City of Tacoma

Public Works Engineering

ADDENDUM NO. 1 **DATE:** 11/15/2023

REVISIONS TO:
Request for Bids Specification No. PW23-0241F
Streets Initiative Packages # 24 & #35

NOTICE TO ALL BIDDERS:

This addendum is issued to clarify, revise, add to or delete from, the original specification documents for the above project. This addendum, as integrated with the original specification documents, shall form the specification documents. The noted revisions shall take precedence over previously issued specification documents and shall become part of this contract.

REVISIONS TO THE SUBMITTAL DEADLINE:

The submittal deadline has been changed to 11:00 a.m., Pacific Time, Tuesday, November 28, 2023.

REVISIONS TO THE SPECIAL PROVISIONS:

Change 1 – Public Works Specifications
Add Section 1-07.12 Federal Agency Inspection Addendum 1
Change 2 – Water Specifications
Remove Water Section 7-09.5 Payment and Replace with Water Section 7-09.5 Payment Addendum 1.
Change 3 – Geotechnical Report
Appendix B is supplemented with the attached "Report of Geotechnical Engineering Services"
Change 4 – TERO Documents
The attached TERO documents are added to the specifications as Appendix D.

REVISIONS TO THE PLANS:

Change 1 – Water Plans
The Sheets "Tacoma Water 1 – 9" are added to the plan set.
Change 2 – Guardrail Plans
The Sheets "Addendum #1 Guardrail Repair" 1 – 10 are added to the plan set.

REVISIONS TO THE PROPOSAL PAGES:

Change 1 – Bid Proposal
Remove Bid Proposal in its entirety and replace with Bid Proposal marked Addendum 1.

REVISIONS TO THE SUBMITTAL PACKAGE:

Change 1 – Bid Proposal
Remove Bid Proposal in its entirety and replace with Bid Proposal marked Addendum 1.

City of Tacoma

NOTE: Acknowledge receipt of this addendum by initialing the corresponding space as indicated on the signature page. Vendors who have already submitted their bid/proposal may contact the Purchasing Division at 253-502-8468 and request return of their bid/proposal for acknowledgment and re-submittal. Or, a letter acknowledging receipt of this addendum may be submitted in an envelope marked Request for Bids Specification No. PW23-0241F Addendum No.1. The City reserves the right to reject any and all bids, including, in certain circumstances, for failure to appropriately acknowledge this addendum.

cc: Josh Lauer, Public Works Engineering

1-07.12 Federal Agency Inspection

Section 1-07.12 is supplemented with the following:

Indian Preference And Tribal Ordinances
(June 1, 2023 Tacoma GSP)

A portion of the project is located on the Puyallup Tribe Reservation. It is the Contractor's responsibility to contact the person and/or office listed in this special provision to determine whether any tribal laws or taxes apply. If the tribal laws and taxes do apply, the Contractor shall comply with them in accordance with Section 1-07.1. For informational purposes only, the Work on this project that falls within Tribal Lands is shown on "Addendum #1 Guardrail Repair" sheets 7 – 10.

Tribal Employment Rights Ordinances (TEROs), may utilize a variety of tools to encourage Indian employment. These tools may include, but are not limited to, TERO fees, Indian hiring preference, Indian-owned business subcontracting preference and/or an Indian training requirement. Other requirements may be a Tribal business license, a required compliance plan and/or employee registration requirements. Every tribe is different and each may be willing to work cooperatively with the Contractor to develop a strategy that works for both parties. For specific details, the Contractor should contact Puyallup Tribe of Indian's TERO Office by phone: (253) 573-7846; or email: TERO@PuyallupTribe-nsn.gov. Appendix D includes pertinent information, forms and sample forms with regards to TERO with the Puyallup Tribe of Indians.

The state recognizes the sovereign authority of the tribe supports the tribe's efforts to enforce its rightful and legal ordinances and expects the Contractor to comply and cooperate with the tribe. The costs related to such compliance shall be borne solely by the Contractor, who is advised to contact the tribal representative listed above, prior to submitting a bid, to assess the impact of compliance on the project.

Although Indian preference cannot be compelled or mandated by the Contracting Agency, there is no limitation whereby voluntary Contractor or Subcontractor initiated preferences are given, if otherwise lawful. 41 CFR 60-1.5(a)7 provides as follows:

> Work on or near Indian reservations --- It shall not be a violation of the equal opportunity clause for a construction or non-construction Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation in connection with employment opportunities on or near an Indian reservation. The use of the word near would include all that area where a person seeking employment could reasonably be expected to commute to and from in the course of a work day. Contractors or Subcontractors extending such a preference shall not, however, discriminate among Indians on the basis of religion, sex, or tribal affiliation, and the use of such a preference shall not excuse a Contractor from complying with the other requirements as contained in the August 25, 1981 Department of Labor, Office of Federal Contract Compliance Programs, Government Contractors Affirmative Actions Requirements.

7-09.5 Payment
This section is revised to read:

"Trench Excavation and Disposal", per cubic yard.

The unit contract price for "Trench Excavation and Disposal" shall be full pay for all labor, equipment and materials required for excavating and disposal of unsuitable materials. Trench and disposal requirements will be in accordance with WSDOT Standard Specifications as modified in these Special Provisions.

"Trench Excavation of Contaminated Material, Incl. Haul to LRI", per cubic yard.

The unit contract price per cubic yard for "Trench Excavation of Contaminated Material, Incl. Haul to LRI" shall be full pay for all work required to haul and dispose of all contaminated unsuitable material, at LRI Landfill, located at 30919 Meridian Street East, Graham, WA, which is a licensed solid waste disposal facility. Trench and disposal requirements will be in accordance with WSDOT Standard Specifications as modified in these Special Provisions. Actual measurement will be based on a neat line trench measurement, per cubic yard.

"Trench shoring", per linear foot.

The single lineal foot measurement will be full pay for both sides of the trench that is shored. Over-excavation to bypass the use of a shoring/shielding is not considered a safety system and no payment will be made.

"____-inch Ductile Iron Pipe, _____Joint ANSI/AWWA. C151 Special Thickness Class No. 52", per linear foot.

The unit contract price per linear foot for each size of "____-inch Ductile Iron Pipe, _____Joint ANSI/AWWA. C151 Special Thickness Class No. 52" shall be full pay for all work to complete the installation of the water main including but not limited to furnishing, laying, jointing pipe, gaskets, gland/bolt kits, testing, flushing, disinfecting the pipeline and cleanup.

Payment for restoration will be made under the applicable items shown in the Proposal. If no pay items for restoration are included in the Proposal, restoration shall be considered incidental to the work of constructing the water main, and all costs thereof shall be included in the unit contract price for "____-inch Ductile Iron Pipe, _____Joint ANSI/AWWA. C151 Special Thickness Class No. 52".

''Asbestos cement Pipe removal and disposal plan", per lump sum.

The lump sum contract price for "Asbestos cement Pipe removal and disposal plan" shall be full pay for all costs, including but not limited to, preparing, submitting, revising, complying with testing requirements, and resubmitting revisions for the Asbestos cement Pipe removal and disposal plan.

"Removal and disposal of abandoned AC pipe, all sizes", per linear foot.

The unit contract price per linear foot of "Removal and disposal of abandoned AC pipe, all sizes": shall be full pay for all work to complete the removal, abatement, haul,

disposal, permitting and permit fees, documentation, material, personal protective equipment, and cleanup necessary to properly remove and dispose of AC pipe abandoned as part of this contract.

"____-inch Ductile Iron Reducer, _____M.J. with concrete anchor, (dwg. 17-56-1) in place", per each.

The unit contract price for "____-inch Ductile Iron Reducer, ____M.J. with concrete anchor, (dwg. 17-56-1) in place" shall be full pay for all labor, equipment and materials required for furnishing and installing these items including concrete anchor, gaskets and gland/bolts kits.

"____-inch Ductile Iron (*fitting)*, M.J. _____in place", per each.

The unit contract price for "____-inch Ductile Iron (*fitting)*, M.J. _____in place" shall be full pay for all labor, equipment and materials required for furnishing and installing these items including gaskets and gland/bolts kits.

"____-inch Ductile Iron *(cap/plug)*, M.J., tapped ____-inch, installed & removed", per each.

The unit contract price for "____-inch Ductile Iron (*cap/plug)*, M.J., tapped ____-inch, installed & removed" shall be full pay for all labor, equipment and materials required for furnishing, installing and removing these items including gaskets gland/bolts kits.

"____-inch Ductile Iron *(Cap/plug),* M.J., tapped ____-inch, in place", per each.

The unit contract price for "____-inch Ductile Iron (*cap/plug)*, M.J., tapped ____-inch, in place" shall be full pay for all labor, equipment and materials required for furnishing, and installing these items including gaskets gland/bolts kits.

"____-inch _____Tapping Sleeve, in place", per each.

The unit contract price for "____-inch _____Tapping Sleeve" shall be full pay for all labor, equipment and materials required for furnishing, and installing these items including gaskets gland/bolts kits.

"____-inch Transition Coupling with ____-inch center ring, ____coating, and _____bolts, _____to D.I.", per each.

The unit contract price for "____-inch Transition Coupling with ____-inch center ring, ____coating, and _____bolts, _____to D.I." shall be full pay for all labor, equipment and materials required for furnishing and installing these items.

"____-inch End Cap Coupling tapped ____-inch, with ____inch center ring,____ coating, and ____bolts," per each.

The unit contract price for "____-inch End Cap Coupling tapped ____-inch, with ____inch center ring, ____coating, and ____bolts," shall be full pay for all labor, equipment and materials required for furnishing and installing these items.

" ____-inch Blow-Off Assembly, in place", per each.

The unit contract price bid per each for "____-inch Blow-Off Assembly, in place" shall be full pay for all work to install the blow-off assembly per drawing 17-56-1, including but not limited to excavating, backfilling, laying and jointing pipe, pipe and fittings, valve box, meter box, and cleanup. Bid item to include raising valve box to finished grade per drawing 17-56-1, and to include concrete pad and asphalt patch at valve box.

"Temporary ____-inch Blow-Off Assembly, installed & removed", per each.

The unit contract price bid per each for "Temporary ____-inch Blow-Off Assembly, installed & removed" shall be full pay for all work to install the blow-off assembly per drawing 17-56-1, including but not limited to excavating, backfilling, laying and jointing pipe, pipe and fittings, gate valve, meter box, cleanup and removal.

"____-inch Mechanical Joint Restraining Gland, in place", per each.

The unit contract price for "____-inch Mechanical Joint Restraining Gland, in place" shall be full pay for all labor, equipment and materials required for furnishing and installing the specified item.

"____-inch Push-On Joint Restraining Gasket, in place", per each.

The unit contract price for "____-inch Push-On Joint Restraining Gasket, in place" shall be full pay for all labor, equipment and materials required for furnishing and installing the specified item.

"Concrete Thrust Anchor, in place", per each.

The unit contract price for "Concrete Thrust Anchor, in place" shall be full pay for all labor, equipment and materials required for furnishing and installing the specified item.

"Temporary Concrete Thrust Anchor, installed & removed", per each.

The unit contract price for "Temporary Concrete Thrust Anchor, installed & removed" shall be full pay for all labor, equipment and materials required for furnishing, installing and removing the specified item.

"Crushed Surfacing Top Course for Trench Backfill per section 9-03.9(3) of the _____WSDOT Standard Specifications, shoulder restoration, and as directed by the inspector", per ton.

The unit contract price for "Crushed Surfacing Top Course for Trench Backfill per section 9-03.9(3) of the _____WSDOT Standard Specifications, shoulder restoration, and as directed by the inspector" shall be full pay for all labor, equipment and materials required for furnishing and installing the specified item including delivery, spreading, compacting and rolling.

"Trench Compaction Test (as directed by the inspector)", per each.

The unit contract price for "Trench Compaction Test (as directed by the inspector)" shall be for passing compaction test as per sections 7-09.3(11), and 2-03(14)D. Testing will be performed by a licensed testing company with trained personnel in the presence of the Tacoma Water Construction Inspector and shall be measured per each passed test.

"Test Holes", per lump sum.

The lump sum contract price for "Test Holes" shall be full pay for all labor, equipment and materials required to perform the specified excavations including all flagging required to field verify existing utilities. Progress payment will be made based on the percentage completion of the total work encompassed within the lump sum item.

END OF SECTION

Addendum 1

GeoDesign Inc
An NV5 Company

REPORT OF GEOTECHNICAL ENGINEERING SERVICES

City of Tacoma – Utility Replacement and Street Reconstruction Project
North 48th Street, North Gove Street, and North Cheyenne Street
from North Mullen Street to North 46th Street
Tacoma, Washington

For
City of Tacoma
July 20, 2020

GeoDesign Project: CityTacoma-33-01

Addendum 1

GeoDesign Inc
An NV5 Company

July 20, 2020

City of Tacoma Public Works, Engineering – Street Design
747 Market Street, Municipal Building, Room 520
Tacoma, WA 98402-3701

Attention: Dan Seabrands, P.E.

Report of Geotechnical Engineering Services
City of Tacoma – Utility Replacement and Street Reconstruction Project
North 48th Street, North Gove Street, and North Cheyenne Street
from North Mullen Street to North 46th Street
Tacoma, Washington
GeoDesign Project: CityTacoma-33-01

GeoDesign, Inc. is pleased to submit this report of geotechnical engineering services for the utility replacement and street reconstruction project located on North 48th Street, North Gove Street, and North Cheyenne Street from North Mullen Street to North 46th Street in Tacoma, Washington. This report has been prepared in accordance with our proposal dated February 12, 2020.

We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

Kevin J. Lamb, P.E.
Principal Engineer

JTW:KJL:kt
Attachments
One copy submitted (via email only)
Document ID: CityTacoma-33-01-072020-geor.docx

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ACRONYMS AND ABBREVIATIONS

AC	asphaltic concrete
ASTM	American Society for Testing and Materials
BGS	below ground surface
BMP	best management practice
HMA	hot mix asphalt
H:V	horizontal to vertical
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
OSHA	Occupational Safety and Health Administration
PCC	portland cement concrete
pcf	pounds per cubic foot
ppm	parts per million
psi	pounds per square inch
psf	pounds per square foot
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
SMP	Soil Management Plan
SPT	standard penetration test
TMC	Tacoma Municipal Code
WSS	Washington Standard Specifications for Road, Bridge, and Municipal Construction (2020)

1.0 INTRODUCTION

GeoDesign, Inc. is pleased to provide this report of geotechnical engineering services for the utility replacement and street reconstruction project located on North 48th Street, North Gove Street, and North Cheyenne Street from North Mullen Street to North 46th Street in Tacoma, Washington. The location of the site relative to surrounding physical features is shown on Figure 1.

The project includes upgrades and replacement to existing sanitary sewer and storm drain utilities as well as reconstruction of the streets within the project areas. Along a portion of North Cheyenne Street the road will be widened, which will require re-grading of a steep slope area on the east side of the road. The site is within the Tacoma Smelter Plume, where arsenic and lead concentrations are predicted to be in excess of 100 ppm.

Specifically, the project extends through the areas shown on Figure 2 and described as follows:

- From the intersection of North Mullen Street and North 48th Street the alignment extends eastward down North 48th Street to the intersection with North Gove Street (approximate length of 320 feet)
- Southward along North Gove Street to the intersection with North 46th Street (approximate length of 900 feet)
- Southeastward along North Cheyenne Street from its intersection with North Gove Street and turning south along North Cheyenne Street up to the intersection with North 46th Street (approximate length of 820 feet)

The utility excavations are expected to vary up to approximately 20 feet BGS and will include excavations to install sanitary sewer and storm drain infrastructure. The streets throughout the project alignment are paved with AC.

The project is located southeast of the former Asarco smelter and is within the area identified as the Tacoma Smelter Plume in which soil is known to have elevated levels of lead and arsenic. For managing soil impacted by the smelter plume the City of Tacoma (City) has adopted the document titled *Soil Management Plan; Tacoma Smelter Plume and Commercial/Industrial Testing Requirements; Tacoma, Washington*, prepared by the City of Tacoma Environmental Services Department and Landau Associates (City of Tacoma SMP; City of Tacoma, 2016). Soil sampling and analytical testing of arsenic and lead concentrations is required on City projects involving earthwork to determine how the soil will be managed during construction. Soil is classified and managed based on arsenic and lead concentrations as indicated in Table 1.

Table 1. City of Tacoma SMP Categories and Disposal Requirements

City of Tacoma SMP Soil Categories	Arsenic (ppm)	Lead (ppm)	Soil Management Requirements
A	<20	<250	Category A soil is not considered to be contaminated.
B	20 - 500	250-500	Category B soil is considered to be contaminated. 1. Category B soil may be taken to the RCRA Subtitle C (solid waste landfill) LRI Landfill unless directed for other use or to another disposal location by the project manager. 2. Category B (conditional) soil on this project will need to be removed as requested by the City.
C	>500	>500	Category C and D soil must be taken to the RCRA Subtitle C (solid waste landfill) LRI Landfill unless directed to another solid waste landfill by the project manager.
D	Smelter slag	Smelter slag	

Excavation for the proposed sanitary sewer replacement project is expected to extend to depths of up to 20 feet BGS. Environmental sampling for the project included sampling to depths to characterize the lead and arsenic concentrations along the project. In addition, explorations were spaced along each utility trench alignment to meet the sampling frequency requirements of the City of Tacoma SMP (City of Tacoma, 2016).

Acronyms and abbreviations used herein are defined above, immediately following the Table of Contents.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to gather and review available subsurface information, evaluate subsurface conditions, and provide geotechnical conclusions and engineering recommendations to support utility installation and pavement design. Our scope of services included a site reconnaissance, borings, laboratory testing, and engineering analyses to develop the geotechnical conclusions and recommendations presented in this report. Specifically, we performed the following:

- Collected and reviewed readily available geotechnical and geologic data for the project area.
- Performed a reconnaissance of the sloped area along the east side of North Cheyenne Street and completed using a shovel along the slope to explore surficial soil conditions.
- Drilled eight borings to depths between 11.5 and 21.5 feet BGS at the locations shown on Figure 2.
- Completed geotechnical laboratory analyses on select disturbed soil samples collected from the explorations to determine certain index properties of the on-site soil.
- Collect samples from the borings for arsenic and lead screening by the City of Tacoma Environmental Services Laboratory.

- Completed chemical analytical testing to screen samples for arsenic and lead contamination as the project is within the Tacoma Smelter Plume.
- Performed engineering analysis and evaluated data derived from the subsurface explorations and prepared this report.

