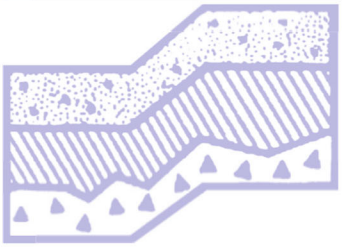
DRAFT

GEOTECHNICAL REPORT

CIC Multifamily
Marysville, Washington

Project No. T-8340-5



Terra Associates, Inc.

Prepared for:

KM Capital, LLC
Lake Stevens, Washington

March 3, 2023

TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

March 3, 2023
Project No. T-8340-5

DRAFT

Mr. Ryan Larsen
KM Capital, LLC
10515 – 20th Street Southeast, Suite 202
Lake Stevens, Washington 98258

Subject: Geotechnical Report
CIC Multifamily
Marysville, Washington

Dear Mr. Larsen:

As requested, we have conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

The soils observed in the test pits generally consist of about 1 to 4 feet of loose to medium dense, fine-grained, alluvial silty sand, sand with silt, or sandy silt overlying glacial outwash consisting primarily of medium dense, fine- to medium-grained sand with varying gravel content and fine- to coarse-grained sand with gravel. Groundwater was encountered in all of the test pits. Groundwater seepage levels observed in the test pits typically ranged between depths of about 4 and 9 feet during the summer months and between depths of about 2.5 and 3.5 feet during the winter.

In our opinion, there are no geotechnical considerations that would preclude development of the site as currently planned. The primary geotechnical issues are shallow wintertime groundwater levels and the potential for liquefaction-induced settlement resulting from a severe seismic event. In our opinion, raising site grades with at least four feet of structural fill would adequately mitigate the potential for unacceptable liquefaction-induced settlement. The buildings can be supported on conventional spread footings bearing on structural fill that is placed and compacted on a competent native soil subgrade. Pavement and floor slabs can be similarly supported.

Detailed recommendations addressing these issues and other geotechnical design considerations are presented in the attached report. We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

John C. Sadler, L.E.G., L.H.G.
Senior Engineering Geologist

DRAFT

Carolyn S. Decker, P.E.
President

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

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Marysville, Washington

1.0 PROJECT DESCRIPTION

The proposed project is residential development. A conceptual site plan by NorthPoint Development, dated December 30, 2022, shows the development consisting of thirteen cottage-style buildings and two clubhouse/amenity structures. Development plans are currently not available; as we understand, the residential buildings will consist of 4-story, wood-frame structures with main floor levels constructed at grade or framed over a crawl space. Foundation loads should be relatively light, in the range of 4 to 6 kips per foot for bearing walls and 100 to 200 kips for isolated columns. Stormwater runoff from the development will be managed by onsite detention and controlled release from six detention ponds.

The recommendations in the following sections of this report are based on our understanding of the design features outlined above. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and to supplement them, if required.

2.0 SCOPE OF WORK

We explored subsurface conditions at the site by excavating 31 test pits to maximum depths of about 5 to 11 feet using a track-mounted excavator. In-Situ Engineering, under subcontract with Terra Associates, Inc., performed four cone penetration tests (CPTs) to a depth of 60 feet and one CPT to a depth of 100 feet below current site grades. Using the results of our subsurface exploration and laboratory testing, analyses were undertaken to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions.
- Geologic hazards per the City of Marysville Municipal Code.
- Seismic site class per the current International Building Code (IBC).
- Site preparation and grading.
- Excavations.
- Foundations.
- Slab-on-grade floors.

- Lateral earth pressures for below-grade walls.
- Infiltration feasibility.
- Stormwater facilities.
- Drainage.
- Utilities.
- Pavements.

It should be noted that the recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment are beyond Terra Associates' purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site consists of approximately 49 acres of vacant property located on the south side of 152nd Street NE and between 51st Avenue Northeast and a BNSF Railroad right-of-way (ROW) in Marysville, Washington. The approximate site location is shown on Figure 1.

Site topography is relatively flat. The Snohomish County Planning & Development Services (PDS) Map Portal website (https://gismaps.snoco.org/Html5Viewer/Index.html?viewer=pdsmapportal) shows existing surface elevations at about Elev. 105. The vast majority of the site consists of grass field or pasture. The northwestern and northeastern portions of the site were formerly occupied by a residence and farm outbuildings. The buildings have been demolished and the areas are now generally vegetated with scattered trees, brush, and grasses.

We observed a drainfield network consisting of six-inch diameter, perforated PVC pipes installed on the ground surface in the northeastern portion of the site. The drainfield appears to be associated with Edgecomb Creek channel relocation work between the eastern side of the planned development area and the BNSF ROW. We did not observe water flowing from the pipes, or indications of surface water accumulation in the area of the drainfield at the time of our February 2023 fieldwork.

An Olympic Pipeline liquified petroleum pipeline corridor runs southeast across the northern portion of the site from a point approximately 400 feet east of the intersection of 51st Avenue Northeast and 152nd Street Northeast to a point approximately 940 feet south of 152nd Street Northeast where it crosses beneath the BNSF ROW. The pipeline easement is shown on Figure 2.

3.2 Soils

The soils observed in the test pits generally consist of about one to four feet of fine-grained, alluvial silty sand, sand with silt, or sandy silt overlying glacial outwash consisting primarily of fine- to medium-grained sand with varying gravel content and fine- to coarse-grained sand with gravel. The upper fine-grained soils were generally in a dry to moist and medium dense condition in the test pits excavated in August 2020 and moist to wet and loose to medium dense in the February 2023 test pits. The outwash sand and gravel deposits are generally in a loose to medium and wet condition.

We observed localized layers of dense to very dense silty sand that is strongly cemented and iron-oxide stained in the upper approximately 3.5 feet of five test pits excavated in the northeastern portion of the site. Organic topsoil thicknesses observed in the test pits generally range between about 4 and 6 inches with scattered localized areas a thick as 12 inches.

The soil types and strengths indicated on the shallow-depth portions of the CPT logs generally correlate with conditions observed in the test pits. At greater depths, the CPT logs indicate soil types and strengths generally consistent with medium dense to dense sand with scattered layers of dense to very dense sand and gravelly sand to the CPT termination depths of approximately 60 feet and 100 feet.

The *Geologic Map of the Arlington West 7.5-Minute Quadrangle, Snohomish County, Washington* by J.P. Minard (1985) shows the site mapped as the Marysville Sand Member (Qvrm) of Vashon glacial recessional outwash deposits described as well-drained stratified to massive outwash sand, some fine gravel, and some areas of silts and clays. The vast majority of the soils encountered in the test pits are consistent with this geologic map unit. The upper 1 to 4 feet of fine-grained silty sand to sandy silt is interpreted to be an alluvial deposit.

Detailed descriptions of the subsurface conditions we observed in our site explorations are presented on the Test Pit Logs. The Test Pit Logs and CPT logs are attached in Appendix A. The approximate Test Pit and CPT locations are shown on Figure 2.

3.3 Groundwater

Groundwater seepage was observed in all of the test pits. The observed groundwater seepage was typically heavy and generally originated from the outwash sand and gravel deposits. The groundwater seepage levels observed in the test pits excavated in August 2020 typically ranged between depths of about 4 and 9 feet. Seepage levels observed in the February 2023 test pits were between depths of about 2.5 and 3.5 feet.

Our groundwater observations in the test pits, and our experience with groundwater conditions in the area, indicate the observed groundwater seepage levels generally correspond with the local groundwater table. Groundwater levels in the area will fluctuate on a seasonal basis with highest levels occurring during the normally wet winter and spring months. The groundwater levels observed in the February 2023 test pits are likely near seasonal high levels.

3.4 Geologic Hazards

We evaluated site conditions for the presence of geologic hazards as designated in the Marysville Municipal Code (MMC). Chapter 22A.020.080 (G Definitions) of the MMC defines geologic hazard areas (GHAs) as lands or areas characterized by geologic, hydrologic, and topographic conditions that render them susceptible to potentially significant or severe risk of landslides, erosion, or seismic activity.

3.4.1 Erosion Hazard Areas

Chapter 22A.020.060 (E Definitions) of the MMC defines erosion hazard areas as "lands or areas that, based on a combination of slope inclination and the characteristics of the underlying soils, are susceptible to varying degrees of risk of erosion." Erosion hazard areas are classified as low hazard, moderate hazard, and high hazard, based on the following criteria:

1. Low Hazard. Areas sloping less than 15 percent.
2. Moderate Hazard. Areas sloping between 15 and 40 percent and underlain by soils that consist predominantly of silt, clay, bedrock, or glacial till.
3. High Hazard. Areas sloping between 15 and 40 percent that are underlain by soils consisting largely of sand and gravel, and all areas sloping more steeply than 40 percent."

Using the above criteria, and considering that the site is relatively flat, it is our opinion that the subject site has a low erosion hazard. The site soils will, however, be susceptible to erosion and disturbance when exposed during construction. In our opinion, the erosion potential of site soils would be adequately mitigated with proper implementation and maintenance of Best Management Practices (BMPs) for erosion prevention and sedimentation control during construction. All erosion and sedimentation control BMPs should conform with City of Marysville requirements.

3.4.2 Landslide Hazard Areas

Chapter 22A.020.130 (L Definitions) of the MMC defines landslide hazard areas as "areas that, due to a combination of slope inclination and relative soil permeability, are susceptible to varying degrees of risk of land sliding." Landslide hazard areas are classified as Classes I- IV based on the degree of risk as follows:

1. Low Hazard. Areas with slopes of less than 15 percent.
2. Moderate Hazard. Areas with slopes of between 15 and 40 percent and that are underlain by soils that consist largely of sand, gravel, bedrock, or glacial till.
3. High Hazard. Areas with slopes between 15 percent and 40 percent that are underlain by soils consisting largely of silt and clay, and all areas sloping more steeply than 40 percent.
4. Very High Hazard. Areas with slopes over 40 percent and areas of known mappable landslide deposits."

Based on the above criteria, and considering the relatively flat site topography, the site is classified as a low landslide hazard area. In our opinion, site the conditions are not susceptible to landsliding and no hazard mitigation is required.

3.4.3 Seismic Hazard Areas

Chapter 22A.020.200 (S Definitions) of the MMC defines seismic hazard areas as "areas that, due to a combination of soil and groundwater conditions, are subject to severe risk of ground shaking, subsidence, or liquefaction of soils during earthquakes. These areas are typically underlain by soft or loose saturated soils (such as alluvium), have a shallow groundwater table and are typically located on the floors of river valleys. Seismic hazard areas are classified as follows:

1. Low Hazard. Areas underlain by dense soils or bedrock.
2. High Hazard. Areas underlain by soft or loose saturated soils."

Based on soil and groundwater conditions observed in our subsurface explorations and the above criteria, the seismic hazard of the site is classified as "high hazard."

The subsurface conditions observed at the site are potentially susceptible to soil liquefaction during a severe seismic event. Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in water pressure induced by vibrations. Liquefaction mainly affects geologically recent deposits of fine grained sands underlying the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

We completed a liquefaction analysis using the computer program LiquefyPro published by CivilTech Corporation. The analysis was completed using a conservative water table established at a depth of 2 feet, and a site-modified peak ground acceleration (PGA_M) of 0.543g representing the peak horizontal acceleration for the maximum considered earthquake (MCE) having a 2 percent probability of exceedance in 50 years. The value was obtained for Latitude 47.13158724°N and Longitude -122.15953166°W using the Structural Engineers Association of California (SEAOC) U.S. Seismic Design Maps website (https://seismicmaps.org/) accessed on February 27, 2023.

The results of our analysis indicate that soil liquefaction could occur during the design earthquake event resulting in total settlements at the existing ground surface ranging between about 1.4 and 3.0 inches with about one-half of this settlement likely being differential in nature. If unmitigated, these settlements could result in some cracking of building walls and floor slabs, as well as distortion of doors and windows, but in our opinion would not structurally impair the building's use. If the owner is not willing to accept the risk associated with the potential settlements due to liquefaction of the site soils, the buildings should be supported on densified aggregate piers. However, in our opinion, raising site grades with at least four feet of structural fill above natural surface grades would adequately mitigate the potential for damaging settlement resulting from seismically-induced soil liquefaction. The liquefaction analysis results are presented in Appendix B.

