



TECHNICAL MEMORANDUM

Client: City of Port Townsend
Project: Holcomb and Wilson Sewer Upsizing
Project File: TWNSD 0250104.00.0006
Project Manager: Ryan Feskens, PE
Composed by: Steve Nelson, LG, LEG
Reviewed by: Ryan Feskens, PE
Subject: Engineering Geology and Groundwater Evaluation
Date: December 15, 2025



STEPHEN ERIC NELSON

Signed: 12/15/2025

Introduction

This technical memorandum was prepared for the City of Port Townsend (City) to support the design and construction of sewer improvements as part of the Holcomb and Wilson Sewer Upsizing project.

The City's gravity sewer near West Sims Way from the end of the Wilson Street cul-de-sac to the intersection of Holcomb Street and 7th Street has inadequate capacity to convey the projected sewer flows and needs to be upsized. Replacement of this sewer main with a larger diameter main was recommended in the City's 2024 *General Sewer Plan* (Capital Improvement Plan Project Nos. SM1 and SM3). The design for the Holcomb and Wilson Sewer Upsizing project will involve the replacement of approximately 1,600 linear feet (lf) of existing gravity sewer pipe with 18-inch pipe, 12 maintenance holes, and approximately 300 lf of 6-inch-diameter ductile iron water main to be installed by open-cut construction methods.

This technical memorandum was authorized by the City through a proposal prepared by RH2 Engineering, Inc., (RH2) and signed on May 12, 2025.

This technical memorandum includes background data reviews and engineering geology site investigations and is intended to characterize the site geologic, groundwater, and geotechnical conditions in support of the selection of a preferred alignment, and the project's design, construction, and operation.

These tasks were accomplished by reviewing background information and observing soil borings by a Washington State Licensed Engineering Geologist on staff with RH2. Two soil borings were completed by a Washington State licensed drilling subcontractor on July 30, 2025.

This technical memorandum was prepared in accordance with the Washington State Department of Licensing's *Guidelines for Preparing Engineering Geology Reports in Washington* (2006) and Chapter 18.2220 Revised Code of Washington (RCW).

This technical memorandum was prepared for the sole use of the City for the purpose of identifying and describing probable geologic, groundwater, and geotechnical conditions at the

proposed site in support of the design of the sewer and water main improvements. No other uses are implied or authorized. The findings of this technical memorandum are limited to the locations of the investigation and the available site information collected, and may not represent specific conditions at areas not investigated.

This technical memorandum is prepared to provide the RH2 design team with specific site information as a basis to support design and construction. In addition, this technical memorandum provides contractors with baseline geologic, groundwater, and geotechnical site-specific information as a common basis to interpret existing site conditions, prepare bids, and complete the project with appropriate means and methods of construction. This technical memorandum also may provide a basis to evaluate claims of potential differing site conditions. Site-specific geologic or groundwater conditions may outlie those described in this technical memorandum, which could affect means and methods, schedule, and/or materials to complete the work, possibly warranting additional City compensation.

Limitations

This technical memorandum summarizes available and relevant geologic information for conditions at the site that are expected to be encountered during construction and may affect the contractor's rate of progress, tooling selection, tool wear, and/or approach to bidding the project. This technical memorandum provides a contractual basis for the allocation of geotechnical risk during performance of the work and does not define a single correct interpretation of geotechnical conditions at the site. The following information represents the site conditions that bidders and the selected contractor should assume for estimating costs and selecting the approach, and for which the contractor is responsible during construction.

Proposed Project Improvements

Proposed Improvements

Approximately 1,600 lf of 18-inch-diameter polyvinyl chloride (PVC) sewer main will be installed along portions of the alignment where no sewer exists and along portions of the alignment where existing sewer will be removed and replaced in the same excavation. Approximately 300 lf of new 6-inch-diameter ductile iron (DI) water main will be placed parallel to the existing asbestos cement water main that will be closed in place. The new **new** sewer and maintenance holes will be constructed at depths ranging from 8 to 18 feet below ground surface (bgs), and the new DI water main will be **construtced** at depths of 4 feet bgs.

Construction of the new sewer and water mains will encounter native soil except where the excavation trench will intercept fill soil placed during the original construction of the **exising** sewer and water mains. It is likely that the fill consists of earth materials similar in composition to native soil, although the soil moisture and density may differ from surrounding undisturbed native soil. The differences likley will not significantly affect the trench excavation or installation of new sewer and water main.

Site Setting

The project alignment of the new sewer and water improvements traverses several asphalt-paved streets and several landscaped, private residential parcels in a commercial/residential neighborhood in southwest Port Townsend in eastern Jefferson County. The project site is in the W ½ of the SE ¼ of Section 10, Township 30 North, Range 01 West, at latitude 48.1003001 North, longitude 122.7888095 West. The site is at an elevation of 115 to 165 feet above mean sea level. The project site and alignment are shown in **Attachment 1**.

Summary of Available Geologic Data

Regional and local geologic information for the site includes publicly available geologic, groundwater, soil boring, LiDAR, and geological hazard mapping by the Washington State Department of Natural Resources, and seismic studies by the United States Geologic Survey. These sources of site-related information are included in the **References** section.

Site Investigation

Summary

RH2 conducted an engineering geology investigation to characterize the site, evaluate the constructability of the sewer and water improvements, evaluate site-specific groundwater conditions, and evaluate critical areas in the project site.

The site characterization was conducted on July 31, 2025, using a truck-mounted hollow-stem auger drilling rig (**Photo 1** and **Photo 2**) operated by Holt Services, Inc., of Edgewood, Washington. Drilling and sampling were observed by a Licensed Engineering Geologist on staff with RH2. Borings B-1 and B-2 were completed to a depth of 21.5 feet bgs at the locations shown on **Attachment 1**. The soil boring logs are included in **Attachment 2**. On-site soil density was measured at 2.5-foot-deep intervals using Standard Penetration Test (SPT) methods advancing split spoons at the bottom of the auger (**Photo 3**). SPT results are included in the boring logs (**Attachment 2**).

Representative soil samples were collected from the split spoon samples and drill cuttings to evaluate the geologic characteristics.



Photo 1 – Drilling borehole B-1.



Photo 2 – Drilling borehole B-2.



Photo 3. Fine sand – glacial advance outwash at 20 to 21.5 feet bgs in B-2.

Investigation Statement and Uncertainties and Reliability

The site investigations followed RH2's scope of work and accomplished the objectives for site characterization and geologic hazard analysis. The observed soil/geologic unit samples were consistent with mapped soil composition and local geology. Conditions observed during drilling support conclusions regarding geologic unit composition and density, and water content. No supplemental investigations are warranted pending review of site conditions and development of the preliminary civil design.