3.0 SITE CONDITIONS

The project area extends between North 46th Street and North 48th Street and between North Mullen Street and North Cheyenne Street. The project includes replacing the sanitary sewer and storm drain utilities as well as reconstruction of the streets within the project area identified above. Site conditions were observed during visits to the site to mark the proposed boring locations and during the subsurface explorations.

3.1 SURFACE CONDITIONS

The project area is located in a single-family residential neighborhood in an upland area overlooking Commencement Bay. Adjacent to the ROW the area is developed with residential single-family homes. The ground surface generally slopes down to the north and northeast with a change in elevation of approximately 50 feet from North 46th Street to the north end of the project at North 48th Street.

The single-family residences bordering the north edge of the project area (north end of North Cheyenne Street and east end of North 48th Street) are located along a steeply sloping greenbelt area that slopes down to North Waterview Street. The slopes within the greenbelt area meet the City's Geologically Hazardous Areas TMC 13.11.720 classification for an Erosion Hazard Area and a Landslide Hazard Area. The proposed improvements to sanitary and storm utilities are generally outside of areas meeting the definition of Landslide Hazard Areas. Portions of the project alignment ROW include areas with steep slopes (slopes in excess of 40 percent) as follows:

- Along the east side of North Cheyenne Street south of where the street turns to the northwest. Proposed reconfiguration and widening of North Cheyenne Street may require reconfiguration of the slope.
- At the east end of North 48th Street at the intersection with North Gove Street. The slope north and east of the manholes at the intersection meets the definition of a Landslide Hazard Area. The proposed utility improvements will be located west of the Landslide Hazard Area and the proposed work will not impact the slope.

The street segments within most of the project area are generally paved with AC, with gravel shoulders along the edge of the pavement. The pavement throughout the project area is in generally very poor to poor condition, with the exception of North Gove Street to the south of the intersection with North Cheyenne Street

The project alignment on North Gove Street between North 46th Street and North Cheyenne Street includes PCC curbs, gutters, and sidewalks along the edge of the AC pavement. The pavement is generally in good condition along this section of the project alignment.

3.2 SUBSURFACE CONDITIONS

Subsurface conditions at the site were evaluated through a review of existing information and by completing subsurface explorations. We drilled eight borings within the project area at the locations shown on Figure 2. The borings were generally located within the ROW and adjacent to the existing sanitary sewer utility trench excavation. The borings were completed using hollow-stem auger drilling techniques to depths between 11.5 and 21.5 feet BGS. A description of our field exploration and laboratory testing programs, the exploration logs, and the results of our laboratory testing are presented in Appendix A.

Along the area where North Cheyenne Street will be widened we completed a site reconnaissance and explored surficial conditions through probing and shallow excavations using a shovel. The slope is generally mantled with fill and some construction debris composed of concrete fragments and wood debris and soil composed of silty sand and gravel.

Subsurface conditions encountered in the explorations are generally consistent with the mapped geology. The surficial materials include fill and disturbed native soil as a result of past grading activities. At the boring locations, the materials encountered below the surficial AC or crushed rock include fill, recessional outwash, and advance outwash. Materials encountered in the explorations are described below.

3.2.1 AC Pavement and Gravel Surfacing

All borings were completed within the roadway through the existing paved areas, as shown on Figure 2. The pavement at all locations is underlain by locally derived fill generally consisting of silty sand with variable amounts of gravel. Surfacing materials and thicknesses encountered at the boring locations are summarized in Table 2.

Table 2. Pavement Section at Exploration Locations

Boring	Location	AC Pavement Thickness (inches)	Crushed Gravel Surfacing (inches)
B-1	North 48th Street	1.5	3.0
B-2	Intersection North 48th Street and North Gove Street	1.5	2.0
B-3	Intersection North Cheyenne Street and North Gove Street	3.5	6.0
B-4	North Cheyenne Street	1.0	3.0
B-5	North Cheyenne Street	2.0	3.0
B-6	North Cheyenne Street	1.0	1.0
B-7	North Cheyenne Street	1.0	2.0
B-8	North Cheyenne Street	3.0	2.0

3.2.2 Fill

Fill is present at all the boring locations and generally extends to depths between 2 and 4.5 feet BGS, except at boring B-7 where fill was observed to the maximum depth explored of 11.5 feet

BGS. The fill generally consists of sand with silt and silty sand with variable amounts of gravel and appears to be locally derived. Based on SPT blow counts, the fill is generally very loose to medium dense.

Fill mantling the slope on the east side of North Cheyenne Street is composed of fill sand with gravel and occasional concrete debris and wood. The soil mantling the slope is generally loose to a depth of 2 feet BGS and underlain by dense, silty sand and gravel.

3.2.3 Recessional Outwash

Recessional outwash is present beneath the fill at most boring locations, except for at borings B-3 and B-7. The recessional outwash typically consists of silty sand with trace to minor amounts of gravel and includes lenses to layers of sandy silt. The sand generally varies from fine to medium and the gravel is fine to coarse. Based on SPT blow counts, the recessional outwash is generally loose to medium dense and extends to depths between 7 and 18.5 feet BGS.

3.2.4 Advance Outwash

Advance outwash is present beneath the fill in boring B-3 and beneath the recessional outwash in borings B-1, B-2, B-4 through B-6, and B-8. It typically consists of sand with variable amounts of silt and gravel and gravelly sand. The sand gradation varies from fine to coarse. The advance outwash is characterized by clean sand deposits. Interbedded layers and lenses of sandy silt are present in the advance outwash in boring B-8. Based on SPT blow counts, the material is dense to very dense.

3.3 GROUNDWATER

Wet soil conditions indicative of perched groundwater were observed in borings B-2, B-5, and B-6 during drilling.

In boring B-2 soil samples were generally wet below a depth of 10 feet BGS and remained wet to the maximum depth explored at 19.5 feet BGS. In boring B-5 samples were moist to wet below a depth of 10 feet BGS and then classified as wet below 15 feet BGS to the maximum depth explored of 16.5 feet BGS. In boring B-6 samples were wet below 13.5 feet BGS to the maximum depth explored of 21.5 feet BGS.

3.4 TACOMA SMELTER PLUME IMPACTS

3.4.1 Environmental Sampling

As indicated above, the site is just south of the former Asarco smelter and is within the Tacoma Smelter Plume where surficial soil has elevated levels of arsenic and lead.

Soil samples were collected from the explorations to screen for arsenic and lead in general accordance with Chapter 2.0 of the City of Tacoma SMP (City of Tacoma, 2016). The sampling frequency and exploration spacing was in general accordance with the guidelines for Capital Improvement Projects provided in Section 2.1 of the City of Tacoma SMP (City of Tacoma, 2016). Environmental sampling for the Tacoma Smelter Plume included collecting composite soil samples from each boring for arsenic and lead testing. As requested by the City, composite samples were collected between the following depth intervals: 0 feet and 1 foot BGS, 2 and

3 feet BGS, 3 and 4 feet BGS, and 4 and 5 feet BGS. Samples for environmental screening typically consisted of fill material and the loose to medium dense native material to depths of up to 5 feet BGS.

Soil samples were also collected from the three shallow excavations completed on the slope on the east side of North Cheyenne Street.

The samples were analyzed by the City of Tacoma Environmental Services Laboratory. The results of the testing are summarized in Table 3 and in Appendix B.

Table 3. Summary of Arsenic and Lead Testing

Boring	Sample Depth (feet BGS)	Metals (mg/kg)	
		Arsenic	Lead
BORING B-1			
B-1	0.3 to 1	14.4	18.8
B-1	1 to 2	<10.0	12.8
B-1	2 to 3	16.1	26.3
B-1	3 to 4	14.1	27.5
B-1	4 to 5	17	14.1
BORING B-2			
B-2	0.2 to 1	31.2	61.3
B-2	1 to 2	31.8	70.2
B-2	2 to 3	24	58.2
B-2	3 to 4	27.3	65
B-2	4 to 5	20.3	46.2
BORING B-3			
B-3	0.4 to 1	18.5	23.9
B-3	1 to 2	32	50.4
B-3	2 to 3	<10.0	12.8
B-3	3 to 4	<10.0	<10.0
B-3	4 to 5	<10.0	10.2
B-3	5 to 6	10.5	11.5
BORING B-4			
B-4	0.3 to 1	41.5	92
B-4	1 to 2	79.2	208
B-4	2 to 3	68.5	134
B-4	3 to 4	21.7	24.9
B-4	4 to 5	25.2	24.4

Table 3. Summary of Arsenic and Lead Testing (continued)

Boring	Sample Depth (feet BGS)	Metals (mg/kg)	
		Arsenic	Lead
BORING B-5			
B-5	0.3 to 125.2	109	76.7
B-5	1 to 2	93.8	286
B-5	2 to 3	37.7	65.3
B-5	3 to 4	28.6	54.4
B-5	4 to 5	18	<10.0
BORING B-6			
B-6	0.3 to 1	53.4	209
B-6	1 to 2	103	600
B-6	2 to 3	14.7	76.3
B-6	3 to 4	<10.0	<10.0
B-6	4 to 5	<10.0	29.3
B-6	5 to 6	<10.0	<10.0
BORING B-7			
B-7	0.3 to 1	<10.0	12.3
B-7	1 to 2	<10.0	<10.0
B-7	2 to 3	<10.0	<10.0
B-7	3 to 4	<10.0	<10.0
B-7	4 to 5	<10.0	<10.0
BORING B-8			
B-8	0.3 to 1	20	29.1
B-8	1 to 2	15.6	22.7
B-8	2 to 3	<10.0	<10.0
B-8	3 to 4	<10.0	<10.0
B-8	4 to 5	<10.0	10.7
NORTH CHEYENNE STREET SLOPE AREA			
SS-1	0 to 1	34.4	76.3
SS-2	0 to 1	29.8	84.8
SS-3	0 to 1	33	103

Table 3. Summary of Arsenic and Lead Testing (continued)

City of Tacoma SMP Soil Categories	Arsenic (ppm)	Lead (ppm)
A	<20	<250
B	20 - 500	250 - 500
C	>500	>500
D	Smelter slag	Smelter slag

U: Not detected. Reporting or detection limit shown.
Yellow shading indicates concentration exceeding MTCA Method A cleanup levels for Unrestricted Land Use and Industrial Properties and is considered Category B soil as defined by the City of Tacoma SMP Section 2.1.2.

The results of the environmental sampling and analytical testing completed for this investigation are presented in Appendix B.

4.0 GEOTECHNICAL LABORATORY TESTING

Laboratory testing for geotechnical purposes was conducted on specific soil samples collected from the explorations to assist in the characterization of certain physical parameters of the soil. Index tests that were performed included the determination of natural water content, Atterberg limits, grain-size distribution, and percent fines content. All testing was conducted in general accordance with appropriate ASTM standards (ASTM, 2020). A discussion of laboratory test methodology and test results are presented in Appendix A. Test results are also displayed where appropriate on the exploration logs in Appendix A.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Based on the development history of the site and the results of our explorations, laboratory testing, and analyses, it is our opinion that the proposed improvements are feasible with regards to geotechnical conditions.

- Wet soil and perched groundwater conditions were encountered in borings B-2, B-5, and B-6 at depths between 10 and 21.5 feet BGS during our explorations. Perched water may be encountered in other areas at or near the invert elevation of the existing sewer pipe due to preferential flow within the pipe bedding and leakage from the pipe. We anticipate shallow sumps within the excavation will be enough for managing the flow at most locations.
- The loose to medium dense fill and recessional outwash material will be moderately prone to sloughing and raveling in open trench excavations.
- Temporary trench shoring consisting of trench box shielding is anticipated for trench construction. An equivalent fluid density of 35 pcf is recommended for shoring design.
- The existing AC pavement along the project alignment is relatively thin, varying from 1 inch to 3.5 inches, depending on location. The existing subgrade adjacent to the utility trench should provide adequate support for the City's standard pavement section for residential streets.

- Environmental Conditions. The results of the arsenic and lead environmental sampling indicate that soil meeting the Category A and B classifications are present throughout the project area at depths typically between the ground surface and 4 to 5 feet BGS. However, Category C soil that exceeded the lead concentration of 500 ppm was found between depths of 1 foot and 2 feet BGS at boring location B-6. The City typically requires that Category B soil on this project will need to be removed and disposed of at an LRI Landfill or other suitable RCRA Subtitle C solid waste landfill.
- The proposed widening of North Cheyenne Street to the east can be accomplished with excavating the slope at 1.5H:1V and then placing a 1- to 2-foot-thick layer of quarry spalls (4 to 8 inches) on the excavated face and compacting in place with a large hoe pac or kneading them in place with the back of an excavator bucket to a dense, unyielding conditions. The quarry spalls will protect the slope from erosion and help buttress the slope.

Our specific recommendations to support design efforts are presented in the following sections. We recommend incorporating these recommendations into the project design and they be implemented during construction.

5.2 UTILITIES

5.2.1 General

Anticipated trench depths to install the new sanitary sewer are expected to vary between 6 and 20 feet throughout the project alignment based on the proposed pipe invert elevations. Since the new sewer pipe will replace the existing sanitary sewer, we anticipate soil encountered during excavation will consist of previously placed trench backfill material. The existing trench backfill material, as encountered at the boring locations, appears to be locally derived as it is similar in composition as the fill and recessional outwash deposits (sand with silt and gravel and silty sand with gravel) encountered at the boring locations and evident in soil exposure in the project area. Perched water or wet soil conditions are anticipated near the pipe invert elevation near boring locations B-2, B-5, and B-6. Elsewhere, isolated zones of perched water may be encountered. Seepage within the pipe bedding around the existing sanitary sewer pipe should be expected. We anticipate temporary sumps installed in the excavations will be capable of dewatering the trench.

The fill deposits and recessional outwash material will tend to ravel and slough during excavation activities. Temporary sidewall support will be required to maintain trench sidewalls and prevent the width of the excavation from growing. Where excavations exceed a depth of 5 feet BGS and significant thicknesses of fill or recessional outwash material are encountered, temporary sidewall support will be required below a depth of 4 feet. The advance outwash material is generally very dense and should stand vertical with minimal raveling during excavation. The outwash material will ravel during backfilling and vibratory compaction activities.

If the new utility alignment is the same as the existing alignment, we do not anticipate boulder obstructions. Although we did not encounter large cobbles or boulders in the explorations, they are commonly observed in the site vicinity. If excavations are contained within the original sewer pipe trench, we estimate a low probability of encountering boulders in the trench excavations.

Excavations that extend outside or beyond the original sanitary sewer trench alignment may encounter large cobbles and boulders within the recessional outwash and advance outwash material.

5.2.2 Pipe Foundation Support

Soil conditions at the pipe invert elevation are expected to vary from medium dense recessional outwash (silty sand with gravel), very dense advance outwash (sand to silty sand with gravel, gravelly sand with silt), and locally derived fill (sand with silt and gravel) that varies from very loose to medium dense. At most locations the anticipated materials will provide adequate pipe support and over-excavation is not generally anticipated, except near boring location B-7.

Near boring B-7, in the area near the intersection of North Cheyenne Street and North 46th Street, we anticipate very loose to medium dense sand with silt will be encountered during excavation and at the pipe invert elevation (estimated at Elevation 230). Groundwater was not encountered in this area, so the fill material can likely be re-compacted at the base of the excavation to a firm and unyielding condition to provide pipe support.

Soft or loose zones encountered within the pipe trench can be mitigated by over-excavation and in accordance with WSS 7-08.3(1)A - Trenches. Over-excavation should extend to firm material or a maximum depth of 1 foot below the pipe bedding. Pipe bedding material should then be placed up to the bottom of the trench and compacted to a dense and unyielding condition.

Over-excavation activities should be at the direction of the City and/or their construction representative. Over-excavation should be completed with a smooth-bladed bucket to reduce soil disturbance at the base of the excavation.

5.2.3 Soil Parameters for Pipeline Design

The soil load that will be imposed on a buried pipe is dependent on soil and groundwater conditions, the type of pipe, the width of the trench, the height of bedding material around the pipe, the depth of cover over the pipe, the method of pipe placement, and backfill conditions. Recommended trench backfill soil parameters for evaluating soil overburden loads are provided below:

- Dry soil density of 120 pcf
- Moist soil density of 130 pcf
- Soil friction angle of 34 degrees
- Soil to clay pipe friction angle of 26 degrees

The soil load factor to be used in estimating pipe deflections using the modulus of soil reaction (E') should be calculated based on the prism load, which is the weight of a column of soil over a unit length of the pipe with a width equal to the pipe diameter and a height equal to the cover over the top of the pipe.

The modulus of soil reaction (E') is used in the Reclamation Equation not the Iowa Formula for estimating vertical pipe deflections (Howard, 1977 and 2006). We anticipate that the trench width will be approximately 4 feet or at least 3 pipe diameters and that the backfill material and

the degree of compaction of the backfill will be consistent with the report recommendations. The existing soil encountered in the borings is typically medium dense to very dense at the anticipated pipe embedment depths. The native soil adjacent to the trench will not greatly affect deflections based on the width of the City's standard trench; a composite E' value of 3,500 psi is recommended for use in the Reclamation Equation for estimating pipe deflections (Howard, 2006).

5.2.4 Pipe Bedding and Backfill

In accordance with City of Tacoma Standard Plan SU-16, we recommend providing a bedding layer of at least 6 inches thick to provide a stable working surface for establishing proper grades and installing the pipe. The pipe zone bedding material should also be used to cover the top of the pipe a minimum of 6 inches in accordance with the City of Tacoma Standard Plan SU-16. The pipe zone bedding material should consist of crushed surfacing top course (WSS 9-03.9(3) – Crushed Surfacing Base Course).

Pipe zone backfill should also consist of bedding material and should be brought up evenly around the pipe and extend at least 6 inches above the crown of the pipe. During placement it should be manually worked under the haunches of the pipe by slicing with a shovel, vibration, or other approved procedures.

Utility trenches should be backfilled with structural fill as defined in the "Fill Materials" section and in accordance with WSS 7-08.3(3) - Backfilling. The on-site soil may to be suitable for use as fill material, although moisture conditioning should be anticipated.

Backfilling of trenches should be in accordance with the requirements of WSS 7-08.3(3) - Backfilling. Trench backfill should be placed in 12-inch layers and compacted to a relative density of at least 95 percent of the maximum dry density (ASTM D1557). The initial lift of trench fill over the top of the pipe should be approximately 24 inches thick and compacted to a firm condition. Successive lifts should meet the minimum compaction criteria.