Based on the results of our liquefaction analyses and our interpretation of the MMC criteria, it is our opinion the site conditions warrant classification as a "high hazard" seismic hazard area. However, as discussed above, it is our opinion that potential for structural damage resulting from soil liquefaction at the site can be adequately mitigated and that design in accordance with local building codes for determining seismic forces would adequately mitigate life safety impacts associated with ground shaking.

3.5 Seismic Site Class

Because the site soils are subject to liquefaction during a severe seismic event, per the current International Building Code (IBC), subsurface conditions would be assigned site class "F" which would require performing a site-specific seismic analysis to determine seismic forces for structural design. However, the IBC allows for using code derived seismic values for the soil conditions indicated if the building's fundamental period is equal to or less than 0.5 seconds. If the proposed residential structures fall into this category, based on soil conditions encountered and our knowledge of the area geology, site class "D" can be used to determine seismic design forces.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Based on our study, in our opinion, there are no geotechnical constraints that would preclude development as currently planned. The primary geotechnical issues are shallow groundwater levels and the potential for liquefaction-induced settlement resulting from a severe seismic event. In our opinion, raising site grades with at least four feet of structural fill would adequately mitigate the potential for unacceptable liquefaction-induced settlement. The structures can be supported by conventional spread footing foundations bearing on the completed structural fill pad. Floor slabs and pavements can be similarly supported.

With the assumption that site grades will be raised by at least four feet, it remains possible that deeper utility excavations and excavations required for onsite stormwater management facilities could extend below the groundwater table. Any excavations extending below the groundwater table will likely require dewatering to maintain relatively dry working conditions and increase the stability of the granular soils. Design and construction of deeper utility structures that may be impacted by groundwater will need to include buoyancy effects and hydrostatic pressures acting on the structure.

Most of the near-surface soils contain a sufficient amount of fines (silt- and clay-sized particles) that will make them difficult to compact as structural fill when too wet. Accordingly, the ability to use the soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions at the time of construction. If grading activities will take place during the winter season, the owner should be prepared to import free-draining granular material for use as structural fill and backfill.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections of this report. These recommendations should be incorporated into the final design drawings and construction specifications.

4.2 Site Preparation and Grading

To prepare the site for construction, all vegetation, organic surface soils, and other deleterious materials should be stripped and removed from the site. Stripping depths between about 4 and 12 inches should be expected. Topsoil and other organic soils will not be suitable for use as structural fill but may be used for limited depths in non-structural areas. We recommend removing any existing building foundations and slabs and abandoning underground septic systems and other buried utilities from the planned development area. Abandoned utility pipes that fall outside of new building areas can be left in place provided they are sealed to prevent intrusion of groundwater seepage and soil.

Once clearing and stripping operations are complete, cut and fill operations can be initiated to establish desired grades. Prior to placing fill, all exposed surfaces should be compacted using a large, heavy, vibratory roller to densify the loose upper soils and determine if any isolated soft and yielding areas are present. We recommend that a Terra Associates, Inc. representative be on-site to observe proofrolling and verify suitable subgrade conditions in pavement and building areas. If excessively yielding areas are observed and cannot be stabilized in place by compaction, the affected soils should be excavated and removed to firm bearing soil and grade restored with new structural fill. If the depth of excavation to remove unstable soils is excessive, use of a geotextile reinforcing/separation fabric, such as Mirafi 500X or equivalent, can be considered in conjunction with structural fill. Our experience has shown that, in general, a minimum of 18 inches of a clean, granular structural fill over the geotextile fabric should establish a stable bearing surface.

Our study indicates that most of the near-surface native soils and existing fill soils contain a sufficient percentage of fines (silt and clay size particles) that will make them difficult to compact as structural fill if they are too wet or too dry. Accordingly, the ability to use these native soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions when site grading activities take place. Soils that are too wet to properly compact could be dried by aeration during dry weather conditions or mixed with an additive such as cement or lime to stabilize the soil and facilitate compaction. If an additive is used, additional Best Management Practices (BMPs) for its use will need to be incorporated into the Temporary Erosion and Sedimentation Control plan (TESC) for the project.

If grading activities are planned during the wet winter months, or if they are initiated during the summer and extend into fall and winter, the owner should be prepared to import wet weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements.

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc., should examine and test all materials imported to the site for use as structural fill.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In non-structural areas, the degree of compaction can be reduced to 90 percent. Structural fill placed in rights of way should conform to material and compaction specifications set forth by the applicable jurisdiction.

4.3 Excavations

All excavations at the site associated with confined spaces, such as utility trenches, must be completed in accordance with local, state, or federal requirements. Based on current Washington Industrial Safety and Health Act (WISHA) regulations, the medium dense native soils would be classified as Type C soils.

Temporary excavations in Type C soils should be sloped at an inclination of 1.5:1 (Horizontal:Vertical) or flatter. Excavations into sand and gravel deposits below the water table will likely require dewatering using regularly spaced well points in order to stabilize the soils.

The preceding information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that Terra Associates, Inc., assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

4.4 Foundations

The structures may be supported on conventional spread footing foundations bearing on structural fill that is placed on a competent native soil subgrade. Foundation subgrades should be prepared as recommended in Section 4.2 of this report.

Perimeter foundations exposed to the weather should bear at a minimum depth of 1.5 feet below final exterior grades for frost protection. Interior foundations can be constructed at any convenient depth below the floor slab. We recommend designing foundations for a net allowable bearing capacity of 3,000 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used. With the anticipated loads and this bearing stress applied, building settlements should be less than one-half inch total and one-fourth inch differential.

A base friction coefficient of 0.35 can be used for designing foundations to resist lateral loads. Passive earth pressures acting on the sides of the footings can also be considered to resist lateral design loads. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pounds per cubic foot (pcf). We recommend not including the upper 12 inches of soil in this computation because this zone can be affected by weather or disturbed by future grading activity. This value assumes the foundations will be constructed neat against competent soil and backfilled with structural fill, as described in Section 4.2 of this report. The recommended values include a safety factor of 1.5.

4.5 Slab-on-Grade Floors

Slab-on-grade floors may be supported on subgrades prepared as recommended in Section 4.2 of this report. Immediately below the floor slabs, we recommend placing a four-inch thick capillary break layer of clean, free-draining, coarse sand or fine gravel that has less than five percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slabs.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting in uniform curing of the slab and can actually serve as a water supply for moisture transmission through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the current American Concrete Institute (ACI) Manual of Concrete Practice for further information regarding vapor barrier installation below slab-on-grade floors.

4.6 Lateral Earth Pressures for Wall Design

The magnitude of earth pressure development on retaining walls will partly depend on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as described in Section 4.2. To prevent overstressing the walls during backfilling, heavy construction machinery should not be operated within five feet of the wall. Wall backfill in this zone should be compacted with hand-operated equipment. To prevent hydrostatic pressure development, wall drainage must also be installed. A typical wall drainage detail is shown on Figure 3. All drains should be routed to the storm sewer system or other approved point of controlled discharge.

With drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf. To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of 2 feet (2-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall, should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.4.

4.7 Stormwater Detention Ponds

We expect that stormwater detention ponds would be constructed primarily in the structural fill used to raise site grades. If pond depths extend below existing native surface grades, the functional depth of the pond will be limited by the seasonal high groundwater level.

If fill berms will be constructed, the berm locations should be stripped of topsoil, duff, and soils containing organic material prior to the placement of fill. Fill material required to construct perimeter containment berm should consist of silty soils with at least 25 percent fines that is compacted structurally, as recommended in Section 4.2 of this report.

Because of exposure to fluctuating stored water levels, soils exposed on the interior side slopes of the ponds will be subject to some risk of periodic shallow instability or sloughing. Establishing interior slopes at a 3:1 gradient will significantly reduce or eliminate this potential. Exterior berm slopes and interior slopes above the maximum water surface should be graded to a finished inclination no steeper than 2:1. Finished slope faces should be thoroughly compacted and vegetated to guard against erosion.

Because of exposure to fluctuating stored water levels, soils exposed above the dead storage elevation on the interior side slopes of the ponds may be subject to some risk of periodic shallow instability or sloughing. In our opinion, establishing interior slopes at a 3:1 (Horizontal:Vertical) gradient will significantly reduce or eliminate this potential. Finished slope faces should be thoroughly compacted and vegetated to guard against erosion. We should review stormwater management plans when they become available to verify suitability of soils in the planned locations and to provide supplemental discussion and recommendations, if needed.

4.8 Infiltration Feasibility

With seasonal high groundwater levels residing near the existing ground surface, it is our opinion that onsite infiltration is not a viable option for stormwater management.

4.9 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the building areas. We recommend providing a gradient of at least three percent for a minimum distance of ten feet from the building perimeter, except in paved locations. In paved locations, a minimum gradient of two percent should be provided, unless provisions are included for collection and disposal of surface water adjacent to the structure.

Subsurface

We recommend installing perimeter foundation drains adjacent to shallow foundations. The drains can be laid to grade at an invert elevation equivalent to the bottom of footing grade. The drains can consist of four-inch diameter perforated PVC pipe that is enveloped in washed pea gravel-sized drainage aggregate. The aggregate should extend six inches above and to the sides of the pipe. Roof and foundation drains should be tightlined separately to the storm drains. All drains should be provided with cleanouts at easily accessible locations.

4.10 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) or local jurisdictional specifications. As a minimum, trench backfill should be placed and compacted as structural fill, as described in Section 4.2 of this report. As noted, successful use of on-site soils as fill will require close moisture control. When moisture cannot be controlled to facilitate proper compaction, trench backfill should consist of an imported granular soil that meets the grading requirements presented in Section 4.2 of this report.

4.11 Pavements

Pavement subgrades should be prepared as described in Section 4.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. The subgrade should be proofrolled with heavy construction equipment to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. We expect traffic at the facility will consist mainly of cars and light trucks, with occasional heavy traffic in the form of moving trucks and trash/recycle vehicles. With a stable subgrade prepared as recommended, we recommend the following pavement sections:

Light Traffic and Parking:

- 2 inches of hot mix asphalt (HMA) over 6 inches of crushed rock base (CRB)
- 4 inches of full depth HMA

Heavy Traffic:

- 3 inches of HMA over 8 inches of CRB
- 6 inches of full depth HMA

Soil cement stabilization or constructing a soil cement base for support of the pavement section can also be considered as an alternative to the above conventional pavement sections. Assuming a properly constructed soil cement base having a minimum thickness of 12 inches and a minimum 7-day compressive strength of 100 pounds per square inch (psi), a minimum HMA pavement thickness of 3 inches would be required for the heavy traffic areas. The design of the soil cement base should be completed using samples of the subgrade exposed at the time of construction.

The paving materials used should conform to the current Washington State Department of Transportation (WSDOT) specifications for ½-inch hot mix asphalt HMA and CRB.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating the subgrade soils and reducing their supporting capability. For optimum performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks as they occur.

5.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review project designs and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and incorporated into project design. We should also provide geotechnical services during construction to observe compliance with our design concepts, specifications, and recommendations. This will allow for expedient design changes if subsurface conditions differ from those anticipated prior to the start of construction.

6.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the CIC Multifamily project in Marysville, Washington. This report is for the exclusive use of KM Capital, LLC, and their authorized representatives.

The analyses and recommendations presented in this report are preliminary and based on data obtained from the subsurface explorations completed on-site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.

