



## PRELIMINARY REPORT

In response to the application for a policy of title insurance referenced herein Ticor Title Company of Oregon hereby reports that it is prepared to issue, or cause to be issued, as of the specified date, a policy or policies of title insurance describing the land and the estate or interest hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an exception herein or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations or Conditions of said policy forms.

The printed Exceptions and Exclusions from the coverage of said policy or policies are set forth in Exhibit One. Copies of the policy forms should be read. They are available from the office which issued this report.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby.

The policy(s) of title insurance to be issued hereunder will be policy(s) of Chicago Title Insurance Company, a/an Florida corporation.

**Please read the exceptions shown or referred to herein and the Exceptions and Exclusions set forth in Exhibit One of this report carefully. The Exceptions and Exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.**

**It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects and encumbrances affecting title to the land.**

This preliminary report is for the exclusive use of the parties to the contemplated transaction, and the Company does not have any liability to any third parties nor any liability until the full premium is paid and a policy is issued. Until all necessary documents are placed of record, the Company reserves the right to amend or supplement this preliminary report.

*Countersigned*

A handwritten signature in black ink that reads 'Sara Waterman'. The signature is written in a cursive style and is positioned above a solid horizontal line.



507 Laneda Ave, Ste 3, PO Box 1089, Manzanita, OR 97130  
(503)368-5124 FAX (855)394-1497

**PRELIMINARY REPORT**

**ESCROW OFFICER:** Jenni Townsend  
Jenni.Townsend@ticortitle.com

**ORDER NO.:** 360420009209  
**Supplement 5:** Sales Price

**TITLE OFFICER:** Nathan Hobbs

**TO:** Ticor Title Company of Oregon  
507 Laneda Ave, Ste 3, PO Box 1089  
Manzanita, OR 97130

**ESCROW LICENSE NO.:** 201006150

**OWNER/SELLER:** 3P Development, LLC, a Colorado limited liability company

**BUYER/BORROWER:** Nehalem Bay Health District, an Oregon Local District

**PROPERTY ADDRESS:** TL 400 at Highway 101, 2N1003DA 00400, Wheeler, OR 97147

**EFFECTIVE DATE:** June 29, 2021, 08:00 AM

1. THE POLICY AND ENDORSEMENTS TO BE ISSUED AND THE RELATED CHARGES ARE:

	<u>AMOUNT</u>	<u>PREMIUM</u>
ALTA Owner's Policy 2006 Owner's Standard	\$ 260,015.00	\$ 853.00
Government Lien Search		\$ 30.00

2. THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:

A Fee

3. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

3P Development, LLC, a Colorado limited liability company

4. THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE CITY OF WHEELER, COUNTY OF TILLAMOOK, STATE OF OREGON, AND IS DESCRIBED AS FOLLOWS:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

**EXHIBIT "A"**  
Legal Description

Beginning at a point on the Section line between Sections 2 and 3, in Township 2 North, Range 10 West of, the Willamette Meridian, Tillamook County, Oregon, which is 235.63 feet South of the intersection of said Section line with the Southerly right-of-way line of Nehalem Boulevard in the Town of Wheeler; thence North along said Section line 119.7 feet to the Southerly line of that tract conveyed to the Methodist Episcopal Church of Wheeler by deed recorded September 7, 1920 in Book 42, page 52 Deed Records of Tillamook County, Oregon; thence North 56°49' East 99.1 feet to the Southeast corner of said Church tract; thence North 33°10' West 96 feet to the Southerly right-of-way line of said Nehalem Boulevard; thence North 57°46' East along said Southerly right-of-way line 264 feet; thence South 5°46' East 100 feet; thence South 24°46' East 97 feet to a point of the Southerly line of Lot 9, Block 23, WHEELER ADDITION, which is South 55°30' West 62.5 feet from the Southeast corner of said Lot 9; thence South 55°30' West along the North right-of-way line of First Street 373.09 feet to the point of beginning.

ALSO that parcel: Beginning at a point on the South line of Nehalem Boulevard in the City of Wheeler at the intersection of said South line with the line between Sections 2 and 3 of Township 2 North, Range 10 West, Willamette Meridian, Tillamook County, Oregon; thence Easterly along the South boundary of Nehalem Boulevard, 35.2 feet; thence South 33°10' East 96 feet; thence South 56°49' West 99.1 feet; thence North along the line between said Sections 2 and 3, a distance of 115.9 feet to the point of beginning.

EXCEPTING FROM both parcels above any portion lying within streets, roads and highways.

**AS OF THE DATE OF THIS REPORT, ITEMS TO BE CONSIDERED AND EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS IN THE POLICY FORM WOULD BE AS FOLLOWS:**

**GENERAL EXCEPTIONS:**

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests or claims, which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, which are not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the Land onto adjoining land or of existing improvements located on adjoining land onto the subject Land), encumbrance, violation, variation or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the subject Land.
5. Any lien or right to a lien for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

**SPECIFIC ITEMS AND EXCEPTIONS:**

6. [Intentionally Deleted]
7. City Liens, if any, in favor of the City of Wheeler. None found as of January 8, 2021.
8. The Land is within, and is subject to the statutory powers, including the power of assessment, of the Nehalem Bay Wastewater Agency. None found as of January 8, 2021.
9. Rights of the public to any portion of the Land lying within streets, roads and highways.
10. [Intentionally deleted]

11. The Company will require the following documents for review prior to the issuance of any title insurance predicated upon a conveyance or encumbrance from the entity named below.

Limited Liability Company: 3P Development, LLC

- a. A copy of its operating agreement, if any, and any and all amendments, supplements and/or modifications thereto, certified by the appropriate manager or member.
- b. If a domestic Limited Liability Company, a copy of its Articles of Organization and all amendment thereto with the appropriate filing stamps.
- c. If the Limited Liability Company is member-managed a full and complete current list of members certified by the appropriate manager or member.
- d. A current dated certificate of good standing from the proper governmental authority of the state in which the entity was created
- e. If less than all members, or managers, as appropriate, will be executing the closing documents, furnish evidence of the authority of those signing.

The Company reserves the right to add additional items or make further requirements after review of the requested documentation.

12. If requested to issue an extended coverage ALTA loan policy, the following matters must be addressed:
- a) The rights of tenants holding under unrecorded leases or tenancies
  - b) Matters disclosed by a statement as to parties in possession and as to any construction, alterations or repairs to the Land within the last 75 days. The Company must be notified in the event that any funds are to be used for construction, alterations or repairs.
  - c) Any facts which would be disclosed by an accurate survey of the Land

13. Memorandum of Option Agreement

Recording Date: February 1, 2021  
Recording No.: 2021-00977

14. Property taxes in an undetermined amount, which are a lien but not yet payable, including any assessments collected with taxes to be levied for the fiscal year 2021-2022.

**ADDITIONAL REQUIREMENTS/NOTES:**

- A. Note: Property taxes for the fiscal year shown below are paid in full.

Fiscal Year: 2020-2021  
Amount: \$4,042.35  
Levy Code: 5607  
Account No.: 22040  
Map No.: 2N1003DA 00400

Prior to close of escrow, please contact the Tax Collector's Office to confirm all amounts owing, including current fiscal year taxes, supplemental taxes, escaped assessments and any delinquencies.

- B. Note: There are NO conveyances affecting said Land recorded within 24 months of the date of this report.

C. NOTE: The following are required when a principal to the proposed transaction is an instrumentality of the state, such as a municipality, a county or other governmental body:

- Certification, with supporting documentation, that the board or other governing authority of the governmental body has approved the transaction in accordance with applicable practices, procedures, rules, ordinances and statutes.
- Certification that a named person or persons, identified by name and position, are authorized to act on behalf of the governmental body in the proposed transaction.
- Verification of the current legal name and good standing of the governmental body when it is a local governmental body other than a city or county.

WARNING REGARDING DEED OR CONTRACT TO TAX-EXEMPT GOVERNMENTAL TRANSFEREE. Oregon law prohibits the county recording officer from recording a deed or contract to a tax-exempt governmental transferee, unless the deed or contract is accompanied by a certificate of payment of ad valorem county taxes. The certificate must be attested by the county assessor using a form prescribed by the Oregon Department of Revenue. Failure to allow adequate time for obtaining a certificate of payment may delay recording. This requirement is contained in Chapter 96, Oregon Laws 2015, effective Oct. 5, 2015.

D. Note: There are no matters against the party(ies) shown below which would appear as exceptions to coverage in a title insurance product:

Parties: Nehalem Bay Health District, an Oregon Local District

E. Recording Charge (Per Document) is the following:

County	First Page	Each Additional Page
Tillamook	\$87.00	\$5.00

Note: When possible the company will record electronically. An additional charge of \$5.00 applies to each document that is recorded electronically.

Please email your release to the following email address:  
OR-TTC-TillamookRecording@ticortitle.com

RECORDING CHARGES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ANY ADDITIONAL FEES CHARGED BY THE TILLAMOOK COUNTY RECORDING CLERK FOR NONCONFORMING DOCUMENTS WILL BE BILLED SEPARATE FROM THE ABOVE DESCRIBED FEES.

DOCUMENTS IN WHICH REAL PROPERTY IS TRANSFERRED OR CONVEYED MUST HAVE NOTED ON SAID DOCUMENTS THE TILLAMOOK COUNTY ASSESSOR'S ACCOUNT NUMBER, I.D. NUMBER AND SITUS ADDRESS OF THE SUBJECT PROPERTY. FAILURE TO COMPLY WILL INCUR AN ADDITIONAL \$20.00 RECORDING FEE.

All recording packets for Tillamook County property should be sent to:  
Ticor Title Company  
Attn: Recorder  
1433 SW Sixth Avenue  
Portland, OR 97201

- F. Notice: Please be aware that due to the conflict between federal and state laws concerning the cultivation, distribution, manufacture or sale of marijuana, the Company is not able to close or insure any transaction involving Land that is associated with these activities.
- G. In addition to the standard policy exceptions, the exceptions enumerated above shall appear on the final 2006 ALTA Policy unless removed prior to issuance.
- H. THE FOLLOWING NOTICE IS REQUIRED BY STATE LAW: YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT SEEN, PLEASE CONTACT THE ESCROW AGENT.
- I. Note: This map/plat is being furnished as an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances or acreage shown thereon.
- J. Note: Effective January 1, 2008 Chapter 864, Oregon Laws 2007 mandates withholding of Oregon income taxes from sellers who do not continue to be Oregon residents or qualify for an exemption. Please read the Information for Sellers flyer that accompanies this report. Unless the seller completes a form qualifying him/her for a lesser amount or an exemption, escrow may be required by law to withhold 4% of the sale price and forward it to the Oregon Department of Revenue.

K. NOTE: IMPORTANT INFORMATION REGARDING PROPERTY TAX PAYMENTS

Fiscal Year:	July 1 <sup>st</sup> through June 30 <sup>th</sup>
Taxes become a lien on real property, but are not yet payable:	July 1 <sup>st</sup>
Taxes become certified and payable (approximately on this date):	October 15 <sup>th</sup>
First one third payment of taxes is due:	November 15 <sup>th</sup>
Second one third payment of taxes is due:	February 15 <sup>th</sup>
Final payment of taxes is due:	May 15 <sup>th</sup>

Discounts: If two thirds are paid by November 15<sup>th</sup>, a 2% discount will apply.  
If the full amount of the taxes are paid by November 15<sup>th</sup>, a 3% discount will apply.

Interest: Interest accrues as of the 15<sup>th</sup> of each month based on any amount that is unpaid by the due date. No interest is charged if the minimum amount is paid according to the above mentioned payment schedule.



## EXHIBIT ONE

### 2006 AMERICAN LAND TITLE ASSOCIATION LOAN POLICY (06-17-06) EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses that arise by reason of:

- (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to
  - the occupancy, use, or enjoyment of the Land;
  - the character, dimensions or location of any improvement erected on the land;
  - the subdivision of land; or
  - environmental protection;or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
- Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
- Defects, liens, encumbrances, adverse claims, or other matters
  - created, suffered, assumed or agreed to by the Insured Claimant;
  - not known to the Company, not recorded in the Public Records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;

- resulting in no loss or damage to the Insured Claimant;
  - attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
  - resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
- Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with the applicable doing-business laws of the state where the Land is situated.
  - Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
  - Any claim, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
    - a fraudulent conveyance or fraudulent transfer, or
    - a preferential transfer for any reason not stated in the Covered Risk 13(b) of this policy.
  - Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage.

#### SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

- Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
- Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
- Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof, water rights, claims or title to water.
- Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
- Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, imposed by law and not shown by the Public Records.

### 2006 AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY (06-17-06) EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses that arise by reason of:

- (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to
  - the occupancy, use, or enjoyment of the Land;
  - the character, dimensions or location of any improvement erected on the land;
  - the subdivision of land; or
  - environmental protection;or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
- Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
- Defects, liens, encumbrances, adverse claims, or other matters
  - created, suffered, assumed or agreed to by the Insured Claimant;

- not known to the Company, not recorded in the Public Records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
  - resulting in no loss or damage to the Insured Claimant;
  - attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
  - resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
- Any claim, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
    - a fraudulent conveyance or fraudulent transfer, or
    - a preferential transfer for any reason not stated in the Covered Risk 9 of this policy.
  - Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage.

#### SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

- Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
- Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
- Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof, water rights, claims or title to water.
- Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
- Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, imposed by law and not shown by the Public Records.



Inquire before you wire!

## WIRE FRAUD ALERT

This Notice is not intended to provide legal or professional advice.  
If you have any questions, please consult with a lawyer.

All parties to a real estate transaction are targets for wire fraud and many have lost hundreds of thousands of dollars because they simply relied on the wire instructions received via email, without further verification. **If funds are to be wired in conjunction with this real estate transaction, we strongly recommend verbal verification of wire instructions through a known, trusted phone number prior to sending funds.**

In addition, the following non-exclusive self-protection strategies are recommended to minimize exposure to possible wire fraud.

- **NEVER RELY** on emails purporting to change wire instructions. Parties to a transaction rarely change wire instructions in the course of a transaction.
- **ALWAYS VERIFY** wire instructions, specifically the ABA routing number and account number, by calling the party who sent the instructions to you. DO NOT use the phone number provided in the email containing the instructions, use phone numbers you have called before or can otherwise verify. **Obtain the number of relevant parties to the transaction as soon as an escrow account is opened.** DO NOT send an email to verify as the email address may be incorrect or the email may be intercepted by the fraudster.
- **USE COMPLEX EMAIL PASSWORDS** that employ a combination of mixed case, numbers, and symbols. Make your passwords greater than eight (8) characters. Also, change your password often and do NOT reuse the same password for other online accounts.
- **USE MULTI-FACTOR AUTHENTICATION** for email accounts. Your email provider or IT staff may have specific instructions on how to implement this feature.

For more information on wire-fraud scams or to report an incident, please refer to the following links:

**Federal Bureau of Investigation:**

<http://www.fbi.gov>

**Internet Crime Complaint Center:**

<http://www.ic3.gov>

## FIDELITY NATIONAL FINANCIAL PRIVACY NOTICE

Effective January 1, 2021

Fidelity National Financial, Inc. and its majority-owned subsidiary companies (collectively, "FNF," "our," or "we") respect and are committed to protecting your privacy. This Privacy Notice explains how we collect, use, and protect personal information, when and to whom we disclose such information, and the choices you have about the use and disclosure of that information.

A limited number of FNF subsidiaries have their own privacy notices. If a subsidiary has its own privacy notice, the privacy notice will be available on the subsidiary's website and this Privacy Notice does not apply.

### **Collection of Personal Information**

FNF may collect the following categories of Personal Information:

- contact information (e.g., name, address, phone number, email address);
- demographic information (e.g., date of birth, gender, marital status);
- identity information (e.g. Social Security Number, driver's license, passport, or other government ID number);
- financial account information (e.g. loan or bank account information); and
- other personal information necessary to provide products or services to you.

We may collect Personal Information about you from:

- information we receive from you or your agent;
- information about your transactions with FNF, our affiliates, or others; and
- information we receive from consumer reporting agencies and/or governmental entities, either directly from these entities or through others.

### **Collection of Browsing Information**

FNF automatically collects the following types of Browsing Information when you access an FNF website, online service, or application (each an "FNF Website") from your Internet browser, computer, and/or device:

- Internet Protocol (IP) address and operating system;
- browser version, language, and type;
- domain name system requests; and
- browsing history on the FNF Website, such as date and time of your visit to the FNF Website and visits to the pages within the FNF Website.

Like most websites, our servers automatically log each visitor to the FNF Website and may collect the Browsing Information described above. We use Browsing Information for system administration, troubleshooting, fraud investigation, and to improve our websites. Browsing Information generally does not reveal anything personal about you, though if you have created a user account for an FNF Website and are logged into that account, the FNF Website may be able to link certain browsing activity to your user account.

### **Other Online Specifics**

**Cookies.** When you visit an FNF Website, a "cookie" may be sent to your computer. A cookie is a small piece of data that is sent to your Internet browser from a web server and stored on your computer's hard drive. Information gathered using cookies helps us improve your user experience. For example, a cookie can help the website load properly or can customize the display page based on your browser type and user preferences. You can choose whether or not to accept cookies by changing your Internet browser settings. Be aware that doing so may impair or limit some functionality of the FNF Website.

**Web Beacons.** We use web beacons to determine when and how many times a page has been viewed. This information is used to improve our websites.

**Do Not Track.** Currently our FNF Websites do not respond to "Do Not Track" features enabled through your browser.

Links to Other Sites. FNF Websites may contain links to unaffiliated third-party websites. FNF is not responsible for the privacy practices or content of those websites. We recommend that you read the privacy policy of every website you visit.

### **Use of Personal Information**

FNF uses Personal Information for three main purposes:

- To provide products and services to you or in connection with a transaction involving you.
- To improve our products and services.
- To communicate with you about our, our affiliates', and others' products and services, jointly or independently.

### **When Information Is Disclosed**

We may disclose your Personal Information and Browsing Information in the following circumstances:

- to enable us to detect or prevent criminal activity, fraud, material misrepresentation, or nondisclosure;
- to nonaffiliated service providers who provide or perform services or functions on our behalf and who agree to use the information only to provide such services or functions;
- to nonaffiliated third party service providers with whom we perform joint marketing, pursuant to an agreement with them to jointly market financial products or services to you;
- to law enforcement or authorities in connection with an investigation, or in response to a subpoena or court order; or
- in the good-faith belief that such disclosure is necessary to comply with legal process or applicable laws, or to protect the rights, property, or safety of FNF, its customers, or the public.

The law does not require your prior authorization and does not allow you to restrict the disclosures described above. Additionally, we may disclose your information to third parties for whom you have given us authorization or consent to make such disclosure. We do not otherwise share your Personal Information or Browsing Information with nonaffiliated third parties, except as required or permitted by law. We may share your Personal Information with affiliates (other companies owned by FNF) to directly market to you. Please see "Choices with Your Information" to learn how to restrict that sharing.

We reserve the right to transfer your Personal Information, Browsing Information, and any other information, in connection with the sale or other disposition of all or part of the FNF business and/or assets, or in the event of bankruptcy, reorganization, insolvency, receivership, or an assignment for the benefit of creditors. By submitting Personal Information and/or Browsing Information to FNF, you expressly agree and consent to the use and/or transfer of the foregoing information in connection with any of the above described proceedings.

### **Security of Your Information**

We maintain physical, electronic, and procedural safeguards to protect your Personal Information.

### **Choices With Your Information**

If you do not want FNF to share your information among our affiliates to directly market to you, you may send an "opt out" request as directed at the end of this Privacy Notice. We do not share your Personal Information with nonaffiliates for their use to direct market to you without your consent.

Whether you submit Personal Information or Browsing Information to FNF is entirely up to you. If you decide not to submit Personal Information or Browsing Information, FNF may not be able to provide certain services or products to you.

For California Residents: We will not share your Personal Information or Browsing Information with nonaffiliated third parties, except as permitted by California law. For additional information about your California privacy rights, please visit the "California Privacy" link on our website (<https://fnf.com/pages/californiaprivacy.aspx>) or call (888) 413-1748.

For Nevada Residents: You may be placed on our internal Do Not Call List by calling (888) 934-3354 or by contacting us via the information set forth at the end of this Privacy Notice. Nevada law requires that we also provide you with the following contact information: Bureau of Consumer Protection, Office of the Nevada Attorney General, 555 E. Washington St., Suite 3900, Las Vegas, NV 89101; Phone number: (702) 486-3132; email: BCPINFO@ag.state.nv.us.

For Oregon Residents: We will not share your Personal Information or Browsing Information with nonaffiliated third parties for marketing purposes, except after you have been informed by us of such sharing and had an opportunity to indicate that you do not want a disclosure made for marketing purposes.

For Vermont Residents: We will not disclose information about your creditworthiness to our affiliates and will not disclose your personal information, financial information, credit report, or health information to nonaffiliated third parties to market to you, other than as permitted by Vermont law, unless you authorize us to make those disclosures.

### **Information From Children**

The FNF Websites are not intended or designed to attract persons under the age of eighteen (18). We do not collect Personal Information from any person that we know to be under the age of thirteen (13) without permission from a parent or guardian.

### **International Users**

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# Carlson Geotechnical

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**Report of  
Geotechnical Investigation  
NBHD Clinic & Housing Project  
Hospital Road & Nehalem Parkway  
Wheeler, Oregon**

**CGT Project Number G2105456**

Prepared for

Jeff Slamal  
Nehalem Bay Health District (NBHD)  
278 Rowe Street  
Wheeler, Oregon 97147

March 31, 2021

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March 31, 2021

Jeff Slamal  
Nehalem Bay Health District (NBHD)  
278 Rowe Street  
Wheeler, Oregon 97147

**Report of  
Geotechnical Investigation  
NBHD Clinic & Housing Project  
Hospital Road & Oregon Coast Highway  
Wheeler, Oregon**

CGT Project Number G2105456

Dear Mr. Slamal:

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation for the proposed NBHD Clinic & Housing project. The site is located at the southwest quadrant of the intersection of Hospital Road and Oregon Coast Highway in Wheeler, Oregon. We performed our work in general accordance with CGT Proposal GP9264, dated March 2, 2021. Written authorization for our services was received on March 3, 2021.

We appreciate the opportunity to work with you on this project. Please contact us at (503) 601-8250 if you have any questions regarding this report.

Respectfully Submitted,  
**CARLSON GEOTECHNICAL**

A handwritten signature in black ink that reads "M. David Irish".

M. David Irish, CESCL  
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## 1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation for the proposed NBHD Clinic & Housing project. The site is located at the southwest quadrant of the intersection of Hospital Road and Oregon Coast Highway in Wheeler, Oregon, as shown on the attached Site Location, Figure 1.

### 1.1 Project Information

CGT developed an understanding of the proposed project based on our correspondence with NBHD and review of conceptual site plans, prepared by Brittell Architecture, Inc., dated February 5, 2021. Based on our review, we understand the project is in the early stages of planning, but will likely include:

- Construction of multiple buildings at the site. One of the buildings will be utilized as a clinic, while the others will be used for housing. Although no architectural information has been provided, we anticipate the building(s) will be one or two stories, wood-framed, and incorporate slab on grade floors. No below-grade levels (basements) are anticipated for the buildings. Although no structural information has been provided, we have assumed maximum column, continuous wall, and uniform floor slab loads will be on the order of 50 kips, 3 kips per lineal foot (klf), and 150 pounds per square foot (psf), respectively.
- Construction of new pavements and underground utilities to serve the new buildings. We assume new pavements will be surfaced with asphalt concrete (AC).
- Although no stormwater management plans have been provided, we assume that stormwater collected from new impervious areas of the site will be diverted to the public storm drain or other suitable discharge points. Infiltration testing was not requested as part of this assignment.
- Although no grading plans have been provided, we anticipate permanent grade changes at the site may include cuts and fills up to 5 feet in depth.

### 1.2 Scope of Services

Our scope of work included the following:

- Contact the Oregon Utilities Notification Center to mark the locations of public utilities within a 20-foot radius of our explorations at the site.
- Explore subsurface conditions at the site by excavating eight test pits to depths of up to about 10 feet below ground surface (bgs). Details of the subsurface investigation are presented in Appendix A.
- Classify the soils encountered in the explorations in general accordance with ASTM D2488 (Visual-Manual Procedure).
- Provide a technical narrative describing surface and subsurface deposits, and local geology of the site, based on the results of our explorations and published geologic mapping.
- Provide recommendations for the Seismic Site Class, mapped maximum considered earthquake spectral response accelerations, and site seismic coefficients.
- Provide a qualitative evaluation of seismic hazards at the site, including earthquake-induced liquefaction, landsliding, and surface rupture due to faulting or lateral spread.
- Provide geotechnical recommendations for site preparation and earthwork.
- Provide geotechnical engineering recommendations for use in design and construction of shallow foundations, floor slabs, and pavements.

- Provide this written report summarizing the results of our geotechnical investigation and recommendations for the project.

## 2.0 SITE DESCRIPTION

### 2.1 Site Geology

Based on available geologic mapping<sup>1,2</sup> of the area, the site is underlain by upper Eocene Nestucca Formation (Tn). This unit is generally a thin-bedded, laminated dark gray tuffaceous mudstone containing interbeds of fine- to coarse-grained arkosic and basaltic sandstone. It also commonly contains thin tuff beds and calcareous concretions.

### 2.2 Site Surface Conditions

The site is bordered by residential properties to the west, Oregon Coast Highway 101 to the north/northwest, and Hospital Road to the east and south. At the time of our investigation, the majority of the site gently descended to the west/northwest. The southwest and northeast margins of the site generally descended to the north at gradients up to about 3 horizontal to 1 vertical (3H:1V). The site was covered with short grasses. Concrete foundation walls from a previously existing building<sup>3</sup> were located in the south central portion of the site. Site layout and surface conditions at the time of our field investigation are shown on the attached Site Plan (Figure 2) and Site Photographs (Figure 3).

### 2.3 Subsurface Conditions

#### 2.3.1 Subsurface Investigation & Laboratory Testing

Our subsurface investigation consisted of eight test pits (TP-1 through TP-8) completed between March 17, 2021, and March 26, 2021. The approximate test pit locations are shown on the Site Plan, attached as Figure 2. In summary, the test pits were excavated to depths ranging from about 7 to 10 feet bgs. Details regarding the subsurface investigation, logs of the explorations, and results of laboratory testing are presented in Appendix A. Subsurface conditions encountered during our investigation are summarized below.

#### 2.3.2 Subsurface Materials

Logs of the explorations are presented in Appendix A. The following describes each of the subsurface materials encountered at the site.

##### Organic Soil Fill (OL Fill)

Undocumented organic soil fill was encountered at the surface of test pits TP-2 through TP-4 and TP-6 through TP-8. Undocumented fill refers to materials placed without (available) records of subgrade conditions or evaluation of compaction. The organic soil fill was typically brown to dark brown, moist, exhibited low to

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<sup>1</sup> Schlicker, H.G., Deacon, R.J., Beaulieu, J.D., and Olcott, G.W., 1972, Environmental geology of the coastal region of Tillamook and Clatsop Counties: Oregon Department of Geology and Mineral Industries, Bulletin 74, scale 1:62,500.

<sup>2</sup> Wells, R.E., Snavely, P.D., MacLeod, N.S., Kelly, M.M., and Parker, M.J., 1994, Geologic map of the Tillamook Highlands, northwest Oregon Coast Range (Tillamook, Nehalem, Enright, Timber, Fairdale, and Blaine 15 minute quadrangles): U.S. Geological Survey, Open-File Report OF-94-21, scale 1:62,500.

<sup>3</sup> Anecdotally, we understand the foundations are remnants of a former school building at the site that was demolished in the 1950s. To the best of our knowledge, there are no records detailing demolition activities associated with removal of the former building and other features at the site. If such records become available, we would be pleased to review them.

medium plasticity, and contained varying amounts of subrounded gravels up to 1½ inches in diameter and abundant rootlets and roots up to 1½ inches in diameter. A clay pipe was observed in this material within test pits TP-2 and TP-3. The organic soil fill extended to depths up to about 1 foot bgs.

#### Poorly Graded Gravel Fill (GP Fill)

Undocumented poorly graded gravel fill was observed beneath the organic soil fill within test pit TP-8. The poorly graded gravel fill was gray to brown, angular, and up to 4 inches in diameter. The poorly graded gravel fill extended to a depth of about ¾ foot bgs.

#### Elastic Silt Fill (MH Fill)

Undocumented elastic silt fill was encountered at the surface of test pits TP-1 and TP-5, and beneath the organic soil fill within test pits TP-2 through TP-4 and TP-6 and TP-7, and beneath the poorly graded gravel fill within test pit TP-8. The elastic silt fill was typically brown and gray, moist, exhibited medium to high plasticity, and contained some fine-grained sand, varying amounts of gravels and cobbles up to 5 inches in diameter, scattered pieces of weathered basalt, and debris (pieces of burnt wood, glass, metal pipe, and pieces of concrete). The elastic silt fill extended to the full depths explored in TP-4 (about 10 feet bgs), TP-7 (about 7 feet bgs) and TP-8 (about 10 feet bgs). A buried concrete slab precluded further investigation in TP-7. The fill extended to depths ranging from 5 to 8 feet bgs within the remaining test pits.

#### Elastic Silt (MH)

Underlying the undocumented fill within test pits TP-1 through TP-3, TP-5 and TP-6, was native elastic silt. This soil was typically medium stiff to better, brown/orange/gray with black flecking and red streaks, moist, exhibited medium plasticity, and contained some fine-grained sand. The native elastic silt extended to the full depths explored in those test pits, about 8½ to 9¾ feet bgs.

### 2.3.3 Groundwater

Groundwater was not encountered within the depths explored in mid- March 2021. To determine approximate regional groundwater levels in the area, we researched well logs available on the Oregon Water Resources Department (OWRD)<sup>4</sup> website for wells located within Section 2, Township 2 North, Range 10 West, Willamette Meridian. Our review indicated that groundwater levels in the area generally ranged from about 7 to 40 feet bgs. It should be noted groundwater levels vary with local topography. In addition, the groundwater levels reported on the OWRD logs often reflect the purpose of the well, so water well logs may only report deeper, confined groundwater, while geotechnical or environmental borings will often report any groundwater encountered, including shallow, unconfined groundwater. Therefore, the levels reported on the OWRD well logs referenced above are considered generally indicative of local water levels and may not reflect actual groundwater levels at the project site. We anticipate that groundwater levels will fluctuate due to seasonal and annual variations in precipitation, changes in site utilization, or other factors. Additionally, the on-site fine-grained soils (MH Fill, MH) are conducive to formation of perched groundwater.

