necessary.
- Solid Waste:
 - Solid waste will be stored in secure, clearly marked containers.
- Other BMP's administered as necessary to address any additional pollutant sources on site:
 - BMP C151: Concrete Handling
This BMP shall be employed whenever concrete work is occurring.
 - BMP C152: Sawcutting and Surfacing Pollution Prevention
This BMP shall be employed whenever sawcutting of existing pavement is occurring.
 - BMP C153: Material Delivery, Storage and Containment
This BMP shall be employed throughout the life of the project for all materials.
 - BMP C154: Concrete Washout Area
This BMP shall be employed in areas of washing of concrete equipment.

Installation Schedules:

Throughout course of construction.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?

☐ Yes ☒ No

List and describe BMPs:

- All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.
- On-site fueling tanks and petroleum product storage containers shall include secondary containment (if required).
- Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.

- In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.
- Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.

Installation Schedules:

BMP's concerning the maintenance, fueling, and repair of heavy equipment and vehicles will be implemented as needed throughout the course of the project.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

Will wheel wash or tire bath system BMPs be used during construction?

☒ Yes ☐ No

List and describe BMPs:

- BMP C106: Wheel Wash
If necessary, a wheel wash or tire bath wastewater shall be utilized with water discharging to a separate on-site treatment system or to the sanitary sewer as part of Wheel Wash implementation.

Installation Schedules:

- BMP C106: Wheel Wash
Wheel wash shall be provided prior to beginning any concrete work on-site, or earlier if off-site sediment tracking occurs and wheel washing to remove sediment is necessary.

Inspection and Maintenance plan:

See BMP details in Appendix B. A blank Site Inspection Form is available in Appendix C.

Responsible Staff:

Project CESCL

Will pH-modifying sources be present on-site?

☐ Yes ☒ No

2.1.10 Element 10: Control Dewatering

No dewatering is anticipated on-site. If groundwater is encountered during construction, the contractor shall immediately install BMPs in accordance with the Washington State DOE Stormwater Manual for Western Washington (SWMMWW).

2.1.11 Element 11: Maintain BMPs

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see Vol II of the Washington State DOE Stormwater Manual for Western Washington (SWMMWW)).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed and the facility shall be returned to conditions specified in the construction documents.

2.1.12 Element 12: Manage the Project

The project will be managed based on the following principles:

- Projects will be phased to the maximum extent practicable and seasonal work limitations will be taken into account.
- Inspection and monitoring:
 - Inspection, maintenance and repair of all BMPs will occur as needed to ensure performance of their intended function.
- Maintain an updated SWPPP.
 - The SWPPP will be updated, maintained, and implemented in accordance with the Manual

As site work progresses the SWPPP will be modified routinely to reflect changing site conditions. The SWPPP will be reviewed monthly to ensure the content is current.

Table 3 – Management

<input checked="" type="checkbox"/>	Design the project to fit the existing topography, soils, and drainage patterns
<input checked="" type="checkbox"/>	Emphasize erosion control rather than sediment control
<input checked="" type="checkbox"/>	Minimize the extent and duration of the area exposed
<input checked="" type="checkbox"/>	Keep runoff velocities low
<input checked="" type="checkbox"/>	Retain sediment on-site
<input checked="" type="checkbox"/>	Thoroughly monitor site and maintain all ESC measures
<input checked="" type="checkbox"/>	Schedule major earthwork during the dry season
<input type="checkbox"/>	Other (please describe)

2.1.13 Element 13: Protect Low Impact Development (LID) BMPs

LID BMPs are not being utilized on this project and therefore Element 13 does not apply.

3 Pollution Prevention Team

Table 5 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	TBD	TBD
Resident Engineer	Eric Schossow, PE	206.523.0024
Emergency Ecology Contact	TBD	TBD
Emergency Permittee/ Owner Contact	TBD	TBD
Non-Emergency Owner Contact	TBD	TBD
Monitoring Personnel	TBD	TBD
Ecology Regional Office	TBD	TBD

Appendices

Appendix A - Site Map

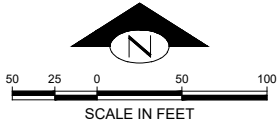
Appendix B - BMP Details

Appendix C - Site Inspection Form

Appendix D – Engineering Calculations

Appendix A – Site Map

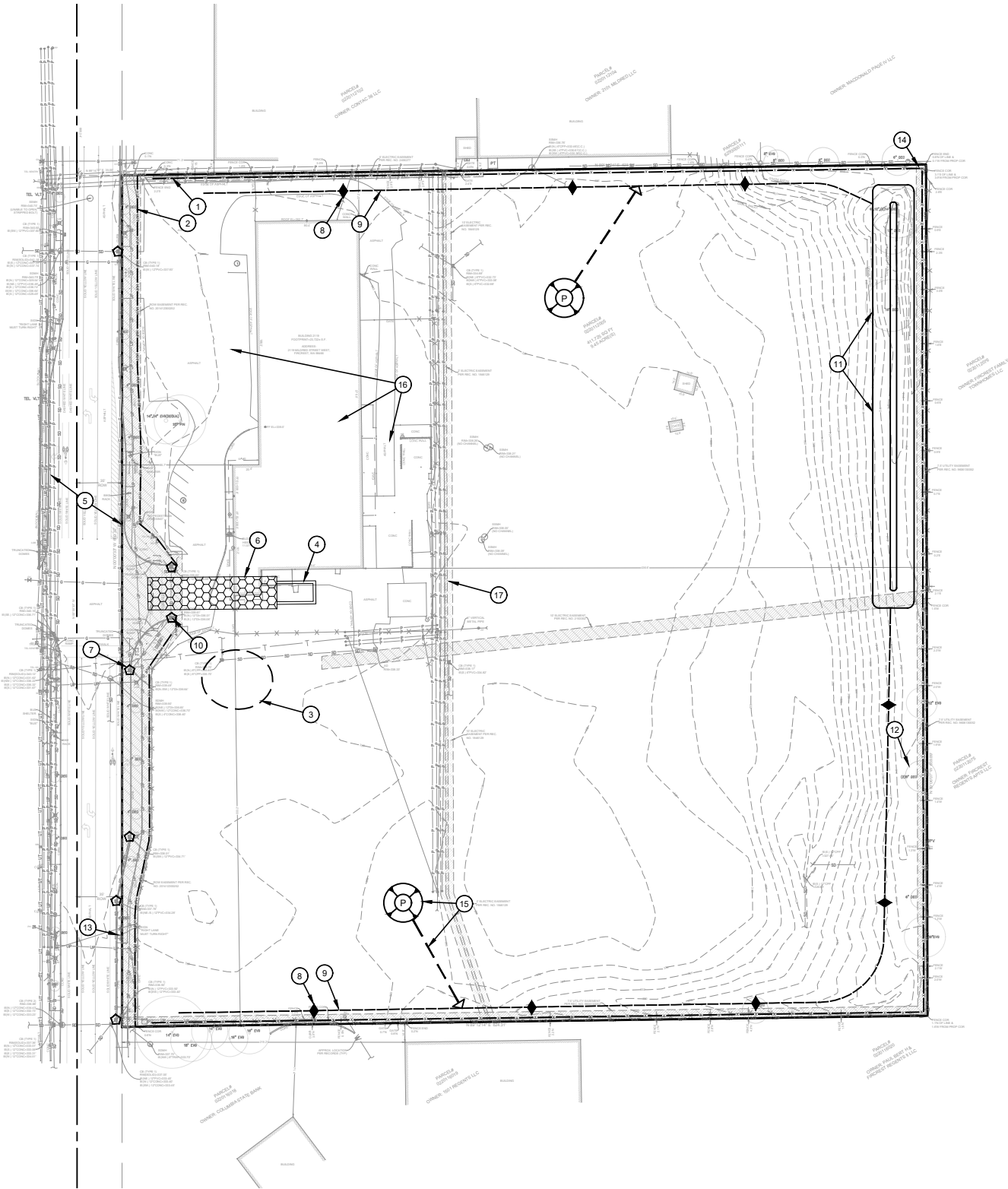
CAD FILE NUMBER: P:\CLIENTS\CIVIL\LANCER RESIDENTIAL\2119 MILDRED STREET WEST FIRCREST\DRAWING\01 TESC PLAN.DWG
LAST MODIFIED BY: GREG - SAVE DATE: 10/26/2022 2:22 AM - SHEET SET: XXX - ORIGINAL SHEET SIZE: ANSI FULL BLEED D (24.00 X 22.00 INCHES)
AUTOCAD VERSION: CIVIL 3D 2013



KEY NOTES:		
KEY	NOTE	DETAIL/ SHEET
1	INSTALL APPRX 1,900 LF PERIMETER PROTECTION*	-
2	INSTALL HIGH VISIBILITY FENCING (APPROX. CLEARING LIMITS)	-
3	PROPOSED STOCKPILE LOCATION. CONTRACTOR TO DETERMINE FINAL LOCATION IN FIELD. STOCKPILE TO BE COVERED WITH PLASTIC/NETS, STAKED DOWN AND TIED	-
4	WHEEL WASH	-
5	CONTRACTOR TO SWEEP STREET DAILY OR MORE OFTEN IF NECESSARY, TO REMOVE TRACKED SEDIMENT	-
6	STABILIZED CONSTRUCTION ACCESS	-
7	TEMPORARY STORM DRAIN INLET PROTECTION. PROTECT ALL STORM DRAIN INLETS DOWNSLOPE AND WITHIN 500 FEET OF THE PROJECT SITE AND/OR ANY ABUTTING PUBLIC STREETS THAT MAY RECEIVE RUNOFF FROM THE SITE DURING CONSTRUCTION (TYP)	-
8	INSTALL CHECK DAMS AS NEEDED TO CONTROL FLOW RATES. INSTALL ADDITIONAL CHECK DAMS IF EROSION IS OBSERVED ALONG FLOWLINE (TYP)	-
9	TEMPORARY INTERCEPTOR SWALE LOCATION SHOWN ON THIS SHEET IS SCHEMATIC & SUBJECT TO CHANGE BY CONTRACTOR. DEPTH: 1' MIN WIDTH : 2' THE BOTTOM SHALL BE LEVEL 1V:2H SIDE SLOPE, MAX 5% SLOPE HYDROSEED CHANNEL PER BMP C120	-
10	CAP EX SOUTHERN SD LATERAL	-
11	TEMPORARY SEDIMENT POND SURFACE AREA AT PRINCIPAL SPILLWAY (TOP OF RISER PIPE): 8,000 SF	-
12	CONTRACTOR HAS THE OPTION OF USING THE EXISTING POND TO MEET TEMPORARY COLLECTION MEASURES	-
13	ALL EX TREES ONSITE TO BE REMOVED UNLESS NOTED OTHERWISE (TYP)	-
14	PROTECT ALL EXISTING SIGNAGE IN THE ROW DURING CONSTRUCTION (TYP)	-
15	EX STORM MAIN/STORM MANHOLES IN PRIVATE EASEMENT TO BE PROTECTED IN PLACE THROUGHOUT CONSTRUCTION	-
16	PROVIDE TEMP. SUMP PUMPS AND DISCHARGE LINES FROM LOW AREAS TO SEDIMENT POND OR TEMPORARY SWALE AS REQ	-
17	REMOVE ALL EX ON-SITE HARD SURFACES: BUILDING: 25,000 SF AT GRADE HARD SURFACES: 40,000 SF	-
18	EX POWER TO BE REMOVED. COORDINATE W/ UTILITY PURVEYOR	-

- NOTES:
- REMOVE ALL EXISTING HARD SURFACES AND UNDERGROUND UTILITIES U.N.O.
 - CONTRACTOR SHALL ADJUST LOCATION OF TEMPORARY INTERCEPTOR SWALE AND CHECK DAMS AS NEEDED TO ROUTE STORMWATER TO TEMPORARY SEDIMENT POND.

*BMP'S REFERENCED FROM THE 2014 DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON



LEGEND:

- STABILIZED CONSTRUCTION ENTRANCE
- PERIMETER PROTECTION
- HIGH VISIBILITY FENCING
- STOCKPILE LOCATION
- TEMP SEDIMENT POND
- INTERCEPTOR SWALE
- CHECK DAM
- INLET PROTECTION

REVISION			
No.	DATE	BY	

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2 BUSINESS DAYS
BEFORE YOU DIG
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)



BASE MAP TOPOGRAPHY PROVIDED BY OTHERS. DCG CANNOT BE HELD LIABLE FOR ACCURACY. CONTRACTOR SHALL FIELD VERIFY GRADES, UTILITIES, & ALL OTHER EX FEATURES & CONDITIONS. CONDITIONS ARE NOT AS SHOWN & OR PLANS CANNOT BE CONSTRUCTED AS SHOWN. CONTACT DCG PRIOR TO CONSTRUCTION.

OWNER: ALLIANCE RESIDENTIAL COMPANY
1900 N NORTHLAKE WAY, STE 237
SEATTLE, WA 98103

PROJECT: PROSE FIRCREST MIXED-USE
2119 MILDRED ST W, FIRCREST, WA 98466
TESC PLAN

PROJ. MANAGER:	ES
DESIGNED BY:	ES
DRAWN BY:	GR
CHECKED BY:	RY
SCALE:	AS SHOWN
DATE:	11/16/2022
REV.	A
SHEET	OF
###	###

SHEET NUMBER
C2.2

Appendix B – BMP Details

BMP C103: High-Visibility Fence

Purpose

High-visibility fencing is intended to:

- Restrict clearing to approved limits.
- Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
- Limit construction traffic to designated construction entrances, exits, or internal roads.
- Protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications

High-visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high-visibility orange. The fence tensile strength shall be 360 lbs/ft using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with [BMP C233: Silt Fence](#) to act as high-visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No. 19-10-021

BMP C105: Stabilized Construction Access

Purpose

Stabilized construction accesses are established to reduce the amount of sediment transported onto paved roads outside the project site by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for project sites.

Conditions of Use

Construction accesses shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential subdivision construction sites, provide a stabilized construction access for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size and configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized accesses not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See [Figure II-3.1: Stabilized Construction Access](#) for details. Note: the 100' minimum length of the access shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction accesses with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction access stabilization because these products raise pH levels in stormwater and concrete discharge to waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the standards listed in [Table II-3.2: Stabilized Construction Access Geotextile Standards](#).

**Table II-3.2: Stabilized Construction Access
Geotextile Standards**

Geotextile Property	Required Value
Grab Tensile Strength (ASTM D4751)	200 psi min.
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will be paved; this can be used as a stabilized access. Also consider the installation of excess concrete as a stabilized access. During large concrete pours, excess concrete is often available for this purpose.
- Fencing (see [BMP C103: High-Visibility Fence](#)) shall be installed as necessary to restrict traffic to the construction access.
- Whenever possible, the access shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction accesses should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction access must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

Alternative Material Specification

WSDOT has raised safety concerns about the Quarry Spall rock specified above. WSDOT observes that the 4-inch to 8-inch rock sizes can become trapped between Dually truck tires, and then released off-site at highway speeds. WSDOT has chosen to use a modified specification for the rock while continuously verifying that the Stabilized Construction Access remains effective. To remain effective, the BMP must prevent sediment from migrating off site. To date, there has been no performance testing to verify operation of this new specification. Jurisdictions may use the alternative specification, but must perform increased off-site inspection if they use, or allow others to use, it.

Stabilized Construction Accesses may use material that meets the requirements of WSDOT's *Standard Specifications for Road, Bridge, and Municipal Construction* Section 9-03.9(1) ([WSDOT, 2016](#)) for ballast except for the following special requirements.

The grading and quality requirements are listed in [Table II-3.3: Stabilized Construction Access Alternative Material Requirements](#).

**Table II-3.3: Stabilized
Construction Access
Alternative Material
Requirements**

Sieve Size	Percent Passing
2½"	99-100
2"	65-100
¾"	40-80
No. 4	5 max.
No. 100	0-2
% Fracture	75 min.

- All percentages are by weight.
- The sand equivalent value and dust ratio requirements do not apply.
- The fracture requirement shall be at least one fractured face and will apply the combined aggregate retained on the No. 4 sieve in accordance with FOP for AASHTO T 335.

Maintenance Standards

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the access is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the access, or the installation of [BMP C106: Wheel Wash](#).
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective

and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.

- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction access(es), [BMP C103: High-Visibility Fence](#) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

Figure II-3.1: Stabilized Construction Access



[pdf download](#)

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology’s website at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

BMP C106: Wheel Wash

Purpose

Wheel washes reduce the amount of sediment transported onto paved roads by washing dirt from the wheels of motor vehicles prior to the motor vehicles leaving the construction site.

Conditions of Use

- Use a wheel wash when [BMP C105: Stabilized Construction Access](#) is not preventing sediment from being tracked off site.
- Wheel washing is generally an effective BMP when installed with careful attention to topography. For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street.
- Pressure washing combined with an adequately sized and surfaced pad with direct drainage to a large 10-foot x 10-foot sump can be very effective.
- Wheel wash wastewater is not stormwater. It is commonly called process water, and must be discharged to a separate on-site treatment system that prevents discharge to waters of the State, or to the sanitary sewer with local sewer district approval.
- Wheel washes may use closed-loop recirculation systems to conserve water use.
- Wheel wash wastewater shall not include wastewater from concrete washout areas.
- When practical, the wheel wash should be placed in sequence with [BMP C105: Stabilized Construction Access](#). Locate the wheel wash such that vehicles exiting the wheel wash will enter directly onto [BMP C105: Stabilized Construction Access](#). In order to achieve this, [BMP C105: Stabilized Construction Access](#) may need to be extended beyond the standard installation to meet the exit of the wheel wash.

Design and Installation Specifications

Suggested details are shown in [Figure II-3.2: Wheel Wash](#). The Local Permitting Authority may allow other designs. A minimum of 6 inches of asphalt treated base (ATB) over crushed base material or 8 inches over a good subgrade is recommended to pave the wheel wash.

Use a low clearance truck to test the wheel wash before paving. Either a belly dump or lowboy will work well to test clearance.

Keep the water level from 12 to 14 inches deep to avoid damage to truck hubs and filling the truck tongues with water.

Midpoint spray nozzles are only needed in extremely muddy conditions.

Wheel wash systems should be designed with a small grade change, 6- to 12-inches for a 10-foot-wide pond, to allow sediment to flow to the low side of pond to help prevent re-suspension of sediment. A drainpipe with a 2- to 3-foot riser should be installed on the low side of the pond to allow for easy cleaning and refilling. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 - 0.5 pounds per 1,000 gallons of water increases effectiveness and reduces cleanup time. If PAM is already being used for dust or erosion control and is being applied by a water truck, the same truck can be used to change the wash water.

Maintenance Standards

The wheel wash should start out each day with fresh water.

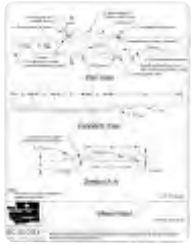
The wheel wash water should be changed a minimum of once per day. On large earthwork jobs where more than 10-20 trucks per hour are expected, the wheel wash water will need to be changed more often.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

Figure II-3.2: Wheel Wash



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Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No. 19-10-021

BMP C107: Construction Road / Parking Area Stabilization

Purpose

Stabilizing roads, parking areas, and other on-site vehicle transportation routes immediately after grading reduces erosion caused by construction traffic or stormwater runoff.

Conditions of Use

Roads and parking areas shall be stabilized wherever they are constructed, whether permanent or temporary, for use by construction traffic.

[BMP C103: High-Visibility Fence](#) shall be installed, if necessary, to limit the access of vehicles to only those roads and parking areas that are stabilized.

Design and Installation Specifications

- On areas that will receive asphalt as part of the project, install the first lift as soon as possible.
- A 6-inch depth of 2- to 4-inch crushed rock, gravel base, or crushed surfacing base course shall be applied immediately after grading or utility installation. A 4-inch course of asphalt treated base (ATB) may also be used, or the road/parking area may be paved. It may also be possible to use cement or calcium chloride for soil stabilization. If cement or cement kiln dust is used for roadbase stabilization, pH monitoring and [BMP C252: Treating and Disposing of High pH Water](#) is necessary to evaluate and minimize the effects on stormwater. If the area will not be used for permanent roads, parking areas, or structures, a 6-inch depth of hog fuel may also be used, but this is likely to require more maintenance. Whenever possible, construction roads and parking areas shall be placed on a firm, compacted subgrade.
- Temporary road gradients shall not exceed 15 percent. Roadways shall be carefully graded to drain. Drainage ditches shall be provided on each side of the roadway in the case of a crowned section, or on one side in the case of a super-elevated section. Drainage ditches shall be directed to a sediment control BMP.
- Rather than relying on ditches, it may also be possible to grade the road so that runoff sheet-flows into a heavily vegetated area with a well-developed topsoil. Landscaped areas are not adequate. If this area has at least 50 feet of vegetation that water can flow through, then it is

generally preferable to use the vegetation to treat runoff, rather than a sediment pond or trap. The 50 feet shall not include wetlands or their buffers. If runoff is allowed to sheetflow through adjacent vegetated areas, it is vital to design the roadways and parking areas so that no concentrated runoff is created.

- Storm drain inlets shall be protected to prevent sediment-laden water entering the drainage system (see [BMP C220: Inlet Protection](#)).

Maintenance Standards

Inspect stabilized areas regularly, especially after large storm events.

Crushed rock, gravel base, etc., shall be added as required to maintain a stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No. 19-10-021

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See [BMP C121: Mulching](#) for specifications.

Seed and mulch all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See [BMP T5.13: Post-Construction Soil Quality and Depth](#).

Design and Installation Specifications

General

- Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over the top of hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow; install sod in the channel bottom — over top of hydromulch and erosion control blankets.
- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See [BMP C121: Mulching](#) for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application. See [BMP T5.13: Post-Construction Soil Quality and Depth](#).
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:
 - Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
 - Phase 2- Install the rest of the mulch and tackifier over the first lift.

Or, enhance vegetation by:

- Installing the mulch, seed, fertilizer, and tackifier in one lift.
- Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
- Hold straw in place with a standard tackifier.

Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:

- Irrigation.
- Reapplication of mulch.
- Repair of failed slope surfaces.

This technique works with standard hydromulch (1,500 pounds per acre minimum) and Bonded Fiber Matrix/ Mechanically Bonded Fiber Matrix (BFM/MBFMs) (3,000 pounds per acre minimum).

- Seed may be installed by hand if:
 - Temporary and covered by straw, mulch, or topsoil.
 - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
- The seed mixes listed in [Table II-3.4: Temporary and Permanent Seed Mixes](#) include recommended mixes for both temporary and permanent seeding.
- Apply these mixes, with the exception of the wet area seed mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used. Apply the wet area seed mix at a rate of 60 pounds per acre.
- Consult the local suppliers or the local conservation district for their recommendations. The appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used, depending on the soil type and hydrology of the area.

Table II-3.4: Temporary and Permanent Seed Mixes

Common Name	Latin Name	% Weight	% Purity	% Germination
Temporary Erosion Control Seed Mix A standard mix for areas requiring a temporary vegetative cover.				
Chewings or annual blue grass	<i>Festuca rubra var. commutata</i> or <i>Poa annua</i>	40	98	90
Perennial rye	<i>Lolium perenne</i>	50	98	90
Redtop or colonial bentgrass	<i>Agrostis alba</i> or <i>Agrostis tenuis</i>	5	92	85
White dutch clover	<i>Trifolium repens</i>	5	98	90
Landscaping Seed Mix A recommended mix for landscaping seed.				

Common Name	Latin Name	% Weight	% Purity	% Germination
Perennial rye blend	<i>Lolium perenne</i>	70	98	90
Chewings and red fescue blend	<i>Festuca rubra</i> var. <i>commutata</i> or <i>Festuca rubra</i>	30	98	90
Low-Growing Turf Seed Mix A turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.				
Dwarf tall fescue (several varieties)	<i>Festuca arundinacea</i> var.	45	98	90
Dwarf perennial rye (Barclay)	<i>Lolium perenne</i> var. <i>barclay</i>	30	98	90
Red fescue	<i>Festuca rubra</i>	20	98	90
Colonial bentgrass	<i>Agrostis tenuis</i>	5	98	90
Bioswale Seed Mix A seed mix for bioswales and other intermittently wet areas.				
Tall or meadow fescue	<i>Festuca arundinacea</i> or <i>Festuca elatior</i>	75-80	98	90
Seaside/Creeping bentgrass	<i>Agrostis palustris</i>	10-15	92	85
Redtop bentgrass	<i>Agrostis alba</i> or <i>Agrostis gigantea</i>	5-10	90	80
Wet Area Seed Mix A low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.				
Tall or meadow fescue	<i>Festuca arundinacea</i> or <i>Festuca elatior</i>	60-70	98	90
Seaside/Creeping bentgrass	<i>Agrostis palustris</i>	10-15	98	85
Meadow foxtail	<i>Alepocurus pratensis</i>	10-15	90	80
Alsike clover	<i>Trifolium hybridum</i>	1-6	98	90

Common Name	Latin Name	% Weight	% Purity	% Germination
Redtop bentgrass	<i>Agrostis alba</i>	1-6	92	85
<p style="text-align: center;">Meadow Seed Mix</p> <p>A recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.</p>				
Redtop or Oregon bentgrass	<i>Agrostis alba</i> or <i>Agrostis oregonensis</i>	20	92	85
Red fescue	<i>Festuca rubra</i>	70	98	90
White dutch clover	<i>Trifolium repens</i>	10	98	90

Roughening and Rototilling

- The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.
- Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum, permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.

Fertilizers

- Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
- Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
- In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20

minutes before use. Too much agitation destroys the slow-release coating.

- There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.

Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix

- On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils. Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.
- Install products per manufacturer's instructions.
- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
 - BFM and MBFMs do not require surface preparation.
 - Helicopters can assist in installing BFM and MBFMs in remote areas.
 - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
 - Installing BFM and MBFMs can save at least \$1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 75 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, nets, or blankets.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

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BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There are a variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and during the hot summer months.
- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

For seeded areas, mulch may be made up of 100 percent:

- cottonseed meal;
- fibers made of wood, recycled cellulose, hemp, or kenaf;
- compost;
- or blends of these.

Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers.

Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

Recycled cellulose may contain polychlorinated biphenyl (PCBs). Ecology recommends that products should be evaluated for PCBs prior to use.

Refer to [BMP C126: Polyacrylamide \(PAM\) for Soil Erosion Protection](#) for conditions of use. PAM shall not be directly applied to water or allowed to enter a water body.

Any mulch or tackifier product used shall be installed per the manufacturer's instructions.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see [Table II-3.6: Mulch Standards and Guidelines](#). Consult with the local supplier or the local conservation district for their recommendations. Increase the application rate until the ground is 95% covered (i.e. not visible under the mulch layer).

Note: Thickness may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Where the option of "Compost" is selected, it should be a coarse compost that meets the size gradations listed in [Table II-3.5: Size Gradations of Compost as Mulch Material](#) when tested in accordance with Test Method 02.02-B found in *Test Methods for the Examination of Composting and Compost* ([Thompson, 2001](#)).

Table II-3.5: Size Gradations of Compost as Mulch Material

Sieve Size	Percent Passing
3"	100%
1"	90% - 100%
3/4"	70% - 100%
1/4"	40% - 100%

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material. Consult the Hydraulic Permit Authority (HPA) for mulch mixes if applicable.

Maintenance Standards

The thickness of the mulch cover must be maintained.

Any areas that experience erosion shall be mulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area mulched.

Table II-3.6: Mulch Standards and Guidelines

Mulch Material	Guideline	Description
Straw	Quality Standards	Air-dried; free from undesirable seed and coarse material.
	Application Rates	2"-3" thick; 5 bales per 1,000 sf or 2-3 tons per acre
	Remarks	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits. It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	Quality Standards	No growth inhibiting factors.
	Application Rates	Approx. 35-45 lbs per 1,000 sf or 1,500 - 2,000 lbs per acre
	Remarks	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about 3/4 - 1 inch clog hydromulch equipment. Fibers should be kept to less than 3/4 inch.
Compost	Quality Standards	No visible water or dust during handling. Must be produced per WAC 173-350 , Solid Waste Handling Standards, but may have up to 35% biosolids.
	Application Rates	2" thick min.; approx. 100 tons per acre (approx. 750 lbs per cubic yard)
	Remarks	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Compost used for mulch has a coarser size gradation than compost used for BMP C125: Topsoiling / Composting or BMP T5.13: Post-Construction Soil Quality and Depth . It is more stable and practical to use in wet areas and during rainy weather conditions. Do not use near wetlands or near phosphorous impaired water bodies.

Mulch Material	Guideline	Description
Chipped Site Vegetation	Quality Standards	Gradations from fines to 6 inches in length for texture, variation, and interlocking properties. Include a mix of various sizes so that the average size is between 2- and 4- inches.
	Application Rates	2" thick min.;
	Remarks	<p>This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If permanent seeding or planting is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment.</p> <p>Note: thick application of this material over existing grass, herbaceous species, and some groundcovers could smother and kill vegetation.</p>
Wood-Based Mulch	Quality Standards	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.
	Application Rates	2" thick min.; approx. 100 tons per acre (approx. 750 lbs. per cubic yard)
	Remarks	This material is often called "wood straw" or "hog fuel". The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
Wood Strand Mulch	Quality Standards	A blend of loose, long, thin wood pieces derived from native conifer or deciduous trees with high length-to-width ratio.
	Application Rates	2" thick min.
	Remarks	Cost-effective protection when applied with adequate thickness. A minimum of 95-percent of the wood strand shall have lengths between 2 and 10-inches, with a width and thickness between 1/16 and 1/2-inches. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood shavings shall not be used as mulch. [Specification 9-14.4(4) from the <i>Standard Specifications for Road, Bridge, and Municipal Construction</i> (WSDOT, 2016)

BMP C122: Nets and Blankets

Purpose

Erosion control nets and blankets are intended to prevent erosion and hold seed and mulch in place on steep slopes and in channels so that vegetation can become well established. In addition, some nets and blankets can be used to permanently reinforce turf to protect drainage ways during high flows.

Nets (commonly called matting) are strands of material woven into an open, but high-tensile strength net (for example, coconut fiber matting). Blankets are strands of material that are not tightly woven, but instead form a layer of interlocking fibers, typically held together by a biodegradable or photodegradable netting (for example, excelsior or straw blankets). They generally have lower tensile strength than nets, but cover the ground more completely. Coir (coconut fiber) fabric comes as both nets and blankets.

Conditions of Use

Erosion control netting and blankets shall be made of natural plant fibers unaltered by synthetic materials.

Erosion control nets and blankets should be used:

- To aid permanent vegetated stabilization of slopes 2H:1V or greater and with more than 10 feet of vertical relief.
- For drainage ditches and swales (highly recommended). The application of appropriate netting or blanket to drainage ditches and swales can protect bare soil from channelized runoff while vegetation is established. Nets and blankets also can capture a great deal of sediment due to their open, porous structure. Nets and blankets can be used to permanently stabilize channels and may provide a cost-effective, environmentally preferable alternative to riprap.

Disadvantages of nets and blankets include:

- Surface preparation is required.
- On slopes steeper than 2.5H:1V, net and blanket installers may need to be roped and harnessed for safety.
- They cost at least \$4,000-6,000 per acre installed.

Advantages of nets and blankets include:

- Installation without mobilizing special equipment.
- Installation by anyone with minimal training
- Installation in stages or phases as the project progresses.
- Installers can hand place seed and fertilizer as they progress down the slope.
- Installation in any weather.
- There are numerous types of nets and blankets that can be designed with various parameters in mind. Those parameters include: fiber blend, mesh strength, longevity, biodegradability, cost, and availability.

An alternative to nets and blankets in some limited conditions is [BMP C202: Riprap Channel Lining](#). Ensure that [BMP C202: Riprap Channel Lining](#) is appropriate before using it as a substitute for nets and blankets.

Design and Installation Specifications

- See [Figure II-3.3: Channel Installation \(Clackamas County et al., 2008\)](#) and [Figure II-3.4: Slope Installation](#) for typical orientation and installation of nets and blankets used in channels and as slope protection. Note: these are typical only; all nets and blankets must be installed per manufacturer's installation instructions.
- Installation is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion.
- Installation of nets and blankets on slopes:
 1. Complete final grade and track walk up and down the slope.
 2. Install hydromulch with seed and fertilizer.
 3. Dig a small trench, approximately 12 inches wide by 6 inches deep along the top of the slope.
 4. Install the leading edge of the net/blanket into the small trench and staple approximately every 18 inches. NOTE: Staples are metal, "U"-shaped, and a minimum of 6 inches long. Longer staples are used in sandy soils. Biodegradable stakes are also available.

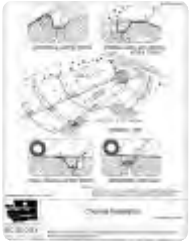
5. Roll the net/blanket slowly down the slope as the installer walks backward. NOTE: The net/blanket rests against the installer's legs. Staples are installed as the net/blanket is unrolled. It is critical that the proper staple pattern is used for the net/blanket being installed. The net/blanket is not to be allowed to roll down the slope on its own as this stretches the net/blanket, making it impossible to maintain soil contact. In addition, no one is allowed to walk on the net/blanket after it is in place.
 6. If the net/blanket is not long enough to cover the entire slope length, the trailing edge of the upper net/blanket should overlap the leading edge of the lower net/blanket and be stapled. On steeper slopes, this overlap should be installed in a small trench, stapled, and covered with soil.
- With the variety of products available, it is impossible to cover all the details of appropriate use and installation. Therefore, it is critical that the designer consult the manufacturer's information and that a site visit takes place in order to ensure that the product specified is appropriate. Information is also available in WSDOT's *Standard Specifications for Road, Bridge, and Municipal Construction* Division 8-01 and Division 9-14 ([WSDOT, 2016](#)).
 - Use jute matting in conjunction with mulch ([BMP C121: Mulching](#)). Excelsior, woven straw blankets and coir (coconut fiber) blankets may be installed without mulch. There are many other types of erosion control nets and blankets on the market that may be appropriate in certain circumstances.
 - In general, most nets (e.g., jute matting) require mulch in order to prevent erosion because they have a fairly open structure. Blankets typically do not require mulch because they usually provide complete protection of the surface.
 - Extremely steep, unstable, wet, or rocky slopes are often appropriate candidates for use of synthetic blankets, as are riverbanks, beaches and other high-energy environments. If synthetic blankets are used, the soil should be hydromulched first.
 - 100-percent biodegradable blankets are available for use in sensitive areas. These organic blankets are usually held together with a paper or fiber mesh and stitching which may last up to a year.
 - Most netting used with blankets is photodegradable, meaning it breaks down under sunlight (not UV stabilized). However, this process can take months or years even under bright sun. Once vegetation is established, sunlight does not reach the mesh. It is not uncommon to find non-degraded netting still in place several years after installation. This can be a problem if maintenance requires the use of mowers or ditch cleaning equipment. In addition, birds and small animals can become trapped in the netting.

Maintenance Standards

- Maintain good contact with the ground. Erosion must not occur beneath the net or blanket.

- Repair and staple any areas of the net or blanket that are damaged or not in close contact with the ground.
- Fix and protect eroded areas if erosion occurs due to poorly controlled drainage.

Figure II-3.3: Channel Installation



[pdf download](#)

Figure II-3.4: Slope Installation



[pdf download](#)

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No.19-10-021

BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.

- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. However, the relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for applications greater than six months.
- Due to rapid runoff caused by plastic covering, do not use this method upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Plastic sheeting may result in increased runoff volumes and velocities, requiring additional on-site measures to counteract the increases. Creating a trough with wattles or other material can convey clean water away from these areas.
- To prevent undercutting, trench and backfill rolled plastic covering products.
- Although the plastic material is inexpensive to purchase, the cost of installation, maintenance, removal, and disposal add to the total costs of this BMP.
- Whenever plastic is used to protect slopes, install water collection measures at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to convey clean rainwater away from bare soil and disturbed areas. Do not mix clean runoff from a plastic covered slope with dirty runoff from a project.
- Other uses for plastic include:
 - Temporary ditch liner.

- Pond liner in temporary sediment pond.
- Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
- Emergency slope protection during heavy rains.
- Temporary drainpipe (“elephant trunk”) used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows:
 1. Run plastic up and down the slope, not across the slope.
 2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.
 3. Provide a minimum of 8-inch overlap at the seams.
 4. On long or wide slopes, or slopes subject to wind, tape all seams.
 5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
 6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and tie them together with twine to hold them in place.
 7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil, which causes extreme erosion.
 8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.
- Plastic sheeting shall have a minimum thickness of 6 mil.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- Completely remove and replace the plastic if it begins to deteriorate due to ultraviolet radiation.
- Completely remove plastic when no longer needed.
- Dispose of old tires used to weight down plastic sheeting appropriately.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

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BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

Use dust control in areas (including roadways) subject to surface and air movement of dust where on-site or off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until the surface is wet. Repeat as needed. To prevent carryout of mud onto the street, refer to [BMP C105: Stabilized Construction Access](#) and [BMP C106: Wheel Wash](#).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM ([BMP C126: Polyacrylamide \(PAM\) for Soil Erosion Protection](#)) added to water at a rate of 0.5 pounds per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to increased infiltration of water into the soil and reduced

evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may reduce the quantity of water needed for dust control. Note that the application rate specified here applies to this BMP, and is not the same application rate that is specified in [BMP C126: Polyacrylamide \(PAM\) for Soil Erosion Protection](#), but the downstream protections still apply.

Refer to [BMP C126: Polyacrylamide \(PAM\) for Soil Erosion Protection](#) for conditions of use. PAM shall not be directly applied to water or allowed to enter a water body.

- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Techniques that can be used for unpaved roads and lots include:
 - Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
 - Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
 - Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
 - Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
 - Encourage the use of alternate, paved routes, if available.
 - Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
 - Limit dust-causing work on windy days.
 - Pave unpaved permanent roads and other trafficked areas.

Maintenance Standards

Respray area as necessary to keep dust to a minimum.

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BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the State.

Conditions of Use

Any time concrete is used, utilize these management practices. Concrete construction project components include, but are not limited to:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Disposal options for concrete, in order of preference are:

1. Off-site disposal
2. Concrete wash-out areas (see [BMP C154: Concrete Washout Area](#))
3. De minimus washout to formed areas awaiting concrete

Design and Installation Specifications

- Wash concrete truck drums at an approved off-site location or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground (including formed areas awaiting concrete), or into storm drains, open ditches, streets, or streams. Refer to [BMP C154: Concrete Washout Area](#) for information on concrete washout areas.
 - Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas as allowed in [BMP C154: Concrete Washout Area](#).
- Wash small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheelbarrows) into designated concrete washout areas or into formed areas awaiting concrete pour.
- At no time shall concrete be washed off into the footprint of an area where an infiltration feature will be installed.
- Wash equipment difficult to move, such as concrete paving machines, in areas that do not directly drain to natural or constructed stormwater conveyance or potential infiltration areas.
- Do not allow washwater from areas, such as concrete aggregate driveways, to drain directly (without detention or treatment) to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no designated concrete washout areas (or formed areas, allowed as described above) are available. Dispose of contained concrete and concrete washwater (process water) properly.
- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to [BMP C252: Treating and Disposing of High pH Water](#) for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit (CSWGP) for pH monitoring requirements if the project involves one of the following activities:
 - Significant concrete work (as defined in the CSWGP).
 - The use of soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
 - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

Maintenance Standards

Check containers for holes in the liner daily during concrete pours and repair the same day.

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BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. Concrete spillage or concrete discharge to waters of the State is prohibited. Use this BMP to minimize and eliminate process water and slurry created through sawcutting or surfacing from entering waters of the State.

Conditions of Use

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.

- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose of process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose of cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and/or vacuum trucks.

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BMP C153: Material Delivery, Storage, and Containment

Purpose

Prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage. Minimize the storage of hazardous materials on-site, store materials in a designated area, and install secondary containment.

Conditions of Use

Use at construction sites with delivery and storage of the following materials:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g., Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents, and curing compounds
- Any other material that may be detrimental if released to the environment

Design and Installation Specifications

- The temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Safety Data Sheets (SDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.

- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as an earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, within secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.
- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to contain 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.
- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).
- The spill kit should include, at a minimum:
 - 1-Water Resistant Nylon Bag
 - 3-Oil Absorbent Socks 3"x 4'
 - 2-Oil Absorbent Socks 3"x 10'

- 12-Oil Absorbent Pads 17"x19"
- 1-Pair Splash Resistant Goggles
- 3-Pair Nitrile Gloves
- 10-Disposable Bags with Ties
- Instructions

Maintenance Standards

- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Re-stock spill kit materials as needed.

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BMP C154: Concrete Washout Area

Purpose

Prevent or reduce the discharge of pollutants from concrete waste to stormwater by conducting washout off-site, or performing on-site washout in a designated area.

Conditions of Use

Concrete washout areas are implemented on construction projects where:

- Concrete is used as a construction material
- It is not possible to dispose of all concrete wastewater and washout off-site (ready mix plant, etc.).
- Concrete truck drums are washed on-site.

Note that auxiliary concrete truck components (e.g. chutes and hoses) and small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheelbarrows) may be washed into formed areas awaiting concrete pour.

At no time shall concrete be washed off into the footprint of an area where an infiltration feature will be installed.

Design and Installation Specifications

Implementation

- Perform washout of concrete truck drums at an approved off-site location or in designated concrete washout areas only.
- Do not wash out concrete onto non-formed areas, or into storm drains, open ditches, streets, or streams.

- Wash equipment difficult to move, such as concrete paving machines, in areas that do not directly drain to natural or constructed stormwater conveyance or potential infiltration areas.
- Do not allow excess concrete to be dumped on-site, except in designated concrete washout areas as allowed above.
- Concrete washout areas may be prefabricated concrete washout containers, or self-installed structures (above-grade or below-grade).
- Prefabricated containers are most resistant to damage and protect against spills and leaks. Companies may offer delivery service and provide regular maintenance and disposal of solid and liquid waste.
- If self-installed concrete washout areas are used, below-grade structures are preferred over above-grade structures because they are less prone to spills and leaks.
- Self-installed above-grade structures should only be used if excavation is not practical.
- Concrete washout areas shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

Education

- Discuss the concrete management techniques described in this BMP with the ready-mix concrete supplier before any deliveries are made.
- Educate employees and subcontractors on the concrete waste management techniques described in this BMP.
- Arrange for the contractor's superintendent or Certified Erosion and Sediment Control Lead (CESCL) to oversee and enforce concrete waste management procedures.
- A sign should be installed adjacent to each concrete washout area to inform concrete equipment operators to utilize the proper facilities.

Contracts

Incorporate requirements for concrete waste management into concrete supplier and subcontractor agreements.

Location and Placement

- Locate concrete washout areas at least 50 feet from sensitive areas such as storm drains, open ditches, water bodies, or wetlands.

- Allow convenient access to the concrete washout area for concrete trucks, preferably near the area where the concrete is being poured.
- If trucks need to leave a paved area to access the concrete washout area, prevent track-out with a pad of rock or quarry spalls (see [BMP C105: Stabilized Construction Access](#)). These areas should be far enough away from other construction traffic to reduce the likelihood of accidental damage and spills.
- The number of concrete washout areas you install should depend on the expected demand for storage capacity.
- On large sites with extensive concrete work, concrete washout areas should be placed in multiple locations for ease of use by concrete truck drivers.

Concrete Truck Washout Procedures

- Washout of concrete truck drums shall be performed in designated concrete washout areas only.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated concrete washout areas or properly disposed of off-site.

Concrete Washout Area Installation

- Concrete washout areas should be constructed as shown in the figures below, with a recommended minimum length and minimum width of 10 ft, but with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
- Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
- Lath and flagging should be commercial type.
- Liner seams shall be installed in accordance with manufacturers' recommendations.
- Soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material.

Maintenance Standards

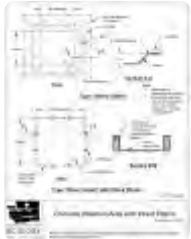
Inspection and Maintenance

- Inspect and verify that concrete washout areas are in place prior to the commencement of concrete work.
- Once concrete wastes are washed into the designated washout area and allowed to harden, the concrete should be broken up, removed, and disposed of per applicable solid waste regulations. Dispose of hardened concrete on a regular basis.
- During periods of concrete work, inspect the concrete washout areas daily to verify continued performance.
 - Check overall condition and performance.
 - Check remaining capacity (% full).
 - If using self-installed concrete washout areas, verify plastic liners are intact and sidewalls are not damaged.
 - If using prefabricated containers, check for leaks.
- Maintain the concrete washout areas to provide adequate holding capacity with a minimum freeboard of 12 inches.
- Concrete washout areas must be cleaned, or new concrete washout areas must be constructed and ready for use once the concrete washout area is 75% full.
- If the concrete washout area is nearing capacity, vacuum and dispose of the waste material in an approved manner.
 - Do not discharge liquid or slurry to waterways, storm drains or directly onto ground.
 - Do not discharge to the sanitary sewer without local approval.
 - Place a secure, non-collapsing, non-water collecting cover over the concrete washout area prior to predicted wet weather to prevent accumulation and overflow of precipitation.
 - Remove and dispose of hardened concrete and return the structure to a functional condition. Concrete may be reused on-site or hauled away for disposal or recycling.
- When you remove materials from a self-installed concrete washout area, build a new structure; or, if the previous structure is still intact, inspect for signs of weakening or damage, and make any necessary repairs. Re-line the structure with new plastic after each cleaning.

Removal of Concrete Washout Areas

- When concrete washout areas are no longer required for the work, the hardened concrete, slurries and liquids shall be removed and properly disposed of.
- Materials used to construct concrete washout areas shall be removed from the site of the work and disposed of or recycled.
- Holes, depressions or other ground disturbance caused by the removal of the concrete washout areas shall be backfilled, repaired, and stabilized to prevent erosion.

Figure II-3.7: Concrete Washout Area with Wood Planks



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Figure II-3.8: Concrete Washout Area with Straw Bales



[pdf download](#)

Figure II-3.9: Prefabricated Concrete Washout Container w/Ramp



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BMP C207: Check Dams

Purpose

Construction of check dams across a swale or ditch reduces the velocity of concentrated flow and dissipates energy at the check dam.

Conditions of Use

Use check dams where temporary or permanent channels are not yet vegetated, channel lining is infeasible, and/or velocity checks are required.

- Check dams may not be placed in streams unless approved by the State Department of Fish and Wildlife.
- Check dams may not be placed in wetlands without approval from a permitting agency.
- Do not place check dams below the expected backwater from any salmonid bearing water between October 1 and May 31 to ensure that there is no loss of high flow refuge habitat for overwintering juvenile salmonids and emergent salmonid fry.

Design and Installation Specifications

- Construct rock check dams from appropriately sized rock. The rock used must be large enough to stay in place given the expected design flow through the channel. The rock must be placed by hand or by mechanical means (do not dump the rock to form the dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges.
- Check dams may also be constructed of either rock or pea-gravel filled bags. Numerous new products are also available for this purpose. They tend to be re-usable, quick and easy to install, effective, and cost efficient.
- Place check dams perpendicular to the flow of water.
- The check dam should form a triangle when viewed from the side. This prevents undercutting as water flows over the face of the check dam rather than falling directly onto the ditch bottom.

- Before installing check dams, impound and bypass upstream water flow away from the work area. Options for bypassing include pumps, siphons, or temporary channels.
- Check dams combined with sumps work more effectively at slowing flow and retaining sediment than a check dam alone. A deep sump should be provided immediately upstream of the check dam.
- In some cases, if carefully located and designed, check dams can remain as permanent installations with very minor regrading. They may be left as either spillways, in which case accumulated sediment would be graded and seeded, or as check dams to prevent further sediment from leaving the site.
- The maximum spacing between check dams shall be such that the downstream toe of the upstream dam is at the same elevation as the top of the downstream dam.
- Keep the maximum height at 2 feet at the center of the check dam.
- Keep the center of the check dam at least 12 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the check dam at 2H:1V or flatter.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 18 inches to avoid washouts from overflow around the dam.
- Use filter fabric foundation under a rock or sand bag check dam. If a blanket ditch liner is used, filter fabric is not necessary. A piece of organic or synthetic blanket cut to fit will also work for this purpose.
- In the case of grass-lined ditches and swales, all check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale - unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.
- Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blockage from displaced stones.
- See [Figure II-3.16: Rock Check Dam](#).

Maintenance Standards

Check dams shall be monitored for performance and sediment accumulation during and after each rainfall that produces runoff. Sediment shall be removed when it reaches one half the sump depth.

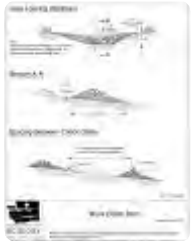
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel. See [BMP C202: Riprap Channel Lining](#).

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

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Figure II-3.16: Rock Check Dam



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BMP C233: Silt Fence

Purpose

Silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent sediment carried by runoff from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment trapping BMP.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

Figure II-3.22: Silt Fence



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Design and Installation Specifications

- Use in combination with other construction stormwater BMPs.
- Maximum slope steepness (perpendicular to the silt fence line) 1H:1V.
- Maximum sheet or overland flow path length to the silt fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- Use geotextile fabric that meets the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in [Table II-3.11: Geotextile Fabric Standards for Silt Fence](#)):

Table II-3.11: Geotextile Fabric Standards for Silt Fence

Geotextile Property	Minimum Average Roll Value
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec ⁻¹ minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength geotextiles with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the geotextile. Silt fence materials are available that have synthetic mesh backing attached.
- Silt fence material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F to 120°F.

- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by the local jurisdiction.
- Refer to [Figure II-3.22: Silt Fence](#) for standard silt fence details. Include the following Standard Notes for silt fence on construction plans and specifications:
 1. The Contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
 2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
 3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
 4. The geotextile fabric shall be sewn together at the point of manufacture to form fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided that the overlap is long enough and that the adjacent silt fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
 5. Attach the geotextile fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the geotextile fabric to the posts in a manner that reduces the potential for tearing.
 6. Support the geotextile fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the geotextile fabric up-slope of the mesh.
 7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the geotextile fabric it supports.
 8. Bury the bottom of the geotextile fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the geotextile fabric, so that no flow can pass beneath the silt fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
 9. Drive or place the silt fence posts into the ground 18-inches min. A 12-inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
 10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:

- Wood with minimum dimensions of 2 inches by 2 inches by 3 feet. Wood shall be free of defects such as knots, splits, or gouges.
- No. 6 steel rebar or larger.
- ASTM A 120 steel pipe with a minimum diameter of 1-inch.
- U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
- Other steel posts having equivalent strength and bending resistance to the post sizes listed above.

11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.

12. If the fence must cross contours, with the exception of the ends of the fence, place check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.

- Check dams shall be approximately 1-foot deep at the back of the fence. Check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
- Check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to [Figure II-3.23: Silt Fence Installation by Slicing Method](#) for slicing method details. The following are specifications for silt fence installation using the slicing method:

1. The base of both end posts must be at least 2- to 4-inches above the top of the geotextile fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the geotextile fabric, enabling posts to support the geotextile fabric from upstream water pressure.
4. Install posts with the nipples facing away from the geotextile fabric.

5. Attach the geotextile fabric to each post with three ties, all spaced within the top 8-inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
6. Wrap approximately 6-inches of the geotextile fabric around the end posts and secure with 3 ties.
7. No more than 24-inches of a 36-inch geotextile fabric is allowed above ground level.
8. Compact the soil immediately next to the geotextile fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck the fabric deeper into the ground if necessary.

Figure II-3.23: Silt Fence Installation by Slicing Method



[pdf download](#)

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment trapping BMP.
- Check the uphill side of the silt fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence and remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace geotextile fabric that has deteriorated due to ultraviolet breakdown.

BMP C235: Wattles

Purpose

Wattles are temporary erosion and sediment control barriers consisting of straw, compost, or other material that is wrapped in netting made of natural plant fiber or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment.

Conditions of Use

- Wattles shall consist of cylinders of plant material such as weed-free straw, coir, wood chips, excelsior, or wood fiber or shavings encased within netting made of natural plant fibers unaltered by synthetic materials.
- Use wattles:
 - In disturbed areas that require immediate erosion protection.
 - On exposed soils during the period of short construction delays, or over winter months.
 - On slopes requiring stabilization until permanent vegetation can be established.
- The material used dictates the effectiveness period of the wattle. Generally, wattles are effective for one to two seasons.
- Prevent rilling beneath wattles by entrenching and overlapping wattles to prevent water from passing between them.

Design Criteria

- See [Figure II-3.24: Wattles](#) for typical construction details.
- Wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length.
- Install wattles perpendicular to the flow direction and parallel to the slope contour.

- Place wattles in shallow trenches, staked along the contour of disturbed or newly constructed slopes. Dig narrow trenches across the slope (on contour) to a depth of 3- to 5-inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5- to 7- inches, or 1/2 to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Spread excavated material evenly along the uphill slope and compact it using hand tamping or other methods.
- Construct trenches at intervals of 10- to 25-feet depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and overlap the ends of adjacent wattles 12 inches behind one another.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.
- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- Wooden stakes should be approximately 0.75 x 0.75 x 24 inches min. Willow cuttings or 3/8-inch rebar can also be used for stakes.
- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.

Figure II-3.24: Wattles



[pdf download](#)

Maintenance Standards

- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.
- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

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BMP C241: Sediment Pond (Temporary)

Purpose

Sediment ponds are temporary ponds used during construction to remove sediment from runoff originating from disturbed areas of the project site. Sediment ponds are typically designed to remove sediment no smaller than medium silt (0.02 mm). Consequently, they usually reduce turbidity only slightly.

Conditions of Use

- Use a sediment pond where the contributing drainage area to the pond is 3 acres or more. Ponds must be used in conjunction with other Construction Stormwater BMPs to reduce the amount of sediment flowing into the pond.
- Do not install sediment ponds on sites where failure of the BMP would result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. Also, sediment ponds are attractive to children and can be dangerous. Compliance with local ordinances regarding health and safety must be addressed. If fencing of the pond is required, show the type of fence and its location on the drawings in the Construction SWPPP.
- Sediment ponds that can impound 10 acre-ft (435,600 cu-ft, or 3.26 million gallons) or more, or have an embankment of more than 6 feet, are subject to the Washington Dam Safety Regulations ([Chapter 173-175 WAC](#)). See [BMP D.1: Detention Ponds](#) for more information regarding dam safety considerations for detention ponds.
- Projects that are constructing permanent Flow Control BMPs or Runoff Treatment BMPs that use ponding for treatment may use the rough-graded or final-graded permanent BMP footprint for the temporary sediment pond. When permanent BMP footprints are used as temporary sediment ponds, the surface area requirement of the temporary sediment pond must be met. If the surface area requirement of the sediment pond is larger than the surface area of the permanent BMP, then the sediment pond shall be enlarged beyond the permanent BMP footprint to comply with the surface area requirement.

The permanent control structure must be temporarily replaced with a control structure that only allows water to leave the temporary sediment pond from the surface or by pumping. Alternatively, the permanent control structure may be used if it is temporarily modified by plugging any outlet

holes below the riser. The permanent control structure must be installed as part of the permanent BMP after the site is fully stabilized.

Design and Installation Specifications

General

- See [Figure II-3.28: Sediment Pond Plan View](#), [Figure II-3.29: Sediment Pond Cross Section](#), and [Figure II-3.30: Sediment Pond Riser Detail](#) for details.
- Use of permanent infiltration BMP footprints for temporary sediment ponds during construction tends to clog the soils and reduce their capacity to infiltrate. If permanent infiltration BMP footprints are used, the sides and bottom of the temporary sediment pond must only be rough excavated to a minimum of 2 feet above final grade of the permanent infiltration BMP. Final grading of the permanent infiltration BMP shall occur only when all contributing drainage areas are fully stabilized. Any proposed permanent pretreatment BMP prior to the infiltration BMP should be fully constructed and used with the temporary sediment pond to help prevent clogging of the soils. See [Element 13: Protect Low Impact Development BMPs](#) for more information about protecting permanent infiltration BMPs.
- The pond shall be divided into two roughly equal volume cells by a permeable divider that will reduce turbulence while allowing movement of water between the cells. The divider shall be at least one-half the height of the riser, and at least one foot below the top of the riser. Wire-backed, 2- to 3-foot high, high strength geotextile fabric supported by treated 4"x4"s can be used as a divider. Alternatively, staked straw bales wrapped with geotextile fabric may be used. If the pond is more than 6 feet deep, a different divider design must be proposed. A riprap embankment is one acceptable method of separation for deeper ponds. Other designs that satisfy the intent of this provision are allowed as long as the divider is permeable, structurally sound, and designed to prevent erosion under and around the divider.
- The most common structural failure of sediment ponds is caused by piping. Piping refers to two phenomena: (1) water seeping through fine-grained soil, eroding the soil grain by grain and forming pipes or tunnels; and, (2) water under pressure flowing upward through a granular soil with a head of sufficient magnitude to cause soil grains to lose contact and capability for support.

The most critical construction practices to prevent piping are:

- Tight connections between the riser and outlet pipe, and other pipe connections.
- Adequate anchoring of the riser.
- Proper soil compaction of the embankment and riser footing.

- Proper construction of anti-seep devices.

Sediment Pond Geometry

To determine the sediment pond geometry, first calculate the design surface area (SA) of the pond, measured at the top of the riser pipe. Use the following equation:

$$SA = 2 \times Q^2 / 0.00096$$

or

2080 square feet per cfs of inflow

See [BMP C240: Sediment Trap](#) for more information on the above equation.

The basic geometry of the pond can now be determined using the following design criteria:

- Required surface area SA (from the equation above) at the top of the riser.
- Minimum 3.5-foot depth from the top of the riser to the bottom of the pond.
- Maximum 3H:1V interior side slopes and maximum 2H:1V exterior slopes. The interior slopes can be increased to a maximum of 2H:1V if fencing is provided at or above the maximum water surface.
- One foot of freeboard between the top of the riser and the crest of the emergency spillway.
- Flat bottom.
- Minimum 1-foot deep spillway.
- Length-to-width ratio between 3:1 and 6:1.

Sediment Pond Discharge

The outlet for the pond consists of a combination of principal and emergency spillways. These outlets must pass the peak runoff expected from the contributing drainage area for a 100-year storm. If, due to site conditions and basin geometry, a separate emergency spillway is not feasible, the principal spillway must pass the entire peak runoff expected from the 100-year storm. However, an attempt to provide a separate emergency spillway

should always be made. Base the runoff calculations on the site conditions during construction. The flow through the dewatering orifice cannot be utilized when calculating the 100-year storm elevation because of its potential to become clogged; therefore, available spillway storage must begin at the principal spillway riser crest.

The principal spillway designed by the procedures described below will result in some reduction in the peak rate of runoff. However, the design will not control the discharge flow rates to the extent required to comply with [§3.4.7 MR7: Flow Control](#). The size of the contributing basin, the expected life of the construction project, the anticipated downstream effects, and the anticipated weather conditions during construction should be considered to determine the need for additional discharge control.

Principal Spillway: Determine the required diameter for the principal spillway (riser pipe). The diameter shall be the minimum necessary to pass the peak volumetric flow rate using a 15-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Use [Figure II-3.31: Riser Inflow Curves](#) to determine the riser diameter.

To aid in determining sediment depth, one-foot intervals shall be prominently marked on the riser.

Emergency Overflow Spillway: Size the emergency overflow spillway for the peak volumetric flow rate using a 10-minute time step from a Type 1A, 100-year, 24-hour frequency storm for the developed condition. See [BMP D.1: Detention Ponds](#) for additional guidance for Emergency Overflow Spillway design

Dewatering Orifice: Size of the dewatering orifice(s) (minimum 1-inch diameter) using a modified version of the discharge equation for a vertical orifice and a basic equation for the area of a circular orifice. Determine the required area of the orifice with the following equation:

$$A_o = \frac{A_s(2h)^{0.5}}{0.6 \times 3600 T g^{0.5}}$$

where

A_o = orifice area (square feet)

A_s = pond surface area (square feet)

h = head of water above orifice (height of riser in feet)

T = dewatering time (24 hours)

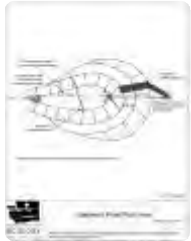
g = acceleration of gravity (32.2 feet/second²)

Convert the orifice area (in square feet) to the orifice diameter D (in inches):

$$D = 24 \times \sqrt{\frac{A_o}{\pi}} = 13.54 \times \sqrt{A_o}$$

The vertical, perforated tubing connected to the dewatering orifice must be at least 2 inches larger in diameter than the orifice to improve flow characteristics. The size and number of perforations in the tubing should be large enough so that the tubing does not restrict flow. The orifice should control the flow rate.

Figure II-3.28: Sediment Pond Plan View



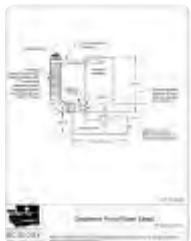
[pdf download](#)

Figure II-3.29: Sediment Pond Cross Section



[pdf download](#)

Figure II-3.30: Sediment Pond Riser Detail



[pdf download](#)

Figure II-3.31: Riser Inflow Curves



[pdf download](#)

Maintenance Standards

- Remove sediment from the pond when it reaches 1 foot in depth.
- Repair any damage to the pond embankments or slopes.

Washington State Department of Ecology

2019 Stormwater Management Manual for Western Washington (2019 SWMMWW)

Publication No. 19-10-021

Appendix C – Site Inspection Form

Construction Stormwater Site Inspection Form

Project Name 2119 Mildred St W Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*

Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (check all that apply):

Pre Construction/installation of erosion/sediment controls	<input type="checkbox"/>	Clearing/Demo/Grading	<input type="checkbox"/>	Infrastructure/storm/roads	<input type="checkbox"/>
Concrete pours	<input type="checkbox"/>	Vertical Construction/buildings	<input type="checkbox"/>	Utilities	<input type="checkbox"/>
Offsite improvements	<input type="checkbox"/>	Site temporary stabilized	<input type="checkbox"/>	Final stabilization	<input type="checkbox"/>

C. Questions:

- | | | | | |
|--|-----|-----|----|-----|
| 1. Were all areas of construction and discharge points inspected? | Yes | ___ | No | ___ |
| 2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen | Yes | ___ | No | ___ |
| 3. Was a water quality sample taken during inspection? (<i>refer to permit conditions S4 & S5</i>) | Yes | ___ | No | ___ |
| 4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* | Yes | ___ | No | ___ |
| 5. If yes to #4 was it reported to Ecology? | Yes | ___ | No | ___ |
| 6. Is pH sampling required? pH range required is 6.5 to 8.5. | Yes | ___ | No | ___ |

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: _____ Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required" details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✓

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
 All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

Construction Stormwater Site Inspection Form

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

Appendix D – Engineering Calculations



civil structural

Davido Consulting Group

Date: 12/21/2022

Name: Ryan Yokum

Project: Prose Fircrest

Description: Sediment Pond Calc

Sediment Pond Calc

$$SA = 2 \left(\frac{Q_2}{0.00096} \right)$$

 Q_2 = Peak flowrate of the 2yr developed runoff event

$$Q_2 = 3.03 \text{ CFS (From WWHM)}$$

SA = Surface Area

$$SA = 2 \left(\frac{3.03}{0.00096} \right)$$

$$SA = 6,313 \text{ SF}$$

Proposed SA = 8,000 SF > 6,313 ✓

Seattle

9706 4th Ave NE, Suite 300
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Tel 360.331.4131

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Mount Vernon, WA 98273
Tel 360.899.1110

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Federal Way, WA 98003
Tel 206.523.0024

APPENDIX E Operations & Maintenance Plan

Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound. No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.

Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults) (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.4: Maintenance Standards - Control Structure/Flow Restrictor

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as designed. Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)
Catch Basin	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.5: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regouted and secure at basin wall.
	Settlement/ Mis-alignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.

APPENDIX F Existing Vs. Proposed Flow Analysis



MEMORANDUM



TO: Tyler Bemis – City of Fircrest
FROM: Eric Schossow, PE
DATE: November 15, 2022
RE: 2119 Mildred St. W. Fircrest – Existing Vs. Proposed Stormwater Flow Rates

Existing Conditions:

The existing conditions of this site consist of a building, an asphalt roadway, concrete walking paths and grass/dirt areas. The grass/dirt areas consist of approximately 86% of the 9.18-acre site. Stormwater from non-impervious surfaces sheet flow to the east and is collected by an existing retention pond. Stormwater is then routed to the existing 18" storm main in a private easement northeast of the site. Existing stormwater from the roof areas and at grade impervious surfaces are tightlined to the existing storm drain in the private easement northeast of the site. There are no existing flow control structures on the site.

The existing on-site areas were modeled using WWHM which produced a 25-year flow rate of 2.38 CFS and a 100-year flow rate of 3.73 CFS.

Proposed Conditions:

The proposed conditions will consist of a multifamily development with associated parking areas, landscaping, and amenities. The Department of Ecology stormwater manual requires the stormwater in the proposed condition to match forested durations. This will be accomplished via the use of a detention vault with a flow control structure.

The proposed on-site areas were modeled using WWHM. The mitigated stormwater flows from the use of detention vaults and control structures results in a 25-year flow rate of 0.357 CFS and a 100-year flow rate of 0.452 CFS.

Summary of Results:

Existing 25-year flow rate = 2.38 CFS

Proposed 25- year flow rate = 0.357 CFS

~85% decrease in the 25-year flow rate from existing to proposed conditions

Existing 100-year flow rate = 3.73 CFS

Proposed 100- year flow rate = 0.452 CFS

~88% decrease in the 100-year flow rate from existing to proposed conditions

This project will significantly reduce the stormwater flow from this site from the existing to proposed conditions, therefore, improving downstream conditions. WWHM results for the existing condition can be found following this memo.

