



City of Napavine

407 Birch Ave. SW
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Napavine, WA 98565
(360) 262-3547

Industrial - Commercial Site Plan and Environmental Review Staff Report

Project Name: Napavine Truck Stop

Hearing Date: May 10th, 2023

Proposal: The project will construct a travel center facility including a convenience store with internal fast-food restaurant, drive-thru, and amenities including showers and laundry. The travel center will include an auto fueling canopy and parking area, truck fueling canopy and truck parking area, a detached vehicle maintenance building, and platform scale. Utility services, stormwater management, and landscape and wetland buffer enhancements are proposed. The travel center proposes three driveway entrances to Hamilton Road. The project site is 14.0 acres.

Location: 121 Hamilton Road; Napavine, Washington
Parcel # 018050005002

Owner: GMD Land Company, LLC

Applicant: GMD Land Company, LLC

Engineer: Daniel Phillips; SCJ Alliance

Staff: Bryan Morris - City of Napavine Public Works Director
Katie Williams - City of Napavine Administrative Assistant
Devin Jackson, City Engineer (*Consultant, Jackson Civil*)
Jim Buzzard, City Attorney (*Consultant, Buzzard O'Rourke*)
Marissa Jay, City Attorney (*Consultant, Buzzard O'Rourke*)

Recommendation: Approved subject to Conditions

City of Napavine Public Works Director's initials: _____

Date issued:

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I. BACKGROUND

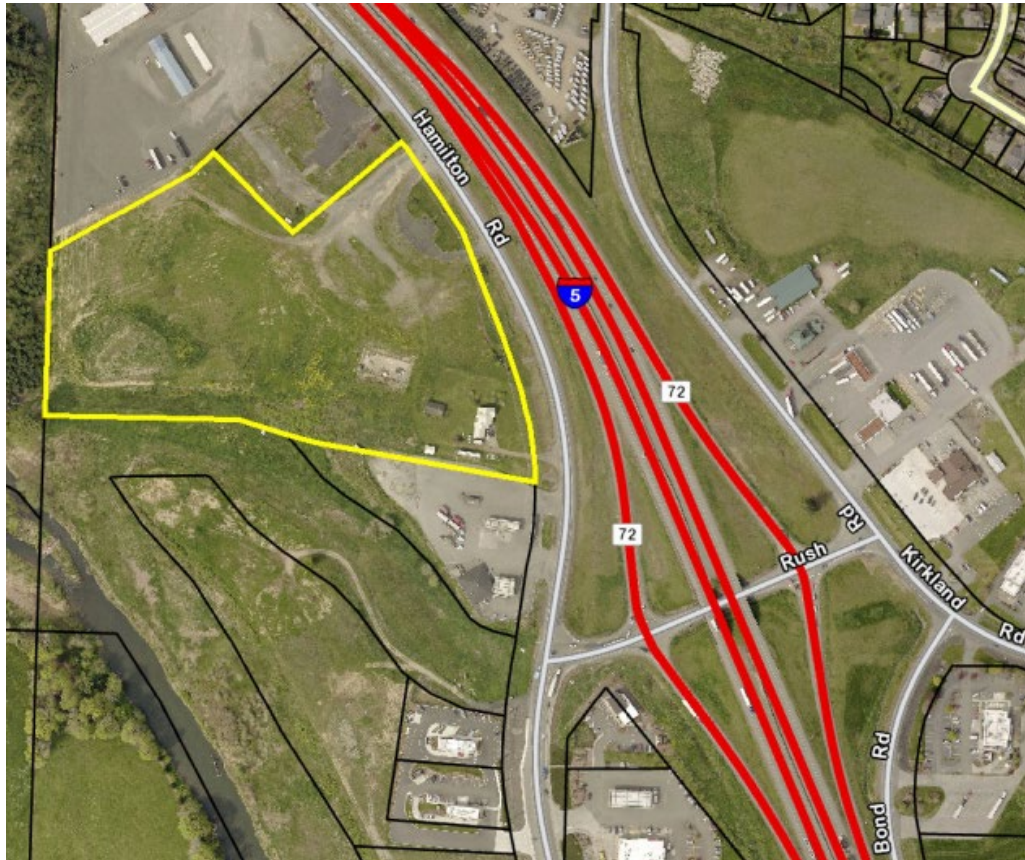
A. General Site Information

Parcel Zone: Commercial
Size of Site: ±14.00 acres (16.98 acres in GIS)
Existing Vegetation: Trees, shrubs, grasses, and asphalt surface
Existing Structures: A single-family residential building.
Adjacent Land Uses: To the north lies commercially developed land. The east is bordered by the I-5 highway. The south comprises commercially developed land and undeveloped residential land. To the west is an agricultural area.
Adjacent Zoning: Surrounded by Commercial (C/C1) zoned areas
Topography: The site is mainly flat with a gentle slope towards the southwest.
Wetlands: Wetlands are potentially present in the southwest and northeast portions of the site.
Flood Plain: The southwest portion of the site is within the 100-year and 500-year floodplain.
Shoreline Jurisdiction: Project is adjacent to a shoreline area. No part of the project lies within the shoreline jurisdiction.
Access Roads: There are three (3) existing driveway approaches entering the site from Hamilton Road.

B. Land Use Processing

Application Submitted:	28 Day Counter Complete Determination
Project Completion Review:	120 Day for Review

Figure 1. Location



Parcel Number: 018050005002
Situs Address: 121 HAMILTON RD
Owner: HAMILTONS WALNUT SHADE LLC
Assessor's Use Description: 11 Single Unit
Property Type: COM
Land Use: single-residential
Land Value: 2,958,600
Improvement Value: 15,000
Total Value: 2,973,600
Total Acres: 16.98
Mail Address: 295 KIRKLAND RD
City: CHEHALIS
State: WA
Zip: 98532

II. DOCUMENTS REVIEWED

The documents reviewed and considered in connection with this staff report include the following:

- A. Environmental SEPA checklist
- B. Engineering submittal
- C. Traffic impact analysis report
- D. Stormwater technical information report
- E. Critical area report

III. PROCEDURAL REQUIREMENTS

Authority for this review is included in the Napavine Municipal Code (NMC) including, Title 12 NMC “Streets, Sidewalk and Public Places”; Title 13 NMC “Public Service”; Title 15 NMC “Building and Construction”; Title 18 NMC “Environment”. The 2017 City of Napavine Comprehensive Growth Management Plan 2003-2023 (as updated). As well as the City of Napavine Public Works Standard (NPW) including Chapters, 2 Transportation, 3 Storm Drainage, 4 Water, and 5 Sanitary Sewer. The decision will be conducted in accordance with rules of procedure adopted by Ordinance No. 639. The final decision on the Applications will be made by the Hearing Examiner.

IV. APPLICABLE REGULATIONS/ANALYSIS

A. NAPAVINE MUNICIPAL CODE

Title 12 - STREETS, SIDEWALKS AND PUBLIC PLACES

12.04 - PUBLIC WORKS CONSTRUCTION STANDARDS

12.04.040 - Design standards

There are adopted design standards for the construction of streets and sidewalks as follows in Sections 12.04.050 and 12.04.060.

12.04.050 - Streets, alleys, cul-de-sacs, side slopes, base, and roadway grade

Arterial streets, collector streets, access streets, residential streets, feeder streets, alleys, cul-de-sacs, side slopes, base, and roadway grades shall be, and the same hereby are, defined as set forth in the Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge, and Municipal Construction for said improvements as adopted and posted from time to time by the Public Works Director of the City of Napavine, Washington. Copies of said specifications and standards are on file with the city and may be reviewed at any time during normal city business hours.

FINDING: The project proposes public improvements in the city right-of-way. NMC 12.04 applies.

CONDITION OF APPROVAL: Prior to engineering approval, plans depicting public improvements satisfying applicable City standards and the most current version of the WSDOT Standard Specifications shall be submitted for review and approval by the City.

12.14 STREET TREES

12.14.050 - Planting size

Street trees shall be two-to-three-inch caliper, measured six inches above the base.

12.14.060 - Planting location

- A. Street trees shall be located at least four feet behind the backside of the curb.*
- B. Street trees shall be spaced thirty-five feet on center starting fifteen feet from property line.*
- C. Street tree spacing may be adjusted slightly to allow a ten-foot clean zone on either side of a driveway.*
- D. Street trees will be planted at least fifteen feet from utility lines.*

12.14.110 - Permit to trim

It is unlawful for any person, firm or corporation; to in any manner, remove, destroy, or cut any tree or shrub now or hereafter planted within the limits of any street or alley in the city of Napavine without having first obtained a permit so to do with the compliance of a standard reference guide.

12.14.130 - Hearing by city council

If the conditions described in said notice have not been corrected prior to the time specified therein, a resolution shall be presented to the city council on the date designated in the notice therefor, which resolution shall provide that the department of the city of Napavine named therein shall, after the date set therein, forth with cause the removal or destruction of the vegetation, or any part thereof, as specified or complained of in said notice. Upon introduction of the resolution, the owner shall cause, if any, why the vegetation or such part thereof should not be removed or destroyed. The finding of the city council determining that the vegetation described in the notice is or is not a nuisance shall be conclusive. If the city council finds that the same is a nuisance and the owner has appeared at the hearing thereon the owner may, in the discretion of the council, be given such additional time as may be specified by the council to abate the nuisance.

FINDING: The application provides landscape area, but does not provide landscaping specifics; therefore, the standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, a complete landscaping plan satisfying all parts of NMC 12.14 shall be submitted for review and approval by the City.

Title 13 - PUBLIC SERVICES

13.02 - PUBLIC WATER SYSTEM

13.02.020 - Application for connection

- A. All new connections, whether inside or outside the city limits shall be metered.*
 - 1. Commercial. One meter may serve more than one business if in the same building, if separate buildings, separate meters are required.*
 - 2. Residential. Separate meters shall be required for all single-family residences. All motels, hotels, recreational vehicle parks, multi-dwellings, condominiums, planned unit developments, and apartments may be served by one meter.*
- B. Applicants for service within the corporate limits of the city may be required to obtain a building or plumbing permit for the premises where water service is being requested.*
- C. Applicants for service outside the corporate limits of the city shall provide required information, comply with city annexation agreement requirements, and sign an agreement stating that they will not oppose annexation of the area including the premises for which service is being applied.*

- D. *If no public sewer service is available to any premises for which application for water service is made, approval of the application shall be conditioned upon the applicant obtaining a septic tank permit from the Lewis County health district, and no connection shall be made if such septic tank permit is not issued.*

13.02.070 - Water services meter location

All water service connections shall be made by, or under the control of the city. Meters shall be placed as follows:

- A. *Within the corporation limits of the city, meters shall be placed within two feet of the edge of the sidewalk or proposed sidewalk on the curb side in existing plats and within two feet of the sidewalk on the property side in new plats.*
- B. *Within the county, meters shall be placed within the county right-of-way and within two feet of the property line nearest the customer's premises.*
- C. *In instances other than contained herein, or where the public works director determines that unusual or conflicting conditions exist, the location of meters shall be determined by the public works director.*

13.02.100 - Service connection—Location of service pipe

Water service pipe shall not be laid or maintained parallel with and within ten feet horizontally of any sanitary sewer, electrical conduit, gas pipe, or communications cable, septic tank, or drain field. When additional water pipe extensions or replacements are to be made beneath the surface of the ground within the premises and connected with existing water service pipes between the meter and the premises, an application therefor shall be made to the city for inspection and approval prior to backfilling the trenches.

13.02.290 - Fire protection

- A. *Any customer using city water for all purposes shall be entitled to a separate standby fire protection service. Such standby fire protection service shall be provided through a separate water connection. The water connection fee for such standby fire protection service shall be as provided in city ordinance. Standby fire protection lines shall be used for no other purpose than for standby fire protection service and all other uses thereof shall be prohibited. The monthly charge for such standby fire protection service shall be as provided in city ordinance. Such standby fire protection connection fees and standby fire protection service charges shall be based upon the size of the customer's line at its connection to the main, and shall not be based on any specific pressure or volume of water furnished to the customer. The city does not, by the connection of a standby fire protection service, and shall not, by agreement or otherwise, warrant or guarantee a minimum water pressure or water volume for such service.*
- B. *Where standby fire protection service is provided, no charge shall be made for water used in extinguishing fires of incendiary or accidental origin if the customer at the location where the fire occurs gives written notice to the city within ten days from the time of such fire that a fire has occurred. Otherwise, a charge for all water used shall be made at the rate for use of fire protection facilities provided in NMC 13.04.020(A).*

13.02.370 - Construction standards

All persons, firms, corporations, and governmental agencies, and/or their contractors, repairing, replacing, installing, extending, or performing other work on water system lines, facilities, service lines, connections, and/or appurtenances thereto, or performing other work that may interfere, conflict, affect, or endanger the water system of the city shall follow and comply with the provisions of the

engineering development code of the city as adopted by the city. Where the engineering development code of the city are silent on any construction standards issue, the current version of the Washington State Department of Transportation/Washington State Chapter of the American Public Works Association Standard Specifications for Road, Bridge, and Municipal Construction shall apply.

13.02.410 - Water main extension request

When a person desires to extend a city water main, that person must make a written request to the city and state on that request the location where the extension is desired, the purpose for extension, and give details and extent of any development they are considering, as well as any other factors as may be pertinent. The public works director shall evaluate all requests for main extensions, taking into consideration the availability of water in the existing mains, reservoir capacity, pressures in the area, and other local conditions. If the proposal is acceptable, specific conditions and requirements will be determined by the public works director.

13.02.420 - Water main extension design

The proposed main extension shall be designed by a licensed engineer and be approved by the public works director and appropriate governmental authorities. The design shall be in conformance with city standards as contained in the engineering development code of the city, and shall be designed by the use of a hydraulic analysis, considering pipe size, restrictions, peak demand, length of run, elevation differences, and other factors that may be pertinent.

FINDING: The engineering plans shows that water will be accessible via a connection to an existing water main on Hamilton Road. The plans also proposed two fire hydrants, one will connect to an existing 8-inch water stub for the development site fire hydrants, and the other one will connect to an existing 12-inch water main for fire department connection with DCDA. There will be one 3-inch compound water meter with bypass in the development site. The water meters will be located on the east side of the development site, and within the city right-of-way. This standard applies. **See Chapter 4 NPW of this report for water design conditions of approval.**

CONDITION OF APPROVAL: Prior to engineering approval, applicant shall submit fire marshal acceptance of engineered drawings for city review and approval. A public easement shall be provided encompassing the DCDA, all meters, and all hydrants as well as the water lines serving the DCDA, meters, and hydrants.

13.05 - CROSS-CONNECTIONS AND BACKFLOW PREVENTION

13.05.030 - Backflow prevention assembly requirement

Approved backflow prevention assemblies shall be installed at the expense of the user, either at the service connection or within the premises, as determined by a cross-connection inspector specialist employed by the city in each of the following circumstances:

- A. If the nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the drinking water supply in any way.*
- B. On premises having any one or more cross-connections as that term is defined in Section 13.05.010.*
- C. Internal cross-connections that are not correctable, or intricate plumbing arrangements which make it impractical to ascertain whether or not cross-connections exist.*
- D. A repeated history of cross-connections being established or re-established.*

- E. Unduly restricted entry so that inspections for cross-connections cannot be made with sufficient frequency or with sufficient notice to assure that cross-connections do not exist.
- F. Materials of a toxic or hazardous nature being used in such that, if back siphonage should occur, a health hazard could result.
- G. All fire sprinkler systems install as minimum protection a double check detector assembly.
- H. All irrigation systems shall install as minimum protection a double check valve assembly.
- I. All properties having a private well that are also connected to city water shall install a reduced pressure backflow assembly at the service connection, or have the option to abandon the well as prescribed in the Washington Administrative Code.
- J. On any premises where installation of an approved backflow prevention assembly is deemed to be necessary to accomplish the purpose of these regulations in the judgment of a certified cross-connection specialist employed by the city.
- K. On any premise where an appropriate cross-connection report form has not been filed with the office of the city water utility.
- L. The choice and application of cross-connection devices in specific circumstances shall comply with WAC 246.290, et seq.

13.05.060 - Access to premises

Authorized employees of the city, with proper identification, shall have access during reasonable hours to all parts of the premises and within the building to which water is supplied. However, if any water user refuses access to a premise or to the interior of a structure at reasonable times and on reasonable notice for inspections by a cross-connection specialist appointed by the city, a reduced pressure backflow assembly will be required to be installed at the service connection to that premise.

FINDING: The preliminary site plan shows a new 3-inch reduced pressure backflow assembly will be installed for the water service connection. This standard applies.

CONDITION OF APPROVAL: Prior to occupancy, the applicant shall provide an easement for access to all backflow devices to the city.

13.20 - LATECOMER AGREEMENTS

FINDING: The proposal does not include latecomer agreement applications; therefore, NMC 13.20 does not apply.

13.30 - STORM WATER SYSTEM

13.30.010 - Storm water standards

The city council adopts the Washington State Department of Ecology "Basic Storm Water Protection Standards" for use in the storm water management within the city of Napavine.

13.30.020 - Use in development review

The city council requires the use of the basic storm water protection standards for all building and development review of storm water drainage and authorizes the public works superintendent to attach storm water quantity and quality conditions to meet the basic storm water program standards.

13.30.040 - Standards of practice

The city council sets the city standard of performance for storm drainage as in all utilities as that of "best engineering practices" for all construction within city.

13.30.060 – Permits

- A. *No building permit shall be issued nor excavation begun upon private land on which a driveway will be installed or constructed, unless or until a culvert permit is issued under this chapter. No driveway may be installed without an approved culvert and no culvert may be installed unless or until a culvert permit is issued under this chapter.*
- B. *A culvert permit may be issued only upon approval of an application for such a permit. Installation of the culvert under the permit must be done pursuant to the specifications in the permit. Permits may be issued per culvert.*

13.30.090 - Existing driveways and culverts

- A. *Prior existing culverts which were in existence before the passage of this chapter are exempt from the requirement to procure a permit prior to installation. Prior existing driveways that do not have an existing or operable culvert must be upgraded and must include a culvert upon notification by the city. When the city becomes aware of a prior existing driveway without a culvert or without an operable culvert, it may provide written notice to the owner thereof by mailing, postage prepaid, a notice to the owner's last known address or by posting the notice at or near the driveway in a conspicuous location. Upon mailing or posting, the owner shall have ninety days to apply for a permit and properly install a working culvert. This provision does not limit the city's ability to repair or remove the danger driveway or culvert as provided in this chapter.*
- B. *Any modifications or upgrades to a prior existing driveway or culvert must conform to this chapter and are not exempt from the permitting requirement.*

FINDING: The proposal includes a preliminary drainage plan and stormwater preliminary technical information report satisfying adopted standards. This standard is met. **See Chapter 3 NPW of this report for stormwater design conditions of approval.**

Title 14 – MISCELLANEOUS PROVISIONS

14.10 - NAPA VINE CRITICAL AREAS ORDINANCE (NCAO)

14.10.100 – DEVELOPMENT STANDARDS

- A. *Authorization Required. Within critical areas, the city shall prohibit soil excavation, grading, removal of native vegetation species, draining, intentional burning, planting of invasive or nuisance vegetation, placement of structures and new construction on critical areas unless otherwise authorized in this chapter.*
 - 1. *These development standards apply to uses on critical areas and within buffers unless otherwise exempted in this title.*
 - 2. *In order to approve application for development on lands subject to this chapter, the administrator shall find that the following standards have been met:*
 - i. *All reasonable alternatives for locating the development activity in such a way so as to avoid critical areas have been considered and the development activity will be located in the least environmentally sensitive area as practicable and the purpose of this chapter, as described in NDC 4.010.010, is fulfilled. If avoidance is not practicable, as determined by the city, development shall minimize adverse impacts to critical areas and buffers consistent with the mitigation sequencing measures and mitigation and enhancement measures prescribed in the chapter.*

- ii. *The city has approved the vegetation removal methods and the removal of native plants has been avoided.*
- iii. *All adverse impacts to all affected critical areas and buffers are either avoided or fully mitigated.*
- iv. *The plan minimizes cuts and fills.*
- v. *Soils are not exposed during the rainy season (November 1 through April 30) and construction activity is limited to the dry season (May 1 through October 31).*
- vi. *The administrator has reviewed and approved an erosion control plan, grading plan, and vegetation removal and replanting plan prior to construction activity.*
- vii. *All activities have received applicable state and federal permits, and comply with SEPA requirements if the lead agency makes a threshold determination of significance (DS), or mitigated determination of non-significance (MDNS).*
- viii. *Hydraulic permits are required for any activity occurring within the ordinary high-water mark of any state regulated class I or class II stream.*
- ix. *Compliance with this chapter does not constitute compliance with state and federal environmental standards. The applicant shall be responsible for demonstrating such compliance.*

B. Review Process.

1. *The review process shall be the type specified in the NDC for each particular land use action unless otherwise specified in this chapter.*
2. *Applications to develop on critical areas or their buffers shall be subject to review if, within a one-year period, the cumulative impact on critical areas is:*
 - a. *Disturbance of more than twenty-five cubic feet of soil;*
 - b. *An activity, the fair market cost of which is more than five hundred dollars; or*
 - c. *The activity involves more than one thousand square feet of critical areas.*
3. *Standard Requirements. All applications requiring review under this section shall have the following minimum conditions applied:*
 - a. *Critical Area and Buffer Marking During Construction. The location of the outer extent of the critical area and its buffer, if any, shall be marked in the field and such markings shall be maintained throughout the duration of the permit.*
 - b. *Permanent Marking of Critical Area and Buffer. A permanent and perpetual physical demarcation along the upland boundary of the critical area and buffer shall be installed and thereafter maintained. Such demarcation may consist of logs, a tree or hedgerow, wood or wood like fencing, or other prominent physical marking approved by the administrator. In addition, signs measuring (minimum size one foot by one foot and posted 3.5 feet above grade) shall be posted at an interval of one per lot or every one hundred feet, whichever is less, and perpetually maintained at locations along the outer perimeter of the critical area and buffer approved by the Administrator worded substantially as follows: "CRITICAL AREA AND BUFFER—PLEASE RETAIN IN A NATURAL STATE."*
 - c. *A conservation covenant shall be recorded in a form approved by the city attorney as adequate to incorporate the other restrictions of this section and to give notice of the requirement to obtain a permit prior to engaging in regulated activities within a habitat area or its buffer.*

- C. *Record of Notice. Prior to issuance of any development or building permit on lands subject to this chapter, the property owner shall record a record of notice of critical areas, on a form provided by the city, on all properties affected by critical areas and buffers and shall provide the city clerk with a copy of the recorded notice.*
- D. *SEPA Review. On a case-by-case basis, the responsible official may issue a determination of non-significance (DNS) if:*
 - 1. *The application for development review contains all requested information, including reports, maps and other documents relevant to the proposed activity;*
 - 2. *The proposed activity complies with all applicable development review and performance standards; and*
 - 3. *Compliance with all applicable development standards and performance standards is made a binding condition of land use approval.*

FINDING: Based on the critical area report, a kidney-shaped freshwater emergent wetland is indicated in the mid-section of the western half of the site in the Lewis County GIS. However, LCG did not observe a wetland in that area. A single depressional freshwater emergent wetland (Category III) was located to the south of the subject site within a historic meander channel of the Newaukum River. A Category III wetland with a moderate habitat score next to proposed high-intensity land use requires a standard 150-foot-wide buffer. In addition, buffers on the Newaukum River are encompassed by the adjacent wetland and associated wetland buffers. There are no developments proposed within the 200-foot buffer of the Newaukum River with the exception of invasive plant removal and the limited grade necessary to install native trees and shrubs. The critical area report proposed a buffer reduction method for the Category III wetland. To compensate for the reduction of the 150-foot buffer to 110 feet. The standard applies.

CONDITION OF APPROVAL: Prior to engineering approval, applicant shall submit a mitigation plan for city review and approval.

CONDITION OF APPROVAL: Prior to building occupancy, applicant shall complete the installation of all mitigation plantings and post a 5-year maintenance bond.

Title 15 - BUILDINGS AND CONSTRUCTION

15.04 - CONSTRUCTION CODES

15.04.020 - Codes adopted

Pursuant to the state Building Code Act, RCW 19.27A.010 et seq., the city adopts by reference the following:

- A. *The International Building Code, 2009 edition, as published by the International Code Council, be and is hereby adopted as the building code of the city of Napavine;*
- B. *Uniform Mechanical Code, 1982 Edition, including Chapter 22, Fuel Gas Piping, Appendix B, published by the International Conference of Building Officials;*
- C. *The Uniform Fire Code and Uniform Fire Code Standards, 1982 Edition, published by the International Conference of Building Officials and the Western Fire Chiefs Association; provided that, notwithstanding any wording in this code, participants in religious ceremonies shall not be precluded from carrying hand-held candles;*
- D. *The Uniform Plumbing Code and Uniform Plumbing Code Standards, 1982 Edition, published by the International Association of Plumbing and Mechanical Officials; provided, that Chapters 11 and 12 of such code are not adopted;*

- E. *The rules and regulations adopted by the council establishing standards for making buildings accessible to and usable by the physically handicapped or elderly persons as provided for in RCW 70.92.100 through 70.92.160; and*
- F. *The Washington State Energy Code, June 30, 1980 Edition, adopted by the state Building Code Advisory Council and amendments to the code adopted prior to January 1, 1985, the revisions to the state energy code adopted pursuant to RCW 19.27.075, and subsequent amendments adopted by the council under RCW Chapter 34.05.*
- G. *The International Residential Code, 2009 edition, as published by the International Code Council, be and is hereby adopted as the residential code of the city of Napavine.*

In case of conflict among the codes enumerated in subsections A through G of this section, the first named code shall govern over those following.

15.08 - ENERGY CODE

15.08.010 – Adopted

WAC Chapter 51-12 as the same now appears or hereafter may be amended, shall be, and is adopted by this reference as the energy code of the city.

FINDING: The proposal will construct an TA travel center building, and a truck shop. However, building specific drawings were not submitted for review. The standard is not met.

CONDITION OF APPROVAL: Prior to building construction, applicant shall submit all necessary drawings compliant with NMC 15.04 or the most current state standards for City review and approval. The applicant shall apply for all necessary building permits, pay associated fees, and be in possession of said permits.

15.12 - FLOOD DAMAGE PREVENTION

FINDING: A small portion of the southwest corner lies in Zone AE and Zone X as shown on FEMA Flood Insurance Rate Map. Letter of Map Revision was executed for the site on December 18, 2015, likely associated with fill placed on the site from prior development. The proposed project will not place any structures within the portion of the site that is mapped as floodplain. The standard is met.

15.16 - GRADING, EXCAVATION AND LAND FILLING

15.16.020 - Permit required

A grading/fill permit application is required for grading, excavation or filling of land except as exempted under Section 15.16.030 of this chapter. There is no fee for fill application less than 500 cubic yards.

15.16.060 – Standards

The following standards must be met to the satisfaction of the community development director or designee prior to permit issuance:

- A. *Cut slopes shall be no steeper than is safe for the intended use and shall not be steeper than two horizontal to one vertical, or as recommended by a soils engineer.*
- B. *Fills that are intended for building sites shall be constructed in conformance with the requirements of the latest edition of the IBC (International Building Code) as adopted by the city.*

- C. *Except as permitted by the city, no material other than earth material shall be buried or placed in fills. Placement of other than earth material is regulated by state statutes or federal laws and additional permits may be required.*
- D. *Fills shall be constructed using earth materials (consisting of dirt/soil, large rock twelve inches or greater, pit run four to twelve inches, fines less than four inches, concrete over twelve inches and concrete less than twelve inches), compaction methods and construction techniques, so that stable fills are created.*
- E. *The following fill material shall be prohibited: Asphalt, asphalt grindings, asphalt shingles, base/tar paper and any hazardous materials, petroleum based products and household items.*
- F. *Grading, filling, or clearing in or within the vicinity of a wetland shall comply with NMC Chapter 14.*
- G. *Grading, filling or clearing in an area of special flood hazard shall be done in accordance with the latest version of the city of Napavine floodplain management ordinance (NMC Chapter 15.12) or this chapter, whichever has the more stringent development regulations.*
- H. *Grading, filling or clearing of archaeological sites shall be done in accordance with WAC Chapter 25-48, as now adopted or as may be amended, or other applicable state or federal law.*

FINDING: The proposal indicates that approximately 10,000 cubic yards of select fill will be required for pavement areas. In addition, the applicant also provides a preliminary grading plan. The standard is met.

Title 17 – ZONING

17.12 - ZONING MAP AND ZONING CHART

17.12.020 - General land use zones

- A. *The city is divided into general land use zoning districts, referred to in this title as "zones." Such zones shall be shown on the map and the intent of each zone and limitations and requirements of use of land therein shall be shown on the chart. No structure or land shall hereafter be used or occupied and no building shall be reconstructed, moved or structurally altered except in conformity with all the regulations set forth in the chart and other sections of this title.*
- B. *For the purposes of this title, the city is divided and classified into the following regular zones:*
 - 1. *R-1 Single-family residential;*
 - 2. *R-2 Multiple residential, low density;*
 - 3. *R-3 Multiple residential, high density;*
 - 4. *C-1 Commercial;*
 - 5. *H-C Highway commercial;*
 - 6. *I-1 Industrial, light.*

17.12.030 - Special land use zones

Each parcel of land in the city shall be covered by one of the preceding regular zones. In addition, where consistent with the intent of zones as expressed in the chart, land may be classified as a special zone. Such special zone must overlay a regular zone and all uses and structures in a special zone shall conform to the regulations of both the special and regular zones, except where regulations of the regular zone are specifically modified in the chart. Special zones are:

- A. *CS Community Service;*
- B. *PUD Planned unit development;*
- C. *FP Flood plain;*

D. AS Aerospace.

17.28 - C AND C-1 DISTRICTS

17.28.020 - Permitted uses and structures

Permitted uses and structures in the C-1 zone are as follows: all commercial uses conducted within an enclosed building; professional offices for attorneys, dentists, doctors, engineers, accountants, real estate brokers, automobile service stations, restaurants, cafes and other eating establishments, and uses of similar and compatible nature. Motels, hotels, apartments and recreational vehicle parks are permitted in this zone as planned unit developments. Facilities for managers, caregivers, and uses of similar and compatible nature allowed, subject to planning commissioner's review and council approval. It is specifically provided for in this section that the property, commonly known as tax parcels 17875-7-3, 17875-7-4 and 17875-5 (which are within a C-1 district) shall be allowed to have uses permitted in the building to the standards of single-family residential, multifamily residential and mobile home parks."

17.28.030 - Permitted accessory uses and structures

Permitted accessory uses and structures in the C-1 zone are as follows

- A. *Any use or structure customarily accessory to permitted uses shall be permissible.*
- B. *On-site hazardous waste treatment and storage facilities that are directly associated with principal uses; provided, that such facilities comply with the state siting criteria contained in RCW 70.105.210 and WAC 173-303-282, or their successors.*

17.28.040 - Conditional uses

After hearing and attachment of conditions, the following uses are permitted: production of items sold on the premises, including small scale production, sewn or woven articles, quilting, ceramics, and similar small scale craft items, garden supply stores, boarding houses, horticultural nurseries, kennels, stables, and pet shops, and other uses later deemed to be conditional by the board of adjustment. Industrial uses of nonnoxious industry are permitted in this zone as a planned unit development subject to approval by the planning commission. Such industries do not produce noise, odor, smoke, fumes, or other nuisances. Examples include any research, experimental, testing, assembling, manufacturing, compounding, or other activity which is conducted inside a completely enclosed building, except for parking and loading, which creates absolutely no nuisance or pollution which has any effect beyond the confines of the building.

17.28.045 - Conditional use conditions

The planning commission shall review the following in identifying appropriate conditions for the proposed use:

- A. *Napavine comprehensive plan and zoning requirements review for applicable requirements for signage, light and glare, landscape buffering, parking circulation, critical areas and aquifer protection;*
- B. *Public facilities impact such as water, sewer and drainage requirements;*
- C. *Prior department comments, after inspection, for fire safety requirements and fire flow concerns, if any; and*
- D. *City police department comments for nuisance, health and safety concerns.*

17.28.050 - Permitted dimensions

Permitted dimensions in the C-1 zone are as follows:

- A. *Minimum lot size, five thousand square feet;*

- B. *Minimum lot front, thirty feet;*
- C. *Maximum lot cover, one hundred percent, including parking and buffer zones;*
- D. *Minimum front yard depth, none;*
- E. *Minimum side yard depth, none, except a fifteen-foot buffer where adjacent to a residential district;*
- F. *Minimum rear yard depth, none, except a twenty-five-foot buffer where adjacent to a residential district;*
- G. *Maximum building height, fifty feet, or thirty-five feet when lot adjacent to any residential district.*

17.28.070 - Fences, walls, and hedges

- A. *Fences within any street setback area shall be limited to:*
 - 1. *Forty-two inches high above adjacent grade if the fence is more than fifty percent opaque;*
 - 2. *Forty-eight inches high above adjacent grade if the fence is fifty percent or less opaque.*
- B. *Fences which are not located within any street setback area shall be limited to six feet high above adjacent grade.*
- C. *No residential fence shall contain barbed wire, broken glass, electricity, or any other hazardous material or substance.*
- D. *Where a legally established use exists requiring the containment of farm animals or livestock, barbed wire or an electric fence may be used; provided, that such fence is set back more than twenty feet from any public right-of-way or public property and more than three feet from any adjacent private property, and warning signs are posted consistent with NMC 17.62.070(V).*
- E. *Retaining walls shall be located entirely upon private property except where required by the public works director to protect public property.*
- F. *A retaining wall shall not project higher than six inches above the higher adjacent grade except when it is a structural element of a building or structure.*
- G. *Retaining walls which are higher than four feet from the bottom of the footing to the top of the wall shall comply with all applicable provisions of the building code, including, but not limited to, permit requirements.*
- H. *Retaining walls which serve as a structural element of any building or structure shall comply with all of the applicable provisions of the building code.*
- I. *A hedge shall comply with the requirements for a fence; provided, hedges which are not located within a street setback, and do not otherwise constitute a traffic visibility obstruction on any right-of-way or alley, or any public nuisance condition, are not limited in height.*

FINDING: The proposal indicates the current zoning of the development site is C1; therefore, this standard applies. The development building lot size is 14.00 acres (min. 5000 square feet). Front lot line (lot front) is approximately 900 feet (min. 30 feet). Based on the SEPA checklist, about 73% of the property will be covered with impervious surface, and the maximum building height is 35 feet (max. 50 feet). This standard is met.

17.48 – FLOODPLAIN

FINDING: See the finding on the NMC 15.12.

17.60 - MISCELLANEOUS REGULATIONS

17.60.010 - Visibility at intersections in residential zones

- A. *Fences, walls or hedges up to a maximum height of six feet may be installed except:*

1. *Within the existing or zone stipulated, whichever is less, front and street side yard setback;*
 2. *Within the area between two main structures with less than five feet of continuous horizontal clearance on each side of the fence, wall or hedge;*
 3. *Within a twenty-foot vision clearance triangle formed by the intersection of two street rights-of-way;*
 4. *Within a ten-foot vision clearance triangle formed by the intersection of an alley and street right-of-way.*
- B. Within the areas identified in subsections (A)(1) and (2), fences, walls and hedges up to a maximum height of four feet may be installed.*
- C. Within the areas identified in subsections (A)(3) and (4), fences, walls and hedges up to a maximum height of three feet may be installed, except open wire-mesh fences which may be up to a maximum of four feet.*

17.60.030 - Street access required

Every building hereafter erected or moved shall be on a lot adjacent to a public street or with access to an approved private street.

17.60.040 - Horizontal dimensions—One-family dwelling

The greatest horizontal dimensions of a one-family dwelling shall not be more than three times its least horizontal dimension. See the appendix for illustration on file in the office of the city clerk-treasurer.

17.60.050 - Parking restrictions—Recreational vehicles and boats

No recreational vehicle, boat, boat trailer or similar equipment shall be parked within the required street or side setbacks of any lot in any residential zone for a period of longer than thirty-six consecutive hours; provided, that one recreational vehicle, boat trailer or similar equipment belonging to visitors to a residence may be parked within such setbacks for a period of up to fourteen days, and provided further, that one such visit shall not be followed by another at the same residence for a period of at least thirty days. Except under circumstances of the preceding provision, a recreational vehicle shall not be used for living, sleeping or housekeeping purposes when parked on a street or any portion of a residential lot.

17.60.060 - Siting criteria—Hazardous waste facilities

On-site and off-site hazardous waste treatment and storage facilities must meet the state siting criteria adopted pursuant to RCW Chapter 70.105.

17.60.070 – Landscaping

Commercial, multifamily or industrial uses shall submit a landscape plan for approval with the application. Approved landscaping shall be completed prior to issuance of a final occupancy permit. The front yard shall be one hundred percent landscaped including lawns, and shrubs, berms or floral planting areas which shall average ten feet wide but no less than five feet wide at any given point except where access is provided. There shall be a five-foot wide side and rear yard landscape setback between uses. Within the landscape area including acceptable trees, shrubs and lawns, one street tree per twenty-five lineal feet of street frontage shall be provided. In any parking lot over fifteen spaces five percent of the interior of the parking area shall consist of landscape islands. Street trees shall be a minimum of one and one-half inch caliper six feet tall of nursery stock or better quality. Any dead or diseased trees within two years of installation shall be replaced.

FINDING: The preliminary plan shows the building is on the lot adjacent to a public street, and also includes landscaping plan; therefore, NMC 17.60 applies.

CONDITION OF APPROVAL: Prior to engineering approval, the landscaping plan shall satisfy all parts of NMC 17.60.070 and be submitted for review and approval by the City.

17.62 – SIGNS

17.62.030 – Applicability

Any sign placed, erected, relocated, enlarged, structurally changed, altered in the city must conform to the standards and procedures described herein. As applied in this chapter, a sign is defined as any device, structure, fixture or placard that uses works, letters, numbers, symbols, graphic designs, logos, or trademarks for the purpose of:

- A. Providing information or directions; or*
- B. Identifying or advertising any place, establishment, product, good, or service. Other terms relating to signs as applied in this chapter are described in Section 17.62.050, Definitions.*

Certain signs are allowed without city approval or a city permit (see Section 17.62.070, Signs allowed without city approval or permits); others are prohibited because they are inconsistent with the purpose and scope of this chapter (see Section 17.62.060, Prohibited signs). All non-exempt, allowable temporary and permanent signs are regulated by this chapter and must meet the specification and city permit or approval requirements described in this chapter.

17.62.040 - Approval or permit requirements

- A. General. It shall be unlawful for any person to place, erect, relocate, enlarge, structurally change, or alter any non-exempt temporary or permanent sign in the city without obtaining written approval from the city.*
- B. Discretionary Permits. If the administrator determines that more effective, coordinated signs will result, he/she may require that any signage that is a part of a proposed use or development requires approval through conditional use process.*

17.62.100 - Sign design standards

A. Construction Standards

- 1. General Requirements. Every sign, and all parts, portions, and materials shall be manufactured, assemble, and erected in compliance with all applicable state, federal and city regulations and the Uniform Building Ordinance.*
 - 2. Structural Components. To the maximum extent possible, signs should be construed and stilled so that angle irons, guy-wires, braces, and other structural elements are not visible. This limitation does not apply to structural elements that are an integral part of the overall design such as decorative metal or woods.*
- B. Location. No sign shall be located so as to physically obstruct any door or exit from a building. No sign shall be located so as to be hazardous to a motorist's ingress or egress from parking areas or any way open to the public. No sign shall be located within the clear-view zone.*
 - C. Landscaping Around Ground Mounted Signs. An area around the base of each ground mounted sign equal to the sign area must be landscaped to improve the overall appearance of the sign and to reduce the risk of automobiles hitting the sign or supports of the sign. This*

landscaping must include vegetation and may include other materials and components such as brick or concrete bases, planter boxes, pole covers or decorative framing.

- D. *Illumination Limitations on Electrical Signs.* No sign may contain or utilize any of the following:
1. Any exposed incandescent lamp with wattage in excess of twenty-five watts.
 2. Any exposed incandescent lamp with an internal or external reflector.
 3. Any continuous or sequential flashing device or operation.
 4. Except for changing message centers, any incandescent lamp inside internally lighted signs.
 5. External light sources directed towards or shining on vehicular or pedestrian traffic or on a street.
 6. Internally lighted signs using eight hundred milliamp or larger ballast if the lamps are spaced closer than twelve inches on center.
 7. Internally lighted signs using four hundred twenty-five milliamp or larger ballast if the lamps are spaced closer than six inches on center.
- E. *Measurement*
1. *Sign Area.* Sign area shall be computed as follows:
 - a. *General Requirements.* Where a sign consists of a generally flat surface or sign face on which lettering or other information is affixed, the sign area shall be computed by measuring the entire face of the sign.
 - b. *Individual Letters.* Where a sign consists of individual letters and/or logo affixed directly to a building canopy, awning or building surface, the area of the sign shall be computed by measuring the area of the envelope required to enclose the lettering and/or logo. Neon signs are computed in this manner.
 2. *Setback and Distance Measurements.* The following guidelines shall be used to determine compliance with setback and distance measurements:
 - a. The distance between two signs shall be measured along a straight horizontal line that represents the shortest distance between the two signs.
 - b. The distance between a sign and a parking lot or building shall be measured along a straight line that represents the shortest distance between the outer edge of the parking lot or building.

FINDING: The proposal includes two monument signs, one at the truck entrance and one at the regular vehicle entrance, in accordance with the engineering plans. This standard applies.

CONDITION OF APPROVAL: No signs shall be installed without a sign permit issued by the City of Napavine. Sign area, size and location shall be in accordance with NMC 17.62.100.

17.64 - OFF-STREET PARKING AND LOADING

17.64.010 - Requirements for off-street parking

Off-street parking spaces under standards set forth in this chapter shall be provided for new uses in the quantities specified in this section.

A. Residential Uses

1. One-family dwelling, two spaces;
2. Duplex dwelling, four spaces;

3. *Multiple-family dwelling with sixteen or fewer dwelling units, two spaces for each dwelling unit; except in cases of housing dedicated to senior citizen housing one space for each dwelling unit;*
 4. *Multiple-family dwelling with more than sixteen dwelling units, thirty-two spaces, plus one and one-half spaces for each dwelling unit in excess of sixteen; except in cases of housing dedicated to senior citizen housing one space for each dwelling unit;*
 5. *Convalescent homes, homes for the children or aged, and similar residential institutions, one space for each three beds.*
- B. *Commercial Uses. Commercial uses within the area designated "Parking Exempt" on the map and addenda to the map shall not be subject to the following requirements:*
1. *Food or drug stores with more than five thousand square feet of gross floor area: one space for each one hundred square feet of gross floor area;*
 2. *Other retail stores with more than five thousand square feet of gross floor area: one space for each one hundred fifty square feet of gross floor area;*
 3. *Retail stores with five thousand or less square feet of gross floor area: one space for each three hundred square feet of gross floor area; provided that at least two spaces shall be provided for any such use;*
 4. *Medical and dental offices: one space for each one hundred square feet of gross floor area;*
 5. *Offices other than medical or dental: one space for each four hundred square feet of gross floor area; provided that at least two spaces shall be provided for any such use;*
 6. *Restaurants: one space for every three seats or stools or for every three persons of legal occupancy, whichever is greater;*
 7. *Bowling alley: four spaces for each alley;*
 8. *Self-service laundry: one space for every three washing or drying machines;*
 9. *Banks: one space for each four hundred square feet of gross floor area;*
 10. *Funeral parlors: one space for each one hundred square feet of chapel or auditorium area;*
 11. *Barber or beauty shops: two spaces for each operator station;*
 12. *Personal service establishments not otherwise listed: one space for each four hundred square feet of gross floor area; provided that at least two spaces shall be provided for any such use;*
 13. *Motel: one space for each sleeping unit;*
 14. *Motor vehicle or machinery sales: one space for each two thousand square feet of gross floor area;*
 15. *Wholesale establishments: one space for each two thousand square feet of gross floor area.*
- C. *Industrial Uses.*
1. *Manufacturing: one space for each one thousand square feet of gross floor area, provided that additional parking shall be provided for any retail sales or office space at the ratio required in subsection B(1) through (5);*
 2. *Contractors establishment: one space for each thousand square feet of gross floor area, provided that additional parking shall be provided for any retail sales or office space at the ratio required in subsection B(1) through (5);*
 3. *Warehouses: one space for each two thousand square feet of gross floor area provided that additional parking shall be provided for any retail sales or office space at the ratio required in subsection B(1) through (5).*
- D. *Institutional Uses.*

1. *Schools: one space for each eight seats in auditorium, or one space for each two hundred square feet of public assembly area if such does not have fixed seating;*
 2. *Auditoriums, theaters, churches, and community centers: one space for each four seats or for each eight feet of bench seating, or one space for each one hundred square feet of public assembly area if use does not have fixed seating;*
 3. *Libraries, museums: one space for each three hundred square feet of gross floor area;*
 4. *Hospitals: two spaces for each three beds.*
- E. Unlisted Uses. A parking requirement for any use not listed in the preceding sections shall be established by the building inspector, based on the requirement for that listed use deemed to be most comparable in terms of parking demand or on standards in the building code.*
- F. Fractional Spaces. Whenever the preceding formulas result in a requirement for a fractional number of spaces, the requirement shall be rounded upward to a whole number.*
- G. Off-Street Loading Facilities. The building inspector shall require that any new business, industrial or institutional use, provide sufficient off-street truck loading facilities to assure that no loading or unloading occurs within any public right-of-way, provided that uses within the area marked "Parking Exempt" on the map shall not be subject to this requirement.*

17.64.020 - Standards for off-street parking

- A. All parking areas, except residential parking for six spaces or less, shall provide for the turning, maneuvering and parking of the required number of vehicles on the lot.*
- B. All areas used for parking and maneuvering of vehicles shall be surfaced as specified by the city public works director.*
- C. Artificial lighting which may be provided shall be deflected so as to not shine into adjacent dwellings and so as not to create a hazard to the traveling public on any road.*
- D. Each required parking space shall be of usable shape and accessible from a public street or alley. Where access drives are necessary, they shall be no less than fifteen feet in width for nonresidential and multiple family residential developments and no less than nine feet for one family and duplex dwellings.*
- E. Commercial or industrial parking area shall be screened from adjacent residential zones by means of sight obscuring landscape, screens, walls or fences, which shall be subject to the following standards:*
- 1. Sight obscuring screening shall be not less than five feet in height;*
 - 2. Required screening shall be at least eighty percent opaque when viewed horizontally from between two feet above average grade and the top of the screening;*
 - 3. Screen plantings shall be of such size as to provide the required degree of screening within twelve months after installation;*
 - 4. Required screening shall be continuously maintained;*
 - 5. All areas used for parking, loading and maneuvering of vehicles shall be physically separated from public streets or adjoining property by required setbacks or by bumper rails, or other effective and suitable barriers against the access or egress of unchanneled motor vehicles.*
- F. Joint Use of Parking. The building inspector may authorize the joint use of parking facilities under the following conditions:*
- 1. Up to one hundred percent of the parking space required for a church may be supplied by off-street parking provided for other uses, provided that such parking lies within two hundred feet of the site of the church;*

2. *Up to fifty percent of the parking space required for a theater, auditorium, bowling alley, or community center may be supplied by off-street parking provided for other uses, provided that such parking lies within two hundred feet of the site of subject use;*
 3. *Two or more uses may join to develop a cooperative parking facility: the total amount of parking required under such circumstances shall be ten percent less than the total amount required for the uses separately. In case of uses which operate at totally different times, the total minimum amount is that required for the most intensive use;*
 4. *Under subdivisions 1, 2 or 3 of this subsection, there shall be filed with the building inspector a written agreement between parties involved assuring to the building inspector's satisfaction, the validity and perpetuity of the joint use.*
- G. *Location of Parking. All required off-street parking other than joint use parking as provided in subsection F shall be located on the same site as the principal use, provided that such parking may be located on another site within two hundred feet of the principal use if a covenant or written agreement is filed with the building inspector assuring to the building inspector's satisfaction the perpetuity of such parking.*

FINDING: The proposed work includes the construction of a 26,085 sq. ft. travel center and truck shop. The NMC 17.64.010 requirement for total off-street parking spaces is approximately 180, which is met by the proposal's provision of 207 parking spaces, including 7 ADA accessible spaces. However, the project does not describe screening information on the west side of property. Therefore, the standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, applicant shall submit all necessary drawings compliant with NMC 17.64 for City review and approval. A photometric plan demonstrating that lighting does not exceed 0.5 footcandle at the property lines. In addition, a landscaping plan demonstrating that west side of property is adequately screened from adjacent residential zones. Both the photometric and landscaping plans shall be submitted for city review and approval.

Title 18 – ENVIRONMENT

18.04 - ENVIRONMENTAL PROTECTION ACT PROCEDURES AND POLICIES

18.04.040 - Categorical exemptions and threshold determinations.

- A. *(WAC 173-806-065). Purpose of this Part and Adoption by Reference. This part contains the rules for deciding whether a proposal has a “probable significant, adverse environmental impact” requiring an environmental impact statement to be prepared. This part also contains rules for evaluating the impacts of proposals not requiring an EIS. The city adopts the following sections by reference, as supplemented in this part:*
1. *197-11-300 Purpose of this part.*
 2. *197-11-305 Categorical exemptions.*
 3. *197-11-310 Threshold determination required.*
 4. *197-11-315 Environmental checklist.*
 5. *197-11-330 Threshold determination process.*
 6. *197-11-335 Additional information.*
 7. *197-11-340 Determination of nonsignificance (DNS).*
 8. *197-11-350 Mitigated DNS.*
 9. *197-11-360 Determination of significance (DS)/Initiation of scoping.*
 10. *197-11-390 Effect of threshold determination.*

- B. (WAC 173-806-070). *Flexible Thresholds for Categorical Exemptions.*
1. *The city establishes the following exempt levels for minor new construction under WAC 197-11-800(1)(b) based on local conditions:*
 - a. *For residential dwelling units in WAC 197-11-800(1)(b)(i), up to twenty dwelling units;*
 - b. *For agricultural structures in WAC 197-11-800(1)(b)(ii), up to thirty thousand square feet;*
 - c. *For office, school, commercial, recreational, service or storage buildings in WAC 197-11-800(1)(b)(iii), up to twelve thousand square feet and up to forty parking spaces;*
 - d. *For parking lots in WAC 197-11-800(1)(b)(iv), up to forty parking spaces;*
 - e. *For landfills and excavations in WAC 197-11-800(1)(b)(v), up to five hundred cubic yards.*
 2. *Whenever the city establishes new exempt levels under this section, it shall send them to the Department of Ecology, Headquarters Office, Olympia, Washington, 98504 under WAC 197-11-800(1)(c).*
- C. (WAC 173-806-090). *Environmental Checklist.*
1. *A completed environmental checklist, or a copy, in the form provided in WAC 197-11-960, shall be filed at the same time as an application for a permit, license certificate or other approval not specifically exempted in this chapter; except, a checklist is not needed if the city and applicant agree an EIS is required, SEPA compliance has been completed, or SEPA compliance has been initiated by another agency. The city shall use the environmental checklist to determine the lead agency and, if the city is the lead agency, for determining the responsible official and for making the threshold determination.*
 2. *For private proposals, the city will require the applicant to complete the environmental checklist, providing assistance as necessary. For city proposals, the department initiating the proposal shall complete the environmental checklist for the proposal.*

18.04.070 - *SEPA and agency decisions*

- A. (WAC 173-806-155). *Purpose of this Part and Adoption by Reference. This part contains rules and policies for SEPA's substantive authority, such as decisions to mitigate or reject proposals as a result of SEPA. This part also contains procedures for appealing SEPA determinations to agencies or the courts. The city adopts the following sections by reference:*
1. *197-11-650 Purpose of this part.*
 2. *197-11-655 Implementation.*
 3. *197-11-660 Substantive authority and mitigation.*
 4. *197-11-680 Appeals.*
- B. (WAC 173-806-160). *Substantive Authority.*
1. *The policies and goals set forth in this chapter are supplementary to those in the existing authorization of the city.*
 2. *The city may attach conditions to a permit or approval for a proposal so long as:*
 - a. *Such conditions are necessary to mitigate specific probable adverse environmental impacts identified in environmental documents prepared pursuant to this chapter, and*
 - b. *Such conditions are in writing, and*
 - c. *The mitigation measures included in such conditions are reasonable and capable of being accomplished, and*

- d. *The city has considered whether other local, state or federal mitigation measures applied to the proposal are sufficient to mitigate the identified impacts, and*
 - e. *Such conditions are based on one or more policies in subdivision (4) of this subsection and cited in the license or other decision document.*
 - 3. *The city may deny a permit or approval for a proposal on the basis of SEPA so long as:*
 - a. *A finding is made that approving the proposal would result in probable significant adverse environmental impacts that are identified in a FEIS or final SEIS prepared pursuant to this chapter; and*
 - b. *A finding is made that there are no reasonable mitigation measures capable of being accomplished that are sufficient to mitigate the identified impact; and*
 - c. *The denial is based on one or more policies identified in subdivision (4) of this subsection and identified in writing in the decision document.*
 - 4. *The city designates and adopts by reference the following policies as the basis for the city's exercise of authority pursuant to this section:*
 - a. *The city shall use all practical means, consistent with other essential considerations of state policy, to improve and coordinate plans, functions, programs, and resources to the end that the state and its citizens may:*
 - i. *Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;*
 - ii. *Assure for all people of the state safe, healthful, productive and aesthetically and culturally pleasing surroundings;*
 - iii. *Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;*
 - iv. *Preserve important historic, cultural and natural aspects of our national heritage;*
 - v. *Maintain, wherever possible, an environment which supports diversity and variety of individual choice;*
 - vi. *Achieve a high balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and*
 - vii. *Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.*
 - b. *The city recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.*
 - 5. *When any proposal or action not requiring a decision of the city council is conditioned or denied on the basis of SEPA by a nonelected official, the decision shall be appealable to the city council. Such appeal may be perfected by the proponent or any aggrieved party by giving notice to the responsible official within ten days of the decision being appealed. Review by the city council shall be on a de novo basis.*
- C. *(WAC 173-806-173). Notice of Statute of Limitations.*
 - 1. *The city, applicant for, or proponent of an action may publish a notice of action pursuant to RCW 43.21C.080 for any action.*
 - 2. *The form of the notice shall be substantially in the form provided in WAC 197-11-990. The notice shall be published by the city clerk-treasurer or county auditor, applicant or proponent pursuant to RCW 43.21C.080.*

FINDING: The proposal includes a SEPA environmental checklist; this standard is met.

CONDITION OF APPROVAL: Prior to engineering approval, a Cultural Resource Survey shall be performed and a report submitted for review and approval by the City.

18.08 - FLOOD HAZARD REDUCTION

Article I. - Statutory Authorization, Findings of Fact, Purpose, and Objectives

18.08.020 - Findings of fact

- A. The flood hazard areas of the city of Napavine are subject to periodic inundation which results in loss of life and property, health, and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.**
- B. These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.**

18.08.040 - Methods of reducing flood losses

In order to accomplish its purposes, this chapter includes methods and provisions for:

- A. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;**
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;**
- C. Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;**
- D. Controlling filling, grading, dredging, and other development which may increase flood damage; and**
- E. Preventing or regulating the construction of flood barriers that unnaturally divert floodwaters or may increase flood hazards in other areas.**

Article III. - General Provisions

18.08.060 - Lands to which this chapter applies

This chapter shall apply to all areas of special flood hazards within the jurisdiction of the city of Napavine.

18.08.070 - Basis for establishing the areas of special flood hazard

The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for the city of Napavine dated July 17, 2006", and any revisions thereto, with an accompanying flood insurance rate map (FIRM), and any revisions thereto, are hereby adopted by reference and declared to be a part of this chapter. The flood insurance study and the FIRM are on file at Community Development Department, 407 Birch Avenue SW, Napavine, Washington, 98565. The best available information for flood hazard area identification as outlined in Section 18.08.150(B) shall be the basis for regulation until a new FIRM is issued that incorporates data utilized under Section 18.08.150(B).

Article IV. – Administration

18.08.130 - Establishment of development permit

- A. *Development Permit Required (44 CFR 60.3(b)(1)). A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 18.08.070. The permit shall be for all structures including manufactured homes, as set forth in the "definitions," and for all development including fill and other activities, also as set forth in the "definitions."*
- B. *Application for Development Permit. Application for a development permit shall be made on forms furnished by the community development department and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:*
 - 1. *Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures recorded on a current elevation certificate (FF 086-0-33) with Section B completed by the local official.*
 - 2. *Elevation in relation to mean sea level to which any structure has been floodproofed;*
 - 3. *Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet floodproofing criteria in Section 18.08.180;*
 - 4. *Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.*

18.08.160 - Conditions for variances

- A. *Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a small or irregularly shaped lot contiguous to and surrounded by lots with existing structures constructed below the base flood level. As the lot size increases the technical justification required for issuing the variance increases.*
- B. *Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.*
- C. *Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.*
- D. *Variances shall only be issued upon:*
 - 1. *A showing of good and sufficient cause;*
 - 2. *A determination that failure to grant the variance would result in exceptional hardship to the applicant;*
 - 3. *A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.*
- E. *Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from flood elevations should be quite rare.*

- F. *Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except Section 18.08.160(A), and otherwise complies with Sections 18.08.170(A), (C) and (D) of the general standards.*
- G. *Any applicant to whom a variance is granted shall be given written notice that the permitted structure will be built with its lowest floor below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk.*

Article V. - Provisions for Flood Hazard Reduction

18.08.170 - General standards

In all areas of special flood hazards, the following standards are required:

A. Anchoring

- 1. *All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.*
- 2. *All manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors. (44 CFR 60.3(b)(8)). For more detailed information, refer to guidebook, FEMA P-85, "Protecting Manufactured Homes from Floods and Other Hazards."*

B. Construction Materials and Methods

- 1. *All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.*
- 2. *All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.*
- 3. *Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding. Locating such equipment below the base flood elevation may cause annual flood insurance premiums to be increased.*

C. Utilities

- 1. *All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the systems;*
- 2. *Water wells shall be located on high ground that is not in the floodway*;*
- 3. *New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;*
- 4. *Onsite waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.*

D. Subdivision Proposals

- 1. *All subdivision proposals shall be consistent with the need to minimize flood damage;*
- 2. *All subdivision proposals shall have public utilities and facilities, such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage;*

3. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage;
 4. Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least fifty lots or five acres (whichever is less).
- E. Review of Building Permits (44 CFR 60.3(a)(3)). Where elevation data is not available either through the flood insurance study, FIRM, or from another authoritative source (Section 18.08.150(B)), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above the highest adjacent grade in these zones may result in higher insurance rates.

18.08.180 - Specific standards

In all areas of special flood hazards where base flood elevation data has been provided as set forth in Section 18.08.070, basis for establishing the areas of special flood hazard, or Section 18.08.150(B), use of other base flood data. Additional standards were clarified in FEMA Technical Bulletin 11-01. No below grade base flood elevation construction is permitted in the special flood hazard areas. However, adopting this provision can result in a twenty percent increase in flood insurance premiums. The following provisions are required:

A. Residential Construction

1. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one foot or more [1] above the base flood elevation (BFE).
2. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:
 - a. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
 - b. The bottom of all openings shall be no higher than one foot above grade.
 - c. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Foundation vent standards required by the IBC/IRC outside the floodplain do not meet this standard and are often inadvertently permitted. Insurance rates reflect an "all or nothing" standard, meaning, partially ventilated crawlspaces may be subject to an additional loading fee of twenty to twenty-five percent attached to the annual insurance premium.

- ##### B. Nonresidential Construction (44 CFR 60.3(c)(3)(4)).
- New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated one foot or more [2] above the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

1. *Be floodproofed so that below one foot or more above the base flood level the structure is watertight with walls substantially impermeable to the passage of water;*
2. *Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;*
3. *Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 18.08.150(C)3(2);*
4. *Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in 18.08.180(B);*

C. Manufactured Homes

1. *All manufactured homes in the floodplain to be placed or substantially improved on sites shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated one foot or more above* the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement.*

D. Recreational Vehicles. Recreational vehicles placed on sites are required to either:

1. *Be on the site for fewer than one hundred eighty consecutive days, (or)*
2. *Be fully licensed and ready for highway use, on wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and have no permanently attached additions; or*
3. *Meet the requirements of Section 18.08.180(C) above and the elevation and anchoring requirements for manufactured homes.*

18.08.190 - AE and A1-30 zones with base flood elevations but no floodways

In areas with base flood elevations (but a regulatory floodway has not been designated), no new construction, substantial improvements, or other development (including fill) shall be permitted within zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

18.08.200 – Floodways

Located within areas of special flood hazard established in Section 18.08.070 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters that can carry debris, and increase erosion potential, the following provisions apply:

- A. *Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels during the occurrence of the base flood discharge.*
- B. *Construction or reconstruction of residential structures is prohibited within designated floodways*, except for (i) repairs, reconstruction, or improvements to a structure which do not increase the ground floor area; and (ii) repairs, reconstruction or improvements to*

- a structure, the cost of which does not exceed fifty percent of the market value of the structure either, (A) before the repair, or reconstruction is started, or (B) if the structure has been damaged, and is being restored, before the damage occurred. Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions, or to structures identified as historic places, may be excluded in the fifty percent.*
- C. *If subsection A is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Article V, provisions for flood hazard reduction.*

18.08.210 - Critical facility

Construction of new critical facilities shall be, to the extent possible, located outside the limits of the special flood hazard area (SFHA) (one hundred-year floodplain). Construction of new critical facilities shall be permissible within the SFHA if no feasible alternative site is available. Critical facilities constructed within the SFHA shall have the lowest floor elevated three feet above BFE or to the height of the five hundred-year flood, whichever is higher. Access to and from the critical facility should also be protected to the height utilized above. Flood proofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. Access routes elevated to or above the level of the base flood elevation shall be provided to all critical facilities to the extent possible.

FINDING: The proposal indicates a small portion of the southwest corner of the parcel is located within Zone AE – 100-year flood plain, and Zone X - outside the 0.2% annual chance floodplain. The preliminary site plan shows that the project will not have any structures in the flood zone, but the southwest part of the parking area will be located in both Zone AE and Zone X. The standard applies.

CONDITION OF APPROVAL: Prior engineering approval, no new construction, substantial improvements, or other development (including fill) shall be permitted within zones AE. Unless the applicant demonstrates the proposed development will not increase the water surface elevation of the base flood more than one foot at any point within the community.

B. PUBLIC WORKS STANDARD

CHAPTER2 TRANSPORTATION

2B STREETS

2B.02 Design Standards

The design of streets and roads will depend upon their type and usage. The design elements of city streets will conform to these Standards as set forth herein and current design practices as set forth in Chapter 1.

The layout of streets will provide for the continuation of existing principal street in adjoining subdivisions or of their proper projection when adjoining property is not subdivided. Minor streets, which serve primarily to provide access to abutting property, will be designed to discourage through traffic. See Table I, Minimum Standards.

Table 1 Minimum Street Standards

DESIGN STANDARD	BOULEVARD	MAJOR OR MINOR ARTERIAL	COMMERCIAL COLLECTOR	NEIGHBORHOOD COLLECTOR	LOCAL ACCESS	PRIVATE
DESIGN LIMITATIONS	Access and intersections should be limited. No on-street parking.		N/A	N/A	N/A	N/A
MINIMAL STRUCTURAL DESIGN	See standard Drawing Number 2-2					
STANDARD RIGHT-OF-WAY	90'-102'	84'-104'	66'-78'	60'	60'	N/A
STANDARD PAVEMENT WIDTH	48' (may have a 16' median)	48'-60'	40'	28'-40'	36'	20'
PARKING LANE	None Allowed	None Allowed	8' Both Sides	7' One Side	7' One Side	N/A
MINIMUM MAXIMUM GRADE	0.5% - 8.0%	0.5% - 8.0%	0.5% - 10.0%	0.5% - 12.0%	0.5% - 15.0%	0.5% - 15.0%
CURB	Both Sides					N/A
SIDEWALKS	Both Sides 6' (min) 8' – pedestrian corridor 10' – zero lot setback			Both Sides 5'	Both Sides 5'	One Side 5'
CUL-DE-SAC RADIUS (PAVEMENT WIDTH)	N/A	N/A	50' (on industrial street only)	N/A	47' with landscaped and island radius of 17'	Fire department Standards
INTERSECTION CURB RADIUS	35'	35'	35'	35'	25'	25'
DESIGN SPEED (MPH)	40	40	30	30	25	N/A
MINIMUM CENTERLINE RADIUS	w/ superelevation * per AASHTO w/o superelevation 600'	w/ superelevation * per AASHTO w/o superelevation 600'	150'	150'	100'	N/A

* Maximum superelevation – 6%

- A. *Alignment of major arterials, minor arterials and collectors will conform as nearly as possible with that shown in the Comprehensive Plan.*
- B. *Grade. Street grade should conform closely to the natural contour of the land. In some cases the Director of Public Works may require a different grade. The minimum allowable grade will be 0.5 percent. The maximum allowable grade will be 8-15 percent depending on the street classification.*
- C. *Width. The pavement and right-of-way width will depend on the street classification. Table I, Minimum Street Standards, show the minimum widths allowed.*

2B.04 Signing and Striping

Street signs are defined as any regulatory, warning, or guide signs. The developer is responsible for the cost of all street signs. Street sign will comply with the latest edition of the U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD).