Site Geologic Conditions

Site Geologic Units

Based on previous work and the findings of this investigation, the native geologic units at the site are identified as glacial drift-ice contact deposits consisting of unstratified, dense to very dense silty gravelly sand to a depth of approximately 10 to 15 feet bgs underlain by glacial advance outwash consisting of dense to very dense fine sand with trace to some silt and trace fine gravel. The extent, thickness, and composition of the two glacial units below the site appear consistent between the two borings. Similar characteristics of native geologic unit composition and grain size are recorded in the logs for soil borings within ¼ mile of the site.

The two glacial units appeared moist but not saturated to a depth of 21.5 feet bgs.

A 1- to 3-foot-thick layer of coarse granular fill was observed at both borings that was similar in composition to the glacial drift unit.

Site Suitability for Project Objectives

The engineering geology and groundwater characteristics at the site present no fatal flaws for design, construction, and operation of the proposed sewer and water main improvements. The findings of the investigation, supported by existing geologic and groundwater information, are adequate to support siting, design, and construction decisions.

Recommendations for Design and Construction

Excavation

The glacial units may be readily excavated at the site using a backhoe or excavator.

Inspection and Treatment of Subgrade and Cut Slopes

A Licensed Engineering Geologist or Professional Engineer with geotechnical experience should inspect the exposed excavation subgrades, cut slopes, and any temporary slope stabilization to confirm whether the earth exposed during excavation is consistent with this technical memorandum and favorable for proceeding with the project as planned.

The excavation trench subgrade should be flat and free of loose earth materials and inspected for evidence of soft, silty, or wet zones or abundant cobbles or boulders. Any granular fill used to replace soft, wet, or cobbly soil should be placed in 8-inch lifts and compacted with a plate compactor, or equivalent, to a firm and unyielding surface, to achieve 95 percent of maximum dry density (MDD) as determined by the modified Proctor test (ASTM D1557).

Use of Excavated Earth Materials

Excavated glacial soil should not be used for backfill below paved areas. The composition of native soil is too variable for placement as backfill below heavily trafficked roads. The excavated native soil may be suitable for trench backfill only in non-traffic areas and only if the excavated soil is protected from drying or saturation.

Compaction of Imported Fill

- Imported granular structural fill material should be tested for moisture content just prior to placement. Fill should be plus 2 percent of its optimum moisture content when placed.
- Structural fill should be placed in lifts that are not more than 8 inches thick when loosely placed and should be compacted to 95 percent of MDD as determined in accordance with the modified proctor test (ASTM D1557). Density testing confirmation should be completed throughout the fill.

Slopes and Shoring

The stability of cut slopes in the glacial units may be able to temporarily (minutes to hours) sustain vertical slopes, but any excavation below 4 feet must be shored using trench boxes or the equivalent.

- The contractor should install shoring for utility trenches, as necessary, to protect workers inside excavations.
- Excavations should comply with all Occupational Safety and Health Administration (OSHA) safety requirements.

Groundwater Control

Minor groundwater seepage may discharge from excavated trench walls at depths of 10 to 18 feet bgs. Rates of seepage would be less than 10 gallons per minute (gpm) and may be managed using in-trench sumping. During winter and spring months or for excavations deeper than 15 feet bgs, groundwater seepage rates could reach up to 30 gpm and may be managed using in-trench sumping; however, zones of elevated discharge could exist that may require multiple sumps to maintain groundwater control.

Critical Areas Evaluation

Review of the City critical areas mapping and topographic maps indicates that portions of the proposed sewer alignment along the Sims Way right of way have slopes greater than 40 percent. This condition triggers an evaluation of the potential impact of the project on these critical areas.

PTMC 19.05.100(E) states:

E. Critical Slopes. Any slope of 40 percent or steeper that exceeds a vertical height of 10 feet over a 25-foot horizontal run shall be presumed geologically hazardous unless it meets at least one of the following exceptions:

- i. A qualified consultant has submitted a letter report that conclusively demonstrates to the satisfaction of the director that the slope does not pose a hazard; or
- ii. The director, in consultation with the city engineer, determines that the area of 40 percent slope is an isolated manmade slope (this exception shall not apply to historically altered bluffs). Engineered plans shall be required and, unless waived by the director, a geotechnical engineer shall review the plans and certify that, either as proposed or subject to recommended mitigation measures, the project will pose no unreasonable threat to persons or property, either on or off site, and the proposal will not decrease slope stability.

Inspection of the slopes that will be traversed by the proposed sewer main indicates that the height of the slope varies between 5 and 15 feet, and the horizontal run varies between 15 and 30 feet. Local areas of the slope meet the criteria for a critical slope. The slopes are man-made cuts to construct Sims Way. The slopes are vegetated and in some areas, landscaped. The slopes appear stable, with only insignificant soil erosion exposure.

The proposed sewer construction will rely on open-cut trench methods. The plans and specifications will require shoring to stabilize the open cut, and trench backfill and restoration to maximize fill and slope stability using appropriate drainage, contouring, and benching to minimize erosion of the restored slope.

The proposed project will pose no unreasonable threat to persons or property, either on or off site, and the proposal will not decrease slope stability.

Attachments

Attachment 1 — Sewer and Water Main Plans and Profiles

Attachment 2 — Soil Boring Logs

References

Natural Resources Conservation Service. Web Soil Survey. Retrieved from

<https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

Washington State Department of Ecology. Well Construction & Licensing. Retrieved from

<https://apps.wa.gov/ecology/wellconstruction/map/WCLSWebMap/WellConstructionMaypSearch.aspx>

Washington State Department of Licensing. (2006). *Guidelines for Preparing Engineering Geology Reports in Washington*. Retrieved from