Sincerely,

Eric Schossow

WWHM2012
PROJECT REPORT

General Model Information

Project Name: default[1]
Site Name:
Site Address:
City:
Report Date: 11/15/2022
Gage:
Data Start: 10/01/1901
Data End: 09/30/2059
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Lawn, Mod 7.88

Pervious Total 7.88

Impervious Land Use acre
ROOF TOPS FLAT 1.3

Impervious Total 1.3

Basin Total 9.18

Element Flows To:
Surface Interflow Groundwater

Mitigated Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Lawn, Mod 7.88

Pervious Total 7.88

Impervious Land Use acre
ROOF TOPS FLAT 1.3

Impervious Total 1.3

Basin Total 9.18

Element Flows To:		
Surface	Interflow	Groundwater

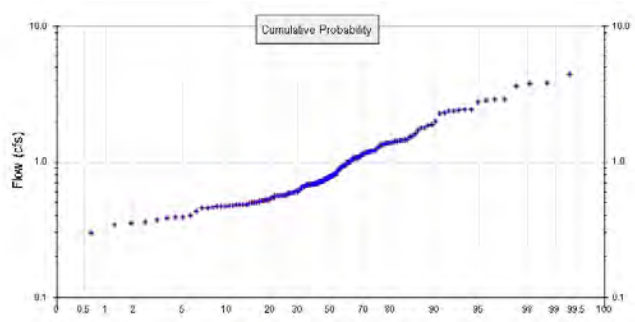
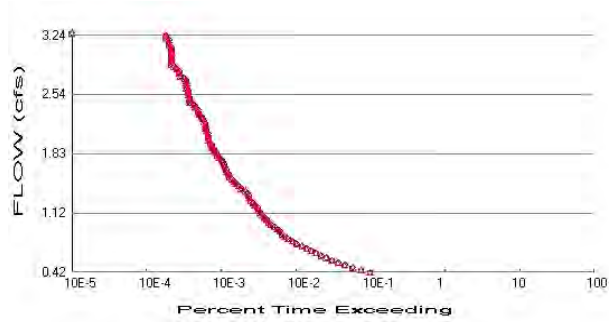
Routing Elements

Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 7.88
Total Impervious Area: 1.3

Mitigated Landuse Totals for POC #1

Total Pervious Area: 7.88
Total Impervious Area: 1.3

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.831312
5 year	1.379909
10 year	1.849129
25 year	2.581926
50 year	3.242401
100 year	4.012673

Existing Condition
Flow Rates

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.831312
5 year	1.379909
10 year	1.849129
25 year	2.581926
50 year	3.242401
100 year	4.012673

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.596	0.596
1903	0.638	0.638
1904	2.254	2.254
1905	0.485	0.485
1906	0.375	0.375
1907	1.218	1.218
1908	0.688	0.688
1909	0.763	0.763
1910	1.279	1.279
1911	1.074	1.074

1912	3.847	3.847
1913	0.560	0.560
1914	3.793	3.793
1915	0.513	0.513
1916	0.902	0.902
1917	0.292	0.292
1918	0.522	0.522
1919	0.519	0.519
1920	0.948	0.948
1921	0.717	0.717
1922	1.545	1.545
1923	0.766	0.766
1924	0.734	0.734
1925	0.466	0.466
1926	0.679	0.679
1927	0.476	0.476
1928	0.600	0.600
1929	1.381	1.381
1930	0.792	0.792
1931	0.587	0.587
1932	0.661	0.661
1933	0.696	0.696
1934	1.881	1.881
1935	0.478	0.478
1936	0.763	0.763
1937	1.382	1.382
1938	0.564	0.564
1939	0.462	0.462
1940	0.843	0.843
1941	0.704	0.704
1942	1.357	1.357
1943	0.891	0.891
1944	1.848	1.848
1945	0.768	0.768
1946	1.074	1.074
1947	0.433	0.433
1948	0.996	0.996
1949	1.045	1.045
1950	0.400	0.400
1951	0.607	0.607
1952	2.891	2.891
1953	2.368	2.368
1954	0.686	0.686
1955	0.356	0.356
1956	0.341	0.341
1957	0.567	0.567
1958	1.514	1.514
1959	1.399	1.399
1960	0.503	0.503
1961	2.423	2.423
1962	0.689	0.689
1963	0.391	0.391
1964	2.862	2.862
1965	1.061	1.061
1966	0.586	0.586
1967	1.414	1.414
1968	0.736	0.736
1969	0.721	0.721

1970	1.175	1.175
1971	1.193	1.193
1972	4.378	4.378
1973	1.182	1.182
1974	1.196	1.196
1975	2.402	2.402
1976	1.985	1.985
1977	0.389	0.389
1978	1.608	1.608
1979	0.936	0.936
1980	1.439	1.439
1981	0.722	0.722
1982	0.571	0.571
1983	1.144	1.144
1984	1.172	1.172
1985	1.773	1.773
1986	0.597	0.597
1987	1.444	1.444
1988	0.588	0.588
1989	0.566	0.566
1990	0.797	0.797
1991	1.462	1.462
1992	1.080	1.080
1993	0.801	0.801
1994	1.124	1.124
1995	0.521	0.521
1996	1.206	1.206
1997	0.678	0.678
1998	1.147	1.147
1999	0.500	0.500
2000	0.787	0.787
2001	0.525	0.525
2002	2.431	2.431
2003	0.775	0.775
2004	1.034	1.034
2005	2.751	2.751
2006	0.556	0.556
2007	1.061	1.061
2008	0.716	0.716
2009	0.536	0.536
2010	0.667	0.667
2011	0.470	0.470
2012	0.745	0.745
2013	0.992	0.992
2014	0.660	0.660
2015	2.366	2.366
2016	0.479	0.479
2017	0.945	0.945
2018	1.417	1.417
2019	2.289	2.289
2020	1.265	1.265
2021	0.934	0.934
2022	1.090	1.090
2023	0.929	0.929
2024	3.602	3.602
2025	0.483	0.483
2026	0.784	0.784
2027	0.682	0.682

2028	0.296	0.296
2029	0.735	0.735
2030	1.341	1.341
2031	0.354	0.354
2032	0.386	0.386
2033	0.473	0.473
2034	0.479	0.479
2035	1.370	1.370
2036	0.693	0.693
2037	0.502	0.502
2038	1.459	1.459
2039	1.003	1.003
2040	0.648	0.648
2041	0.813	0.813
2042	1.343	1.343
2043	0.993	0.993
2044	0.899	0.899
2045	0.611	0.611
2046	0.694	0.694
2047	0.543	0.543
2048	0.455	0.455
2049	0.809	0.809
2050	0.866	0.866
2051	1.706	1.706
2052	0.467	0.467
2053	0.560	0.560
2054	2.829	2.829
2055	0.680	0.680
2056	0.691	0.691
2057	0.453	0.453
2058	0.565	0.565
2059	1.781	1.781

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	4.3784	4.3784
2	3.8469	3.8469
3	3.7929	3.7929
4	3.6020	3.6020
5	2.8911	2.8911
6	2.8622	2.8622
7	2.8288	2.8288
8	2.7510	2.7510
9	2.4309	2.4309
10	2.4231	2.4231
11	2.4022	2.4022
12	2.3679	2.3679
13	2.3659	2.3659
14	2.2895	2.2895
15	2.2543	2.2543
16	1.9848	1.9848
17	1.8814	1.8814
18	1.8475	1.8475
19	1.7812	1.7812
20	1.7726	1.7726
21	1.7065	1.7065
22	1.6084	1.6084

23	1.5445	1.5445
24	1.5135	1.5135
25	1.4620	1.4620
26	1.4592	1.4592
27	1.4440	1.4440
28	1.4390	1.4390
29	1.4169	1.4169
30	1.4139	1.4139
31	1.3995	1.3995
32	1.3819	1.3819
33	1.3806	1.3806
34	1.3700	1.3700
35	1.3572	1.3572
36	1.3434	1.3434
37	1.3413	1.3413
38	1.2788	1.2788
39	1.2649	1.2649
40	1.2176	1.2176
41	1.2056	1.2056
42	1.1955	1.1955
43	1.1929	1.1929
44	1.1816	1.1816
45	1.1746	1.1746
46	1.1722	1.1722
47	1.1469	1.1469
48	1.1443	1.1443
49	1.1238	1.1238
50	1.0899	1.0899
51	1.0797	1.0797
52	1.0739	1.0739
53	1.0738	1.0738
54	1.0613	1.0613
55	1.0612	1.0612
56	1.0451	1.0451
57	1.0343	1.0343
58	1.0030	1.0030
59	0.9961	0.9961
60	0.9931	0.9931
61	0.9920	0.9920
62	0.9482	0.9482
63	0.9448	0.9448
64	0.9359	0.9359
65	0.9337	0.9337
66	0.9288	0.9288
67	0.9021	0.9021
68	0.8990	0.8990
69	0.8911	0.8911
70	0.8660	0.8660
71	0.8431	0.8431
72	0.8127	0.8127
73	0.8085	0.8085
74	0.8013	0.8013
75	0.7974	0.7974
76	0.7923	0.7923
77	0.7870	0.7870
78	0.7841	0.7841
79	0.7753	0.7753
80	0.7684	0.7684

81	0.7661	0.7661
82	0.7630	0.7630
83	0.7626	0.7626
84	0.7447	0.7447
85	0.7362	0.7362
86	0.7352	0.7352
87	0.7337	0.7337
88	0.7215	0.7215
89	0.7210	0.7210
90	0.7175	0.7175
91	0.7157	0.7157
92	0.7041	0.7041
93	0.6959	0.6959
94	0.6944	0.6944
95	0.6930	0.6930
96	0.6909	0.6909
97	0.6891	0.6891
98	0.6882	0.6882
99	0.6859	0.6859
100	0.6819	0.6819
101	0.6798	0.6798
102	0.6789	0.6789
103	0.6782	0.6782
104	0.6670	0.6670
105	0.6615	0.6615
106	0.6598	0.6598
107	0.6478	0.6478
108	0.6381	0.6381
109	0.6110	0.6110
110	0.6070	0.6070
111	0.6004	0.6004
112	0.5971	0.5971
113	0.5957	0.5957
114	0.5881	0.5881
115	0.5870	0.5870
116	0.5859	0.5859
117	0.5710	0.5710
118	0.5666	0.5666
119	0.5660	0.5660
120	0.5651	0.5651
121	0.5641	0.5641
122	0.5599	0.5599
123	0.5597	0.5597
124	0.5556	0.5556
125	0.5433	0.5433
126	0.5361	0.5361
127	0.5249	0.5249
128	0.5217	0.5217
129	0.5207	0.5207
130	0.5193	0.5193
131	0.5134	0.5134
132	0.5026	0.5026
133	0.5021	0.5021
134	0.5003	0.5003
135	0.4852	0.4852
136	0.4833	0.4833
137	0.4793	0.4793
138	0.4791	0.4791

139	0.4784	0.4784
140	0.4755	0.4755
141	0.4733	0.4733
142	0.4697	0.4697
143	0.4670	0.4670
144	0.4658	0.4658
145	0.4623	0.4623
146	0.4548	0.4548
147	0.4530	0.4530
148	0.4328	0.4328
149	0.4003	0.4003
150	0.3907	0.3907
151	0.3891	0.3891
152	0.3863	0.3863
153	0.3751	0.3751
154	0.3562	0.3562
155	0.3536	0.3536
156	0.3415	0.3415
157	0.2957	0.2957
158	0.2924	0.2924

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4157	5472	5472	100	Pass
0.4442	4176	4176	100	Pass
0.4728	3217	3217	100	Pass
0.5013	2503	2503	100	Pass
0.5299	2029	2029	100	Pass
0.5584	1688	1688	100	Pass
0.5870	1431	1431	100	Pass
0.6155	1218	1218	100	Pass
0.6441	1033	1033	100	Pass
0.6726	894	894	100	Pass
0.7012	770	770	100	Pass
0.7297	672	672	100	Pass
0.7583	567	567	100	Pass
0.7868	501	501	100	Pass
0.8154	441	441	100	Pass
0.8440	398	398	100	Pass
0.8725	368	368	100	Pass
0.9011	336	336	100	Pass
0.9296	310	310	100	Pass
0.9582	283	283	100	Pass
0.9867	255	255	100	Pass
1.0153	238	238	100	Pass
1.0438	223	223	100	Pass
1.0724	209	209	100	Pass
1.1009	196	196	100	Pass
1.1295	185	185	100	Pass
1.1580	176	176	100	Pass
1.1866	169	169	100	Pass
1.2151	156	156	100	Pass
1.2437	148	148	100	Pass
1.2722	139	139	100	Pass
1.3008	130	130	100	Pass
1.3294	129	129	100	Pass
1.3579	124	124	100	Pass
1.3865	117	117	100	Pass
1.4150	103	103	100	Pass
1.4436	95	95	100	Pass
1.4721	87	87	100	Pass
1.5007	83	83	100	Pass
1.5292	77	77	100	Pass
1.5578	72	72	100	Pass
1.5863	69	69	100	Pass
1.6149	65	65	100	Pass
1.6434	64	64	100	Pass
1.6720	62	62	100	Pass
1.7005	60	60	100	Pass
1.7291	58	58	100	Pass
1.7576	56	56	100	Pass
1.7862	52	52	100	Pass
1.8148	49	49	100	Pass
1.8433	47	47	100	Pass
1.8719	45	45	100	Pass
1.9004	42	42	100	Pass

1.9290	42	42	100	Pass
1.9575	40	40	100	Pass
1.9861	38	38	100	Pass
2.0146	37	37	100	Pass
2.0432	37	37	100	Pass
2.0717	37	37	100	Pass
2.1003	35	35	100	Pass
2.1288	34	34	100	Pass
2.1574	34	34	100	Pass
2.1859	34	34	100	Pass
2.2145	33	33	100	Pass
2.2430	31	31	100	Pass
2.2716	30	30	100	Pass
2.3002	28	28	100	Pass
2.3287	27	27	100	Pass
2.3573	27	27	100	Pass
2.3858	25	25	100	Pass
2.4144	24	24	100	Pass
2.4429	21	21	100	Pass
2.4715	21	21	100	Pass
2.5000	21	21	100	Pass
2.5286	20	20	100	Pass
2.5571	20	20	100	Pass
2.5857	20	20	100	Pass
2.6142	19	19	100	Pass
2.6428	19	19	100	Pass
2.6713	19	19	100	Pass
2.6999	19	19	100	Pass
2.7284	18	18	100	Pass
2.7570	16	16	100	Pass
2.7856	15	15	100	Pass
2.8141	15	15	100	Pass
2.8427	14	14	100	Pass
2.8712	13	13	100	Pass
2.8998	12	12	100	Pass
2.9283	12	12	100	Pass
2.9569	12	12	100	Pass
2.9854	12	12	100	Pass
3.0140	12	12	100	Pass
3.0425	12	12	100	Pass
3.0711	12	12	100	Pass
3.0996	12	12	100	Pass
3.1282	11	11	100	Pass
3.1567	11	11	100	Pass
3.1853	11	11	100	Pass
3.2138	10	10	100	Pass
3.2424	10	10	100	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

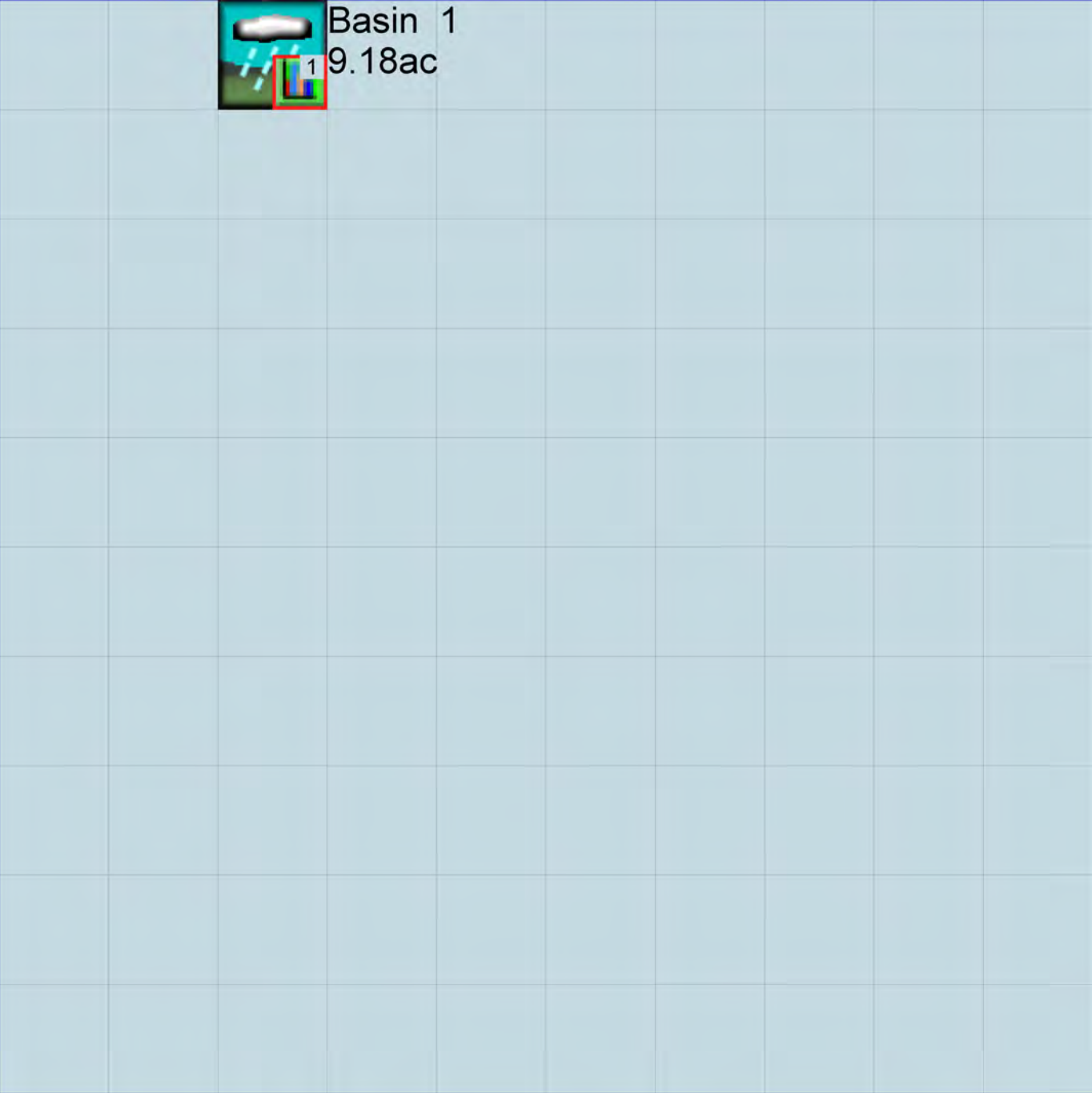
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

```
WWMH4 model simulation
START      1901 10 01      END      2059 09 30
RUN INTERP OUTPUT LEVEL    3      0
RESUME     0 RUN          1          UNIT SYSTEM      1
END GLOBAL
```

FILES

```
<File>  <Un#>  <-----File Name----->***
<-ID->                                     ***
WDM      26     default[1].wdm
MESSU    25     Predefault[1].MES
          27     Predefault[1].L61
          28     Predefault[1].L62
          30     POCdefault[1]1.dat
END FILES
```

OPN SEQUENCE

```
INGRP                      INDELT 00:15
  PERLND      17
  IMPLND       4
  COPY        501
  DISPLY       1
END INGRP
```

END OPN SEQUENCE

DISPLY

```
DISPLY-INFO1
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1   Basin 1          MAX          1   2   30   9
END DISPLY-INFO1
```

END DISPLY

COPY

```
TIMESERIES
# - #  NPT  NMN ***
1   1   1
501 1   1
END TIMESERIES
```

END COPY

GENER

```
OPCODE
#   # OPCD ***
END OPCODE
PARM
#   #           K ***
END PARM
```

END GENER

PERLND

```
GEN-INFO
<PLS ><-----Name----->NBLKS    Unit-systems    Printer ***
# - #                      User    t-series  Engl Metr ***
                      in  out
17   C, Lawn, Mod      1    1    1    1    27    0
END GEN-INFO
*** Section PWATER***
```

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL PEST NITR PHOS TRAC ***
17   0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
```

PRINT-INFO

```
<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL PEST NITR PHOS TRAC *****
17   0    0    4    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
```

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
17 0 0 0 0 0 0 0 0 0 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
17 0 4.5 0.03 400 0.1 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
17 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
17 0.1 0.25 0.25 6 0.5 0.25
END PWAT-PARM4

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
17 0 0 0 0 2.5 1 0
END PWAT-STATE1

END PERLND

IMPLND
GEN-INFO
<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out ***
4 ROOF TOPS/FLAT 1 1 1 27 0
END GEN-INFO
*** Section IWATER***

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
4 0 0 1 0 0 0
END ACTIVITY

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
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END PRINT-INFO

IWAT-PARM1
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IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
4 400 0.01 0.1 0.1
END IWAT-PARM2

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
4 0 0

```

```

END IWAT-PARM3

IWAT-STATE1
  <PLS > *** Initial conditions at start of simulation
  # - # *** RETS      SURS
  4      0      0
END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->
<Name> #
Basin 1***
PERLND 17      7.88      COPY 501      12
PERLND 17      7.88      COPY 501      13
IMPLND 4      1.3      COPY 501      15

*****Routing*****
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor-->strg <Name> # # <Name> # # ***
COPY 501 OUTPUT MEAN 1 1 48.4 DISPLY 1 INPUT TIMSER 1

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<Name> # <Name> # #<-factor-->strg <Name> # # <Name> # # ***
END NETWORK

RCHRES
GEN-INFO
  RCHRES Name Nexits Unit Systems Printer ***
  # - #<-----><----> User T-series Engl Metr LKFG ***
  in out ***
END GEN-INFO
*** Section RCHRES***

ACTIVITY
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  # - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
END ACTIVITY

PRINT-INFO
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  # - # HYDR ADCA CONS HEAT SED GQL OXRX NUTR PLNK PHCB PIVL PYR *****
END PRINT-INFO

HYDR-PARM1
  RCHRES Flags for each HYDR Section ***
  # - # VC A1 A2 A3 ODFVFG for each *** ODGTFG for each FUNCT for each
  FG FG FG FG possible exit *** possible exit possible exit
  * * * * * * * * * * * * * * * * * * * * * *
END HYDR-PARM1

HYDR-PARM2
  # - # FTABNO LEN DELTH STCOR KS DB50 ***
  <-----><-----><-----><-----><-----><-----> ***
END HYDR-PARM2

HYDR-INIT
  RCHRES Initial conditions for each HYDR section ***
  # - # *** VOL Initial value of COLIND Initial value of OUTDGT
  *** ac-ft for each possible exit for each possible exit
  <-----><-----> <----><----><----><----><----> *** <----><----><----><----><---->
END HYDR-INIT
END RCHRES

SPEC-ACTIONS

```

END SPEC-ACTIONS
 FTABLES
 END FTABLES

EXT SOURCES

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WDM	2	PREC	ENGL	1		IMPLND	1	999
WDM	1	EVAP	ENGL	1		PERLND	1	999
WDM	1	EVAP	ENGL	1		IMPLND	1	999

END EXT SOURCES

EXT TARGETS

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Volume->	<Member>	Tsys	Tgap	Amd	***
<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem	strg
COPY	501	OUTPUT	MEAN	1	1	48.4	WDM	501	FLOW	ENGL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***
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PERLND	PWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		12					
MASS-LINK		13					
PERLND	PWATER	IFWO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		13					
MASS-LINK		15					
IMPLND	IWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		15					

END MASS-LINK

END RUN

Mitigated UCI File

RUN

GLOBAL

```
WWM4 model simulation
START      1901 10 01      END      2059 09 30
RUN INTERP OUTPUT LEVEL    3      0
RESUME     0 RUN          1          UNIT SYSTEM      1
END GLOBAL
```

FILES

```
<File>  <Un#>  <-----File Name----->***
<-ID->                                     ***
WDM      26     default[1].wdm
MESSU    25     Mitdefault[1].MES
          27     Mitdefault[1].L61
          28     Mitdefault[1].L62
          30     POCdefault[1]1.dat
END FILES
```

OPN SEQUENCE

INGRP INDELT 00:15

```
PERLND    17
IMPLND     4
COPY       501
DISPLY     1
```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1   Basin 1          MAX          1   2   30   9
```

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

```
# - # NPT NMN ***
1   1   1
501 1   1
```

END TIMESERIES

END COPY

GENER

OPCODE

```
# # OPCD ***
```

END OPCODE

PARM

```
# # K ***
```

END PARM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
          in out          ***
```

```
17      C, Lawn, Mod          1   1   1   1   27   0
```

END GEN-INFO

*** Section PWATER***

ACTIVITY

```
<PLS > ***** Active Sections *****
```

```
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
17      0      0      1      0      0      0      0      0      0      0      0
```

END ACTIVITY

PRINT-INFO

```
<PLS > ***** Print-flags ***** PIVL PYR
```

```
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
17      0      0      4      0      0      0      0      0      0      0      0      1      9
```

END PRINT-INFO


```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
17 0 0 0 0 0 0 0 0 0 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
17 0 4.5 0.03 400 0.1 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
17 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
17 0.1 0.25 0.25 6 0.5 0.25
END PWAT-PARM4

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
17 0 0 0 0 2.5 1 0
END PWAT-STATE1

END PERLND

IMPLND
GEN-INFO
<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out ***
4 ROOF TOPS/FLAT 1 1 1 27 0
END GEN-INFO
*** Section IWATER***

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
4 0 0 1 0 0 0
END ACTIVITY

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
4 0 0 4 0 0 0 1 9
END PRINT-INFO

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
4 0 0 0 0 0
END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
4 400 0.01 0.1 0.1
END IWAT-PARM2

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
4 0 0

```


END SPEC-ACTIONS
 FTABLES
 END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target	vols>	<-Grp>	<-Member->	***
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WDM	2	PREC	ENGL	1	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1	IMPLND	1 999	EXTNL	PREC
WDM	1	EVAP	ENGL	1	PERLND	1 999	EXTNL	PETINP
WDM	1	EVAP	ENGL	1	IMPLND	1 999	EXTNL	PETINP

END EXT SOURCES

EXT TARGETS

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Volume->	<Member>	Tsys	Tgap	Amd	***
<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem	strg
COPY	1	OUTPUT	MEAN	1 1	48.4	WDM	701	FLOW	ENGL	REPL
COPY	501	OUTPUT	MEAN	1 1	48.4	WDM	801	FLOW	ENGL	REPL

END EXT TARGETS

MASS-LINK

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<Name>		<Name>	#	#<-factor->	<Name>		<Name>
MASS-LINK		12					
PERLND	PWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		12					
MASS-LINK		13					
PERLND	PWATER	IFWO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		13					
MASS-LINK		15					
IMPLND	IWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		15					

END MASS-LINK

END RUN

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GEOTECHNICAL ENGINEERING REPORT

PROPOSED DEVELOPMENT – PROSE FIRCREST

2119 MILDRED STREET WEST

FIRCREST, WASHINGTON

Project No. 21-529

December 14, 2022



Prepared for:

5`JUbW`F YgJXYbhjU`7 ca dUbm



3213 Eastlake Avenue E, Suite B
Seattle, WA 98102-3513
Tel: 206.262.0370

*Geotechnical & Earthquake
Engineering Consultants*



December 14, 2022
File No. 21-529

Garrett Hodgins
Alliance Residential Company | Pacific Northwest
1900 N Northlake Way, Suite 237
Seattle, WA 98103

Subject: Geotechnical Engineering Report
Proposed Development – Prose Fircrest
2119 Mildred Street West, Fircrest, Washington

Dear Garrett:

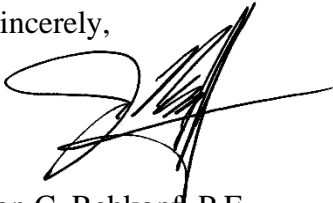
As requested, PanGEO, Inc. completed a geotechnical engineering study to assist you and your project team with the design and construction of the proposed development in Fircrest, Washington. PanGEO previously prepared a draft geotechnical report dated July 19, 2022. The following report is consistent with our draft report, but includes additional recommendations that have been provided to the project team since the draft report was issued.

In summary, the site is underlain by as much as about 35 feet of undocumented fill soil over dense to very dense native silty sand with gravel (glacial till). The fill soils are generally loose, and will not provide adequate support for the proposed structures. In our opinion, where more than about five feet of loose fill is present, such as within the eastern half of the site, a feasible foundation system consists of supporting the structures on a shallow foundation bearing on ground improved with aggregate piers. Along the west side of the site, where the fill is generally less than five feet thick, we anticipate that the building footings could be deepened to reach the native soils, or the unsuitable fill soils can be over-excavated and replaced with lean-mix concrete or structural fill. Ground improvement may also be used below the buildings along the west side of the site to reduce earthwork quantities associated with over-excavation and backfill.

The re-use of on-site fill soils may be possible below proposed landscaping or pavement areas during periods of dry weather, but will be difficult or impossible to re-use during periods of wet weather. The on-site soils may be amended with cement to allow their re-use during wet times of the year.

We appreciate the opportunity to work with you on this project. Please do not hesitate to contact us with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jon C. Rehkopf', with a large, stylized flourish extending from the end.

Jon C. Rehkopf, P.E.
Principal Geotechnical Engineer
(JRehkopf@pangeoinc.com)

Encl.: Geotechnical Engineering Report

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Figure 1	Vicinity Map
Figure 2	Site and Exploration Plan
Figure 3	Approximate Elevation of Glacial Till Contact
Figure 4	Cross Section A-A' & B-B'
Figures 5A-5E	Cross Sections C-C'

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Appendix A: Previous Subsurface Explorations – Kleinfelder (2005)

Appendix B: Previous Subsurface Explorations – Terracon (2008)

**GEOTECHNICAL ENGINEERING REPORT
PROPOSED DEVELOPMENT – PROSE FIRCREST
2119 MILDRED STREET WEST
FIRCREST, WASHINGTON**

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering study that was undertaken to support the design and construction of the proposed Prose Fircrest development along Mildred Street West in Fircrest, Washington. Our study was performed in general accordance with our mutually agreed scope of work as outlined in our consulting agreement for the project dated November 19, 2021.

Our service scope included reviewing readily available geologic data at the project site which included the results of two previous geotechnical studies that were conducted for the project site, conducting a site reconnaissance, and conducting engineering analyses to develop the geotechnical recommendations outlined in this report. PanGEO will finalize this report once we receive comments from the project team, and the design concept has been finalized.

2.0 SITE AND PROJECT DESCRIPTION

The subject site consists of a generally square-shaped parcel located at 2119 Mildred Street West, in Fircrest, Washington, as depicted in Figure 1. The site has an area of about 9½ acres, and is currently developed with a one-story structure in the northwest portion of the site. The remainder of the site is undeveloped, but has received a significant amount of undocumented fill soils.

The western approximately two-thirds of the site is generally flat, with an elevation around 335 feet to 340 feet (NGVD 1929) with a gentle slope down to the east, while the remainder of the site slopes steeper down to the east to the eastern property line which has an elevation of about 315 feet (NGVD 1929).

An aerial photo of the project site depicting site features is shown in the attached Figure 2, *Site and Existing Exploration Plan*. Plates 1 and 2 on the following page depict current site conditions.



Plate 1. Looking northeast from Mildred Street West at the existing structure located along the west side of the subject property.



Plate 2. Looking north along eastern portion of site, from near the center of site. Note the sloping topography down to the east.

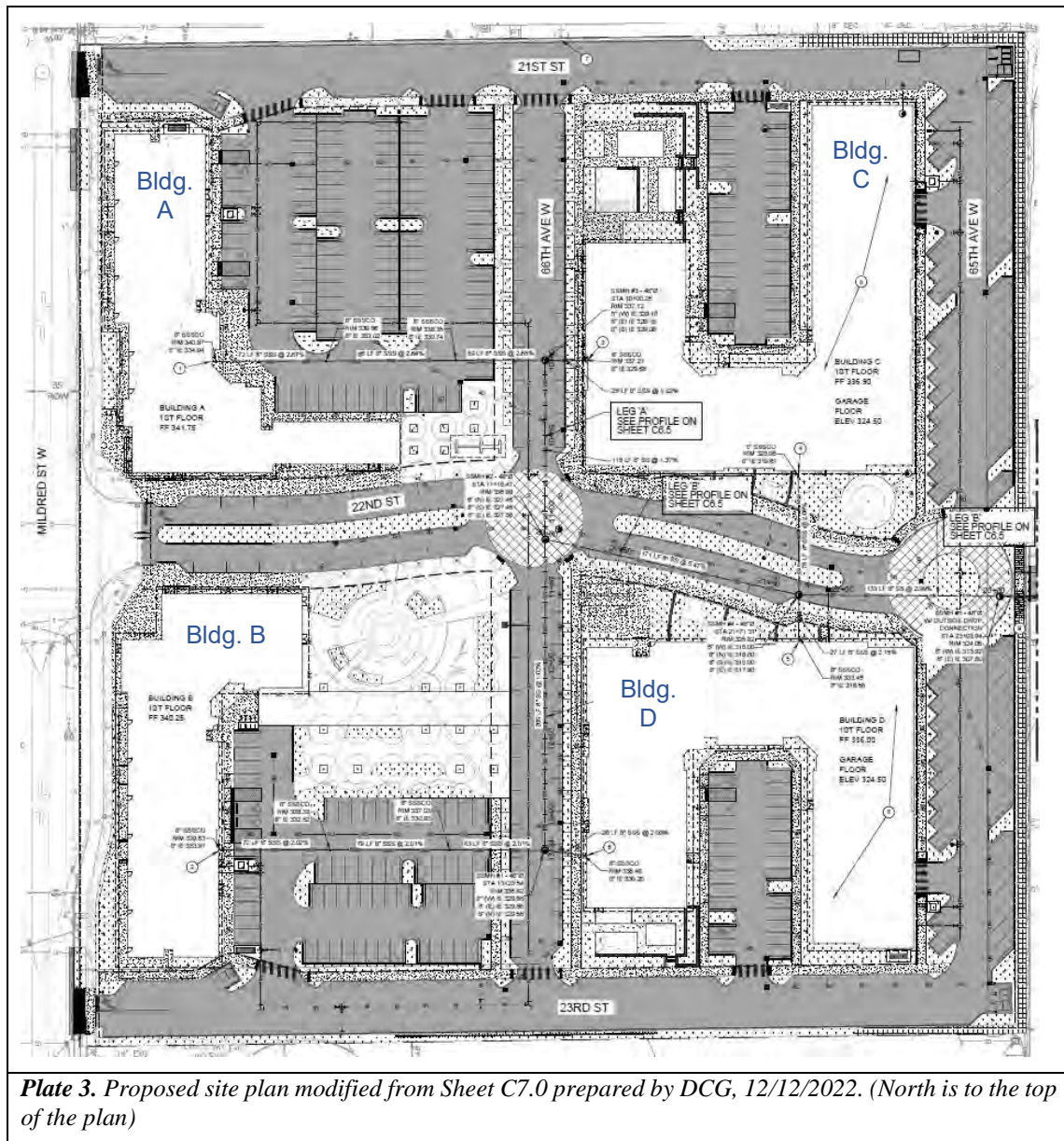
The current development plan consists of the construction of four primary structures that will be surrounded with open spaces and at-grade surface parking lots and drive lanes. The western two structures (Buildings A and B) will consist of five levels of timber-frame construction, and will be located along Mildred Street West. Buildings A and B will be at-grade structures without basements. We understand that the finished floor elevation of Building A will be around elevation 341.75 feet, and the finished floor elevation for Building B will be around elevation 340.25 feet.

The two eastern structures, designated Building C and D, will contain underground parking in a daylight basement along the east side of the structure. We understand Buildings C and D will contain four above-grade levels, with one concrete deck and timber framing above. Buildings C and D will have a basement finished floor elevation of about 325 feet.

A large stormwater detention vault that will service the majority of the site will be located below the basement floor of Building C, and will have a bottom elevation around 303 feet.

A site retaining wall up to about 12-feet tall will be needed along the eastern property line to allow for the change in grade between the proposed eastern parking lot and the existing ground surface along the eastern property line.

The currently proposed site plan is shown on the following page depicting the proposed buildings and site features.



3.0 SUBSURFACE EXPLORATIONS

In preparing this report we reviewed two previously completed geotechnical studies performed at the site. The previous studies included drilling over sixty test borings at the site. The existing geotechnical information reviewed included the following:

- Final geotechnical report prepared by Kleinfelder (2005) for the subject site that included 56 test borings spaced relatively equally across the site. The report also included laboratory tests of representative soil samples; and

- Preliminary geotechnical report prepared by Terracon (2008) for the subject site that included 9 test borings generally located in the northern half of the subject site.

The approximate locations of the previous explorations are presented in Figures 2 and 3 of this report, and the summary logs are included in Appendix A and B.

Laboratory Testing - The results of previous laboratory tests can be found in Appendix A.

4.0 SUBSURFACE CONDITIONS

4.1 GEOLOGY

Based on a review of the geologic map of the project area (Schuster et. al. 2015), the site is underlain by deposits of the Vashon Stade of the Fraser Glaciation including recessional outwash soils (map unit Qgo). Recessional outwash is described as silt, clay, sand and gravel deposited by glacial meltwater, variable sorted, loose to compact, massive to well stratified, with horizontal to steeply dipping beds. Vashon glacial till (map unit Qgt) is also mapped in close proximity to the north, west and south side of the project site. Vashon glacial till typically consists of an over-consolidated heterogeneous mixture of sand, silt and gravel deposited directly below the glacial ice sheet during the Vashon Stade of the Fraser Glaciation. Glacial till typically exhibits low compressibility and high strength characteristics.

4.2 SOIL

Based on the results of previous explorations at the site, the site soils consist of a thin to thick layer of generally loose undocumented fill over dense glacial till. The subsurface conditions encountered in the explorations differed slightly from the mapped geology in that glacial till was not mapped directly on the subject property.

The site subsurface conditions are summarized below, and logs of the subsurface explorations at the site are included in Appendix A and B. In addition, the attached Figure 3 shows the anticipated elevation of the native glacial till soils across the site, and Figures 4 and 5 include subsurface profiles across the site depicting the anticipated depth of the fill soils and elevation of the native glacial till.

Unit 1: Undocumented Fill – The site is underlain by undocumented fill soils that range in thickness from only about 2 to 5 feet thick along the western side of the site, to up to about 35 feet deep within the eastern portion of the site. Based on our review of the test borings logs, the fill material consists of a mixture of silty sand, sandy silt and silt with various amounts of gravel and debris such as concrete fragments, bricks, wood, organics, and other deleterious materials. The density of the fill is generally very loose to medium dense.

Unit 2: Glacial Till – Underlying the fill soil is a dense to very dense silty sand with varying amounts of gravel that was interpreted to be glacial till. The very dense glacial till was encountered to the termination depth of the test borings. Cobbles and boulders are common in glacial till deposits, as are pockets of clean sand and gravel.

4.3 GROUNDWATER

Significant groundwater was not encountered in the previous test borings. Occasionally perched groundwater was noted in the fill soils, on-top of the dense glacial till soils, or within sandy or gravelly zones of the native glacial till. It should be noted that groundwater depths are likely to vary depending on seasonal precipitation, local subsurface conditions, and other factors. Groundwater levels and seepage rates are normally highest during the winter and early spring.

5.0 SEISMIC CONSIDERATIONS

5.1 SEISMIC DESIGN PARAMETERS

The seismic design of the building will be accomplished in accordance with the 2018 International Building Code (IBC). Based on the results of the previous subsurface explorations, as well as our understanding of the geology of the area, we anticipate that a Site Class C would be appropriate for Buildings A and B located on the west side of the subject site. Due to the thick fill soils on the eastern portion of the site, we recommend a Site Class D (stiff soil) would be appropriate for Buildings C and D.

5.2 SOIL LIQUEFACTION POTENTIAL

Liquefaction occurs when saturated sands are subjected to cyclic loading, which causes the pore water pressure to increase in the soils thereby reducing the inter-granular stresses. As the inter-granular stresses are reduced, the shearing resistance between soil particles decreases. If pore pressures develop to the point where the effective stresses acting between the grains become zero, the soil particles will be in suspension and behave like a viscous fluid. Typically loose, saturated, granular soils such as sand and silt, that have a low enough permeability to prevent drainage during cyclic loading, have the greatest potential for liquefaction, while more dense soil deposits with higher silt or clay contents have a lesser potential. Soil liquefaction may cause the temporary loss/reduction of foundation capacity and settlement.

Due to the dense to very dense soils underlying the site, and the lack of groundwater at shallow depths, in our opinion the risk of soil liquefaction is low, and special design considerations for soil liquefaction are not required for the proposed project

6.0 GEOTECHNICAL RECOMMENDATIONS

6.1 BUILDINGS A & B

We understand the proposed first floors for buildings A and B will be near existing grade. Based on the results of the test borings at the site and our understanding of the current building layout, we anticipate that dense native soils will be present at or within about 2 to 5 feet of existing grade over the majority of the building footprint, but could be as deep as 8 to 10 feet in some areas. Figure 3 depicts the anticipated elevation of the glacial till bearing soils at the site. If the glacial till is not present at the design footing subgrade elevation, the footings can either be deepened to bear on the dense native soils, or the undocumented fill can be over-excavated and replaced with lean-mix concrete or properly compacted structural fill. The over-excavation would need to only occur below the footings, and the lean-mix backfill would need to extend about 6-inches wider than the proposed footings. Alternatively, ground improvement can be used, such as rammed aggregate piers, as described below for Buildings C and D.

6.1.1 Allowable Bearing Pressure

We recommend that the footings bearing on native, undisturbed dense to very dense glacial till be designed for a maximum allowable bearing pressure of 6,000 psf. If footings are supported on structural fill placed over dense, undisturbed glacial till, the structural fill should consist of lean-mix concrete (minimum 1½ sack mix). If compacted granular structural fill is placed below the footings, a reduced allowable bearing pressure of 4,000 psf should be used for design. The granular structural fill should extend wider than the footings by a horizontal distance equal to half of the over-excavation depth. For allowable stress design, the recommended allowable bearing pressure may be increased by 1/3 for transient conditions such as wind and seismic loadings.

If some or all of the building footings or mat slab will bear on ground improved with rammed aggregate piers, the bearing pressure will be determined by the ground improvement designer, as described below for Buildings C & D.

All footings should have a minimum width of 24 inches. Exterior foundation elements should be placed at a minimum depth of 18 inches below final exterior grade. Interior spread foundations should be placed at a minimum depth of 12 inches below the top of slab.

6.1.2 Foundation Performance

Total and differential settlements are anticipated to be within tolerable limits for footings designed and constructed as discussed above. Footing settlement under static loading conditions is estimated to be less than approximately 1 inch, and differential settlement between adjacent columns should be less than about ½ inch. Most settlement will occur during construction as loads are applied.

6.1.3 Lateral Resistance

Lateral forces from wind or seismic loading may be resisted by the combination of passive earth pressures acting against the embedded portions of the foundations and by friction acting on the base of the foundations. Passive resistance values may be determined using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value includes a factor of safety of at least 1.5 assuming that properly compacted structural fill will be placed adjacent to the sides of the footings. A coefficient of friction of 0.35 may be used to

determine the frictional resistance at the base of the footings. This coefficient includes a factor of safety of approximately 1.5.

6.1.4 Footing Construction Considerations

All footing subgrades should be carefully prepared. Any loose soil should be removed from the footing excavations or re-compacted. Footing subgrades should be observed by PanGEO to confirm that the exposed footing subgrade is consistent with the expected conditions and adequate to support the design bearing pressure.

6.1.5 Subgrade Protection

The contractor should be aware that the site soils are highly sensitive to moisture, and will become disturbed and soft when exposed to inclement weather conditions. As a result, depending on the groundwater and weather conditions at the time of footing construction, and the actual soil conditions encountered, it may be necessary to place 2 to 4 inches of clean crushed rock or lean-mix concrete (1½ sack) on the exposed footing subgrade to protect it against moisture and disturbance.

If groundwater seepage is encountered, the contractor should be prepared to dewater the footing excavations using sumps and pumps to allow for proper subgrade preparation. In addition, the contractor should consider proper sequencing of earthwork activities during wet weather to minimize moisture exposure of footing and floor subgrade soils.

6.1.6 Slab On Grade

Conventional slab on grade construction may be used for the floor slabs. Due to the potential for up to 4 or 5 feet of loose undocumented fill below the floor slab, to increase the performance of the floor slab, and reduce the potential for cracking, we recommend that a minimum of 2 feet of undocumented fill be removed and replaced with properly compacted structural fill. Prior to re-compaction, any existing loose soil in the over-excavation should be compacted to a firm and unyielding condition. Based on the subgrade preparation recommended above, the floor slab design may be accomplished using a modulus of subgrade reaction of 150 pci.

We recommend that the slab on grade be constructed on a minimum 4-inch thick capillary break placed on the undisturbed native soil or properly compacted structural fill over native

soil. The capillary break should have no more than 10 percent passing the No. 40 sieve and less than 2 percent by weight of the material passing the U.S. Standard No. 200 sieve. If portions of the basement floor will house any equipment or facilities that are sensitive to moisture, we recommend that a minimum 10-mil polyethylene vapor barrier be placed below the subject portions of the slab.

6.2 BUILDINGS C & D

We understand the proposed garage floors for buildings C and D will be around elevation 325 feet, and the first floors of the buildings will be around elevation 336 and 337 feet. Based on the results of the test borings at the site, we anticipate that from about 15 to 25 feet of undocumented fill will be present below the proposed structures. One exception is below the proposed detention vault under building C, which may likely reach bearing soils without the need for ground improvement. Due to the loose and variable nature of the fill soils, the fill will not be suitable to support the proposed structures due to the potential for long-term settlement.

In our opinion a feasible foundation support option from a geotechnical standpoint is to install aggregate piers to improve the bearing capacity of the existing fill soils, and to reduce the potential for settlement to a tolerable level. Conventional shallow foundations could then be constructed over the improved ground.

Another option consisting of a deep foundation, such as augercast or driven piles, was considered; however, in our opinion piles would not be as cost-effective as ground improvement using aggregate piers.

6.2.1 Ground Improvement with Aggregate Piers

In our opinion, a feasible soil improvement technique consists of improving the loose to medium dense undocumented fill consisting of sand, silty sand and silt below the proposed structure with aggregate piers. Aggregate piers consist of compacting columns of well-graded crushed rock to increase the bearing capacity of poor soils, and to reduce settlements.

Because specialty contractors install aggregate piers using a proprietary system, the contractor determines the lengths and spacing of piers, the allowable soil bearing pressure

of the improved soil, improved soil characteristics and anticipated settlements. Specifically, the specialty contractor is responsible for the ground improvement design, and will provide design drawings and calculations stamped by a registered professional engineer.

We anticipate that the aggregate piers would need to extend through the undocumented fill to reach the undisturbed native soils approximately 15 to 25 feet below the proposed structures. The actual depth of ground improvements should be determined by the design-build contractor to meet the project specifications.

6.2.2 Shallow Foundation

In our opinion it would be feasible to support the new structure on conventional spread and strip footings bearing on closely spaced ground improvement elements or on a mat slab. We anticipate that the ground improvement can be designed to provide an allowable bearing capacity in the range of 4 to 6 ksf, depending on the spacing of aggregate piers. A discussion with the design-build contractor is recommended before selecting the allowable bearing pressure to size the footings or design the mat slab.

6.2.3 Lateral Resistance

Lateral forces from wind or seismic loading may be resisted by a combination of passive earth pressures acting against the embedded portions of the foundation, and by friction acting on the base of the foundation. Passive resistance values may be determined using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value includes a factor of safety of at least 1.5 assuming that properly compacted structural fill will be placed adjacent to the sides of the foundation, and level ground surface adjacent to the footings.

A friction coefficient of 0.4 may be used to determine the frictional resistance at the base of the foundation on improved ground. This coefficient includes a factor of safety of approximate 1.5.

6.2.4 Slab on Grade

The thick layer of loose undocumented fill below the basement floor slabs has the potential to settle and cause cracking of the floors. As such, to increase the performance of the floor slabs and reduce the potential for settlement, we recommend that ground improvement

elements be installed below the floor slab to provide adequate support for the slab on grade. Ground improvement elements to support a floor slab are typically much more widely spaced than ground improvement elements below footings.

We recommend that the slab on grade be constructed on a minimum 4-inch thick capillary break placed on the undisturbed native soil or properly compacted structural fill over native soil. The capillary break should have no more than 10 percent passing the No. 40 sieve and less than 2 percent by weight of the material passing the U.S. Standard No. 200 sieve. If portions of the basement floor will house any equipment or facilities that are sensitive to moisture, we recommend that a minimum 10-mil polyethylene vapor barrier be placed below the subject portions of the slab.

6.3 BASEMENT WALLS

Presented below are our geotechnical recommendations for the design and construction of the proposed basement walls.

6.3.1 Lateral Earth Pressures

The basement walls braced against rotation may be designed for an earth pressure based upon an equivalent fluid weight of 50 pcf (at-rest condition). For the seismic condition, we recommend including an incremental uniform lateral earth pressure of $10H$ psf (where H is the height of the below grade portion of the wall) as an ultimate seismic load. The recommended lateral pressures assume that the backfill behind the wall consists of a free draining and properly compacted fill with adequate drainage provisions to prevent the development of hydrostatic pressure.

Buried Structures (Elevator Pits, Detention Vaults, etc.) - There is potential for groundwater to accumulate next to buried structures such as elevator pits and detention vaults. If it is not feasible to incorporate footing drains for elevator pits, detention vaults, etc., we recommend that an equivalent fluid weight of 90 pcf be applied for wall design. The recommended 90 pcf includes both the soil pressure and the effects of hydrostatic pressure. Buoyancy force should also be considered in the design of these structures where drainage provisions are not present.

6.3.2 Wall Surcharge

The basement walls should be designed to accommodate traffic surcharge pressures if the traffic load is located within the height dimension of the wall. As minimum, the traffic surcharge should be considered to be a 75 psf uniform horizontal pressure for roadway traffic, and 25 psf if the traffic is limited to lightweight passenger vehicles. Similarly, surcharge loads from construction equipment or soil/material stockpiles should be considered in the basement wall design.

6.3.3 Lateral Resistance

Please see Sections 6.1.3 and 6.2.3 above for a discussion of lateral resistance.

6.3.4 Wall Drainage/Damp Proofing

We recommend that provisions for permanent control of subsurface water be incorporated into the design and construction of the basement walls. Prefabricated drainage mats, such as Mirafi 6000 or equivalent, may be installed behind the basement walls. For backfilled walls, a footing drain consisting of a 4-inch diameter perforated PVC pipe embedded in at least 12 inches of washed gravel wrapped with a geotextile fabric should be placed at the base of the wall footings.

Waterproofing considerations are beyond our scope of work. We recommend that a building envelope specialist be consulted to determine appropriate damp-proofing or water-proofing measures.

6.3.5 Wall Backfill

Where wall backfill will be needed, free draining granular soils such as Gravel Borrow (Section 9-03.14(1) WSDOT) are recommended. We do not recommend using the onsite soils for wall backfill due to its relatively high fines content.

Wall backfill should be moisture conditioned to near its optimum moisture content, placed in loose, horizontal lifts less than 8 to 12 inches in thickness, and systematically compacted to a dense and relatively unyielding condition. If density tests will be performed, the test results should indicate at least 95 percent of the maximum dry density, as determined using

test method ASTM D 1557. Within 5 feet of the wall, the backfill should be compacted to at least 90 percent of the maximum dry density.

6.4 SUBSURFACE DRAINAGE PROVISIONS

Footing drains should be installed around the perimeter of the buildings, at or just below the invert of the foundation. The footing drains should consist of a 4-inch diameter perforated drainpipe placed behind and at the base of the footings, embedded in 12 to 18 inches of clean crushed rock or pea gravel wrapped with a layer of filter fabric.

Under no circumstances should roof downspout drain lines be connected to the footing drain systems. Roof downspouts must be separately tightlined to appropriate discharge locations. Cleanouts should be installed at strategic locations to allow for periodic maintenance of the footing drain and downspout tightline systems.

6.5 PERMANENT DRAINAGE & INFILTRATION CONSIDERATIONS

Permanent control of surface water and roof runoff should be incorporated in the final grading design. In addition to these sources, irrigation and rain water infiltrating into landscaped and planter areas adjacent to paved areas or building foundations should also be controlled. All collected runoff should be directed into conduits that carry the water away from the pavement or structure and into storm drain systems or other appropriate outlets. Adequate surface gradients should be incorporated into the grading design such that surface runoff is directed away from structures.

Based on the presence of undocumented fill over dense to very dense glacial till, in our opinion infiltration is not feasible for the project.

6.6 PAVEMENT DESIGN & CONSIDERATIONS

We understand that asphalt paved parking lots and drive lanes will be constructed around the proposed buildings. Assuming the pavement will generally be used by light passenger cars and trucks, as a minimum, we recommend that the pavement section consist of 3-inches HMA, overlying a 6-inch thick layer of crushed surfacing base course (CSBC), overlying properly compacted structural fill. For pavement areas that will receive regular loading of heavy trucks, including delivery trucks or garbage trucks, we recommend a heavier pavement section consisting of a minimum of 4 inches of HMA over 6-inches of

CSBC. As a pavement alternative, the layer of crushed rock maybe substituted for a minimum 12-inch thick layer of cement treated base, as described in the *Section 6.6.2* below. If ATB (Asphalt Treated Base) is to be used as a temporary pavement during construction, and then incorporated into the final pavement design, the bottom one inch of HMA may be replaced with 2 inches of ATB. Alternatively, half of the HMA pavement section could be placed early in the project for construction access. Prior to final paving, any areas of pavement that have become distressed from construction traffic will need to be locally repaired.

It should be noted that actual pavement performance will depend on a number of factors, including the actual traffic loading conditions. The recommended pavement section will need to be revised if the traffic level will be more or less than our assumed value.

6.6.1 Pavement Subgrade Preparation

Following the stripping operation and excavations necessary to achieve construction subgrade elevations, the ground surface where structural fill, or pavements are to be placed should be observed by PanGEO. Proof-rolling should be performed to identify soft or unstable areas. Proof-rolling should be performed using a full loaded, tandem-axle dump truck with a minimum gross weight of 20 tons. Other equipment can be used, provided the subgrade loading is equivalent. The dump truck should make several overlapping passes in perpendicular directions over a given area. Soft or yielding areas identified during proof-rolling should be moisture conditioned as needed and re-compacted in place.

If soft areas are still yielding after re-compaction, they should be over-excavated and replaced with structural fill to a depth that will provide a stable pavement base. The optional use of a geotextile subgrade stabilization fabric, such as Mirafi 600X, or an equivalent product placed directly on the over-excavated surface may help to bridge excessively unstable areas. Over-excavated areas should be and backfilled with 1¼-inch Crushed Surfacing Base Course, or WSDOT gravel borrow to the requirements of structural fill. The subgrade preparation should be observed by PanGEO to verify the adequacy of the prepared subgrade.

Both the structural fill and crushed rock base should be compacted to a minimum of 95% of the materials maximum dry density (Modified Proctor ASTM D-1557). Any soft or

loose areas of subgrade soils should be re-compacted or over-excavated prior to structural fill placement.

6.6.2 Cement Treated Base

Cement Treated Base (CTB) is a mixture of aggregate material and/or soils combined with a pre-determined amount of cement and water, which hardens after placement and compaction. After sufficient hardening, a tack coat and HMA wearing course is placed over the CTB to complete the pavement structure. For this project, the existing fill soils should be suitable for cement treatment. The existing soils will be mixed with a pre-determined quantity of cement and water and then compacted. Conventional rollers are used to compact the CTB mixture immediately after the mixing is completed. CTB can be an economical option as it eliminates the need to import base course and can reduce or eliminate the need to export the on-site soils.

If CTB is used for the pavement section, we recommend at least 3 inches of HMA over 12 inches of CTB. We recommend 5% cement by weight be mixed with the fill soil. Assuming a fill soil unit weight of about 125 pcf, a minimum of 6¼ pounds of Type 1 Portland cement should be added to the soil mixture per square foot of 12-inch thick CTB layer. Type 3 cement is also acceptable, however, because Type 3 cement hydrates faster, we suggest Type 1 cement be used so more time is available to properly compact the CTB. We typically do not recommend a layer of crushed rock between the HMA and CTB due to the potential risk of water becoming trapped in the gravel layer.

In our opinion it would be acceptable to reuse the existing asphalt at the site in the cement treated soils. If the asphalt pavement is pulverized for re-use in the CTB construction, we recommend that at least 95% passes a 2-inch sieve, and at least 55% passes a No. 4 sieve. No more than 50% of the final mixed materials should contain more than 50% of the existing bituminous materials. We also recommend that the final mixed materials be moisture conditioned to within 3% of its optimum moisture content (i.e. optimum moisture content before addition of cement) and be compacted to at least 95% of its maximum density as determined using ASTM D1557 (Modified Proctor).

In our opinion cement treatment would also be suitable below the footprints of building C & D to not only provide a stable working surface for the ground improvement contractor, but also to provide a firm subgrade to support the building floor slab.

6.7 SITE RETAINING WALLS

We understand that an approximately 12-foot-tall site retaining wall will be located along the eastern property line of the site, with return walls along the eastern portion of the north and south property lines. Many different wall types are feasible at this location, including MSE (Mechanically Stabilized Walls), gravity walls, cast-in-place concrete walls, or soldier pile walls. We understand that the currently proposed wall type will be an MSE wall over the majority of the wall alignment, with the exception of a concrete cast-in-place wall that will be utilized at the center of the east wall to allow for stairway construction. MSE walls can have a variety of facing elements such as precast-concrete blocks or panels, geotextile wrapped faces, or wire mesh. We understand that the proposed wall will have a modular block wall facing. We offer the following recommendations for MSE walls along the east property line of the site.

6.7.1 Ground Improvement

Based on the results of the existing test borings along the east property line, up to about 10 feet of loose undocumented fill is present below the proposed base of wall elevation. As such, we recommend that ground improvement elements, such as rammed aggregate piers, be installed below the proposed wall alignment. The ground improvement should be installed below the MSE wall facing and the reinforced backfill zone to provide adequate bearing capacity of the foundation soils, and to reduce wall settlement. We anticipated about three rows of aggregate piers may be needed below the wall. The length of the ground improvement elements should be quite short, on the order of 10 feet below the bottom of the wall.

The spacing and size of the ground improvement elements will depend on the wall design and required bearing capacity. We recommend that the ground improvement design provide a minimum allowable bearing capacity of 2,500 psf, unless the wall designer requires a higher bearing capacity, and we recommend that the ground improvement be designed for a total wall settlement of 1 inch or less, unless more settlement is acceptable to the owner. The ground improvement below the wall will also improve the global stability of the wall.

6.7.2 MSE Wall Design Recommendations

An MSE wall or SEW (Structural Earth Wall) consists of placing a reinforcing mesh onto lifts of compacted structural fill to create a reinforced earth mass that functions as the retaining structure. The face of the reinforced fill can receive a variety of treatments depending on cost and aesthetics. We understand that modular blocks, such as those manufactured by Keystone, will be utilized for this project.

We recommend the following soil parameters presented in Table 1 below be utilized for the MSE wall design:

Table 1
Design Parameters for Mechanically Stabilized Earth (MSE) Walls

Soil Properties	Reinforced Wall Backfill¹	Retained Soil
Unit Weight (pcf)	130	125
Friction Angle (deg)	36	32
Cohesion (psf)	0	0

Notes: ¹ – Wall backfill should be Gravel Borrow (WSDOT, 2022).

The following recommendations should be satisfied to provide external stability of the proposed MSE walls. We recommend that MSE walls be constructed in accordance with Section 6-13 of the Standard Specifications (WSDOT, 2022), with the following information included in the project plans.

1. The wall may be constructed near vertical, without a specified batter.
2. The wall should be placed on a level foundation in the horizontal direction perpendicular to the wall face.
3. The reinforcing length should not be less than 70 percent of the wall height, with a minimum reinforcing length of 8 feet. The recommended minimum reinforcing length may need to be increased to maintain adequate external stability based on final design configurations. Greater reinforcing lengths may be needed to provide adequate internal stability.
4. The minimum embedment of the walls should be 2 feet below adjacent finish grade, or 10% of the height of the wall, whichever is greater.

5. The uppermost reinforcing layer should be placed no lower than 2 feet below the top of wall. Welded wire faced systems should include a top mat at the top of the wall.
6. Special drainage elements, such heel drains should be considered based on the final design of the wall.

6.7.3 MSE Walls Backfill

The structural fill in the reinforced zone of the MSE wall should consist of imported granular structural fill such as WSDOT gravel borrow, or equivalent. Due to the high silt content of the on-site soils, the on-site soil should not be reused in the reinforcement zone.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 DEMOLITION, SITE STRIPPING AND GRADING

All footings and floor slabs of the existing buildings, as well as asphalt, building debris and concrete rubble should be removed from the site prior to the start of excavations or grading, unless the existing pavement will be grinded and re-used within cement treated soils. The existing subsurface explorations encountered scatted debris such as concrete and brick fragments within the undocumented fill, and such debris should be expected. Any debris uncovered in the on-site fill during grading should be separated and removed from the site.

We anticipate that topsoil and organic rich soils extend about 8 below the ground surface in the currently vegetated areas of the site. The organic material should be removed prior to placing fill for parking areas, the building pad, or to raise site grades. The organic rich soil should not be re-used in structural areas such as below pavements, the building footprint, or other structural elements. The organic rich soils may be “wasted” in landscaping areas where fill is needed, and ground settlements are not a concern.

7.2 TEMPORARY EXCAVATIONS

In general, maximum temporary excavation depths are expected to be about 10 to 15 feet for the proposed basements and stormwater vault. Temporary excavations greater than 4 feet deep should be properly sloped or shored. All temporary excavations should be

performed in accordance with Part N of WAC (Washington Administrative Code) 296-155. The contractor is responsible for maintaining safe excavation slopes and/or shoring. For planning purposes, the temporary excavations may be sloped to as steep as 1H:1V (Horizontal:Vertical). The temporary cut slopes should be re-evaluated by a representative of PanGEO during construction based on actual observed soil conditions.

During periods of precipitation, the temporary cuts should be protected with plastic sheeting. If areas of seepage are encountered during construction, the slopes may need to be flattened.

We recommend that heavy construction equipment, building materials and excavated soil should not be allowed within a distance equal to $\frac{1}{2}$ the slope height from the top of any excavation, or 4-foot minimum. The setback distance of heavy point loads, such as crane or pump truck outriggers, should be evaluated on a case-by-case basis.

7.3 SITE CONDITIONS AND CONSTRUCTION WORKING SURFACE

The site soils are anticipated to be highly moisture sensitive due to their high silt content, and will become disturbed when wet. As such, we anticipate that the exposed soils at the site may need to be improved during wet weather to create a working surface for construction equipment. One option to improve the stability of the site is to install a thick working surface of quarry spalls over geotextile fabric. Another option is to treat the soils with cement, as described above in *Section 6.6.2*. The proper measures needed to stabilize the subgrade will be in part depend on the actual soil conditions exposed at the bottom of the excavation, and the contractor's construction methods and sequence.

7.4 PAVEMENT SUBGRADE PREPARATION

Following the stripping operation and excavations necessary to achieve construction subgrade elevations, the ground surface where structural fill or pavements are to be placed should be observed by PanGEO. Proof-rolling should be performed to identify soft or unstable areas. Proof-rolling should be performed using a fully loaded, tandem-axle dump truck with a minimum gross weight of 20 tons. Other equipment can be used, provided the subgrade loading is equivalent. The dump truck should make several overlapping passes in perpendicular directions over a given area. Soft or yielding areas identified during proof-rolling should be moisture conditioned as needed and re-compacted in place.

If soft areas are still yielding after re-compaction, they should be over-excavated and replaced with structural fill to a depth that will provide a stable pavement base. The optional use of a geotextile subgrade stabilization fabric, such as Mirafi 600X, or an equivalent product placed directly on the over-excavated surface may help to bridge excessively unstable areas. Over-excavated areas should be and backfilled with 1¼-inch Crushed Surfacing Base Course, or WSDOT gravel borrow (WSDOT 9-03.14(1)) compacted to the requirements of structural fill. The subgrade preparation should be observed by PanGEO to verify the adequacy of the prepared subgrade.

7.5 STRUCTURAL FILL AND COMPACTION

If structural fill is needed at the site, we recommend using a granular fill material such as Gravel Borrow (WSDOT 9-03.14(1)), or other approved equivalent. Alternatively, in our opinion, the on-site material, may be re-used as structural fill below pavements and sidewalks provided that it can be adequately compacted. We do not recommend the re-use of on-site material below building footings.

Based on the relatively high fines content of the on-site soils, we anticipate that cement treatment will be needed to adequately re-use the on-site soils other than in the summer when the soils can be dried to near optimum moisture content. It should be noted that the on-site fill includes scattered debris, which should be screened from the fill prior to using as structural fill. Recommendations for cement treatment are provided in *Section 6.6.2* of this report.

The structural fill should be moisture conditioned to near optimum moisture content, placed in loose, horizontal lifts less than 8 inches in thickness, and systematically compacted to a dense and unyielding condition, and to at least 95 percent of the maximum dry density, as determined using test method ASTM D 1557.

7.6 EROSION AND DRAINAGE CONSIDERATIONS

Surface runoff can be controlled during construction by careful grading practices. This may include the construction of shallow, upgrade perimeter ditches or low earthen berms to collect runoff and prevent water from entering the excavation. All collected water should be directed to a positive and permanent discharge system such as a storm sewer. It should be noted that some of the site soils are prone to surficial erosion. Special care should

be taken to avoid surface water on open cut excavations, and exposed slopes should be protected with plastic sheeting.

Permanent control of surface water and roof runoff should be incorporated in the final grading design. In addition to these sources, irrigation and rain water infiltrating into any landscape and/or planter areas adjacent to paved areas or building foundations should also be controlled. Water should not be allowed to pond immediately adjacent to buildings or paved areas. All collected runoff should be directed into conduits that carry the water away from pavements or the structure and into storm drain systems or other appropriate outlets. Adequate surface gradients should be incorporated into the grading design such that surface runoff is directed away from structures.

7.7 WET WEATHER EARTHWORK AND EROSION CONSIDERATIONS

The fill soils at the site are expected to contain a moderate to high amount of fines, and are therefore considered moisture sensitive. As a result, it may be more economical to perform earthwork in the drier summer months to reduce the potential of site soils becoming soft due to excessive moisture. Any softened soils should be removed and replaced with structural fill.

General recommendations relative to earthwork performed in wet weather or in wet conditions are presented below:

- Because site soils are considered moisture sensitive, all subgrade surfaces should be protected against inclement weather.
- Earthwork may need to be performed in small areas to minimize subgrade exposure to wet weather. Excavation or the removal of unsuitable soil should be followed promptly by the placement and compaction of structural fill. The size and type of construction equipment used may have to be limited to reduce soil disturbance.
- During wet weather, the allowable fines content of the structural fill should be reduced to no more than 5 percent by weight based on the portion passing 3/4-inch sieve. The fines should be non-plastic.

- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water, and to prevent surface water from entering the excavations.
- Bales of straw and/or geotextile silt fences should be strategically located to control erosion and the movement of sediment. Erosion control measures should be installed along all the property boundaries.
- Excavation slopes and soils stockpiled on site should be covered with plastic sheeting.
- Under no circumstances should soil be left uncompacted and exposed to moisture.

8.0 LIMITATIONS

We have prepared this report for use by Alliance Residential and the project team. Recommendations contained in this report are based on a site reconnaissance, a review of existing subsurface explorations, and our understanding of the project. The study was performed using a mutually agreed-upon scope of work.

Variations in soil conditions may exist between the explorations and the actual conditions underlying the site. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at the site that are different from those described in this report, we should be notified immediately to review the applicability of our recommendations. Additionally, we should also be notified to review the applicability of our recommendations if there are any changes in the project scope.

The scope of our work does not include services related to construction safety precautions. Our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design. Additionally, the scope of our work specifically excludes the assessment of environmental characteristics, particularly those involving hazardous substances. We are not mold consultants nor are our recommendations to be interpreted as being preventative of mold development. A mold specialist should be consulted for all mold-related issues.