Pavement markings and street signs, including poles and hardware, will be paid for by the developer, but will be designed, furnished and installed by the city or by the developer under the city's direction, to establish and maintain uniformity. The Public Works Department will determine whether pavement markings and street signs will be provided by the city or by the developer. If the work is to be performed by the city, the developer must submit a written request to Public Works and, the developer will then be billed, upon completion of the work.

2B.05 Right-of-Way

Right-of-way is determined by the functional classification of a street, refer to Table 1, Minimum Street Standards.

Right-of-way requirements may be increased if additional lanes, pockets, transit lanes, bus loading zones, operational speed, bike lanes, utilities, or other factors are required as determined by the Director of Public Work.

Right-of-way will be conveyed to the city on a recorded plat or by a right-of- way dedication deed.

FINDING: The proposal indicates that the right-of-way dimensions for Hamilton Road are 50-feet to 80-feet, but it has been determined that the commercial collector must have 66-feet to 78-feet of right-of-way. Therefore, this standard is not met.

CONDITION OF APPROVAL: Prior engineering approval, applicant shall provide a 16-foot right-of-way dedication in order to comply with the required 66-foot right-of-way dimensions for the commercial collector.

2B.06 Private Streets

FINDING: The proposal does not include any roadway design; therefore, the standard does not apply.

2B.07 Street Frontage Improvements

- A. *All commercial and residential (including multi-family) development, plats, and short plats will install street frontage improvements at the time of construction as required by the Public Works Department. Such improvements may include curb and gutter; sidewalk; street; storm drainage; street lighting system; traffic signal modification, relocation or installation; utility relocation; landscaping and irrigation; and street widening per these Standards. Plans will be prepared and signed by a licensed civil engineer registered in the State of Washington.*

- B. All frontage improvements will be made across full frontage of property and on all sides that may border a city right-of-way.
- C. Exceptions. See Chapter 1, Section 1.07 "Exceptions".

FINDING: The preliminary site plan shows a 5-foot-wide concrete sidewalk along Hamilton Road, as well as frontage improvements as required by the City of Napavine. However, street lighting on Hamilton Road is not shown in the plan; therefore, the standard is not met. **See NPW 2D of this report for street lighting plan conditions of approval.**

2B.12 Driveways

- A. All abandoned driveway areas on the same frontage will be removed and the curbing and sidewalk or shoulder and ditch section will be properly restored.
- B. All driveways will be constructed of Portland Cement Concrete (CC) or asphalt from the right-of-way line to the edge of the street. The Director of Public Works will make the acceptable driveway material determination. PCC driveways will be subject to the same testing and inspection requirements as curb, gutter, and sidewalk construction. Residential PCC driveways will have a nominal concrete thickness of six (6) inches. All other PCC approaches will be eight (8) inches thick.
- C. Joint-use driveways serving two adjacent parcels may be built on their common boundary with a formal written agreement between both property owners and with the approval of the city. The agreement will be a recorded easement for both parcels of and specifying joint usage.
- D. Grade breaks, including the tie to the roadway, will be constructed as smooth vertical curves. The maximum change in driveway grade will be eight (8) percent within any ten (10) feet of distance on a rest and twelve (12) percent within any ten (10) feet of distance in a sag vertical curve.
- E. No commercial driveway will be approved where backing onto the sidewalk or street would occur.
- F. Driveways will be separated by twenty (20) feet of straight curb between each driveway providing access to a parcel or parcel of land under common ownership or occupancy unless otherwise allowed by the Director of Public Works.
- G. No driveway will be built within fifteen (15) feet of the end of any curb return or within five (5) feet of any property line unless otherwise allowed by the Director of Public Works.

H. Driveway Widths

1. The maximum driveway width for a single driveway onto an arterial or collector will be:

Frontage Width	Residential	Commercial	Industrial
Up to 50-feet	24-feet	24-feet	24-feet
50- to 75-feet	24-feet	30-feet	30-feet
More than 75-feet	30-feet	30-feet	35-feet

2. The maximum driveway width for each of two driveways onto an arterial or collector will be:

Frontage Width	Residential	Commercial	Industrial
Up to 50-feet	not permitted	not permitted	not permitted
50- to 75-feet	20-feet	20-feet	24-feet
More than 75-feet	20-feet	24-feet	24-feet

3. The maximum driveway width for a single driveway onto a local access. street will be;

Frontage Width	Residential	Commercial	Industrial
Up to 50-feet	24-feet	26-feet	not permitted
50- to 75-feet	24-feet	26-feet	not permitted
More than 75-feet	24-feet	26-feet	not permitted

4. *The maximum driveway width for each of two driveways onto a local access street will be:*

<i>Frontage Width</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>Up to 50-feet</i>	<i>not permitted</i>	<i>not permitted</i>	<i>not permitted</i>
<i>50- to 75-feet</i>	<i>20-feet</i>	<i>20-feet</i>	<i>not permitted</i>
<i>More than 75-feet</i>	<i>20-feet</i>	<i>24-feet</i>	<i>not permitted</i>

5. *The maximum driveway width for one-way driveways will be:*

<i>Frontage Width</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
<i>Up to 50-feet</i>	<i>14-feet</i>	<i>22-feet</i>	<i>22-feet</i>
<i>50- to 75-feet</i>	<i>14-feet</i>	<i>22-feet</i>	<i>22-feet</i>
<i>More than 75-feet</i>	<i>14-feet</i>	<i>22-feet</i>	<i>22-feet</i>

6. *A road approach or wider driveway may be approved by the Director of Public Works when a substantial percentage of oversized vehicle traffic exists, when divisional islands desired, or when multiple exit or entrance lanes are needed.*

I. Arterial Street Access

- 1. No driveway may access an arterial street within seventy-five (75) feet (measured along the arterial) of any other such access to the street: on either side of the travel way but may be allowed at locations directly opposite another point of access.*
- 2. No driveway access will be allowed to an arterial street within 150 feet of the nearest right-of-way line of an intersecting street.*
- 3. Within the limitations set forth above, access to arterial streets within the city will be limited to one driveway for each tract of property separately owned. Properties contiguous to each other and owned by the same person are considered to be one tract.*
- 4. Driveways giving direct access onto arterials may be denied if alternate access is available. The Director of Public Work may permit deviations from this requirement if sufficient justification is provided.*
- 5. Road approaches and/or ingress and egress tapers may be required in industrial and commercially zoned areas as directed by the Director of Public Works. Tapers will be designed, per the most recent edition, "Transportation and Land Development by V.G. Stover and F. Koepke.*

FINDING: The preliminary site plan shows three driveways onto Hamilton Road, two of them are 45 feet wide and one 38.67 feet wide. According to Napavine Public Works Standard 2B.12, the maximum driveway width for two driveways onto an arterial or collector for a commercial property with a frontage width greater than 75 feet should be 24 feet. This standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, the applicant shall modify driveway widths to compliant with NPW 2.12, or submit a variance application and receive approval.

2B.13 Sight Obstruction

The following sight clearance requirements take into account the proportional relationship between speed and stopping distance.

The sight distance area is a clear-view triangle formed on all intersections by extending two lines of specified length (A) and (B) as shown in this section, Uncontrolled Intersection, from the center of the intersecting streets along the centerlines of both streets and connecting those endpoints to form the

hypotenuse of the triangle. Refer to Standard Drawing 2-1 at the end of this Chapter. The area within the triangle will be subject to said restrictions to maintain a clear view on the intersection approaches.

Sight Distance Triangle:

- A. *Stop or Yield Controlled Intersection. Providing adequate sight distance from a street or driveway is one of the most important considerations to ensure safe-street and driveway operation the Intersection Sight Distance criteria given in the following table is based on line 8-1 shown in Figure IX-40 of “A Policy on Geometric Design of Highways and Streets” published by AASHTO. This table applies to all intersections as well as driveways with an ADT greater than 20. For driveways with an ADT of 20 or less, the Stopping Sight Distance in Table 1/1-1 of the MSHTO publication can be used.*

SIGHT DISTANCE			
Operating Speed (MPH)	Intersection Sight Distance		Stopping Sight Distance
	2 Lanes	4+ Lanes	
20	210	230	125
25	255	280	150
30	310	340	200
35	355	390	250
40	410	450	325

Other factors such as vertical and horizontal curves and roadway grades also need to be taken into account. Such factors can require necessary modification to the intersection sight distance given in the above table.

Sight distance is measured from a point on the minor road or driveway fifteen (15) feet from the edge (extended) of the major road pavement (or nearest traffic lane if parking is permitted) and from a height of 3.50 feet on the minor road to a height of object of 4.25 feet on the major road.

B. Uncontrolled Intersection

Operating Speed (MPH)	Sight Distance	
	Major Street A	Minor Street B
20	90	90
25	110	110
30	130	130
35	155	155
40	180	180

- C. *Vertical Clearance. The area within the sight distance triangle will be free from obstructions to a motor vehicle operator’s view between a height of two and one half (2.5) feet and ten (10) feet above the existing surface of the street.*
- D. *Exclusions. Sight obstructions that may be excluded from these requirements include; fences in conformance with this chapter, utility poles¹ regulatory signs, trees trimmed from the base to a height of ten (10) feet above the street, places where the contour of the ground is such that there can be no cross visibility at the intersection, saplings or plant species open growth habits and not in the form of a hedge that are so planted and trimmed as to leave a clear and unobstructed cross*

view during all seasons, buildings constructed in conformance with the provisions of appropriate zoning regulations and pre-existing buildings.

FINDING: The proposal does not include sight clearance or sight distance triangle. The standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, the site plan shall show the sight distance area as a clear-view triangle at both driveways.

2B.14 Surfacing Requirements

The following are the surfacing requirements for each application listed.

A. *Asphalt Pavements. The minimum pavement sections listed in Standard Drawing 2-2 are in lieu of pavement design and are based on a subgrade California Bearing Ratio (CBR) value of three (3). Alternate pavement designs will be accepted based on soil test to determine the actual CSR value and completion of the worksheet on Standard Drawing 2-3 at the end of this chapter. Soil tests on, a completed worksheet for each road classification will accompany plans submitted if other than the structures shown below pavement sections in Standard Drawing 2-2 are used. One sample per each 500 LF of centerline, with a minimum of three (3) per project, representative of the roadway subgrade, will be taken to determine a statistical representation of the existing soil conditions. An engineering firm that specializes in soils analysis will perform the soil tests. The report, signed and stamped by a professional engineer licensed by the State of Washington, must be based on actual soils tests and submitted with the plans. All depths indicated are a minimum compacted depth.*

Existing pavement restoration: for utility or street widening projects requiring restoration of existing pavement, additional information and design calculations will be required to ensure that the pavement will need minimal maintenance for five to seven years. The information required may include:

- 1. Pavement cores representative of typical pavement sections; and*
- 2. statement of existing pavement condition and discussion of how it will “match up” to the new pavement section*

B. Sidewalks

Surfacing: four (4) inches Commercial Concrete.

Base: two (2) inches Crushed Surfacing Top Course or well graded sand.

Asphalt sidewalks will not be permitted unless otherwise approved by the Director of Public Works.

C. Concrete Driveway

Surfacing: six (6) inches Commercial Concrete for residential, (8) inches Commercial Concrete for all others.

Base: two (2) inches Crushed Surfacing Top Course or well graded sand.

D. Asphalt Driveway

Surfacing: three (3) inches Class B asphalt concrete for residential, six (6) inches Class B asphalt concrete for all others.

Base: four (4) inches ballast.

2B.15 Temporary Street Patching

Temporary restoration of trenches will be accomplished by using two (2) inches Class 8 Asphalt Concrete Pavement (when available) or two (2) inches medium-curing (MC-250) Liquid Asphalt (cold mix). Two (2) inches Asphalt Treated Base (ATB)1 or steel plates.

ATB used for temporary restoration may be placed directly into the trench, bladed and rolled. After rolling, the trench must be filled flush with asphalt concrete pavement to provide a smooth riding surface. Prior to beginning street trenching work, the contractor will ensure that all necessary material for temporary patching is stockpiled at the project site, both for completing and maintaining the patch.

The contractor will maintain all temporary patches until such time as a permanent pavement patch is in place. Patches not properly maintained by the contractor will be repaired by the city at the developer's, contractor's and/or private utility's expense.

2B.16 Pavement Restoration

Trench cuts in roadways greatly degrade the condition of the pavement as well as reduce its design life. The most significant damage can be seen in newer pavements. Pavement restoration should result in the pavement being as good as, or better than, the pre-trench cut condition. This can be achieved by the prevention of trench cuts, thorough utility coordination, and high-quality pavement restoration.

A. Trench Cuts in New Pavements. Trench cuts are not permitted in pavements that have been constructed or rehabilitated within five (5) years. "Rehabilitation" includes all surface treatments such as chip seal slurry seal, and asphalt overlay.

If there is no other option but to cut into new pavement, prior approval will be obtained from the Director of Public Works. Pavement must then be restored in accordance with the following standards.

B. Transverse Utility Crossings must be bored or completed by another trenchless method. Bore pits must be restored in accordance with the following standards.

C. Pavement Restoration Requirements. Trench cuts, bore holes, and miscellaneous pavement repairs will be made in accordance with Standard Drawings 2-5 and 2-6, at the end of this chapter. Pavement will be restored across the entire lane. In addition, the patch will be made perpendicular to the closest affected road edge with a single, straight, continuous cut along the entire width of the required restoration. Minimum restoration width is five (5) feet.

D. Lane Width Restoration Requirements. For longitudinal utility trench cuts in pavements over five years old, a minimum two-inch overlay or full-depth pavement reconstruction is required for the following widths:

- 1. One-lane overlay or reconstruction – When trench cut or pitch is within one travel lane.*
- 2. Two-lane overlay or reconstruction – When trench cut or pitch is within two travel lanes.*
- 3. Additional overlay or reconstruction - When the remaining pavement area to the edge of existing pavement on either side is less than one travel lane. No longitudinal joints will be allowed in the wheel path.*

All trench and pavement cuts will be made uniformly by wheel or saw cutting. The cuts will be a minimum of one-foot outside the trench width. If the edge of the trench line degrades, raveling is non-uniform, additional saw cutting will be required prior to final patch or paving.

All trenching will be backfilled with crushed surfacing material conforming to Section 4-04 of the most recent edition of WSDOT/APWA Standard Specifications. The subgrade will be compacted to 95 percent maximum density, as described in Section 2-03 of the WSDOT/APWA Standard Specifications.

All granular backfill material will conform to Section 9-03.19 of the current edition of the WSDOT/APWA Standard Specifications. If the existing material is determined by the city to be suitable for backfill, the contractor may use the native material except that the top

eight (8) inches of trench will be 2-1/2 inch minus ballast. All trench backfill materials will be compacted to 95 percent density

When the trench width is eighteen (18) inches or less and is within the travel-way, the trench will be backfilled with control density fill (CDF) Class B, as defined by the Washington Aggregates and Concrete Association. The aggregate will be 3/8-inch minus. CDF may be required in wider trenches within the travel-way if site conditions dictate.

Backfill placement and compaction will be performed in six (6) inch lifts.

Replacement of the asphalt concrete or Portland Cement Concrete will conform to the most current edition of the WSDOT/APWA Standard Specifications.

E. Tack Coat. Tack will be applied to the existing pavement along the edge of cut and will be emulsified asphalt grade CSS-1 as specified in the most recent edition of the WSDOT/APWA Standard Specifications. Tack coat will be applied as identified in Section 5-04 of the most recent WSDOT/APWA Standard Specifications.

F. Asphalt Concrete Class B. Asphalt concrete Class B will be placed on the prepared surface by an approved paving machine and will be in accordance with the applicable requirements of Section 5-04 of the most recent edition of the WSDOT/APWA Standard Specifications, except that longitudinal joint between successive layers of asphalt concrete will be displaced laterally a minimum of twelve (12) inches, unless otherwise approved by the Director of Public Works. Fine and coarse aggregate will be in accordance with Section 9-03.8 of the WSDOT/APWA Standard Specifications. Asphalt concrete over two (2) inches thick will be placed in equal lifts not to exceed two (2) inches each.

The preferred means of connection to existing asphalt at the centerline, lane edges, and overlay ends is through grinding. Grinds can be a few inches off centerline to avoid existing stripping. Feathering may be used when grinding is not feasible, with the approval of the Director of Public Works. The affected surfaces within the trenching area will be feathered and shimmed to an extent that provides a smooth riding connection and expeditious drainage flow for the newly paved surface.

Surface smoothness will be per Section 5-04 of the most recent edition of WSDOT/APWA Standard Specifications. The paving will be corrected by removal and repaving of the trench only.

Asphalt concrete pavement for wearing course. will not be place on any travel-way between October 15 and April 1 without written approval of the Director of Public Works.

Asphalt for prime coat will not be applied when the temperature is lower than 50 degrees Fahrenheit without written approval of the Director of Public Works.

G. Final Patch. The final patch will be completed as soon as possible but-no later than 30 calendar days after the trench is first opened. Time extensions due to inclement weather or other adverse conditions will be evaluated on a case-by-case basis. However, any delays must have prior approval of the Director of Public Works.

H. Staking. All surveying and staking will be performed by an engineering or surveying firm licensed by the State of Washington and capable of performing such work.

A pre-construction meeting will be held with the Public Works Department prior to commencing staking. All construction staking will be inspected by the Public Works Department prior to construction.

The minimum staking of curb, gutter and sidewalk will be as follows:

- 1. Stake centerline alignment every 25 feet (50 feet in tangent sections) with cuts and/or fills to subgrade.*
- 2. Stake top of ballast and top of crushed surfacing at centerline and edge of pavement every 25 feet.*

3. *Stake top back of curb at a consistent offset for vertical and horizontal alignment every 25 feet (50 feet in tangent sections).*
 4. *Staking will be maintained throughout construction.*
- I. *Testing. Testing will be required at the developer's or contractor's expense. The developer or contractor is responsible to order all required testing. The testing lab will be approved by the Public Works Director prior to the commencement of any testing. Testing will be done on all materials and construction as specified in the WSDOT/APWA Standard Specifications and with the frequency as specified herein.*
- In addition, the Public Works Department will be notified before each phase of street construction commences (i.e., staking, grading, subgrade ballast, base top course, and surfacing). A minimum of two (2) business days advance notice is required before the start of each phase. All test results and documentation will be submitted to the Public Works Department prior to final approval of the project.*

FINDING: As indicated on the preliminary utility plan, Hamilton Road has an existing water main and sewer force main, which the proposed development will connect to. The connections will be located between the north proposed driveways along Hamilton Road and will be situated in the proposed sidewalk and ditch area. The development will use asphalt pavement with a concrete sidewalk. As a result, the requirements of NPW 2B.14 have been met, and NPW 2B.15 and 2B.16 are not relevant.

CONDITION OF APPROVAL: Prior to engineering approval, engineering plans demonstrating trenching and restoration compliant with Napavine Public Works standards shall be submitted for review and approval by the City.

2C SIDEWALKS, CURBS AND GUTTERS

2C.02 Design Standards

Plans for construction of sidewalks, curbs and gutters are to be submitted as part of the street plans when applicable. The City has set forth minimum standards that must be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, the Director of Public Works may modify them should it be deemed necessary.

- A. *Sidewalks will be constructed of Commercial Concrete four (4) inches thick except in a driveway section at which point the concrete thickness must meet driveway standards. The minimum of sidewalk will be five (5) feet. When the sidewalk, curb and gutter are contiguous the width of the sidewalk will be measured from the back of the curb and gutter to the back of the sidewalk. In commercial areas, sidewalks may be required to extend from the curb to the property line.*
- B. *Arterial Streets. Sidewalks, curbs and gutters will be required on both sides of arterial streets interior to the development. Sidewalks, curbs and gutters will also be required on the development side of arterial streets abutting the exterior of said development.*
- C. *Local Access Streets. Sidewalks, curbs and gutters will be required on both sides of local access streets interior to the development. Sidewalks, curbs and gutters will also be required on the development side of local access streets abutting the exterior of said development including cul-de-sacs.*
- D. *Design and Construction. The design and construction of sidewalks, curbs, gutters and walkways will meet the following minimum standards:*

1. *The width of sidewalks will be as shown in the street design drawings. Design of all sidewalks will provide for a gradual rather than an abrupt transition between sidewalks of different widths or alignments.*
 2. *Form and subgrade inspection by the Public Works Department is required before the sidewalk is poured.*
 3. *Monolithic pour of curb, gutter and sidewalk will not be allowed without specific approval from the Director of Public Works.*
- E. *Driveways - see Section 2B.12*
- F. *Curbs and Gutters. Cement concrete curbs and gutters will be used for all street edges unless otherwise approved by the Public Works Director. All curbs and gutters will be constructed in accordance with Standard Drawing 2-7.*
- G. *The face or top of all new curbs will be embossed ¼-inch into the cement to denote the location of water and sewer service eras 1ngs. Water services will be marked with a “W” and side-sewers will be marked with an “S”. The markings will be at least three (3) inches in height and clearly legible.*
- H. *Access Ramps. Sidewalks will be constructed to provide for access ramps in accordance with State Law, Access ramps will be constructed of Commercial Concrete. Form and sub-grade inspection by the Public Works Department is required before the access ramp is poured.*

FINDING: The proposed scope of work involves building a new public sidewalk connecting the travel center and truck shop to a new public sidewalk along the length of the project's frontage on Hamilton Road. However, the preliminary site plan is missing information about curb and gutter, as well as design criteria for concrete sidewalks, indicating that the standard is not being met.

CONDITION OF APPROVAL: Prior to engineering approval, the engineering site plan shall include concrete sidewalks design criteria. All sidewalk construction must follow the standard and approved by the City of Napavine.

2D ILLUMINATION

2D.02 Design Standards

A street lighting plan submitted by the applicant and approved by the Director of Public Works will be required for all streetlight installations. Type of installation will be as set forth in the most recent edition of the WSDOT/APWA Standard Specifications, Illumination Standards Table in this chapter, and as directed by the city.

All public streetlight designs will be prepared by an engineering licensed by the State of Washington, and capable of performing such work. All developments will submit the lighting plan on a separate plan sheet. After the system is completed and approved, a set of “as-built” mylars will be submitted to the city as a permanent record.

Streetlights will be located in accordance with the design criteria contained herein, and as approved by the Director of Public Works. In addition, intersections will be illuminated to 1.5 times the highest foot-candle requirement of the streets surrounding the intersection. Exception: In residential and intermediate classes, local and collector streets intersecting other local and collector streets will not be subject to the 1.5 times illumination factor provided a luminaire is placed at the intersection. Energy efficient fixtures will be incorporated into the streetlight system whenever practical. Poles will be

opposite across the roadway or on one side of the roadway. Staggered spacing will be allowed if the roadway width is such that adequate light levels cannot be provided with a one-side or opposite/both-sided pattern.

For the purposes of this section, area classes are determined by zoning as follows:

Commercial

- Multi-family, high density
- Central business district
- Freeway commercial
- General commercial
- Neighborhood commercial

Industrial

- Heavy industrial
- Light industrial

Intermediate

- Essential public facilities
- Commercial office/mixed use

Residential

- Single family, low density.
- Single family, medium density
- Multi-family, medium density

As new zones are created the Director of Public Works will classify them. The following criteria will be used to determine streetlight spacing:

AVERAGE MAINTAINED HORIZONTAL ILLUMINATION (FOOT CANDLES)				
ROAD CLASS	AREA CLASS			
	Residential	Intermediate	Industrial	Commercial
Local	0.2	0.6	N/A	N/A
Collector	0.5	0.7	0.8	0.9
Arterial	0.7	1.0	1.2	1.4
Boulevard	0.7	1.0	1.2	1.4

Uniformity ratio: 6:1 average: minimum for local
 4:1 average: minimum for collector
 3:1 average: minimum for arterial and boulevard

Dirt Factor: 0.85

Lamp Lumen Depreciation Factor: 0.73

Weak Point Light: 0.2 fc (except local residential street)

Line loss calculations will show no more than a 5 percent voltage drop in any circuit from the source to the most distant luminaire. Branch circuits will serve a minimum of four (4) luminaires.

Pole foundations will be per Standard Drawing 2-16. Luminaire poles will conform to Section 9-29 of the WSDOT Standard Specifications, except as modified herein. Light standards will be tapered aluminum with satin ground finish. The diameter at the base of the pole will not exceed nine (9) inches

and the minimum thickness of the pole will be ¼-inch. Mounting height will be 30 feet. Mast arms will be single bracket, taper, minimum ten (10) feet in length. The shaft will heat treated after welding on the based flange to produce T6 temper. The pole and davit arm will be designated to support streetlight luminaries with a minimum weight of 60 pounds and a minimum effective protected area (EPA) of 1.5 square feet. Poles will be designed to withstand a 100mph (AASHTO) wind loading with a 1.3 gust factor with luminaire and mast arm attached, without permanent deformation or failure. Minimum wall thickness will be 0.188 inches. Poles will be equipped with a removable metal ornamental pole cap secured to the shaft with stainless steel screws. Poles will have a minimum 3 ½ by 6-inch hand hole with cover, near the base and will be equipped with a grounding lug. The pole will also be equipped with a 120V, 20 AMP recessed weatherproof power receptacle, that meet II applicable guidelines and standards. The receptacle will be located thirteen (13) feet above the base of the pole.

All luminaries will be a medium cut off. JES Type II distribution and will comply with art standards as established by the Public Utility District No. 1 of Lewis County. Unless otherwise required by PUD #1, luminaries will be: 20-watt, catalog #GEMDCLZOS3A11GMC31.

All streetlight electrical installations including wiring conduits and power connections will be located underground. New street lighting will be designed and installed in such a way as to lend with any utility pole-mounted lighting that may exist along the frontage of 1 adjacent properties, but also to accommodate future integration of conforming streetlights along the roadway. To this end, when streetlight(s) are -required along a property, conduit(s) and junction box(es) will be installed along the entire frontage, as appropriate, to allow for the interconnection of future streetlight installations. This requirement may be waived with approval of the Director of Public Works based on the site-specific conditions of the property in question.

Alternate streetlight designs may be allowed or required by the ci to accommodate the unique characteristics of a particular street or neighborhood. For example, special lighting may be deemed appropriate along a street that is part of a designated Historic District. The use of any alternate street lighting must approved in writing by the Director of Public Works.

FINDING: The proposal provides lighting location in the preliminary site plan, but lacks detail demonstrating compliance with applicable standards.

CONDITION OF APPROVAL: Prior to engineering approval, revise the site plans to show compliance with NPW 2D for streetlighting plan and design.

2F ROADSIDE FEATURES

2F.02 Design Standards

The design and placement of roadside feature included herein will adhere to the specific requirements as listed for each feature, and, when applicable, to the appropriate Standard as set forth in Section 1.11.

2F.10 Street Trees

In order for developers or property owners to plant trees, shrubbery or vegetation that may attain a height of more than 30-inches within right-of-way, they must first apply for and obtain a right-of-way permit from Public Works Department. The application must include information on type of tree or plant and the proposed location placement.

Certain varieties of trees are prohibited from being planted within a city right-of-way. Such trees are excluded from the right-of-way to protect utilities and infrastructure or to minimize visual

obstructions and interference. Trees not to be planted within a city right-of-way specifically include the following:

Alder; Apple (fruiting); Ash, Mountain; Birch, White Cherry (fruiting); Chestnut, Cottonwood, Elm, American Hawthorne, London Plane; Maple Big leaf; Maple, Oregon; Maple, Silver; Oak, Pine; Pagoda; Pear (fruiting); Plum (fruiting); Poplar; Sycamore; Walnut: Willow; and any other species of tree with a propensity to produce large or extensive root systems that may interfere with or damage underground utilities or public infrastructure including streets, curbing, and sidewalks. Also prohibited from being planted within the right-of-way are any other species of plants or trees that will create an obstruction or potential obstruction to traffic, pedestrian visibility or safe public use of the right-of- way.

FINDING: The applicant has submitted a preliminary landscaping plan to the city for review and comment. Specific comments may be addressed during final civil engineering review.

2F.11 Parking Lots

A Right of-way Permit is required prior to surfacing a designated parking area that will access a public right-of-way.

Stormwater retention will be provided and will follow the criteria as set forth in the Stormwater Management Plan and as addressed in Chapter 3 of these Standards.

Parking lot circulation and signing needs to be met on site. The public right-of-way will not be utilized as part of a one-way parking lot flow.

All requirements for construction of parking lots will be determined through the Development Plan Review process, including capacity and configuration. Parking lot ingress and egress will be evaluated to determine traffic controls necessary to ensure vehicle safety to and from the public right-of-way.

Parking lot surfacing materials must meet the requirements for a permanent all-weather surface. Asphalt concrete pavement and cement concrete pavement satisfy this requirement and are approved surface material type. Gravel surfaces are not acceptable or an approved surface material type. Combination grass/paving systems are approved surface material types; however, their use requires submittal of an overall parking lot paving plan showing the limits of the grass/paving systems and a description of how the systems will be irrigated and maintained. If the Director of Public Works determines the grass/paving system is not appropriate for the specific application, alternate approved surfacing materials will be utilized.

FINDING: The proposal provides asphalt concrete pavement for parking lot surfacing. The standard is met.

2G TRAFFIC IMPACT ANALYSIS

2G.02 When Required

The need for a TIA will be based on; the size of the proposed development, existing street and intersection conditions, traffic volumes, accident history, community concerns, and other pertinent factors associated with the proposed project.

- A. TIA will be required if a proposed development meets one or more if the following conditions:*
- B. The proposed project generates more than ten (10) vehicles in the peak direction of the peak hour on the adjacent streets and intersections. This includes the summation of all turning movements that affect the peak direction of traffic.*

- C. *The proposed project generates more than 25 percent of the site-generated peak hour traffic through a signalized intersection or "critical" movement at a non-signalized intersection.*
- D. *The proposed project is within an existing or proposed transportation benefit area. This may include Transportation Benefit Districts (TSO), Local Improvement Districts (LID), or local state transportation improvement areas programmed for development reimbursement.*
- E. *The proposed project may potentially affect the implementation of the street system outlined in the transportation element of the Comprehensive Plan, the Six-Year Transportation Improvement Program, or any other documented transportation project.*
- F. *If the original TIA was prepared more than two (2) years before the proposed project completion date.*
- G. *The increase in traffic volume as measured by ADT, peak hour, or peak hour of the "critical" movement is more than 10 percent.*

Even if it is determined that a TIA is not required, the Director of Public Works may require the developer to have a Trip Generation Study (TGS) conducted. TGS's will be used to forecast project generated traffic for an established future horizon.

2G.03 Qualifications For Preparing TIA Documents

The TIA will be prepared by an engineer licensed in the State of Washington and with special training and demonstrated experience in traffic engineering. The applicant will provide the Public Works Director with the credentials of the individual(s) selected to perform the TIA for approval prior to initiating the analysis.

FINDING: The proposal complies with NPW 2G.02.A and requires a Traffic Impact Assessment (TIA). The TIA document, which was prepared by a licensed engineer in Washington. This standard is met.

CONDITION OF APPROVAL: Prior to building occupancy, the applicant shall ensure completion of TIA (Traffic Impact Analysis) mitigation measures. This includes any measures identified in the TIA report that are necessary to mitigate the impact of increased traffic resulting from the building's use. Following are the mitigation measures:

1. **Construct a full-size single-lane roundabout at the intersection of Rush Road and Hamilton Road, with single-lane approaches for the north and south legs and a left-turn lane and right-turn lane on the east leg as approved by WSDOT.**
2. **Implement access control at the southbound ramps intersection to eliminate the westbound to southbound left-turn movement onto the southbound on-ramp as approved by WSDOT.**
3. **Widen Rush Road between the southbound ramps and the I-5 bridge to provide a refuge lane for southbound to eastbound left-turn vehicles, facilitating two-stage left-turn maneuvers as approved by WSDOT.**
4. **Install a compact single-lane roundabout at the intersection of Rush Road and Kirkland Road, with single-lane approaches as approved by WSDOT.**
5. **Make necessary frontage improvements on Hamilton Road, as required by the City of Napavine as approved by WSDOT.**

CHAPTER 3 STORM DRAINAGE AND EROSION CONTROL

3A STORMWATER MANAGEMENT

3A.01 General

The standards established by this chapter are intended to represent the minimum standards for the design and construction of storm drainage facilities.

The "City of Napavine Stormwater Management Plan" and the most recent version of the "Stormwater Management Manual for the Puget Sound Basin" documents are considered a part of this chapter as well as the City Public Works Standards, except as supplemented herein. The Stormwater Management Plan sets forth the minimum drainage and erosion control requirements as supplemented herein.

3A.02 Design Standards

The design of storm drainage and/or retention/detention systems will depend on their type and local site conditions. The design elements of storm drainage systems will conform to these Standards and follow current design practice as set forth in the City of Napavine Stormwater Management Plan. Properties will not be developed in such a way as to discharge stormwater onto adjacent lots.

Stormwater conveyance and detention systems will be designed in accordance with the following design standards table:

<i>Hydrologic Model</i>	
<i>Conveyance Design</i>	
<50 acres	<i>Rational Method</i>
>50 <200 acres	<i>SCS-based Hydrograph Method</i>
>200 acres	<i>Continuous Simulation Method</i>
<i>Detention Design</i>	
<50 acres	<i>SCS Unit Hydrograph Method with Level Pool Routing</i>
>50 acres	<i>Continuous Simulation Method</i>
<i>Design Storm Frequency</i>	
<i>Conveyance</i>	<i>Capacity to handle:</i> <i>100-year storm event</i>
<i>Detention</i>	<i>Prevent peak flow increase:</i> <i>100-year storm event</i>
	<i>Evaluation of erosion control:</i> <i>2-year storm event and</i> <i>10-year storm event</i>
<i>Design Storm Duration/Distribution</i>	
<i>Hydrograph Method</i>	<i>6 and 24-hour duration</i>
<i>SCS Unit Hydrograph Method</i>	<i>6 and 24-hour durations</i> <i>SCS Type IA distribution</i>
<i>Rational Method</i>	<i>Time of concentration</i> <i>Constant rainfall intensity</i>

3A.03 Conveyance

Pipe: Storm drainpipe within a public right-of-way or easement will be sized to carry the maximum anticipated runoff from the contributing area. The calculations of anticipated runoff and pipe sizing will be developed by a professional engineer licensed in the State of Washington. The developer will provide the calculations and all associated information to the Public Works Department.

The minimum main size will be twelve (12) inch diameter, smaller pipe sizes will be considered on a case-by-case basis as approved by the Director of Public Works. Lateral lines may be six (6) inch diameter. The city may require the installation of a larger main if it is determined that a larger size is needed to serve adjacent areas or for future service. The installation of a larger main may allow the developer to seek partial reimbursement through a Latecomers Agreement. (see Chapter 1 for details) All pipe used for storm mains will comply with one of the following types:

- A. Plain concrete pipe conforming to the requirements of AASHTO M 86. Class 2.*
- B. Reinforced concrete pipe conforming to the requirements of AASHTOM 170.*
- C. PVC pipe conforming to ASTM D 3034 SOR 35 or ASTM F 794 or ASTM F679 Type 1 with joints and gaskets conforming to ASTM D 3212 and ASTM F 477.*
- D. Ductile iron pipe conforming to the requirements of AWWA C 151, thickness class as shown on the plans.*
- E. High-density polyethylene smooth interior pipe conforming to AASHTO M252 types or AASHTO M294 type S, with a gasketed bell and spigot joints.*
- F. Aluminized steel helical or spiral rib pipe in diameters of thirty (30) inches or greater. with a Mannings" value of 0.020 or less.*

Channels: Open vegetated channels may be utilized for stormwater conveyance when deemed appropriate by the Public Works Department. Open channels located in a public right-of-way will be sized to carry the maximum anticipated runoff from the contributing area without exceeding the confines of the channel. In addition, when the end of the "new" conveyance system is within twenty (20) feet of another piped drainage system, the "new" system will be extended through the open portion to complete the closed system. Extensions to complete closed drainage systems will only be required along the property where the "new" system originates, unless deemed necessary by the Director of Public Works.

When the flow of an open channel is interrupted by the construction of a driveway, the entire channel across the property will be enclosed with piped system, unless deemed impractical by the Director of Public Works. However, the culvert under the driveway must be installed to accommodate closure of the ditch in the future. The channel enclosure may necessitate the inclusion manholes and/or catchbasins.

3A.04 Catchbasins

Maximum catchbasin spacing will be 300-feet on all street classifications. No surface water will cross any roadway to private property. Additional manholes and/or catchbasins may be required by the city to accommodate the maintenance needs of the storm system.

FINDING: The proposal contains a preliminary Stormwater Technical Information Report. The total impervious area exceeds 10 acres, and the applicant is proposing a bio-retention facility with a perforated underdrain pipe to satisfy treatment as well as detention requirements. The bioretention basin has a bottom surface area of 15,737 square feet and a storage depth of 2.83 feet. The native soil infiltration rate has been designed with a rate of 0.45, using a safety factor of 4.0. The proposed stormwater detention systems meet the Low Impact Development (LID) performance standard and flow control standard. In addition, the proposal also specifies areas where oil control measures will be implemented. This standard has been met.

CONDITION OF APPROVAL: Prior to engineering approval applicant shall submit a final Stormwater Plan and Technical Information Report complying with NPW 3A for review and approval.

Additionally, stormwater collected at the fuel island containment pads shall be routed to the sanitary sewer system.

CONDITION OF APPROVAL: Prior to building occupancy the applicant shall register the proposed infiltration facility with the Ecology Underground Injection Control (UIC) program.

3B EROSION CONTROL

3B.01 General

All projects requiring Public Works Department approval, as defined by these Standards, will include erosion control plans if any of the following conditions are met:

- A. Proposed land disturbance activities that could cause sediment runoff beyond the project limits.*
- B. A Clearing, Filling or Grading Permit is required.*
- C. The proposed project could possibly impact a nearby stream, wetland, or body of water.*
- D. When deemed necessary by another permitting authority.*

Site work will not commence until all erosion control measures have been set in place in accordance with the approved erosion control plans.

The contractor/applicant must ensure that all erosion control measures are properly maintained in accordance with standard industry procedures.

3B.02 Best Management Practices

Erosion control may include the following:

A. Sedimentation Ponds

Sedimentation ponds are utilized to collect runoff generated on a construction site, thereby allowing sediment to be captured before the runoff leaves the site. Sedimentation pond design will include the following considerations:

- 1. computation of the sediment storage volume*
- 2. computation of the settling volume*
- 3. computation of the pond surface area –
(surface area, in sf = 1,250 x 1-yr, 24 hour storm rate, in cfs)*

Minimum pond dimensions are as follows:

- 1. 2-foot depth for settling*
- 2. 3-foot depth for sediment storage*
- 3. 3:1 side slope*

The contractor will inspect sedimentation ponds immediately after each rain event to ensure the integrity of the facility. The contractor will also remove the majority of the sediment collected in the ponds whenever the storage volume is exceeded or the settling volume is infringed upon. In addition, prior to the final completion of the project, ponds will be cleaned out in their entirety.

The length/width ratio of the pond will be as large as possible. A 5:1 ratio is the preferred minimum, but exceptions will be granted when deemed appropriate by the Director of Public Works. The pond will be divided into a series of at least two (2) separate chambers. Perforated pipe risers will be used to convey water between the chambers and at the outlet.

B. Interceptor Channels

Interceptor channels are used to capture runoff generated on a construction site before it can leave the project limits. The channel is often used in combination with a sedimentation pond. The channel is typically grass lined and runs along the perimeter of the site. The grass must be established prior to the start of construction. Therefore, sod is often used to establish the

vegetated surface of the channel. Upon completion of the project, the sod can be removed and re-used if the ditch is filled in and restored with a suitable and stable cover material.

C. *Sediment Barriers*

Sediment barriers are filtering devices that are run along the perimeter of a site to capture sediment while allowing runoff water to continue along its natural path. Silt fencing and hay bales are common examples of sediment barriers.

Regular removal of sediment is required to ensure that the barriers function properly. In addition, the structural integrity of the barriers must be maintained at all times. Barriers will be installed, inspected and repaired, in accordance with the details and requirements included in these Standards.

D. *Stabilized Construction Entrance*

A stabilized construction entrance is a rocked access point to a construction site. The entrance reduces material carried from the site onto the public right-of-way.

Construction entrances must be cleared of mud and debris regularly to ensure that materials are not being tracked from the construction site, onto the right-of-way and beyond. The contractor is responsible for all required maintenance of entrances.

E. *Detention/Retention Facilities*

No retention/detention facility will be located in an area that is used to satisfy an open space requirement unless it enhances a recreational amenity. Use of designated open space areas for stormwater detention/retention and infiltration must satisfy all conditions of the City of Napavine for usability, landscape conformity and ease of access. The city will make the final determination whether or not the proposed stormwater facilities are compatible with and satisfy the intent of an open space.

The primary purpose of a consolidated open space is to provide usable area for recreation activities, buffer zones, and green belt areas. and must be designed for this intent. Any use of this area for stormwater detention/retention must clearly be subordinate to and not detract from open space uses. The usable open space will be predominantly flat, and in no case, exceed 4:1 where drainage facilities represent. A minimum of 50 percent of the linear slope length will not exceed 7:1.

The Director of Public Works will review the use of commercial, parking lots for stormwater detention on a case-by-case basis. The detention area will be situated away from areas of pedestrian movement. The maximum depth of water in parking lot storage will be limited to twelve (12) inches.

FINDING: The proposal does not include an erosion control design plan and SWPPP report; therefore, this standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, Erosion Control Plan compliant with NPW 3B and shall be submitted for review and approval.

CONDITION OF APPROVAL: Prior to construction, erosion control devices shall be installed and shall remain in place during construction and afterwards until soil stabilization.

4.01 General

Any extension of the Napavine Water System must be approved by the Department of Public Works and conform to Department of Health, the City of Napavine Water System Plan.

In designing and planning for any development, it is the developer's responsibility to determine that adequate water for both domestic use and fire protection is attainable. Proposed plans must show how water will be supplied and whether adequate water pressure and volume will be maintained in case of fire. An analysis of the system may be required if it appears that the system might be inadequate.

Anyone desiring to extend or connect to the city water system must contact the Public Works Department for a Water/Sewer/Stormwater Application form. After the completed application is returned to the Public Works Department, along with any other information that may be required or requested, staff will determine the costs to connect to city utilities. Extension of or connection to city water lines outside of the Napavine Urban Growth Area (UGA) are permitted only when a demonstrated public health risk exists and has been identified in writing by an appropriate health agency.

Prior to the issuance of a water meter for development projects, all Public Works improvements must be completed and approved, including granting of right-of-way or easements, submission and acceptance of as-built drawings, and all applicable fees must be paid.

Building permits for new construction of single-family subdivisions will not be issued without final approval of the Public Works Director. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A construction bond, in accordance with Section 1.14 of these Standards, will be required for the remaining improvements. A Certificate of Occupancy will not be issued until final Public Works approval is given for all improvements.

4.02 Design Standards

The design of any water extension/connection will conform to these Standards and all other applicable standards. The layout of extensions will provide for continuation and/or looping of the existing system.

4.05 Hydrants

- A. The lead from the service main to the fire hydrant will be ductile iron cement mortar lined Class 52, no less than six (6) inches in diameter. A gate valve will be installed a minimum of three (3) feet from the hydrant, unless otherwise approved.*
- B. Fire hydrants will have two, 2-1/2-inch outlets with National Standard threads and one, 4-inch pumper port outlet with Pacific Coast threads (male threaded 4.72-inch diameter). The pumper port will be fitted with a 5-inch quick connect Storz Adapter with a Pacific Coast thread hydrant connection (female threaded 4.75-inch diameter). The Storz Adapter will include a cap. The hydrant valve opening will be 5¼-inch diameter. The hydrant will have a positive and automatic barrel drain and will be of the "safety" or breakaway style.*

Hydrants will be Manufacturer M & H Style 929

Alternate hydrant styles and manufacturers will be considered on a case-by-case basis and must be approved by the Director of Public Works. All hydrants will be bagged and the connecting gate valves will remain closed until the system is tested and approved. Developments being served by existing hydrants will be required to upgrade to these Standards and use the same type of hydrant

throughout the development. Hydrants will be painted with sunburst yellow high-grade enamel after installation.

- C. The Department of Public Works and The Napavine Fire Services will work together to determine the required hydrant spacing for installation. All hydrants will be installed and placed in a manner that provides accessibility to Police and Fire Services and their equipment as determined by both departments.

Unless otherwise required by the Public Works Department, the following guidelines will apply for hydrant number and location:

1. At least one hydrant will be installed at all intersections.
2. Hydrant spacing of 200,feet will be required in all areas except single family and duplex residential areas.
3. Hydrant spacing of .300 feet will be required for single family and duplex residential areas.
4. The spacing distance for hydrants will be measured along the frontage street(s) and/or accessible side street(s) only. When determining the sufficiency of existing hydrants related to hydrant placement and spacing, hydrants located behind or on parallel streets or alleys, or hydrants with flows less than the minimum fire flows listed in Section 4.03A will not be considered.
5. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street or right-of-way, privately owned on- site hydrants will be required. Such hydrants will be located per Napavine PW Dept. and Fire Services and the Uniform Fire Code. The hydrants will be privately maintained and will include the appropriate metering and backflow prevention, as noted in these Standards. A proposed maintenance schedule will be submitted to the city for review prior to final approval of the engineering plans.

- D. Fire hydrants will be installed as detailed in Standard Drawing 4-8.

E.

- F. When necessary, the Public Works Department may require hydrants to be protected by two or more posts, 4-inch diameter x 5 feet high made of either reinforced concrete or steel.

- G. Fire hydrants must be installed, tested, and accepted prior to the issuance of a Certificate of Occupancy.

4.10 Backflow Prevention

All water system connections providing buildings or properties with domestic potable water, fire suppression or irrigations systems, will comply with the backflow prevention requirements as established by the Department of Health (DOH) WAC and the City of Napavine Cross-connection Control Program.

Having an approved backflow assembly(s) installed is necessary to protect the city water system and all users from any possible contamination. All backflow assemblies installed will be of a type and model pre-approved by DOH or the city. No cross-connections will be created, installed, used, or maintained within the City of Napavine water system. A list of approved testers may be obtained from the Washington Environmental Training Resource Center (WETRC) located in Auburn, Washington.

In-premises cross-connections must have an approved backflow assembly(s) in place in accordance with the Uniform Plumbing Code (UPC). The city may require additional in-premises and/or premises protection in accordance with DOH and the City of Napavine Cross-Connection Control Plan when health hazards are determined to exist.

All assemblies must be installed in accordance with the most recent versions of the -City of Napavine - Cross Connection Control Program, DOH, UPC. and the PNWSIAWWA Cross-Connection Control Manual. In addition, all assemblies must be inspected and approved by the city's Cross-Connection Specialist (CCS). The CCS may also conduct an on-site inspection of new and/or existing backflow

assemblies during testing. The city will release or issue a Certificate of Occupancy only after all backflow assemblies have passed a certified test.

Any person violating any provision of the City of Napavine Cross-Connection Control of Plan will be subject to penalties as stated under 'Napavine Municipal Code.

4.14 Irrigation

All irrigation systems will be installed with a backflow prevention assembly approved by the Department of Health or the City of Napavine Irrigation sprinklers will be situated so as to not wet any public street or sidewalk.

FINDING: The proposal includes the installation of a new water system that will be connected to the existing city water system located on Hamilton Road. One 3-inch water meter with a bypass and a 3-inch reduced pressure backflow assembly will be installed on the site. The project also proposes the installation of two fire hydrants and a fire department connection with a Dual Check Detector Assembly (DCDA) for single service. However, the utility plan does not include an irrigation system, so this standard is not met.

CONDITION OF APPROVAL: Prior to engineering approval, water utility plan sheets and details meeting WDG Chapter 4 shall be submitted for review and approval by the City.

CONDITION OF APPROVAL: Prior to construction, all water system materials and methods shall be reviewed by the City for compliance with applicable standards.

CHAPTER 5 SANITARY SEWER

5A GENERAL CONSIDERATIONS

5A.01 General

Sanitary sewerage refers to wastewater derived from domestic, commercial and industrial pretreated waste to which storm, surface, and ground water are not intentionally admitted. Pretreatment will follow all the requirements as set forth by city ordinances and Public Works Departmental policies.

Any extension of the City of Napavine Sanitary Sewer System must be approved by the Public Works Department and must be consistent with the City of Napavine Comprehensive Plan: City of Napavine General Sewer Plan, Department of Ecology, and Department of Health requirements.

Within the corporate city limits where public sewer is available it must be used. Connection is not required provided that the sewage from the structure originates more than 200 feet from the public sewer, except in the case of private residential or commercial developments where the developed property abuts a right-of-way in which a public sewer is located or where a service connection is otherwise provided. In this case, connection of all structures generating sewage will be required to connect to the public sewer regardless of distance.

Anyone who wishes to extend or connect to the city sewer system will contact the Public Works Department for a Water/Sewer/Storm Application. If a sewer line extension is being requested, a written request that specifically lists and details the line extension must be submitted to the Public Works Department. After the Water/Sewer/Storm Application is returned to the Public Works Department along with a written request and/or any other information as may be required or requested, city staff will determine costs or estimated costs and/or address council and other approvals as may be required.

See Chapter 1, Section 1.02 for definitions of specific sewers. Maintenance of the building sewer will be the responsibility of the property owner while the remaining sewer lateral will be the city's responsibility.

5A.09 Design Standards

The General Notes on the following pages will be included on all plans dealing with sewage system design. In addition, the specific notes with gravity sewer and STEP systems will be included when these utilities are part of the project.

5B GRAVITY SEWER

5B.01 General

All sewers will be designed as a gravity sewer whenever physically and/or economically feasible or as outlined in the City of Napavine General Sewer Plan.

5B.02 Design Standards

The design of any sewer extension/connection will conform to these Standards, Department of Ecology's "Criteria of Sewage Works Design," and any applicable standards as set forth herein.

The Layout of extensions will provide for the future continuation of the existing system as determined by the city. See Section 1.16 for utility extension information.

New gravity sewer systems will be designed on the basis of an average daily per capita flow of sewage of not less than 100 gallons per day. See the following DOE Table on Design Basis for Sewage. This figure is assumed to cover normal infiltration, but an additional allowance will be made where condition are unfavorable. Generally, laterals and sub-main sewers should be designed to carry, when running full, not less than 400 gallon daily per capita contributions of sewage. When deviations from the foregoing per capita rates are used, a description of the procedure used for sewer design will be submitted to the Public Works Department for review and approval.

5D PRESSURE SEWER (FORCE MAIN)

5D.01 General

Low pressure systems, i.e., force mains, may be considered for situations where high groundwater table or topography make gravity sewer impractical. STEP systems are addressed separately in Chapter 5E.

5D.02 Design Standards

The design of any sewer extension/connection will conform to City Standards, Department of Ecology's "Criteria of Sewage Works Design" and any applicable standards as set forth herein and in Sections 1.03 and 1.11.

The layout of extensions will provide for the future continuation of the existing system as determined by the city. In addition, main extensions will be extended to and across the side of the affected property fronting the main.

The system will be designed at full depth of flow on the basis of an average daily per capita flow as shown on the Table in Section 5B. 02. A coefficient of friction of 120 will be used for the Hazen-Williams "C" valve.

New sewer systems will be designed by methods in conjunction with the basis of per capita flow rates. Methods will include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, and modification of per capita flow rates based on specific data. Documentation of the alternative method used will be provided along with plans. Applicable General Notes in Section 5B.02 will be included on all plans dealing with pressure sanitary sewer design.

FINDING: The project proposes connecting an existing sewer force main line. The site plan includes two oil/water separator units, one grease interceptor, and a sewer pump station. Furthermore, the utility plan also depicts that the stormwater under the truck fueling canopy will be directed through the sewer system. The standard applies.

CONDITION OF APPROVAL: Prior to engineering approval, engineered sewer plans compliant with Chapter 5 of the NPW shall be submitted to the City for review and approval.

CONDITION OF APPROVAL: Prior to construction, sewer system materials and methods shall be reviewed by the City for compliance with applicable standards.

5F GREASE TRAP/GREASE INTERCEPTOR

5F.01 General

Acceptable grease traps or grease interceptors will be required for all restaurants, commercial kitchens, industrial processing facilities or other facilities where fats, oils or grease (FOG) could be otherwise discharged to the sanitary sewer system. Such equipment will be operated and/or maintained by the owner or operator of such facilities so as to eliminate the discharge of these substances to the sanitary sewer system. Grease traps and interceptors will be designed in accordance with the most recent edition of the Uniform Plumbing Code (UPC) as well as these Standards.

Grease traps and grease interceptors are placed on "gray" water drain lines from fixtures that discharge high concentration levels of FOG. They are generally installed on premises that have kitchens and/or food preparation facilities for large numbers of people. These facilities include restaurants/food services, hotels/motels, schools, and institutions.

The purpose of a grease trap or a grease interceptor is to provide a place for the wastewater to reach a semi-quiescent state and cool sufficiently; allowing the liquefied FOG to solidify and be retained through separation before the wastewater reaches the sanitary sewer system. The retained FOG is regularly cleaned and/or pumped out. The maintenance frequency varies with each facility and will be established by a representative from the Wastewater Division.

A. Grease trap

A grease trap is a device designed to retain FOG from a source of up to four (4) fixtures. Grease traps are usually located near the fixtures being served, inside the facility. The connection of dishwashers to grease traps will be avoided when practical. The maximum liquid temperature through a grease trap will be 90 degrees Fahrenheit. A dump valve may be required to ensure the liquid temperature standard is maintained, at the discretion of the Director of Public Works.

All grease traps will be regularly maintained by the customer at a frequency as determined by the facility characteristics. A maintenance log will be kept on-site for recording of all maintenance activity. At a minimum, the log will contain date of maintenance and/or inspection, work performed, and name of individual who performed service.

B. Grease interceptor

A grease interceptor consists of a tank with a minimum liquid volume of 750 gallons and serves multiple fixtures of a facility. Grease interceptors are general located outside the facility they serve and are buried underground.

Interceptors will be water tight and constructed of materials not subject to excessive corrosion. Appropriate tank materials include concrete, coated metal, and fiberglass.

FINDING: The preliminary site plan proposes sewer connected to TA travel center building with grease interceptor unit. The standard does apply.

CONDITION OF APPROVAL: Prior to engineering approval, grease traps or a grease interceptor device compliant with NPW 5F and shall be submitted to the city for review and approval.

V. COMMENTS

Eight comments have been received to date during the advertisement for the notice of application. The comments are attached in Appendix A. Please refer to this Appendix to review the comments in their entirety.

VI. CONDITIONS OF APPROVAL

A. Prior to Engineering Approval

- 1) Plans depicting public improvements satisfying applicable City standards and the most current version of the WSDOT Standard Specifications shall be submitted for review and approval by the City.
- 2) A complete landscaping plan satisfying all parts of NMC 12.14 shall be submitted for review and approval by the City.
- 3) Applicant shall submit fire marshal acceptance of engineered drawings for city review and approval. A public easement shall be provided encompassing the DCDA, all meters, and all hydrants as well as the water lines serving the DCDA, meters, and hydrants.
- 4) Applicant shall submit a mitigation plan for city review and approval.
- 5) The landscaping plan shall satisfy all parts of NMC 17.60.070 and be submitted for review and approval by the City.
- 6) Applicant shall submit all necessary drawings compliant with NMC 17.64 for City review and approval. A photometric plan demonstrating that lighting does not exceed 0.5 footcandle at the property lines. In addition, a landscaping plan demonstrating that west side of property is adequately screened from adjacent residential zones. Both the photometric and landscaping plans shall be submitted for city review and approval.
- 7) A Cultural Resource Survey shall be performed and a report submitted for review and approval by the City.
- 8) No new construction, substantial improvements, or other development (including fill) shall be permitted within zones AE. Unless the applicant demonstrates the proposed development will not increase the water surface elevation of the base flood more than one foot at any point within the community.
- 9) Applicant shall provide a 16-foot right-of-way dedication in order to comply with the required 66-foot right-of-way dimensions for the commercial collector.

- 10) The applicant shall modify driveway widths to compliant with NPW 2.12, or submit a variance application and receive approval.
 - 11) The site plan shall show the sight distance area as a clear-view triangle at both driveways.
 - 12) Engineering plans demonstrating trenching and restoration compliant with Napavine Public Works standards shall be submitted for review and approval by the City.
 - 13) The engineering site plan shall include concrete sidewalks design criteria. All sidewalk construction must follow the standard and approved by the City of Napavine.
 - 14) Revise the site plans to show compliance with NPW 2D for streetlighting plan and design.
 - 15) Applicant shall submit a final Stormwater Plan and Technical Information Report complying with NPW 3A for review and approval. Additionally, stormwater collected at the fuel island containment pads shall be routed to the sanitary sewer system.
 - 16) Erosion Control Plan compliant with NPW 3B and shall be submitted for review and approval.
 - 17) Water utility plan sheets and details meeting WDG Chapter 4 shall be submitted for review and approval by the City.
 - 18) Engineered sewer plans compliant with Chapter 5 of the NPW shall be submitted to the City for review and approval.
 - 19) Grease traps or a grease interceptor device compliant with NPW 5F and shall be submitted to the city for review and approval.
- B. Prior to Construction
- 1) Applicant shall submit all necessary drawings compliant with NMC 15.04 or the most current state standards for City review and approval. The applicant shall apply for all necessary building permits, pay associated fees, and be in possession of said permits.
 - 2) Erosion control devices shall be installed and shall remain in place during construction and afterwards until soil stabilization.
 - 3) All water system materials and methods shall be reviewed by the City for compliance with applicable standards.
 - 4) Sewer system materials and methods shall be reviewed by the City for compliance with applicable standards.
- C. Prior to Building Occupancy
- 1) The applicant shall provide an easement for access to all backflow devices to the city.
 - 2) Applicant shall complete the installation of all mitigation plantings and post a 5-year maintenance bond.
 - 3) The applicant shall ensure TIA (Traffic Impact Analysis) to be approved by WSDOT and completion of TIA mitigation measures. This includes any measures identified in the TIA report that are necessary to mitigate the impact of increased traffic resulting from the building's use. Following are the mitigation measures:
 - i. Construct a full-size single-lane roundabout at the intersection of Rush Road and Hamilton Road, with single-lane approaches for the north and south legs and a left-turn lane and right-turn lane on the east leg.

- ii. Implement access control at the southbound ramps intersection to eliminate the westbound to southbound left-turn movement onto the southbound on-ramp.
 - iii. Widen Rush Road between the southbound ramps and the I-5 bridge to provide a refuge lane for southbound to eastbound left-turn vehicles, facilitating two-stage left-turn maneuvers.
 - iv. Install a compact single-lane roundabout at the intersection of Rush Road and Kirkland Road, with single-lane approaches.
 - v. Make necessary frontage improvements on Hamilton Road, as required by the City of Napavine.
- 4) The applicant shall register the proposed infiltration facility with the Ecology Underground Injection Control (UIC) program.
- D. General
- 1) No signs shall be installed without a sign permit issued by the City of Napavine. Sign area, size and location shall be in accordance with NMC 17.62.100.

VII. RECOMMENDATION

Based upon the proposed plan, findings, and conclusion stated above and within the attached reports. The City of Napavine’s Planning Commission hereby recommends the Napavine Hearing Examiner **Approves Subject to Conditions.**

VIII. EXHIBIT LIST

SCOT INDUSTRIES - SITE PLAN	
EXHIBIT #	DESCRIPTION
1	Site Plan Review Plan set
2	Traffic Impact Analysis Report
3	Preliminary Stormwater Site Plan Report
4	Wetlands and Streams Report
5	SEPA Checklist
6	Critical Areas Memo

Appendix A

March 21, 2023

Bryan Morris, Public Works and Community Development Director
City of Napavine
407 Birch Ave NW
Napavine, WA 98565

RE: Napavine Truck Stop SEPA DNS
Interstate 5 MP 72 Vicinity

Dear Mr. Morris:

Washington State Department of Transportation (WSDOT) staff have reviewed the application materials submitted for the Napavine Truck Stop development. Approval of subsequent permits will result in the construction of a 15,000 square foot truck stop building with automobile and high-speed heavy vehicle fueling facilities, truck and vehicle parking, and associated utilities and infrastructure. WSDOT would like to address our concerns and offer the following comments.

The Traffic Impact Analysis (TIA) submitted for the proposal identified that the development would have significant adverse impacts on the I-5 Rush Road interchange. The applicant has proposed to mitigate their impacts on city and state transportation facilities by constructing a full-size roundabout at the Rush Road/Hamilton Road intersection, prohibiting westbound to southbound left turns and allowing two-stage southbound to eastbound left turns at the I-5 SB ramp terminal, and constructing a compact roundabout at the I-5 NB ramp terminal¹.

Generally, WSDOT staff is supportive of the proposed mitigation; however, staff have raised concerns with the proposed two-stage southbound to eastbound left turns from the I-5 SB ramp terminal. While the proposed refuge lane on Rush Road would allow for a passenger vehicle to queue and wait for a gap in traffic moving eastbound, there is not enough space for any larger vehicles (semi-trucks, buses, local delivery vehicles) to make such a maneuver without blocking westbound traffic, and its presence may encourage larger vehicles to do so. Therefore, we request that the mitigation measures be revised to remove the refuge lane and two-stage southbound to eastbound left turns from the I-5 SB off-ramp.

With the proposed revised mitigation, operations at the interchange will return to pre-development levels of service (LOS) or better, except for conditions at the I-5 SB ramp terminals, which will operate at LOS F with 65.9 seconds of delay. However, adequate storage exists for the PM peak hour volumes without effecting I-5 mainline operations. Therefore, we

¹ Note that the proposed mitigation in the preliminary staff report calls out the compact roundabout to be constructed at the Rush Rd/Kirkland Rd intersection; upon further discussion with the developer's consultant, the location for the compact roundabout has been adjusted in a revised version of the TIA and should be reflected in the condition of approval as such.

recommend that the development be conditioned upon the installation of the proposed mitigation as outlined in the TIA except for the two-stage southbound to eastbound left turns, provided that the final design may be revised if design documentation requires changes to the proposed measures.

Please be advised that WSDOT is required to be reimbursed by agreement for our actual direct and related expenses associated with this project. All work performed within the WSDOT right of way will require our technical review, permits, inspection and approval by WSDOT prior to construction. This reimbursable agreement must be in place prior to WSDOT reviewing any plans submitted for approval.

WSDOT will require the following for all work within WSDOT right of way:

- Proposed changes to State facilities must be designed to current WSDOT standards and specifications.
- Plans must be reviewed and accepted by WSDOT prior to beginning work.
- Engineering calculations, plans and reports submitted for review and approval must bear the seal and original signature of a professional engineer licensed in the State of Washington.
- Copies of all environmental documentation required of this project by any local, State, or Federal jurisdiction. Failure to provide this documentation may result in a substantial delay of approval by WSDOT.
- Construction must be done in accordance with the current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction manual.
- Construction inspection will be performed by WSDOT at the developer's expense.

Due to the proximity of this proposal to Interstate 5, WSDOT will require that lighting installed by the applicant must be of an appropriate wattage and be shielded and/or directed according to RCW 47.36.180 to avoid any glare to the motorists on the freeway.

These comments are based on a preliminary review of your project. As this project progresses, there may be need for additional information by this department for further review. There may be other issues and requirements by this department that are not stated here. Other issues or requirements may include, but are not limited to, drainage, illumination, signing, and channelization. *This review does not constitute final approval by WSDOT.*

Thank you for the opportunity to comment on the above referenced project. If you have any questions or need additional information, please contact me at BassD@wsdot.wa.gov or at 360-831-5829.

Sincerely,



Dylan Bass
Development Review Planner

cc: Scott Langer

Carley Francis
Laurie Lebowsky-Young
LisaRene Schilperoort
Ryan Shea – SCJ Alliance



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Southwest Region Office
PO Box 47775, Olympia, WA 98504-7775 • 360-407-6300

March 21, 2023

Rachelle Denham, Clerk
City of Napavine
Community Development Department
PO Box 810
Napavine, WA 98565

Dear Rachelle Denham:

Thank you for the opportunity to comment on the determination of nonsignificance for the Napavine Truck Stop Project located at 121 Hamilton Road as proposed by GMD Land Company, LLC. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

SOLID WASTE MANAGEMENT: Derek Rockett (360) 407-6287

The applicant proposes to demolish an existing structure(s). In addition to any required asbestos abatement procedures, the applicant should ensure that any other potentially dangerous or hazardous materials present are removed prior to demolition. It is important that these materials and wastes are removed and appropriately managed prior to demolition. It is equally important that demolition debris is also safely managed, especially if it contains painted wood or concrete, treated wood, or other possibly dangerous materials. Please review the "Dangerous Waste Rules for Demolition, Construction, and Renovation Wastes," on Ecology's website at: [Construction & Demolition Guidance](#). All removed debris resulting from this project must be disposed of at an approved site. All grading and filling of land must utilize only clean fill. All other materials may be considered solid waste and permit approval may be required from your local jurisdictional health department prior to filling. Contact the local jurisdictional health department for proper management of these materials.

**WATER QUALITY/WATERSHED RESOURCES UNIT:
Jacob Neuharth (360) 742-9751**

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
 - a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
 - a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
 - b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted. For additional information on contaminated construction sites, please contact Evan Wood at evan.wood@ecy.wa.gov, or by phone at (360) 706-4599.

Additionally, sites that discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorous, or to waterbodies covered by a TMDL may need to meet additional sampling and record keeping requirements. See condition S8 of the Construction Stormwater General Permit for a description of these requirements. To see if your site discharges to a TMDL or 303(d)-listed waterbody, use Ecology's Water Quality Atlas at:

<https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx>.