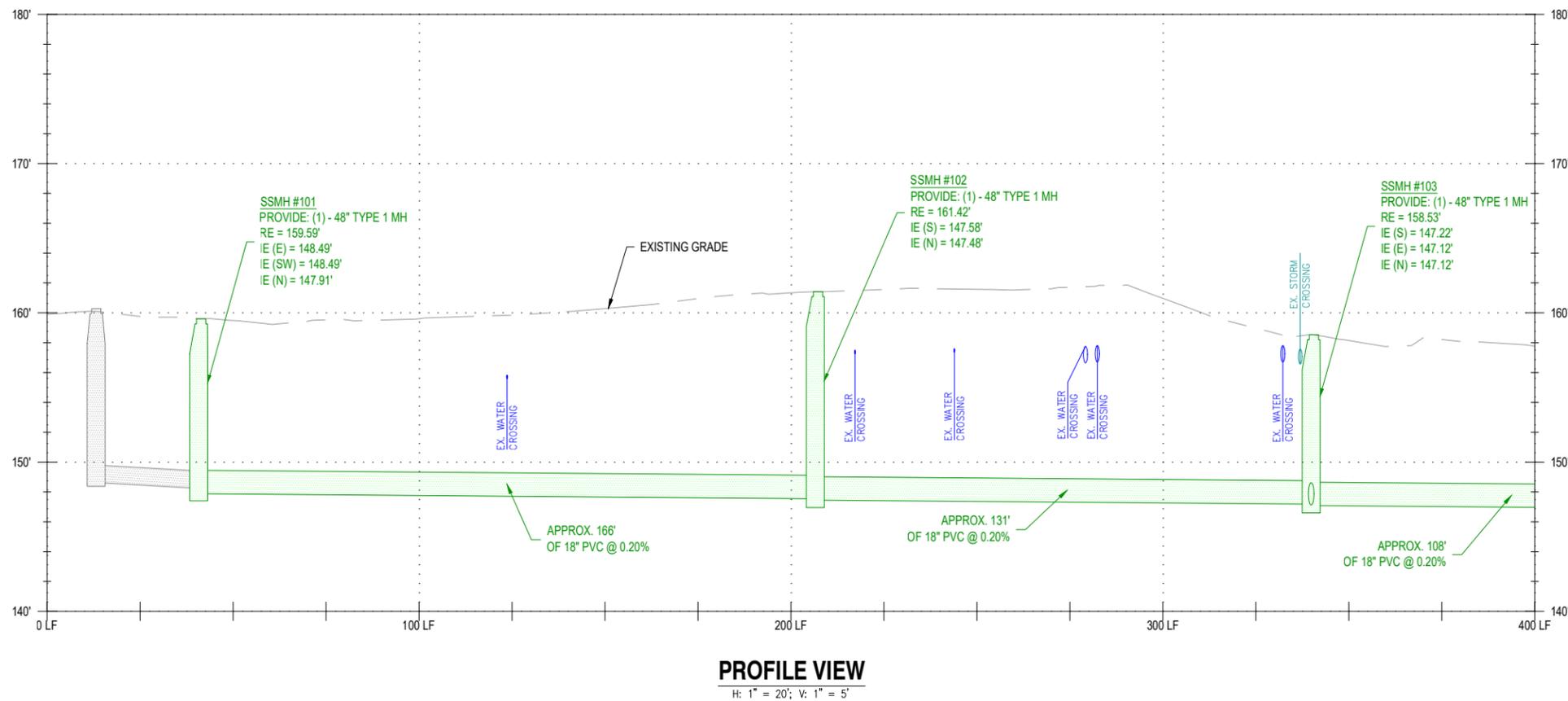
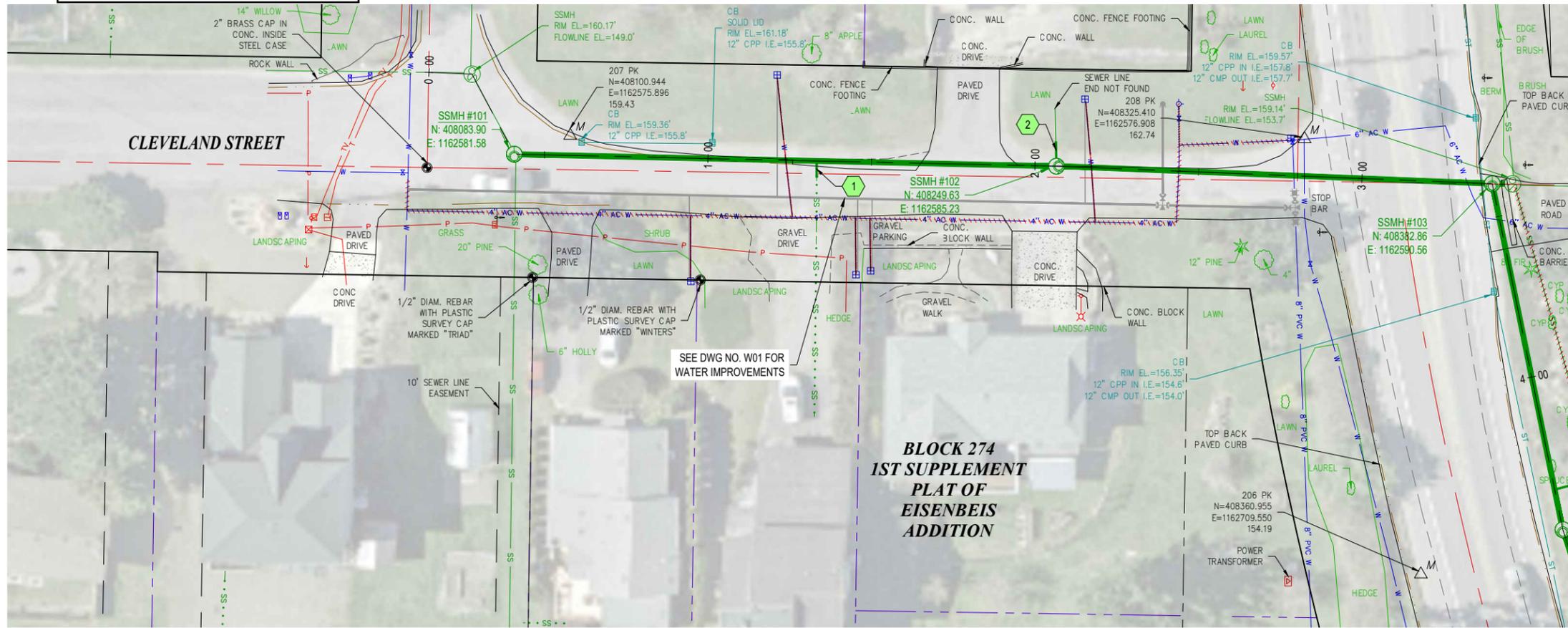
<https://dol.wa.gov/sites/default/files/2023-03/georptguide.pdf>

Washington State Department of Natural Resources. Washington Geologic Information Portal.

Retrieved from <https://geologyportal.dnr.wa.gov/>.