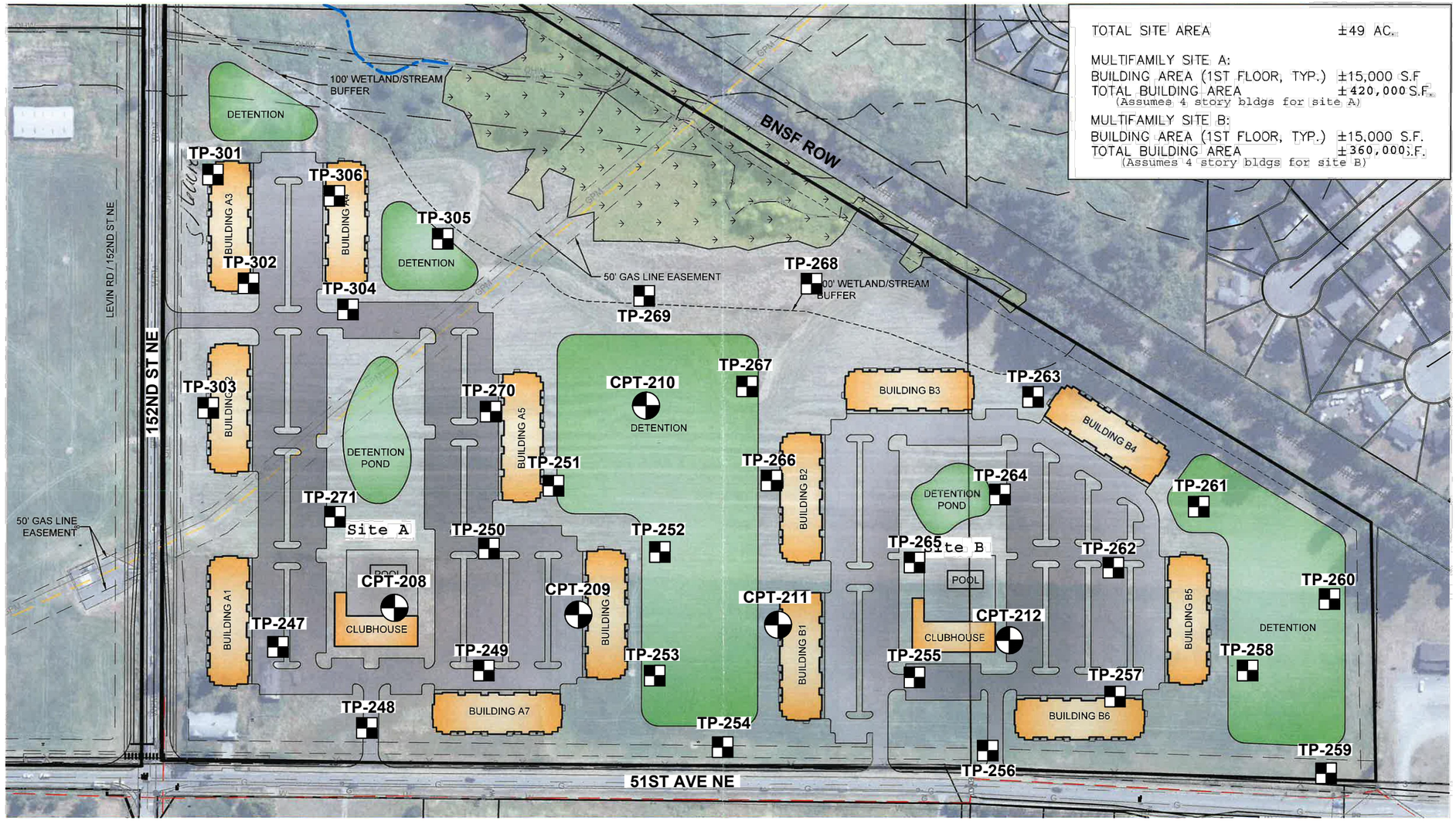
REFERENCE: WSDOT GEOPORTAL

NOT TO SCALE

Terra Associates, Inc.
Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

VICINITY MAP
CIC MULTIFAMILY
MARYSVILLE, WASHINGTON

Proj. No.T-8340-5	Date MAR 2023	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE:

NORTHPOINT DEVELOPMENT

LEGEND:

APPROXIMATE TEST PIT LOCATION

APPROXIMATE CPT LOCATION

0 200 400

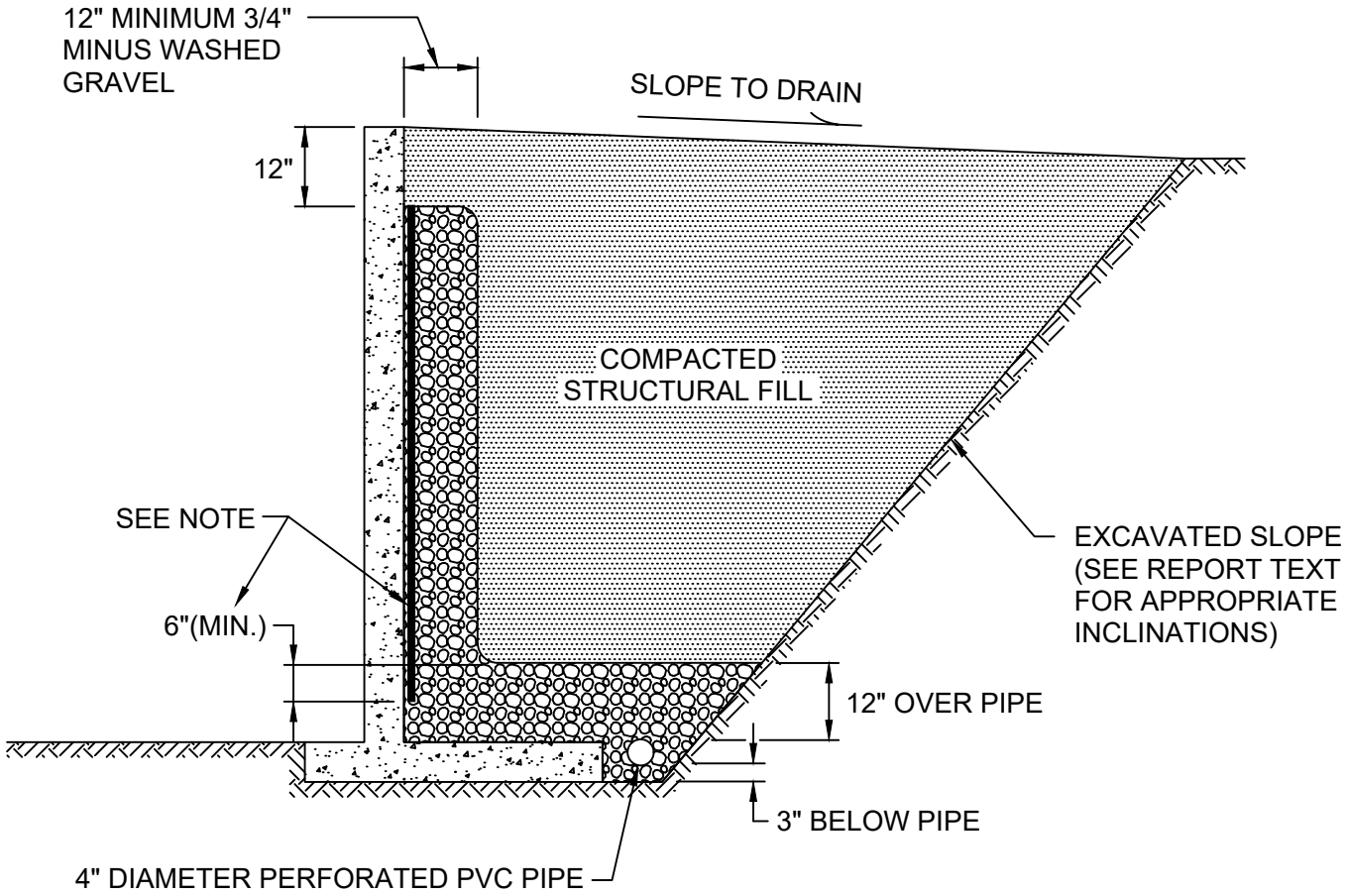
APPROXIMATE SCALE IN FEET

Terra Associates, Inc.

Consultants in Geotechnical Engineering
Geology and
Environmental Earth Sciences

EXPLORATION LOCATION PLAN
CIC MULTIFAMILY
MARYSVILLE, WASHINGTON

Proj. No.T-8340-5 | Date MAR 2023 | Figure 2



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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Geology and
Environmental Earth Sciences

TYPICAL WALL DRAINAGE DETAIL
CIC MULTIFAMILY
MARYSVILLE, WASHINGTON

Proj. No.T-8340-5	Date MAR 2023	Figure 3

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

CIC Multifamily
Marysville, Washington

We explored subsurface conditions at the site by excavating 31 test pits to maximum depths of about 5 to 11 feet using a track-mounted excavator. The test pit locations were approximately determined in the field by pacing and sighting relative to existing surface features and using a hand-held GPS unit. The approximate test pit locations are shown on Figure 2. The Test Pit Logs are attached as Figures A-2 through A-32.

An engineering geologist from our office conducted the field explorations, maintained test pit logs, classified soils, collected representative soil samples, and observed pertinent site features. All soil samples were visually classified in the field in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test pits were placed in sealed containers and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the Test Pit Logs. Grain size analyses were performed on seven select soil samples. The results of the grain size analyses are attached as Figures A-33 through A-35.

In Situ Engineering, under subcontract with Terra Associates, Inc. conducted four 60-foot deep electric cone penetration tests (CPTs) and one 100-foot deep CPT for seismic shear wave velocity testing at site locations selected by Terra Associates, Inc. The approximate CPT locations are shown on Figure 2. The CPT is an instrumented approximately 1.5-inch diameter cone that is pushed into the ground at a constant rate. During advancement, continuous measurements are made of the resistance to penetration of the cone and the friction of the outer surface of a sleeve. The cone is also equipped with a porous filter and a pressure transducer for measuring groundwater or pore water pressure generated. Measurements of tip and sleeve frictional resistance, pore pressure, interpreted soil conditions, and seismic shear wave velocities are summarized in graphical form on the attached CPT Logs.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS (More than 50% material larger than No. 200 sieve size)	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS (More than 50% material smaller than No. 200 sieve size)	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
‖	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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UNIFIED SOIL CLASSIFICATION SYSTEM
CIC MULTIFAMILY
MARYSVILLE, WASHINGTON

Proj. No.T-8340-5	Date MAR 2023	Figure A-1

LOG OF TEST PIT NO. 247

FIGURE A-2

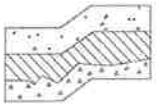
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >6 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1	1	Gray-brown silty SAND, fine grained, dry to moist, mottled. (SM)		21.0
2		Gray-brown to gray SAND with silt, fine grained, moist, mottled. (SP-SM)		
3	2		Medium Dense	18.9
4		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, moist to wet. (SP)		
5				
▼ 6	3			17.8
7		Test pit terminated at 7 feet. Heavy groundwater seepage below 6 feet. Caving below 4 feet.		
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 248

FIGURE A-3

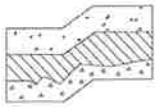
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >6 ft **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil. Brown silty SAND, fine grained, dry. (SM)	Medium Dense	
1		Gray-brown SAND with silt to SAND, fine grained, trace of fine to coarse gravel, dry to moist, mottled. (SP-SM/SP)		
2		Gray silty SAND to sandy SILT, fine grained, moist. (SM/ML)		
3		Gray SAND, fine to medium grained, trace of fine to coarse gravel, moist to wet. (SP) - Grain size and gravel content increase with depth.		
4				
5				
▼ 6				
7		Test pit terminated at 7 feet. Heavy groundwater seepage below 6 feet.		
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 249

FIGURE A-4

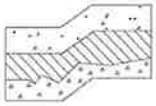
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil. Brown silty SAND, fine grained, dry. (SM)		
1		Gray-brown silty SAND, fine grained, moist, mottled. (SM)		
2				
3		Gray SAND, fine to coarse grained, trace of fine to coarse gravel, wet. (SP)	Medium Dense	
▼ 4				
5				
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 4 feet. Caving below 3 feet.		
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 250

FIGURE A-5

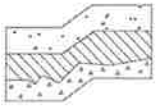
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND, fine grained, dry. (SM)		
1		Gray-brown to orange-brown silty SAND, fine grained, moist, mottled. (SM)		
2				
3			Medium Dense	
		Gray SAND, fine to medium grained, trace of fine to coarse gravel, wet. (SP)		
▼ 4		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)		
5				
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 4 feet. Caving below 4 feet.		
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 251

FIGURE A-6

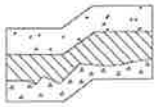
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4 ft **DEPTH TO CAVING:** >3.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND, fine grained, dry. (SM)		
1		Orange-brown to gray-brown silty SAND, fine grained, moist, mottled. (SM)		
2	1		Medium Dense	39.5
3		Gray SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)		
▼ 4	2			16.2
5		Test pit terminated at 5 feet. Heavy groundwater seepage below 4 feet. Caving below 3.5 feet.		
6				
7				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 252

FIGURE A-7

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		12 inches Sod and Topsoil. Gray-brown to orange-brown silty SAND, fine grained, moist, mottled. (SM)	Medium Dense	
3		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)		
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 4.5 feet. Caving below 4 feet.		