The applicant may apply online or obtain an application from Ecology's website at: <http://www.ecy.wa.gov/programs/wq/stormwater/construction/> - [Application](#). Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

Rachelle Denham

March 21, 2023

Page 3

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(GMP:202301052)

cc: Derek Rockett, SWM
Jacob Neuharth, WQ



Community Development

2025 NE Kresky Avenue
Chehalis WA 98532

March 21, 2023

To: SEPA Administrator

RE: Napavine Stuck Stop / MSC23-0009

Date Received: March 8, 2023

Comments Due: March 21, 2023

Thank you for the opportunity to review and comment on the above project. Lewis County Community Development circulated your documents to the Environmental Health and Public Works departments for their comments. Following are the County comments:

Community Development

- Napavine city limits, appears portion of property is located in a SFHA Napavine FIRM map.

Environmental Health

- Project proposes connection to City of Napavine Public Water Supply.
- Project proposes use of City of Napavine's sanitary sewer.

Public Works

- Private and public survey monuments shall be maintained and replaced if destroyed per WAC 332-120-040.
- Survey monuments exist for this parcel and adjoining parcels. The proper monument removal form will need to be recorded with the Public Land Survey Office by a licensed land surveyor if any of these monuments are to be removed or destroyed.
- Stormwater: No Comment
- Traffic: No comment with mitigation provided.
- Access: No comment, in city limits.
- Roads: No Comment, in city limits.

Respectfully,

Megan Sathre

Megan Sathre
Lewis County Community Development
Megan.Sathre@lewiscountywa.gov



Katie Williams

From: Shaun Dinubilo <sdinubilo@squaxin.us>
Sent: Friday, March 17, 2023 8:13 AM
To: Katie Williams
Subject: RE: City of Napavine -SEPA Checklist /DNS 202301052 for Napavine Truck Stop - 121 Hamilton Road
- Comments Due 3/21/2023

CAUTION: External Email

Hello Katie,

Thank you for contacting the Squaxin Island Tribe Cultural Resources Department regarding the above listed project for our review and comment. The project area has a high potential for the location of cultural resources. We recommend a cultural resources survey and report be completed for this project. We would prefer to receive an electronic copy by email once completed.

Additionally, there is a known cultural resource site within and directly adjacent to the project area. While part of this site had salvage excavations conducted on it in 1974, the full extent of the site remains unknown at this time.

Please feel free to reach out if you have additional questions.



Shaun Dinubilo
Archaeologist
Cultural Resource Department
Squaxin Island Tribe
200 S.E. Billy Frank Jr. Way
Shelton, WA 98584
Office Phone: 360-432-3998
Cell Phone: 360-870-6324
Email: sdinubilo@squaxin.us

Email is my preferred method of communication.

As per 43 CFR 7.18[a][1]) of the Archaeological Resource Protection Act, Section 304 of the National Historic Preservation Act, and RCW 42.56.300 of the Washington State Public Records Act-Archaeological Sites, all information concerning the location, character, and ownership of any cultural resource must be withheld from public disclosure.

From: Katie Williams <kwilliams@cityofnapavine.com>
Sent: Wednesday, March 8, 2023 3:49 PM
To: sepacenter@dnr.wa.gov; SW-SEPA-REVIEW@WSDOT.WA.GOV; R5planning@dfw.wa.gov; evan.g.carnes@usace.army.mil; Judy Godbey <jgodbey@cityofnapavine.com>; John Brockmueller <jbrockmueller@cityofnapavine.com>; chief5100@lcpd5.com

Cc: Shaun Dinubilo <sdinubilo@squaxin.us>; dpenn@chehalistrike.org; Casey_Barney@yakama.com; RAsgeirsson@cowlitz.org; Naomi.Brandenfels@quinault.org; Bass, Dylan <BassD@wsdot.wa.gov>; Shane Schutz <sshutz@napavineschools.org>; Karen Witherspoon <karen.witherspoon@lewiscountywa.gov>
Subject: City of Napavine -SEPA Checklist /DNS 202301052 for Napavine Truck Stop - 121 Hamilton Road - Comments Due 3/21/2023

Hello,

Please review the link below for the City of Napavine's most recent project -Napavine Truck Stop SEPA Checklist and DNS.

[SEPA record number 202301052, "Napavine Truck Stop"](#)

Comments are due – March 21, 2023.

Comments can be directed to me, kwilliams@cityofnapavine.com, or Bryan Morris at bmorris@cityofnapavine.com.

Thank you,

*Katie Williams
Community Development/Public Works
Executive Assistant
City of Napavine
(360) 262-9344
(360) 262-9199-fax*

Disclaimer: Public documents and records are available to the public as provided under the Washington State Public Records Act (RCW 42.56). This e-mail may be considered subject to the Public Records Act and may be disclosed to a third-party requestor.

January 22, 2023

Subject: Napavine Truck Stop environmental checklist

Att: Bryan Morris, Director of Public Works

RECEIVED
JAN 23 2023

BY: ...KW.....

Dear Mr. Morris:

Traffic congestion at Exit 72 is a well known problem that you and certainly others like me that use Exit 72 regularly are aware of. The applicant proposes several road improvements to mitigate for their increased traffic at I-5 Exit 72. Will those improvements work? I don't know. I leave that question for WDOT and other commenters. However, I urge City of Napavine to require that all traffic improvements be completed before the truck stop is allowed to occupy and operate its facility.

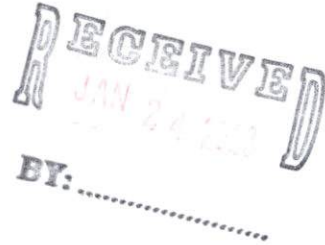


614 Newaukum Valley Road

Chehalis WA

1/23/2023

City of Napavine Community Development
Bryan Morris, Director of Public Works
bmorris@cityofnapavine.com
Napavine City Hall
PO Box 810
Napavine, WA 98565



Re: Industrial – Commercial Site Plan Review
Napavine Truck Stop Site Plan

My concerns re: the Napavine Truck Stop development:

Traffic – Two roundabouts will not solve the issue with the traffic at Exit 72. Without improvements to Rush Road (i.e. a third roundabout), there will be gridlock by Loves, Taco Bell and Arby's.

Lighting – there needs to be light buffer to shield the properties on the other side of the river.

Noise – there needs to a noise buffer to shield the properties on the other side of the river.

Road Maintenance – who will be responsible for the road maintenance with the increased traffic? i.e. paint striping, pot holes and general road maintenance. Historically this has not been done and will become even worse with more traffic.

Flooding – how are the roundabouts going to be designed around the flooding issues? Will the roundabouts encroach in the floodways and wetlands? Will they block flood waters?

Thank you,

Kodie and Jenny Baker
592 Newaukum Valley Road
Chehalis WA 98532
Phone – 360.269.7617

January 23, 2023

Bryan Morris, Director
Public Works/Community Development
City of Napavine
By email to: bmorris@cityofnapavine.com

RECEIVED
JAN 24 2023
BY: kw

Regarding: Napavine Truck Stop Site Plan – GMD Land Company LLC

Dear Director Morris:

I am submitting these comments for your consideration and for the record in the Industrial-Commercial Site Plan Review and SEPA Checklist application submitted by GMD Land Company LLC for a new truck stop and travel center on 14 acres west of Hamilton Road at the I-5 interchange.

I am asking you to please not approve this application at this time, and to request significantly more detailed environmental analysis and opportunity for public input before you make a final decision. The project is proposed to start onsite construction in spring 2023, and that is too soon. The proposal as submitted is insufficient for a project of this scope without more information and a more robust mitigation plan.

My comments and request are based on materials posted online by the City of Napavine, including the SEPA Environmental Checklist prepared for GMD Land Company, LLC, dated September 2022. I have not had an opportunity to review project documents at City Hall, having just learned last Friday that the City posted a notice of this application, and comments are due by January 24.

Paragraph 12 of the SEPA Checklist describes the project site as encompassing Lewis County Parcel No. 018050005000 (no search results in Assessor's parcel system) and Parcel No. 018150004000 (on Forest Napavine Road). However, the site drawing attached to the Checklist clearly shows the project site, and it is clear from the rest of the Checklist that the truck stop would be built on Parcel 018050005002, close in on the northwest side of the Rush Road/I-5 interchange.

The new owner of this site, GMD Land Company, LLC was incorporated a year ago, January 13, 2022 and appears in the Washington Secretary of State's records as UBI# 604857115, nature of business: real estate, real property investments. GMD purchased the property December 29, 2022 from Hamiltons Walnut Shade LLC for \$4 million. It is currently assessed at \$2,973,600. GMD's mailing address is in Fresno, California. One of GMD's corporate governors is also listed at a Fresno address, with another governor, Gurinderjit Sidhu, listed as registered agent of the LLC at an address in Edmonds, WA. The third governor of the LLC is Sidhu Investments, Inc, which I did not find listed in the Secretary of State's website. Another Washington Limited Liability Company, GMD Moses Land Company, LLC, formed March 11, 2022 by the same LLC board of governors, is in the Secretary of State's website as UBI 604886337.

I raise this information to point out that the proposal for the new Napavine Truck Stop has been submitted by a California-based corporate entity with limited liability in Washington, only recently formed, able to buy 16 acres for \$4 million, and very obviously not too concerned about the damaging effects their proposed project would have on those of us living here for the long-term in the community.

GMD Land Company, LLC applied to build out 14 acres of the property as a Travel Centers of America travel service facility. Travel Centers of America is the largest publicly traded full-service truck stop company in the United States, headquartered in Ohio¹, taking in ~\$7.3 billion in revenue each year (per their website). The Napavine Truck Stop site plan is large, too. Per the SEPA Checklist, *this truck stop will generate approximately 7,350 total daily trips.*

Seven thousand three hundred and fifty additional trips per day through the Rush Road/I-5 interchange That's going to make a lot of money for somebody, some limited liability company governors. Maybe it will bring in more commercial tax revenue for the City, and generate some more truck stop and fast food jobs. But the proposal doesn't come even close to identifying and addressing the impacts our community will suffer while Travel Centers of America and other corporate entities rake in more profits and dividends for stock owners.

The SEPA Checklist indicates the project would have 105 parking spaces for use at the fueling station and retail center, plus 97 overnight parking spaces for trucks. Of the 7,350 total daily trips, approximately 25% of the volumes would be truck traffic, with the peak in volume during the PM peak hour. The Checklist is skimpy on traffic volume analysis, and not very descriptive of the proposed mitigation. A more thorough analysis is needed, one that's more realistic about the actual traffic impacts of these additional 7,350 trips per day.

Checklist Sec. 11 proposes minimal offset mitigation:

- A modern roundabout (also called a full-size single-lane roundabout) at the intersection of Hamilton Road and Rush Road (with single lane approaches and turn lanes, involving widening Rush Road).
- Construction of a compact roundabout at the intersection of Rush Road and Kirkland Road.
- Channelization improvements on the I-5 southbound ramp at the I-5 exit 72 interchange.

My concerns:

- There are no drawings to help visualize this proposal. Even though there are several bullet sentences describing the proposed new traffic flow, it is essential for the public record to include some drawings of this concept, which is difficult to follow in words.
- The Napavine Truck Stop proposed mitigation is way under-proportioned to the impacts it will add to this already-unsafe interchange.
 - The northbound ramps are as dangerous as the southbound.
 - Every intersection and on-ramp in every direction is uncontrolled with unmaintained "improvements," and even the existing commercial build-out with truck stops, convenience stores, and fast-food restaurants has left the local community with a big mess.
 - The narrative Checklist is very light on detail and dismissive of the very real unsafe traffic conditions that already exist in all directions at this interchange.
- This proposed additional truck stop would only make the bad situation much worse.

The Checklist indicates in Sec. 10 that a construction agreement will be needed for work within the WSDOT right-of-way. This WSDOT agreement, and any other WSDOT approvals, should be completed and included in the application packet, available to the public.

¹ Not found listed on Washington Secretary of State's website.

In addition to a more realistic design for major impacts to the I-5 interchange, the Napavine Truck Stop application should also include a thorough traffic analysis and mitigation plan for the Hamilton Road frontage road, where the additional 7,350 daily trips of cars and trucks would be coming and going from three new driveway entrances. The Checklist indicates the City of Napavine would require frontage improvements on Hamilton Road. We already have an unsafe, inefficient traffic situation where Hamilton Road comes into this interchange. Please do not allow this developer to make the situation even worse.

The Checklist makes reference to improvements being made to the surrounding road network, and mitigation measures to be constructed, but it does not confirm that the *developer* will have to *pay* for the improvements and construction, nor does it commit the developer to cover the costs of years of ongoing maintenance that will be required due to heavy use of the infrastructure. Please protect the local community so we don't subsidize the impacts of this development while it reduces our property values and raises our taxes.

The Napavine Truck Stop would have other very real impacts, too, in addition to unbearable traffic congestion.

- The Checklist says the new truck stop is not expected to significantly affect the capacity or distribution of public services. There is no mention where our local service providers have actually been contacted. The public record should include substantive assessments of impacts on our local law enforcement, fire districts, and State Emergency Management Division, at a minimum.
- The Checklist makes only a summary assessment of the project's environmental impacts. It concludes that the wetland on and adjacent to the property is not worth saving (and it certainly will not be saved after the truck stop converts 73% of the site to impervious surface). It acknowledges bald eagle nesting but is not concerned because eagles are now only on the ESA sensitive list instead of threatened and endangered.
- Lights (an unspecified number, many) will be operated 24 hours/day every day and night (superficially mitigated by shielding and directing the lights downward).
- There are no measures required to reduce noise.

Please do not approve this site plan. Please send it back for a complete and thorough assessment of impacts, and require the developer to submit a realistic and robust mitigation plan.

Thank you for your consideration of these comments submitted by a very concerned neighbor.

Mary B Verner

vernernmaryb@gmail.com

509-994-7206

423 Newaukum Valley Rd, Chehalis 98532

23 January 2023

Comments on proposed Napavine Truck Stop at 121 Hamilton Rd

Hello: My name is Michael L. Smell and I live at 470 Hamilton Rd 1 mile downstream from the proposed project on land designated as a floodway. I invite you all to visit my place during the flood season, 1 November to 30 April. I live by, on, and in the Newaukum River. In the 33 years I have lived in a 100-year-old house, the Newaukum River near me has flooded 40+ times. Some were out of bankers, some were minor meaning my property was inundated, many were major where my house was surrounded by water for 24 to 38 hours. I have been here for 9 out of the top 10 floods including the highest ever recorded on 7 January 2022. None of us downstream needs anymore water during a flood. This is my major concern with this project. I have gone over the entire proposal and make the following comments: Under B1g, it states 73% will have an impervious surface which is about 10 acres. During a rain event before and during a flood event from 1 to 3 inches of rain can occur in a 24 hour period. How much rain in acre feet will fall on this impervious surface? I did not see an estimate in the proposal. Under B3a5) and B3d, a wetland/floodplain of 46,500 square feet is planned. I did not see anywhere where this area would be put into a Conservation Easement as required by State Law. B3c(1 talks about a catch basin “..sized to handle runoff from the entire development..” and after treatment “” discharged in the existing wetland” but there is no mention of the gallon capacity of the new catch basin. If the catch basin is already full from the 1 – 3 inches of rain before a flood then it will not have any holding capacity during the flood. All the water from the impervious surfaces will go directly into the wetlands/floodplain and directly into the Newaukum River adding that much more volume for us downstream. One last item not related to water runoff. B14f says that 7,350 vehicle trips could be generated from this project. Add that amount to the existing vehicle trips and the total number could be 13,000 per day. B14h says a full-sized single-lane roundabout will be installed at the Rush Road/Hamilton Road intersection. Were the existing vehicle trips taken into account with this planning? I think the roundabout will be too small.

Michael L. Smell

470 Hamilton Rd

Chehalis, WA 98532

RECEIVED
JAN 24 2023
BY: Kw

Katie Williams

From: Bryan Morris
Sent: Wednesday, January 25, 2023 8:53 AM
To: Katie Williams
Subject: FW: Incidental..

Bryan Morris
Public Works Director
City Of Napavine
P.O. Box 810
Napavine, WA 98565
Office (360) 262-3547
Cell (360) 880-6137

From: Ric P Rivera <rp02river@gmail.com>
Sent: Tuesday, January 24, 2023 9:09 PM
To: Bryan Morris <bmorris@cityofnapavine.com>
Subject: Incidental..

CAUTION: External Email

Hi Bryan,

This may not have any bearing in the future for the Napavine TA Truck Stop 22-0005-SP-01 Proposal site plan but maybe since there is for public road construction B&O tax.

I heard the City of Winlock will be charging tax on traffic studies.

Sincerely,
Ric Rivera
542 Newaukum Valley Rd
Chehalis, WA 98532

Re: Industrial / Commercial Site Plan Review
Napavine Truck Stop Site Plan

January 24, 2023

To: City of Napavine Community Development
Bryan Morris, Director of Public Works
Napavine City Hall
P.O. Box 810
Napavine, WA 98565

RECEIVED
JAN 24 2023

BY: kw

We strongly oppose the proposal for another truck stop. Please sincerely consider our reasons for opposition:

(1) Traffic: Exit 72 is already a dangerous exit. There is a great deal of congestion with big rigs coming and going from Lewis. The turn lanes are unclear and confusing. The roads are not well maintained. Adding another truck stop would greatly compound the already existing ~~problem~~ problems, creating a more dangerous situation for everyone who drives on Bush Road.

(2) Air pollution: The carbon emissions from big rigs are the largest mobile source

of air pollution. There are already two ² truck stops off of exit 72, creating more smog in this area. Please find a different location for another truck stop, and limit the amount of exhaust and fumes in the air for residents close to this area.

(3) Flood Zones: The proposed roundabouts would redirect flood waters putting existing structures at risk. The Newark Valley River floods, and redirecting floodwaters endanger property, wildlife habitat, and even human lives.

(4) Environmental Impact: Another truck stop would have detrimental effects on the environment. Besides air pollution, runoff from oil and gasoline can seep into the surrounding wetlands and river. An eagle's nest is very close to this site and we look forward to watching the eagles every year. Furthermore, bald eagles are protected

→

in the state of Washington. A truck stop and a healthy, thriving wildlife habitat are not conducive to one another. We already have a truck stop, so please protect the wetlands, river front, and wildlife we have left.

(5) Agriculture / Farm Community: I remember when we first came to Napavine and saw the "Welcome" sign: "Welcome to Napavine, For a day, Or a lifetime!" We were so happy to call this our home, and to be around like-minded people who are interested in farming, preserving the land, and working together. We love it ~~now~~ here, helping our neighbors, encouraging each other, sharing ideas, and working together to create a sustainable community. Please take into account what another truck stop would do to our livelihood, diminishing the quality of life for all of us living in this rural community. Many of us are

→

here because we want to raise our families on farms, teaching our children how to care for animals and how to take care of the land. Another truck stop does not line up with the vision of Napavine to support the families living in and around the city.

(6) Increased Crime Rate: Another truck stop will increase crime. We value our truckdrivers that work hard to make an honest living. It is not an easy life. Truckdrivers are necessary for our economy. However, we already have two truck stops here and truck stops bring in a higher rate of crime. Napavine does not have the resources to sufficiently protect the citizens, as law enforcement and emergency responders are already understaffed.

(7) Noise Pollution: We live in the country. It is healthy for people to hear quiet, and sounds in nature (birds, frogs, crickets, water) not the noise from big rigs coming and going over.

going, numbers being called all night for available showers, honking horns, etc. Please do not allow another truck stop that will just add to this chaos.

(8) Light Pollution: It is healthy for people to observe natural lights, and be able to see the stars at night amidst a dark sky. The lights from truck stops and other public places are unnatural and disrupt the peacefulness of living in the country.

(9) Litter: There is already a problem with litter all over exit 72, and outside of the fast food restaurants. A truck stop would make this problem much worse, not better.

(10) Lack of Infrastructure: Napavine does not have the proper infrastructure to add another truckstop. It is poor planning. The cumulative effects of the structures already in place

off of Exit 72, and any proposed structures need to be assessed as a whole. It is unwise to look at the effects of Luis, the effects of Arby's, etc individually. We need to assess the effects of this area as a whole on flooding, environment, traffic, and how any development would affect neighboring communities (property values, noise and light pollution, crime rate).

Thank you for taking the time to read this. Please help protect the well-being and lives of those who are thankful to be living here.

Sincerely,

Rob and Alison Simpson
 and Johnny Simpson, Jimmy Simpson, and Bobby Simpson
 517 Newaukum Valley Rd.
 Chehalis, WA 98532

Napavine Truck Stop 22-0004 SP-01

Bryan Morris, Director of Public Works
Napavine City Hall
407 Birch Ave. SW
Napavine, WA 98565

Comment period
Date: 1-23-2023

Dear Mr. Morris

The PLAN on page 17 states that it expects daily traffic of 7,350 during PM peak hours as per the ITE Trip Generation Manual.

QUESTIONS:

- What are the peak hours?
- Is there a conflict with the other truck stops?
- What happens if and when an accident occurs in the narrow I-5 underpass at exit 72
- Does the roadway intersection at Hamilton Road and Rush Road need to widen if there are traffic circle(s)?
- Will traffic circle(s) alleviate traffic congestion if Love's Travel/Truck Stop backs up on the southbound exit?
- **Suggestion:** (wishful) Offramps have left-right turn lanes!
 - (wishful) At Love's commercial Truck Stop - Widen the southbound lane as the short middle turn lane ingress to the truck stop. The 53-footers block the southbound traffic to Napavine.

Napavine Truck Stop

22-0004 SP-01

On drawing

Sheet SV-1 of 5

In the DATUM map | ALT/NSPS LAND TITLE TABLE A SURVEY NOTES

Says:

2. ADDRESS: 0 HAMILTON RD, CHEHALIS, WA 98532
121 HAMILTON RD, CHEHALIS, WA 98532
3. THE PROPERTY LIES IN MULTIPLE FLOOD ZONES BASED ON FEMA FIRM MAP 5301021781C W/ AN EFFECTIVE DATE 7/17/2006 W/ LETTER OF MAP REVISION LOMR 15-10-0078P W/ AN EFFECTIVE DATE OF 12/18/2015. MAJORITY OF THE PROPERTY LIES IN FLOOD ZONE "X", AREA OF MINIMAL FLOOD HAZARD. THE SOUTHWEST PORTION OF THE SITE FALLS WITHIN FLOOD ZONE "AE" W/ A BASE FLOOD ELEVATION OF 222' TO 223.8'. BASED ON THE FEMA FIRM MAP, A SMALL PORTION OF THE SITE MAY FALL WITHIN THE REGULATORY FLOODWAY, FURTHER DETERMINATION MAY BE NEEDED.

Based on FEMA FIRM MAP 7/7/2006 - it **is not up to date!**

QUESTION: Is the present regulation upholding and does not require further determination while, in full knowledge, natural weather events have occurred since 2006?

Sheet SV-3

Next to the sheet notes is of 3/3/2022

WETLAND
2-3' OF STANDING
WATER IN WETLAND AS
OF 3/3/2022

Napavine Truck Stop

22-0004 SP-01

Dwg No. SP-02 Sheet 11 of 17 | FEMA FLOOD ZONES MAP | preliminary

Shows **CATEGORY III WETLAND** highlighted and projected beyond the **WETLAND BUFFER ZONE** into the parking lot. The perimeter driveway borders the WETLAND BUFFER

Dwg No. VP-01 Sheet 13 of 17 | PRELIMINARY & LANDSCAPING PLAN

Indicates the perimeter driveway borders the WETLAND BUFFER

Dwg No. SD-02 Sheet 17 of 17 | PRELIMINARY STORMWATER PROFILES

QUESTIONS:

Unforeseen events - Measures beyond presently required?

- 1. *Are there contingencies to account for unexpected 100, 200, – 500-year events and the surface water runoff of contaminants that is incidental to the SF of "Buffer Enhancement Area" & "Stormwater Basin?"***

DATA:

- **Concentrations and Retention Efficiency of Tire Wear Particles from Road Runoff in Bioretention Cells - peer-reviewed**
<https://www.mdpi.com/2073-4441/14/20/3233>
- **Scientific Basis of the Proposed Adoption of Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-Phenyl-p-Phenylenediamine (6PPD) as a Priority Product**
https://dtsc.ca.gov/wp-content/uploads/sites/31/2022/05/Final-ESPR-6PPD-in-Tires_Accessible.pdf

Napavine Truck Stop 22-0004 SP-01

INCIDENTALS

The flood of Jan 2022 flooded exit 72.

Flood Central: Rivers Have Crested Across Basin

Thursday, Jan 6, 2022, 8:45 am by The Chronicle staff, Eric Rosane / ericr@chronline.com

9:45 p.m. Update: WSDOT Announces On and Off Ramps at Interstate 5 Exit 72 Are Closed



WSDOT SW  @wsdot_sw · 11m

Updated: Closure I-5 Exit 72 On and Off Ramps closed due to water over roadway both directions beginning at 9:45 pm on Jan. 6, 2022 until further notice.

The Chronicle, Centralia, Lewis County, Dec 3, 2007

An earthen dike broke at the Newaukum River at Exit 72 in Napavine, reportedly sending four feet of water into the area around Burger King, McDonald's and the Bethel Church of the Assemblies of God. The underpass at the Rush Road Exit is flooded.

Major floods happened in the Chehalis River Basin in 1990, 1996, 2007, 2009, & 2022.

Sincerely,

Suzy Rasmussen & Ric Rivera

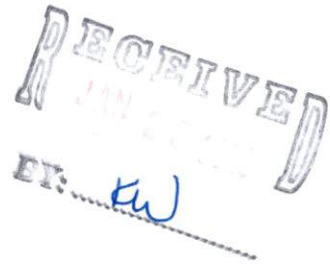
542 Newaukum Valley Road

Chehalis, WA, 98532

rp02river@gmail.com

1/19/2023

City of Napavine Community Development
Bryan Morris, Director of Public Works
Napavine City Hall
PO Box 810
Napavine, WA 98565



Re: Industrial – Commercial Site Plan Review
Napavine Truck Stop Site Plan

Addressing Checklist – Opposing it:

1. Traffic – 7,350 daily trips – 11% trucks.
Concerns: the accumulative effects on other development at exit 72, Rush, Hamilton and Kirkland Road should be required.
 - a. Pollutions (air, litter) (WAC 173-806-160)
 - b. Noise is terrible now, no buffers (should be required).
 - c. No loud speakers used outside.
 - d. Lighting – need shields required for area. The lighting with development is awful and blinding, lighting up to my home and fields. Glare is awful on my home and property.
 - e. Autos and Trucks coming and going need buffers (required).
 - f. Aesthetics – 35 foot buildings would alter views and lighting and impact my property.
 - g. Agriculture – won't affect is wrong. We have agriculture equipment going through this area and not safe now. Development should be notified agriculture adjacent. Reason: practices and noise – flies and smells, etc. to protect agriculture.
2. Roundabouts = we opposed plan.
 - a. Blocking – flood waters at exit 72 – Hamilton Road, Rush Road and Kirkland Road. It will block or redirect flood waters – using wetlands for it.
 - b. Two roundabouts won't address the dangerous traffic from the Love's truck stop, Starbucks, Arbys, Taco Bell, and Truck stop.
 - c. The roundabout wont address north and south on Rush Road. We have to wait long times getting on Rush Road from Newaukum Valley Road.
 - d. No accumulative effects studies done – appears to development is being piecemealed on Hamilton Road, Rush Road and Kirkland Road, Exit 72.
 - e. Accumulative Effects should be done/required with allthe development on Hamilton Road, Rush Road, Kirkland Road, Exit 72/1-5.

Our concern is who will maintain the roads and roundabouts? Who will enforce what needs to be done? Lighting, stop signs, buffers?

Thank you,

Tamara Baker
575 Newaukum Valley Road
Chehalis WA 98532
Phone – 360.520.1076



Community Development
407 Birch Ave SW, P. O. Box 810 Napavine, WA 98565
Phone: (360) 262-9344 Fax: (360) 262-9199
www.cityofnapavine.com

Notice of Public Hearing

NOTICE IS HEREBY GIVEN that City of Napavine has received a Land Use application packet, SEPA Checklist, and Variance Application from GMD Land Company LLC for the following development proposal:

Project Proposal: The project will construct a travel center facility including a convenience store with an internal fast-food restaurant, drive-thru, and amenities including showers and laundry. The travel center will include an auto fueling canopy and parking area, truck fueling canopy and truck parking area, a detached vehicle maintenance building, and platform scale. Utility services, stormwater management, and landscape and wetland buffer enhancements are proposed. The travel center proposes three driveway entrances to Hamilton Road. The project site is 14.0 acres.

Project Location: 121 Hamilton Road; Napavine, Washington - Tax Parcel #018050005002

Hearing Date and Location: **May 10, 2023. 10:00 AM**
 Napavine City Hall - Council Chambers
 407 Birch Ave SW
 Napavine WA 98565

City Contact:

Bryan Morris, Director of Public Works
Phone: (360) 262-9344
Email: bmorris@cityofnapavine.com
Mail: PO Box 810, Napavine, WA 98565

View the complete application online:

<https://www.cityofnapavine.com/communitydev/page/public-notice>

Date Application Received: **December 15, 2022**
Date of Complete Application: **January 9, 2023**
Date of Notice of Application: **January 10, 2023**
Date SEPA Comments Due: **March 21, 2023**

Anyone interested may appear and be heard. The decision of the Hearing Examiner will be sent to all those who submit comments, testify at the hearing, or request the decision in writing. Any aggrieved party of record can file an appeal with Lewis County Superior Court. Written comments about this application must be submitted to Bryan Morris at the listed address above. If you have any questions, please visit the website or call.

****WRITTEN PUBLIC COMMENTS CAN BE ACCEPTED UNTIL 9:30 AM ON May 10, 2023****

Hamiltons Walnut Shade
295 Kirkland Road
Chehalis, WA 98532

James & Debbie Fine
536 Toutle Park Road
Castle Rock, WA 98611

Virginia Breen
PO BOX 1050
Centralia WA 98531

Carlough Living Trust
2325 Trillium Heights
Longview, WA 98632

Tamara Baker
575 Newaukum Valley Rd
Chehalis, WA 98532

Rai Petroleum LLC
107 Hamilton Road
Chehalis, WA 98532

GMD Land Company LLC
7664 N Santa Fe Ave
Fresno CA 93772

From: [Flannery Publications](#)
To: [Katie Williams](#)
Subject: Re: City of Napavine - Notice of Public Hearing
Date: Friday, April 28, 2023 12:27:01 PM

CAUTION: External Email

Hi Katie,
it's booked and will run 05.03.23. I'll get it posted on FB
asap.
Thanks,
Alisa

On Friday, April 28, 2023 at 11:02:15 AM PDT, Katie Williams <kwilliams@cityofnapavine.com> wrote:

Hello,

Can you please post this in the next edition of the newspaper and on Facebook?

Thank you,

Katie Williams

Community Development/Public Works

Executive Assistant

City of Napavine

(360) 262-9344

(360) 262-9199-fax

Disclaimer: Public documents and records are available to the public as provided under the Washington State Public Records Act (RCW 42.56). This e-mail may be considered subject to the Public Records Act and may be disclosed to a third-party requestor.

CITY OF NAPA VINE

407 BIRCH AVE SW, P. O. BOX 810, NAPA VINE, WA 98565
(360) 262-9344

VARIANCE APPLICATION

Fee: \$

File No. _____ Date _____

Applicant _____

Applicant's Address _____

Location of property: _____

Lot _____ Block _____ Addition _____

- A. The above described property was acquired on _____, _____.
- B. A certificate of ownership and a list of owners of property located within 300 feet of this parcel must accompany this application.
- C. Do covenants, conditions or restrictions concerning type of improvements contemplated exist on the property? _____. If so, attach a copy of said document to this application.

D. I HEREBY REQUEST A VARIANCE AS FOLLOWS:

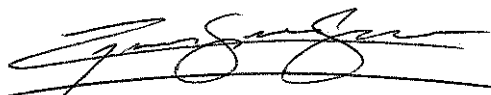
(Please explain the hardship for which you are requesting a variance to alleviate.)

Your approval of the requested variance would permit me to use my property in the following manner:

1. Would the strict application of the Zoning Regulations create practical difficulties or unnecessary hardships for you? (please explain)

2. Are there exceptional circumstances of conditions applicable to this property or to the intended use or development of the property that do not apply generally to other property in the same zone or neighborhood? (Please explain).

3. Will the granting of a variance be significantly detrimental to the public welfare or injurious to the other property or improvements in your zone or neighborhood in which your property is located? (Please explain).

X 
Signature of applicant

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of Los Angeles

On Apr. 17, 2023, before me, Rod Elyson, Notary Public, personally appeared

Gurinderjit Sidhu

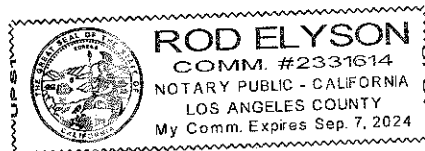
who proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(~~s~~) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she~~/~~they~~ executed the same in his/~~her~~/~~their~~ authorized capacity(~~ies~~), and that by his/~~her~~/~~their~~ signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature

Rod Elyson



OPTIONAL

The description below is not required by law but may be valuable to persons relying on the attached document and could prevent fraudulent use of this form.

Title or Description of Attached Document:

Variance Application

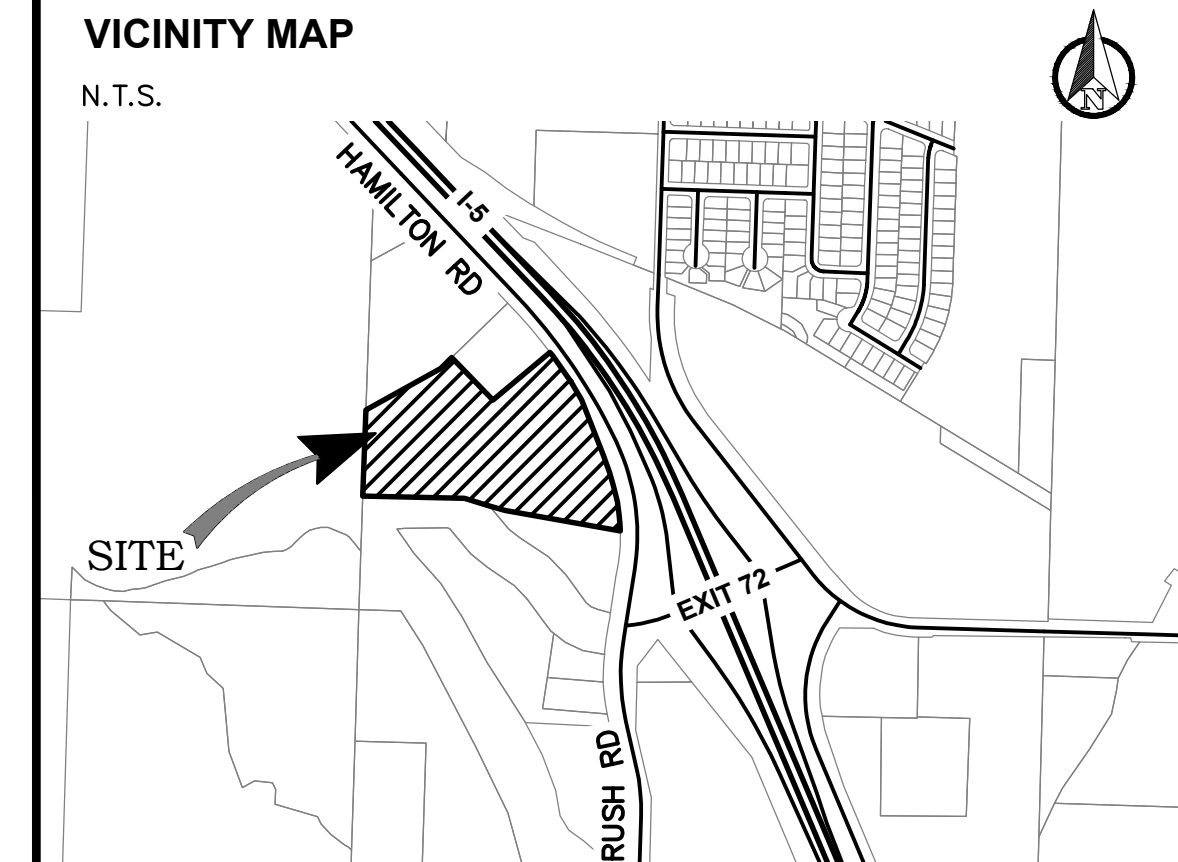
Document Date: _____

Number of Pages: 2

TA TRAVEL TRUCK STOP

SECTION 15, TOWNSHIP 13 NORTH, RANGE 02 WEST, W.M.
LEWIS COUNTY, WASHINGTON

LEGEND		
EXISTING	PROPOSED	
— W —	— W —	WATER MAIN
— SS —	— SS —	SANITARY SEWER MAIN
— FM —	— FM —	FORCE MAIN
— SD —	— SD —	STORM MAIN
— RD —	— RD —	ROOF DRAIN
	— / —	FOOTING DRAIN
— G —	— G —	GAS LINE
— UGP —	— UGP —	POWER LINE
— T —	— T —	TELEPHONE LINE
— TV —	— CATV —	CABLE TV LINE
— — — — —	— — — — —	ROADWAY CENTERLINE
— - - - -	— - - - -	RIGHT-OF-WAY LINE
— - - - -	— - - - -	EASEMENT LINE
— — — — —	— — — — —	FRONT/BACK OF CURB
— - - - -	— - - - -	EDGE OF GRAVEL SHOULDER
— EP —	— — — — —	EDGE OF PAVEMENT



PROJECT INFORMATION	
APPLICANT:	GURINDERJIT SIDHU GMD LAND COMPANY LLC 7664 N SANTA FE AVE FRESNO, CA 93722 (559) 905-9407 SIDHUGURINDERJIT4@GMAIL.COM
PARCEL NOS:	018050005002
SITE ADDRESS:	121 HAMILTON RD NAPAVINE, WA 98565
ZONING:	COMMERCIAL
SITE AREA:	14.01 ACRES
GRADING:	10,000 CY FILL, 7,400 CY CUT
SOILS:	ALVOR SILTY CLAY LOAM CHEHALIS SILTY CLAY LOAM OLEQUA SILT LOAM REED SILTY CLAY LOAM
SANITARY SEWER:	CITY OF NAPAVINE
WATER:	CITY OF NAPAVINE
FIRE DISTRICT:	LEWIS COUNTY

SHEET INDEX	
C0.1	CIVIL COVER AND SITE PLAN
C0.2	EXISTING SITE PLAN
C1.1-C1.4	HORIZONTAL CONTROL PLAN
C1.5	HORIZONTAL CONTROL DETAILS AND NOTES
C2.1-C2.4	GRADING AND DRAINAGE PLAN
C2.5	POND CROSS SECTIONS AND DETAILS
C2.6	DRAINAGE DETAILS AND NOTES
C3.1-C3.2	SEWER SERVICE PLAN
C3.3	SEWER DETAILS AND NOTES
C3.4	SEWER PUMP SYSTEM DETAILS AND NOTES
C4.1	WATER MAIN AND SERVICE PLAN
C4.2-C4.3	WATER DETAILS AND NOTES
C4.4	OVERALL UTILITY AND DRY UTILITY PLAN
C5.1-C5.2	FRONTAGE IMPROVEMENT PLAN AND PROFILE
C5.3	FRONTAGE IMPROVEMENT DETAILS AND NOTES
C5.4	STREET LIGHT DETAILS AND NOTES
C5.5	DRIVEWAY ACCESS GRADING PLAN DETAILS
C6.1	SITE PAVING AND MARKING PLAN
C6.2	PAVEMENT MARKING DETAILS AND NOTES
C7.1	TEMPORARY EROSION AND SEDIMENT CONTROL PLAN
C7.2-C7.3	T.E.S.C. DETAILS AND NOTES

SURVEY INFORMATION

LEGAL DESCRIPTION

PARCEL B OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT 07-11-2022 MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THAT PORTION OF PARCEL D OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT SILED JUNE 3RD, 2009 AND RECORDED UNDER AFN 3328812, LYING SOUTHERLY OF THE FOLLOWING DESCRIBED LINE: BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL D, FROM WHICH THE WEST LINE OF SAID PARCEL D BEARS SOUTH 02°00'22" WEST; THENCE SOUTH 87°52'08" EAST, 467.95 FEET, MORE OR LESS TO THE INTERSECTION WITH THE NORTH LINE OF SAID PARCEL "D".

VERTICAL DATUM

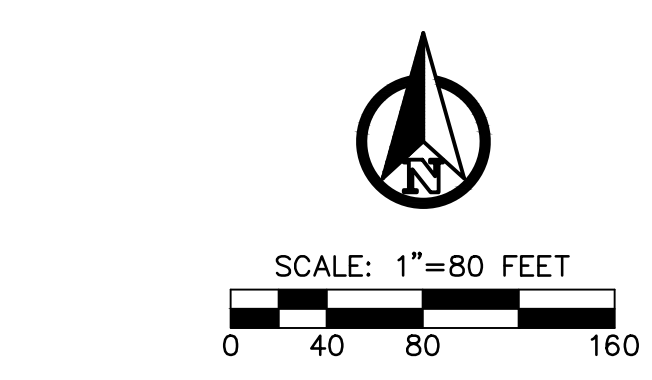
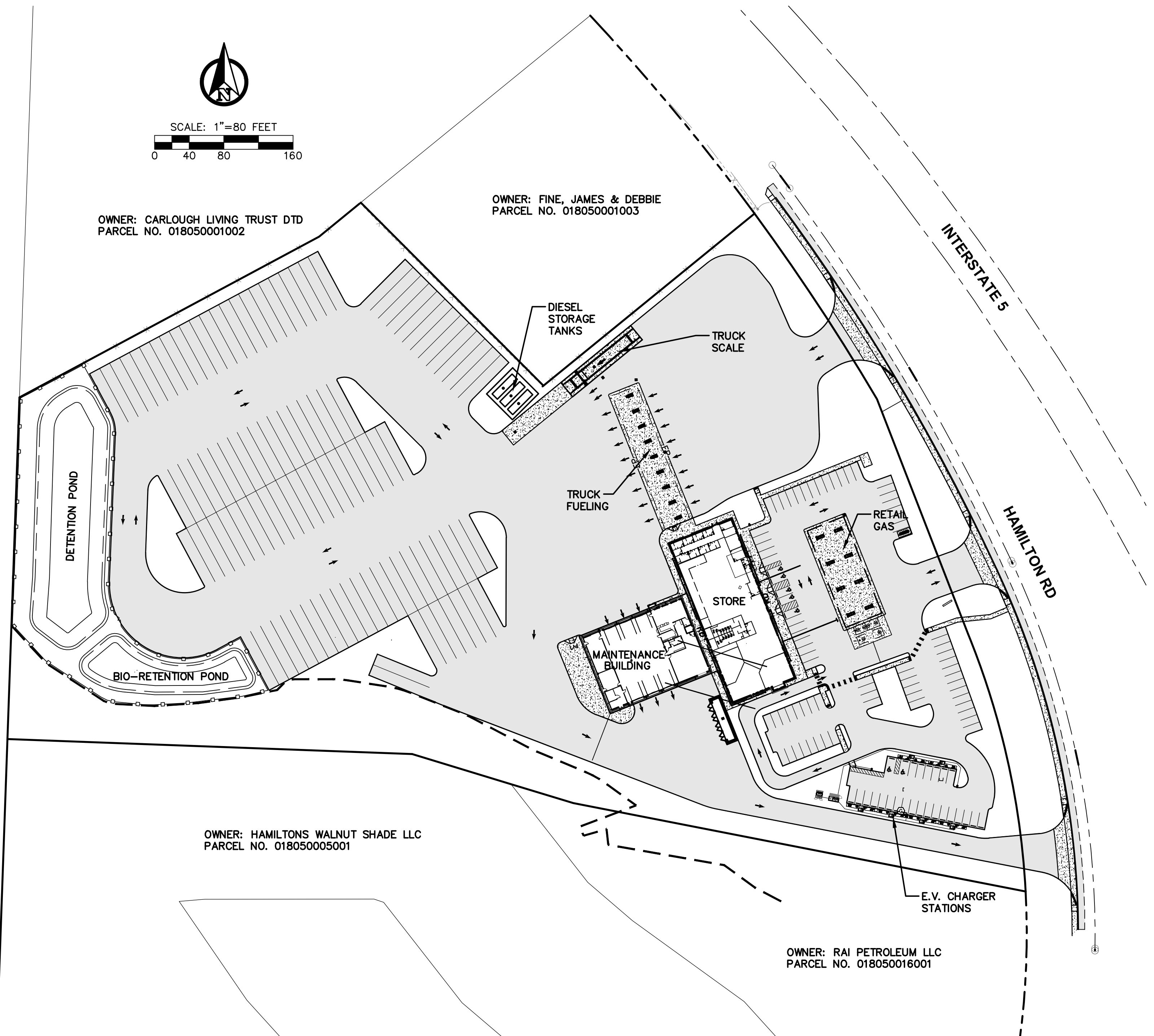
NAVD 88 BASED ON GPS TIES TO WSDOT MONUMENT 7406, ELEVATION = 242.49

BASIS OF BEARING

HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/ 2011 BASED ON GPS TIES TO WSDOT MONUMENTS 7406 AND 6779, CONVERTED TO GROUND SCALE ABOUT N: 473622.35/E: 1035469.491 USING A COMBINED SCALE FACTOR OF 0.99990646.

WORK IN COUNTY RIGHT-OF-WAY

CONTRACTOR TO OBTAIN RIGHT OF WAY PERMIT PRIOR TO ANY WORK WITHIN COUNTY RIGHT OF WAY. ALL WORK WITHIN COUNTY RIGHT OF WAY SHALL ADHERE TO COUNTY STANDARDS AS OUTLINED IN THE RIGHT OF WAY PERMIT.



OWNER: CARLOUGH LIVING TRUST DTD
PARCEL NO. 018050001002

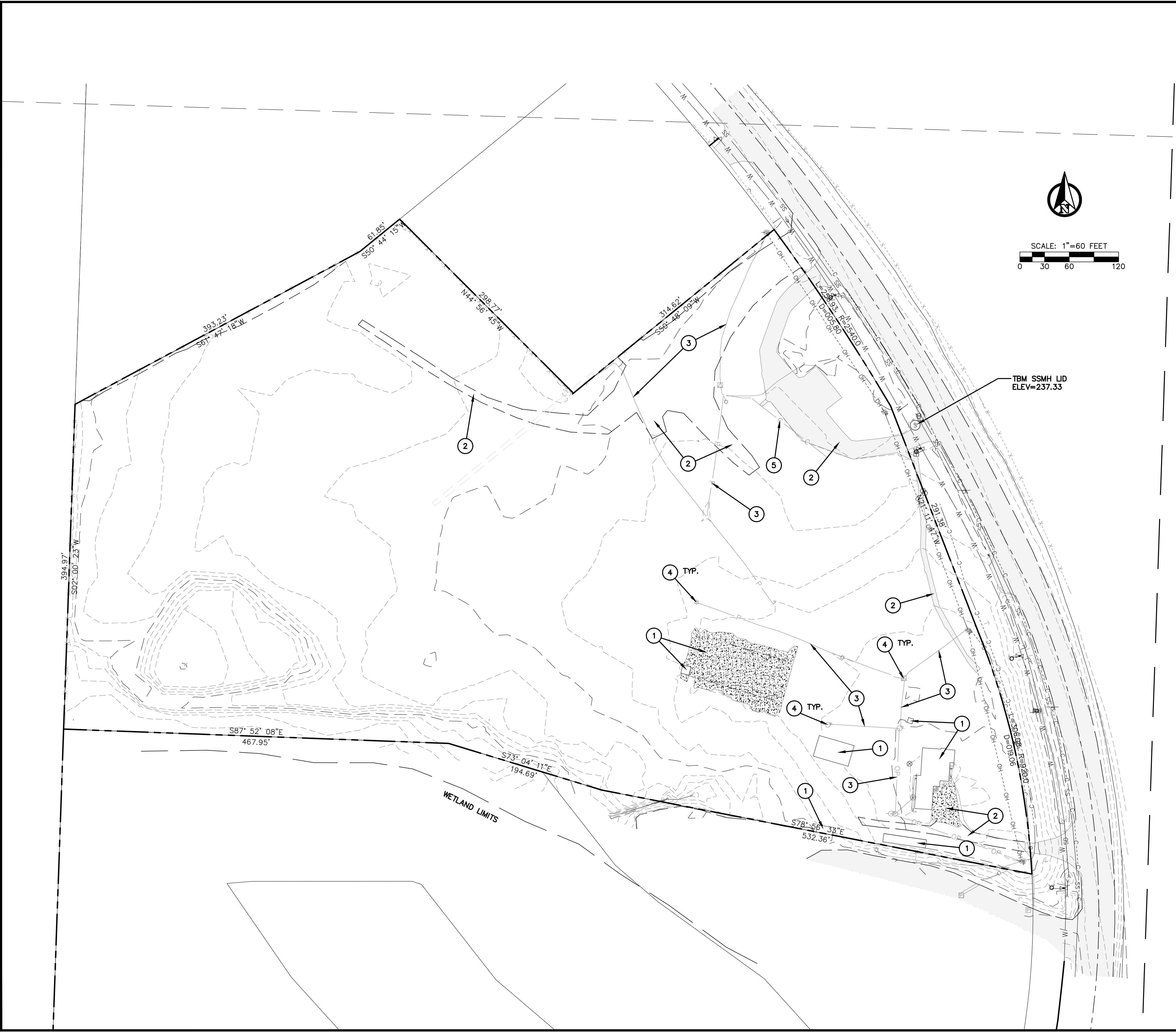
OWNER: FINE, JAMES & DEBBIE
PARCEL NO. 018050001003

OWNER: BREEN, VIRGINIA M
PARCEL NO. 017904002002

OWNER: HAMILTONS WALNUT SHADE LLC
PARCEL NO. 018050005001

OWNER: RAI PETROLEUM LLC
PARCEL NO. 018050016001

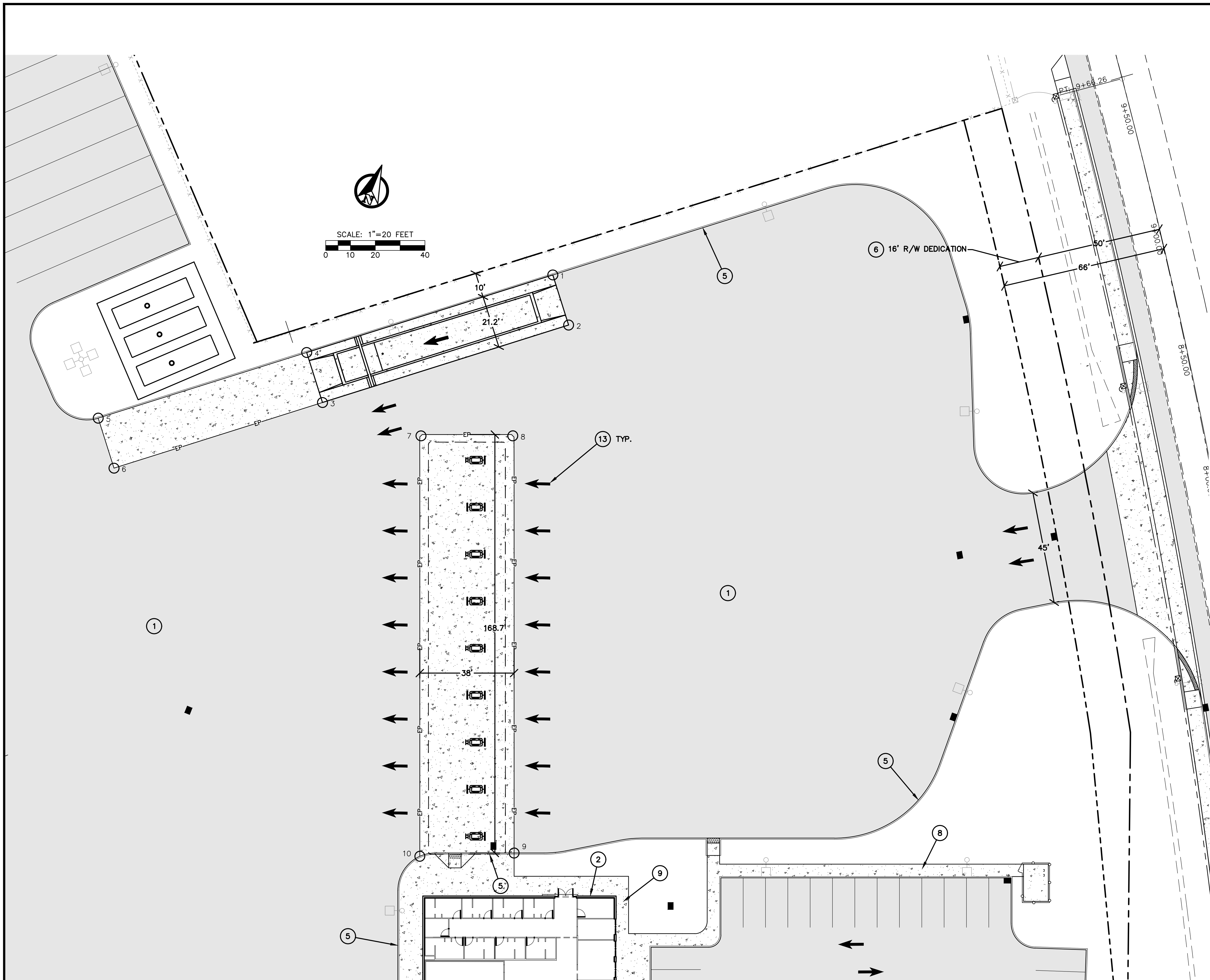
NO.	DATE	REVISION
DESIGNED BY: RWB	DRAWN BY: ZRW	CHECKED BY: RWB
DATE: 4.14.23	SCALE:	
NAPAVINE TRUCK STOP		WA.
CIVIL COVER SHEET AND SITE PLAN		NAPAVINE
RB Engineering DESIGN → PERMIT → MANAGE OFF: (360) 740-8819 EMAIL: CwProcs@RBEng.com P.O. Box 923 CHEHALIS, WA 98532		
JOB NUMBER	23007	
DRAWING NAME	23007_CVSP	
C0.1		
1 OF 31		



- DEMOLITION NOTES:**
- 1 REMOVE EX. STRUCTURES AND FOUNDATIONS.
 - 2 REMOVE EX. ON-SITE PAVEMENT AND GRAVEL.
 - 3 REMOVE EX. ON-SITE OVERHEAD AND BURIED POWER LINES.
 - 4 REMOVE EX. ON-SITE POWER POLES AND LIGHTS.
 - 5 REMOVE EX. ON-SITE COMMUNICATION LINES.

NO.	DATE	REVISION	
DESIGNED BY: <u> RWB </u>	DRAWN BY: <u> ZRW </u>	CHECKED BY: <u> RWB </u>	DATE: <u> 4.14.23 </u>
			SCALE: <u> </u>
NAPAVINE TRUCK STOP			WA.
EXISTING SITE PLAN AND DEMO PLAN			NAPAVINE
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: info@rbengineering.com			
JOB NUMBER: 23007 DRAWING NAME: 23007_EXSP C0.2 2 OF 31			

MTN 2 COAST
 PROFESSIONAL LAND SURVEYORS
 2320 MOTTMAN RD SW, STE 106
 TUMWATER, WA 98512
 360.688.1949



COORDINATE TABLE				
Point #	Description	Elevation	Northing	Easting
1	SCALE	239.76	474130.83	1034654.77
2	SCALE	239.76	474114.44	1034668.17
3	SCALE	239.76	474048.62	1034587.65
4	SCALE	239.76	474065.01	1034574.25
5	SCALE	238.88	474009.24	1034506.04
6	SCALE	238.88	473992.85	1034519.43
7	FUEL	239.84	474050.89	1034629.50
8	FUEL	239.84	474064.63	1034663.86
9	FUEL	239.79	473908.62	1034726.76
10	FUEL	239.75	473893.31	1034691.96

HORIZONTAL CONTROL NOTES:

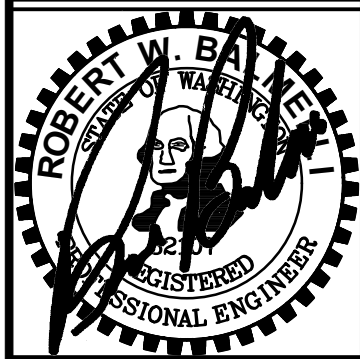

- ① CONSTRUCT HEAVY AND LIGHT NEW PAVED PARKING LOT PER PLANS. SEE SHEET C6.1 FOR PAVING PLAN.
- ② BUILDING FOUNDATION AND CONCRETE SLAB CORNERS SHALL BE STAKED BY WASHINGTON STATE LICENSED LAND SURVEYING.
- ③ CONSTRUCT NEW ADA PARKING STALLS AND STRIPING PER PLAN AND STD. DETAIL ON SHEET C2.6.
- ④ INSTALL CONCRETE WHEEL STOPS AT ALL PARKING STALLS. SEE STD. DETAIL ON SHEET C1.5.
- ⑤ CONSTRUCT NEW PARKING LOT CONCRETE BARRIER CURB PER STD. DETAIL ON SHEET C1.5.
- ⑥ RIGHT OF WAY DEDICATION.
- ⑦ CONSTRUCT NEW CONCRETE CURB AND GUTTER PER STD. DETAIL ON SHEET C5.3.
- ⑧ CONSTRUCT NEW ONSITE CONCRETE SIDEWALK PLAN AND PER STD. DETAIL ON SHEET C1.5.
- ⑨ CONSTRUCT NEW BUILDING PERIMETER CONCRETE SIDEWALKS, PROVIDE CRACK CONTROL AND EXPANSION MATERIALS AT ALL BUILDING/CONCRETE CONNECTIONS.
- ⑩ STRIPE NEW PEDESTRIAN CROSSING PER PLAN AND MUTCD STANDARDS.
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- ⑫ STRIPE NEW ADA PARKING STALLS AND ROUTES PER DETAIL ON SHEET C2.6.
- ⑬ PROVIDE WHITE PAVEMENT MARKING DIRECTIONAL ARROWS PER PLAN AND MUTCH STANDARDS.
- ⑭ CONSTRUCT NEW TRASH ENCLOSURE PER ARCHITECTURAL PLANS.

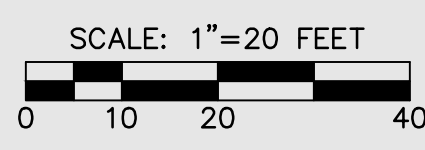
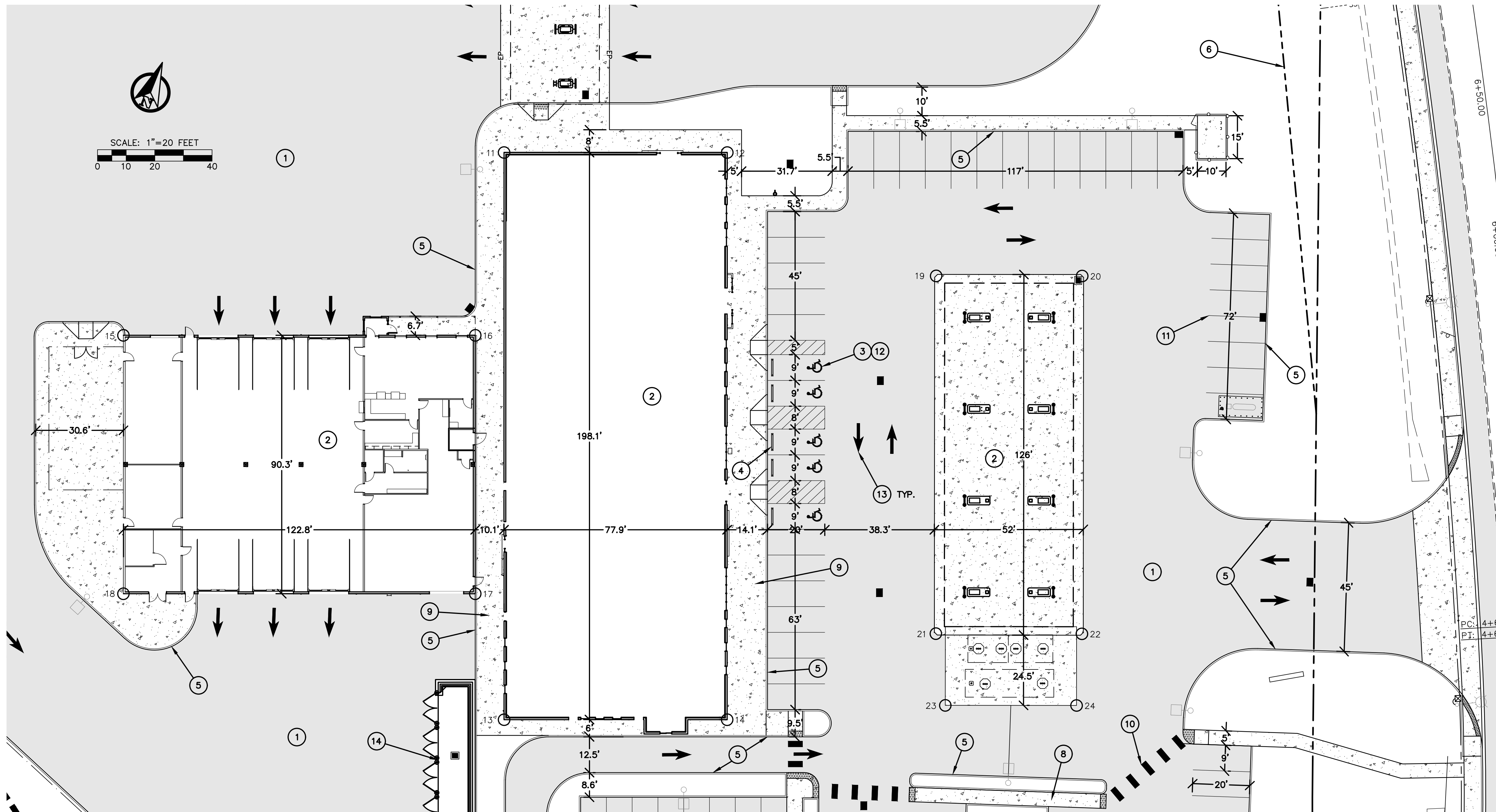
ADA NOTE:

ALL NEW SIDEWALKS SHALL NOT EXCEED 2% SIDE SLOPE AND ADA PARKING STALLS AND RAMP LANDINGS SHALL NOT EXCEED 2 PERCENT SLOPE IN ALL DIRECTIONS. ALL ADA ACCESSIBLE ROUTES IDENTIFIED ON THE PLANS SHALL NOT EXCEED 5% LONGITUDINAL GRADE. ALL ADA RAMPS SHALL NOT EXCEED 8% GRADE AND 2% CROSS SLOPE. CONTRACTOR IS RESPONSIBLE TO CHECK GRADES PRIOR TO CONCRETE AND PAVING WORK. ANY GRADES EXCEEDING THE ABOVE LIMITS WILL BE REQUIRED TO BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR.

STAKING AND INSPECTION NOTE:

CONTRACTOR SHALL CALL RB ENGINEERING 48 HOUR PRIOR TO POURING CONCRETE BARRIER OR CURB AND GUTTER FOR INSPECTION.