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<sup>4</sup> Oregon Water Resources Department, 2021. Well Log Records, accessed February 2021, from OWRD web site: [http://apps.wrd.state.or.us/apps/gw/well\\_log/](http://apps.wrd.state.or.us/apps/gw/well_log/).

### 3.0 SEISMIC CONSIDERATIONS

#### 3.1 Seismic Design

Section 1613.2.2 of the 2019 Oregon Structural Specialty Code (2019 OSSC) requires that the determination of the seismic site class be in accordance with Chapter 20 of the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures (ASCE 7-16). We have assigned the site as Site Class D (“Stiff Soil”) based on geologic mapping and subsurface conditions encountered during our investigation.

Earthquake ground motion parameters for the site were obtained in accordance with the 2019 OSSC using the Seismic Hazards by Location calculator on the ATC website<sup>5</sup>. The site Latitude 45.68834676° North and Longitude 123.8839982° West were input as the site location. The following table shows the recommended seismic design parameters for the site.

**Table 1 Seismic Ground Motion Values (2019 OSSC)**

	Parameter	Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second ( $S_s$ )	1.241g
	Spectral Acceleration, 1.0 second ( $S_1$ )	0.653g
Coefficients (Site Class D)	Site Coefficient, 0.2 second ( $F_A$ )	1.004
	Site Coefficient, 1.0 second ( $F_V$ ) <sup>1</sup>	1.700
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 second ( $S_{MS}$ )	1.246g
	MCE Spectral Acceleration, 1.0 second ( $S_{M1}$ )	1.110g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 second ( $S_{DS}$ )	0.830g
	Design Spectral Acceleration, 1.0 second ( $S_{D1}$ )	0.740g
Seismic Design Category (Risk Category II)		D
<sup>1</sup> Value determined from 2019 OSSC Table 1613.2.3(2).		

#### 3.2 Seismic Hazards

##### 3.2.1 Liquefaction

In general, liquefaction occurs when deposits of loose/soft, saturated, cohesionless soils, generally sands and silts, are subjected to strong earthquake shaking. If these deposits cannot drain quickly enough, pore water pressures can increase, approaching the value of the overburden pressure. The shear strength of a cohesionless soil is directly proportional to the effective stress, which is equal to the difference between the overburden pressure and the pore water pressure. When the pore water pressure increases to the value of the overburden pressure, the shear strength of the soil approaches zero, and the soil can liquefy. The liquefied soils can undergo rapid consolidation or, if unconfined, can flow as a liquid. Structures supported by the liquefied soils can experience rapid, excessive settlement, shearing, or even catastrophic failure.

For fine-grained soils, susceptibility to liquefaction is evaluated based on penetration resistance and plasticity, among other characteristics. Criteria for identifying non-liquefiable, fine-grained soils are constantly evolving. Current practice to identify non-liquefiable, fine-grained soils is based on moisture content and

<sup>5</sup> Applied Technology Council (ATC), 2021. USGS seismic design parameters determined using “Seismic Hazards by Location,” accessed March 2021, from the ATC website <https://hazards.atcouncil.org/>.

plasticity characteristics of the soils<sup>6,7,8</sup>. The susceptibility of sands, gravels, and sand-gravel mixtures to liquefaction is typically assessed based on penetration resistance, as measured using SPTs, CPTs, or Becker Hammer Penetration tests (BPTs).

Based on their lack of saturated conditions and plasticity characteristics, the soils encountered within our explorations are considered non-liquefiable. Based on review of geologic mapping and our previous experience in the area, we do not anticipate liquefiable conditions are present at depths below those explored as part of this assignment.

### 3.2.2 Slope Instability

Review of the Statewide Landslide Information Database for Oregon (SLIDO), available at the DOGAMI website<sup>9</sup>, shows no prehistoric or historic landslides on the project site. Pre-historic (over 150 years) landslides are mapped about 550 feet to the east, 950 feet to the south, and 900 feet to the southeast of the site. The Oregon Department of Geology and Mineral Industries' Oregon Statewide Geohazards Viewer (HazVu)<sup>10</sup> shows a 'moderate' hazard for landslides at the site; however, we anticipate that hazard level is assigned based principally on slope gradient. No obvious signs of recent or on-going instability were observed at the site during our field investigation in March 2021. Recognizing the relatively gentle site grades (up to 3H:1V), and provided the recommendations presented later in this report regarding grading and drainage are incorporated into design and construction, the risk of seismically-induced landslides at the site is considered low.

### 3.2.3 Surface Rupture

#### 3.2.3.1 Faulting

Although the site is situated in a region of the country with known active faults and historic seismic activity, no known faults exist on or immediately adjacent to the site. Therefore, the risk of surface rupture at the site due to faulting is considered low.

#### 3.2.3.2 Lateral Spread

Surface rupture due to lateral spread can occur on sites underlain by liquefiable soils that are located on or immediately adjacent to slopes steeper than about 3 degrees (20H:1V), and/or adjacent to a free face, such as a stream bank or the shore of an open body of water. During lateral spread, the materials overlying the liquefied soils are subject to lateral movement downslope or toward the free face. Based on the non-liquefiable nature of the soils at the site, the risk of damage associated with lateral spread is negligible.

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<sup>6</sup> Seed, R.B. et al., 2003. Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. Earthquake Engineering Research Center Report No. EERC 2003-06.

<sup>7</sup> Bray, Jonathan D., Sancio, Rodolfo B., et al., 2006. Liquefaction Susceptibility of Fine-Grained Soils, Journal of Geotechnical and Geoenvironmental Engineering, Volume 132, Issue 9, September 2006.

<sup>8</sup> Idriss, I.M., Boulanger, R.W., 2008. Soil Liquefaction During Earthquakes, Earthquakes Engineering Research Institute Monograph MNO-12.

<sup>9</sup> Oregon Department of Geology and Mineral Industries, 2021. Statewide Landslide Information Database for Oregon (SLIDO), accessed March 2021, from DOGAMI web site: <https://gis.dogami.oregon.gov/maps/slido/>.

<sup>10</sup> Oregon Department of Geology and Mineral Industries, 2021. Oregon Statewide Geohazards Viewer, accessed March 2021, from DOGAMI web site: <http://www.oregongeology.org/sub/hazvu/index.htm>.

## 4.0 CONCLUSIONS

Based on the results of our field explorations and analyses, the site may be developed as described in Section 1.1 of this report, provided the recommendations presented in this report are incorporated into the design and development. The primary geotechnical considerations for this project are discussed in the following paragraphs.

### 4.1 Undocumented Fill

#### 4.1.1 Overview

As indicated above, we encountered undocumented fill in each of the test pits completed at the site. The predominant fill material consisted of elastic silt fill (MH Fill). As shown on the attached Site Plan, Figure 2, and on the test pit logs in Appendix A, the elastic silt fill extended to depths of about 5 to 10+ feet bgs. In three locations (TP-4, TP-7, and TP-8), we were unable to fully characterize the depth of the existing fill due to encountering the practical reach of the excavator or refusal on top of a buried concrete slab.

To the best of our knowledge, there are no records detailing the original placement and compaction of the existing fill materials at the site. Anecdotally, we anticipate the elastic silt fill was likely placed during past site development. Earthwork records could be sought to confirm this assumption and provide more information. In the absence of review of earthwork records, the test pits showed the fill materials exhibited variable relative compaction, evidenced by the range of pocket penetrometer readings and effort required by the excavator to penetrate the material. In addition, the test pits contained varying amounts of debris (pieces of burnt wood, glass, metal pipe, and concrete) and in one location a buried slab was encountered. Due to the inherent variable relative compaction, presence of debris, and a buried slab, it is evident the existing elastic silt fill was not placed and compacted in accordance with typical code requirements for structural fill.

#### 4.1.2 Planned Buildings

Due to the lack of documentation of the existing fill materials and the inherent risk of excessive, total and differential, post-construction settlements, we do not recommend the existing fill materials be relied upon to support shallow foundations and floor slabs associated with the planned buildings at the site. Two options are presented for mitigation of the existing fill in the building pad areas<sup>11</sup>:

- Option 1 – Over-Excavation & Replacement. This option would include over-excavating the existing fill materials within, and for a minimum 5-foot margin around, the building pad areas. The over-excavated fill materials may be re-used as structural fill, provided they are processed free of debris (as required) and moisture-conditioned (as necessary) to facilitate proper compaction. Geotechnical recommendations for re-using the on-site fill materials as structural fill at the site are presented later in this report.
- Option 2 – Ground Improvement: This option would include leaving the existing fill materials in place but pursuing a ground improvement technique to improve soil conditions at depth to allow for use of conventionally supported shallow foundations and floor slabs. Granular piers (GPs) are anticipated to be an effective and economical ground improvement technique for this site<sup>12</sup>. GPs are an intermediate, foundation system that consists of nominally spaced, aggregate piers that provide shallow foundation

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<sup>11</sup> Supplemental geotechnical investigation (deep test pits or drilled borings) is recommended to refine depths of the existing fill in the areas of test pits TP-4, TP-7, and TP-8, particularly if building(s) will be located in those areas of the site.

<sup>12</sup> Other ground improvement techniques (e.g. deep soil mixing, compaction grouting, etc.) could also be considered, subject to review of the project geotechnical engineer.

bearing support and assist with controlling settlement. Through proper design and construction, we anticipate this approach should help reduce total and differential settlements to a level acceptable for supporting the buildings on conventional shallow foundations and utilizing floor slabs supported on-grade. If considered, the geotechnical engineer should be contacted to provide supplemental recommendations for use in design of GPs once site layout and grading plans are available for review.

A third option for supporting the buildings would include the use of deep foundations [e.g. driven pin (pipe) piles, micro-piles, or drilled piers] and supporting interior floor slabs on grade beams structurally-connected to deep foundations. While deep foundations could be pursued, supplemental geotechnical investigation (drilled borings) would be recommended to collect deeper subsurface information and data for use in developing recommendations for design of deep foundations. If considered, the geotechnical engineer should be contacted to provide recommendations for supplemental subsurface investigation once site layout and grading plans are available for review.

#### 4.1.3 Pavements

Subject to geotechnical engineering review of site grading plans<sup>13</sup>, the existing, near-surface, inorganic fill materials (GP Fill, MH Fill) may be relied upon for subgrade support of anticipated light-duty, flexible (asphalt concrete) pavements at the site. Proof roll testing is recommended to confirm the existing fill materials are stable and non-yielding and suitable for placement and compaction of pavement base rock. Specific recommendations for subgrade preparation of pavements are presented in Section 5.9.1 of this report.

### 4.2 **Moisture Sensitive Soils**

Due to their fines content, the on-site silty soils (MH Fill, MH) are susceptible to disturbance during wet weather. Trafficability of these soils may be difficult, and significant damage to the subgrade could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above optimum moisture content. In the event that construction occurs during wet weather, CGT recommends that measures be implemented to protect the fine-grained subgrade in areas of repeated construction traffic. Geotechnical recommendations for wet weather construction are presented in Section 5.3 of this report. Re-use of the on-site soils as structural fill during wet times of the year will require special consideration as discussed in Section 5.4.1 of this report.

## 5.0 **RECOMMENDATIONS**

The recommendations presented in this report are based on the information provided to us, results of our field investigation and analyses, laboratory data, and professional judgment. CGT has observed only a small portion of the pertinent subsurface conditions. The recommendations are based on the assumptions that the subsurface conditions do not deviate appreciably from those found during the field investigation. CGT should be consulted for further recommendations if the design of the proposed development changes and/or variations or undesirable geotechnical conditions are encountered during site development.

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<sup>13</sup> If grading plans include raising pavement areas with several feet of structural fill, settlement monitoring of the fill materials may be recommended. The geotechnical engineer should be consulted to review the proposed grading plans and provide supplemental recommendations for settlement monitoring, if warranted.

## 5.1 Site Preparation

### 5.1.1 Demolition

Demolition of existing buildings and appurtenant structures should include complete removal of all structural elements, including foundations and concrete slabs. Abandoned buried utilities should similarly be removed or grouted full. Concrete or asphalt concrete debris resulting from demolition activities may be re-used as structural fill, provided it is processed in accordance with the recommendations presented in Section 5.4.1 of this report. Alternatively, demolition debris should be hauled off site for disposal.

### 5.1.2 Stripping

Existing vegetation, topsoil, and organic soil fill (OL Fill) should be removed from within, and for a minimum 5-foot margin around, proposed building pad, structural fill, and pavement areas. Based on the results of our field explorations, topsoil stripping depths are anticipated to be less than 1 foot bgs. These materials may be deeper or shallower at locations away from the completed explorations. The geotechnical engineer's representative should provide recommendations for actual stripping depths based on observations during site stripping. Stripped surface vegetation and rooted soils should be transported off-site for disposal, or stockpiled for later use in landscaped areas. Stripped, inorganic fill materials should be transported off-site for disposal, or may be stockpiled for later use as structural fill as described in Section 5.4.1 of this report.

### 5.1.3 Over-Excavation of Existing Fills

Where over-excavation of existing fills is to be performed (see Section 4.1.2 above), the existing elastic silt fill (MH Fill) should be removed from within, and for a minimum 5-foot margin around, proposed building pad areas. Based on the results of our field explorations, undocumented fill encountered at the site extended to depths of about 5 feet to at least 10 feet bgs<sup>14</sup>. These materials may be deeper or shallower at locations away from the completed explorations. The geotechnical engineer's representative should provide recommendations for actual over-excavation depths based on observations during over-excavation activities. Stripped, inorganic fill materials should be transported off-site for disposal, or may be stockpiled for later use as structural fill as described in Section 5.4.1 of this report.

### 5.1.4 Test Pit Backfills

The test pits conducted at the site were loosely backfilled during our field investigation. Where test pits are located within finalized building, structural fill, or pavement areas, the loose backfill materials should be re-excavated. The resulting excavations should be backfilled with structural fill in conformance with Section 5.4 of this report.

### 5.1.5 Existing Utilities & Below-Grade Structures

All existing utilities at the site should be identified prior to excavation. Abandoned utility lines beneath the new buildings, pavements, and hardscaping features should be completely removed or grouted full. Soft, loose, or otherwise unsuitable soils encountered in utility trench excavations should be removed and replaced with structural fill in conformance with Section 5.4 this report. Buried structures (i.e. footings,

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<sup>14</sup> Supplemental investigation (e.g. deep test pits or drilled borings) is recommended to refine depths of the existing fill materials in finalized building pad areas. The geotechnical engineer should be contacted to review finalized site layout and grading plans, once available, to develop the supplemental investigation program.



foundation walls, retaining walls, slabs-on-grade, tanks, etc.), if encountered during site development, should be completely removed and replaced with structural fill in conformance with Section 5.4 of this report.

#### 5.1.6 Subgrade Preparation – Pavements & Areas to Receive Structural Fill

After site preparation as recommended above, but prior to placement of structural fill and/or aggregate base, the geotechnical engineer's representative should observe the exposed subgrade soils in order to identify areas of excessive yielding through either proof rolling or probing. Proof rolling of subgrade soils is typically conducted during dry weather using a fully-loaded, 10- to 12-cubic-yard, tandem-axle, tire-mounted, dump truck or equivalent weighted water truck. Areas of limited access or that appear too soft or wet to support proof rolling equipment should be evaluated by probing. During wet weather, subgrade preparation should be performed in general accordance with the recommendations presented in Section 5.3 of this report. If areas of soft soil or excessive yielding are identified, the affected material should be over-excavated to firm, unyielding subgrade, and replaced with imported granular structural fill in conformance with Section 5.4.2 of this report.

#### 5.1.7 Erosion Control

Erosion and sedimentation control measures should be employed in accordance with applicable City, County, and State regulations.

### **5.2 Temporary Excavations**

#### 5.2.1 Overview

Conventional earthmoving equipment in proper working condition should be capable of making necessary excavations for the anticipated site cuts as described earlier in this report. All excavations should be in accordance with applicable OSHA and state regulations. It is the contractor's responsibility to select the excavation methods, to monitor site excavations for safety, and to provide any shoring required to protect personnel and adjacent improvements. A "competent person," as defined by OR-OSHA, should be on-site during construction in accordance with regulations presented by OR-OSHA. CGT's current role on the project does not include review or oversight of excavation safety.

#### 5.2.2 OSHA Soil Type

For use in the planning and construction of temporary excavations up to 10 feet in depth, an OSHA soil type "C" should be used for the existing elastic silt fill (MH Fill) encountered near the surface of the site. Similarly, an OSHA soil type "A" may be used for the native elastic silt (MH) encountered below the fill materials.

#### 5.2.3 Utility Trenches

Temporary trench cuts should stand near vertical to depths of approximately 4 feet in the elastic silt soils (MH Fill, MH) encountered near the surface of the site. If groundwater seepage undermines the stability of the trench, or if sidewall caving is observed during excavation, the sidewalls should be flattened or shored. Depending on the time of year trench excavations occur, trench dewatering may be required in order to maintain dry working conditions. Pumping from sumps located within the trench will likely be effective in removing water resulting from seepage. If groundwater is encountered, we recommend placing trench stabilization material at the base of the excavations. Trench stabilization material should be in conformance with Section 5.4.3.

#### 5.2.4 Excavations Near Foundations

Excavations near footings should not extend within a 1 horizontal to 1 vertical (1H:1V) plane projected out and down from the outside, bottom edge of the footings. In the event excavation needs to extend below the referenced plane, temporary shoring of the excavation and/or underpinning of the subject footing may be required. The geotechnical engineer should be consulted to review proposed excavation plans for this design case to provide specific recommendations.

#### 5.2.5 Draping of Cut Slopes

In wet weather conditions, we recommend temporary cut slopes in excess of 4 feet in height (created during construction) be draped with minimum 10-mil plastic sheeting (e.g. polyethylene). Draping of cut slopes less than 4 feet in height may also be performed. The draping should extend from the base of the cut slope and back from the top of the cut slope sufficient to limit runoff from flowing under the covering. The plastic sheets should be lapped sufficiently to prevent water from flowing directly onto the slope and should extend at least several feet beyond each side of the cut area. The plastic should be weighted or otherwise anchored so that it remains on the slope during construction. Runoff from the sheeting should not be allowed to pond or infiltrate into the subsurface at the toe of the slope, but should be collected and diverted away from the cut slope to a suitable discharge point.

### 5.3 **Wet Weather Considerations**

For planning purposes, the wet season should be considered to extend from late September to late June. It is our experience that dry weather working conditions should prevail between early July and mid-September. Notwithstanding the above, soil conditions should be evaluated in the field by the geotechnical engineer's representative at the initial stage of site preparation to determine whether the recommendations within this section should be incorporated into construction.

#### 5.3.1 Overview

Due to their fines content, the on-site elastic silt soils (MH Fill, MH) are susceptible to disturbance during wet weather. Trafficability of these soils may be difficult, and significant damage to subgrade soils could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above optimum moisture content. For wet weather construction, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material onto trucks supported on granular haul roads, or other methods to limit soil disturbance. The geotechnical engineer's representative should evaluate the subgrade during excavation by probing rather than proof rolling. Soils that have been disturbed during site preparation activities, or soft or loose areas identified during probing, should be over-excavated to firm, unyielding subgrade, and replaced with imported granular structural fill in conformance with Section 5.4.2.

#### 5.3.2 Geotextile Separation Fabric

We recommend a geotextile separation fabric be placed to serve as a barrier between the prepared subgrade and granular fill/base rock in areas of repeated or heavy construction traffic. The geotextile fabric should meet the requirements presented in the current Oregon Department of Transportation (ODOT) Standard Specification for Construction (ODOT SSC), Section 02320.

### 5.3.3 Granular Working Surfaces (Haul Roads & Staging Areas)

Haul roads subjected to repeated heavy, tire-mounted, construction traffic (e.g. dump trucks, concrete trucks, etc.) will require a minimum of 18 inches of imported granular material. For light staging areas, 12 inches of imported granular material is typically sufficient. Additional granular material, cement amendment, or geo-grid reinforcement may be recommended based on site conditions and/or loading at the time of construction. The imported granular material should be in conformance with Section 5.4.2 and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The prepared subgrade should be covered with geotextile fabric (Section 5.3.2) prior to placement of the imported granular material. The imported granular material should be placed in a single lift (up to 24 inches deep) and compacted using a smooth-drum, non-vibratory roller until well-keyed.

### 5.3.4 Footing Subgrade Protection

A minimum of 3 inches of imported granular material is recommended to protect fine-grained (silty), footing subgrades from foot traffic during inclement weather. The imported granular material should be in conformance with Section 5.4.2. The maximum particle size should be limited to 1 inch. The imported granular material should be placed in one lift over the prepared, undisturbed subgrade, and compacted using non-vibratory equipment until well keyed.

Surface water should not be allowed to collect in footing excavations. The excavations should be draped and/or provided with sumps to preclude water accumulation during inclement weather.

### 5.3.5 Cement Amendment

It is sometimes less costly to amend near-surface, moisture-sensitive, fine-grained soils with Portland cement than to remove and replace those soils with imported granular material. Successful use of soil cement amendment depends on use of correct techniques and equipment, soil moisture content, and the amount of cement added to the subgrade (mix design). We anticipate the on-site elastic silt fill (MH Fill) soils are conducive for cement amendment due to their generally medium plasticity and experience with similar soils.

The recommended percentage of cement is based on soil moisture contents at the time the work is performed. Based on our experience, 3 percent cement by weight of dry soil can generally be used when the soil moisture content does not exceed approximately 20 percent. If the soil moisture content is in the range of 25 to 35 percent, 4 to 6 percent by weight of dry soil is recommended. It is difficult to accurately predict field performance due to the variability in soil response to cement amendment. The amount of cement added to the soil may need to be adjusted based on field observations and performance.

If cement amendment is considered, we recommend additional sampling, laboratory testing, and a mix design be performed to determine the level of improvement in engineering properties (strength, stiffness) of the on-site soils when blended with Portland cement. We recommend project scheduling allow for a minimum of 4 weeks for this testing and design to be completed, prior to initiating cement amendment.

## 5.4 **Structural Fill**

The geotechnical engineer should be provided the opportunity to review all materials considered for use as structural fill (prior to placement). Samples of the proposed fill materials should be submitted to the

geotechnical engineer a minimum of 5 business days prior their use on site<sup>15</sup>. The geotechnical engineer's representative should be contacted to evaluate compaction of structural fill as the material is being placed. Evaluation of compaction may take the form of in-place density tests and/or proof roll tests with suitable equipment. Structural fill should be evaluated at intervals not exceeding every 2 vertical feet as the fill is being placed.

#### 5.4.1 On-Site Soils – General Use

##### 5.4.1.1 Elastic Silt Fill, Elastic Silt (MH Fill, MH)

Re-use of these soils as structural fill may be difficult because these soils are sensitive to small changes in moisture content and are difficult, if not impossible, to adequately compact during wet weather. We anticipate the moisture content of these soils will be higher than the optimum moisture content for satisfactory compaction. Therefore, moisture conditioning (drying) should be expected in order to achieve adequate compaction. If used as structural fill, these soils should be free of organic matter, debris, and particles larger than 4 inches. When used as structural fill, these soils should be placed in lifts with a maximum pre-compaction thickness of about 8 inches at moisture contents within -1 and +3 percent of optimum, and compacted to not less than 92 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor).

If the on-site materials cannot be properly moisture-conditioned and/or processed, we recommend using imported granular material for structural fill.

#### 5.4.2 Imported Granular Structural Fill – General Use

Imported granular structural fill should consist of angular pit or quarry run rock, crushed rock, or crushed gravel that is fairly well graded between coarse and fine particle sizes. The granular fill should contain no organic matter, debris, or particles larger than 4 inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. For fine-grading purposes, the maximum particle size should be limited to 1½ inches. The percentage of fines can be increased to 12 percent of the material passing the U.S. Standard No. 200 Sieve if placed during dry weather, and provided the fill material is moisture-conditioned, as necessary, for proper compaction. Imported granular fill material should be placed in lifts with a maximum thickness of about 12 inches, and compacted to not less than 95 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). Proper moisture conditioning and the use of vibratory equipment will facilitate compaction of these materials.

Granular fill materials with high percentages of particle sizes in excess of 1½ inches are considered non-moisture-density testable materials. As an alternative to conventional density testing, compaction of these materials should be evaluated by proof roll test observation (deflection tests), where accepted by the geotechnical engineer.

#### 5.4.3 Trench Base Stabilization Material

If groundwater is present at the base of utility excavations, trench base stabilization material should be placed. Trench base stabilization material should consist of a minimum of 1 foot of well-graded granular material with a maximum particle size of 4 inches and less than 5 percent material passing the U.S. Standard

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<sup>15</sup> Laboratory testing for moisture density relationship (Proctor) is required. Tests for gradation may be required.

No. 4 Sieve. The material should be free of organic matter and other deleterious material, placed in one lift, and compacted until well-keyed.

5.4.4 Trench Backfill Material

Trench backfill for the utility pipe base and pipe zone should consist of granular material as recommended by the utility pipe manufacturer. Trench backfill above the pipe zone should consist of well-graded granular material containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 8 percent material passing the U.S. Standard No. 200 Sieve. As a guideline, trench backfill should be placed in maximum 12-inch-thick lifts. The earthwork contractor may elect to use alternative lift thicknesses based on their experience with specific equipment and fill material conditions during construction in order to achieve the required compaction. The following table presents recommended relative compaction percentages for utility trench backfill.

**Table 2 Utility Trench Backfill Compaction Recommendations**

Backfill Zone	Recommended <u>Minimum</u> Relative Compaction	
	Structural Areas <sup>1</sup>	Landscaping Areas
Pipe Base and Within Pipe Zone	90% ASTM D1557 or pipe manufacturer's recommendation	85% ASTM D1557 or pipe manufacturer's recommendation
Above Pipe Zone	92% ASTM D1557	88% ASTM D1557
Within 3 Feet of Design Subgrade	95% ASTM D1557	90% ASTM D1557

<sup>1</sup> Includes proposed buildings, pavement areas, structural fill areas, exterior hardscaping, etc.

5.4.5 Controlled Low-Strength Material (CLSM)

CLSM is a self-compacting, cementitious material that is typically considered when backfilling localized areas. CLSM is sometimes referred to as “controlled density fill” or CDF. Due to its flowable characteristics, CLSM typically can be placed in restricted-access excavations where placing and compacting fill is difficult. If chosen for use at this site, we recommend the CLSM be in conformance with Section 00442 of the most recent, ODOT SSC. The geotechnical engineer’s representative should observe placement of the CLSM and obtain samples for compression testing in accordance with ASTM D4832. As a guideline, for each day’s placement, two compressive strength specimens from the same CLSM sample should be tested. The results of the two individual compressive strength tests should be averaged to obtain the reported 28-day compressive strength. If CLSM is considered for use on this site, please contact the geotechnical engineer for site-specific and application-specific recommendations.

**5.5 Permanent Slopes**

5.5.1 Overview

Permanent cut or fill slopes constructed at the site should be graded at 2H:1V or flatter. Constructed slopes should be overbuilt by a few feet depending on their size and gradient so that they can be properly compacted prior to being cut to final grade. The surface of all slopes should be protected from erosion by seeding, sodding, or other acceptable means. Adjacent on-site and off-site structures should be located at least 5 feet from the top of slopes.

### 5.5.2 Placement of Fill on Slopes

New fill should be placed and compacted against horizontal surfaces. Where slopes exceed 5H:1V, the slopes should be keyed and benched prior to structural fill placement in general accordance with the attached Fill Slope Detail, Figure 4. If subdrains are needed on benches, subject to the review of the geotechnical representative, they should be placed as shown on the attached Fill Slope Detail. In order to achieve well-compacted slope faces, slopes should be overbuilt by a few feet and then trimmed back to proposed final grades. The geotechnical engineer or his representative should observe the benches, keyways, and associated subdrains, if needed, prior to placement of structural fill.

## 5.6 **Shallow Foundations**

### 5.6.1 Subgrade Preparation

Satisfactory subgrade support for shallow foundations can be obtained from the native, medium stiff to better elastic silt (MH), or new structural fill that is properly placed and compacted on this material during construction. The geotechnical engineer's representative should be contacted to observe subgrade conditions prior to placement of forms, reinforcement steel, or granular backfill (if required). If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill in conformance with Section 5.4.2. The maximum particle size of over-excavation backfill should be limited to 1½ inches. All granular pads for footings should be constructed a minimum of 6 inches wider on each side of the footing for every vertical foot of over-excavation.

### 5.6.2 Minimum Footing Width & Embedment

Minimum footing widths should be in conformance with the current OSSC. As a guideline, CGT recommends individual spread footings have a minimum width of 24 inches. Subject to review of the project structural engineer, we recommend continuous wall footings have a minimum width of 18 inches. All footings should be founded at least 18 inches below the lowest, permanent adjacent grade to develop lateral capacity and for frost protection.

### 5.6.3 Bearing Pressure & Settlement

Footings founded as recommended above should be proportioned for a maximum allowable soil bearing pressure of 2,000 pounds per square foot (psf). This bearing pressure is a net bearing pressure, applies to the total of dead and long-term live loads, and may be increased by one-third when considering seismic or wind loads. For foundations founded as recommended above, total settlement of foundations is anticipated to be less than 1 inch. Differential settlements between adjacent columns and/or bearing walls should not exceed ½ inch. If an increased allowable soil bearing pressure is desired, the geotechnical engineer should be consulted.