This report may be used only by the client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both off and on-site), or other factors including advances in our understanding of applied science, may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 24 months from its issuance. PanGEO should be notified if the project is delayed by more than 24 months from the date of this report so that we may review the applicability of our conclusions considering the time lapse.

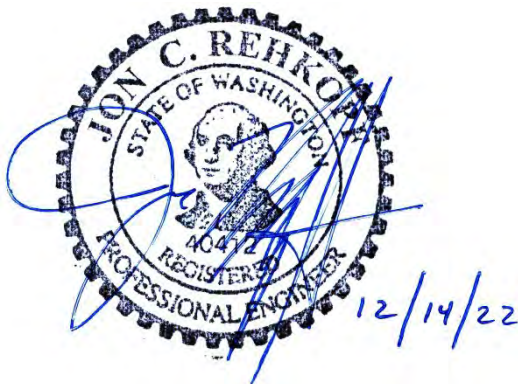
It is the client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk. Any party other than the client who wishes to use this report shall notify PanGEO of such intended use and for permission to copy this report. Based on the intended use of the report, PanGEO may require that additional work be performed and that an updated report be reissued. Noncompliance with any of these requirements will release PanGEO from any liability resulting from the use this report.

Within the limitation of scope, schedule and budget, PanGEO engages in the practice of geotechnical engineering and endeavors to perform its services in accordance with generally accepted professional principles and practices at the time the Report or its contents were prepared. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you on this project. Please feel free to contact our office with any questions you have regarding our study, this report, or any geotechnical engineering related project issues.

Sincerely,

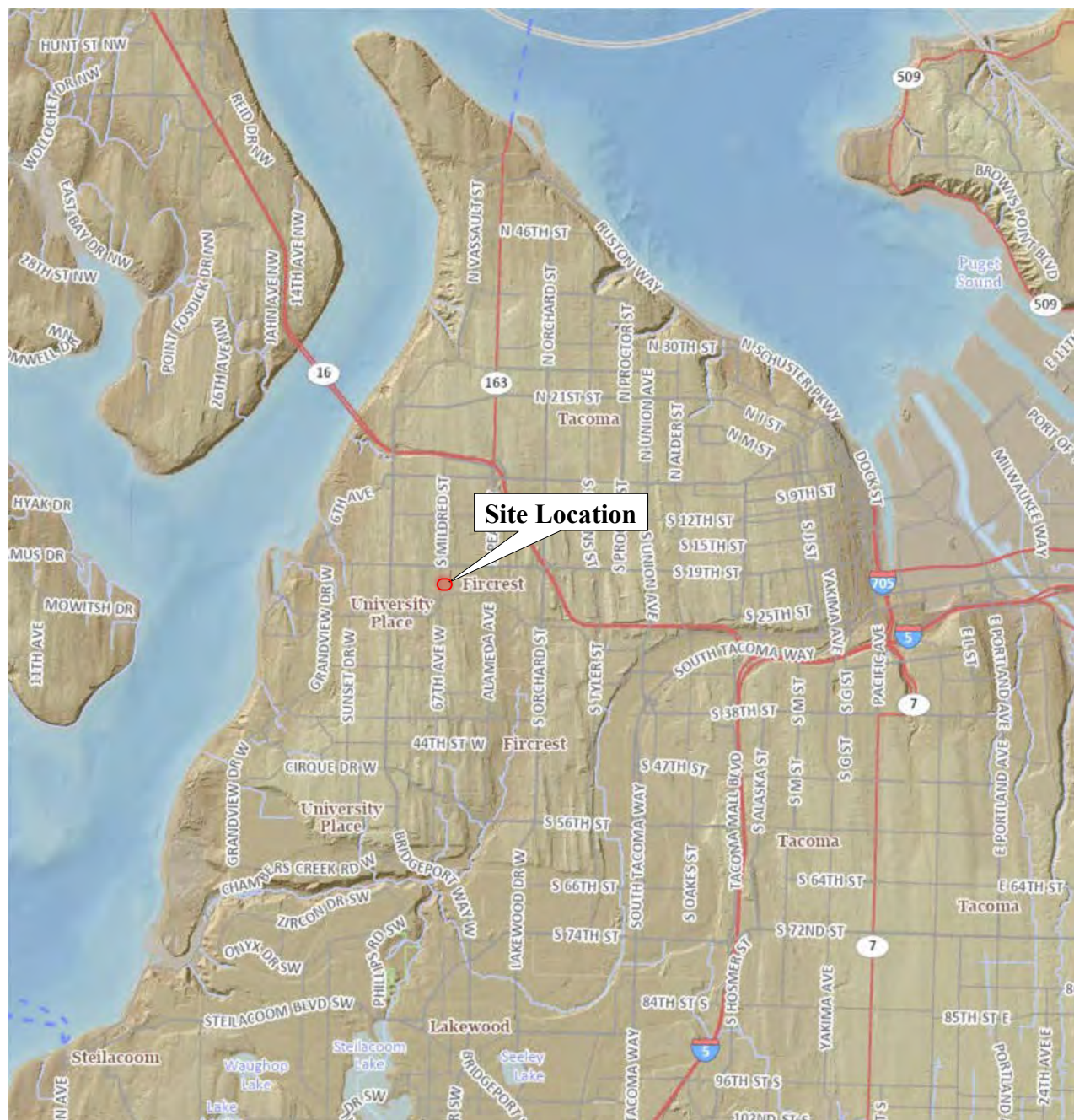
PanGEO, Inc.



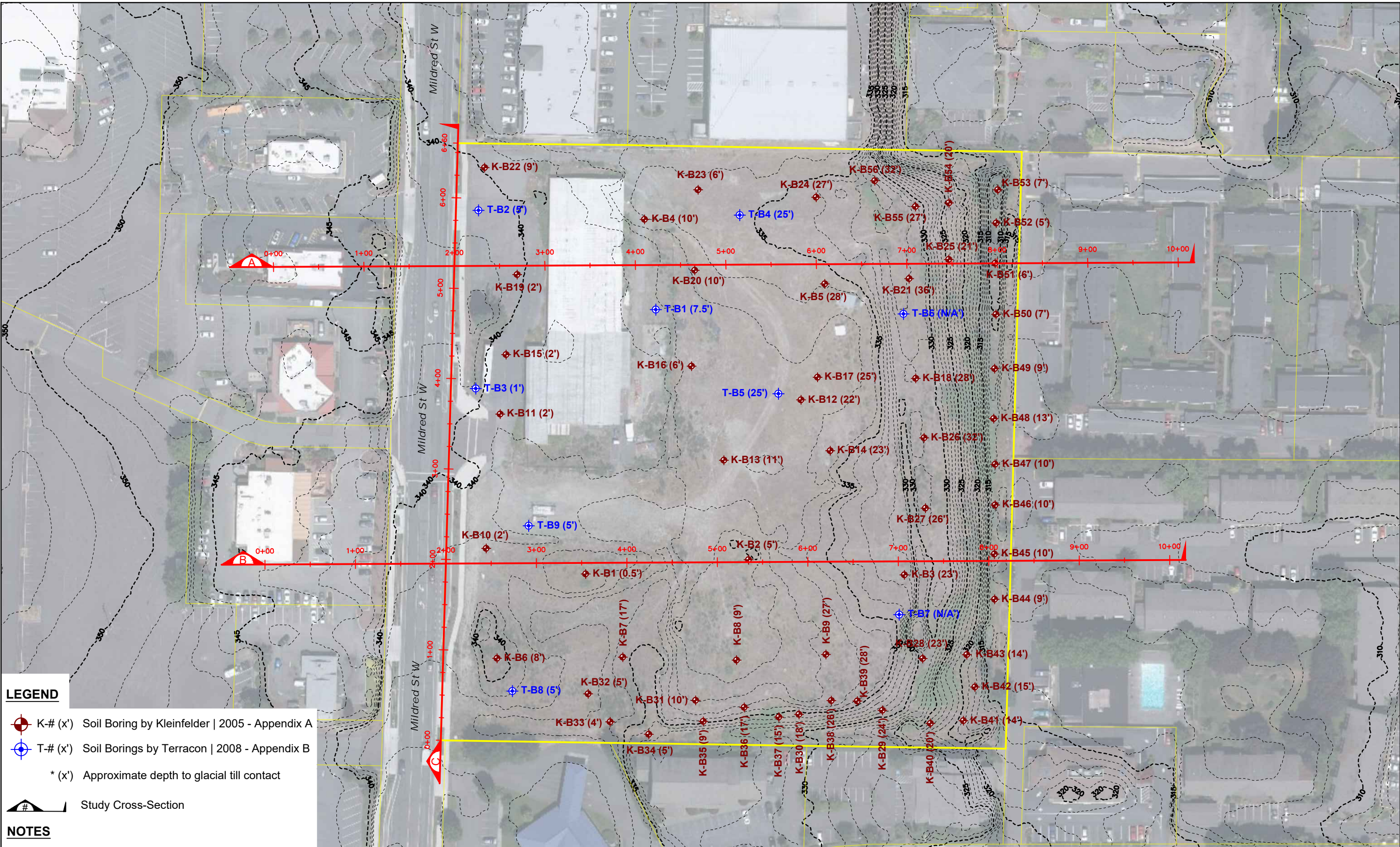
Jon C. Rehkopf, P.E.
Principal Geotechnical Engineer

9.0 REFERENCES

- ASCE (2016). “SEI/ASCE 7-16, Minimum Design Loads for Buildings and Other Structures,” American Society of Civil Engineers.
- International Building Code (IBC), 2018, International Code Council.
- Kleinfelder (2005). *Summary Boring Logs B-1 through B-56, Proposed Retail Development, 2119 Mildred Street, Fircrest, Washington*, February 2005.
- Schuster, J.E., Cabibbo, A.A., Schilter, J.F., and Hubert, I.J. 2015, *The Geologic map of the Tacoma 1:100,000-scale quadrangle*. Washington Division of Geology and Earth Resources, Map Series 2015-03. November 2015.
- Terracon (2008). *Summary Boring Logs B-1 through B-9, WinCo Foods, Inc., 2119 Mildred Street West, Fircrest, Washington*, May 2008.
- Washington State Department of Transportation (WSDOT), 2022, Geotechnical Design Manual, M 46-03-13, Olympia, Washington.



No Scale

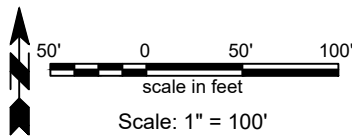


LEGEND

- K-# (x') Soil Boring by Kleinfelder | 2005 - Appendix A
- T-# (x') Soil Borings by Terracon | 2008 - Appendix B
- * (x') Approximate depth to glacial till contact
- Study Cross-Section

NOTES

1. Aerial background, dated 2018, obtained from Pierce County GIS website.
2. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
3. Additional features are based on GIS data obtained from Pierce County and WA DNR websites.
4. Topology and GIS features are provided for relative information only and are not a substitution for field survey.
5. Locations of subsurface explorations are approximate and based on the relative locations of known site features.
6. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department






Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

SITE AND EXISTING EXPLORATION PLAN

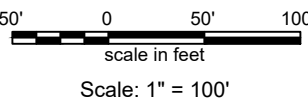
PROJECT NO.	FIGURE NO.
21-529	2

LEGEND

-  K-# (x') Soil Boring by Kleinfelder | 2005 - Appendix A
-  T-# (x') Soil Borings by Terracon | 2008 - Appendix B
- * (x') Approximate depth to glacial till contact
-  Study Cross-Section

NOTES

1. Aerial background, dated 2018, obtained from Pierce County GIS website.
2. Approximate elevations of glacial till contact inferred from subsurface explorations by others.
3. Additional features are based on GIS data obtained from Pierce County and WA DNR websites.
4. Topology and GIS features are provided for relative information only and are not a substitution for field survey.
5. Locations of subsurface explorations are approximate and based on the relative locations of known site features.
6. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department

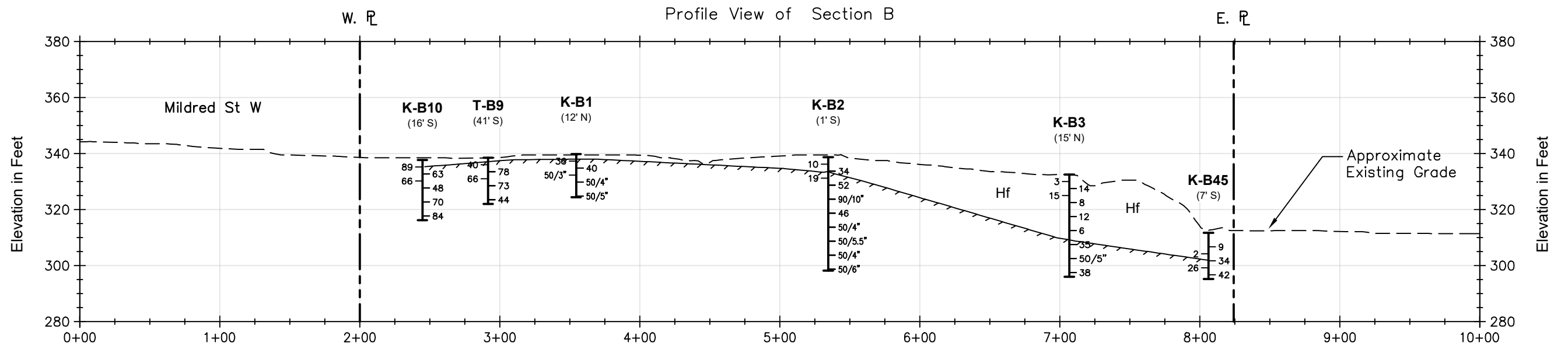
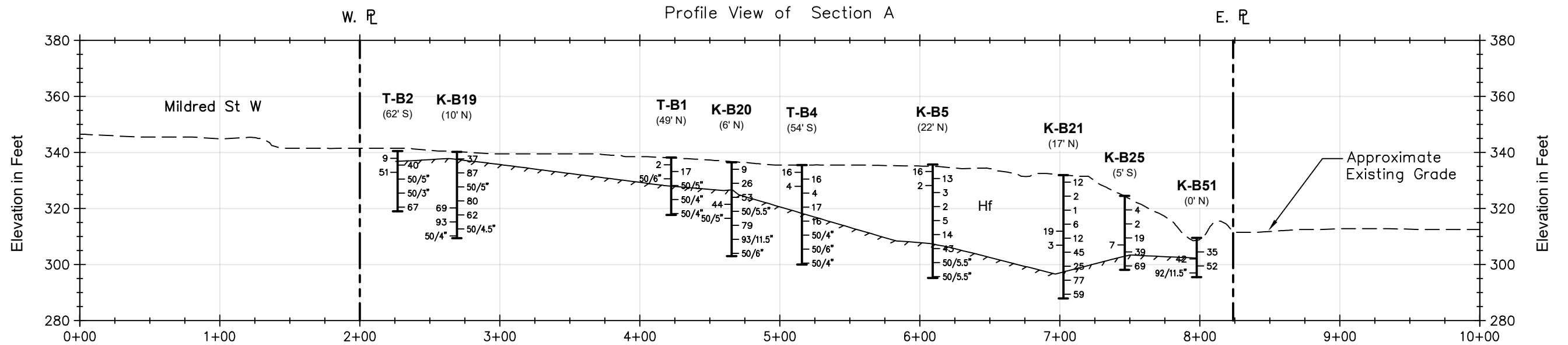


Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

APPROXIMATE ELEVATION OF
GLACIAL TILL CONTACT

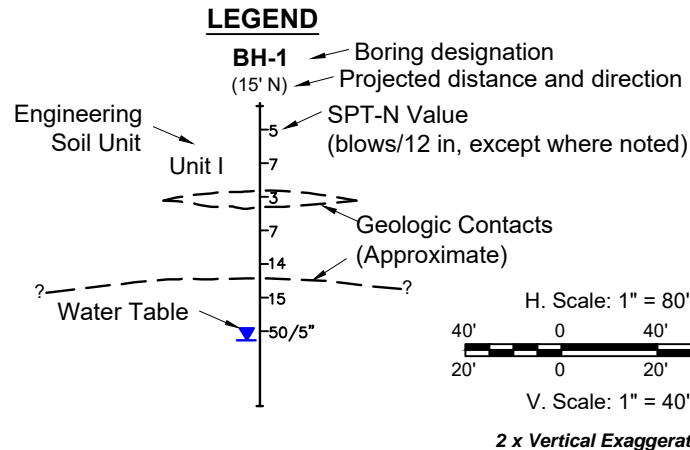
PROJECT NO.
21-529

FIGURE NO.
3



NOTES

1. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
2. Locations of glacial till contact are approximate and based on subsurface explorations by others.
3. Locations of subsurface explorations are approximate and based on the relative locations of known site features.
4. Geologic contacts between explorations are inferred.
5. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department.



ENGINEERING SOIL UNITS

See text of report for soil unit descriptions.

Hf Fill
Qvt Vashon Glacial Till



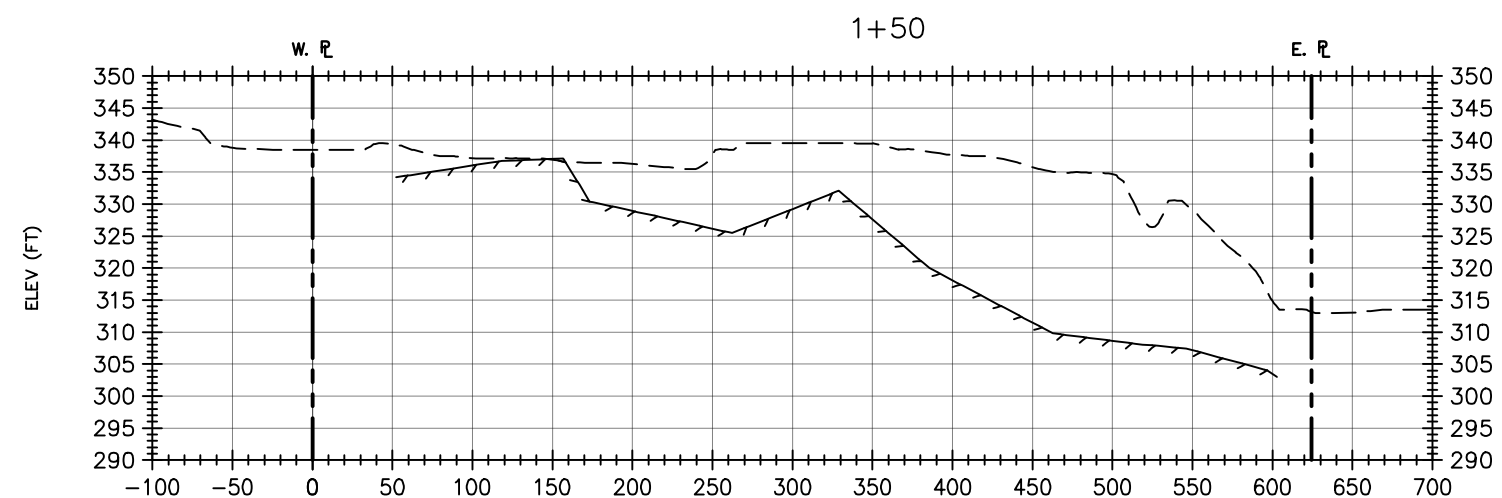
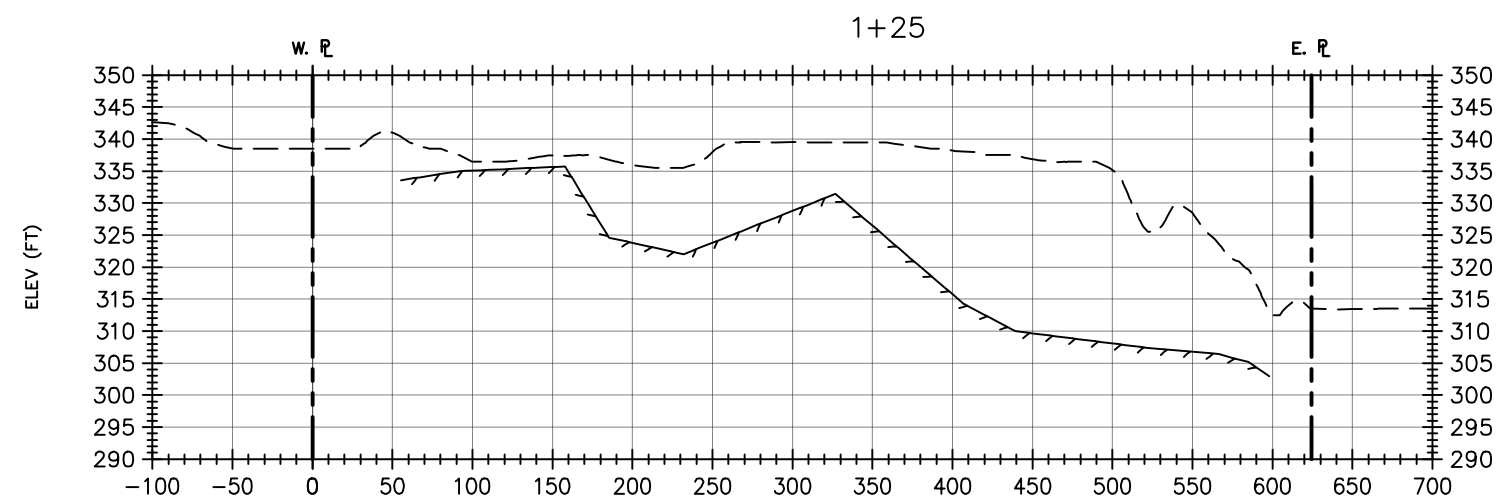
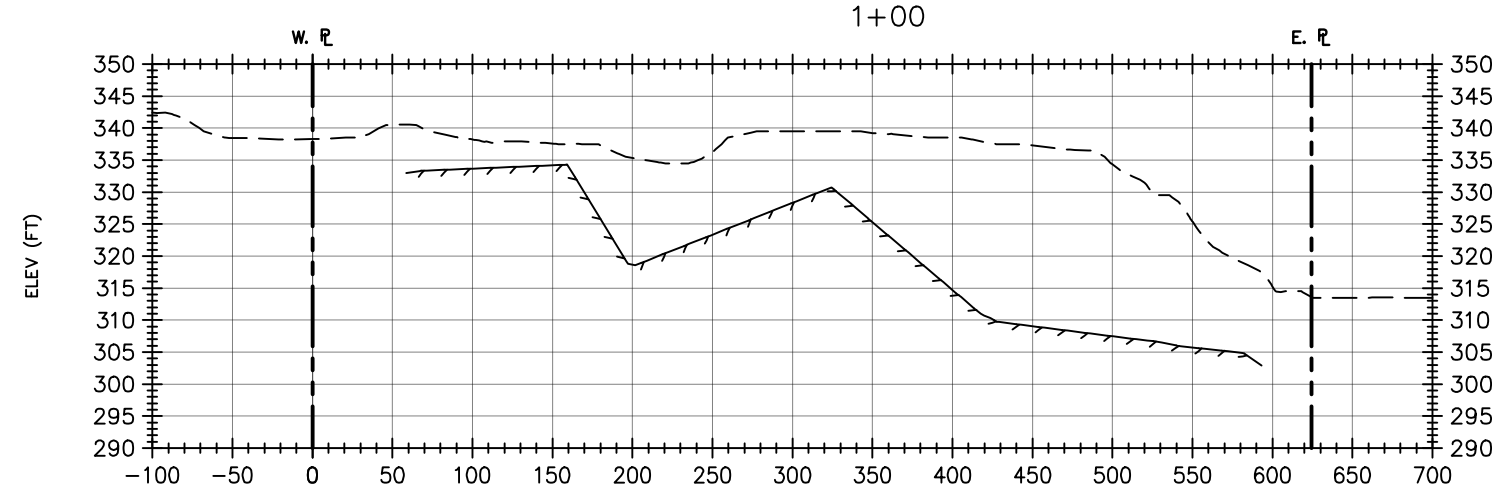
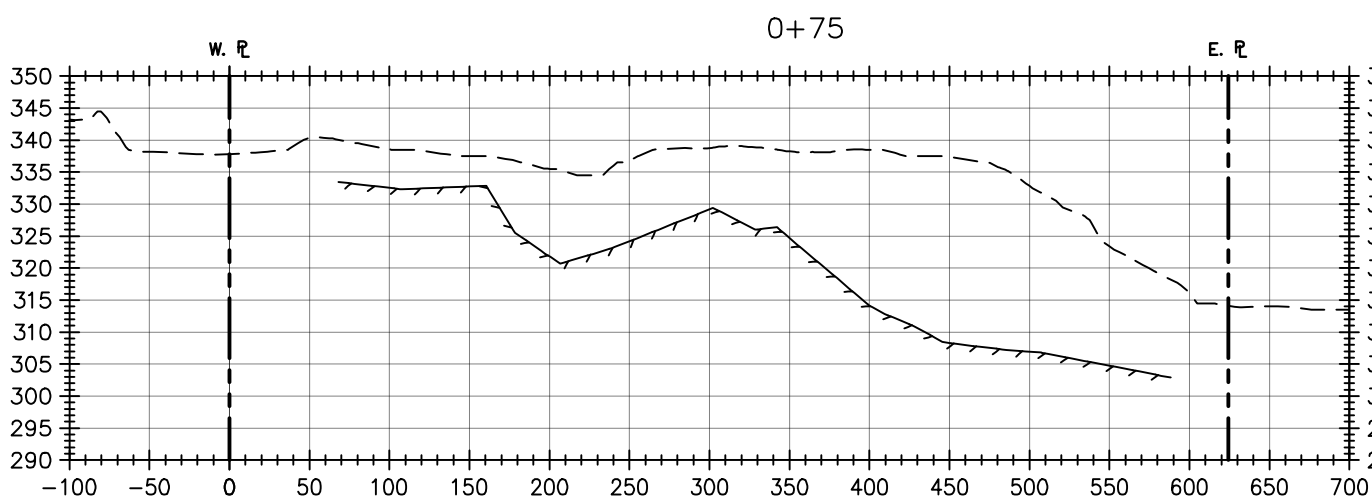
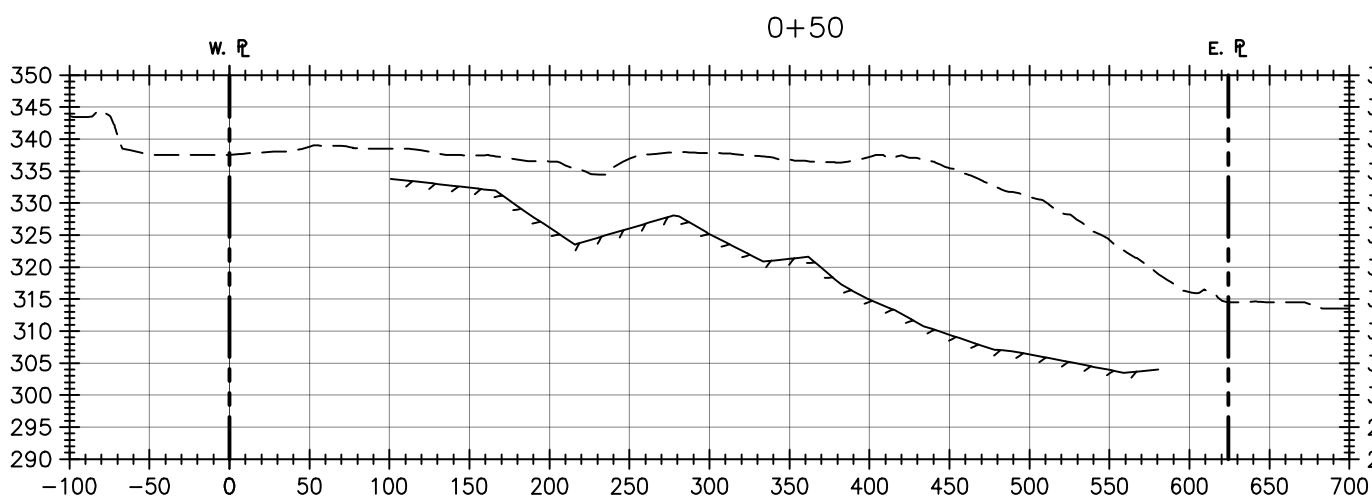
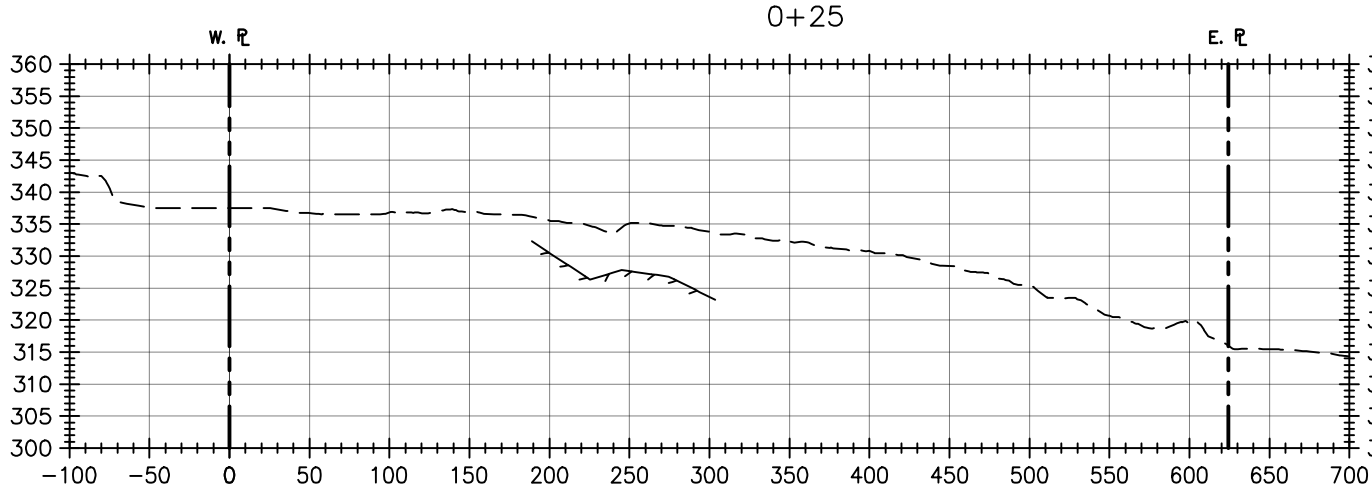
Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

CROSS-SECTIONS
Study Sections A & B

PROJECT NO.
21-529

FIGURE NO.
4

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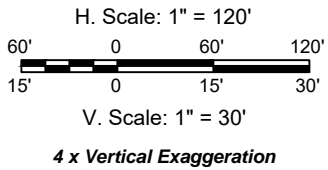


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

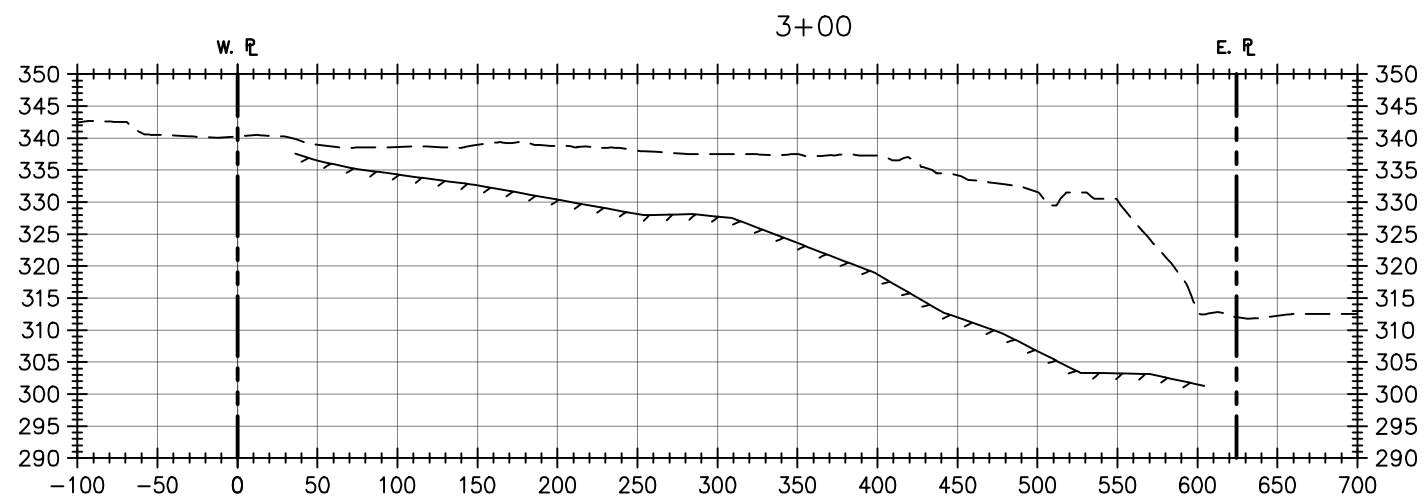
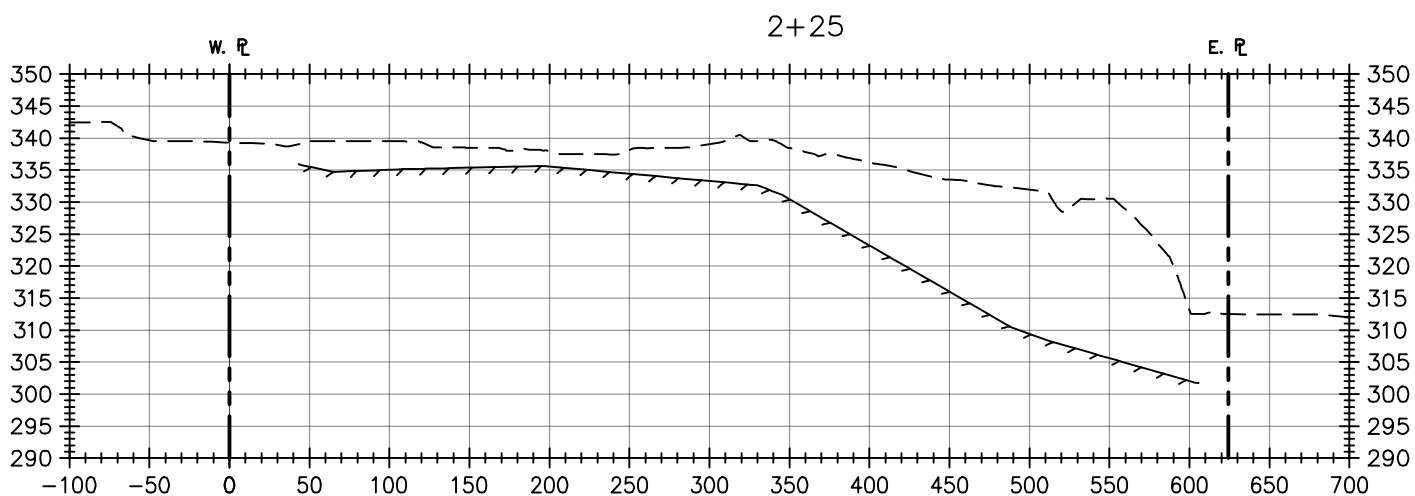
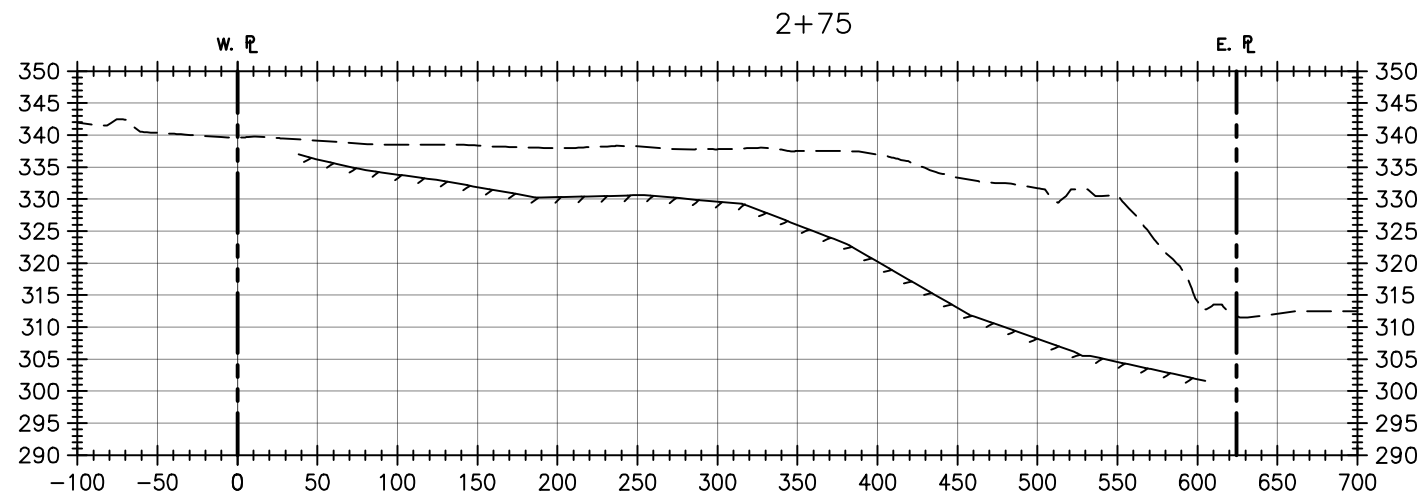
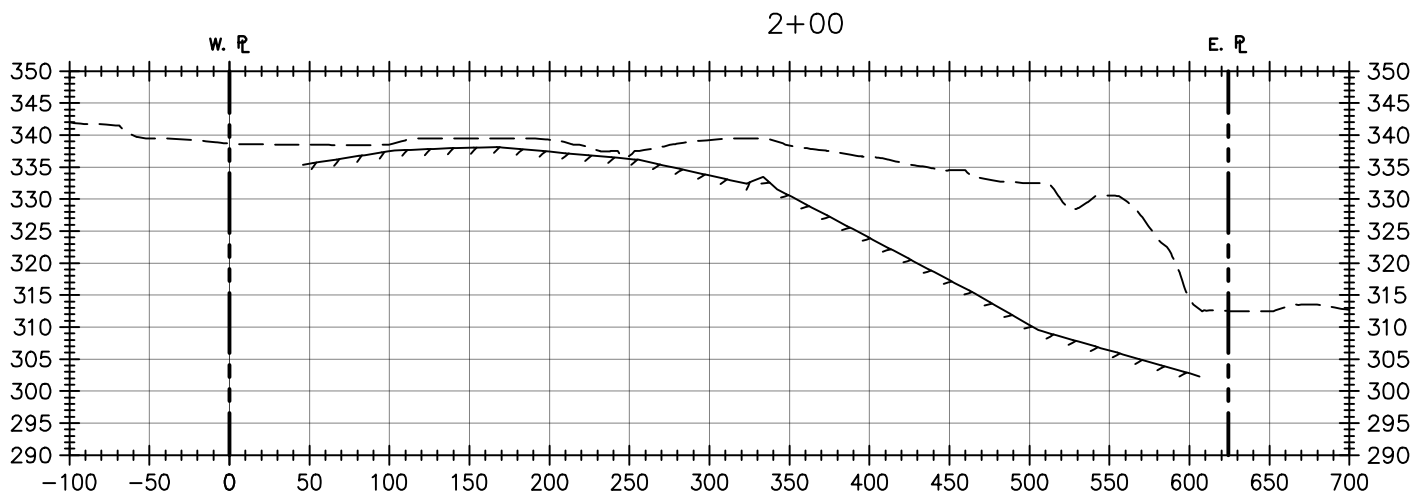
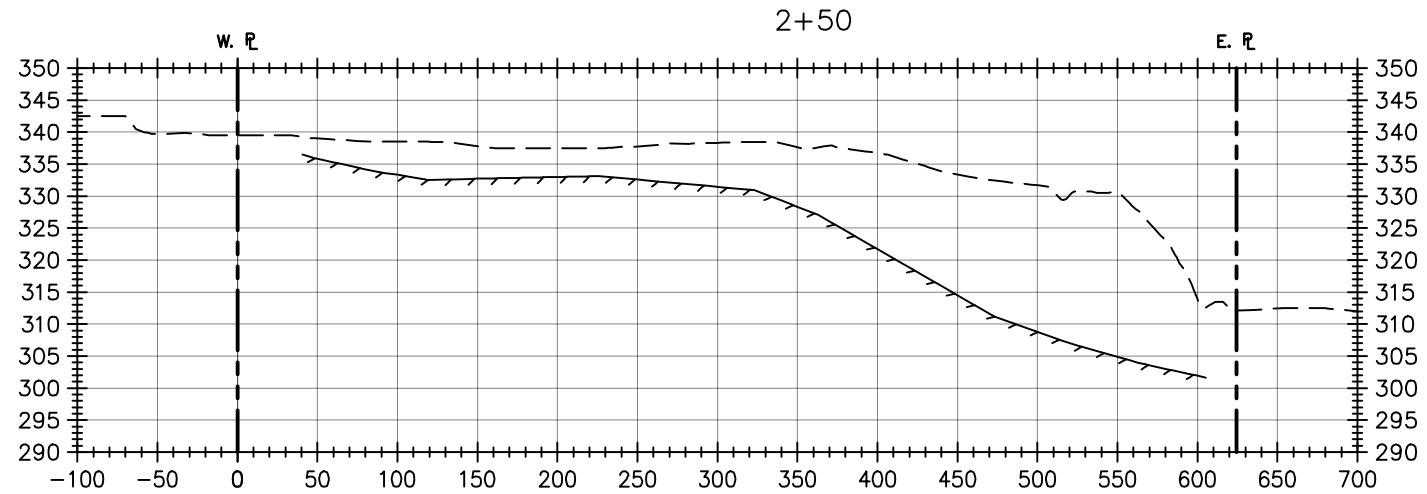
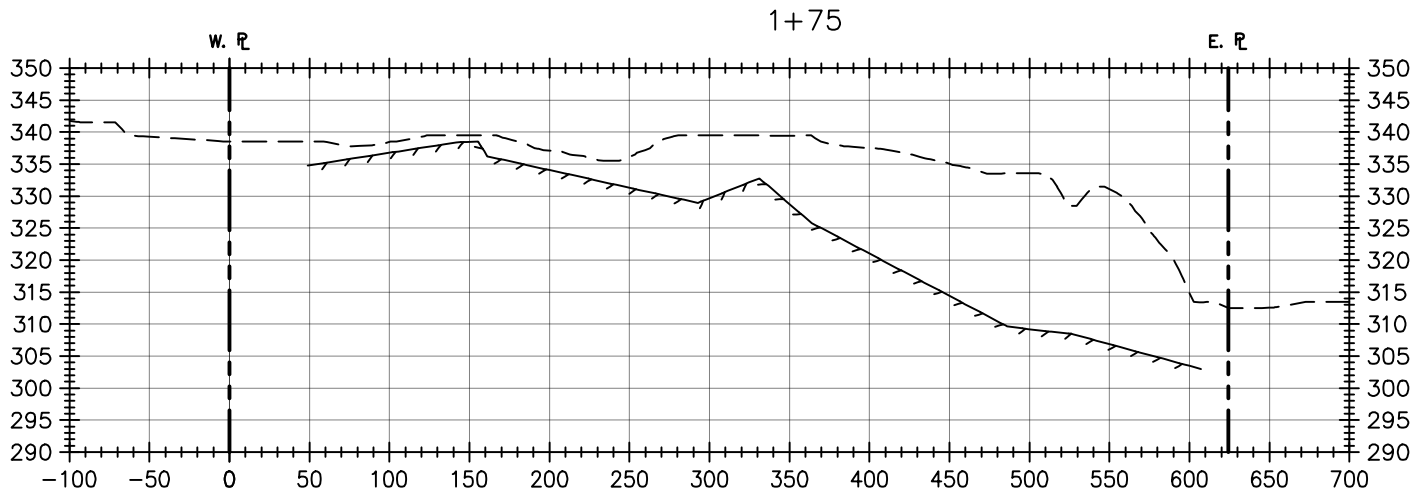
NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 0+00 TO 1+50	
		PROJECT NO. 21-529	FIGURE NO. 5A

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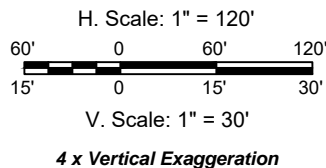


LEGEND

- — — Approximate Existing Ground Surface
- / — / — Approximate Glacial Till Contact

NOTES

- Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



PanGEO
INCORPORATED

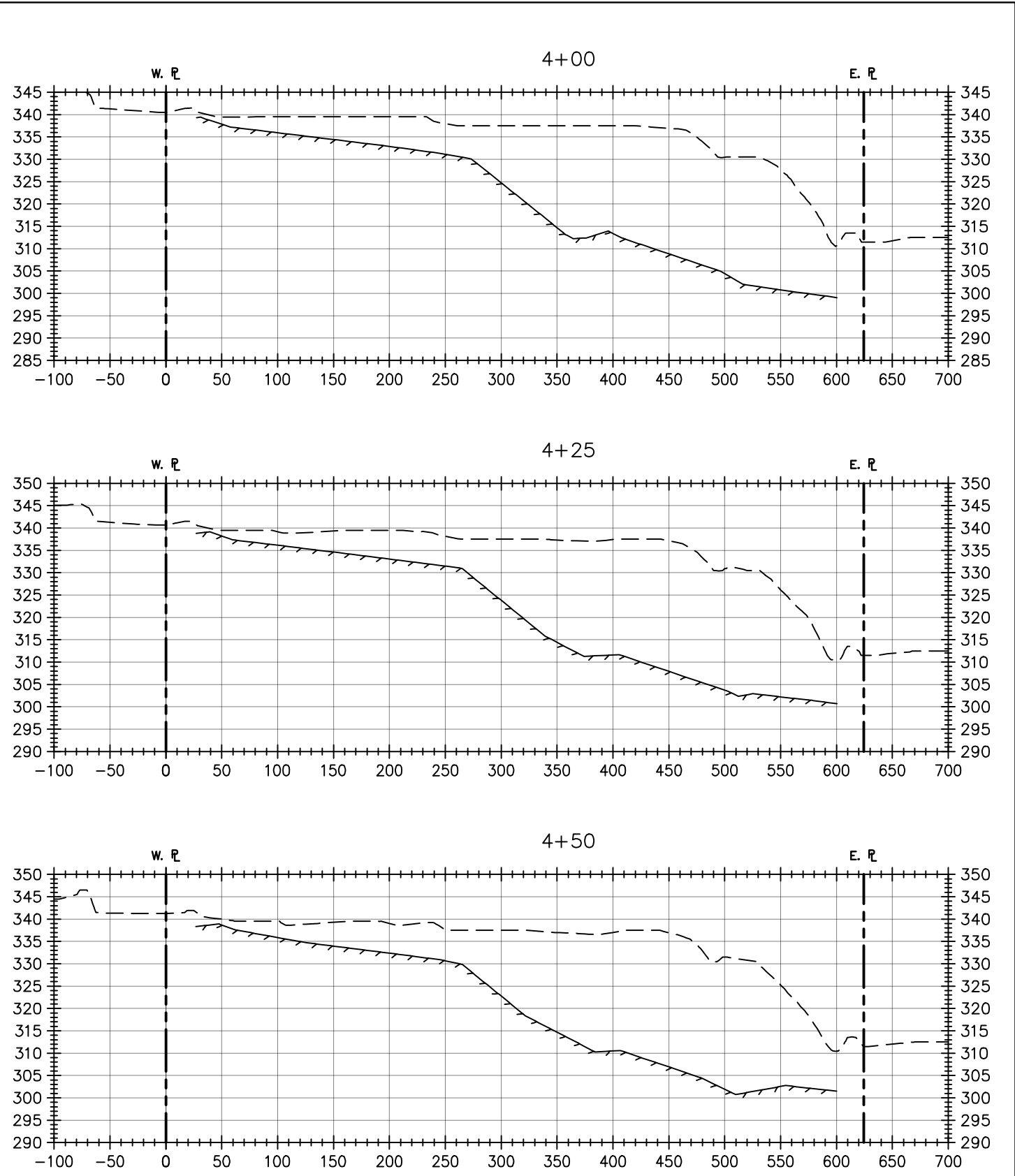
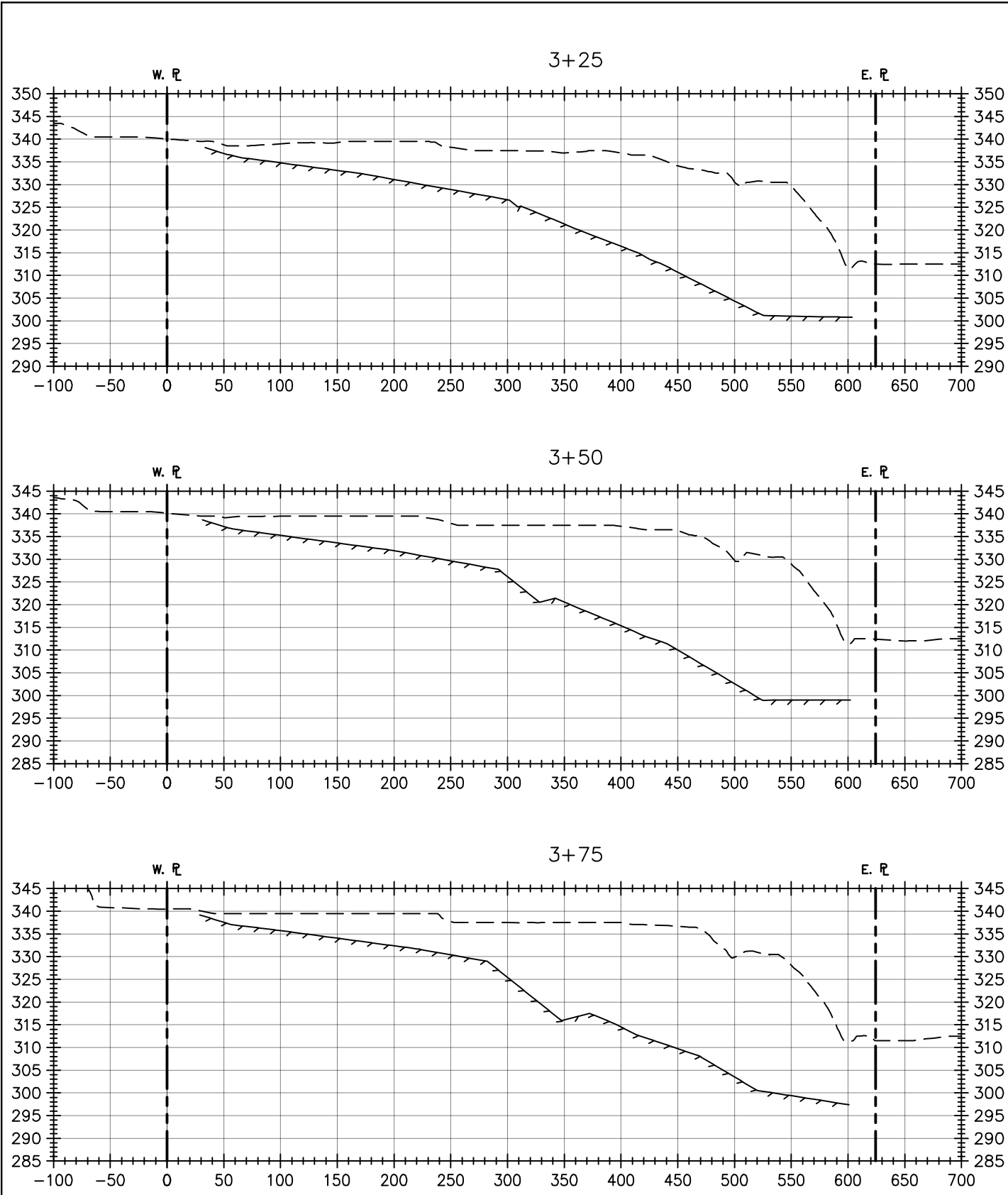
Prose Fircrest
2119 Mildred Street West
Fircrest, Washington

CROSS-SECTIONS
SECTION C | 1+75 TO 3+00

PROJECT NO.
21-529

FIGURE NO.
5B

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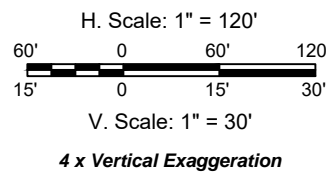


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

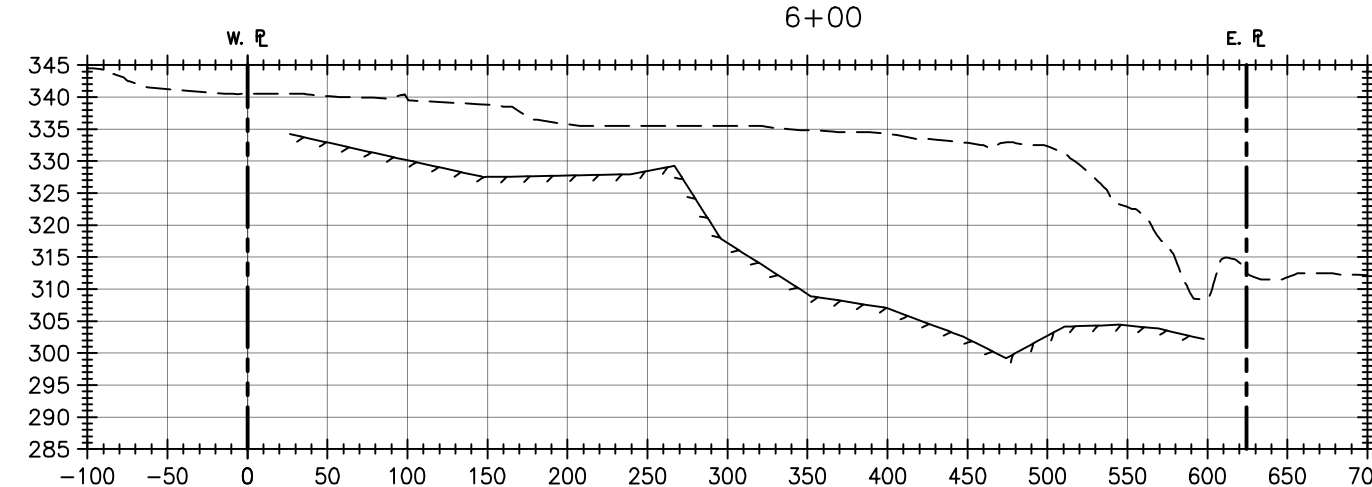
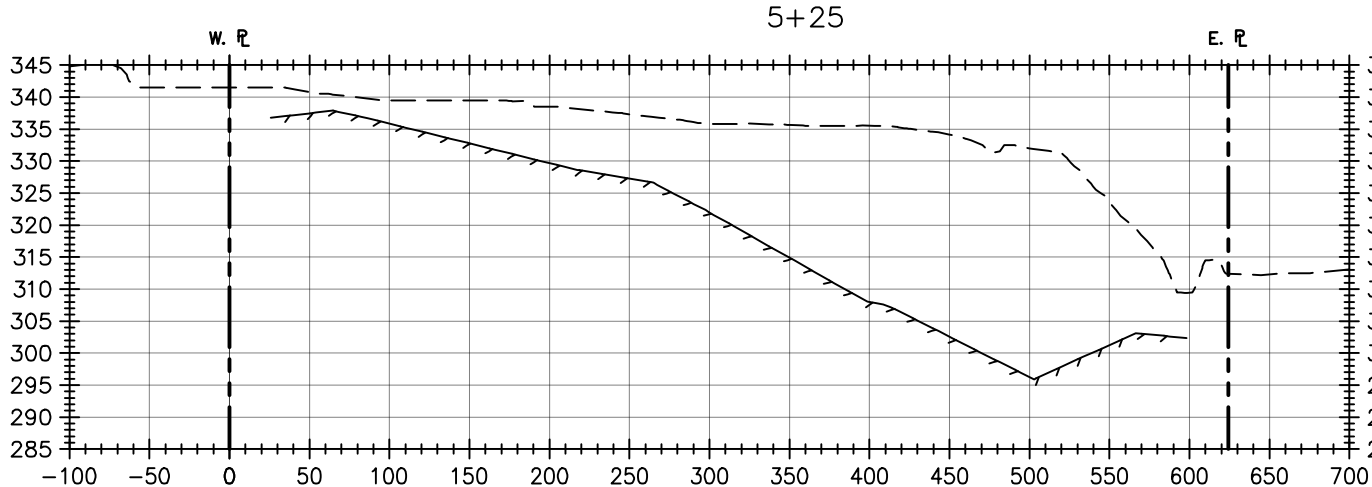
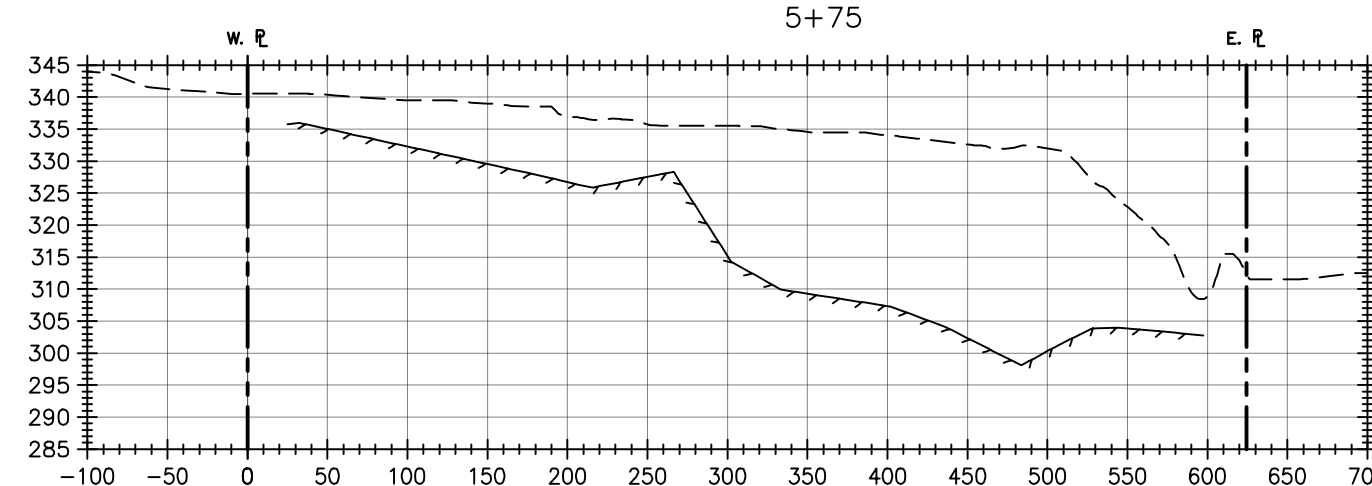
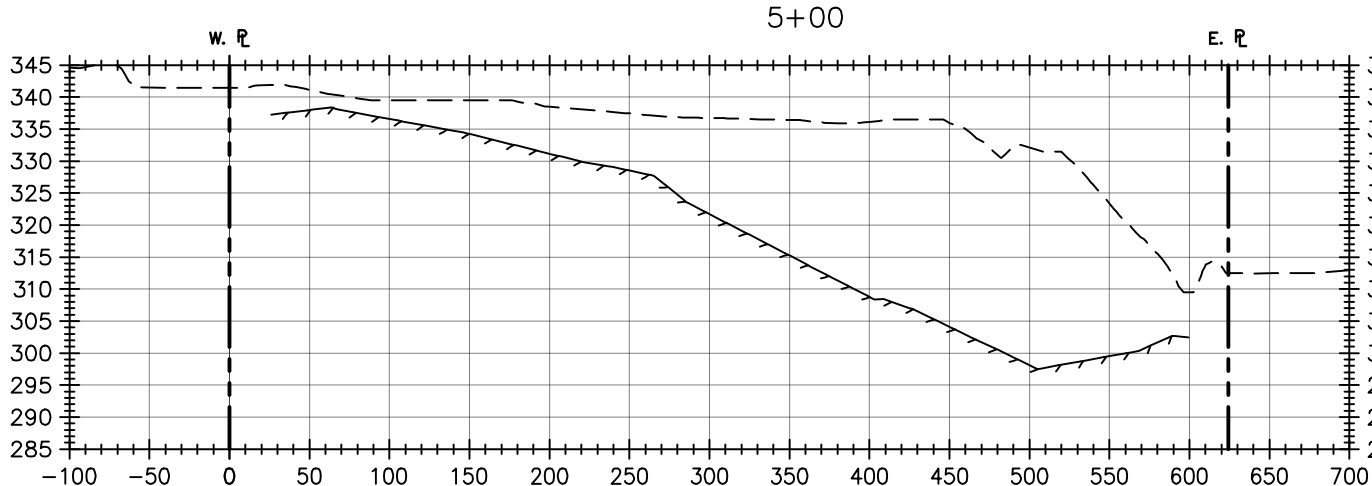
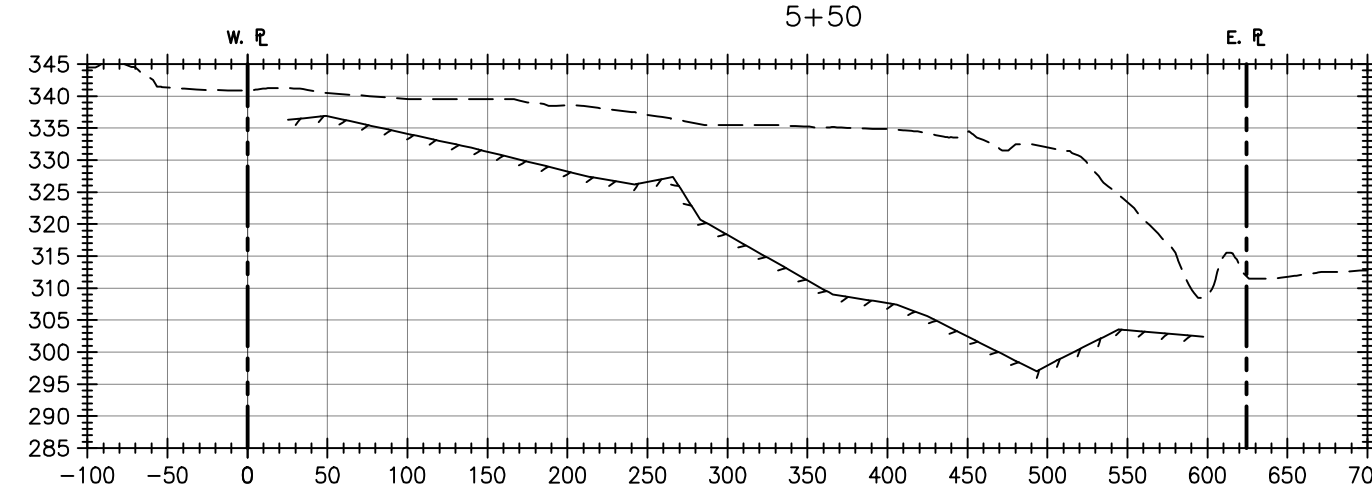
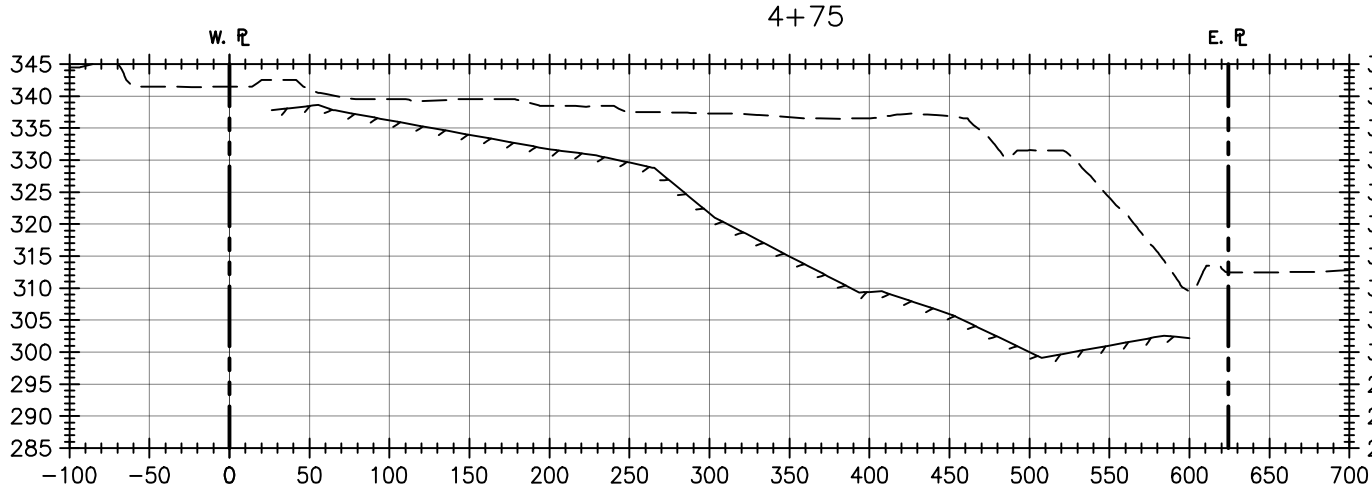
NOTES

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- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 3+25 TO 4+50	
		PROJECT NO. 21-529	FIGURE NO. 5C

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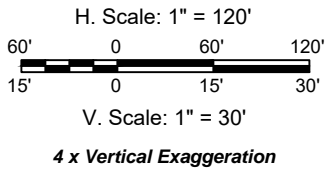


LEGEND

- Approximate Existing Ground Surface
- Approximate Glacial Till Contact

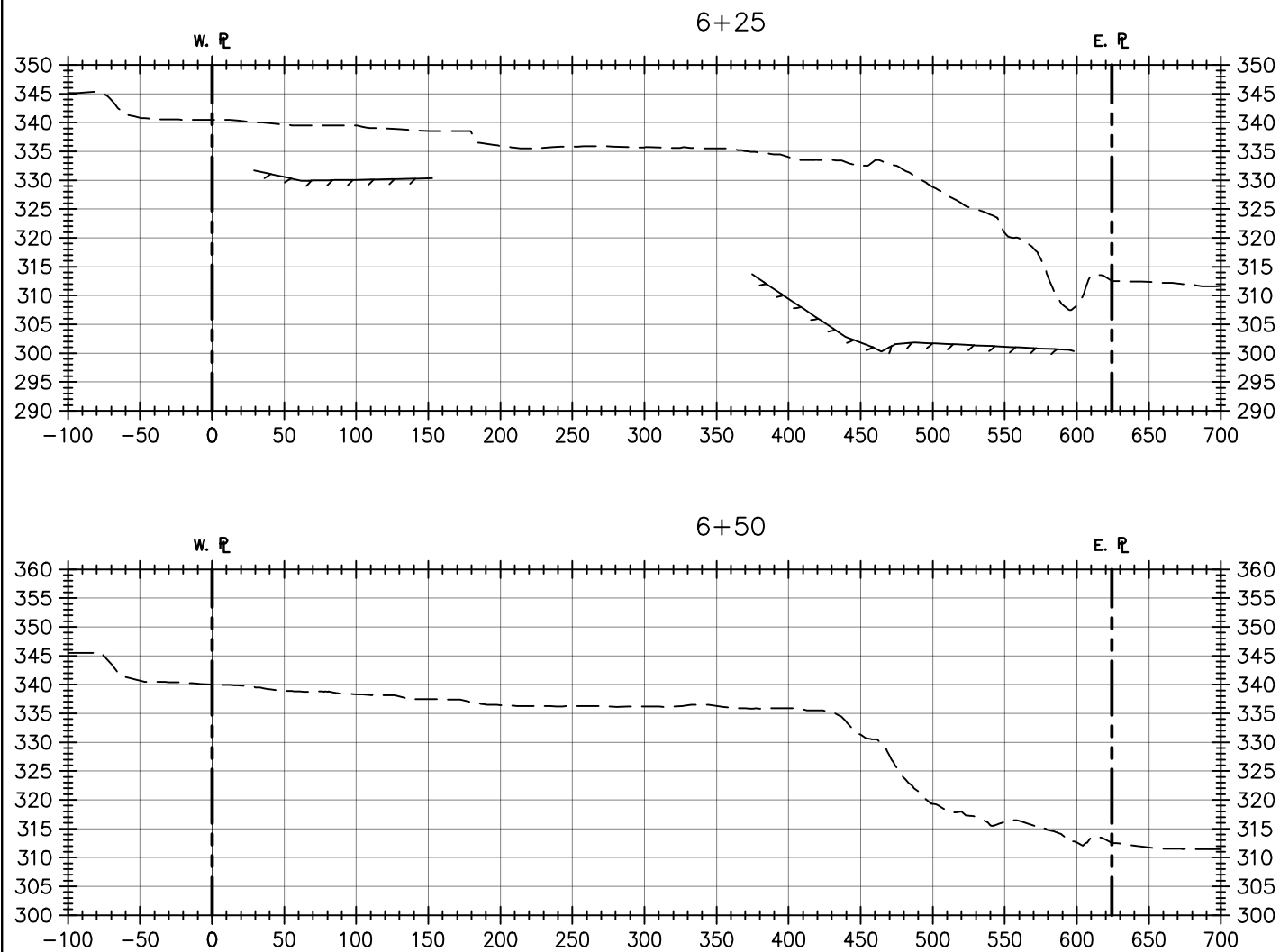
NOTES

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- Locations of glacial till contact are approximate and based on subsurface explorations by others.
- Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 4+75 TO 6+00	
		PROJECT NO. 21-529	FIGURE NO. 5D

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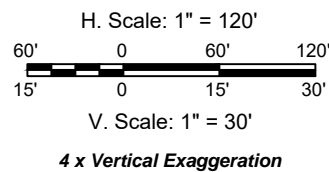


LEGEND

- — — Approximate Existing Ground Surface
- /// Approximate Glacial Till Contact

NOTES

1. Topology derived 2017 Green River Service Area LiDAR data obtained from Washington DNR website.
2. Locations of glacial till contact are approximate and based on subsurface explorations by others.
3. Vertical Datum: NGVD 1929 = (NAVD 1988 - 3.50 ft) per City of Tacoma Public Works Department



	Prose Fircrest 2119 Mildred Street West Fircrest, Washington	CROSS-SECTIONS SECTION C 6+25 TO 6+50	
		PROJECT NO. 21-529	FIGURE NO. 5E

APPENDIX A

EXISTING SUBSURFACE EXPLORATIONS

(Kleinfelder, 2005)

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOIL MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, 0% TO 15% FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, 0% TO 15% FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, SILTY GRAVEL-SAND MIXTURES
				GC	CLAYEY GRAVELS, CLAYEY GRAVEL-SAND MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, 0% TO 15% FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, 0% TO 15% FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SILTY SAND-GRAVEL MIXTURES
				SC	CLAYEY SANDS, CLAYEY SAND-GRAVEL MIXTURES
FINE GRAINED SOIL MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
Project: 54568 August 2005

SOIL CLASSIFICATION LEGEND

APPENDIX
A-1

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
0											Surface: grass	
											SM	Topsoil. SILTY SAND (SM): gray-brown, moist, dense, fine-grained, trace gravel. (GLACIAL TILL)
5								10	X	S1-1		
								16	X			
								20	X			
								12	X	S1-2		
								18	X			- grades to gray, some gravel.
								22	X			
								30	X	S1-3		
								50/3"	X			- grades to very dense.
10								16	X	S1-4		
								50/4"	X			
15								50/5"	X	S1-5		
15.4												

Boring was completed to a depth of 15.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.8
 TOTAL DEPTH (feet): 15.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-1

Appendix

A - 2

PAGE 1 of 1

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

[illegible]

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DATE DRILLED: 2-28-05
LOGGED BY: I. LaVielle
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 338.7
TOTAL DEPTH (feet): 40.5
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568


**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
B-2**

Appendix
A -3a

PAGE 1 of 2

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								20	X	S2-7	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, medium- to coarse-grained. (GLACIAL TILL)
								50/4"				
30								50/5.5"	X	S2-8		
35								24	X	S2-9		
								50/4"				
40								50/6"	X	S2-10		
40.5												
<p>Boring was completed to a depth of 40.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

* SAMPLER TYPE	<input checked="" type="checkbox"/> Cal. (3"OD) Split Spoon	<input checked="" type="checkbox"/> SPT (2" OD) Split Spoon	<input type="checkbox"/> Core Sample	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Grab	<input type="checkbox"/> No Recovery
**HAMMER WEIGHT	300 lbs (30" Drop)	140 lbs (30" Drop)				

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-2	Appendix A -3b PAGE 2 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		BLOWS/6 in** (uncorrected)	SAMPLER #	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)					
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very loose, medium-grained. (FILL)
1									1	S3-1			
2									2				
3									1				
4									4	S3-2			- grades to medium dense.
5									6				
6									8				
7									9	S3-3			
8									10				
9									5				
10									3	S3-4			grades to black, low plasticity, some wood debris and organics.
11									5				
12									3				
13													
14									1	S3-5			- grades to with lenses of sandy silt.
15									5				
16									7				
17													
18													
19													
20									4	S3-6			
21									4				
22									2		SM		SILTY SAND (SM): brown, moist, medium dense, fine-grained, with organics. (RELIC TOPSOIL)
23													
24											SM		SILTY SAND WITH GRAVEL (SM): gray-brown, moist, dense, medium-grained. (GLACIAL TILL)
25													

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 332.5
 TOTAL DEPTH (feet): 36.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-3

Appendix

A -4a

PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY					FIELD	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25								7 13 22			- grades to trace gravel, lenses of sand.
30								25 50/5"			- grades to very dense.
35								9 17			grades to lenses of wet, fine-grained, gray sand.
36.5								21			

Boring was completed to a depth of 36.5 feet below ground surface. Groundwater was encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3" OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington

BORING LOG
B-3

Appendix

A -4b

PAGE 2 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)
0									
5									
10									
15									
20									
20.5									

Surface: asphaltic concrete pavement

SM

Asphaltic concrete pavement (2 inches thick).
 SILTY SAND WITH GRAVEL (SM):
 gray-brown, moist to dry, very dense, fine-
 to coarse-grained.
 (GLACIAL TILL)
 - grades to with cobbles.
 - grades to brown, moist.