NO.	DATE	DESIGNED BY: <u> </u>	DRAWN BY: <u> </u>	CHECKED BY: <u> </u>	DATE: <u>4.14.23</u>	SCALE: <u> </u>
						
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: info@rbengineers.com						
						
JOB NUMBER 23007 DRAWING NAME 23007_HCPL C1.1 3 OF 31						



COORDINATE TABLE				
Point #	Description	Elevation	Northing	Easting
11	BLDG	240.50	473878.84	1034699.03
12	BLDG	240.50	473907.76	1034771.40
13	BLDG	240.50	473694.86	1034772.55
14	BLDG	240.50	473723.78	1034844.90
15	BLDG	240.50	473770.23	1034599.31
16	BLDG	240.50	473815.81	1034713.38
17	BLDG	240.50	473731.99	1034746.87
18	BLDG	240.50	473686.40	1034632.81
19	FUEL	239.51	473894.83	1034855.13
20	FUEL	238.45	473913.70	1034902.50
21	FUEL	239.68	473778.73	1034901.39
22	FUEL	239.70	473797.59	1034948.79
23	FUEL	239.60	473756.69	1034913.75
24	FUEL	239.60	473773.65	1034956.33

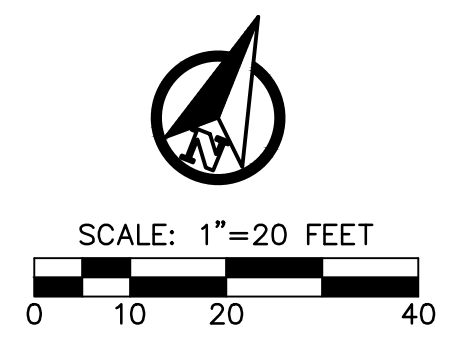
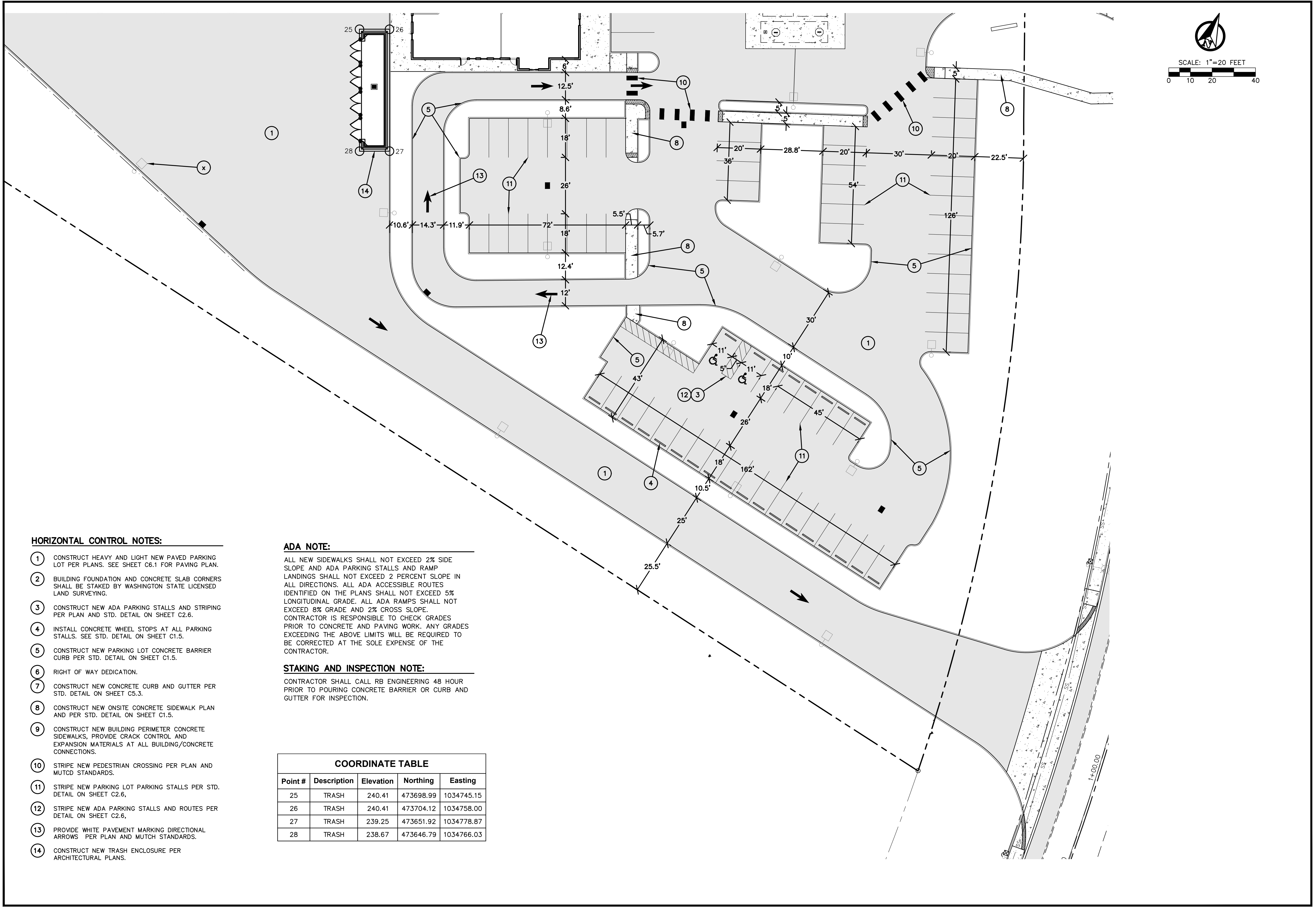
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STAKING AND INSPECTION NOTE:
 CONTRACTOR SHALL CALL RB ENGINEERING 48 HOUR PRIOR TO POURING CONCRETE BARRIER OR CURB AND GUTTER FOR INSPECTION.

- HORIZONTAL CONTROL NOTES:**
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 - ② BUILDING FOUNDATION AND CONCRETE SLAB CORNERS SHALL BE STAKED BY WASHINGTON STATE LICENSED LAND SURVEYING.
 - ③ CONSTRUCT NEW ADA PARKING STALLS AND STRIPING PER PLAN AND STD. DETAIL ON SHEET C2.6.
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- ⑪ STRIPE NEW PARKING LOT PARKING STALLS PER STD. DETAIL ON SHEET C2.6.
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NO.	DATE	REVISION	
DESIGNED BY: <u>RWB</u>	DRAWN BY: <u>ZRW</u>	CHECKED BY: <u>RWB</u>	DATE: <u>4.14.23</u>
			SCALE:
NAPAVINE TRUCK STOP		WA.	
HORIZONTAL CONTROL PLAN		NAPAVINE	
RB Engineering DESIGN → PERMIT → MANAGE OFF: (360) 740-8819 EMAIL: info@rbengineers.com P.O. Box 923 CHEHALIS, WA 98532			
811 Know what's below. Call 811 before you dig.			
JOB NUMBER: 23007 DRAWING NAME: 23007_HCPL C1.2 4 OF 31			



HORIZONTAL CONTROL NOTES:

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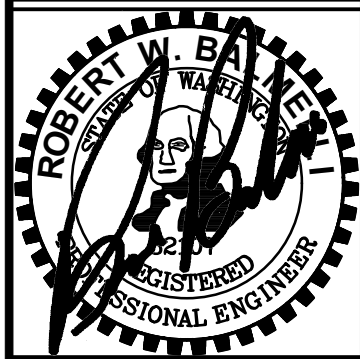

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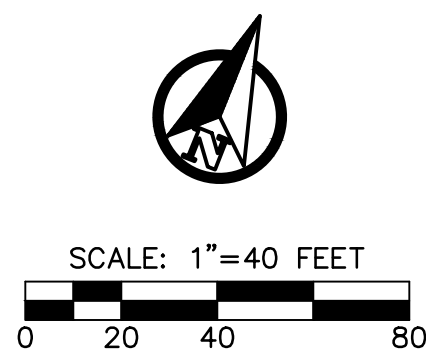
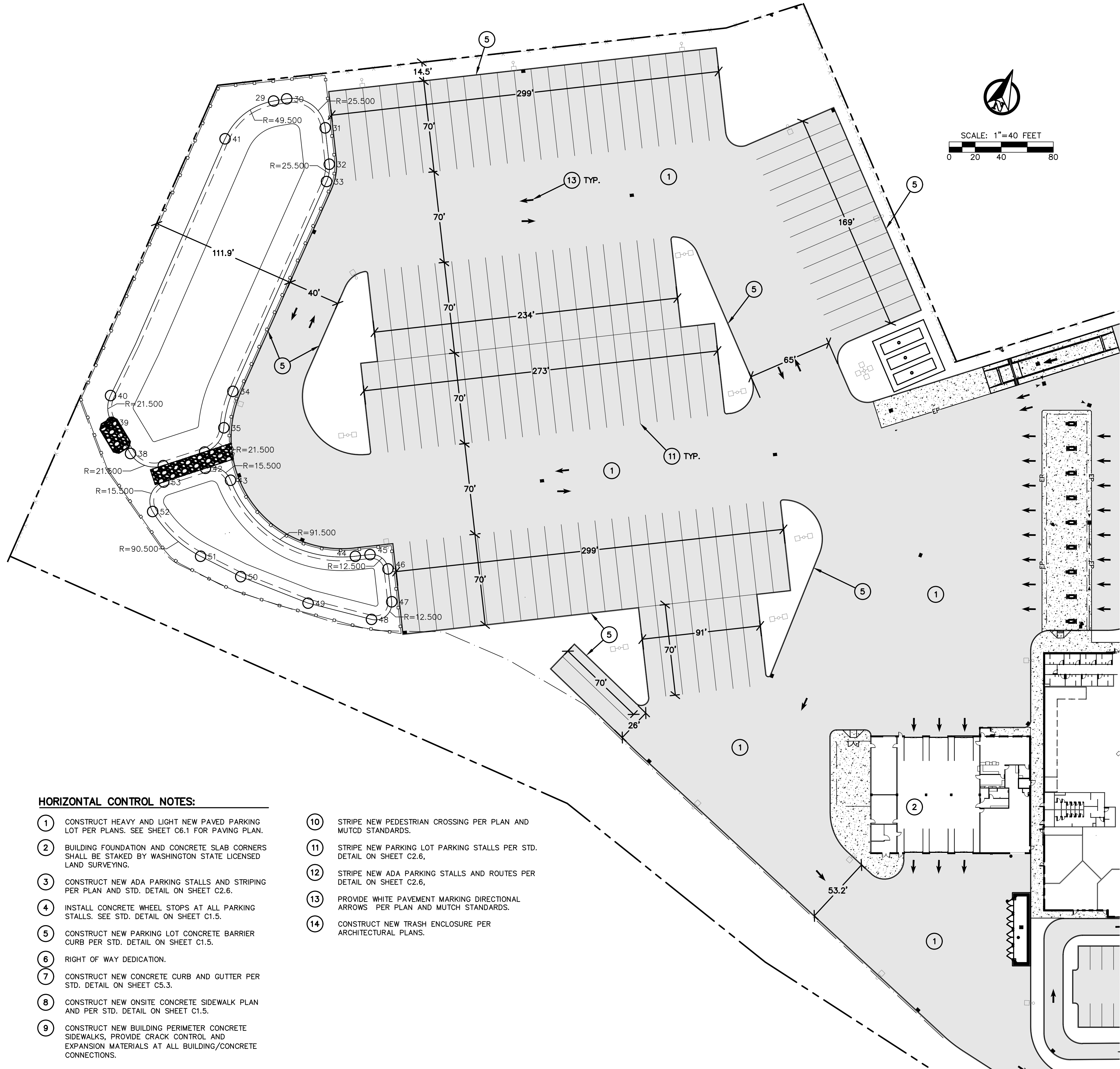
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STAKING AND INSPECTION NOTE:

CONTRACTOR SHALL CALL RB ENGINEERING 48 HOUR PRIOR TO POURING CONCRETE BARRIER OR CURB AND GUTTER FOR INSPECTION.

COORDINATE TABLE				
Point #	Description	Elevation	Northing	Easting
25	TRASH	240.41	473698.99	1034745.15
26	TRASH	240.41	473704.12	1034758.00
27	TRASH	239.25	473651.92	1034778.87
28	TRASH	238.67	473646.79	1034766.03

NO.	DATE	REVISION	NAPAVINE TRUCK STOP HORIZONTAL CONTROL PLAN	NAPAVINE WA.		
DESIGNED BY: <u> RWB </u>	DRAWN BY: <u> ZRW </u>	CHECKED BY: <u> RWB </u>			DATE: <u> 4.14.23 </u>	SCALE: <u> </u>
						
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: info@rbengineers.com						
						
JOB NUMBER 23007 DRAWING NAME 23007_HCPL C1.3 5 OF 31						



COORDINATE TABLE				
Point #	Description	Elevation	Northing	Easting
29	POND	232.50	474052.75	1033992.99
30	POND	232.50	474058.05	1034001.71
31	POND	232.50	474048.31	1034037.41
32	POND	232.50	474023.57	1034050.69
33	POND	232.50	474010.50	1034053.70
34	POND	232.50	473834.21	1034046.65
35	POND	232.50	473805.67	1034050.59
36	POND	232.50	473782.92	1034043.83
37	POND	232.50	473761.43	1034018.19
38	POND	232.50	473760.77	1033991.38
39	POND	232.50	473777.68	1033969.08
40	POND	232.50	473796.37	1033960.63
41	POND	232.50	474011.99	1033969.20
42	POND	232.50	473771.58	1034048.99
43	POND	232.50	473770.20	1034070.34
44	POND	232.50	473751.57	1034180.91
45	POND	232.50	473756.93	1034190.90
46	POND	232.50	473751.82	1034207.82
47	POND	232.50	473729.50	1034219.80
48	POND	232.50	473711.19	1034210.41
49	POND	232.50	473704.68	1034160.57
50	POND	232.50	473704.36	1034105.02
51	POND	232.50	473707.47	1034070.59
52	POND	232.50	473725.76	1034023.70
53	POND	232.50	473749.94	1034023.17

HORIZONTAL CONTROL NOTES:

- ① CONSTRUCT HEAVY AND LIGHT NEW PAVED PARKING LOT PER PLANS. SEE SHEET C6.1 FOR PAVING PLAN.
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- ⑩ STRIPE NEW PEDESTRIAN CROSSING PER PLAN AND MUTCD STANDARDS.
- ⑪ STRIPE NEW PARKING LOT PARKING STALLS PER STD. DETAIL ON SHEET C2.6.
- ⑫ STRIPE NEW ADA PARKING STALLS AND ROUTES PER DETAIL ON SHEET C2.6.
- ⑬ PROVIDE WHITE PAVEMENT MARKING DIRECTIONAL ARROWS PER PLAN AND MUTCD STANDARDS.
- ⑭ CONSTRUCT NEW TRASH ENCLOSURE PER ARCHITECTURAL PLANS.

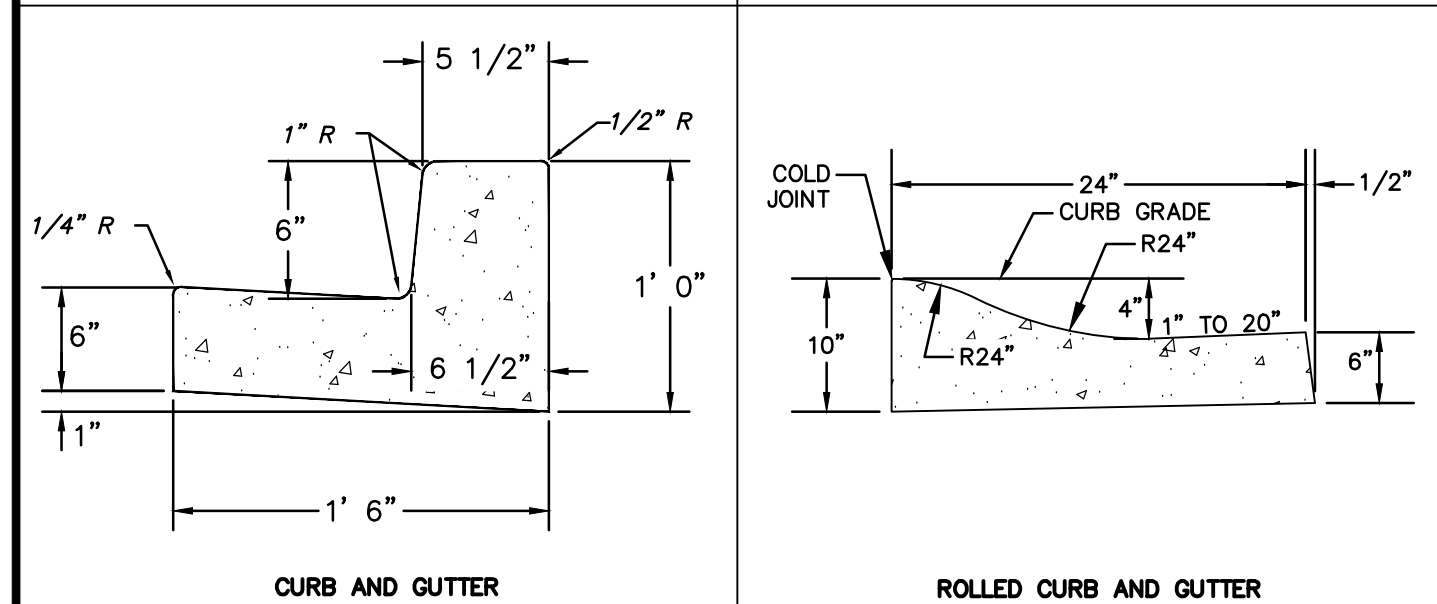
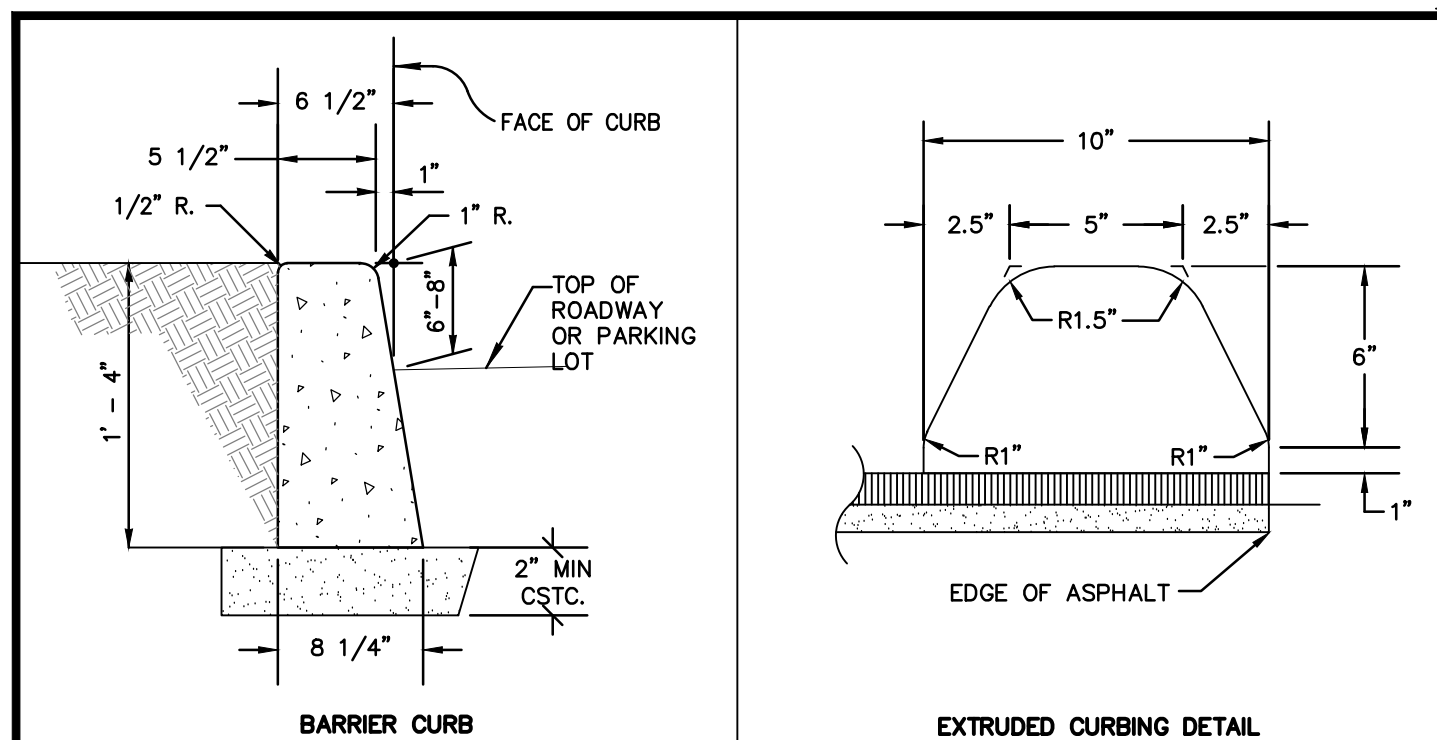
ADA NOTE:

ALL NEW SIDEWALKS SHALL NOT EXCEED 2% SIDE SLOPE AND ADA PARKING STALLS AND RAMP LANDINGS SHALL NOT EXCEED 2 PERCENT SLOPE IN ALL DIRECTIONS. ALL ADA ACCESSIBLE ROUTES IDENTIFIED ON THE PLANS SHALL NOT EXCEED 5% LONGITUDINAL GRADE. ALL ADA RAMPS SHALL NOT EXCEED 8% GRADE AND 2% CROSS SLOPE. CONTRACTOR IS RESPONSIBLE TO CHECK GRADES PRIOR TO CONCRETE AND PAVING WORK. ANY GRADES EXCEEDING THE ABOVE LIMITS WILL BE REQUIRED TO BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR.

STAKING AND INSPECTION NOTE:

CONTRACTOR SHALL CALL RB ENGINEERING 48 HOUR PRIOR TO POURING CONCRETE BARRIER OR CURB AND GUTTER FOR INSPECTION.

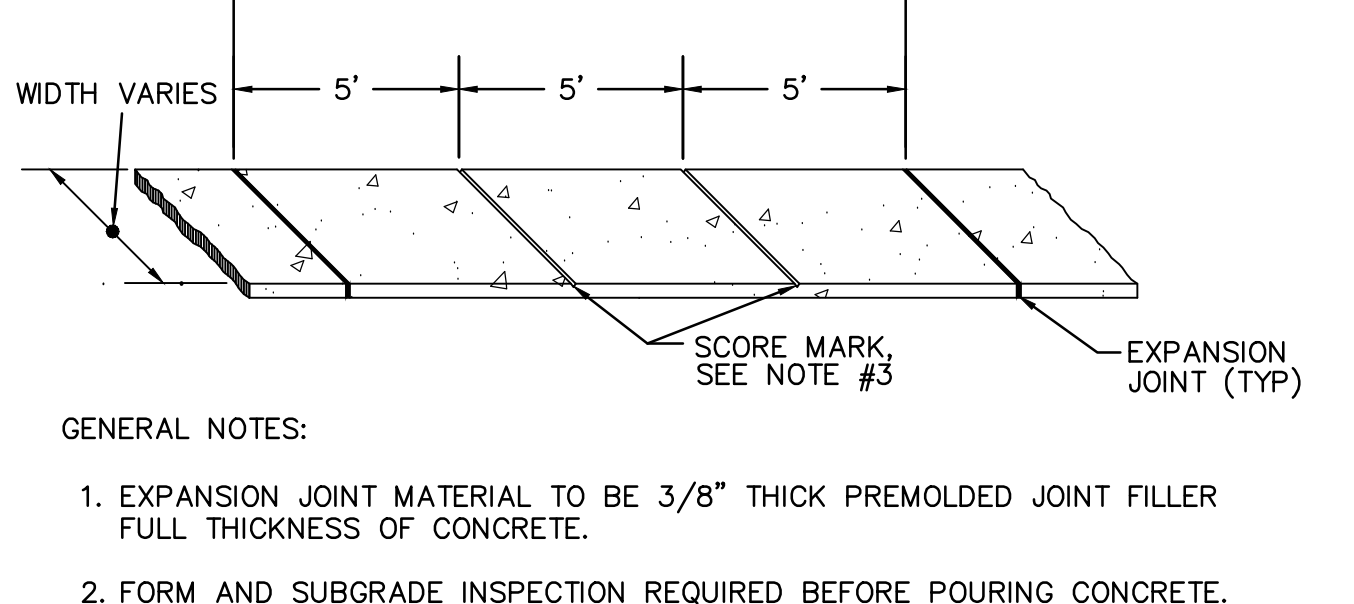
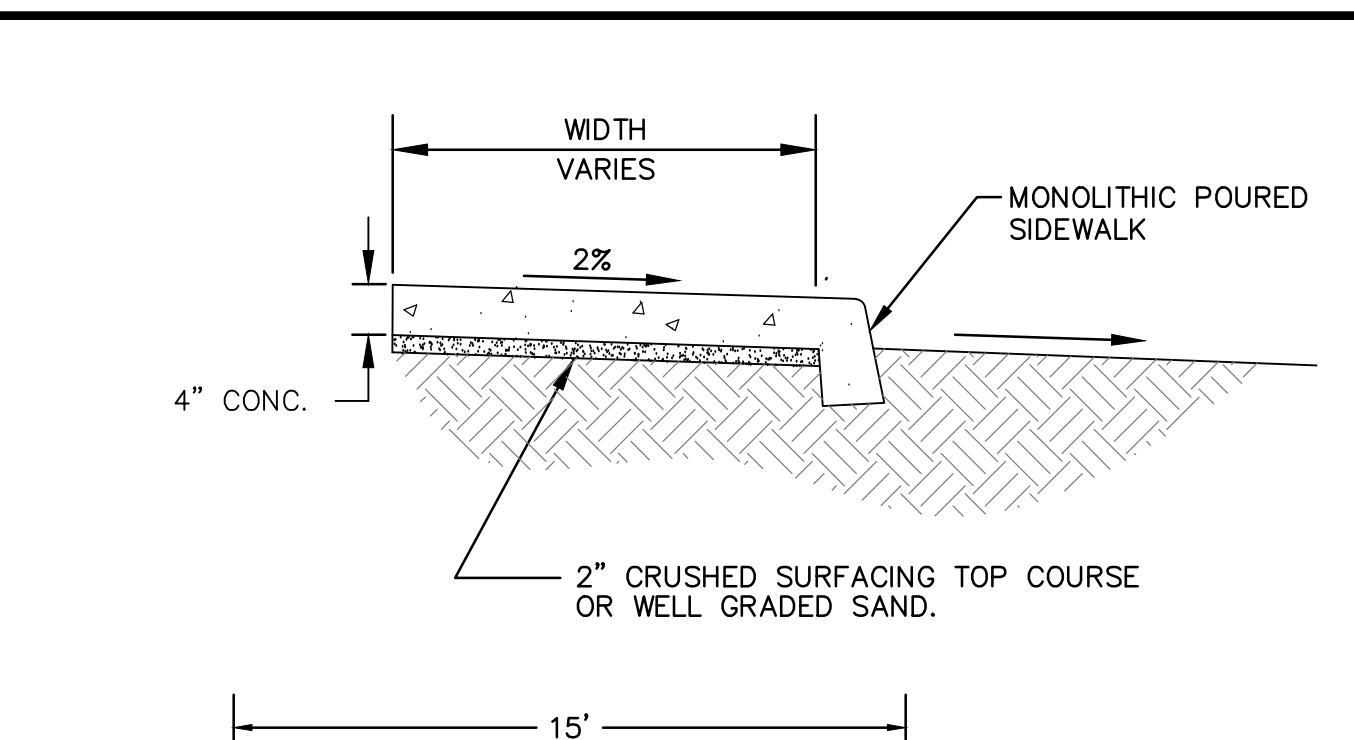
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DATE: <u> 4.14.23 </u>	SCALE: <u> </u>	
NAPAVINE TRUCK STOP		
HORIZONTAL CONTROL PLAN		
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JOB NUMBER 23007 DRAWING NAME 23007_HCPL C1.4 6 OF 31		



NOTES:

- EXPANSION JOINT MATERIAL TO BE 3/8" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE SPACING.
- FORM AND SUBGRADE INSPECTION REQUIRED BEFORE POURING CONCRETE.
- WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE, GRADE SHALL NOT DEVIATE MORE THAN 1/8 INCH, AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4 INCH.

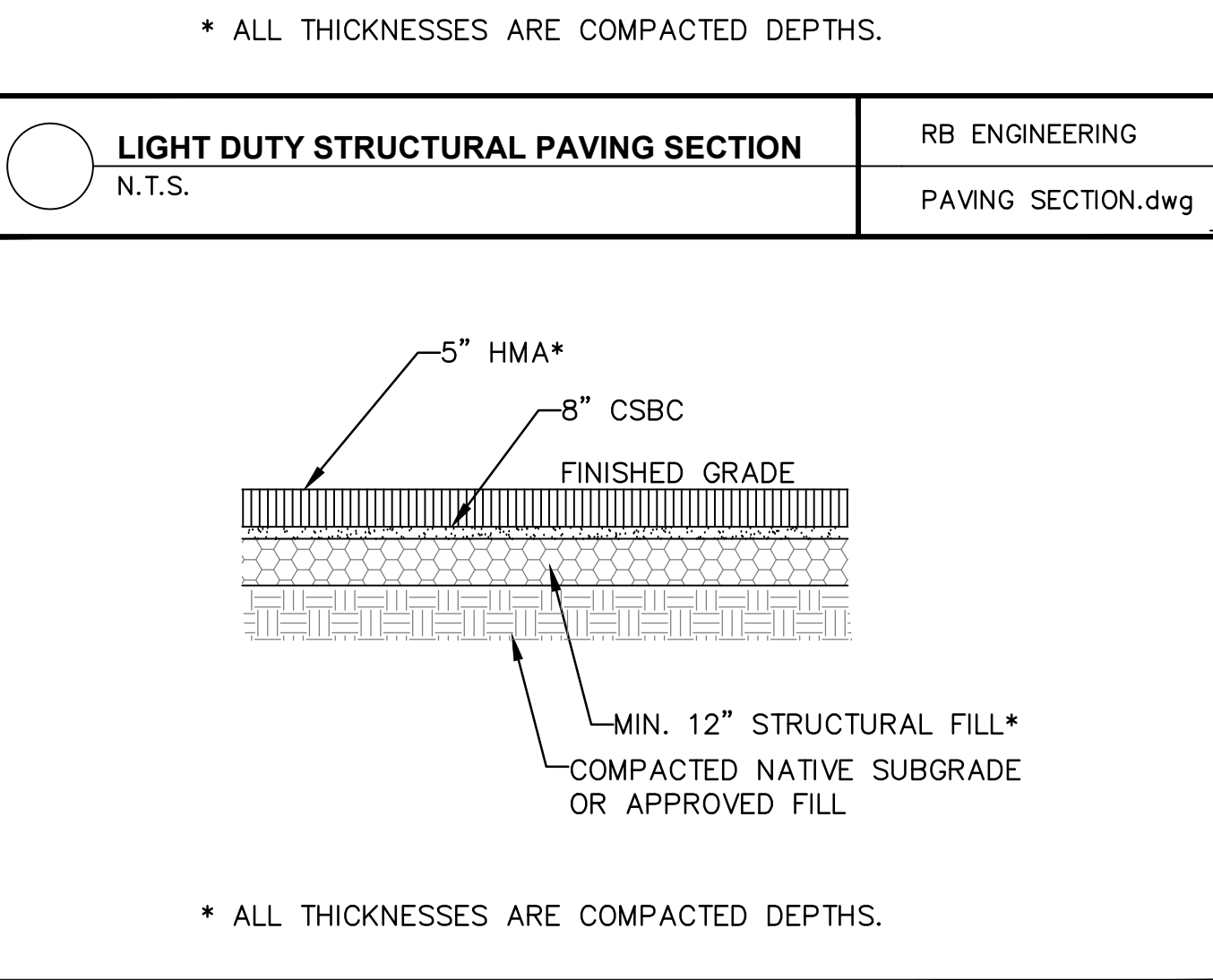
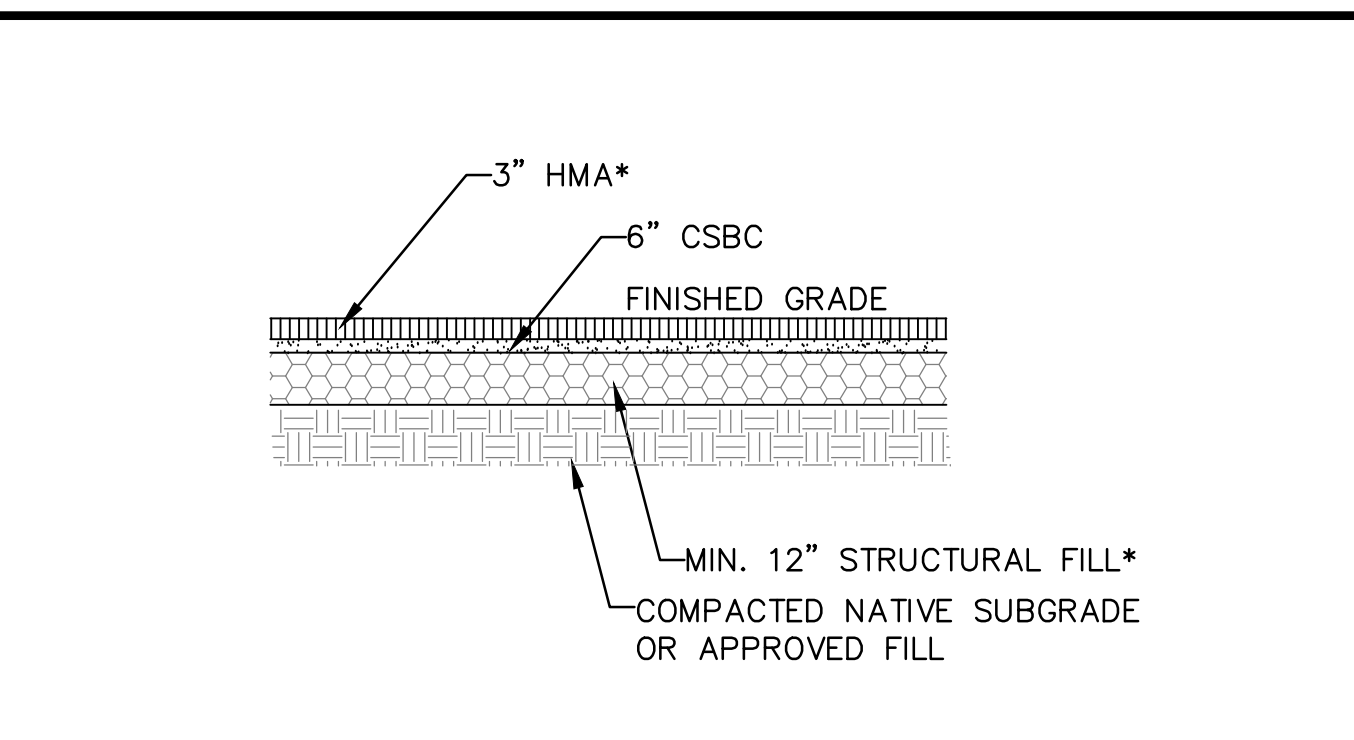
CONCRETE CURB DETAILS
N.T.S.
RB ENGINEERING
CONC_CURB_DT.dwg



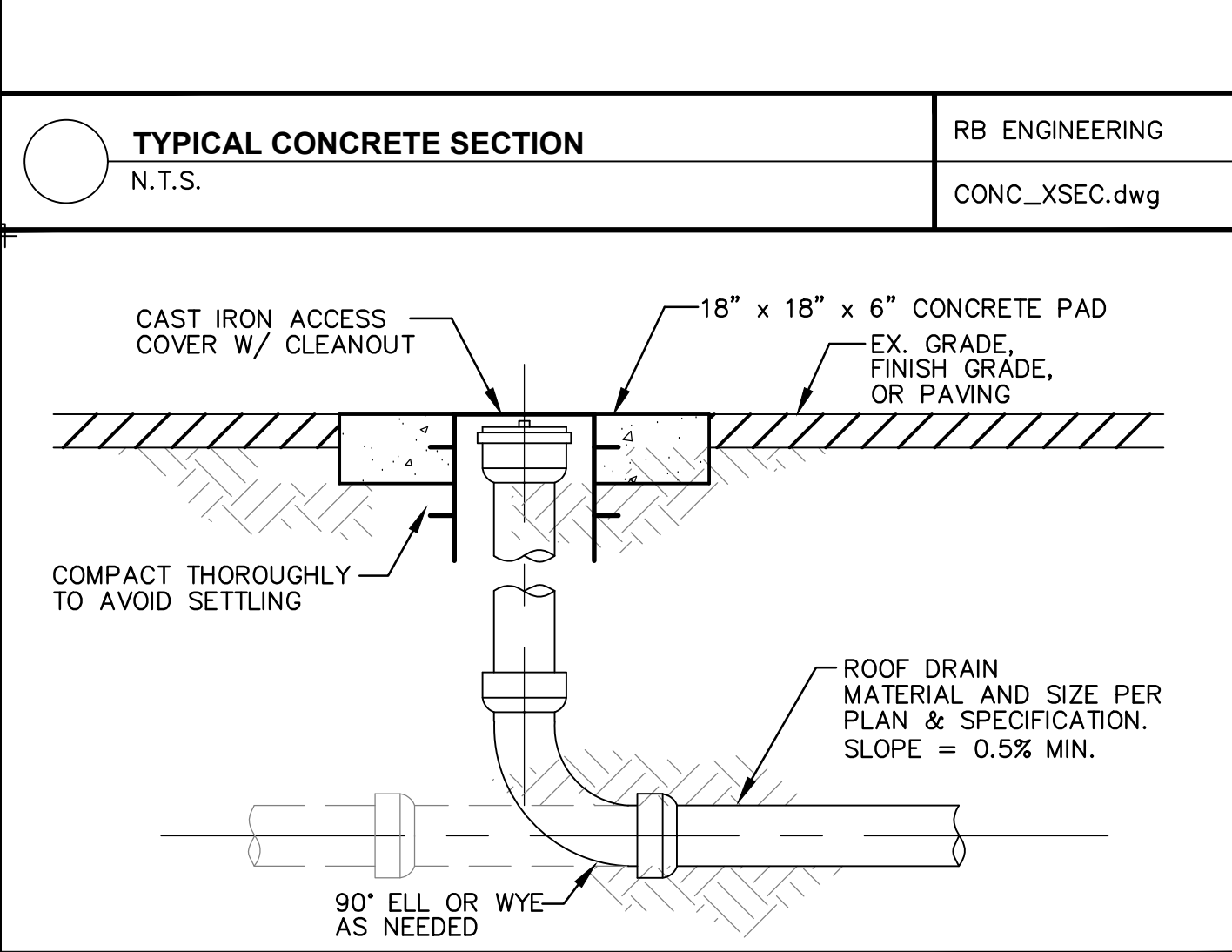
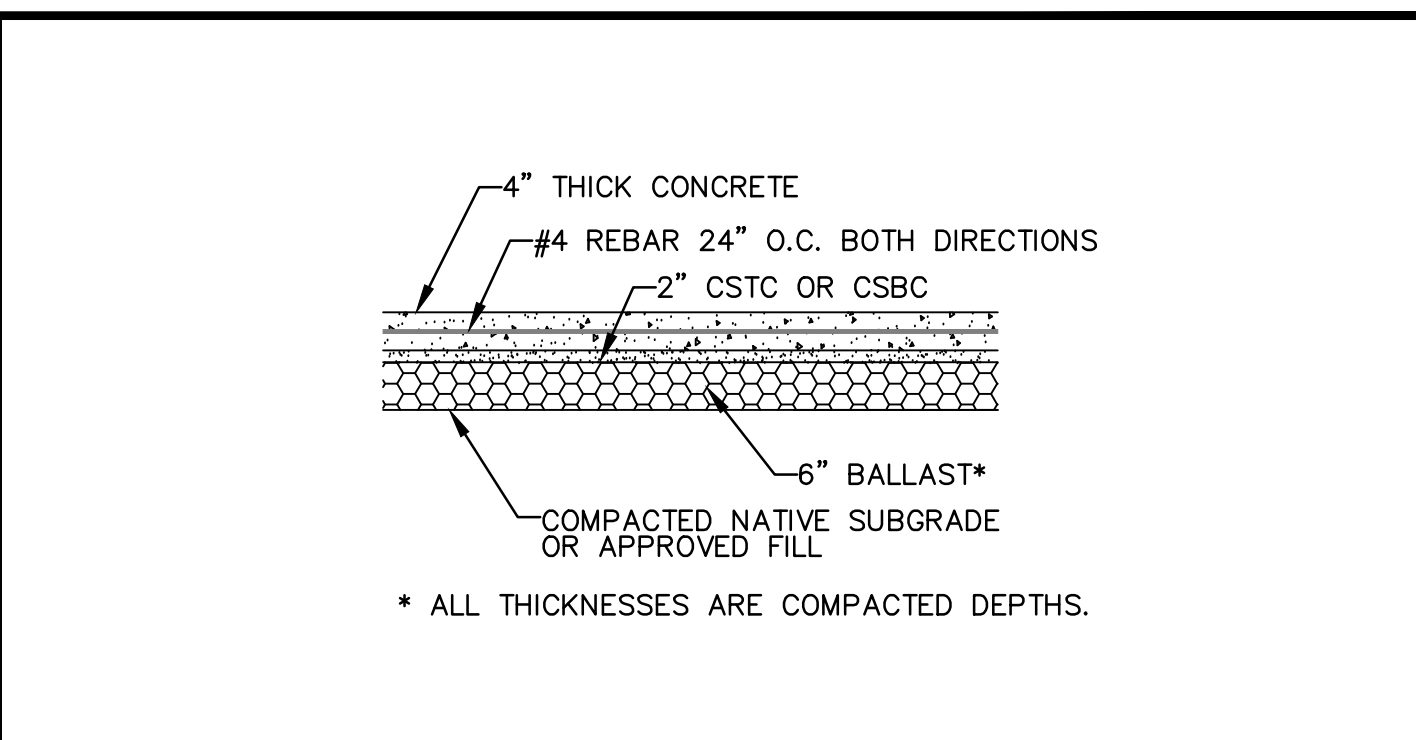
GENERAL NOTES:

- EXPANSION JOINT MATERIAL TO BE 3/8" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE.
- FORM AND SUBGRADE INSPECTION REQUIRED BEFORE POURING CONCRETE.
- SCORE MARKS SHALL BE ±1/8" WIDE BY ±1/4" DEEP. FOR SIDEWALKS OVER 8' IN WIDTH, A LONGITUDINAL SCORE MARK SHALL BE MADE ALONG CENTER OF WALK.
- EXPANSION JOINTS SHALL BE INSTALLED IN CURB AND GUTTER AND IN SIDEWALK AT PC AND PT AT ALL CURB RETURNS. EXPANSION JOINTS SHALL BE PLACED IN SIDEWALK AT SAME LOCATIONS AS THOSE IN CURB AND GUTTER WHEN SIDEWALK IS ADJACENT TO CURB AND GUTTER, UNLESS OTHERWISE DIRECTED BY ENGINEER.

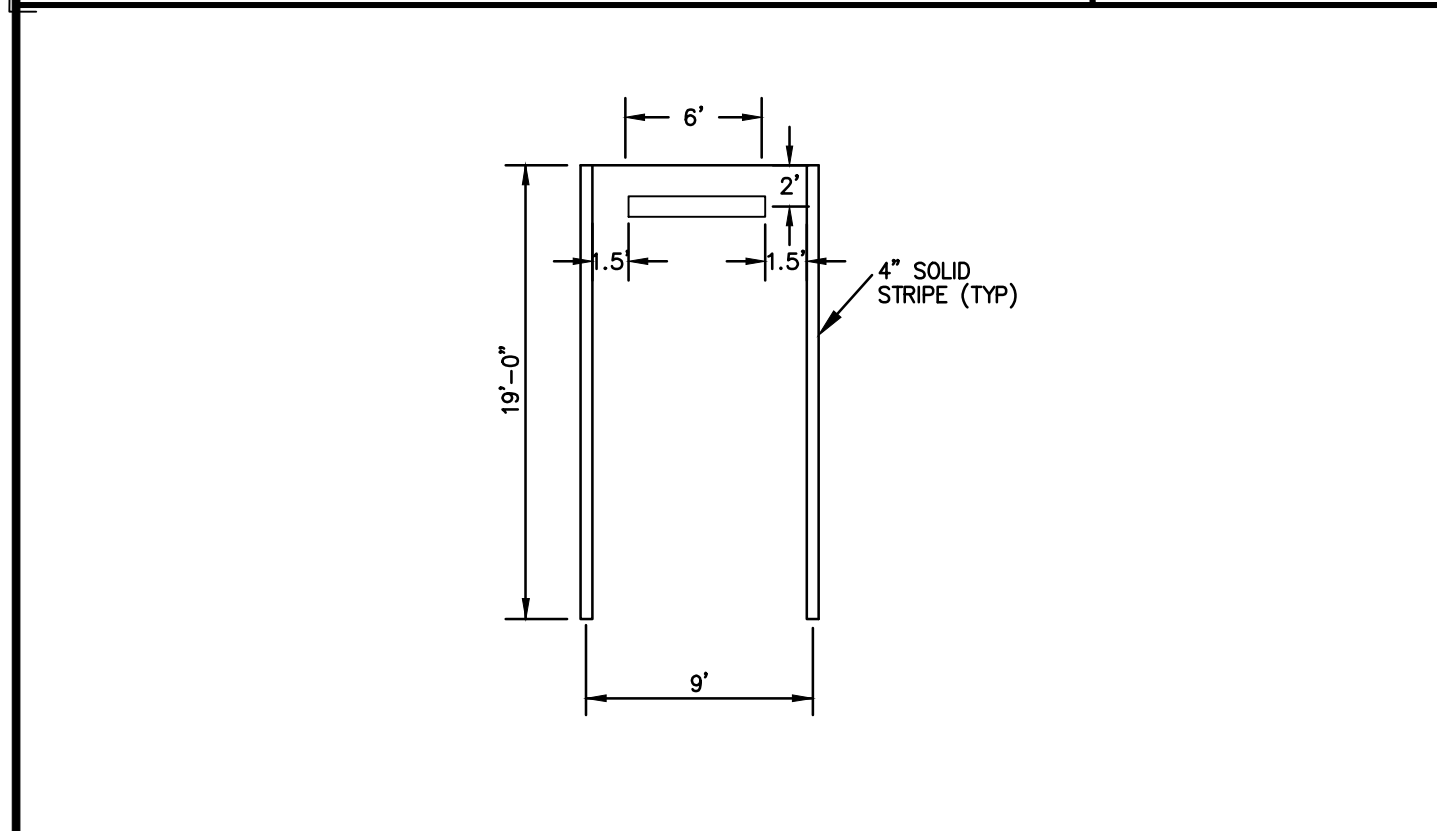
ONSITE SIDEWALK DETAIL
N.T.S.
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ONSITE_SIDEWALK.dwg



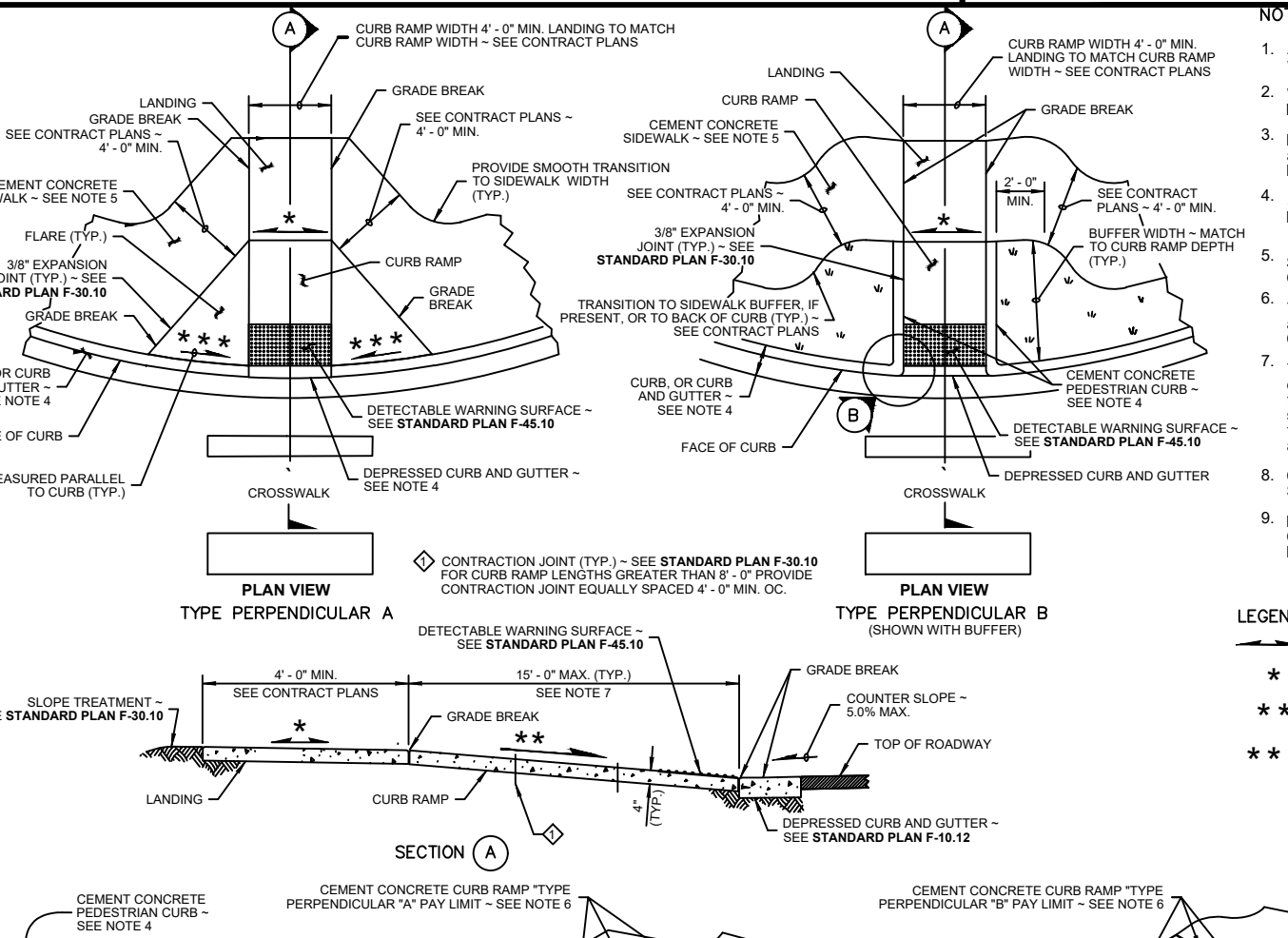
HEAVY DUTY STRUCTURAL PAVING SECTION
N.T.S.
RB ENGINEERING
PAVING_SECTION.dwg



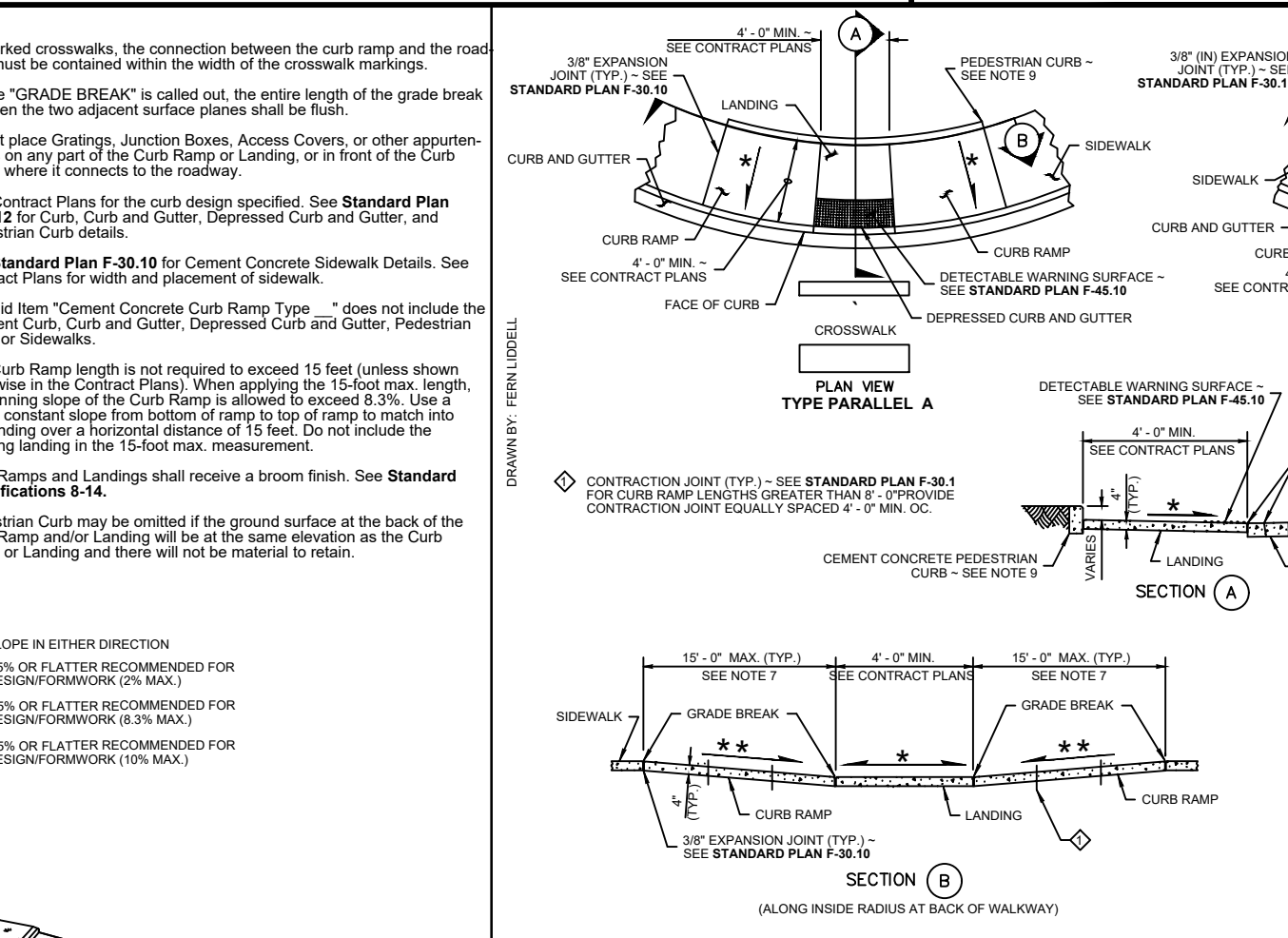
ROOF DRAIN CLEANOUT DETAIL
N.T.S.
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ROOF_DRAIN_CLEANOUT.dwg



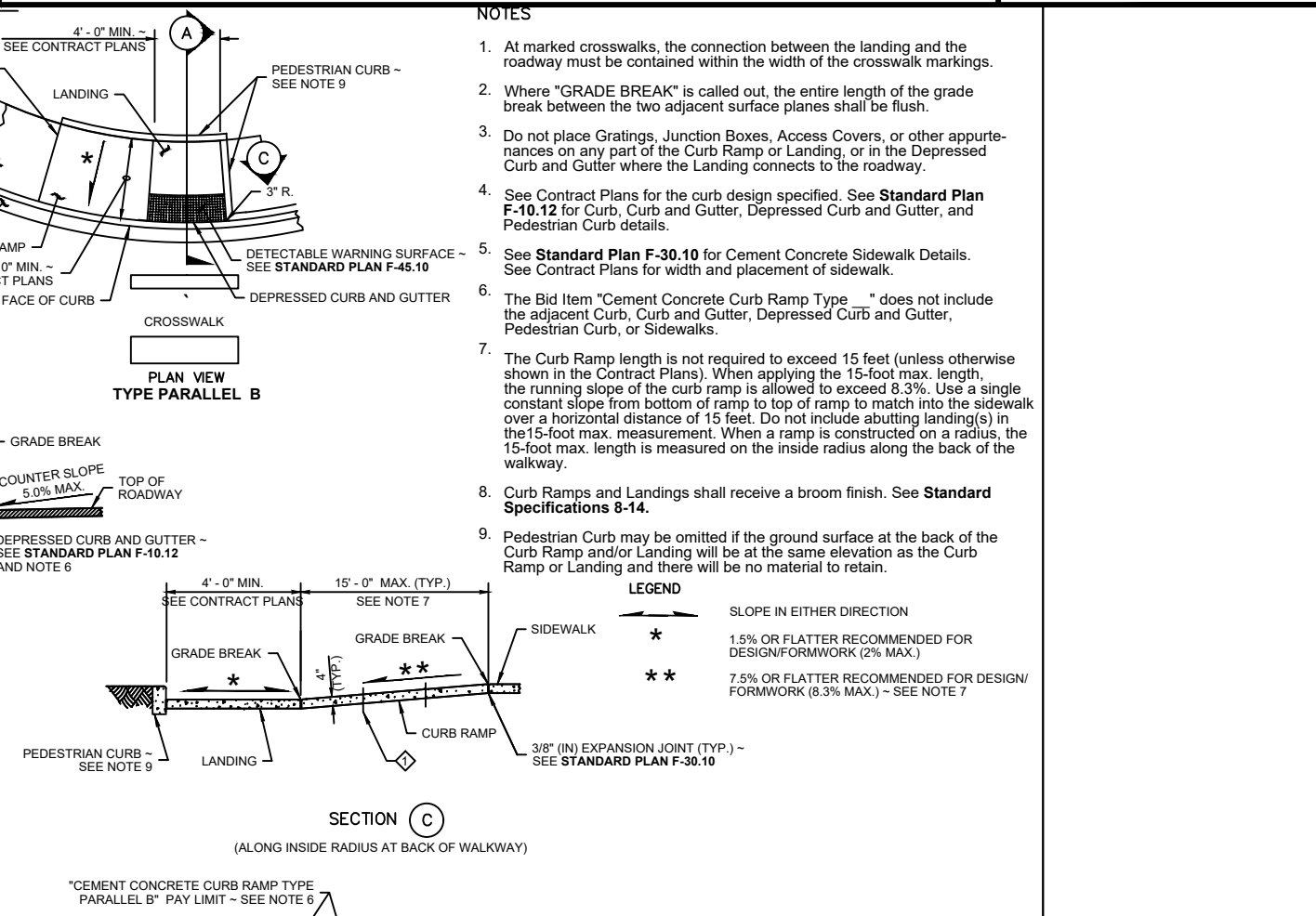
WHEEL STOP/PARKING STALL INSTALLATION DETAIL
N.T.S.
RB ENGINEERING
PARKING_STALL_W-WHEEL_STOP.dwg



FOOTING AND ROOF DRAIN
N.T.S.
RB ENGINEERING
WHEELSTOP.dwg



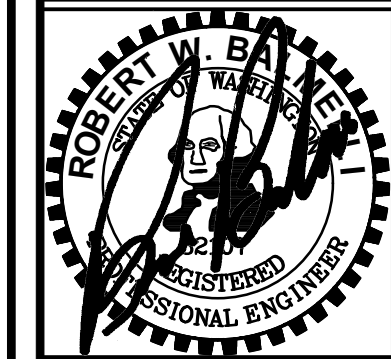
ONSITE SIDEWALK DETAIL
N.T.S.
RB ENGINEERING
ONSITE_SIDEWALK.dwg



ROOF DRAIN CLEANOUT DETAIL
N.T.S.
RB ENGINEERING
ROOF_DRAIN_CLEANOUT.dwg

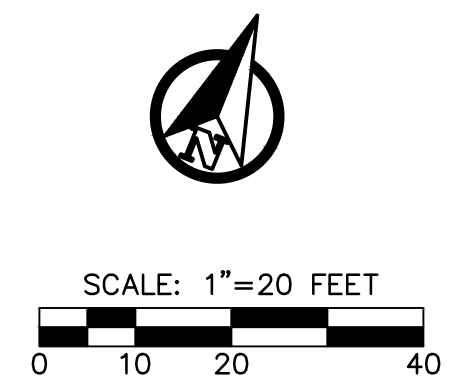
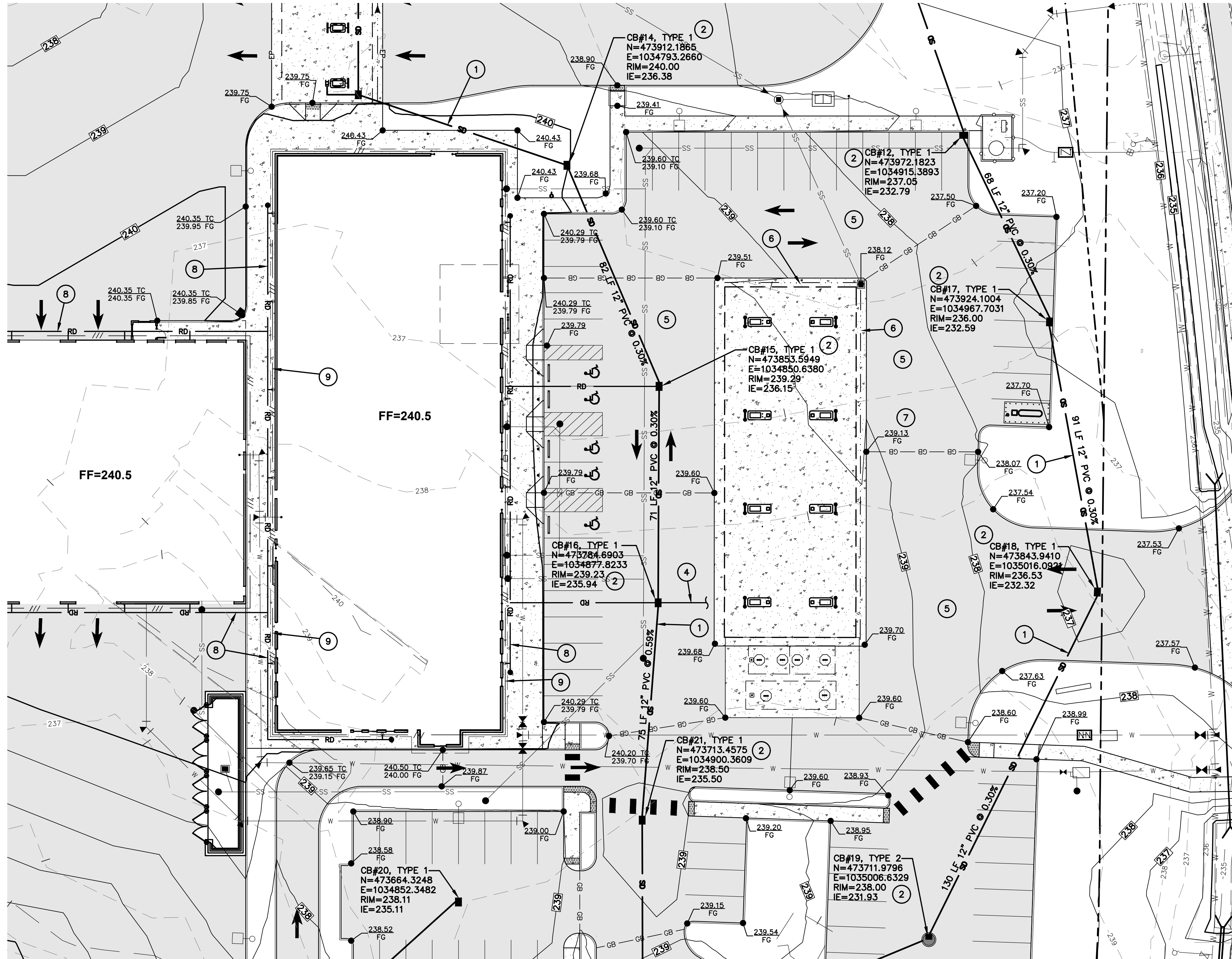
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HORIZONTAL CONTROL DETAILS AND NOTES



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C15
7 OF 31



GRADING AND DRAINAGE CONSTRUCTION NOTES:

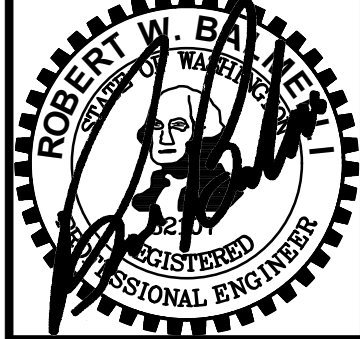
- 1 INSTALL NEW STORM MAIN PER PLAN AND REVIEW AGENCY STANDARDS. PIPE SHALL BE ADSN12 OR PVC. BACKFILL PIPE PER STD. DETAIL ON SHEET CX.X. MAINTAIN MINIMUM 2 FEET OF COVER OVER THE ALL STORM PIPE.
- 2 INSTALL NEW CATCH BASINS PER PLAN TYPE LISTED AND STD. DETAILS ON SHEET CX.X.
- 3 INSTALL SDR 35 PVC ROOF DRAIN AROUND PERIMETER OF THE BUILDING. COORDINATE WITH BUILDING CONTRACTOR FOR DOWNSPOUT SIZE AND LOCATIONS.
- 4 INSTALL FUELING STATION CANOPY DRAINS TO STORM SYSTEM PER PLAN.
- 5 CONTRACTOR SHALL STRIP SITE AND PROVIDE STRUCTURAL FILL, GRADING AND TESTING AS AS OUTLINED IN THE LANDAU & ASSOCIATES GEOTECHNICAL REPORT. IF SOIL CEMENT TREATMENT IS USED, CONTRACTOR TO SUBMIT TREATMENT DESIGN FOR ENGINEER APPROVAL. ALL PAVEMENT SECTIONS SHALL BE CONSTRUCTED PER GEOTECHNICAL REPORT RECOMMENDATIONS AND PAVING PLAN SHEET C6.1.
- 6 INSTALL CONCRETE GUTTER DRAIN PER DETAIL ON SHEET C2.6. GRADE TO DRAIN TO CB#6.
- 7 SPOT ELEVATIONS ARE FINISHED PAVING SURFACE ELEVATIONS, ADD 0.5 FT FOR TOP OF CURB ELEVATION.
- 8 INSTALL 6" SDR 35 ROOF DRAIN LINES. MINIMUM SLOPE = 0.5%. SEE SHEET C1.5.
- 9 INSTALL 4" PERFORATED FOOTING DRAINS ON BOTH BUILDINGS PER DETAIL ON SHEET C1.5.