### 5.6.4 Lateral Capacity

A maximum passive (equivalent fluid) earth pressure of 150 pounds per cubic foot (pcf) is recommended for design of footings cast neat into excavations in suitable native soil or confined by structural fill that is properly placed and compacted during construction. The recommended earth pressure was computed using a factor of safety of 1½, which is appropriate due to the amount of movement required to develop full passive resistance. In order to develop the above capacity, the following should be understood:

1. Concrete must be poured neat in excavations or the foundations must be backfilled with imported granular structural fill,
2. The adjacent grade must be level,
3. The static ground water level must remain below the base of the footings throughout the year.
4. Adjacent floor slabs, pavements, or the upper 12-inch-depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

An ultimate coefficient of friction equal to 0.35 may be used when calculating resistance to sliding for footings founded on the native soils described above. An ultimate coefficient of friction equal to 0.45 may be used when calculating resistance to sliding for footings founded on a minimum of 6 inches of imported granular structural fill (crushed rock) that is properly placed and compacted during construction.

#### 5.6.5 Subsurface Drainage

Recognizing the fine-grained soils encountered at this site, we recommend placing foundation drains at the exterior, base elevations of perimeter continuous wall footings. Foundation drains should consist of a minimum 4-inch diameter, perforated, PVC drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should also be encased in a geotextile fabric in order to provide separation from the surrounding fine-grained soils. Foundation drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer's representative should observe the drains prior to backfilling. Roof drains should not be tied into foundation drains.

### 5.7 **Rigid Retaining Walls**

#### 5.7.1 Footings

Retaining wall footings should be designed and constructed in conformance with the recommendations presented in Section 5.6, as applicable.

#### 5.7.2 Wall Drains

We recommend placing retaining wall drains at the base elevation of the heel of retaining wall footings. Retaining wall drains should consist of a minimum 4-inch-diameter, perforated, HDPE (High Density Polyethylene) drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should be encased in a geotextile fabric in order to provide separation from the surrounding soils. Retaining wall drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer's representative should be contacted to observe the drains prior to backfilling. Roof or area drains should not be tied into retaining wall drains.

#### 5.7.3 Wall Backfill

Retaining walls should be backfilled with imported granular structural fill in conformance with Section 5.4.2 and contain less than 5 percent passing the U.S. Standard No. 200 Sieve. The backfill should be compacted to a minimum of 90 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). When placing fill behind walls, care must be taken to minimize undue lateral loads on the walls. Heavy compaction equipment should be kept at least "H" feet from the back of the

walls, where “H” is the height of the wall. Light mechanical or hand tamping equipment should be used for compaction of backfill materials within “H” feet of the back of the walls.

#### 5.7.4 Design Parameters & Limitations

For rigid retaining walls founded, backfilled, and drained as recommended above, the following table presents parameters recommended for design.

**Table 3 Design Parameters for Retaining Walls**

Retaining Wall Condition	Modeled Backfill Condition	Static Equivalent Fluid Pressure (S <sub>A</sub> ) <sup>1</sup>	Seismic Equivalent Fluid Pressure (S <sub>AE</sub> ) <sup>1,2</sup>	Surcharge from Uniform Load, q, Acting on Backfill Behind Retaining Wall
Not Restrained from Rotation	Level (i=0)	28 pcf	42 pcf	0.22*q
Restrained from Rotation	Level (i=0)	50 pcf	62 pcf	0.38*q

<sup>1</sup> Refer to the attached Figure 5 for a graphical representation of static and seismic loading conditions. Seismic resultant force acts at 0.6H above the base of the wall.

<sup>2</sup> Seismic (dynamic) lateral loads were computed using the Mononobe-Okabe Equation as presented in the 1997 Federal Highway Administration (FHWA) design manual. Static and seismic equivalent fluid pressures are not additive.

The above design recommendations are based on the assumptions that:

- The walls consist of concrete cantilevered retaining walls ( $\beta = 0$  and  $\delta = 24$  degrees, see Figure 5).
- The walls are 10 feet or less in height.
- The backfill is drained and consists of imported granular structural fill ( $\phi = 38$  degrees).
- No line, strip, or point load surcharges are imposed behind the walls.
- The grade behind the wall is level, or sloping down and away from the wall, for a distance of 10 feet or more from the wall.
- The grade in front of the walls is level or ascending for a distance of at least 5 feet from the wall.

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

## 5.8 Floor Slabs

### 5.8.1 Subgrade Preparation

Satisfactory subgrade support for slabs constructed on grade, supporting up to 150 psf area loading, can be obtained from the native, medium stiff to better elastic silt (MH), or new structural fill that is properly placed and compacted on this material during construction. The geotechnical engineer’s representative should observe floor slab subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill as described in Section 5.4.2.



### 5.8.2 Crushed Rock Base

Concrete floor slabs should be supported on a minimum 6-inch-thick layer of crushed rock (base rock).

#### 5.8.2.1 Conventional Base Rock

Floor slab base rock should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of  $\frac{3}{4}$  inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). We recommend "choking" the surface of the base rock with sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does not provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing. Choking the base rock also reduces punctures in vapor retarding membranes due to foot traffic where such membranes are used.

#### 5.8.2.2 Gas Permeable Base Rock

Floor slab base rock in areas where radon gas mitigation is desired should consist of open-graded crushed rock containing no organic matter or debris, with all material passing through a 2-inch sieve and retained on the  $\frac{1}{4}$ -inch sieve, in accordance with 2017 ORSC Appendix F, Section AF103.2, Bullet 1.

CGT recommends that a minimum 10-mil polyethylene sheeting or equivalent material with equal or greater tensile strength, resistance to puncture, resistance to deterioration, and resistance to water-vapor transmission be placed on top of the gas-permeable base rock to act as a soil-gas-retarder. Placement and installation of this sheeting should be in conformance with that indicated in 2017 ORSC Appendix F, Section AF103.3.

The geotechnical engineer or their representative should be contacted to observe gas-permeable base rock conditions prior to placement of the soil-gas-retarder.

### 5.8.3 Design Considerations

For floor slabs constructed with a 6-inch thick base rock layer as recommended, an effective modulus of subgrade reaction of 100 pounds per cubic inch (pci) is recommended for the design of the floor slab. A higher effective modulus of subgrade reaction can be obtained by increasing the base rock thickness. Please contact the geotechnical engineer for additional recommendations if a higher modulus is desired. Floor slabs constructed as recommended will likely settle less than  $\frac{1}{2}$  inch. For general floor slab construction, slabs should be jointed around columns and walls to permit slabs and foundations to settle differentially.

### 5.8.4 Subgrade Moisture Considerations

Liquid moisture and moisture vapor should be expected at the subgrade surface. The recommended crushed rock base is anticipated to provide protection against liquid moisture. Where moisture vapor emission through the slab must be minimized, e.g. impervious floor coverings, storage of moisture sensitive materials directly on the slab surface, etc., a vapor retarding membrane or vapor barrier below the slab should be considered. Factors such as cost, special considerations for construction, floor coverings, and end use suggest that the decision regarding a vapor retarding membrane or vapor barrier be made by the architect and owner.

If a vapor retarder or vapor barrier is placed below the slab, its location should be based on current American Concrete Institute (ACI) guidelines, ACI 302 Guide for Concrete Floor and Slab Construction. In some cases, this indicates placement of concrete directly on the vapor retarder or barrier. Please note that the placement of concrete directly on impervious membranes increases the risk of plastic shrinkage cracking and slab curling in the concrete. Construction practices to reduce or eliminate such risk, as described in ACI 302, should be employed during concrete placement.

## **5.9 Pavements**

### **5.9.1 Subgrade Preparation**

Satisfactory subgrade support for pavements constructed on grade can be obtained from the existing, inorganic, elastic silt fill (MH Fill), the native, medium stiff to better elastic silt (MH), or structural fill that is properly placed and compacted on these materials during construction. Pavement subgrade preparation should be performed in general accordance with the recommendations presented in Section 5.1.6 above. Subgrade surfaces should be crowned (or sloped) for proper drainage in accordance with specifications provided by the project civil engineer.

### **5.9.2 Traffic Classifications**

Recognizing that traffic data has not been provided, CGT has considered two levels of traffic demand for review and design of pavement sections. We modeled the following two design cases (traffic levels) developed from the Asphalt Pavement Association of Oregon (APAO):

- *APAO Level I (Very Light)*: This design case considers typical average daily truck traffic (ADTT) of 1 per day over 20 years. Among others, examples under this loading consist of passenger car parking stalls, residential driveways, and seasonal recreational roads.
- *APAO Level II (Light)*: This design case considers typical ADTT of 2 to 7 per day over 20 years. Examples under this loading consist of residential streets and parking lots of less than 500 stalls.

### **5.9.3 Input Parameters**

Design of the asphalt concrete (AC) pavement sections presented below were based on the parameters presented in the following table, the American Association of State Highway and Transportation Officials (AASHTO) 1993 "Design of Pavement Structures" manual, and pavement design manuals presented by APAO and ODOT<sup>16</sup>. If any of the items listed need revision, please contact us and we will reassess the provided design sections.

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<sup>16</sup> Oregon Department of Transportation (ODOT) Pavement Design Guide, January 2019.

**Table 4 Input Parameters Used in AC Pavement Design**

Input Parameter	Design Value <sup>1</sup>	Input Parameter	Design Value <sup>1</sup>
Pavement Design Life	20 years	Resilient Modulus	Subgrade (Native Soils) <sup>4</sup> 5,000 psi
Annual Percent Growth	0 percent	Structural Coefficient <sup>2</sup>	Crushed Aggregate Base <sup>2</sup> 20,000 psi
Initial Serviceability	4.2	Structural Coefficient <sup>2</sup>	Crushed Aggregate Base 0.10
Terminal Serviceability <sup>2</sup>	2.5	Structural Coefficient <sup>2</sup>	Asphalt 0.42
Reliability <sup>2</sup>	75 percent	Vehicle Traffic <sup>4</sup>	APAO Level I (Very Light) Less than 10,000
Standard Deviation <sup>2</sup>	0.49	Vehicle Traffic <sup>4</sup>	APAO Level II (Light) Less than 50,000
Drainage Factor <sup>3</sup>	1.0	---	---

<sup>1</sup> If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.

<sup>2</sup> Value based on guidelines presented in the 2019 ODOT Pavement Design Guide.

<sup>3</sup> Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.

<sup>4</sup> Values based on experience with similar soils in the region.

<sup>5</sup> ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If actual traffic levels will be above those identified above, the geotechnical engineer should be consulted.

#### 5.9.4 Recommended Minimum Sections

The following table presents the minimum AC pavement sections for various traffic loads indicated in the preceding table, based on the referenced AASHTO procedures.

**Table 5 Recommended Minimum Asphalt Concrete Pavement Sections**

Material	APAO Traffic Loading	
	Level I	Level II
	(Passenger Car Traffic Only)	(Entrance/Service Drive Lanes)
Asphalt Pavement (inches)	3	3½
Crushed Aggregate Base (inches) <sup>1</sup>	6	8
Subgrade Soils	Prepared in conformance with Section 5.9.1 of this report.	

<sup>1</sup> Thickness shown assumes dry weather construction. A granular sub-base section and/or a geotextile separation fabric may be required in wet conditions in order to support construction traffic and protect the subgrade. Refer to Section 5.3 for additional discussion.

#### 5.9.5 AC Pavement Materials

We recommend pavement aggregate base consist of dense-graded aggregate in conformance with Section 02630.10 of the most recent ODOT SSC, with the following additional considerations. We recommend the material consist of crushed rock or gravel, have a maximum particle size of 1½ inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Aggregate base should be compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor), or as specified by the local jurisdiction.

We recommend asphalt pavement consist of Level 2, ½-inch, dense-graded AC in conformance with the most recent ODOT SSC. Asphalt pavement should be compacted to at least 91 percent of the material's theoretical maximum density as determined in general accordance with ASTM D2041 (Rice Specific Gravity), or as specified by the local jurisdiction.

## **5.10 Additional Considerations**

### **5.10.1 Drainage**

Subsurface drains should be connected to the nearest storm drain or other suitable discharge point. Paved surfaces and grading near or adjacent to the buildings should be sloped to drain away from the buildings. Surface water from paved surfaces and open spaces should be collected and routed to a suitable discharge point. Surface water should not be directed into foundation drains, retaining wall drains, or onto site slopes.

### **5.10.2 Expansive Potential**

The near surface native soils consist of moderate plasticity silty soils. Based on the results of the testing and our experience with similar soils in the vicinity of the site, these soils are not considered to be susceptible to appreciable movements from changes in moisture content. Accordingly, no special considerations are required to mitigate expansive potential of the near surface soils at the site.

## **6.0 RECOMMENDED ADDITIONAL SERVICES**

### **6.1 Design Review**

Geotechnical design review is of paramount importance. We recommend the geotechnical design review take place prior to releasing bid packets to contractors.

### **6.2 Observation of Construction**

Satisfactory earthwork, foundation, floor slab, and pavement performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during subsurface explorations, and recognition of changed conditions often requires experience. We recommend that qualified personnel visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those observed to date and anticipated in this report. We recommend geotechnical engineer's representative attend a pre-construction meeting coordinated by the contractor and/or developer. The project geotechnical engineer's representative should provide observations and/or testing of at least the following earthwork elements during construction:

- Site Stripping
- Subgrade Preparation for Shallow Foundations, Retaining Walls, Structural Fills, Floor Slabs, and Pavements
- Compaction of Structural Fill, Retaining Wall Backfill, and Utility Trench Backfill
- Compaction of Base Rock for Floor Slabs and Pavements
- Compaction of Asphalt Concrete for Pavements

It is imperative that the owner and/or contractor request earthwork observations and testing at a frequency sufficient to allow the geotechnical engineer to provide a final letter of compliance for the earthwork activities.

## **7.0 LIMITATIONS**

We have prepared this report for use by the owner/developer and other members of the design and construction team for the proposed development. The opinions and recommendations contained within this report are forwarded to assist in the planning and design process and are not intended to be, nor should they be construed as, a warranty of subsurface conditions.

We have made observations based on our explorations that indicate the soil conditions at only those specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between or away from our explorations. If subsurface conditions vary from those encountered in our site explorations, CGT should be alerted to the change in conditions so that we may provide additional geotechnical recommendations, if necessary. Observation by experienced geotechnical personnel should be considered an integral part of the construction process.

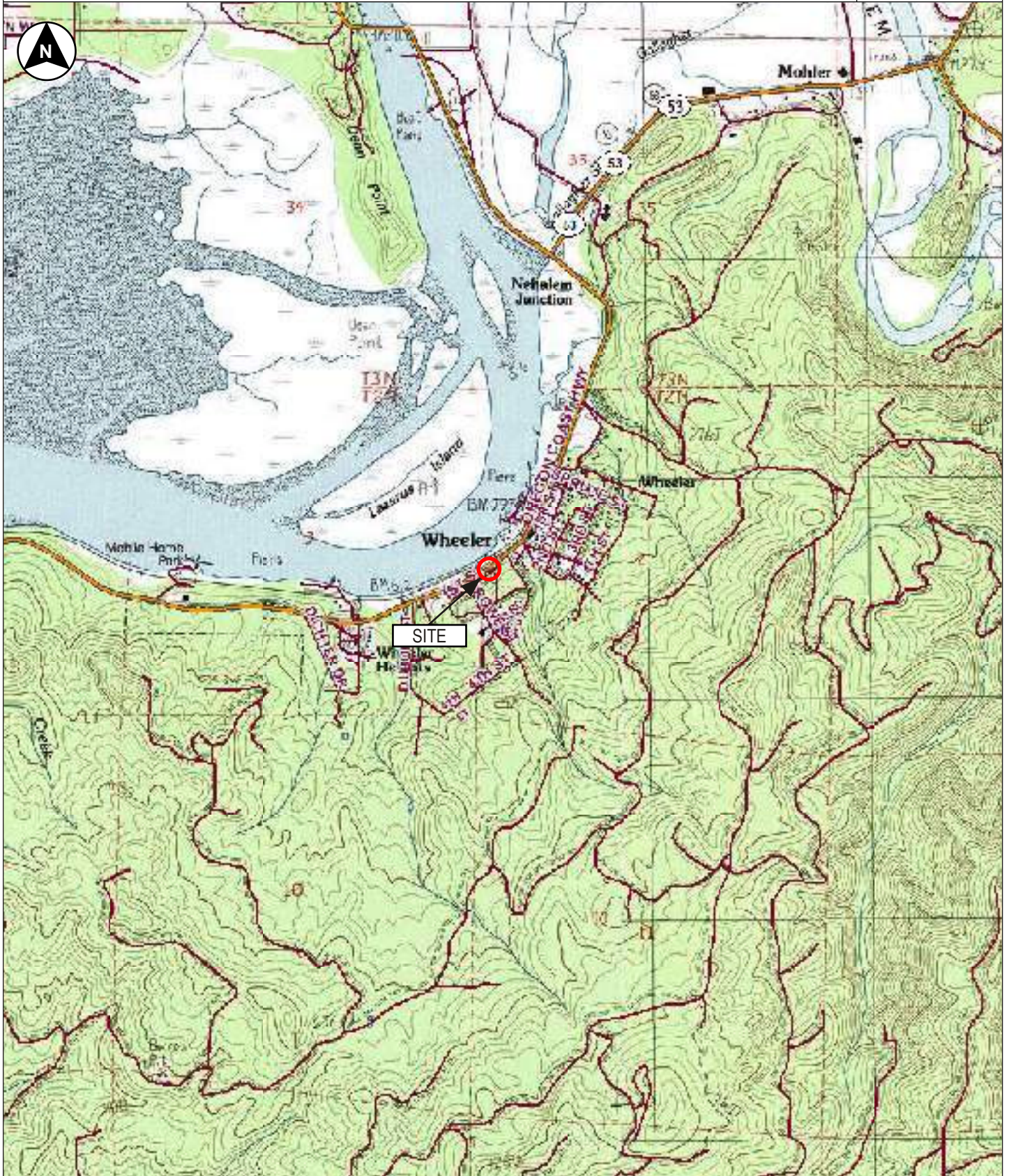
The owner/developer is responsible for ensuring that the project designers and contractors implement our recommendations. When the design has been finalized, prior to releasing bid packets to contractors, we recommend that the design drawings and specifications be reviewed by our firm to see that our recommendations have been interpreted and implemented as intended. 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. Design review and construction phase testing and observation services are beyond the scope of our current assignment, but will be provided for an additional fee.

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 our report for consideration in design.

Geotechnical engineering and the geologic sciences are characterized by a degree of uncertainty. Professional judgments presented in this report are based on our understanding of the proposed construction, familiarity with similar projects in the area, and on general experience. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared; no warranty, expressed or implied, is made. This report is subject to review and should not be relied upon after a period of three years.

NBHD CLINIC BUILDING - WHEELER, OREGON  
Project Number G2105456

FIGURE 1  
Site Location



Drafted by: MDI

Map created with TOPO!™, © 2006 National Geographic Holdings  
USGS 7.5 Minute Topographic Map Series, Nehalem, Oregon Quadrangle,  
1985.

Township 2 North, Range 10 West, Section 2 Willamette Meridian


Latitude: 45.68834676° North  
Longitude: -123.8839982° West


1 Inch = 2,000 feet

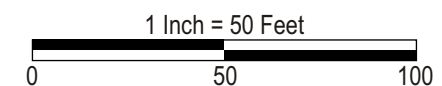




LEGEND

TP-1 (8')  Test Pit Exploration. Depth of fill indicated in ().

 Elevation benchmark - Assumed 100-foot elevation at the SW corner of the intersection of Oregon Coast Highway and Hospital Road.



NOTES: 2019 aerial photograph and property lines from Tillamook County Mapping System <http://tillamookcountymaps.co.tillamook.or.us/geomoose2/geomoose.html>. All locations are approximate.



Drafted by: AET/MBM



Photograph 1



Photograph 2



Photograph 3



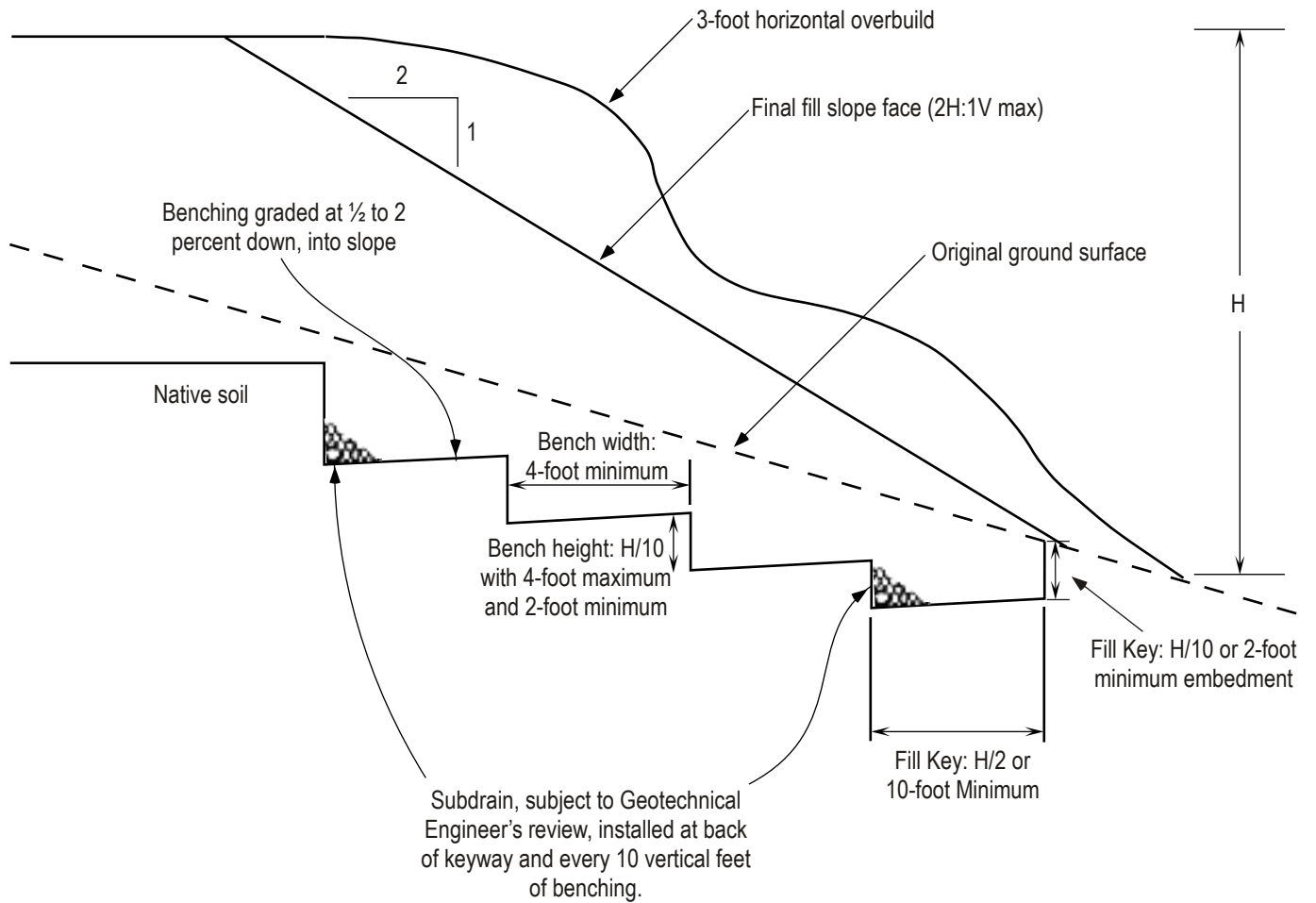
Photograph 4



Drafted by: MDI

See Figure 2 for approximate photograph locations and directions. Photographs were taken at the time of our fieldwork.

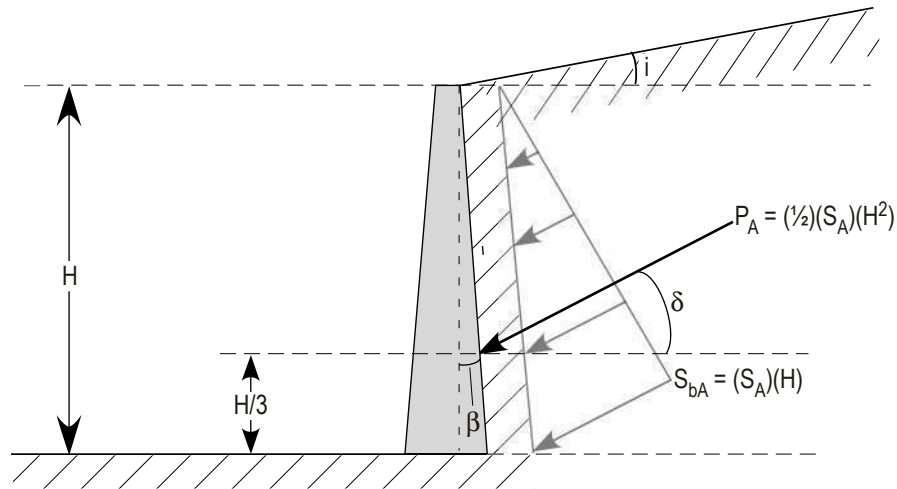




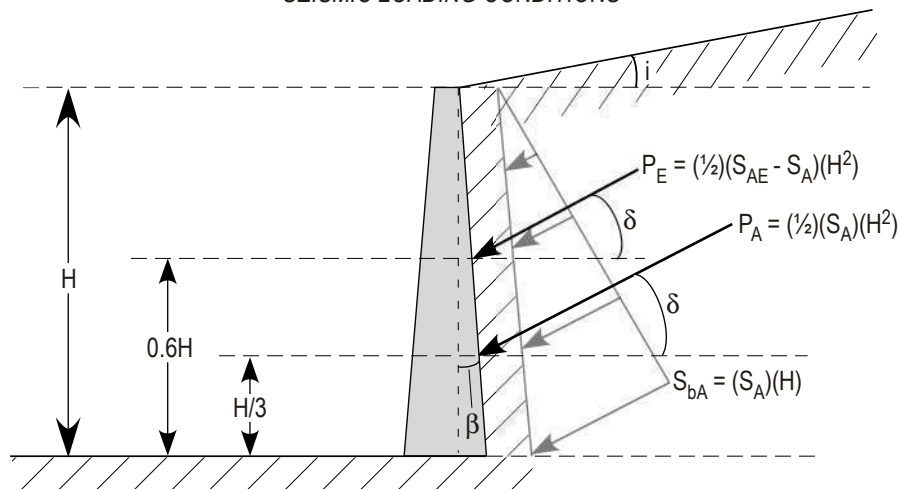
NOTE: Surfaces to receive fill with slopes steeper than 5H:1V (horizontal:vertical) should be benched and keyed as shown.

ACTIVE LATERAL PRESSURE DISTRIBUTION

STATIC LOADING CONDITIONS



SEISMIC LOADING CONDITIONS



LEGEND

$S_A$  = Active lateral equivalent fluid pressure (lb/ft<sup>3</sup>)\*

$S_{bA}$  = Active lateral earth pressure (static) at the bottom of wall (lb/ft<sup>3</sup>)

$S_{AE}$  = Active total (static + seismic) equivalent fluid pressure (lb/ft<sup>3</sup>)\*

$i$  = Slope of backfill, relative to horizontal (degrees)\*\*

$\beta$  = Slope of back of wall, relative to vertical (degrees)\*\*

$P_A$  = Static active thrust force acting at  $H/3$  from bottom of retaining wall (lb/ft)

$P_E$  = Dynamic active thrust force acting at  $0.6H$  from bottom of retaining wall (lb/ft)

$\delta$  = Angle from normal of back of wall (degrees). Based on friction developing between wall and backfill\*\*

\*Refer to report text for calculated values \*\*Refer to report text for modeled/assumed values



Notes

1. Uniform pressure distribution of seismic loading is based on empirical evaluations [Sherif et al, 1982 and Whitman, 1990].
2. Placement of seismic resultant force at  $0.6H$  is based on wall behavior and model test results [Whitman, 1990].

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## Appendix A: Subsurface Investigation and Laboratory Testing

**NBHD Clinic & Housing Project  
Hospital Road & Oregon Coast Highway  
Wheeler, Oregon**

**CGT Project Number G2105456**

March 31, 2021

*Prepared For:*

Jeff Slamal  
Nehalem Bay Health District  
278 Rowe Street  
Wheeler, Oregon 97147

*Prepared by*  
**Carlson Geotechnical**

Exploration Key.....	Figure A1
Soil Classification.....	Figure A2
Exploration Logs .....	Figures A3 – A10

## **A.1.0 SUBSURFACE INVESTIGATION**

Our field investigation consisted of eight test pits completed in mid-March 2021. The exploration locations are shown on the Site Plan, attached to the geotechnical report as Figure 2. The exploration locations shown therein were determined based on measurements from the nearby street intersection and are approximate. Surface elevations indicated on the logs were estimated based on a temporary benchmark (assumed 100-foot elevation at the southwest corner of the intersection of Oregon Coast Highway and Hospital Road) shown on the referenced Site Plan and are approximate. The attached figures detail the exploration methods (Figure A1), soil classification criteria (Figure A2), and present detailed logs of the explorations (Figures A3 through A10), as discussed below.

### **A.1.1 Test Pits**

CGT observed the excavation of eight test pits (TP-1 through TP-8) at the site between March 17 and March 26, 2021, to depths of about 5 to 10 feet bgs. The test pits were excavated using a Takeuchi TB 235-2 mini-excavator provided and operated provided by CGT. The test pits were loosely backfilled with the excavated materials upon completion.

### **A.1.2 In-Situ Testing**

#### **A.1.2.1 Pocket Penetrometer Tests**

Pocket penetrometer readings were generally taken at approximate ½-foot intervals in the upper four of test pits TP-1 through TP-7. The pocket penetrometer is a hand-held instrument that provides an approximation of the unconfined compressive strength of cohesive, fine-grained soils. The correlation between pocket penetrometer readings and the consistency of cohesive, fine-grained soils is provided on the attached Figure A2.

### **A.1.3 Material Classification & Sampling**

Representative disturbed (grab) samples of the soils encountered were obtained at select intervals within the test pits. Qualified members of CGT's geotechnical staff collected the samples and logged the soils in general accordance with the Visual-Manual Procedure (ASTM D2488). An explanation of this classification system is attached as Figure A2. The grab samples were stored in sealable plastic bags and transported to our soils laboratory for further examination and testing. Our geotechnical staff visually examined all samples in order to refine the initial field classifications.