S4-1

6
13
50/3"

S4-2

18
50/5"

S4-3

24
50/3"

- grades to gray-pink.

S4-4

21
37
43

SP-SM

SAND WITH SILT (SP-SM): gray, moist,
 very dense, fine-grained.
 (GLACIAL TILL)

S4-5

50/5.5"

SM

SILTY SAND WITH GRAVEL (SM):
 gray, moist, very dense, fine- to
 coarse-grained.
 (GLACIAL TILL)

S4-6

50/5.5"

Boring was completed to a depth of 20.5
 feet below ground surface. No
 groundwater encountered. Boring was
 backfilled with a mixture of cuttings and
 bentonite chips.

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.8
 TOTAL DEPTH (feet): 20.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-4

Appendix

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
0											Surface: grass	
											Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to coarse-grained. (FILL)	
4							4	X	S5-1			
10							10	X				
6							6	X				
12							12	X	S5-2			
7							7	X				
6							6	X			- grades to with cobbles.	
1							1	X	S5-3			
1							1	X			- grades to dark brown, very loose, with roots and other organics.	
1							1	X				
2							2	X	S5-4			
2							2	X			- asphaltic concrete and wood debris encountered during drilling.	
1							1	X				
0							0	X	S5-5			
1							1	X			- grades to wet.	
1							1	X				
5							5	X	S5-6			
4							4	X				
1							1	X			- groundwater seepage encountered during drilling.	
25												

DATE DRILLED: 2-28-05
 LOGGED BY: I. LaVielle
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.7
 TOTAL DEPTH (feet): 40.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A


KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING
 PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
B-5

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	NAME
25												- grades to black, with lenses of gray silty sand.
30											SM	SILTY SAND WITH GRAVEL (SM): gray, moist, dense, fine- to coarse-grained. (GLACIAL TILL)
35												
40												
40.5												
<p>Boring was completed to a depth of 40.5 feet below ground surface. Groundwater seepage was encountered at 23 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

* SAMPLER TYPE	<input checked="" type="checkbox"/> Cal. (3" OD) Split Spoon	<input checked="" type="checkbox"/> SPT (2" OD) Split Spoon	<input type="checkbox"/> Core Sample	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Grab	<input type="checkbox"/> No Recovery
**HAMMER WEIGHT	300 lbs (30" Drop)	140 lbs (30" Drop)				

 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568	Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-5	Appendix A -6b PAGE 2 of 2
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in ** (uncorrected)	SAMPLER *
0											Surface: grass
										SM	Topsoil. SILTY SAND (SM): brown, moist, loose, fine-grained, trace wood fragments. (FILL)
3									S6-1		
2											
2											
6									S6-2		- grades to light brown, fine- to medium-grained. - grades to light gray to brown, medium dense, trace gravel.
12											
16											
6									S6-3		
25										SM	SILTY SAND WITH GRAVEL (SM): green-gray to gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
50/6"											
20									S6-4		- grades to dense.
25											
18											
14									S6-5		
12										ML	SILT WITH SAND (ML): light gray, moist, hard. (GLACIAL TILL)
26											
15										SM	SILTY SAND WITH GRAVEL (SM): olive gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
15									S6-6		
50/6"											
21											Boring was completed to a depth of 21 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DATE DRILLED: 4-27-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 340.9
TOTAL DEPTH (feet): 21.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A




KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

**Proposed Retail Development
2119 Mildred Street
Fircrest, Washington
BORING LOG
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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					% PASSING No. 200 SIEVE	OTHER TESTS
0										Surface: grass	
0			7.7		22		7	X	S7-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive gray to brown, moist, very dense, fine- to medium-grained. (FILL)
5							37	X			
							50/5"	X			
							50/6"	X	S7-2		- grades to light gray.
							19	X	S7-3		- grades to olive gray, moist to dry, some gravel.
							50/5"	X			
10							30	X	S7-4		
							50/4"	X			
15							0	X	S7-5	SM	SILTY SAND (SM): olive gray to brown, moist, medium dense, fine-grained, some gravel. (FILL)
							10	X			
							4	X			
20							5	X	S7-6		An apparent void was encountered at a depth of 15 feet below the existing ground surface. SILTY SAND (SM): olive-gray, moist, dense, fine-grained, som gravel. (GLACIAL TILL)
21.5							16	X			
							14	X			
<p>Boring was completed to a depth of 21.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
DATE DRILLED: 4-26-05			SURFACE ELEVATION (feet): 335.2			DRILLING METHOD: HSA					
LOGGED BY: D. Divine			TOTAL DEPTH (feet): 21.5			DRILLER: Holt Drilling					
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-7				Appendix A - 8 PAGE 1 of 1	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											SM Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, moist, loose, fine- to medium-grained. (FILL)
5							5 5 3	S8-1			
10							10 42 50/5"	S8-2			SM SILTY SAND WITH GRAVEL (SM): olive gray, moist, very dense, fine- to medium-grained, with small seams of wet. (GLACIAL TILL)
15							7 29 45	S8-3			
20							16 37 50/3"	S8-4			SM SILT WITH SAND (ML): light gray to olive gray, moist, hard. (GLACIAL TILL)
							33 40 50	S8-5			SILTY SAND WITH GRAVEL (SM): light gray to brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
25											

DATE DRILLED: 4-27-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.7
 TOTAL DEPTH (feet): 41.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
 2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

[illegible]

Boring was completed to a depth of 41 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

 **Cal. (3" OD)
Split Spoon**

 SPT (2" OD)
Split Spoon

Core Sample


**Shelby
Tube**

Grab

 **No Recovery**

****HAMMER WEIGHT**

**300 lbs
(30" Drop)**

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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**Proposed Retail Development
2119 Mildred Street
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BORING LOG

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND (SM): olive-gray to brown, moist, medium dense, fine- to medium-grained, some gravel. (FILL)
5			10.9		25		4	X	S9-1		
							10	X			
							6	X			
10							12	X	S9-2		
							7	X			- grades to dark brown, loose to medium dense, fine-grained, trace wood fragments.
							6	X			
15							1	X	S9-3		
							1	X			- grades to loose.
							1	X			
20							2	X	S9-4		
							2	X			
							1	X			
							0	X	S9-5		
							1	X			
							1	X			
25										SP	SAND WITH GRAVEL (SP): gray, moist, loose, fine-grained, trace fines. (FILL)
										SM	SILTY SAND WITH GRAVEL (SM): olive-gray, moist, very dense, fine- to medium-grained. (FILL)

DATE DRILLED: 4-26-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.1
 TOTAL DEPTH (feet): 41.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL	
25								5	S9-6		- grades to loose.
								4			
								1			
								4	S9-7	SM	SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								6			
								9			
30								5	S9-8		
								18			
								25			
35								21	S9-9		
								50/5.5"			
40								50/5.5"	S9-10		
41.5											

Boring was completed to a depth of 41.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3" OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
0											Surface: grass	
											SM	Topsoil.
											SM	SILTY SAND WITH GRAVEL (SM): light brown, moist, medium dense, fine- to medium-grained.
												(FILL)
												SILTY SAND WITH GRAVEL (SM): olive gray to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
29										S10-1		
39												
50												
14										S10-2		- grades to olive gray to brown.
23												
40												
20										S10-3		- grades to olive gray.
24												
42												
17										S10-4		- grades to dense.
23												
25												
10										S10-5		- grades to very dense.
32												
38												
15										S10-6		
40												
21.5												
												Boring was completed to a depth of 21.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.
DATE DRILLED: 4-27-05			SURFACE ELEVATION (feet): 337.7			DRILLING METHOD: HSA						
LOGGED BY: D. Divine			TOTAL DEPTH (feet): 21.5			DRILLER: Holt Drilling						
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A						
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-10			Appendix A -11 PAGE 1 of 1			

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY			FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE				OTHER TESTS	PID (ppm)
0										Surface: asphaltic concrete pavement	
										SP-SM	Asphaltic concrete pavement (1.5 inches thick).
										SM	Base course gravel.
											SAND WITH SILT AND GRAVEL (SP-SM): brown, dry to moist, medium dense, fine- to medium-grained.
											(FILL)
											SILTY SAND WITH GRAVEL (SM): gray-brown, moist, dense, fine- to medium-grained.
											(GLACIAL TILL)
											- grades to wet.
											- grades to gray, moist.
											- grades to gray-brown, very dense.
5											
							5	X	S11-1		
							20	X			
							22	X			
							15	X	S11-2		
							29	X			
							45	X			
							48	X	S11-3		
							50/3"	X			
10											
							11	X	S11-4		- grades to dry.
							30	X			
							37	X			
							15	X	S11-5		
							22	X			
							36	X			
15											
							12	X	S11-6		
							30	X			
19							34	X			

Boring was completed to a depth of 10 feet

DATE DRILLED: 5-3-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.0
TOTAL DEPTH (feet): 19.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

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2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
			8.7		18		4	X	S12-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive gray, moist, medium dense, fine- to medium-grained. (FILL)
5							4	X			
							2	X			
							1	X	S12-2		- grades to wet, very loose.
							0	X			
							2	X			
							6	X	S12-3		- grades to dark brown, medium dense, groundwater seepage encountered.
							10	X			
							9	X			- grades to olive gray.
10							3	X	S12-4		- grades to moist, loose.
							2	X			
							2	X			
							50/2"	X	S12-5		- sampler pounding on piece of Portland cement concrete driller reported as approximately 1 to 2 feet in dimension.
							8	X	S12-6		- grades to olive gray to light brown, medium dense.
							9	X			
							5	X			
20							1	X	S12-7	SM	SILTY SAND WITH GRAVEL (SM): olive gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)
							8	X			
24							35	X			Boring was completed to a depth of 24 feet below ground surface. Groundwater

DATE DRILLED: 4-28-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.6
 TOTAL DEPTH (feet): 24.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY		FIELD		U.S.C.S.		SOIL DESCRIPTION			
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *
<p>seepage was encountered at a depth of 7.5 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
<p style="text-align: center;">Trial Version www.nuance.com</p>											
<p>* SAMPLER TYPE <input checked="" type="checkbox"/> Cal. (3" OD) Split Spoon <input checked="" type="checkbox"/> SPT (2" OD) Split Spoon <input type="checkbox"/> Core Sample <input checked="" type="checkbox"/> Shelby Tube <input type="checkbox"/> Grab <input type="checkbox"/> No Recovery</p> <p>**HAMMER WEIGHT 300 lbs (30" Drop) 140 lbs (30" Drop)</p>											
<p>KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING</p> <p>PROJECT NUMBER: 54568</p>					<p>Proposed Retail Development 2119 Mildred Street Fircrest, Washington</p> <p>BORING LOG B-12</p>			<p>Appendix A 13b</p> <p>PAGE 2 of 2</p>			

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0											Surface: grass
0										GM	Topsoil. SILTY GRAVEL WITH SAND (GM): light brown, moist, very loose, fine-grained. (FILL)
2			9.1		14		2	X	S13-1		
1							1	X			
1							1	X			
3							3	X	S13-2		
10							10	X			- grades to light gray to olive-gray, moist to wet, medium dense, trace wood fragments.
15							15	X			
10										SM	SILTY SAND WITH GRAVEL (SM): light gray, moist, dense, fine- to medium-grained, seams of sand with silt. (GLACIAL TILL)
10							10	X	S13-3		
18							18	X			
26							26	X			
30							30	X	S13-4		- grades to very dense.
50/6"											
11							11	X	S13-5	ML	SILT WITH SAND (ML): light gray to olive gray, moist, very stiff. (GLACIAL TILL)
12							12	X			
15							15	X			
12							12	X	S13-6	SM	SILTY SAND WITH GRAVEL (SM): light gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)
23							23	X			
21							21	X			

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.3
 TOTAL DEPTH (feet): 39.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington

BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____


[illegible]

Boring was completed to a depth of 39 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3" OD)
Split Spoon



 **SPT (2" OD)
Split Spoon**
**140 lbs
(30" Drop)**



Core Sample



Shelby Tube



Grab



No Recovery

****HAMMER WEIGHT**

**300 lbs
(30" Drop)**

**140 lbs
(30" Drop)**



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL	
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, moist, very loose, fine- to medium-grained. (FILL)
1									1			
1									1			
0									0			
5												
11									11			
30									30			- grades to olive gray, wet, dense. Groundwater seepage encountered during drilling.
17									17			
10												
15												
3									3			- grades to moist, loose.
2									2			
2									2			
15												
9									9			- grades to light gray with dark brown lenses, medium dense, trace wood debris and roots.
6									6			
5									5			
20												
4									4			
6									6			
4									4			
2									2			
21									21			
21									21			
25										SM		SILTY SAND WITH GRAVEL (SM): light gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.7
 TOTAL DEPTH (feet): 38.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	NAME	
25								16 43 50/5.5'		S14-7			- grades to very dense.
30								16 32 36		S14-8			- grades to olive gray.
35								18 50/6"		S14-9			
38.4								15 50/5"		S14-10			

Boring was completed to a depth of 38.4 feet below ground surface. Groundwater seepage was encountered at a depth of 8 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

*** SAMPLER TYPE**
☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT**
 300 lbs (30" Drop) 140 lbs (30" Drop)

KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: asphaltic concrete pavement	
									SP-SM	Asphaltic concrete pavement (2 inches thick).
									SM	Base course gravel.
										SAND WITH SILT AND GRAVEL (SP-SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
										SILTY SAND WITH GRAVEL (SM): gray-brown, dry, dense, fine- to medium-grained. (GLACIAL TILL) - grades to dry to moist, very dense.
5								17 27 28	S15-1	
10								16 29 47	S15-2	
15								40 50/2.5"	S15-3	
20								50/5"	S15-4	
								32 50/4"	S15-5	
25								50/4.5"	S15-6	

DATE DRILLED: 5-3-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.4
 TOTAL DEPTH (feet): 31.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25								13			- grades to dense, seams of sand with silt and gravel.
								17			
								25			
								50/2.5		S15-8	- grades to very dense.
30								13			- grades to dry, very dense, seams of silt and sand with silt.
								35		S15-9	
31.4								50/4.5			

Boring was completed to a depth of 31.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips, and capped with Portland cement concrete.

* SAMPLER
TYPE

☒ Cal. (3" OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray to light brown, moist, loose, fine- to medium-grained. (FILL)
							1	X	S16-1		
							4	X			
							2	X			
5											
							27	X	S16-2	SM	SILTY SAND WITH GRAVEL (SM): light brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
							45	X			
							36	X			
10											
							16	X	S16-3		
							30	X			
							25	X			
15							16	X	S16-4		- grades to light gray.
							50/6"	X			
							16	X	S16-5		
							35	X			
							32	X			
20							34	X	S16-6		
							38	X			
							32	X			
							20	X	S16-7		
							50/6"	X			
25											

DATE DRILLED: 4-28-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.1
 TOTAL DEPTH (feet): 33.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
25										
30										
33.4										

29
50/6" S16-834
50/5" S16-9

Boring was completed to a depth of 33.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray to brown, moist, very loose, fine- to medium-grained. (FILL)
3								S17-1		
2										
1										
5										
1								S17-2		
1										
12										- grades to dark brown, medium dense, with wood fragments and roots.
10										
3								S17-3		
3										- grades to olive-gray, loose.
2										
15										
4								S17-4		
5										- grades to olive-gray to light brown, loose to medium dense.
5										
20										
3								S17-5		
6										- grades to dark brown, trace wood fragments.
4										
1								S17-6		
6										- grades to dark brown to olive-gray, moist to wet, medium dense, seams of relic topsoil up to 3 inches thick.
10										
25									SM	SILTY SAND WITH GRAVEL (SM):

DATE DRILLED: 4-27-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.2
 TOTAL DEPTH (feet): 38.3
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

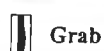
APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		
25									
30									
35									
38.3									

20
50/6" S17-730
30
43 S17-820
50/4" S17-933
50/3" S17-10light gray, moist, very dense, fine- to
medium-grained.
(GLACIAL TILL)- groundwater seepage encountered during
drilling.

- grades to olive gray.

Boring was completed to a depth of 38.3
feet below ground surface. Groundwater
seepage was encountered at a depth of 29
feet below ground surface during drilling.
Boring was backfilled with a mixture of
cuttings and bentonite chips.

* SAMPLER
TYPECal. (3"OD)
Split SpoonSPT (2" OD)
Split SpoonCore
SampleShelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very loose, fine- to medium-grained. (FILL)
1							1	X	S18-1		
1							1	X			
1							1	X			
5											
							0	X	S18-2		
							0	X			
							1	X			- grades to brown, some gravel.
10											
							0	X	S18-3		
							0	X			
							1	X			
15											
							2	X	S18-4		
							4	X			- grades to dark brown, medium dense, trace roots and wood fragments.
							5	X			
20							2	X	S18-5		
							5	X			- grades to olive-gray to brown.
							6	X			
							5	X	S18-6		
							20	X			- grades to dense.
							12	X			- grades to gray, dry.
25											

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.0
 TOTAL DEPTH (feet): 38.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

[illegible]

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* SAMPLER
TYPE

**Cal. (3" OD)
Split Spoon**

☐ SPT (2" OD)
Split Spoon

Core Sample

Shelby Tube

Grab


No Recovery

**HAMMER WEIGHT

**300 lbs
(30" Drop)**

140 lbs
(30" Drop)

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
												NAME	SYMBOL
0													Surface: asphaltic concrete pavement
													SP-SM Asphaltic concrete pavement (1 inch thick). Base course gravel. SAND WITH SILT AND GRAVEL (SP-SM): brown, moist, medium dense, fine- to medium-grained. (FILL) SILTY SAND WITH GRAVEL (SM): gray-brown, dry to moist, dense, fine- to medium-grained. (GLACIAL TILL)
									12	X	S19-1		
									17	X			
									20	X			
5													
									9	X	S19-2		
									45	X			
									42	X			
10													
									20	X	S19-3		
									50/5"	X			
15													
									20	X	S19-4		
									44	X			
									36	X			
20													
									13	X	S19-5		
									32	X			
									37	X			
									12	X	S19-6		
									30	X			
									32	X			
5													- grades to seams of sand with silt.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				PID (ppm)	NAME	
25													
								16	X	S19-7			
								43	X				
								50	X				
								20	X	S19-8			
								50/4.5'	X				
30													
								19	X	S19-9			
30.8								50/4"	X				
													- grades to fine-grained.

Boring was completed to a depth of 30.8 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips, and capped with Portland cement concrete.

* SAMPLER
TYPE

☒ Cal. (3" OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, loose, fine- to medium-grained. (FILL)
3								S20-1		
5										
10								S20-2		- grades to medium dense.
15								S20-3		
20								S20-4		- grades to dense.
25								S20-5		- grades to very dense.
								S20-6		
								S20-7		

DATE DRILLED: 4-28-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.5
 TOTAL DEPTH (feet): 33.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____


[illegible]

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* SAMPLER
TYPE

 Cal. (3"OD)
Split Spoon

 **SPT (2" OD)
Split Spoon**

Core Sample

**Shelby
Tube**

 **Grab**

 No Recovery

**HAMMER WEIGHT

**300 lbs
(30" Drop)**

**140 lbs
(30" Drop)**

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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Fircrest, Washington**

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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					NAME	SYMBOL	
0													Surface: grass
													Topsoil.
													SILTY SAND WITH GRAVEL (SM): light brown, moist, medium dense, fine- to medium-grained. (FILL)
								2	X	S21-1			
								7	X				
								5	X				
5													
								1	X	S21-2			- grades to very loose.
								1	X				
								1	X				
10													
								1	X	S21-3			- grades to dark brown, trace wood fragments.
								0	X				
								1	X				
15													- groundwater seepage encountered during drilling.
								2	X	S21-4			- grades to wet, loose.
								4	X				
								2	X				
20								6	X	S21-5			- grades to dark brown to olive-gray, moist, medium dense.
								10	X				
								9	X				
								5	X	S21-6			- grades to brown to olive-gray, some gravel.
								7	X				
								5	X				
25													

DATE DRILLED: 4-29-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.9
 TOTAL DEPTH (feet): 44.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
25									1	S21-7	- grades to very loose.
									2		
									1		
									2	S21-8	
									1		
									44		
30											- grades to olive-gray, moist to wet, medium dense.
									10	S21-9	
									9		
									16		- groundwater seepage encountered during drilling.
35											
									15	S21-10	SM SILTY SAND WITH GRAVEL (SM): olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
									30		
									47		
40											
									27	S21-11	
									29		
44									30		- grades to light gray.

Boring was completed to a depth of 44 feet below ground surface. Groundwater seepage was encountered at 15 and 34 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPECal. (3"OD)
Split SpoonSPT (2" OD)
Split SpoonCore
SampleShelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)**KLEINFELDER**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
2119 Mildred Street
Fircrest, Washington**BORING LOG****B-21**

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
0											Surface: asphaltic concrete pavement
			6.2								Asphaltic concrete pavement (2 inches thick). (Base course gravel). SILTY SAND WITH GRAVEL (SM): red-brown, moist, medium dense, fine- to medium-grained, with bark and wood fragments. (FILL) - grades to gray-brown, dry to moist, very dense, no visible organics.
5											
10											
15											
19											

Boring was completed to a depth of 19 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips, and capped with Portland cement concrete.

DATE DRILLED: 5-3-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 339.8
 TOTAL DEPTH (feet): 19.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *	
0												Surface: grass
												Topsoil. SM SILTY SAND WITH GRAVEL (SM): dark gray to olive-gray, moist, loose, fine- to medium-grained, plastic debris encountered in sampler. (FILL) - garbage encountered in cuttings.
3								X	S23-1			
4								X				
5								X				
6								X	S23-2			SM SILTY SAND WITH GRAVEL (SM): light brown to light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
30								X				
50/5.5"								X				
13								X	S23-3			- grades to light brown to olive-gray, dense.
24								X				
16								X				
6								X	S23-4			- grades to olive gray, very dense.
22								X				
37								X				
25								X	S23-5			
37								X				
38								X				
27								X	S23-6			
50/5"								X				
22								X	S23-7			
50/6"								X				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DATE DRILLED: 4-28-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.9
TOTAL DEPTH (feet): 34.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

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Fircrest, Washington**

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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL	
25								22		S23-8			
								47					
								40					
30													
								35		S23-9			
								30					
34								21					

Boring was completed to a depth of 34 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

2000 STANDARD IN/OUT 54568 GPJ 2000REV.GDT 6/8/05

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	C.S.C.S.		SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE				OTHER TESTS	PID (ppm)	
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): olive-gray, moist, medium dense, fine- to medium-grained. (FILL)
3									S24-1			
9												
4												
5												
10									S24-2			grades to olive-gray to dark brown, loose, fine- to coarse-grained.
15									S24-3			- grades to dark brown, very loose, some organics.
20									S24-4			- grades to olive-gray, medium dense, fine- to medium-grained.
25									S24-5			- grades to olive-gray to dark brown, loose, with wood fragments and roots, lenses of gray silty sand.
									S24-6			

DATE DRILLED: 4-28-05
LOGGED BY: D. Divine
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 334.0
TOTAL DEPTH (feet): 39.0
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	U.S.C.S.		SOIL DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)			SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Boring was completed to a depth of 39 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3" OD)
Split Spoon

☐ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)	
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained. (FILL)
5							3	X	S25-1				- grades to gray-brown, trace roots.
10							1	X	S25-2				- grades to dark brown, wet, very loose, with wood fragments and roots.
15							6	X	S25-3				- grades to gray, moist, loose.
							16						
							3	X	S25-4				- grades to lenses of dark brown, wet organic silt.
20							3						
							5						
							2	X	S25-5				
							10						
							29				SM		SILTY SAND WITH GRAVEL (SM): gray, wet, dense, fine- to medium-grained, low plasticity. (GLACIAL TILL)
							4	X	S25-6				- grades to moist, very dense, lenses of silt, seams of sand with silt.
25							30						
							39						

DATE DRILLED: 4-28-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 324.5
 TOTAL DEPTH (feet): 26.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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 2119 Mildred Street
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

Trial Version
www.nuance.com

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
25									19	<div>X</div>	S25-7			
26.4									37					

50/5"

Boring was completed to a depth of 26.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0										Surface: grass
9.7										
1								1	S26-1	SM
1								1		
1								1		
5										
2								2	S26-2	
0								0		
1								1		
10										
1								1	S26-3	
1								1		
1								1		
15										
2								2	S26-4	
2								2		
2								2		
20										
4								4	S26-5	
2								2		
2								2		
25										

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.0
 TOTAL DEPTH (feet): 44.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
25											
								2	S26-6		- grades to gray-brown with gray mottling, medium dense, low plasticity.
								4			
								8			
30											
								12	S26-7	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								21			
								39			
35								25	S26-8		
								50/5.5"			
								17	S26-9		
								31			
								30			
40								6	S26-10		
								35			
								50/5"			
								8	S26-11		
								33			
44								50/5.5"			

Boring was completed to a depth of 44 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, wet, very loose, fine- to medium-grained, trace roots. (FILL)
1								1	S27-1	
0								0		
1								1		
5										
								1	S27-2	
								1		
								2		
10										- grades to dark brown to gray, trace roots.
								7	S27-3	
								7		
								5		
15										- large gravel or cobbles encountered during sampling.
								1	S27-4	
								1		
								2		
20										- log encountered during sampling.
								1	S27-5	
								1		
								1		
25										- grades to gray-brown, wet, very loose, trace roots and wood fragments.

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 331.8
 TOTAL DEPTH (feet): 43.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25												
								19	X	S27-6	SM	SILTY SAND WITH GRAVEL (SM): gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								34	X			
								40	X			
30												
								12	X	S27-7		- grades to wet, dense, seams of sand with silt and sandy silt.
								14	X			
								21	X			
35												
								24	X	S27-8		- grades to dry to moist, very dense.
								50/4"	X			
								28	X	S27-9		- grades to moist to wet.
								50/4"	X			
40												
								50/1"	X	S27-10		- grades to moist.
43.4								29	X	S27-11		
								50/5"	X			

Boring was completed to a depth of 43.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3"OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

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Fircrest, Washington

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS				PID (ppm)	NAME
0											Surface: grass	
											SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained, occasional 2- to 4-inch quarry spall encountered. (FILL)
5								2 1 2	X	S28-1		- grades to very loose, no quarry spalls.
10								3 2 2	X	S28-2		- grades to loose.
15								3 3 3	X	S28-3		- grades to dark brown, moist to wet, with wood fragments.
20								1 1 9	X	S28-4		- grades to gray, wet, medium dense, fine- to medium-grained, no visible organics.
25											SM	SILTY SAND WITH GRAVEL (SM): gray, dry, very dense, fine- to coarse-grained. (GLACIAL TILL)

DATE DRILLED: 4-28-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 329.7
 TOTAL DEPTH (feet): 43.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
 2119 Mildred Street
 Fircrest, Washington
BORING LOG
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION		
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								21 46 50/5.5"	S28-5		
30								1 30 50/4"	S28-6		
35								13 43 40/4.5"	S28-7		
								3 50/6"	S28-8		
40								20 38 50/5.5"	S28-9		
								7 46 50/5"	S28-10		
43.9											

Boring was completed to a depth of 43.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

Cal. (3"OD)
Split Spoon

SPT (2" OD)
Split Spoon

Core
Sample

Shelby
Tube

Grab

No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					% PASSING No. 200 SIEVE	OTHER TESTS
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, som roots. (FILL)
5							5	X	S29-1		- grades to loose.
3							3	X			
10							2	X	S29-2		- grades to very loose.
1							1	X			
2							2	X			
15							2	X	S29-3		- grades to dark brown, wet, loose, fine-grained, no visible gravel.
2							2	X			
2							2	X			
20							3	X	S29-4		
2							2	X			
6							6	X			
25										SM	SILTY SAND WITH GRAVEL (SM): gray, moist, very dense, fine- to
DATE DRILLED: 4-25-05			SURFACE ELEVATION (feet): 330.9			DRILLING METHOD: HSA					
LOGGED BY: F. Reinart			TOTAL DEPTH (feet): 45.8			DRILLER: Holt Drilling					
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-29			Appendix A 30a PAGE 1 of 2		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION						
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL	
25									11	X	S29-5			medium-grained. (GLACIAL TILL)
								50/6"	X	S29-6				
30														
35								2	X	S29-7				
								33	X					
								41	X					
								3	X	S29-8				
								26	X					
								50	X					
40								34	X	S29-9				
								50/2.5"	X					
								2	X	S29-10				
								35	X					
								50/4"	X					
45								22	X	S29-11				
45.8								50/3"	X					

Boring was completed to a depth of 45.8 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER TYPE

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____




KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 54568

Proposed Retail Development
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BORING LOG
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DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					% PASSING No. 200 SIEVE	OTHER TESTS
0										Surface: grass	
5		14.2					1	S30-1		SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to medium-grained. (FILL) - grades to wet. - grades to dark brown, moist, loose, fine-grained, with roots and wood fragments.
10							4	S30-2			grades to medium dense, some organics.
15							2	S30-3			- grades to brown, moist to wet, loose, with wood fragments.
20							5	S30-4		SP-SM	SAND WITH SILT (SP-SM): gray, moist, medium dense, fine-grained. (FILL)
21.4							17	S30-5		SM	SILTY SAND WITH GRAVEL (SM): gray, wet, very dense, fine-grained. (GLACIAL TILL)
							20	S30-6			
							36				
<p>Boring was completed to a depth of 21.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>											
DATE DRILLED: 4-25-05 LOGGED BY: F. Reinart REVIEWED BY: J. Schmidt			SURFACE ELEVATION (feet): 333.9 TOTAL DEPTH (feet): 21.4 DIAMETER OF BORING (in): 8 inches			DRILLING METHOD: HSA DRILLER: Holt Drilling CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568						Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-30				Appendix A -31 PAGE 1 of 1	

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	
0											Surface: grass
5											SM Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, loose, fine- to medium-grained. (FILL)
10											- grades to brown to gray, moist to wet, loose.
11											- grades to brown, very loose
											SM SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)

Boring was completed to a depth of 11 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 338.1
 TOTAL DEPTH (feet): 11.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0											Surface: grass
											Topsoil.
										SM	SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained. (FILL)
								2	S32-1		
								1			
								3			
5								15	S32-2	SM	SILTY SAND WITH GRAVEL (SM): brown, moist, dense, fine- to medium-grained. (GLACIAL TILL)
								16			
								34			
								19	S32-3		grades to light gray-brown, very dense.
								27			
								46			
10								7	S32-4		
11.5								35			

50/5.5"

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.8
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
0											Surface: grass	
								7	X	S33-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, medium dense, fine- to medium-grained. (FILL)
								8	X			
								11	X			
5								8	X	S33-2	SM	SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								15	X			
								29	X			
								25	X	S33-3		grades to light brown, moist, very dense.
								38	X			
								50	X			
10								21	X	S33-4		grades to light gray to brown, fine-grained.
								22	X			
11.5								44	X			

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 336.6
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	
0											Surface: grass
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
							5	X	S34-1		
							7	X			
							11	X			
5							16	X	S34-2	SM	SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
							28	X			
							34	X			
							43	X	S34-3		
							43	X			
							50	X			
10							17	X	S34-4		
11.2							48	X			

50/2"

Boring was completed to a depth of 11.2 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 332.7
 TOTAL DEPTH (feet): 11.2
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
								5		SM	Topsoil.
								7			SILTY SAND WITH GRAVEL (SM):
								11			light gray-brown, moist, medium dense,
											fine- to medium-grained.
											(FILL)
5								10		SM	
								9			- grades to black, with organics and
								3			asphaltic concrete fragments.
								4		SM	
								5			- grades to light brown to light gray, no
								11			visible organics or debris.
10								32		SM	SILTY SAND WITH GRAVEL (SM):
11								50/6"			light gray to olive-gray, wet to moist, very
											dense, fine-grained.
											(GLACIAL TILL)

Boring was completed to a depth of 38.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-25-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 335.5
 TOTAL DEPTH (feet): 11.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *
0											Surface: grass
											Topsoil.
			8.5					2	S36-1		SILTY SAND WITH GRAVEL (SM): gray-brown, moist, loose, fine- to medium-grained. (FILL) - grades to moist to wet, medium dense.
								3			
								11			
5											
								6	S36-2		- grades to brown, moist.
								6			
								6			
10											
								3	S36-3		- grades to loose.
								5			
								4			
15											
								15	S36-4	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, wet, very dense, fine- to medium-grained. (GLACIAL TILL) - grades to gray to gray-brown, moist to wet. - grades to moist, with seams of wet sand.
								33			
								37			
20								28	S36-5		
								33			
								42			
								22	S36-6		- grades to moist.
								50/6"			
25											

DATE DRILLED: 5-2-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 337.0
 TOTAL DEPTH (feet): 26.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S.		SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					NAME	SYMBOL	
25								19		S36-7			
26								50/6"					

Boring was completed to a depth of 26 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION				
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	NAME	SYMBOL
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray, moist, medium dense, fine- to medium-grained. (FILL)
5								5	X	S37-1			
								5	X				
								5	X				
10								3	X	S37-2			- grades to dark brown, loose.
								2	X				
								3	X				
15								14	X	S37-3			
								20	X				SILT (ML): light gray to olive gray, moist, hard, trace sand. (GLACIAL TILL)
								17	X				
20								28	X	S37-4			
								47	X				SILTY SAND WITH GRAVEL (SM): light gray, dry, very dense, fine- to medium-grained. (GLACIAL TILL)
								50	X				
								39	X	S37-5			- grades to olive-gray, moist.
								50/3"	X				
25													

DATE DRILLED: 4-26-05
 LOGGED BY: D. Divine
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 334.0
 TOTAL DEPTH (feet): 30.4
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A


KLEINFELDER
 GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
25								25		
								50/6"	X	S37-6
								50/6"	X	S37-7
30								50/5"	X	S37-8
30.4										

Boring was completed to a depth of 30.4 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION				
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	NAME	SYMBOL
0													Surface: grass
											SM		Topsoil. SILTY SAND WITH GRAVEL (SM): brown to light gray, moist, medium dense, fine- to medium-grained, lenses of wet. (FILL)
5									3 4 10	S38-1			
10									6 3 3	S38-2			- grades to loose, some wood fragments.
15									6 4 4	S38-3			
20									6 6 8	S38-4			- grades to olive-gray to light gray, moist, medium dense.
25											SP		SAND (SP): light gray, wet, medium dense to dense, fine-grained, trace fines.
DATE DRILLED: 4-25-05		SURFACE ELEVATION (feet): 337.5				DRILLING METHOD: HSA							
LOGGED BY: D. Divine		TOTAL DEPTH (feet): 36.5				DRILLER: Holt Drilling							
REVIEWED BY: J. Schmidt		DIAMETER OF BORING (in): 8 inches				CASING SIZE: N/A							
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING					Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-38					Appendix A 39a PAGE 1 of 2			

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
25							9		S38-5		(FILL)
							37			ML	
							34			SM	
							31		S38-6		SILT (ML): light gray, wet, hard. (GLACIAL TILL)
							50/5"				SILTY SAND WITH GRAVEL (SM): light gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
30							41		S38-7		
							50/6"				
							28		S38-8		
							34				
							50/5"				
35							22		S38-9		
							37				
36.5							45				

Boring was completed to a depth of 36.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

Proposed Retail Development
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION		
			MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		BLOWS/6 in** (uncorrected)	SAMPLER *	NAME
0										Surface: grass		
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to olive-gray, moist, very loose, fine- to medium-grained. (FILL)	
5								1 1 1	S39-1			
10								1 1 1	S39-2		- grades to moist to wet.	
15								1 1 1	S39-3		- grades to dark brown, wet, fine-grained, some gravel, with bark and wood fragments.	
20								1 3 1	S39-4		- grades to gray to brown, moist, fine- to medium-grained, trace organics.	
25												
DATE DRILLED: 4-26-05 SURFACE ELEVATION (feet): 335.5 DRILLING METHOD: HSA LOGGED BY: D. Divine TOTAL DEPTH (feet): 41.0 DRILLER: Holt Drilling REVIEWED BY: J. Schmidt DIAMETER OF BORING (in): 8 inches CASING SIZE: N/A												
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NUMBER: 54568										Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-39		Appendix A 40a PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS /	PID (ppm)	BLOWS/6 in** (uncorrected) SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
											NAME	SYMBOL
25									4	S39-5	SP	SAND (SP): light gray, moist, loose, fine-grained. (FILL)
									4			
									4			
											SM	SILTY SAND WITH GRAVEL (SM): light gray to olive-gray, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
30									20	S39-6		
									29			
									47			
									50/6"	S39-7		
35									18	S39-8		
									29			
									32			
									31	S39-9		
									50/6"			
40									25	S39-10		
41									50/6"			

Boring was completed to a depth of 41 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE Cal. (3" OD)
Split Spoon

 **SPT (2" OD)
Split Spoon**

Core Sample


**Shelby
Tube**

 Grab

 **No Recovery**

****HAMMER WEIGHT**

300 lbs
(30" Drop)

**140 lbs
(30" Drop)**

**KLEINFELDER**

**GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING**

PROJECT NUMBER: 54568

**Proposed Retail Development
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Fircrest, Washington**

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

13Y:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0											Surface: grass
											Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, with roots. (FILL)
5								3 6 7	S40-1		
10								2 2 2	S40-2		- grades to brown to gray-brown, loose, trace roots.
15								1 1 2	S40-3		- grades to wet, very loose, trace wood fragments.
								1 2 3	S40-4		- grades to gray, loose.
20								9 18 25	S40-5	SP-SM	SAND WITH SILT AND GRAVEL (SP-SM): gray, wet, dense, medium-grained. (GLACIAL TILL)
25								3 34 50/3"	S40-6	SM	SILTY SAND WITH GRAVEL (SM): gray, moist to wet, very dense, fine- to medium-grained. (GLACIAL TILL)

DATE DRILLED: 4-25-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 323.9
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					NAME	SYMBOL
25								13		S40-7		
25.9								50/5"				

Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
5							1 1 2		S41-1		- grades to very loose.
10							1 2 2		S41-2	OL SM	ORGANIC SILT (OL): dark brown, moist, soft, trace sand. (FILL) SILTY SAND WITH GRAVEL (SM): brown, wet, loose, fine- to medium-grained. (FILL)
15							12 30 32		S41-3	SP-SM	SAND WITH SILT AND GRAVEL (SP-SM): gray, moist, very dense, medium-grained. (GLACIAL TILL)
							3 17 50/5"		S41-4	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist to wet, very dense, fine- to medium-grained, lenses of gray-brown sand with silt. (GLACIAL TILL)
20							22 50/3"		S41-5		
25							2 27 50		S41-6		

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 318.5
 TOTAL DEPTH (feet): 26.3
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____


DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	PID (ppm)
25												
26.3							25 36	X	S41-7			
<p>Boring was completed to a depth of 26.3 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>												

50/4"

*** SAMPLER TYPE**

☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT** 300 lbs (30" Drop) 140 lbs (30" Drop)



KLEINFELDER
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0										Surface: grass
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray-brown, moist, medium dense, fine- to medium-grained. (FILL)
5		13.9						3 6 5	S42-1	
10								4 4 2	S42-2	- grades to dark brown, loose, with wood fragments.
15								11 18 30	S42-3	SM SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								3 20 33	S42-4	- grades to wet, very dense.
20								20 32	S42-5	
								50/4.5"		
25								7 50/5"	S42-6	- grades to dry to moist, with lenses of light brown silt.

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 317.9
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25								20		S42-7		
25.9								50/5"				

Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE



Cal. (3"OD)
Split Spoon



SPT (2" OD)
Split Spoon



Core
Sample



Shelby
Tube



Grab



No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	SAMPLE NUMBER	SOIL DESCRIPTION		
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained. (FILL)
5								4 4 14	S43-1		- grades to dark brown, moist, with organics.
10								4 3 5	S43-2		- grades to light brown to brown, moist to wet, loose, no visible organics.
15								11 35 41	S43-3	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL)
								10 31 46	S43-4		
20								10 34 44	S43-5		- grades to with lenses of wet sand.
								2 30	S43-6		
25								50/4.5"			

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 319.8
 TOTAL DEPTH (feet): 25.9
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				NAME	SYMBOL
25								21		S43-7		
25.9								50/5"				

- grades to gray-brown with yellow-brown mottling, dry to moist.

Boring was completed to a depth of 25.9 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY			FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE				OTHER TESTS	PID (ppm)
0										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained, trace roots. (FILL)
5							6	X	S44-1		
							4	X			
							3	X			
							10	X	S44-2		- grades to brown, wet.
							10	X		SM	SILTY SAND WITH GRAVEL (SM): gray-brown, wet, dense, fine-grained. (GLACIAL TILL)
10							17	X			
							5	X	S44-3		- grades to moist to wet.
							17	X			
							18	X			
							3	X	S44-4		
							13	X			
							25	X			
15							11	X	S44-5		- grades to with lenses of sand with silt.
							19	X			
16.5							22	X			

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-26-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 312.0
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)					NAME	SYMBOL
0										Surface: grass	
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, loose, fine- to medium-grained. (FILL)
5							2	X	S45-1		
							5	X			
							4	X			
							1	X	S45-2		
							0	X			
							2	X			- grades to dark brown, wet, very loose, with wood fragments.
10							6	X	S45-3	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, dense, fine- to medium-grained. (GLACIAL TILL)
							16	X			
							18	X			
							5	X	S45-4		
							12	X			- grades to wet, medium dense, with lenses of sand with silt.
							14	X			
15							10	X	S45-5		
							17	X			- grades to dense.
16.5							25	X			

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 311.7
TOTAL DEPTH (feet): 16.5
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	NAME	SYMBOL	
0											Surface: grass
										SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense to dense, fine- to medium-grained, cobbles encountered during drilling. (FILL)
5											
10											
15											
16.5											

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 311.6
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
 SOILS AND MATERIALS TESTING

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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____
 BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION					
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in ** (uncorrected)	SAMPLER *	SAMPLE NUMBER	NAME	SYMBOL
0													Surface: grass
5		11.6							2	X	S47-1	SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, moist, medium dense, fine- to medium-grained, occasional 2- to 4-inch quarry spall encountered during drilling. (FILL)
									3	X			- grades to moist to wet, loose, trace roots.
									2	X			
									0	X	S47-2		- grades to brown with orange-brown mottling, wet, very loose, trace organics.
									1	X			
									2	X			
10									11	X	S47-3	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, moist, dense, fine- to medium-grained, with lenses of sand with silt. (GLACIAL TILL)
									18	X			- grades to gray.
									12	X			
									4	X	S47-4		- grades to gray.
									19	X			
									28	X			
15									13	X	S47-5		- grades to very dense.
									30	X			
16.5									50	X			
<p>Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.</p>													

DATE DRILLED: 4-27-05

LOGGED BY: F. Reinart

REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 311.0


TOTAL DEPTH (feet): 16.5

DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA

DRILLER: Holt Drilling

CASING SIZE: N/A



KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		BLOWS/6 in ** (uncorrected)	SAMPLER #	SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)			NAME	SYMBOL
0											Surface: grass	
											SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown to gray-brown, moist to wet, loose, fine- to medium-grained. (FILL)
5									1 3 1	S48-1		- grades to wet, very loose, trace organics.
									0 1 5	S48-2		- grades to gray, wet, loose, fine- to medium-grained, low plasticity.
10									6 11 12	S48-3		- grades to medium dense.
									3 17 26	S48-4	SM	SILTY SAND WITH GRAVEL (SM): gray, wet, dense, fine- to medium-grained, with seams of sand with silt. (GLACIAL TILL)
15									11 18	S48-5		
16.5									23			

Boring was completed to a depth of 16.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 310.3
 TOTAL DEPTH (feet): 16.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	SOIL DESCRIPTION	
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE					OTHER TESTS	NAME
0											Surface: grass	
											SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, wet, very loose, fine- to medium-grained, with wood fragments and roots. (FILL)
5										S49-1		
										S49-2		- grades to gray to gray-brown, wet, medium dense.
10										S49-3	SM	SILTY SAND WITH GRAVEL (SM): gray to gray-brown, dry to moist, very dense, fine- to medium-grained. (GLACIAL TILL)
										S49-4		- grades to moist to wet.
15										S49-5		- grades to dry to moist.
6.4												Boring was completed to a depth of 16.4

DATE DRILLED: 4-27-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 309.9
TOTAL DEPTH (feet): 16.4
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



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APPROV: _____

BY:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0										Surface: grass
5			15.4							
10										
15										
16.5										

SM

Topsoil.
SILTY SAND WITH GRAVEL (SM):
gray-brown, wet, loose, fine- to
medium-grained.
(FILL)

- grades to brown, medium dense, trace
organics.

SM

SILTY SAND WITH GRAVEL (SM):
gray-brown, moist to wet, dense, fine- to
medium-grained.
(GLACIAL TILL)

- grades to gray to gray-brown, moist, very
dense.

- grades to dry to moist.

Boring was completed to a depth of 16.5
feet below ground surface. Groundwater
was not encountered during drilling.
Boring was backfilled with a mixture of
cuttings and bentonite chips.

DATE DRILLED: 4-27-05
LOGGED BY: F. Reinart
REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 309.5
TOTAL DEPTH (feet): 16.5
DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
DRILLER: Holt Drilling
CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER
AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		NAME	SYMBOL	SOIL DESCRIPTION
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)			
0										Surface: grass
										Topsoil. SM SILTY SAND WITH GRAVEL (SM): gray-brown, wet, loose, fine- to medium-grained. (FILL) - grades to brown.
5										
										SM SILTY SAND WITH GRAVEL (SM): gray-brown, moist, very dense, fine- to medium-grained. (GLACIAL TILL) - grades to gray to gray-brown, moist to wet, dense, with lenses of sand with silt.
10										
14										

Boring was completed to a depth of 14 feet below ground surface. Groundwater seepage was encountered at a depth of 10 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 308.3
 TOTAL DEPTH (feet): 14.0
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
											Topsoil.
								1	S52-1	SM	SILTY SAND WITH GRAVEL (SM): brown, wet, very loose, fine- to medium-grained, trace roots. (FILL)
								1			
								13			- grades to yellow brown, moist to wet, medium dense, some gravel.
5								5	S52-2	SM	SILTY SAND WITH GRAVEL (SM): gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
								12			
								19			
								4	S52-3		- grades to wet, with lenses of sand with silt.
								10			
								21			
10								2	S52-4		- grades to moist to wet, very dense.
								22			
11.5								50/5.5"			

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater seepage was encountered at a depth of 7.5 feet below ground surface during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 308.0
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS		NAME	SYMBOL
0									Surface: grass	
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): brown, wet, loose, fine- to medium-grained. (FILL)
5								1 4 2	S53-1	
								4 11 14	S53-2	- grades to gray-brown, medium dense, with lenses of sand with silt.
10								3 19 30	S53-3	10 SILTY SAND WITH GRAVEL (SM): gray-brown, moist to wet, dense, fine- to medium-grained. (GLACIAL TILL)
11.5								11 36	S53-4	- grades to very dense.

50/5.5"

Boring was completed to a depth of 11.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

DATE DRILLED: 4-27-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 307.3
 TOTAL DEPTH (feet): 11.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	SOIL DESCRIPTION	
		MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)		NAME	SYMBOL
0										Surface: grass
									SM	Topsoil. SILTY SAND WITH GRAVEL (SM): gray-brown, moist, medium dense, fine- to medium-grained. (FILL)
5		8.6						7 4 3	S54-1	- grades to brown, loose, trace roots.
10								6 4 2	S54-2	
15								3 4 6	S54-3	- grades to gray-brown to gray, moist to wet, medium dense.
								0 1 1	S54-4	- grades to brown, wet, very loose.
20								10 14 18	S54-5	SM SILTY SAND WITH GRAVEL (SM): gray, moist, dense, fine- to medium-grained. (GLACIAL TILL)
								2 14 38	S54-6	- grades to wet, very dense, seams of sand with silt.
25										

DATE DRILLED: 4-28-05
 LOGGED BY: F. Reinart
 REVIEWED BY: J. Schmidt

SURFACE ELEVATION (feet): 324.6
 TOTAL DEPTH (feet): 26.5
 DIAMETER OF BORING (in): 8 inches

DRILLING METHOD: HSA
 DRILLER: Holt Drilling
 CASING SIZE: N/A



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 AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)
25									16
									43
26.5									50

S54-7

- grades to gray to gray-brown with yellow-brown mottling, moist.

Boring was completed to a depth of 26.5 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE

**HAMMER WEIGHT

300 lbs
(30" Drop)

140 lbs
(30" Drop)



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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS				
0											Surface: grass
									SM		Topsoil. SILTY SAND WITH GRAVEL (SM): gray, moist, loose, fine- to medium-grained. (FILL)
								3 3 1	S55-1		- grades to very loose.
5											
								1 1 1	S55-2		
10											
								2 2 5	S55-3		- grades to loose.
15											
								1 1 5	S55-4		- grades to brown to gray, wet, with wood fragments.
20											
								1 5 7	S55-5		- grades to dark brown. - grades to gray.
25											
								6 7 5	S55-6		- grades to gray with gray-brown mottling, moist, medium dense.
DATE DRILLED: 5-2-05		SURFACE ELEVATION (feet): 331.2				DRILLING METHOD: HSA					
LOGGED BY: F. Reinart		TOTAL DEPTH (feet): 29.0				DRILLER: Holt Drilling					
REVIEWED BY: J. Schmidt		DIAMETER OF BORING (in): 8 inches				CASING SIZE: N/A					
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING					Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-55					Appendix A 56a PAGE 1 of 2	
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THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	LABORATORY				FIELD		SOIL DESCRIPTION	
		WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)
25									1
									3
									2
									15
									19
29									19

S55-7

S55-8

SM

- grades to brown to gray, wet, loose, fine-grained.

SILTY SAND WITH GRAVEL (SM):
gray, moist, dense, fine-grained.
(GLACIAL TILL)

Boring was completed to a depth of 29 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

* SAMPLER
TYPE
☒ Cal. (3"OD)
Split Spoon

☒ SPT (2" OD)
Split Spoon

☐ Core
Sample

☐ Shelby
Tube

☐ Grab

☐ No
Recovery

**HAMMER WEIGHT

300 lbs
(30" Drop)140 lbs
(30" Drop)

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APPROV: _____

BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
0												Surface: grass
										SM		Topsoil. SILTY SAND WITH GRAVEL (SM): light brown, dry, medium dense, fine- to medium-grained, trace roots. (FILL)
5								2 2 2	S56-1			- grades to loose.
10								1 1 2	S56-2			- grades to brown, wet, very loose, trace roots.
15								1 0 2	S56-3			- grades to with wood fragments. - grades to gray, wet, loose.
								2 2 2	S56-4			- grades to gray to gray-brown with black mottling, no odor (0.0 using PID).
								2 6 5	S56-5			- grades to medium dense, no black mottling.
20								7 11 5	S56-6			
25												
DATE DRILLED: 4-28-05			SURFACE ELEVATION (feet): 332.6			DRILLING METHOD: HSA						
LOGGED BY: F. Reinart			TOTAL DEPTH (feet): 35.7			DRILLER: Holt Drilling						
REVIEWED BY: J. Schmidt			DIAMETER OF BORING (in): 8 inches			CASING SIZE: N/A						
 KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING									Proposed Retail Development 2119 Mildred Street Fircrest, Washington BORING LOG B-56			Appendix A 57a PAGE 1 of 2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____


BY: _____

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	LABORATORY				FIELD		SAMPLE NUMBER	NAME	SYMBOL	SOIL DESCRIPTION
			MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)				
25								2		S56-7		- grades to brown, wet, loose, fine-grained, with roots.
								2				
								3				
30								5		S56-8		- grades to gray, medium dense, fine- to medium-grained.
								9				
								18				
										SM		SILTY SAND WITH GRAVEL (SM): gray, wet, dense, fine- to medium-grained. (GLACIAL TILL)
35								44		S56-9		- grades to dry to moist, very dense.
35.7								50/2"				

Boring was completed to a depth of 35.7 feet below ground surface. Groundwater was not encountered during drilling. Boring was backfilled with a mixture of cuttings and bentonite chips.

*** SAMPLER TYPE**
☒ Cal. (3" OD) Split Spoon ☒ SPT (2" OD) Split Spoon ☐ Core Sample ☐ Shelby Tube ☐ Grab ☐ No Recovery

****HAMMER WEIGHT**
300 lbs (30" Drop) 140 lbs (30" Drop)


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APPROV: _____

BY: _____

APPENDIX B

GEOTECHNICAL LABORATORY TESTING

B.1 GENERAL

We conducted laboratory tests on several representative soil samples to better identify the soil classification of the units encountered and to evaluate the material's general physical properties and engineering characteristics. A brief description of the tests performed for this study is provided below. The results of laboratory tests performed on specific samples are provided at the appropriate sample depths on the individual boring logs. However, it is important to note that these test results may not accurately represent in situ soil conditions. All of our recommendations are based on our interpretation of these test results and their use in guiding our engineering judgment. Kleinfelder cannot be responsible for the interpretation of these data by others.

In accordance with your requirements, the soil samples for this project will be retained a period of 6 months following completion of this report, or until the foundation installation is complete, unless we are otherwise directed in writing.

B.2 SOIL CLASSIFICATION

Soil samples were visually examined in the field by our representative at the time they were obtained. They were subsequently packaged and returned to our laboratory where they were reexamined and the original description checked and verified or modified. With the help of information obtained from the other classification tests, described below, the samples were described in general accordance with the Unified Classification System, ASTM Standard D2487. The resulting descriptions are provided at the appropriate locations on the individual boring logs, located in Appendix A, and are qualitative only.

B.3 MOISTURE CONTENT

Moisture content tests were performed on 15 samples obtained from the borings. The purpose of these tests is to approximately ascertain the in-place moisture content of the soil sample at the time it was collected. The moisture content is determined in general accordance with ASTM Standard D2216. The information obtained assists us by providing qualitative information regarding soil compressibility. The results of these tests are presented at the appropriate sample depths on the boring logs.

B.4 GRAIN-SIZE DISTRIBUTION

Detailed grain-size distribution analyses were conducted in general accordance with ASTM Standard D422 on 5 representative soil samples to determine the grain-size distribution of the on-site soil. The information gained from this analysis allows us to provide a detailed description and classification of the in-place materials. In turn, this information helps us to understand how the in-place materials will react to conditions such as heavy seepage, traffic action, loading, potential liquefaction, and so forth. The results of these tests are presented in this Appendix.

B.5 MODIFIED PROCTOR

We performed one compaction test on a composite bulk sample obtained from borings performed in the proposed parking lot. The test was performed in accordance with ASTM Standard D1557 (Modified Proctor). The test was performed to obtain a compaction value for the on-site soils for use in performing a California Bearing Ratio test. The results of this test is presented in this Appendix.

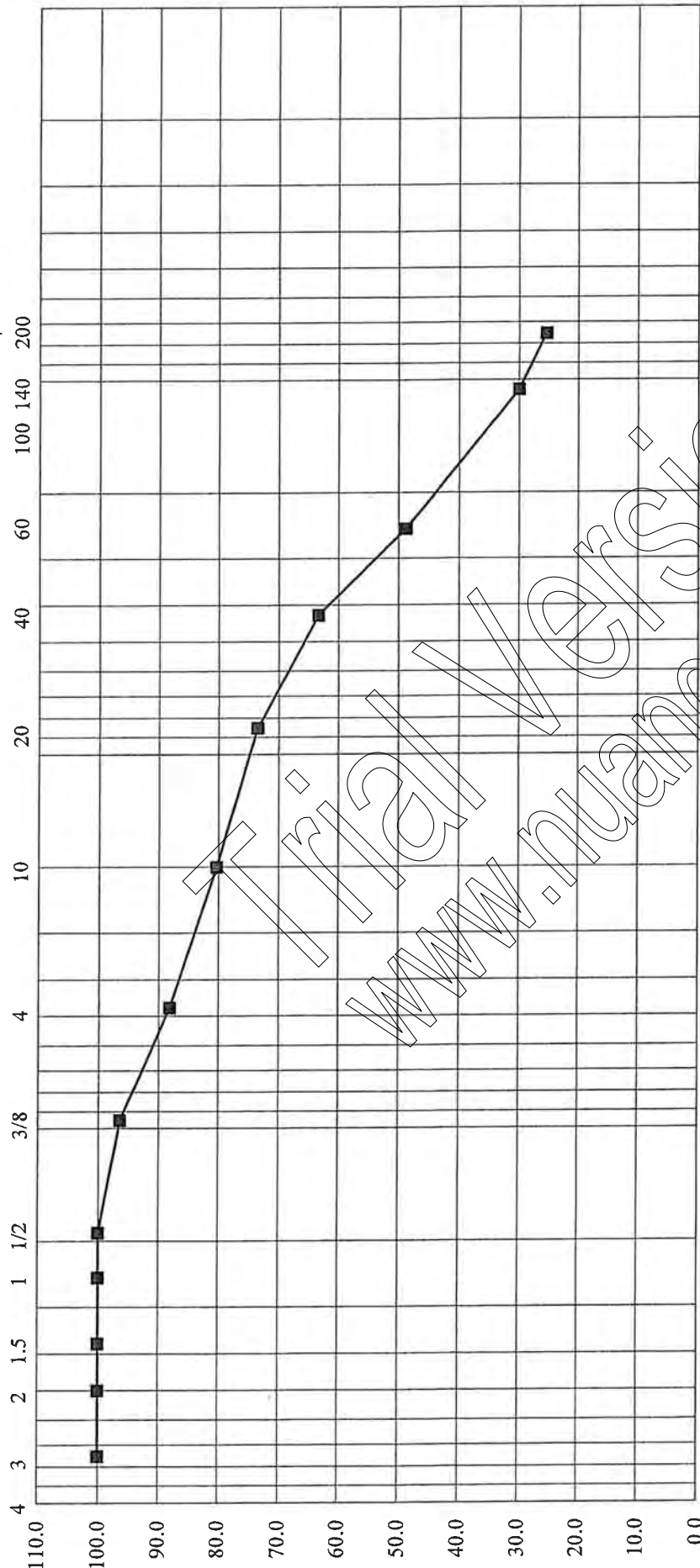
B.6 CALIFORNIA BEARING RATIO

We performed one CBR test on a composite bulk sample obtained from borings performed in the proposed parking lot. The test was performed in general accordance with ASTM Standard D1883. A CBR value of 19 was obtained from this test.

B.7 DIRECT SHEAR

We performed a direct shear test on one relatively undisturbed samples to determine the shear strength of the in-place native soil. The test was performed in general accordance with ASTM Standard D3080 on a sample at the field moisture conditions. A normal load, appropriate to the anticipated foundation conditions, was applied to the test sample and the sample was then sheared under a constant strain control. The results of this test is presented in this Appendix.