Attachment 1

Sewer and Water Main Plans and Profiles



GENERAL NOTES

SIDE SEWER NOTES

- 1 SIDE SEWER RECONNECTION
- 2 SIDE SEWER RECONNECTION

KEY PLAN



CITY OF PORT TOWNSEND
HOLCOMB AND WILSON
SEWER REPLACEMENT

SEWER MAIN PLAN AND PROFILE 1

NO.	DATE	DESCRIPTION	BY	REVIEW

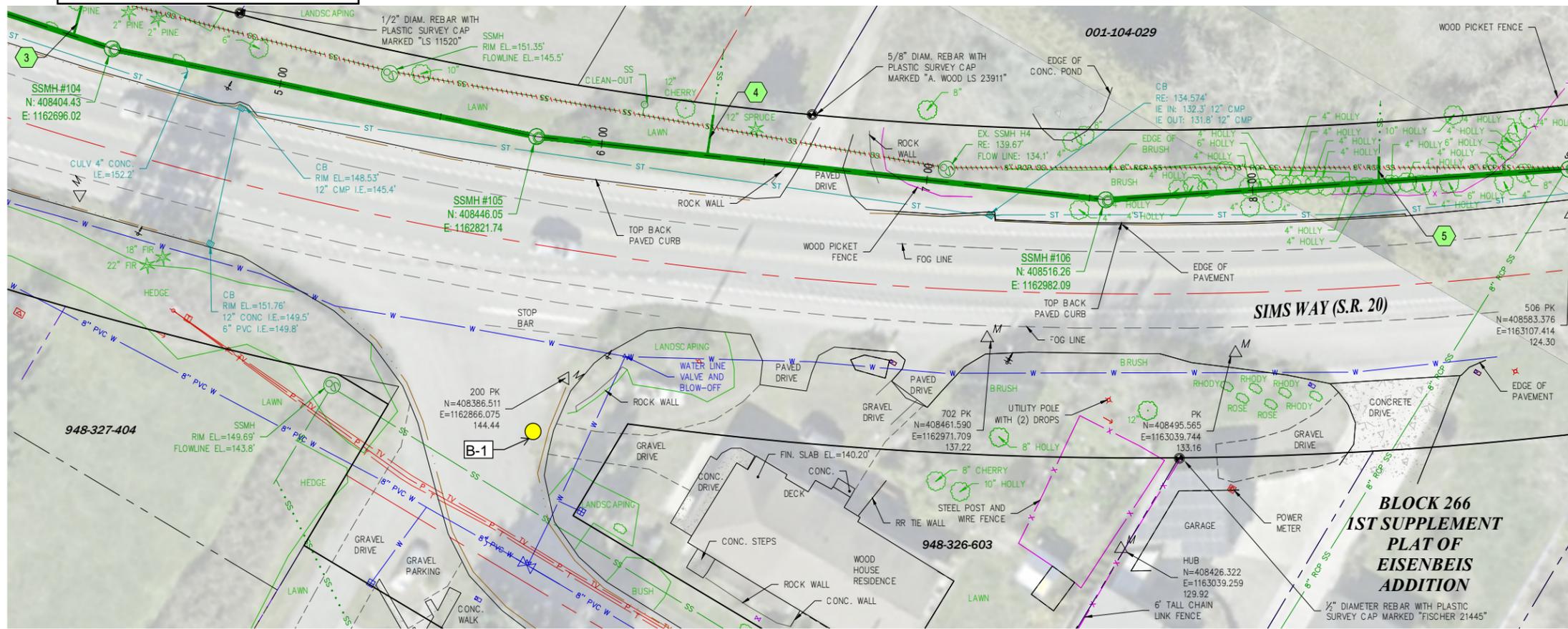
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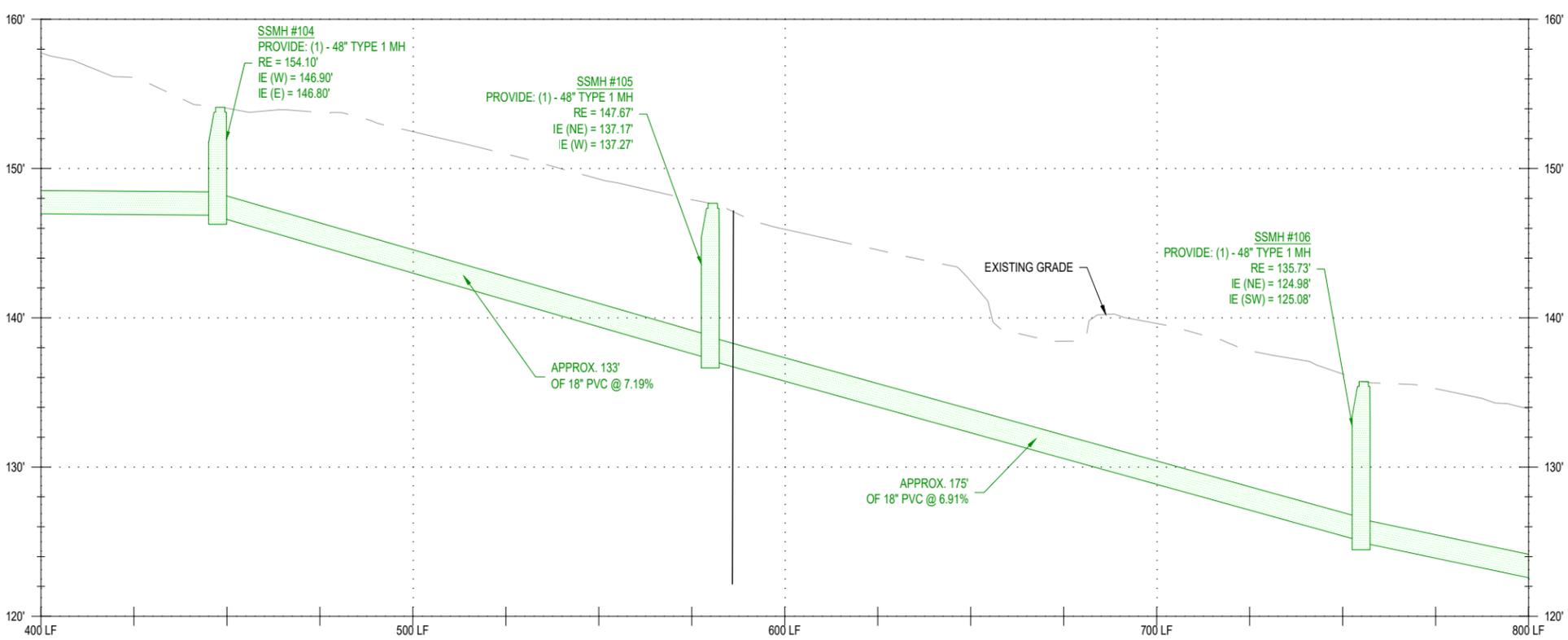
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DWG NO. SS01 SHEET NO. 1 OF 6

Exhibit E - Geotech Memo



PLAN VIEW
1" = 20'



PROFILE VIEW
H: 1" = 20'; V: 1" = 5'

GENERAL NOTES

SIDE SEWER NOTES

- 3 SIDE SEWER RECONNECTION
- 4 SIDE SEWER RECONNECTION
- 5 SIDE SEWER RECONNECTION

KEY PLAN

NO.	DATE	DESCRIPTION	BY	REVIEW

SCALE: SHOWN

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DWG NO. **SS02** SHEET NO. **2** OF **6**