### **A.1.4 Subsurface Conditions**

Subsurface conditions are summarized in Section 2.3 of the geotechnical report. Detailed logs of the explorations are presented on the attached exploration logs, Figures A3 through A10.

## **A.2.0 LABORATORY TESTING**

Laboratory testing was performed on samples collected in the field to refine our initial field classifications and determine in-situ parameters. Laboratory testing included the following:

- Ten moisture content determinations (ASTM D2216).
- One percentage passing the U.S. Standard No. 200 Sieve test (ASTM D1140).
- Two Atterberg limits (plasticity) tests (ASTM D4318).

Results of the laboratory tests are shown on the exploration logs.



Atterberg limits (plasticity) test results (ASTM D4318): PL = Plastic Limit, LL = Liquid Limit, and MC= Moisture Content (ASTM D2216)

□ FINES CONTENT (%) Percentage passing the U.S. Standard No. 200 Sieve (ASTM D1140)

**SAMPLING**

 GRAB

Grab sample

 BULK

Bulk sample

 SPT

**Standard Penetration Test (SPT)** consists of driving a 2-inch, outside-diameter, split-spoon sampler into the undisturbed formation with repeated blows of a 140-pound, hammer falling a vertical distance of 30 inches (ASTM D1586). The number of blows (N-value) required to drive the sampler the last 12 inches of an 18-inch sample interval is used to characterize the soil consistency or relative density. The drill rig was equipped with a cat-head or automatic hammer to conduct the SPTs. The observed N-values, hammer efficiency, and  $N_{60}$  are noted on the boring logs.

 MC

**Modified California** sampling consists of 3-inch, outside-diameter, split-spoon sampler (ASTM G3550) driven similarly to the SPT sampling method described above. A sampler diameter correction factor of 0.44 is applied to calculate the equivalent SPT  $N_{60}$  value per Lacroix and Horn, 1973.

 CORE

**Rock Coring** interval

 SH

**Shelby Tube** is a 3-inch, inner-diameter, thin-walled, steel tube push sampler (ASTM D1587) used to collect relatively undisturbed samples of fine-grained soils.

WDCP

**Wildcat Dynamic Cone Penetrometer (WDCP)** test consists of driving 1.1-inch diameter, steel rods with a 1.4-inch diameter, cone tip into the ground using a 35-pound drop hammer with a 15-inch free-fall height. The number of blows required to drive the steel rods is recorded for each 10 centimeters (3.94 inches) of penetration. The blow count for each interval is then converted to the corresponding SPT  $N_{60}$  values.

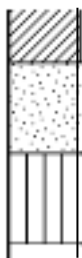
DCP

**Dynamic Cone Penetrometer (DCP)** test consists of driving a 20-millimeter diameter, hardened steel cone on 16-millimeter diameter steel rods into the ground using a 10-kilogram drop hammer with a 460-millimeter free-fall height. The depth of penetration in millimeters is recorded for each drop of the hammer.

POCKET PEN. (tsf)

**Pocket Penetrometer** test is a hand-held instrument that provides an approximation of the unconfined compressive strength in tons per square foot (tsf) of cohesive, fine-grained soils.

**CONTACTS**



Observed (measured) contact between soil or rock units.

Inferred (approximate) contact between soil or rock units.

Transitional (gradational) contact between soil or rock units.

**ADDITIONAL NOTATIONS**

*Italics*

Notes drilling action or digging effort

{ Braces }

Interpretation of material origin/geologic formation (e.g. { Base Rock } or { Columbia River Basalt })



*All measurements are approximate.*

**NBHD CLINIC BUILDING - WHEELER, OREGON**  
**Project Number G2105456**

**FIGURE A2**  
**Soil Classification**

Classification of Terms and Content		Grain Size		U.S. Standard Sieve
NAME: Group Name and Symbol Relative Density or Consistency Color Moisture Content Plasticity Other Constituents Other: Grain Shape, Approximate Gradation Organics, Cement, Structure, Odor, etc. Geologic Name or Formation	Fines			<#200 (0.075 mm)
	Sand	Fine		#200 - #40 (0.425 mm)
		Medium		#40 - #10 (2 mm)
		Coarse		#10 - #4 (4.75 mm)
	Gravel	Fine		#4 - 0.75 inch
		Coarse		0.75 inch - 3 inches
Cobbles			3 to 12 inches	
Boulders			> 12 inches	

**Coarse-Grained (Granular) Soils**

Relative Density		Minor Constituents		
SPT N <sub>60</sub> -Value	Density	Percent by Volume	Descriptor	Example
0 - 4	Very Loose	0 - 5%	"Trace" as part of soil description	"trace silt"
4 - 10	Loose	5 - 15%	"With" as part of group name	<b>"POORLY GRADED SAND WITH SILT"</b>
10 - 30	Medium Dense			
30 - 50	Dense	15 - 49%	Modifier to group name	<b>"SILTY SAND"</b>
>50	Very Dense			

**Fine-Grained (Cohesive) Soils**

SPT N <sub>60</sub> -Value	Torvane tsf Shear Strength	Pocket Pen tsf Unconfined	Consistency	Manual Penetration Test	Minor Constituents		
					Percent by Volume	Descriptor	Example
<2	<0.13	<0.25	Very Soft	Thumb penetrates more than 1 inch	0 - 5% 5 - 15% 15 - 30% 30 - 49%	"Trace" as part of soil description "Some" as part of soil description "With" as part of group name Modifier to group name	"trace fine-grained sand" "some fine-grained sand" <b>"SILT WITH SAND"</b> <b>"SANDY SILT"</b>
2 - 4	0.13 - 0.25	0.25 - 0.50	Soft	Thumb penetrates about 1 inch			
4 - 8	0.25 - 0.50	0.50 - 1.00	Medium Stiff	Thumb penetrates about ¼ inch			
8 - 15	0.50 - 1.00	1.00 - 2.00	Stiff	Thumb penetrates less than ¼ inch			
15 - 30	1.00 - 2.00	2.00 - 4.00	Very Stiff	Readily indented by thumbnail			
>30	>2.00	>4.00	Hard	Difficult to indent by thumbnail			

**Moisture Content**

Dry: Absence of moisture, dusty, dry to the touch  
 Moist: Leaves moisture on hand  
 Wet: Visible free water, likely from below water table

	Plasticity	Dry Strength	Dilatancy	Toughness
<b>ML</b>	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
<b>CL</b>	Low to Medium	Medium to High	None to Slow	Medium
<b>MH</b>	Medium to High	Low to Medium	None to Slow	Low to Medium
<b>CH</b>	Medium to High	High to Very High	None	High

**Structure**

Stratified: Alternating layers of material or color >6 mm thick  
 Laminated: Alternating layers < 6 mm thick  
 Fissured: Breaks along definite fracture planes  
 Slickensided: Striated, polished, or glossy fracture planes  
 Blocky: Cohesive soil that can be broken down into small angular lumps which resist further breakdown  
 Lenses: Has small pockets of different soils, note thickness  
 Homogeneous: Same color and appearance throughout

**Visual-Manual Classification**

Major Divisions		Group Symbols	Typical Names	
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: 50% or more retained on the No. 4 sieve	Clean Gravels	GW Well-graded gravels and gravel/sand mixtures, little or no fines GP Poorly-graded gravels and gravel/sand mixtures, little or no fines	
		Gravels with Fines	GM Silty gravels, gravel/sand/silt mixtures GC Clayey gravels, gravel/sand/clay mixtures	
			Sands: More than 50% passing the No. 4 sieve	Clean Sands
		Sands with Fines		SM Silty sands, sand/silt mixtures SC Clayey sands, sand/clay mixtures
	Fine-Grained Soils: 50% or more Passes No. 200 Sieve			Silt and Clays Low Plasticity Fines
		Silt and Clays High Plasticity Fines	MH Inorganic silts, clayey silts CH Inorganic clays of high plasticity, fat clays OH Organic soil of medium to high plasticity	
			Highly Organic Soils	



References:

ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)  
 ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)  
 Terzaghi, K., and Peck, R.B., 1948, Soil Mechanics in Engineering Practice, John Wiley & Sons.



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# FIGURE A3

## Test Pit TP-1

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456 **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21 **GROUND ELEVATION** 111 ft **ELEVATION DATUM** See Figure 2  
**WEATHER** Cloudy, ~39F **SURFACE** Grass **LOGGED BY** BLN/MBM **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2 **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲				
											PL	LL			
					0							MC			
												0 20 40 60 80 100			
110		MH FILL	<b>ELASTIC SILT FILL:</b> Brown to dark brown, moist, low to medium plasticity, trace charred debris up to ¼-inch diameter, some gravels and cobbles, angular and up to 5 inches in diameter, trace weathered rock fragments,						3.50						
										2.50					
											1.75				
							2		GRAB 1	100		2.00			45 52 72
108												1.50			
												1.75			
				4					1.75						
106									1.75						
									1.75						
104				6		GRAB 2	100					54			
102		MH	<b>ELASTIC SILT:</b> <i>Medium stiff to better</i> , orange with gray and brown mottling and trace black flecking, moist, medium to high plasticity, some fine-grained sand (residual soils).		8										
100															

- Test pit terminated at about 9¼ feet bgs.
- No groundwater or caving encountered.
- Test pit loosely backfilled with spoils upon completion.

CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI



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# FIGURE A4

## Test Pit TP-2

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456 **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21 **GROUND ELEVATION** 111.5 ft **ELEVATION DATUM** See Figure 2  
**WEATHER** Cloudy, ~42F **SURFACE** Grass **LOGGED BY** BLN/MBM **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2 **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲	
										PL	LL
				0							MC
											0 20 40 60 80 100
110		OL FILL	<b>ORGANIC SOIL FILL:</b> Brown to dark brown, moist, abundant rootlets and roots up to ¼-inch in diameter, some rounded gravel up to 1½ inches in diameter. Clay pipe encountered at 5 inches bgs.					1.25			
			<b>ELASTIC SILT FILL:</b> Brown to gray to dark brown, scattered charred wood debris and angular gravels up to 1½ inches in diameter, trace roots up to ¼-inch in diameter, trace pieces of weathered basalt.	2				3.75			
108		MH FILL						2.00			
				4				1.75			
106		MH	<b>ELASTIC SILT:</b> <i>Medium stiff to better</i> , orange with gray and brown mottling, moist, medium to high plasticity, some fine-grained sand (residual soils).					0.75			
				6				1.25			
104					GRAB 1	100		1.50			45
				8				1.50			
			Light brown with orange mottling, increased sand content below about 8 feet bgs.		GRAB 2	100					41
102			<ul style="list-style-type: none"> <li>• Test pit terminated at about 9 feet bgs.</li> <li>• No groundwater or caving encountered.</li> <li>• Test pit loosely backfilled with spoils upon completion.</li> </ul>								
100											

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# FIGURE A5

## Test Pit TP-3

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal      **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456      **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21      **GROUND ELEVATION** 111 ft      **ELEVATION DATUM** See Figure 2  
**WEATHER** Sunny, ~46F      **SURFACE** Grass      **LOGGED BY** BLN/MBM      **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT      **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2      **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket      **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲	
										PL	LL
110		OL FILL	<b>ORGANIC SOIL FILL:</b> Brown to dark brown, moist, abundant rootlets and roots up to ¼-inch in diameter, some rounded gravel up to 1½ inches in diameter. Clay pipe encountered at 5 inches bgs.	0				1.00			
108		MH FILL	<b>ELASTIC SILT FILL:</b> Orange to light brown with gray mottling, moist, medium to high plasticity, some roots up to ½-inch in diameter, trace fine-grained sand, concrete and metal debris at about 1 foot bgs.	2				0.25			
106		MH FILL	Concrete slab encountered at about 5½ feet bgs. Test pit moved 5 feet east.	4				0.75			
104		MH	<b>ELASTIC SILT:</b> <i>Medium stiff to better</i> , light brown, tan, orange, and gray, moist, medium plasticity, some fine-grained sand, contained abundant clay stone fragments.	6				2.50			
				8	GRAB 1	100		1.00			
102			<ul style="list-style-type: none"> <li>• Test pit terminated at about 8½ feet bgs.</li> <li>• No groundwater or caving encountered.</li> <li>• Test pit loosely backfilled with spoils upon completion.</li> </ul>								48
100											

CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI

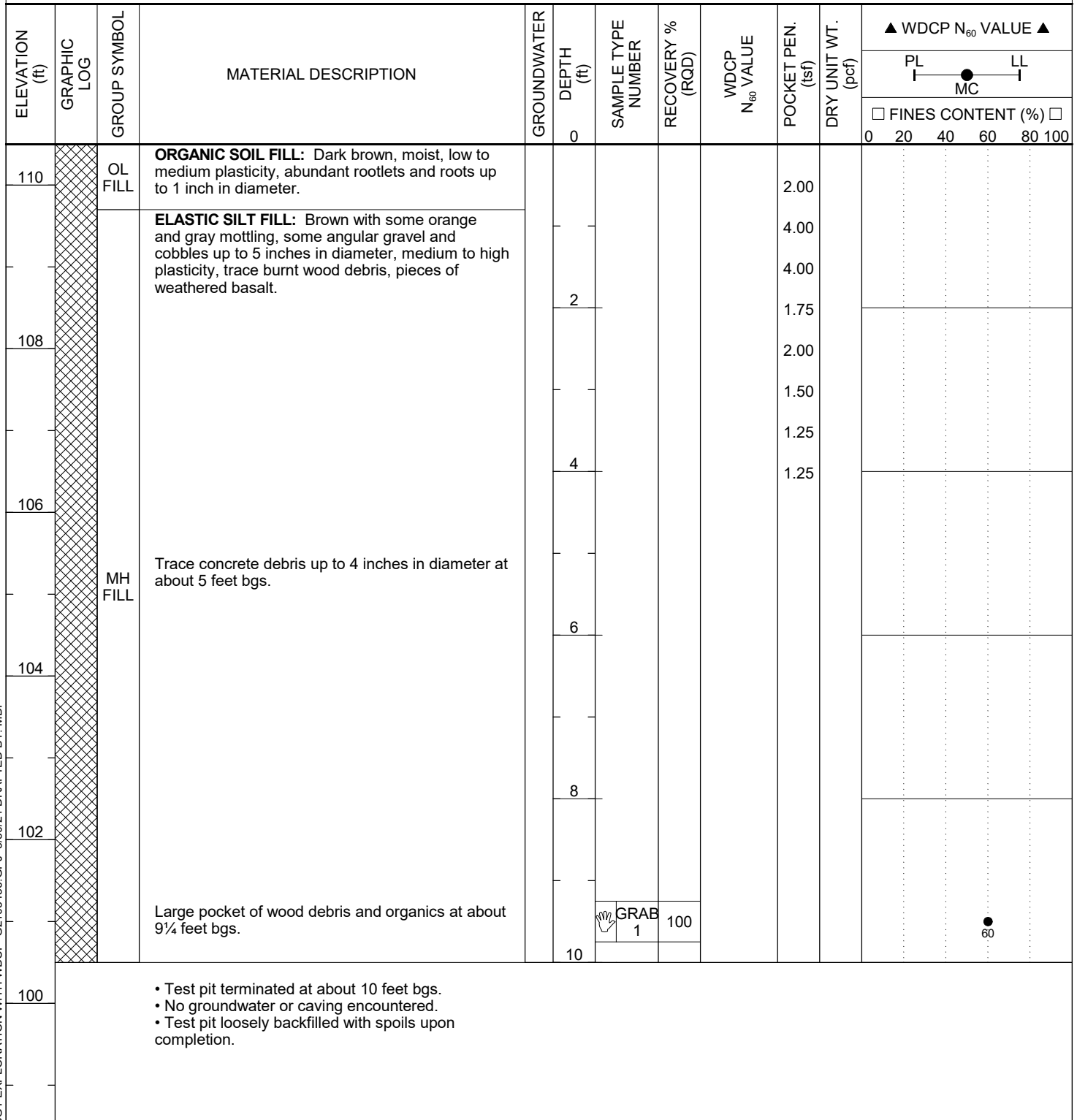


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# FIGURE A6

## Test Pit TP-4

<b>CLIENT</b> <u>Nehalem Bay Health District (NBHD) - Jeff Slamal</u>	<b>PROJECT NAME</b> <u>NBHD Clinic Building</u>
<b>PROJECT NUMBER</b> <u>G2105456</u>	<b>PROJECT LOCATION</b> <u>Hospital Road &amp; Oregon Coast HWY - Wheeler, OR</u>
<b>DATE STARTED</b> <u>3/17/21</u> <b>GROUND ELEVATION</b> <u>110.5 ft</u>	<b>ELEVATION DATUM</b> <u>See Figure 2</u>
<b>WEATHER</b> <u>Sunny, ~48F</u> <b>SURFACE</b> <u>Grass</u>	<b>LOGGED BY</b> <u>BLN/MBM</u> <b>REVIEWED BY</b> <u>BMW</u>
<b>EXCAVATION CONTRACTOR</b> <u>CGT</u>	<b>SEEPAGE</b> <u>---</u>
<b>EQUIPMENT</b> <u>Takeuchi TB235-2</u>	<b>GROUNDWATER DURING DRILLING</b> <u>---</u>
<b>EXCAVATION METHOD</b> <u>2-foot toothed bucket</u>	<b>GROUNDWATER AFTER EXCAVATION</b> <u>---</u>



CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI

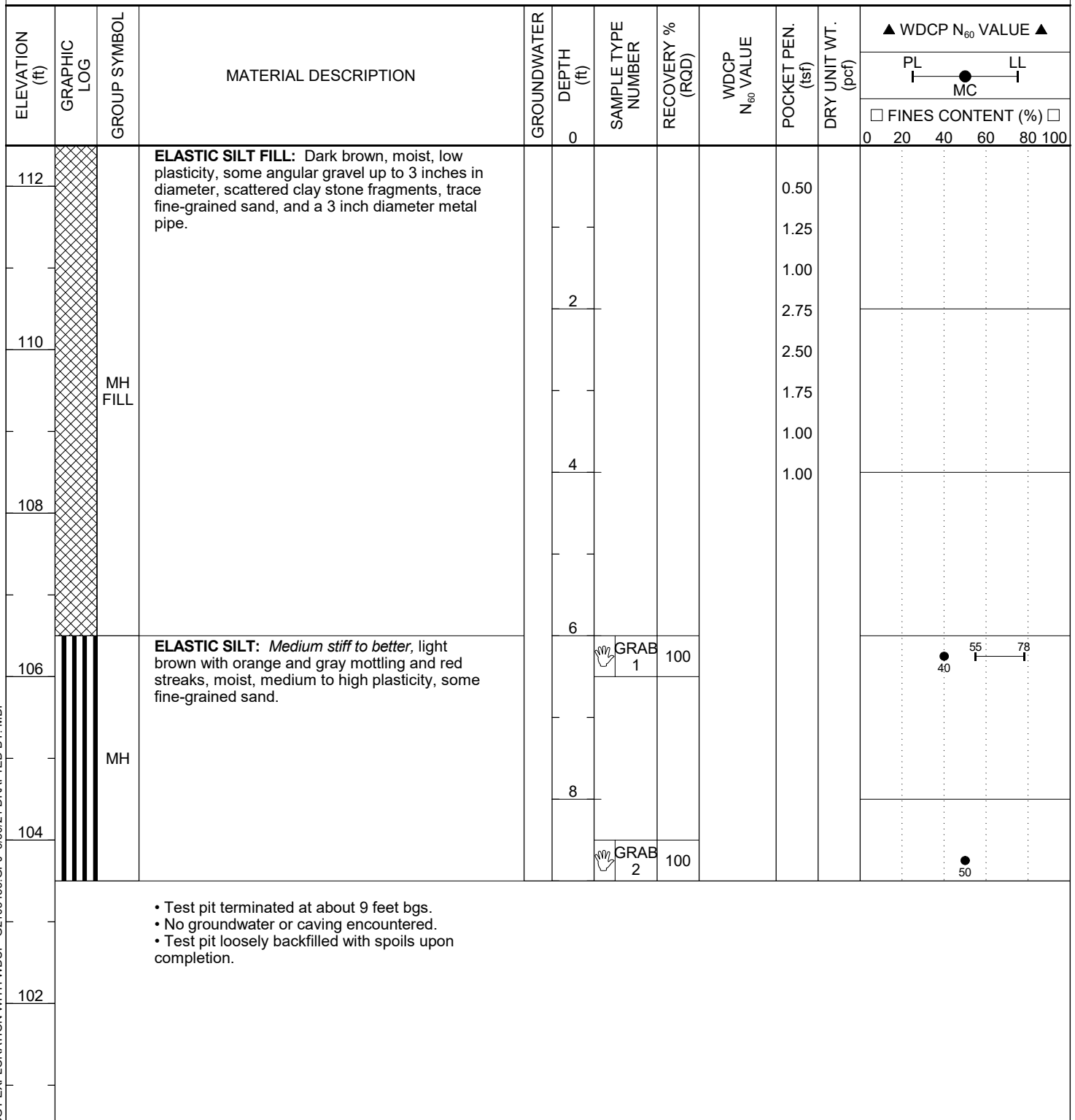


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# FIGURE A7

## Test Pit TP-5

<b>CLIENT</b> <u>Nehalem Bay Health District (NBHD) - Jeff Slamal</u>	<b>PROJECT NAME</b> <u>NBHD Clinic Building</u>
<b>PROJECT NUMBER</b> <u>G2105456</u>	<b>PROJECT LOCATION</b> <u>Hospital Road &amp; Oregon Coast HWY - Wheeler, OR</u>
<b>DATE STARTED</b> <u>3/17/21</u> <b>GROUND ELEVATION</b> <u>112.5 ft</u>	<b>ELEVATION DATUM</b> <u>See Figure 2</u>
<b>WEATHER</b> <u>Sunny, ~49F</u> <b>SURFACE</b> <u>Grass</u>	<b>LOGGED BY</b> <u>BLN/MBM</u> <b>REVIEWED BY</b> <u>BMW</u>
<b>EXCAVATION CONTRACTOR</b> <u>CGT</u>	<b>SEEPAGE</b> <u>---</u>
<b>EQUIPMENT</b> <u>Takeuchi TB235-2</u>	<b>GROUNDWATER DURING DRILLING</b> <u>---</u>
<b>EXCAVATION METHOD</b> <u>2-foot toothed bucket</u>	<b>GROUNDWATER AFTER EXCAVATION</b> <u>---</u>



CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI



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# FIGURE A8

## Test Pit TP-6

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal      **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456      **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21      **GROUND ELEVATION** 130 ft      **ELEVATION DATUM** See Figure 2  
**WEATHER** Partly Sunny, ~50F      **SURFACE** Grass      **LOGGED BY** BLN/MBM      **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT      **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2      **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket      **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲	
										PL	LL
				0							MC
											0 20 40 60 80 100
128	[Cross-hatched pattern]	OL FILL	<b>ORGANIC SOIL FILL:</b> Dark brown, moist, low to medium plasticity, abundant rottlets and roots up to ¼-inch in diameter.					1.50			
		MH FILL		<b>ELASTIC SILT FILL:</b> Dark brown, moist, low to medium plasticity, trace fine-grained sand, wood debris and glass jar.	2				2.25		
126				Minor caving observed at about 3 feet bgs.					1.75		
	[Vertical lines pattern]	MH	<b>ELASTIC SILT:</b> <i>Medium stiff to better</i> , brown to orange to light brown, moist, medium to high plasticity, some fine-grained sand.	4				1.00			
124							6	GRAB 1	100		
122								1.00			
				8	GRAB 2	100					50 ●

- Test pit terminated at about 8½ feet bgs.
- No groundwater encountered.
- Minor caving encountered at about 3 feet bgs.
- Test pit loosely backfilled with spoils upon completion.

CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI

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# FIGURE A9

## Test Pit TP-7

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456 **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21 **GROUND ELEVATION** 111 ft **ELEVATION DATUM** See Figure 2  
**WEATHER** Partly Sunny, ~52F **SURFACE** Grass **LOGGED BY** BLN/MBM **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2 **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲	
										PL	LL
				0							MC
											0 20 40 60 80 100
110		OL FILL	<b>ORGANIC SOIL FILL:</b> Brown to dark brown, moist, low to medium plasticity, abundant rootlets and roots up to ¼-inch in diameter. <b>ELASTIC SILT FILL:</b> Brown with some orange, gray, and brown mottling, trace burnt wood and glass debris, trace pieces of concrete up to 4 inches ind diameter, trace decomposed pieces of basalt.					0.25			
108		MH FILL		2				2.00			
106		MH FILL	Concrete debris up to 18 inches in diameter at about 5 feet bgs.	4				2.00			
104		MH FILL		6				1.00			
102			<ul style="list-style-type: none"> <li>• Test pit terminated at about 7 feet bgs due to practical refusal on concrete slab.</li> <li>• No groundwater encountered.</li> <li>• Significant caving encountered below 5 feet bgs.</li> <li>• Test pit loosely backfilled with spoils upon completion.</li> </ul>								
100											

CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI



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# FIGURE A10

## Test Pit TP-8

**CLIENT** Nehalem Bay Health District (NBHD) - Jeff Slamal      **PROJECT NAME** NBHD Clinic Building  
**PROJECT NUMBER** G2105456      **PROJECT LOCATION** Hospital Road & Oregon Coast HWY - Wheeler, OR  
**DATE STARTED** 3/17/21      **GROUND ELEVATION** 110 ft      **ELEVATION DATUM** See Figure 2  
**WEATHER** Partly Sunny, ~52F      **SURFACE** Grass      **LOGGED BY** BLN/MBM      **REVIEWED BY** BMW  
**EXCAVATION CONTRACTOR** CGT      **SEEPAGE** ---  
**EQUIPMENT** Takeuchi TB235-2      **GROUNDWATER DURING DRILLING** ---  
**EXCAVATION METHOD** 2-foot toothed bucket      **GROUNDWATER AFTER EXCAVATION** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WDCP N <sub>60</sub> VALUE ▲		
										PL	LL	
				0							MC	
										□ FINES CONTENT (%) □		
										0	20 40 60 80 100	
108		OL FILL	<b>ORGANIC SOIL FILL:</b> Brown, moist, low plasticity, abundant rootlets.									
		GP FILL	<b>POORLY GRADED GRAVEL WITH COBBLES FILL:</b> Gray to brown, angular, up to 4 inches in diameter.									
				<b>ELASTIC SILT FILL:</b> Brown to dark brown, with orange and gray mottling, moist, medium to high plasticity, and contained scattered weathered basalt pieces.	2							
106					4							
104			MH FILL		6							
102				8								
100				10								

- Test pit terminated at about 10 feet bgs due to practical limit (reach) of excavator.
- No groundwater or caving encountered.
- Test pit loosely backfilled with spoils upon completion.

CGT EXPLORATION WITH WDCP G2105456.GPJ 3/30/21 DRAFTED BY: MDI

# Carlson Geotechnical

A division of Carlson Testing, Inc.  
Phone: (503) 601-8250  
[www.carlsontesting.com](http://www.carlsontesting.com)

Bend Office (541) 330-9155  
Eugene Office (541) 345-0289  
Salem Office (503) 589-1252  
Tigard Office (503) 684-3460

November 7, 2023

Nehalem Bay Health District (NBHD)  
278 Rowe Street  
Wheeler, Oregon 97147  
*c/o: Chris Mastrandrea of Kosh Group, Inc.*

**Addendum 1 to  
Report of Geotechnical Investigation  
NBHD Clinic Building  
Hospital Road & Nehalem Parkway  
Wheeler County, Oregon**

CGT Project Number G2105456A

## 1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this Addendum No. 1 to our "Report of Geotechnical Investigation" dated March 31, 2021 (CGT Project Number G2105456) for the proposed NBHD Clinic Building project. The site is located at the southwest quadrant of the intersection of Hospital Road and Oregon Coast Highway in Wheeler, Oregon. This addendum was prepared following our recent correspondence with the design team and is being provided as a continuation of services for NBHD on this project.

This addendum was prepared to provide supplemental geotechnical engineering recommendations for use in design of site retaining walls, as well as provide comment that the geotechnical recommendations presented in the referenced 2021 geotechnical report remain valid for the updated project. Accordingly, this addendum should be attached to, and considered part of, the referenced geotechnical report.

CGT was recently authorized by NBHD to perform a supplemental geotechnical investigation of the project site. The results of the supplemental investigation will be presented in a separate written report.

## 2.0 PROJECT UNDERSTANDING

CGT developed an understanding of the updated plans based on our correspondence with the project architect, Scott Edwards Architecture, and review of provided preliminary architectural plan sheets. Based on our review, we understand the updated project will include:

- Construction of a new, two-story, health center and pharmaceutical building within the west portion of the site. The building will incorporate a slab-on-grade ground floor and finished floor elevation (FFE) will be established at 49.00 feet. No below-grade levels (basements) are planned. Depending on final grading, the southeast (upslope) wall of the building may resemble a concrete cantilevered retaining wall. We understand the building will be classified as Risk Category II per the current (2022) Oregon Structural Specialty Code (OSSC).
- Construction of a new asphalt-concrete (AC) paved parking lot to the east of the building. Permanent grade changes within the parking lot area will be relatively minimal, with maximum cuts and fills on the order of about 2 feet in depth.

- Depending on final grading plans, two concrete cantilevered retaining walls will be constructed to the southeast of the planned building, and one retaining wall will be constructed northwest of the building. The retaining walls will be up to about 5 feet in height and in some cases, may incorporate ascending backfills. Design of the retaining walls will rest with others.
- Installation of new underground utilities to serve the new building and parking lot.
- Although no stormwater management plans have been provided, we understand stormwater runoff collected from new impervious areas of the site will be diverted to the nearest public storm drain or other suitable discharge point(s).

### **3.0 SITE SURFACE CONDITIONS**

As part of this assignment, CGT revisited the site on October 24, 2023, in order to ascertain present-day surface conditions and confirm site surface conditions were consistent with those described in the above referenced geotechnical report. The site is bordered by residential properties to the west, Oregon Coast Highway 101 to the north/northwest, and Hospital Road to the east and south. At the time of our visit, the majority of the site gently descended to the west/northwest. The southwest and northeast margins of the site generally descended to the north at gradients up to about 3 horizontal to 1 vertical (3H:1V). The site was covered with short grasses. Photographs taken during our recent site visit are shown on the attached Figure 1. Site surface conditions had not appreciably changed since the time of our 2021 field investigation.