US SIEVE OPENINGS IN INCHES | US SIEVE NUMBERS | HYDROMETER

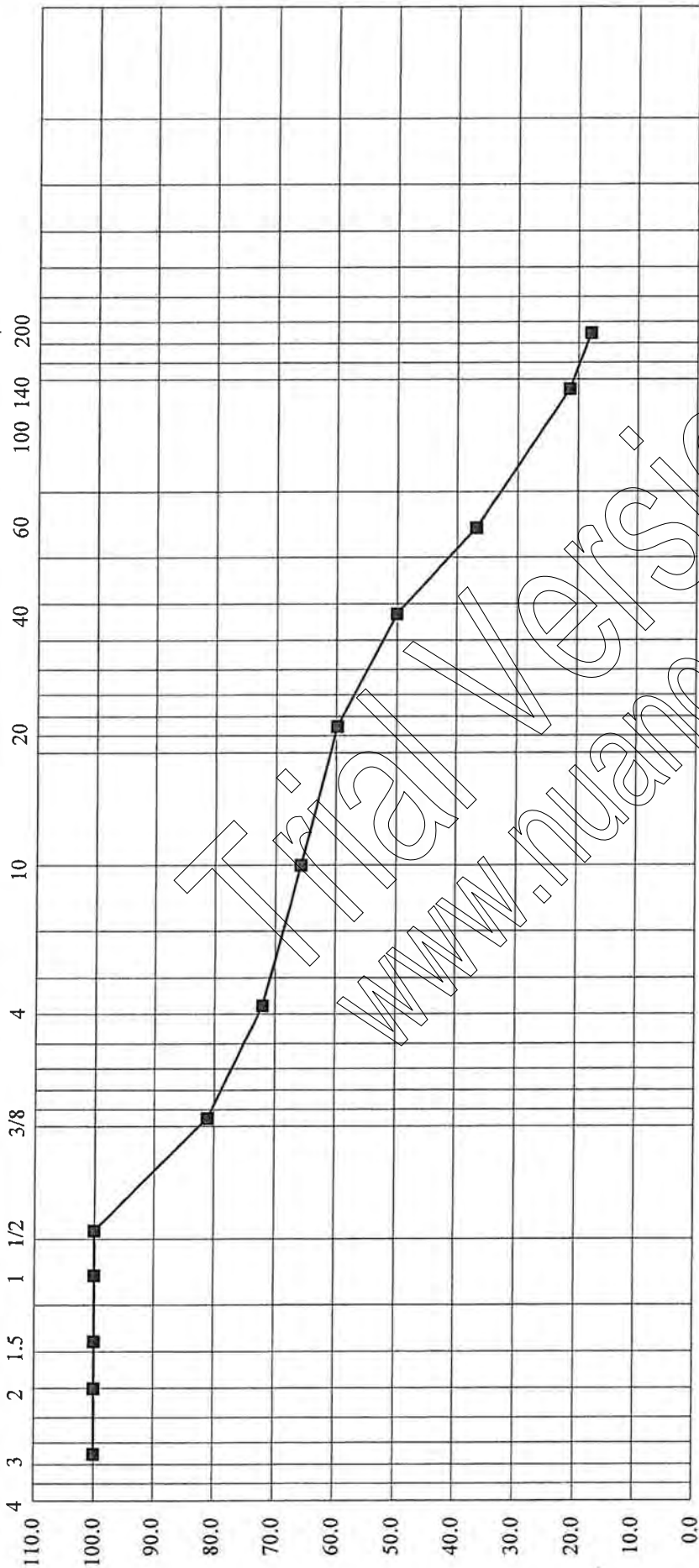


Grain Size in Millimeters

GRAVEL		SAND		FINES (SILTS OR CLAYS)	
coarse	fine	coarse	medium	fine	


Sa. No. S9-1 Boring B-9 / 5' Desc. SM		2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200		Sieve Analysis Proposed Retail Development		L05S	
Project Number 54568 / 3		Technician F. Bengco		Approved G. Hayre		Revised M. Monserud	
Silty Sand		Date 5/31/2005		Date 6/7/2005			

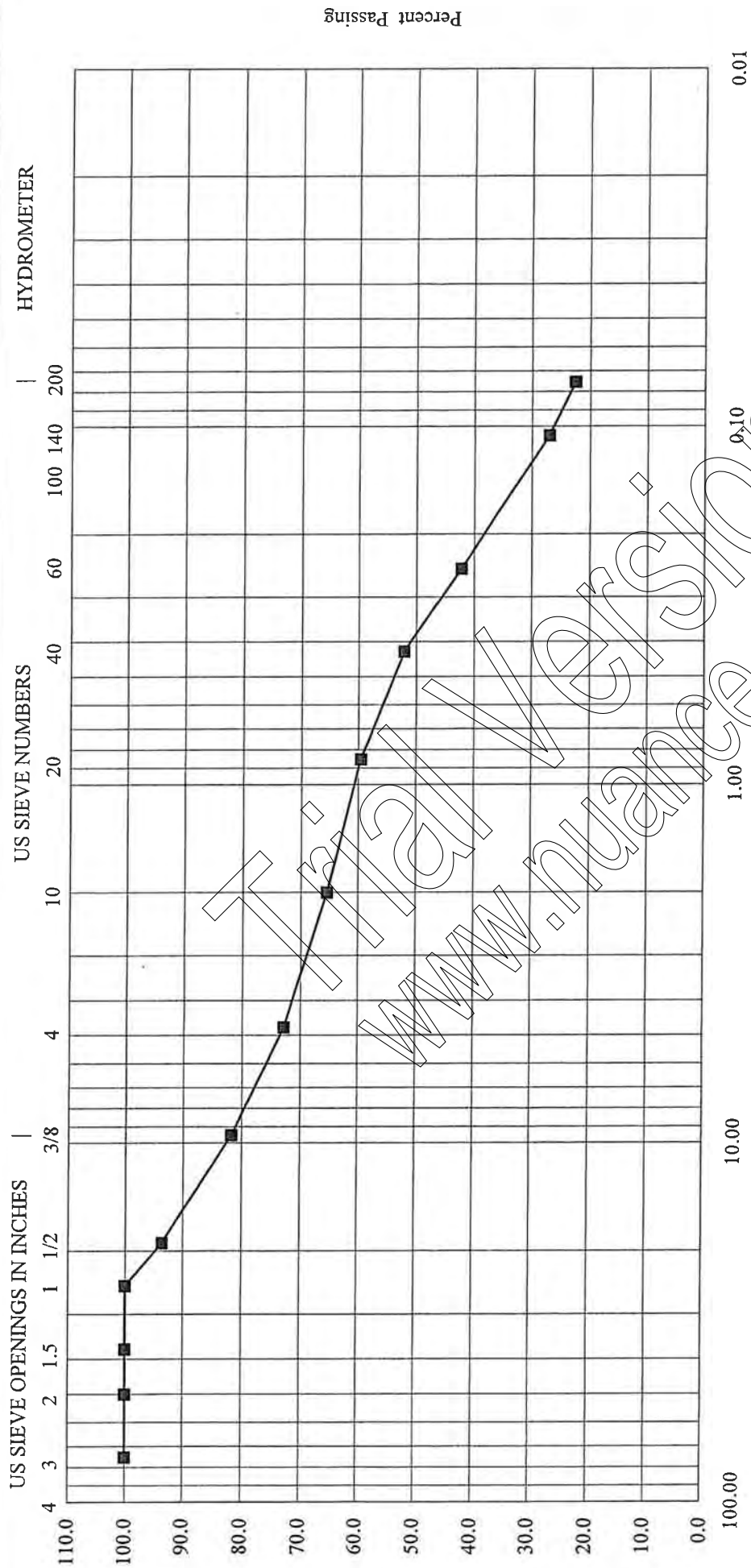
US SIEVE OPENINGS IN INCHES | US SIEVE NUMBERS | HYDROMETER



Grain Size in Millimeters

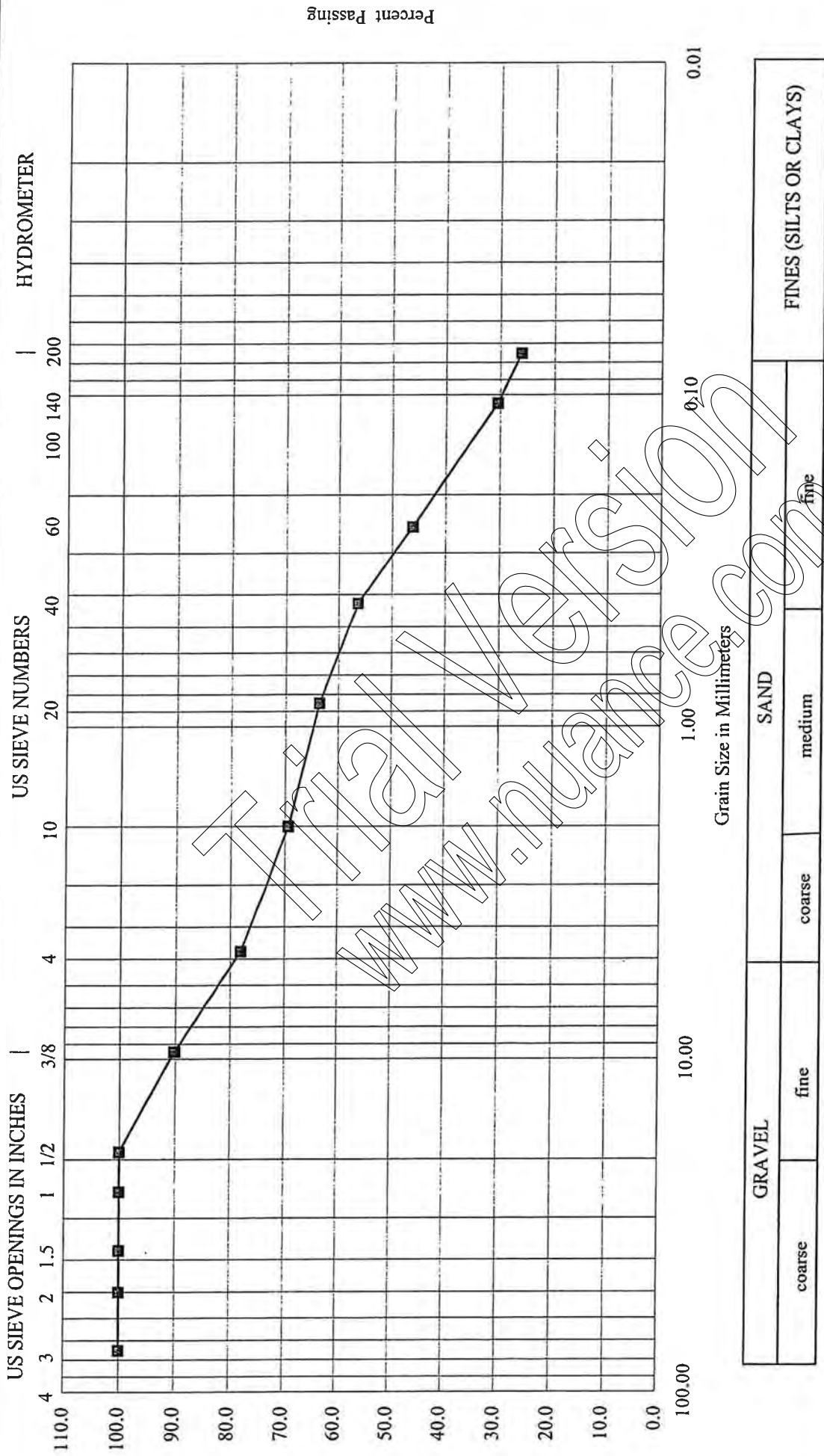
GRAVEL		SAND		FINES (SILTS OR CLAYS)	
coarse	fine	coarse	medium	fine	


Sieve Analysis Proposed Retail Development		L06S	
Sa. No. S12-1 Boring B-12 / 2.5' Desc. SM	 2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200	Project Number 54568 / 3	Technician F. Bengco
Silty Sand with Gravel		Approved G. Hayre	Date 5/31/2005
Revised M. Monserud		Date 6/7/2005	



GRAVEL		SAND		FINES (SILTS OR CLAYS)
coarse	fine	coarse	medium	

Sa. No. S7-1		2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200		Sieve Analysis		L07S	
Boring	B-7 / 2.5'			Proposed Retail Development			
Desc.	SM			Technician F. Bengco		Revised M. Monserud	
Silty Sand with Gravel		Project Number 54568 / 3		Approved G. Hayre		Date 5/31/2005	
						Date 6/7/2005	



Sa. No. NAT-1		 2405 140th Ave. NE Suite A 101 Bellevue, WA 98005 (452) 562-4200		Sieve Analysis		L03S	
Test Pit Native 2.5'				Architects BCRA			
Desc. SM				Proposed Retail Development			
Silty Sand with Gravel		Project Number 54568	Technician F. Bengco	Approved G. Hayre	Date 5/26/2005	Revised M. Monserud	Date 6/8/2005

SAMPLE DATA

Sampled Location:	NAT-1
Sample No.:	Native 2.5'
Depth:	2.5'
Soil Description	Silty Sand with Gravel
USCS	SM
Specific Gravity	N/A

TEST DATA

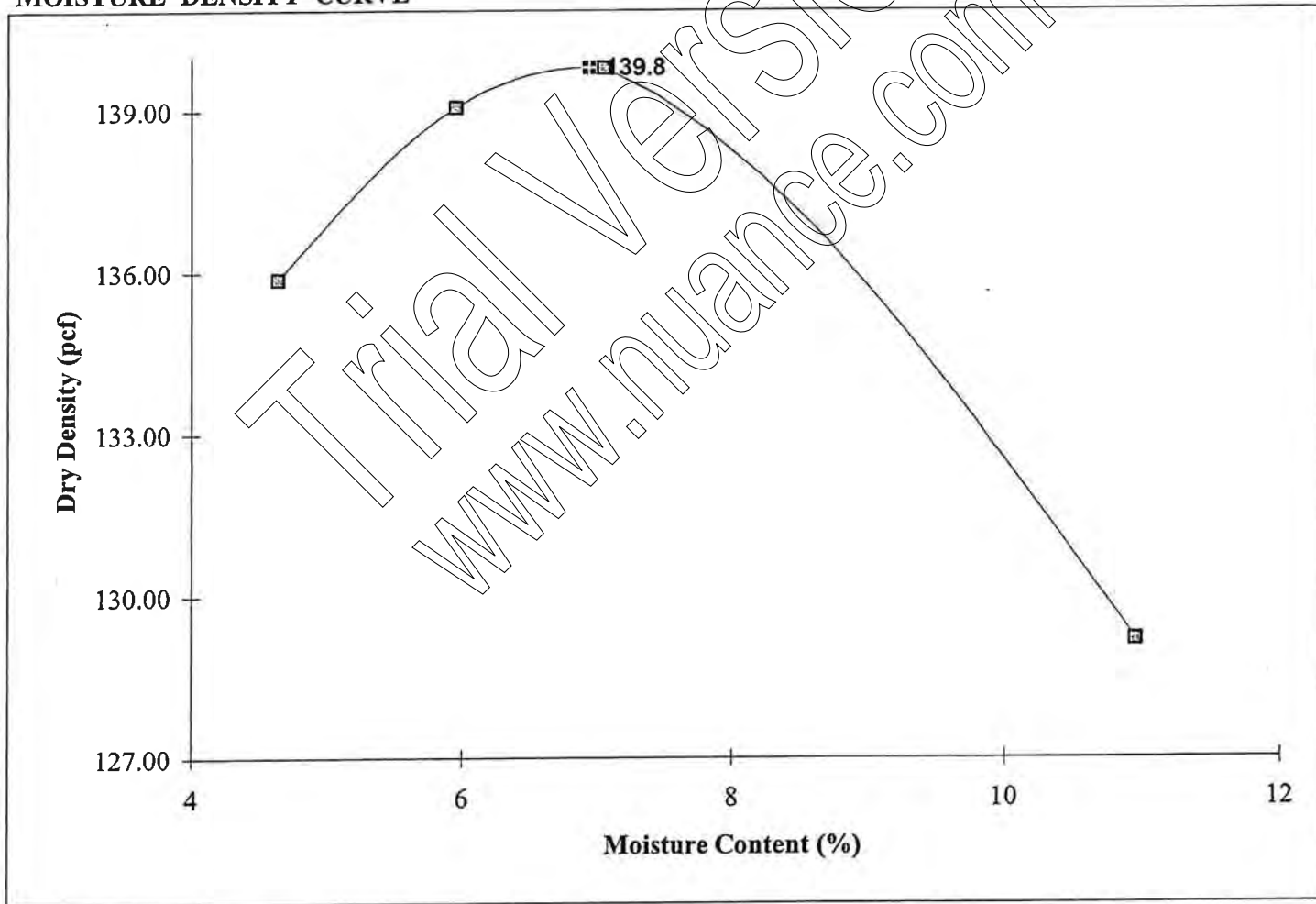
Trial	Moisture Content (%)	Dry Density (pcf)	Wet Density (pcf)	Comp. Strength (psi)
1	4.6	135.9	142.2	0
2	6.0	139.1	147.3	0
3	7.0	139.8	149.6	0
4	11.0	129.2	143.3	0
Optium	6.9	139.8		NT

PROCEDURE

Standard	ASTM D - 1557		
Method Used	A	B	C
Preparation Procedure	Wet		Dry
Automatic Hammer			

RESULTS

Max. Dry Density:	139.8 pcf
Optimum Moisture:	6.9 %
Comp. Str. @ Max. Dens.:	NT psi
95 % of Max. Density:	132.8 pcf

MOISTURE DENSITY CURVE

2405 140th Ave. NE
Suite A 101
Bellevue, WA 98005
(425) 562-4200

Moisture-Density: Untreated Soil

Architects BCRA
Proposed Retail Development

L01MD

Project Number
54568

Technician
F. Bengco

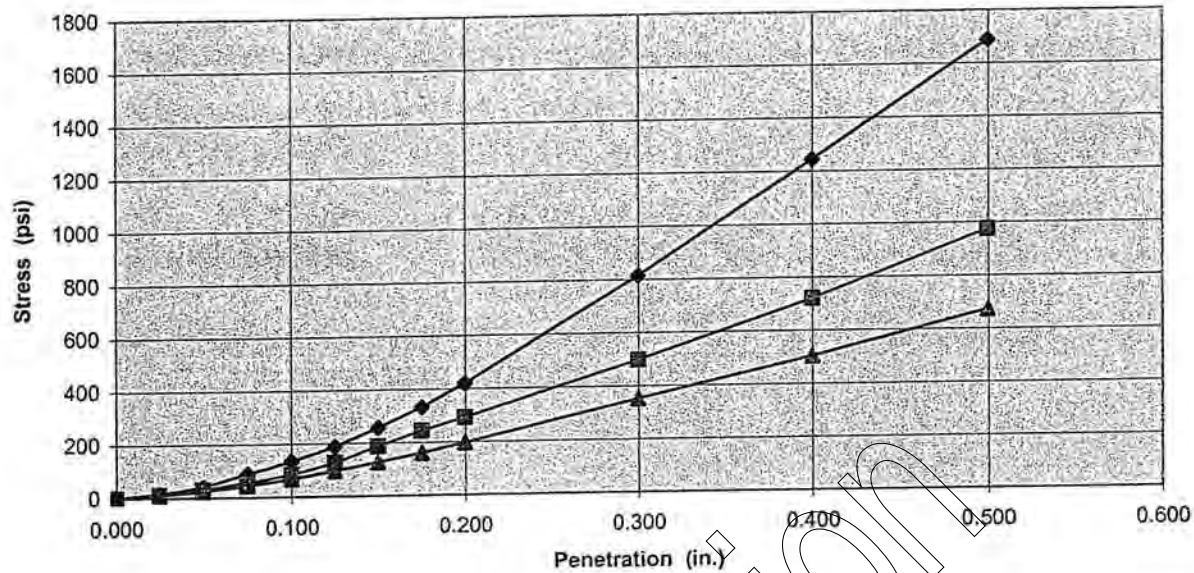
Approved
G. Hayre

Date
05/25/05

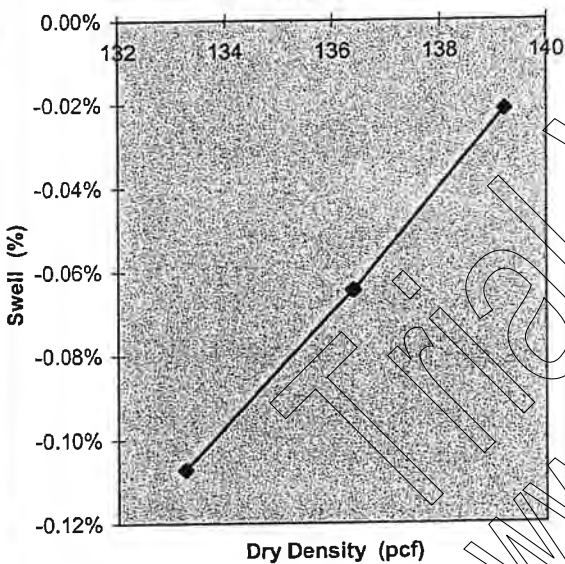
Revised
M. Monserud

Date
6/8/2005

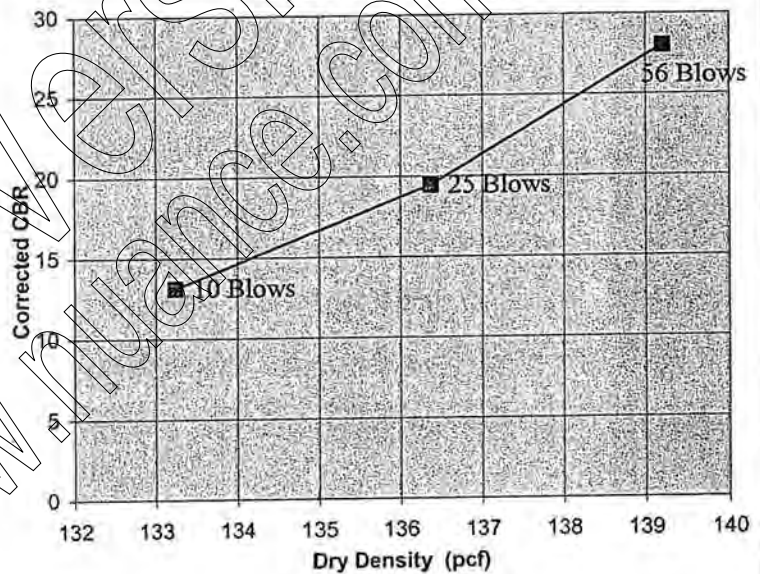
Corrected Load Penetration Curves



Swell



Dry Density vs Corr. CBR



CBR	19
100% DD	136.4 pcf

TEST PIT	SAMPLE DEPTH	USCS	SOIL DESCRIPTION
Native 2.5'		SM	Silty Sand with Gravel

ASTM D 1883 (Nat. WC)

Kleinfelder, Inc.

2405 140th Ave. NE, Ste. A-101
Bellevue, WA 98005
(425) 562-4200

California Bearing Ratio: Untreated

Architects BCRA

Proposed Retail Development

L01CBR

Project Number
54568

Technician
F. Bengco

Approved
C. Mlodzik

Date
06/03/05

Revised
C. Mlodzik

Date
6/3/2005



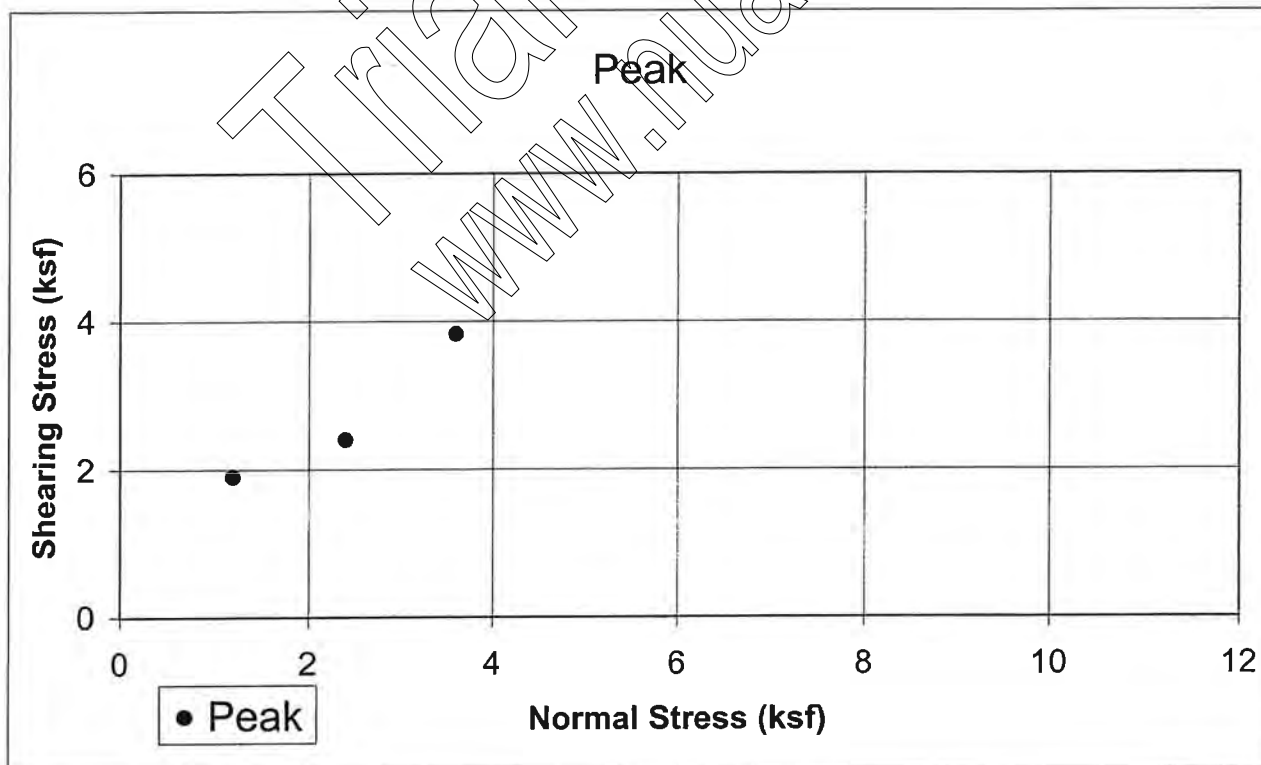
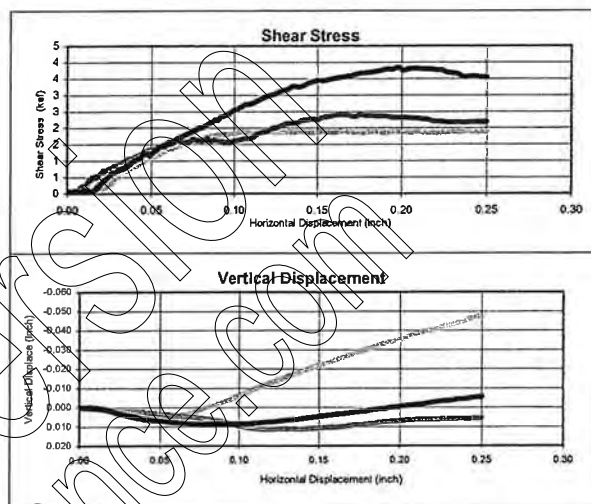
KLEINFELDER

PROJECT: Fircrest Retail Development BCRA
LOCATION: Tacoma, WA
MATERIAL: SM
SAMPLE SOURCE: B-11-7.5'
SAMPLE PREP.: Remolded

JOB NO: 54568
W.O. NUMBER:
LAB NO: L01DS
DATE SAMPLED:

DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS (ASTM D3080)

Initial thickness of specimen (in.): 1.00
Initial diameter of specimen (in.): 2.50
Rate of deformation (in/min): 0.016
Direct shear point: 1 2 3
Dry mass of specimen (g): 11.9 8.3 12.9
Initial Moisture Content: 5.4% 4.8% 6.3%
Initial Wet Density (lb per cu.ft): Recompacted Material
Initial Dry Density (lb per cu.ft): Recompacted Material
Final Moisture Content: 5.4% 4.8% 6.3%
Final Wet Density (lb per cu.ft): Recompacted Material
Final Dry Density (lb per cu.ft): Recompacted Material
Normal Stress (kips per sq. ft): 1.20 2.40 3.60
Max Shearing Stress (kips / sq. ft): 1.90 2.40 3.83
Vert Deformation @ Max Shear (in): -0.045 0.010 0.000
Horiz Deformation @ Max Shear (in): 0.240 0.166 0.198
Shearing device used:
Created by DigiShear Version 3.1.3; Copyright 2004, GEOTAC



NOTE: Soil that was used for point 1 was reused for points 2 and 3 also soil that was used for points 1 and 2 was reused for point 3.

APPENDIX B

EXISTING SUBSURFACE EXPLORATIONS

(Terracon, 2008)

LOG OF BORING NO. B-1

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS		
			NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
0.5									
SANDY GRAVEL Gray, Medium Dense, Dry (Fill)									
SILTY SAND Brown, Very Loose, Moist (Probable Fill)			S1	SS	3	2			
Medium Dense, Organics	5		S2	SS	6	17			
7.5			S3	SS	9	50/6			
SILTY SAND, WITH GRAVEL Gray, Very Dense, Moist (Possible Glacial Till)									
10			S4	SS	12	50/5			
GRAVELLY SILTY SAND Gray, Very Dense, Moist (Glacial Till)									
15			S5	SS	18	50/4			
SILTY SAND, WITH GRAVEL Gray, Very Dense, Moist (Glacial Till)									
20.5			S6	SS	6	50/4			
Bottom of Boring									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

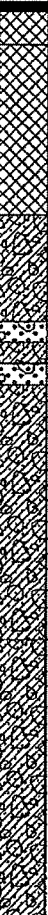
Terracon

BORING STARTED		5-19-08	
BORING COMPLETED		5-19-08	
RIG	Track Rig	DRILLER	Boretac
LOGGED	AJD	JOB #	B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-2

Page 1 of 1

CLIENT		PROJECT							
WinCo Foods, Inc.		WinCo Fircrest							
SITE		PROJECT							
2119 Mildred Street West Fircrest, Washington		WinCo Fircrest							
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	0.2	<u>Approximately 2 Inches of Asphalt</u>							
	1	<u>GRAVEL, WITH SAND</u> Gray, Medium Dense, Dry (Fill)							
		<u>SILTY SAND, WITH GRAVEL</u> Orangish Brown, Loose, Moist (Fill)							
	5	<u>SILTY SAND, WITH GRAVEL</u> Gray, Dense, Moist (Glacial Till)							
	7.5	<u>SAND, WITH GRAVEL</u> Brown, Very Dense, Moist							
	8.5	<u>GRAVELLY SILTY SAND</u> Gray, Very Dense, Moist to Wet (Glacial Till)							
	9	<u>SAND, WITH GRAVEL</u> Brown, Very Dense, Moist							
		<u>GRAVELLY SILTY SAND</u> Gray, Very Dense, Moist (Glacial Till)							
	15	<u>SILTY SAND, WITH GRAVEL</u> Light Gray, Very Dense, Dry, Cobbles (Glacial Till)							
		Gray, Moist							
	21.5	Bottom of Boring							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED		5-19-08	
BORING COMPLETED		5-19-08	
RIG	Track Rig	DRILLER	Boretac
LOGGED	AJD	JOB #	B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-3

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.2 Approximately 2 Inches of Asphalt

0.5 GRAVEL, WITH SAND

Gray, Medium Dense, Dry (Fill)

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

5

GRAVELLY SAND, WITH SILT

Gray, Very Dense, Moist, Cobbles (Glacial Till)

10

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

15

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

20

SILTY SAND, WITH GRAVEL

Gray, Very Dense, Moist (Glacial Till)

Bottom of Boring

5

S1

SS

12

71

10

S2

SS

3

50/3

S3

SS

NR

50/4

S4

SS

18

96/11

15

S5

SS

9

50/6

20

S6

SS

6

50/5

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Borettec

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-4

Page 1 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.3

Approximately 3 Inches of Topsoil

SILTY SAND, TRACE GRAVEL

Brownish Gray, Medium Dense, Moist (Fill)

5

GRAVELLY SAND, WITH SILT

Dark Gray, Medium Dense, Moist (Fill)

7.5

SILT, WITH SAND

Black, Loose, Moist, Organics (Fill)

10

SILTY SAND, WITH GRAVEL

Gray, Loose, Wet (Fill)

15

SILTY SAND, TRACE CLAY AND
GRAVEL

Dark Brown, Medium Dense, Moist (Fill)

20

SILTY SAND, TRACE GRAVEL

Dark Brown, Medium Dense, Moist, Trace
Organics (Probable Fill)

25

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretac

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-4

Page 2 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

30

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

SILTY SAND WITH GRAVEL

Gray, Very Dense, Moist (Glacial Till)

35.5

Bottom of Boring

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Borettec

LOGGED

AJD


JOB #

B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-5

Page 1 of 2

CLIENT		WinCo Foods, Inc.									
SITE		2119 Mildred Street West Fircrest, Washington									
PROJECT		WinCo Fircrest									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS				
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	0.3	<u>Approximately 3 Inches of Topsoil</u> <u>SILTY SAND, WITH GRAVEL</u> Gray, Medium Dense, Moist (Fill)									
			S1	SS	6	10					
		5		S2	SS	3	11				
	7.5	<u>SANDY SILT, WITH GRAVEL</u> Dark Brown, Medium Dense, Wet to Saturated, Organics (Fill)									
			S3	SS	12	11					
	10	<u>SILTY SAND, TRACE GRAVEL</u> Dark Brown, Loose, Wet, Organics (Fill)									
			S4	SS	12	7					
	15	<u>SAND, WITH SILT, TRACE GRAVEL</u> Gray, Loose, Wet to Saturated, Asphalt (Fill)									
		S5	SS	9	7						
20	<u>SILTY SAND, TRACE GRAVEL</u> Dark Brown, Loose, Wet, Organics (Fill)										
		S6	SS	12	8						
25	Continued Next Page										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED	5-19-08
BORING COMPLETED	5-19-08
RIG Track Rig	DRILLER Borettec
LOGGED AJD	JOB # B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-5

Page 2 of 2

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

30

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

SILTY GRAVELLY SAND

Gray, Very Dense, Moist (Glacial Till)

35

SILTY SAND, TRACE GRAVEL

Gray, Very Dense, Moist (Glacial Till)

Brownish Gray, Wet

41.5

Bottom of Boring

40

S10

SS

18

73/11

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretac

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON GDT 5/27/08

LOG OF BORING NO. B-7

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

TESTS

0.5

Approximately 6 Inches of Topsoil
SILTY SAND
Brown, Loose, Moist, Organics (Fill)

5

SILTY SAND, TRACE GRAVEL
Dark Brown, Loose to Medium Dense,
Moist (Fill)

10

SAND, WITH SILT
Gray, Loose, Moist (Fill)

16.5

Trace Gravel
Bottom of Boring

5

10

15

S1

SS

3

5

S2

SS

3

16

S3

SS

3

5

S4

SS

3

7

S5

SS

3

9

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretac

LOGGED

AJD


JOB #

B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-8

Page 1 of 1

CLIENT		WinCo Foods, Inc.							
SITE		2119 Mildred Street West Fircrest, Washington							
PROJECT		WinCo Fircrest							
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	0.5	<u>Approximately 6 Inches of Topsoil</u> <u>SAND, WITH SILT AND GRAVEL</u> Brown, Moist, Medium Dense							
	5	<u>SILTY SAND, TRACE GRAVEL</u> Gray, Dense, Moist (Possible Glacial Till)	S1	SS	6	11			
	7.5	<u>GRAVELLY SILTY SAND</u> Gray, Very Dense, Moist (Glacial Till)	S2	SS	9	36			
	10		S3	SS	9	50/4			
	15		S4	SS	6	50/6			
15.5	Bottom of Boring	S5	SS	3	50/5				

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL	▽	▽
WL	▽	▽
WL		

Terracon

BORING STARTED		5-19-08	
BORING COMPLETED		5-19-08	
RIG	Track Rig	DRILLER	Boretec
LOGGED	AJD	JOB #	B2085019

BOREHOLE 99 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

LOG OF BORING NO. B-9

Page 1 of 1

CLIENT

WinCo Foods, Inc.

SITE

2119 Mildred Street West
Fircrest, Washington

PROJECT

WinCo Fircrest

GRAPHIC LOG

DESCRIPTION

DEPTH, ft.

USCS SYMBOL

NUMBER

TYPE

RECOVERY, in.

SPT - N
BLOWS / ft.

WATER
CONTENT, %

DRY UNIT WT
pcf

UNCONFINED
STRENGTH, psf

0.6

GRAVEL, WITH SAND

Gray, Medium Dense, Dry (Fill)

SAND, WITH SILT AND GRAVEL

Brown, Dense, Moist

5

GRAVELLY SILTY SAND

Gray, Very Dense, Moist (Glacial Till)

Approximately 3 Inch Lense of Sand

5

S1

SS

3

40

S2

SS

9

78

S3

SS

12

66

10

S4

SS

15

73

15

S5

SS

18

44

16.5

Bottom of Boring

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*CME 140H SPT hammer

WATER LEVEL OBSERVATIONS, ft

WL

▽

▽

WL

▽

▽

WL

Terracon

BORING STARTED

5-19-08

BORING COMPLETED

5-19-08

RIG

Track Rig

DRILLER

Boretec

LOGGED

AJD

JOB #

B2085019

BOREHOLE 98 WINCO FIRCREST BORING LOGS.GPJ TERRACON.GDT 5/27/08

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	N/E:	Not Encountered
WCI:	Wet Cave in	WD:	While Drilling		
DCI:	Dry Cave in	BCR:	Before Casing Removal		
AB:	After Boring	ACR:	After Casing Removal		

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

<u>Unconfined Compressive Strength, Qu, psf</u>	<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Consistency</u>
< 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	4 - 8	Medium Stiff
2,000 - 4,000	8 - 15	Stiff
4,000 - 8,000	15 - 30	Very Stiff
8,000+	> 30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Relative Density</u>
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
> 50	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifiers	> 12

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soil Classification		
				Group Symbol	Group Name ^a	
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^c	$Cu \geq 4$ and $1 \leq Cc \leq 3^e$	GW	Well-graded gravel ^f	
			$Cu < 4$ and/or $1 > Cc > 3^e$	GP	Poorly graded gravel ^f	
		Gravels with Fines More than 12% fines ^c	Fines classify as ML or MH	GM	Silty gravel ^{f,g,h}	
			Fines classify as CL or CH	GC	Clayey gravel ^{f,g,h}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^o	$Cu \geq 6$ and $1 \leq Cc \leq 3^e$	SW	Well-graded sand ⁱ	
			$Cu < 6$ and/or $1 > Cc > 3^e$	SP	Poorly graded sand ⁱ	
		Sands with Fines More than 12% fines ^o	Fines classify as ML or MH	SM	Silty sand ^{g,h,j}	
			Fines Classify as CL or CH	SC	Clayey sand ^{g,h,j}	
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line ^j	CL	Lean clay ^{k,l,m}	
			$PI < 4$ or plots below "A" line ^j	ML	Silt ^{k,l,m}	
		organic	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{k,l,m,n}
			Liquid limit - not dried			Organic silt ^{k,l,m,o}
	Silt and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{k,l,m}	
			PI plots below "A" line	MH	Elastic Silt ^{k,l,m}	
		organic	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{k,l,m,p}
			Liquid limit - not dried			Organic silt ^{k,l,m,o}
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat	

^ABased on the material passing the 3-in. (75-mm) sieve

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^DSands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^KIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

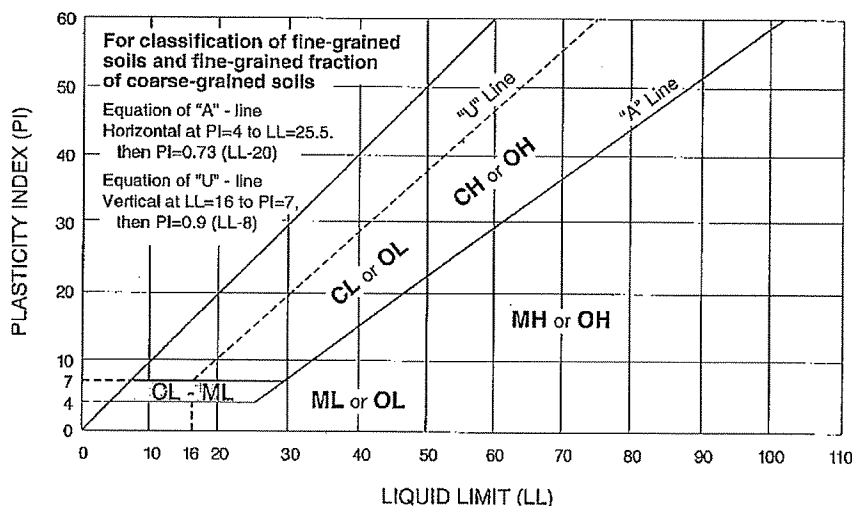
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



Terracon

Traffic Impact Analysis

FIRCREST PROSE

Prepared for:
Alliance Residential

January 2023

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Introduction

This traffic impact analysis (TIA) identifies potential transportation-related impacts associated with the construction of a 395-unit multifamily residential development with 8,650 square feet of retail located in the City of Fircrest.

Project Description

The project is located east of Mildred Street W with 23rd St W to the south and S 19th Street approximately 0.1 miles to the north (see Figure 1). The project would develop 412 multifamily units with 12,000 square feet of retail space. The existing unoccupied warehouse would be demolished. Three vehicular access points on Mildred would be provided to the site. The north and south access points would be restricted to right-in/right-out movements through on-site features such as a pork chop/island. The center access, aligned with 22nd St W, would be signalized. A preliminary site plan is illustrated on Figure 2. The project is anticipated to be constructed and occupied by 2026.

Study Scope

While the project is located in the City of Fircrest, access and off-site impacts are primarily within the University Place jurisdiction. As such City of University Place staff was consulted as part of the preparation of this Traffic Impact Analysis. Based on this coordination, the following intersections were identified for analysis:

1. Mildred Street W/S 19th Street
2. Mildred Street W/22nd Street W
3. 67th Avenue W/Regents Boulevard W/24th Street W
4. Bridgeport Way W/27th Street W
5. 35th Street W/67th Avenue W
6. 40th Street W/67th Avenue W

In addition to the off-site intersections, the three proposed access points were evaluated under future (2026) with-project conditions.

The scope of the analysis includes analysis of existing and future conditions in the vicinity of the project site under weekday PM peak hour conditions. A review of the surrounding street system, transit service, non-motorized facilities, existing and future (2026) without-project weekday peak hour traffic volumes, traffic operations, and traffic safety are provided. Future (2026) with-project conditions were estimated by adding site-generated traffic to future without-project volumes. The project's impacts on the surrounding transportation system were identified by comparing the future with-project conditions to the future without-project conditions.

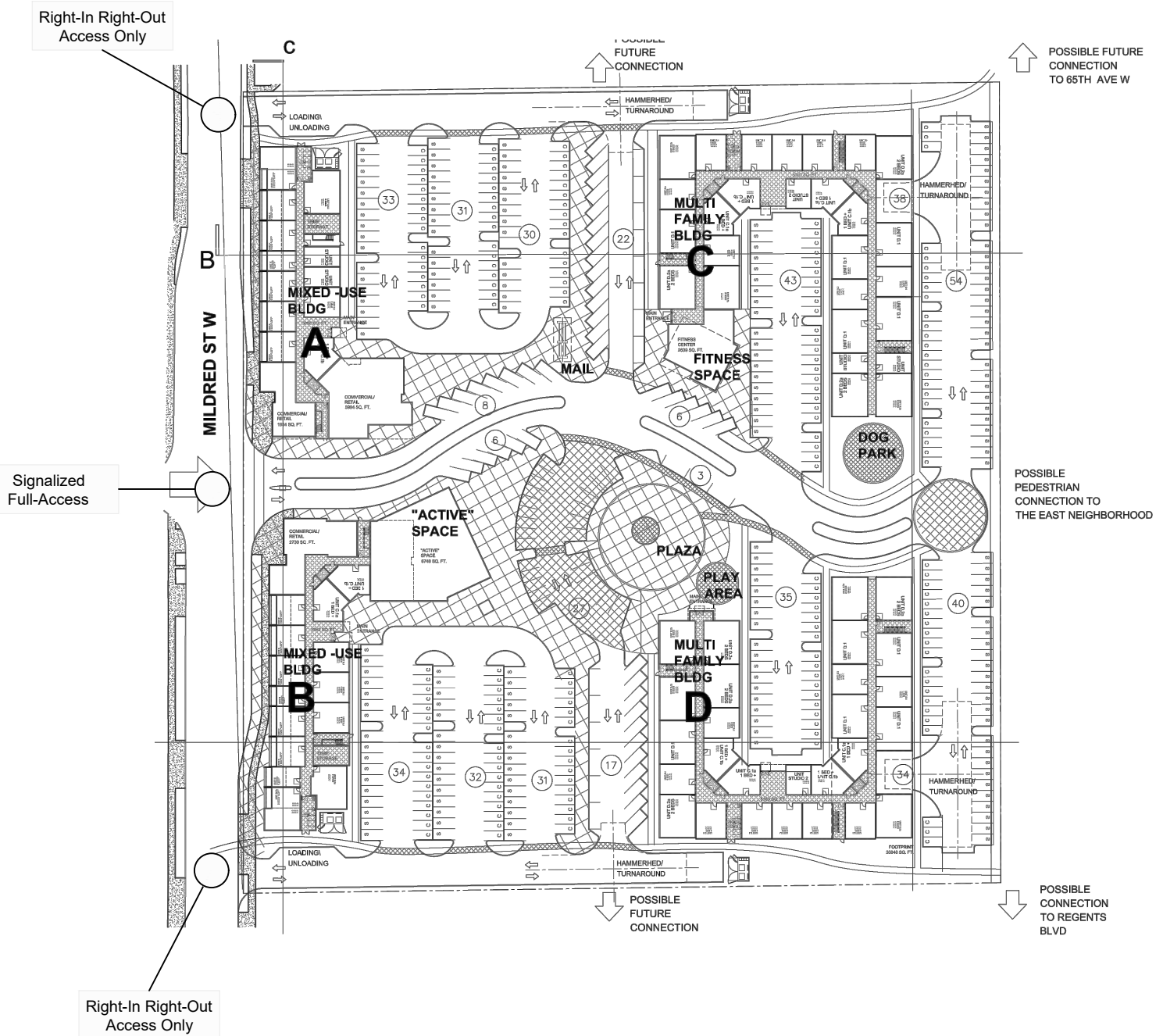


Site Vicinity & Study Intersections

Fircrest Prose

FIGURE

1



Preliminary Site Plan

Fircrest Prose

transpogroup 

FIGURE

2

Existing and Future Without-Project Conditions

This section describes existing condition within the identified study area. Characteristics are provided for the roadway network, non-motorized facilities, transit service, existing traffic volumes, traffic operations, and traffic safety.

Roadway Network

The following sections describe the existing street network within the vicinity of the proposed project and anticipated changes resulting from planned improvements.

Existing

The project site is in the City of Fircrest, with site accesses along Mildred Street W. The site lies south of S 19th Street, with the southernmost boundary approximately parallel to 23rd Street W. A description of the existing roadway network is shown on Table 1.

Table 1. Study Area Existing Roadway Network Summary

Roadway	Arterial Classification ¹	Posted Speed Limit (mph)	Number of Travel Lanes	Parking?	Sidewalks?	Bicycle Facilities?
S 19th Street	Principal Arterial	35	5	No	Yes	No
Mildred Street W	Minor Arterial	35	3-5 ²	No	Yes	Yes
24th Street W	Major Collector	25	2	No	No	No
27th Street W/Regents Boulevard	Minor Arterial	35	3	No	Yes	No
Bridgeport Way W	Principal Arterial	35	5	No	Yes	Yes
35th Street W	Major Collector	25	2	No	Yes	No
40th Street W	Principal Arterial	35	3	No	Yes	Yes

1. Arterial Classification comes from WSDOT

2. S Mildred St is a 3 lane road that widens to 5 lanes at some intersections to include designated turn lanes

Planned Improvements

Based on a review of the *City of University Place 2022-2027 Transportation Improvement Program (TIP)*, seven planned improvements were identified within the vicinity of the study area that would impact the street network. Only two of the seven planned projects have secured some degree of funding at the time of this analysis. The following planned improvements were identified:

- **Mildred St/Regents Intersection Improvements (Project #1)** - Construction of intersection improvements at the intersection of 67th Avenue and Regents Boulevard. Project is projected to start in 2023 and last until 2026-2027.
- **27th St W Undergrounding (Project #2)** – Installation of underground utilities below 27th Street West between Grandview Drive and Bridgeport Way. Project is expected to start between 2026 and 2027.
- **67th Ave Phases 1-3 (Projects #11-13)** – Construct concrete curbs, gutters, and sidewalks on both sides of 67th Avenue between Regents Boulevard and 40th Street in phase 1, between Bridgeport Way and Cirque Drive in phase 2, and between Cirque Drive and 40th Street in phase 3. Phase 1 is projected for completion in 2022, phase 2 is expected to last between 2022 and 2024, and phase 3 is expected to begin in 2026. Some funding has been secured for phases 1 and 2.

- **40th Street Phase 3 (Project #14)** - – Construct concrete curbs, gutters, sidewalks, and bike lanes on the north side of 40th Street between 7200 block and 67th Avenue. Project is expected to begin between 2026 and 2027.
- **35th Street Improvements Phases 1-2 (Projects # 19-20)** – Construction of concrete curbs, gutters, sidewalks, and bike lanes on both sides of 35th Street between Bridgeport way and 67th Street during phase 1, and between Grandview Drive and Bridgeport Way during phase 2. Both phases have secured funding and are expected to be completed in 2023.
- **27th Street (Project #26)** – Construction of curb, gutter, sidewalks and bike lane on one side of 27th Street between Grandview Drive and city limits (67th Avenue/ S Mildred Street). Enclosed storm drainage will also be installed throughout the street. The project is expected to start between 2026 and 2027.
- **40th Street/67th Avenue Intersection (Project #43)** - Construction of intersection improvements at the intersection of 40th Street and 67th Avenue. Project is expected to start between 2026 and 2027.

While worth noting these improvements, no intersection improvements were identified by the City of Fircrest that would impact the operational characteristics of study area intersections.

Non-Motorized Facilities

Sidewalks are provided along Mildred Street W in the vicinity of the project site. Marked crosswalks with curb ramps are present at all 6 intersections in the study area. Bike lanes exist in both the north and south directions of the segment of Mildred Street W that borders the project site. The nearest signalized pedestrian and bicycle crossings occur to the north at S Mildred Street/S 19th Street, and to the south at Mildred Street W/Regents Boulevard/67th Avenue W.

In the future, as identified in the planned improvement section above, there are planned project to install sidewalks at the intersections of Mildred Street/Regents Boulevard, Bridgeport Way/27th Street, 67th Avenue/35th Street, and 67th Avenue/40th Street.

Transit Service

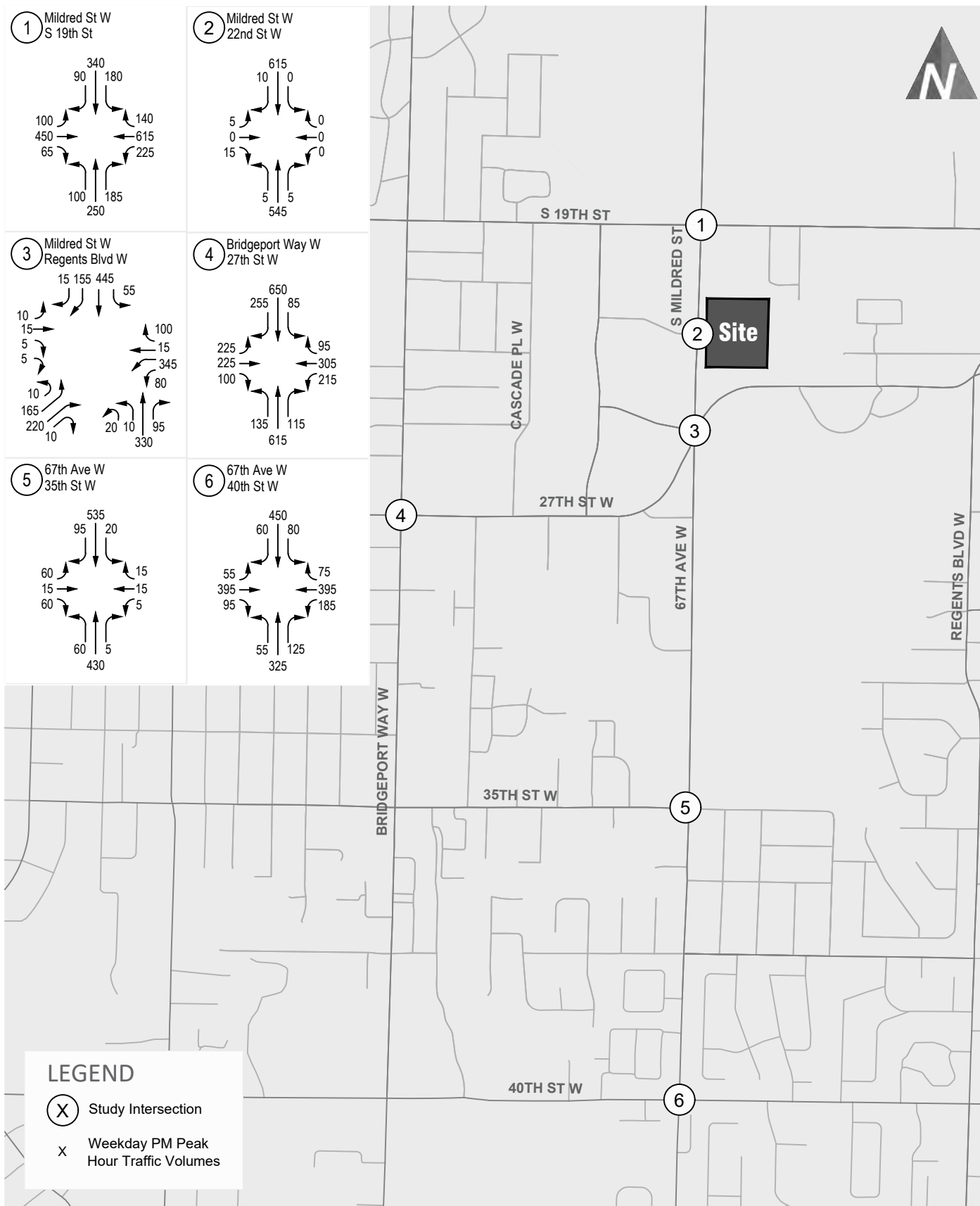
The closest transit stop to the site is located along S Mildred Street at the 22nd Street W intersection, immediately south of the existing site access. The stop is served by Pierce Transit's Route 53, providing service from Tacoma Community College to South Tacoma. This route has a designate transit-only lane on the south side of the intersection of S Mildred Street and S 19th Street. Pierce Transit's Routes 2 and 52 also run along streets designated in the study area.

Traffic Volumes

The following sections summarize existing and future (2026) without-project traffic volumes within the study area.

Existing

Existing weekday PM peak period (4-6 p.m.) traffic volumes were collected in June 2022 at the study intersections. The estimated existing weekday PM peak hour traffic volumes are shown on Figure 3. The traffic volumes were rounded to the nearest five vehicles to account for daily fluctuations. The detailed weekday PM peak hour traffic counts are included in Appendix A.



Existing Weekday Peak Hour Traffic Volumes

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FIGURE

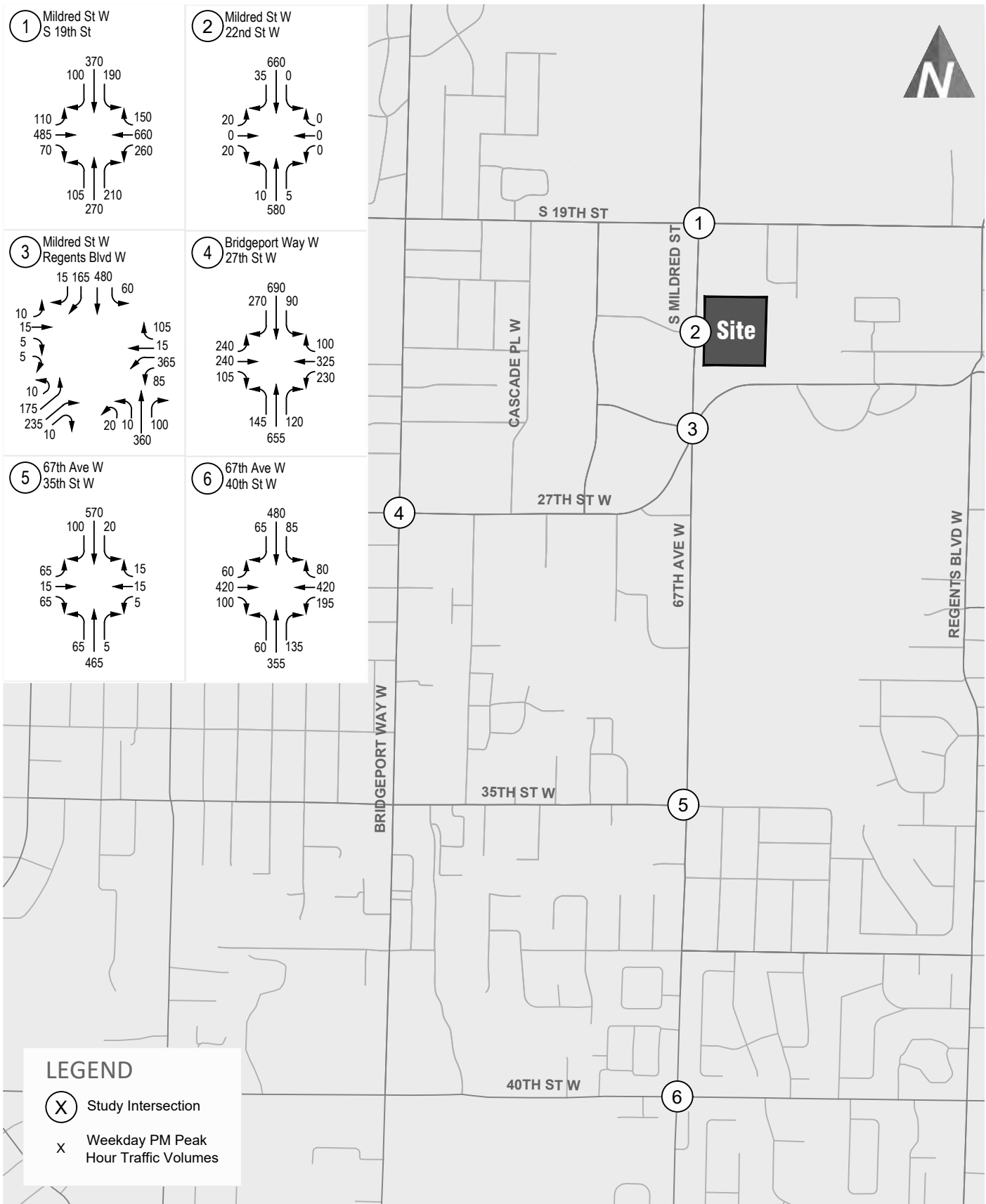
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Future Without-Project Traffic Volumes

Future (2026) without-project traffic volumes were forecasted by applying an annual growth rate to existing traffic volumes and adding traffic from “pipeline” development projects that would also contribute traffic to study intersections. Consistent with the Traffic Impact Analysis completed for the project on the west side of Mildred Street W, an annual growth rate of 1.5 percent was applied to existing study intersection traffic volumes to estimate 2026 horizon year background traffic growth. In addition to the background growth rate, one pipeline project was identified to be completed by 2026 and is included in the analysis, based on coordination with City staff. The pipeline project is described below.

- **Narrow Urban Village:** *Up to 272 Multi-family dwelling units single family development located between 70th Avenue W and Mildred Street W. The development is bisected by 22nd Street W; providing a new intersection with Mildred Street W.*

The forecast future (2026) without-project weekday peak hour traffic volumes are shown on Figure 4.



Future (2026) Without-Project Weekday Peak Hour Traffic Volumes

FIGURE

Traffic Operations

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). At unsignalized side-street, stop-controlled intersections, LOS is measured by the average delay on the worst movement of the intersection. Traffic operations and average vehicle delay can be described qualitatively with a range of levels of service (LOS A through LOS F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Appendix B contains a detailed explanation of LOS criteria and definitions.

Existing analysis parameters such as channelization were maintained for future (2026) without-project conditions. Weekday AM and PM peak hour traffic operations for existing and future (2026) without-project conditions were evaluated based on the procedures identified in the *Highway Capacity Manual* (HCM 6) using *Synchro 11*. *Synchro 11* is a software program that uses HCM methodology to evaluate intersection LOS and average vehicle delay. The intersections of S 19th Street/Mildred Street W and Mildred Street W/Regents Boulevard/67th Avenue W were evaluated based on HCM 2000 methodology due to the northbound transit queue jump and five-lane approach respectively. These two parameters are restricted by HCM 6th edition methodology, so HCM 2000 was used. Results for the existing and future without-project operations analyses are summarized in Table 2. Detailed LOS worksheets for each intersection analysis are included in Appendix C.

Table 2. Existing and Future (2026) Without-Project Weekday PM Peak Hour Level of Service

Intersections	Traffic Control ⁴	Existing			2026 Without-Project		
		LOS ¹	Delay ²	WM ³	LOS	Delay	WM
<u>PM Peak Hour</u>							
1. Mildred St W/S 19th St	Signal	D	35	-	D	37	-
2. Mildred St W/22nd St W	TWSC	C	17	EB	D	27	EB
3. Mildred St W/Regents Blvd	Signal	D	49	-	D	52	-
4. Bridgeport Way W/27th St W	Signal	B	18	-	B	19	-
5. 67th Ave W/35th St W	Signal	A	6	-	A	6	-
6. 67th Ave W/40th St W	Signal	C	28	-	C	33	-

Note: TWSC = two-way stop-controlled.

1. Level of service (LOS), based on *Highway Capacity Manual* 6th Edition methodology.

2. Average delay in seconds per vehicle.

3. Worst movement reported for unsignalized intersections where EB = eastbound

4. Existing traffic control

As shown in Table 2, all intersections operate at LOS D or better under existing and future (2026) without-project PM peak hour conditions, meeting the City's LOS D standard.

Traffic Safety

Collision data was obtained from the Washington State Department of Transportation (WSDOT) for the most recent three-year period for the study area intersections. Data was summarized between January 1, 2019 and December 31, 2021. A summary of the collision history at the study intersections is provided in Table 3.

Table 3. Three-Year Collision Summary – 2019 to 2021

Location	Number of Collisions			Total	Annual Average	Collisions per MEV ¹
	2019	2020	2021			
1. Mildred St W/S 19th St	5	4	9	18	6.00	0.60
2. Mildred St W/22nd St W	1	1	0	2	0.67	0.15
3. Mildred St W/Regents Blvd	6	0	4	10	3.33	0.47
4. Bridgeport Way W/27th St W	5	8	8	21	7.00	0.53
5. 67th Ave W/35th St W	2	1	2	5	1.67	0.35
6. 67th Ave W/40th St W	7	3	2	12	4.00	0.38

Source: WSDOT June 2022

1. MEV = Million Entering Vehicles

As shown in Table 3, annual averages ranged from 0.67 to 7 collisions per year at the study intersections. The majority of collisions resulted in property damage only and were the result of rear-end collisions or entering at an angle. There were no reported fatalities. There was one reported pedestrian related collision at the intersection of Bridgeport Way W/27th Street W in which a vehicle driving straight hit a pedestrian at night, resulting in an injury.

The number of collisions per million entering vehicles (MEV) was also reviewed for the study intersections. The collision rate is representative of the number of collisions per one million entering vehicles at each intersection. Intersections with a rate greater than 1.0 collisions per MEV are typically noted for further investigation to determine whether an adverse condition exists. As shown in Table 3, the highest collisions per MEV occurred at the intersection of Mildred Street W/S 19th Street with a value of 0.60. The collision summary indicates that there are no present safety concerns at the study intersections.

Project Impacts

The following sections summarize the proposed project's impacts on the surrounding street system. First, traffic volumes generated by the proposed project are estimated and then distributed and assigned to adjacent roadways within the study area. Next, project trips are added to future without-project traffic volumes and the potential impact to traffic operations are identified. Site-specific items are also discussed.

Trip Generation

Trip generation for the existing and proposed project was based on established trip rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th Edition, 2021). As previously noted, the project includes construction of 395 multifamily (low-rise) homes and 8,650 sf of retail space. For the proposed land uses, ITE's Multifamily (LU #221) and Strip Plaza Retail (< 40k) (LU #822) were used. ITE land use definitions for 821 & 822 note that specific uses in this category could include retail merchandising facilities, office space, restaurants, banks, and recreational facilities amongst others. Pass-by trips were evaluated for the retail use consistent with the *Trip Generation Manual*, which is calculated as 40% of the gross trips.

Table 4 shows the estimated weekday trips generated by the proposed project. The detailed trip generation calculations are included in Appendix E.

Table 4. Estimated Weekday Vehicle Trip Generation

Land Use ¹	Size	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Proposed								
Multifamily (LU #221)	412 du	1,920	39	131	170	98	63	161
Retail (LU #822 ²)	12,000 sf	94	17	11	28	40	39	79
	<i>Less Pass-By</i>	<u>38</u>	<u>6</u>	<u>6</u>	<u>12</u>	<u>16</u>	<u>16</u>	<u>32</u>
Net New Trips		1,976	50	136	186	122	86	208

Note: du = dwelling units, sf = square feet

1. Average trip rates from ITE *Trip Generation Manual*, 11th Edition (2021).

2. ITE Land use #822 – Strip Plaza Retail < 40k

As shown in Table 4, the proposed project is estimated to generate 1,976 weekday net new daily trips with 186 occurring in the weekday AM peak hour and 208 occurring in the PM peak hour.

Trip Distribution & Assignment

Trip distribution patterns for the proposed uses to and from the site were based on previous studies in the project vicinity, U.S. Census Bureau's *OnTheMap* tool, and were coordinated with City of University Place staff. *OnTheMap* is a web-based mapping and reporting application, which shows where workers are employed and where they live based on census data. The *OnTheMap* census data was translated to the number of people that live within a quarter-mile radius of the proposed project and where they work. The zip codes were evaluated to determine if a person would be more likely to travel to the zip code via vehicle or by other means. Trips to zip codes closer to the proposed project site or in more transit-oriented locations are more likely to use transit, walk, bike, or other non-SOV modes. The trip distribution for the proposed project is shown in Figure 5.

The net new peak hour project trips were assigned within the study area based on distribution for the proposed project and are shown in Figure 5. Note that the trip assignment considers the RIRO restrictions at the north and south site driveways.