Trench backfill should be placed in lifts with a maximum uncompacted thickness of 8 inches for walk-behind compactors and up to 18 inches for larger driven equipment.

5.3 PAVEMENT DESIGN

We understand the existing paved roadways impacted by replacement of the sewer will be restored using the City's pavement section standards for residential streets. The pavement section standard for residential streets consists of 4 inches of HMA over 2 inches of crushed surfacing top course over 10 inches of crushed surface base course. The standard pavement section should be adequate to support the anticipated traffic loading. Prior to paving, the exposed subgrade should be prepared as recommended in the "Subgrade Preparation" section. We are available to provide a site-specific design based on traffic count data, which may provide for a thinner pavement section than the standard section.

Alternatively, a full-depth restoration can be completed using a cement-amended subgrade and a thin layer of gravel over which the standard 4-inch HMA section can be constructed. We recommend a subgrade amendment depth of 12 inches. We anticipate a cement ratio varying

from 4 to 6 percent will be adequate based on the soil encountered in our borings. We recommend a cement amendment mix design be completed prior to bidding.

The existing pavement along North Gove Street between North 46th Street and North Cheyenne Street is in generally good condition. Borings B-3 and B-8 were completed within this area and encountered AC between 3 and 3.5 inches thick. Restoration of North Gove Street in this area can be accomplished either through a shallow grind and overlay or by placing a thin, 1-inch overlay using a 3/8-inch asphalt mix. Alternatively, a thicker, 2-inch overlay using ½-inch mix could also be accomplished depending on grade restrictions.

5.4 SOIL MANAGEMENT

The results of environmental sampling indicate that contaminated soil meeting the City of Tacoma SMP Categories A and B soil classification are predominant in the project area. The depth below the existing ground surface, to which soil meeting Category B arsenic and lead contaminated soil extends, is summarized in Table 4.

Table 4. Estimated Depth to Which Category B Contaminated Soil Extends

Boring	Category B Soil Extent (depth feet BGS)
B-1	4
B-2	>5
B-3	2
B-4	>5
B-5	4
B-6	5
B-7	0
B-8	2

This summary is based on the results of the environmental sampling completed within the project area during this investigation. The results were used to develop Figure 3, which shows the anticipated distribution and depth to which the Category B soil extends in the areas where the sewer will be replaced.

Soil meeting the Category B classification has arsenic concentrations between 20 and 500 ppm or lead concentrations between 250 and 500 ppm. For this project we anticipate that, per the City, Category B soil will be managed by disposing of it at a RCRA Subtitle C (solid waste landfill) LRI Landfill unless directed for other use or to another disposal location by the project manager.

A thin zone, between 1 foot and 2 feet BGS, of soil meeting the Category C classification is present at boring location B-6. The underlying material should be treated as Category B material to a depth of 5 feet BGS. We anticipate that it will be difficult to distinguish and separate this material during excavation for the sewer replacement project due to the limited thickness and

extent. We recommend that screening of excavation spoils be conducted during construction in the isolated areas where Category C soil was encountered to confirm that the excavation spoils are in compliance with the Category B management requirements.

5.5 NORTH CHEYENNE STREET WIDENING

A portion of North Cheyenne Street will be widened, which will require re-grading of a steep slope area on the east side of the road. The slope is up to approximately 15 feet in height at inclinations in excess of 25 percent.

5.5.1 Geologic Critical Areas

A portion of North Cheyenne Street on the east side of the project area is bordered by a steep slope area. The slope extends up to the adjacent residential properties addressed 4611, 4621, and 4623 North Cheyenne Street at inclinations varying up to approximately 1.5H:1V over vertical heights of up to approximately 15 feet. The slope is vegetated with deciduous trees, English Ivy, and blackberry thickets. The upper one-half to two-thirds of the slope appears to consist of undocumented fill with construction debris composed of brick and concrete fragments that are exposed on the ground surface. The area above the slope is used as a gravel storage area and residential structures beyond the slope crest are set back approximately 30 feet. The slope inclination is greater than 25 percent and meets the City's Geologically Hazardous Areas TMC 13.11.720 classification for an Erosion Hazard Area. Characteristics to classify the slope as a Landslide Hazard Area were not observed.

The area will be impacted by proposed widening of North Cheyenne Street, which will require re-grading the slope to an inclination of approximately 1.5:1V within the ROW. The impacts can be mitigated through engineering protocols and the use of rock facing and thin buttress installed at the toe of the slope.

5.5.2 Permanent Cut Slope – North Cheyenne Street

The proposed improvements include widening North Cheyenne Street by re-grading the Erosion Hazard Area by cutting it back toward the ROW boundary. This work can be accomplished without impacting adjacent properties by re-grading the slope from the ROW boundary to a 1.5H:1V inclination and facing it with a layer of quarry spalls meeting WSS 9-13.1(5) - Quarry Spalls gradation. The spalls should be placed in a 1-foot to 2-foot-thick lift on the slope cut and then compacted into the subgrade using a large hoe pac or the bucket of the excavator to a dense and unyielding condition. Each lift should be keyed into the face 1 foot to 2 feet.

Alternatively, a short gravity wall can be used along the bottom of the slope to support the cut. Appropriate gravity walls would be constructed using large-block concrete masonry units. Walls in excess of 4 feet will require engineering.

Temporary erosion control and stabilization measure BMPs should be implemented to mitigate the temporary increase in the erosion hazard as a result of the re-grading activities. Erosion control measures should be in accordance with the most current version of the City erosion control BMPs as provided in the City's Stormwater Management Manual where applicable within all disturbed areas.

Erosion control BMPs for the anticipated work include (but are not limited to) the use of mulch, jute/burlap netting, erosion control nets and blankets to protect the ground surface, and straw wattles or log erosion barriers to reduce runoff velocities. Based on the project area slope inclinations, we recommend a wattle spacing of approximately 20 feet as measured parallel with the slope.

We anticipate appropriate BMPs, such as mantling the slope with quarry spalls or the use of jute matting and straw wattles, will be used after re-grading is completed, which will also help to remove invasive plants. The BMP measures will reduce the potential for erosion and support establishment of permanent vegetation on the slope. These measures should be sufficient to address the erosion potential during construction such that the risk of slope instability on the site or to adjacent areas is not increased above existing levels.

The recommended quarry spall facing will protect the slope from erosion and increase the stability of the slope. The proposed slope inclination will be similar to that of the existing slope. The quarry spall facing will prevent erosion and act as a buttress to support the slope. The proposed re-grading and quarry spall facing will increase slope stability, and adjacent properties will not be negatively impacted. Provided work is completed in accordance with our recommendations, there is no increased risk to the ROW or adjacent properties. Additional setback criteria is not warranted.

5.6 MAINTENANCE STRUCTURES – INTERSECTION OF NORTH 48TH STREET AND NORTH GOVE STREET

The maintenance structures west of the intersection of North 48th Street and North Gove Street are located within a gently sloping grass area located at the top of a steep slope greenbelt area that extends down to North Waterview Street (greenbelt area). We anticipate work may include replacement or improvements to the maintenance structures and require excavation at the top of the slope.

5.6.1 Geologic Critical Areas

As previously indicated in the "Surface Conditions" section, the slopes within the greenbelt area meet the City's Geologically Hazardous Areas 13.11.720 classification for an Erosion Hazard Area and a Landslide Hazard Area, this includes the slope below the maintenance structures at the intersection. Excavation to repair or replace the maintenance structures is not expected to significantly impact the adjacent Landslide and Erosion Hazard Area provided the work is completed using appropriate BMPs

5.6.2 Mitigation Recommendations

BMPs such as silt fencing and straw waddles should be installed downslope of the work area around the maintenance structures and associated utility trenches. Additional BMPs may be added during construction as necessary. The BMPs should be effective in mitigating impacts to the erosion hazard.

Trench dams, composed of lean mix concrete or controlled density fill, should be installed in utility trenches up slope of the structures to minimize subsurface flow along the trench line

down to the structures and the top of the slope. Provisions should be included in the contract to add subsurface drains within storm drain trenches to collect water flowing in trench bedding and routing it into catch basins.

Fill placed around the maintenance structures should consist of structural fill as defined in this report. Backfill around the structures should be compacted to a minimum of 92 percent maximum dry density and be keyed into the sidewalls of the excavation.

The ground surface around the structures and at the top of the slope should be graded to prevent concentrated water from flowing down the slope. Ideally, the area should be sloped back to a catch basin in the street to collect surface water drainage and prevent it from flowing down the steep slope.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 GENERAL

The sewer alignments are located along paved roads. Site preparation to facilitate installation of utilities will generally involve removal of AC. Excavation to install the new utilities will generally encounter soil composed of silty sand with gravel, sand with silt and gravel, sandy silt, and gravelly sand with silt.

6.2 SITE GRADING

Fill required to establish site grades along the roadway and the upper 2 feet within the utility trench should consist of structural fill or appropriate crushed rock surfacing material as described in the "Fill Materials" section. Fill required to backfill over-excavations should consist of imported stabilization or crushed rock base course material placed and compacted as recommended in the "Fill Materials" section.

6.3 SUBGRADE PREPARATION

After installation of utilities is complete, the exposed subgrade within the trench area and disturbed areas adjacent to the trench should be prepared for paving. The exposed subgrade beneath the pavement section will likely consist of silty sand with gravel to silty gravel with sand. Appropriate provisions should be taken to protect the subgrade from inclement weather. The subgrade should be compacted to a dense and unyielding condition to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

6.3.1 Subgrade Verification

Exposed subgrades and compacted fill should be evaluated by a representative from GeoDesign to verify the conditions are as anticipated, the compaction is adequate, and that it will provide the required support. If possible, the exposed subgrade should be evaluated by proof rolling. The subgrade should be proof rolled with a fully loaded dump truck or similar heavy rubber tire construction equipment to identify soft, loose, or unsuitable areas. If soft or loose zones are identified, these areas should be excavated to the extent indicated by the engineer or technician and replaced with structural fill or stabilization material.

6.4 EXCAVATION

6.4.1 Excavation

The soil at the site can be excavated with conventional earthwork equipment. Excavations should stand vertical to a depth of approximately 4 feet, provided groundwater seepage is not observed in the trench walls. Open excavation techniques may be used to excavate utility trenches, provided the walls of the excavation are cut at appropriate cut slopes determined by the contractor or supported using contractor-designed temporary shoring or shielding.

6.4.2 Temporary Shoring

Excavations that extend below a depth of 4 feet will require temporary support. If a conventional shield (such as a trench box) is used, the contractor should limit the length of open trench. If shoring is used, we recommend that the type and design of the shoring system be the responsibility of the contractor, who is in the best position to choose a system that fits the overall plan of operation and the subsurface conditions. All excavations should be made in accordance with applicable OSHA, local, and state regulations.

We recommend temporary shoring or shielding elements, under drained conditions, be designed for an equivalent fluid density of 35 pcf for active soil conditions. The design should include appropriate lateral pressures caused by surcharge loads located within a horizontal distance equal to or less than the height of the wall. We recommend a lateral surcharge pressure of 70 psf to account for traffic loading adjacent to the trench.

Areas where significant raveling and sloughing of the trench sidewalls should be expected are provided in Table 5.

Table 5. Sloughing Potential of Soil Encountered in Explorations

Boring	Estimated Ground Surface Elevation	Estimated Existing Pipe Invert Elevation	Sloughing Potential	Material Susceptible to Sloughing (depth interval feet BGS)
B-1	199	186	Moderate	0 to 7
B-2	184	172	Low	--
B-3	197	180	High	0 to 4.5
B-4	190	183	High	0 to 7
B-5	191	183	Moderate	0 to 13
B-6	206	189	Moderate	0 to 17.5
B-7	237	230	High	0 to 7
B-8	217	213	Moderate	0 to 4

6.4.3 Temporary Dewatering

Groundwater was encountered at varying depths and locations in the project area, as discussed in the "Subsurface Conditions" section and on the exploration logs in Appendix A. Groundwater seepage and/or wet, saturated soil conditions are expected near the existing pipe invert near boring locations B-2, B-5, and B-6. Based on the slow flow rates, this water is anticipated to be

perched. We anticipate sumps within the excavation will be adequate to manage perched groundwater flows that may be encountered along the existing sanitary sewer pipe.

If significant groundwater seepage is encountered during construction, more proactive control of groundwater may be necessary. Additional trench stabilization measures applicable to the anticipated conditions may include (1) the installation of steel sheets between the trench box and the trench sidewalls and (2) the installation of sumps within the trench. Stabbing the sheets below the bottom of the excavation may be sufficient to control groundwater flow and piping erosion if a perched water condition is encountered. If the groundwater represents a local water table, more proactive measures to control water levels will be required, such as closely spaced well points. Wells would need to extend to depths of at least 20 to 25 feet into the recessional outwash material and the underlying advance outwash.

We recommend assuming the groundwater represents a perched condition, but also providing an additive bid item for proactive dewatering measures should they be required.

The contractor will be responsible for selection and design of the dewatering system. The contractor's dewatering methods should be capable of maintaining groundwater levels at least 2 feet below the base of the excavation (including the depth required for trench bedding and stabilization material). Perched water may be encountered in other areas and groundwater may be encountered within the trench along the existing sewer pipe due to preferential flow within the pipe bedding. We anticipate shallow sumps within the excavation will be enough for managing the flow at most locations.

Flow rates for dewatering are likely to vary depending on location, soil type, and the season in which the excavation occurs. Dewatering systems should be capable of adapting to variable flows. We note that these recommendations are for guidance only. Dewatering of excavations is the sole responsibility of the contractor, as the contractor is in the best position to select these systems based on their means and methods. The contract plans and specification should address and identify a suitable dewatering discharge location and allowable quantities.

If sumps within the excavation are used, the discharge water will likely have a high turbidity and require detention prior to disposal.

6.5 FILL MATERIALS

Fill material will be required for site grading, backfilling over-excavations, pavement support, installing utilities, and drainage. The recommended fill materials are discussed below.

6.5.1 On-Site Soil

The on-site recessional outwash material composed of sand or silty sand and the advance outwash material may be suitable for use as fill, provided it is approved by the City and that its use, based on the arsenic and lead concentrations, is consistent with the City of Tacoma SMP and the City's specific requirements for this project. Deleterious material in the fill layer and large cobble- and boulder-size particles should be removed from the fill. On-site material, if deemed suitable for fill by the contracting agency, may be used as fill.

6.5.2 On-Site Recycled AC Pavement

If allowed by the contracting agency, the on-site AC material can be milled in place with the underlying fill or native material and can be used as fill within the trench below the pavement section, provided it can be properly compacted. The AC should be milled to have a maximum particle size of 1.5 inches.

6.5.3 Off-Site Recycled Fill Materials

Recycled material generated off site should not be used on site without approval from the geotechnical engineer and acceptance by the City. The use of recycled material will be subject to performance criteria, gradation requirements, and hazardous material testing in conformance with WSS 9-03.21(1) – General Requirements and the requirements of the material for which it is being substituted. Provided performance, gradation, and hazardous material testing results are acceptable, recycled material may be suitable for use beneath hardscape areas.

6.5.4 Structural Fill

Structural fill placed for general site grading in improved areas should consist of clean, free-draining granular soil (sand and gravel) that is free from organic material or other deleterious and man-made materials, with a maximum particle size of approximately 3 inches and a maximum fines content of 5 percent by dry weight. The use of granular free-draining material will increase the workability of the material during the wet season and the likelihood that the material can be placed and adequately compacted.

Imported granular material used for structural fill should be naturally occurring pit- or quarry-run rock, crushed rock, or crushed gravel and sand and should meet the specifications provided in WSS 9-03.14(1) – Gravel Borrow, with the exception that the percentage passing the U.S. Standard No. 200 sieve does not exceed 5 percent by dry weight. Structural fill should be placed in lifts with a maximum uncompacted thickness of 8 inches for walk-behind compactors and 12 inches for larger driven equipment. It should be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

6.5.5 Pavement Base Course

Imported granular material used as aggregate base for pavement and beneath hardscape areas should consist of 1¼-inch-minus crushed rock base course material meeting the specifications provided in the WSS 9-03.9(3) – Crushed Surfacing Base Course, with the exception that the aggregate should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve. Hardscape and pavement base course material should be placed in lifts with a maximum uncompacted thickness of 8 inches for walk-behind compactors and 12 inches for larger driven equipment. It should be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

6.5.6 Gravel Backfill for Pipe Zone Bedding

Pipe zone bedding material should be crushed surfacing top course as specified in WSS 9-03.9(3) - Crushed Surfacing Base Course.

6.5.7 Trench Backfill

Trench backfill material should be in accordance with City of Tacoma Standard Plan SU-16. The material should consist of "Gravel Backfill for Walls" as defined in WSS 9-03.12(2). The initial lift of utility trench fill over the top of the pipe should be a minimum of 2 feet thick to prevent damaging the pipe during compaction. Successive lift thickness should be limited based on the type of compaction equipment used. Utility trench fill in improved areas should be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557, and in conformance with City of Tacoma Standard Plan SU-28. The on-site material consisting of recessional outwash may also be suitable for trench backfill if approved by the contracting agency.

6.5.8 Stabilization Material

Stabilization material to backfill over-excavations or to stabilize soft subgrade areas should consist of crushed rock and should meet the specifications provided in WSS 9-03.9(2) – Permeable Ballast or spalls as defined in WSS 9-13.7(2) - Backfill for Rock Wall. The initial lift of stabilization material used to fill over-excavations should be 18 inches thick and compacted to a firm condition. Successive lifts should be 12 inches thick and compacted to a dense and unyielding condition.

6.6 GEOSYNTHETICS

Geosynthetic geotextiles may be necessary to stabilize the base of over-excavations when wet or saturated soil conditions are encountered and as a separator between subsurface drainage materials and native materials or fill. The geotextiles should be installed in conformance with the specifications provided in WSS 2-12 – Construction Geosynthetic.

6.6.1 Stabilization Geotextile

We recommend using a woven geotextile stabilization material at the base of over-excavations and to stabilize soft subgrade areas beneath paved areas. The geotextile should conform to the specifications for woven soil stabilization material provided in WSS 9-33.2(1) – Geotextile Properties, Table 3 Geotextile for Separation or Soil Stabilization.