### **4.0 GEOTECHNICAL REVIEW & DISCUSSION**

Based on our discussion with the design team and review of the provided site plan, the updated project is generally consistent with that understood by CGT in 2021 and site surface conditions have not changed appreciably since that time. Accordingly, the conclusions and recommendations presented in the referenced 2021 geotechnical report remain valid for the project. As requested, updated recommendations for seismic design and supplemental recommendations for use in design of planned site retaining walls are presented in Sections 5.0 and 6.0 of this report, respectively.

As described above, CGT has been retained by NBHD to perform a supplemental geotechnical investigation of the project site. The purpose of this supplemental investigation is to fully characterize the extent of undocumented fill materials at the site and finalize geotechnical recommendations for use in design and construction of the planned building (notably its foundations and ground floor slab-on-grade). The results of the supplemental investigation will be presented in a separate written report.

### **5.0 UPDATED GEOTECHNICAL RECOMMENDATIONS**

We understand the project will be designed per the current (2022) Oregon Structural Specialty Code (OSSC). The above referenced 2021 geotechnical report was based on a previous (2019) version of the OSSC. The recommendations that follow are presented for design of new structures designed under the 2022 OSSC.

#### **5.1 Seismic Site Class**

Section 1613.2.2 of the 2022 OSSC requires that the determination of the seismic site class be in accordance with Chapter 20 of the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures (ASCE 7-16). We have assigned the site as Site Class D ("Stiff Soil") based on



geologic mapping and subsurface conditions encountered during our initial investigation. This is the same Site Class as recommended in the previous report.

## 5.2 Seismic Ground Motion Values

Earthquake ground motion parameters for the site were obtained in accordance with the 2022 OSSC using the Seismic Hazards by Location calculator on the ATC website<sup>1</sup>. The site Latitude 45.68834676° North and Longitude 123.8839982° West were input as the site location. The following table shows the recommended seismic design parameters for the site<sup>2</sup>.

	Parameter	Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second ( $S_s$ )	1.241g
	Spectral Acceleration, 1.0 second ( $S_1$ )	0.653g
Coefficients (Site Class D)	Site Coefficient, 0.2 second ( $F_A$ )	1.004
	Site Coefficient, 1.0 second ( $F_v$ ) <sup>1</sup>	1.700
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 second ( $S_{MS}$ )	1.246g
	MCE Spectral Acceleration, 1.0 second ( $S_{M1}$ )	1.110g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 second ( $S_{DS}$ )	0.830g
	Design Spectral Acceleration, 1.0 second ( $S_{D1}$ )	0.740g
	Seismic Design Category (Risk Category II)	D
	Value determined from 2022 OSSC Table 1613.2.3(2).	

## 5.3 SUPPLEMENTAL GEOTECHNICAL RECOMMENDATIONS

### 5.4 Site Retaining Walls

Geotechnical recommendations for use in design and construction of rigid retaining walls were presented in Section 5.7 of the above referenced 2021 geotechnical report and remain valid for the project. The recommendations presented herein are provided to convey lateral earth pressures for design case(s) where ascending backfill conditions are present behind select retaining wall(s).

#### 5.4.1 Design Parameters & Limitations

For rigid retaining walls founded, drained, and backfilled in accordance with Sections 5.7.1 through 5.7.3 of the referenced geotechnical report, the following table presents parameters recommended for design.

<sup>1</sup> Applied Technology Council (ATC), 2023. USGS seismic design parameters determined using "Seismic Hazards by Location," accessed October 2023, from the ATC website <https://hazards.atcouncil.org/>.

<sup>2</sup> These parameters are consistent with those recommended in the referenced 2021 geotechnical report, as the 2022 OSSC is based on the same version of ASCE 7 (ASCE 7-16) as the previous (2019) version of the OSSC was based.

**Table 2 Design Parameters for Rigid Retaining Walls**

Retaining Wall Condition	Modeled Backfill Condition	Static Equivalent Fluid Pressure ( $S_A$ ) <sup>1</sup>	Seismic Equivalent Fluid Pressure ( $S_{AE}$ ) <sup>1,2</sup>	Surcharge from Uniform Load, $q$ , Acting on Backfill Behind Retaining Wall
Not Restrained from Rotation	Level ( $i = 0$ )	28 pcf	42 pcf	$0.28^*q$
	Ascending ( $i = 5H:1V$ max)	32 pcf	50 pcf	---
	Ascending ( $i = 3H:1V$ max)	35 pcf	58 pcf	---
Restrained from Rotation	Level ( $i = 0$ )	50 pcf	62 pcf	$0.38^*q$
	Ascending ( $i = 5H:1V$ max)	60 pcf	82 pcf	---
	Ascending ( $i = 3H:1V$ max)	66 pcf	121 pcf	---

<sup>1</sup> Refer to the attached Figure 5 of the main report for a graphical representation of static and seismic loading conditions. Seismic resultant force acts at 0.6H above the base of the wall.

<sup>2</sup> Seismic (dynamic) lateral loads were computed using the Mononobe-Okabe Equation as presented in the 1997 Federal Highway Administration (FHWA) design manual. Static and seismic equivalent fluid pressures are not additive.

The above design recommendations are based on the assumptions that:

- The wall(s) consist of concrete cantilevered retaining walls ( $\beta = 0$  and  $\delta = 24$  degrees, see Figure 5 of the referenced report).
- The walls are 12 feet or less in height.
- The backfill is drained and consists of imported granular structural fill ( $\phi = 38$  degrees).
- The grade in front of the walls is level or ascending for a distance of at least 5 feet from the wall.

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

## 6.0 CLOSURE

This addendum should be attached to, and considered part of, the referenced March 31, 2021, geotechnical report. As such, the limitations detailed in the referenced report apply to this addendum letter.

We appreciate the opportunity to work with you on this project. Please contact us at (503) 601-8250 if you have any questions regarding this report.

NBHD Clinic Building  
Wheeler County, Oregon  
CGT Project Number G2105456A  
November 7, 2023

Respectfully Submitted,  
**CARLSON GEOTECHNICAL**



M. David Irish, CESCL  
Geotechnical Project Manager  
[dirish@carlsontesting.com](mailto:dirish@carlsontesting.com)



EXPIRES: 6/30/2024

Brad M. Wilcox, P.E., G.E.  
Principal Geotechnical Engineer  
[bwilcox@carlsontesting.com](mailto:bwilcox@carlsontesting.com)

Attachment: Site Photographs, Figure 1

Doc ID: \\geosrv\public\GEOTECH\PROJECTS\2021 Projects\G2105456 - NBHD Clinic Building\G2105456A - Engineering Support\008  
- Deliverables\Addendum No. 1\G2105456A Addendum.docx



East side of site looking west



West corner of site looking east



North corner of site looking southwest



Southwest side of site looking northeast



South corner of site looking north



Buried concrete foundation in middle of site



Drafted by: mdi

Photographs were taken on October 24, 2023.



Nehalem Bay Wastewater Agency  

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SEWER AVAILABILITY

Date: September 5, 2023  
To: Tillamook County Building Department (Fax#503-842-1819)  

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From: Nehalem Bay Wastewater Agency  
RE: Sewer Availability

As an Agent of Nehalem Bay Wastewater Agency, I confirm that sewer is available to the following lot within our service area boundary:

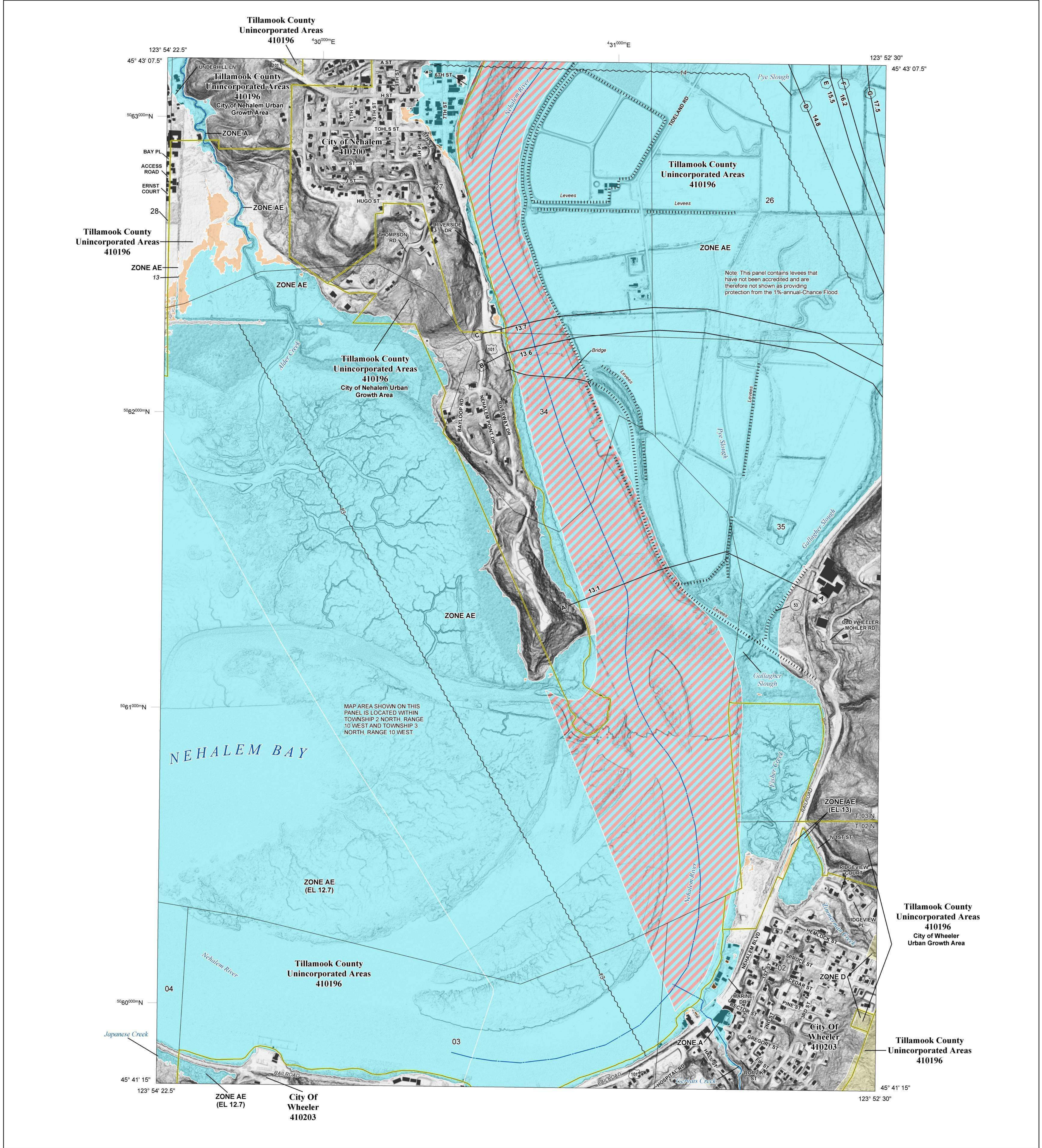
2N10W03DA 00400

Owner of Record: Nehalem Bay Health District  
Project Information: New Construction

This letter shall not create a liability on the part of Nehalem Bay Wastewater Agency, or by an agent, or employee thereof, for the services described above.

A handwritten signature in black ink, appearing to read "Ashley Myers", is written over a horizontal line.

Ashley Myers, Office Assistant  
Nehalem Bay Wastewater Agency



**FLOOD HAZARD INFORMATION**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT**  
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

	Without Base Flood Elevation (BFE) Zone A,V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Seclusion Zone

**NOTES TO USERS**

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

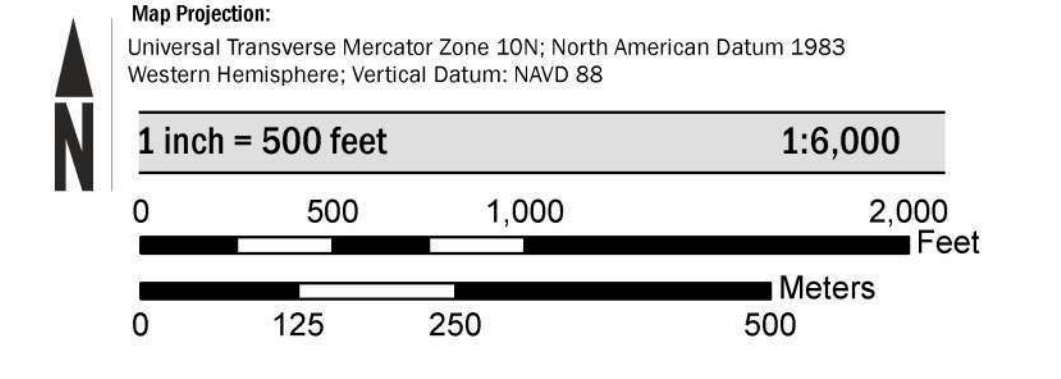
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

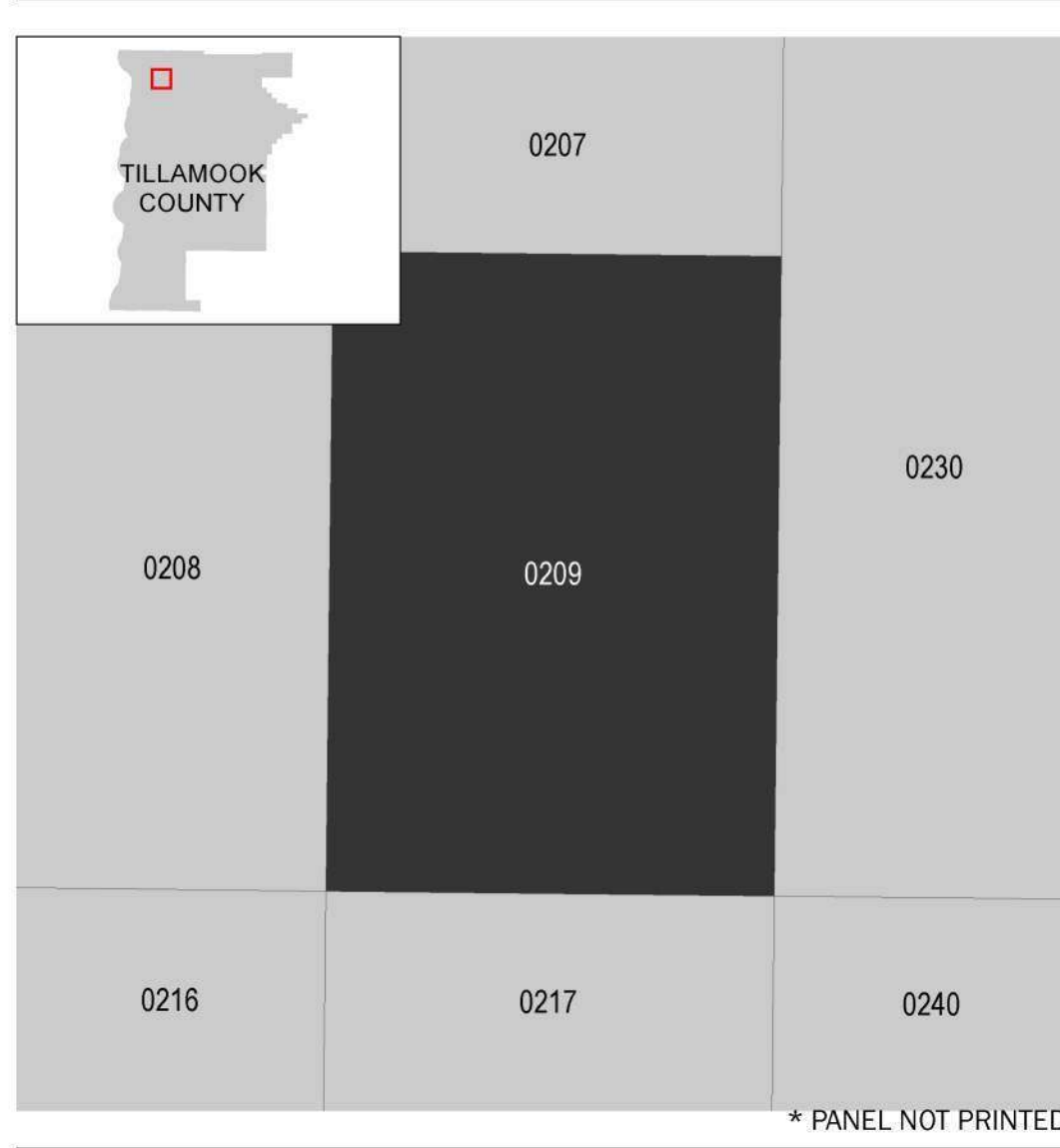
To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

The topographic base map for this FIRM revision is derived from aerial lidar surveys conducted between 2007 and 2011. Orthophotography acquired in 2009 was used where lidar coverage was unavailable for portions of Tillamook County.

**SCALE**



**PANEL LOCATOR**



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
**FLOOD INSURANCE RATE MAP**

**TILLAMOOK COUNTY, OREGON**  
 And Incorporated Areas

PANEL 209 of 1075

COMMUNITY	NUMBER	PANEL	SUFFIX
NEHALEM, CITY OF	410200	0209	F
TILLAMOOK COUNTY	410196	0209	F
WHEELER, CITY OF	410203	0209	F

VERSION NUMBER  
**2.3.2.1**

MAP NUMBER  
**41057C0209F**

EFFECTIVE DATE  
**SEPTEMBER 28, 2018**



# Nehalem Bay Fire & Rescue

## Hydrant W31

LOCATION
Hospital/Akin 891 1st ST Wheeler, OR 97147

LATITUDE	LONGITUDE	MAP PAGE	NATIONAL GRID	PARCEL NUMBER
45.687756999999998	-123.88372			

ZONE	DISTRICT	STATION
Lower	Wheeler	13 - 13 HQ

## Flow Tests for Hydrant W31

Start Time	End Time	Static Pressure	Residual Pressure	Desired Pressure	Volume at Desired Pressure	Tested By
2015-09-20 14:05:03	2015-09-20 14:11:06	71.0	51.0	20.0	1158.0	Walsh , Jesse H

## Work Orders for Hydrant W31

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No



# Nehalem Bay Fire & Rescue

## Hydrant W32

LOCATION
101/Akin 985 Nehalem BLVD Wheeler, OR 97147

LATITUDE	LONGITUDE	MAP PAGE	NATIONAL GRID	PARCEL NUMBER
45.688254399999998	-123.884623			

ZONE	DISTRICT	STATION
Lower	Wheeler	13 - 13 HQ

## Flow Tests for Hydrant W32

Start Time	End Time	Static Pressure	Residual Pressure	Desired Pressure	Volume at Desired Pressure	Tested By
2015-09-23 15:43:45	2015-09-23 15:49:07	83.0	64.0	20.0	1522.0	Walsh , Jesse H

## Work Orders for Hydrant W32

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No





# Nehalem Bay Fire & Rescue

## Hydrant W33

LOCATION
101/Hall 775 Nehalem BLVD Wheeler, OR 97147

LATITUDE	LONGITUDE	MAP PAGE	NATIONAL GRID	PARCEL NUMBER
45.689028200000003	-123.882941			

ZONE	DISTRICT	STATION
Lower	Wheeler	13 - 13 HQ

## Flow Tests for Hydrant W33

Start Time	End Time	Static Pressure	Residual Pressure	Desired Pressure	Volume at Desired Pressure	Tested By
2015-09-20 16:12:20	2015-09-20 16:19:47	85.0	77.0	20.0	2272.0	Walsh , Jesse H

## Work Orders for Hydrant W33

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

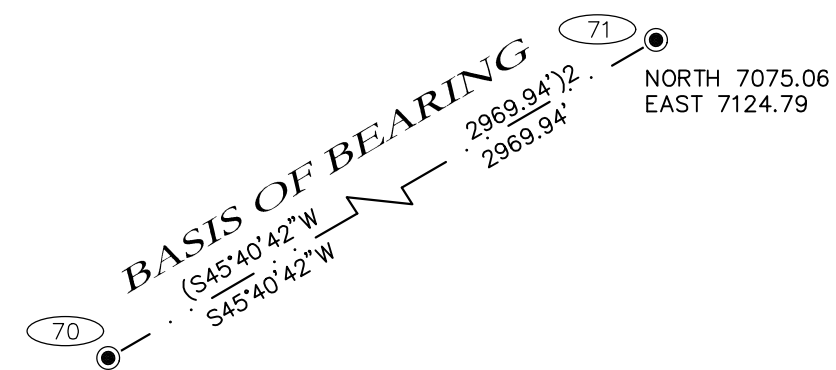
Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

Title	Requested By	Assigned To	Complete
Annual Inspection	Walsh , Jesse H		No

**BASIS OF BEARING**

THE LINE BETWEEN FOUND MONUMENTS (70) AND (71) BEARS NORTH 45°40'42" EAST. THE CALCULATED RECORD VALUE FROM THE PLATS OF WHEELER AND ROWE'S ADDITION TO WHEELER.



**NOTES**

THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY OF THE SUBJECT PROPERTY. THE BOUNDARY AS SHOWN HEREON IS BASED ON THE BOUNDARY SURVEY PERFORMED BY THIS FIRM IN NOVEMBER, 2023. THE PURPOSE OF THIS MAP IS TO SHOW SPOT ELEVATIONS AND TOPOGRAPHIC FEATURES ON THE SUBJECT PROPERTY. THE UTILITIES SHOWN HEREON ARE BASED ON ABOVE GROUND UTILITY FEATURES, ASBUILTS AND HISTORICAL DATA FROM OUR FIRMS RECORDS.

**ELEVATION DATUM**

ELEVATIONS ON THIS MAP ARE BASED UPON A 3" BRASS DISK IN CONCRETE STAMPED "U.S. COAST GEODETIC SURVEY BENCH MARK, J97, 1934". ELEVATION OF SAID DISK = 18.15' (NGVD 1929).

**MONUMENT NOTES**

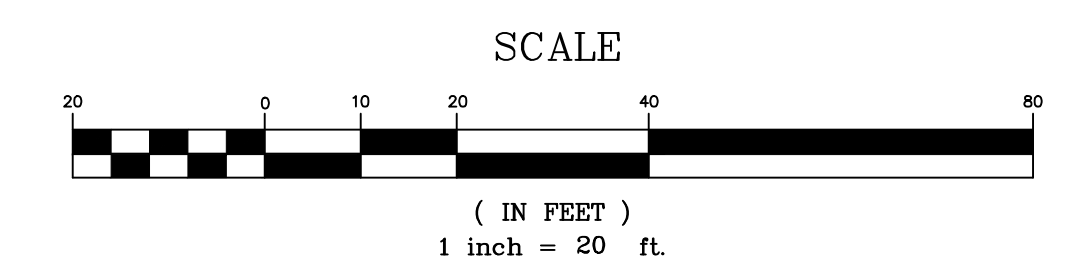
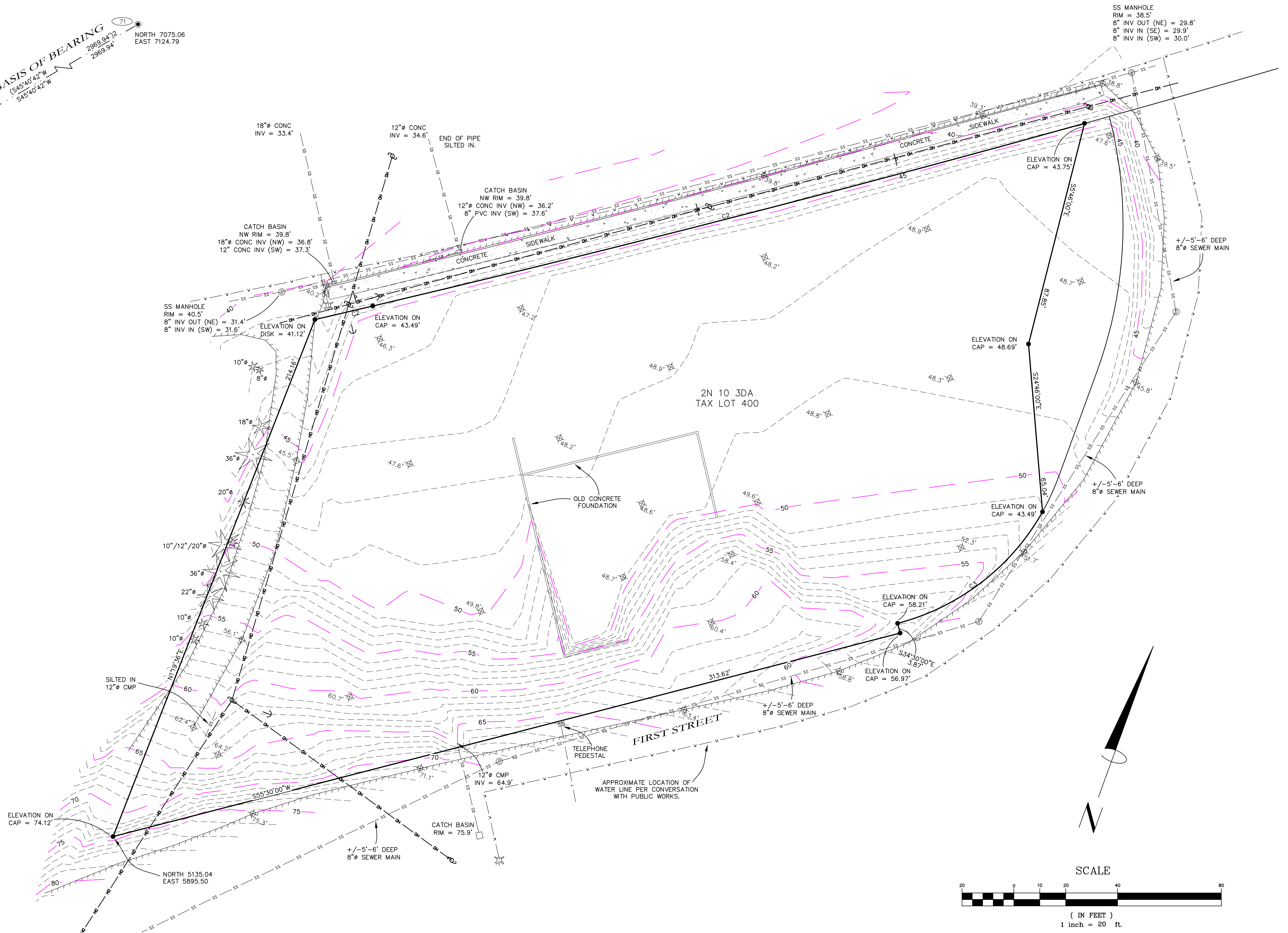
(70) FOUND 3" TILLAMOOK COUNTY SURVEYOR'S BRASS CAP STAMPED "INITIAL POINT TO WHEELER RS 287 1979", FLUSH IN GROUND. SEE RETWISS BIN #75, TILLAMOOK COUNTY SURVEY RECORDS.

(71) FOUND 3" TILLAMOOK COUNTY SURVEYOR'S BRASS CAP STAMPED "ROWES ADD RS287 RESET 1990 1979", FLUSH IN CONCRETE. SEE MAP A-6123, TILLAMOOK COUNTY SURVEY RECORDS.

**LEGEND**

- INDICATES MONUMENT FOUND AS NOTED HEREON, HELD FOR CONTROL.
- INDICATES MONUMENT SET ON BOUNDARY SURVEY BY THIS FIRM.
- XX.X' ⊕ INDICATES MONUMENT FOUND AS NOTED HEREON, HELD FOR CONTROL.
- ⊕ INDICATES POWER POLE.
- ⊕ INDICATES SIGN AS NOTED.
- ⊕ INDICATES GUY ANCHOR.
- ⊕ INDICATES WATER VALVE.
- ⊕ INDICATES FIRE HYDRANT.
- ⊕ INDICATES SANITARY SEWER MANHOLE.
- ⊕ INDICATES CONIFEROUS TREE, APPROXIMATE DIAMETER NOTED.
- v — INDICATES WATERLINE.
- ss — INDICATES SEWER LINE.
- sd — INDICATES STORM DRAIN LINE.
- dh — INDICATES OVERHEAD POWER LINE.
- t — INDICATES UNDERGROUND TELEPHONE LINE.
- / — INDICATES EDGE OF ASPHALT.
- ( ) 1 INDICATES RECORD VALUE FROM MAP B-1482, TILLAMOOK COUNTY SURVEY RECORDS.
- NO ( ) INDICATES MEASURED VALUE.