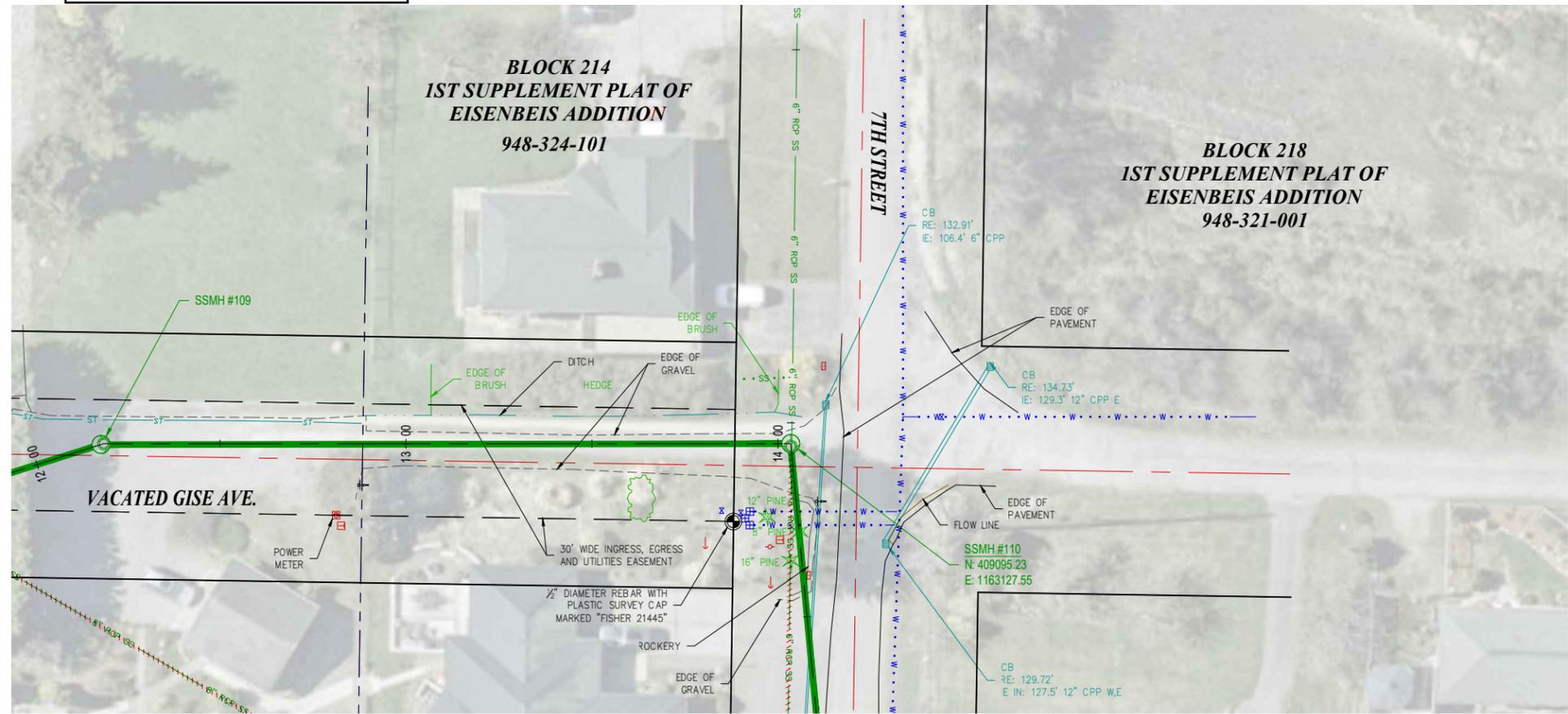
RH2

PRELIMINARY

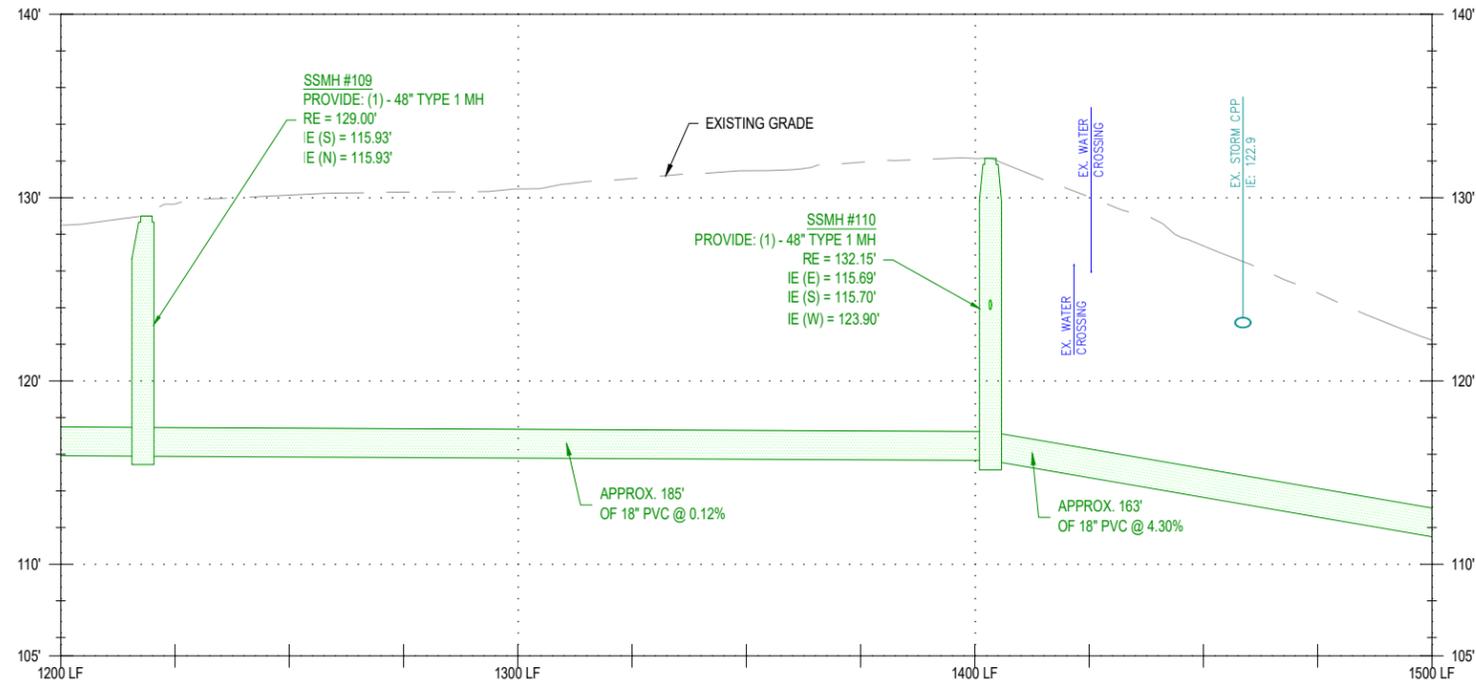
CITY OF PORT TOWNSEND
HOLCOMB AND WILSON
SEWER REPLACEMENT

SEWER MAIN PLAN AND PROFILE 2

ENGINEER: CRB
REVIEWER: R.J.F.
DATE: Aug 21, 2025
PROJECT: HOL-D-SEWERP-NORTHDWG



PLAN VIEW
1" = 20'