▼ 4.5 ft

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 253

FIGURE A-8

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		6 inches Sod and Topsoil.		
		Gray-brown to orange-brown silty SAND, fine grained, moist, mottled. (SM)		
3		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)	Medium Dense	
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 4.5 feet. Caving below 4 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 254

FIGURE A-9

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		7 inches Sod and Topsoil. Gray-brown SAND, fine grained, moist, mottled. (SP)	Medium Dense	
3		Gray-brown to orange silty SAND, fine grained, moist, mottled, significant iron oxide staining. (SM)		
4		Gray to gray-brown SAND, fine to coarse grained, trace of fine to coarse gravel, wet. (SP)		
▼ 5				
7		Test pit terminated at 7 feet. Heavy groundwater seepage below 5 feet. Caving below 4 feet.		
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 255

FIGURE A-10

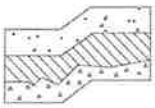
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 14, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** NA

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		12 inches Sod and Topsoil.		
1		Gray-brown silty SAND to SAND with silt, fine to medium grained, scattered coarse sand to fine gravel, moist, mottled. (SM/SP-SM)		
2	1			21.1
3		Gray SAND, fine to medium grained, scattered fine to coarse gravel, wet. (SP)	Medium Dense	
4				
▼				
5				
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 4.5 feet.		
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 256

FIGURE A-11

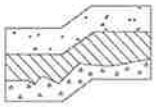
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND fine grained, dry. (SM)		
1		Gray-brown silty SAND to SAND with silt, fine grained, moist, mottled. (SM/SP-SM)		
2				
3		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)		
4			Medium Dense	
▼ 5				
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 5 feet. Caving below 3 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 257

FIGURE A-12

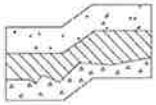
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >3.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND fine grained, dry. (SM)		
1		Gray-brown silty SAND to SAND with silt, fine grained, moist, mottled. (SM/SP-SM)		
2	1			31.5
3		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)		
4	2		Medium Dense	17.4
▼				
5				
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 4.5 feet. Caving below 3.5 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 258

FIGURE A-13

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1		Brown silty SAND fine grained, dry. (SM)		
2		Gray-brown silty SAND to SAND with silt, fine grained, moist, mottled. (SM/SP-SM)		
3		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)		
4 ▼				
5			Medium Dense	
6				
7				
8				
9				
10		Test pit terminated at 10 feet. Heavy groundwater seepage below 4.5 feet. Caving below 4 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 259

FIGURE A-14

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1		Brown silty SAND fine grained, dry. (SM)		
2	1	Red-brown SAND, fine to medium grained, dry to moist, weakly cemented, mottled. (SP)		13.6
3		Orange-brown silty SAND, fine to medium grained, wet, significant iron oxide staining. (SM)		
4		Gray SAND, fine to coarse grained, trace of fine to coarse gravel, wet. (SP)	Medium Dense	
▼ 5				
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 5 feet. Caving below 4 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 260

FIGURE A-15

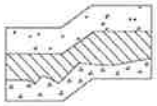
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND fine grained, dry. (SM)		
1		Gray-brown silty SAND, fine grained, dry, mottled. (SM)		
2	1	Orange-brown to gray-brown silty SAND, fine grained, moist, mottled, significant iron oxide staining. (SM)		36.7
3				
4		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)	Medium Dense	
▼ 5				
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 5 feet. Caving below 4 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 261

FIGURE A-16

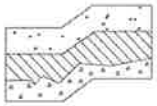
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >9 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, dry. (SM)		
		Gray to gray-brown SAND with silt to silty SAND, fine grained, dry to moist, mottled. (SP-SM/SM)		
2		Gray SAND, fine grained, moist. (SP)		
3				
4		Gray SAND to SAND with silt, fine to medium grained, moist. (SP/SP-SM)		
5			Medium Dense	
6				
7				
8		- Becomes wet below about 8 feet.		
▼ 9				
10	1			24.7
11				
		Test pit terminated at 11 feet.		
12		Heavy groundwater seepage below 9 feet.		
		Caving below 3 feet.		
13				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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Environmental Earth Sciences

LOG OF TEST PIT NO. 262

FIGURE A-17

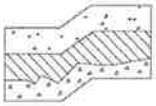
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >7 ft **DEPTH TO CAVING:** >2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil. Brown silty SAND, fine grained, dry. (SM)		
1		Gray-brown SAND, fine grained, dry, mottled. (SP)		
2				
3		Gray SAND, fine to medium grained, moist, scattered coarse sand with gravel layers. (SP)		
4				
5			Medium Dense	
6		- Becomes wet below about 6 feet.		
▼ 7				
8				
9				
10				
		Test pit terminated at 10 feet. Heavy groundwater seepage below 7 feet. Caving below 2 feet.		
11				
12				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 263

FIGURE A-18

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

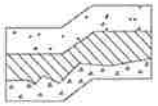
LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		5 inches Sod and Topsoil. Brown silty SAND, fine grained, dry. (SM)		
1		Gray-brown SAND with silt to silty SAND, fine grained, dry, mottled. (SP-SM/SM)		
2		Orange-brown sandy SILT, fine grained, moist to wet, mottled, significant iron oxide staining. (ML)		
3				
4		Gray SAND, fine to coarse grained, scattered fine to coarse gravel, wet. (SP)	Medium Dense	
▼ 5	1			18.0
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 4.5 feet. Caving below 2 feet.		
9				
10				

/

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 264

FIGURE A-19

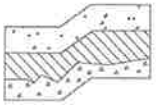
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >7 ft **DEPTH TO CAVING:** >2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Brown silty SAND, fine grained, dry. (SM)		
1	1	Gray-brown silty SAND to SAND with silt, fine grained, dry to moist, mottled. (SM/SP-SM)		9.7
2		Gray SAND, fine grained, moist. (SP)		
3				
4		Gray SAND, fine to medium grained, scattered fine to coarse gravel, wet, scattered coarse sand with gravel layers. (SP)	Medium Dense	
5				
6				
▼ 7				
8				
9		Test pit terminated at 9 feet. Heavy groundwater seepage below 7 feet. Caving below 2 feet.		
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 265

FIGURE A-20

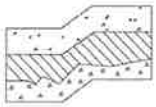
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >7 ft **DEPTH TO CAVING:** >4 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		5 inches Sod and Topsoil. Brown silty SAND, fine grained, dry. (SM)		
1		Gray-brown SAND with silt to silty SAND, fine grained, dry, mottled. (SP-SM/SM)		
2		Orange-brown sandy SILT, fine grained, moist to wet, mottled, significant iron oxide staining. (ML)		
3				
4		Gray SAND, fine to medium grained, scattered coarse sand to fine gravel, moist to wet. (SP)	Medium Dense	
5				
6				
▼ 7				
8				
9		Test pit terminated at 9 feet. Heavy groundwater seepage below 7 feet. Caving below 4 feet.		
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 266

FIGURE A-21

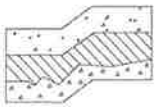
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
		Gray-brown silty SAND, fine grained, dry to moist, mottled. (SM)		
1		Orange-brown silty SAND to sandy SILT, moist, mottled, significant iron oxide staining. (SM/ML)		
2				
3	1			31.7
		Gray SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)	Medium Dense	
4				
▼ 5				
6				
7				
8				
		Test pit terminated at 8 feet. Heavy groundwater seepage below 5 feet. Caving below 2 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 267

FIGURE A-22

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >4.5 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1		Gray-brown silty SAND to SAND with silt, fine grained, dry to moist, mottled. (SM/SP-SM)		
2		Gray-brown sandy SILT, fine to medium sand, moist, mottled, significant iron oxide staining, scattered black-stained pockets. (ML)		
3		Gray SAND, fine to coarse grained, trace of fine to coarse gravel, wet. (SP)		
4			Medium Dense	
▼				
5				
6				
7				
8				
		Test pit terminated at 8 feet. Heavy groundwater seepage below 4.5 feet. Caving below 3 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 268

FIGURE A-23

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >6 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		6 inches Sod and Topsoil.		
1		Gray-brown silty SAND, fine grained, moist, mottled. (SM)		
2				
3		Gray SAND, fine grained, moist to wet. (SP)		
4		Gray SAND with gravel, fine to coarse sand fine to coarse gravel, wet. (SP)	Medium Dense	
5		Gray SAND, fine to medium grained, wet. (SP)		
▼ 6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 6 feet. Caving below 3 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 269

FIGURE A-24

PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >4 ft **DEPTH TO CAVING:** >1 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, dry. (SM)		
2	1	Light brown SAND, fine grained, trace of fine to coarse gravel, moist, mottled. (SP)		10.8
3		Gray SAND, fine to medium grained, trace of fine to coarse gravel, wet. (SP)		
▼ 4			Medium Dense	
5				
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 4 feet. Caving below 1 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 270

FIGURE A-25

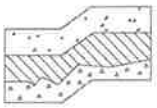
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >5 ft **DEPTH TO CAVING:** >3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		8 inches Sod and Topsoil.		
1		Gray-brown silty SAND to SAND with silt, fine grained, dry to moist, mottled. (SM/SP-SM)		
2		Orange-brown silty SAND, fine to medium grained, moist, mottled, significant iron oxide staining. (SM)		
3		Gray-brown SAND, fine to medium grained, wet. (SP)		
4			Medium Dense	
▼ 5		Gray SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)		
6				
7				
8		Test pit terminated at 8 feet. Heavy groundwater seepage below 5 feet. Caving below 3 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 271

FIGURE A-26

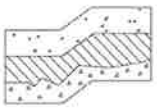
PROJECT NAME: CIC Multifamily **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grasses **APPROX. ELEV:** NA

DATE LOGGED: August 24, 2020 **DEPTH TO GROUNDWATER:** >9 ft **DEPTH TO CAVING:** >2 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		5 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, dry. (SM)		
		Gray to gray-brown SAND, fine grained, dry, mottled. (SP)		
2		Gray SAND, fine grained, moist. (SP)		
3				
4		Gray SAND, fine to medium grained, trace of fine to coarse gravel, moist to wet. (SP)		
5			Medium Dense	
6				
7				
8				
▼ 9				
10				
11		Test pit terminated at 11 feet. Heavy groundwater seepage below 9 feet. Caving below 2 feet.		
12				
13				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 301

FIGURE A-27

PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 3 ft **DEPTH TO CAVING:** > 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
1	1	3 inches Sod and Topsoil. Black, gray, and red-brown silty SAND, fine to medium grained, moist, strongly cemented, significant iron oxide staining. (SM)	Very Dense	44.7
2		Gray-brown SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)		
▼ 3				
4	2		Loose to Medium Dense	17.8
5		- Becomes gray with less gravel below about 5 feet.		
6				
7		Test pit terminated at 7 feet. Heavy groundwater seepage below about 3 feet. Significant caving below 2.5 feet.		
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 302

FIGURE A-28

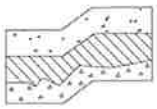
PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 2.5 ft **DEPTH TO CAVING:** > 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		3 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, moist. (SM)	Medium Dense	
2	1	Red-brown silty SAND to SAND with silt, fine to medium grained, moist to wet, strongly cemented, significant iron oxide staining. (SM/SP-SM)	Dense	31.4
▼ 3		Gray-brown SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)	Medium Dense	
4				
5				
6				
7		Test pit terminated at 7 feet. Heavy groundwater seepage below 2.5 feet. Significant caving below 2.5 feet.		
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 303

FIGURE A-29

PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 3 ft **DEPTH TO CAVING:** > 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		3 inches Sod and Topsoil.		
		Brown silty SAND, fine grained, moist to wet. (SM)	Loose to Medium Dense	
1		Gray-brown silty SAND, fine grained, wet, mottled. (SM)		
2	1			22.3
		Gray-brown SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)		
▼ 3				
4			Medium Dense	
5				
6				
		Test pit terminated at 6.5 feet. Heavy groundwater seepage below 3 feet. Significant caving below 2.5 feet.		
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. 304