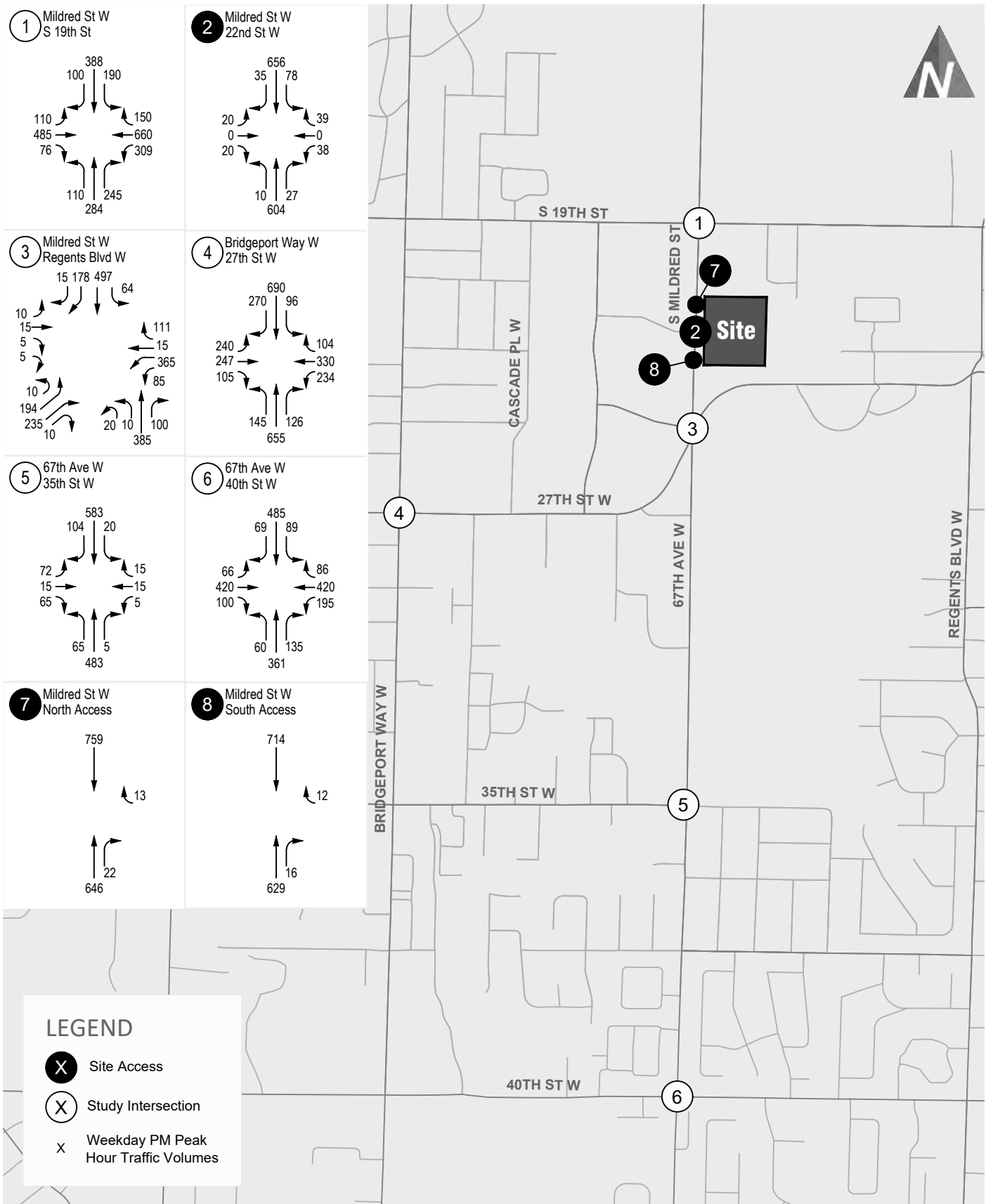
Traffic Volume Impact

Site-generated weekday peak hour traffic volumes were added to future without-project volumes at study intersections. The resulting future (2026) with-project peak hour traffic volumes are illustrated on Figure 6. 5 summarizes the anticipated increase in total entering traffic at the study intersections as well as the percent of future with-project traffic volumes attributable to the proposed project.

Table 5. Traffic Volume Impacts at Study Intersections

Intersection	Total Entering Vehicles			Percent Project Share
	2026 Without-Project	New Project Trips	2026 With-Project	
<u>Weekday PM Peak Hour</u>				
1. Mildred St W/S 19th St	2,980	127	3,107	4.1%
2. Mildred St W/22nd St W	1,330	197	1,527	12.9%
3. Mildred St W/Regents Blvd	2,245	84	2,329	3.6%
4. Bridgeport Way W/27th St W	3,210	32	3,242	1.0%
5. 67th Ave W/35th St W	1,405	42	1,447	2.9%
6. 67th Ave W/40th St W	2,455	31	2,486	1.2%

As shown in Table 5, the project generated traffic volumes are anticipated to be minimal (approximately 4 percent or less) at the study intersections under future conditions with the exception of Mildred Street W/22nd Street W, which will function as the primary site access with 12.9 percent project share of trips.



Future (2026) With-Project Weekday Peak Hour Traffic Volumes **FIGURE**

Traffic Operations Impact

A future (2026) with-project level of service analysis was conducted for the weekday peak hour to analyze traffic impacts of the proposed project. The same methodologies were applied as described for existing and future without-project conditions. All intersection parameters such as channelization and intersection control were consistent with those used in the evaluation of future without-project conditions. A comparison of future (2026) without-project and with-project weekday peak hour traffic operations is summarized in Table 6. Detailed LOS worksheets are provided in Appendix C.

Table 6. Future (2026) Without- and With-Project Weekday Peak Hour LOS Summary

Intersections	Traffic Control	2026 Without-Project			2026 With-Project		
		LOS ¹	Delay ²	WM	LOS	Delay	WM
PM Peak Hour							
1. Mildred St W/ S 19th St	Signal	D	37	-	D	39	-
3. Mildred St W/ Regents Blvd	Signal	D	52	-	D	54	-
4. Bridgeport Way W/ 27th St W	Signal	B	19	-	B	19	-
5. 67th Ave W/ 35th St W	Signal	A	6	-	A	6	-
6. 67th Ave W/ 40th St W	Signal	C	33	-	C	35	-
1. Level of service (LOS), based on <i>Highway Capacity Manual</i> 6th Edition methodology. 2. Average delay in seconds per vehicle.							

As shown in Table 6, under future with-project conditions, all intersections are forecast to operate at LOS D or better, meeting the City of University Place requirements.

Site Access Evaluation

As described above and shown on Figure 2, three vehicular accesses would be provided to the site via Mildred Street W located at the northern corner, central, and southern corner along the western frontage. The operations at the site access along Mildred Street W are reviewed below.

Traffic Operations

Weekday PM peak hour traffic operations were evaluated at the site accesses along Mildred Street W under future (2026) with-project conditions based on the same methodology as noted above for the off-site study intersections. The traffic operations are summarized in Table 7. Detailed LOS worksheets are provided in Appendix C.

Signalization at the Central Access was assumed, along with restriction of movements at the north and south site access points to RIRO only.

Table 7. Existing and Future (2026) Without-Project Weekday PM Peak Hour Level of Service

Intersections	Traffic Control	2026 With-Project		
		LOS ¹	Delay ²	WM ³
2. Mildred St W/22nd St W/Central Access	Signal	A	9	-
7. Mildred St W/North Access	TWSC	B	13	WB
8. Mildred St W/South Access	TWSC	B	13	WB
Note: TWSC = two-way stop-controlled. Note shading indicates intersection is operating below LOS D standard. ^{1.} Level of service (LOS), based on <i>Highway Capacity Manual</i> 6th Edition methodology. ^{2.} Average delay in seconds per vehicle. ^{3.} Worst movement reported for unsignalized intersections where EB = eastbound, WB = westbound.				

As shown in Table 7, all site access points are forecast to operate at LOS B or better, meeting the City of University Place LOS standard which is D.

Signalization of the central access point is proposed in order to provide improved access to areas south of the site. While the site plan includes provisions to connect to the future grid system north, south and east of the site, the timing of these connections are uncertain. As such, in the short term, all access to/from the site is provided via the access points along Mildred St. Several design alternatives were considered with respect to the north and south access points, but in order to address intersection spacing standards and eliminate conflicts with opposing driveways, RIRO restrictions were required by the City of University Place. While full access was considered at the central access point, the distribution of traffic to the south resulted in westbound left-turn operations that did not meet City of UP standards. Restriction of outbound left-turns was considered. However, given limited location to accommodate u-turns north of the site on Mildred, the signalization of the access point was determined to be the most appropriate solution.

Findings and Recommendations

This traffic impact study summarizes the project traffic impacts of the proposed Fircrest Prose mixed-use development. General findings and recommendations include:

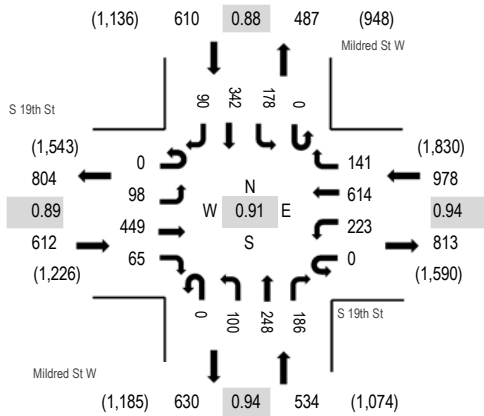
- The proposed project, constructing 412 multifamily homes and 12,000 square feet of retail, is estimated to generate approximately 1,976 weekday net new daily trips with 186 occurring in the AM peak hour and 208 occurring in the PM peak hour.
- Project traffic would represent less than approximately 4 percent of the future (2026) weekday peak hour traffic volumes at the study intersections during the weekday PM peak hour with the exception of the main central site access, where it would represent 12.9 percent.
- Traffic operations at each intersection include:
 - All off-site intersections forecast to operate at LOS D or better under future (2026) with-project PM peak hour conditions, meeting the City of University Place standards.
 - All site access points are forecast to operate at LOS B or better under future (2026) with-project PM peak hour conditions, meeting the City of University Place standards. This is under the assumption that access at the northern and southern access points is restricted to right-in right-out movements, and the central access is signalized under with-project conditions.

Appendix A: Traffic Counts

Location: 1 Mildred St W & S 19th St PM
Date: Tuesday, June 14, 2022
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

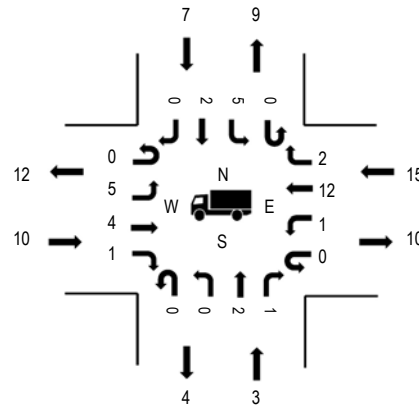
Motorized Vehicles



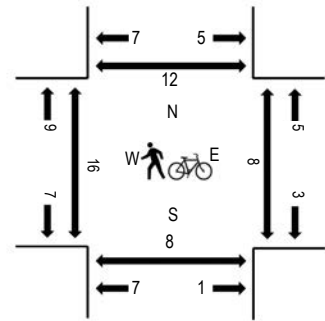
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.6%	0.89
WB	1.5%	0.94
NB	0.6%	0.94
SB	1.1%	0.88
All	1.3%	0.91

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	S 19th St Eastbound				S 19th St Westbound				Mildred St W Northbound				Mildred St W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	24	113	18	0	46	143	32	0	26	63	44	0	39	79	25	652	2,622
4:15 PM	0	36	102	20	0	55	152	32	0	23	47	58	0	24	80	14	643	2,723
4:30 PM	0	23	112	9	0	62	148	30	0	27	64	56	0	36	71	22	660	2,734
4:45 PM	0	28	95	21	0	42	154	39	0	26	63	46	0	40	87	26	667	2,730
5:00 PM	0	30	132	15	0	61	159	39	0	24	70	47	0	58	102	16	753	2,644
5:15 PM	0	17	110	20	0	58	153	33	0	23	51	37	0	44	82	26	654	
5:30 PM	0	31	122	11	0	50	137	30	0	21	67	45	0	37	71	34	656	
5:45 PM	0	15	106	16	0	35	116	24	0	28	60	58	0	29	74	20	581	
Count Total	0	204	892	130	0	409	1,162	259	0	198	485	391	0	307	646	183	5,266	
Peak Hour	0	98	449	65	0	223	614	141	0	100	248	186	0	178	342	90	2,734	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	4	0	3	3	10	4:00 PM	0	0	0	0	0	4:00 PM	6	2	5	7	20
4:15 PM	3	1	5	1	10	4:15 PM	0	0	0	0	0	4:15 PM	2	0	0	2	4
4:30 PM	2	0	4	1	7	4:30 PM	0	1	0	1	2	4:30 PM	5	1	2	4	12
4:45 PM	4	2	4	2	12	4:45 PM	0	0	0	0	0	4:45 PM	7	2	4	5	18
5:00 PM	2	0	2	2	6	5:00 PM	0	0	0	0	0	5:00 PM	6	3	2	4	15
5:15 PM	2	1	5	2	10	5:15 PM	0	2	0	0	2	5:15 PM	0	6	0	0	6
5:30 PM	1	0	4	3	8	5:30 PM	0	0	0	0	0	5:30 PM	7	1	3	7	18
5:45 PM	2	2	1	2	7	5:45 PM	0	0	0	0	0	5:45 PM	2	2	0	4	8
Count Total	20	6	28	16	70	Count Total	0	3	0	1	4	Count Total	35	17	16	33	101
Peak Hour	10	3	15	7	35	Peak Hour	0	3	0	1	4	Peak Hour	18	12	8	13	51



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Location: 2 Mildred St W & 22nd St W PM

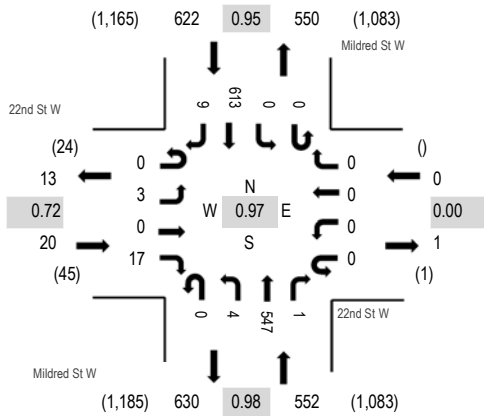
Date: Tuesday, June 14, 2022

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

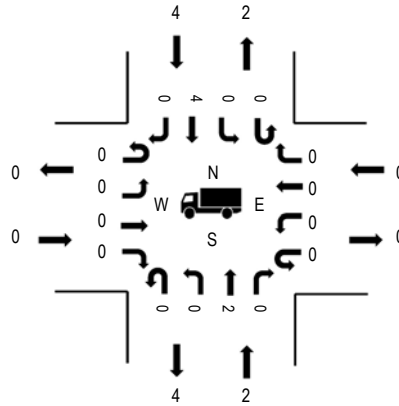
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

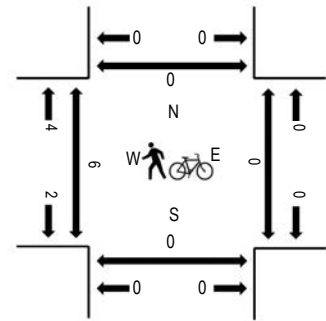
Motorized Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.72
WB	0.0%	0.00
NB	0.4%	0.98
SB	0.6%	0.95
All	0.5%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	22nd St W Eastbound				22nd St W Westbound				Mildred St W Northbound				Mildred St W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	1	0	6	0	0	0	0	0	1	137	0	0	0	126	2	273	1,160
4:15 PM	0	0	0	4	0	0	0	0	0	2	139	0	0	0	148	0	293	1,194
4:30 PM	0	2	0	6	0	0	0	0	0	1	135	1	0	0	144	4	293	1,177
4:45 PM	0	0	0	3	0	0	0	0	0	0	139	0	0	0	158	1	301	1,151
5:00 PM	0	1	0	4	0	0	0	0	0	1	134	0	0	0	163	4	307	1,133
5:15 PM	0	2	0	5	0	0	0	0	0	1	109	0	0	0	157	2	276	
5:30 PM	0	3	0	5	0	0	0	0	0	0	132	0	0	0	125	2	267	
5:45 PM	0	0	0	3	0	0	0	0	0	2	149	0	0	0	128	1	283	
Count Total	0	9	0	36	0	0	0	0	0	8	1,074	1	0	0	1,149	16	2,293	
Peak Hour	0	3	0	17	0	0	0	0	0	4	547	1	0	0	613	9	1,194	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	2	2	4:00 PM	0	0	0	0	0	4:00 PM	2	0	0	0	2
4:15 PM	0	1	0	1	2	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM	0	0	0	0	0	4:30 PM	2	0	0	0	2
4:45 PM	0	1	0	1	2	4:45 PM	0	0	0	0	0	4:45 PM	4	0	0	0	4
5:00 PM	0	0	0	1	1	5:00 PM	0	0	0	0	0	5:00 PM	2	0	0	0	2
5:15 PM	0	1	0	1	2	5:15 PM	0	2	0	0	2	5:15 PM	1	0	0	0	1
5:30 PM	0	2	0	3	5	5:30 PM	0	0	0	0	0	5:30 PM	6	0	0	0	6
5:45 PM	0	2	0	0	2	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
Count Total	0	7	0	10	17	Count Total	0	2	0	0	2	Count Total	17	0	0	0	17
Peak Hour	0	2	0	4	6	Peak Hour	0	0	0	0	0	Peak Hour	8	0	0	0	8



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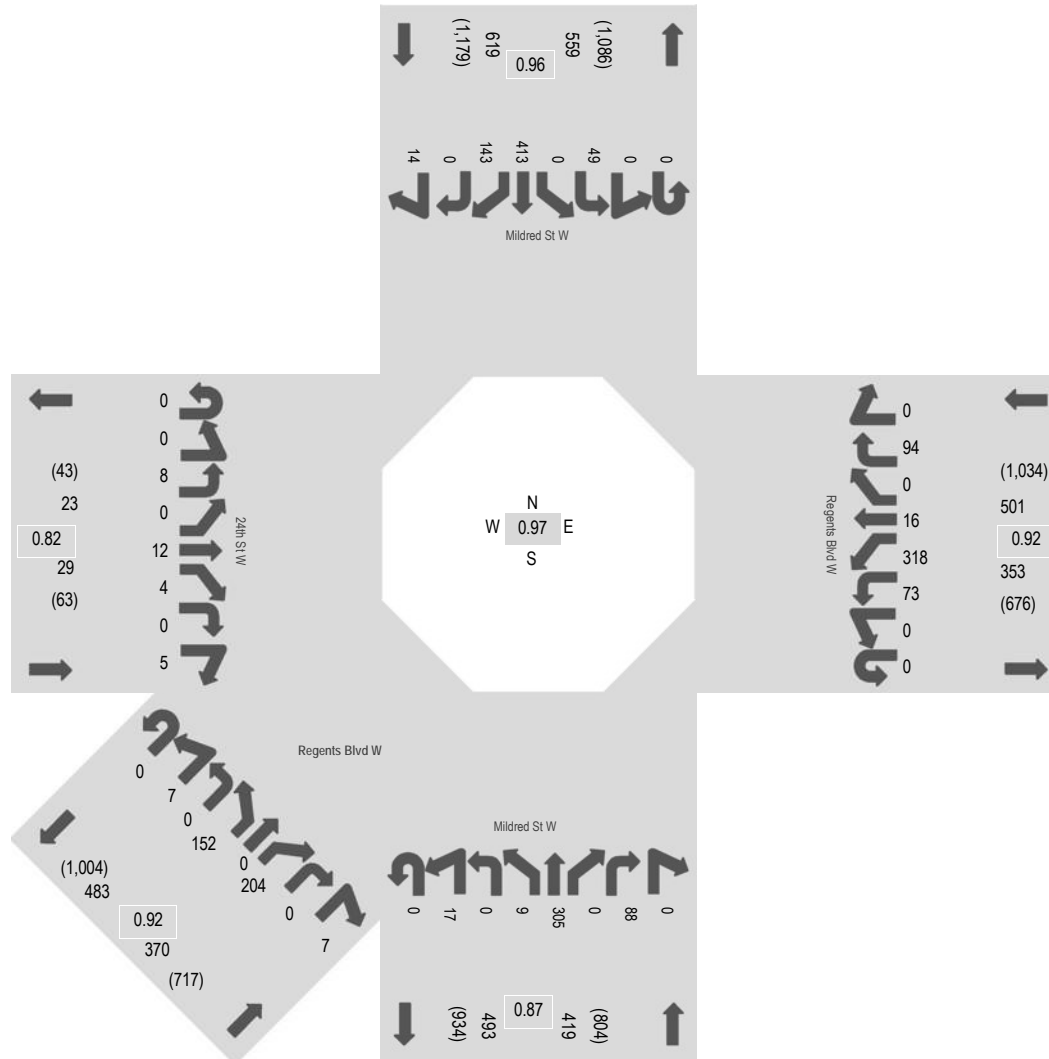
Location: 3 Mildred St W & Regents Blvd W PM

Date: Tuesday, June 14, 2022

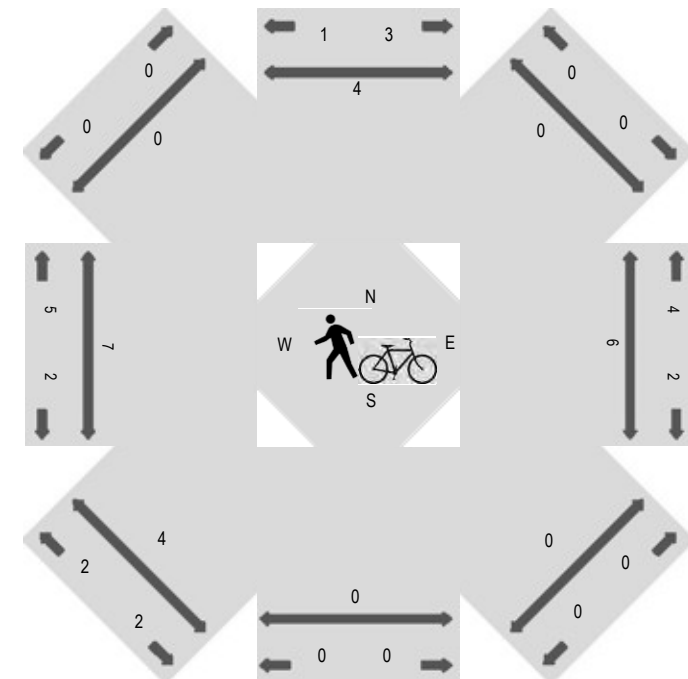
Peak Hour: 04:15 PM - 05:15 PM

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

Peak Hour - Motorized Vehicles

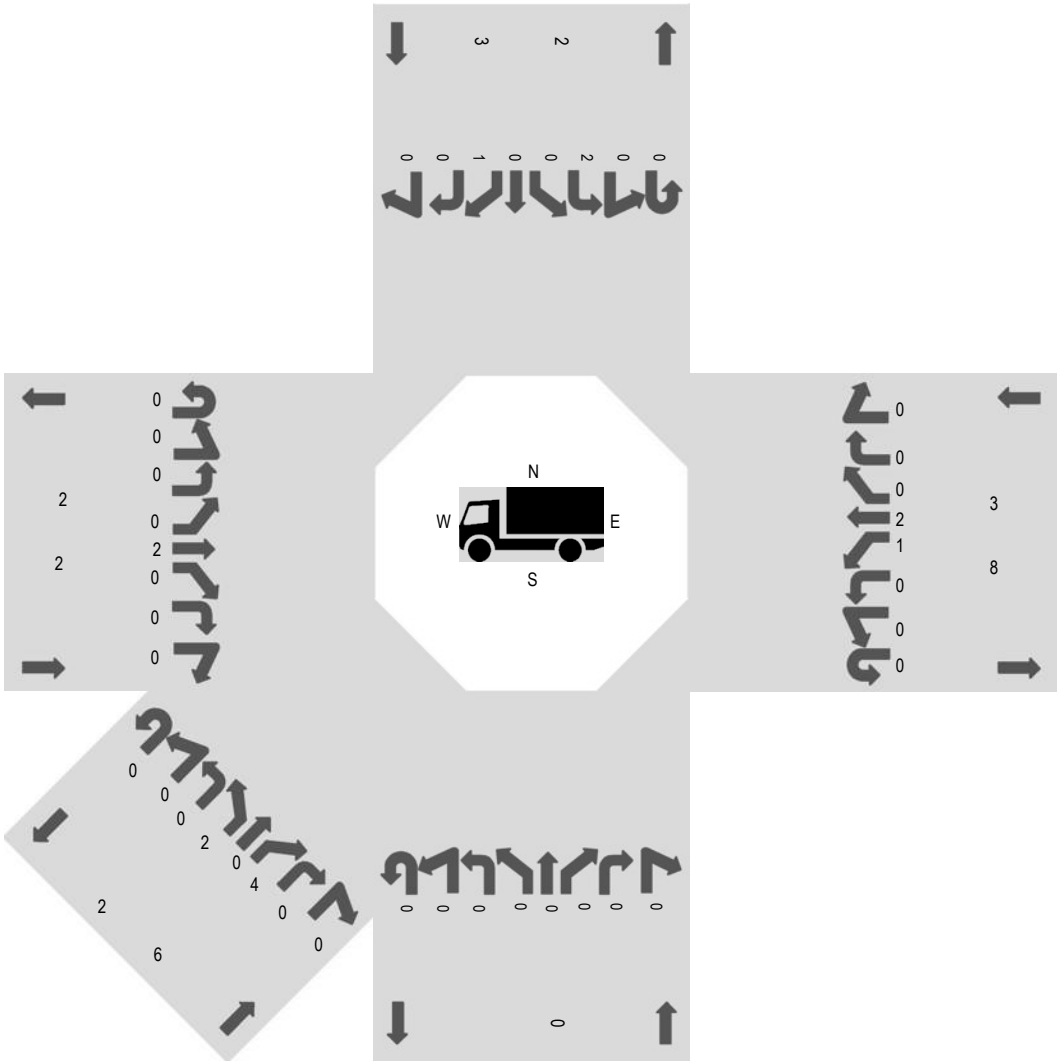


Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Peak Hour - Heavy Vehicles



	HV%	PHF
WB	0.6%	0.92
NWB	0.0%	0.00
NB	0.0%	0.87
NEB	1.6%	0.92
EB	6.9%	0.82
SEB	0.0%	0.00
SB	0.5%	0.96
SWB	0.0%	0.00
All	0.7%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	Westbound								Northwestbound								Northbound								Northeastbound							
	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR	U	HL	L	BL	T	BR	R	HR
4:00 PM	0	0	19	82	4	0	23	0									0	3	0	0	70	0	19	0	0	1	0	44	0	52	0	0
4:15 PM	0	0	17	83	5	0	27	0									0	4	0	5	71	0	25	0	0	3	0	45	0	52	0	3
4:30 PM	0	0	16	86	5	0	21	0									0	4	0	3	80	0	34	0	0	3	0	36	0	52	0	3
4:45 PM	0	0	23	79	3	0	20	0									0	6	0	1	78	0	13	0	0	1	0	35	0	51	0	0
5:00 PM	0	0	17	70	3	0	26	0									0	3	0	0	76	0	16	0	0	0	0	36	0	49	0	1
5:15 PM	0	0	27	93	1	0	20	0									0	2	0	1	61	0	13	0	0	3	0	30	0	52	0	0
5:30 PM	0	0	25	87	4	0	21	0									0	6	0	0	75	0	16	0	0	1	0	30	0	45	0	0
5:45 PM	0	0	18	81	6	0	22	0									0	9	0	3	87	0	20	0	0	0	0	40	0	48	0	1
Count Total	0	0	162	661	31	0	180	0									0	37	0	13	598	0	156	0	0	12	0	296	0	401	0	8
Peak Hour	0	0	73	318	16	0	94	0									0	17	0	9	305	0	88	0	0	7	0	152	0	204	0	7

[illegible]

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

Interval Start Time	Heavy Vehicles									Interval Start Time	Bicycles on Roadway									Interval Start Time	Pedestrians/Bicycles on Crosswalk								
	WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total		WB	NWB	NB	NEB	EB	SEB	SB	SWB	Total
4:00 PM	4	0	0	0	1	0	1	0	6	4:00 PM	0	0	0	0	0	0	0	0	0	4:00 PM	2	0	0	0	0	0	0	0	2
4:15 PM	2	0	0	2	1	0	1	0	6	4:15 PM	0	0	0	0	0	0	0	0	0	4:15 PM	0	0	0	0	0	0	1	0	1
4:30 PM	0	0	0	2	0	0	0	0	2	4:30 PM	0	0	0	0	0	0	0	0	0	4:30 PM	0	0	0	0	0	0	2	0	2
4:45 PM	0	0	0	1	1	0	1	0	3	4:45 PM	0	0	0	0	0	0	0	0	0	4:45 PM	4	0	0	3	4	0	1	0	12
5:00 PM	1	0	0	1	0	0	1	0	3	5:00 PM	0	0	0	0	0	0	0	0	0	5:00 PM	2	0	0	1	3	0	0	0	6
5:15 PM	2	0	0	1	1	0	1	0	5	5:15 PM	0	0	2	0	0	0	0	0	2	5:15 PM	0	0	0	2	4	0	0	0	6
5:30 PM	3	0	1	1	0	0	3	0	8	5:30 PM	0	0	0	0	0	0	0	0	0	5:30 PM	0	0	0	1	2	0	0	0	3
5:45 PM	2	0	0	1	1	0	0	0	4	5:45 PM	0	0	0	0	0	0	0	0	0	5:45 PM	0	0	0	0	1	0	0	0	1
Count Total	14	0	1	9	5	0	8	0	37	Count Total	0	0	2	0	0	0	0	0	2	Count Total	8	0	0	7	14	0	4	0	33
Peak Hour	3	0	0	6	2	0	3	0	14	Peak Hour	0	0	0	0	0	0	0	0	0	Peak Hour	6	0	0	4	7	0	4	0	21



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Location: 4 Bridgeport Way W & 27th St W PM

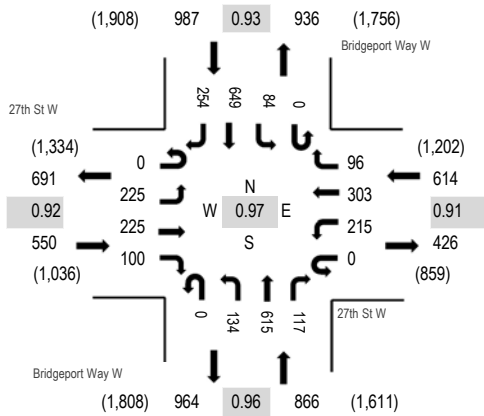
Date: Tuesday, June 14, 2022

Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour

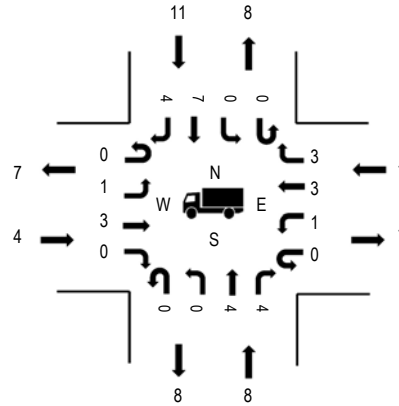
Motorized Vehicles



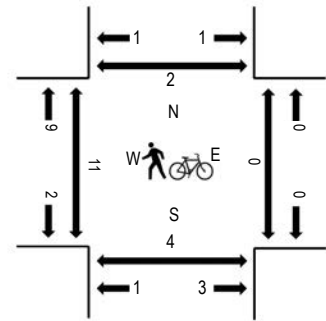
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.7%	0.92
WB	1.1%	0.91
NB	0.9%	0.96
SB	1.1%	0.93
All	1.0%	0.97

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	27th St W Eastbound				27th St W Westbound				Bridgeport Way W Northbound				Bridgeport Way W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	42	51	19	0	34	86	34	2	31	125	23	0	23	155	56	681	2,906
4:15 PM	0	54	69	15	0	39	78	29	0	39	139	35	0	20	157	51	725	2,968
4:30 PM	0	63	56	31	0	44	74	29	0	40	142	32	0	22	154	54	741	3,017
4:45 PM	0	62	59	17	0	58	79	22	0	25	172	25	0	23	154	63	759	2,952
5:00 PM	0	51	46	27	0	56	62	21	0	31	172	26	0	23	167	61	743	2,851
5:15 PM	0	49	64	25	0	57	88	24	0	38	129	34	0	16	174	76	774	
5:30 PM	0	56	51	13	0	49	81	18	2	29	121	23	0	32	153	48	676	
5:45 PM	0	49	53	14	0	48	66	26	0	21	127	28	0	25	144	57	658	
Count Total	0	426	449	161	0	385	614	203	4	254	1,127	226	0	184	1,258	466	5,757	
Peak Hour	0	225	225	100	0	215	303	96	0	134	615	117	0	84	649	254	3,017	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	2	2	0	5	4:00 PM	1	0	0	0	1	4:00 PM	0	3	1	1	5
4:15 PM	3	1	0	3	7	4:15 PM	0	0	0	0	0	4:15 PM	5	1	1	5	12
4:30 PM	1	3	2	2	8	4:30 PM	0	0	0	0	0	4:30 PM	3	0	0	0	3
4:45 PM	2	2	2	2	8	4:45 PM	0	0	0	1	1	4:45 PM	1	2	0	0	3
5:00 PM	0	2	2	5	9	5:00 PM	1	0	0	1	2	5:00 PM	3	1	1	2	7
5:15 PM	1	1	1	2	5	5:15 PM	0	0	0	0	0	5:15 PM	4	1	0	2	7
5:30 PM	1	0	2	1	4	5:30 PM	0	0	0	0	0	5:30 PM	1	1	0	2	4
5:45 PM	2	1	0	1	4	5:45 PM	0	0	0	0	0	5:45 PM	0	3	0	5	8
Count Total	11	12	11	16	50	Count Total	2	0	0	2	4	Count Total	17	12	3	17	49
Peak Hour	4	8	7	11	30	Peak Hour	1	0	0	2	3	Peak Hour	11	4	1	4	20

Location: 5 67th Ave W & 35th St W PM

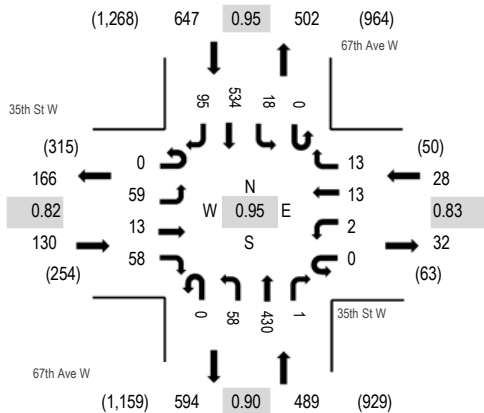
Date: Tuesday, June 14, 2022

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

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

Peak Hour

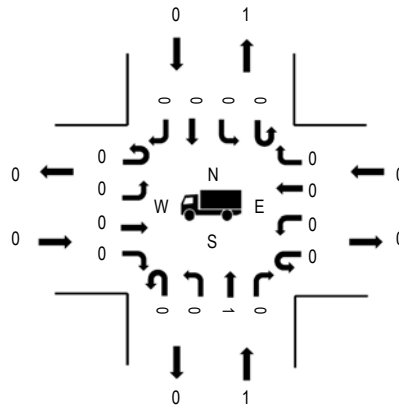
Motorized Vehicles



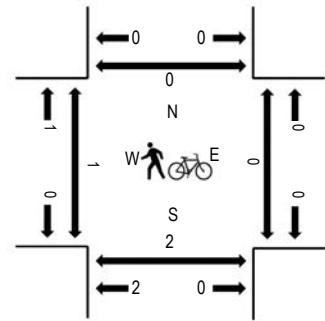
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.82
WB	0.0%	0.83
NB	0.2%	0.90
SB	0.0%	0.95
All	0.1%	0.95

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	35th St W Eastbound				35th St W Westbound				67th Ave W Northbound				67th Ave W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	14	1	11	0	0	1	3	0	15	78	1	0	4	132	18	278	1,252
4:15 PM	0	16	3	17	0	1	1	5	0	20	115	1	0	4	129	27	339	1,294
4:30 PM	0	17	5	15	0	0	3	4	0	13	106	0	0	3	133	25	324	1,276
4:45 PM	0	15	3	16	0	0	4	2	0	12	105	0	0	8	131	15	311	1,264
5:00 PM	0	11	2	10	0	1	5	2	0	13	104	0	0	3	141	28	320	1,249
5:15 PM	0	19	4	18	0	0	1	8	0	8	89	0	0	3	147	24	321	
5:30 PM	0	14	2	11	0	0	2	2	0	12	115	0	1	4	129	20	312	
5:45 PM	0	9	8	13	0	0	2	3	0	15	107	0	0	4	104	31	296	
Count Total	0	115	28	111	0	2	19	29	0	108	819	2	1	33	1,046	188	2,501	
Peak Hour	0	59	13	58	0	2	13	13	0	58	430	1	0	18	534	95	1,294	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	2	2	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	1	0	0	1
4:30 PM	0	1	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	1	1	0	0	2
5:15 PM	0	0	0	0	0	5:15 PM	0	2	0	0	2	5:15 PM	2	0	0	1	3
5:30 PM	0	0	0	1	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	1	0	0	0	1
Count Total	0	1	0	3	4	Count Total	0	2	0	0	2	Count Total	4	2	0	1	7
Peak Hour	0	1	0	0	1	Peak Hour	0	0	0	0	0	Peak Hour	1	2	0	0	3

Location: 6 67th Ave W & 40th St W PM

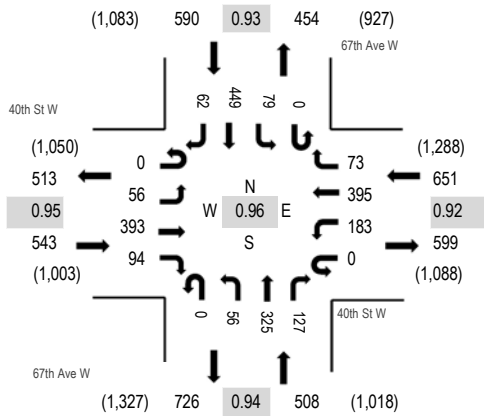
Date: Tuesday, June 14, 2022

Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

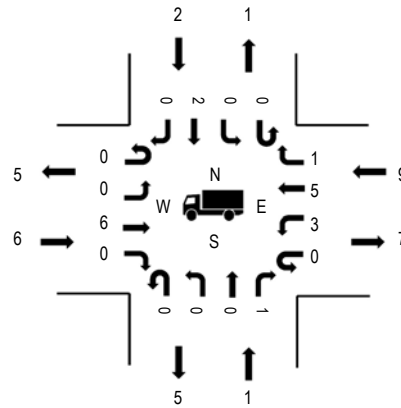
Motorized Vehicles



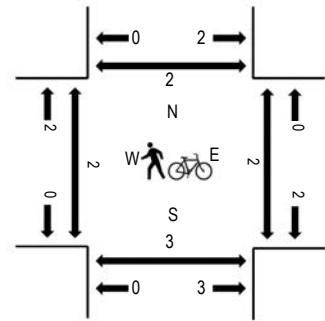
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.1%	0.95
WB	1.4%	0.92
NB	0.2%	0.94
SB	0.3%	0.93
All	0.8%	0.96

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - Motorized Vehicles

Interval Start Time	40th St W Eastbound				40th St W Westbound				67th Ave W Northbound				67th Ave W Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	18	72	19	0	33	100	13	0	15	87	20	0	20	99	13	509	2,199
4:15 PM	0	18	100	19	0	42	111	17	0	16	84	28	0	16	99	12	562	2,287
4:30 PM	0	9	97	20	0	53	89	20	0	12	91	35	0	22	110	6	564	2,292
4:45 PM	0	13	106	23	0	37	93	19	0	17	84	32	0	23	102	15	564	2,261
5:00 PM	0	21	102	22	0	50	114	17	0	11	77	29	0	18	120	16	597	2,193
5:15 PM	0	13	88	29	0	43	99	17	0	16	73	31	0	16	117	25	567	
5:30 PM	0	11	66	20	0	47	108	19	0	16	93	24	0	18	103	8	533	
5:45 PM	0	11	89	17	0	28	102	17	0	17	85	25	0	11	75	19	496	
Count Total	0	114	720	169	0	333	816	139	0	120	674	224	0	144	825	114	4,392	
Peak Hour	0	56	393	94	0	183	395	73	0	56	325	127	0	79	449	62	2,292	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	1	1	2	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	6	1	1	0	8	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	1	1
4:30 PM	3	0	4	1	8	4:30 PM	0	0	0	0	0	4:30 PM	0	0	1	0	1
4:45 PM	1	0	2	0	3	4:45 PM	0	0	0	0	0	4:45 PM	1	2	0	1	4
5:00 PM	0	1	1	0	2	5:00 PM	0	2	0	0	2	5:00 PM	1	1	0	1	3
5:15 PM	2	0	2	1	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	1	0	1
5:30 PM	1	0	2	1	4	5:30 PM	0	0	0	0	0	5:30 PM	2	0	1	2	5
5:45 PM	2	0	0	0	2	5:45 PM	0	0	0	0	0	5:45 PM	1	0	0	0	1
Count Total	15	2	13	4	34	Count Total	0	2	0	0	2	Count Total	5	3	3	5	16
Peak Hour	6	1	9	2	18	Peak Hour	0	2	0	0	2	Peak Hour	2	3	2	2	9

Appendix B: LOS Definitions

Highway Capacity Manual 2010/6th Edition

Signalized intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* and 6th Edition (Transportation Research Board, 2010 and 2016, respectively).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F ¹	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010 and 6th Edition*, Transportation Research Board, 2010 and 2016, respectively.

1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop control. All-way stop control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F ¹	>50

Source: *Highway Capacity Manual 2010 and 6th Edition*, Transportation Research Board, 2010 and 2016, respectively.

1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.
























Appendix C: LOS Worksheets

HCM Signalized Intersection Capacity Analysis

1: Mildred St SW & 19th St W

Fircrest Prose









Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	450	65	225	615	140	100	250	185	180	340	90
Future Volume (vph)	100	450	65	225	615	140	100	250	185	180	340	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3458		1770	3539	1517	1787	1881	1566	1787	3441	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3458		1770	3539	1517	1787	1881	1566	1787	3441	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	110	495	71	247	676	154	110	275	203	198	374	99
RTOR Reduction (vph)	0	13	0	0	0	102	0	0	153	0	28	0
Lane Group Flow (vph)	110	553	0	247	676	52	110	275	50	198	445	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	9.8	20.9		21.9	33.0	33.0	8.9	19.1	19.1	15.1	25.3	
Effective Green, g (s)	9.8	20.9		21.9	33.0	33.0	8.9	19.1	19.1	15.1	25.3	
Actuated g/C Ratio	0.10	0.22		0.23	0.34	0.34	0.09	0.20	0.20	0.16	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	178	745		399	1203	516	163	370	308	278	897	
v/s Ratio Prot	0.06	c0.16		c0.14	0.19		0.06	c0.15		c0.11	0.13	
v/s Ratio Perm						0.03			0.03			
v/c Ratio	0.62	0.74		0.62	0.56	0.10	0.67	0.74	0.16	0.71	0.50	
Uniform Delay, d1	41.8	35.5		33.8	26.1	21.9	42.6	36.6	32.3	38.9	30.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	3.5		2.0	1.9	0.4	8.4	6.9	0.1	7.0	0.2	
Delay (s)	46.2	39.1		35.8	28.0	22.3	51.0	43.6	32.4	45.9	30.6	
Level of Service	D	D		D	C	C	D	D	C	D	C	
Approach Delay (s)		40.2			29.0			41.1			35.1	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			35.2			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			97.0			Sum of lost time (s)			23.0			
Intersection Capacity Utilization			70.5%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th TWSC
2: Mildred St SW & 22nd St W

Fircrest Prose
Existing PM Peak Hour






















Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	15	0	0	0	5	545	5	0	615	10
Future Vol, veh/h	5	0	15	0	0	0	5	545	5	0	615	10
Conflicting Peds, #/hr	6	0	6	0	0	0	6	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	5	0	15	0	0	0	5	562	5	0	634	10
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1221	1217	646	1225	1222	568	650	0	0	567	0	0
Stage 1	640	640	-	572	572	-	-	-	-	-	-	-
Stage 2	581	577	-	653	650	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	158	182	475	157	181	526	946	-	-	1010	-	-
Stage 1	467	473	-	509	508	-	-	-	-	-	-	-
Stage 2	503	505	-	460	468	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	156	180	470	150	179	523	941	-	-	1010	-	-
Mov Cap-2 Maneuver	156	180	-	150	179	-	-	-	-	-	-	-
Stage 1	462	470	-	506	505	-	-	-	-	-	-	-
Stage 2	497	502	-	442	465	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	17.3		0			0.1			0			
HCM LOS	C		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	941	-	-	313	-	1010	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.066	-	-	-	-				
HCM Control Delay (s)	8.8	-	-	17.3	0	0	-	-				
HCM Lane LOS	A	-	-	C	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	-	0	-	-				

HCM Signalized Intersection Capacity Analysis

3: Regents Blvd W & 67th Ave W/Mildred St SW & 24th St W/Regents Blvd

Fircrest Prose

Existing PM Peak Hour















												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	80	345	15	100	20	10	330	95
Future Volume (vph)	10	15	5	5	80	345	15	100	20	10	330	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.98	1.00		0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1736	1466		1787	1698	1709	1548		1805	1900	1556
Flt Permitted		0.36	1.00		0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)		644	1466		1394	1698	1709	1548		1805	1900	1556
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	82	356	15	103	21	10	340	98
RTOR Reduction (vph)	0	0	9	0	0	0	0	88	0	0	0	71
Lane Group Flow (vph)	0	25	1	0	82	185	186	15	0	31	340	27
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)		7.7	7.7		18.4	18.4	18.4	18.4		2.9	33.4	33.4
Effective Green, g (s)		7.7	7.7		18.4	18.4	18.4	18.4		2.9	33.4	33.4
Actuated g/C Ratio		0.06	0.06		0.15	0.15	0.15	0.15		0.02	0.27	0.27
Clearance Time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)		1.0	1.0		3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)		40	92		209	255	257	232		42	518	424
v/s Ratio Prot						c0.11	0.11			0.02	c0.18	
v/s Ratio Perm		c0.04	0.00		0.06			0.01				0.02
v/c Ratio		0.62	0.01		0.39	0.73	0.72	0.07		0.74	0.66	0.06
Uniform Delay, d1		55.9	53.7		46.9	49.5	49.5	44.6		59.3	39.4	32.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		19.9	0.0		1.2	9.8	9.7	0.1		44.0	3.0	0.1
Delay (s)		75.8	53.7		48.1	59.4	59.2	44.7		103.3	42.4	32.9
Level of Service		E	D		D	E	E	D		F	D	C
Approach Delay (s)		69.5					54.9				44.4	
Approach LOS		E					D				D	
Intersection Summary												
HCM 2000 Control Delay			49.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			122.3			Sum of lost time (s)				39.0		
Intersection Capacity Utilization			91.5%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Regents Blvd W & 67th Ave W/Mildred St SW & 24th St W/Regents Blvd

Fircrest Prose
























Existing PM Peak Hour

									
Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2	
Lane Configurations									
Traffic Volume (vph)	55	445	155	15	10	165	220	10	
Future Volume (vph)	55	445	155	15	10	165	220	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5		
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00		
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96		
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00		
Frt	1.00	1.00	0.85			1.00	0.85		
Flt Protected	0.95	1.00	1.00			0.95	1.00		
Satd. Flow (prot)	1787	1881	1521			1729	1527		
Flt Permitted	0.95	1.00	1.00			0.97	1.00		
Satd. Flow (perm)	1787	1881	1521			1763	1527		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	57	459	160	15	10	170	227	10	
RTOR Reduction (vph)	0	0	123	0	0	0	203	0	
Lane Group Flow (vph)	57	459	52	0	0	180	34	0	
Confl. Peds. (#/hr)	6		4	7	7	4	6		
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%	
Turn Type	Prot	NA	Perm		Perm	Perm	Perm		
Protected Phases	5	2							
Permitted Phases			2		4	4	4		
Actuated Green, G (s)	6.0	36.5	36.5			17.8	17.8		
Effective Green, g (s)	6.0	36.5	36.5			17.8	17.8		
Actuated g/C Ratio	0.05	0.30	0.30			0.15	0.15		
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5		
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	87	561	453			256	222		
v/s Ratio Prot	0.03	c0.24							
v/s Ratio Perm			0.03			c0.10	0.02		
v/c Ratio	0.66	0.82	0.12			0.70	0.16		
Uniform Delay, d1	57.1	39.8	31.2			49.7	45.7		
Progression Factor	1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	12.7	9.0	0.1			8.5	0.3		
Delay (s)	69.9	48.9	31.3			58.2	46.0		
Level of Service	E	D	C			E	D		
Approach Delay (s)		46.1				51.3			
Approach LOS		D				D			
Intersection Summary									

HCM 6th Signalized Intersection Summary

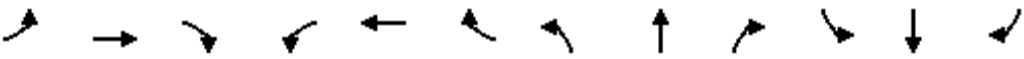
4: Bridgeport Way W & 27th St W

Fircrest Prose
Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	225	100	215	305	95	135	615	115	85	650	255
Future Volume (veh/h)	225	225	100	215	305	95	135	615	115	85	650	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	232	232	103	222	314	98	139	634	119	88	670	263
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	419	422	483	469	412	430	335	918	172	302	996	643
Arrive On Green	0.13	0.22	0.22	0.12	0.22	0.22	0.08	0.31	0.31	0.05	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	3001	562	1795	3582	1566
Grp Volume(v), veh/h	232	232	103	222	314	98	139	378	375	88	670	263
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1772	1795	1791	1566
Q Serve(g_s), s	5.6	6.3	2.8	5.3	9.0	2.8	3.1	10.7	10.8	1.9	9.6	6.9
Cycle Q Clear(g_c), s	5.6	6.3	2.8	5.3	9.0	2.8	3.1	10.7	10.8	1.9	9.6	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	419	422	483	469	412	430	335	548	542	302	996	643
V/C Ratio(X)	0.55	0.55	0.21	0.47	0.76	0.23	0.41	0.69	0.69	0.29	0.67	0.41
Avail Cap(c_a), veh/h	1304	897	883	1363	897	838	689	1100	1088	831	2199	1169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	19.9	15.0	14.4	21.2	16.4	14.0	17.6	17.7	13.7	18.5	12.2
Incr Delay (d2), s/veh	0.4	0.4	0.1	0.3	1.1	0.1	0.3	0.6	0.6	0.2	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.6	0.9	1.9	3.8	0.9	1.1	4.0	4.0	0.7	3.6	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	20.3	15.1	14.7	22.3	16.5	14.3	18.2	18.3	13.9	18.8	12.3
LnGrp LOS	B	C	B	B	C	B	B	B	B	B	B	B
Approach Vol, veh/h	567			634			892			1021		
Approach Delay, s/veh	17.4			18.7			17.6			16.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	20.6	11.2	17.4	7.0	22.2	11.5	17.1				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g_c+I1), s	5.1	11.6	7.3	8.3	3.9	12.8	7.6	11.0				
Green Ext Time (p_c), s	0.0	3.7	0.1	1.0	0.0	3.2	0.1	1.2				
Intersection Summary												
HCM 6th Ctrl Delay	17.5											
HCM 6th LOS	B											

HCM 6th Signalized Intersection Summary 5: 67th Ave W & 35th St SW
























Fircrest Prose
Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↑	↔	↔	↑	↔
Traffic Volume (veh/h)	60	15	60	5	15	15	60	430	5	20	535	95
Future Volume (veh/h)	60	15	60	5	15	15	60	430	5	20	535	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	63	16	63	5	16	16	63	453	5	21	563	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	320	52	125	192	153	134	489	886	750	583	886	750
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	579	291	693	126	846	740	784	1900	1608	948	1900	1608
Grp Volume(v), veh/h	142	0	0	37	0	0	63	453	5	21	563	100
Grp Sat Flow(s),veh/h/ln	1562	0	0	1712	0	0	784	1900	1608	948	1900	1608
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	1.6	4.0	0.0	0.4	5.4	0.9
Cycle Q Clear(g_c), s	1.9	0.0	0.0	0.4	0.0	0.0	7.0	4.0	0.0	4.4	5.4	0.9
Prop In Lane	0.44		0.44	0.14		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	498	0	0	479	0	0	489	886	750	583	886	750
V/C Ratio(X)	0.29	0.00	0.00	0.08	0.00	0.00	0.13	0.51	0.01	0.04	0.64	0.13
Avail Cap(c_a), veh/h	1238	0	0	1288	0	0	1279	2801	2371	1538	2801	2371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	0.0	8.3	0.0	0.0	7.5	4.5	3.4	6.0	4.9	3.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.0	0.0	0.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.0	0.0	0.0	8.3	0.0	0.0	7.6	4.7	3.4	6.1	5.2	3.7
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		142			37			521			684	
Approach Delay, s/veh		9.0			8.3			5.0			5.0	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		15.7		8.3		15.7		8.3				
Change Period (Y+Rc), s		4.5		4.0		4.5		4.0				
Max Green Setting (Gmax), s		35.5		16.0		35.5		16.0				
Max Q Clear Time (g_c+I1), s		7.4		2.4		9.0		3.9				
Green Ext Time (p_c), s		2.7		0.1		2.2		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			5.5									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose
Existing PM Peak Hour
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	395	95	185	395	75	55	325	125	80	450	60
Future Volume (veh/h)	55	395	95	185	395	75	55	325	125	80	450	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	57	411	99	193	411	78	57	339	130	83	469	62
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	74	509	429	184	509	97	72	529	447	107	566	478
Arrive On Green	0.04	0.27	0.27	0.10	0.33	0.33	0.04	0.28	0.28	0.06	0.30	0.30
Sat Flow, veh/h	1795	1885	1589	1795	1539	292	1810	1900	1604	1810	1900	1605
Grp Volume(v), veh/h	57	411	99	193	0	489	57	339	130	83	469	62
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	0	1831	1810	1900	1604	1810	1900	1605
Q Serve(g_s), s	1.8	11.9	2.8	6.0	0.0	14.3	1.8	9.2	3.7	2.7	13.5	1.7
Cycle Q Clear(g_c), s	1.8	11.9	2.8	6.0	0.0	14.3	1.8	9.2	3.7	2.7	13.5	1.7
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	509	429	184	0	606	72	529	447	107	566	478
V/C Ratio(X)	0.77	0.81	0.23	1.05	0.00	0.81	0.79	0.64	0.29	0.78	0.83	0.13
Avail Cap(c_a), veh/h	184	1303	1098	184	0	1265	648	1151	972	648	1151	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	20.0	16.7	26.3	0.0	17.9	27.9	18.6	16.6	27.2	19.2	15.0
Incr Delay (d2), s/veh	6.1	1.2	0.1	80.2	0.0	1.0	7.2	0.5	0.1	4.5	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	4.9	1.0	6.5	0.0	5.5	0.9	3.7	1.3	1.2	5.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	21.2	16.8	106.5	0.0	18.9	35.1	19.0	16.7	31.6	20.4	15.1
LnGrp LOS	C	C	B	F	A	B	D	B	B	C	C	B
Approach Vol, veh/h		567			682			526			614	
Approach Delay, s/veh		21.7			43.7			20.2			21.4	
Approach LOS		C			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.5	20.8	6.4	23.9	6.3	22.0	10.0	20.3				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+I1), s	4.7	11.2	3.8	16.3	3.8	15.5	8.0	13.9				
Green Ext Time (p_c), s	0.0	1.5	0.0	2.1	0.0	2.0	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			27.6									
HCM 6th LOS			C									

HCM Signalized Intersection Capacity Analysis

1: Mildred St W & 19th St W

Fircrest Prose

Future (2026) Without-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	485	70	260	660	150	105	270	210	190	370	100
Future Volume (vph)	110	485	70	260	660	150	105	270	210	190	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3457		1770	3539	1517	1787	1881	1566	1787	3438	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3457		1770	3539	1517	1787	1881	1566	1787	3438	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	533	77	286	725	165	115	297	231	209	407	110
RTOR Reduction (vph)	0	13	0	0	0	111	0	0	159	0	29	0
Lane Group Flow (vph)	121	597	0	286	725	54	115	297	72	209	488	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	10.5	21.2		21.2	31.9	31.9	9.5	19.8	19.8	14.8	25.1	
Effective Green, g (s)	10.5	21.2		21.2	31.9	31.9	9.5	19.8	19.8	14.8	25.1	
Actuated g/C Ratio	0.11	0.22		0.22	0.33	0.33	0.10	0.20	0.20	0.15	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	191	755		386	1163	498	175	383	319	272	889	
v/s Ratio Prot	0.07	c0.17		c0.16	0.20		0.06	c0.16		c0.12	0.14	
v/s Ratio Perm						0.04			0.05			
v/c Ratio	0.63	0.79		0.74	0.62	0.11	0.66	0.78	0.23	0.77	0.55	
Uniform Delay, d1	41.4	35.8		35.3	27.5	22.7	42.2	36.5	32.2	39.5	31.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.0	5.3		6.6	2.5	0.4	6.6	8.7	0.1	11.1	0.4	
Delay (s)	46.4	41.1		41.9	30.0	23.1	48.8	45.2	32.3	50.6	31.4	
Level of Service	D	D		D	C	C	D	D	C	D	C	
Approach Delay (s)		42.0			31.9			41.2			36.9	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			97.0			Sum of lost time (s)			23.0			
Intersection Capacity Utilization			74.7%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th TWSC
2: Mildred St W & 22nd St W/Central Site Access

Fircrest Prose
Future (2026) Without-Project PM Peak Hour

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↗	↗	↗	↗	↗
Traffic Vol, veh/h	20	0	20	0	0	0	10	580	5	0	660	35
Future Vol, veh/h	20	0	20	0	0	0	10	580	5	0	660	35
Conflicting Peds, #/hr	6	0	6	0	0	0	6	0	0	0	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	21	0	21	0	0	0	10	598	5	0	680	36

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1313	1309	692	1333	1340	604	722	0	0	603	0	0
Stage 1	686	686	-	618	618	-	-	-	-	-	-	-
Stage 2	627	623	-	715	722	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	137	161	447	132	154	502	889	-	-	979	-	-
Stage 1	441	451	-	480	484	-	-	-	-	-	-	-
Stage 2	475	481	-	425	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	134	158	442	124	151	499	884	-	-	979	-	-
Mov Cap-2 Maneuver	134	158	-	124	151	-	-	-	-	-	-	-
Stage 1	434	448	-	475	479	-	-	-	-	-	-	-
Stage 2	467	476	-	403	431	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.8	0	0.2	0
HCM LOS	D	A		






















Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	884	-	-	206	-	979	-
HCM Lane V/C Ratio	0.012	-	-	0.2	-	-	-
HCM Control Delay (s)	9.1	-	-	26.8	0	0	-
HCM Lane LOS	A	-	-	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	-	0	-

HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W














Ents B200 Without-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	85	365	15	105	20	10	360	100
Future Volume (vph)	10	15	5	5	85	365	15	105	20	10	360	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.98	1.00		0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1735	1465		1787	1698	1708	1547		1805	1900	1555
Flt Permitted		0.35	1.00		0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)		612	1465		1394	1698	1708	1547		1805	1900	1555
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	88	376	15	108	21	10	371	103
RTOR Reduction (vph)	0	0	9	0	0	0	0	92	0	0	0	72
Lane Group Flow (vph)	0	25	1	0	88	196	195	16	0	31	371	31
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)		8.1	8.1		19.0	19.0	19.0	19.0		3.1	38.5	38.5
Effective Green, g (s)		8.1	8.1		19.0	19.0	19.0	19.0		3.1	38.5	38.5
Actuated g/C Ratio		0.06	0.06		0.15	0.15	0.15	0.15		0.02	0.30	0.30
Clearance Time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)		1.0	1.0		3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)		38	91		204	249	250	227		43	565	463
v/s Ratio Prot						c0.12	0.11			0.02	c0.20	
v/s Ratio Perm		c0.04	0.00		0.06			0.01				0.02
v/c Ratio		0.66	0.01		0.43	0.79	0.78	0.07		0.72	0.66	0.07
Uniform Delay, d1		59.2	56.8		50.2	53.2	53.1	47.5		62.7	39.6	32.5
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		27.1	0.0		1.5	15.1	14.5	0.1		39.5	2.8	0.1
Delay (s)		86.4	56.8		51.7	68.3	67.7	47.7		102.2	42.4	32.6
Level of Service		F	E		D	E	E	D		F	D	C
Approach Delay (s)		77.9					61.8				44.1	
Approach LOS		E					E				D	
Intersection Summary												
HCM 2000 Control Delay		52.4										
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		129.3										
Intersection Capacity Utilization		94.6%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Fircrest Prose

3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W
Ents Blvd Without-Project PM Peak Hour
























								
Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations								
Traffic Volume (vph)	60	480	165	15	10	175	235	10
Future Volume (vph)	60	480	165	15	10	175	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5	
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00	
Frt	1.00	1.00	0.85			1.00	0.85	
Flt Protected	0.95	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	1787	1881	1519			1727	1525	
Flt Permitted	0.95	1.00	1.00			0.97	1.00	
Satd. Flow (perm)	1787	1881	1519			1764	1525	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	495	170	15	10	180	242	10
RTOR Reduction (vph)	0	0	125	0	0	0	206	0
Lane Group Flow (vph)	62	495	60	0	0	190	46	0
Confl. Peds. (#/hr)	6		4	7	7	4	6	
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm		Perm	Perm	Perm	
Protected Phases	5	2						
Permitted Phases			2		4	4	4	
Actuated Green, G (s)	6.3	41.7	41.7			18.4	18.4	
Effective Green, g (s)	6.3	41.7	41.7			18.4	18.4	
Actuated g/C Ratio	0.05	0.32	0.32			0.14	0.14	
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5	
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	87	606	489			251	217	
v/s Ratio Prot	0.03	c0.26						
v/s Ratio Perm			0.04			c0.11	0.03	
v/c Ratio	0.71	0.82	0.12			0.76	0.21	
Uniform Delay, d1	60.6	40.3	30.9			53.3	49.0	
Progression Factor	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	20.4	8.4	0.1			12.3	0.5	
Delay (s)	81.0	48.7	31.0			65.6	49.5	
Level of Service	F	D	C			E	D	
Approach Delay (s)		47.0				56.4		
Approach LOS		D				E		
Intersection Summary								

HCM 6th Signalized Intersection Summary

4: Bridgeport Way W & 27th St W

Fircrest Prose





















Future (2026) Without-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	240	105	230	325	100	145	655	120	90	690	270
Future Volume (veh/h)	240	240	105	230	325	100	145	655	120	90	690	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	247	247	108	237	335	103	149	675	124	93	711	278
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	413	435	500	466	425	444	326	939	172	290	1011	656
Arrive On Green	0.13	0.23	0.23	0.13	0.23	0.23	0.08	0.31	0.31	0.05	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	3012	553	1795	3582	1566
Grp Volume(v), veh/h	247	247	108	237	335	103	149	401	398	93	711	278
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1774	1795	1791	1566
Q Serve(g_s), s	6.3	7.2	3.1	6.0	10.4	3.1	3.6	12.3	12.3	2.1	11.0	7.8
Cycle Q Clear(g_c), s	6.3	7.2	3.1	6.0	10.4	3.1	3.6	12.3	12.3	2.1	11.0	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	413	435	500	466	425	444	326	559	553	290	1011	656
V/C Ratio(X)	0.60	0.57	0.22	0.51	0.79	0.23	0.46	0.72	0.72	0.32	0.70	0.42
Avail Cap(c_a), veh/h	1216	838	839	1279	838	792	640	1027	1017	774	2054	1113
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	21.1	15.6	15.2	22.6	17.2	14.9	18.9	18.9	14.6	19.9	12.8
Incr Delay (d2), s/veh	0.5	0.4	0.1	0.3	1.2	0.1	0.4	0.7	0.7	0.2	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	3.0	1.0	2.3	4.4	1.1	1.3	4.7	4.7	0.8	4.2	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	21.5	15.7	15.5	23.8	17.3	15.3	19.5	19.6	14.8	20.2	13.0
LnGrp LOS	B	C	B	B	C	B	B	B	B	B	C	B
Approach Vol, veh/h	602			675			948			1082		
Approach Delay, s/veh	18.4			19.9			18.9			17.9		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	22.0	12.0	18.8	7.3	23.8	12.3	18.5				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g_c+I1), s	5.6	13.0	8.0	9.2	4.1	14.3	8.3	12.4				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.0	0.0	3.4	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay	18.7											
HCM 6th LOS	B											

HCM 6th Signalized Intersection Summary

5: 67th Ave W & 35th St SW
























Fircrest Prose
Future (2026) Without-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	15	65	5	15	15	65	465	5	20	570	100
Future Volume (veh/h)	65	15	65	5	15	15	65	465	5	20	570	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	68	16	68	5	16	16	68	489	5	21	600	105
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	310	50	126	182	154	134	470	924	782	565	924	782
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	584	278	698	121	852	742	754	1900	1609	917	1900	1609
Grp Volume(v), veh/h	152	0	0	37	0	0	68	489	5	21	600	105
Grp Sat Flow(s),veh/h/ln	1560	0	0	1716	0	0	754	1900	1609	917	1900	1609
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	1.9	4.5	0.0	0.4	6.0	0.9
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.4	0.0	0.0	7.9	4.5	0.0	5.0	6.0	0.9
Prop In Lane	0.45		0.45	0.14		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	486	0	0	470	0	0	470	924	782	565	924	782
V/C Ratio(X)	0.31	0.00	0.00	0.08	0.00	0.00	0.14	0.53	0.01	0.04	0.65	0.13
Avail Cap(c_a), veh/h	1169	0	0	1218	0	0	1155	2647	2241	1397	2647	2241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	0.0	8.7	0.0	0.0	7.9	4.5	3.4	6.2	4.9	3.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.1	0.0	0.0	0.2	0.5	0.0	0.0	0.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	0.0	0.0	8.8	0.0	0.0	7.9	4.7	3.4	6.3	5.2	3.6
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		152			37			562			726	
Approach Delay, s/veh		9.6			8.8			5.1			5.0	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.9		8.6		16.9		8.6				
Change Period (Y+Rc), s		4.5		4.0		4.5		4.0				
Max Green Setting (Gmax), s		35.5		16.0		35.5		16.0				
Max Q Clear Time (g_c+I1), s		8.0		2.4		9.9		4.2				
Green Ext Time (p_c), s		3.0		0.1		2.4		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			5.6									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose
Future (2026) Without-Project PM Peak Hour























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	420	100	195	420	80	60	355	135	85	480	65
Future Volume (veh/h)	60	420	100	195	420	80	60	355	135	85	480	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	62	438	104	203	438	83	62	370	141	89	500	68
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	78	530	447	171	512	97	79	552	467	115	590	499
Arrive On Green	0.04	0.28	0.28	0.10	0.33	0.33	0.04	0.29	0.29	0.06	0.31	0.31
Sat Flow, veh/h	1795	1885	1589	1795	1539	292	1810	1900	1605	1810	1900	1605
Grp Volume(v), veh/h	62	438	104	203	0	521	62	370	141	89	500	68
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	0	1831	1810	1900	1605	1810	1900	1605
Q Serve(g_s), s	2.2	13.7	3.2	6.0	0.0	16.8	2.1	10.8	4.3	3.1	15.5	1.9
Cycle Q Clear(g_c), s	2.2	13.7	3.2	6.0	0.0	16.8	2.1	10.8	4.3	3.1	15.5	1.9
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	78	530	447	171	0	609	79	552	467	115	590	499
V/C Ratio(X)	0.79	0.83	0.23	1.19	0.00	0.86	0.78	0.67	0.30	0.77	0.85	0.14
Avail Cap(c_a), veh/h	171	1210	1020	171	0	1175	602	1069	903	602	1069	903
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	21.2	17.4	28.6	0.0	19.6	29.9	19.7	17.4	29.1	20.3	15.7
Incr Delay (d2), s/veh	6.5	1.3	0.1	128.9	0.0	1.4	6.2	0.5	0.1	4.1	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	5.7	1.1	8.6	0.0	6.7	1.0	4.5	1.5	1.4	6.5	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.4	22.5	17.5	157.5	0.0	21.0	36.1	20.2	17.5	33.2	21.7	15.7
LnGrp LOS	D	C	B	F	A	C	D	C	B	C	C	B
Approach Vol, veh/h		604			724			573			657	
Approach Delay, s/veh		23.1			59.3			21.3			22.6	
Approach LOS		C			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	22.8	6.8	25.5	6.8	24.1	10.0	22.2				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+I1), s	5.1	12.8	4.2	18.8	4.1	17.5	8.0	15.7				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.2	0.0	2.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			32.8									
HCM 6th LOS			C									