PROFILE VIEW
H: 1" = 20'; V: 1" = 5'

GENERAL NOTES

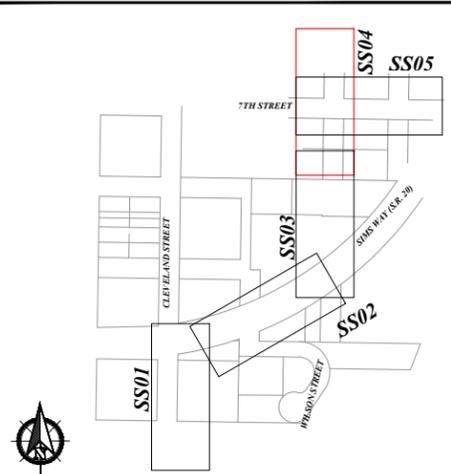
SIDE SEWER NOTES




CITY OF PORT TOWNSEND
HOLCOMB AND WILSON
SEWER REPLACEMENT

SEWER MAIN PLAN AND PROFILE 4

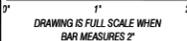
KEY PLAN



NO.	DATE	DESCRIPTION	BY	REVIEW

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 REVIEWED: R.J.F. PLOT DATE: Aug 21, 2025 FILENAME: HOL-D-SEWERP-NORTHDWG

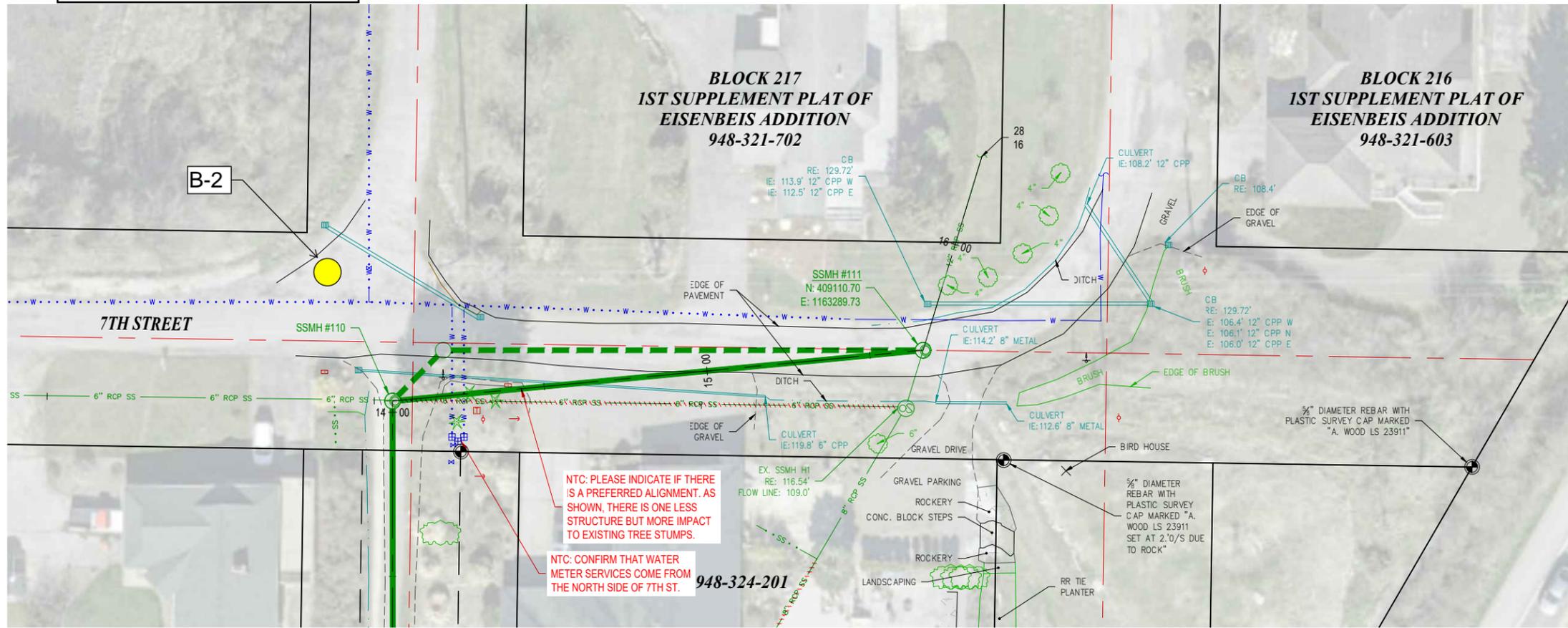
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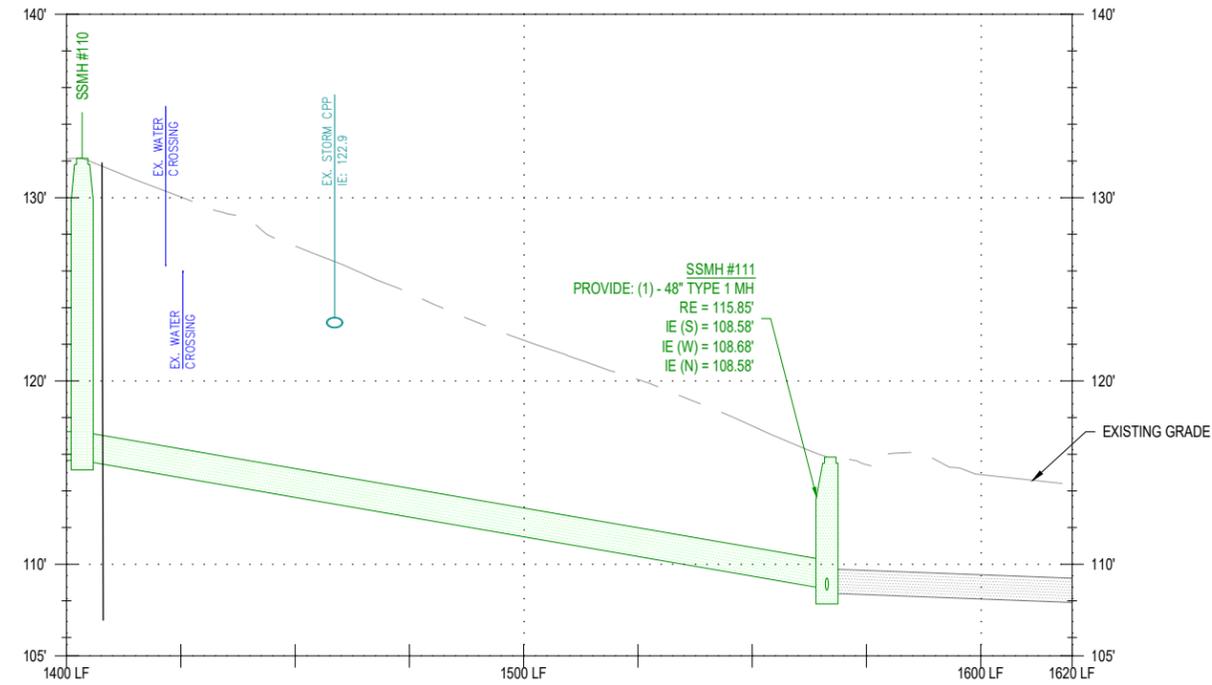
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DWG NO. **SS04** SHEET NO. **4**