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CH. BEARING	CH. LENGTH
C1	2715.74'	22.88'	0°28'58"	N56°59'36"E	22.88'
C2	7045.81'	442.63'	3°35'58"	N55°35'58"E	283.43'
C3	89.96'	72.45'	46°08'37"	S32°25'41"W	70.51'



TOPOGRAPHIC SURVEY FOR:  
**NEHALEM BAY HEALTH DISTRICT**  
 2N 10 3 DA  
 TAX LOT 400  
 SW 1/4, SECTION 2, T2N, R10W, W.M.  
 TILLAMOOK COUNTY  
 NOVEMBER 2, 2023

REGISTERED PROFESSIONAL LAND SURVEYOR  
*Erick M White*  
 OREGON  
 APRIL 28, 2014  
 ERICK M. WHITE  
 78572  
 RENEWS 6/30/2024

"WHEELER" #A2010 NBH02310-1.DWG

NOT FOR  
CONSTRUCTION

**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**

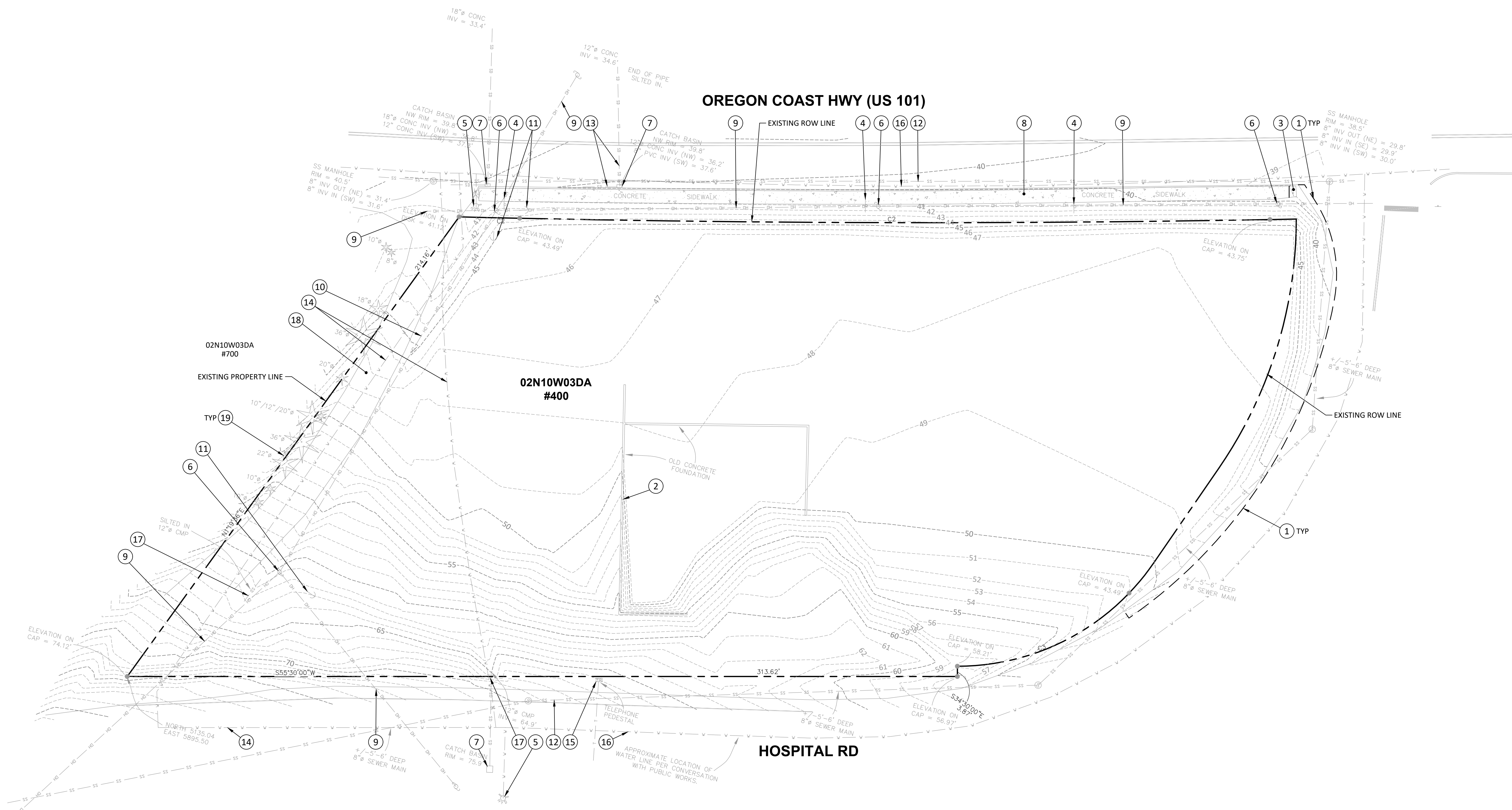
Job Number: 21148

TAX LOT 400, U.S. HIGHWAY 101  
WHEELER, OREGON 97147

**Harper  
Houf Peterson  
Righellis Inc.**

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phone: 503.221.1131 www.hlpr.com fax: 503.221.1171

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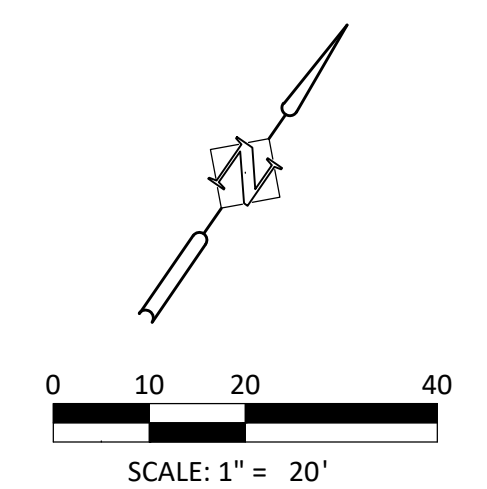
**CONSTRUCTION NOTES:**

- 1 SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT.
- 2 EXISTING CONCRETE FOUNDATION TO BE REMOVED.
- 3 EXISTING CONCRETE SIDEWALK TO BE REMOVED.
- 4 EXISTING SIGN AND POST TO REMAIN. PROTECT IN PLACE.
- 5 EXISTING FIRE HYDRANT TO REMAIN. PROTECT IN PLACE.
- 6 EXISTING POWER POLE TO REMAIN. PROTECT IN PLACE.
- 7 EXISTING STORM CATCHBASIN TO REMAIN. PROTECT IN PLACE.
- 8 EXISTING PUBLIC CONCRETE CURB AND SIDEWALK TO REMAIN. PROTECT IN PLACE.
- 9 EXISTING OVERHEAD POWER TO REMAIN. PROTECT IN PLACE.
- 10 EXISTING OVERHEAD POWER TO BE UNDERGROUNDED IN COORDINATION WITH POWER PROVIDER.
- 11 EXISTING GUY WIRE TO BE ADJUSTED IN COORDINATION WITH POWER PROVIDER.
- 12 EXISTING PUBLIC SANITARY SYSTEM TO REMAIN. PROTECT IN PLACE.
- 13 EXISTING STORM LINE TO REMAIN. PROTECT IN PLACE. REFER TO STORMWATER PLANS FOR MORE INFORMATION.
- 14 POSSIBLE EXISTING WATERLINE IN THIS AREA. CONTRACTOR TO POTHOLE PRIOR TO CONSTRUCTION, CONFIRM IF LINE IS PRESENT AND NOTIFY ENGINEER OF FINDINGS IMMEDIATELY. EXISTING WATERLINES IN CONFLICT WITH PROPOSED IMPROVEMENTS TO BE RELOCATED IN COORDINATION WITH CIVIL ENGINEER AND WATER SERVICE PROVIDER.
- 15 EXISTING TELECOM PEDESTAL TO BE ADJUSTED OR RELOCATED AS NECESSARY, IN COORDINATION WITH PROVIDER.
- 16 EXISTING PUBLIC WATERLINE TO REMAIN. PROTECT IN PLACE.
- 17 EXISTING CULVERT TO REMAIN. STORMWATER TO BE REROUTED ON SITE. REFER TO UTILITY PLAN FOR INFORMATION.
- 18 EXISTING ASPHALT DRIVEWAY TO BE REMOVED WITHIN PROPERTY LIMITS.
- 19 EXISTING TREES TO REMAIN AND BE PROTECTED.

**EXISTING LEGEND:**

- INDICATES MONUMENT SET ON BOUNDARY SURVEY BY THIS FIRM.
- INDICATES MONUMENT FOUND AS NOTED HEREON, HELD FOR CONTROL.
- ⌋ INDICATES POWER POLE.
- ⊥ INDICATES SIGN AS NOTED.
- ⊕ INDICATES GUY ANCHOR.
- ⊕ INDICATES WATER VALVE.
- ⊕ INDICATES FIRE HYDRANT.
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C3	89.98'	72.45'	48°08'37"	S32°29'41"W	70.51'



DESIGN REVIEW 11.10.2023

ISSUE DATE

Drawing:

**EXISTING CONDITIONS  
& DEMO PLAN**

Sheet No:

**C1.00**

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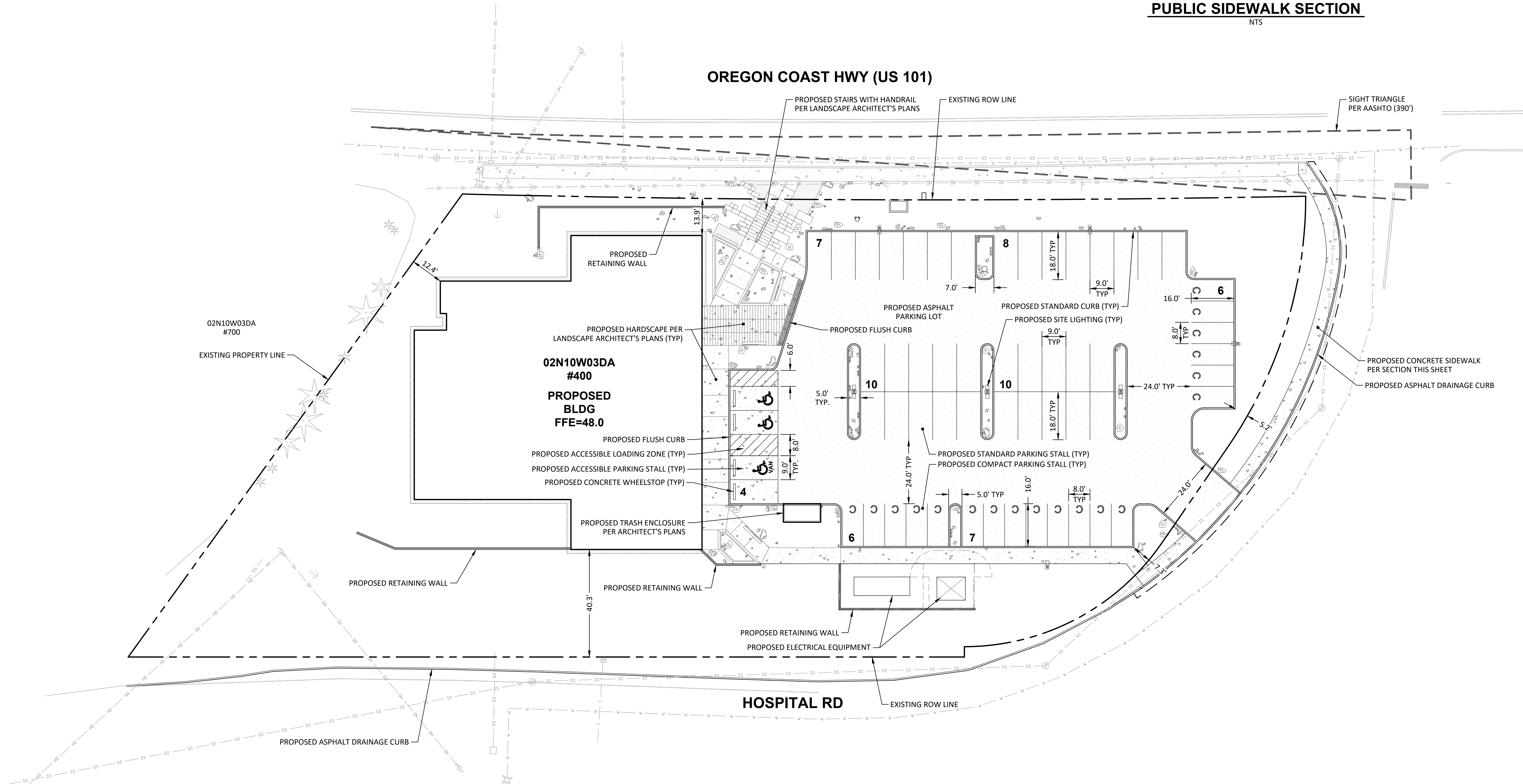
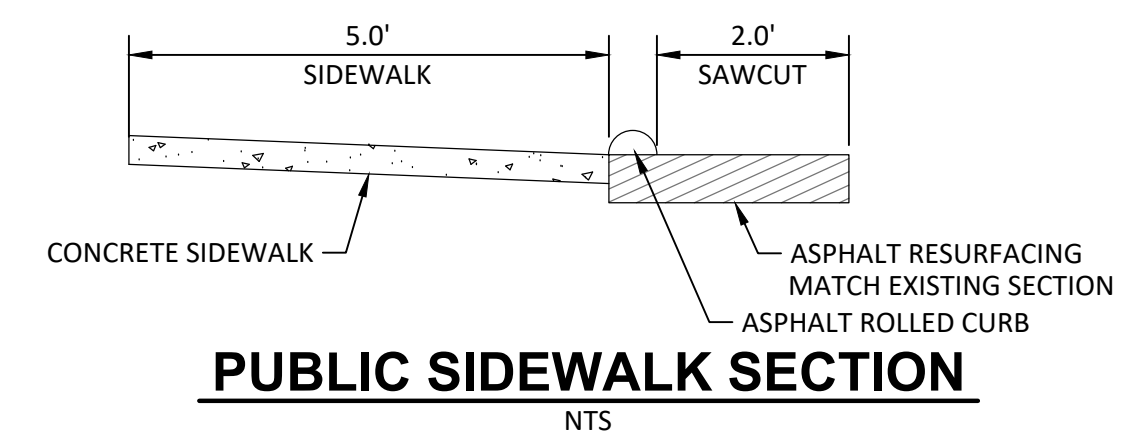
**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**

Job Number: 21148

TAX LOT 400, U.S. HIGHWAY 101  
WHEELER, OREGON 97147

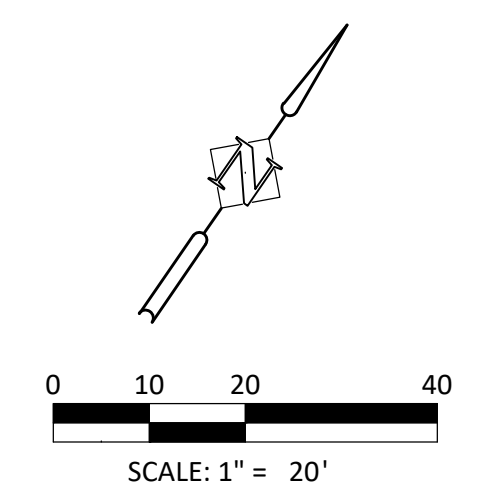
**HP** Harper  
Houf Peterson  
Righellis Inc.

ENGINEERS PLANNERS  
LANDSCAPE ARCHITECTS SUPERVISORS  
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Drawing:

**CIVIL SITE PLAN**

Sheet No:

**C2.00**

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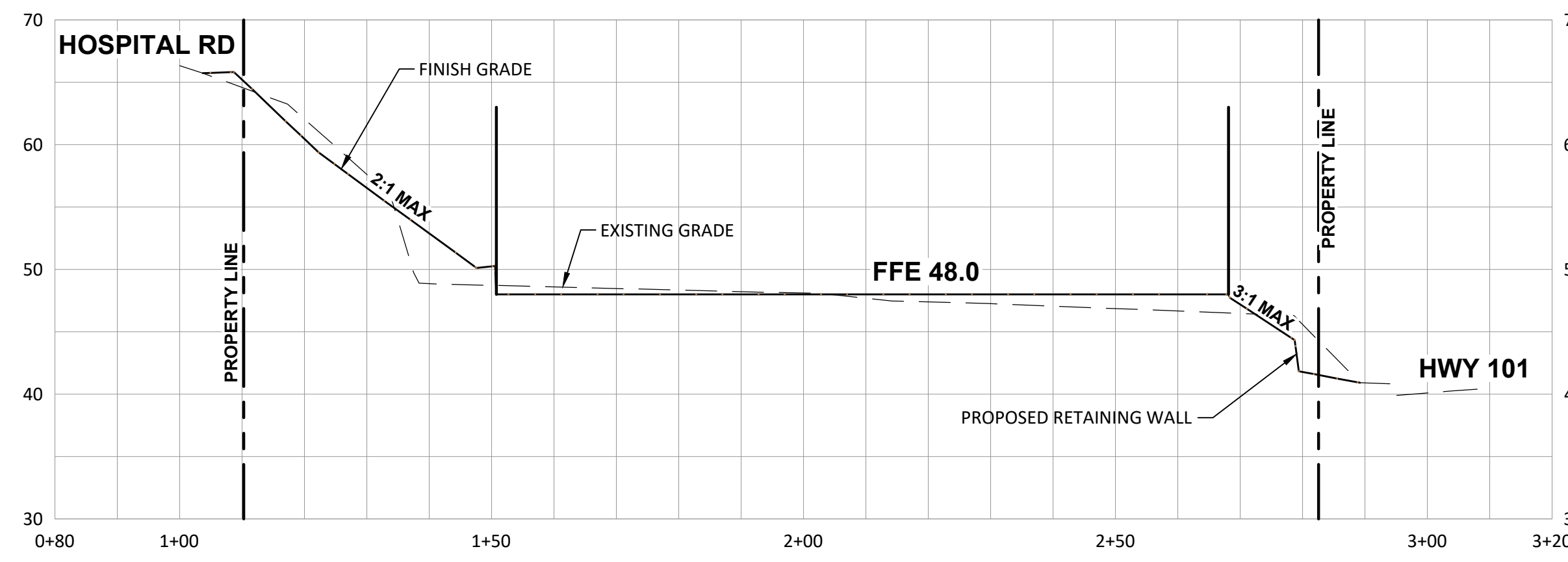
**NEHALEM BAY HEALTH CENTER & PHARMACY**

Job Number: 21148

TAX LOT 400, U.S. HIGHWAY 101 WHEELER, OREGON 97147

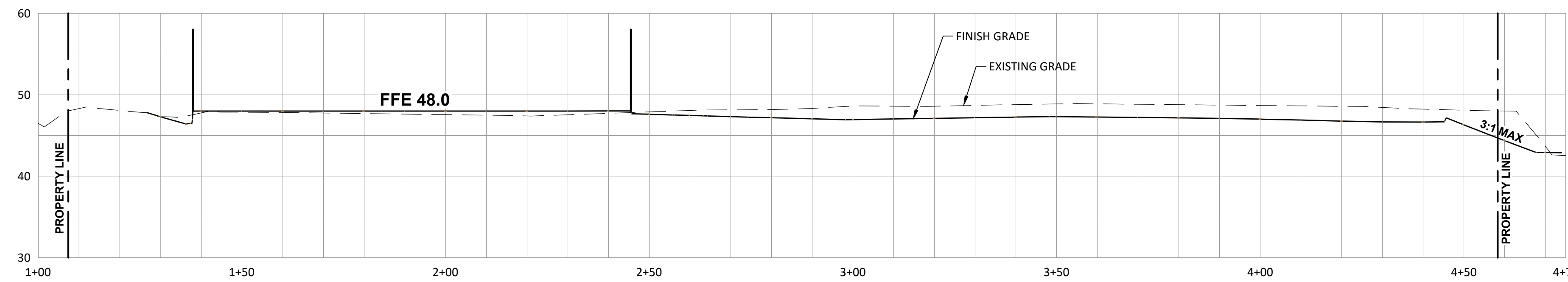
**HP** Harper Houf Peterson Righellis Inc.

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phone: 503.221.1131 www.hlpr.com fax: 503.221.1171



**GRADING SECTION 1: SOUTH TO NORTH**

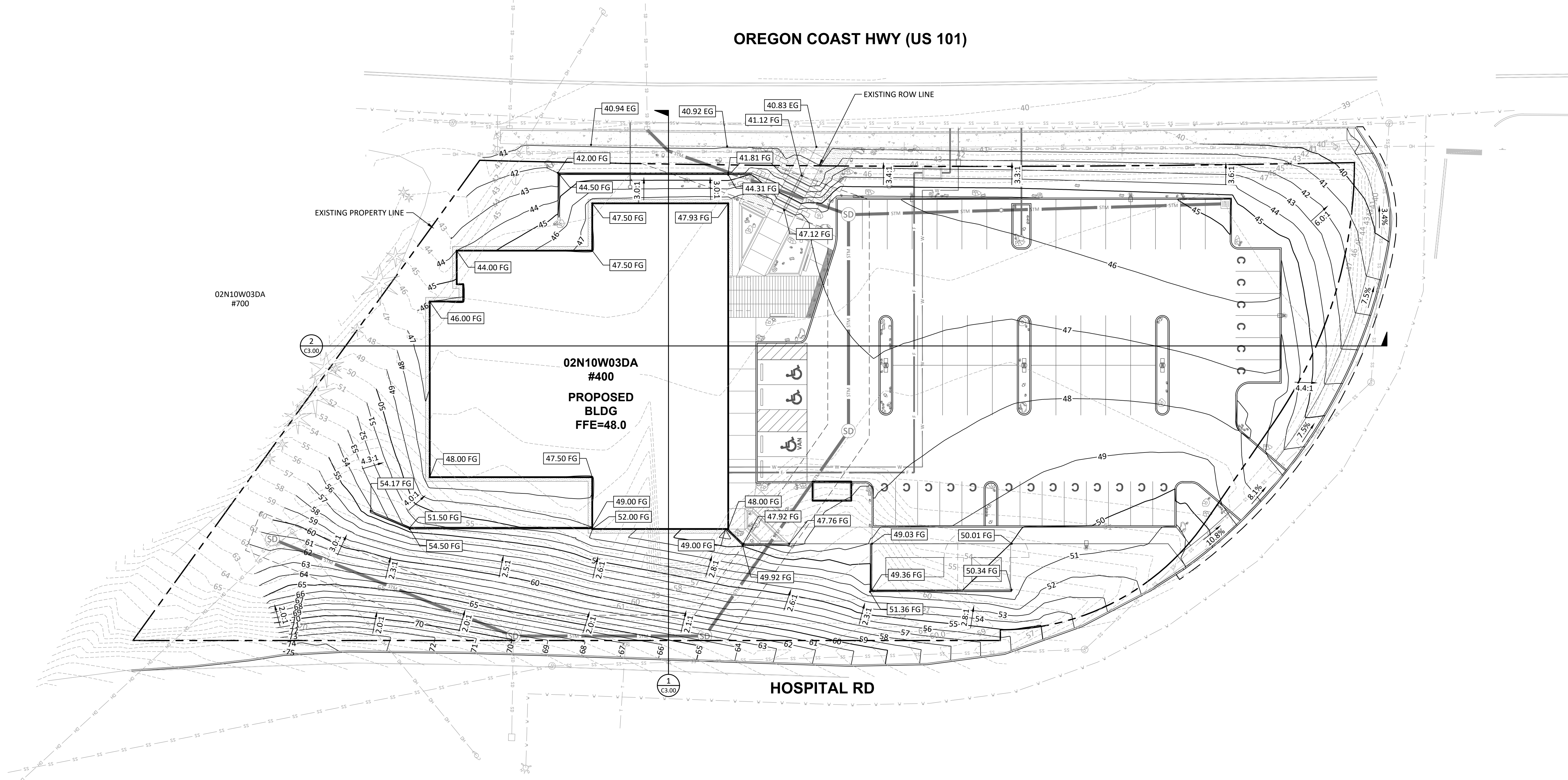
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1" = 10' (VERT.)



**GRADING SECTION 2: WEST TO EAST**

SCALE: 1" = 20' (HORIZ.)  
1" = 10' (VERT.)

**OREGON COAST HWY (US 101)**



**HOSPITAL RD**

DESIGN REVIEW 11.10.2023

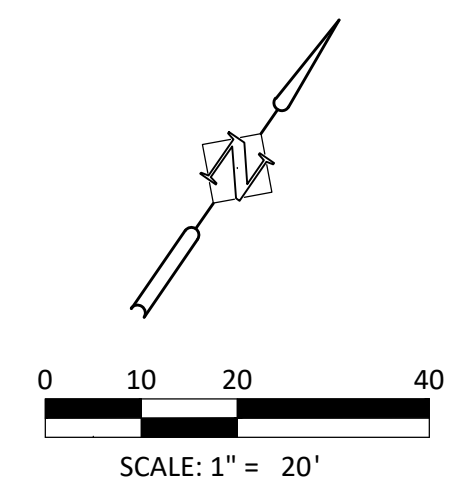
ISSUE DATE

Drawing:

**PRELIMINARY GRADING PLAN**

Sheet No:

**C3.00**



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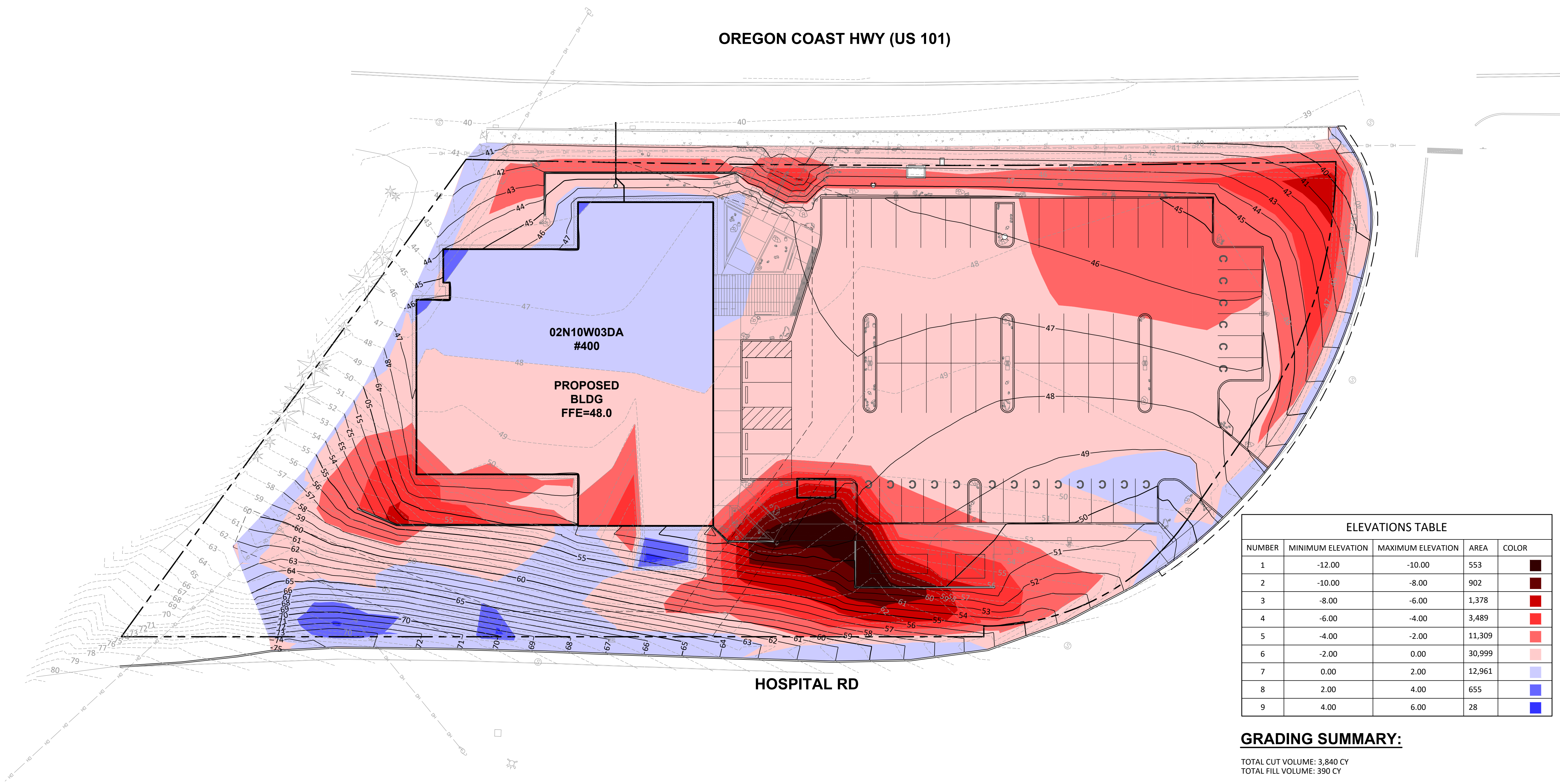
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CONSTRUCTION

**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**  
Job Number: 21148  
TAX LOT 400, U.S. HIGHWAY 101  
WHEELER, OREGON 97147

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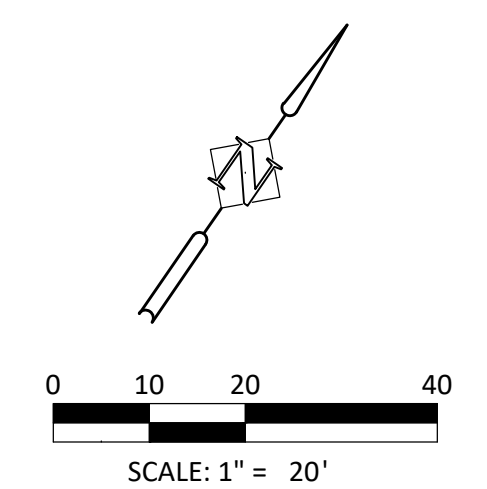
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ELEVATIONS TABLE				
NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	AREA	COLOR
1	-12.00	-10.00	553	Dark Brown
2	-10.00	-8.00	902	Dark Red
3	-8.00	-6.00	1,378	Red
4	-6.00	-4.00	3,489	Light Red
5	-4.00	-2.00	11,309	Pink
6	-2.00	0.00	30,999	Light Pink
7	0.00	2.00	12,961	Light Blue
8	2.00	4.00	655	Blue
9	4.00	6.00	28	Dark Blue

**GRADING SUMMARY:**  
TOTAL CUT VOLUME: 3,840 CY  
TOTAL FILL VOLUME: 390 CY

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Drawing:  
**PRELIMINARY CUT  
FILL ANALYSIS**

Sheet No:  
**C3.01**

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**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**