NO.	DATE	REVISION

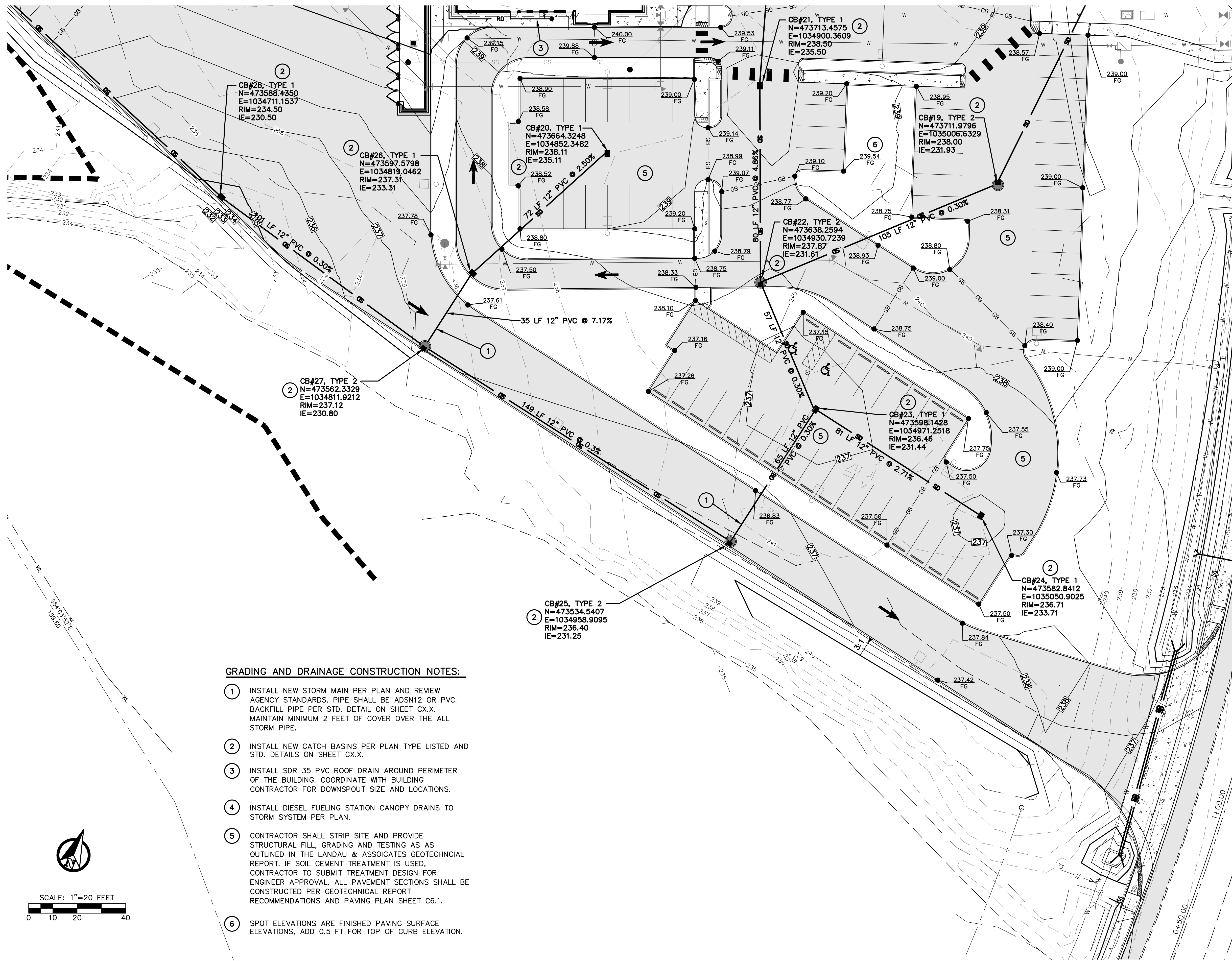
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 CHECKED BY: RWB
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NAPAVINE TRUCK STOP
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GRADING AND DRAINAGE PLAN

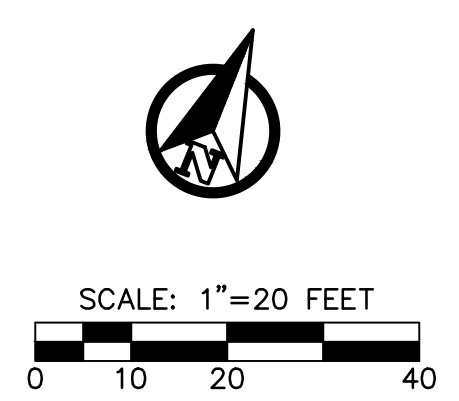


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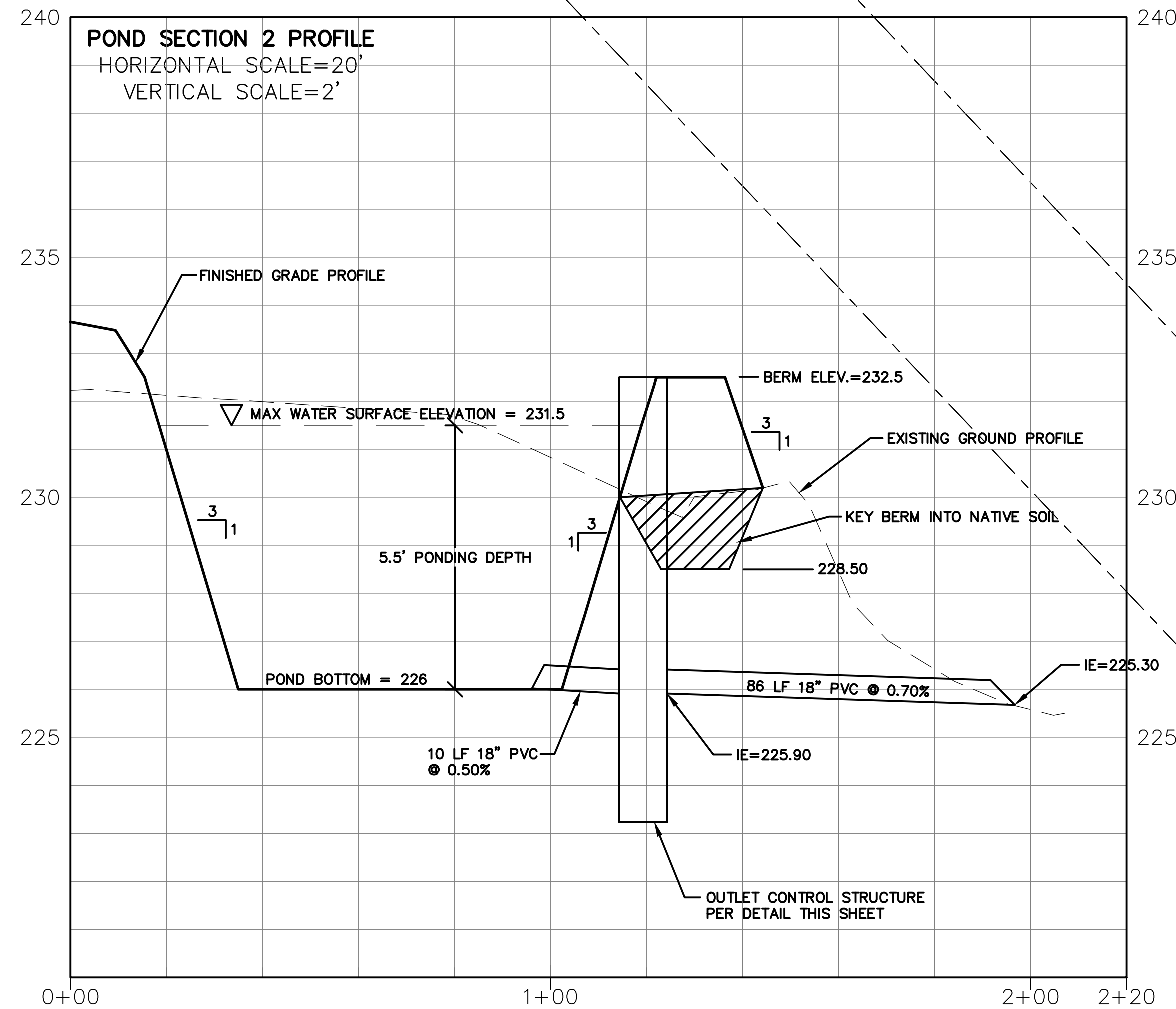
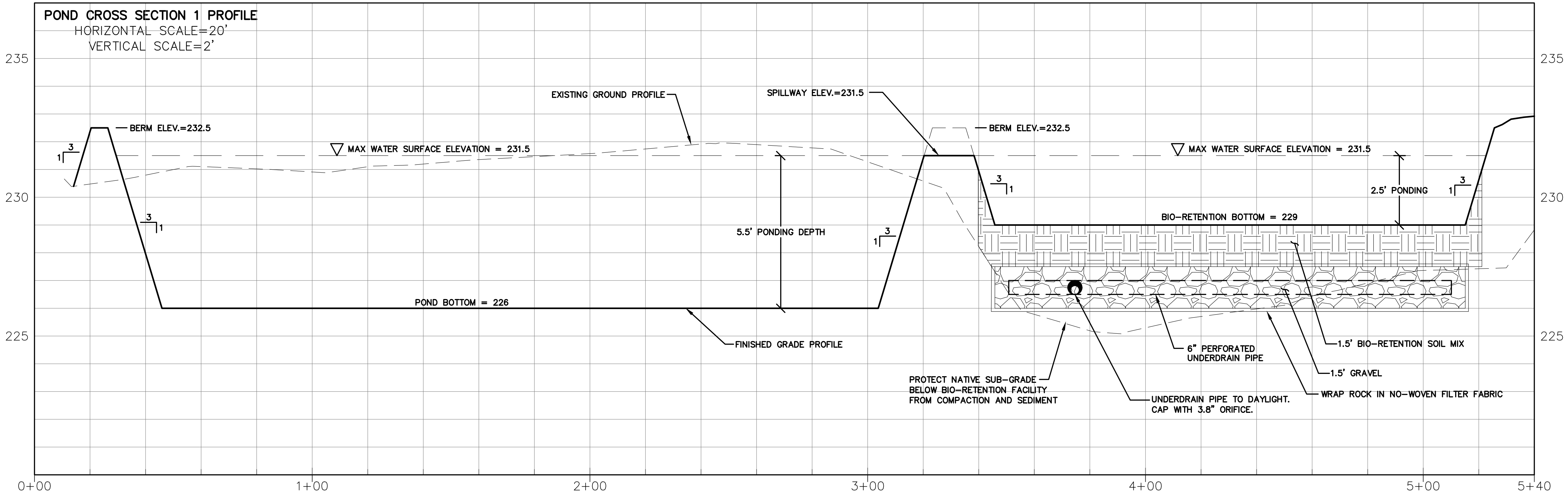


GRADING AND DRAINAGE CONSTRUCTION NOTES:

- 1 INSTALL NEW STORM MAIN PER PLAN AND REVIEW AGENCY STANDARDS. PIPE SHALL BE ADSN12 OR PVC. BACKFILL PIPE PER STD. DETAIL ON SHEET CX.X. MAINTAIN MINIMUM 2 FEET OF COVER OVER THE ALL STORM PIPE.
- 2 INSTALL NEW CATCH BASINS PER PLAN TYPE LISTED AND STD. DETAILS ON SHEET CX.X.
- 3 INSTALL SDR 35 PVC ROOF DRAIN AROUND PERIMETER OF THE BUILDING. COORDINATE WITH BUILDING CONTRACTOR FOR DOWNSPOUT SIZE AND LOCATIONS.
- 4 INSTALL DIESEL FUELING STATION CANOPY DRAINS TO STORM SYSTEM PER PLAN.
- 5 CONTRACTOR SHALL STRIP SITE AND PROVIDE STRUCTURAL FILL, GRADING AND TESTING AS AS OUTLINED IN THE LANDAU & ASSOCIATES GEOTECHNICAL REPORT. IF SOIL CEMENT TREATMENT IS USED, CONTRACTOR TO SUBMIT TREATMENT DESIGN FOR ENGINEER APPROVAL. ALL PAVEMENT SECTIONS SHALL BE CONSTRUCTED PER GEOTECHNICAL REPORT RECOMMENDATIONS AND PAVING PLAN SHEET C6.1.
- 6 SPOT ELEVATIONS ARE FINISHED PAVING SURFACE ELEVATIONS, ADD 0.5 FT FOR TOP OF CURB ELEVATION.



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JOB NUMBER 23007 DRAWING NAME 23007_GDPL C2.3 10 OF 31			



BIORETENTION SOIL MIX:

CONTRACTOR TO PROVIDE SUBMITTAL OF BIO-RETENTION GRADATION SOIL MIX TO CITY AND ENGINEER PRIOR TO CONSTRUCTION.

SOIL MIX:

- 60% TO 65% GRAVELLY SAND AND 35% TO 40% COMPOST (SEE SPECIFICATION BELOW).
- GRAVELLY SAND GRADATION PER ASTM D 422 LESS THAN 5%

SIEVE SIZE	PERCENT PASSING
US NO. 0.375	100
US NO. 4	100
US NO. 10	75-90
US NO. 40	24-40
US NO. 100	4-10
US NO. 200	2-5
- MAXIMUM CLAY CONTENT SHOULD BE LESS THAN 5%
- SOIL MIXTURE SHOULD BE UNIFORM, FREE OF STONES, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 2 INCHES
- ON-SITE SOIL MIXING OR PLACEMENT NOT ALLOWED IF SOIL IS SATURATED OR SUBJECTED TO WATER WITHIN 48 HOURS
- COVER AND STORE SOIL ACCORDINGLY TO PREVENT WETTING OR SATURATION
- TEST SOIL FOR FERTILITY AND MICRONUTRIENTS AND, IF NECESSARY, AMEN MIXTURE TO CREATE OPTIMUM CONDITIONS FOR PLANT ESTABLISHMENT AND EARLY GROWTH AT RATES RECOMMENDED BY AN INDEPENDENT LABORATORY SOIL TEST.
- ORGANIC CONTENT OF THE SOIL MIXTURE SHOULD BE 5% TO 8%
- CATION EXCHANGE CAPACITY (C.E.C) MUST BE LESS THAN 5 MILLIEQUIVALENTS PER 100 GRAMS OF DRY SOIL.

2 **BIORETENTION CELL TRAPEZOIDAL** RB ENGINEERING
 C2.1 N.T.S. BIORTN_CELL_CURB.dwg

CONTROL STRUCTURE TYPE D - ORIFICE RB ENGINEERING
 N.T.S. /ORIFICE/ORIFICE WITH OVERFLOW GRATE CTRL_STRT_D.dwg

NOTES:

- USE A MINIMUM OF A 54" DIAMETER TYPE 2 CATCH BASIN.
- OUTLET CAPACITY: 100-YEAR DEVELOPED PEAK FLOW.
- METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
- FRAME AND LADDER OR STEPS OFFSET SO:
 - CLEANOUT GATE IS VISIBLE FROM TOP.
 - CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
 - FRAME IS CLEAR OF CURB.
- IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE: OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS THAN 1/2".
- PROVIDE AT LEAST ONE 3"x0.90 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL. (MAXIMUM 3'-0" VERTICAL SPACING)
- LOCATE ADDITIONAL LADDER RUNGS IN STRUCTURES USED AS ACCESS TO TANKS OR VAULTS TO ALLOW ACCESS WHEN CATCH BASIN IS FILLED WITH WATER.

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NAPAVINE TRUCK STOP

NAPAVINE

POND CROSS SECTIONS AND DETAILS

ROBERT W. BAKER
 REGISTERED PROFESSIONAL ENGINEER

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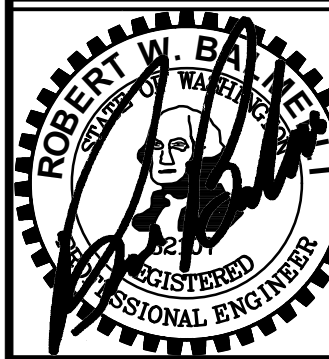
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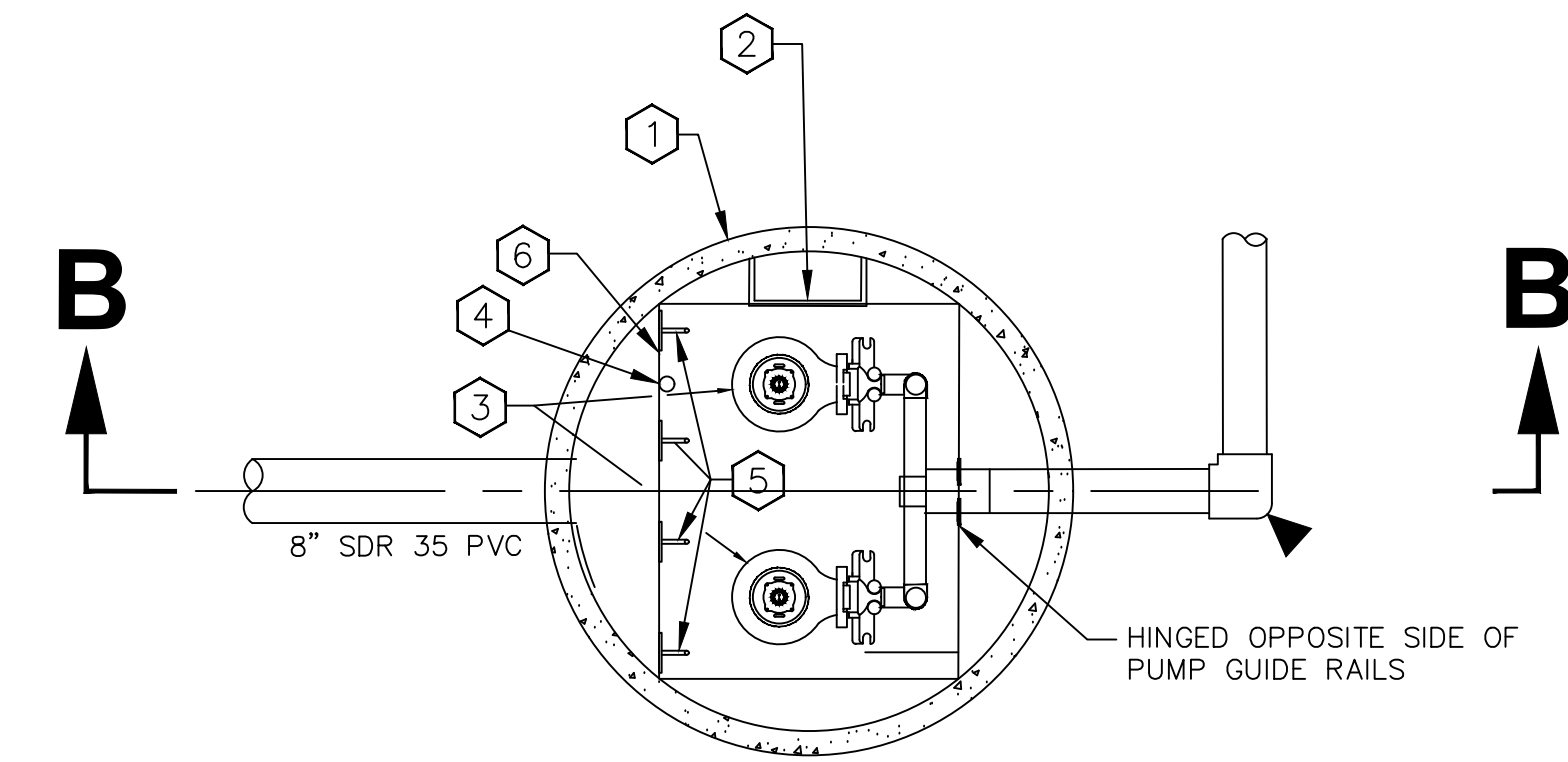
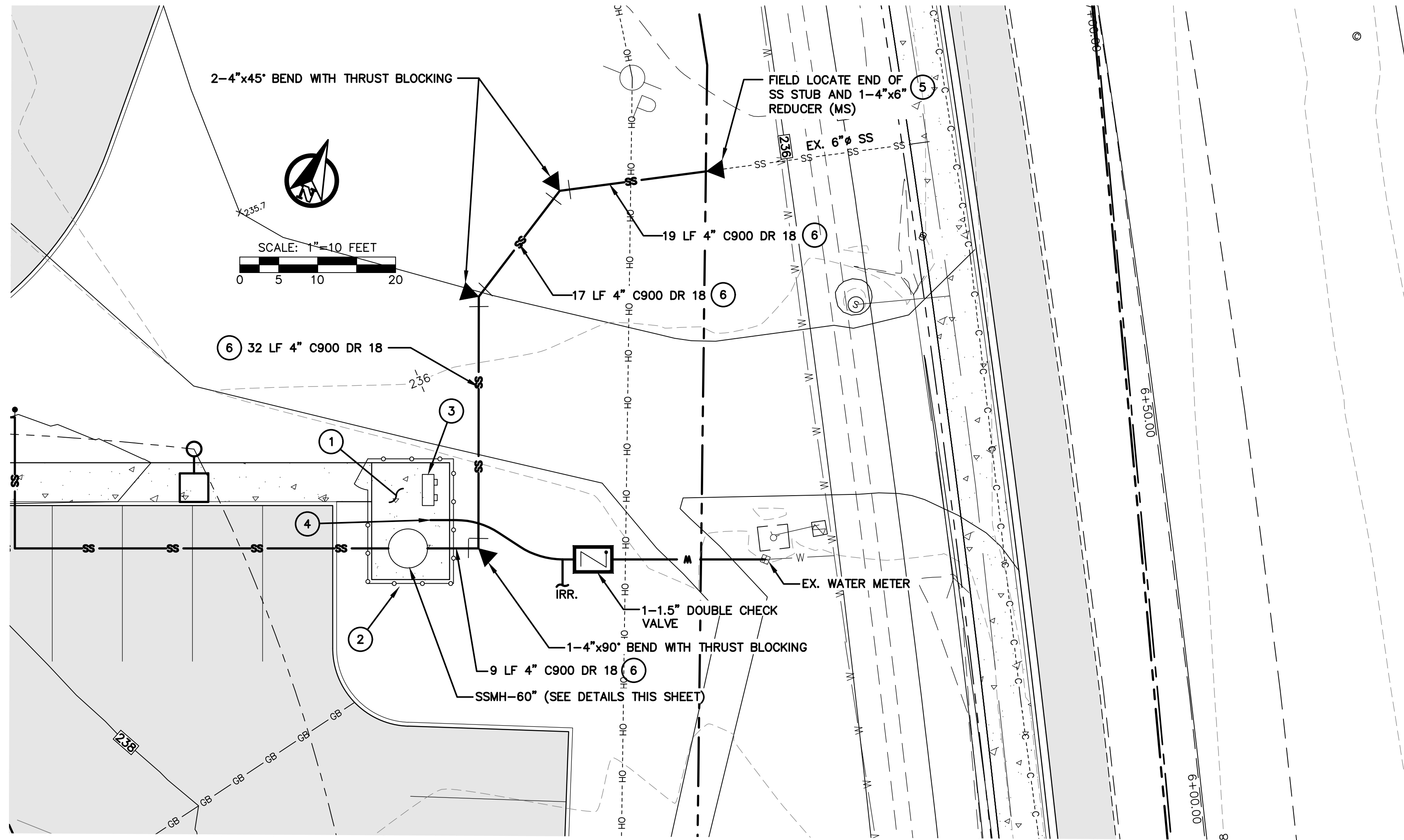
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C2.5
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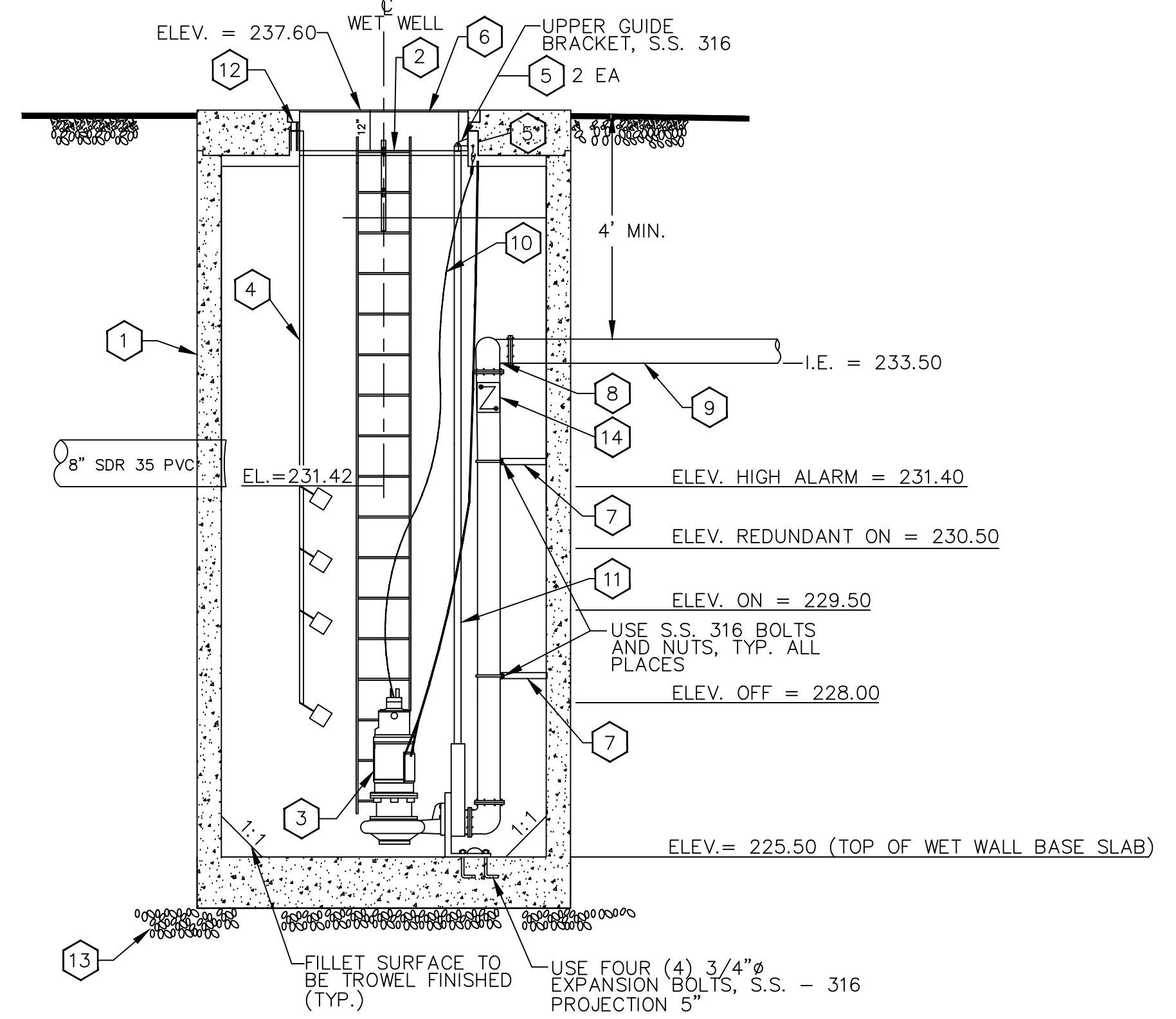


- SEWER CONSTRUCTION NOTES:**
- 1 CONSTRUCT NEW SEWER PUMP STATION PER PLAN AND DETAIL ON SHEET C3.4
 - 2 INSTALL NEW SEWER CLEANOUT PER PLAN AND PROFILE. SEE STD. DETAIL ON SHEET C3.3.
 - 3 INSTALL SIDE SEWER AND BUILDING CLEANOUT PER PLANS AND STD. DETAIL ON SHEET C3.3. LATERAL IE AT BUILDING = 236.50'
 - 4 INSTALL GREASE INTERCEPTOR PER PLAN AND DETAIL ON SHEET C3.3. RIM ELEV. = 239.66 INLET IE = 235.66 OUTLET IE = 235.50
 - 5 INSTALL NEW SDR 35 PVC SEWER MAIN PER PLAN AND PROFILES. BACKFILL TRENCH PER STD. DETAIL ON SHEET C2.8..
 - 6 INSTALL NEW TYPE 1 CATCH BASIN IN TRASH ENCLOSURE. PROVIDE TRAP BETWEEN CB AND SS LINE CONNECTION.

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		SEWER SERVICE PLAN				NAPAVINE
						
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PLAN - PUMP STATION & VALVE VAULT
1" = 2'



SECTION B-B
1" = 2'

PUMP STATION CONSTRUCTION NOTES:

- 1 CONSTRUCT NEW 10' BY 15' BY 6" THICK CONCRETE SLAB. SLAB ELEVATION = 237.50.
- 2 INSTALL 6 FT TALL BLACK COATED CHAIN LINK FENCING AND 3 FT MAN GATE PER PLAN AND DETAIL ON SHEET C3.3.
- 3 PROPOSED LOCATION FOR NEW PUMP CONTROL PANEL AND SERVICE. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR LIBERTY PUMP PACKAGE SYSTEM AND CONTROLS. COORDINATE POWER SUPPLY WITH MAIN BUILDING.
- 4 INSTALL WATER YARD HYDRANT.
- 5 CONNECT TO EXISTING SEWER MAIN STUB PER PLAN. FIELD VERIFY LOCATION AND SIZE OF EXISTING SSFM STUBOUT.
- 6 INSTALL NEW PVC SSFM PRESSURE LINE PER PLAN. MAINTAIN MINIMUM 4 FEET OF COVER OVER PIPE. BACKFILL PER STD. DETAIL ON SHEET C2.8

GENERAL SEWER NOTES:

ALL NEW SEWER FORCE MAINS SHALL BE FLUSHED, PRESSURE TESTED PER REVIEW AGENCY STANDARDS. PROVIDE AGENCY AND ENGINEER WITH TV RESULTS.

ALL NEW SEWER FORCE MAINS SHALL INCLUDE TRACER WIRE AND LOCATE TAPE PER REVIEW AGENCY STANDARDS.

LIBERTY PUMP SYSTEM DESIGN NOTES:

DESIGN: PUMP SHALL PROVIDE MINIMUM OF 24 GPM @ 77 TDH (SINGLE PUMP OPERATION) SYSTEM SHALL BE CLASS 1, DIVISION 1. PUMP SYSTEM SHALL INCLUDE STAINLESS STEEL RAIL SYSTEM FOR PUMP ACCESS.

PUMPS: LIBERTY PUMP XLSG202M05 XP GRINDER, 2 HP, 1 STAGE, 230 VAC, 1 PH, 50 FT. CORD. CONTACT JONATHON MARCUS @ 425.228.555, GORDON & ASSOCIATES INC.

PIPING: ALL WETWELL FORCE MAIN PIPING AND FITTINGS SHALL BE DUCTILE IRON OR GALVANIZED STEEL.

POWER: 3 PHASE, 230 VAC

PANEL: LIBERTY ISD- SERIES, DUPLEX UL LISTED NEMA 4X OUTDOOR ENCLOSURE, INTRINSICALLY SAFE RELAYS, CIRCUIT BREAKER PUMP DISCONNECT, MAGNETIC MOTOR CONTRACTOR, 3 FLOAT SWITCH CONTROL AND HIGH WATER ALARM, ELAPSED TIME METERS, ALARM HORN. LEAD/LAG PUMP OPERATION WITH PUMP START ALTERNATOR.

FLOATS: ADJUSTING/VARIABLE LEVEL, STD. NORMALLY OPEN. PROVIDE HIGH WATER ALARM, LEAD, LAG AND PUMP OFF FLOATS.

RAILS: GRZONS, GRINDER RAIL NON-SPARKING

- 1 60" I.D. CONCRETE WETWELL, OLD CASTLE PRECAST.
- 2 ACCESS LADDER W/SQUARE RUNGS, W/ANTI-SLIP RIDGES. FIELD MEASURE BEFORE FABRICATION.
- 3 LIBERTY PUMPS XLSG SERIES SEE SPECIFICATIONS BELOW.
- 4 3/4" SS FLOAT ROD LOCATED AWAY FROM INLET PIPE.
- 5 S.S. 316 HOOK FOR EACH PUMP W/CORD GRIPS, EPOXY SEAL-OFFS & S.S. STRAIN RELIEF
- 6 ACCESS COVER - LW-HATCH S-3, 36"x48" HATCH. OPENING SIZED TO ALLOW REMOVAL OF PUMPS W/3" CLEARANCE, W/ RECESSED PADLOCK HASP (H2O LOADING). SINGLE DOOR CONFIGURATION WITH DOOR HINGE ON WEST SIDE.
- 7 DISCHARGE PIPE HANGER, 316 S.S. ON 6 FT. MAX. SPACING (TYP. 2 PLACES). SEE DETAIL
- 8 D.I. ELBOW AND 1-2"x4"x2" D.I. TEE
- 9 2" D.I. PIPING
- 10 PUMP LIFTING CHAIN, 316SS LIFTING CAPACITY 150% OF PUMP WEIGHT WITH MOUNTING HOOK SAME AS FOR TRANSDUCER POLE. SEE DETAIL
- 11 PUMP GUIDE RAILS SS 316
- 12 1 1/2" DRAIN COUPLING WELDED UNDER FRAME FOR PIPE CONNECTION W/WATER VAPOR TRAP
- 13 6" MIN. COMPACTED CSTC.
- 14 2" CHECK VALVE, 2 EACH.

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SEWER PUMP DETAILS AND NOTES

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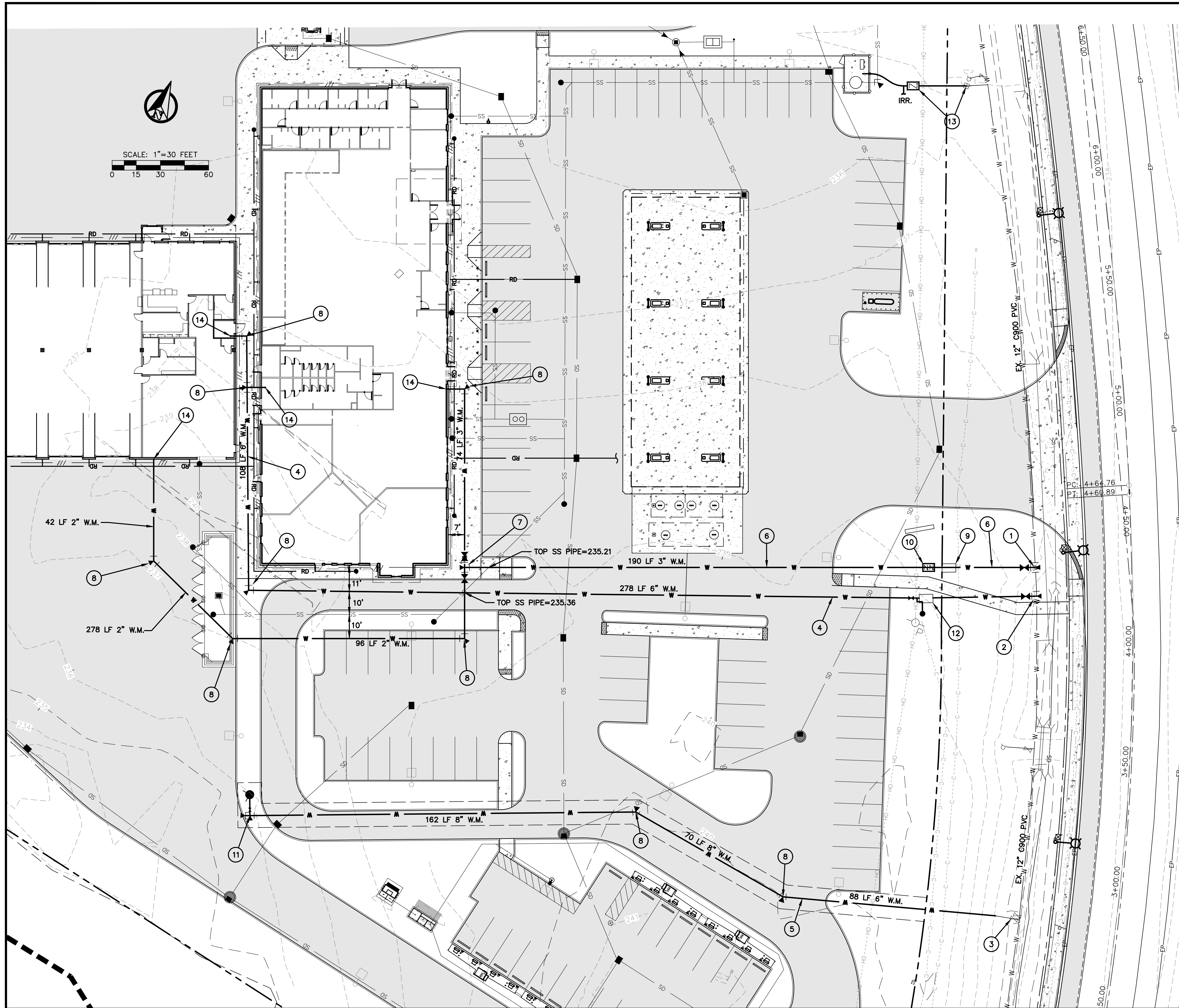
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JOB NUMBER
23007

DRAWING NAME
23007_SPDT

C3.4

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WATER CONSTRUCTION NOTES:

- 1 STA 4+31.75, 40.25' LT CONTRACTOR TO MAKE CONNECTION TO EXISTING WATER MAIN VIA LIVE TAP. SEE STD. DETAIL ON SHEET C4.2.
1-3" X 12" SADDLE TAP
1-3" CORP STOP
1-THRUST BLOCK
- 2 STA 4+19.36, 40' LT CONTRACTOR TO MAKE CONNECTION TO EXISTING WATER MAIN VIA LIVE TAP. SEE STD. DETAIL ON SHEET C4.2.
1-6" X 12" TAPPING SADDLE
1-6" TAPPING VALVE AND BOX
1-THRUST BLOCK
- 3 STA 2+79.59, 42.20' LT CONNECT TO EXISTING 8" GATE VALVE AT MAIN LINE STUB AND EXTEND 8" C900 PVC TO HYDRANT.
- 4 INSTALL NEW DUCTILE IRON CLASS 52 FIRE LINE WATER MAIN PER PLAN AND PROFILE. BACKFILL TRENCH PER DETAIL ON C2.8.
- 5 INSTALL NEW C900 DR 18 WATER MAIN PER PLAN AND PROFILE. BACKFILL TRENCH PER DETAIL ON C2.8.
- 6 INSTALL NEW SCHEDULE 40 PVC WATER MAIN PER PLAN AND PROFILE. BACKFILL TRENCH PER DETAIL ON C2.8.
- 7 STA 1+40.67, 276.58' LT INSTALL NEW WATER MAIN TEE AND GATE VALVES. PER DETAIL ON SHEET C4.2. SET BOX FLUSH IN CONCRETE WALK.
2-3" GATE VALVE AND BOX (MJXFL)
1-3" TEE (MJXFLXL)
1-THRUST BLOCK
- 8 INSTALL NEW SCHEDULE 40 WATER MAIN FITTING PER PLAN.
1-2" 90°, 2-2" 45°
1-3" 90°
2-6" 90°, 1-6" TEE
2-8" 45°, 1-8" 90°
- 9 STA 4+32.59, 76.08' LT, VAULT TOP ELEV.=238.5 INSTALL NEW 3" COMPOUND WATER METER IN OLD CASTLE VAULT 444-LA. SEE DETAILS ON SHEET C4.2.
- 10 STA 4+33.07, 84.44' LT INSTALL 3" DOUBLE CHECK VALVE PER PLAN AND STD. DETAIL ON SHEET C4.2.
- 11 N: =473586.7496
E: =1034821.2167
INSTALL NEW FIRE HYDRANT ASSEMBLY PER PLAN AND STD. DETAIL ON SHEET C4.3.
1-8" X 6" TEE (MJXFLXMJ)
1-6" GATE VALVE AND BOX (FLXMJ)
1-8" BLIND FLANGE (MJ)
1-FIRE HYDRANT ASSEMBLY
2-THRUST BLOCKS
- 12 STA 4+19.03, 85.79' LT, VAULT TOP ELEV.=239.0 INSTALL FIRE LINE DOUBLE DETECTOR CHECK VALVE IN CONCRETE VAULT PER STD. DETAIL ON SHEET C4.3. PROVIDE 1.25" SCHEDULE 40 UTILITY CONDUIT TO VAULT FROM BUILDING FIRE SYSTEM. PROVIDE DUAL 180' FULL OPEN COVERS.
1-WILKENS DCDV ASSEMBLY MODEL ZURM 350DA
1-OLD CASTLE VAULT MODEL NO. 577LA
1-POST INDICATOR VALVE ASSEMBLY
1-6" GATE VALVE (MJ)
1-6" X 4" TEE (MJ)
1-FDC CONNECTION
1-THRUST BLOCK
- 13 STA 6+37.44, 52.11' LT-W.M. STA 6+40.27, 73.98' LT-IDCV USE EXISTING 2" WATER METER SERVICE FOR IRRIGATION SERVICE AND PUMP STATION WATER. INSTALL IRRIGATION DOUBLE CHECK VALVE PER PLAN AND STD. DETAIL ON SHEET C4.2.
- 14 COORDINATE WATER SERVICE AND FIRE LINE CONNECTIONS TO BUILDING WITH PLUMBING OR GENERAL CONTRACTOR.

WATER GENERAL NOTES:

PRIOR TO CONNECTING TO THE EXISTING SYSTEM, ALL WATER MAIN SHALL BE CHLORINATED AND PRESSURE TESTED PER REVIEW AGENCY TESTING STANDARDS. CONTACT REVIEW AGENCY FOR REQUIREMENTS.

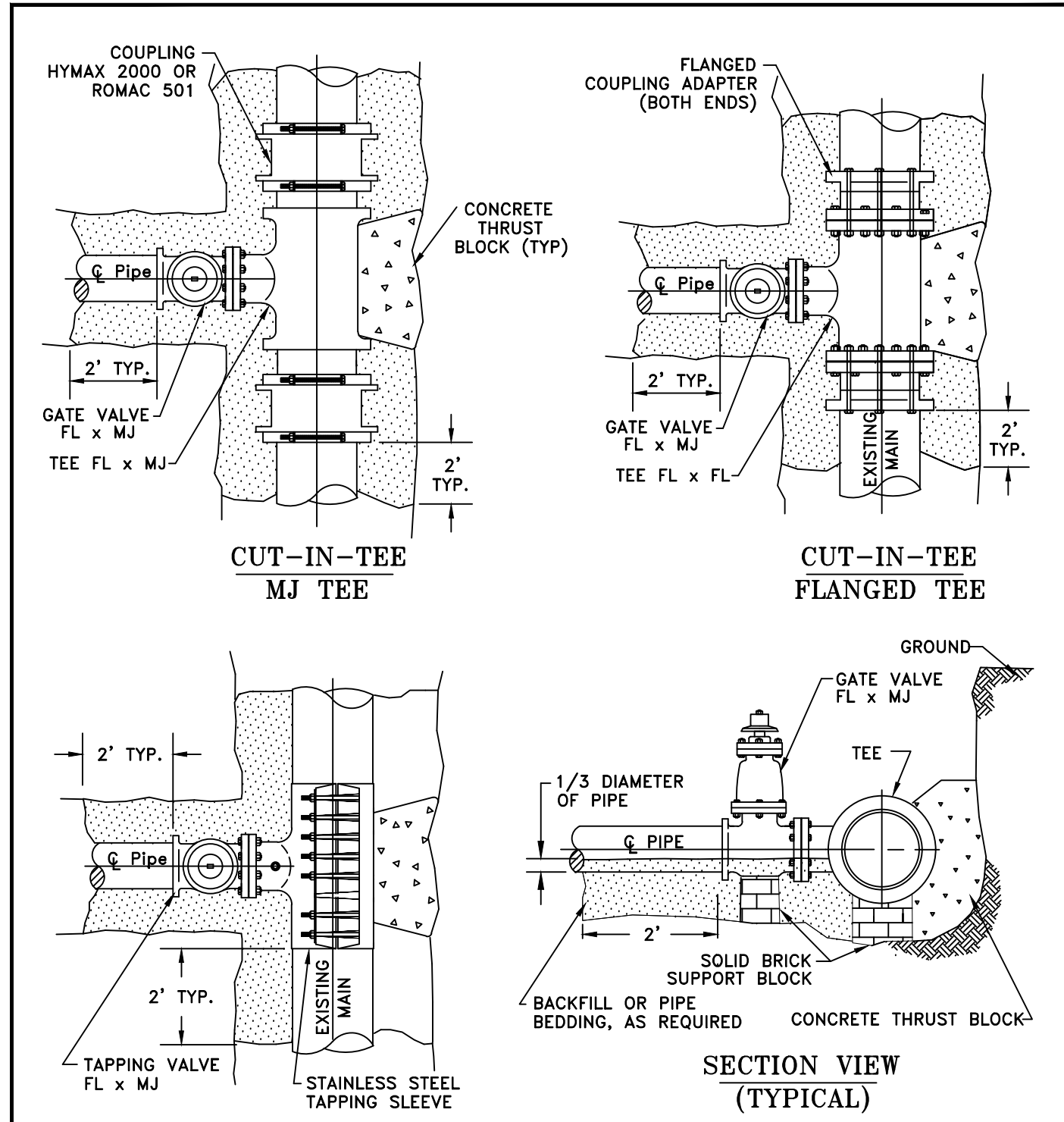
CONTACT REVIEW AGENCY INSPECTOR AND DESIGN ENGINEER 24 HOURS PRIOR TO TESTING.

CONTACT REVIEW AGENCY 72 HOURS PRIOR TO ANY PLANNED WATER MAIN SHUT DOWNS.

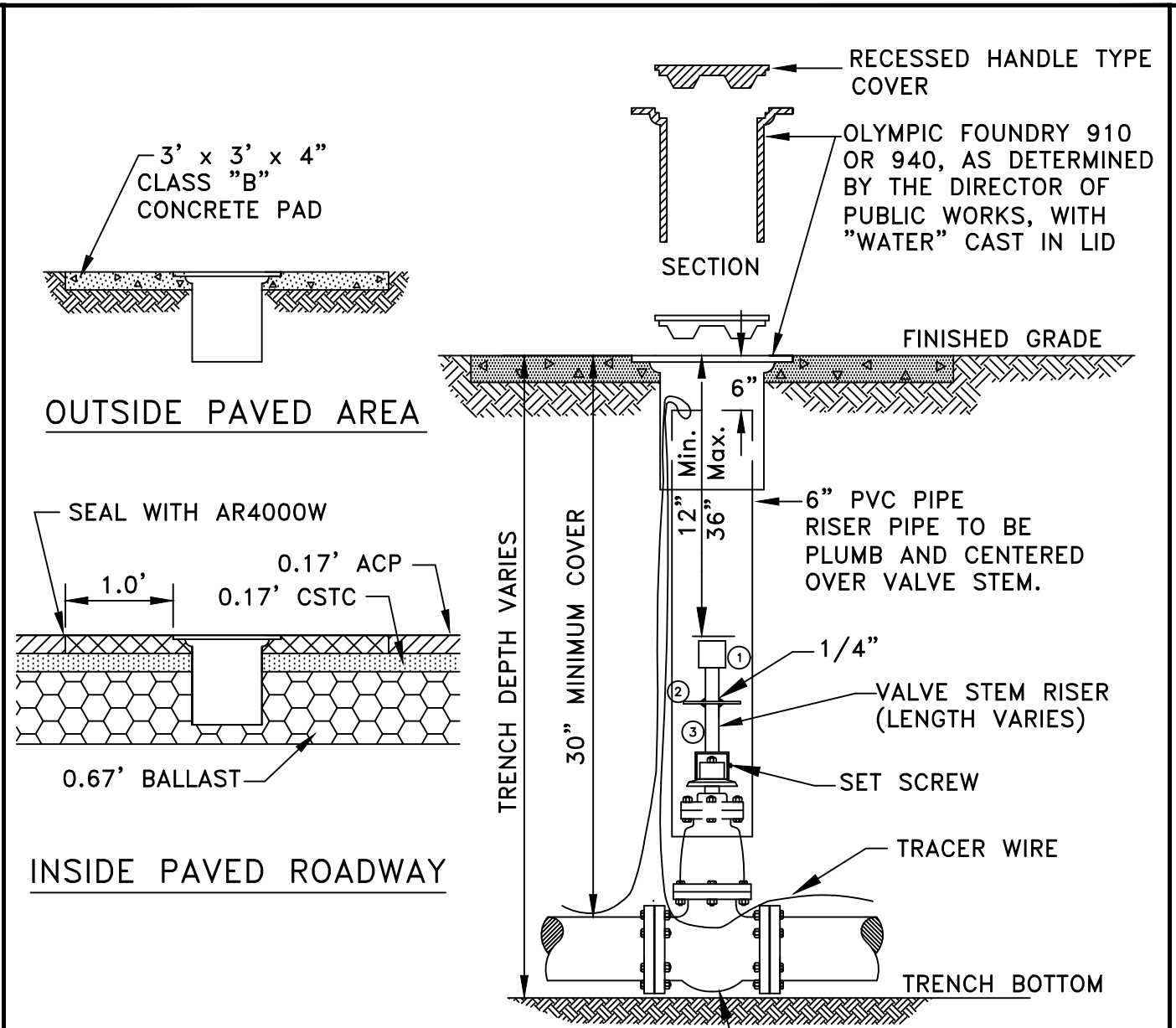
ALL WATER MAIN SHALL BE INSTALLED WITH TRACER TAPE AND LOCATE WIRE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POT HOLE THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING 411. LOCATIONS OF SAID UTILITIES SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT THE DESIGN ENGINEER TO RESOLVE ALL CONFLICTS PRIOR TO PROCEEDING WITH THE CONSTRUCTION.

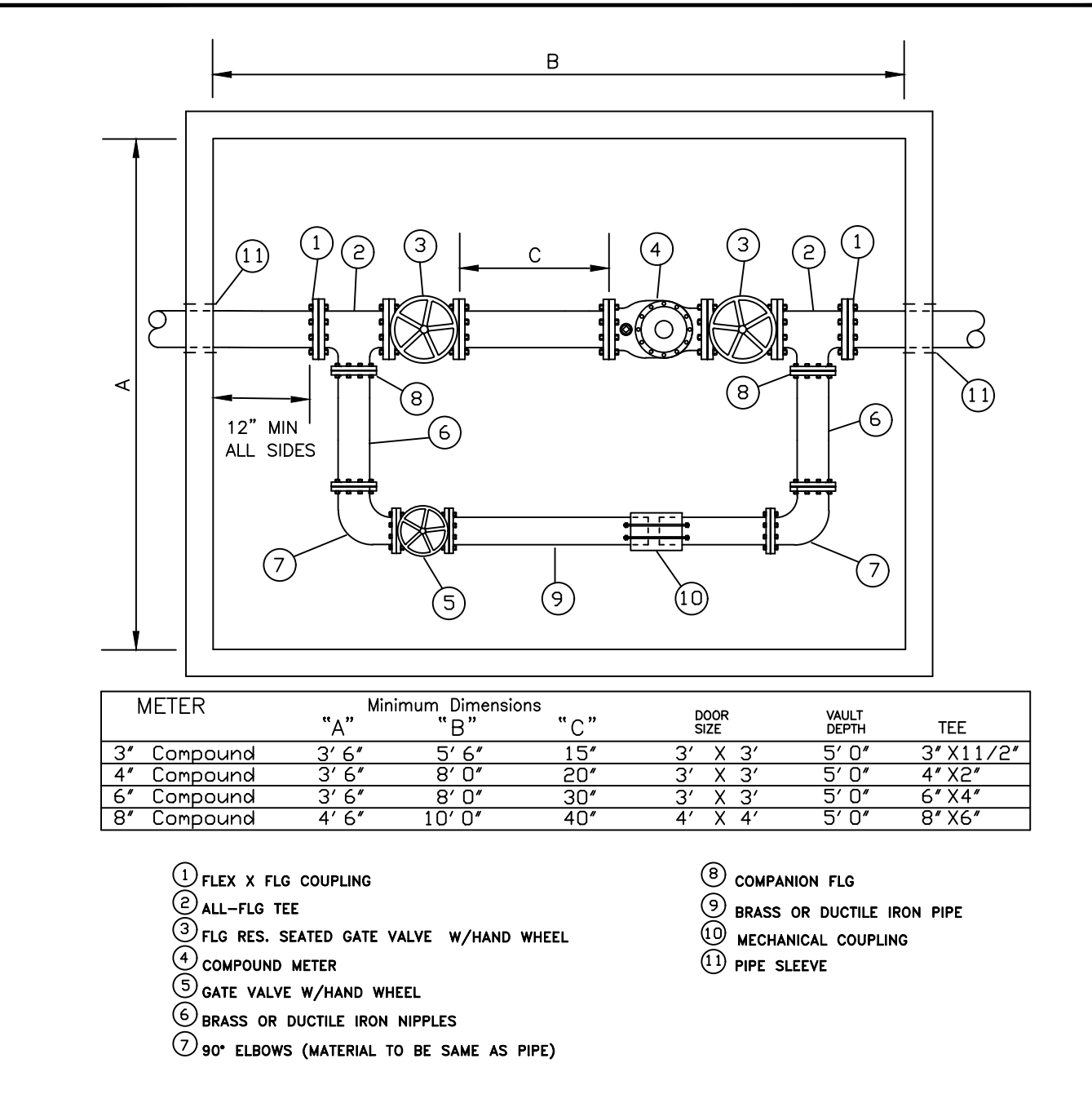
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NAPAVINE TRUCK STOP						
WATER SERVICE PLAN						
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHERLUS, WA 98532 OFF: (360) 740-8919 EMAIL: info@rbengineering.com						
JOB NUMBER: <u>23007</u> DRAWING NAME: <u>23007_WSP_L</u> C4.1 18 OF 31						



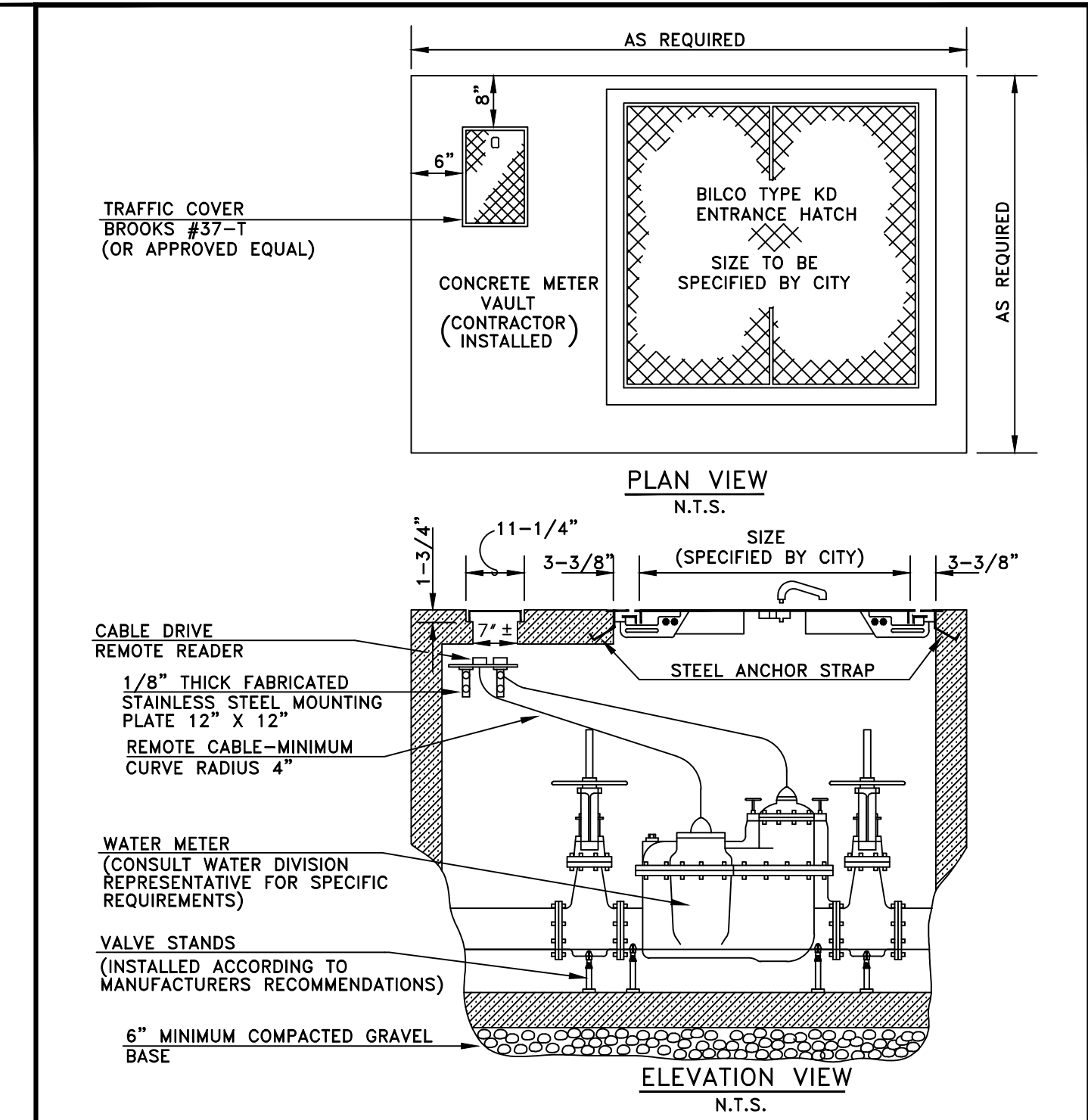
City of Napavine
CONNECTION TO EXISTING MAIN
 APPROVED BY: [Signature] DWG. NO. 4-11
 CITY ENGINEER 3/16/2005



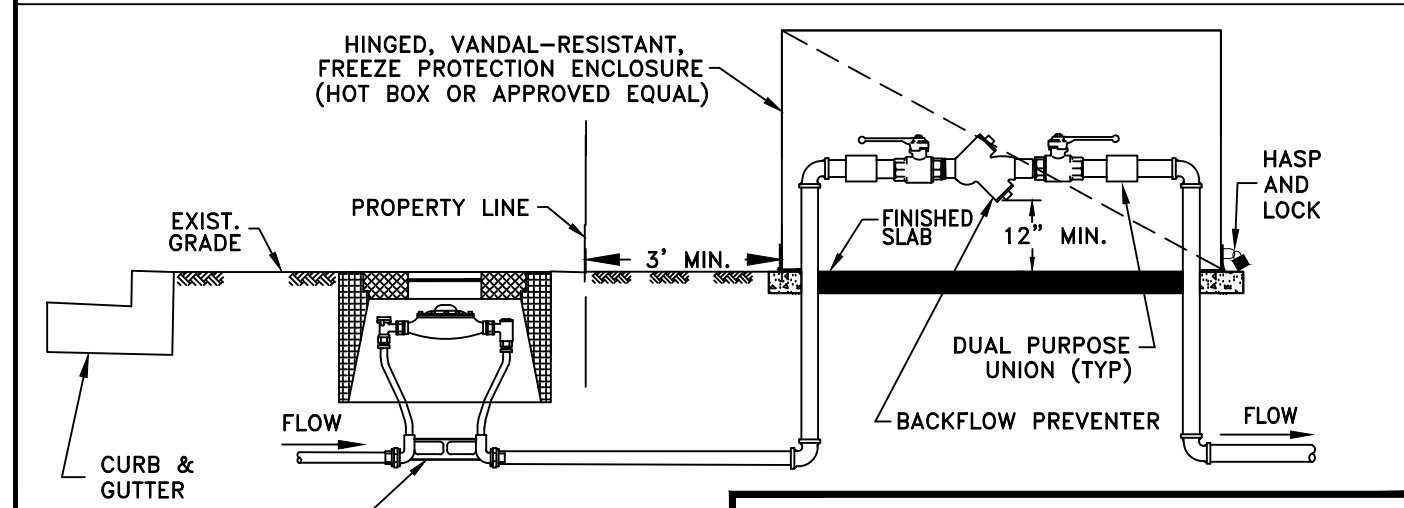
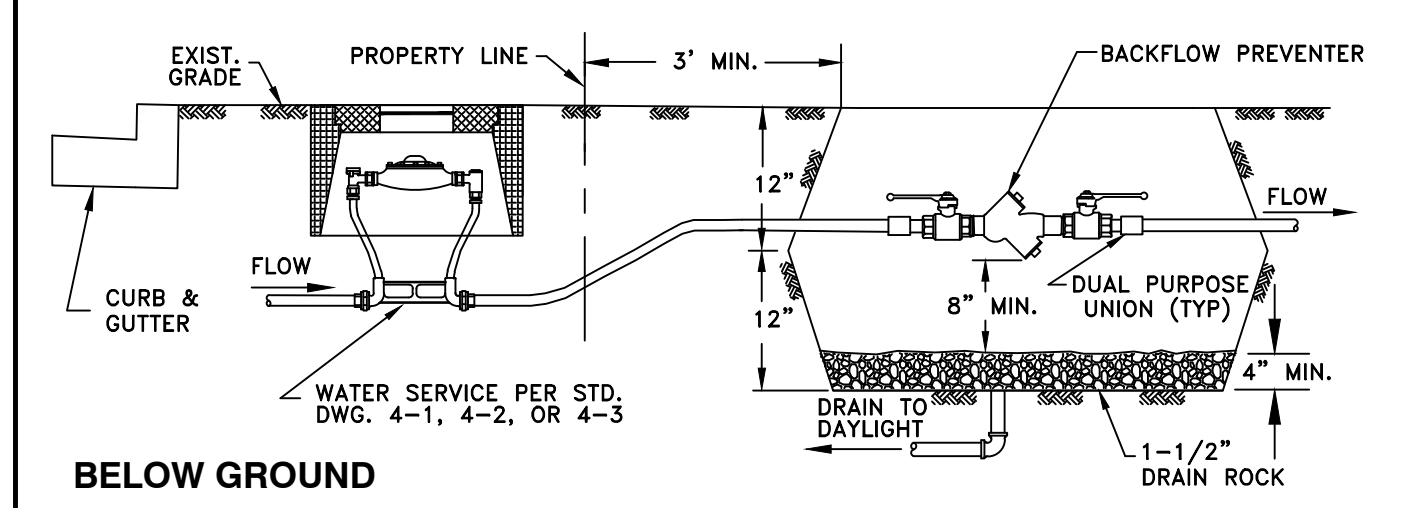
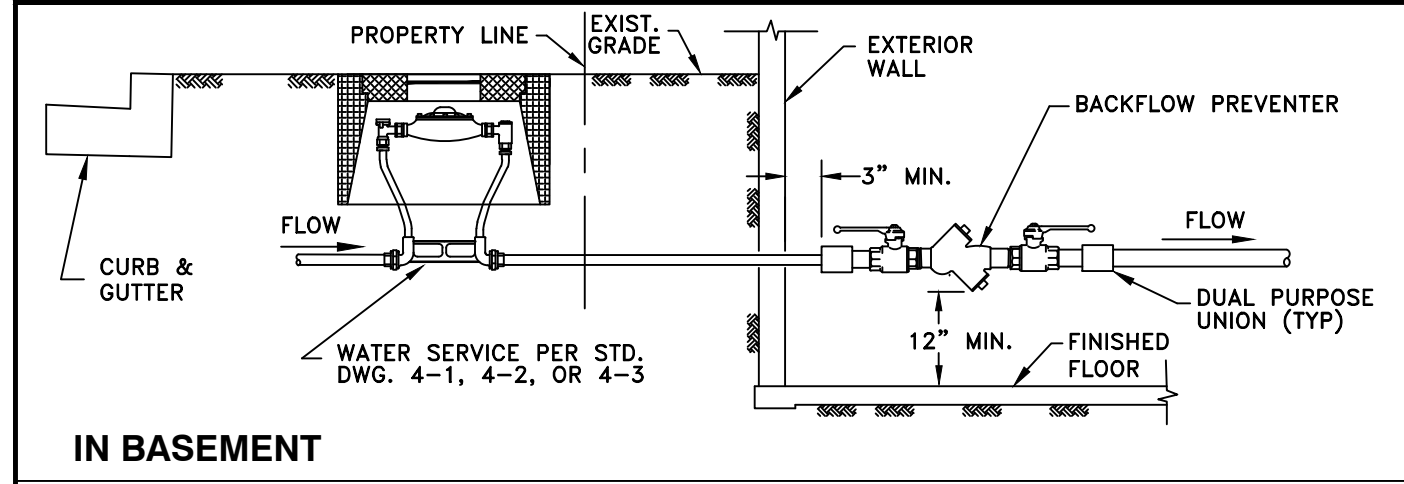
City of Napavine
VALVE BOX
 APPROVED BY: [Signature] DWG. NO. 4-12
 CITY ENGINEER 1/02/2003