HCM Signalized Intersection Capacity Analysis

1: Mildred St W & 19th St W

Fircrest Prose

Future (2026) With-Project PM Peak Hour





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	485	76	309	660	150	110	284	245	190	388	100
Future Volume (vph)	110	485	76	309	660	150	110	284	245	190	388	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3451		1770	3539	1517	1787	1881	1566	1787	3443	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3451		1770	3539	1517	1787	1881	1566	1787	3443	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	533	84	340	725	165	121	312	269	209	426	110
RTOR Reduction (vph)	0	14	0	0	0	111	0	0	175	0	27	0
Lane Group Flow (vph)	121	603	0	340	725	54	121	312	94	209	509	0
Confl. Peds. (#/hr)	12		8	8		12	16		8	8		16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			
Actuated Green, G (s)	10.3	21.3		20.6	31.6	31.6	9.9	20.4	20.4	14.7	25.2	
Effective Green, g (s)	10.3	21.3		20.6	31.6	31.6	9.9	20.4	20.4	14.7	25.2	
Actuated g/C Ratio	0.11	0.22		0.21	0.33	0.33	0.10	0.21	0.21	0.15	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	187	757		375	1152	494	182	395	329	270	894	
v/s Ratio Prot	0.07	c0.17		c0.19	0.20		0.07	c0.17		c0.12	c0.15	
v/s Ratio Perm						0.04			0.06			
v/c Ratio	0.65	0.80		0.91	0.63	0.11	0.66	0.79	0.28	0.77	0.57	
Uniform Delay, d1	41.6	35.8		37.3	27.7	22.9	42.0	36.3	32.2	39.6	31.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.7	5.4		24.2	2.6	0.4	6.9	9.4	0.2	11.9	0.5	
Delay (s)	47.3	41.2		61.5	30.3	23.3	48.9	45.6	32.3	51.4	31.7	
Level of Service	D	D		E	C	C	D	D	C	D	C	
Approach Delay (s)		42.2			38.0			41.1			37.2	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			39.4		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			97.0		Sum of lost time (s)					23.0		
Intersection Capacity Utilization			78.1%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2: Mildred St W & 22nd St W/Central Site Access






















Fircrest Prose
Future (2026) With-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	20	38	0	39	10	604	27	78	656	35
Future Volume (veh/h)	20	0	20	38	0	39	10	604	27	78	656	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.98		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	21	0	21	39	0	40	10	623	28	80	676	36
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	1	1	1
Cap, veh/h	220	20	88	225	11	86	387	822	691	463	935	788
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.11	0.01	0.43	0.43	0.08	0.50	0.50
Sat Flow, veh/h	616	186	802	666	97	783	1810	1900	1599	1795	1885	1588
Grp Volume(v), veh/h	42	0	0	79	0	0	10	623	28	80	676	36
Grp Sat Flow(s),veh/h/ln	1603	0	0	1546	0	0	1810	1900	1599	1795	1885	1588
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	0.1	9.8	0.4	0.8	10.0	0.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.6	0.0	0.0	0.1	9.8	0.4	0.8	10.0	0.4
Prop In Lane	0.50		0.50	0.49		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	0	0	322	0	0	387	822	691	463	935	788
V/C Ratio(X)	0.13	0.00	0.00	0.25	0.00	0.00	0.03	0.76	0.04	0.17	0.72	0.05
Avail Cap(c_a), veh/h	915	0	0	912	0	0	618	1258	1059	578	1248	1052
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	0.0	14.7	0.0	0.0	6.3	8.5	5.8	6.0	7.0	4.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.4	0.0	0.0	0.0	1.5	0.0	0.2	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.5	0.0	0.0	0.0	2.8	0.1	0.2	2.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.6	0.0	0.0	15.1	0.0	0.0	6.4	10.0	5.8	6.2	8.4	4.6
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h	42			79			661			792		
Approach Delay, s/veh	14.6			15.1			9.7			8.0		
Approach LOS	B			B			A			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	19.8		8.4	5.0	22.1		8.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	23.5		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	2.8	11.8		2.8	2.1	12.0		3.6				
Green Ext Time (p_c), s	0.0	3.4		0.1	0.0	3.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				9.3								
HCM 6th LOS				A								

HCM Signalized Intersection Capacity Analysis

Fircrest Prose














3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W (2026) With-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	10	15	5	5	85	365	15	111	20	10	385	100
Future Volume (vph)	10	15	5	5	85	365	15	111	20	10	385	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	0.95	0.95	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	0.97		1.00	1.00	0.96
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	1.00	1.00	0.85		1.00	1.00	0.85
Flt Protected		0.98	1.00		0.95	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1735	1465		1787	1698	1708	1547		1805	1900	1554
Flt Permitted		0.35	1.00		0.74	0.95	0.96	1.00		0.95	1.00	1.00
Satd. Flow (perm)		612	1465		1394	1698	1708	1547		1805	1900	1554
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	15	5	5	88	376	15	114	21	10	397	103
RTOR Reduction (vph)	0	0	9	0	0	0	0	97	0	0	0	73
Lane Group Flow (vph)	0	25	1	0	88	196	195	17	0	31	397	30
Confl. Peds. (#/hr)	4			4		4		4	4	7		6
Heavy Vehicles (%)	7%	7%	7%	7%	1%	1%	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm		Perm	Split	NA	Perm	Prot	Prot	NA	Perm
Protected Phases		7				8	8		1	1	6	
Permitted Phases	7		7		8			8				6
Actuated Green, G (s)		8.1	8.1		19.1	19.1	19.1	19.1		3.1	38.3	38.3
Effective Green, g (s)		8.1	8.1		19.1	19.1	19.1	19.1		3.1	38.3	38.3
Actuated g/C Ratio		0.06	0.06		0.15	0.15	0.15	0.15		0.02	0.29	0.29
Clearance Time (s)		6.5	6.5		8.0	8.0	8.0	8.0		7.0	8.0	8.0
Vehicle Extension (s)		1.0	1.0		3.0	3.0	3.0	3.0		1.0	3.0	3.0
Lane Grp Cap (vph)		37	90		203	248	249	226		42	556	455
v/s Ratio Prot						c0.12	0.11			0.02	c0.21	
v/s Ratio Perm		c0.04	0.00		0.06			0.01				0.02
v/c Ratio		0.68	0.01		0.43	0.79	0.78	0.07		0.74	0.71	0.07
Uniform Delay, d1		60.0	57.5		50.9	53.9	53.8	48.2		63.4	41.3	33.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		32.1	0.0		1.5	15.6	14.8	0.1		44.0	4.3	0.1
Delay (s)		92.1	57.5		52.4	69.5	68.6	48.3		107.4	45.6	33.4
Level of Service		F	E		D	E	E	D		F	D	C
Approach Delay (s)		82.2					62.6				46.9	
Approach LOS		F					E				D	
Intersection Summary												
HCM 2000 Control Delay			54.4									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			130.7									Sum of lost time (s) 39.0
Intersection Capacity Utilization			95.5%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Fircrest Prose

























3: Regents Blvd W & 67th Ave W/Mildred St W & 24th St W/Regents Blvd W (2026) With-Project PM Peak Hour

								
Movement	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations								
Traffic Volume (vph)	64	497	178	15	10	194	235	10
Future Volume (vph)	64	497	178	15	10	194	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	8.0	8.0			9.5	9.5	
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95			1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00			0.98	1.00	
Frt	1.00	1.00	0.85			1.00	0.85	
Flt Protected	0.95	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	1787	1881	1518			1728	1525	
Flt Permitted	0.95	1.00	1.00			0.97	1.00	
Satd. Flow (perm)	1787	1881	1518			1769	1525	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	66	512	184	15	10	200	242	10
RTOR Reduction (vph)	0	0	135	0	0	0	204	0
Lane Group Flow (vph)	66	512	64	0	0	210	48	0
Confl. Peds. (#/hr)	6		4	7	7	4	6	
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm		Perm	Perm	Perm	
Protected Phases	5	2						
Permitted Phases			2		4	4	4	
Actuated Green, G (s)	6.6	41.8	41.8			19.6	19.6	
Effective Green, g (s)	6.6	41.8	41.8			19.6	19.6	
Actuated g/C Ratio	0.05	0.32	0.32			0.15	0.15	
Clearance Time (s)	7.0	8.0	8.0			9.5	9.5	
Vehicle Extension (s)	1.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	90	601	485			265	228	
v/s Ratio Prot	0.04	c0.27						
v/s Ratio Perm			0.04			c0.12	0.03	
v/c Ratio	0.73	0.85	0.13			0.79	0.21	
Uniform Delay, d1	61.2	41.6	31.6			53.6	48.8	
Progression Factor	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	23.1	11.2	0.1			14.9	0.5	
Delay (s)	84.2	52.8	31.7			68.5	49.2	
Level of Service	F	D	C			E	D	
Approach Delay (s)		50.0				58.0		
Approach LOS		D				E		
Intersection Summary								

HCM 6th Signalized Intersection Summary

4: Bridgeport Way W & 27th St W





















Fircrest Prose
Future (2026) With-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	247	105	234	330	104	145	655	126	96	690	270
Future Volume (veh/h)	240	247	105	234	330	104	145	655	126	96	690	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	247	255	108	241	340	107	149	675	130	99	711	278
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	411	435	500	464	430	453	325	920	177	290	1009	655
Arrive On Green	0.13	0.23	0.23	0.13	0.23	0.23	0.08	0.31	0.31	0.06	0.28	0.28
Sat Flow, veh/h	1795	1885	1589	1795	1885	1589	1795	2986	574	1795	3582	1566
Grp Volume(v), veh/h	247	255	108	241	340	107	149	405	400	99	711	278
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	1885	1589	1795	1791	1769	1795	1791	1566
Q Serve(g_s), s	6.3	7.5	3.1	6.2	10.6	3.2	3.6	12.6	12.6	2.3	11.1	7.8
Cycle Q Clear(g_c), s	6.3	7.5	3.1	6.2	10.6	3.2	3.6	12.6	12.6	2.3	11.1	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	411	435	500	464	430	453	325	552	545	290	1009	655
V/C Ratio(X)	0.60	0.59	0.22	0.52	0.79	0.24	0.46	0.73	0.73	0.34	0.70	0.42
Avail Cap(c_a), veh/h	1210	833	836	1268	833	794	637	1022	1010	765	2044	1108
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	21.3	15.7	15.2	22.6	17.0	15.0	19.2	19.2	14.8	20.0	12.9
Incr Delay (d2), s/veh	0.5	0.5	0.1	0.3	1.3	0.1	0.4	0.7	0.7	0.3	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	3.1	1.0	2.3	4.5	1.1	1.3	4.9	4.8	0.9	4.3	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	21.7	15.8	15.6	23.9	17.1	15.4	20.0	20.0	15.0	20.4	13.1
LnGrp LOS	B	C	B	B	C	B	B	B	B	B	C	B
Approach Vol, veh/h		610			688			954			1088	
Approach Delay, s/veh		18.5			19.9			19.3			18.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	22.0	12.1	18.9	7.6	23.7	12.3	18.7				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	16.0	35.5	36.0	27.5	20.0	35.5	36.0	27.5				
Max Q Clear Time (g_c+I1), s	5.6	13.1	8.2	9.5	4.3	14.6	8.3	12.6				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.0	0.0	3.4	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			18.9									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary

5: 67th Ave W & 35th St SW
























Fircrest Prose
Future (2026) With-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	15	65	5	15	15	65	483	5	20	583	104
Future Volume (veh/h)	72	15	65	5	15	15	65	483	5	20	583	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	76	16	68	5	16	16	68	508	5	21	614	109
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	317	48	120	178	155	135	462	936	792	553	936	792
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	627	265	659	119	857	744	742	1900	1609	901	1900	1609
Grp Volume(v), veh/h	160	0	0	37	0	0	68	508	5	21	614	109
Grp Sat Flow(s),veh/h/ln	1551	0	0	1721	0	0	742	1900	1609	901	1900	1609
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	2.0	4.8	0.0	0.4	6.3	1.0
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.5	0.0	0.0	8.3	4.8	0.0	5.3	6.3	1.0
Prop In Lane	0.47		0.42	0.14		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	485	0	0	469	0	0	462	936	792	553	936	792
V/C Ratio(X)	0.33	0.00	0.00	0.08	0.00	0.00	0.15	0.54	0.01	0.04	0.66	0.14
Avail Cap(c_a), veh/h	1142	0	0	1191	0	0	1106	2587	2190	1336	2587	2190
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	0.0	8.9	0.0	0.0	8.1	4.6	3.4	6.4	5.0	3.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.1	0.0	0.0	0.2	0.6	0.0	0.0	0.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.8	0.0	0.0	9.0	0.0	0.0	8.1	4.8	3.4	6.4	5.3	3.6
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	160			37			581			744		
Approach Delay, s/veh	9.8			9.0			5.1			5.0		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	17.3			8.7			17.3			8.7		
Change Period (Y+Rc), s	4.5			4.0			4.5			4.0		
Max Green Setting (Gmax), s	35.5			16.0			35.5			16.0		
Max Q Clear Time (g_c+I1), s	8.3			2.5			10.3			4.4		
Green Ext Time (p_c), s	3.0			0.1			2.5			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	5.7											
HCM 6th LOS	A											

HCM 6th Signalized Intersection Summary




6: 67th Ave W & 40th St W/Emerson St

Fircrest Prose
Future (2026) With-Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	420	100	195	420	86	60	361	135	89	485	69
Future Volume (veh/h)	66	420	100	195	420	86	60	361	135	89	485	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	69	438	104	203	438	90	62	376	141	93	505	72
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	88	551	465	165	508	104	79	549	464	120	592	500
Arrive On Green	0.05	0.29	0.29	0.09	0.34	0.34	0.04	0.29	0.29	0.07	0.31	0.31
Sat Flow, veh/h	1795	1885	1589	1795	1516	311	1810	1900	1605	1810	1900	1605
Grp Volume(v), veh/h	69	438	104	203	0	528	62	376	141	93	505	72
Grp Sat Flow(s),veh/h/ln	1795	1885	1589	1795	0	1827	1810	1900	1605	1810	1900	1605
Q Serve(g_s), s	2.5	14.0	3.2	6.0	0.0	17.6	2.2	11.5	4.5	3.3	16.3	2.1
Cycle Q Clear(g_c), s	2.5	14.0	3.2	6.0	0.0	17.6	2.2	11.5	4.5	3.3	16.3	2.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	88	551	465	165	0	613	79	549	464	120	592	500
V/C Ratio(X)	0.78	0.79	0.22	1.23	0.00	0.86	0.78	0.69	0.30	0.77	0.85	0.14
Avail Cap(c_a), veh/h	165	1169	985	165	0	1133	582	1033	872	582	1033	872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	21.3	17.5	29.7	0.0	20.3	30.9	20.6	18.1	30.0	21.1	16.2
Incr Delay (d2), s/veh	5.6	1.0	0.1	145.5	0.0	1.4	6.2	0.6	0.1	3.9	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.8	1.1	9.1	0.0	7.1	1.1	4.8	1.6	1.5	6.8	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	22.3	17.6	175.1	0.0	21.7	37.1	21.2	18.2	33.9	22.5	16.3
LnGrp LOS	D	C	B	F	A	C	D	C	B	C	C	B
Approach Vol, veh/h		611			731			579			670	
Approach Delay, s/veh		23.1			64.3			22.2			23.4	
Approach LOS		C			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.3	23.4	7.2	26.4	6.9	24.9	10.0	23.6				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	21.0	35.5	6.0	40.5	21.0	35.5	6.0	40.5				
Max Q Clear Time (g_c+I1), s	5.3	13.5	4.5	19.6	4.2	18.3	8.0	16.0				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.3	0.0	2.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay				34.6								
HCM 6th LOS				C								




HCM 6th TWSC
7: Mildred St W & Northern Site Access

Fircrest Prose
Future (2026) With-Project PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	13	646	22	0	759
Future Vol, veh/h	0	13	646	22	0	759
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	13	666	23	0	782
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	678	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	456	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	456	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.1	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 456		-		
HCM Lane V/C Ratio	-	- 0.029		-		
HCM Control Delay (s)	-	- 13.1		-		
HCM Lane LOS	-	- B		-		
HCM 95th %tile Q(veh)	-	- 0.1		-		

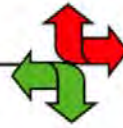
HCM 6th TWSC
8: Mildred St W & Southern Site Access

Fircrest Prose
Future (2026) With-Project PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	12	629	16	0	714
Future Vol, veh/h	0	12	629	16	0	714
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	12	648	16	0	736
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	656	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	469	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	469	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.9	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 469		-		
HCM Lane V/C Ratio	-	- 0.026		-		
HCM Control Delay (s)	-	- 12.9		-		
HCM Lane LOS	-	- B		-		
HCM 95th %tile Q(veh)	-	- 0.1		-		

Appendix D: Signal Warrant Analysis

Manual on Uniform Traffic Control Devices (MUTCD)



- A. Existing AM Peak Hour
(615 Major, 345 Minor)
- B. Future (2026) Without-Project AM
Peak Hour
(700 Major, 370 Minor)

- MUTCD Home
- Site Map
- Knowledge
 - Overview
 - Evolution of the MUTCD
 - Who Uses the MUTCD
 - 2009 Edition with Revisions 1 and 2
 - Color Specifications
 - Amendment Process
 - Experimentations
 - Standard Highway Signs and Markings (SHSM) Book—Design Details
 - FAQs
- Technical Assistance
 - Peer-to-Peer Program
 - Discussion Area
 - MUTCD Team
- Resources
 - 23 CFR 655
 - Official Rulings
 - Interim Approvals
 - Interpretations Issued by FHWA
 - State MUTCDs & TCD Info
 - FHWA Contacts
 - Related Links
 - Federal Register
 - Policy Statements
 - Previous Editions of the MUTCD
- Services
 - Publications
 - Training
 - Events

Knowledge

[Back to Chapter 4C](#)

2009 Edition Part 4 Figure 4C-3. Warrant 3, Peak Hour

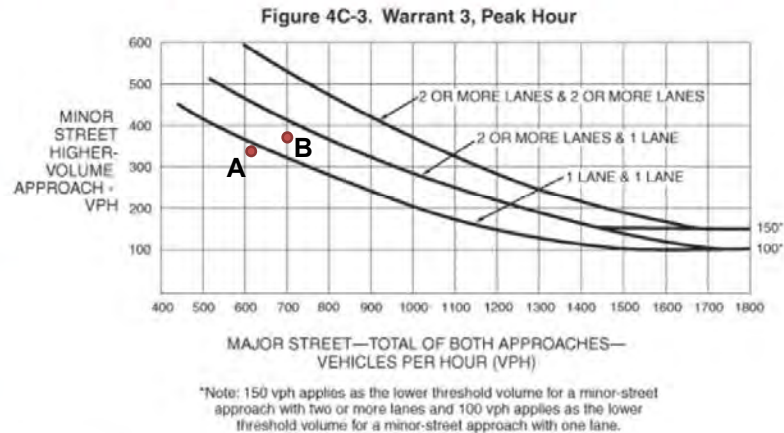


Figure 4C-3. Warrant 3, Peak Hour

This figure shows a graph depicting numerical values for Warrant 3, Peak Hour (see Section 4C.04 for further details).

The table below shows the approximate VPH on the major street and corresponding VPH on the minor street for each

Table for Figure 4C-3

One lane and one lane		Two or more lanes and one lane		Two or more lanes and two or more lanes	
VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)
1800	100	1800	100 or 150*	1800	150
1700	100	1700	100 or 150*	1700	150
1600	100	1600	120 or 150*	1600	170
1500	100	1500	145 or 150*	1500	180
1400	120	1400	155	1400	220
1300	130	1300	190	1300	250
1200	150	1200	220	1200	285
1100	175	1100	250	1100	340
1000	200	1000	285	1000	370
900	245	900	325	900	425
800	285	800	360	800	475
700	325	700	420	700	540
600	360	600	460	600	590
500	420	500	Not available	500	Not available

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix E: Trip Generation

Appendix D: Trip Generation

Fircrest Prose

<u>Proposed Use</u>																		
									Gross Trips			Pass-By ²				Total Net New		
Land Use	Setting	Size	Units	Model	Equation	Rate	Units	Inbound %	Inbound	Outbound	Subtotal	%	In	Out	Total	Inbound	Outbound	Total
Multifamily (Low-Rise) (LU 221)		412 du																
Daily	General Urban/Suburban			Equation (lin)	T= 4.77x-46.46	-	-	50%	960	960	1,920	-	-	-	-	960	960	1,920
AM Peak Hour	General Urban/Suburban			Equation (lin)	T= 0.44x-11.61	-	-	23%	39	131	170	-	-	-	-	39	131	170
PM Peak Hour	General Urban/Suburban			Equation (lin)	T= 0.39x+0.34	-	-	61%	98	63	161	-	-	-	-	98	63	161
Retail (LU 822)		12,000 sf																
Daily	General Urban/Suburban			Rate	-	7.81	per ksf	50%	47	47	94	40%	19	19	38	28	28	56
AM Peak Hour	General Urban/Suburban			Rate	-	2.36	per ksf	60%	17	11	28	40%	6	6	12	11	5	16
PM Peak Hour	General Urban/Suburban			Rate	-	6.59	per ksf	50%	40	39	79	40%	16	16	32	24	23	47
<u>Subtotal</u>																		
Daily									1,007	1,007	2,014		19	19	38	988	988	1,976
AM Peak Hour									56	142	198		6	6	12	50	136	186
PM Peak Hour									138	102	240		16	16	32	122	86	208

<u>Net New Trips</u>																		
Daily																988	988	1976
AM Peak Hour																50	136	186
PM Peak Hour																122	86	208

Notes:

- 1. Trip rates based on Institute of Transportation Engineers' (ITE) *Trip Generation* 11th Edition equation and average trip rate as shown above.
- 2. Passby rates per ITE Trip Generation Manual (11th Edition, 2021).

MEMORANDUM

Date:	December 22, 2022	TG:	1.22165.00
To:	Jeff Boers, City of Fircrest		
From:	Michael Swenson, PE, PTOE		
cc:	David Armsey & Garrett Hodgins, Alliance Residential		
Subject:	Prose Fircrest – Mildred ROW Parallel Parking		

As dictated by the Form-Based Code, parallel parking is required along Mildred Street SW along the project frontage. This memorandum provides an evaluation of that requirement with respect to safety and operations along Mildred Street SW.

Transportation Context/Site Development Plan

Mildred Street is a 3-lane facility with protected bike lanes and turn lanes at major intersections. The posted speed limit is 35 mph. Numerous driveways exist along the east and west sides of the roadway.

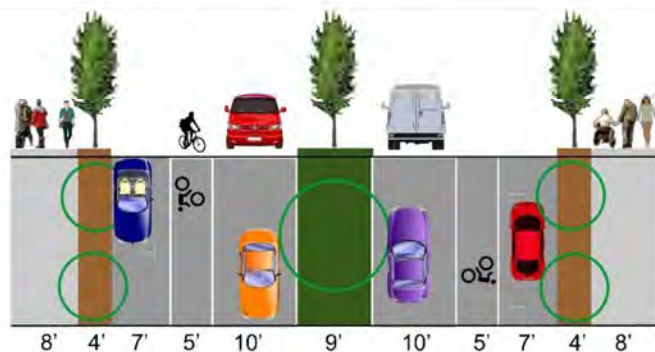
The proposed mixed-use project includes three access points along Mildred Street. The north and south access points would be restricted to right-in/right-out movements based on driveway spacing. The central access (22nd Avenue) point would be full access with a traffic signal installed by the applicant. Northbound and southbound right-turn lanes are currently constructed at this access point and would remain with the signalization.



Form-Based Code Requirements

The City's Form-Based Code requirements outline the need for parallel parking along Mildred Street along the project frontage.

Mildred Street Shopfront			
Assembly		Transportation Way	
Type	Minor arterial with parking	Vehicle Lanes	2 lanes; 1 lane each way
Right-of-way	77 feet	Lane Width	10 feet
Pavement	44 feet	Parking Lanes	Parallel; both sides
Public Frontage		Movement Type	Medium
Curb Type	Vertical curb; 10 feet radius	Median Width	9 feet
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete and pavers	Median Surface	Ground cover
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	5-foot lane
		Transit	Bus



As shown in this section, the requirements along Mildred include a bike lane as well as on-street parking.

Technical Review

As described previously, Mildred Street is a 3-lane facility with bike lanes and a posted speed of 35 mph. There is currently no on-street parking within the vicinity of this project. Along the project frontage, on-street parking could not be accommodated between the southern access point and the central access point due to the northbound right-turn lane and the traffic signal. It is not recommended that the northbound right-turn lane be eliminated.

The section between the central access and the north access is also limited in its capacity due to the traffic signal and the appropriate offset from the north driveway. Given the taper section that is shown coming out of the central access point and offset from the north access point, there is very limited space that would be left to accommodate on-street parking. Assuming a 40ft offset from the driveway, there would only be approximately 80 ft of length to accommodate the on-street parking. When considering entering sight distance triangles for the northern access point of around 240 ft based on the 35 mph posted speed, additional parking restrictions would be needed to accommodate the required sight triangles.

Given these constraints that exist along the project frontage, the net effect would be accommodation of 1 or 2 stalls. Given the rest of the context along the corridor having one or two isolated parallel parking stalls could create safety issues when factoring in driver expectations and travel speeds along the corridor.

Given these constraints, and the limited amount of on-street parking that would be provided, we recommended that the parking be eliminated along the section of the project frontage.

Memo

DATE: 12/21/2022
TO: Garrett Hodgins, David Armesy
FROM: Jordan Martin, UP Engineering
SUBJECT: Prose Site – Access Shift

Garrett/David;

The City of University Place has reviewed the North and South access proposal shifts and are okay with the proposed locations. The City has discussed the requirement for the 'Pork-Chop' median divider to limit the ability of left-hand turn lanes into the proposed development and out onto Mildred Street West. Approval of the shift of the driveways will be dependent on the pronouncement of the 'Pork-Chop' itself, which has not been presented in any design elements to date. To continue with the design process itself, the City approves the locations of the shifts pending the design submittals showing the location and extents of the turn restricting medians.

If you have any further questions please contact Jordan Martin at (253) 370-9776 or at jmartin@cityofup.com.



Sincerely, Jordan Martin P.E.



THE CITY OF FIRCREST

115 RAMSDELL STREET • FIRCREST, WA 98466-6999 • (253) 564-8901 • www.cityoffircrest.net

MITIGATED DETERMINATION OF NONSIGNIFICANCE

Description of Proposal: "Alliance Prose" -- Preliminary Site Plan for a mixed-use development consisting of four buildings containing 391 residential units and 9,968 SF of retail/commercial space, plus publicly accessible open space facilities, on a 9.49-acre site. Access will be provided via Mildred Street West and five new public streets. Buildings A & B are 5-story mixed-use buildings and Buildings C & D are 4-story residential buildings with parking garages at level 0.

Application(s): **Preliminary Site Plan Case # 22-05**

Proponent: Alliance Residential Company

Location of Proposal: 2119 Mildred Street West / Parcel # 0220112005

Lead Agency: City of Fircrest

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C3030(2)(c). This decision was made after review of an environmental checklist on file with the City of Fircrest. This information is available to the public on request.

- ☐ There is no comment period for this DNS.
- ☒ This MDNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below.

Responsible Official: Jayne Westman
Position/Title: Administrative Services Director
Phone: (253) 564-8901
Address: 115 Ramsdell Street, Fircrest WA 98466
Email: permits@cityoffircrest.net

Signature: Jayne Westman

Date: January 26, 2023

Pursuant to RCW 43.21C.075 and the Fircrest Municipal Code, decisions of the Responsible Official may be appealed. Appeals are filed with appropriate fees at the City of Fircrest City Hall, located at 115 Ramsdell Street, Fircrest W. Comments and appeals must be filed no later than 14 days after the issuance of the MDNS (February 13, 2023).

NOTE: The issuance of this Mitigated Determination of Nonsignificance does not constitute project approval. The applicant must comply with all other applicable requirements of the City of Fircrest, the Hearing Examiner, or other reviewing agencies prior to receiving construction permits and final approval.

MITIGATION MEASURES **for** **“Alliance Prose” Preliminary Site Plan**

The probable environmental impacts of this proposal are documented in an environmental checklist, a preliminary site plan application, site development permit application, and other information on file with the City of Fircrest. In addition to the requirements of the reviewing agencies, which are based on existing regulations other than SEPA, the City of Fircrest Responsible Official has determined that other mitigation measures will be necessary to ensure that the proposal will not have a significant impact on the environment. These mitigation measures are required under the Substantive Authority of SEPA.

Water

1. Project design, implementation, construction, and maintenance shall comply with the 2019 Stormwater Management Manual for Western Washington (SWMMWW). The Applicant shall ensure that erosion control measures are in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or storm drains that lead to waters of the state.
2. The Applicant shall provide the City of Fircrest a Construction Stormwater Pollution Prevention Plan (CSWPPP) prepared in accordance with the SWMMWW as part of the site development permit package. Per the SWMMWW, the CSWPPP shall be completed using the Department of Ecology's Construction Stormwater General Permit CSWPPP template.

Environmental Health

3. The Applicant shall prepare a Cleanup Action Plan (CAP) and Contaminated Media Management Plan (CMMP) in accordance with Ecology requirements. The CAP shall describe the methods to remediate the known arsenic soil contamination associated with the Tacoma Smelter Plume and shall be prepared consistent with Ecology's existing guidance (Tacoma Smelter Plume Model Remedies Guidance, Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101). The CMMP shall describe the procedures that will be used to appropriately manage contaminated environmental media that will be encountered during the proposed project construction. The CAP shall be submitted to Ecology for review under its Voluntary Cleanup Program (VCP) prior to the start of construction. However, due to the nature of the remediation plan including using the project as a cap over smelter-plume impacted soils, the work described in the CAP may be performed concurrent with the proposed project construction, rather than completed prior to construction. A report documenting the complete implementation of the remedial action described in the CAP will be submitted to Ecology for review and approval under the VCP (Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101).
4. Prior to demolition of any existing structures, any potentially dangerous or hazardous materials present, such as asbestos, PCB-containing lamp ballasts, fluorescent lamps, and wall thermostats containing mercury, shall be removed and disposed of in accordance with the Department of Ecology's *“Dangerous Waste Rules for Demolition, Construction, and Renovation Wastes”*.

Transportation

5. The Applicant shall install a traffic signal at the proposed intersection of 22nd Avenue/Mildred Street West per the requirements of the City of University Place.
6. Proposed intersections to be located at 21st Avenue/Mildred Street West and at 23rd Avenue/Mildred Street West shall be designed for right-in right-out only access per the Traffic Impact Analysis prepared by TranspoGroup, dated January 2023. Turn-restricting medians shall be installed at these intersections per the requirements of the City of University Place.

City of Fircrest Regulations that Support Issuance of an MDNS for “Alliance Prose” Preliminary Site Plan

FMC 22.58.008 Performance Standards. In addition to the specific requirements within the applicable zoning district chapter, the following performance standards shall apply:

(a) Objectionable Elements. No land or building shall be used or occupied in any manner to create any dangerous, injurious, noxious, or otherwise objectionable element. An objectionable element may include, but is not limited to, excessive noise, vibration, glare, smoke, dust, or odor.

(d) Refuse Collection Containers. For multifamily, mixed-use, or nonresidential structures and uses, all outdoor refuse collection containers (including recycling containers) shall be completely screened from public or private streets and from adjacent property by an opaque screen. Masonry block wall, decorative metal, or other high-quality durable materials shall be used for the screen. Chain link with slats shall not be used. Where space allows, evergreen shrubs and other landscaping shall be installed to soften the visual impact of the screening enclosure. Refuse storage areas that are visible from the upper stories of adjacent structures shall have an opaque or semi-opaque horizontal cover or screen to mitigate unsightly views. The covering structure shall be compatible with the site's architecture. If required by the sanitary sewer service provider, the trash enclosure floor shall be designed to slope to an interior trapped area floor drain and connected to a grease interceptor before plumbing to the sanitary sewer system. The floor shall be designed to contain all interior runoff and not allow outside storm rain or runoff from entering the trash enclosure. The storage of animal or vegetable waste that may attract insects or rodents or otherwise create a potential health hazard is prohibited.

(g) Screening of Mechanical Equipment. All roof-mounted air conditioning or heating equipment, vents or ducts shall not be visible from the ground level of any abutting parcel or any public rights-of-way. This shall be accomplished through the extension of the main structure or roof or screening in a manner that is architecturally integrated with the main structure. The screening may require acoustical treatment to mitigate noise generation.

(i) Erosion and Sedimentation. A temporary erosion and sedimentation control plan detailing measures for controlling erosion and sediment-laden runoff shall be submitted for approval by the director prior to issuance of a clearing and grading permit or other construction permit for a project. Measures shall include provisions to remove depositions of soil and material from streets and to prevent discharge of soil and materials onto adjoining properties or environmentally sensitive areas. The plan shall be implemented by the applicant before and during construction, and the applicant's performance shall be monitored by the city. The plan shall be upgraded as deemed necessary by the director to ensure effective control during construction.

(j) Particulates. During site development activities, construction dust and other particulates shall be controlled through frequent watering and/or other dust control measures approved by the director. Reclaimed water shall be used whenever practicable. Soil that is transported in trucks to and from the construction site shall be covered to the extent practicable to prevent particulates from being released.

(k) Stormwater Management. Stormwater facilities shall be designed in accordance with the standards set forth in Chapter [20.24](#) FMC. Stormwater site plans demonstrating compliance with stormwater management standards shall be submitted for approval by the director and city engineer prior to issuance of site development permits.

(l) Contaminants. During site development activities, all releases of oils, hydraulic fluids, fuels, other petroleum products, paints, solvents, and other deleterious materials shall be contained and removed in a manner that will prevent their discharge to waters and soils of the state. The cleanup of spills shall take precedence over other work on the site.

22.58.018 Outdoor lighting.

(b) General Requirements.

(4) Wherever practicable, lighting installations shall include timers, dimmers, and/or sensors to reduce overall energy consumption and eliminate unneeded lighting.

(c) Parking Lot Lighting. Parking lot lighting shall be designed to provide the minimum lighting necessary to ensure adequate vision and comfort in parking areas, and to not cause glare or direct illumination onto adjacent properties or streets.

(1) All lighting fixtures serving parking lots shall be cut-off fixtures as defined by the Illuminating Engineer Society of North America (IESNA).

(2) Alternatives. The design for an area may suggest the use of parking lot lighting fixtures of a particular “period” or architectural style, as either alternatives or supplements to the lighting described above.

(A) If such fixtures are not “cut-off” fixtures as defined by IESNA, the maximum initial lumens generated by each fixture shall not exceed 2,000 (equivalent to a 150-watt incandescent bulb).

(B) Mounting heights of such alternative fixtures shall not exceed 15 feet.

22.58.025 Electric vehicle charging stations.

(c) Where electric vehicle charging stations are provided in parking lots or parking garages, accessible electric vehicle charging stations shall be provided as follows:

(1) Accessible electric vehicle charging stations shall be provided in the ratios shown on the following table:

Number of EV Charging Stations	Minimum Accessible EV Charging Stations
1 – 50	1
51 – 100	2
101 – 150	3

(2) Accessible electric vehicle charging stations should be located in close proximity to the building or facility entrance and shall be connected to a barrier-free accessible route of travel. It is not necessary to designate the accessible electric vehicle charging station exclusively for the use of disabled persons.

Chapter 20.24 STORMWATER MANAGEMENT

20.24.030 Adoption of standard.

(a) All new development, redevelopment, and construction site activities will be subject to the thresholds and minimum requirements published in Appendix 1 of the current Western Washington Phase II municipal stormwater permit.

(b) The city adopts as its standard for use in regulating the stormwater element for development, redevelopment, and construction site activities within the city the document entitled “Stormwater Management Manual for Western Washington.” The city shall incorporate into this manual, upon their adoption by the Washington State Department of Ecology by due process, amendments and revisions to the document as they become effective. *(Note: The 2019 SWMMWW will apply to the Prose project.)*

<p style="text-align: center;">Technical Reports Prepared for “Alliance Prose” Preliminary Site Plan</p>

1. Phase I Environmental Site Assessment, PES Environmental, Inc. May 31, 2022
2. Drainage Report, Davido Consulting Group, Inc., December 2022
3. Geotechnical Engineering Report (draft), Pangeo, Inc., July 19, 2022
4. Traffic Impact Analysis, Transpogroup, January 2023

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [\[HELP\]](#)

1. Name of proposed project, if applicable:
[Alliance – Fircrest](#)
2. Name of applicant:
[Jon Graves](#)
3. Address and phone number of applicant and contact person:
[Jon Graves | 253-272-4214](#)
[3110 Ruston Way Ste E, Tacoma, WA 98402](#)
4. Date checklist prepared:
[6/13/2022](#)
5. Agency requesting checklist:
[City of Fircrest](#)
6. Proposed timing or schedule (including phasing, if applicable):
[Phasing proposed for construction of first two buildings in front, then the other two toward the back.](#)
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
[No](#)
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
 - [Geotechnical Recommendations – Pan Geo \(Jon Rehkopf\)](#)
 - [Phase I Environmental Site Assessment PES Environmental, Inc. \(Dan Balbiani\)](#)
 - [Cleanup Action Plan PES Environmental, Inc. \(Dan Balbiani\)](#)
9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
[None currently.](#)

10. List any government approvals or permits that will be needed for your proposal, if known.

Commercial Building Permit or equivalent (including associated site development and utility permits)

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Project site is approx. 413,384ft sq (9.49 Acres). Proposed is a mixed use multifamily complex of approx. 389 units in 4 buildings. Through block connections are planned running in opposing directions. Parks, recreation, and open space are included. Surface and structured parking are proposed.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

2119 Mildred Street W, Fircrest, WA 98466.

Legal Description: Section 11 Township 20 Range 02 Quarter 22 : SW OF NW OF NW SUBJ TO CY OF TAC EASE LESS R/W FOR RD

B. Environmental Elements [\[HELP\]](#)

1. Earth [\[help\]](#)

a. General description of the site: Generally flat or rolling, only has a small area of steep slopes

(circle one): Flat, rolling, hilly, steep slopes mountainous, other _____

- b. What is the steepest slope on the site (approximate percent slope)?
Steepest slope approximately 56%
- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.
Approximately 5-10 feet of fill on the western half of the site over dense glacial till. Approximately 25-30 feet of fill on the eastern half of the site over dense glacial till. Fill consists of gravel with sand, silty sand, etc.
- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.
There are no surface indications of unstable soils.
- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.
The entire site (approx. 10 acres) will be disturbed and is proposed to be a multi-family development. The approximate cut and fill quantities will be equal (approx. 9,000 CY) depending if on-site soils can be re-used for fill. If on-site soils cannot be used for fill, import will be required.
- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Erosion will occur as a result of clearing/construction unless appropriate erosion control measures are put in place. These measures included but are not limited to: stabilized construction entrance, wheel wash, filter fabric fence, swales with checkdams, temporary sediment trap. These erosion control measures are temporary and will ensure that construction stormwater runoff from clearing of existing vegetation and infrastructure as well as proposed construction will be intercepted and mitigated before leaving the site.
- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
Approximately 90% of the site will be covered with impervious surfaces
- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Stock piling, interceptor swales, sediment trap, construction entrance, CB inserts, filter fabric fence, etc.

2. **Air** [\[help\]](#)

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Emissions associated with use of combustion engines anticipated during construction (construction equipment/vehicles). Upon completion, the project will not contribute any unusual or uncommon emissions into the air

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Trucks and equipment will be inspected to ensure any emission control devices installed by the manufacturer are properly functional. All construction machinery will be in good mechanical condition to minimize exhaust fumes. Watering the ground as needed during construction will control dust particles. Vehicles that are not being used in construction activities will be shut off.

3. **Water** [\[help\]](#)

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

There are no surface water bodies within the immediate vicinity of the site.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Surface water will not be withdrawn or diverted from the site.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No

b. Ground Water: [\[help\]](#)

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Groundwater will not be withdrawn from the site for any purpose.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, thenumber of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Sewage will not discharge into the ground. Sewage will discharge to the city's piped sanitary sewer system.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Sources of stormwater runoff include roof, paved, and landscaped areas. Stormwater runoff from the site will be collected and conveyed to detention systems sized using a stormwater model.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

No

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Proposed measures to mitigate stormwater runoff will adhere to the 2014 Stormwater Management Manual for Western Washington (DOE Manual). Flow control is required for this project and must match pre-developed durations defined in the DOE Manual. The geotechnical engineer recommends that infiltration not be used due to poor soils. Therefore, detention systems will be used to mitigate stormwater runoff.

4. **Plants** [\[help\]](#)

a. Check the types of vegetation found on the site:

☒ deciduous tree: alder, maple, aspen, other

☒ evergreen tree: fir, cedar, pine, other

☒ shrubs

☒ grass

☐ pasture

☐ crop or grain

☐ Orchards, vineyards or other permanent crops.

☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

☐ water plants: water lily, eelgrass, milfoil, other

____ other types of vegetation

- b. What kind and amount of vegetation will be removed or altered?
Very few trees exist on site. Most trees have already been cleared. Vegetation is minimal. Minor vegetation which remains will require removal.
- c. List threatened and endangered species known to be on or near the site.
None known on or near site.
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
Proposed landscaping will meet or exceed Fircrest Municipal Code requirements.
- e. List all noxious weeds and invasive species known to be on or near the site.
None known on or near site.

5. *Animals* [\[help\]](#)

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other: ____x____ (pigeon, crow)

mammals: deer, bear, elk, beaver, other: ____x____ (rodent, raccoon, possum)

fish: bass, salmon, trout, herring, shellfish, other _____

- b. List any threatened and endangered species known to be on or near the site.
None known on or near site.
- c. Is the site part of a migration route? If so, explain.
Unknown - migratory bird flight path not available on publicly available GIS sources.

- d. Proposed measures to preserve or enhance wildlife, if any:

None proposed.

- e. List any invasive animal species known to be on or near the site.

None known on or near site.

6. Energy and Natural Resources [\[help\]](#)

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be used for lighting, heating, and hot water.

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Project will not affect the potential use of solar energy by adjacent properties.

- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Insulated building heating spaces, insulated glass, set-back thermostats, typical measures used in contemporary buildings of a similar nature and in compliance with the Washington State Energy Code.

7. Environmental Health [\[help\]](#)

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

The completed project would have no known environmental health hazards that could occur as a result of this proposal.

Previous environmental investigations conducted at the property have indicated contaminants (petroleum hydrocarbons and limited volatile organic compound [VOCs]) are present in soil beneath an area adjacent to the southeast corner of the existing building on the property. In addition the investigations indicate the presence of arsenic in the fill soil place over the eastern portion of the Property.

Two underground concrete vaults or underground storage associated with previous operations at the site are located east of the existing building.

1) Describe any known or possible contamination at the site from present or past uses.

The property was formerly operated for the design and manufacture of marine automatic pilots and other marine navigational aids (e.g., compasses) from approximately 1957 to 2000. As indicated previously, between the years 1972 and 2000, soil fill was deposited throughout the central and eastern portions of the site. During the course of operations at the property, there have been documented releases of certain VOCs, primarily perchloroethene (PCE) to the ground east of the existing building. In addition, a release of paraffin oil from the north adjoining property affected soil near the northern end of the property. Cleanup actions were performed in 1993, 2000, and 2012 to remove and properly dispose of all of the contaminated soil above the applicable cleanup levels in the affected areas. Low concentrations (below cleanup levels) of PCE and paraffin oil may be present in these areas. Perched groundwater in the vicinity and down gradient of these areas did not contain contamination (PCE and/or paraffin oil) at concentrations exceeding cleanup levels. The results of these cleanup actions were reported to the Washington Department of Ecology (Ecology) under its Voluntary Cleanup Program (VCP). Ecology issued an opinion letter in July 2015, indicating that the site meets the cleanup standards for PCE and petroleum hydrocarbons in soil.

Previous investigations of the fill material present in the central and eastern portions of the property indicated the presence of arsenic at concentrations exceeding the CUL predominantly at depths of 15 feet or greater and widely dispersed. The property is located in the Tacoma Smelter Plume (Asarco Area Wide Contamination Plume) and the presence of arsenic at the property is attributed to the historic operation of the Asarco Smelter Plant. The investigation also found arsenic in perched groundwater in 2 of the 6 wells tested at concentrations slightly exceeding the cleanup level. In Ecology's July 2015 opinion letter, Ecology stated that the source of the arsenic is likely attributed to the former operation of the Tacoma Asarco Smelter Plant and the fill material that was imported to the subject property as part of historical grading activities.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Soil containing concentrations of PCE may be present in soil near the southeast corner of the existing building and petroleum hydrocarbons may be present along the central portion of the northern property boundary. Based on the results of the previous cleanup action, the PCE and petroleum hydrocarbons are expected to be below applicable cleanup levels. Arsenic is present in the fill soil located within the central and eastern portions of the property. Arsenic is present in perched groundwater within a limited area in the eastern portion of the property.

The current development design includes approximately 9,000 CYDs of cut/fill. If existing soil is not suitable for use as fill on the property, soil removed from the property will require appropriate screening, segregation, and management to insure its proper disposal.

There are two concrete vaults located east of the existing building that were previously used in the manufacturing operations which will be removed during construction

Based on its date of construction, the existing building may contain hazardous building material (e.g., asbestos or lead based paint). Prior to construction the building will be assessed for the presence of hazardous building materials and appropriately abated as needed.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

During the construction phase of the project, chemicals and fuel associated with construction equipment will be present and properly managed. No hazardous chemicals are anticipated in association with the completed project.

- 4) Describe special emergency services that might be required.

No special emergency services will be required. The project will rely on police, emergency medical and fire protection services already available in the area.

5) Proposed measures to reduce or control environmental health hazards, if any:

Ecology has been contacted regarding the presence of arsenic in soil and perched groundwater at the site resulting from impacts due to the Asarco Smelter Plume. A Cleanup Action Plan is being prepared to address the arsenic consistent with the requirements of Ecology's 2019 guidance document for cleanups conducted within the Tacoma Smelter plume (*Tacoma Smelter Plume Model Remedies Guidance, Sampling and Cleanup of Arsenic and Lead Contaminated Soils. Publication Number 19-09-101*). Consistent with Ecology's guidance, the Cleanup Action Plan will utilize the impervious surfaces created by the proposed project (approximately 90 percent of the property) to cap and isolate soil containing arsenic at concentrations exceeding cleanup levels. The Cleanup Action Plan will address impacts to groundwater through an environmental covenant prohibiting the future use of groundwater at the property. The Cleanup Action Plan will be submitted to Ecology for review and approval under the VCP.

In addition to the measures described above, the following measures will be implemented to control potential environmental health hazards;

- A contaminated media management plan (CMMP) will be prepared that describes the actions that will be taken during construction of the proposed development in response to the known soil contamination present at the property. The CMMP will include the following:
 - A requirement that the earthwork contractor performing excavation activities have a health and safety plan in place that describes worker protection methods if contaminated soils encountered;
 - Procedures to properly decommission the existing concrete vaults and remove them from the property; and
 - Procedures to manage contaminated soil when it is encountered during construction.
- Preparation of a Construction Stormwater Pollution Prevention

Plan.

At the conclusion of the implementation of the approved Cleanup Action Plan, removal and disposal of contaminated soil (if any), and removal of the concrete vaults, a report documenting the work completed will be prepared and submitted to the Department of Ecology consistent with the applicable regulations and guidance.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Noise from adjacent residential uses; minimal street noise from Mildred St.

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term noise associated with heavy machinery anticipated to last for duration of construction; post construction long term noise would be commensurate with residential use.

- 3) Proposed measures to reduce or control noise impacts, if any:

BMP's (Best Management Practices) will be implemented to minimize noise levels to the greatest extent possible during construction.

8. Land and Shoreline Use [\[help\]](#)

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Site is current undeveloped. Adjacent properties to north, south, and west are commercial. Zoning east of property is residential.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No

c. Describe any structures on the site.

Structure remaining from industrial use fronts ROW. Two small sheds are located centrally.

d. Will any structures be demolished? If so, what?

All structures will require demolition.

e. What is the current zoning classification of the site?

Current zoning is split Mix Use Urban/Mix Use Neighborhood (MUU/MUN).

f. What is the current comprehensive plan designation of the site?

Commercial Mix Use

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable; no shoreline

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

No

i. Approximately how many people would reside or work in the completed project?

Presuming total occupancy is reached, proposed would house at least 389 residents (or more assuming some units will house multiple occupants).

j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

None

- L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Preapplication meeting with city staff; design and site plan review; periodic internal review of Fircrest Municipal Code; frequent interface with City of Fircrest reviewers.

- m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

NA

9. *Housing* [\[help\]](#)

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

The 389 units proposed are of various sizes and intended to serve a diverse range of incomes.

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None

- c. Proposed measures to reduce or control housing impacts, if any:

No housing impacts anticipated

10. *Aesthetics* [\[help\]](#)

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Tallest building proposed is 65'. Exterior materials are primarily fiber cement.

- b. What views in the immediate vicinity would be altered or obstructed?

Mt Rainier might be visible from the higher units and would potentially obstruct views from structures of a similar height or smaller directly behind the development.

- b. Proposed measures to reduce or control aesthetic impacts, if any:

Project is designed to improve area aesthetics in compliance with Fircrest Municipal Code design guidelines.

11. Light and Glare [\[help\]](#)

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
Early morning glare (sunrise) on east facing windows and evening (sunset) glare on west facing windows is expected to be minimal. Times will vary due to seasonal shift.
- b. Could light or glare from the finished project be a safety hazard or interfere with views?
No
- c. What existing off-site sources of light or glare may affect your proposal?
None
- d. Proposed measures to reduce or control light and glare impacts, if any:
None proposed

12. Recreation [\[help\]](#)

- a. What designated and informal recreational opportunities are in the immediate vicinity?
Property is located near shopping, restaurants, and other retail/commercial spaces. Project will add public recreational/commercial spaces to area.
- b. Would the proposed project displace any existing recreational uses? If so, describe.
No
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
Proposed parks, recreation, and open space will add recreational opportunities for residents, guests, and the community in general.

13. Historic and cultural preservation [\[help\]](#)

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

No

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

No

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

None

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

NA

14. Transportation [\[help\]](#)

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

Site is currently served by Mildred with extensions proposed east/west connection

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

Site is currently about 800' from Pierce Transit Connection Center. Busses to nearly every part of the city can be caught at this location. In addition, route 53 stops within a few feet of proposed development site.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?
Currently there are 7 stalls. Total proposed is 511 with 64 spots dedicated in ROW to City.
- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
A Transportation Impact Analysis is being prepared and will be submitted/reviewed by City of University Place and the City of Fircrest. Any transportation improvements required to off-set the impacts per agency criteria will be identified in that report.
- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No
- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?
The project is expected to generation approximately 1,854 weekday daily trips, with 174 occurring during the AM peak hour and 189 occurring during the PM peak hour. The trip generation projections are based on the proposed development plan and trip rates identified in the ITE Trip Generation manual, 11th Edition (2021).
- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No
- h. Proposed measures to reduce or control transportation impacts, if any:
A Transportation Impact Analysis is being prepared and will be submitted/reviewed by City of University Place and the City of Fircrest. Any transportation improvements required to off-set the impacts per agency criteria will be identified in that report.

15. Public Services [\[help\]](#)

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

Any necessary increase in public services will be determined by the City of Fircrest.

- b. Proposed measures to reduce or control direct impacts on public services, if any.

The project design intends to follow sustainable practices relative to the integration of local endurable products and high efficiency and performing systems. The campus design includes pedestrian and bicycle pathways and the provision of electric car parking and charging stations to promote reducing dependency on fossil fuels. The project will meet or exceed the current Washington State Energy Code. The storm drainage system proposed will reduce the dependence on the public storm system currently connecting to 19th by integrating an onsite detention system that reduces outflow compared to the current site storm system. The project will include fair contribution to impact fees to further support public services.

16. Utilities [\[help\]](#)

- a. Circle utilities currently available at the site:

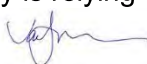
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Proposed utilities include water, sanitary sewer, and electricity. Utility connections on adjacent properties will be required for sanitary sewer and water. On-site construction activities will include laying pipe/duct banks for utility installation. City of Fircrest to provide water. Electricity provided by TPU.

C. Signature [\[HELP\]](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:  _____

Name of signee _____ Jon Graves _____

Position and Agency/Organization _____ Principal Architect/G+A _____

Date Submitted: _____ 6-13-2022 _____

D. Supplemental sheet for nonproject actions [\[HELP\]](#)

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.



**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

Southwest Region Office
PO Box 47775, Olympia, WA 98504-7775 • 360-407-6300

February 13, 2023

Jayne Westman, Administrative Services Director
City of Fircrest
115 Ramsdell Street
Fircrest, WA 98466

Dear Jayne Westman:

Thank you for the opportunity to comment on the mitigated determination of nonsignificance for the Prose Fircrest Project (22-05) located at 2119 Mildred Street West as proposed by Alliance Residential Company. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

SOLID WASTE MANAGEMENT: Derek Rockett (360) 407-6287

The applicant proposes to demolish an existing structure(s). In addition to any required asbestos abatement procedures, the applicant should ensure that any other potentially dangerous or hazardous materials present are removed prior to demolition. It is important that these materials and wastes are removed and appropriately managed prior to demolition. It is equally important that demolition debris is also safely managed, especially if it contains painted wood or concrete, treated wood, or other possibly dangerous materials. Please review the "Dangerous Waste Rules for Demolition, Construction, and Renovation Wastes," on Ecology's website at: [Construction & Demolition Guidance](#). All removed debris resulting from this project must be disposed of at an approved site. All grading and filling of land must utilize only clean fill. All other materials may be considered solid waste and permit approval may be required from your local jurisdictional health department prior to filling. Contact the local jurisdictional health department for proper management of these materials.

TOXICS CLEANUP: Eva Barber (360) 999-9593

The applicant contacted Ecology discussing cleanup options and joining the Voluntary Cleanup Program to address contamination associated with the Tacoma Smelter Plume.

**WATER QUALITY/WATERSHED RESOURCES UNIT:
Joseph McCord (360) 791-5017**

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
 - a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
 - a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
 - b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted. For additional information on contaminated construction sites, please contact Evan Wood at evan.wood@ecy.wa.gov, or by phone at (360) 706-4599.

Additionally, sites that discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorous, or to waterbodies covered by a TMDL may need to meet additional sampling and record keeping requirements. See condition S8 of the Construction Stormwater General Permit for a description of these requirements. To see if your site discharges to a TMDL or 303(d)-listed waterbody, use Ecology's Water Quality Atlas at: <https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx>.

The applicant may apply online or obtain an application from Ecology's website at: <http://www.ecy.wa.gov/programs/wq/stormwater/construction/-Application>. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Jayne Westman
February 13, 2023
Page 3

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(GMP:202300394)

cc: Derek Rockett, SWM
Eva Barber, TCP
Joseph McCord, WQ

CITY OF FIRCREST

Form-Based Code

Adopted by Reference in FMC Chapter 22.57 on December 8, 2020

Amended Code Effective November 8, 2022



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Introduction

Fircrest's Form-Based Code (FBC) is an alternative to conventional land use (zoning) regulations with an increased focus on the design of the public realm – the public space defined by the exterior of buildings and the surrounding streets and open space.

A key difference between a conventional use-based code and FBC is that an FBC does not result in zoning approvals based on units per acre or floor area ratio (FAR). Conventional density controls have not produced diversity or variety in living and working arrangements in a contextual manner and instead have resulted in uniformity of designs within zones. In contrast, an FBC deals with building types that differ in design and intensities of development.

BUILDING TYPES

Building types is a classification system resulting from the process of creating, selecting, and transforming a few basic character-defining features of a building that when repeated, produce predictable results. Building types provide a much more diverse stock of buildings that accommodate a higher intensity of development in a contextual manner that produces great places.



Human scaled building types, when consistently aligned with similar or compatible building types, create a harmonious and a pedestrian-friendly streetscape. Diverse building types can also provide a variety of local affordable housing options for all incomes and ages.

TRANSECT

A Transect is the operating system for Fircrest's Form-Based Code. A Transect is an organizing framework for coding all elements of the built environment on a scale from rural to urban.

Differences in design and ecology vary – based on character and intensity of the place – and progress through a sequence of habitats from rural to urban core.

The central objective of FBC is to expand – and not limit – choices. Instead of one-size-fits-all regulation, the use of transect zones enables a range of development characters and intensity in a higher contextual manner.

T-1	Natural that includes wilderness
T-2	Rural that includes farmland or open space
T-3	Suburban that is primarily single-family residential neighborhoods
T-4	Suburban neighborhood but with a mixture of housing types and slightly greater mix of uses
T-5	Urban with higher density housing types and mixed-use developments
T-6	Urban center or core with the highest density housing types and mixed-use developments serving a surrounding community or region

Fircrest's FBC includes:

T-4	Mixed-Use Neighborhood	MUN
T-5	Mixed-Use Urban	MUU

I.1 PURPOSE AND APPLICATION

I.1A Intent of the FBC

The FBC implements the Comprehensive Plan's goals and policies relating to the 19th and Mildred area and other specified mixed-use neighborhoods. The prescriptive standards in the FBC ensure that new development exhibits the highest standards of urban design, architecture, and landscaping at the scale of neighborhood, block, lot, and building according to the Transect.

The Comprehensive Plan's vision for these areas is compact, walkable, and mixed-use. The urban form is intended to be inviting, comfortable, safe, and ecologically resilient. The FBC allows a mix of uses within a walkable environment so that driving is an option, not a necessity, to meet daily needs.

I.1B Relationship to Comprehensive Plan

The FBC is consistent with the Comprehensive Plan currently in effect, adopted pursuant to Chapter 23.04 FMC. The FBC implements the community-supported vision for the 19th and Mildred area and other mixed-use neighborhoods.

I.1C Relationship to Municipal Code

The FBC is adopted pursuant to Chapter 22.57 FMC and referred to as the "Fircrest Form-Based Code." The FBC provides the primary requirements for development and land use activity within the boundaries identified in the Regulating Plan in Figure RP.1 and other specified mixed-use neighborhoods. FBC standards augment and/or supersede existing regulations in Title 22 Land Development consistent with FMC 22.57.002.

Property, including structures, land uses, and physical improvements such as signs, landscaping, and lighting within the regulating plan boundaries of the FBC shall comply with all applicable requirements of the FBC and regulations contained in Title 22 Land Development.

I.2A Administration

The FBC shall be administered by the Director and the Fircrest Planning and Building Department.

Zoning and Regulating Plan

RP.1 ZONING DISTRICTS AND OVERLAYS

RP.1A Purpose and Establishment of Zoning Districts and Overlays

This section establishes the zoning districts and overlays to implement the Form-Based Code. Property and rights-of-way subject to the Form-Based Code shall be divided into the following zones and overlays, which shall be applied to all property as shown on Figure RP.1 or on the Fircrest Zoning Map.

RP.1B Zoning Districts and Overlays

The following zoning districts and overlay are established and applied to property and rights-of-way within the boundaries of the Form-Based Code. Refer to Table RP.1 for the intent and descriptions of the zoning districts and section RP.2A.2 for descriptions of the overlays:

- Mixed-Use Urban Zone (MUU)
- Mixed-Use Neighborhood Zone (MUN)
- Shopfront Overlay

RP.2 REGULATING PLAN

RP.2A Purpose and Establishment of Regulating Plan

This section establishes the regulating plan, Figure RP.1, as the map that identifies and implements the various intentions and principles of the vision for the area. Table RP.1 defines the zoning districts, overlays and standards for site development, design and land use through the following:

- 1) Zoning Districts. Each zoning district is allocated standards in the following areas:
 - Building Placement
 - Allowed Building Types
 - Allowed Frontage Types
 - Building Height and Size
 - Allowed Encroachments into Required Yards
 - Parking Placement and Site Access
 - Required Parking
 - Allowed Land Uses
- 2) Shopfront Frontage Overlay. This overlay requires buildings to have shopfront frontage and a minimum floor-to-ceiling height. This requirement is to accommodate ground floor live-work, commercial, retail or other such non-residential activity on streets where the vision expects active, pedestrian-oriented streetscapes.
- 3) Regulating Plan Diagram. Each zoning district and overlay established by the Form-Based Code is identified on Figure RP.1 to show the boundaries of each zoning district, overlay, and the parcels within each boundary. Figure RP.1 is established as the zoning atlas for all property within the Form-Based Code boundaries.

Figure RP.1 Regulating Plan



Table RP.1 Summary of Zoning District

Zoning District Intent	Mixed-Use Urban	Mixed-Use Neighborhood
Desired Form	 <p>New buildings are block scale, up to seven stories above grade and 80 feet in height, located close to the front property line, with active ground floor activities. The building mass steps down to 45 feet when located adjacent to an MUN neighborhood. Building mass along the street edge should be articulated with balconies and terraces and the building base should include human</p>	 <p>New buildings are primarily house and small apartment scale, up to four stories above grade and 50 feet in height, located close to front property line, with active frontages along ground level. Building mass steps down to 35 feet when adjacent to residential districts.</p>
Streetscape and Public Realm Improvements	<p>Active streetscape providing continuity with adjacent areas. Commercial frontages such as shopfronts, arcades, or galleries; wide sidewalks; and street trees support interesting, safe, and comfortable walking environment.</p>	<p>Range of tree-lined walkable streets will continue adjacent street pattern while also providing opportunities for future development to extend the street grid. Commercial frontages such as shopfronts, arcades, or galleries; wide sidewalks; and street trees encourage interesting, safe, and comfortable walking environment, while yards, porches, stoop, and forecourt may extend privacy to residential frontages.</p>
Parking	<p>Parking consists of on-site spaces located either behind buildings or in above- or underground parking structure. On-street public parking spaces are provided. Parking ratios are lower due to available transit and shared parking options.</p>	<p>Parking consists of on-site spaces located either behind buildings or in above- or underground parking structures. On-street public parking spaces are provided.</p>
General Use	<p>Buildings are occupied with ground floor retail, office, service, and other active uses along commercially viable corridors. Residential uses on the ground floor should provide appropriate frontage that ensures privacy to the units. Units should be accessed directly from the street. Upper floors and the floor area behind shopfronts are flexible for a wide variety of office, lodging, and housing uses.</p>	<p>Buildings may be occupied with ground floor retail, office, service and other active uses. Residential uses on the ground floor should provide appropriate frontage that ensures privacy to the units. Units should be accessed directly from the street. Upper floors and the floor area behind shopfronts are flexible for a wide variety of office, lodging, and housing uses.</p>

See Chapter 22.48 FMC and Chapter 22.50 FMC for more detailed information on uses and development standards.

Development Standards by Zone

DS.1 DEVELOPMENT STANDARDS

Development standards are aimed at generating the individual buildings on a block that collectively with other buildings will shape the form of the public realm.

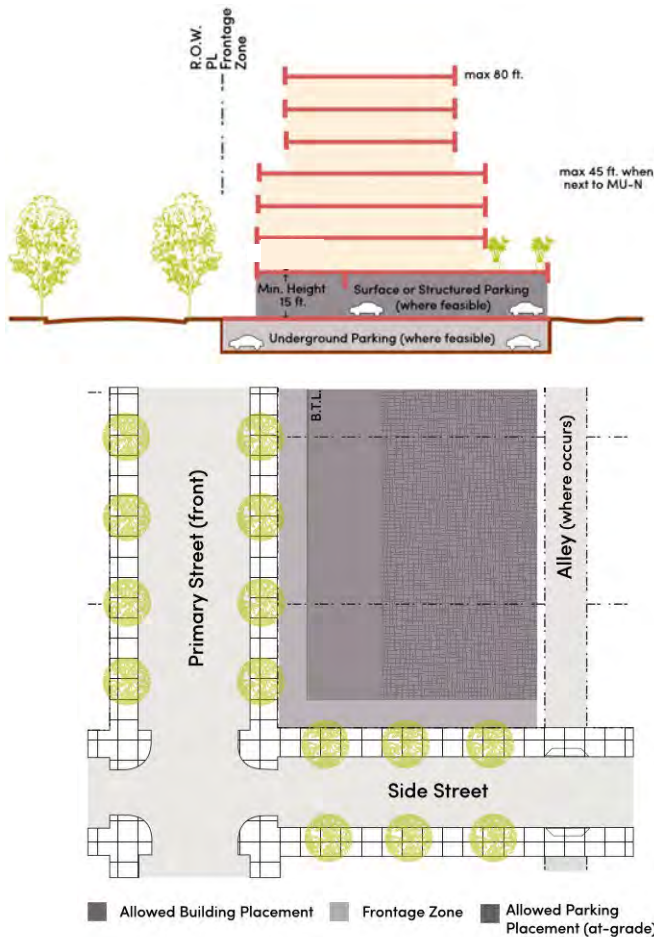
The standards shape and situate buildings based on their physical characteristics and compatibility with the context. The successful fit of a new project into an existing context depends on how it relates to neighboring buildings to its side and rear in terms of setbacks, height, massing, scale, and arrangement of shared and private open spaces.

For each zone identified on the regulating plan, setback, height, lot size, and parking requirement associated with permitted building and frontage types are called out. These standards come together to define the distinctive character and intensity of a particular zone.

Architectural features such as porches, stoops, bay windows, balconies and cornices are allowed to project into the setback area. Balconies, cornices, awnings, and stands selling magazines, fruits, vegetables, or flowers may project into the public right-of-way, subject to encroachment permit. Such encroachments animate street life. Encroachments should not affect pedestrian movement and maintenance of utilities.

The basis of the standards is the synoptic survey and community vision to create a specific place.

MIXED-USE URBAN (MUU)



Building Placement

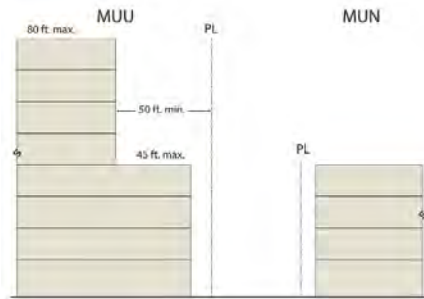
Setback	Building setback from PL		
	Frontage Zone	Side/Rear	
	Min. (ft.)	Max. (ft.)	Min. (ft.)
Primary street	0	10	—
Side street	0	10	—
Rear yard with alley	—	—	5
Rear yard without alley	—	—	15

Allowed Frontages

- Arcade
- Gallery
- Shopfront
- Lightcourt
- Forecourt
- Stoop

Allowed Building Types and Height

Building Types	Maximum Height
Flex Building	80
Liner	50
Hybrid Court	80
Court	80
Live-Work	35
Row House	35



Buildings in MUU cannot exceed 45-foot height for a depth of 50 feet from the property line when the lot is located adjacent to MUN zone.