FIGURE A-30

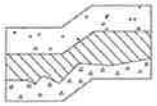
PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 3.5 ft **DEPTH TO CAVING:** > 3.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		3 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, scattered fine to coarse gravel, wet. (SM)	Loose to Medium Dense	
2	1	Red-brown to black silty SAND, fine to medium grained, scattered fine to coarse gravel, moist, moderately cemented, significant iron oxide staining. (SM)	Dense	22.0
3				
▼				
4		Gray SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)	Loose to Medium Dense	
5		Test pit terminated at 5 feet. Heavy groundwater seepage below 3.5 feet. Significant caving below 3.5 feet.		
6				
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 305

FIGURE A-31

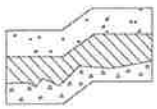
PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 2.5 ft **DEPTH TO CAVING:** > 2.5 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		10 inches Sod and Topsoil.		
1		Brown silty SAND, fine grained, scattered fine to coarse gravel, wet. (SM)	Loose to Medium Dense	
2		Red-brown to black silty SAND, fine to medium grained, scattered fine to coarse gravel, moist to wet, strongly cemented, significant iron oxide staining. (SM)	Dense	
▼				
3	1	Brown SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)	Loose to Medium Dense	22.5
4				
5		Test pit terminated at 5 feet. Heavy groundwater seepage below 2.5 feet. Significant caving below 2.5 feet.		
6				
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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LOG OF TEST PIT NO. 306

FIGURE A-32

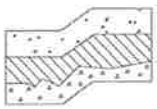
PROJECT NAME: CIC Multi-Family **PROJ. NO:** T-8340-5 **LOGGED BY:** JCS

LOCATION: Marysville, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** NA

DATE LOGGED: February 17, 2023 **DEPTH TO GROUNDWATER:** > 3 ft **DEPTH TO CAVING:** > 3 ft

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		4 inches Sod and Topsoil.		
1	1	Brown silty SAND to sandy SILT, fine grained, wet. (SM/ML)	Loose to Medium Dense	36.5
2		Red-brown to black silty SAND to SAND with silt, fine to medium grained, scattered fine to coarse gravel, moist to wet, strongly cemented, significant iron oxide staining. (SM/SP-SM)	Dense	
▼ 3		Dark gray SAND with gravel, fine to coarse sand, fine to coarse gravel, wet. (SP)	Loose to Medium Dense	
4				
5				
6		Test pit terminated at 6 feet. Heavy groundwater seepage below 3 feet. Significant caving below 3 feet.		
7				
8				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



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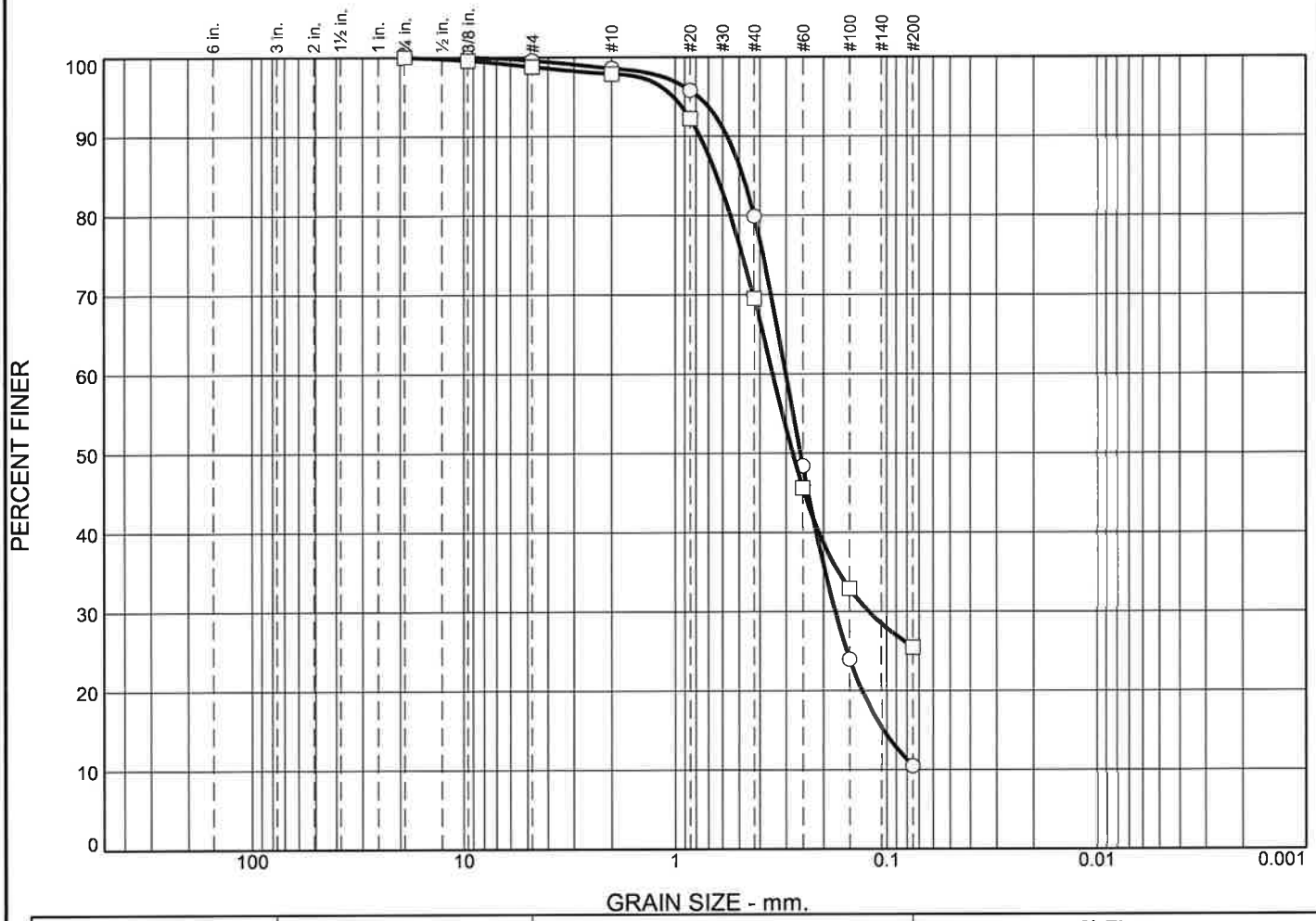
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	1.0	18.7	69.4	10.5	
□	0.0	0.0	1.2	0.9	28.4	44.0	25.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4813	0.3009	0.2567	0.1754	0.1036			
□			0.6379	0.3470	0.2790	0.1215				

Material Description	USCS	AASHTO
○ SAND with silt	SP-SM	
□ silty SAND	SM	

Project No. T-8340-5 **Client:** KM Capitol, LLC

Project: CIC Multi-Family

○ **Location:** TP-261 **Depth:** 10'

□ **Location:** TP-266 **Depth:** 3'

Remarks:

○ Tested August 28, 2020

□ Test August 28, 2020

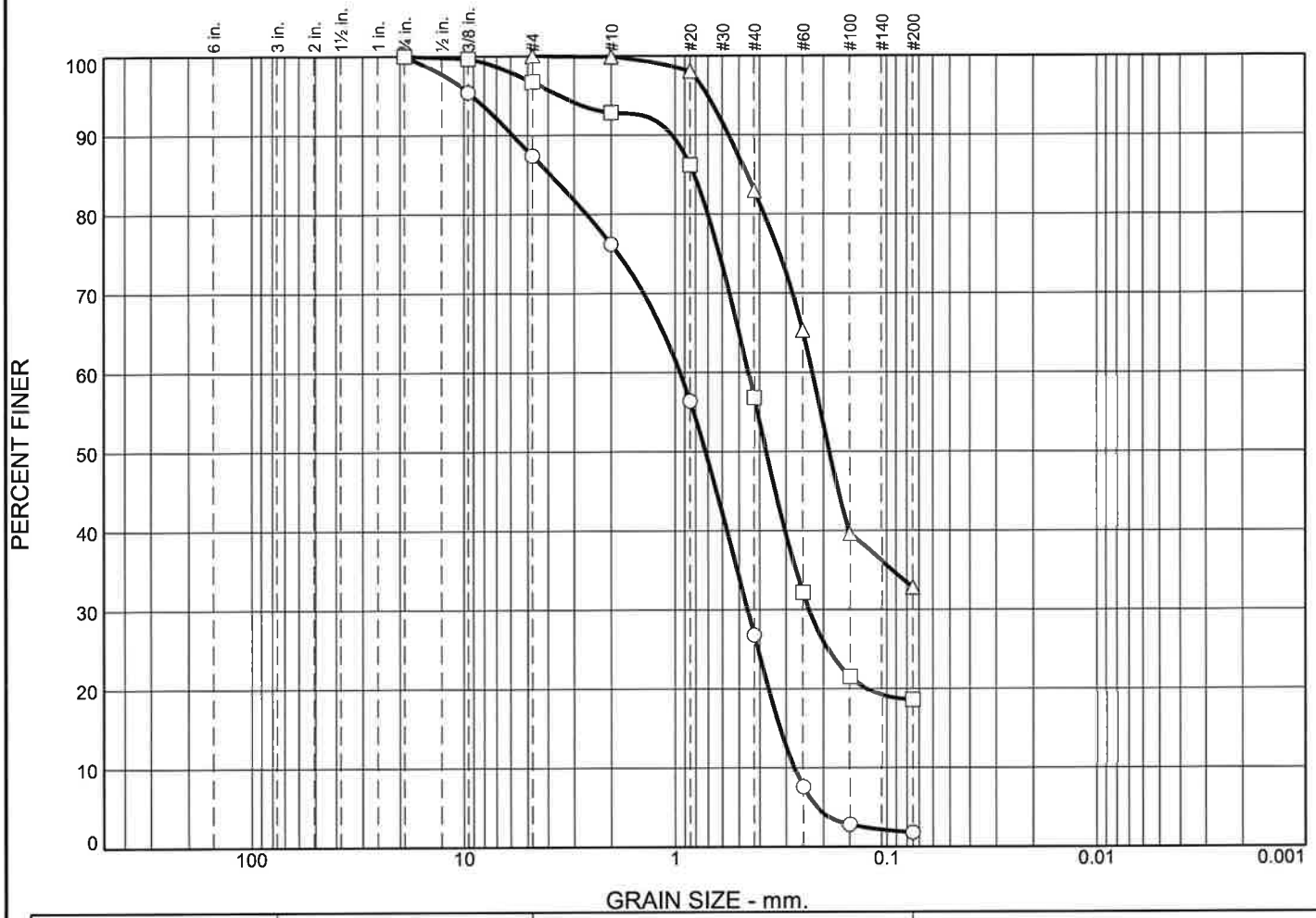
Terra Associates, Inc.