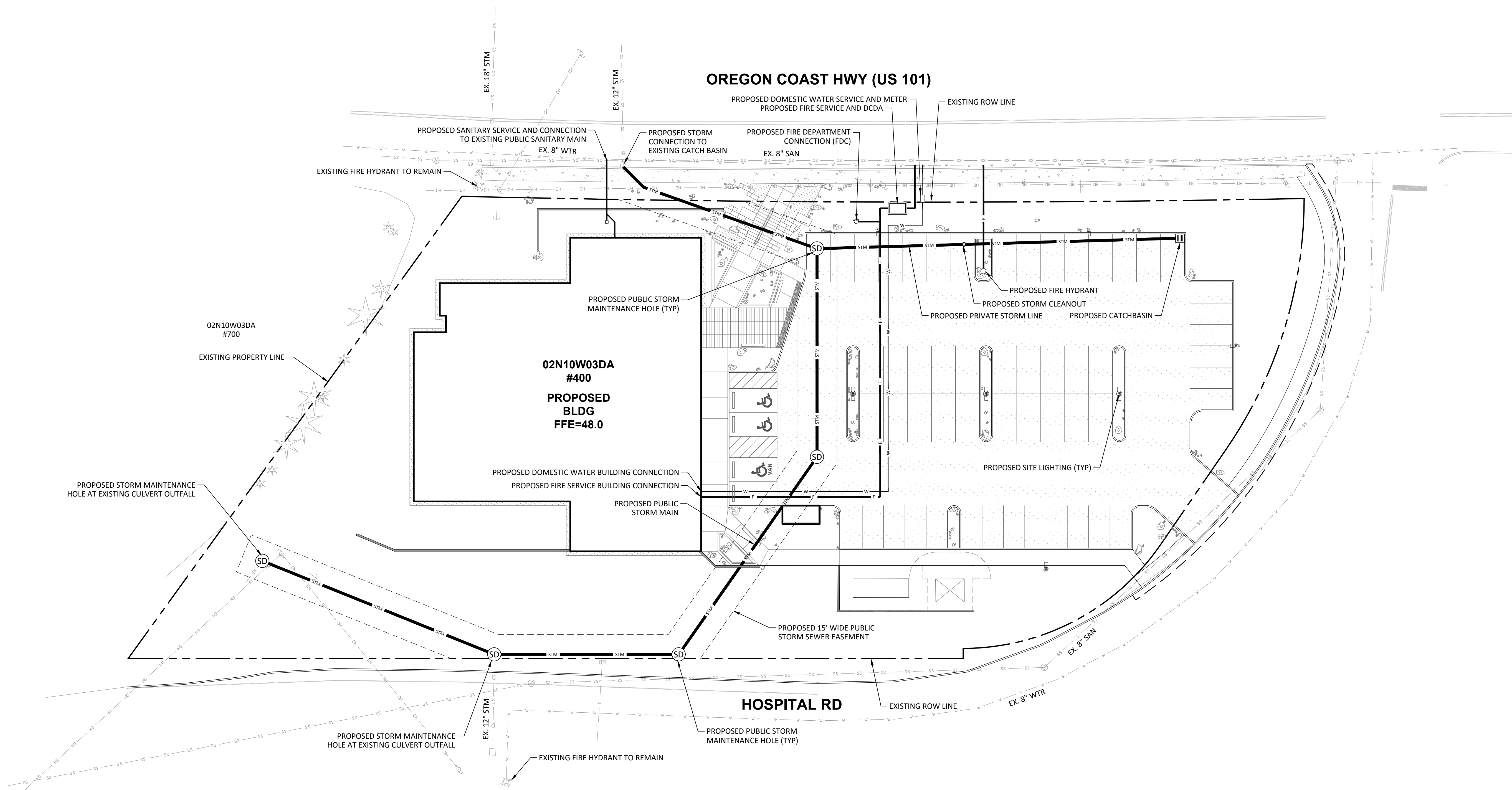
Job Number: 21148

TAX LOT 400, U.S. HIGHWAY 101  
WHEELER, OREGON 97147

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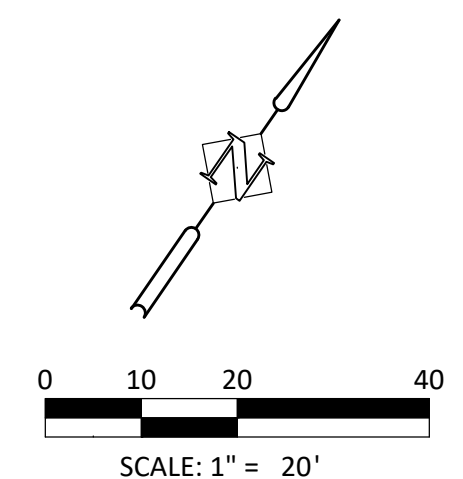
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Drawing:

**UTILITY PLAN**

Sheet No:

**C4.00**



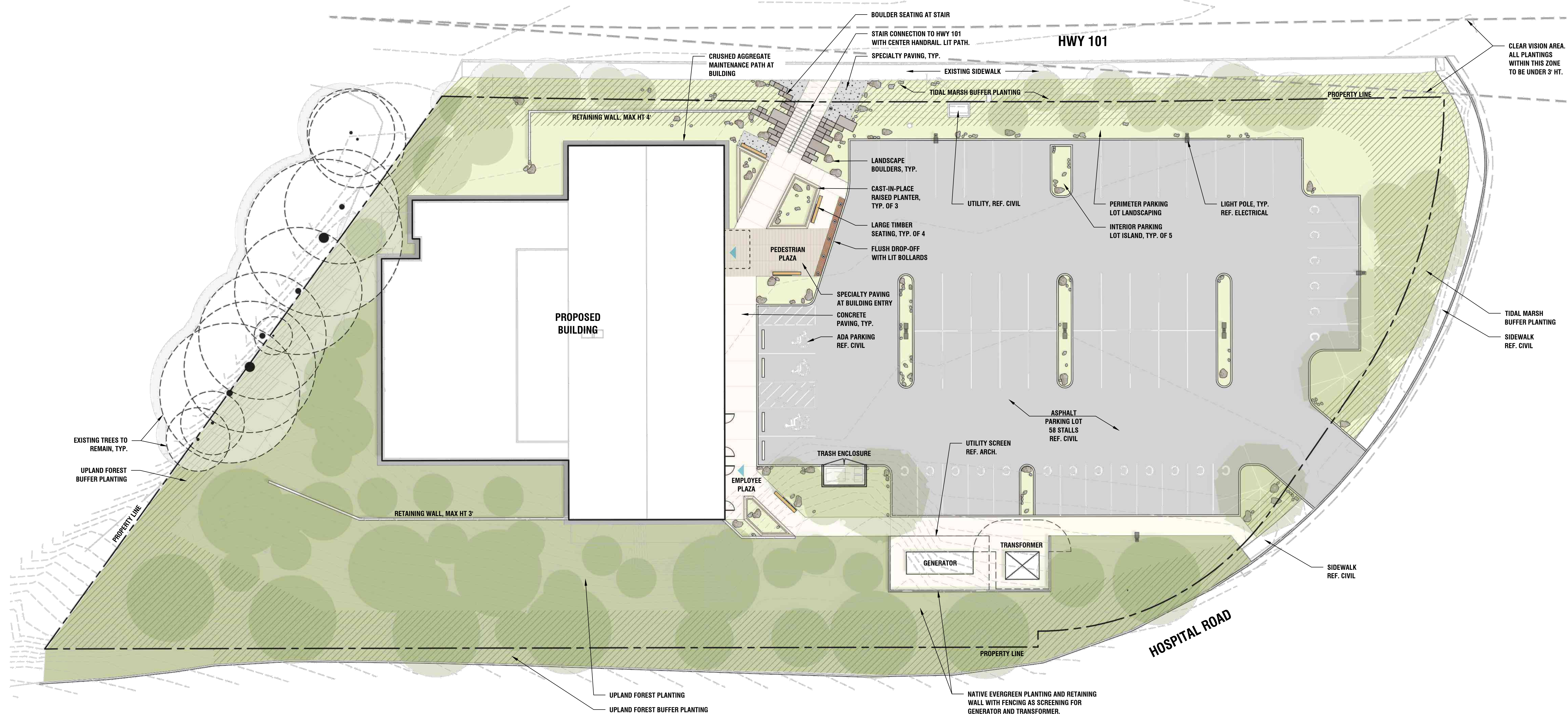
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**NEHALEM BAY HEALTH CENTER & PHARMACY**  
 Job Number: 21148  
 TAX LOT 400, U.S. HIGHWAY 101 WHEELER, OREGON 97147

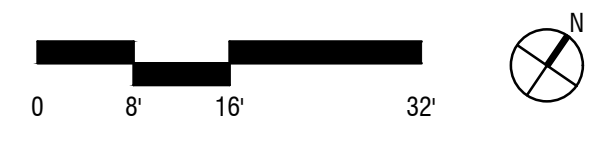


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 Portland OR 97232 971 268 8570 range-studio.com

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**1 LANDSCAPE MATERIALS AND PLANTING PLAN**  
 SCALE: 1/16" = 1'-0"



**SITE / LANDSCAPE CODE SUMMARY**

- SECTION 11.050 - DESIGN REVIEW**
- 11.050.4.a.2:**
- EXISTING TREES SHOULD BE LEFT STANDING EXCEPT WHERE NECESSARY FOR BUILDING PLACEMENT, SUN EXPOSURE, SAFETY OR OTHER VALID PURPOSE. **REQUIREMENT MET.** SEE LO.00 TREE PROTECTION & REMOVAL PLAN.  
 EXISTING TREES ON SITE: 6 EA.  
 EXISTING TREES TO REMAIN: 6 EA.  
 EXISTING TREES TO REMOVE DUE TO BUILDING PLACEMENT: 0  
 EXISTING TREES ON ADJACENT PROPERTY: 5 EA.  
 EXISTING TREES ADJACENT PROPERTY TO REMAIN: 3 EA.  
 EXISTING TREES ADJACENT PROPERTY TO REMOVE DUE TO BUILDING PLACEMENT: 2 EA.\*  
 \*TREES WILL BE SAVED IF POSSIBLE. CONTRACTOR TO COORDINATE WITH ARBORIST DURING CONSTRUCTION, SEE LO.00.
  - LANDSCAPE VEGETATIVE BUFFERS SHALL BE PROVIDED ALONG MAJOR STREETS OR HIGHWAYS, OR TO SEPARATE ADJACENT USES: SEE THIS SHEET. **REQUIREMENT MET.**
- 11.050.4.a.6:**
- PRIMARY BUILDING ENTRANCES SHALL HAVE WALKWAYS CONNECTING THEM TO THE STREET SIDEWALK. **REQUIREMENT MET.**
  - CREATE AN ADA ACCESSIBLE COURTYARD / PLAZA INCORPORATING PEDESTRIAN AMENITIES INCLUDING STREET TREES, OUTDOOR SEATING, AND DECORATIVE PAVERS. **REQUIREMENT MET.**
  - ENSURE DIRECT PEDESTRIAN CONNECTIONS BETWEEN THE STREET AND BUILDINGS, BETWEEN BUILDINGS AND OTHER ACTIVITIES, AS WELL AS BETWEEN ADJACENT SITES WHERE FEASIBLE. **REQUIREMENT MET.**
- 11.050.4.a.9:**
- PARKING LOTS**
- DIVIDED INTO GROUPS OF NO MORE THAN 8 SPACES WITH LANDSCAPING AND WALKWAYS DIVIDING THE GROUPS. **REQUIREMENT MET.**
  - A WALKWAY OR SIDEWALK SHALL BE PROVIDED TO SEPARATE THE PARKING FROM PUBLIC STREETS AND ADJACENT PROPERTY. **REQUIREMENT MET.**
  - PARKING SHALL BE DESIGNED TO BE AS UNOBTUSIVE AS POSSIBLE THROUGH SITE LOCATION AND LANDSCAPING. **REQUIREMENT MET.**
- 11.050.4.b.8:**
- ARCHITECTURAL FEATURES OR LANDSCAPING SHALL BE PROVIDED FOR AT LEAST 30 PERCENT OF THE WALL LENGTH ON EACH STREET FACING ELEVATION. **REQUIREMENT MET.**
- SECTION 11.090 - OFF STREET PARKING AND LOADING REQUIREMENTS**
- 11.090.5.i**
- OFF STREET PARKING STALL REQUIREMENTS: SEE CIVIL SHEETS
- 11.090.11**
- ALL PARKING LOTS WITH MORE THAN FIVE VEHICLES SHALL BE DEVELOPED WITH AT LEAST 10% OF PARKING AREA IN PLANTINGS OR OTHER LANDSCAPING.  
 PAVED PARKING AREA: 17,627 SF  
 INTERIOR PARKING LOT ISLANDS, MIN 3' WIDE: 560 SF  
 PERIMETER PARKING LOT LANDSCAPE (MEASURED 9' OFFSET FROM BACK OF PARKING LOT CURB): 2,009 SF  
 TOTAL PARKING LOT LANDSCAPING PROVIDED: 2,569 SF, OR 14% **REQUIREMENT MET.**

**SITE MATERIAL AND LANDSCAPE AREA SUMMARY**

**SITE MATERIALS:**  
 HARDSCAPE / PAVING  
 ASPHALT PARKING LOT: 17,627 SF  
 CONCRETE PAVING (INCLUDING STAIRS): 3,345 SF  
 SPECIALTY PAVING / PAVERS: 558 SF  
 CRUSHED AGGREGATE PAVING: 552 SF  
 TOTAL PAVING: 22,082 SF, 37% OF PROPERTY

**LANDSCAPING:**  
 LANDSCAPE AREA / OPEN SPACE: 42%  
 PROPERTY: 59,131 SF  
 EXISTING VEGETATION: 190 SF  
 PROPOSED VEGETATION: 25,043 SF

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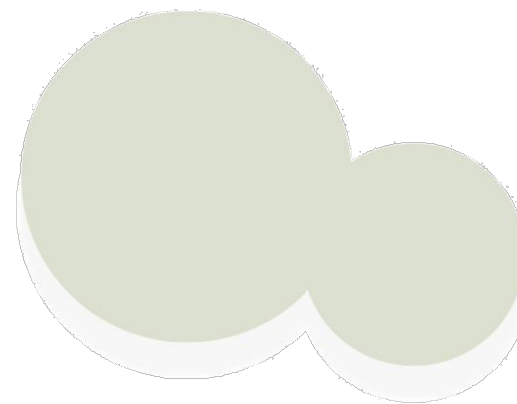
DESIGN REVIEW 11.10.2023  
 ISSUE DATE  
 Drawing:  
**LANDSCAPE MATERIALS AND PLANTING PLAN**

Sheet No:  
**LX.00**




PLANT LEGEND

TREES

SYMBOL	CODE	BOTANICAL NAME	COMMON NAME	SIZE	NOTES	QUANTITY
	AC	ACER CIRCINATUM	VINE MAPLE	2" CAL./B&B	MULTI-STEM, MIN. 3-5 STEMS	
	AG	ACER GLABRUM	ROCKY MOUNTAIN MAPLE	2" CAL./B&B	BRANCHED AT 6' HT.	
	AR	ALNUS RUBRA	RED ALDER	2" CAL./B&B	BRANCHED AT 6' HT.	
	AU	ARBUTUS UNEDO	STRAWBERRY TREE	15 GAL.	MULTI-STEM, MIN. 3-5 STEMS	
	PM	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	10-12' HT/B&B	STRONG CENTRAL LEADER	
	PC	PINUS CONTORTA	SHORE PINE	10-12' HT/B&B	STRONG CENTRAL LEADER	
	TH	TSUGA HETEROPHYLLA	WESTERN HEMLOCK	10-12' HT/B&B	STRONG CENTRAL LEADER	

PLANTING AREAS

SYMBOL	CODE	BOTANICAL NAME	COMMON NAME	SPACING	SIZE	NOTES
TIDAL MARSH PLANTINGS/ BUFFER PLANTINGS						
	ACHILLIA MILLEFOLIUM	YARROW	18" O.C.	1 GAL.		
	ACHNATHERUM HYMENOIDES	INDIAN RICE GRASS	18" O.C.	1 GAL.		
	ARCTOSTAPHYLOS COLUMBIANA (PACIFIC COAST)	HAIRY MANZANITA	60" O.C.	1 GAL.		
	ARCTOSTAPHYLOS X 'SUNSET'	SUNSET MANZANITA	48" O.C.	1 GAL.		
	CAREX TUMULICOLA	FOOTHILL SEDGE	18" O.C.	1 GAL.		
	CEANOTHUS 'PT. REYES'	PT. REYES CEANOTHUS	60" O.C.	1 GAL.		
	CEANOTHUS THYRSIFLORUS VAR. GRISEUS 'KURT ZADNICK'	KURT ZADNICK CEANOTHUS	60" O.C.	1 GAL.		
	DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	18" O.C.	1 GAL.		
	KOELERIA MACRANTHA	JUNEGRASS	12" O.C.	1 GAL.		
	LEYMUS MOLLIS	AMERICAN DUNEGRASS	24" O.C.	1 GAL.		
ROSMARINUS OFFICINALIS	ROSEMARY	48" O.C.	1 GAL.			
UPLAND FOREST PLANTINGS/BUFFER PLANTINGS						
	ACHLYS TRIPHYLLA	VANILLA-LEAF	18" O.C.	1 GAL.		
	BLECHNUM SPICANT	DEER FERN	30" O.C.	1 GAL.		
	DICENTRA FORMOSA 'ALBA'	WHITE BLEEDING HEART	30" O.C.	1 GAL.		
	MAHONIA NERVOSA	LOW MAHONIA	36" O.C.	1 GAL.		
	MAHONIA REPENS	CREeping MAHONIA	36" O.C.	1 GAL.		
	OPLOPANAX HORRIDUS	DEVIL'S CLUB	120" O.C.	1 GAL.		
	OXALIS OREGANA 'SELECT PINK'	SELECT PINK REDWOOD SORREL	18" O.C.	1 GAL.		
	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	30" O.C.	1 GAL.		
	RUBUS SPECTABILIS	SALMONBERRY	72" O.C.	1 GAL.		
	TOLMIEA MENZIESII 'TAFFS GOLD'	TAFFS GOLD PIGGYBACK PLANT	18" O.C.	1 GAL.		
VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	54" O.C.	1 GAL.			

NOT FOR CONSTRUCTION

NEHALEM BAY HEALTH CENTER & PHARMACY  
 Job Number: 21148  
 TAX LOT 400, U.S. HIGHWAY 101 WHEELER, OREGON 97147



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PLANT IMAGES

TIDAL MARSH



UPLAND FOREST



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 Drawing:  
 PLANTING SCHEDULE

Sheet No:  
**LX.01**

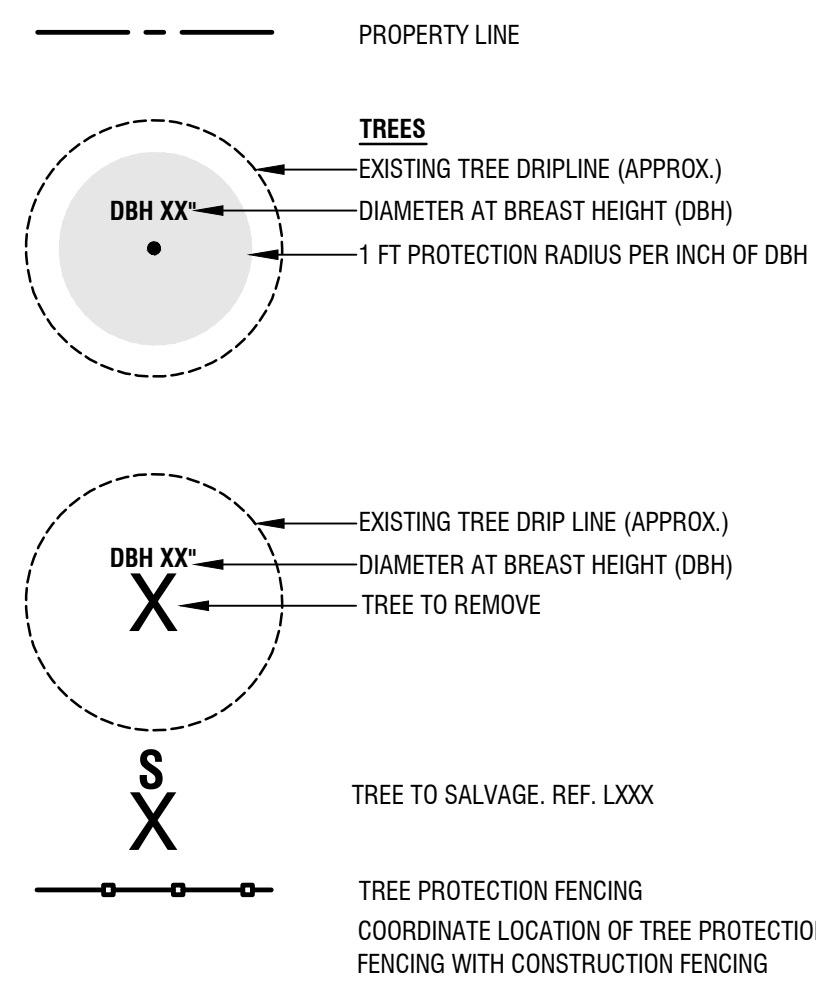
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& PHARMACY**  
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WHEELER, OREGON 97147



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**TREE PROTECTION LEGEND**

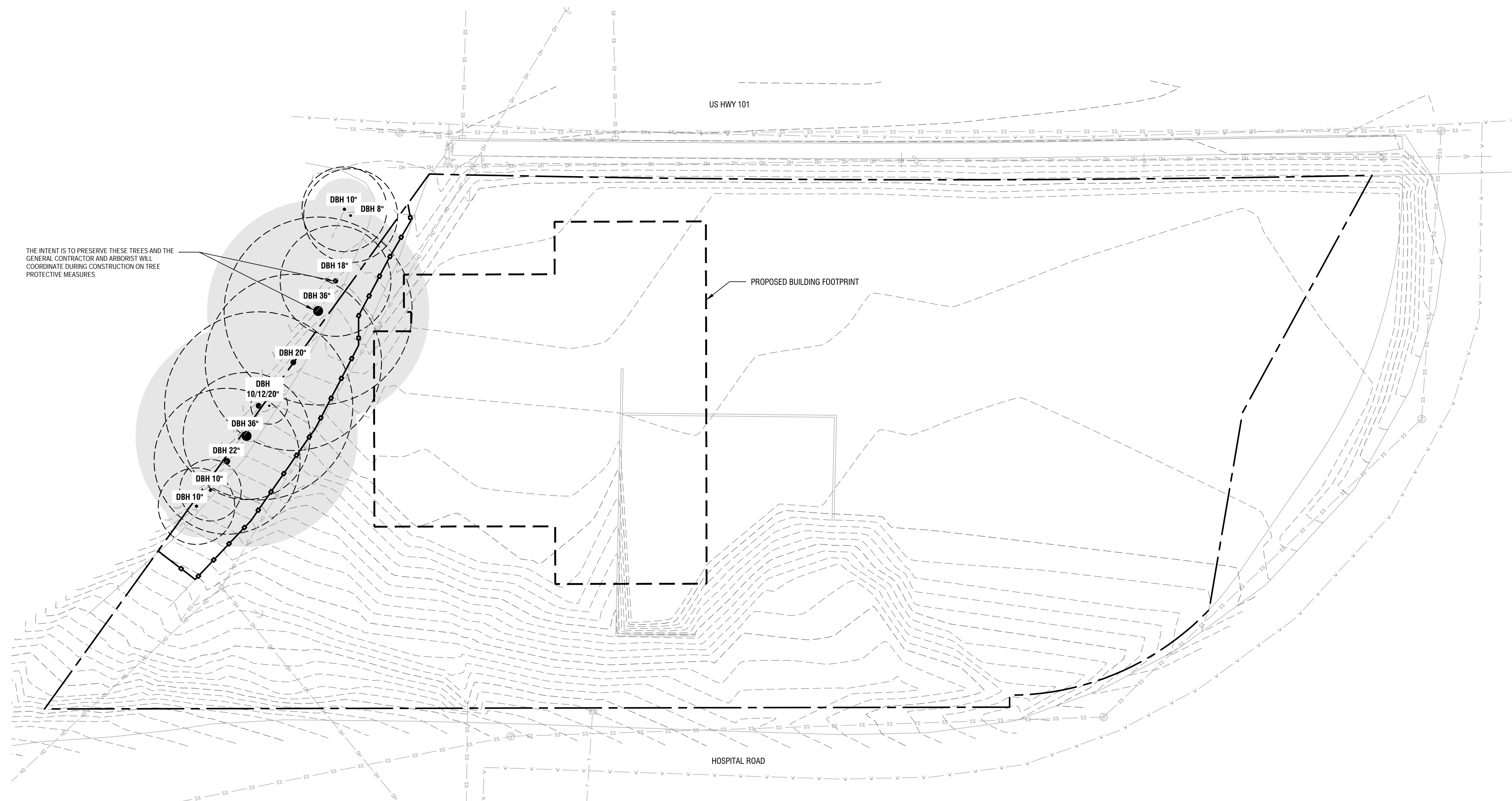


**ARBORIST'S NOTES**

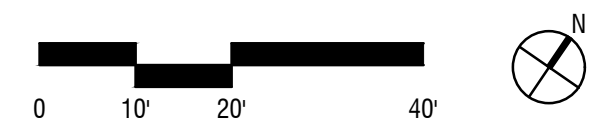
- BEFORE CONSTRUCTION BEGINS**
- NOTIFY CONTRACTORS OF THE TREE PROTECTION PROCEDURES.  
For successful tree protection on a construction site, all contractors must know and understand the goals of tree protection.  
a. Hold a tree protection meeting with all contractors to explain goals of tree protection.  
b. Have all contractors sign memoranda of understanding regarding the goals of tree protection. The memoranda should include a penalty for violating the tree protection plan. The penalty should equal the appraised value of the tree(s) within the violated tree protection zone per the current Trunk Formula Technique as outlined in the current edition of the Guide for Plant Appraisal plus any resulting fines by government agencies.  
c. The penalty should be paid to the owner of the property.
  - FENCING  
a. Establish fencing around each tree or group of trees to be retained.  
b. The fencing should be put in place before the ground is cleared in order to protect the trees and the soil around the trees from disturbances.  
c. Fencing should be established by the project arborist based on the needs of the trees to be protected and to facilitate construction.  
d. Fencing should consist of 4-foot-high steel fencing on concrete blocks, or 4-foot metal fencing secured to the ground to prevent it from being moved by contractors, sagging, or falling down.  
e. Fencing should remain in the position that is established by the project arborist and not be moved without approval from the project arborist. Final fencing removal shall be approved in writing by the project arborist and owners representative.
  - SIGNAGE  
a. All tree protection fencing should have signage indicating purpose of fencing so that all contractors understand the purpose of the fencing.  
b. Signage should be placed on every other fence panel.
- DURING CONSTRUCTION**
- Protection Guidelines Within the Tree Protection Zones  
a. No traffic should be allowed within the tree protection zones. This includes but is not limited to vehicle, heavy equipment, or even repeated foot traffic.  
b. No storage of any materials including but not limiting to soil, construction material, or waste from the site should be permitted within the tree protection zones. Waste includes but is not limited to concrete wash out, gasoline, diesel, paint, cleaner, thinners, etc.  
c. Construction trailers should not be parked/placed within the tree protection zones.  
d. No vehicles should be allowed to park within the tree protection zones.  
e. No activity should be allowed that will cause soil compaction within the tree protection zones.
  - The trees should be protected from any cutting, skidding, or breaking of branches, trunks, or woody roots.
  - The project arborist should be notified prior to the cutting of woody roots from trees that are to be retained to evaluate and oversee the proper cutting of roots with sharp cutting tools. Cut roots should be immediately covered with soil or mulch to prevent them from drying out.
  - No grade changes should be allowed within the tree protection zones.
  - Trees that have woody roots cut should be provided supplemental water during the summer months.
  - Any necessary passage of utilities through the tree protection zones should be by means of tunneling under woody roots by hand digging or boring with oversight by the project arborist.
  - Any deviation from the recommendations in this section should receive prior approval from the project arborist.
- AFTER CONSTRUCTION**
- Carefully landscape the areas within the tree protection zones. Do not allow trenching for irrigation or other utilities within the tree protection zones.
  - Carefully plant new plants within the tree protection zones. Avoid cutting the woody roots of trees that are retained. If smaller roots have to be cut, prune with sharp cutting tools, do not use shovels or other digging implements to cut roots.
  - Do not install permanent irrigation within the tree protection zones unless it is drip irrigation to support a specific planting, or the irrigation is approved by the project arborist.
  - Provide adequate drainage within the tree protection zones and do not alter soil hydrology significantly from existing conditions for the trees to be retained.
  - Provide for the ongoing inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants.
  - Any deviation from the recommendations in this section should receive prior approval from the project arborist.

**TREE PROTECTION NOTES**

- TREE PROTECTION ZONE IS THE AREA RESERVED AROUND A TREE OR GROUP OF TREES IN WHICH NO GRADING, EQUIPMENT ACCESS, STOCKPILING, OR OTHER CONSTRUCTION ACTIVITY SHALL OCCUR. THE TREE PROTECTION ZONE IS DEFINED BY THE TREE PROTECTION FENCING.
- REFERENCE CIVIL ENGINEERING DRAWINGS FOR OTHER SITE DEMOLITION AND EROSION CONTROL.
- LOCATE ALL UNDERGROUND, SURFACE AND OVERHEAD UTILITIES PRIOR TO ANY WORK. CALL FOR LOCATES AND COORDINATE WITH UTILITY SERVICE PROVIDERS.
- ADJUST LOCATION OF TREE PROTECTION FENCING AND PERFORM WORK WITHIN THE TREE PROTECTION ZONE ONLY UNDER SUPERVISION OF A PROJECT ARBORIST.
- WORK WITHIN THE TREE PROTECTION ZONE IS TO BE REVIEWED BY A PROJECT ARBORIST PRIOR TO COMMENCEMENT OF WORK TO LIMIT TREE DISTURBANCE.
- TAKE EXTRA CARE IN EXCAVATING AREAS ADJACENT TO EXISTING AND PROPOSED UNDERGROUND UTILITIES. REFERENCE CIVIL DRAWINGS FOR UTILITY INFORMATION. ANY DAMAGE RESULTING FROM THIS WORK MUST BE RESTORED AT THE CONTRACTOR'S OWN EXPENSE.
- ASCERTAIN ALL FACTS CONCERNING CONDITIONS TO BE FOUND AT THE LOCATION OF THE PROJECT INCLUDING ALL PHYSICAL CHARACTERISTICS ABOVE AND BELOW THE SURFACE OF THE GROUND AND TO FULLY EXAMINE THE PLANS AND SPECIFICATIONS. ANY DISCREPANCIES IN DIMENSIONING OR LAYOUT SHALL BE BROUGHT TO THE ATTENTION OF THE AGENCY PRIOR TO THE ALTERATION OF ANY PLANTING.
- ALL WORK SHALL CONFORM TO THE CURRENT APPLICABLE BUILDING CODES AND ORDINANCES. IN THE CASE OF CONFLICT OCCURRING WHERE METHODS / STANDARDS, INSTALLATION OR THE MATERIAL SPECIFIED DO NOT MEET OR EXCEED THE REQUIREMENT OF THE CODES OR ORDINANCES, THE CODES SHALL GOVERN. NOTIFY OWNERS REPRESENTATIVE OF ANY CONFLICT PRIOR TO CONSTRUCTION.
- VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO EACH PHASE OF CONSTRUCTION. NOTIFY OWNERS REPRESENTATIVE PRIOR TO PROCEEDING WITH WORK. WHERE CONFLICT IS IDENTIFIED, COST OF PROCEEDING WITHOUT OWNERS REPRESENTATIVE WRITTEN CLARIFICATION AND AUTHORIZATION TO PROCEED SHALL BE AT THE CONTRACTOR'S EXPENSE.