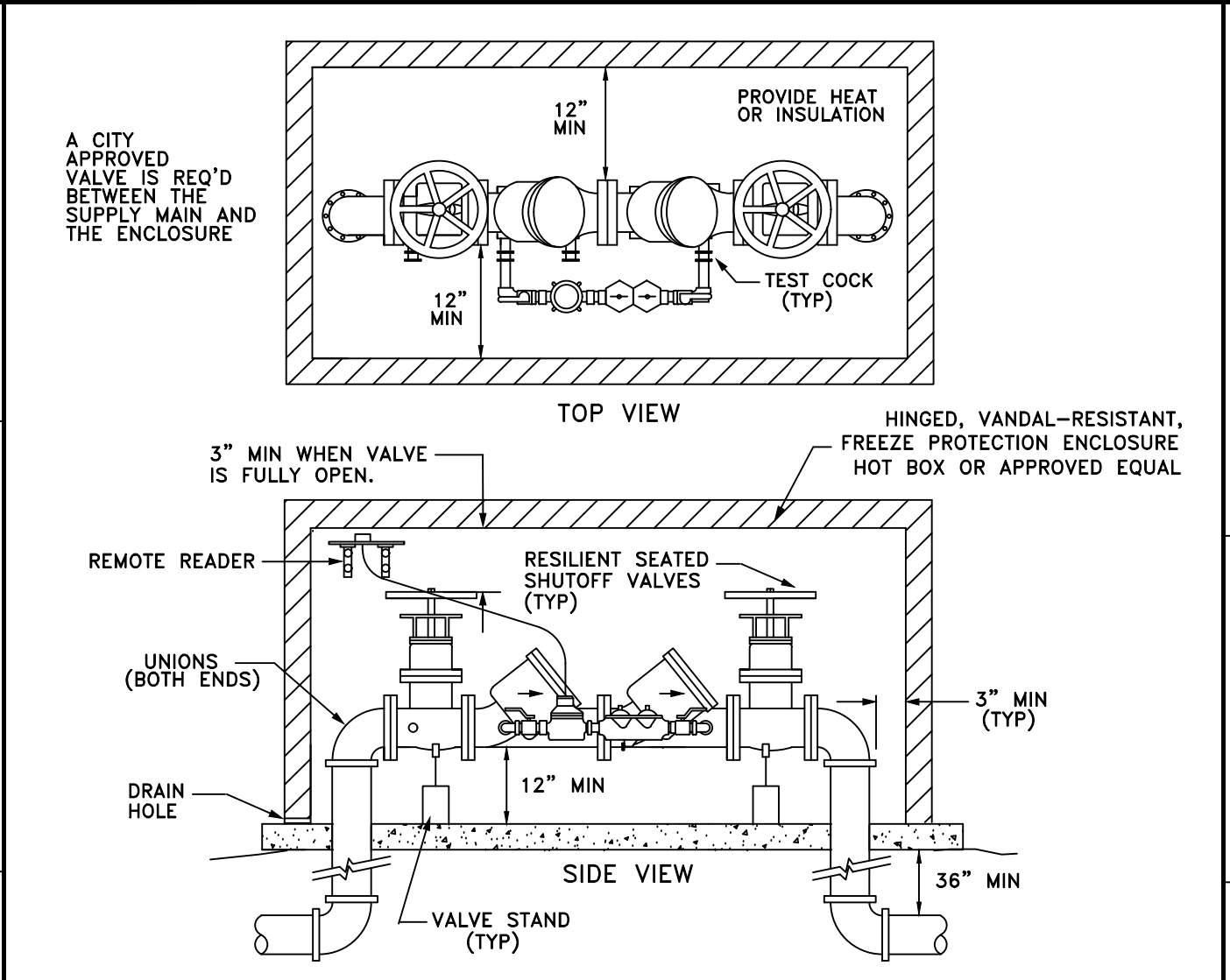
City of Napavine
COMPOUND WATER METER WITH BYPASS FOR 3"-8" WATER SERVICE
 APPROVED BY: [Signature] DWG. NO. 4-4
 CITY ENGINEER 1/02/2003



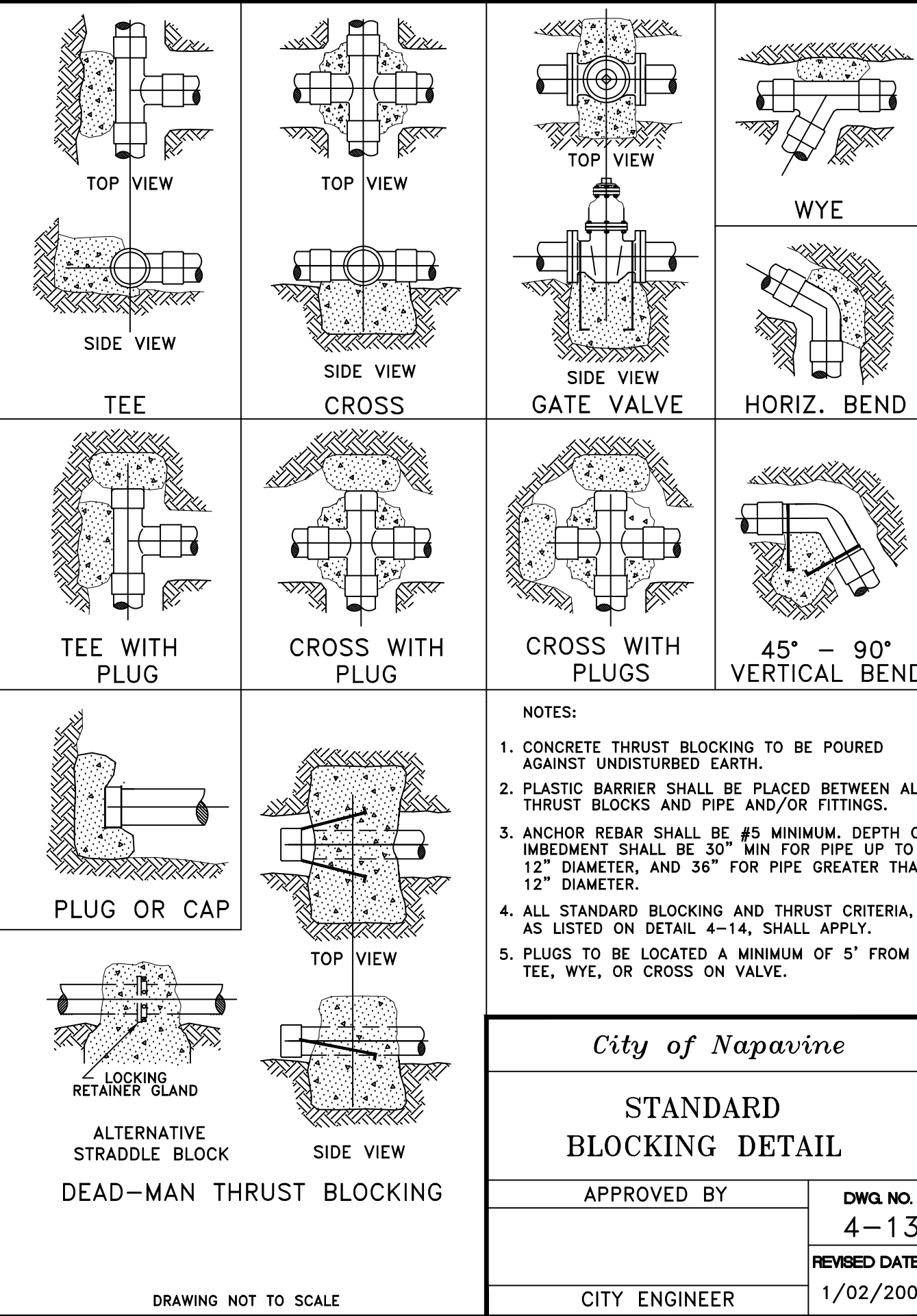
City of Napavine
LARGE METER VAULT
 APPROVED BY: [Signature] DWG. NO. 4-5
 CITY ENGINEER 3/16/2005



City of Napavine
1 1/2"-2" DOUBLE CHECK BACKFLOW PREVENTER
 APPROVED BY: [Signature] DWG. NO. 4-18
 CITY ENGINEER 1/02/2003



City of Napavine
STANDARD DOUBLE CHECK DETECTOR ASSEMBLY 3" OR LARGER
 APPROVED BY: [Signature] DWG. NO. 4-15
 CITY ENGINEER 1/02/2003



City of Napavine
STANDARD BLOCKING DETAIL
 APPROVED BY: [Signature] DWG. NO. 4-13
 CITY ENGINEER 1/02/2003

THRUST LOADS
 THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:
 1. BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTINGS & PIPE SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.
 2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
 EXAMPLE: 12" - 90° BEND IN SAND AND GRAVEL
 32,000 LBS ÷ 3000 LB/S.F. = 10.7 S.F. OF AREA
 3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.
 4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS
 FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

City of Napavine
THRUST LOADS
 APPROVED BY: [Signature] DWG. NO. 4-14
 CITY ENGINEER 1/02/2003

DESIGNED BY: [Signature] DWG. NO. 4-14.23
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
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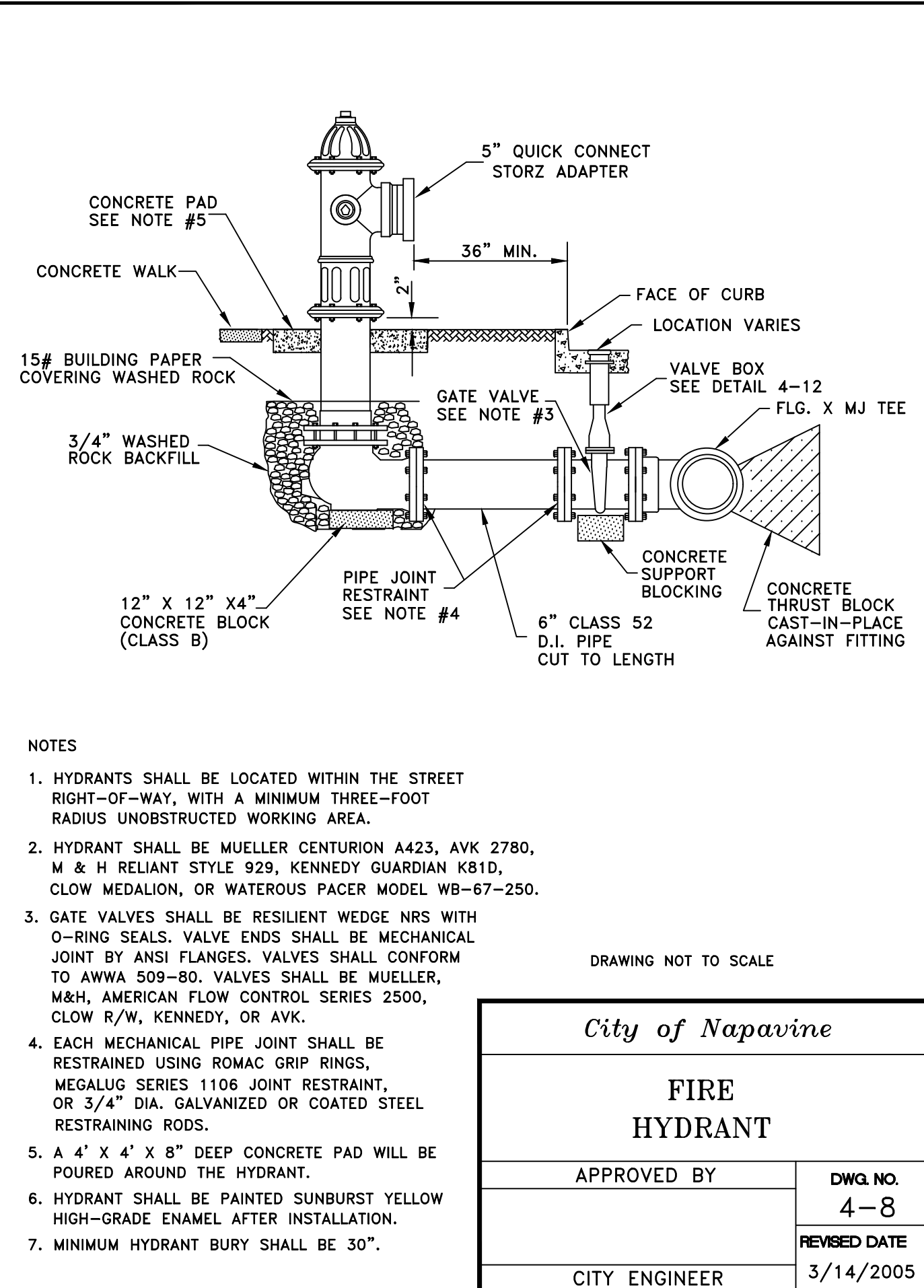
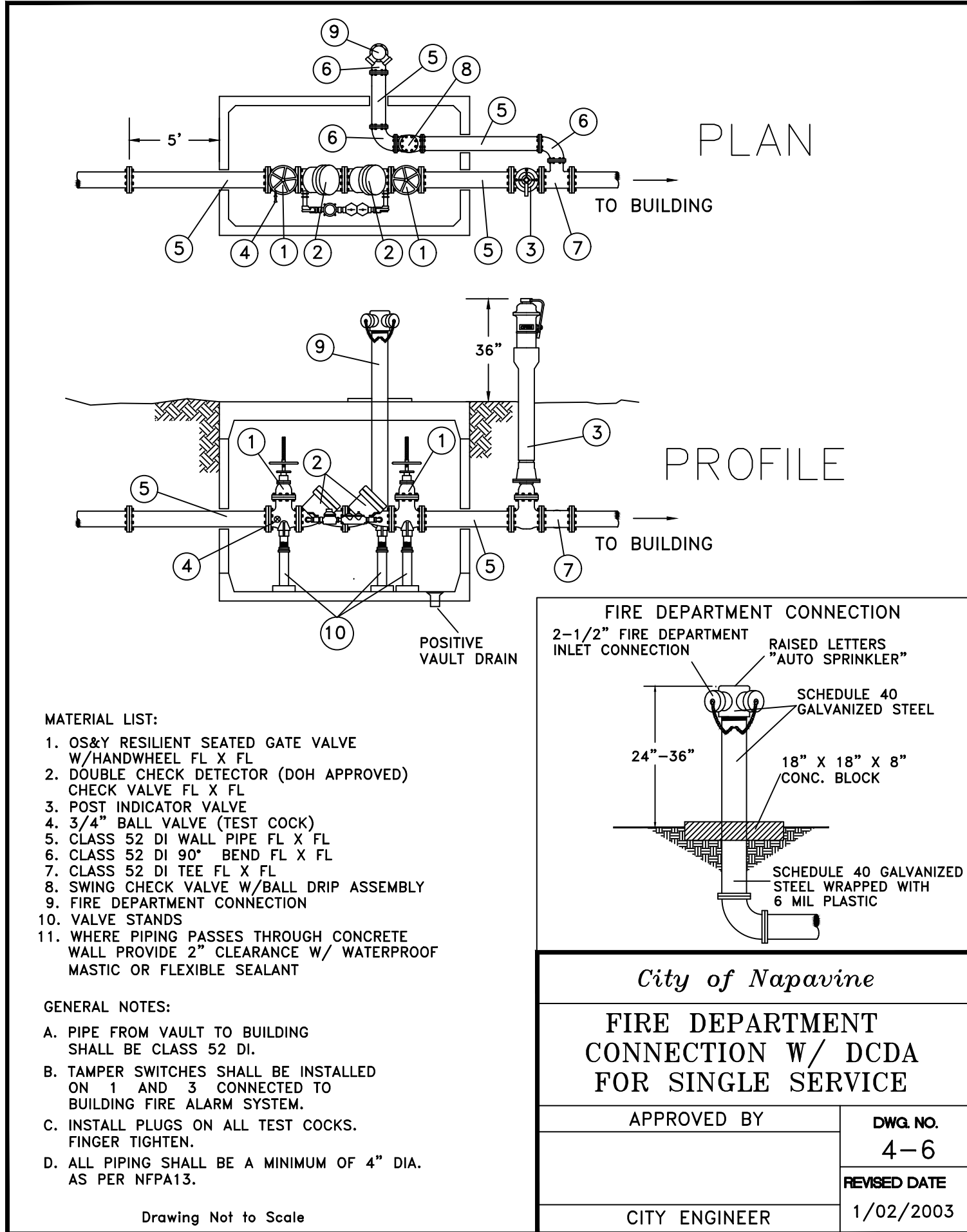
REVISION

NO.	DATE	DESCRIPTION

RB Engineering
 DESIGN → PERMIT → MANAGE
 OFF: (360) 740-8819
 EMAIL: CWR@rbengineering.com
 P.O. Box 923
 CHEHALIS, WA 98532

811 Know what's below. Call 811 before you dig.

JOB NUMBER: 23007
 DRAWING NAME: 23007_WSDT
C4.2
 19 OF 31



GENERAL NOTES (WATERMAIN INSTALLATION)

- ALL WORKMANSHIP AND MATERIAL WILL BE IN ACCORDANCE WITH CITY OF NAPAVALINE STANDARDS AND THE MOST RECENT COPY OF THE WSDOT/APWA STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARDS AND ANSIS/NSF STANDARD 60 OR 61.
 - A PRE-CONSTRUCTION MEETING WILL BE HELD WITH THE PUBLIC WORKS DEPARTMENT PRIOR TO THE START OF CONSTRUCTION.
 - ALL WATERMANS WILL BE DUCTILE IRON CEMENT MORTAR LINED THICKNESS CLASS 52.
 - GATE VALVES WILL BE RESILIENT WEDGE, NRS (NON-RISING STEM) WITH O-RINGS SEALS. VALVE ENDS WILL BE MECHANICAL JOINT OR ANSI FLANGES. VALVES WILL CONFORM TO AWWA 509-80. VALVES WILL BE MUELLER, M & H, KENNEDY, CLOW R/W OR WATEROUS SERIES 500. EXISTING VALVES AND ALL VALVES INSTALLED DIRECTLY TO AND CONNECTED TO A PORTION OF THE ACTIVE WATER SYSTEM ARE TO BE OPERATED BY CITY EMPLOYEES ONLY.
 - FIRE HYDRANTS WILL BE MUELLER CENTURION A-423, M & H RELIANT STYLE 129, CLOW MEDALLION, OR KENNEDY GUARDIAN K81D. HYDRANTS WILL BE INSTALLED IN ACCORDANCE WITH THE MOST RECENT VERSION OF THE UNIFORM FIRE CODE. HYDRANTS WILL BE BAGGED AND THE CONNECTING GATE VALVES LEFT CLOSED UNTIL THE SYSTEM HAS BEEN APPROVED. HYDRANTS MUST BE PAINTED WITH SUNBURST YELLOW HIGH-GRADE ENAMEL AFTER INSTALLATION.
 - ALL LINES WILL BE CHLORINATED AND TESTED IN CONFORMANCE WITH THE ABOVE REFERENCED SPECIFICATIONS. (SEE NOTE 1)
 - ALL PIPES AND SERVICES WILL BE INSTALLED WITH CONTINUOUS TRACER TAPE PLACED TWELVE (12) TO EIGHTEEN (18) INCHES UNDER THE PROPOSED FINISHED SUBGRADE. THE MARKER WILL BE OF PLASTIC NON-BIODEGRADABLE, METAL CORE, OR BACKING MARKED "WATER" THAT CAN BE DETECTED BY A STANDARD METAL DETECTOR. TAPE WILL BE TERRA TAPE "DT" OR APPROVED EQUAL. IN ADDITION TO TRACER TAPE, TONING WIRE WILL BE INSTALLED OVER ALL PIPE AND SERVICES. TONING WIRE WILL BE UL LISTED, TYPE UF, FOURTEEN (14) GAUGE SOLID COATED COPPER WIRE, TAPED TO THE TOP OF THE PIPE TO PREVENT MOVEMENT DURING BACKFILLING AND LAID LOOSE ENOUGH TO PREVENT STRETCHING AND DAMAGE BEFORE BEING BROUGHT UP AND TIED OFF AT THE VALVE OPERATING NUT OR VALVE BOX. IF THE OPERATING NUT IS NOT EASILY ACCESSIBLE FROM THE GROUND SURFACE, THE COPPER WIRE WILL BE TIED OFF AT THE VALVE BOX IN SUCH A WAY THAT THE WIRE IS EASILY ACCESSIBLE FROM THE GROUND SURFACE. TWO (2) FEET OF SLACK WILL BE PROVIDED TO ALLOW FOR CONNECTION TO THE LOCATOR.
- A 1-LB MAGNESIUM ANODE WILL BE BURIED WITH THE PIPE EVERY 1,000 LINEAR FEET MAXIMUM FOR CATHODIC PROTECTION OF THE TONING WIRE. TONING WIRE SPLICES AND CONNECTIONS TO ANODES WILL JOIN WIRES BOTH MECHANICALLY AND ELECTRICALLY AND WILL EMPLOY EPOXY RESIN OR HEAT-SHRINK TAPE INSULATION. TONING WIRE WILL BE TESTED PRIOR TO ACCEPTANCE OF THE PIPE SYSTEM. A WRITTEN NOTICE FROM THE CONTRACTOR TO THE CITY MUST BE RECEIVED TWO (2) BUSINESS DAYS PRIOR TO WHEN TESTING IS REQUIRED.
- THE CONTRACTOR WILL PROVIDE TRAFFIC CONTROL PLAN(S) AS REQUIRED IN ACCORDANCE WITH MUTCD.
 - ALL WATERMANS WILL BE STAKED FOR GRADES AND ALIGNMENT BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK. STAKING WILL BE MAINTAINED THROUGHOUT CONSTRUCTION.
 - ALL SERVICE LINE AND WATER VALVE LOCATIONS WILL BE MARKED ON THE FACE OF THE ADJACENT CURB WITH A "W" OR "WW" EMBOSSED 1/4-INCH INTO THE CONCRETE.
 - ALL WATER SYSTEM CONNECTIONS SERVING BUILDINGS OR PROPERTIES WITH DOMESTIC POTABLE WATER, FIRE SPRINKLER OR IRRIGATIONS SYSTEMS WILL COMPLY WITH THE MINIMUM BACKFLOW PREVENTION REQUIREMENTS ESTABLISHED BY THE DEPARTMENT OF HEALTH (DOH).
 - CALL UTILITIES UNDERGROUND LOCATION CENTER AT 811 A MINIMUM OF TWO (2) BUSINESS DAYS PRIOR TO ANY EXCAVATIONS.
 - THE CITY WILL BE NOTIFIED FIVE (5) BUSINESS DAYS PRIOR TO SCHEDULING A WATER SYSTEM SHUTDOWN. THE CITY'S WATER DIVISION WILL PERFORM ALL WATER SYSTEM SHUTDOWNS. WHEN CONNECTIONS REQUIRE "FIELD VERIFICATION," CONNECTION POINTS WILL BE EXPOSED BY THE CONTRACTOR AND FITTINGS VERIFIED BY THE CITY TWO (2) BUSINESS DAYS PRIOR TO THE DISTRIBUTION OF SHUTDOWN NOTICES. CUSTOMERS INVOLVED WITH OR AFFECTED BY WATER SERVICE INTERRUPTIONS WILL BE NOTIFIED AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. SHUTDOWNS WILL NOT BE PERMITTED ON FRIDAYS, WEEKENDS, OR HOLIDAYS WITHOUT WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS.
 - WHEN CONNECTING TO AN EXISTING WATERLINE WHERE A NEW VALVE IS NOT TO BE INSTALLED, THE EXISTING VALVE MUST BE PRESSURE TESTED TO THESE STANDARDS BY THE CONTRACTOR PRIOR TO CONNECTION. IF AN EXISTING VALVE FAILS TO PASS THE TEST, THE CONTRACTOR WILL MAKE THE NECESSARY ADDITIONAL PROVISIONS TO TEST THE NEW LINE PRIOR TO CONNECTING TO THE EXISTING SYSTEM OR WILL INSTALL A NEW VALVE. NEW LINES WILL NOT BE CONNECTED TO THE EXISTING SYSTEM UNTIL ALL REQUIRED TESTS HAVE BEEN PASSED.

NO.	DATE	REVISION
DESIGNED BY: RWB	DRAWN BY: ZRW	CHECKED BY: RWB
DATE: 4.14.23	SCALE:	

NAPAVINE TRUCK STOP

WATER SERVICE DETAILS AND NOTES

ROBERT W. BAUER
REGISTERED PROFESSIONAL ENGINEER

RB Engineering
DESIGN → PERMIT → MANAGE
P.O. Box 923
CHEHALIS, WA 98532
OFF: (360) 740-8819
EMAIL: rw@rbengineering.com

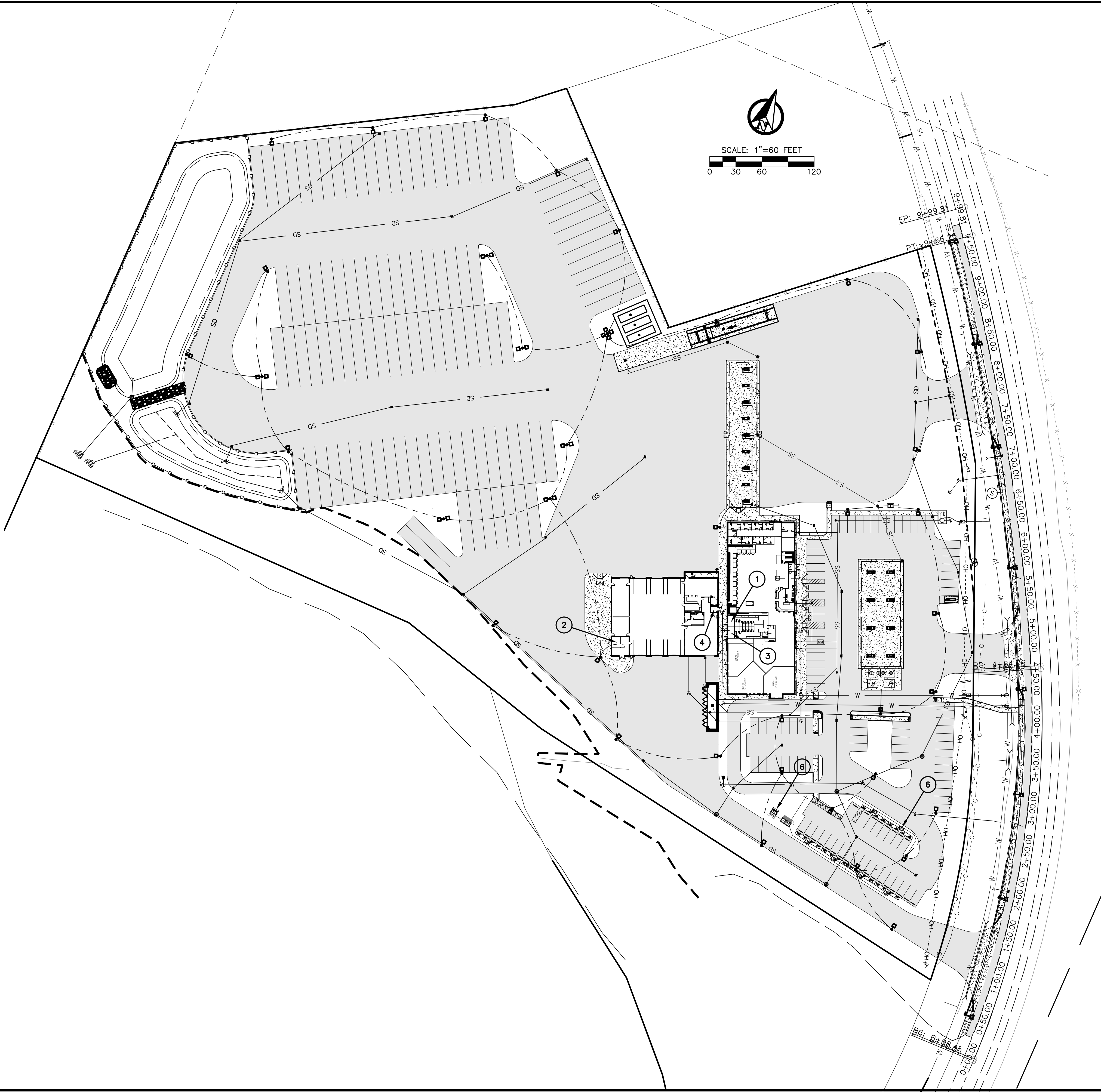
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JOB NUMBER
23007

DRAWING NAME
23007_WSDT

C4.3

20 OF 31



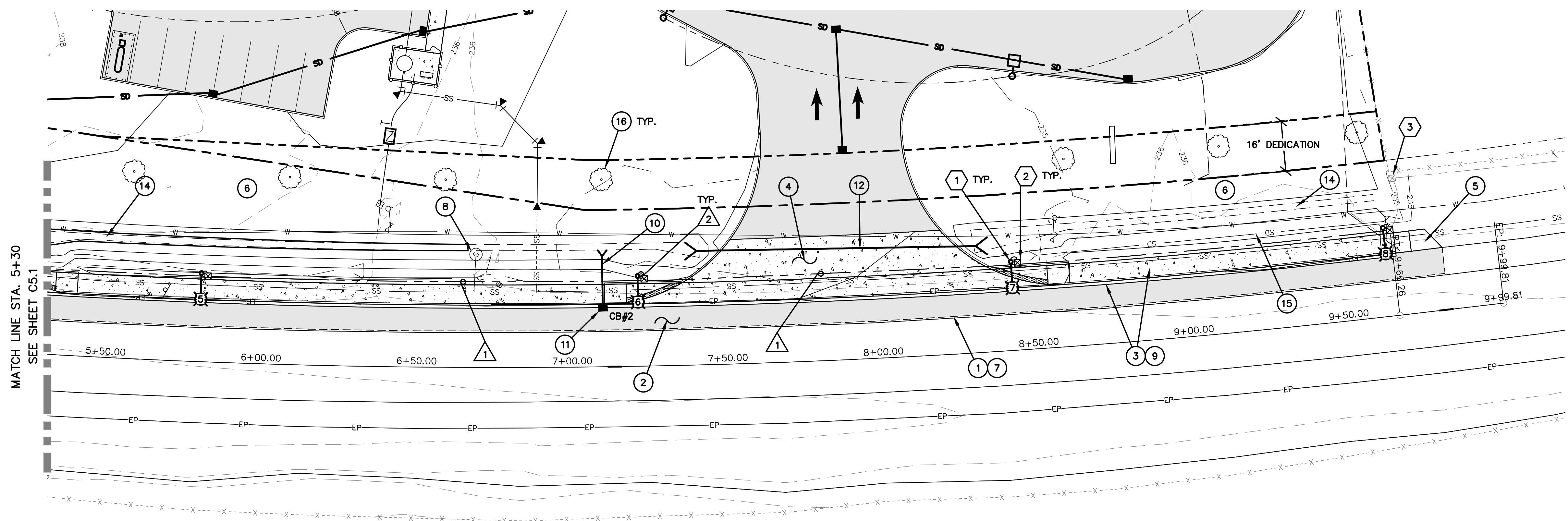
PROJECT UTILITY NOTES

- ① MAIN STORE ELECTRICAL ROOM LOCATION
- ② TRUCK MAINTENANCE ELECTRICAL ROOM LOCATION
- ③ MAIN STORE SPRINKLER RISER ROOM
- ④ TRUCK MAINTENANCE SPRINKLER RISER ROOM
- ⑤ NEW UNDERGROUND POWER SERVICE AND TRANSFORMER LOCATIONS, SEE ELECTRICAL DESIGN BY LEWIS COUNTY PUD.
- ⑥ TESLA CHARGING STATIONS AND POWER SUPPLIES, SEE TESLA PLANS BY OTHERS.

NO.	DATE	REVISION	
DESIGNED BY: <u>RWB</u>	DRAWN BY: <u>ZRW</u>	CHECKED BY: <u>RWB</u>	DATE: <u>4.14.23</u>
			SCALE: _____
NAPAVINE TRUCK STOP			WA.
OVERALL UTILITY AND DRY UTILITY PLAN			NAPAVINE
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: cm@proseengineers.com			
JOB NUMBER 23007 DRAWING NAME 23007_DUTL C4.4 21 OF 31			



SCALE: 1"=20 FEET
0 10 20 40



MATCH LINE STA. 5+30
SEE SHEET C5.1

MATCH LINE STA. 5+30
SEE SHEET C5.1

FRONTAGE CONSTRUCTION NOTES:

- 1 SAWCUT 965 LF OF EXISTING ASPHALT 0.5' OUTSIDE EXISTING FOG LINE.
- 2 VERIFY SHOULDER ROCK SECTION DEPTH, IF INSUFFICIENT, EXCAVATE OUT AND RE-CONSTRUCT NEW WIDTH OF ROAD AND PAVEMENT PER CROSS SECTION ON SHEET C5.3.
- 3 INSTALL NEW CONCRETE CURB, GUTTER, AND 6' SIDEWALK PER PLAN AND PROFILE. SEE STD. DETAIL ON SHEET C5.3.
- 4 CONSTRUCT NEW CONCRETE DRIVEWAY PER PLAN AND DETAIL ON SHEET CX.X.
- 5 CONSTRUCT TEMPORARY ASPHALT ADA RAMP OFF END OF NEW CONCRETE SIDEWALK. GRADE NOT TO EXCEED 12:1 SLOPE. TRANSITION TO EXISTING ASPHALT GRADE.
- 6 GRADE LANDSCAPE AREA IN RIGHT OF WAY PER GRADES SHOWN. SLOPE TOWARD BACK OF SIDEWALK. HYDROSEED ALL EXPOSED SLOPES NOT COVERED IN LANDSCAPE PLAN.
- 7 SEAL ALL NEW ASPHALT JOINTS WITH EMULSIFIED ASPHALT.
- 8 ADJUST ALL UTILITY STRUCTURES RIM ELEVATIONS TO MATCH NEW FINISH GRADE. ALL UTILITY COVERS TO BE FLUSH WITH NEW PAVEMENT SURFACE. REPLACE SOLID COVER LID IF DAMAGED.
- 9 CONTRACTOR SHALL CALL REVIEW AGENCY AND RB ENGINEERING AT (360) 740-8919 48 HOURS PRIOR TO POURING CONCRETE CURB AND GUTTER FOR GRADE INSPECTION OF CONCRETE CURB. FAILURE TO CALL FOR INSPECTION MAY RESULT IN CONTRACTOR REMOVING AND RE-CONSTRUCTING CONCRETE CURB AND OR SIDEWALK.

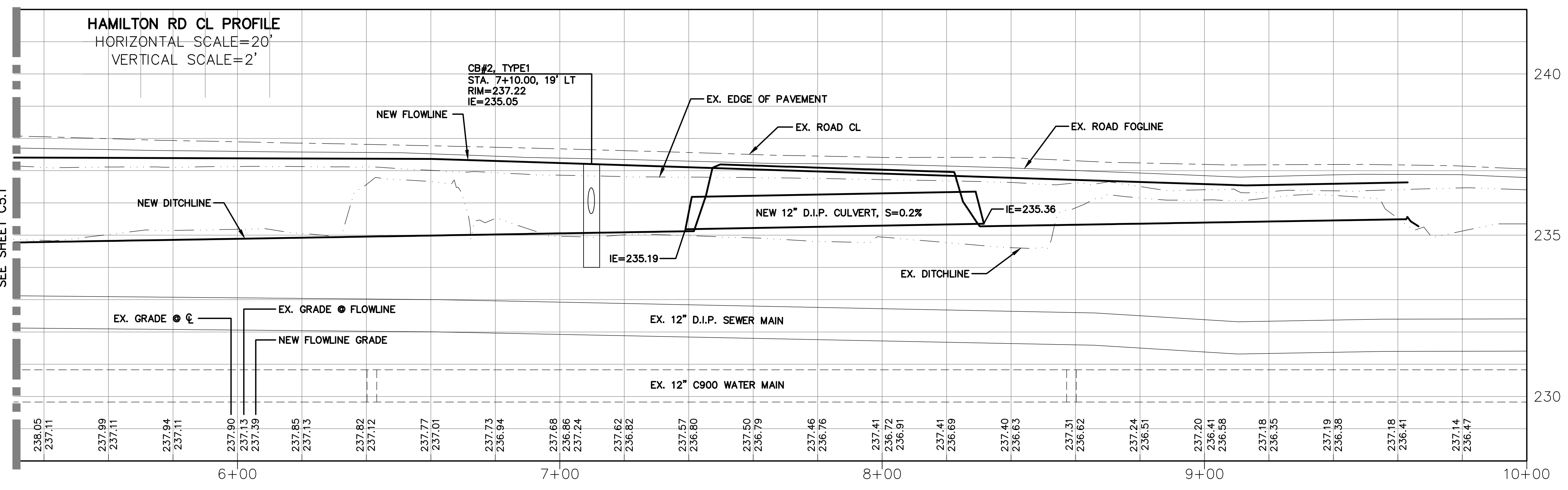
DRAINAGE CONSTRUCTION NOTES:

- 10 INSTALL NEW 8" STORM PIPE PER PLAN AND REVIEW AGENCY STANDARDS. BACKFILL PIPE PER STD. DETAIL ON SHEET C2.2. PIPE SHALL BE ADS N12 OR EQUAL.
- 11 INSTALL NEW TYPE 1 CATCH BASINS PER PLAN AND STD. DETAIL ON SHEET C2.8.
- 12 INSTALL NEW ACCESS CULVERTS PER PLAN AND PROFILE.
- 13 RELOCATE EXISTING CULVERT IN LINE WITH NEW GRASS SWALE PER PLAN AND PROFILE.
- 14 FINE GRADE NEW ROADSIDE BIO-FILTRATION SWALE. HYDROSEED WITH WET GRASS SEED MIX. SCARIFY SIDE SLOPES PRIOR TO HYDROSEEDING..
- 15 REMOVE EXISTING ROAD ACCESS CULVERTS.
- 16 INSTALL STREET TREES AT 50' SPACING AND 60' OFFSET FROM STREET CENTERLINE.

LIGHTING CONSTRUCTION NOTES:

- 1 INSTALL STREET LIGHT BASE AND POLE ACCORDING TO CITY OF NAPAVINE STANDARDS. TOP OF FOUNDATION SHALL BE LEVEL WITH BACK OF SIDEWALK, ADD ADDITIONAL FOUNDATION DEPTH AS NEEDED TO MAINTAIN THE REQUIRED BURY DEPTH FOR GRADES LOWER THAN THE ROAD EDGE.
- 2 INSTALL TYPE 1 JUNCTION BOX PER WSDOT STANDARD PLAN J-11A. J BOXES SHALL BE INSTALLED ADJACENT AND FLUSH WITH THE BACK OF WALK. OFFSET = 28.00'
- 3 FIELD LOCATE EXISTING JBOX AND EXTEND CONDUIT TO NEW LIGHT AND JBOX.

HAMILTON RD CL PROFILE
HORIZONTAL SCALE=20'
VERTICAL SCALE=2'



STREET LIGHTING REQUIREMENTS

POLE TYPE, MOUNTING HEIGHTS, ARM LENGTH, POWER SOURCE, LUMINAIRE, AND BOLT PATTERNS SHALL BE AS FOLLOWS:
POLE TYPE: SEE CITY OF NAPAVINE STD DETAILS
MOUNTING HEIGHT: 20'
ARM LENGTH: 8 FT.
POWER SOURCE: 240 VAC, SINGLE PHASE, 3 WIRE
LUMINAIRE TYPES: LED 100W TYPE II DISTRIBUTION
BOLT PATTERN: 4 BOLT, 10"-13" DIAMETER BOLT CIRCLE
BASE STYLE: SEE STANDARD LIGHTING NOTES

RUSH ROAD STREETLIGHT SCHEDULE

LIGHT STD. (LSP)	CIRCUIT NO.	TYPE WATTAGE DISTRIBUTION	MOUNTING HEIGHT	STATION OFFSET,	TOP OF FOUNDATION ELEVATION	SERVICE 240 VOLTS COMMENTS
1	1	LED-100W-TYPE2	20'	STA. 0+47, 28.5' LT	236.11	8' SINGLE ARM MAST
2	1	LED-100W-TYPE2	20'	STA. 1+91, 28.5' LT	237.46	8' SINGLE ARM MAST
3	1	LED-100W-TYPE2	20'	STA. 3+14, 28.5' LT	237.96	8' SINGLE ARM MAST
4	1	LED-100W-TYPE2	20'	STA. 4+38, 28.5' LT	237.48	8' SINGLE ARM MAST
5	1	LED-100W-TYPE2	20'	STA. 5+80, 28.5' LT	238.00	8' SINGLE ARM MAST
6	1	LED-100W-TYPE2	20'	STA. 7+21, 28.5' LT	237.23	8' SINGLE ARM MAST
7	1	LED-100W-TYPE2	20'	STA. 8+43, 28.5' LT	236.84	8' SINGLE ARM MAST
8	1	LED-100W-TYPE2	20'	STA. 9+64, 28.5' LT	236.52	8' SINGLE ARM MAST

WIRE SCHEDULE

RUN NO.	CONDUIT SIZE	#8 THHN STRANDED SPR	COPPER WIRE	COMMENTS
1	1 1/2" PVC	1	2 - #8	ILLUMINATION
2	1 1/2" PVC	1	2 - #8	ILLUMINATION

NO.	DATE	REVISION

DESIGNED BY: RWB
DRAWN BY: ZRW
CHECKED BY: RWB
DATE: 4.14.23
SCALE:

NAPAVINE TRUCK STOP
NAPAVINE
WA.

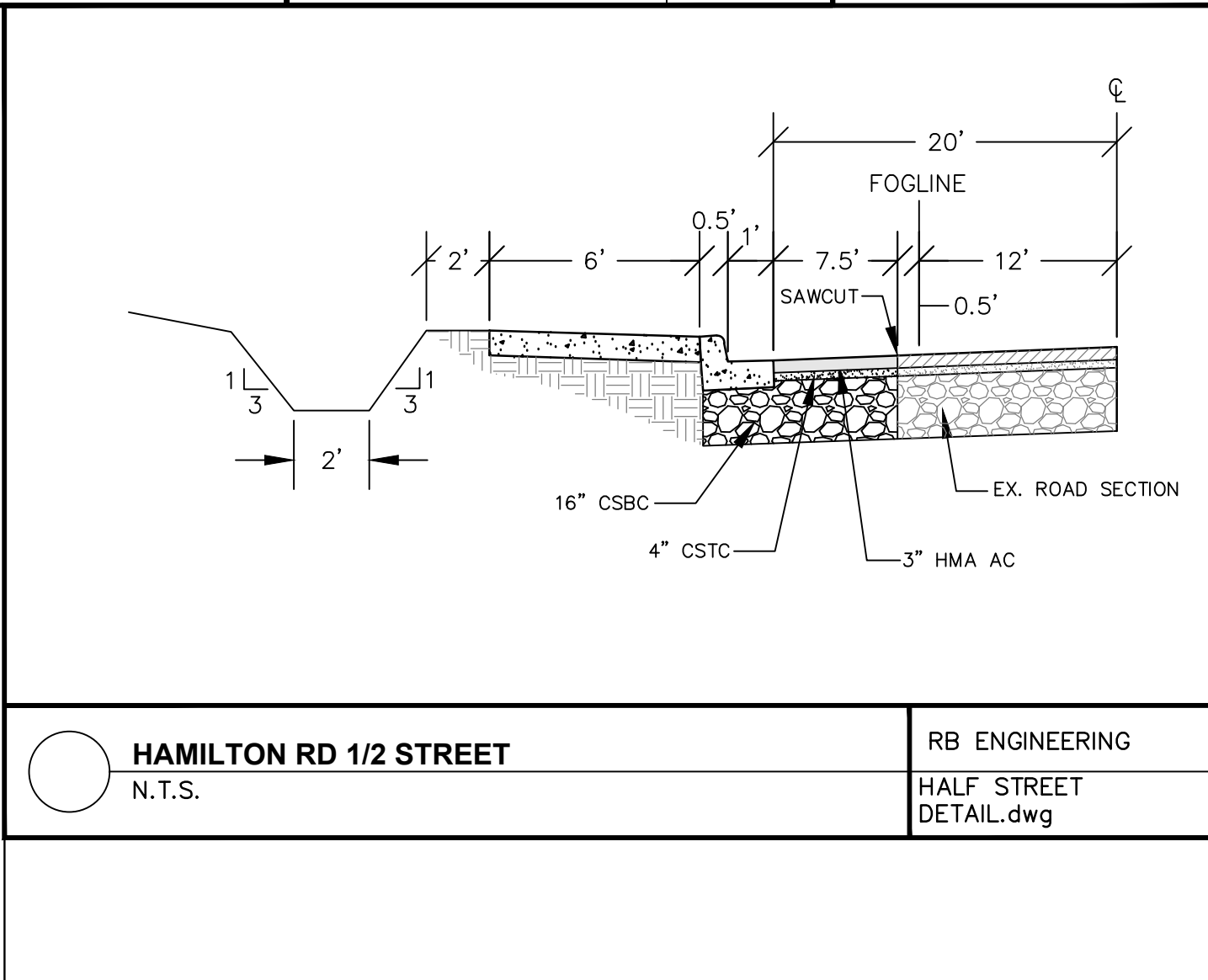
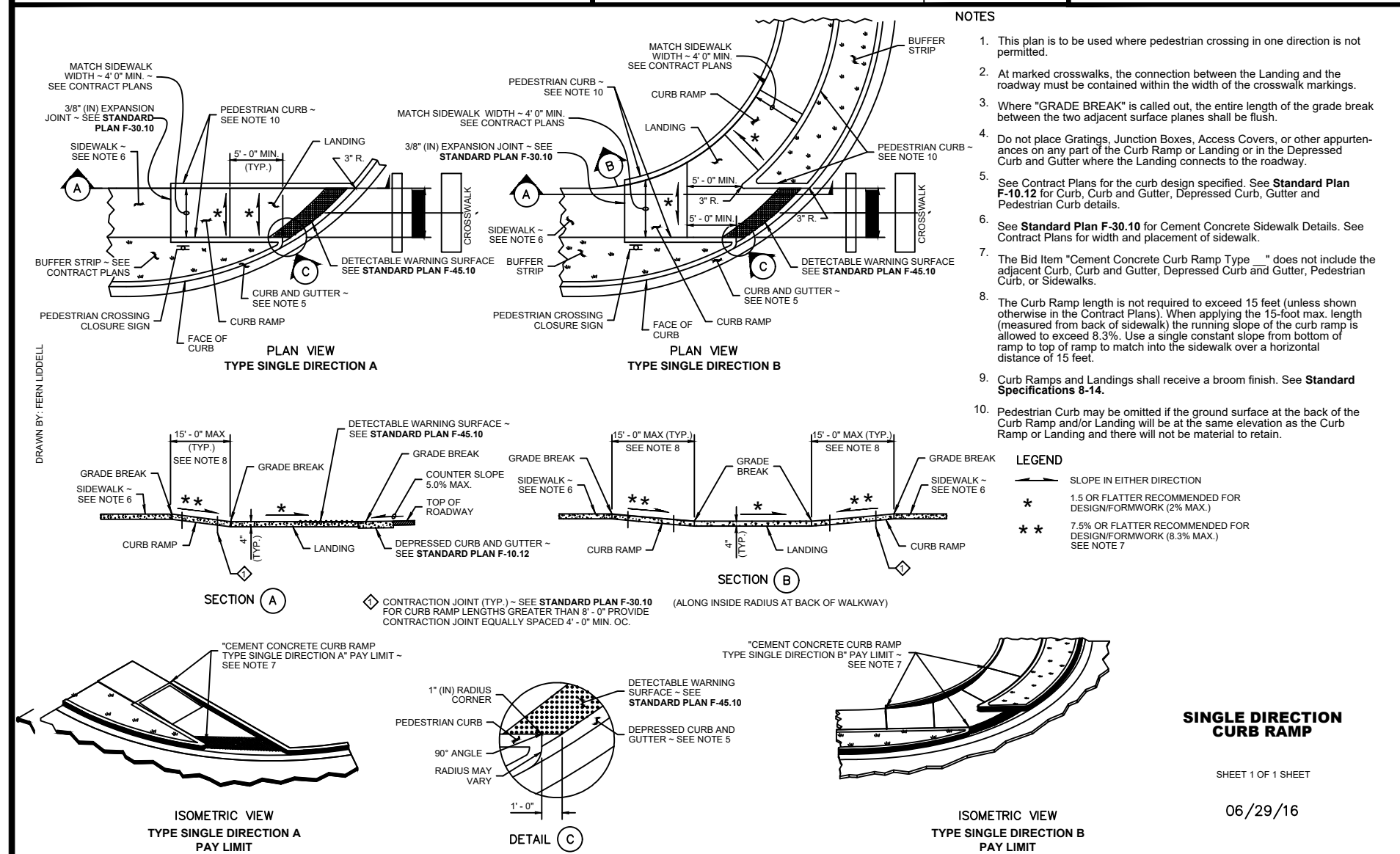
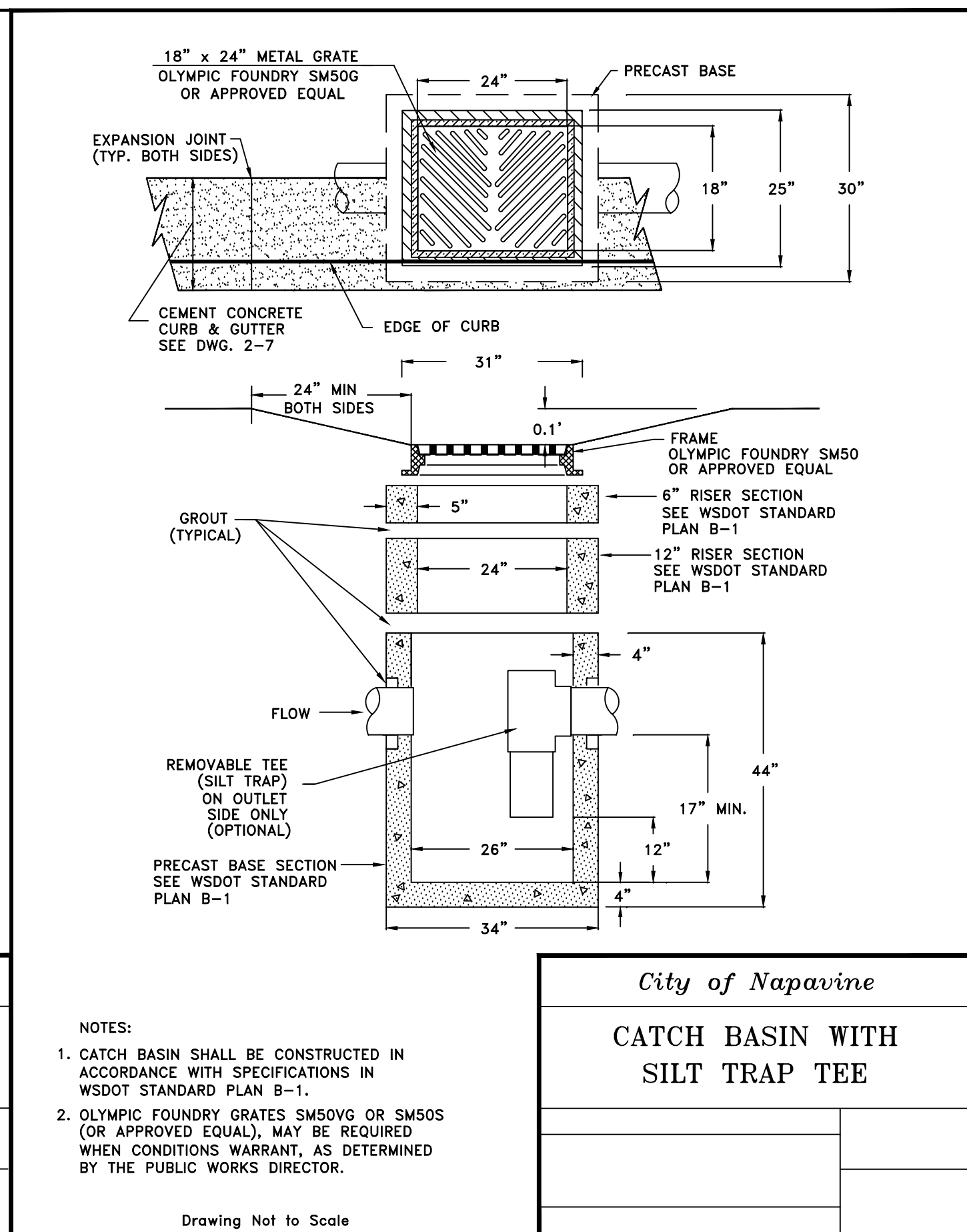
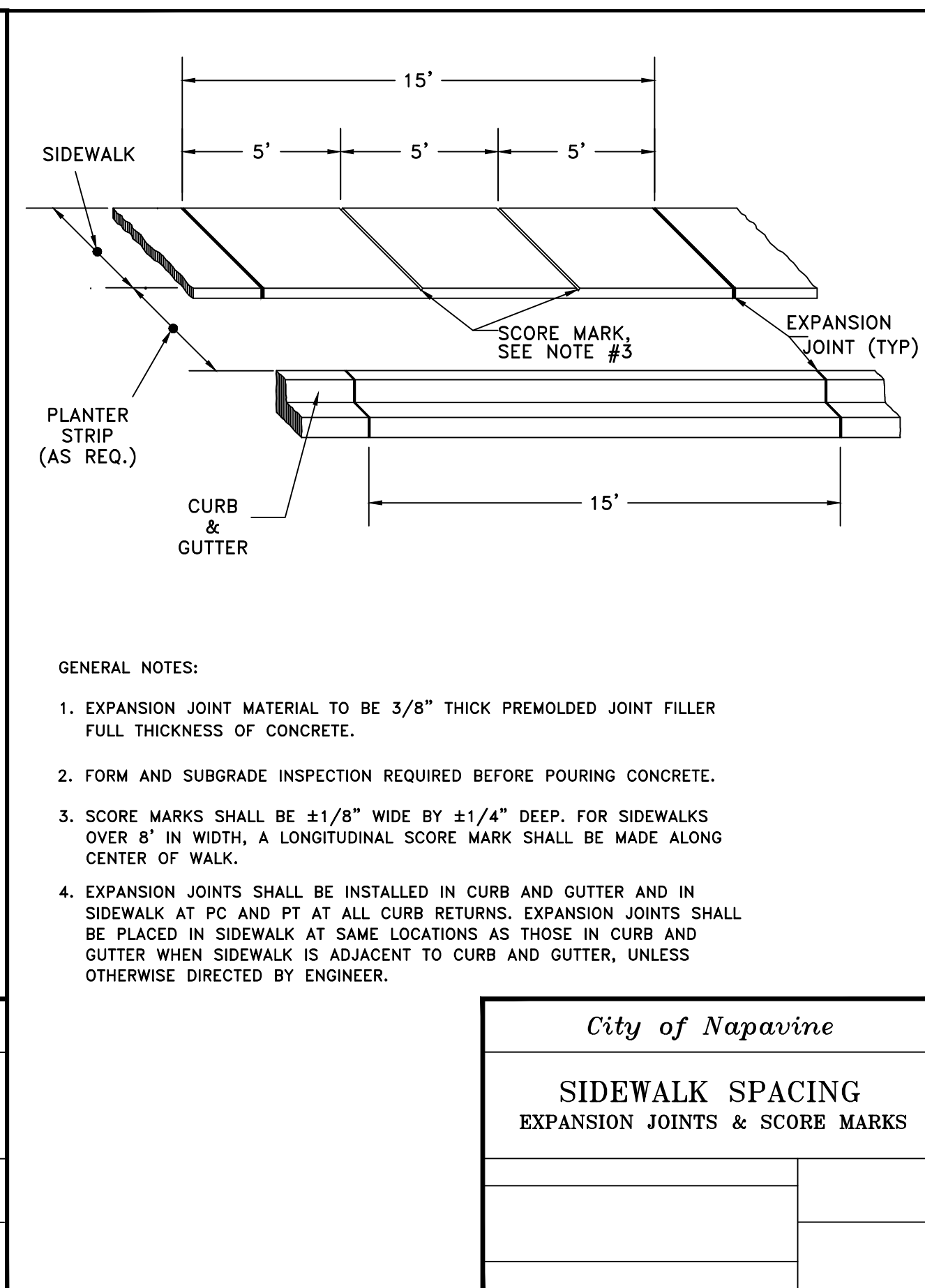
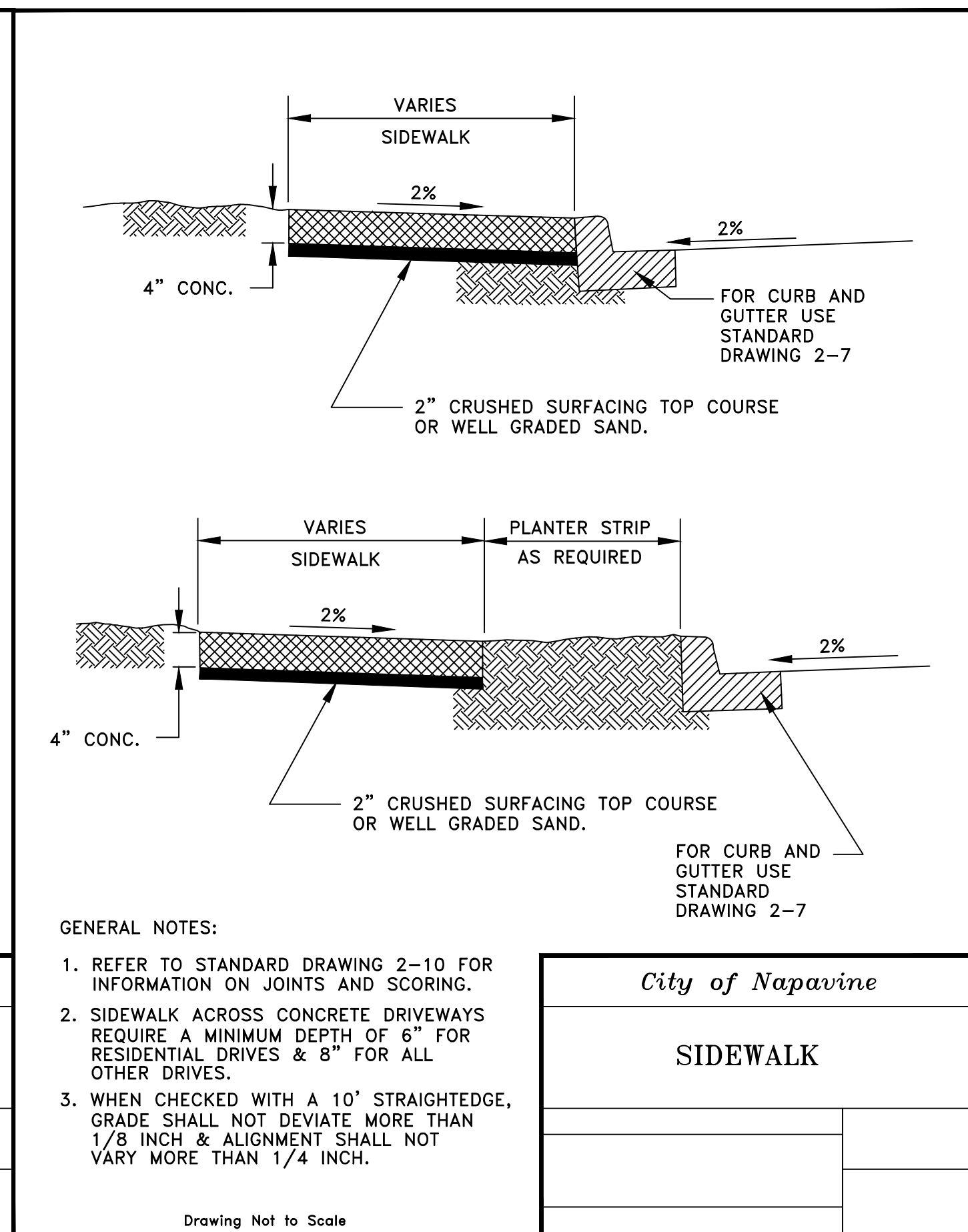
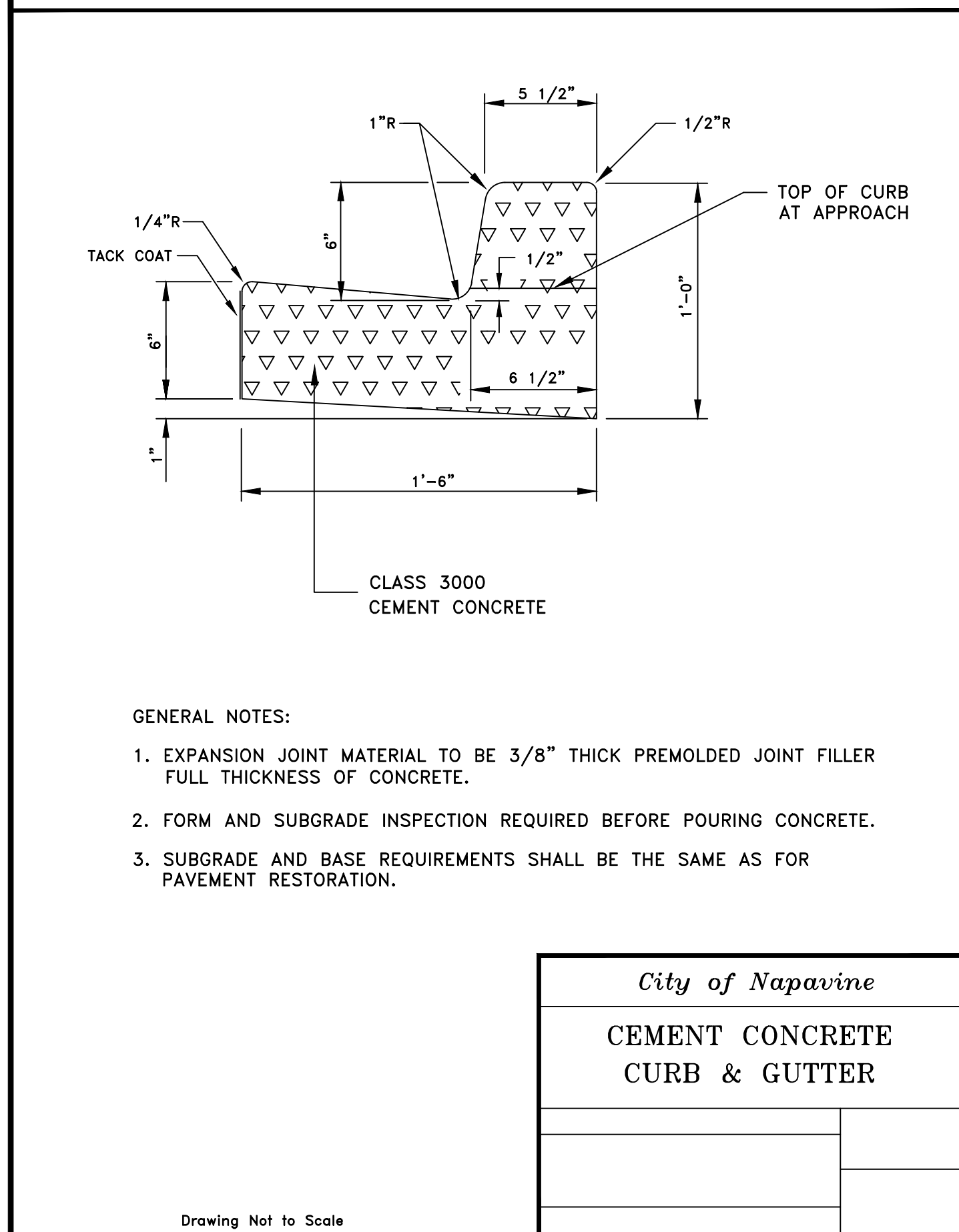
FRONTAGE IMPROVEMENT
PLAN AND PROFILE



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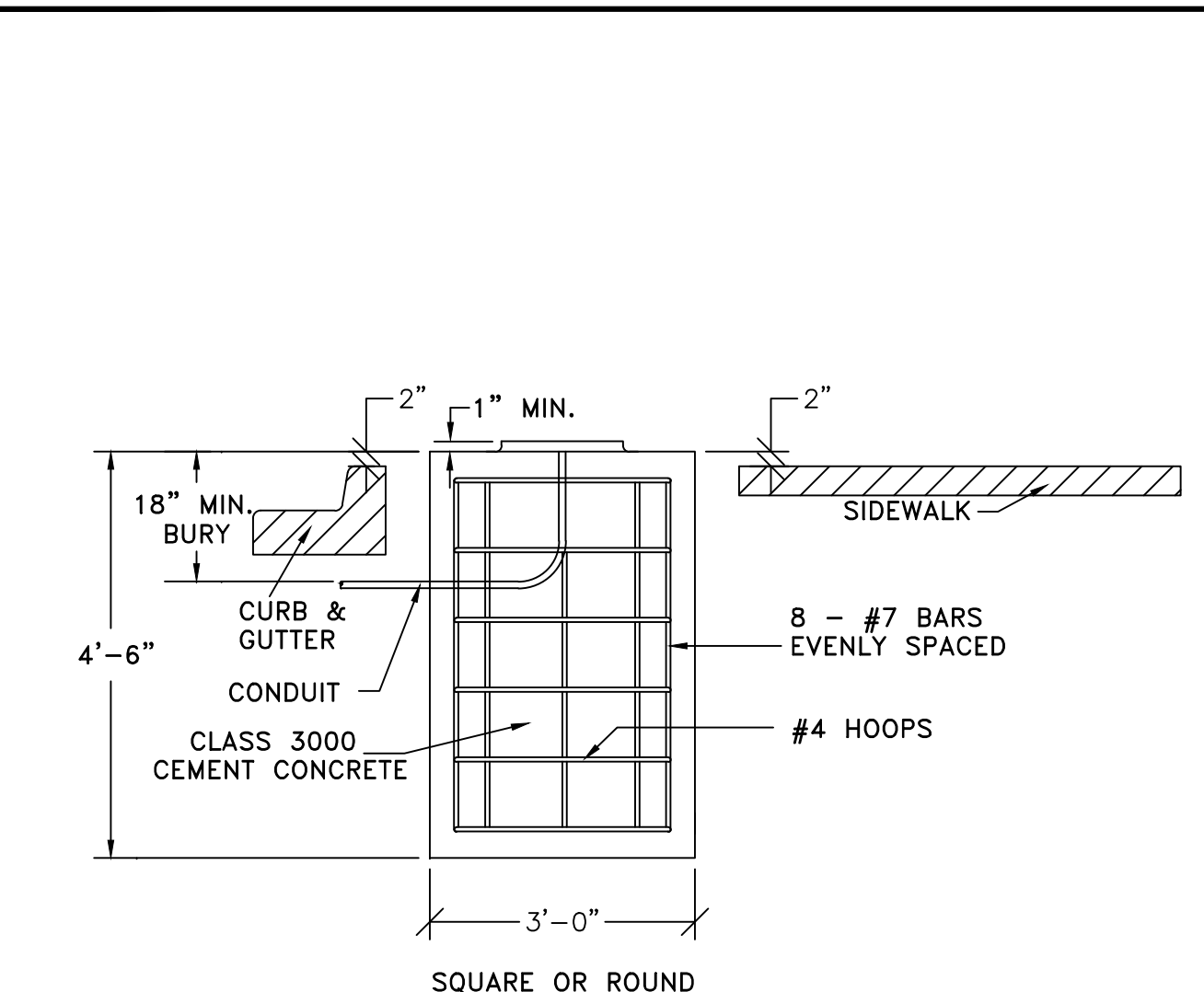
JOB NUMBER
23007
DRAWING NAME
23007_FIPP
C5.2
23 OF 31



GENERAL NOTES (STREET CONSTRUCTION)

- ALL WORKMANSHIP AND MATERIALS WILL BE IN ACCORDANCE WITH CITY OF NAPAVINE STANDARDS AND THE MOST RECENT EDITION OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL IN ACCORDANCE WITH MUTCD. PRIOR TO DISRUPTION OF ANY TRAFFIC, TRAFFIC CONTROL PLANS MUST BE PREPARED AND SUBMITTED TO THE CITY FOR APPROVAL. NO WORK WILL COMMENCE UNTIL ALL APPROVED TRAFFIC CONTROL PLANS ARE IN PLACE.
- ALL CURB AND GUTTER, STREET GRADES, SIDEWALK GRADES, AND ANY OTHER VERTICAL AND/OR HORIZONTAL ALIGNMENT, WILL BE STAKED BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK.
- WHERE NEW ASPHALT JOINS EXISTING, THE EXISTING ASPHALT WILL BE CUT TO A NEAT VERTICAL EDGE AND TACKED WITH ASPHALT EMULSION TYPE CSS-1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE NEW ASPHALT WILL BE FEATHERED BACK OVER EXISTING TO PROVIDE FOR A SEAL AT THE SAW CUT LOCATION AND THE JOINT SEALED WITH GRADE AR-4000W PAVING ASPHALT.
- COMPACTION OF SUBGRADE, ROCK AND ASPHALT WILL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- FORM AND SUBGRADE INSPECTION BY THE PUBLIC WORKS DEPARTMENT IS REQUIRED BEFORE POURING CONCRETE. TWENTY-FOUR HOURS (ONE WORK DAY) ADVANCE NOTICE IS REQUIRED FOR FORM INSPECTION.
- TESTING AND SAMPLING FREQUENCIES ARE DESCRIBED IN THESE STANDARDS.
- THE PUBLIC WORKS DEPARTMENT WILL INSTALL OR OVERSEE THE INSTALLATION OF STREET NAME AND REGULATORY SIGNS AT THE CONTRACTOR'S AND/OR THE DEVELOPER'S EXPENSE. ALL STREET NAME AND REGULATORY SIGNS WILL BE REQUESTED AND APPROVED BY THE CITY PRIOR TO THE START OF CONSTRUCTION.