6.7 WET WEATHER CONSIDERATIONS

This section describes additional recommendations with potential budget and schedule impacts that may affect the owner and site contractor if earthwork occurs during the wet season. These recommendations are based on the site conditions and our experience on previous construction projects completed in the area.

- Beneath the surficial pavement, the native material will be susceptible to deterioration during wet weather. If construction is completed or extends into the wet season, we recommend stabilizing exposed areas where construction traffic is anticipated using a gravel pad.
- Earthwork should be accomplished in small sections to minimize exposure to wet weather.
- Excavation or the removal of unsuitable soil should be followed promptly by the placement and compaction of clean structural fill.
- The size of construction equipment and access to the area should be limited to prevent soil disturbance.

- The ground surface in the construction area should be sloped and sealed with a smooth-drum roller to promote rapid runoff of precipitation, to prevent surface water from flowing into excavations, and to prevent puddles from forming.
- Installation of sumps within excavations may be necessary to remove accumulated stormwater. The sumps should be located outside of the footing footprint and installed to a depth sufficient to lower the water to below the excavated subgrade elevation.
- Increased handling, excavation, and disposal of wet and disturbed surface materials should be expected.
- Protection of exposed soil subgrades and stockpiles will be required.
- Heavy rainfall can occur during winter months and can compromise earthwork schedules in this region.
- In general, snowfall is not dramatically high; however, frozen ground should not be proof rolled or compacted and fill should not be placed over frozen ground.

7.0 OBSERVATION OF CONSTRUCTION

Recommendations provided in this report assume that GeoDesign will be retained to provide geotechnical consultation and observation services during construction. Satisfactory earthwork performance depends to a large degree on the quality of construction. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed subsurface conditions often requires site-specific experience; therefore, GeoDesign personnel should visit the site with enough frequency to detect whether subsurface conditions change significantly from those anticipated and to verify the work is completed in accordance with the construction drawings and specifications.

Observation and laboratory testing of the proposed fill materials should be completed to verify that proposed fill materials are in conformance with our recommendations. Observation of the placement and compaction of the fill should be performed to verify it meets the required compaction and will be capable of providing the structural support for the proposed infrastructure. A sufficient number of in-place density tests should be performed as the fill is placed to verify the required relative compaction is being achieved.

8.0 LIMITATIONS

We have prepared this report for use by the City of Tacoma and its consultants in design of this project. The data and report can be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as warranty of the subsurface conditions and are not applicable to other nearby building sites.

Exploration observations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The site development plans and design details were preliminary at the time this report was prepared. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification.

The scope of our services does not include services related to construction safety precautions and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in this report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, express or implied, should be understood.

♦ ♦ ♦

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.

Joe Westergreen, P.E.
Senior Project Engineer

Kevin J. Lamb, P.E.
Principal Engineer

Signed 07/20/2020

REFERENCES

ASTM, 2020. Annual Book of ASTM Standards, Vol. 4.08 and 4.09, Soil and Rock (I and II): D420 - latest, Philadelphia: ASTM.

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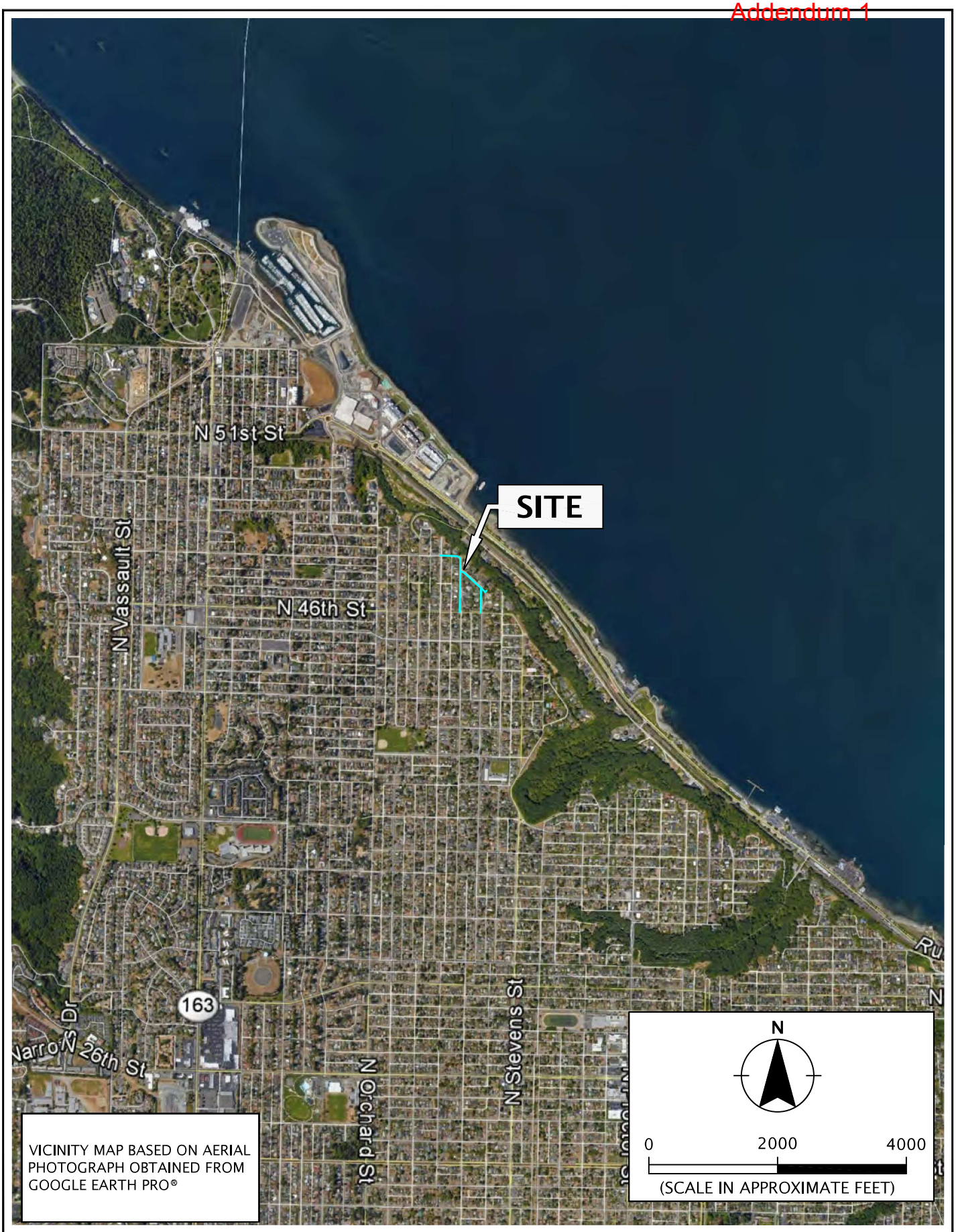
Addendum 1

FIGURES

Addendum 1



VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®

GEODESIGN INC AN NV5 COMPANY	CITYTACOMA-33-01	**VICINITY MAP**	
	JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE 1**

Printed By: mmiller | Print Date: 7/20/2020 8:56:06 AM
File Name: J:\A-D\CityTacoma\CityTacoma-33\CityTacoma-33-01\Figures\CAD\CityTacoma-33-01-VM01.dwg | Layout: FIGURE 1

LEGEND:

B-1 BORING

S-1 ENVIRONMENTAL COMPOSITE SAMPLE

N

0 100 200

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, MAY 6, 2020

Addendum 1

GEODESIGN INC

CITYTACOMA-33-01

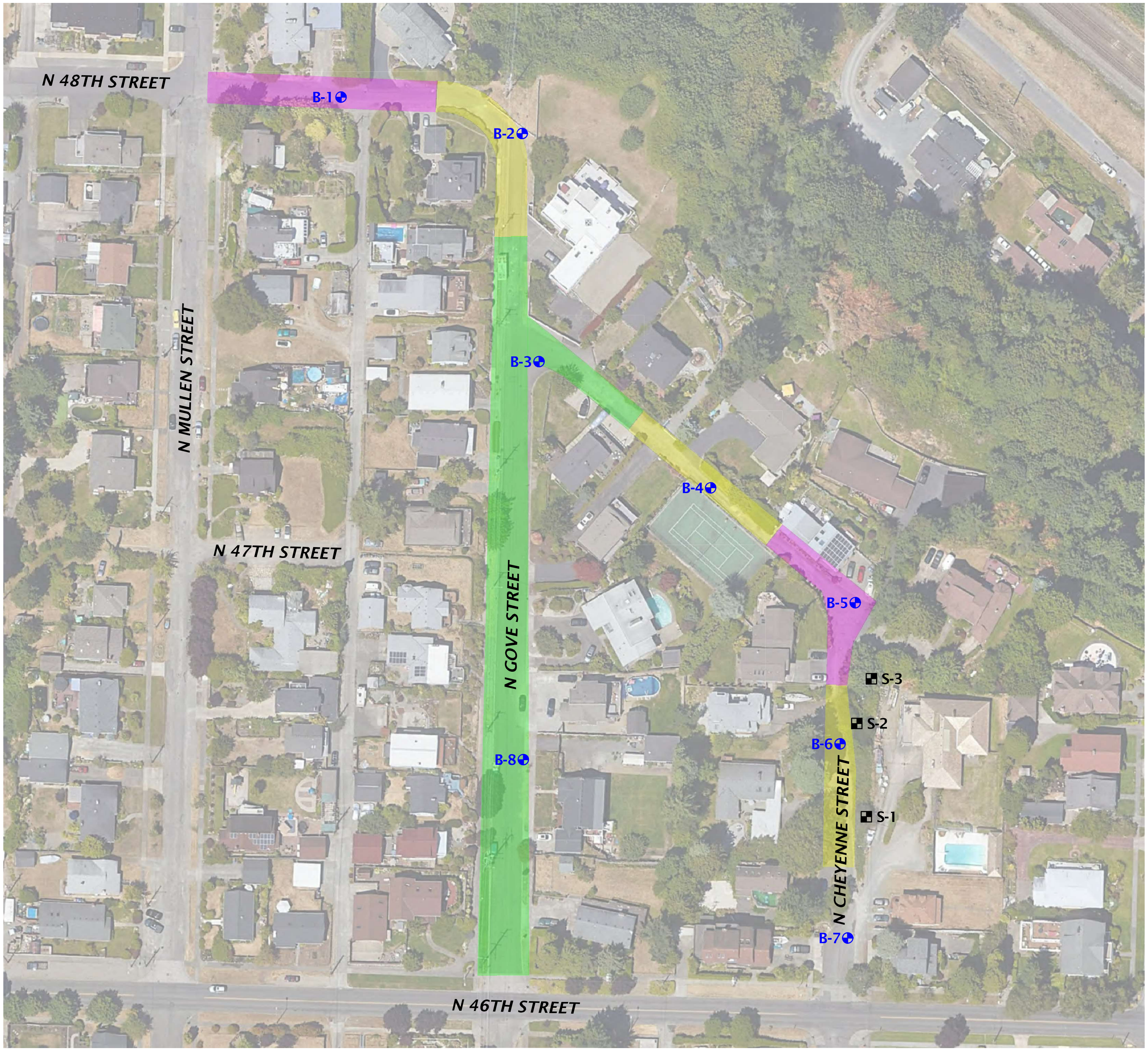
JULY 2020

SITE PLAN

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE 2

Printed By: mmiller | Print Date: 7/20/2020 8:56:12 AM
File Name: J:\A-D\CityTacoma\CityTacoma-33\CityTacoma-33-01\Figures\CAD\CityTacoma-33-01-SP01.dwg | Layout: FIGURE 2



LEGEND:

B-1 BORING

S-1 ENVIRONMENTAL COMPOSITE SAMPLE

ARSENIC- AND LEAD-CONTAMINATED CATEGORY B SOIL EXTENDS TO A DEPTH OF:

- 2 FEET
- 4 FEET
- >5 FEET

N

0 100 200

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, MAY 6, 2020

GEODESIGN INC

Addendum 1

CITYTACOMA-33-01

JULY 2020

EXTENT OF CATEGORY B CONTAMINATED SOIL

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE 3

Printed By: mmiller | Print Date: 7/20/2020 8:56:14 AM
File Name: J:\A-D\CityTacoma\CityTacoma-33\CityTacoma-33-01\Figures\CAD\CityTacoma-33-01-SP01.dwg | Layout: FIGURE 3

Addendum 1

APPENDIX A

APPENDIX A

FIELD EXPLORATIONS

GENERAL

Subsurface conditions at the site were explored by drilling eight soil borings to depths between 11.5 and 21.5 feet BGS. The explorations were completed on April 15 and 16, 2020 by Boretec1 of Bellevue, Washington, using a trailer-mounted drill rig using hollow-stem auger drilling techniques. The exploration logs are presented in this appendix. The locations of the explorations were determined based on existing conditions and field measurements. This information should be considered accurate to the degree implied by the methods used.

SOIL SAMPLING

We collected representative samples of the various soils encountered in the explorations for geotechnical laboratory testing. Samples were collected from the borings using a 1½-inch-inside diameter, split-spoon sampler (SPT sampler). The split-spoon sampling was conducted in general accordance with ASTM D1586. The 1½-inch-inside diameter, split-spoon samplers were driven into the soil with 140-pound hammer free falling 30 inches. The samplers were driven a total distance of 18 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the boring logs, unless otherwise noted. Sampling methods and intervals are shown on the exploration logs.

The SPT blows completed by Boretec1, Inc. were conducted using two wraps around a cathead.

SOIL CLASSIFICATION

The soil samples were classified in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this appendix. The exploration logs indicate the depths at which the soils or their characteristics change, although the change could be gradual. A horizontal line between soil types indicates an observed change. If the change was gradual the change is indicated using a dashed line. Classifications are shown on the exploration logs.

LABORATORY TESTING

CLASSIFICATION

The soil samples were classified in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this appendix. The exploration logs indicate the depths at which the soils or their characteristics change, although the change could be gradual. A horizontal line between soil types indicates an observed change. If the change was gradual the change is indicated using a dashed line. Classifications are shown on the exploration logs.

GRAIN-SIZE ANALYSIS

We completed grain-size analysis on a select soil sample in order to determine the distribution of soil particle sizes. The testing was completed in general accordance with ASTM C136 and ASTM C117. The test results are presented in this appendix.

MOISTURE CONTENT

We tested the moisture content of select soil samples in general accordance with ASTM D2216. The moisture content is a ratio of the weight of the water to soil in a test sample and is expressed as a percentage. The test results are presented in this appendix.

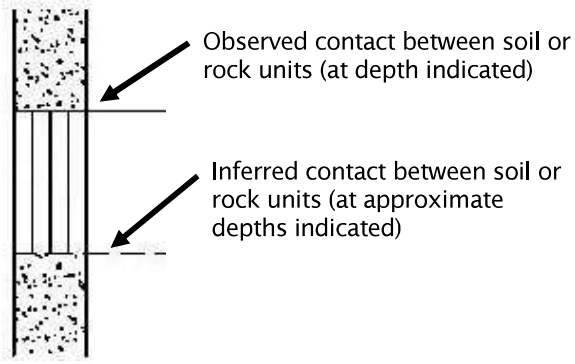
FINES CONTENT

We completed fines content testing on select soil samples in order to determine the soil characteristics. The testing was completed in general accordance with ASTM D1140. The test results are presented in this appendix.

Addendum 1

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-O.D. California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density		
DS	Direct Shear	RES	Resilient Modulus
HYD	Hydrometer Gradation	SIEV	Sieve Gradation
MC	Moisture Content	TOR	Torvane
MD	Moisture-Density Relationship	UC	Unconfined Compressive Strength
NP	Non-Plastic	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

Addendum 1

RELATIVE DENSITY - COARSE-GRAINED SOIL

Relative Density	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)
Very Loose	0 – 4	0 – 11	0 – 4
Loose	4 – 10	11 – 26	4 – 10
Medium Dense	10 – 30	26 – 74	10 – 30
Dense	30 – 50	74 – 120	30 – 47
Very Dense	More than 50	More than 120	More than 47

CONSISTENCY - FINE-GRAINED SOIL

Consistency	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)	Unconfined Compressive Strength (tsf)
Very Soft	Less than 2	Less than 3	Less than 2	Less than 0.25
Soft	2 – 4	3 – 6	2 – 5	0.25 – 0.50
Medium Stiff	4 – 8	6 – 12	5 – 9	0.50 – 1.0
Stiff	8 – 15	12 – 25	9 – 19	1.0 – 2.0
Very Stiff	15 – 30	25 – 65	19 – 31	2.0 – 4.0
Hard	More than 30	More than 65	More than 31	More than 4.0

PRIMARY SOIL DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt
			GW-GC or GP-GC	GRAVEL with clay
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt
			SW-SC or SP-SC	SAND with clay
		SAND WITH FINES (> 12% fines)	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT
			CL	CLAY
			CL-ML	silty CLAY
			OL	ORGANIC SILT or ORGANIC CLAY
		Liquid limit 50 or greater	MH	SILT
			CH	CLAY
			OH	ORGANIC SILT or ORGANIC CLAY
HIGHLY ORGANIC SOIL			PT	PEAT

MOISTURE CLASSIFICATION

Term	Field Test
dry	very low moisture, dry to touch
moist	damp, without visible moisture
wet	visible free water, usually saturated

ADDITIONAL CONSTITUENTS

Secondary granular components or other materials such as organics, man-made debris, etc.