**1 TREE PROTECTION & REMOVAL PLAN**  
SCALE: 1" = 20'-0"



DESIGN REVIEW 11.10.2023  
ISSUE DATE  
Drawing:  
**TREE PROTECTION  
& REMOVAL PLAN**

Sheet No:  
**L0.00**

FILE PATH:

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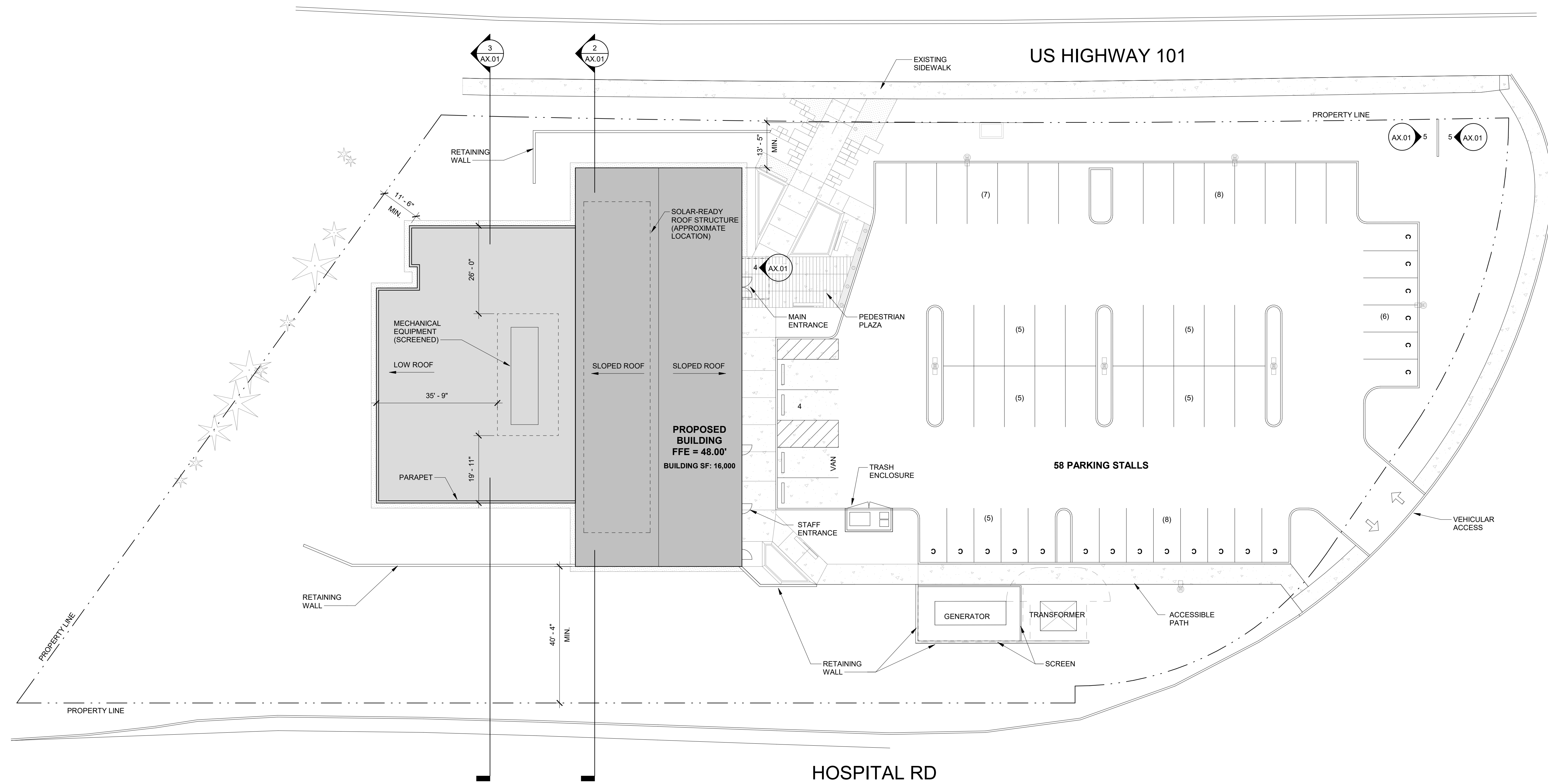
**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**

Job Number: 21148

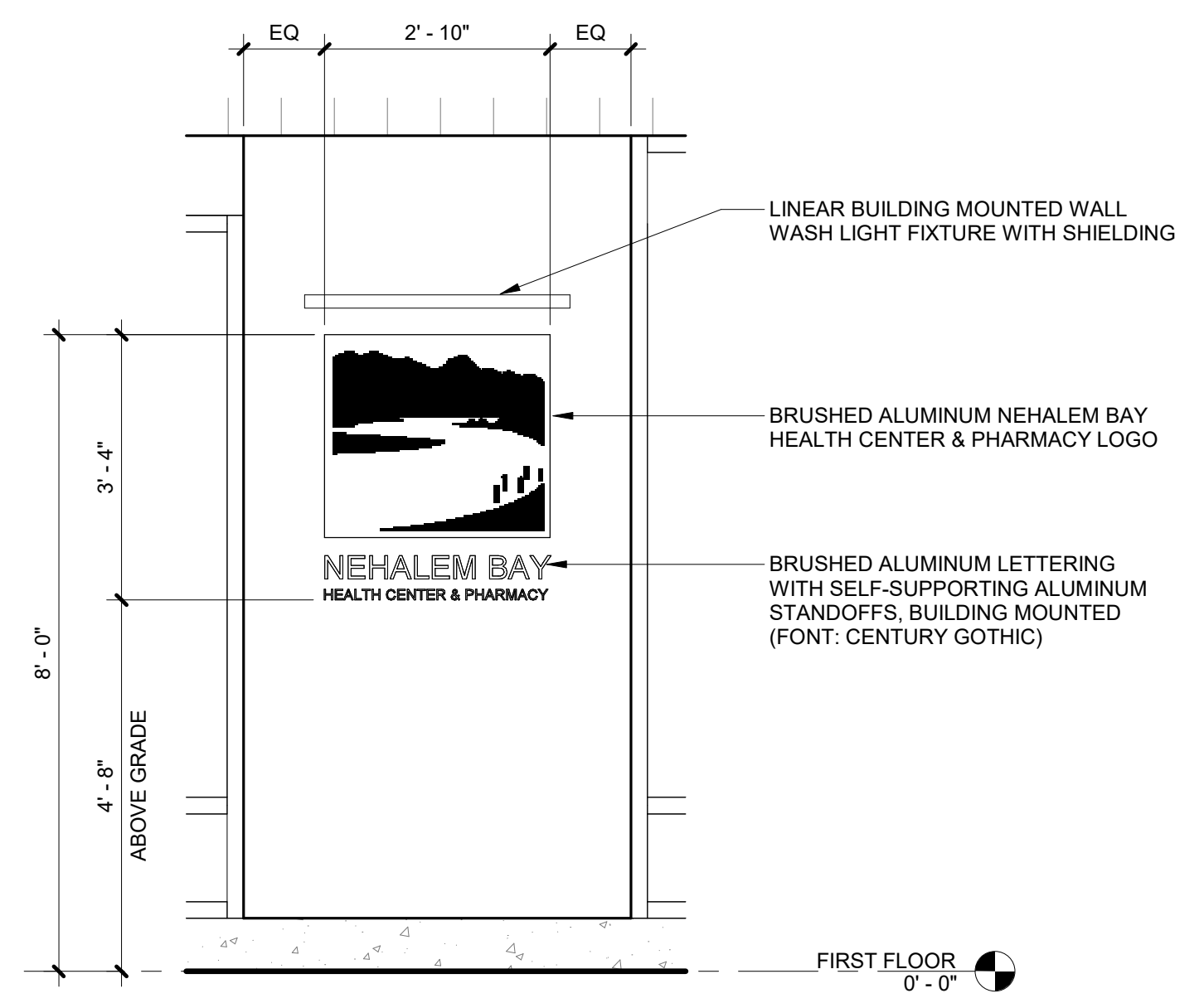
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WHEELER, OREGON 97147



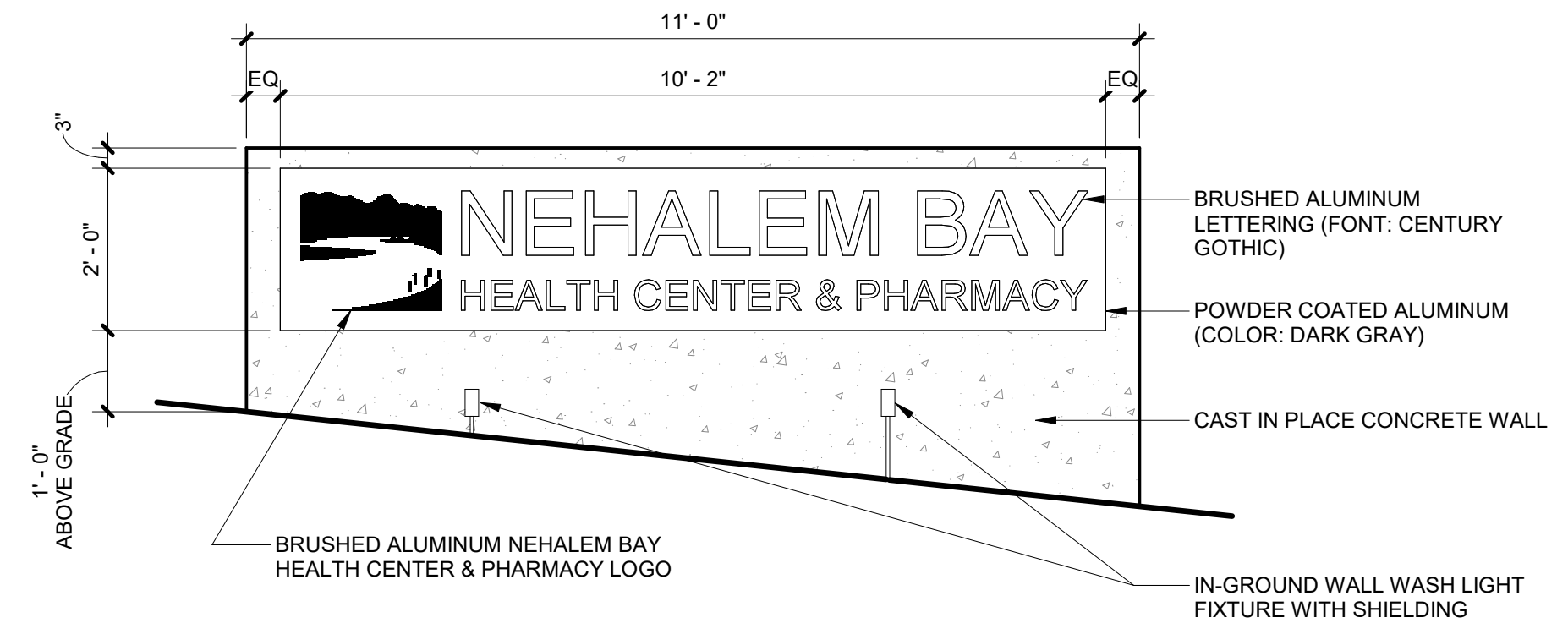
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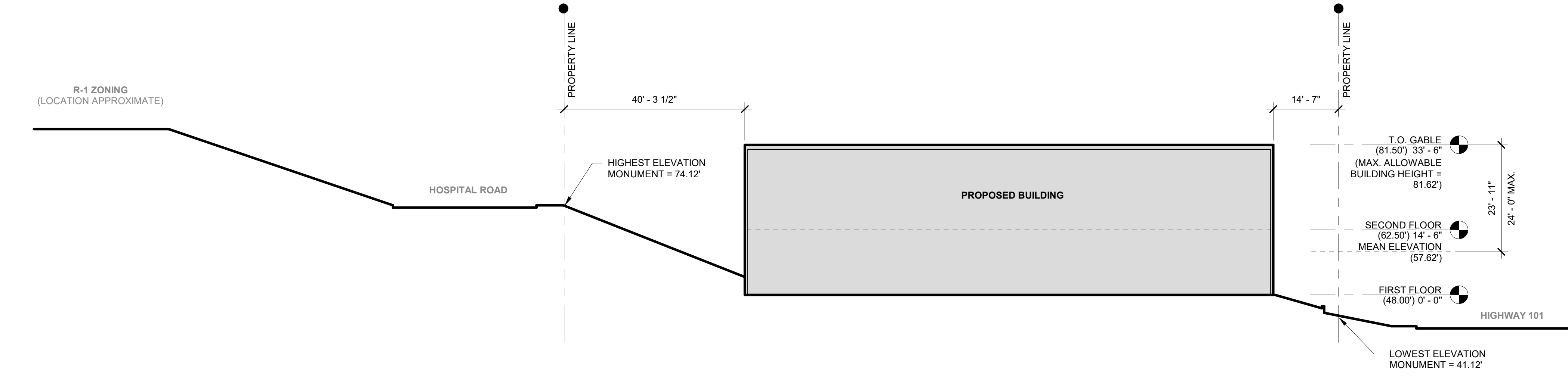
**1 SITE PLAN**  
1/16" = 1'-0"



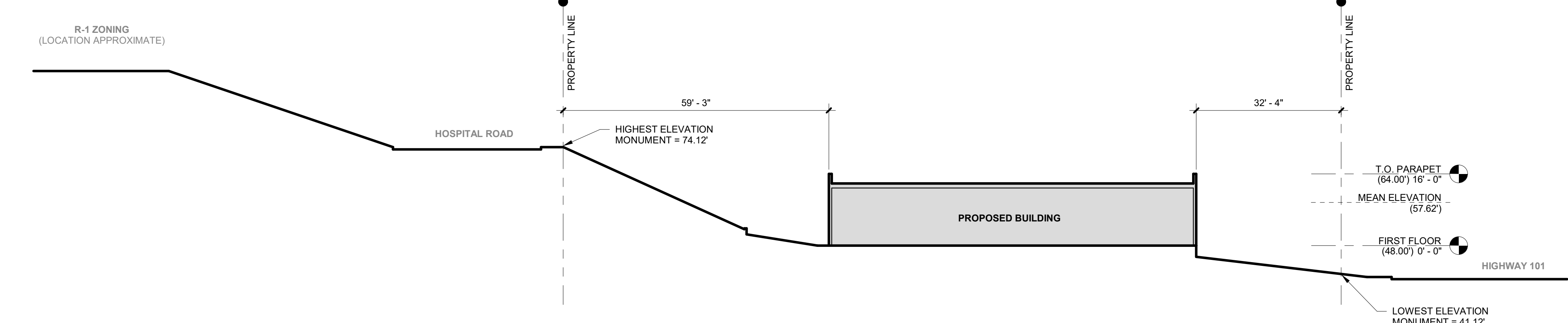
**4 BUILDING MOUNTED SIGNAGE**  
1/2" = 1'-0"



**5 MONUMENT SIGN**  
1/2" = 1'-0"



**2 SITE SECTION**  
1/16" = 1'-0"



**3 SITE SECTION**  
1/16" = 1'-0"

DESIGN DEVELOPMENT 11.17.2023  
ISSUE DATE

Drawing:  
**ARCHITECTURAL  
SITE PLAN,  
SECTIONS, &  
DETAILS**

Sheet No:

**AX.01**

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**NEHALEM BAY  
HEALTH CENTER  
& PHARMACY**

Job Number: 21148


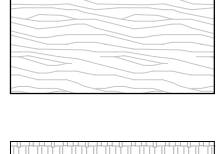
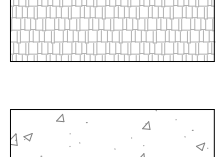
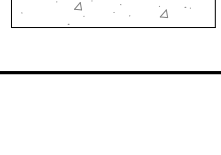
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WHEELER, OREGON 97147

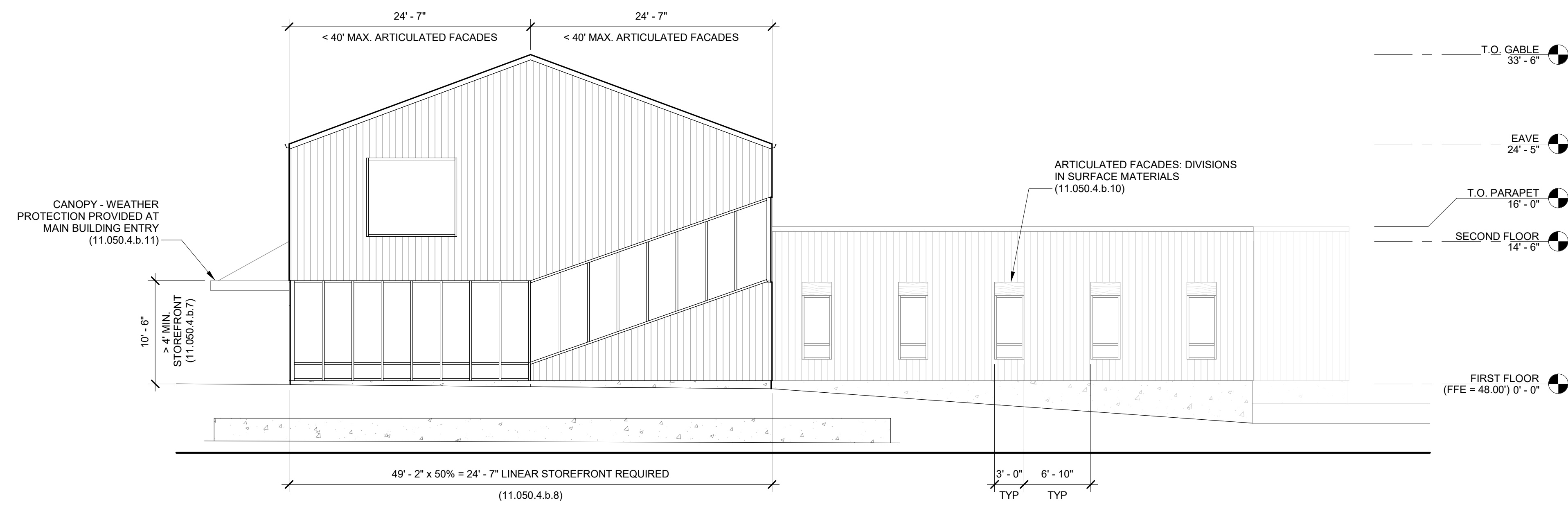


**GENERAL SHEET NOTES**

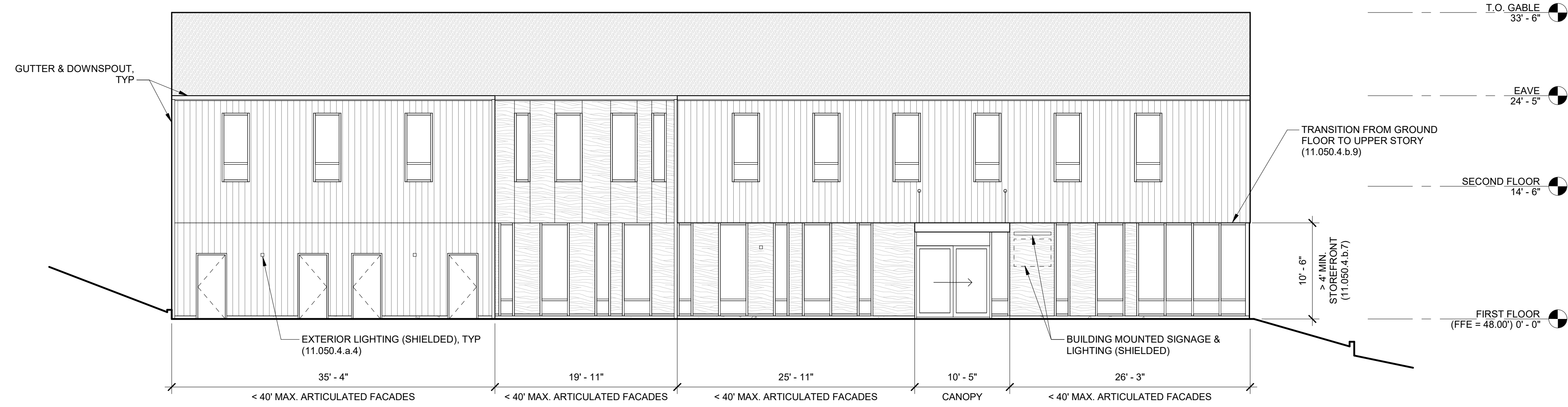
A. GENERAL ELEVATION NOTES HERE

**LEGEND**

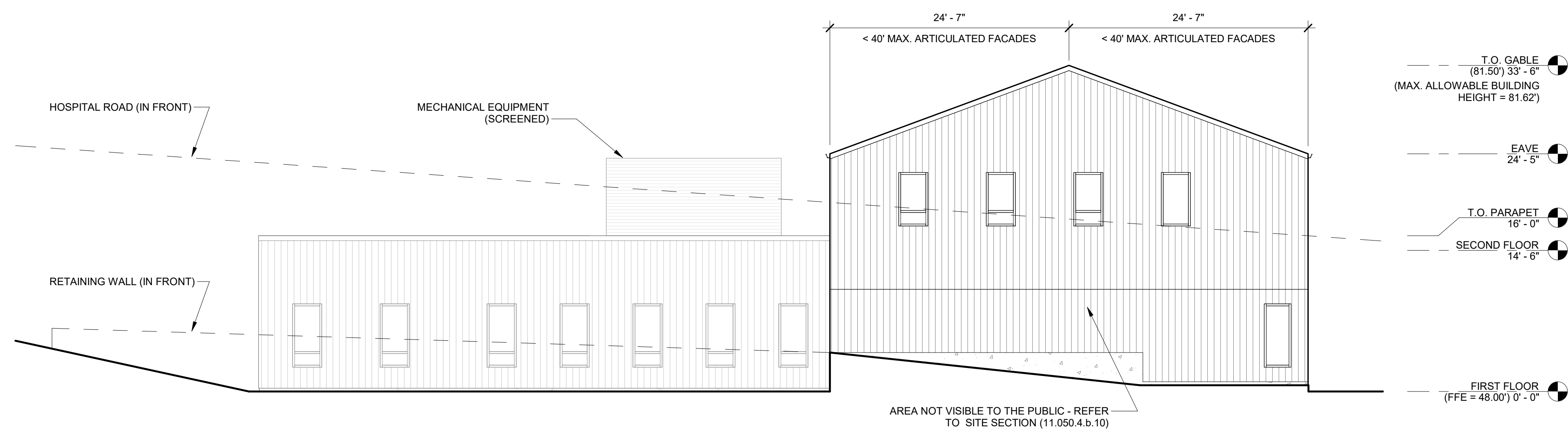
-  FIBER CEMENT SIDING: ARTISAN V-GROOVE
-  WOOD-LIKE SIDING
-  ASPHALT SHINGLE ROOFING
-  CONCRETE STEMWALL OR RETAINING WALL



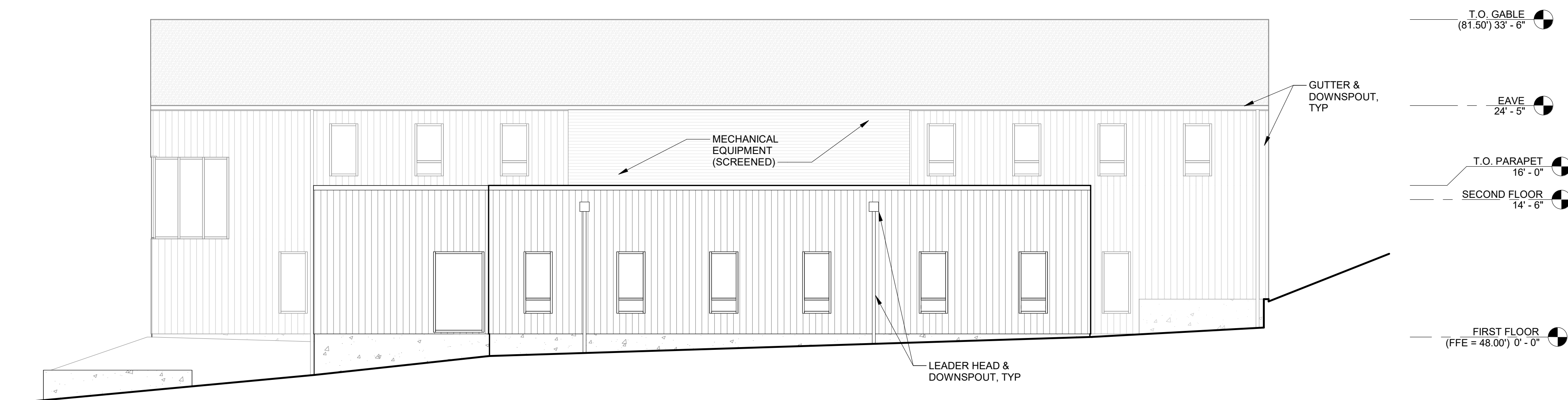
**1 NORTH ELEVATION**  
1/8" = 1'-0"



**2 EAST ELEVATION**  
1/8" = 1'-0"



**3 SOUTH ELEVATION**  
1/8" = 1'-0"



**4 WEST ELEVATION**  
1/8" = 1'-0"

DESIGN DEVELOPMENT 11.17.2023  
ISSUE DATE

Drawing:

**EXTERIOR  
ELEVATIONS**

Sheet No:

**AX.02**

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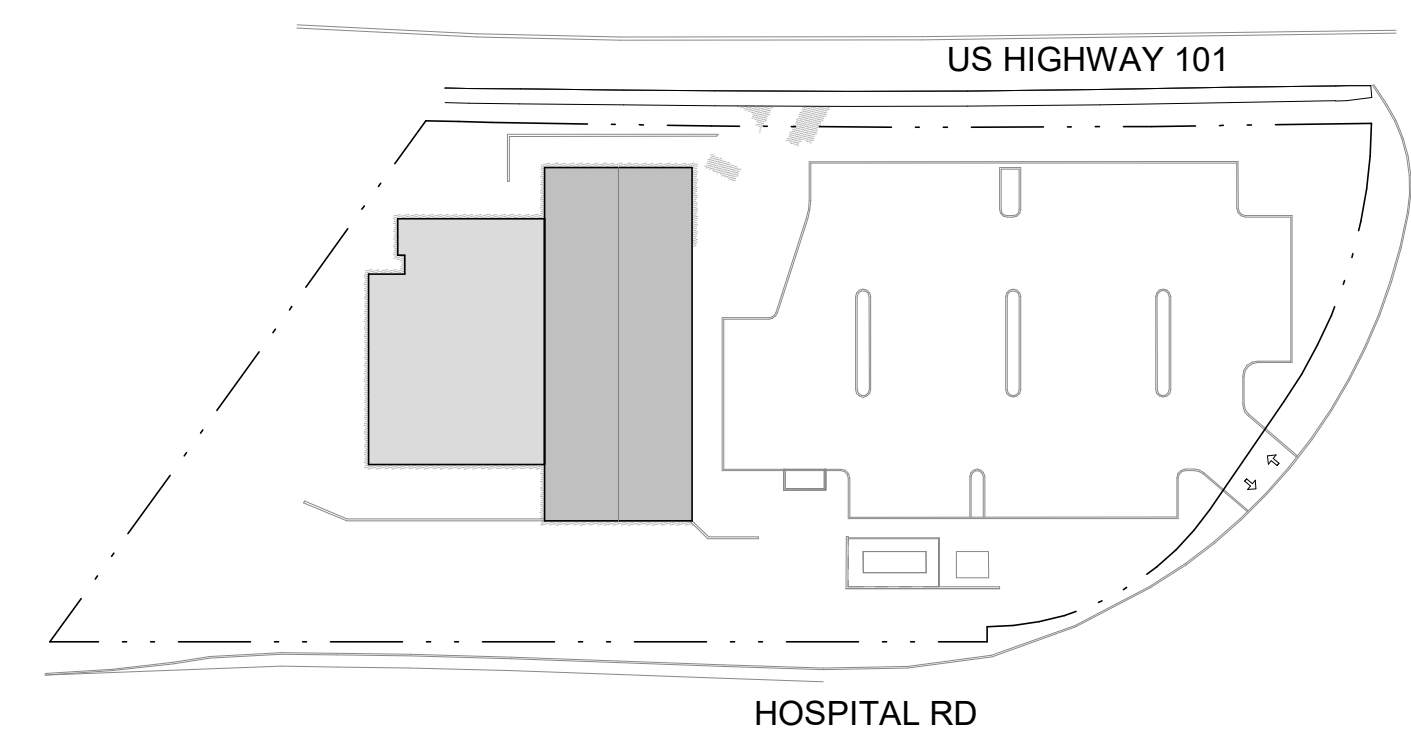
**NEHALEM BAY HEALTH CENTER & PHARMACY**  
 Job Number: 21148  
 TAX LOT 400, U.S. HIGHWAY 101  
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KEY PLAN

DESIGN DEVELOPMENT 11.17.2023  
 ISSUE DATE

Drawing:  
**RENDERS**

Sheet No:  
**AX.03**