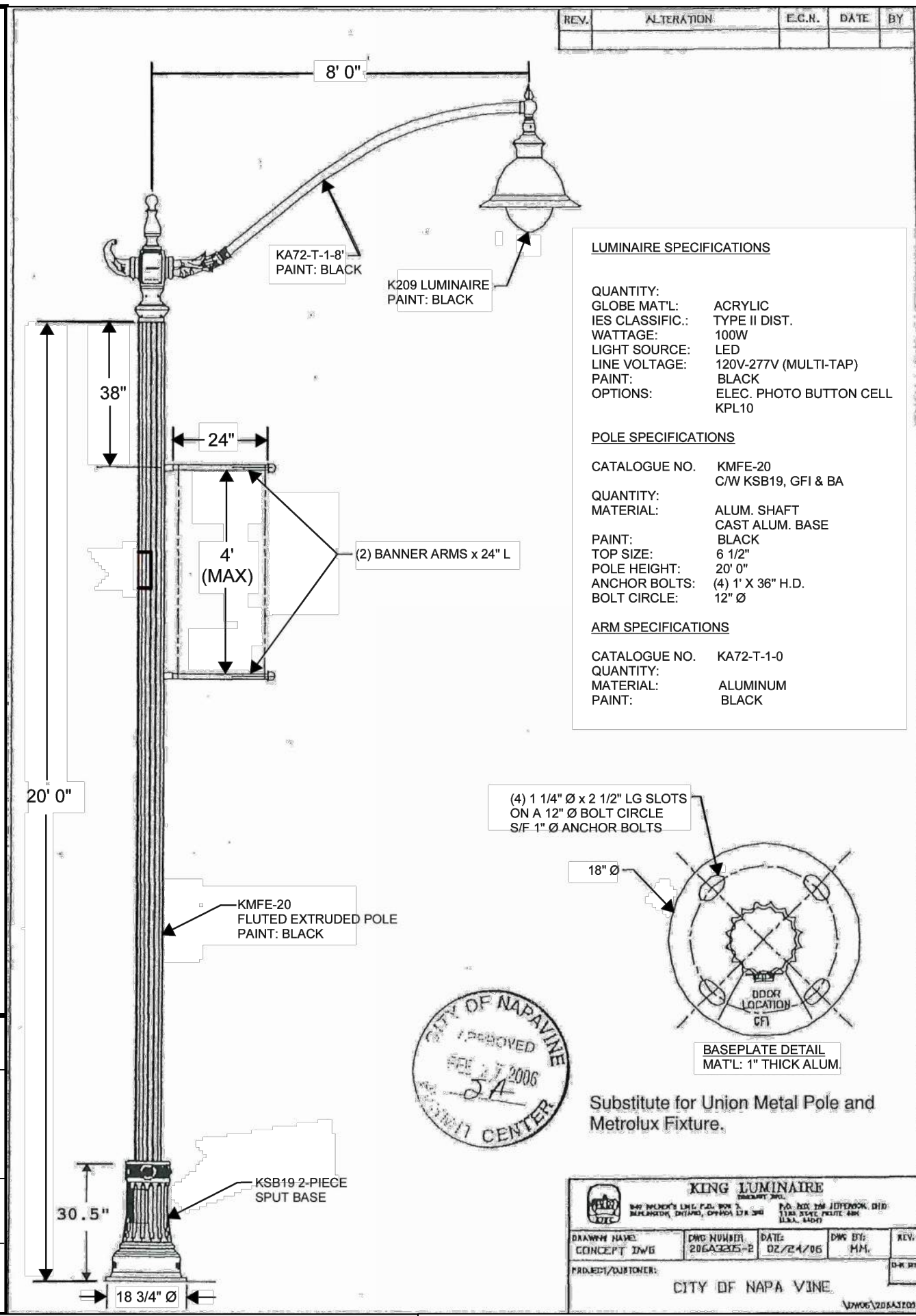
<p>City of Napavine CEMENT CONCRETE CURB & GUTTER</p>	<p>City of Napavine SIDEWALK</p>	<p>City of Napavine SIDEWALK SPACING EXPANSION JOINTS & SCORE MARKS</p>	<p>City of Napavine CATCH BASIN WITH SILT TRAP TEE</p>
<p>DESIGNED BY: <u>RBW</u> DRAWN BY: <u>ZRW</u> CHECKED BY: <u>RBW</u> DATE: <u>4.14.23</u> SCALE: _____</p>	<p>NAPAVINE TRUCK STOP</p>		
<p>FRONTAGE IMPROVEMENT DETAILS AND NOTES</p>			
<p>RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: info@rbengineers.com</p>			
<p>811 Know what's below. Call 811 before you dig.</p>			
<p>JOB NUMBER: <u>23007</u> DRAWING NAME: <u>23007_FIDT</u> C5.3 24 OF 31</p>			



- GENERAL NOTES:**
1. ALL REINFORCING STEEL SHALL HAVE 2-1/2" CLEAR COVER OF CONCRETE.
 2. PROVIDE WATER TIGHT GROUT JOINT BETWEEN BASE OF POLE AND CONCRETE.
 3. PROVIDE 3/8" EXPANSION JOINT WHEN PLACED IN A SIDEWALK AREA.
 4. ANCHOR BOLTS & BOLT CIRCLE TO MEET MANUFACTURER SPECIFICATIONS. SET BOLT HEIGHT TO PERMIT DOUBLE LOCKNUT FOR ADJUSTMENT.

City of Napavine
LUMINAIRE FOUNDATION

DRAWING NOT TO SCALE



LUMINAIRE SPECIFICATIONS

QUANTITY: 1
GLOBE MAT'L: ACRYLIC
IES CLASSIFIC: TYPE II DIST.
WATTAGE: 100W
LIGHT SOURCE: LED
LINE VOLTAGE: 120V-277V (MULTI-TAP)
PAINT: BLACK
OPTIONS: ELEC. PHOTO BUTTON CELL KFL10

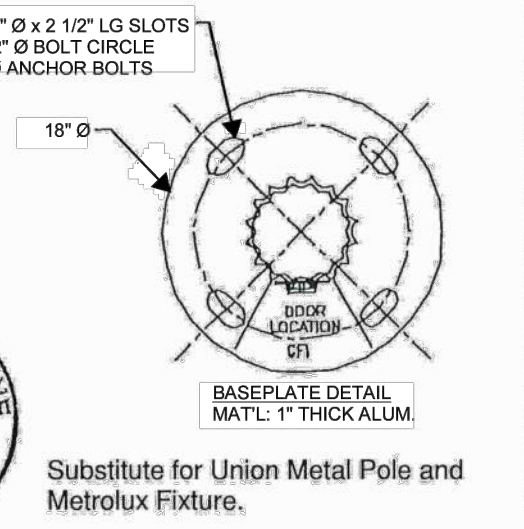
POLE SPECIFICATIONS

CATALOGUE NO. KMFE-20
C/W KSB19, GF1 & BA

QUANTITY: 1
MATERIAL: ALUM. SHAFT
CAST ALUM. BASE
PAINT: BLACK
TOP SIZE: 8 1/2"
POLE HEIGHT: 20' 0"
ANCHOR BOLTS: (4) 1" X 38" H.D.
BOLT CIRCLE: 12" Ø

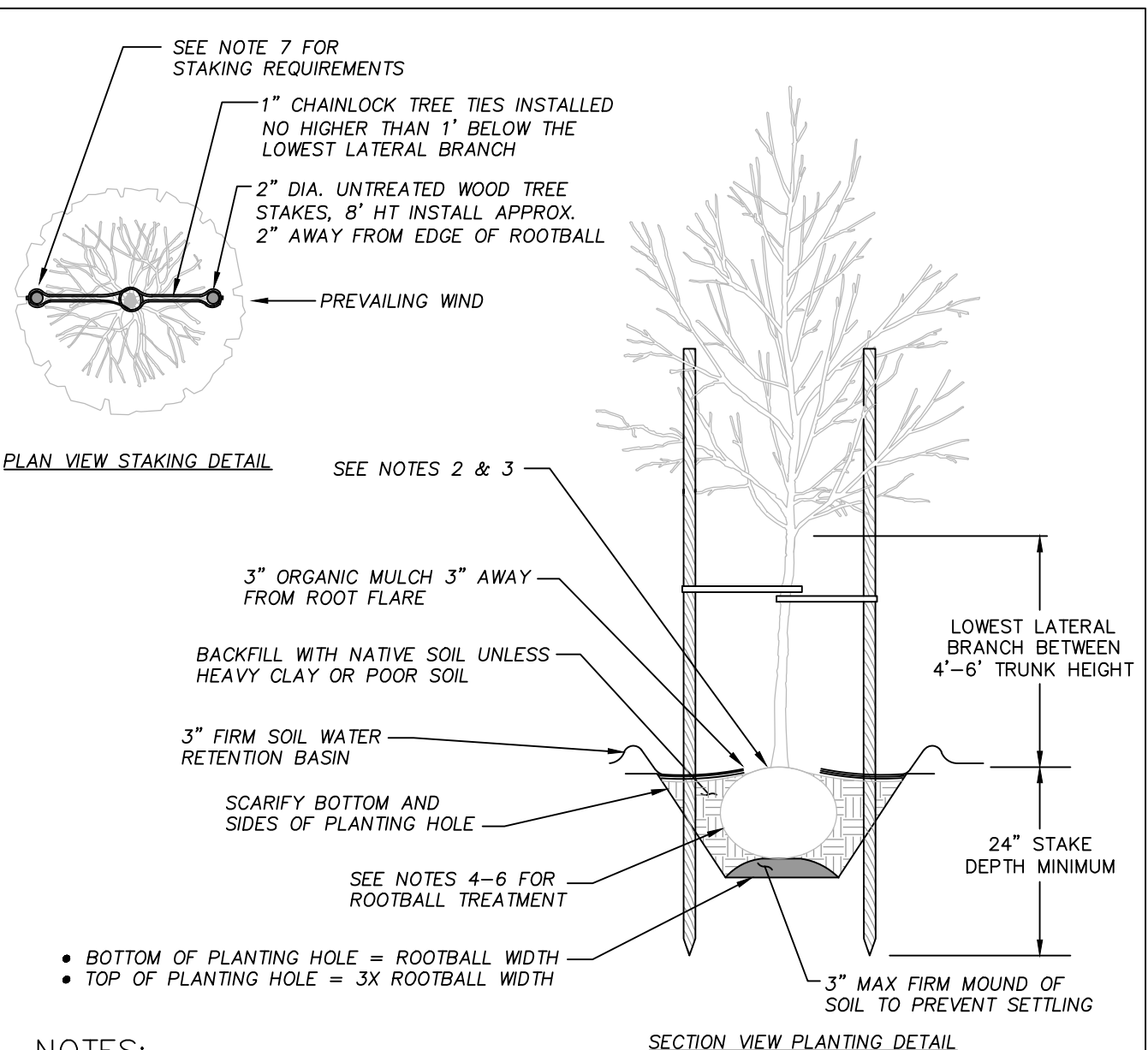
ARM SPECIFICATIONS

CATALOGUE NO. KA72-T-1-0
QUANTITY: 1
MATERIAL: ALUMINUM
PAINT: BLACK



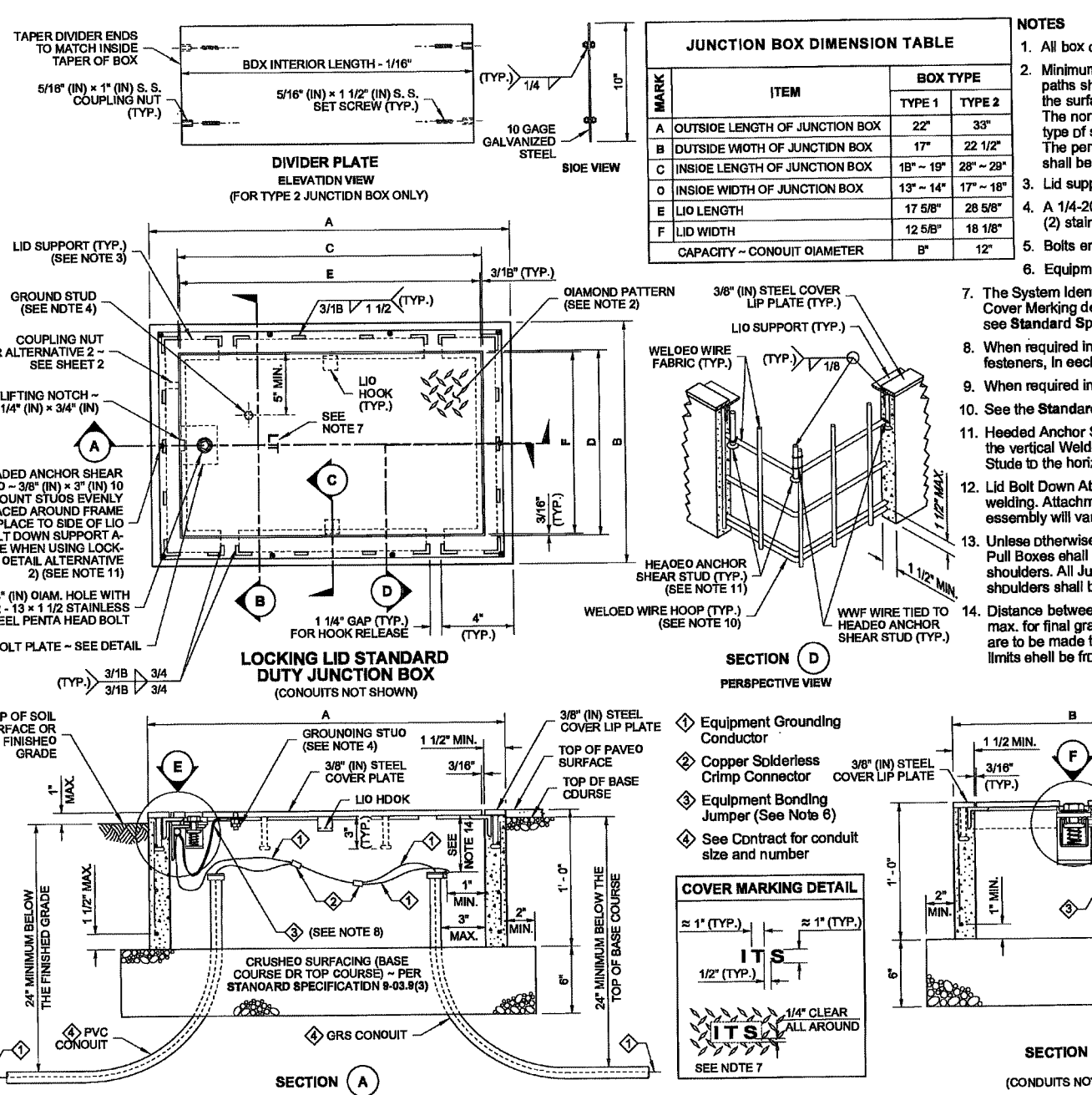
Substitute for Union Metal Pole and Metrolux Fixture.

KING LUMINAIRE
MANUFACTURER



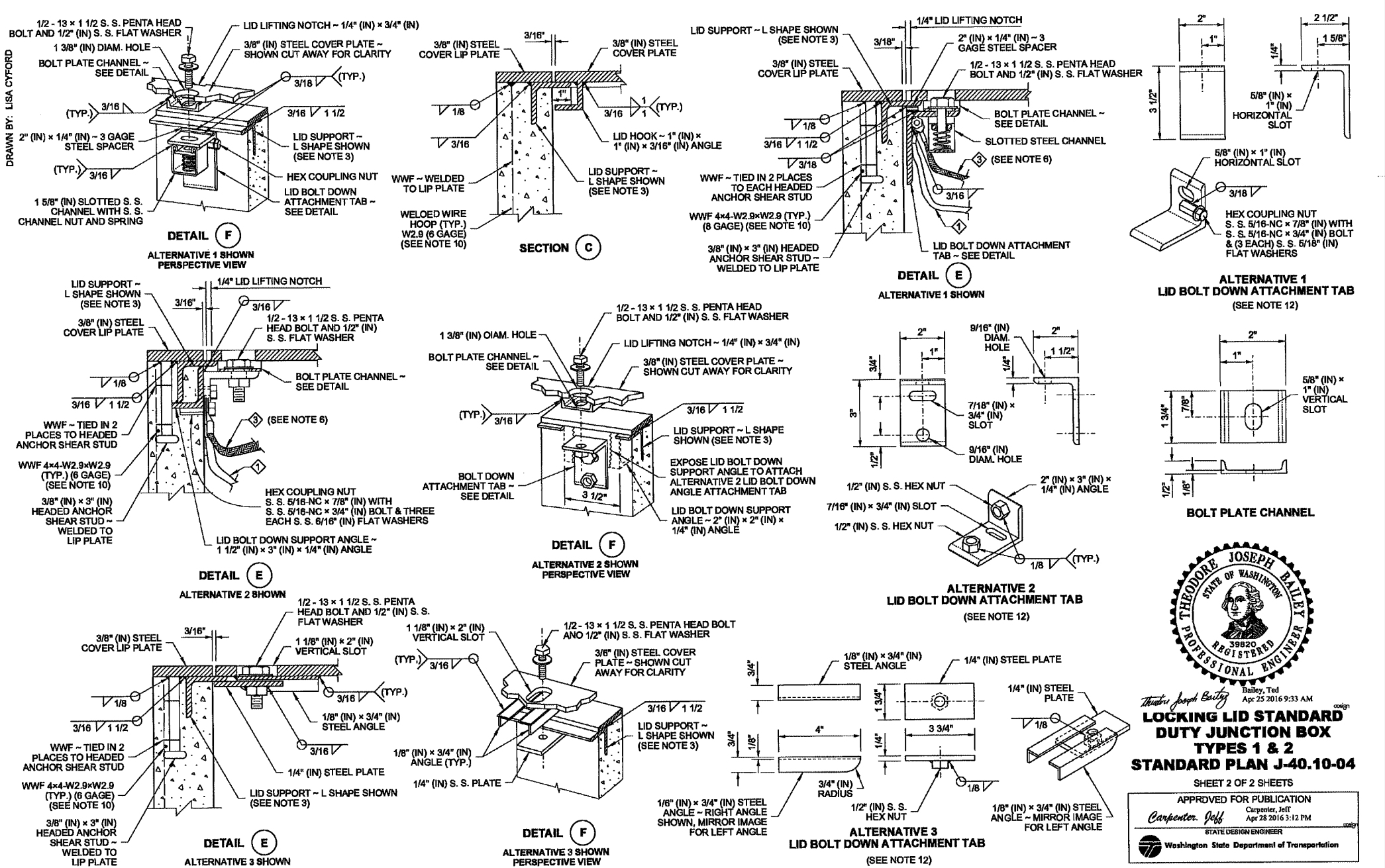
- NOTES:**
1. ALL TREES SHALL MEET ANSI AZ60.1 STANDARDS.
 2. LOOK FOR EXCESSIVE SOIL ON THE ROOT BALL COVERING ROOT FLARE AND REMOVE TO EXPOSE ROOT FLARE.
 3. BOTTOM OF ROOT FLARE SHALL BE AT FINISH GRADE IN WELL DRAINED SOIL AND 2" ABOVE FINISH GRADE IN POORLY DRAINED SOIL.
 4. B&B TREES: COMPLETELY REMOVE WIRE BASKET AND TREATED OR SYNTHETIC BURLAP AND TWINE. REMOVE NATURAL TWINE AND BURLAP FROM TOP AND SIDES OF ROOTBALL.
 5. CONTAINERIZED TREES: SHAVE THE OUTER 1-2" OF SOIL FROM ROOT BALL WITH SHARP KNIFE.
 6. GROW BAG TREES: REMOVE BAG COMPLETELY.
 7. STAKE ONLY IF REQUIRED BY PROJECT FORESTER OR NECESSARY FOR TREE STABILITY. REMOVE STAKES AFTER 1 YEAR.
 8. PRUNE DAMAGED OR BROKEN BRANCHES. NO OTHER PRUNING SHALL BE DONE AT PLANTING.

City of Napavine
STREET TREE PLANTING DETAIL



JUNCTION BOX DIMENSION TABLE

ITEM	TYPE 1	TYPE 2
A. OUTSIDE LENGTH OF JUNCTION BOX	22"	33"
B. OUTSIDE WIDTH OF JUNCTION BOX	17"	22 1/2"
C. INSIDE LENGTH OF JUNCTION BOX	18" - 18 1/2"	27" - 27 1/2"
D. INSIDE WIDTH OF JUNCTION BOX	12" - 14"	17" - 18"
E. LID LENGTH	17 5/8"	25 5/8"
F. LID WIDTH	12 5/8"	18 1/8"
G. CAPACITY - CONDUIT DIAMETER	8"	12"



General Notes (Street Light Construction)

1. ALL WORKMANSHIP, MATERIALS AND TESTING WILL BE IN ACCORDANCE WITH WSDOT/APWA, MUTCD, NEC OR CITY OF NAPAVINE PUBLIC WORKS STANDARDS UNLESS OTHERWISE SPECIFIED BELOW. IN CASES OF CONFLICT, THE MOST STRINGENT GUIDELINE WILL APPLY.
2. WASHINGTON STATE ELECTRICAL PERMITS AND INSPECTIONS ARE REQUIRED FOR ALL STREET LIGHTING INSTALLATIONS WITHIN THE CITY OF NAPAVINE. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING SAID PERMITS PRIOR TO ANY TYPE OF ACTUAL CONSTRUCTION.
3. A CLEARLY MARKED SERVICE DISCONNECT WILL BE PROVIDED FOR EVERY LIGHTING CIRCUIT. THE LOCATION AND INSTALLATION OF THE DISCONNECT WILL CONFORM TO NATIONAL ELECTRICAL CODE (NEC) AND THESE STANDARDS. THE PHOTO CONTROLS WINDOW WILL FACE NORTH UNLESS OTHERWISE DIRECTED BY THE CITY. THE SERVICE DISCONNECT WILL NOT BE MOUNTED ON THE LUMINAIRE POLE. THE SERVICE DISCONNECT WILL BE OF A TYPE EQUAL TO A MILBANK CP3B-11115 AALSP2 SERVICE, 120/240 VAC, 10/3W, CALTRANS TYPE 3B WITH CONTACTORS, PHOTO CONTROLS AND TEST SWITCH. ALL SERVICE DISCONNECTS WILL BE USED TO FULLEST CAPACITY, I.E., MAXIMUM NUMBER OF LUMINAIRE PER CIRCUIT.
4. ALL LIGHTING WIRE WILL BE COPPER WITH A MINIMUM SIZE OF #8. ALL WIRE WILL BE SUITABLE FOR WET LOCATIONS. ALL WIRE WILL BE INSTALLED IN SCHEDULE 80 PVC CONDUIT WITH A MINIMUM DIAMETER OF 1 1/4 INCHES. A BUSHING OR BELL-END WILL BE USED AT THE END OF A CONDUIT THAT TERMINATES AT A JUNCTION BOX OR LUMINAIRE POLE. CONDUCTOR IDENTIFICATION WILL BE AN INTEGRAL PART OF THE INSULATION OF THE CONDUCTORS THROUGHOUT THE SYSTEM I.E., COLOR-CODED WIRE. EQUIPMENT GROUNDING CONDUCTOR WILL BE #8 COPPER. ALL SPLICES OR TAPS WILL BE MADE BY APPROVED METHODS UTILIZING EPOXY KITS RATED AT 600 VOLTS, MINIMUM (I.E., 3-M 82-A2). ALL SPLICES WILL BE MADE WITH PRESSURE TYPE CONNECTORS (WIRE NUTS WILL NOT BE ALLOWED). DIRECT BURIAL WIRE WILL NOT BE ALLOWED. ALL OTHER INSTALLATION WILL CONFORM TO NEC, WSDOT/APWA, AND MUTCD STANDARDS.
5. EACH LUMINAIRE POLE WILL HAVE AN IN-LINE, FUSED, WATER TIGHT ELECTRICAL DISCONNECT LOCATED AT THE BASE OF THE POLE. ACCESS TO THESE FUSED DISCONNECTS WILL BE THROUGH THE HAND-HOLE ON THE POLE. THE HAND-HOLE WILL BE FACING AWAY FROM ON-COMING TRAFFIC. ADDITIONAL CONDUCTOR LENGTH WILL BE LEFT INSIDE THE POLE AND PULL OR JUNCTION BOX EQUAL TO A LOOP HAVING A DIAMETER OF ONE FOOT. LOAD SIDE OF IN-LINE FUSE TO LUMINAIRE HEAD WILL BE CABLE AND POLE BRACKET WIRE, 2 CONDUCTOR, 19-STRAND COPPER #10 AND WILL BE SUPPORTED AT THE END OF THE LUMINAIRE ARM BY AN APPROVED MEANS. FUSE SIZE, DISCONNECT INSTALLATION AND GROUNDING IN POLE WILL CONFORM TO NEC STANDARDS.
6. APPROVED PULL BOXES OR JUNCTION BOXES WILL BE INSTALLED WHEN CONDUIT RUNS ARE MORE THAN 200 FEET. IN ADDITION, A PULL BOX OR JUNCTION BOX WILL BE LOCATED WITHIN 10 FEET OF EACH LUMINAIRE POLE AND AT EVERY ROAD CROSSING. BOXES WILL BE CLEARLY AND INDELIBLY MARKED AS LIGHTING BOXES BY THE LEGEND, "L.T." OR "LIGHTING". SEE WSDOT STANDARD PLAN J-11A.
7. ALL LIGHTING POLES WILL HAVE TAPERED ROUND SHAFTS WITH A LINEAR TAPER OF BETWEEN 0.125 AND 0.14 INCHES PER FOOT. IN EXISTING DEVELOPED AREAS, THE CITY MAY REQUIRE A SPECIFIC POLE TYPE TO MAINTAIN CONSISTENCY WITHIN THE DEVELOPED AREA.
8. CEMENT CONCRETE BASES WILL FOLLOW WSDOT STANDARD PLAN J-1B, SHEET 1, FOUNDATION DETAIL. CONDUIT WILL EXTEND BETWEEN THREE (3) AND SIX (6) INCHES ABOVE THE CONCRETE BASE.
9. ALL STREETLIGHTS WILL INCLUDE A RECESSED 120V WEATHERPROOF RECEPTACLE THAT MEETS ALL APPLICABLE GUIDELINES AND STANDARDS. THE RECEPTACLE WILL BE LOCATED THIRTEEN (13) FEET ABOVE THE BASE OF THE POLE.
10. ANY MODIFICATION TO APPROVED PLANS WILL BE REVIEWED AND APPROVED BY THE DIRECTOR OF PUBLIC WORKS PRIOR TO INSTALLATION.

REVISION

NO.	DATE	BY	DESCRIPTION

DESIGNED BY: RWB
DRAWN BY: ZRW
CHECKED BY: RWB
DATE: 4.14.23
SCALE:

NAPAVINE TRUCK STOP

WA.

NAPAVINE

STREET LIGHT DETAILS AND NOTES

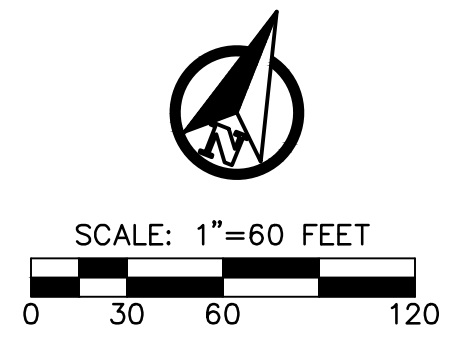
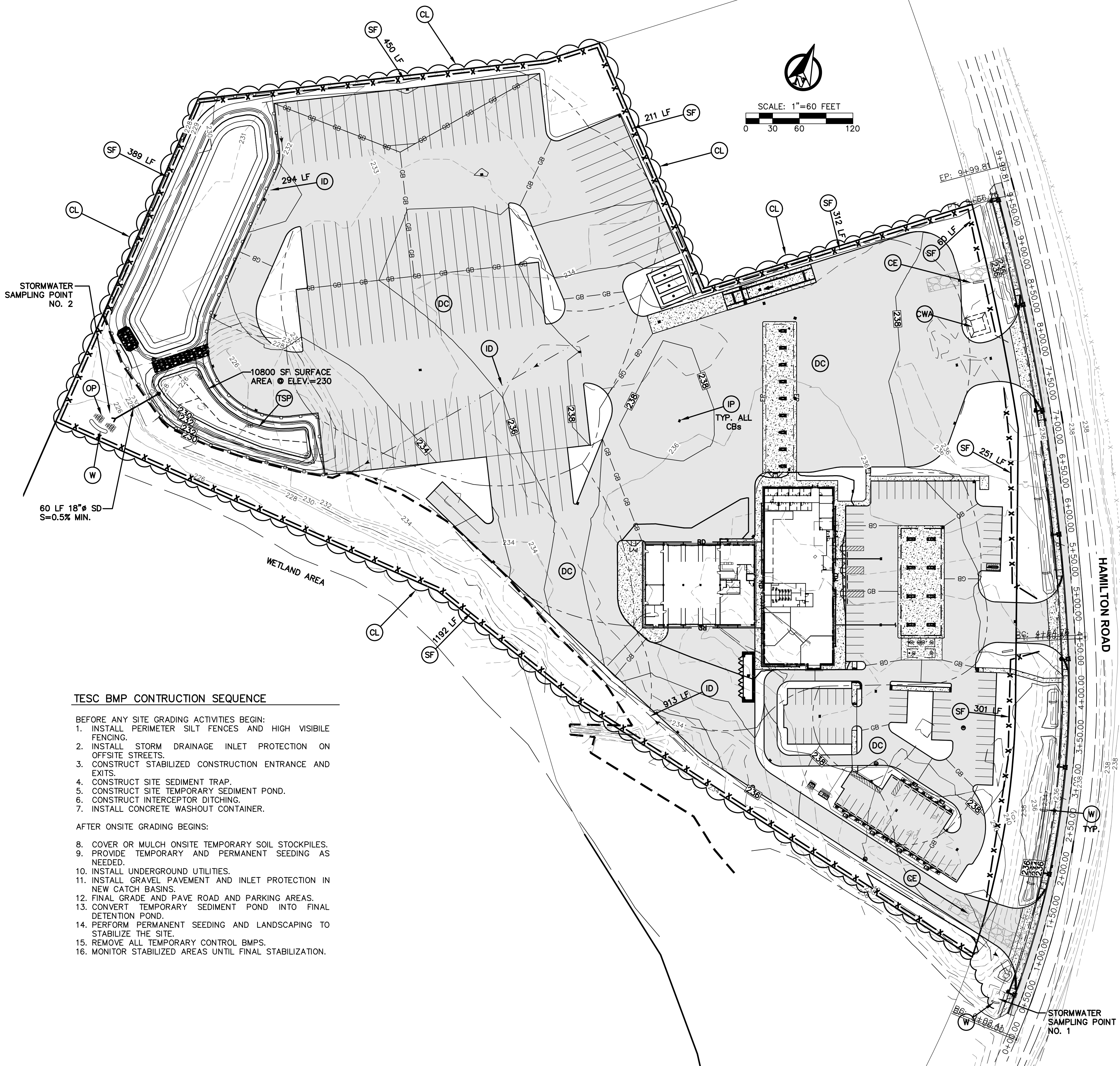
ROBERT W. BAILEY
REGISTERED PROFESSIONAL ENGINEER

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P.O. Box 923
CHEHALIS, WA 98532

JOB NUMBER: 23007
DRAWING NAME: 23007-SLD
C5.4
25 OF 31



TESC BMP CONSTRUCTION SEQUENCE

- BEFORE ANY SITE GRADING ACTIVITIES BEGIN:
1. INSTALL PERIMETER SILT FENCES AND HIGH VISIBLE FENCING.
 2. INSTALL STORM DRAINAGE INLET PROTECTION ON OFFSITE STREETS.
 3. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND EXITS.
 4. CONSTRUCT SITE SEDIMENT TRAP.
 5. CONSTRUCT SITE TEMPORARY SEDIMENT POND.
 6. CONSTRUCT INTERCEPTOR DITCHING.
 7. INSTALL CONCRETE WASHOUT CONTAINER.
- AFTER ONSITE GRADING BEGINS:
8. COVER OR MULCH ONSITE TEMPORARY SOIL STOCKPILES.
 9. PROVIDE TEMPORARY AND PERMANENT SEEDING AS NEEDED.
 10. INSTALL UNDERGROUND UTILITIES.
 11. INSTALL GRAVEL PAVEMENT AND INLET PROTECTION IN NEW CATCH BASINS.
 12. FINAL GRADE AND PAVE ROAD AND PARKING AREAS.
 13. CONVERT TEMPORARY SEDIMENT POND INTO FINAL DETENTION POND.
 14. PERFORM PERMANENT SEEDING AND LANDSCAPING TO STABILIZE THE SITE.
 15. REMOVE ALL TEMPORARY CONTROL BMPs.
 16. MONITOR STABILIZED AREAS UNTIL FINAL STABILIZATION.

WSDOE BMP LIST:

CONTRACTOR SHALL HAVE A COPY OF THE PROJECT SWPPP ONSITE AT ALL TIMES DURING CONSTRUCTION. SEE SWPPP FOR LISTED BMPs.

- (CE)** CONSTRUCTION ENTRANCE – BMP C105
CONTRACTOR SHALL INSTALL 15 FT WIDE CONSTRUCTION ENTRANCE/EXIT USING 4 TO 8 INCH MINUS QUARRY ROCK 12 INCHES THICK PER WSDOE FIGURE II-4.2.12. CRUSHED CONCRETE WILL NOT BE ALLOWED. PLACE A WOVEN GEOTEXTILE WITH A GRAB TENSILE STRENGTH OF 200 PSI IF SOFT SOILS ARE ENCOUNTERED. PROVIDE LENGTH PER PLAN. CONTRACTOR SHALL REMOVE ALL SILT FENCING ONCE THE PROJECT IS COMPLETED OR DETERMINED TO BE STABILIZED BY THE PROJECT ENGINEER.
- (TPS)** TEMPORARY AND PERMANENT SEEDING – BMP C120
CONTRACTOR TO PROVIDE APPLY TEMPORARY AND PERMANENT HYDRO-SEEDING AS OUTLINED ON THE APPROVED TESC. PROVIDE SEED MIXES AT A RATE OF 120 POUNDS PER ACRE. SEED MIXES TO USE ARE PER APPLICABLE WSDOE TABLE 4.1.2 TEMPORARY EROSION CONTROL SEED, 4.1.3 LANDSCAPING SEED, 4.1.4 LOW-GROWING TURF SEED, 4.1.5 BIO-SWALE SEED, 4.1.6 WET AREA SEED AND 4.1.7 MEADOW SEED MIX. USE TYPICAL FERTILIZER OF 10-4-6 NPK AT A RATE OF 90 POUNDS PER ACRE AND MULCH PER BMP C121. ALL SLOPE AREAS SHALL BE SCARIFIED WITH TRACKED VEHICLE PERPENDICULAR TO THE SLOPE PRIOR TO SEEDING SLOPE.
- (SR)** SURFACING ROUGHENING – BMP C130
ALL CUT AND FILL SLOPE AREAS STEEPING THAN 10:1 SLOPE SHALL BE SCARIFIED WITH TRACKED VEHICLE PERPENDICULAR TO THE SLOPE FOR TEMPORARY AND PERMANENT SEEDING. SEE WSDOE FIGURE II-4.1.5 ON THE APPROVED TESC PLANS.
- (DC)** DUST CONTROL – BMP C140
CONTRACTOR SHALL PROVIDE DUST CONTROL USING A WATER TRUCK THROUGHOUT CONSTRUCTION DURING THE DRY SEASON. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE WATER FOR ALL DUST CONTROL.
- (CH)** CONCRETE HANDLING – BMP C151
- (SC)** SAWCUTTING AND SURFACING POLLUTION PREVENTION – BMP C152
CONTRACTOR SHALL PROTECT ALL DRAINS FROM PROCESS WATER USED FOR SAWCUTTING ASPHALT AND CONCRETE PAVEMENTS. ALL PROCESS WATER SLURRY SHALL BE COLLECTED AND REMOVED FROM THE SITE AND DISPOSE PROCESS WATER IN A MANNER THAT DOES NOT VIOLATE GROUND OR SURFACE WATER QUALITY STANDARDS.
- (CWA)** CONCRETE WASHOUT AREA – BMP C154
CONTRACTOR SHALL PROVIDE THE CONCRETE WASHOUT AREA AT THE LOCATION SHOWN ON THE APPROVED TESC PLANS. CONTRACTOR SHALL USE ONE OF THE TWO OPTIONS SHOWN ON WSDOE FIGURE II-4.1.7A. WASHOUT AREA SHALL BE A MINIMUM 10-FOOT X 10-FOOT SQUARE. CONTRACTOR SHALL MAINTAIN THE BMP THROUGHOUT CONSTRUCTION AND REMOVE WASHOUT WATER AS NEEDED DURING THE WINTER MONTHS. CLEAN ALL CONCRETE TOOLS OVER THE WASHOUT AREA. NO WASHOUT AREA WATER MAY ENTER THE GROUND, SURFACE OR ONSITE STORMWATER SYSTEM.
- (ID)** INTERCEPTOR DIKE AND SWALE – BMP C200
CONTRACTOR SHALL INSTALL INTERCEPTOR DITCH PER APPROVED TESC PLAN. DITCHES SHALL BE MINIMUM DEPTH OF 1.5 FEET WITH 2:1 SIDE SLOPE. PROVIDE CHECK DAMS ALONG DITCH PER BMP C207.
- (OP)** OUTLET PROTECTION – BMP C209
CONTRACTOR TO PROVIDE OUTLET PROTECTION AT ALL LOCATION IDENTIFIED ON THE APPROVED TESC PLAN. OUTLET PROTECTION SHALL CONSIST OF 8-INCH MINUS QUARRY ROCK PADS A MINIMUM OF 4- FEET WIDE BY 6- FEET LONG.
- (IP)** STORM DRAIN INLET PROTECTION – BMP C220
CONTRACTOR TO PROVIDE INLET PROTECTION ON ALL NEW CATCH BASIN INLETS IMMEDIATELY AFTER INSTALLATION. ALL EXISTING CATCH BASINS WITHIN 500 FEET OF THE SITE CONSTRUCTION ENTRANCE SHALL ALSO RECEIVE INLET PROTECTION. SEE DETAIL ON APPROVED PLANS. REMOVE THE BMP'S ONCE THE SITE IS DETERMINED TO BE STABILIZED BY THE PROJECT ENGINEER.
- (SF)** SILT FENCING – BMP C233
CONTRACTOR SHALL INSTALL ALL SILT FENCING PER APPROVED TESC PLAN AND WSDOE FIGURE II-4.2.12. SILT FENCING ALONG THE CLEARING LIMITS SHALL BE ORANGE IN COLOR. SEE PROJECT SWPPP FOR SILT FENCING SPECIFICATIONS.
- (W)** WATTLES – BMP C235
CONTRACTOR SHALL PROVIDE WADDLES PER APPROVED TESC PLAN AND WSDOE FIGURE II-4.2.14.
- (TSP)** TEMPORARY SEDIMENT POND – BMP C241
CONTRACTOR SHALL CONSTRUCT TEMPORARY SEDIMENT POND PER APPROVED TESC PLAN AND POND CROSS SECTION DETAILS ON PLANS.

NO.	DATE	REVISION					
DESIGNED BY:	RWB	DRAWN BY:	ZRW	CHECKED BY:	RWB	DATE:	4.14.23
						SCALE:	
NAPAVINE TRUCK STOP				TEMPORARY EROSION SEDIMENT CONTROL PLAN			
NAPAVINE				NAPAVINE			
RB Engineering DESIGN → PERMIT → MANAGE P.O. Box 923 CHEHALIS, WA 98532 OFF: (360) 740-8819 EMAIL: info@rbengineering.com							
JOB NUMBER 23007 DRAWING NAME 23007_TESCPL C7.1 29 OF 31							

Traffic Impact Analysis

Napavine Truck Stop
Napavine, Washington

Prepared For:

GMD Land Company, LLC

Prepared By:

SCJ Alliance

8730 Tallon Lane NE, Suite 200

Lacey, WA 98516

360.352.1465

September 2022



Traffic Impact Analysis

Project Information

Project: Napvaine Truck Stop
Prepared for: GMD Land Company, LLC

Reviewing Agency

Jurisdiction: City of Napavine

Project Representative

Prepared by: SCJ Alliance
8730 Tallon Lane NE, Suite 200
Lacey, WA 98516
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scjalliance.com

Contact: Ryan Shea, PTP, Senior Transportation Planner

Project Reference: SCJ #22-000051

Path: N:\Projects\5557 GMD Land Company LLC\22-000051 Napavine Truck Stop\TIA\Report\2022-0902 Napavine Truck Stop TIA.docx

Signature

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



Prepared by Ryan Shea, PTP, Senior Transportation Planner



9/06/22

Approved by Perry Shea, PE, Principal

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1 Introduction

1.1 Project Overview

GMD Land Company, LLC plans to construct a truck stop northwest of the I-5/Rush Road interchange in Napavine, WA. The project will consist of a new truck stop facility that will provide passenger vehicle and truck fueling, a convenience market and food service, and overnight truck parking.

Figure 1 illustrates the site vicinity and the transportation network serving the project area.

Figure 1 Site Vicinity Map



1.2 Study Context

A Trip Generation and Distribution letter was prepared and submitted to the City of Napavine and Washington State Department of Transportation (WSDOT) on January 25th, 2022. This report has been prepared to build on the information in that earlier analysis and provide traffic analysis and project information for the City of Napavine and WSDOT to use in reviewing the development proposal. The report describes the existing and forecasted operation of the following study area intersections:

- ◆ Rush Road/Kirkland Road at Rush Road
- ◆ Rush Road at I-5 Northbound Ramps
- ◆ Rush Road at I-5 Southbound Ramps
- ◆ Rush Road/Hamilton Road at Rush Road
- ◆ Site Driveways

Operational analysis has been prepared for existing 2022 conditions and forecasted 2023 conditions with and without completion of the project. PM peak hour conditions were analyzed.

2 Project Description

2.1 Development Proposal

The proposed truck stop project will consist of an approximately 15,000-square foot building containing a convenience market with walk-up and drive-through food service, truck repair space, and truck drivers facilities and lounge. There will be a diesel fueling island with 8 fueling positions and a gasoline island with 16 fueling positions. 97 truck parking stalls for overnight parking will be provided.

The project proposes to construct three access points on Hamilton Road. The north driveway will provide inbound-only access for trucks, the center driveway will be exclusively for passenger car vehicles, and the south driveway will provide outbound-only access for truck. For purposes of this analysis it was assumed that there will be two driveways along Hamilton Road with the north driveway providing access for all truck traffic and the south driveway serving passenger vehicles, which provides a conservative analysis of the site driveways.

The preliminary site plan is provided on **Figure 2**.

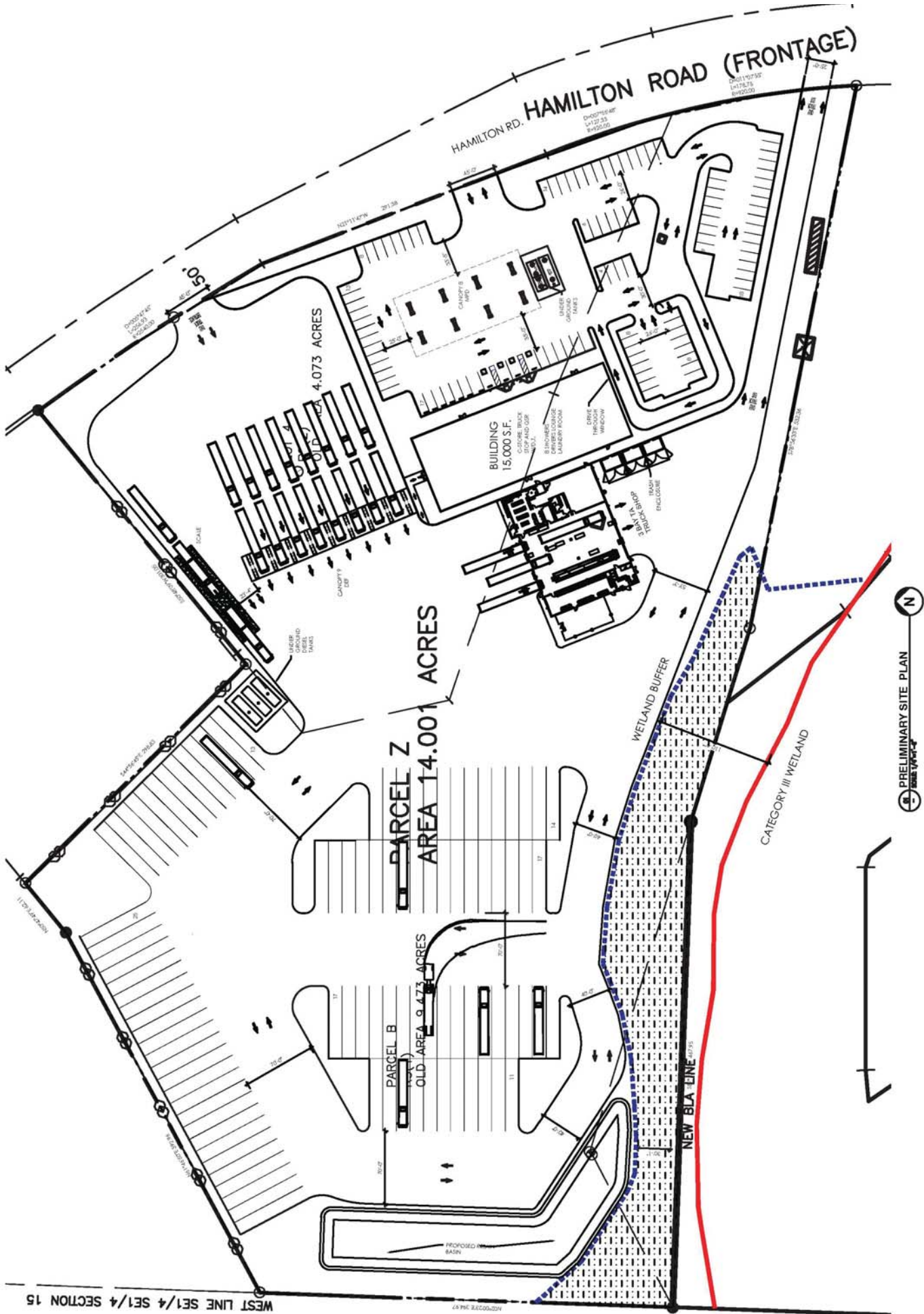


Figure 2
Preliminary Site Plan

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

3 Existing Conditions

3.1 Area Land Uses

The proposed Napavine truck stop will be located northwest of the I-5/Rush Road interchange in Napavine, WA. The site is currently undeveloped. Adjacent land uses largely include gas stations/truck stops, quick service restaurants, and industrial uses.

3.2 Roadway Inventory

3.2.1 Interstate 5

Interstate 5 (I-5) is a north-south divided highway classified an Urban Interstate and is a highway of statewide significance (HSS). This portion of I-5 has a posted speed limit of 70 mph. North of the Rush Road interchange the roadway provides three lanes in each direction. The Rush Road interchange includes a southbound drop lane and a northbound add lane. South of the interchange the roadway provides two lanes in each direction.

3.2.2 Rush Road

Rush Road is the main north-south minor arterial through Napavine providing access to and from Interstate 5. In the project vicinity, Rush Road provides a single lane in each direction with paved shoulders and a posted speed limit of 25 mph south of the project and 35 mph east of the project.

3.2.3 Hamilton Road

Hamilton Road is a two-lane north-south roadway extending from Labree Road to Rush Road. The roadway has a single lane in each direction with paved shoulders and a posted speed limit of 35 mph.

3.2.4 Kirkland Road

Kirkland Road is a two-lane roadway that generally runs north-south connecting from Rush Road to Forest Napavine Road. The roadway has a speed limit of 25 mph.

A summary of the intersection channelization and control type for each of the study intersections is provided in **Figure 3**.

3.3 Traffic Volume Data

Traffic Count Consultants, TC2, a transportation data collection service, provided evening peak period turning movement counts at the following five study intersections:

- ◆ Rush Road/Kirkland Road at Rush Road
- ◆ Rush Road at I-5 Northbound Ramps
- ◆ Rush Road at I-5 Southbound Ramps
- ◆ Rush Road/Hamilton Road at Rush Road
- ◆ Hamilton Road/Pacific Pride Driveway

The counts were conducted on February 17, 2022 between 4:00 and 6:00 PM for the PM peak hour. The turning movement count diagrams are provided in **Appendix A**.

Figure 4 shows the existing 2022 PM peak hour traffic volumes for the study intersections.

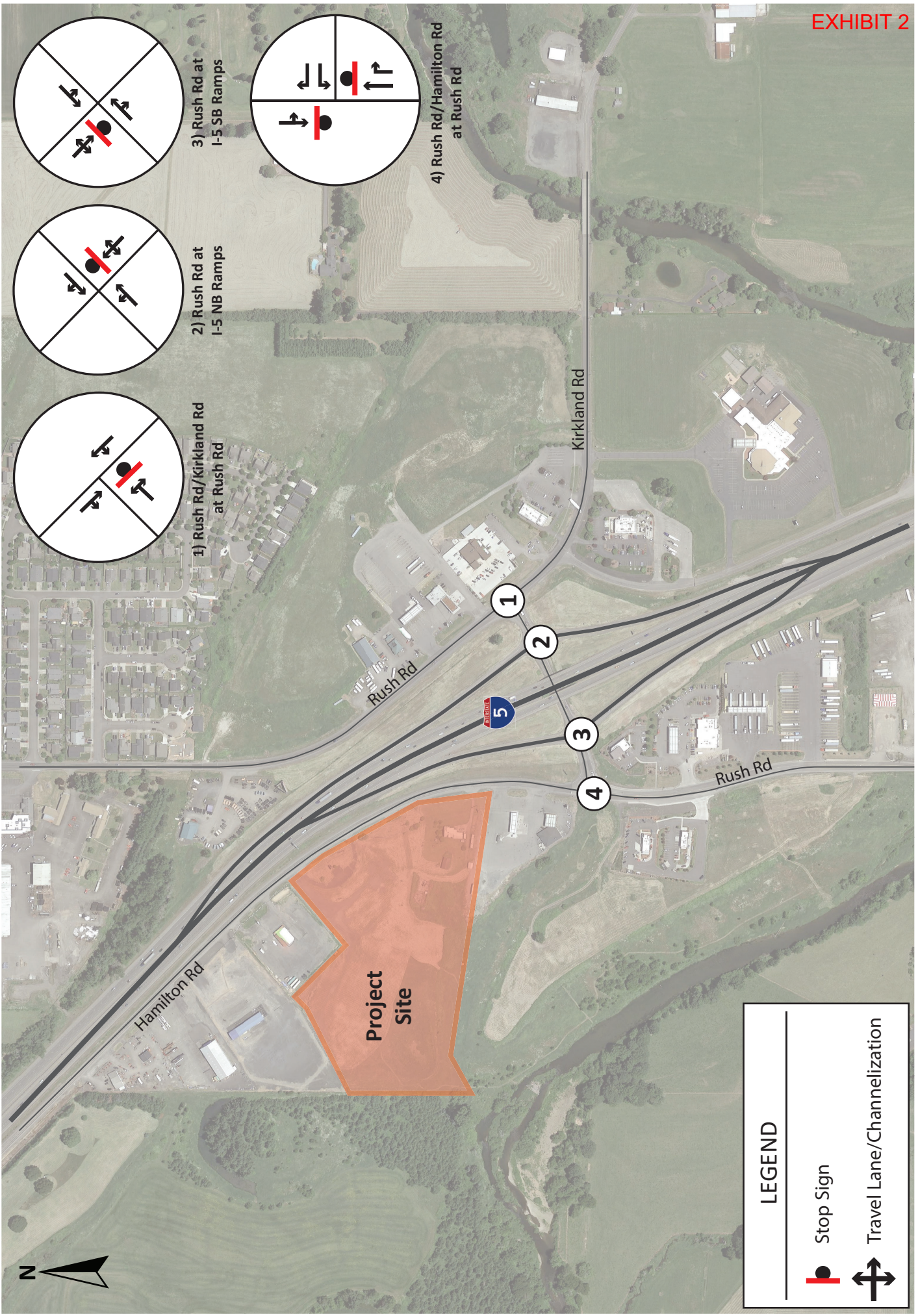


Figure 3
Existing Intersection
Channelization and Control

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

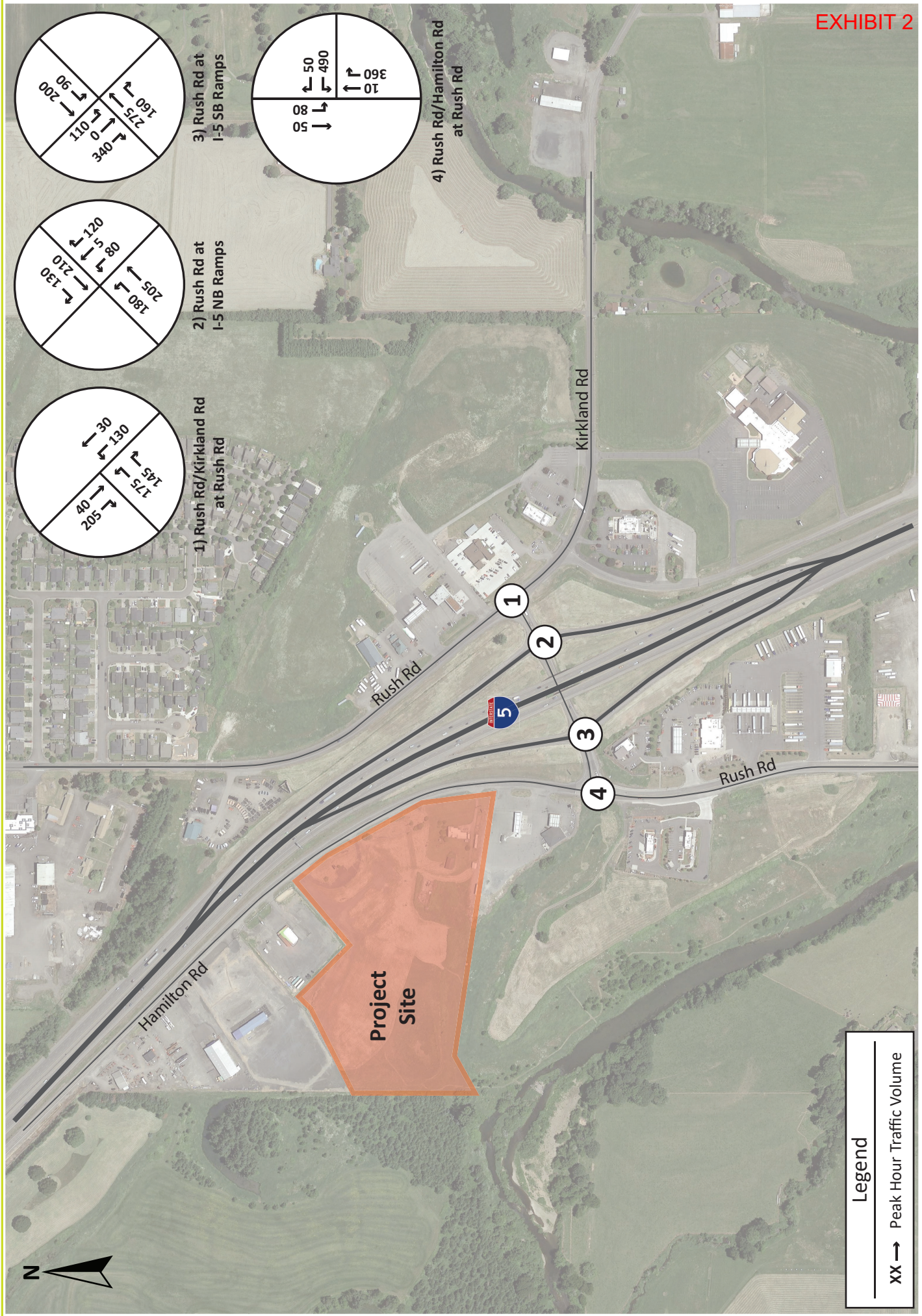


Figure 4

Existing 2022 PM Peak Hour Traffic Volumes

Napavine Truck Stop
 Napavine, Washington
 Traffic Impact Analysis

3.4 Crash History

The Washington Department of Transportation provides crash data for study area roadways. The data was collected over the five-year span between January 1, 2016 and December 31, 2020. We have summarized the crash data for the study intersections in **Table 1**. Detailed crash data records are provided in **Appendix B**.

Table 1. Existing Crash Severity by Study Intersection

Intersection	Fatal	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	Total
Rush Road/Kirkland Road at Rush Road	0	0	0	0	2	2
Rush Road at I-5 NB Ramps	0	0	0	1	8	9
Rush Road at I-5 SB Ramps	0	0	0	1	7	8
Rush Road/Hamilton Road at Rush Road	0	0	0	0	3	3
Total Crashes	0	0	0	2	20	22

Overall, approximately 90% of all the reported crashes were classified as property damage only (no apparent injury). There were no serious injury or fatal crashes reported.

3.5 Other Transportation Modes

3.5.1 Transit Service

There are no transit stops in the immediate vicinity of the project site. Twin Transit provides service in Lewis County.

3.5.2 Pedestrian and Bicycle Facilities

There are currently no bicycle lanes or sidewalks along the project frontage. Sidewalks are provided along newly developed areas on Rush Road, south of the project site.

4 Project Traffic Characteristics

The project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network

4.1 Project Trip Generation

Vehicle trip generation was estimated using the trip generation rates contained in the 11th edition of the Trip Generation Manual by the *Institute of Transportation Engineers (ITE)*. The land-use categories Truck Stop (land use code 950), and Convenience Market/Gas Station – GFA (5.5-10ksf) (land use code 945) were used. The Truck Stop land use code is specific to the number of trucks that will be generated by the site while the Convenience Market/Gas Station – GFA (5.5-10ksf) land use code accounts for all of the passenger vehicle activity. In both instances these land use codes account for the total traffic generated by the project and are not specific to vehicles purchasing fuel.

Non-Primary Traffic

A project such as a truck stop tends to attract a large amount of traffic from people already driving on area roadways. These trips are not new trips added to local roadways (primary trips) but represent “non-primary” trips according to the following definitions:

Pass-by trips are trips made as an intermediate stop from an origin to a primary destination (i.e., stopping to shop on the way home from work) by vehicles passing directly by the project driveway.

Diverted Trips are similar to pass-by trips, except diverted trips require a diversion from their original route onto another roadway to reach the site. These trips are not technically new trips but are new to the roadways in the immediate vicinity of a project.

Pass-by and diverted percentages assumptions were taken from the 3rd edition of the Trip Generation Handbook by ITE. ITE provides averages of primary, pass-by and diverted trips for Convenience Market/Gas Station – GFA (land use code 945). To provide a conservative analysis, and to better reflect the traffic patterns of this site, the non-primary trip percentages were assumed to be primarily diverted trips. For this study, we assumed 5% pass-by, 82% diverted and 13% primary trips. For trucks it is assumed that 100% of the trips will be diverted trips. The majority of diverted trips were assumed to be traveling to/from I-5.

A summary of the project trip generation rates is provided in **Table 2**.

Table 2. Trip Generation Characteristics

Land Use (LU)	ITE Code	Unit	PM Peak Hour Trip Rates				
			Trip Rate	% Diverted	% Pass-By	% Enter	% Exit
Truck Stop	950	Fueling Positions	15.42	100%	0%	53%	47%
Convenience Market/Gas Station – GFA (5.5-10ksf)	945	Fueling Positions	26.90	82%	5%	50%	50%

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The trip generation for the proposed project is shown in **Table 3** below.

Table 3. Project Trip Generation – PM Peak Hour

	Size	PM Peak Hour Trip Generation					
		Total Trips	Diverted	Pass-by Trips	Primary Trips		
					Enter	Exit	Total
Truck Stop	8 fueling Positions	123	123	0	0	0	0
Convenience Market/Gas Station – GFA (5.5-10ksf)	16 fueling Positions	431	353	22	28	28	56
Total Project Traffic		554	476	22	28	28	56

The calculations in Table 3 represent the typical trip generation totals for the proposed land uses. It should be noted that the proposed land use is similar to several of the adjacent land uses at the Rush Road interchange. This will likely result in a redistribution of some of the existing traffic, causing the overall increase in traffic to be less than the totals in Table 3. However, to provide a conservative analysis the full trip generation totals have been used.

4.2 Site Traffic Distribution and Assignment

Truck Trips

100% of the truck trips are assumed to be diverted from I-5, with 50% drawn from each direction. None of the truck trips are considered pass-by or primary trips. For this analysis it has been assumed that all of the truck trips will travel to/from I-5 via the Rush Road interchange. However, given that this project is located north of Rush Road, trucks travelling to/from the north will have the secondary option of using the Labree Road interchange.

Passenger Vehicle Trips:

As noted above, passenger vehicle trips are comprised of diverted trips, pass-by trips and primary trips.

- The diverted trips were assumed to be primarily drawn from I-5, with 35% drawn from each direction, with some drawn from the existing interchange volumes. These represent regional trips to/from the site.
- The pass-by trips were assigned to Hamilton Road, with 50% drawn from each direction.
- The primary trips were assumed to be to/from the surrounding household and commercial populations located south and east of the project. These represent local trips to/from the site.

The site traffic distribution and assignment showing the sum of passenger vehicle and truck trips is provided on **Figure 5**. Graphics showing the component pieces of the traffic distribution and assignment (primary, diverted and pass-by) are provided in **Appendix C**.