Kirkland, WA

Figure A-33

Tested By: FQ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	12.6	11.2	49.4	25.0	1.8	
□	0.0	0.0	3.3	3.9	36.0	38.2	18.6	
△	0.0	0.0	0.0	0.1	17.0	50.1	32.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.8988	0.9473	0.7184	0.4564	0.3197	0.2746	0.80	3.45
□			0.8135	0.4523	0.3724	0.2337				
△			0.4602	0.2250	0.1873					

Material Description	USCS	AASHTO
○ SAND	SP	
□ silty SAND	SM	
△ silty SAND	SM	

Project No. T-8340-5 **Client:** KM Capitol, LLC

Project: CIC Multi-Family

○ **Location:** TP-301 **Depth:** 4'

□ **Location:** TP-302 **Depth:** 2'

△ **Location:** TP-303 **Depth:** 2'

Remarks:

○ Tested February 24, 2023

□ Tested February 24, 2023

△ Tested February 24, 2023

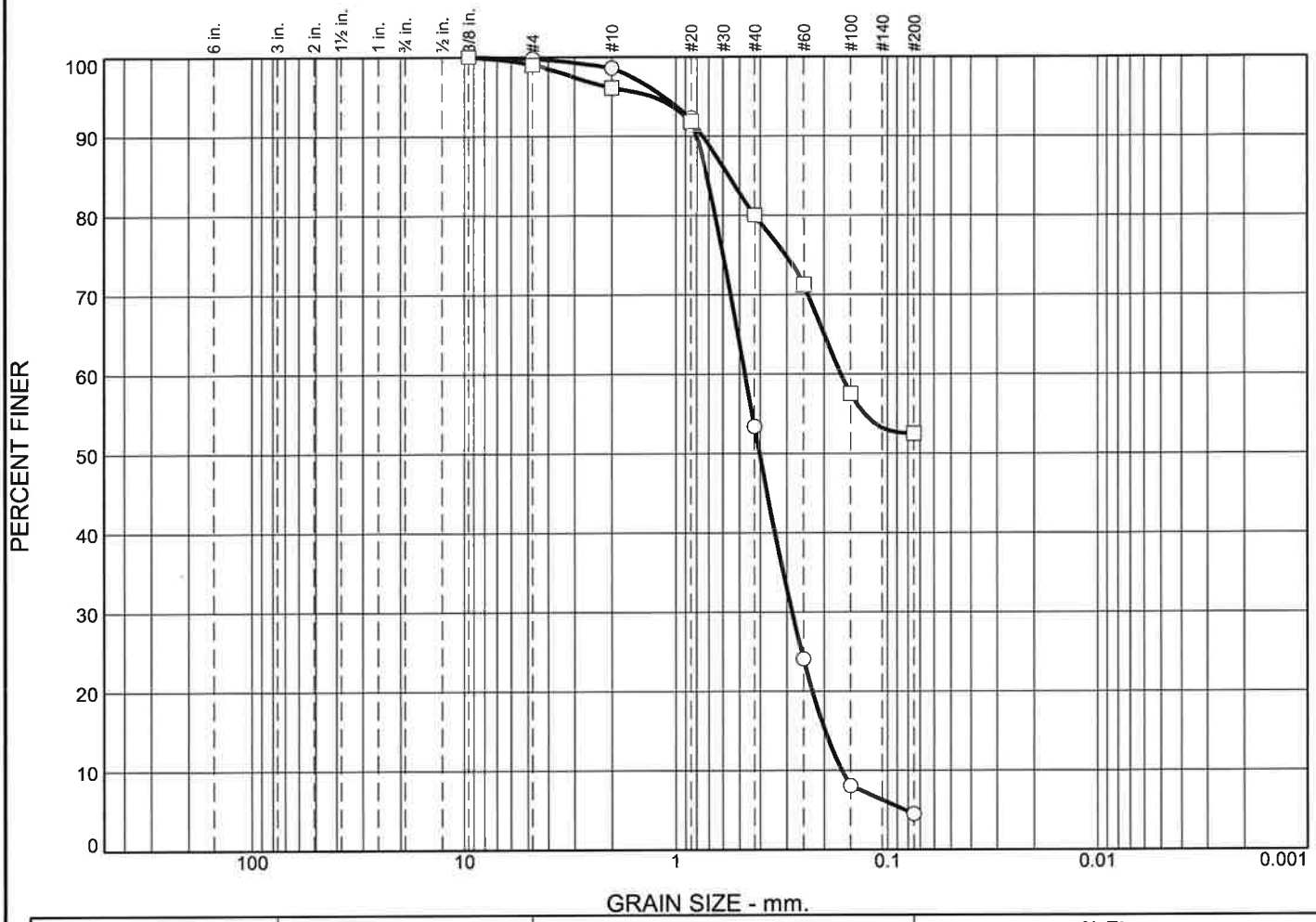
Terra Associates, Inc.

Kirkland, WA

Figure A-34

Tested By: FQ/KJ

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	1.2	45.2	48.9	4.5	
□	0.0	0.0	1.0	2.9	16.1	27.5	52.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.7172	0.4712	0.4026	0.2831	0.1974	0.1647	1.03	2.86
□			0.5640	0.1667						

Material Description	USCS	AASHTO
○ SAND	SP	
□ sandy SILT	ML	

Project No. T-8340-5 **Client:** KM Capitol, LLC

Project: CIC Multi-Family

○ **Location:** TP-305 **Depth:** 3'

□ **Location:** TP-306 **Depth:** 1'

Remarks:

○ Tested February 24, 2023

□ Tested February 24, 2023

Terra Associates, Inc.

Kirkland, WA

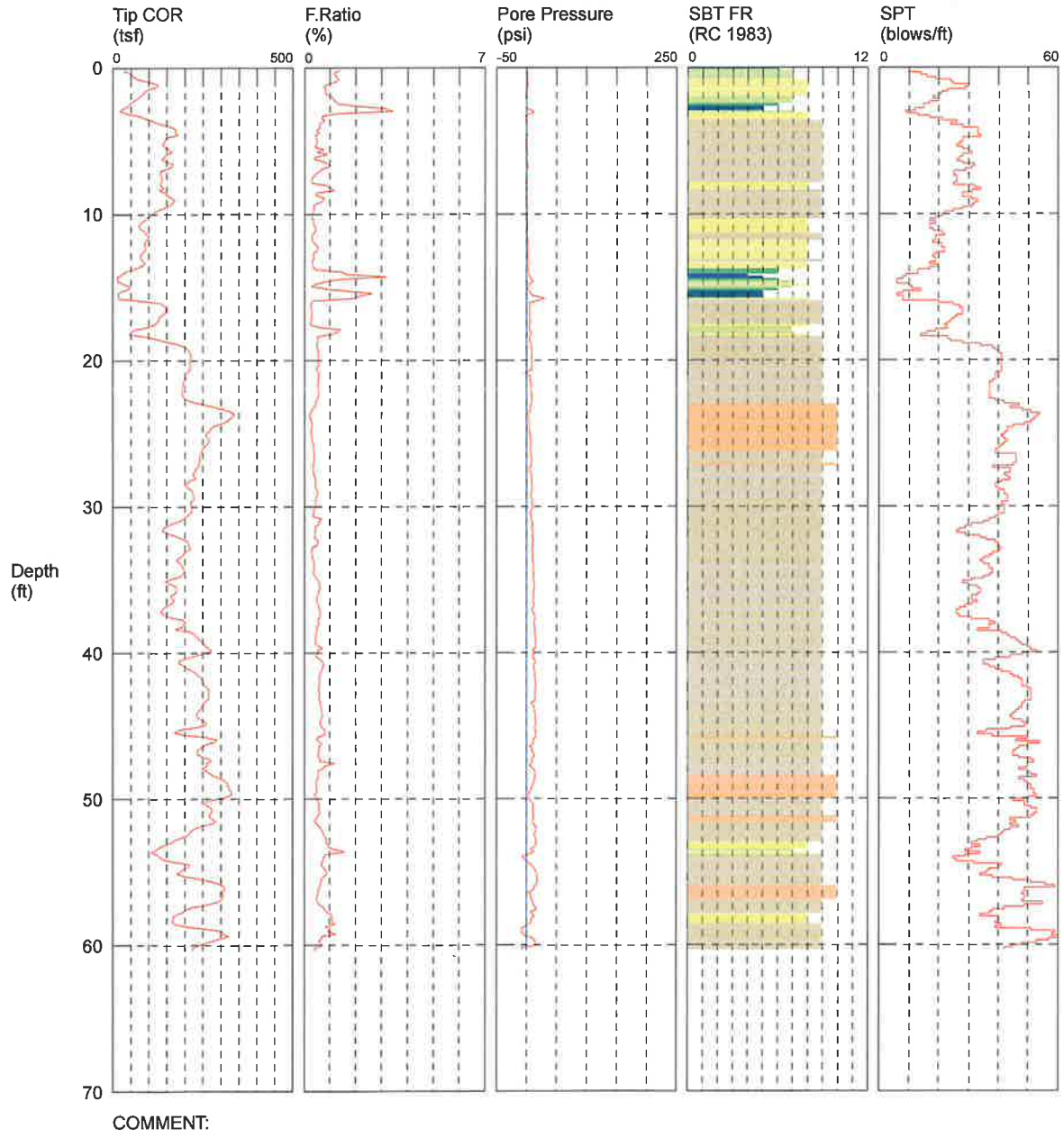
Figure A-35

Tested By: FQ/KJ

CPT-208

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 8/19/2020 7:53:30 AM
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



COMMENT:

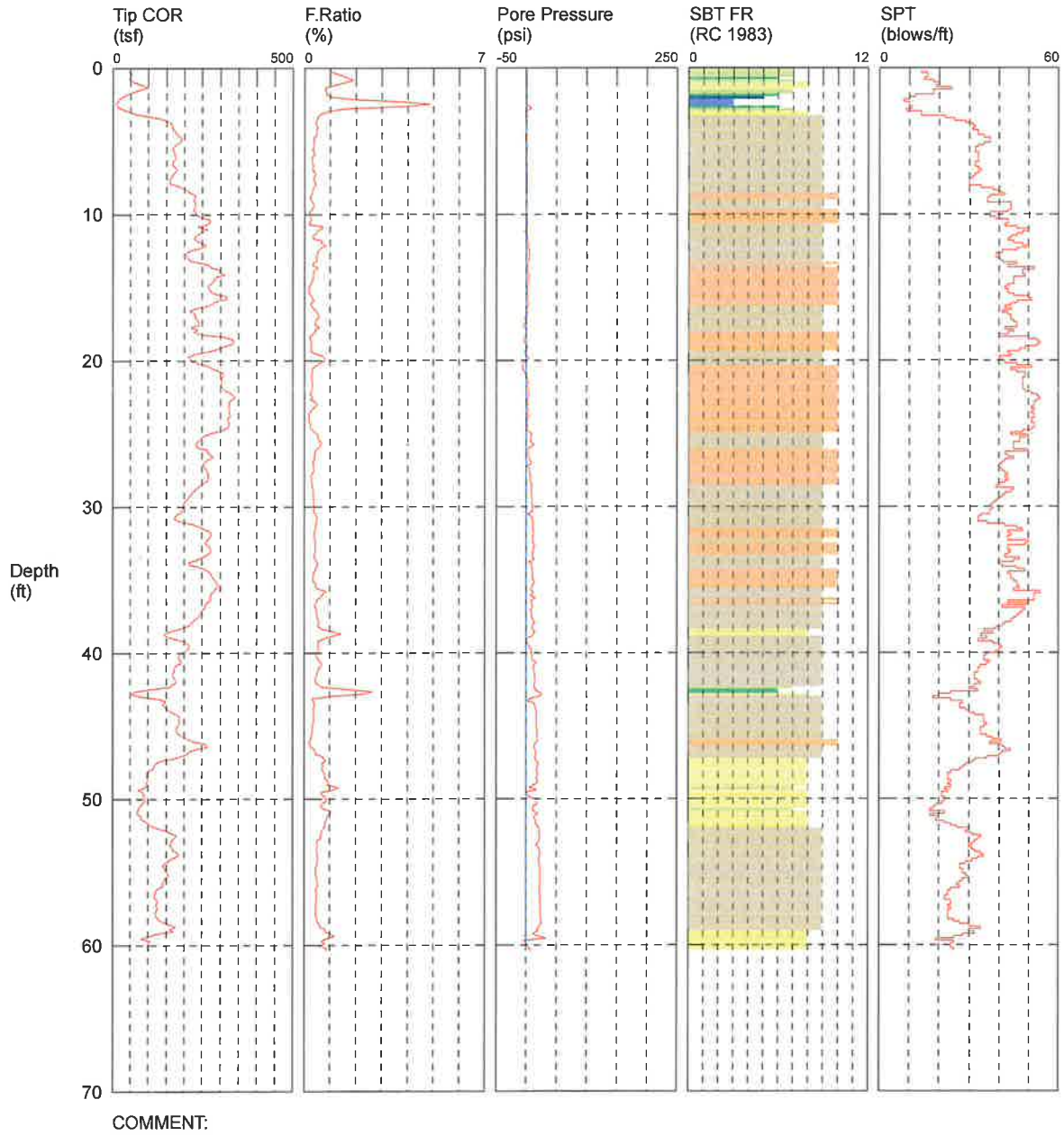
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-209

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 8/18/2020 1:07:44 PM
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



COMMENT:

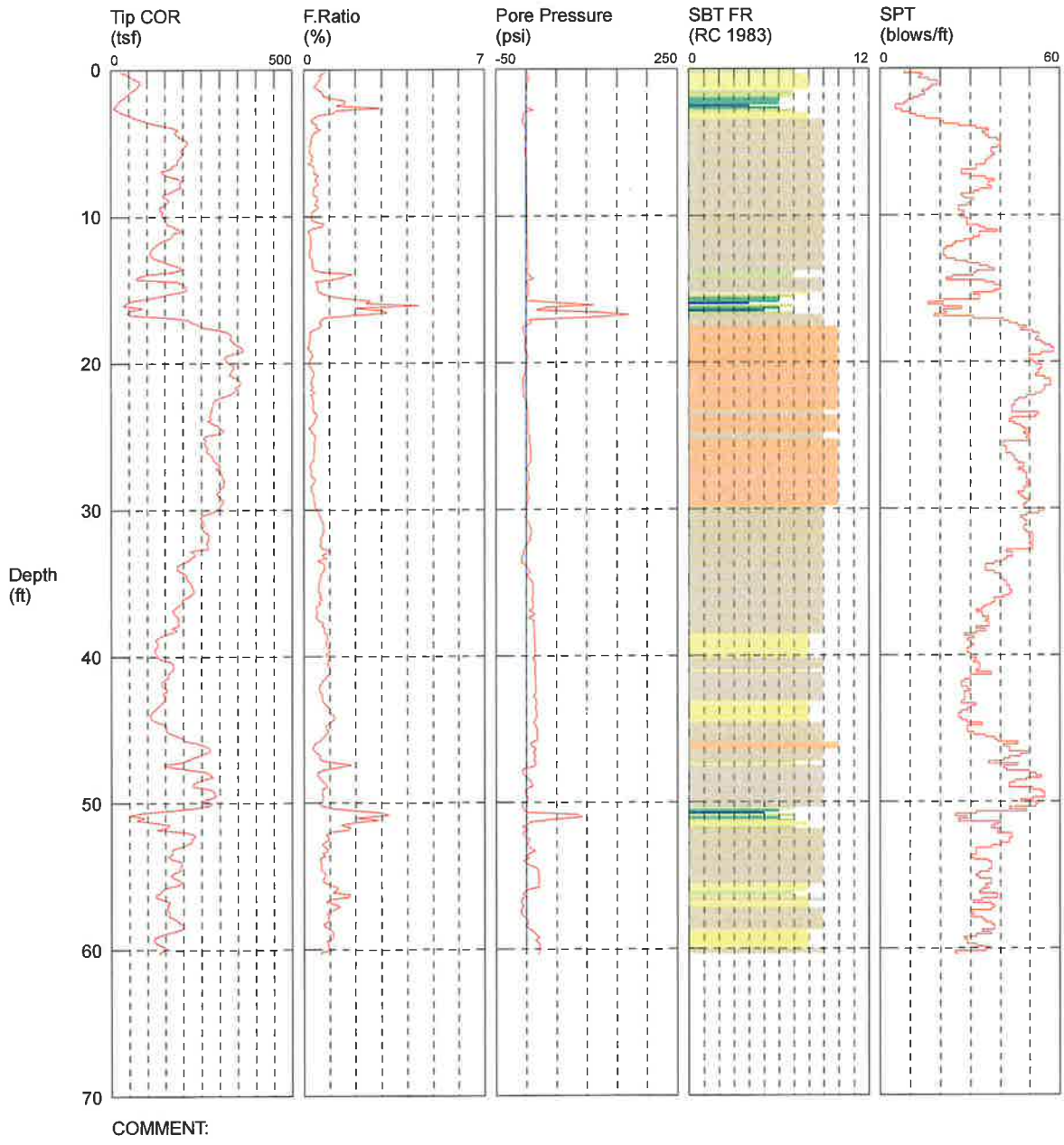
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-210

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 8/19/2020 6:57:28 AM
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



COMMENT:

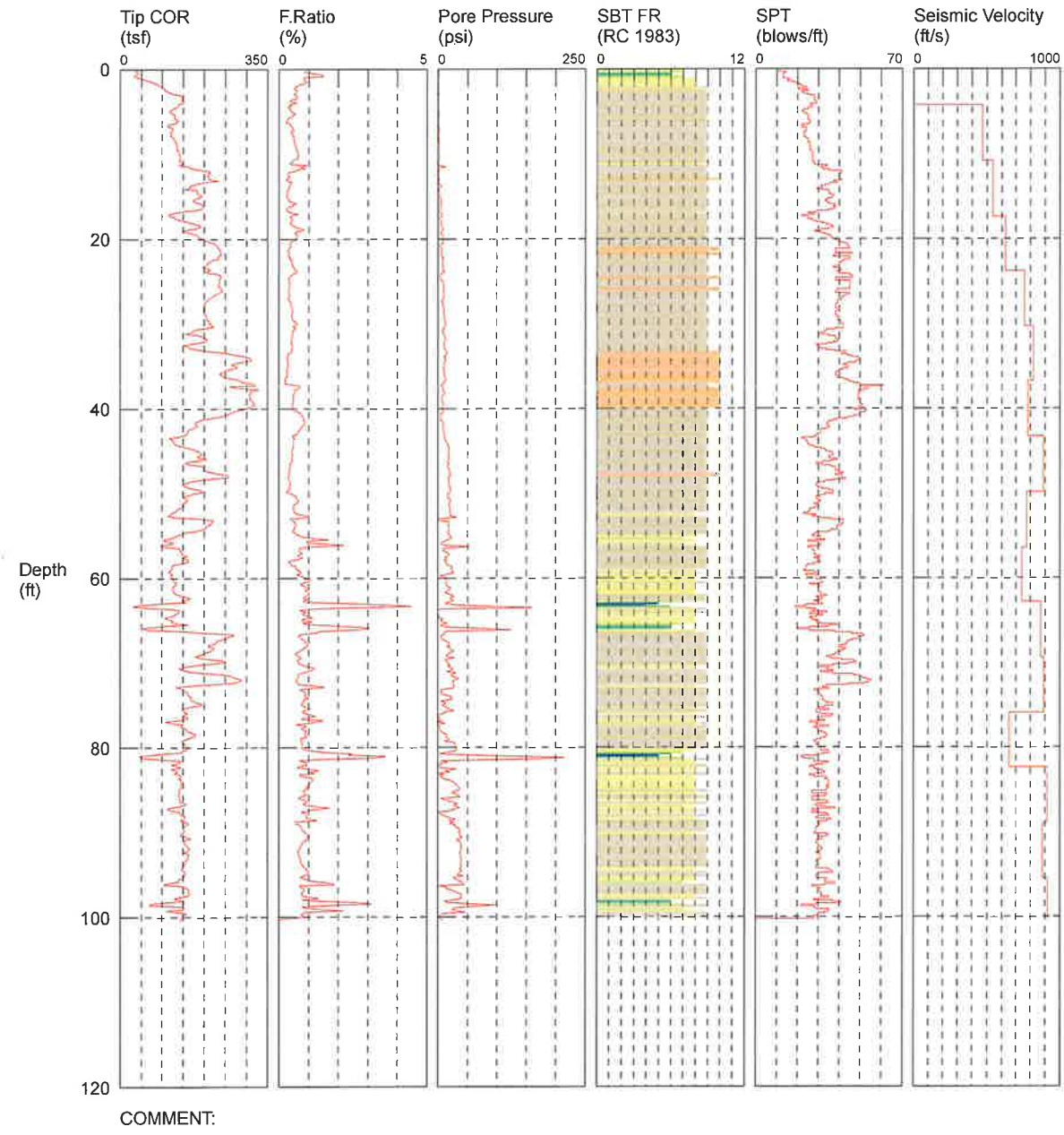
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-211

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 8/18/2020 9:46:34 AM
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



COMMENT:

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

HOLE NUMBER: CPT-211

OPERATOR: Mayfield

CUSTOMER:

LOCATION: Arlington

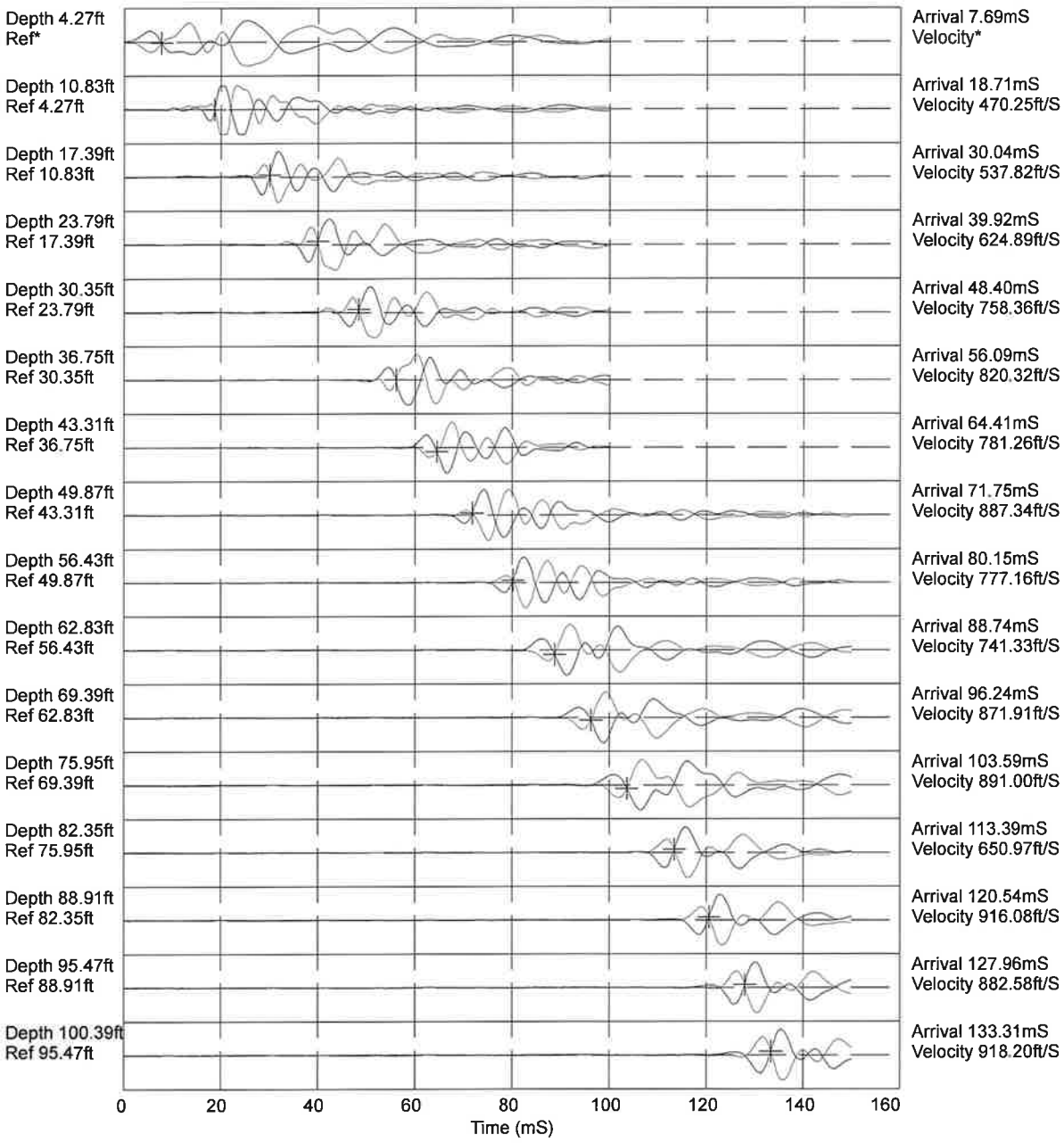
JOB NUMBER: T-8340

CPT Contractor: In Situ Engineering

CONE ID: DDG1263

TEST DATE: 8/18/2020 9:46:34 AM

HOLE NUMBER: CPT-211

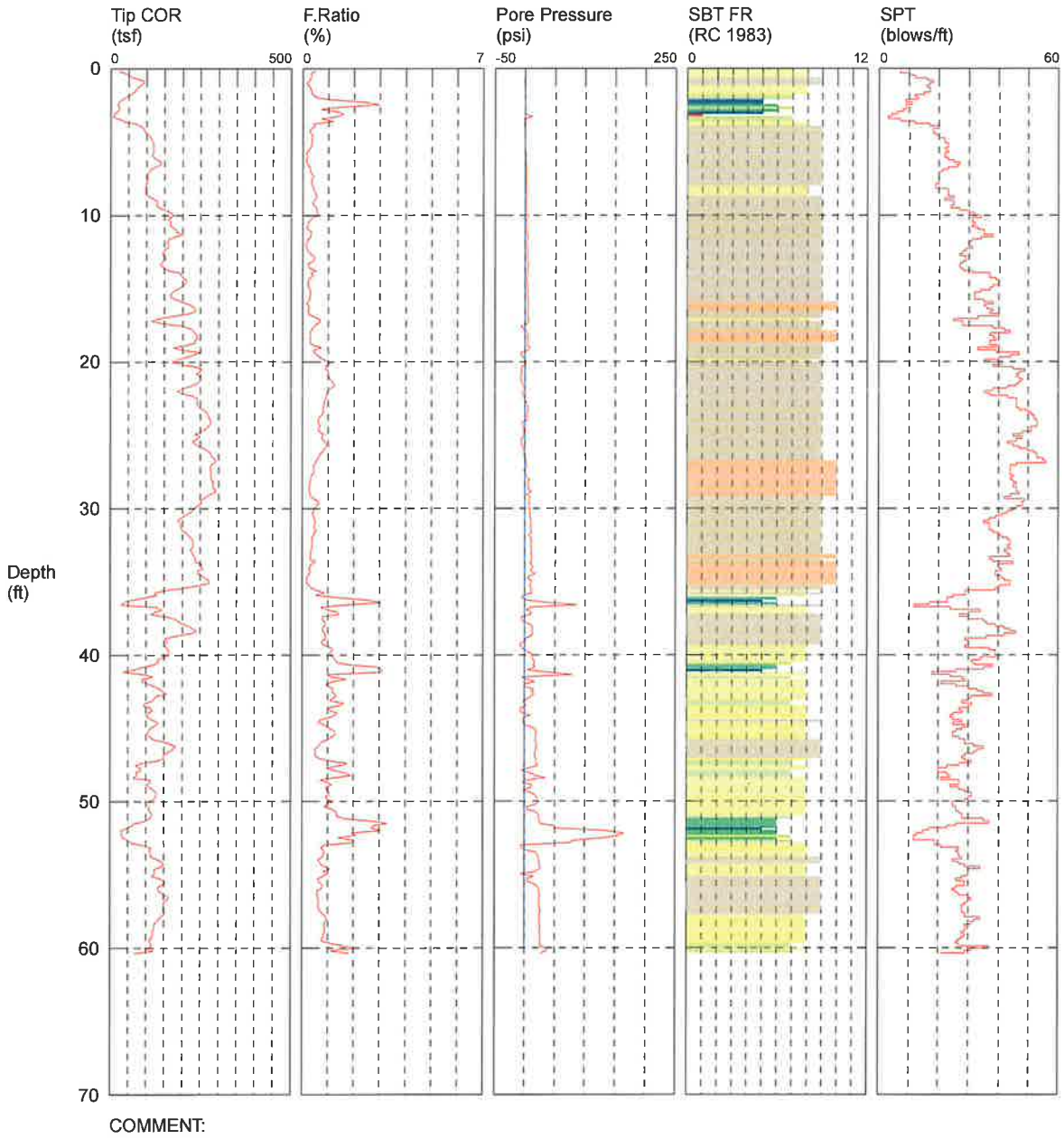


Hammer to Rod String Distance (ft): 5.51
* = Not Determined

CPT-212

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 8/18/2020 11:51:11 AM
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



COMMENT:

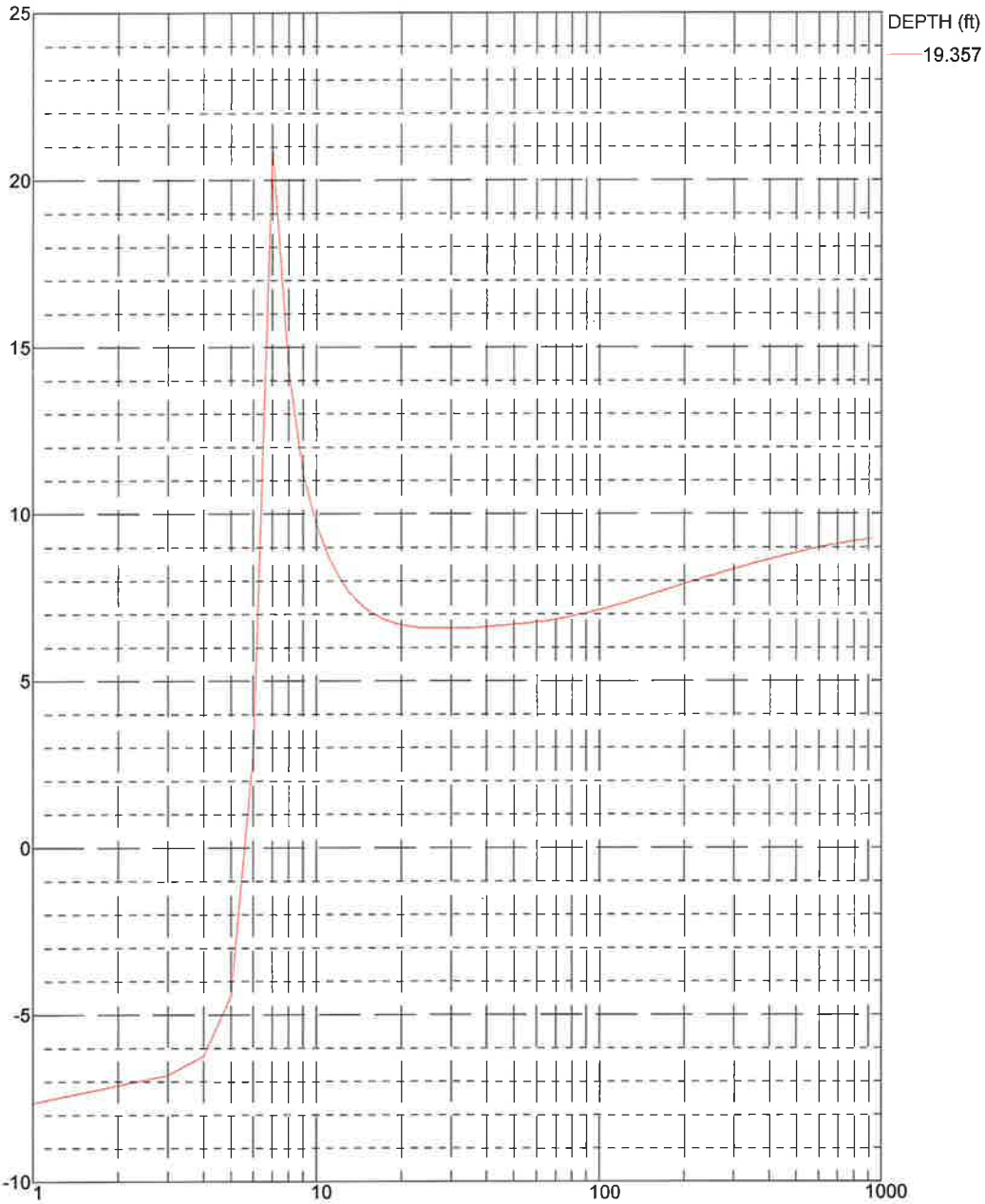
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

CPT-212

CPT Contractor: In Situ Engineering
CUSTOMER: Terra
LOCATION: Arlington
JOB NUMBER: T-8340

OPERATOR: Mayfield
CONE ID: DDG1263
TEST DATE: 08/18/2020 11:53:11
Predrill:
Backfill: 20% Bentonite Slurry
Surface Patch:



MAXIMUM PRESSURE = 20.932 (PSI) TIME: (SECONDS)
HYDROSTATIC PRESSURE = 8.389 (PSI), WATER TABLE: 0.00 ft
COMMENT:

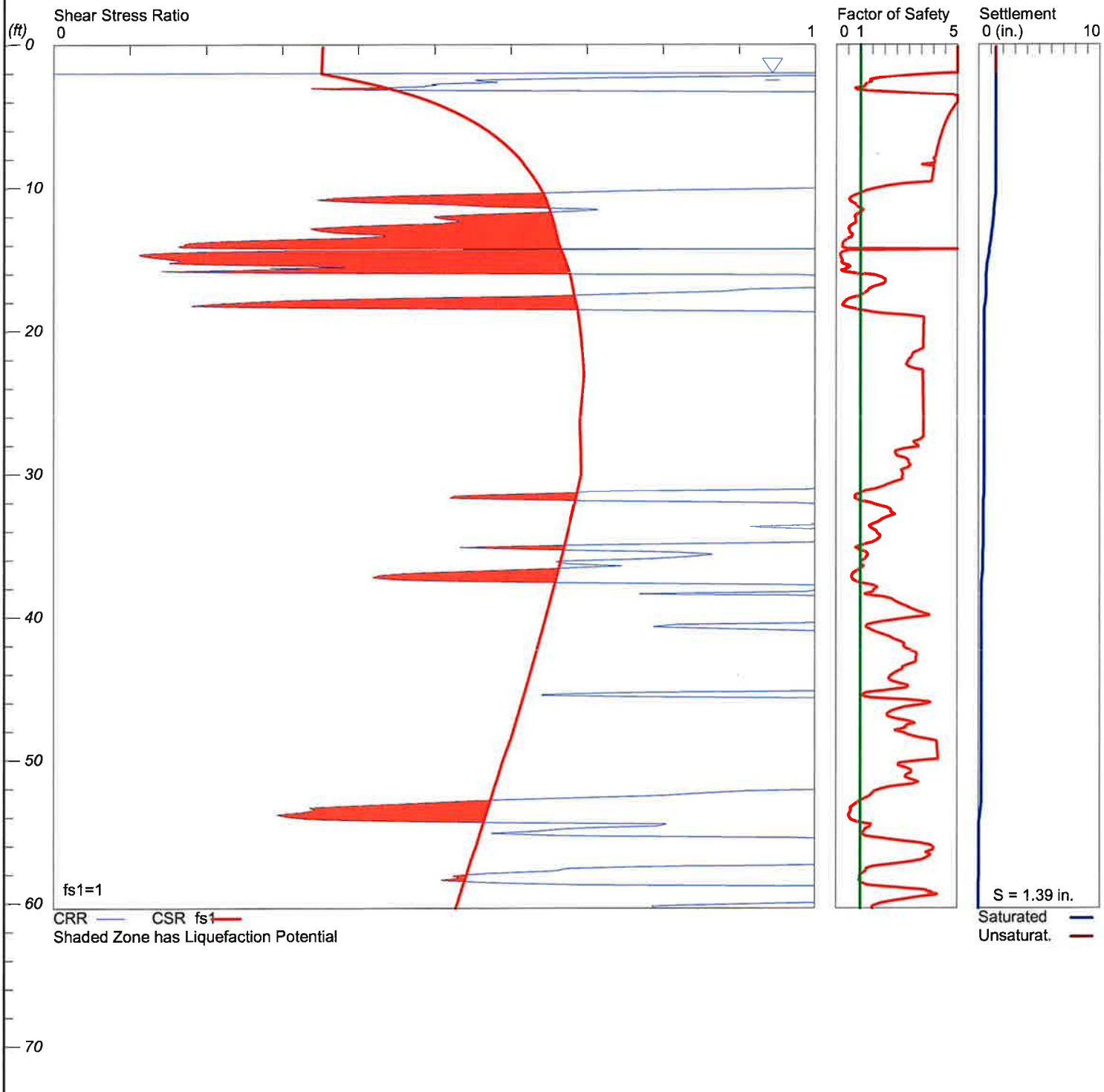
APPENDIX B
LIQUEFACTION ANALYSES RESULTS

LIQUEFACTION ANALYSIS

CIC Multifamily

Hole No.=CPT-208 ***Water Depth=2 ft***

Magnitude=7
Acceleration=0.543g



LIQUEFACTION ANALYSIS

CIC Multifamily

Hole No.=CPT-212 Water Depth=2 ft

Magnitude=7
Acceleration=0.543g