6



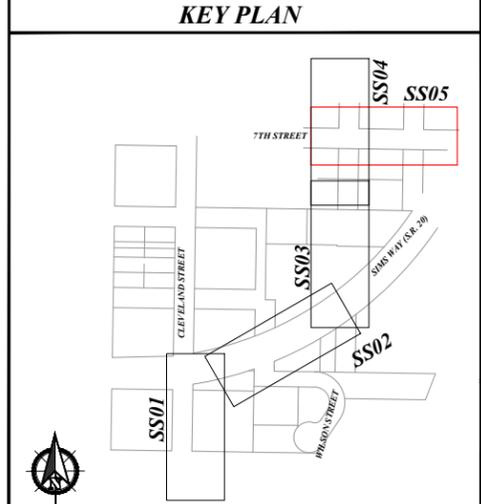
PLAN VIEW
1" = 20'



PROFILE VIEW
H: 1" = 20'; V: 1" = 5'

GENERAL NOTES

SIDE SEWER NOTES



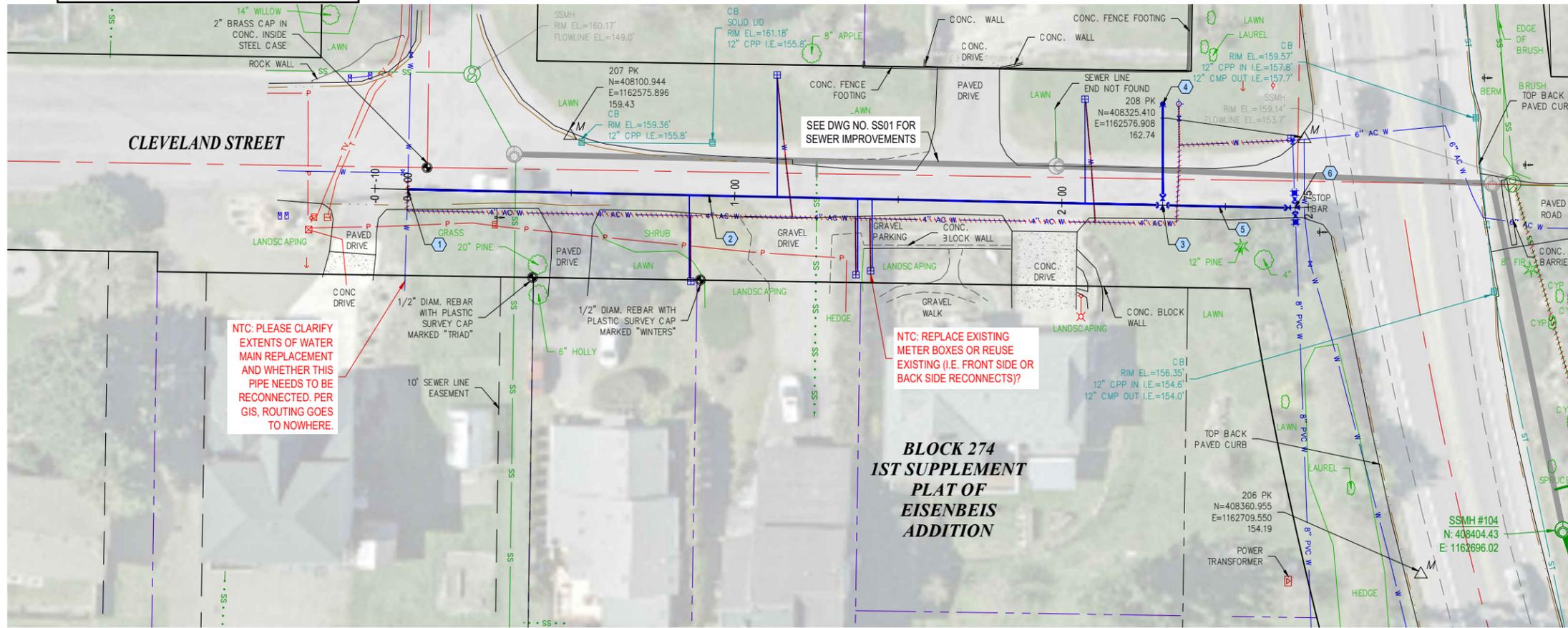
CITY OF PORT TOWNSEND
HOLCOMB AND WILSON
SEWER REPLACEMENT

SEWER MAIN PLAN AND PROFILE 5

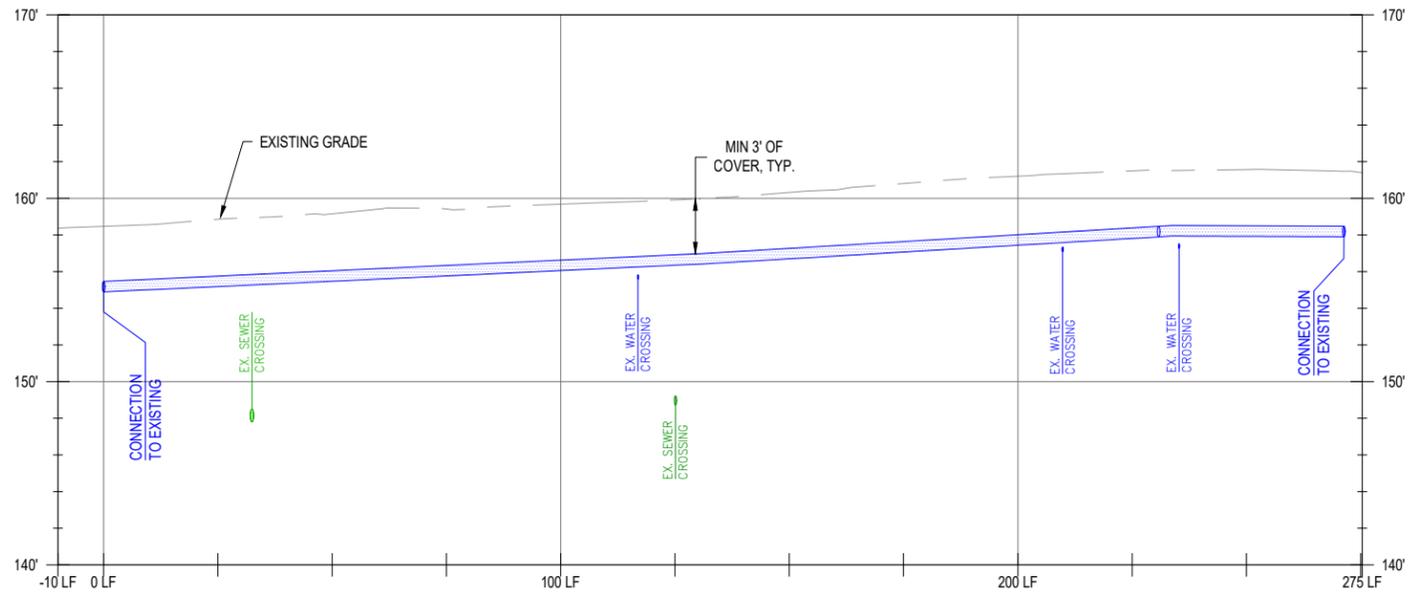
ENGINEER: CRB	DATE: Aug 21, 2025	CLIENT: XXX	JOB NO.: XXX-XXX
REVIEWER: R.J.F.	DATE: Aug 21, 2025	PROJECT: HOL-D-SEWER-NORTH/DWG	

NO.	DATE	DESCRIPTION	BY	REVIEW

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DRAWING IS FULL SCALE WHEN BAR MEASURES 2"	
DWG NO. SS05	SHEET NO. 5



PLAN VIEW
1" = 20'



PROFILE VIEW
H: 1" = 20'; V: 1" = 5'

GENERAL NOTES

WATER MAIN NOTES

- APPROX. STA 0+00.0, 0.0' L, PROVIDE:
(1) - CONNECTION TO EXISTING
- INSTALL APPROX 231 LF OF 6" DI PIPE
- APPROX. STA 2+30.8, 0.0' L, PROVIDE:
(1) - 6" DI TEE (R&FL) WITH THRUST BLOCK
- APPROX. STA 2+30.2, 30.8' L, PROVIDE:
(1) - FIRE HYDRANT ASSEMBLY
- INSTALL APPROX 37 LF OF 6" DI PIPE
- APPROX. STA 2+71.3, 0.0' L, PROVIDE:
(1) - CONNECTION TO EXISTING

WATER SERVICE NOTES

KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION	BY	REVIEW

SCALE: SHOWN

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

DWG NO. **W01** SHEET NO. **6**

RH2

PRELIMINARY

CITY OF PORT TOWNSEND
HOLCOMB AND WILSON
SEWER REPLACEMENT

WATER MAIN PLAN AND PROFILE

City of Port Townsend

ENGINEER: JD SWE/DRE: Aug 21, 2025 CLIENT: XXX JOB NO.: XXX-XXX
REVIEWED: R/JF PLOT DATE: Aug 21, 2025 FILENAME: HOL-D-WATERP-NORTH/DWG

Attachment 2

Soil Boring Logs

Exhibit E - Geotech Memo



Boring Exploration Log

**Holcomb Sewer
TWNS 25-0191
Project**

**7th and Gise NW corner
Port Townsend, WA
Location**

B-1

Exploration Name

Steve Nelson, LHG, LEG
Inspected by

July 30, 2025
Date

**Hollow-Stem Auger 4-in. bit, CME truck rig
Holt Services
Drilling Equipment and Contractor**

Depth (ft)	Attempt/ Recovery	Blow Counts*	Description	Lithology