Interior Ceiling Height

Shopfront Overlay Ground Floor	15-foot minimum
Other floors	NA

Parking

See parking standards in FMC 22.60.003.

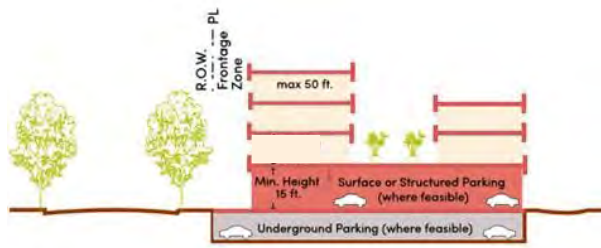
Parking garages should be designed to have leveled floors that can facilitate redevelopment for another use such as commercial when parking demand lessens.

Encroachments

Architectural features and signs may encroach into the required setbacks subject to the following requirements:

	Encroachment			
	Horizontal			Vertical
	Front/Side Street	Rear	Side	
Arcade, gallery, awning	6' max.	Min. 5' from PL	Not allowed	Min. 8' clear
Balcony	4' max.		Min. 5' from PL	
Bay Window	4' max. on upper floors			
Eave	4' max.	Min. 3' from PL	Min. 3' from PL	

MIXED-USE NEIGHBORHOOD (MUN)



Building Placement

Setback	Building setback from PL		
	Frontage Zone	Side/Rear	
	Min. (ft.)	Max. (ft.)	Min. (ft.)
Primary street	0	10	—
Side street	0	10	—
Rear yard with alley	—	—	5
Rear yard without alley	—	—	15

Allowed Frontages

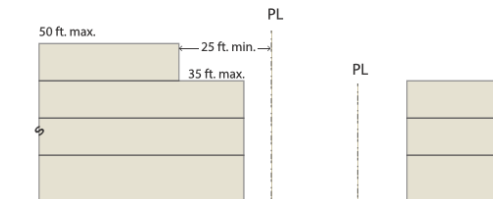
- Arcade
- Lightcourt
- Dooryard
- Gallery
- Forecourt
- Porch & Fence
- Shopfront
- Stoop
- Front Yard

Allowed Building Types and Height

Building Types	Maximum Height
Flex Building	50
Court	50
Live-Work	35
Row House	35
Rosewalk or Bungalow	See FMC 22.58.027, cottage housing
Multiplex	35

MUN

Residential Districts



Buildings in the MUN zone cannot exceed 35-foot height for a depth of 25 feet from the property line when the lot is located adjacent to residential districts that allow duplex or single-family building types.

Interior Ceiling Height

Shopfront Overlay Ground Floor	15-foot minimum
Other floors	NA

Parking

See parking standards in FMC 22.60.003.

Parking garages should be designed to have leveled floors that can facilitate redevelopment for another use such as commercial when parking demand lessens.

Encroachments

Architectural features and signs may encroach into the required setbacks subject to the following requirements:

	Encroachment			Vertical
	Front/Side Street	Horizontal Rear	Side	
Arcade, gallery, awning	6' max.	Min. 5' from PL	Not allowed	Min. 8' clear
Balcony	4' max.		Min. 5' from PL	
Bay Window	4' max. on upper floors			
Eave	4' max.	Min. 3' from PL	Min. 3' from PL	

Building Standards

BS.1 BUILDING STANDARDS

BS.1A Purpose

This Section provides design standards for individual buildings to ensure that proposed development is consistent with the community's vision for mixed-use areas as it pertains to building form, physical character, land use, and quality.

BS.1B Applicability

Each building shall be designed in compliance with the applicable general requirements in Section BS.2 and all applicable requirements of the International Building and Fire Codes.

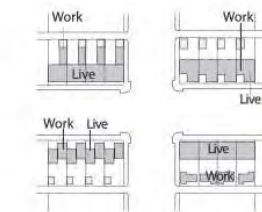
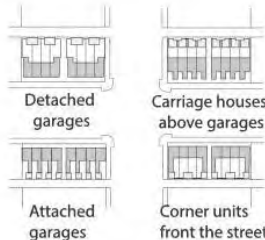
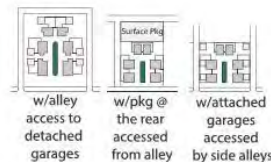
BS.1C Allowed Building Types by Zoning District

Each proposed building or existing building modification shall be designed as one of the building types allowed for the zoning district applicable to the site as identified in the table below.

Building Type	Mixed-Use Neighborhood (MUN)	Mixed-Use Urban (MUU)
Multiplex	X	
Rosewalk/Bungalow court	X	
Row House	X	X
Live-Work	X	X
Court	X	X
Hybrid Court	X	X
Liner Building		X
Flex Building	X	X

Table BS.1 Building Types

House Scale Buildings



Multiplex

A *multiplex* is a residential building of 3 to 6 dwelling units respectively.

Depending on the lot size and context the units can be placed side-by-side, front-to-back or stacked, or some combination of these options.

Multiplexes are not allowed on arterials.

Coding Criteria

Multiplexes when packaged within house-like form and detailing, with breaks in building elevations in the horizontal and vertical planes provide human scale and make the building contextual.

Typical height of the building is 2-3 stories.

Rosewalk & Bungalow Court

A *rosewalk* is comprised of 6 or more single dwellings arranged in a linear manner along either side of a common green. Pedestrian access to the building entrance is accessed from the common green and/or primary street.

A *bungalow court* is comprised of 6 or more single dwellings arranged around a shared courtyard, with pedestrian access to the building entrances from the courtyard and/or fronting street.

Coding Criteria

The defining feature of these are the communal central open space. The lot width should be large enough to allow functional public and private open spaces and area for driveways or common parking.

The building size and massing of individual buildings is similar to a small-scale single dwelling unit.

Entrance to units shall be directly from the front yard or from the courtyard.

Row House

A *row house* is a building comprised of 5 or more attached 2- or 3-story dwelling units arranged side by side, with the ground floor raised above grade to provide privacy for ground floor rooms. The primary building sits at the front of the property, with the garage at the rear, separated from the primary building by a rear yard.

Coding Criteria

The single family dwelling units can be separated by property lines with lot sizes 16 to 30 feet wide.

Design principles such as repetition, rhythm and order must be considered carefully to add interest and individuality.

Rowhouses have shallow front yards, 5 to 10 feet, to maximize the size of a private open space in the rear yard. The rear yard should be large enough to be functional and receive sunlight and be screened by fence or wall to provide privacy.

Live-Work

A *live-work* is an integrated residence and work space located at street level, occupied and utilized by a single household in a grouping of at least 3 such structures, or a structure with at least 3 units arranged side by side along the primary frontage, which has been designed or structurally modified to accommodate joint residential occupancy and work activity.

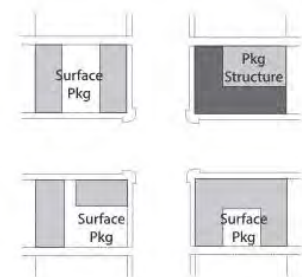
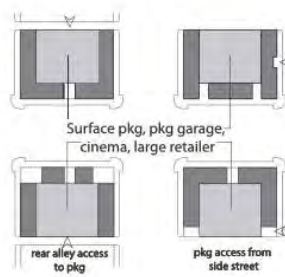
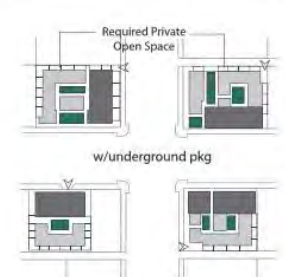
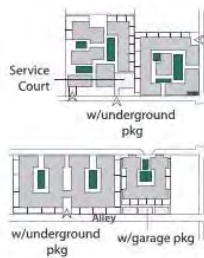
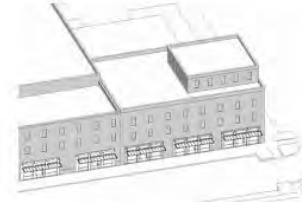
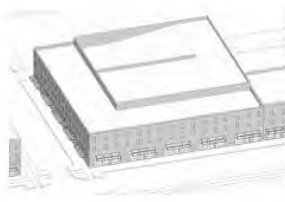
Coding Criteria

The floor to ceiling height of the work floor is typically about 15 feet. The main entrance to the street level work space should be accessed directly from and face the street. The dwelling unit above the work space should be accessed by a separate entrance, and by a stair or elevator.

Each unit should have access to private open space. The private open space should be in the rear yard of each unit.

Table BS.1 Building Types (continued)

Block Scale Buildings



Court

A *court* is a group of dwelling units arranged to share one or more common courtyards. The courtyard is intended to be a semi-public outdoor room that is an extension of the public realm. The units may be arranged in 4 possible configurations: rowhouses, rowhouses over flats, flats, and flats over flats. Court buildings may accommodate ground floor commercial/flex uses in either a live-work configuration or as solely commercial/retail space in qualifying zones facing the primary street.

Coding Criteria

The main entry to ground floor units should be directly of the courtyard or from the street. Access to second story units should be directly from the courtyard through stairs. Elevator access, if any, should be provided between the underground garage and courtyard-podium only.

The open space is designed as a central court or partial, multiple, separated or interconnected courtyards.

Hybrid

A *hybrid court* is composed of two building types: the stacked dwelling and courtyard housing, arranged around a courtyard. This building type combines a point-access portion of the stacked dwelling with a walk-up portion of the courtyard housing building type. The building may be designed for occupancy by retail, service, or office uses on the ground floor, with upper floors also configured for those uses or for residences.

Coding Criteria

Stacked dwelling defines the street edge and the building mass tapers down to a courtyard building type. The main entrance to all ground floor units should be directly from the street. Entrance to the stacked dwelling element can be through a dedicated street level lobby, or through a dedicated podium lobby accessible from the street or through a side yard. Access to units above the second level in the stacked dwelling element not accessed from the podium is through an interior, double-loaded corridor.

Liner Building

A *liner building* has a thin footprint that conceals parking garage or other large scale faceless building, such as a movie theater, or "big box" store to create a pedestrian friendly environment. The building can be designed for occupancy by retail, service, and/or office uses on the ground floor, with upper floors configured for retail, service, office, and/or residential uses.

Coding Criteria

The main entrance to each ground floor storefront and the theater or big box retail is directly from the street. Entrance to the upper levels of the building is through a street level lobby accessible from the street or through a side yard. Interior upper level uses are accessed by a corridor.

Parking is accommodated in an underground garage, surface parking at the rear of the lot, parking tucked under from the back, or a combination of any of the above.

Flex Building

A *flex building* is a vertical mixed-use building typically of a single massing element, designed for occupancy by retail, service, or office uses on the ground floor, with upper floors configured for retail, service, office, and/or residential uses. Second floor units may be directly accessed from the street through a stair. Upper floors are accessed through a street level lobby.

Coding Criteria

The floor to ceiling height of the first floor is greater than the rest of the floors, typically about 15 feet to accommodate the unique needs of commercial space and increase the comfort of residential occupants and guests.

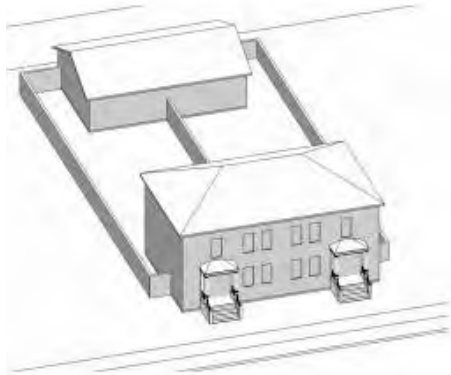
The main entrance to each ground floor tenant bay should be directly from the street. Parking is accommodated in an underground garage, surface lot, structure, tuck under facility, or some combination of these options.

BS.2 BUILDING TYPES (CONTINUED)

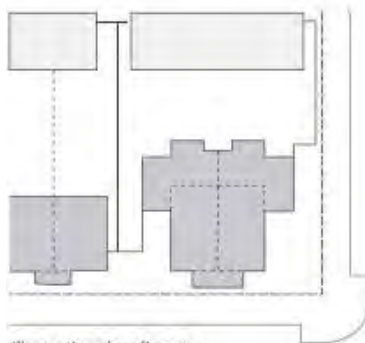
MUN

MUU

BS.2.A Multiplex



Illustrative axonometric diagram



Illustrative plan diagram



Illustrative photo of duplex

- 1 **Description** A Multiplex Building Type is a medium-sized structure that consists of 3–6 side-by-side and/or stacked dwelling units, typically with one shared entry or individual entries along the front. The Multiplex Building Type has the appearance of a large-sized family home and is appropriately scaled to fit well within medium-density neighborhoods. This building type is important for providing missing middle housing and promoting walkability.
- 2 **Pedestrian Access** Main entrance location: Primary street
- 3 **Frontages** Porch
Stoop
Dooryard
- 4 **Vehicle Access & Parking** Parking spaces may be enclosed, covered, or open.
- 5 **Private Open Space**

Width	Depth	Area
8-foot minimum	8-foot minimum	100-square foot minimum
- 6 **Building Size & Massing**

Length along frontage:	Duplex: 36-foot maximum Multiplex 50-foot maximum
Length along side yard:	80-foot maximum

The footprint area of an accessory structure may not exceed the footprint area of the principal structure.

BS.2 BUILDING TYPES (CONTINUED)

MUN

MUU

BS.2.B Rosewalk and Bungalow court

- 1 Description A Rosewalk Building Type is a group of 6 or more single dwellings arranged in a linear manner along either side of a common green. Having the same right-of-way width as a narrow neighborhood street, the Rosewalk (in contrast to the Bungalow Court) must connect two parallel streets. Pedestrian access to the building entrances are accessed from the common green and/or primary street. Rosewalks are prohibited on corner lots.

Bungalow Court Building Type is a group of 6 or more single dwellings arranged around a shared courtyard, with pedestrian access to the building entrances from the courtyard and/or fronting street.

The courtyard is wholly open to the street and parking is placed in the rear of the lot or behind each unit. Bungalow courts are prohibited on corner lots that do not have alley access.

- 2 Pedestrian Access Main entrance location: Common courtyard

- 3 Frontages Porch
Stoop
Dooryard

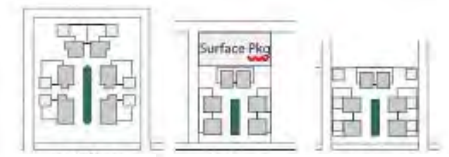
- | 4 Private Open Space | Width | Depth | Area |
|----------------------|----------------|----------------|-------------------------|
| | 8-foot minimum | 8-foot minimum | 100-square foot minimum |

- | 5 Common Courtyard | Width | Depth |
|--------------------|-----------------------|-----------------------|
| | 20-foot minimum clear | 50-foot minimum clear |

Also see cottage housing standards in FMC 22.58.027.



Illustrative axonometric diagram



Alley access to detached garages Rear parking accessed from alley Attached garages accessed by side alleys

Illustrative plan diagram



Illustrative photo of bungalow court



Illustrative photo of rosewalk

BS.2 BUILDING TYPES (CONTINUED)

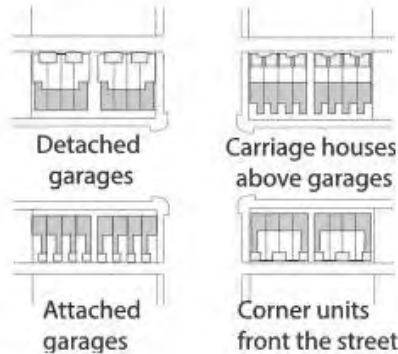
MUN

MUU

BS.2.C Row House



Illustrative axonometric diagram



Illustrative plan diagram



Illustrative photo of Row House



Illustrative photo of Row House

- 1 Description A Row House Building Type is a small- to medium-sized building comprised of 5 or more attached dwelling units arrayed side by side, with the ground floor raised above grade in order to provide privacy for ground floor rooms. The primary building sits at the front of the property, with the garage at the rear, separated from the primary building by a rear yard. Each dwelling unit is directly accessed from the front yard/street. Garages must be located and accessed from the rear of the lot. This Type is typically located within medium-density neighborhoods or in a location that transitions from a primarily single-family neighborhood into a neighborhood main street. This Type enables appropriately-scaled, well-designed higher densities and is important for providing a broad choice of missing middle housing types and promoting walkability.

- 2 Pedestrian Access Main entrance location: Primary street

- 3 Frontages Porch
Stoop
Dooryard

- 4 Vehicle Access & Parking Parking spaces may be enclosed, covered, or open.

- 5 Private Open Space

Width	Depth	Area
8-foot minimum	8-foot minimum	100-square foot minimum

- 6 Building Size & Massing

Width per rowhouse:	18-foot minimum 36-foot maximum
---------------------	------------------------------------

The front elevation and massing of each Row House building may be either symmetrical or asymmetrical, repetitive or unique in disposition, as long as the delineation of each individual unit is evident. The footprint area of an accessory structure may not exceed the footprint area of the principal structure.

BS.2 BUILDING TYPES (CONTINUED)

MUN

MUU

BS.2.D Live-Work

- 1 Description A Live-Work Building Type is a small to medium-sized attached or detached structure that consists of single dwelling unit above and/or behind a flexible ground floor space that can be used for home-office uses such as residential, personal and general service, small-scale craft production or retail uses. Both the ground-floor flex space and the unit above are owned by one entity. This Type is typically located within medium-density neighborhoods or in a location that transitions from a neighborhood into a urban neighborhood street. It is especially appropriate for incubating neighborhood-serving retail and service uses and allowing neighborhood main streets to expand as the market demands. Garages must be located and accessed from the rear of the lot. The work space is accessed directly from the primary street, and the living space at the rear or above is accessed directly or indirectly from the working space.

- 2 Pedestrian Access Main entrance location: Primary street
Ground floor space and upper unit shall have separate exterior entries.

- 3 Frontages Forecourt
Dooryard
Shopfront
Lightcourt
Gallery

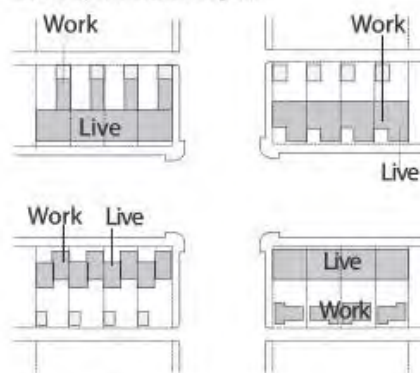
- | 4 Private Open Space | Width | Depth | Area |
|----------------------|----------------|----------------|-------------------------|
| | 8-foot minimum | 8-foot minimum | 100-square foot minimum |

- | 5 Building Size & Massing | Width per unit | 18-foot minimum
36-foot maximum |
|---------------------------|----------------|------------------------------------|
|---------------------------|----------------|------------------------------------|

The footprint area of an accessory structure may not exceed the footprint area of the principal structure.



Illustrative axonometric diagram



Illustrative plan diagram



Illustrative photo of live-work



Illustrative photo of live-work

BS.2 BUILDING TYPES (CONTINUED)

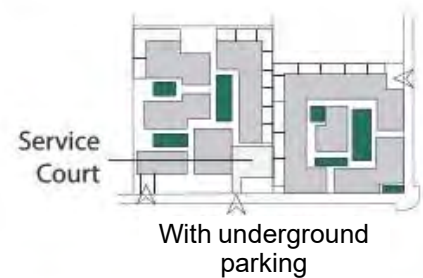
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BS.2.E Court



Illustrative axonometric diagram



With underground parking



With underground parking With garage parking

Illustrative plan diagram



Illustrative photo of court



Illustrative photo of court

- 1

Description

A Court Building Type is a group of dwelling units arranged to share one or more common courtyards. The courtyard is intended to be a semi-public outdoor room that is an extension of the public realm. Court buildings may accommodate ground floor commercial/flex uses in either a live-work configuration or as solely commercial/retail space in qualifying zones facing the primary street. This building type enables the incorporation of high-quality, well-designed density within a walkable neighborhood.
- 2

Pedestrian Access

The main entry to ground level units should be from the courtyard or from the street. Access to second story units should be directly from the courtyard through stairs. Elevator access, if any, should be provided between the underground garage and courtyard-podium only.
- 3

Frontages

Porch
Stoop
Dooryard
- 4

Vehicle Access & Parking

From alley.
For lots without alley, via driveway, 12-foot wide maximum, located as close to side yard property line as possible.
- 5

Private Open Space

Width	Depth	Area
8-foot minimum	8-foot minimum	100-square foot minimum

This open space is exclusive of the courtyard and may be located in a side or rear yard.
- 6

Common Courtyard

Recommended width/depth/height ratio:	1:1 approximate
Width and depth:	20-foot minimum
Length along frontage:	200-foot minimum
Length along side yard:	140-foot maximum

The footprint area of an accessory structure may not exceed the footprint area of the principal structure.
- 7

Building Size & Massing

BS.2 BUILDING TYPES (CONTINUED)

MUN

MUU

BS.2.F Hybrid Court

- 1 **Description** A Hybrid Court Building Type combines a point-access portion of the building with a walk-up portion. The building may be designed for occupancy by residential, retail, service, and/or office uses on the ground floor, with upper floors also configured for those uses.
- 2 **Pedestrian Access**

The main entrance to all ground floor units should be directly from the street.

Entrance to the stacked dwelling element can be through a dedicated street level lobby, or through a dedicated podium lobby accessible from the street or through a side yard.

Access to units above the second level in the stacked dwelling element not accessed from the podium is through an interior, double-loaded corridor of at least 6 feet in width with recessed doors or seating alcoves/offsets at every 100 feet at a minimum.

For other units, access is directly off a common courtyard or through stairs serving up to 3 dwellings.
- 3 **Frontages**

Porch
Stoop
Dooryard
- 4 **Vehicle Access & Parking**

Underground garage, surface parking, tuck under parking, or a combination of any of the above.
- 5 **Private Open Space**

Width	Depth	Area
8-foot minimum	8-foot minimum	100-square foot minimum

This open space is exclusive of the courtyard and may be located in a side or rear yard.
- 6 **Common Courtyard**

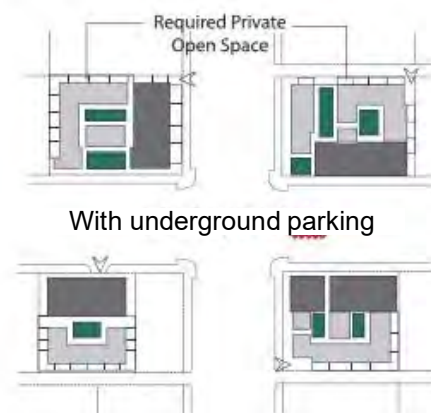
Recommended width/depth/height ratio: 1:1 approximate

Width and depth: 20-foot minimum
- 7 **Building Size & Massing**

Width per unit: 18-foot minimum
36-foot maximum



Illustrative axonometric diagram



Illustrative plan diagram



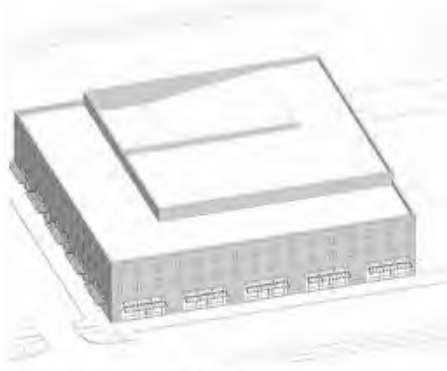
Illustrative photo of hybrid court

BS.2 BUILDING TYPES (CONTINUED)

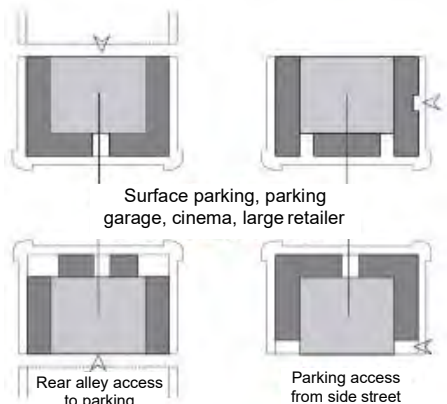
MUN

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BS.2.G Liner



Illustrative axonometric diagram



Illustrative plan diagram



Illustrative photo of liner



Illustrative photo of liner

- 1 **Description** A Liner Building Type conceals a garage, or other large-scale faceless building such as a movie theater, or “big box” store designed for occupancy by retail, service, and/or office uses on the ground floor, with upper floors configured for retail, service, office, and/or residential uses. The access corridor, if applicable, is included in the minimum depth.
- 2 **Lot Size** Width: 400-foot maximum
Depth: 150-foot maximum
- 3 **Pedestrian Access** Direct access from sidewalk. Upper floors accessed from street level lobby.
- 4 **Frontages** Forecourt
Shopfront
Gallery
Arcade
- 5 **Vehicle Access & Parking** Required parking is accommodated in an underground or above-ground garage, tuck under parking, or a combination of any of the above.
- 6 **Private Open Space** Private open space is required for each residential unit and shall be no less than 50-square feet with a minimum dimension of 5 feet in each direction. Alternatively, private open space requirements may be met with open space designed for specific use by the residents. See OS.1.
- 7 **Shared Open Space** The primary shared common space is the rear or side yard designed as a courtyard. Courtyards can be located on the ground, or on a podium, or on a parking deck, and must be open to the sky. Side yards can also be formed to provide outdoor patios connected to ground floor commercial uses.

Recommended width/depth/height ratio: 1:1 approximate

Width and depth: 20-foot minimum
- 8 **Building Size & Massing** Length along frontage: 400-foot maximum
Length over 200 feet must provide massing break

BS.2 BUILDING TYPES (CONTINUED)

MUN

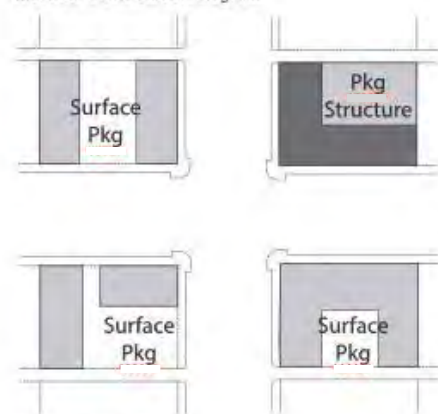
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BS.2.H Flex Building

- 1 **Description** A Flex Building Type is designed for occupancy by retail, service, office and/or residential uses on the ground floor, with upper floors configured for a similar mix of uses. Second floor units may be directly accessed from the street through a stair; upper floors are accessed through a street level lobby.
- 2 **Lot Size** Width: 400-foot maximum
Depth: 150-foot maximum
- 3 **Pedestrian Access** Direct access from sidewalk. Upper floors accessed from street level lobby.
- 4 **Frontages** Forecourt
Shopfront
Gallery
Arcade
Stoop
- 5 **Vehicle Access & Parking** Required parking is accommodated in an underground or above-ground garage, tuck under parking, or a combination of any of the above.
- 6 **Private Open Space** Private open space is required for each residential unit and shall be no less than 50-square feet with a minimum dimension of 5 feet in each direction. Alternatively, private open space requirements may be met with open space designed for specific uses by residents. See OS.1.
- 7 **Shared Open Space** The primary shared common space is the rear or side yard designed as a courtyard. Courtyards can be located on the ground, on a podium, or on a parking deck, and must be open to the sky. Side yards can also be formed to provide outdoor patios connected to ground floor commercial uses.
Recommended width/depth/height ratio: 1:1 approximate
Width and depth: 20-foot minimum
- 8 **Building Size & Massing** Length along frontage: 400-foot maximum
Length over 200 feet must provide massing break



Illustrative axonometric diagram



Illustrative plan diagram



Illustrative photo of flex building



Illustrative photo of flex building

Frontage Standards

FS.1 FRONTAGE STANDARDS

FS.1A Purpose

This Section sets forth the standards applicable to the development of private frontages. Private frontages are the components of a building that provide an important transition and interface between the public realm (street and sidewalk) and the private realm (yard or building). These standards supplement the standards for each zone that the frontage types are allowed within. For each frontage type, a description, a statement of the type's intent, and design standards are provided. These standards are intended to ensure that proposed development is consistent with the City's goals for building form, physical character, land use activity and quality.

FS.1B Applicability

These standards work in combination with the standards found in Section DS.0 (Development Standards by Zones) and Section BS.0 (Building Standards) and are applicable to all private frontages within transect zones.

FS.1C Allowed Building Types by Zoning District

Table FS.1 (Frontage Types) provides an overview of the allowed frontage types.

TABLE FS.1 FRONTAGE TYPES

Front Yard: The facade is set back substantially from the frontage line. The front yard created remains unfenced and is visually continuous with adjacent yards, supporting a common landscape. The setback can be densely landscaped to buffer from the higher speed thoroughfares.

Porch & Fence: The facade is set back from the frontage line with an attached porch permitted to encroach. A fence at the frontage line maintains the demarcation of the yard while not blocking view into the front yard. The porches shall be no less than 8 feet deep.

Dooryard (Terrace): The facade is set back from the frontage line with an elevated garden or terrace permitted to encroach. This type can effectively buffer residential quarters from the sidewalk, while removing the private yard from public encroachment. The terrace is also suitable for cafes.

Stoop: The facade is aligned close to the frontage line with the first story elevated from the sidewalk sufficiently to secure privacy for the windows. The entrance is usually an exterior stair and landing. This type is recommended for ground-floor residential use.

Forecourt: A portion of the facade is close to the frontage line and the central portion is set back. The forecourt with a large tree offers visual and environmental variety to the urban street streetscape. The forecourt may accommodate a vehicular drop-off.

Lightcourt: The facade is set back from the frontage line by a sunken light- court. This type buffers residential use from urban sidewalks and removes the private yard from public encroachment.

Shopfront: The facade is aligned close to the frontage line with the building entrance at sidewalk grade. This type is conventional for retail use. It has substantial glazing on the sidewalk level and an awning that may overlap the sidewalk.

Gallery: The facade is aligned close to the frontage line with an attached cantilevered shed or a lightweight colonnade overlapping the sidewalk. This type is conventional for retail use. The gallery shall be no less than 10 feet wide and may overlap the whole width of the sidewalk to within 2 feet of the curb.

Arcade: The facade is a colonnade that overlaps the sidewalk, while the facade at sidewalk level remains at the frontage line. This type is conventional for retail use. The arcade shall be no less than 12 feet wide and may overlap the whole width of the sidewalk to within 2 feet of the curb.

Front Yard

Description The main facade of the building has a large planted setback from the frontage line providing a buffer from the street. The front yard remains unfenced and is visually continuous with adjacent yards, supporting a common landscape and working in conjunction with the other private frontages.

Size Depth: 20 feet

Design Standards The front yard should be visually continuous with adjacent yards, supporting a common landscape. The setback can be densely landscaped to buffer from the higher speed thoroughfares. The yard is the first impression of a home and therefore should be carefully landscaped, preferably with drought-resistant plants.

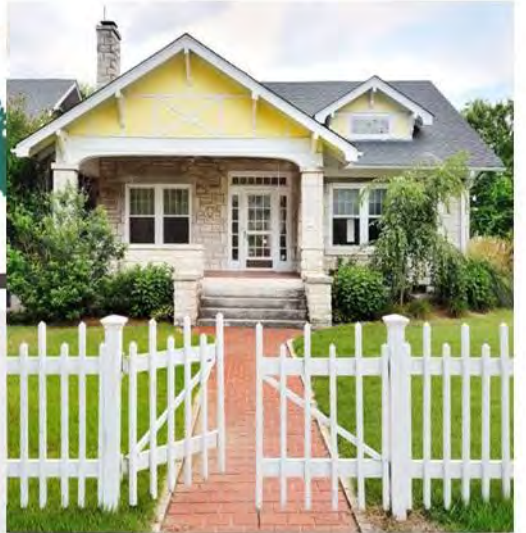


Porch & Fence

Description Provides a physical transition from the sidewalk to the private lot and building while maintaining visual connection between buildings and the public space of the street. The porch frontage consists of a building with a front set back from the property line and a porch encroaching into that front setback.

Size Width: 8-foot minimum
Depth: 8-foot minimum
Height: 8-foot minimum
Pathway: 3-foot wide minimum
Finished level above sidewalk: 18-inch minimum

Design Standards Projecting porches must be open on three sides and have a roof.



Dooryard (Terrace)

Description The main facade of the building is set back a small distance and the frontage line is defined by a low wall or hedge, creating a small dooryard. The dooryard shall not provide public circulation along a ROW. The dooryard may be raised, sunken, or at grade and is intended for ground-floor residential.

Size Width: 8-foot minimum
Length: 50-foot maximum
Pathway: 3-foot minimum
Finished level above sidewalk: 3'-6" maximum

Design Standards For live/work, retail and service uses, these standards are to be used in conjunction with those for the Shopfront Frontage Type. In case of conflict between them, the Dooryard Frontage Type standards shall prevail.



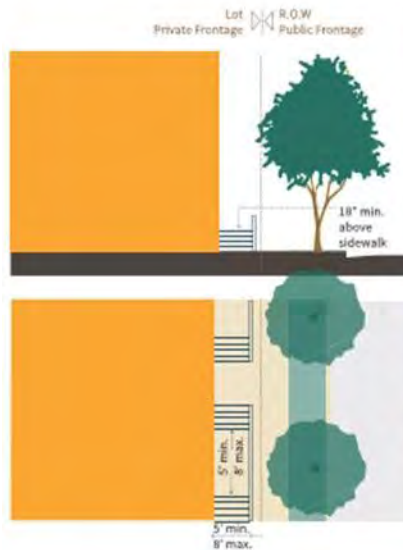
Stoop

Description The main facade of the building is near the frontage line and the elevated stoop engages the sidewalk. The stoop shall be elevated above the sidewalk to ensure privacy within the building. Stairs or ramps from the stoop may lead directly to the sidewalk or may be side-loaded. This Type is appropriate for residential uses with small setbacks.

Size Width & Depth: 5-foot min.; 8-foot max.
Finished level above sidewalk: 18-in min.

Design Standards

1. Stairs may be perpendicular or parallel to the building facade.
2. Ramps shall be parallel to façade or along the side of the building.
3. The entry doors are encouraged to be covered or recessed to provide shelter from the elements.

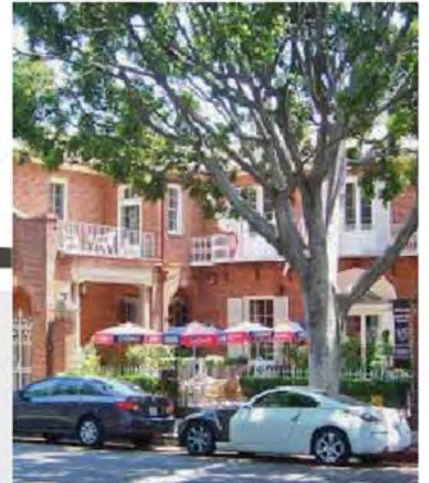
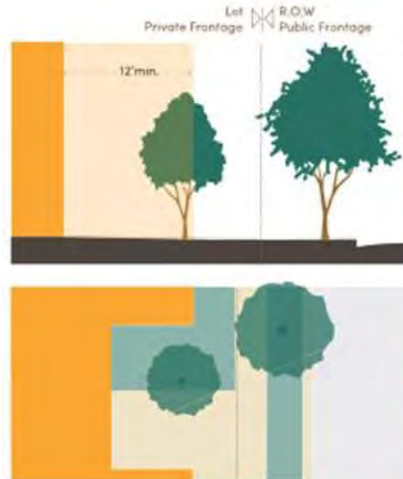


Forecourt

Description The main facade of the building is at or near the frontage line and a small percentage is set back, creating a small court space. The space may could be used as an entry court or shared garden space for apartment buildings, or as an additional shopping or restaurant seating area.

Size Width & Depth: 12-foot minimum
Ratio, height to width: 2:1 maximum

Design Standards The proportions and orientation of these spaces should be carefully considered for solar orientation and user comfort.

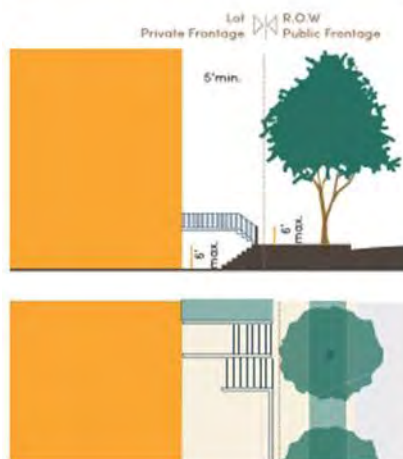


Lightcourt

Description The main facade of the building is set back from the frontage line by an elevated terrace or a sunken lightcourt. This Type buffers residential, retail or service uses from urban sidewalks and removes the private yard from public encroachment.

Size Width: 5-foot minimum
Height:
landing above sidewalk: 6-foot maximum
landing below sidewalk: 6-foot maximum

Design Standards A short fence may be placed along the built-to-line or setback where it is not defined by a building.



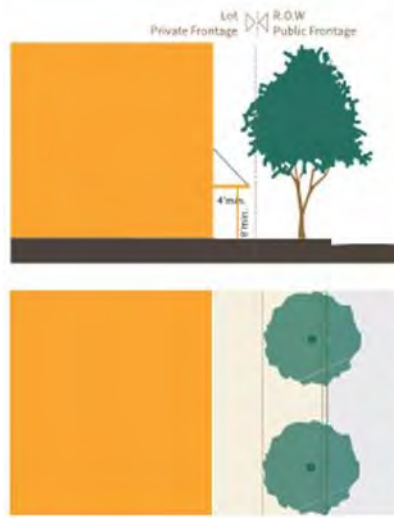
Shopfront

Description The main facade of the building is at or near the frontage line with an at-grade entrance along the public way. This Type is intended for retail use. It has substantial glazing at the sidewalk level and typically includes an awning that may overlap the sidewalk. It may be used in conjunction with other frontage types. An awning that extends over the sidewalk requires an encroachment permit.

Size Ground Floor Transparency:
75% of frontage minimum

Awning Depth: 4-foot minimum
Setback from curb: 2-foot minimum
Height, clear: 8-foot maximum

- Design Standards**
1. Shopfront glass shall be clear without reflective glass frosting or dark tinting.
 2. Shopfront windows may have clerestory windows (horizontal panels) between the shopfront and second floor/top of single-story parapet. Glass in clerestory may be of a character to allow light, while moderating it such as stained glass, glass block, painted glass, or frosted glass.
 3. Shopfronts with accordion-style doors/windows or other operable windows that allow the space to open to the street are encouraged.
 4. Operable awnings are encouraged.

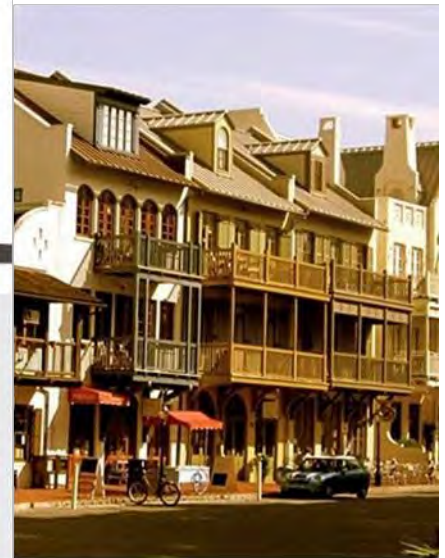
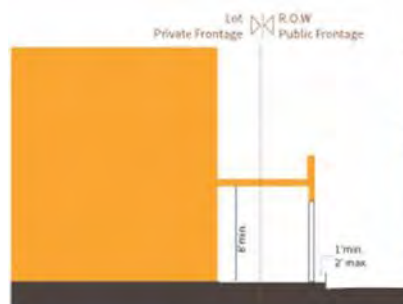


Gallery

Description A roof or deck projecting from the facade of a building, supported by columns located just behind the street curb. Galleries shelter the sidewalk with a roof or unenclosed, accessible, out-door space making them ideal for retail use. Galleries may be one- or two-stories in height, functioning as covered or uncovered porches at the second floor. Railing on top of the gallery is only required if the gallery roof is accessible as a deck.

Size Depth: 8-foot minimum
Ground floor height: 16-foot minimum
Setback from curb: 1-foot min.; 2-foot max.

- Design Standards**
1. Galleries shall be combined with the Shopfront frontage type.
 2. Galleries must have consistent depth along a frontage.
 3. Ceiling light is encouraged.
 4. Galleries may be entirely on private property or may encroach over the sidewalk in the public ROW, subject to approval of an encroachment permit.
 5. Column spacing and colonnade detailing, including lighting, shall be consistent with the style of the building to which it is attached.
 6. Columns shall be placed in relation to curbs so as to allow passage around and to allow for passengers of cars to disembark.

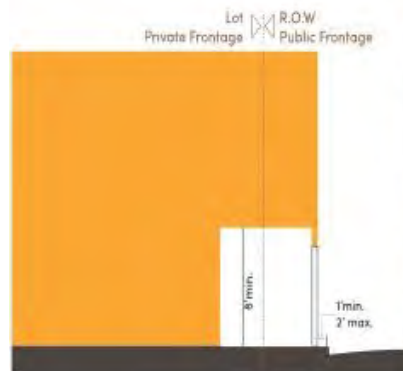


Arcade

Description Composed of a building with ground floor facades that align with the property line, and upper floors that project over the property line to cover the sidewalk. A colonnade structurally and visually supports the building mass that encroaches into the public right-of-way. Arcades contain ground-floor storefronts, making them ideal for retail use as the arcade shelters the pedestrian and shades the storefront glass, preventing glare that might obscure views of merchandise.

Size Depth: 8-foot minimum
Ground floor height: 16-foot minimum
Setback from curb: 1-foot min.; 2-foot max.

- Design Standards**
1. Arcades shall be combined with the Shopfront frontage type.
 2. Arcades may be entirely on private property or may encroach over the sidewalk in the public right-of-way, subject to approval of an encroachment permit.
 3. Column spacing and colonnade detailing, including lighting, shall be consistent with the style of the building.
 4. Columns shall be placed in relation to curbs so as to allow passage around and to allow for passengers of cars to disembark.



Street Standards

SS.1 STREET STANDARDS

SS.1A Purpose

This Section provides design standards to ensure that proposed development is consistent with the Comprehensive Plan's goals for an interconnected and walkable network of blocks and streets that support the intended physical character, land use activity, and quality.

Streets must not only provide for the efficient and safe movement of people, goods, and services, but must also facilitate great places that contribute to the look, feel, and experience of the 19th and Mildred mixed-use area and other neighborhoods.

SS.1B Applicability

This Section describes the standards for streets in FBC zones. These street standards are applicable for the transformation of existing streets and the creation of new streets in FBC zones. Additional street assemblies can be integrated into this Section when approved by the City.

SS.1C. Design objectives

Streets are one of the most important elements in defining FBC character. Due to this important role in place-making, in addition to their contribution of a major percentage of public space, street standards must be considered alongside building form, building types, frontage types, civic spaces, and landscaping in creating urban environments.

In accordance with the intent of this Section, new or modified street shall be designed to incorporate the following criteria for street design:

- a) Function: Ensuring essential access to premises for deliveries and servicing; effective use of curb space to support land use activities; and upgrading utilities under the roads to serve growing neighborhood needs.
- b) Mobility: Safe, efficient, and reliable movement supporting access of people and goods.
- c) Livability: Providing good and inclusive places for all that support vital economic, cultural, and community activity.

The City shall determine the appropriate street type for new and modified streets based on the anticipated function of the street while taking into consideration the areawide context.

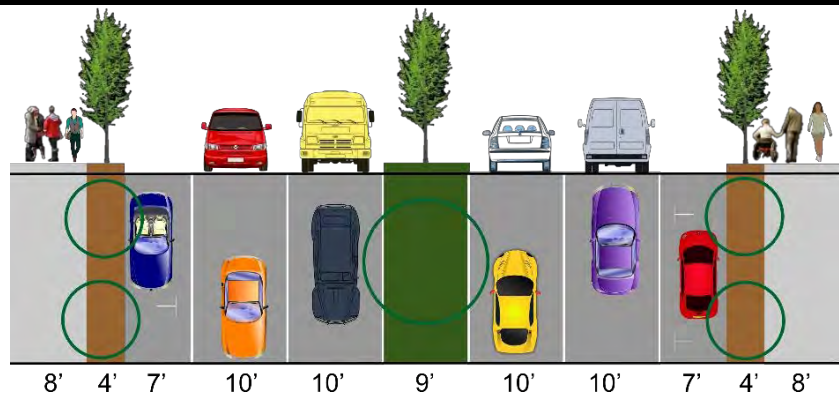
All of the elements of the streets are context based. Overall width and pavement width, the number of lanes, and the lanes' specific sizes are listed. Street edges include planter type, lighting type, walkway type, and curb radii at intersections. Bulb-outs are encouraged to facilitate a pedestrian-friendly environment.

The street sections in this Section suggest quality and intent. The dimensions in the street sections consider information gleaned from aerials and field observations of existing conditions plus desired outcomes resulting from redevelopment.

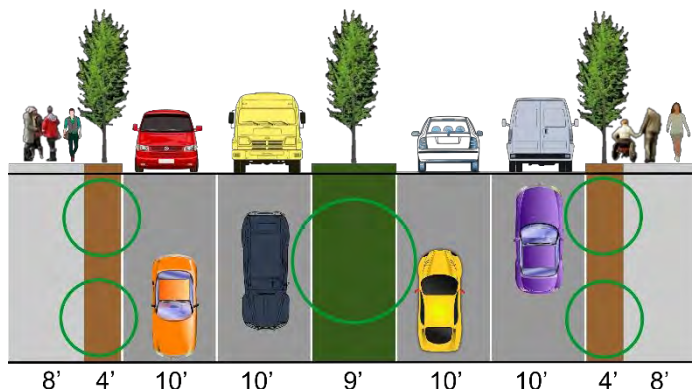
SS.1D. Design Departures

Minor departures from street section design elements are subject to administrative approval. The City may authorize departures when existing street frontage improvements that do not fully meet current standards will effectively achieve the FBC's design objectives for the applicable street type. In such instances, the City must determine that the costs of modifications required to ensure full compliance with the street section standards will exceed the benefits. The City may also authorize departures that will achieve comparable landscape amenities, parking stall counts, pedestrian walkway surfaces, and other features when the overall design is consistent with the intent of the specified street type. Departures may be authorized where topography dictates design solutions that are not fully compliant or where parking structures with daylighted fronts face public ways.

19th Street Shopfront			
Assembly		Transportation Way	
Type	Principal arterial with parking	Vehicle Lanes	4 lanes; 2 lanes each way
Right-of-way	87 feet	Lane Width	10 feet
Pavement	54 feet	Parking Lanes	Parallel; both sides
Public Frontage		Movement Type	Medium
Curb Type	Vertical curb	Median Width	9 feet
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete and pavers	Median Surface	Ground cover
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	35 mph
		Bicycle Provisions	None
		Transit	Bus; Light rail

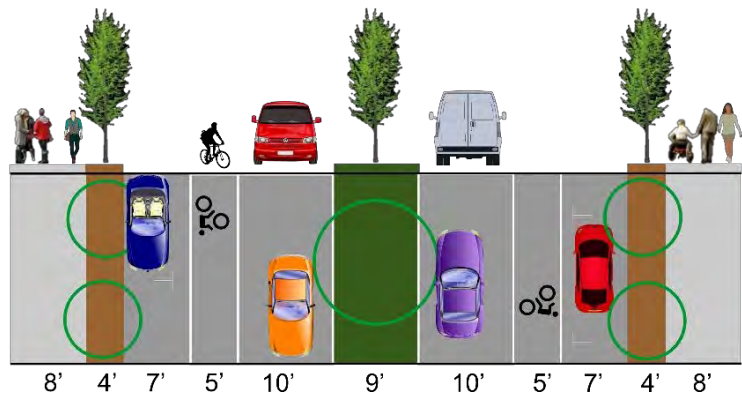


19th Street Non-Shopfront			
Assembly		Transportation Way	
Type	Principal arterial w/o parking	Vehicle Lanes	4 lanes; 2 lanes each way
Right-of-way	73 feet	Lane Width	10 feet
Pavement	40 feet	Parking Lanes	No on-street parking
Public Frontage		Movement Type	Medium
Curb Type	Vertical curb	Median Width	9 feet
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete and pavers	Median Surface	Ground cover
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	35 mph
		Bicycle Provisions	None
		Transit	Bus; Light rail



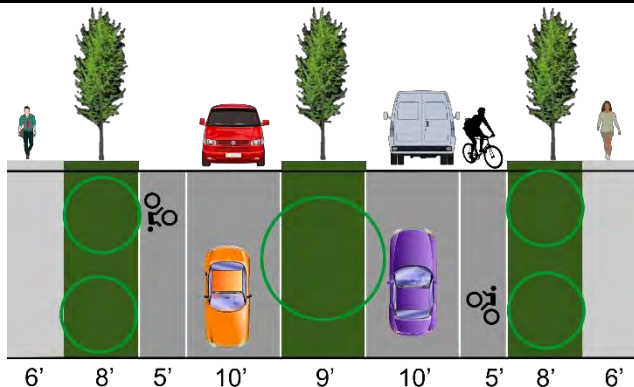
Mildred Street Shopfront

Assembly		Transportation Way	
Type	Minor arterial with parking	Vehicle Lanes	2 lanes; 1 lane each way
Right-of-way	77 feet	Lane Width	10 feet
Pavement	44 feet	Parking Lanes	Parallel; both sides
Public Frontage		Movement Type	Medium
Curb Type	Vertical curb; 10 feet radius	Median Width	9 feet
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete and pavers	Median Surface	Ground cover
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	5-foot lane
		Transit	Bus

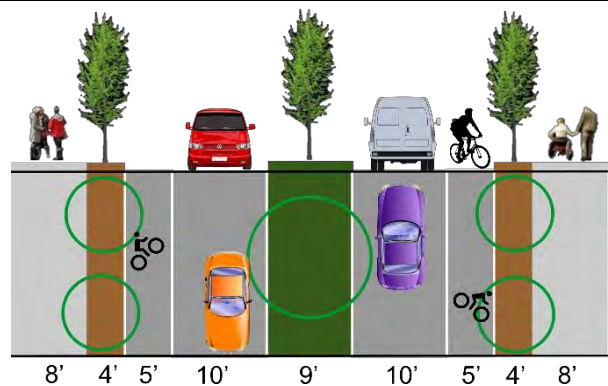


Mildred Street Non-Shopfront

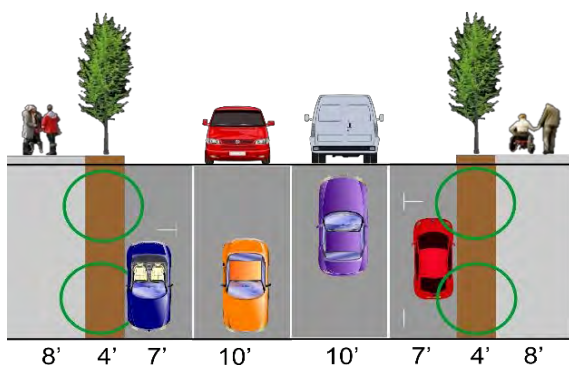
Assembly		Transportation Way	
Type	Minor arterial w/o parking	Vehicle Lanes	2 lanes; 1 lane each way
Right-of-way	67 feet	Lane Width	10 feet
Pavement	30 feet	Parking Lanes	No on-street parking
Public Frontage		Movement Type	Medium
Curb Type	Vertical curb; 10 feet radius	Median Width	9 feet
Walkway Width	6 feet	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete	Median Surface	Ground cover
Planter	8-foot amenity with shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	5-foot lane
		Transit	Bus



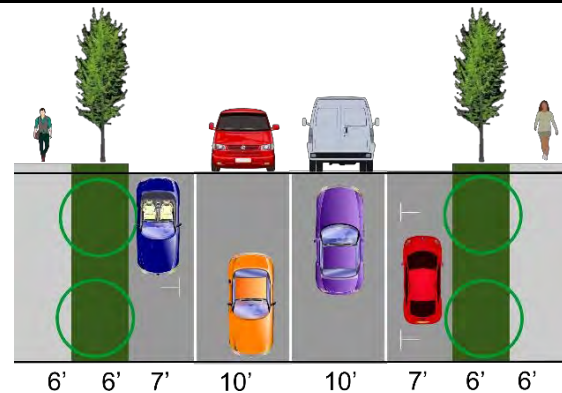
Regents Boulevard			
Assembly		Transportation Way	
Type	Minor arterial without parking	Vehicle Lanes	2 lanes; 1 lane each direction
Right-of-way	63 feet	Lane Width	10 feet
Pavement	30 feet	Parking Lanes	<i>Option 7 feet</i>
Public Frontage		Movement Type	Slow
Curb Type	Vertical curb; 10 feet radius	Median Width	9 feet
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	Street trees with shrubbery
Walkway Surface	Concrete and pavers	Median Surface	Ground cover
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	5-foot lane
		Transit	Bus



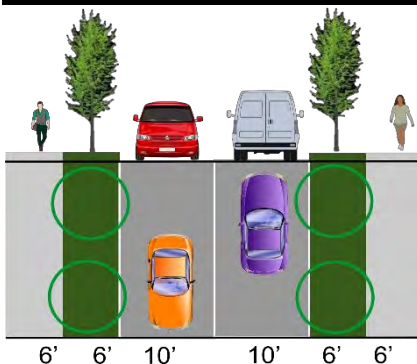
Local - Higher Intensity			
Assembly		Transportation Way	
Type	Feeder with parking	Vehicle Lanes	2 lanes; 1 lane each direction
Right-of-way	51 – 58 feet	Lane Width	10 feet
Pavement	27 – 34 feet	Parking Lanes	Parallel, angled*; one or both sides
Public Frontage		Movement Type	Slow
Curb Type	Vertical curb; 10 feet radius	Median Width	NA
Walkway Width	12 feet with 4-foot tree wells & contrasting pavement strips	Median Planting	NA
Walkway Surface	Concrete and pavers	Median Surface	NA
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	None
		Transit	No transit
			<i>*Only in unique circumstances</i>



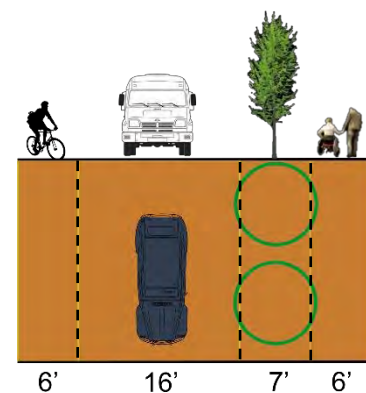
Local - Lower Intensity			
Assembly		Transportation Way	
Type	Feeder with parking	Vehicle Lanes	2 lanes; 1 lane each direction
Right-of-way	51 – 58 feet	Lane Width	10 feet
Pavement	27 – 34 feet	Parking Lanes	Parallel, angled*; one or both sides
Public Frontage		Movement Type	Slow
Curb Type	Vertical curb; 10 feet radius	Median Width	NA
Walkway Width	6 feet	Median Planting	NA
Walkway Surface	Concrete	Median Surface	NA
Planter	6-foot amenity with shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	None
		Transit	No transit <i>*Only in unique circumstances</i>



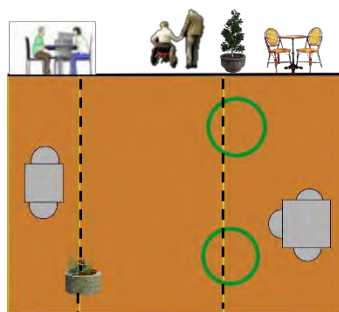
Local - Delivery			
Assembly		Transportation Way	
Type	Local without parking	Vehicle Lanes	2 lanes; 1 lane each direction
Right-of-way	44 feet	Lane Width	10 feet
Pavement	20 feet	Parking Lanes	None
Public Frontage		Movement Type	Slow
Curb Type	Vertical curb; 10 feet radius	Median Width	NA
Walkway Width	6 feet	Median Planting	NA
Walkway Surface	Concrete	Median Surface	NA
Planter	6-foot amenity with shade trees limbed for visibility and pedestrian access	Target Speed	25 mph
		Bicycle Provisions	None
		Transit	No transit



Local - Pedestrian			
Assembly		Transportation Way	
Type	Woonerf	Vehicle Lanes	2 lanes; 2-way, shared space
Right-of-way	35 feet	Lane Width	Shared 35-foot spaces
Pavement	35 feet	Parking Lanes	Shared 35-foot spaces
Public Frontage		Movement Type	Slow
Curb Type	Flat curb	Median Width	NA
Walkway Width	Shared 35-foot spaces	Median Planting	NA
Walkway Surface	Concrete or pavers	Median Surface	NA
Planter	Shade trees limbed for visibility and pedestrian access	Target Speed	20 mph
		Bicycle Provisions	Shared 35-foot spaces
		Transit	NA

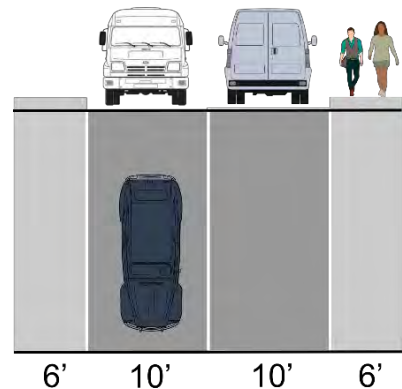


Local - Pedestrian			
Assembly		Transportation Way	
Type	Paseo	Vehicle Lanes	NA
Right-of-way	NA	Lane Width	NA
Pavement	TBD	Parking Lanes	NA
Walkway Width	Minimum 12 feet	Movement Type	NA
Walkway Surface	Concrete or pavers	Median Width	NA
Design	Additional space should be included for intended uses and furnishings (such as tables, benches, planter pots, etc.)	Median Planting	NA
		Median Surface	NA
		Target Speed	NA
		Bicycle Provisions	NA
		Transit	NA



12'

Alley – 2 way			
Assembly		Transportation Way	
Type	Alleyway	Vehicle Lanes	2 lanes; 1 lane each direction
Right-of-way	20 – 32 feet	Lane Width	10 feet
Pavement	20 feet	Parking Lanes	NA
Public Frontage		Movement Type	Slow
Curb Type	Vertical curb; 10 feet radius	Median Width	NA
Walkway	Both sides, one-side or neither	Median Planting	NA
Walkway Width	6 feet	Median Surface	NA
Walkway Surface	concrete	Target Speed	20 mph
Planter	NA	Bicycle Provisions	NA
		Transit	NA



Alley – 1 way			
Assembly		Transportation Way	
Type	Alleyway without sidewalks	Vehicle Lanes	1 lane; 1 direction
Right-of-way	16 feet	Lane Width	16 feet
Pavement	16 feet	Parking Lanes	NA
Public Frontage		Movement Type	Slow
Curb Type	NA	Median Width	NA
Walkway Width	NA	Median Planting	NA
Walkway Surface	NA	Median Surface	NA
Planter	NA	Target Speed	20 mph
		Bicycle Provisions	NA
		Transit	NA



Open Space Standards

OS.1 OPEN SPACE STANDARDS

OS.1A Purpose

This Section provides a catalog of pre-approved Public Open Space types that are appropriate to use within walkable urban environments.

OS.1B Applicability

This section describes the guidelines for development of Public Open Spaces in the Form-Based Code Area.

The Standards shall apply to all proposed development within Form-Based Code zones and shall be considered in combination with the standards for the applicable zone.

Additional Public Open Spaces can be integrated into this section as they are approved by the City.

OS.1C Design Objective

Open Spaces play an important role in place-making. Their standards must be considered alongside building form, building types, frontage types, and thoroughfares in creating urban environments.

OS.1D Open Space Required

Each project application that involves at least four acres shall be required to provide a minimum of 10 percent of the project area as open space. The required open space shall be designed in compliance with the applicable requirements from Table OS.1. For projects that provide more than 10 percent public open space, the City may approve an open space plan that provides this additional public open space in lieu of a portion of the private open space required in BS.2.G.6 or BS.2.H.6. Sidewalks and planter strips located within a street right of way shall not count as open space when calculating minimum requirements unless they are part of plaza, rambla or promenade.

Each project four acres or larger shall include an open space design plan that incorporates the urban design concept described in OS.2, where applicable. If, when a project applicant intends to submit an application to the City, an urban design concept has not been prepared and adopted in the FBC for the applicable open space type and location specified in OS.2, the applicant shall prepare or fund the preparation of a conceptual plan under the direction of the City. The City may opt to retain the services of a qualified firm to complete the plan with funding to be provided by the applicant.

TABLE OS.1 OPEN SPACE TYPES




























Open Space Type	Greenway				Green			Square	
Illustration									
Example of Intended Physical Character									
Description	A linear open space that can meet a variety of purposes, from recreational to environmental restoration.				An open space available for unstructured and limited amounts of structured recreation.			An open space available for civic purposes, unstructured and limited amounts of structured recreation.	
Size Frontage (minimum)	Variable Fronting lots encouraged to provide access and pleasant frontage.				1 acre to 15 acres 2 streets			½ acre to 5 acres 2 streets	
Typical Facilities	Passive and active recreation, accessory structure, drinking fountains, signs, benches, exercise equipment, benches, and paths.				Passive and active recreation (unstructured or structured), accessory structure, drinking fountains, community facilities less than 5,000 square feet, benches, and paths.			Passive and active recreation (unstructured or structured), accessory structure, drinking fountains, community facilities greater than 5,000 square feet, benches, and paths.	

TABLE OS.1 OPEN SPACE TYPES (CONT.)

Open Space Type	Plaza		Pocket Park		Playground		Community Garden				
Illustration											
Example of Intended Physical Character											
Description	An open space available for civic purposes and commercial activities. Building frontages should define these spaces. Plazas are typically hardscaped.		An open space available for informal activities in proximity to neighborhood residences.		An open space designed for the recreation of children and interspersed within residential areas. Playgrounds may be included within other open spaces.		An open space designed as a grouping of plots for nearby residents for small-scale cultivation. Community Gardens may be included within other open spaces.				
Size	1/2 to 2 1/2 acres		4,000 sf to 1/2 acre		No minimum or maximum		No minimum or maximum				
Frontage (minimum)	2 streets		1 street		1 street		1 street				
Typical Facilities	Passive recreation, accessory structure, drinking fountains, and paths.		Passive recreation, accessory structure, drinking fountains, and paths.		Accessory structure, drinking fountains, and paths.		Accessory structure, drinking fountains, and paths.				

OS.2 URBAN DESIGN CONCEPTS

In accordance with OS.1D, each project application that includes a Public Open Space Overlay within its boundaries, as further determined by OS.1D, or designated in the Regulating Plan Diagram, shall be required to develop the urban green street, green, square, plaza, or other open space type generally consistent with the applicable urban design concept depicted below. The plan shall incorporate, at a minimum, the design elements described in the placeholder for each open space type below.

- 1.) Urban green street with median, sidewalks and curbside parking located on 22nd Street (planned) east of Mildred Street West.

The green street design concept would include a median containing plant materials with hardscape/paving where appropriate to support passive and active space including pedestrian corridors. The street cross section should include a promenade/rambla filled with kiosks that sell newspapers, flowers, beverages, or other goods. These features could be located within an active median, or if the median is to be primarily passive, along one or both sides of the street within an adjoining plaza, square, or another type of FBC-identified open space area. Space could be provided for street traders, performers, and seating for outdoor cafes. Areas should be designed to support programmed activities such as farmers markets and arts fairs. Notable sights and facilities should be located within the promenade, including water features, imaginative play areas, and covered spaces for popular meeting points. Suggestions for street furniture and street lighting to be used in the rambla/promenade would be included. The concept would include a street tree plan and suggestions for street furniture and street lighting. An overall illustrative site plan, sections, and renderings are required to be provided. Photos of similar successful projects may support or supplement the plans.

- 2.) Green, square or plaza located north of 20th Street (planned) and east of 66th Avenue West (planned).

The green, square or plaza design concept would create informal community gathering places by providing comfortable seating opportunities with multi-seasonal amenities, such as canopies or other cover from the elements and heating during periods of cooler temperatures. Designs should include character-defining materials and accessories, art elements or water features, wayfinding elements, pedestrian-scale lighting, and landscape features that provide visual access to the space and support active and passive uses. An overall illustrative site plan, sections, and renderings are required to be provided. Photos of similar successful projects may support or supplement the plans.

- 3.) Green, square or plaza located south of 22nd Street (planned) and west of 66th Avenue West (planned).

The green, square or plaza design shall be a minimum of ½ acre in size. The design concept would create informal community gathering places by providing comfortable seating opportunities with multi-seasonal amenities, such as canopies or other cover from the elements and heating during periods of cooler temperatures. Designs should include character-defining materials and accessories, art elements or water features, wayfinding elements, pedestrian -scale lighting, and landscape features that provide visual access to the space and support active and passive uses. An overall illustrative site plan, sections, and renderings are required to be provided. Photos of similar successful projects may support or supplement the plans.



THE CITY OF FIRCREST

Public Works Department
Location: 120 Ramsdell St · Fircrest, WA 98466 · Ph. (253) 564-8900 ·
Fax: (253) 564-3640 · Email: vwalston@cityoffircrest.net

CERTIFICATE OF WATER AVAILABILITY

PART A to be Completed by Applicant

Project Address: 2119 Mildred Street Parcel #: 0220112005

Related Permit #(s): TBD (If available)

Applicant Name: Garrett Hodgins – Alliance Residential Company

Applicant Contact #: 206.462.0142 Email: ghodgins@allresco.com

Proposed water usage: 1-2 (number of connections)

Customer type (check one)

☐ Residential ☐ Multi-Family ☐ Commercial

☒ Other: Mixed Use

I, the undersigned or my appointed representative, have requested the City of Fircrest to certify willingness and ability to provide the indicated service(s). I have read and understand the information provided by the City of Fircrest on this Certificate and acknowledge that the proposed project may require improvements to the water and or sewer system which would incur my financial obligation. Prior to final approval for construction of the water and/or sewer facilities, it is understood that a legal contract between myself and the City of Fircrest which specifies the terms of water service, operational responsibility, and financial obligation may be required.

Signature: [Signature] Date: 5/19/2022

Address: 1100 N Northlake Way Suite 236 City, State: Seattle, WA

PART B to be Completed by Water Purveyor

TO BE COMPLETED BY WATER SYSTEM OFFICIAL

System/Purveyor: City of Fircrest

✓ Check One:

☒ The above system will provide water service to the project address requested above.

☐ The above system will **NOT** provide water service to the projected address requested above.

Reason: _____

Water System Official: Tyler Benis

Phone: (253) 564-8900

Title: Public Works Director

Signature: [Signature]

Date: 5/19/2022

Should the Development Permit related to this Certificate expire, this Certificate also expires.