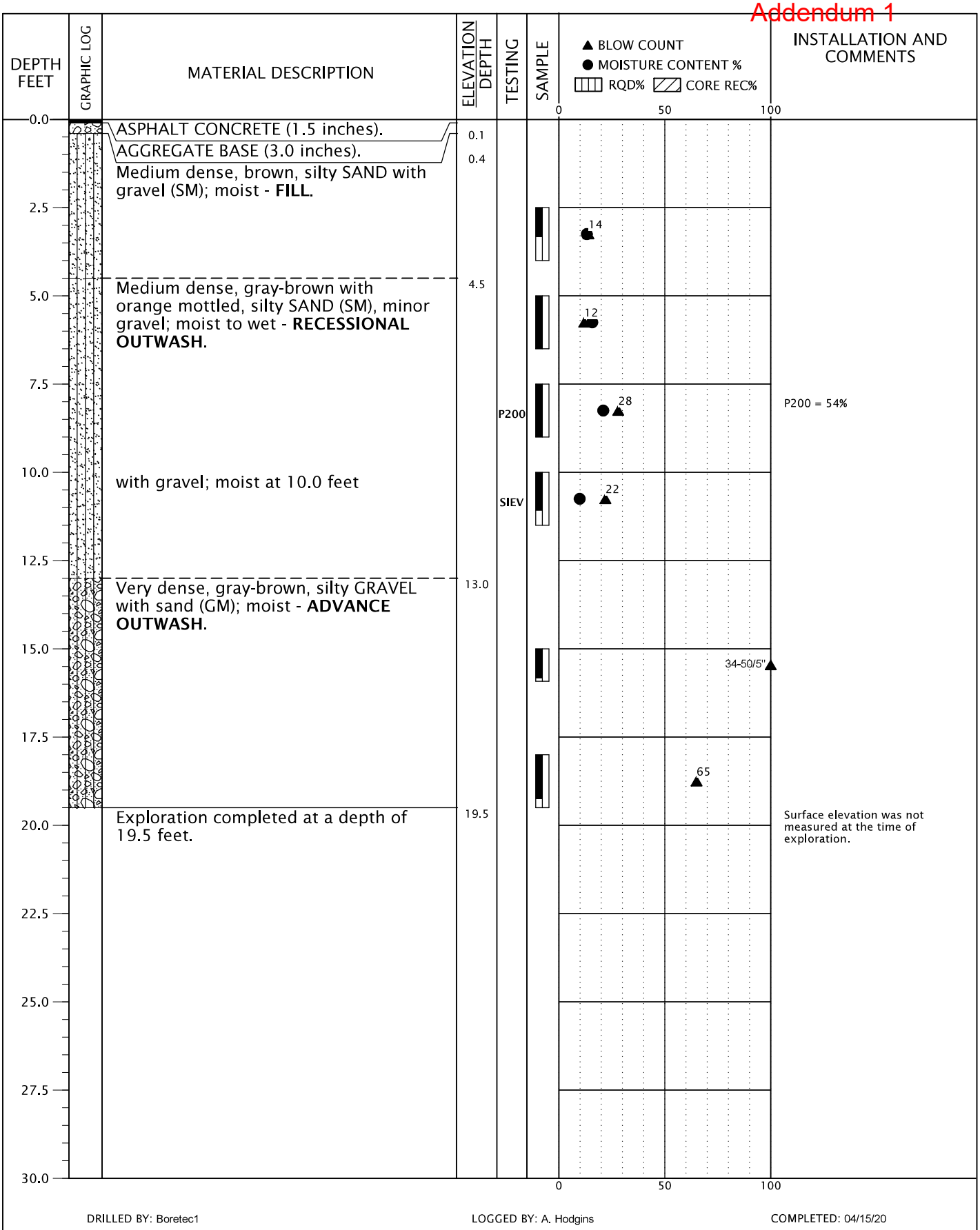
Percent	Silt and Clay In: Fine-Grained Soil	Silt and Clay In: Coarse-Grained Soil	Percent	Sand and Gravel In: Fine-Grained Soil	Sand and Gravel In: Coarse-Grained Soil
< 5	trace	trace	< 5	trace	trace
5 – 12	minor	with	5 – 15	minor	minor
> 12	some	silty/clayey	15 – 30	with	with
			> 30	sandy/gravelly	Indicate %

GEODESIGN INC AN NV5 COMPANY

SOIL CLASSIFICATION SYSTEM

TABLE A-2

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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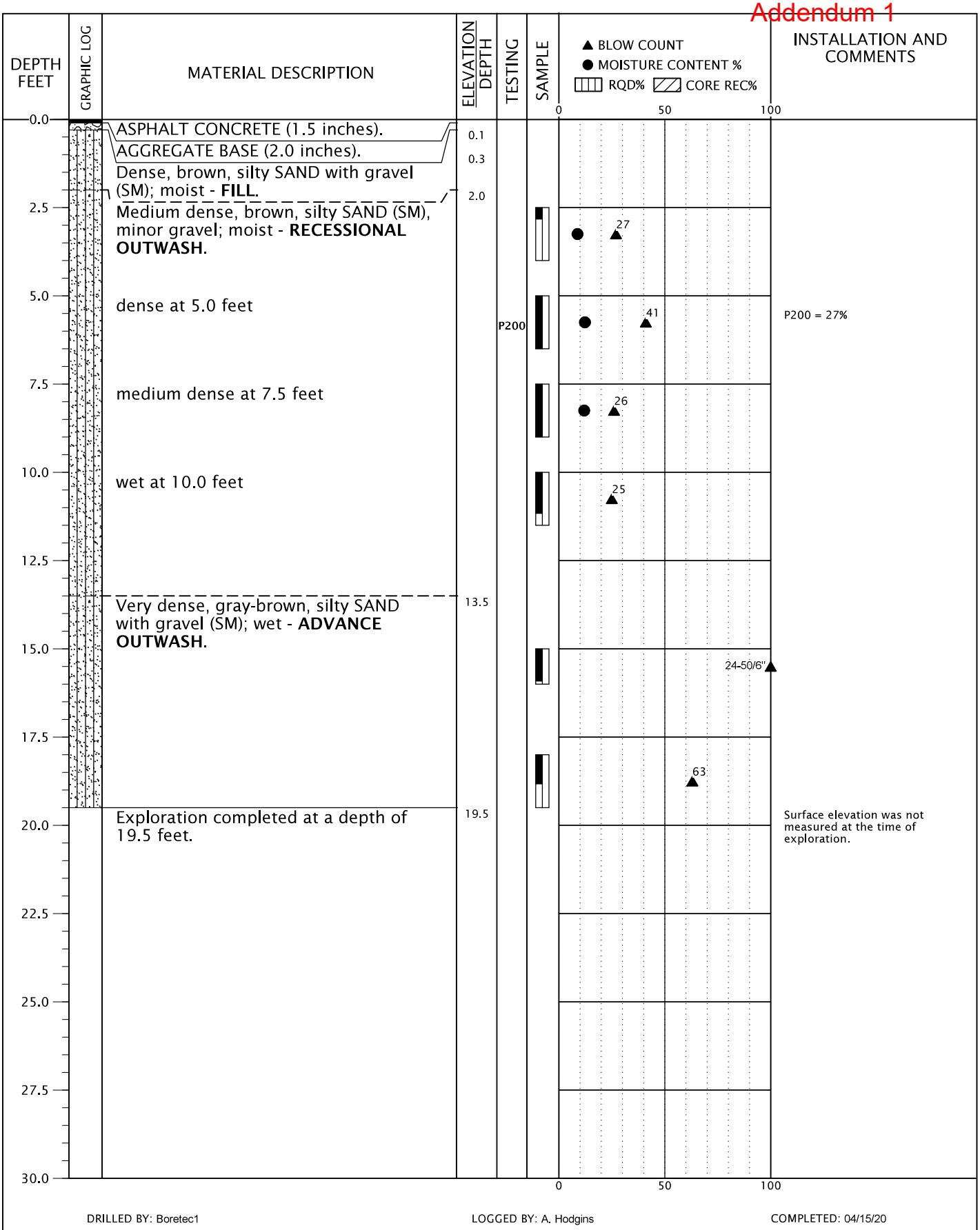
CITYTACOMA-33-01	**BORING B-1**	
JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE A-1**

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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CITYTACOMA-33-01

BORING B-2

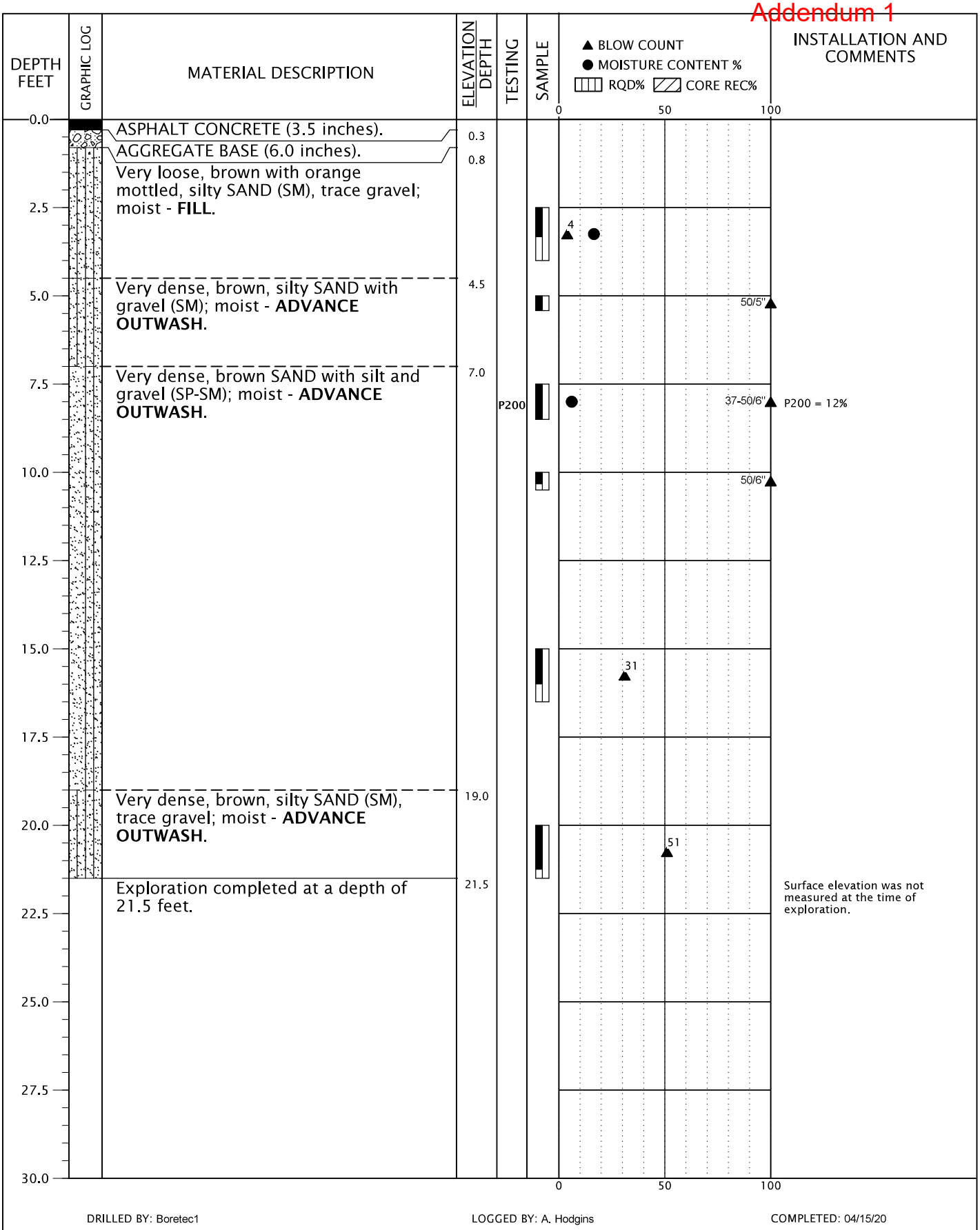
JULY 2020

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE A-2

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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CITYTACOMA-33-01

BORING B-3

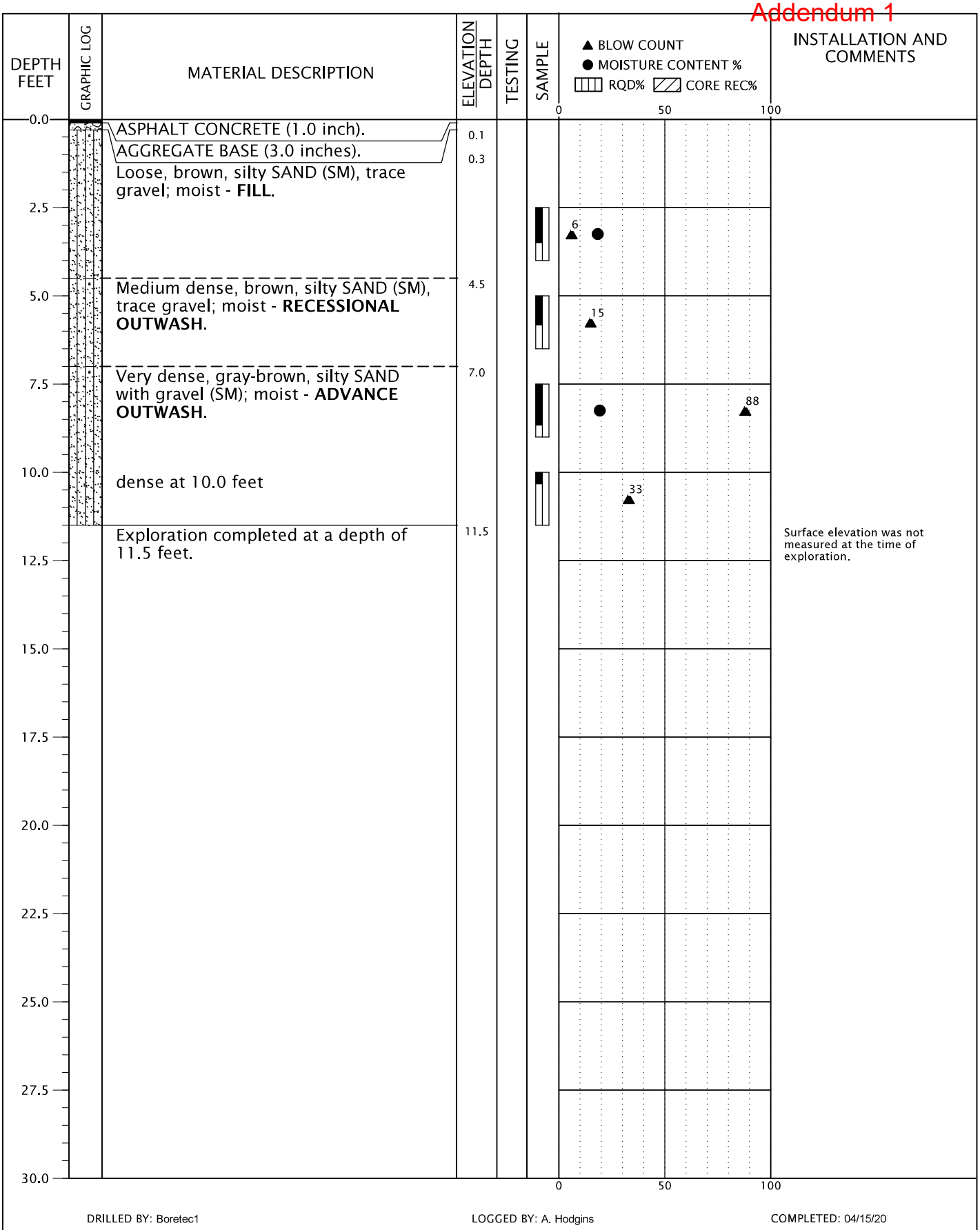
JULY 2020

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE A-3

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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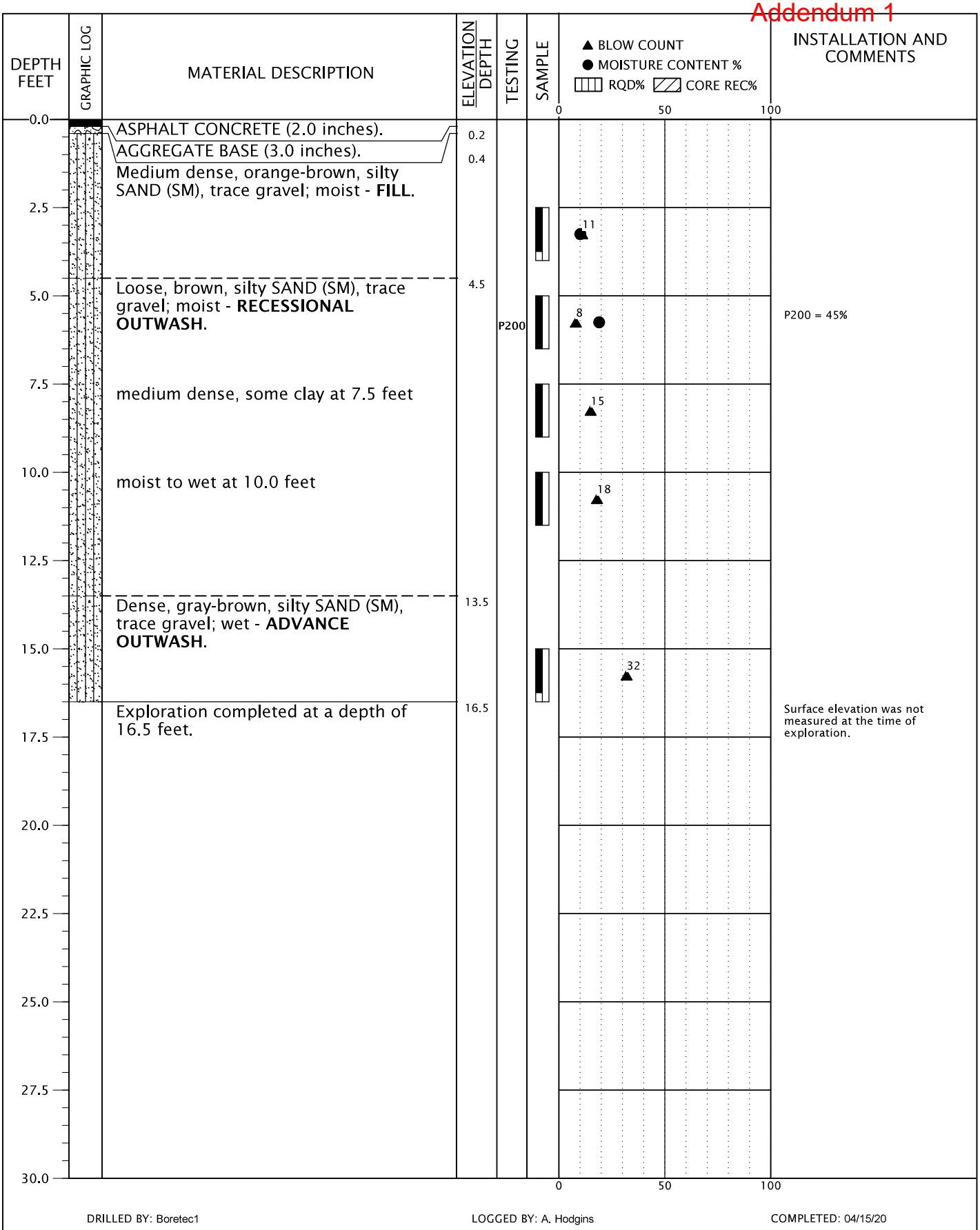
CITYTACOMA-33-01	**BORING B-4**	
JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE A-4**