0			0 to 0.25 ft: Asphalt	
0.25			0.25 to 1.0 Fill crushed rock.	
1.0			1.0 to 3.0 ft: Sandy Silty Gravel (GM); Brown, fine subrounded gravel, fine to coarse sand, non-plastic, moist. (FILL)	
5		10/12/20		
3			3 ft to 14 ft Olive brown, silty gravelly SAND (SM), fine to medium, some coarse, fine subrounded gravel, non-plastic fines, moist, very dense. (Glacial drift-ice contact)	GM
10		10/14/23		
14			14 ft to 26.5 ft Olive gray to gray, SAND with silt and SAND (SP-SM and SP) fine, few medium, trace to few fines, moist, moderate to very dense. (Glacial advance outwash)	
15		17/22/23		
20		17/19/36	Little or no drill rig chatter to 25 feet.	SP SP-SM
25		12/16/27		
30				
35				
40				
45				
50				

Boring Backfilled with hydrated bentonite chips.

Exhibit E - Geotech Memo



Boring Exploration Log

**Holcomb Sewer
TWNS 25-0191
Project**

**Wilson Street at Sims Way
Port Townsend, WA
Location**

B-2

Exploration Name

Steve Nelson, LHG, LEG
Inspected by

July 30, 2025
Date

**Hollow-Stem Auger 4-in. bit, CME truck rig
Holt Services
Drilling Equipment and Contractor**

Depth (ft)	Attempt/ Recovery	Blow Counts*	Description	Lithology
0			0 to 0.25 ft: Asphalt	
0.25			0.25 to 1.0 Fill crushed rock.	
1.0			1.0 to 3.0 ft: Sandy Silty Gravel (GM); Brown, fine subrounded gravel, fine to coarse sand, non-plastic, moist. (FILL)	
5		3/5/4		
3			3 ft to 11 ft Olive brown, silty gravelly SAND (SM), fine to medium, some coarse, fine subrounded gravel, non-plastic fines, moist, very dense. (Glacial drift-ice contact)	
10		10/17/29		
11			11 ft to 26.5 ft Olive gray to gray, SAND with silt and SAND (SP-SM and SP) fine, few medium, trace to few fines, moist, moderate to very dense. (Glacial advance outwash)	
15		12/26/32		
20		14/28/32	Little or no drill rig chatter to 25 feet.	
25		13/29/34		
30				
35				
40				
45				
50				

Boring Backfilled with hydrated bentonite chips.