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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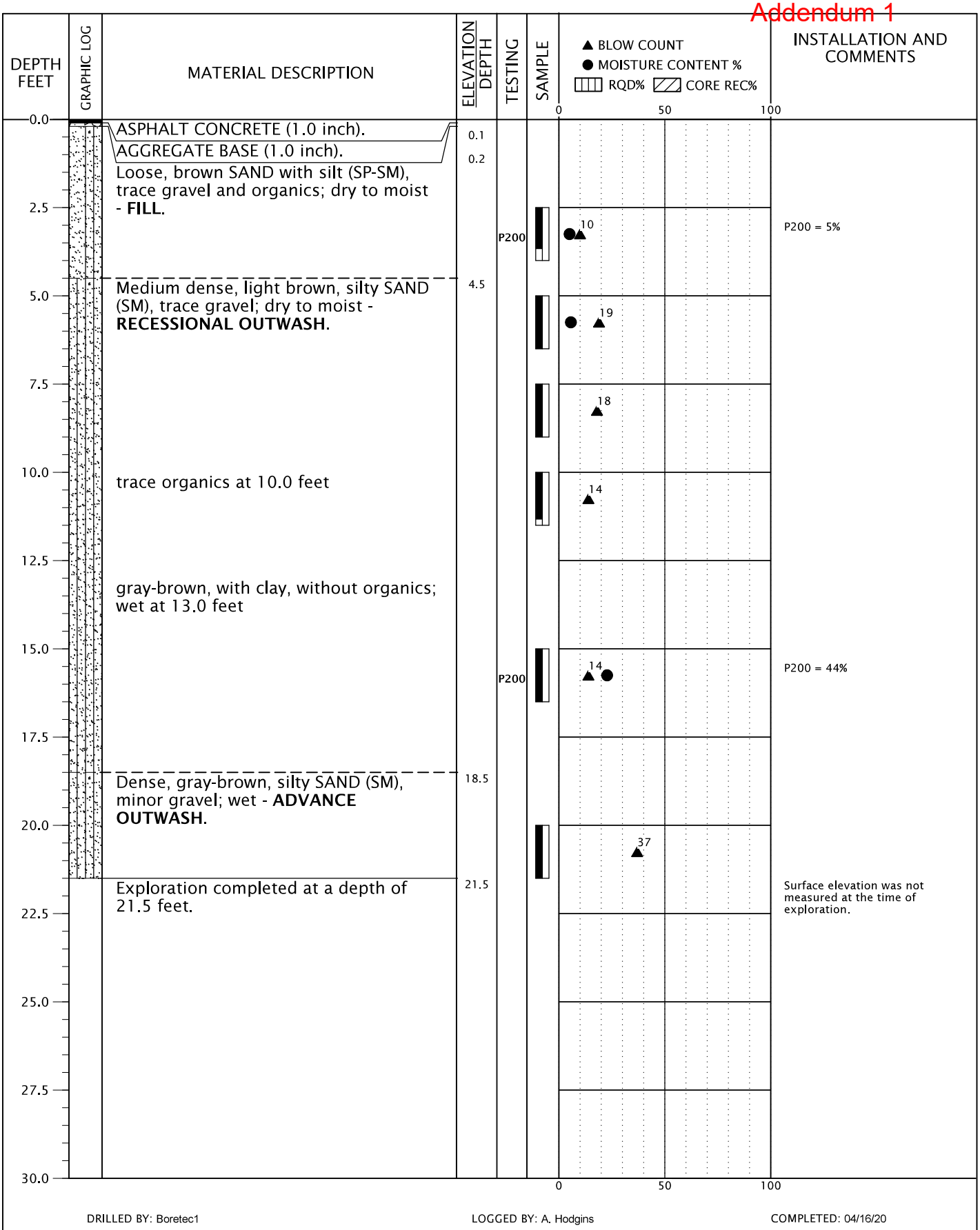
CITYTACOMA-33-01	**BORING B-5**	
JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE A-5**

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/16/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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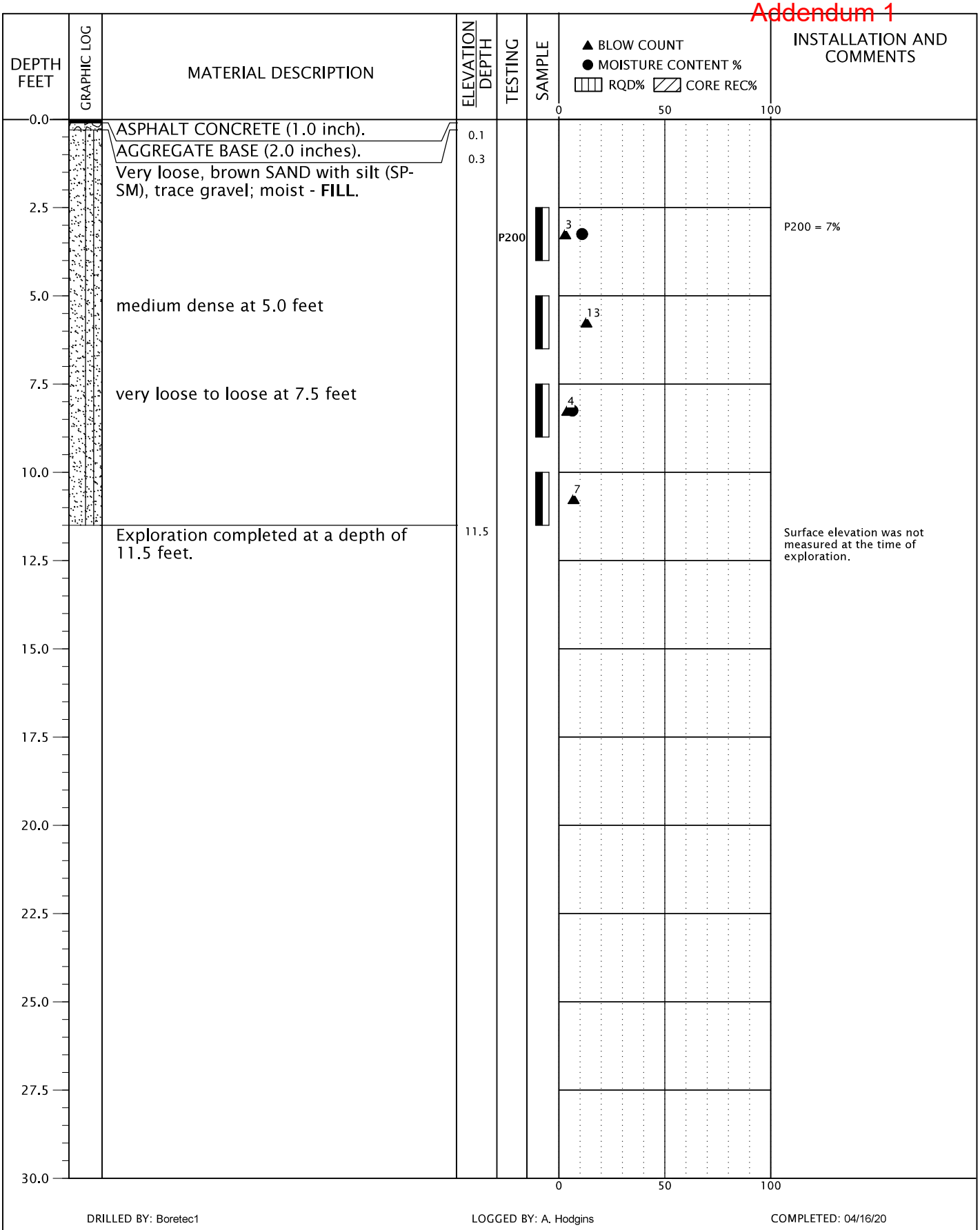
CITYTACOMA-33-01	**BORING B-6**	
JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE A-6**

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1 LOGGED BY: A. Hodgins COMPLETED: 04/16/20

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 4 1/4 inches

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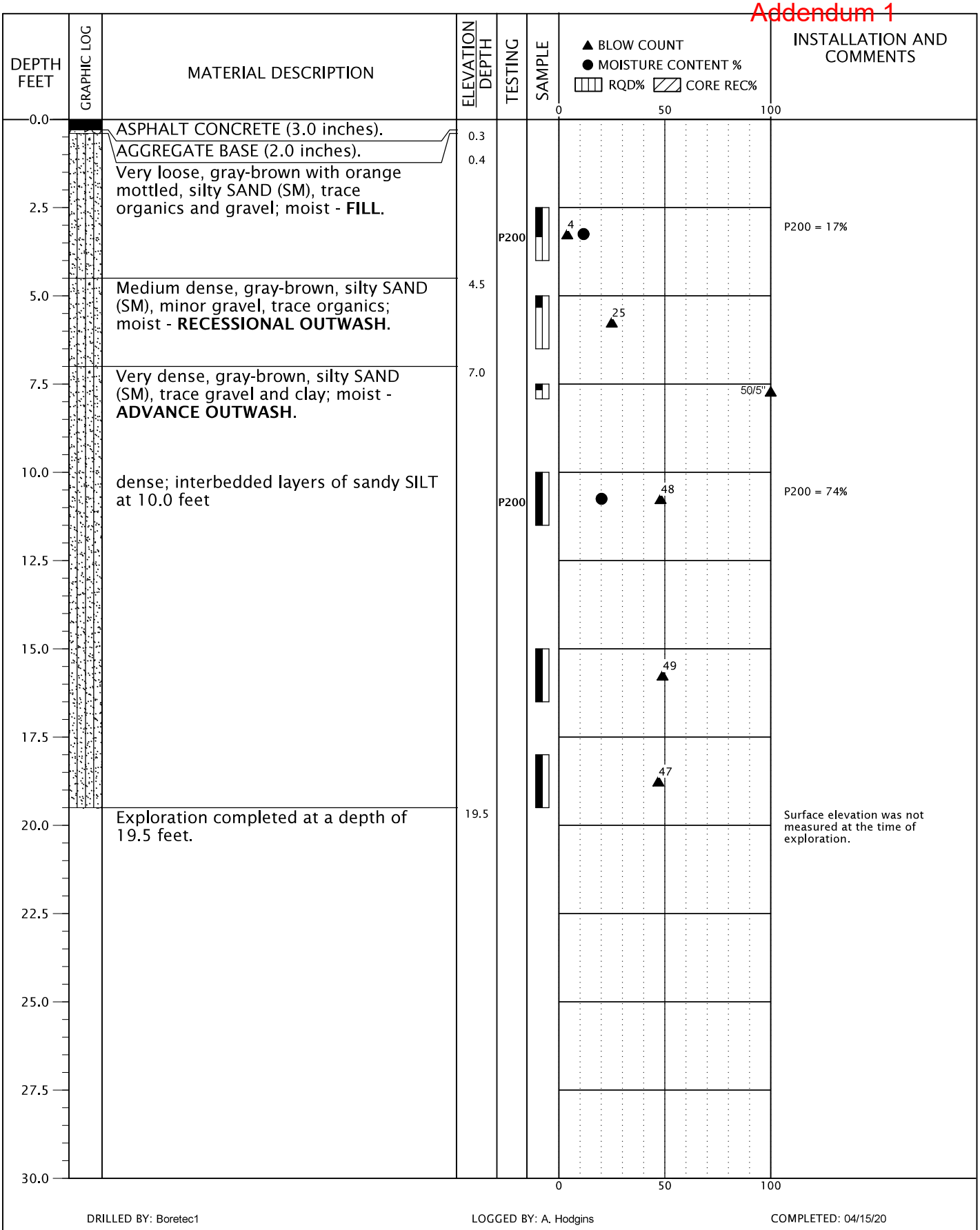
CITYTACOMA-33-01	**BORING B-7**	
JULY 2020	UTILITY REPLACEMENT & STREET RECONSTRUCT. TACOMA, WA	**FIGURE A-7**

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT

Addendum 1



DRILLED BY: Boretec1

LOGGED BY: A. Hodgins

COMPLETED: 04/15/20

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 4 1/4 inches

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CITYTACOMA-33-01

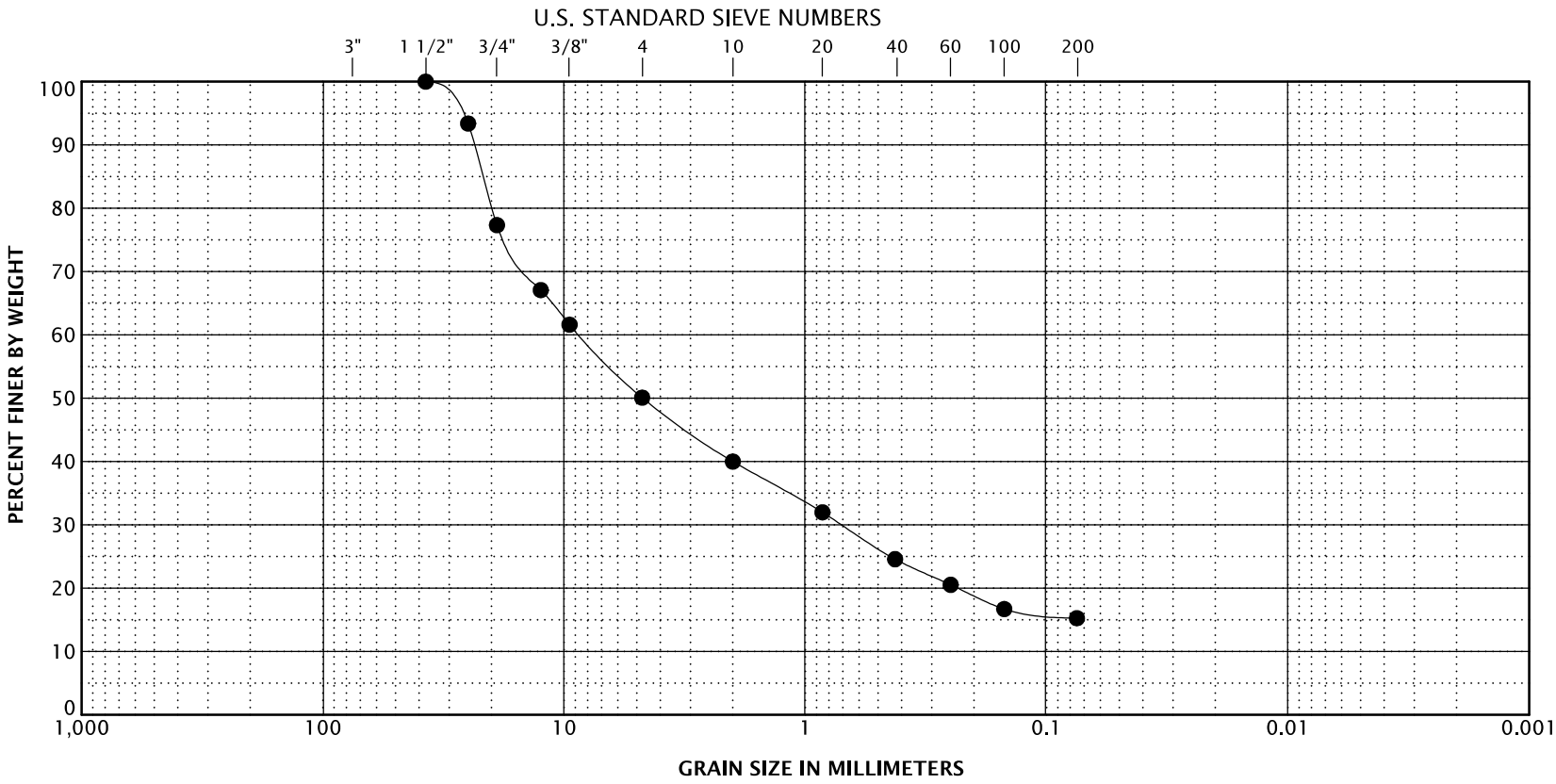
BORING B-8

JULY 2020

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE A-8

BORING LOG - GDI-NV5 - 1 PER PAGE CITYTACOMA-33-01-B1_8.GPJ GDI_NV5.GDT PRINT DATE: 7/20/20:KM:KT



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

KEY	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60	D50	D30	D10	D5	GRAVEL (PERCENT)	SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)
●	B-1	10.0	10	8.62	4.71	0.71			50	35	15	

Addendum 1

GEODESIGN INC
AN NV5 COMPANY

CITYTACOMA-33-01

GRAIN-SIZE TEST RESULTS

JULY 2020

UTILITY REPLACEMENT & STREET RECONSTRUCT.
TACOMA, WA

FIGURE A-9

Addendum 1

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
B-1	2.5		13							
B-1	5.0		16							
B-1	7.5		21				54			
B-1	10.0		10		50	35	15			
B-2	2.5		9							
B-2	5.0		12				27			
B-2	7.5		12							
B-3	2.5		17							
B-3	7.5		6				12			
B-4	2.5		18							
B-4	7.5		19							
B-5	2.5		10							
B-5	5.0		19				45			
B-6	2.5		5				5			
B-6	5.0		6							
B-6	15.0		23				44			
B-7	2.5		11				7			
B-7	7.5		6							
B-8	2.5		12				17			
B-8	10.0		20				74			

Addendum 1

APPENDIX B

APPENDIX B

LABORATORY TESTING

This appendix includes chemical analytical laboratory results completed by the City of Tacoma Environmental Services laboratory.

Addendum 1

SAMPLENAME	MATRIX	ANALYTE	Result	UNITS	SMP SOIL CATEGORY
BORING B-1					
CT-B1-S3 (0.3-1)	Soil	Arsenic	14.4	mg/Kg	A
CT-B1-S3 (0.3-1)	Soil	Lead	18.8	mg/Kg	A
CT-B1-S3 (1-2)	Soil	Arsenic	<10.0	mg/Kg	A
CT-B1-S3 (1-2)	Soil	Lead	12.8	mg/Kg	A
CT-B1-S3 (2-3)	Soil	Arsenic	16.1	mg/Kg	A
CT-B1-S3 (2-3)	Soil	Lead	26.3	mg/Kg	B
CT-B1-S3 (3-4)	Soil	Arsenic	14.1	mg/Kg	A
CT-B1-S3 (3-4)	Soil	Lead	27.5	mg/Kg	B
CT-B1-S3 (4-5)	Soil	Arsenic	17	mg/Kg	A
CT-B1-S3 (4-5)	Soil	Lead	14.1	mg/Kg	A
BORING B-2					
CT-B2-S2 (0.2-1)	Soil	Arsenic	31.2	mg/Kg	B
CT-B2-S2 (0.2-1)	Soil	Lead	61.3	mg/Kg	B
CT-B2-S2 (1-2)	Soil	Arsenic	31.8	mg/Kg	B
CT-B2-S2 (1-2)	Soil	Lead	70.2	mg/Kg	B
CT-B2-S2 (2-3)	Soil	Arsenic	24	mg/Kg	B
CT-B2-S2 (2-3)	Soil	Lead	58.2	mg/Kg	B
CT-B2-S2 (3-4)	Soil	Arsenic	27.3	mg/Kg	B
CT-B2-S2 (3-4)	Soil	Lead	65	mg/Kg	B
CT-B2-S2 (4-5)	Soil	Arsenic	20.3	mg/Kg	B
CT-B2-S2 (4-5)	Soil	Lead	46.2	mg/Kg	B
BORING B-3					
CT-B3-S4 (0.4-1)	Soil	Arsenic	18.5	mg/Kg	A
CT-B3-S4 (0.4-1)	Soil	Lead	23.9	mg/Kg	B
CT-B3-S4 (1-2)	Soil	Arsenic	32	mg/Kg	B
CT-B3-S4 (1-2)	Soil	Lead	50.4	mg/Kg	B
CT-B3-S4 (2-3)	Soil	Arsenic	<10.0	mg/Kg	A
CT-B3-S4 (2-3)	Soil	Lead	12.8	mg/Kg	A
CT-B3-S4 (3-4)	Soil	Arsenic	<10.0	mg/Kg	A
CT-B3-S4 (3-4)	Soil	Lead	<10.0	mg/Kg	A
CT-B3-S4 (4-5)	Soil	Arsenic	<10.0	mg/Kg	A
CT-B3-S4 (4-5)	Soil	Lead	10.2	mg/Kg	A
CT-B3-S4 (5-6)	Soil	Arsenic	10.5	mg/Kg	A
CT-B3-S4 (5-6)	Soil	Lead	11.5	mg/Kg	A
BORING B-4					
CT-B4-S5 (0.3-1)	Soil	Arsenic	41.5	mg/Kg	B
CT-B4-S5 (0.3-1)	Soil	Lead	92	mg/Kg	B
CT-B4-S5 (1-2)	Soil	Arsenic	79.2	mg/Kg	B
CT-B4-S5 (1-2)	Soil	Lead	208	mg/Kg	B
CT-B4-S5 (2-3)	Soil	Arsenic	68.5	mg/Kg	B
CT-B4-S5 (2-3)	Soil	Lead	134	mg/Kg	B
CT-B4-S5 (3-4)	Soil	Arsenic	21.7	mg/Kg	B
CT-B4-S5 (3-4)	Soil	Lead	24.9	mg/Kg	B
CT-B4-S5 (4-5)	Soil	Arsenic	25.2	mg/Kg	B
CT-B4-S5 (4-5)	Soil	Lead	24.4	mg/Kg	B
BORING B-5					
CT-B5-S6 (0.3-1)	Soil	Arsenic	109	mg/Kg	B
CT-B5-S6 (0.3-1)	Soil	Lead	76.7	mg/Kg	B
CT-B5-S6 (1-2)	Soil	Arsenic	93.8	mg/Kg	B
CT-B5-S6 (1-2)	Soil	Lead	286	mg/Kg	B
CT-B5-S6 (2-3)	Soil	Arsenic	37.7	mg/Kg	B
CT-B5-S6 (2-3)	Soil	Lead	65.3	mg/Kg	B
CT-B5-S6 (3-4)	Soil	Arsenic	28.6	mg/Kg	B
CT-B5-S6 (3-4)	Soil	Lead	54.4	mg/Kg	B
CT-B5-S6 (4-5)	Soil	Arsenic	18	mg/Kg	A
CT-B5-S6 (4-5)	Soil	Lead	<10.0	mg/Kg	A
BORING B-6					
CT-B6-S7 (0.3-1)	Soil	Arsenic	53.4	mg/Kg	B
CT-B6-S7 (0.3-1)	Soil	Lead	209	mg/Kg	B
CT-B6-S7 (1-2)	Soil	Arsenic	103	mg/Kg	B
CT-B6-S7 (1-2)	Soil	Lead	600	mg/Kg	C
CT-B6-S7 (2-3)	Soil	Arsenic	14.7	mg/Kg	A
CT-B6-S7 (2-3)	Soil	Lead	76.3	mg/Kg	B
CT-B6-S7 (3-4)	Soil	Arsenic	<10.0	mg/Kg	A

LEGEND

- Category "A" Soil
- Category "B" Soil
- Category "C" Soil

Addendum 1

CT-B6-S7 (3-4)	Soil	Lead	<10.0	mg/Kg	A	
CT-B6-S7 (4-5)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B6-S7 (4-5)	Soil	Lead	29.3	mg/Kg	B	
CT-B6-S7 (5-6)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B6-S7 (5-6)	Soil	Lead	<10.0	mg/Kg	A	
BORING B-7						
CT-B7-S8 (0.3-1)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B7-S8 (0.3-1)	Soil	Lead	12.3	mg/Kg	A	
CT-B7-S8 (1-2)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B7-S8 (1-2)	Soil	Lead	<10.0	mg/Kg	A	
CT-B7-S8 (2-3)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B7-S8 (2-3)	Soil	Lead	<10.0	mg/Kg	A	
CT-B7-S8 (3-4)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B7-S8 (3-4)	Soil	Lead	<10.0	mg/Kg	A	
CT-B7-S8 (4-5)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B7-S8 (4-5)	Soil	Lead	<10.0	mg/Kg	A	
BORING B-8						
CT-B8-S1 (0.3-1)	Soil	Arsenic	20	mg/Kg	A	
CT-B8-S1 (0.3-1)	Soil	Lead	29.1	mg/Kg	B	
CT-B8-S1 (1-2)	Soil	Arsenic	15.6	mg/Kg	A	
CT-B8-S1 (1-2)	Soil	Lead	22.7	mg/Kg	B	
CT-B8-S1 (2-3)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B8-S1 (2-3)	Soil	Lead	<10.0	mg/Kg	A	
CT-B8-S1 (3-4)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B8-S1 (3-4)	Soil	Lead	<10.0	mg/Kg	A	
CT-B8-S1 (4-5)	Soil	Arsenic	<10.0	mg/Kg	A	
CT-B8-S1 (4-5)	Soil	Lead	10.7	mg/Kg	A	
NORTH CHEYENNE STREET SLOPE AREA						
S1 (0-1)	Soil	Arsenic	34.4	mg/Kg	B	
S1 (0-1)	Soil	Lead	76.3	mg/Kg	B	
S2 (0-1)	Soil	Arsenic	29.8	mg/Kg	B	
S2 (0-1)	Soil	Lead	84.8	mg/Kg	B	
S3 (0-1)	Soil	Arsenic	33	mg/Kg	B	
S3 (0-1)	Soil	Lead	103	mg/Kg	B	
COMPOSITE SAMPLES						
D1 COMP	Soil	Arsenic	<10.0	mg/Kg	A	
D1 COMP	Soil	Lead	<10.0	mg/Kg	A	
D2 COMP	Soil	Arsenic	10.2	mg/Kg	A	
D2 COMP	Soil	Lead	<10.0	mg/Kg	A	
D3 COMP	Soil	Arsenic	<10.0	mg/Kg	A	
D3 COMP	Soil	Lead	<10.0	mg/Kg	A	
D4 COMP	Soil	Arsenic	<10.0	mg/Kg	A	
D4 COMP	Soil	Lead	25.2	mg/Kg	B	

LABSAMPID	QCTYPE	MATRIX	ANADATE	BATCH	METHODCODE	METHODNAME	ANALYTE	RESULT	PQL	UNITS	SPIKELEVEL	RECOVERY	UPPERCL	LOWERCL
B018012-BLK1	Blank	Soil	04/22/2020 10:44:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	<10.0	10.0	mg/Kg				
B018012-BLK1	Blank	Soil	04/22/2020 10:44:00	B018012	XRF_TSP_6200	EPA 6200	Lead	<10.0	10.0	mg/Kg				
B018012-BLK2	Blank	Soil	04/23/2020 10:15:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	<10.0	10.0	mg/Kg				
B018012-BLK2	Blank	Soil	04/23/2020 10:15:00	B018012	XRF_TSP_6200	EPA 6200	Lead	<10.0	10.0	mg/Kg				
B018012-BLK3	Blank	Soil	04/24/2020 09:54:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	<10.0	10.0	mg/Kg				
B018012-BLK3	Blank	Soil	04/24/2020 09:54:00	B018012	XRF_TSP_6200	EPA 6200	Lead	<10.0	10.0	mg/Kg				
B018012-SRM1	Reference	Soil	04/22/2020 10:56:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	27.0		mg/Kg	18.9	143	153	37
B018012-SRM1	Reference	Soil	04/22/2020 10:56:00	B018012	XRF_TSP_6200	EPA 6200	Lead	312		mg/Kg	330	94.5	100	76
B018012-SRM2	Reference	Soil	04/23/2020 10:53:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	24.7		mg/Kg	18.9	131	153	37
B018012-SRM2	Reference	Soil	04/23/2020 10:53:00	B018012	XRF_TSP_6200	EPA 6200	Lead	299		mg/Kg	330	90.6	100	76
B018012-SRM3	Reference	Soil	04/24/2020 10:07:00	B018012	XRF_TSP_6200	EPA 6200	Arsenic	33.0		mg/Kg	18.9	175	153	37
B018012-SRM3	Reference	Soil	04/24/2020 10:07:00	B018012	XRF_TSP_6200	EPA 6200	Lead	369		mg/Kg	330	112	100	76

Addendum 1

Addendum 1

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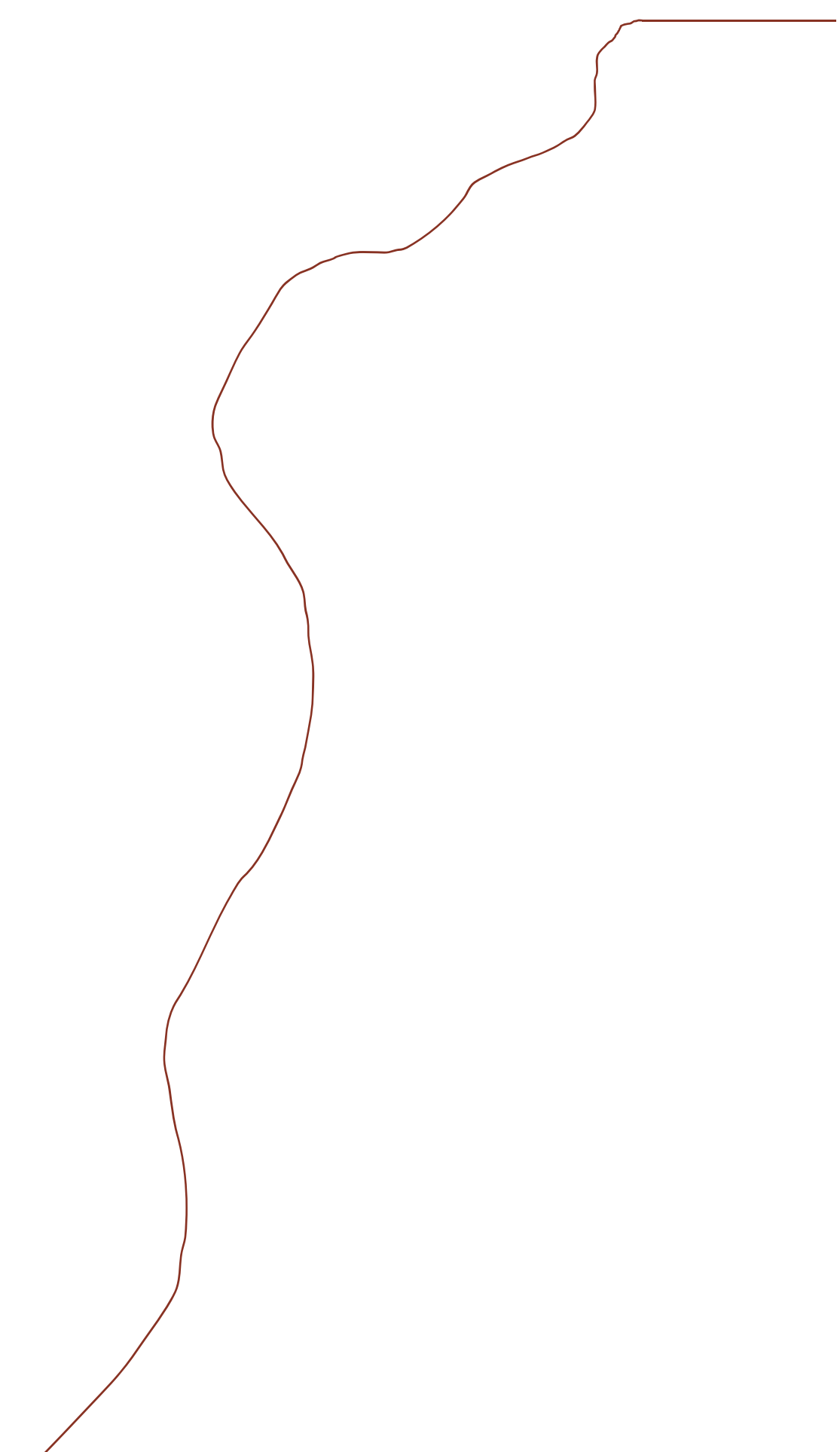

B I D P R O P O S A L

Addendum 1

SPECIFICATION NO. PW23-0241F

Streets Initiative Packages #24 & #35

The undersigned hereby certifies that he/she has examined the location and construction details of work as outlined on the Plans and Specifications for Project No. PWK-00434-24 & PWK-00434-35 and has read and thoroughly understands the Plans and Specifications and contract governing the work embraced in this improvement and the method by which payment will be made for said work, and hereby proposes to undertake and complete the work embraced in this improvement in accordance with said Plans, Specifications and contract and at the following schedule of rates and prices.

NOTE:

1. Unit prices of all items, all extensions and total amount of bid should be shown. Show unit prices in figures only.
2. The notations below the item numbers refer to the specification section where information may be found regarding each contract item. These notations are intended only as a guide and are not warranted to refer to all specification sections where information may be found.
3. The total base bid will be determined by adding the base bid of Schedule A and Schedule B and Schedule C.

All bid items are sorted in the following groups:

- ***Schedule A: Roadway, Bid Items R1 – R83***
- ***Schedule B: Wastewater, Bid Items WW1 – WW32***
- ***Schedule C: Water, Bid Items W1 – W38***
- ***Schedule D: Guardrail Repair G1 – G11***

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-1. 1-05	Roadway Surveying	1 Lump Sum	Lump Sum	$_____
R-2. 1-05	Project Redline Drawings	1 Lump Sum	Lump Sum	$_____
R-3. 1-07	SPCC Plan	1 Lump Sum	Lump Sum	$_____
R-4. 1-09	Mobilization	1 Lump Sum	Lump Sum	$_____
R-5. 1-10	Pedestrian Traffic Control	1 Lump Sum	Lump Sum	$_____
R-6. 1-10	Project Temporary Traffic Control	1 Lump Sum	Lump Sum	$_____
R-7. 2-01	Clearing and Grubbing	1 Lump Sum	Lump Sum	$_____
R-8. 2-01	Certified Arborist	1 Lump Sum	Lump Sum	$_____
R-9. 2-01	Certified Arborist Assessment Report Compliance	1 Force Account	Estimated	$ 7,500.00
R-10. 2-02	Test Hole	150 Lin. Ft.	$_____	$_____
R-11. 2-02	Existing Irrigation Systems	1 Force Account	Estimated	$ 2,500.00
R-12. 2-03	Roadway Excavation Incl. Haul	2154 Cu. Yd.	$_____	$_____
R-13. 2-03	Roadway Excavation of Contaminated Material, Incl. Haul	3414 Cu. Yd.	$_____	$_____
R-14. 2-03	Embankment Compaction	50 Cu. Yd.	$_____	$_____
R-15. 2-03	Gravel Borrow Incl. Haul	114 Cu. Yd.	$_____	$_____

Contractor's Name: _____

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-16. 2-06	Subgrade Maintenance and Protection	1 Lump Sum	Lump Sum	$_____
R-17. 2-09	Structure Excavation Class B	2233 Cu. Yd.	$_____	$_____
R-18. 2-09	Shoring or Extra Excavation Class B	16093 Sq. Ft.	$_____	$_____
R-19. 2-14	Remove Existing Pavement, Type I, Class A2	12523 Sq. Yd.	$_____	$_____
R-20. 2-14	Remove Existing Pavement, Type I, Class A4	5009 Sq. Yd.	$_____	$_____
R-21. 2-14	Remove Existing Pavement, Type I, Class C6	1638 Sq. Yd.	$_____	$_____
R-22. 2-14	Remove Existing Pavement, Type I, Class CA	250 Sq. Yd.	$_____	$_____
R-23. 2-15	Remove Curb	564 Lin. Ft.	$_____	$_____
R-24. 2-16	Remove Catch Basin	18 Each	$_____	$_____
R-25. 2-16	Remove Manhole	3 Each	$_____	$_____
R-26. 2-17	Site Health and Safety Plan	1 Lump Sum	Lump Sum	$_____
R-27. 2-17	Site Health and Safety Officer	1 Lump Sum	Lump Sum	$_____
R-28. 2-17	Soil Management Plan	1 Lump Sum	Lump Sum	$_____
R-29. 4-04	Crushed Surfacing Top Course	1410 Ton	$_____	$_____
R-30. 4-04	Crushed Surfacing Base Course	5617 Ton	$_____	$_____

Contractor's Name: _____

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-31. 4-04	Gravel Path	12 Ton	$_____	$_____
R-32. 5-04	Planing Bituminous Pavement	2539 Sq. Yd.	$_____	$_____
R-33. 5-04	HMA CL 1/2" PG 58H-22, per ton	3895 Ton	$_____	$_____
R-34. 5-04	HMA for Approach CL 3/8" PG 58H-22	1013 Sq. Yd.	$_____	$_____
R-35. 5-04	Temporary Pavement Patch	257 Ton	$_____	$_____
R-36. 7-05	Adjust Area Drain to Grade	2 Each	$_____	$_____
R-37. 7-05	Adjust Existing Catch Basin	8 Each	$_____	$_____
R-38. 7-05	Adjust Existing Manhole	25 Each	$_____	$_____
R-39. 7-05	Adjust Existing Valve Chamber to Grade	39 Each	$_____	$_____
R-40. 7-05	Catch Basin Type 1	38 Each	$_____	$_____
R-41. 7-05	Catch Basin Type 2, 48 In. Diam.	1 Each	$_____	$_____
R-42. 7-05	Manhole 48 In. Diam. Type 1	9 Each	$_____	$_____
R-43. 7-05	Manhole Additional Height 48 In. Diam. Type 1	4 Lin. Ft.	$_____	$_____
R-44. 7-05	Reconnect Existing Sewer Pipe, 8-In. Diam., to New Structure	5 Each	$_____	$_____
R-45. 7-05	Reconnect Existing Sewer Pipe, 6-In. Diam., to New Structure	1 Each	$_____	$_____

Contractor's Name: _____

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-46. 7-05	Reconnect Existing Sewer Pipe, 12-In. Diam., to New Structure	2 Each	$_____	$_____
R-47. 7-05	Reconnect Existing Sewer Pipe, 10-In. Diam., to New Structure	4 Each	$_____	$_____
R-48. 7-05	Connect New Sewer Pipe, 12-In Diam., to Existing Structure	7 Each	$_____	$_____
R-49. 7-05	Contech StormFilter Manhole 60-In. Diam., with 4 StormFilter Cartridges	2 Each	$_____	$_____
R-50. 7-08	CDF for Pipe Abandonment	7 Cu. Yd.	$_____	$_____
R-51. 7-08	Temporary Storm Sewer Bypass	1 Lump Sum	Lump Sum	$_____
R-52. 7-08	Temporary Storm Sewer Bypass plan	1 Lump Sum	Lump Sum	$_____
R-53. 7-17	Removal and Replacement of Unsuitable Material Incl. Haul	1273 Cu. Yd.	$_____	$_____
R-54. 7-17	Removal and Replacement of Unsuitable Contaminated Material, Incl. Haul	387 Cu. Yd.	$_____	$_____
R-55. 7-17	Pipe Zone Contaminated Material Haul and Disposal	187 Cu. Yd.	$_____	$_____
R-56. 7-17	Ductile Iron Sewer Pipe 6 In. Diam.	58 Lin. Ft.	$_____	$_____
R-57. 7-17	Ductile Iron Sewer Pipe 12 In. Diam.	453 Lin. Ft.	$_____	$_____
R-58. 7-17	PVC Storm Sewer Pipe 12 In. Diam.	2360 Lin. Ft.	$_____	$_____
R-59. 7-17	Testing Sewer Pipe	2871 Lin. Ft.	$_____	$_____

Contractor's Name: _____

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-60. 7-20	Residential Storm Drain Through Curb	85 Lin. Ft.	$_____	$_____
R-61. 8-01	Erosion/Water Pollution Control	1 Lump Sum	Lump Sum	$_____
R-62. 8-01	Stormwater Pollution Prevention Plan (SWPPP)	1 Lump Sum	Lump Sum	$_____
R-63. 8-01	NPDES Construction Stormwater General Permit	1 Lump Sum	Lump Sum	$_____
R-64. 8-02	Site Restoration	1 Lump Sum	Lump Sum	$_____
R-65. 8-02	Topsoil Type A	581 Cu. Yd.	$_____	$_____
R-66. 8-02	Seeded Lawn Installation	3410 Sq. Yd.	$_____	$_____
R-67. 8-02	Quarry Spalls for Slope Restoration	405 Ton	$_____	$_____
R-68. 8-04	Cement Conc. Traffic Curb and Gutter	5792 Lin. Ft.	$_____	$_____
R-69. 8-04	Mountable Cement Conc. Curb and Gutter, Type D	45 Lin. Ft.	$_____	$_____
R-70. 8-04	Pedestrian Curb	15 Lin. Ft.	$_____	$_____
R-71. 8-06	Cement Conc. Driveway Entrance	1117 Sq. Yd.	$_____	$_____
R-72. 8-11	Removing and Resetting Beam Guardrail	60 Lin. Ft.	$_____	$_____
R-73. 8-13	Poured Monument	7 Each	$_____	$_____
R-74. 8-14	Cement Conc. Sidewalk	637 Sq. Yd.	$_____	$_____

Schedule A: Roadway Improvements (Rule 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
R-75. 8-14	Cement Conc. Sidewalk with Score Pattern	40 Sq. Yd.	$_____	$_____
R-76. 8-14	Cement Conc. Curb Ramp	88 Each	$_____	$_____
R-77. 8-14	Detectable Warning Surface	20 Sq. Ft.	$_____	$_____
R-78. 8-18	Mailbox Support	15 Each	$_____	$_____
R-79. 8-21	Permanent Roadway Terminus	1 Each	$_____	$_____
R-80. 8-21	Permanent Signing	1 Lump Sum	Lump Sum	$_____
R-81. 8-22	Plastic Line	1700 Lin. Ft.	$_____	$_____
R-82. 8-32	Concrete Border	25 Lin. Ft.	$_____	$_____
R-83. 8-32	Artificial Turf	44 Sq. Yd.	$_____	$_____

Roadway Base Bid Total

(Bid Items No. R1 – R83) $_____(1)

SCHEDULE B ON FOLLOWING PAGE

Schedule B: Wastewater Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
WW-1. 1-05	Roadway Surveying	1 Lump Sum	Lump Sum	$_____
WW-2. 1-05	Project Redline Drawings	1 Lump Sum	Lump Sum	$_____
WW-3. 1-07	SPCC Plan	1 Lump Sum	Lump Sum	$_____
WW-4. 1-09	Mobilization	1 Lump Sum	Lump Sum	$_____
WW-5. 1-10	Pedestrian Traffic Control	1 Lump Sum	Lump Sum	$_____
WW-6. 1-10	Project Temporary Traffic Control	1 Lump Sum	Lump Sum	$_____
WW-7. 2-01	Clearing and Grubbing	1 Lump Sum	Lump Sum	$_____
WW-8. 2-01	Certified Arborist	1 Lump Sum	Lump Sum	$_____
WW-9. 2-02	Removal of Structures and Obstructions	1 Lump Sum	Lump Sum	$_____
WW-10. 2-09	Structure Excavation Class B	6619 Cu. Yd.	$_____	$_____
WW-11. 2-09	Shoring or Extra Excavation Class B	54507 Sq. Ft	$_____	$_____
WW-12. 2-16	Remove Manhole	9 Each	$_____	$_____
WW-13. 5-04	Temporary Pavement Patch	590 Ton	$_____	$_____
WW-14. 7-05	Manhole 48 In. Diam. Type 1	21 Each	$_____	$_____
WW-15. 7-05	Manhole Additional Height 48 In. Diam. Type 1	35 Lin. Ft.	$_____	$_____

Contractor's Name: _____

Schedule B: Wastewater Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
WW-16. 7-05	Reconnect Existing Sewer Pipe, 10-In. Diam., to New Structure	3 Each	$_____	$_____
WW-17. 7-05	Connect New Sewer Pipe, 10-In Diam., to Existing Structure	7 Each	$_____	$_____
WW-18. 7-05	Connect New Sewer Pipe, 8-In Diam., to Existing Structure	1 Each	$_____	$_____
WW-19. 7-08	CDF for Pipe Abandonment	2 Cu. Yd.	$_____	$_____
WW-20. 7-08	Temporary Sanitary Sewer Bypass	1 Lump Sum	Lump Sum	$_____
WW-21. 7-08	Temporary Sanitary Sewer Bypass plan	1 Lump Sum	Lump Sum	$_____
WW-22. 7-17	Removal and Replacement of Unsuitable Material Incl. Haul	3648 Cu. Yd.	$_____	$_____
WW-23. 7-17	Removal and Replacement of Unsuitable Contaminated Material, Incl. Haul	2114 Cu. Yd.	$_____	$_____
WW-24. 7-17	Pipe Zone Contaminated Material Haul and Disposal	60 Cu. Yd.	$_____	$_____
WW-25. 7-17	PVC Sanitary Sewer Pipe 10 In. Diam.	3313 Lin. Ft.	$_____	$_____
WW-26. 7-17	PVC Sanitary Sewer Pipe 8 In. Diam.	911 Lin. Ft.	$_____	$_____
WW-27. 7-17	PVC Sanitary Sewer Pipe 6 In. Diam.	964 Lin. Ft.	$_____	$_____
WW-28. 7-17	PVC Sanitary Sewer Pipe C900 6 In. Diam.	434 Lin. Ft.	$_____	$_____
WW-29. 7-17	Testing Sewer Pipe	5152 Lin. Ft.	$_____	$_____
WW-30. 7-19	Sewer Cleanout	76 Each	$_____	$_____

Contractor's Name: _____

Schedule B: Wastewater Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
WW-31. 8-01	Erosion/Water Pollution Control	1 Lump Sum	Lump Sum	$_____
WW-32. 8-02	Site Restoration	1 Lump Sum	Lump Sum	$_____

Wastewater Base Bid Total

(Bid Items No. WW1 – WW32) $_____(2)

SCHEDULE C ON FOLLOWING PAGE

Schedule C: Water Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
W-1. 1-09.7	Mobilization (1-09.7)	1 Lump Sum	Lump Sum	$_____
W-2. 1-10	Project Temporary Traffic Control (1-10)	1 Lump Sum	Lump Sum	$_____
W-3. 2-02.3(3)	Removal/Disposal of existing asphalt, concrete sidewalk/curbing & concrete pavement. Includes all thicknesses and combinations (2-02.3(3))	739 Sq. Yd.	$_____	$_____
W-4. 5-04	Temporary HMA Class ½" PG58-22, 2-inch minimum depth, installed & removed (5-04 & 9-03.8)	706 Sq. Yd.	$_____	$_____
W-5. 5-04	HMA Cl ½" PG58-22 pavement for permanent trench patch (5-04 & 9-03.8)-6" in Depth	10 Ton	$_____	$_____
W-6. 7-09	Crushed Surfacing Top Course for trench backfill (7-09.5 & 9-03.9(3))	1576 Ton	$_____	$_____
W-7. 7-17	Storm, Sanitary, Side Sewer Restoration (7-04,7-09.5, 7-17, & 7-18)	8 Each	$_____	$_____
W-8. 7-09	Trench Excavation of Contaminated Material, Incl. Haul to LRI (2-17 & 7-09.5)	617 Cu. Yd.	$_____	$_____
W-9. 7-09	Trench Excavation & Disposal (7-09.3(7) & 7-09.5)	347 Cu. Yd.	$_____	$_____
W-10. 7-09	Trench Shoring (7-09.3(7) & 7-09.5)	2017 Lin. Ft.	$_____	$_____
W-11. 7-09	8-inch Ductile Iron Pipe, Push-On Joint, ANSI/AWWA, C151, Special Class Thickness No. 52, to furnish, lay and test, (7-09.3(15)A, 7-09.5 & 9-30.1(1))	235 Lin. Ft.	$_____	$_____

Contractor's Name: _____

Schedule C: Water Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
W-12. 7-09	6-inch Ductile Iron Pipe, Push-On Joint, ANSI/AWWA, C151, Special Class Thickness No. 52, to furnish, lay and test, (7-09.3(15)A, 7-09.5 & 9-30.1(1))	1960 Lin. Ft.	$_____	$_____
W-13. 7-05	8-inch x 6-inch Ductile Iron Reducer, 2-B, M.J., w/ anchor, installed (7-09.5 & 9-30.2(1))	1 Each	$_____	$_____
W-14. 7-09	8-inch x 6-inch Ductile Iron Tee, 3-B, M.J., installed (9-30.2(1))	1 Each	$_____	$_____
W-15. 7-09	6-inch Ductile Iron Tee, 3-B, M.J., installed (9-30.2(1))	3 Each	$_____	$_____
W-16. 7-09	8-inch Ductile Iron Ell, M.J., 45°, installed. (7-09, & 9-30.2(1))	2 Each	$_____	$_____
W-17. 7-09	6-inch Ductile Iron Ell, M.J., 45°, installed. (7-09, & 9-30.2(1))	12 Each	$_____	$_____
W-18. 7-09	6-inch Ductile Iron Ell, M.J., 22-1/2°, installed. (7-09, & 9-30.2(1))	4 Each	$_____	$_____
W-19. 7-09	6-inch Ductile Iron Ell, M.J., 11-1/4°, installed. (7-09, & 9-30.2(1))	1 Each	$_____	$_____
W-20. 7-09	6-inch Vertical Ductile Iron Ell, M.J., 22-1/2°, installed. (7-09, & 9-30.2(1))	2 Each	$_____	$_____
W-21. 7-09	8-inch Transition Coupling with 7-inch center ring, epoxy coating, and stainless steel bolts, C.I. to D.I., installed (7-09.3(19)A, 7-09.5 & 9-30.2(7))	1 Each	$_____	$_____

Schedule C: Water Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
W-22. 7-09	6-inch Transition Coupling with 7-inch center ring, epoxy coating, and stainless steel bolts, C.I. to D.I., installed (7-09.3(19)A, 7-09.5 & 9-30.2(7))	3 Each	$_____	$_____
W-23. 7-09	8-inch Ductile Iron Cap, M.J., tapped 2", installed and removed (9-30.2(1) & 7-09.5)	1 Each	$_____	$_____
W-24. 7-09	6-inch Ductile Iron Cap, M.J., tapped 2", installed and removed (9-30.2(1) & 7-09.5)	4 Each	$_____	$_____
W-25. 7-09	Temporary 2-inch Blow-Off Assembly, installed and removed (Dwg. 17-56-1) (7-09.3(22) & 7-09.5)	5 Each	$_____	$_____
W-26. 7-09	8-inch Mechanical Joint Restraining Glands (7-14, 7-09.5 & 9-30.2(6))	6 Each	$_____	$_____
W-27. 7-09	6-inch Mechanical Joint Restraining Glands (7-14, 7-09.5 & 9-30.2(6))	8 Each	$_____	$_____
W-28. 7-09	Concrete Thrust Anchor, installed. (7-09.3(21) & 7-09.5)	21 Each	$_____	$_____
W-29. 7-09	Temporary Concrete Thrust Anchor, installed and removed (7-09.3(21) & 7-09.5)	5 Each	$_____	$_____
W-30. 7-10	12-inch PVC casing, AWWA C-900, DR 25, including insulating casing spacers and end seals for 6-inch DI pipe (7-10)	311 Lin. Ft.	$_____	$_____
W-31. 7-09	Trench Compaction Test (as directed by the Inspector) (7-09.3(11) & 7-09.5)	40 Each	$_____	$_____
W-32. 7-09	Test Holes (7-09.3(6) & 7-09.5)	1 Lump Sum	Lump Sum	$_____

Contractor's Name: _____

Schedule C: Water Improvements (Rule 170)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
W-33. 7-12	8-inch Gate Valve, M.J., ANSI/AWWA, C509/515, with C.I. Valve Box (7-12 & 9.30.3)	1 Each	$_____	$_____
W-34. 7-12	6-inch Gate Valve, M.J., ANSI/AWWA, C509/515, with C.I. Valve Box (7-12 & 9.30.3)	10 Each	$_____	$_____
W-35. 7-14	6-inch Hydrant, M.J., 5.0-ft bury, with 4-inch Tacoma Standard Threads & 5-inch Quick Coupling (7-14 & 9-30.5(2))	2 Each	$_____	$_____
W-36. 8-01.3(8)	Street cleaning with Self-propelled Pickup and Vacuum Street Sweeper Equipment. (8-01.3(8))	25 Hour	$_____	$_____
W-37. 8-22	Traffic Lane Markings (8-22)	1 Lump Sum	Lump Sum	$_____
W-38. 1-09.6	Force Account (1-09.6)	1 Force Account	Estimated	$ 40,000.00

Water Base Bid Total

(Bid Items No. W1 – W38) $_____(3)

SCHEDULE D ON FOLLOWING PAGE

Schedule D: Guardrail Repair (Part 171)

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
G-1. 1-09	Mobilization	1 Lump Sum	Lump Sum	$_____
G-2. 1-10	Pedestrian Traffic Control	1 Lump Sum	Lump Sum	$_____
G-3. 1-10	Project Temporary Traffic Control	1 Lump Sum	Lump Sum	$_____
G-4. 2-01	Clearing and Grubbing	1 Lump Sum	Lump Sum	$_____
G-5. 8-01	Erosion/Water Pollution Control	1 Lump Sum	Lump Sum	$_____
G-6. 8-01	Stormwater Pollution Prevention Plan (SWPPP)	1 Lump Sum	Lump Sum	$_____
G-7. 8-02	Site Restoration	1 Lump Sum	$_____	$_____
G-8. 8-11	Remove Crash Cushion	1 Each	$_____	$_____
G-9. 8-11	Valtir Quadguard M10 (TL-2) Crash Cushion	1 Each	$_____	$_____
G-10. 8-11	Removing Guardrail Anchor	4 Each	$_____	$_____
G-11. 8-11	Beam Guardrail Type 31 Non-Flared Terminal	4 Each	$_____	$_____

Guardrail Base Bid Total
(Bid Items No. G1 – G11) $_____(4)

TOTAL BASE BID (1) + (2) + (3) + (4)
(Not Including Sales Tax) $_____(5)

Proposal for Incorporating Recycled Materials into the Project on following page.

Contractor's Name: _____

Proposal for Incorporating Recycled Materials into the Project

In compliance with RCW 70A.205.700, the Bidder shall propose below, the total percent of construction aggregate and concrete materials to be incorporated into the Project that are recycled materials. Calculated percentages must be within the amounts allowed in Section 9-03.21(1)E, Table on Maximum Allowable Percent (By Weight) of Recycled Material, of the Standard Specifications.

Proposed total percentage: _____ percent.

Note: Use of recycled materials is highly encouraged within the limits shown above, but does not constitute a Bidder Preference, and will not affect the determination of award, unless two or more lowest responsive Bid totals are exactly equal, in which case proposed recycling percentages will be used as a tie-breaker, per the APWA GSP in Section 1-03.1 of the Special Provisions. Regardless, the Bidder's stated proposed percentages will become a goal the Contractor should do its best to accomplish. Bidders will be required to report on recycled materials actually incorporated into the Project, in accordance with the APWA GSP in Section 1-06.6 of the Special Provisions.

Bidder: _____

Signature of Authorized Official: _____

Date: _____