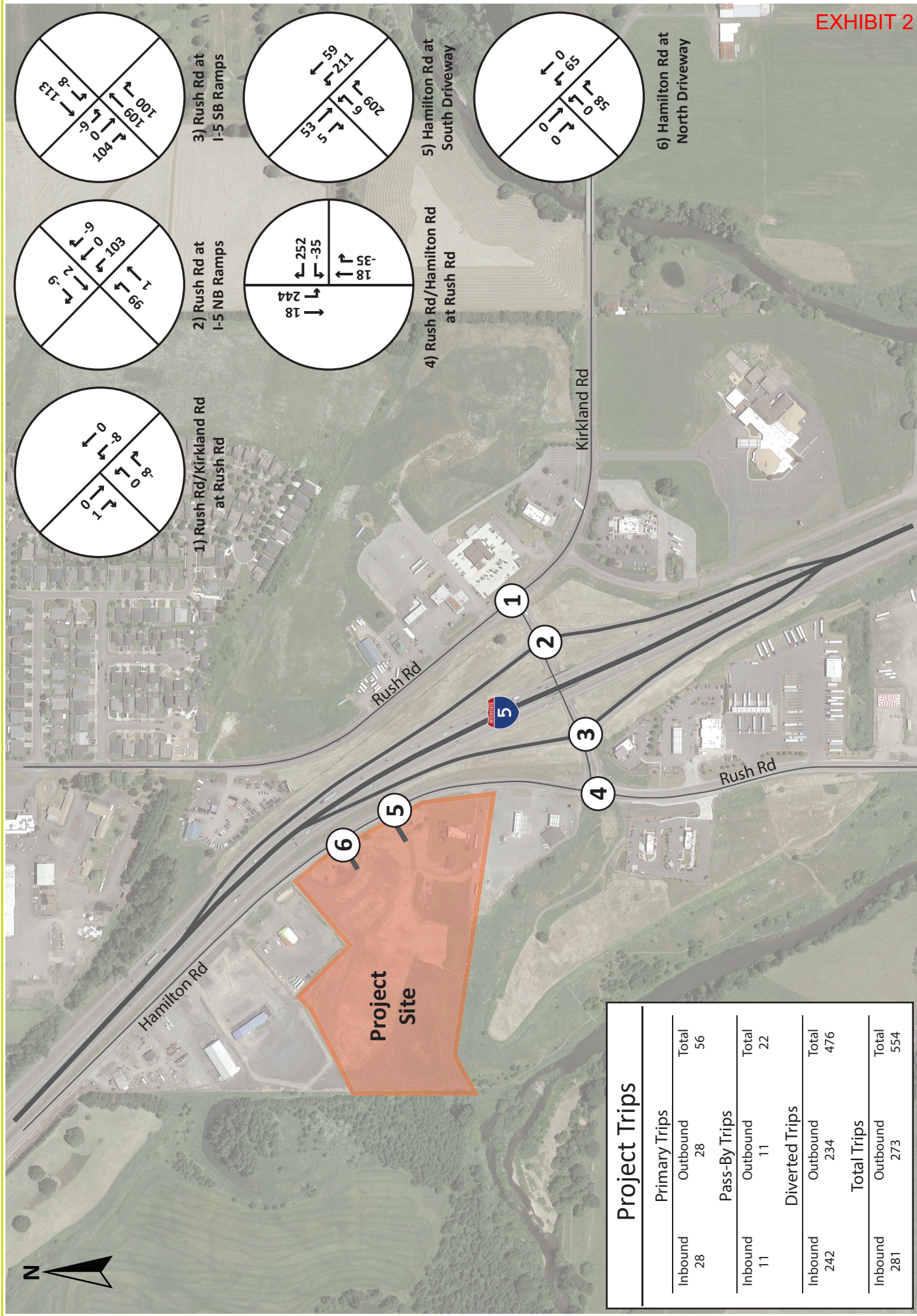


EXHIBIT 2

Figure 5
PM Peak Hour Site Generated
Traffic Volumes

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

5 Future Traffic Conditions

5.1 Roadway Network Improvements

In 2018, Washington State Department of Transportation (WSDOT) completed the *Rush Road Interchange Congestion Relief Summary Report* which studied multiple improvement alternatives for the Rush Road interchange. No formal recommendation was made, but the alternatives described in the report were referenced in the intersection operational analysis work described below

5.2 Future Traffic Volumes

Traffic volume forecasts were prepared for PM peak hour conditions for the 2023 horizon year. The future traffic volume forecast includes non-specific background traffic growth, pipeline development projects, and estimated traffic generated by the proposed *Napavine Truck Stop*.

One pipeline development project was identified by the City of Napavine for inclusion in this study. This project is the ARCO AM/PM Gas Station located along Rush Road south of the project site.

The background traffic growth was calculated by adding one year of 2% annual growth, as used in the ARCO TIA, and the traffic from the pipeline development project to the existing 2022 turning movement counts. The traffic volume calculations for study intersections are included in **Appendix C**. The projected 2023 traffic volumes without the *Napavine Truck Stop* are shown on **Figure 6**. The projected 2023 traffic volumes with the project are shown on **Figure 7**.

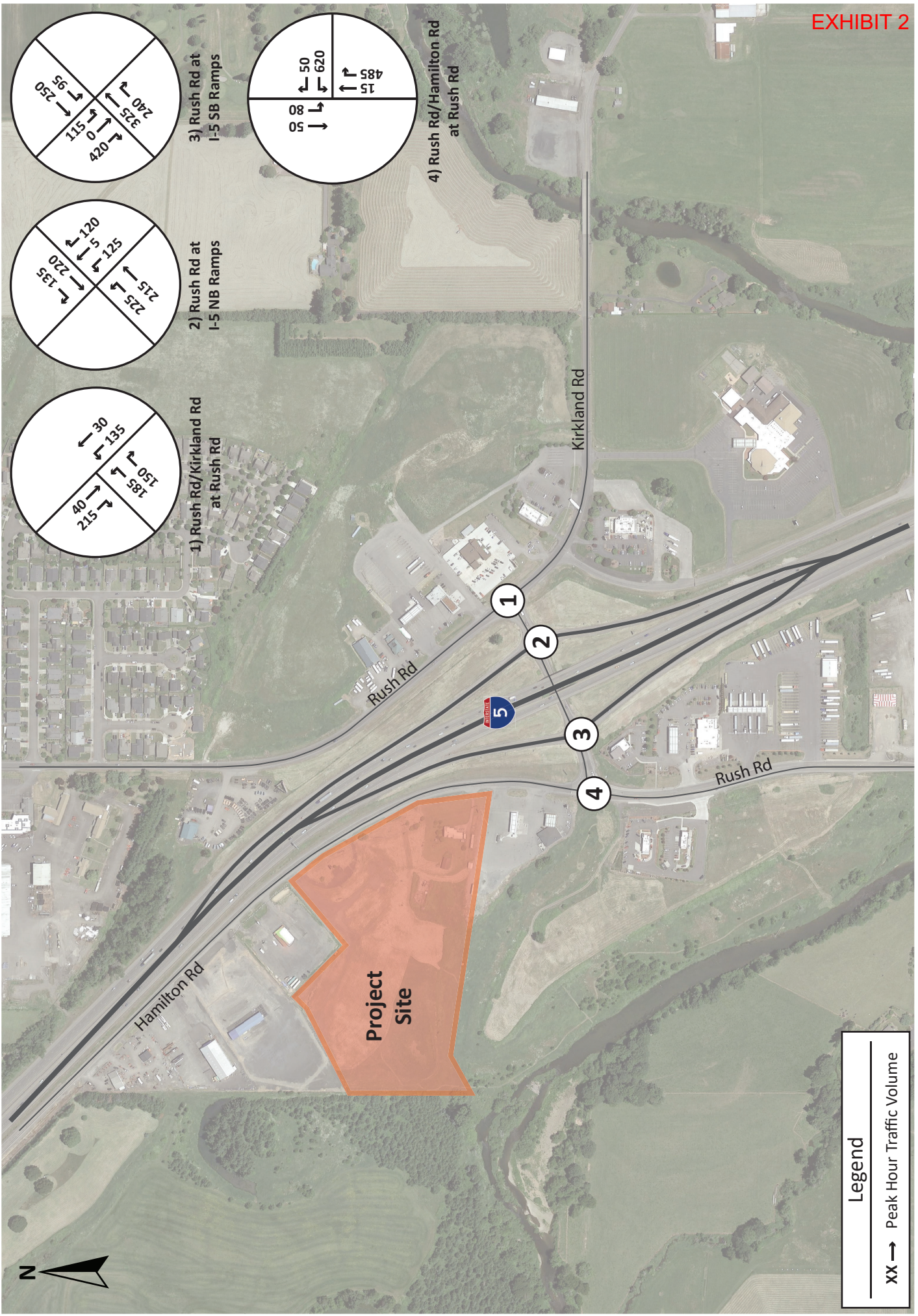


Figure 6

Projected 2023 PM Peak Hour
Traffic Volumes Without Project

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

Legend

XX → Peak Hour Traffic Volume

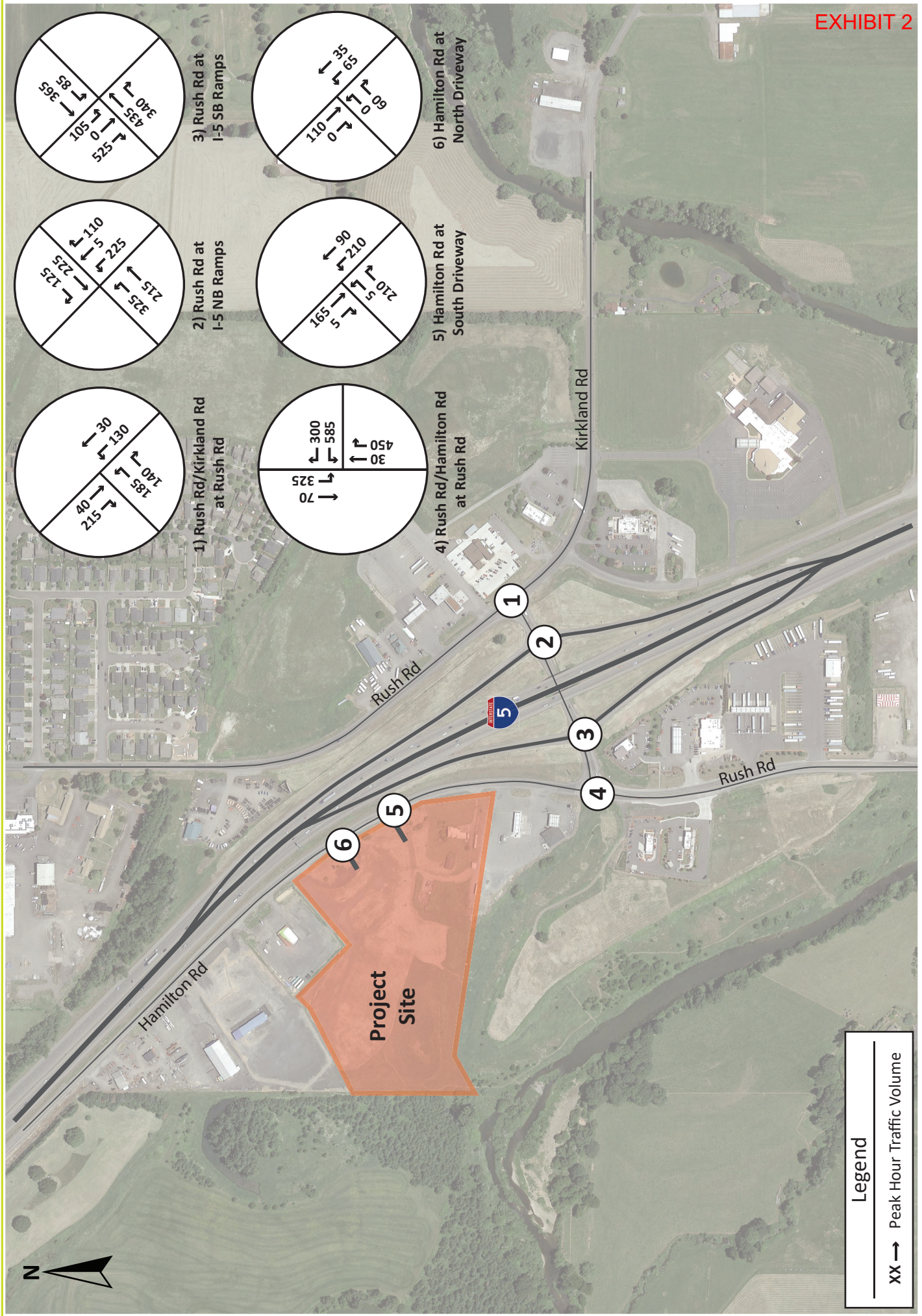


Figure 7

Projected 2023 PM Peak Hour Traffic Volumes With Project

Napavine Truck Stop
 Napavine, Washington
 Traffic Impact Analysis

6 Traffic Operations Analysis

Traffic analyses were conducted to identify any deficiencies within the study area for the 2022 base year, and 2023 project opening year.

6.1 Level of Service

The acknowledged source for determining overall capacity for arterial segments and independent intersections is the current edition of the *Highway Capacity Manual* (HCM) published by the Transportation Research Board (TRB). Capacity analysis results are described in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a street or highway during a specific time interval. LOS ranges from A (very little delay) to F (long delays and congestion).

Operations analyses were completed for the base year and projected 2023 PM peak hour traffic volume scenarios for all study intersections. The PM peak hour is the highest traffic flow period during the day in this area. This time period is typically selected for analysis as it reflects the greatest impact of a project on the area's roadway system.

Intersection analysis was performed using Synchro version 11, with the HCM6 output of the Synchro software. The Synchro software packages implement the methodologies described in the current HCM. The existing intersection control for the Rush Road/Hamilton Road intersection, which is free flow for the westbound approach and stop controlled for the northbound and southbound approaches, cannot be modeled using the standard approach identified in the Highway Capacity Manual. To calculate an average vehicle delay for each movement at this intersection the SimTraffic simulation software was used.

The City of Napavine Comprehensive Plan 2017-2037 identifies a citywide Level of Service (LOS) E standard as the threshold indicating where roadway improvements would be necessary.

6.1.1 Intersection Operations

For intersections under minor street stop-sign control, the LOS of the most difficult movement (typically the minor street left turn) represents the intersections operating performance. The LOS/delay criteria for stop sign-controlled intersections are different than for signalized intersections because driver expectation is that a signalized intersection is designed to carry higher traffic volumes and experience greater delay.

Table 4 shows the Level of Service criteria for signalized/roundabout-controlled intersections and stop-controlled intersections.

Table 4. Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Average Control Delay (seconds/vehicle)	Stop-Controlled Intersection Average Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

6.2 Intersection Analysis

The analysis was conducted for the following scenarios:

- ◆ Existing 2022 traffic volumes
- ◆ Projected 2023 background traffic volumes with and without the *Napavine Truck Stop* project

The operational analysis results of the study intersections for the PM peak hour are provided in **Table 5**. The LOS analysis worksheets are included in **Appendix D**.

Table 5. PM Peak Hour Intersection Level of Service

Intersection	Control Type	2022	2023 Without Project	2023 With Project
		LOS (delay)	LOS (delay)	LOS (delay)
Rush Road/Kirkland Road at Rush Road	TWSC ¹	C (17.5)	C (19.0)	C (18.3)
Rush Road at I-5 NB Ramps	TWSC ¹	C (23.9)	F (68.8)	F (300+)
Rush Road at I-5 SB Ramps	TWSC ¹	C (23.3)	D (33.8)	F (65.9)
Rush Road/Hamilton Road at Rush Road	TWSC ^{1,2}	B (14.7)	C (24.2)	F (94.7)
North (Truck) Driveway at Hamilton Road	TWSC ¹	-	-	A (9.2)
South (Passenger Car) Driveway at Hamilton Road	TWSC ¹	-	-	B (11.0)

1. Two-Way-Stop-Control

2. Analysis results derived from the average of five SimTraffic simulations

6.2.1 Rush Road/Kirkland Road at Rush Road

This intersection operates under stop sign-control for the eastbound approach with each approach providing a single travel lane.

In the 2022 PM peak hour, the intersection operates at LOS C with 17.5 seconds of delay. For the 2023 horizon year without project, the intersection is projected to operate at LOS C with 19.0 seconds of delay. With the addition of project traffic, the intersection would operate at LOS C with 18.3 seconds of delay.

6.2.2 Rush Road at I-5 Northbound Ramps

This intersection operates under stop sign-control for the northbound approach. Each approach provides a single travel lane.

In the PM peak hour, the intersection operates at LOS C condition with 23.9 seconds of delay for the northbound approach. For the 2023 horizon year without project, the intersection is projected to operate at LOS F with 68.8 seconds of delay. With the addition of project traffic, the intersection would operate at LOS F, with 300+ seconds of delay.

6.2.3 Rush Road at I-5 Southbound Ramps

This intersection operates under stop sign-control for the southbound approach, with each approach providing a single travel lane. However, given the existing width of the southbound off-ramp, which provides a 16-foot travel lane and a 10-foot paved outside shoulder, the analysis was performed assuming a separate right-turn lane.

In the PM peak hour, the intersection operates at LOS C condition with 23.3 seconds of delay for the southbound approach. For the 2023 horizon year without project, the intersection is projected to operate at LOS D with 33.8 seconds of delay. With the addition of project traffic, the intersection would operate at LOS F with 65.9 seconds of delay.

6.2.4 Rush Road/Hamilton Road at Rush Road

This intersection operates under stop sign-control for the northbound and southbound approaches. The south bound approach provides a single travel lane, the northbound approach provides a through lane and a right turn lane, and the westbound approach provides a left-turn lane and a right-turn lane

In the PM peak hour, the intersection operates at LOS B condition with 14.7 seconds of delay. For the 2021 horizon year without project, the intersection is projected to operate at LOS C with 24.2 seconds of delay. With the addition of project traffic, the intersection would operate at LOS F with 94.7 seconds of delay.

6.2.5 Site Driveways

The project is proposed to include one passenger car driveway and one truck driveway on Hamilton Road.

6.2.6 Hamilton Road North (Passenger Car) Driveway

The passenger car driveway will provide passenger vehicle access to the fuel pumps and convenience store. This intersection will operate under stop-sign control for the eastbound approach. It is projected to operate at LOS A in the 2023 opening year horizon.

6.2.7 Hamilton Road South (Truck) Driveway

The truck driveway will provide truck access to the fuel pumps and convenience store. This intersection will operate under stop-sign control for the eastbound approach. It is projected to operate at LOS B in the 2023 opening year horizon

6.3 Intersection Improvement Scenario

6.3.1 Proposed Improvements

With multiple intersection failures projected in the in the Rush Road interchange area, a range of intersection improvements were evaluated. The previously completed WSDOT interchange alternatives study was reviewed and referenced in the improvement analysis. Elements of alternative R from that study, which includes two full-size roundabouts at Rush Road/Hamilton Road and Rush Road/Kirkland Road and access control for the I-5 ramps, were found to accommodate the opening year forecast volumes including the project. An initial package of improvements was established, which included the following elements:

- Full size roundabout at Rush Road/Hamilton Road, with a single-lane northbound, a single-lane southbound, and a westbound right-turn lane.
- Access control at the southbound ramps eliminating both left-turn movements. These movements will use the Rush Road/Hamilton Road roundabout to make U-turn maneuvers.
- A compact roundabout at the northbound ramps, with all single-lane approaches.

This initial package was submitted to WSDOT for consideration. After review, WSDOT requested a few edits to the improvements. The updated improvement package, as requested by WSDOT, is described below:

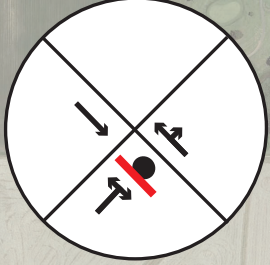
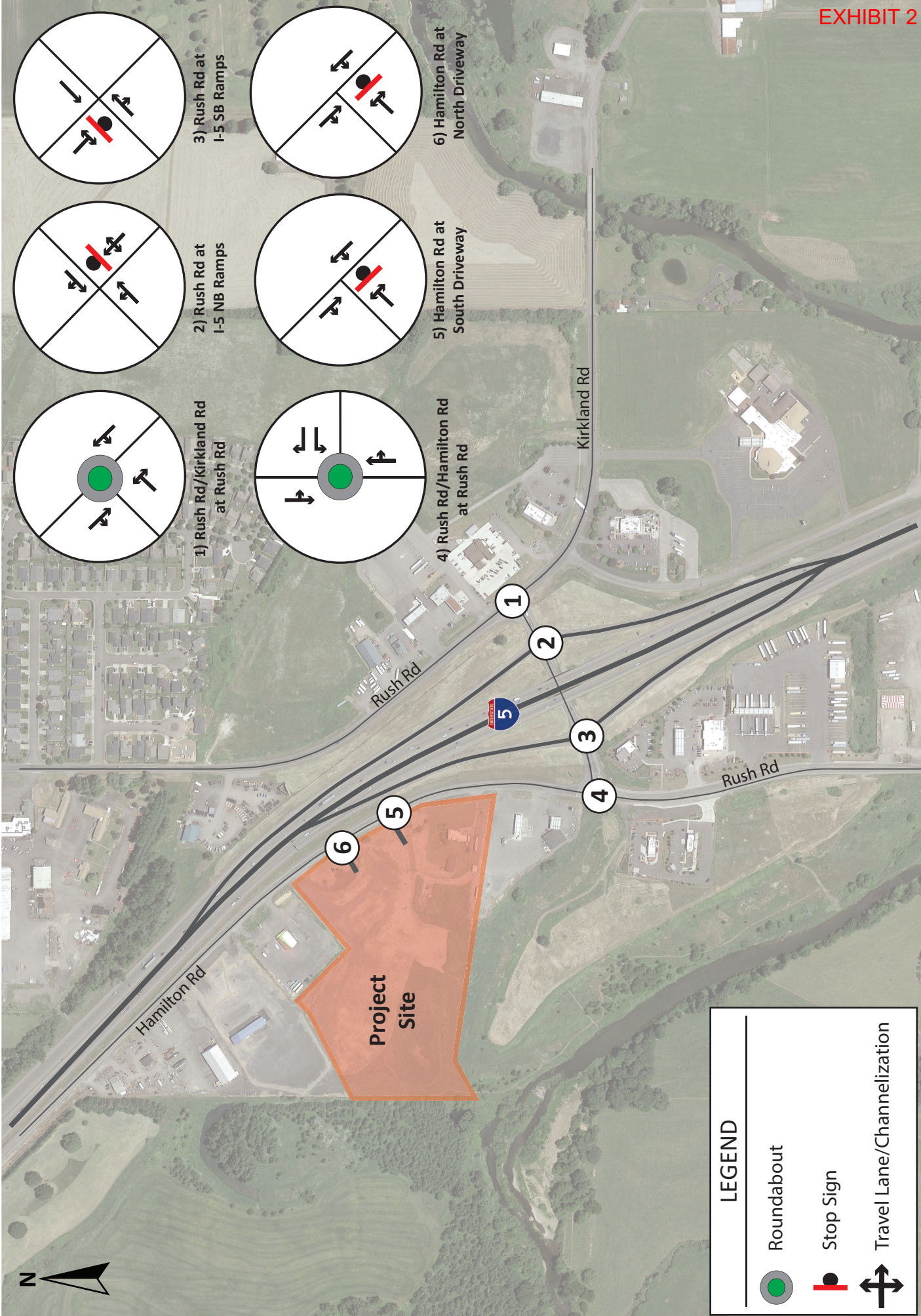
- Full size roundabout at Rush Road/Hamilton Road, with a single-lane northbound, a single-lane southbound, and a westbound right-turn lane.
- Access control at the southbound ramps, restricting the westbound to southbound left-turn movement onto the on-ramp. The southbound off-ramp will maintain full movements. To accommodate the southbound left-turn movement, a short refuge lane on Rush Road will be constructed to allow for two-stage left-turn maneuvers.
- No changes to the northbound ramps intersection.
- A compact roundabout at the Rush Road/Kirkland Road intersection.

The intersection control and channelization within the study area with completion of the proposed project and the improvement package is shown on **Figure 8**. Results from the analysis of study intersections including this package of improvements is provided in **Table 6**.

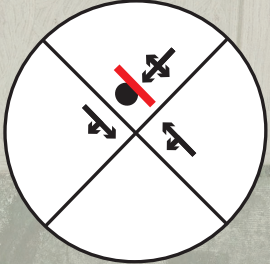
Table 6. Projected 2023 PM Peak Hour Intersection Level of Service

Intersection	With Project		With Project and Improvements	
	Existing Control Type	LOS (delay)	Proposed Control Type	LOS (delay)
Rush Road/Kirkland Road at Rush Road	TWSC ¹	C (18.3)	RAB ²	A (7.1)
Rush Road at I-5 NB Ramps	TWSC ¹	F (300+)	TWSC ^{1,3}	F (59.0)
Rush Road at I-5 SB Ramps	TWSC ¹	F (65.9)	TWSC ^{1,4}	F (64.1)
Rush Road/Hamilton Road at Rush Road	TWSC ¹	F (94.7)	RAB ²	A (2.9)
North (Truck) Driveway at Hamilton Road	TWSC ¹	A (9.2)	TWSC ¹	A (9.2)
South (Passenger Car) Driveway at Hamilton Road	TWSC ¹	B (11.0)	TWSC ¹	B (11.0)

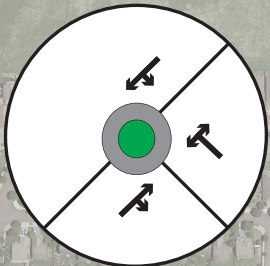
1. Two-Way-Stop-Control
2. Roundabout
3. Analysis assumes all left and through vehicles will divert to the new roundabout at Kirkland Road and make a U-turn.
4. Analysis includes access control eliminating the westbound to southbound left-turn movement to the southbound on-ramp and a new refuge lane on Rush Road to allow the southbound to eastbound off-ramp left-turning vehicles to make a two-stage left-turn movement.



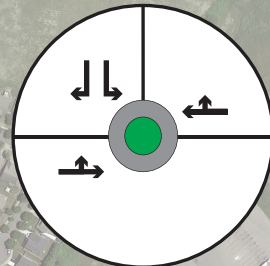
1) Rush Rd/Kirkland Rd at Rush Rd



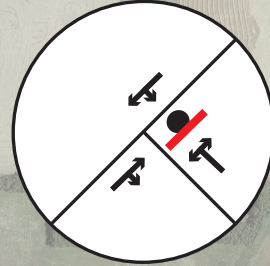
2) Rush Rd at I-5 NB Ramps



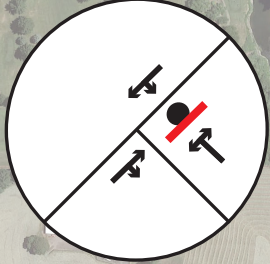
3) Rush Rd at I-5 SB Ramps



4) Rush Rd/Hamilton Rd at Rush Rd



5) Hamilton Rd at South Driveway



6) Hamilton Rd at North Driveway

LEGEND

-  Roundabout
-  Stop Sign
-  Travel Lane/Channelization

Figure 8
Proposed Intersection
Channelization and Control

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

6.3.2 Rush Road/Kirkland Road at Rush Road

This intersection will operate under roundabout control with each approach providing a single travel lane.

In the PM peak hour, for the 2023 horizon year with the addition of project traffic, the intersection is projected to operate at LOS C with 19.9 seconds of delay. For the 2023 horizon year with intersection improvements, the intersection would operate at LOS A, with 7.1 seconds of delay. It is assumed that the northbound off-ramp left and through movements will divert to this intersection and make a U-turn maneuver.

6.3.3 Rush Road at I-5 Northbound Ramps

This intersection will continue to operate under stop sign-control for the northbound approach. Each approach provides a single travel lane. While no access restrictions are proposed at this location, given the projected performance of the left and through movements, these vehicles have been reassigned as right-turns to then make a U-turn maneuver at the proposed Kirkland Road roundabout. A single vehicle was assumed for the left-turn and through maneuvers.

In the PM peak hour, for the 2023 horizon year with the addition of project traffic, the intersection is projected to operate at LOS F with 300+ seconds of delay. For the 2023 horizon year with intersection improvements, the intersection would operate at LOS F with 59.0 seconds of delay, which reflects the delay of the single left-turn and single through movement vehicles assumed in the analysis. The right-turn movement is projected to operate at LOS B with 13.8 seconds of delay.

6.3.4 Rush Road at I-5 Southbound Ramps

This intersection will continue to operate under stop sign-control for the southbound approach, with each approach providing a single travel lane. The southbound approach will be limited to a right or left turn (eliminating the through movement) and the westbound movement will be limited to a through lane only (eliminating the left-turn).

In the PM peak hour, for the 2023 horizon year with the addition of project traffic, the intersection is projected to operate at LOS F with 65.9 seconds of delay for the through-left turn movement. For the 2023 horizon year with intersection improvements, the intersection would operate at LOS F with 64.1 seconds of delay for the right-turn movement.

6.3.5 Rush Road/Hamilton Road at Rush Road

This intersection will operate under roundabout control. The northbound and southbound approaches will provide a single lane, and the westbound approach will provide a left-turn lane and a right turn lane.

In the PM peak hour, for the 2023 horizon year with the addition of project traffic, the intersection is projected to operate at LOS F with 94.7 seconds of delay for the southbound approach. For the 2023 horizon year with intersection improvements, the intersection would operate at LOS A, with 2.9 seconds of delay. With access control implemented at the I-5 SB Ramps intersection, the westbound SB on-ramp left-turn movement will divert to this intersection and make a U-turn maneuver.

6.3.6 95th Percentile Queue Summary

Given the limited spacing available in the Rush Road interchange area, an evaluation of the potential vehicle queuing at the study area intersections was performed using the SimTraffic simulation tool included in the Synchro software package. The analysis shows the average of five simulations, providing the 95th percentile queue, which is the peak typical queue experienced, excluding the highest five percent of occurrences. The 95th percentile queue is a useful parameter for determining the appropriate length of turn pockets but is not typical of what the average driver would experience.

Specific movements associated with travelling on Rush Road through the interchange and the I-5 off-ramp 95th percentile queue results are provided in **Table 7**.

Table 7. Projected 2023 PM Peak Hour Intersection Queues

Intersection Movement	Movement Storage ¹	2023 With Project	2023 With Project and Improvements
		95 th Percentile Queue	95 th Percentile Queue
Rush Road at Kirkland Road			
Eastbound left/through/right	115 feet	106 feet	83 feet
Rush Road at I-5 Northbound Ramps			
Eastbound through/left	330 feet	133 feet	263 feet
Westbound through/right	115 feet	60 feet	14 feet
Northbound left/through/right	1,025 feet	950+ feet	126 feet ²
Rush Road at I-5 Southbound Ramps			
Eastbound through/right	125 feet	19 feet	10 feet
Southbound left/through/right	1,150 feet	1,193 feet	788 feet
Rush Road at Hamilton Road			
Westbound left	125 feet	138 feet	117 feet
Westbound right	125 feet	78 feet	47 feet

1. Approximate distance between intersections accounting for proposed roundabout control
2. The left and through volumes were assumed to be one (1), with all remaining traffic turning right and making a U-turn maneuver

In 2023 after completion of the project, the existing roadway system is not projected to have any 95th percentile queues on Rush Road that extend into upstream intersections. This is largely by design as both off-ramps are stop-sign controlled and the Hamilton Road intersection allows free westbound movements. However, as shown in Table 5 and Table 6, multiple existing intersections are projected to operate at LOS F in the 2023 horizon year. The poor performance of the northbound ramps intersection is also apparent with a projected 95th percentile queue of over 950 feet.

With the proposed improvements, Rush Road will essentially continue to operate without any queuing impacts on upstream intersections. The future available storage between Hamilton Road, once a roundabout is constructed, and the southbound ramps is difficult to specify before design of the roundabout is completed. For now, the available storage is estimated to be 125 feet. With a westbound left-turn 95th percentile queue of 117 feet, the roundabout is projected to generate minimal queue spillback into the southbound ramps intersection and should not impact vehicle queues on the off-ramp.

The southbound off-ramp queue is projected to remain over 500 feet long but is still well short of the freeway mainline and would be unlikely to affect I-5 operations. The northbound off-ramp queue is projected to dramatically reduce, from in excess of 950 feet to 126 feet. As described above, this assumes the off-ramp traffic will make right-turns during the PM peak hour and then make a U-turn maneuver at the Kirkland Road roundabout to head in the opposite direction.

The queue analysis worksheets are provided in **Appendix E**.

7 Summary and Mitigation

7.1 Summary

GMD Land Company, LLC plans to construct a truck stop northwest of the I-5/Rush Road interchange in Napavine, WA. The project will consist of a new truck stop facility that will provide passenger vehicle and truck fueling, a convenience market and food service, and overnight truck parking. There will be a diesel fueling island with 8 fueling positions and a gasoline island with 16 fueling positions. 97 truck parking stalls for overnight parking will be provided.

At full occupancy and operation, the project is estimated to generate approximately 554 total trip ends during the PM peak hour. Most of these trips will be drawn from traffic already driving on I-5 or using the existing interchange and roads. This report has been prepared to provide the traffic analysis and project information for the City of Napavine and WSDOT to use in review of the project.

Based on the analysis described in this report, multiple intersections within the Rush Road interchange area are projected to operate at LOS F after completion of the project. A set of improvements has been identified, with input from WSDOT, that will address the level of service deficiencies and provide minimal vehicle queuing on Rush Road. These improvements are consistent with Alternative R from the 2018 interchange study conducted by WSDOT.

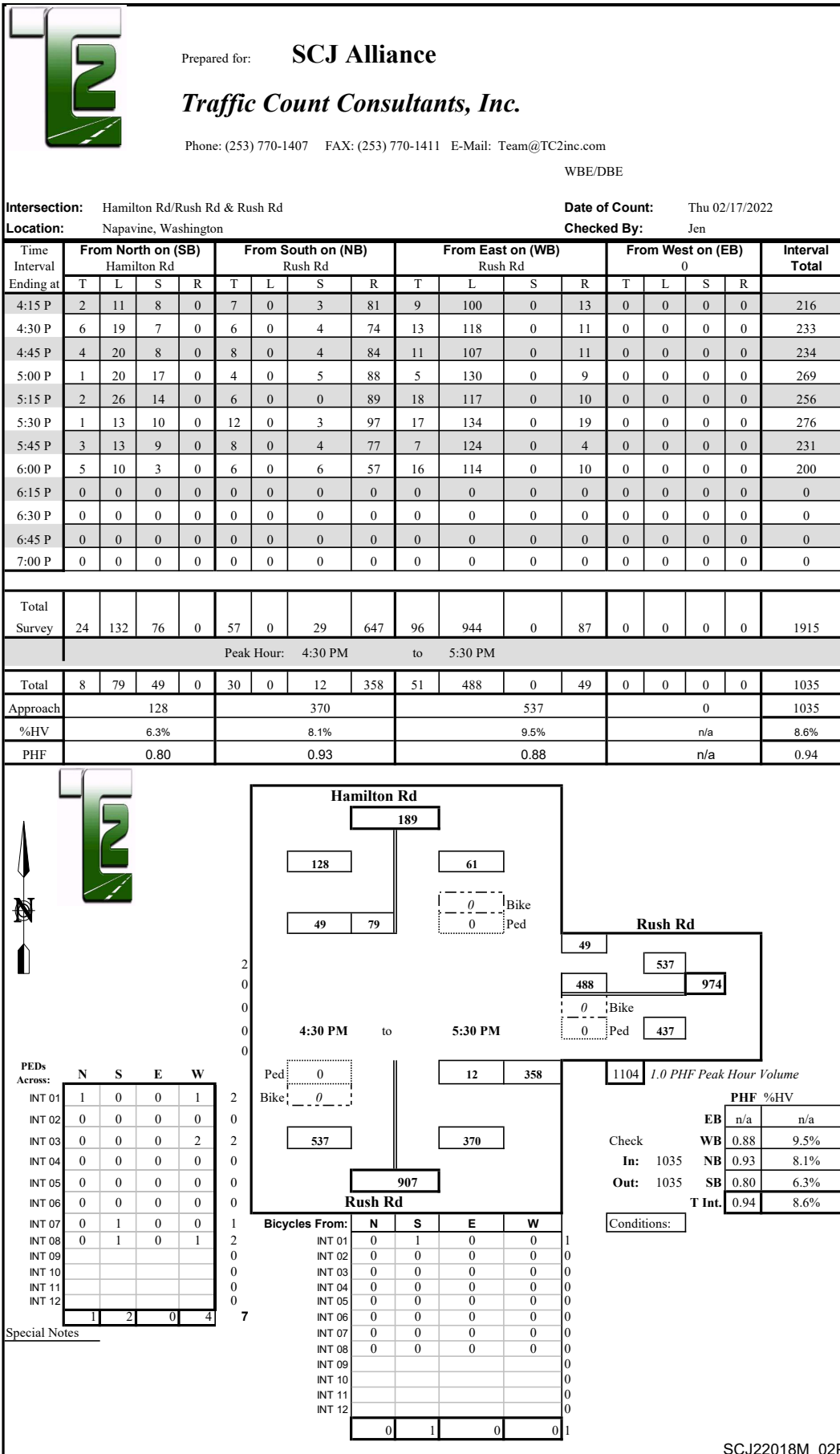
7.2 Mitigation


As part of the proposed truck stop project the following mitigation measures will be constructed:

- A full-size single-lane roundabout at Rush Road and Hamilton Road, with single lane approaches for the north and south legs and a left-turn lane and right-turn lane on the east leg.
- Access control at the southbound ramps intersection eliminating the westbound to southbound left-turn movement onto the southbound on-ramp.
- Widen Rush Road between the southbound ramps and the I-5 bridge to provide a refuge lane for southbound to eastbound left-turn vehicles, allowing for two-stage left-turn maneuvers.
- Install a compact single-lane roundabout at Rush Road and Kirkland Road, with all single lane approaches.
- Frontage improvements on Hamilton Road as required by the City of Napavine.

Appendix A

Traffic Volume Counts





Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

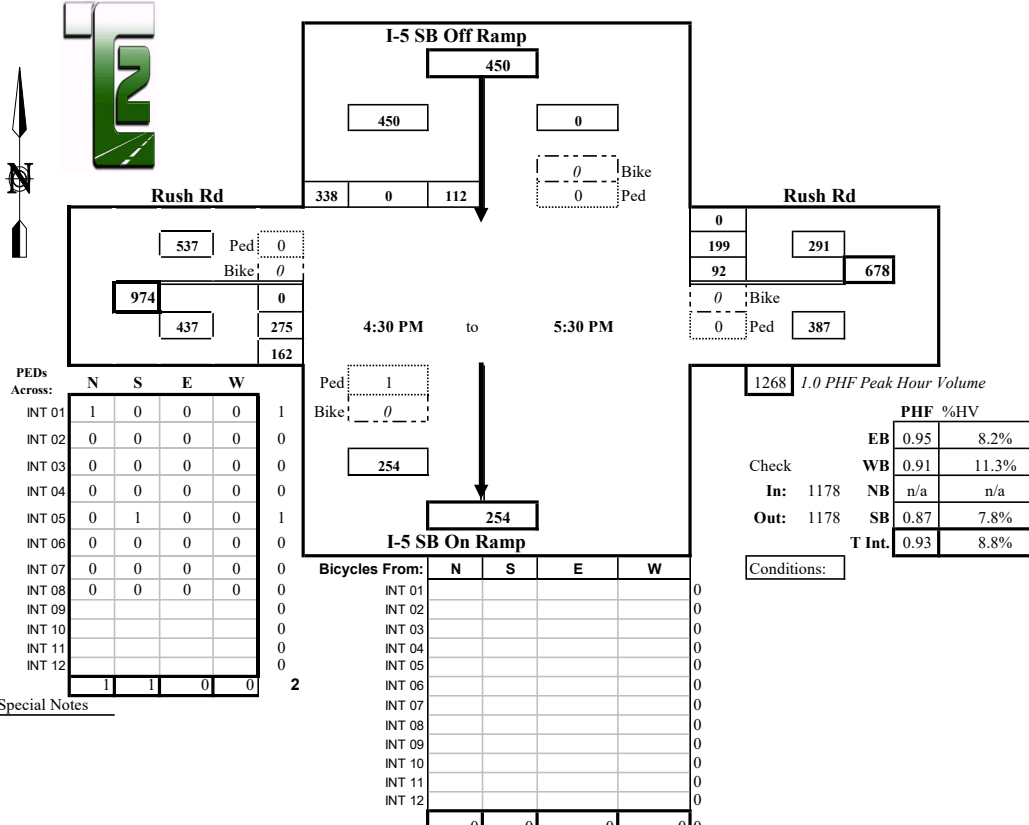
Intersection: I-5 SB Ramps & Rush Rd

Date of Count: Thu 02/17/2022

Location: Napavine, Washington

Checked By: Jen

Time Interval	From North on (SB) I-5 SB Off Ramp				From South on (NB) I-5 SB On Ramp				From East on (WB) Rush Rd				From West on (EB) Rush Rd				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	6	26	0	66	0	0	0	0	7	17	47	0	8	0	62	30	248
4:30 P	9	21	2	77	0	0	0	0	12	20	52	0	10	0	54	39	265
4:45 P	6	21	0	65	0	0	0	0	8	27	53	0	12	0	59	45	270
5:00 P	8	20	0	94	0	0	0	0	4	20	45	0	3	0	77	31	287
5:15 P	11	38	0	82	0	0	0	0	11	24	45	0	8	0	79	36	304
5:30 P	10	33	0	97	0	0	0	0	10	21	56	0	13	0	60	50	317
5:45 P	5	21	0	85	0	0	0	0	4	17	43	0	8	0	67	23	256
6:00 P	8	25	0	84	0	0	0	0	12	21	40	0	9	0	41	26	237
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey																	
	63	205	2	650	0	0	0	0	68	167	381	0	71	0	499	280	2184
Peak Hour: 4:30 PM to 5:30 PM																	
Total	35	112	0	338	0	0	0	0	33	92	199	0	36	0	275	162	1178
Approach	450				0				291				437				1178
%HV	7.8%				n/a				11.3%				8.2%				8.8%
PHF	0.87				n/a				0.91				0.95				0.93



PEDs Across:

	N	S	E	W	
INT 01	1	0	0	0	1
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	1	0	0	1
INT 06	0	0	0	0	0
INT 07	0	0	0	0	0
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	1	1	0	0	2

Special Notes

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	0	0	0	0	0


PHF %HV

Check	WB	PHF	%HV
EB	0.95	0.95	8.2%
WB	0.91	0.91	11.3%
In: 1178	NB	n/a	n/a
Out: 1178	SB	0.87	7.8%
T Int.		0.93	8.8%

Conditions:

1268 1.0 PHF Peak Hour Volume

SCJ22018M_03P



Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

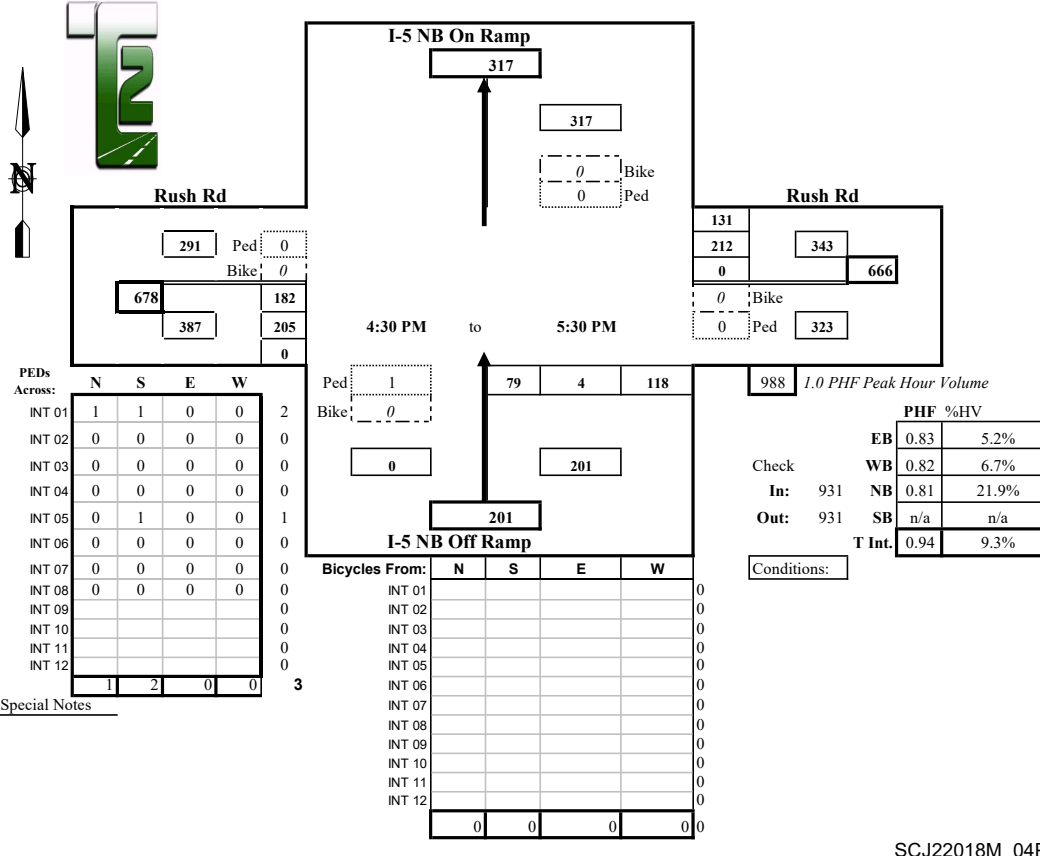
Intersection: I-5 NB Ramps & Rush Rd

Date of Count: Thu 02/17/2022

Location: Napavine, Washington

Checked By: Jen

Time Interval	From North on (SB) I-5 NB On Ramp				From South on (NB) I-5 NB Off Ramp				From East on (WB) Rush Rd				From West on (EB) Rush Rd				Interval Total			
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R				
4:15 P	0	0	0	0	7	15	1	27	3	0	49	29	7	40	48	0	209			
4:30 P	0	0	0	0	13	27	0	32	10	0	45	32	7	30	45	0	211			
4:45 P	0	0	0	0	11	15	0	24	6	0	65	40	4	39	41	0	224			
5:00 P	0	0	0	0	7	15	1	33	5	0	50	29	5	50	47	0	225			
5:15 P	0	0	0	0	11	22	1	28	6	0	47	32	4	50	67	0	247			
5:30 P	0	0	0	0	15	27	2	33	6	0	50	30	7	43	50	0	235			
5:45 P	0	0	0	0	7	13	1	29	3	0	47	23	5	45	43	0	201			
6:00 P	0	0	0	0	10	19	1	17	9	0	42	24	4	26	40	0	169			
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Total Survey	0	0	0	0	81	153	7	223	48	0	395	239	43	323	381	0	1721			
Peak Hour: 4:30 PM to 5:30 PM																				
Total	0	0	0	0	44	79	4	118	23	0	212	131	20	182	205	0	931			
Approach	0				201				343				387				931			
%HV	n/a				21.9%				6.7%				5.2%				9.3%			
PHF	n/a				0.81				0.82				0.83				0.94			



PEDs Across:

	N	S	E	W	
INT 01	1	1	0	0	2
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	1	0	0	1
INT 06	0	0	0	0	0
INT 07	0	0	0	0	0
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	1	2	0	0	3

Special Notes

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	0	0	0	0	0

PHF %HV

Check	PHF	%HV	
EB	0.83	5.2%	
WB	0.82	6.7%	
In: 931	NB	0.81	21.9%
Out: 931	SB	n/a	n/a
T Int.	0.94	9.3%	

Conditions:

SCJ22018M_04P



Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

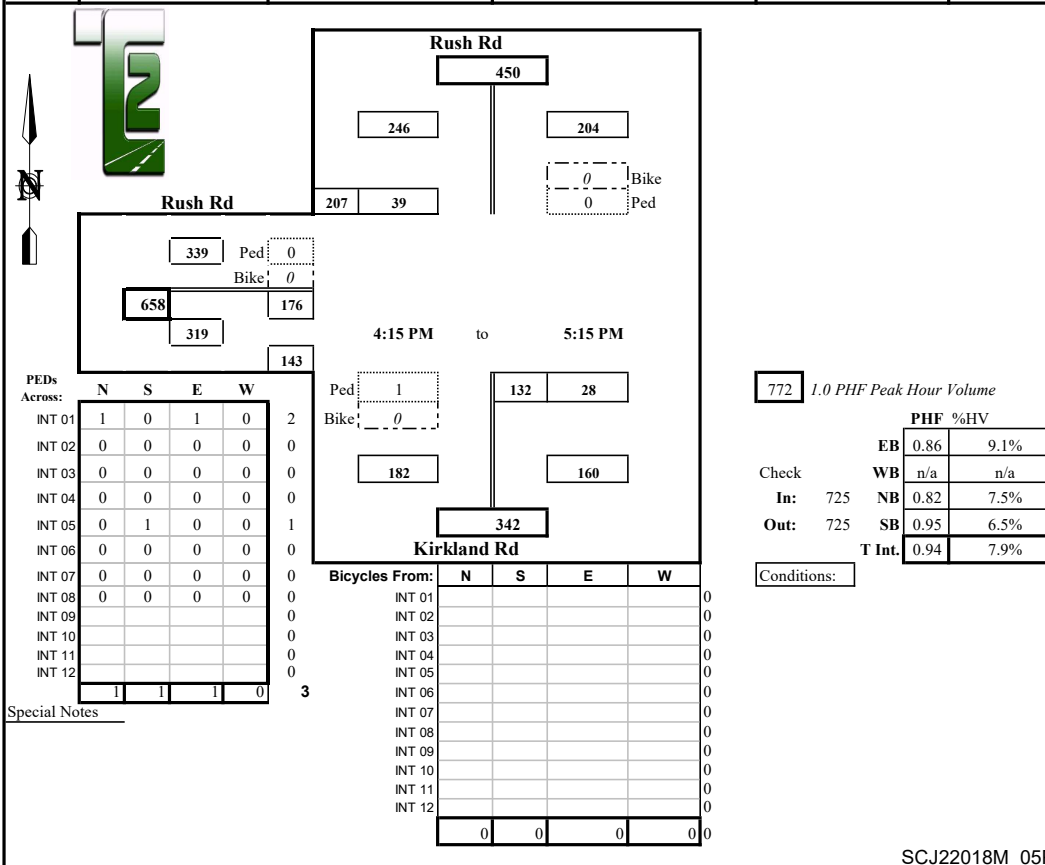
Intersection: Rush Rd/Kirkland Rd & Rush Rd

Date of Count: Thu 02/17/2022

Location: Napavine, Washington

Checked By: Jen

Time Interval	From North on (SB) Rush Rd				From South on (NB) Kirkland Rd				From East on (WB) 0				From West on (EB) Rush Rd				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	3	0	9	54	1	23	8	0	0	0	0	0	4	37	0	39	170
4:30 P	6	0	11	48	5	31	10	0	0	0	0	0	9	40	0	40	180
4:45 P	3	0	10	55	3	47	2	0	0	0	0	0	6	39	0	28	181
5:00 P	4	0	5	52	1	27	8	0	0	0	0	0	9	39	0	40	171
5:15 P	3	0	13	52	3	27	8	0	0	0	0	0	5	58	0	35	193
5:30 P	4	0	10	46	3	37	5	0	0	0	0	0	7	41	0	39	178
5:45 P	3	0	3	36	0	31	14	0	0	0	0	0	6	50	0	30	164
6:00 P	6	0	2	40	5	26	7	0	0	0	0	0	2	26	0	26	127
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	32	0	63	383	21	249	62	0	0	0	0	0	48	330	0	277	1364
Peak Hour: 4:15 PM to 5:15 PM																	
Total	16	0	39	207	12	132	28	0	0	0	0	0	29	176	0	143	725
Approach	246				160				0				319				725
%HV	6.5%				7.5%				n/a				9.1%				7.9%
PHF	0.95				0.82				n/a				0.86				0.94



Appendix B

Crash Data

Appendix C

Traffic Volume Calculations Worksheets

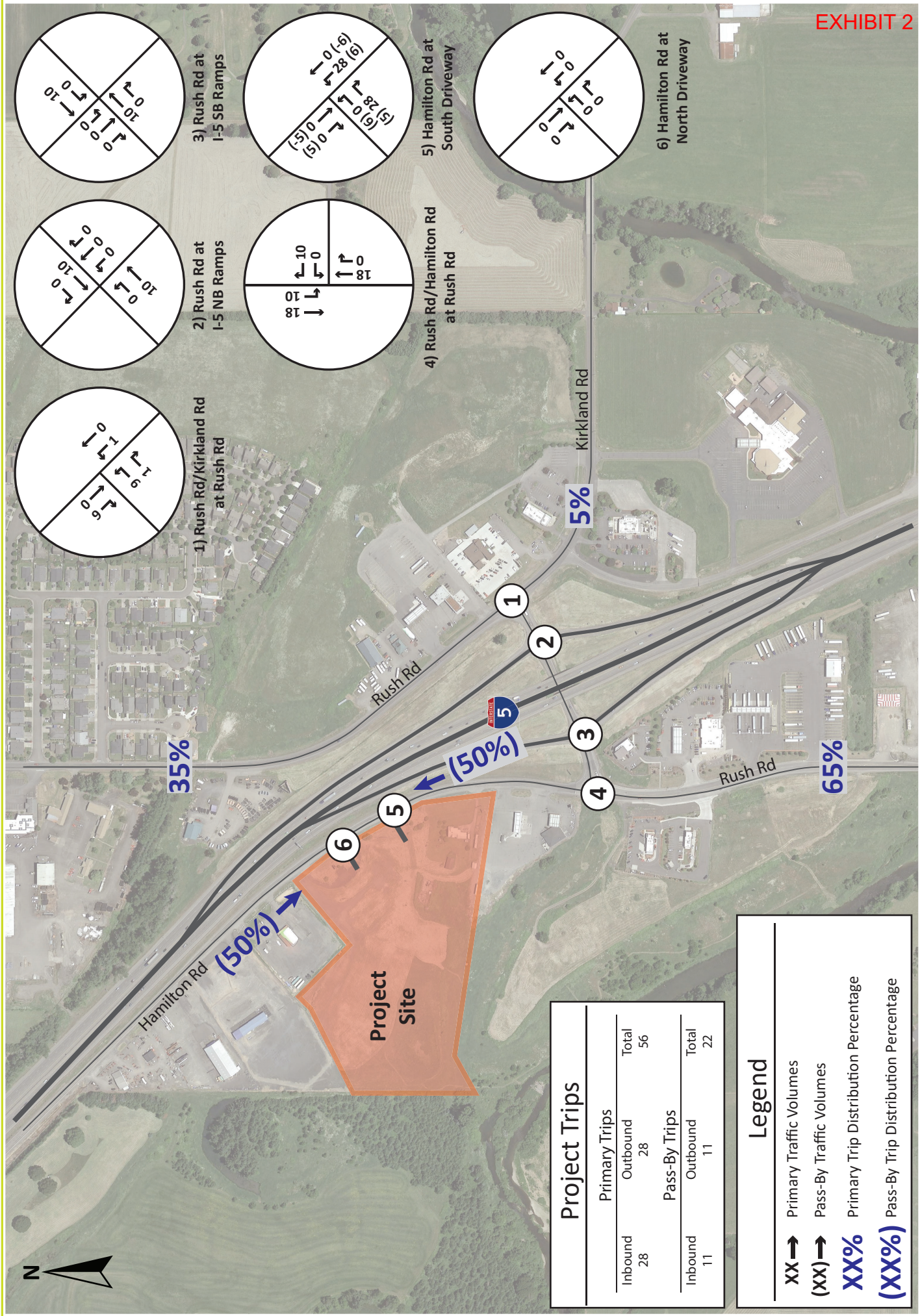


Figure A
PM Peak Hour Primary and Pass-By
Site Generated Traffic Volumes

Napavine Truck Stop
Napavine, Washington
Traffic Impact Analysis

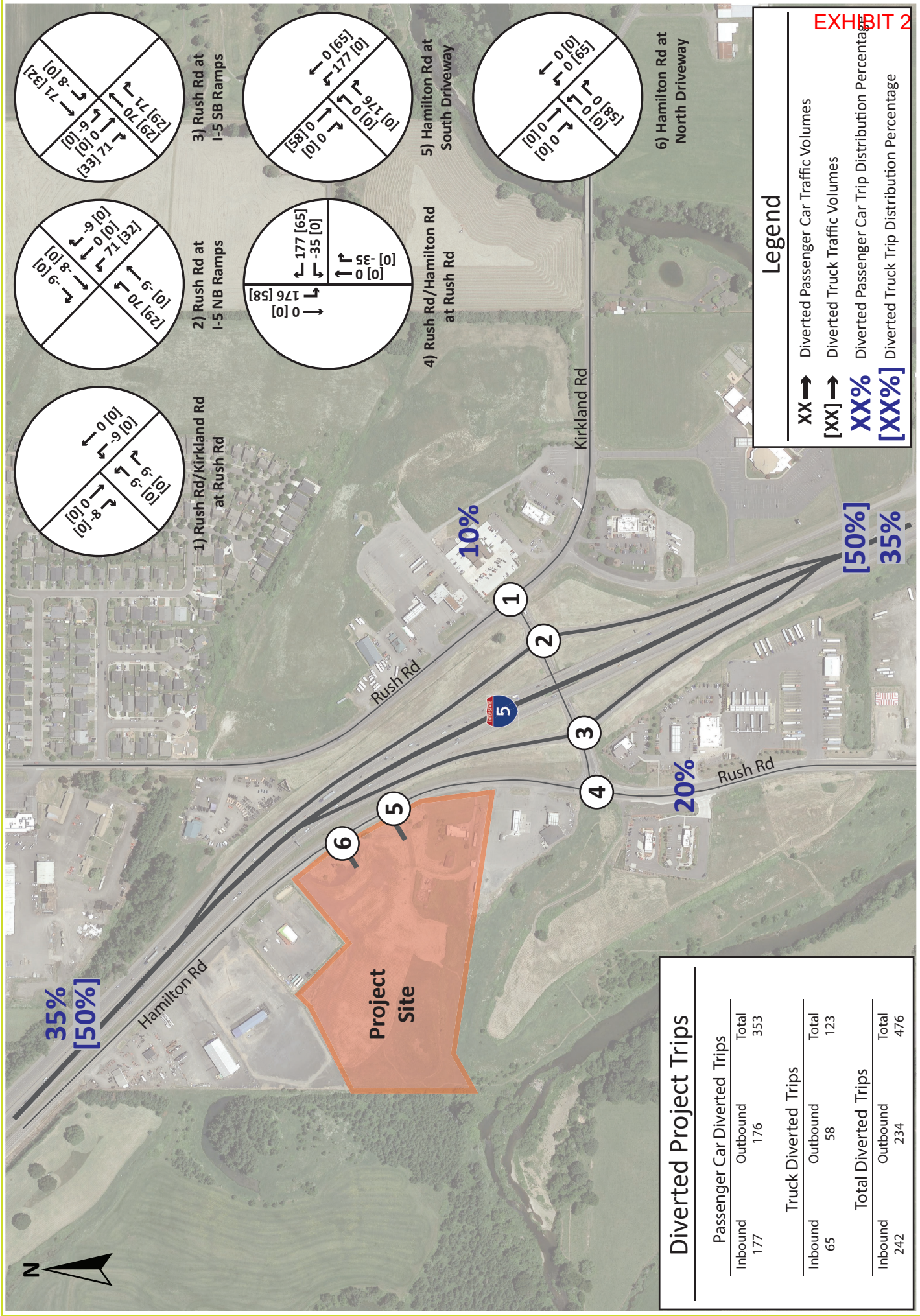


Figure B
 PM Peak Hour Diverted
 Site Generated Traffic Volumes

Napavine Truck Stop
 Napavine, Washington
 Traffic Impact Analysis

Napavine Truck Stop

PM Peak Hour Volumes

Growth Rate: 2%
Pipeline Development

Intersection	Movement	Existing 2022 Counts	Background 2023 Growth	ARCO AM/PM Volumes	Baseline 2023 Volumes	Primary Car Trips	Pass-By Car Trips	Diverted Car Trips	Diverted Truck Trips	Site Generated Volumes	Projected 2023 Volumes
1 Rush Rd Kirkland Rd TMC Date: 02/17/2022 4:15 - 5:15 PM PHF: 0.94	EB	L 176	4	3	183	9	0	-9	0	0	183
		T 0	0	0	0	0	0	0	0	0	0
		R 143	3	2	148	1	0	-9	0	-8	140
		L 0	0	0	0	0	0	0	0	0	0
		T 0	0	0	0	0	0	0	0	0	0
		R 0	0	0	0	0	0	0	0	0	0
		L 0	0	0	0	0	0	0	0	0	0
		T 0	0	0	0	0	0	0	0	0	0
		R 0	0	0	0	0	0	0	0	0	0
		L 0	0	0	0	0	0	0	0	0	0
		T 39	1	0	40	0	0	0	0	0	40
		R 207	4	3	214	9	0	-8	0	1	215
		725								-15	735
2 Rush Rd I-5 NB Ramps TMC Date: 02/17/2022 4:30 - 5:30 PM PHF: 0.94	EB	L 182	4	40	226	0	0	70	29	99	325
		T 205	4	5	214	10	0	-9	0	1	215
		R 0	0	0	0	0	0	0	0	0	0
		L 0	0	0	0	0	0	0	0	0	0
		T 212	4	5	221	10	0	-8	0	2	223
		R 131	3	0	134	0	0	-9	0	-9	125
		L 79	2	42	123	0	0	71	32	103	226
		T 4	0	0	4	0	0	0	0	0	4
		R 118	2	0	120	0	0	-9	0	-9	111
		L 0	0	0	0	0	0	0	0	0	0
		T 0	0	0	0	0	0	0	0	0	0
		R 0	0	0	0	0	0	0	0	0	0
		931		1,042						187	1,229

Napavine Truck Stop

PM Peak Hour Volumes

Growth Rate: 2%
Pipeline Development

Intersection	Movement	Existing	Background	ARCO	Baseline	Primary	Pass-By	Diverted	Diverted	Site	Projected
		2022	2023	AM/PM	2023	Car	Car	Car	Truck	Generated	2023
		Counts	Growth	Volumes	Volumes	Trips	Trips	Trips	Trips	Volumes	Volumes
3 Rush Rd I-5 SB Ramps TMC Date: 02/17/2022 4:30 - 5:30 PM PHF: 0.93	EB	0	0	0	0	0	0	0	0	0	0
	T	275	6	45	326	10	0	70	29	109	435
	R	162	3	75	240	0	0	71	29	100	340
	L	92	2	0	94	0	0	-8	0	-8	86
	T	199	4	47	250	10	0	71	32	113	363
	R	0	0	0	0	0	0	0	0	0	0
	L	0	0	0	0	0	0	0	0	0	0
	T	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	0	0	0	0	0	0
	L	112	2	0	114	0	0	-9	0	-9	105
	T	0	0	0	0	0	0	0	0	0	0
	R	338	7	77	422	0	0	71	33	104	526
		1,178			1,446				409	1,855	
4 Rush Rd Hamilton Rd TMC Date: 02/17/2022 4:30 - 5:30 PM PHF: 0.94	EB	0	0	0	0	0	0	0	0	0	0
	T	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	0	0	0	0	0	0
	L	488	10	124	622	0	0	-35	0	-35	587
	T	0	0	0	0	0	0	0	0	0	0
	R	49	1	0	50	10	0	177	65	252	302
	L	0	0	0	0	0	0	0	0	0	0
	T	12	0	1	13	18	0	0	0	18	31
	R	358	7	120	485	0	0	-35	0	-35	450
	L	79	2	0	81	10	0	176	58	244	325
	T	49	1	2	52	18	0	0	0	18	70
	R	0	0	0	0	0	0	0	0	0	0
		1,035		1,303					462	1,765	

Napavine Truck Stop

PM Peak Hour Volumes

Growth Rate: 2%
Pipeline Development

Intersection	Movement	Existing 2022 Counts	Background 2023 Growth	ARCO AM/PM Volumes	Baseline 2023 Volumes	Primary Car Trips	Pass-By Car Trips	Diverted Car Trips	Diverted Truck Trips	Site Generated Volumes	Projected 2023 Volumes	
												Car Trips
5 Hamilton Rd South Driveway	EB	0	0	0	0	0	6	0	0	6	6	
	T	0	0	0	0	0	0	0	0	0	0	
	R	0	0	0	0	28	5	176	0	209	209	
	L	0	0	0	0	0	0	0	0	0	0	
	T	0	0	0	0	0	0	0	0	0	0	
	R	0	0	0	0	0	0	0	0	0	0	
	L	0	0	0	0	0	0	0	0	0	0	
	T	32	1	0	33	28	6	177	0	65	211	211
	R	0	0	0	0	0	-6	0	0	59	92	92
	L	0	0	0	0	0	0	0	0	0	0	0
T	110	2	0	112	0	-5	0	58	53	165	165	
R	0	0	0	0	0	0	5	0	0	5	5	
		1,177			1,448					1,005	2,453	
6 Hamilton Rd North Driveway	EB	0	0	0	0	0	0	0	0	0	0	
	T	0	0	0	0	0	0	0	0	0	0	
	R	0	0	0	0	0	0	0	58	58	58	
	L	0	0	0	0	0	0	0	0	0	0	
	T	0	0	0	0	0	0	0	0	0	0	
	R	0	0	0	0	0	0	0	0	0	0	
	L	0	0	0	0	0	0	0	0	0	0	
	T	32	1	0	33	0	0	0	65	65	65	65
	R	0	0	0	0	0	0	0	0	0	0	0
	L	0	0	0	0	0	0	0	0	0	0	0
T	110	2	0	112	0	0	0	0	0	112	112	
R	0	0	0	0	0	0	0	0	0	0	0	
		142			145					123	268	

Appendix D

Capacity Analysis Worksheets

HCM 6th TWSC
1: Kirkland Rd & Rush Rd

EXHIBIT 2
Existing 2022
PM Peak Hour

Intersection						
Int Delay, s/veh	9.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	175	145	130	30	40	205
Future Vol, veh/h	175	145	130	30	40	205
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	186	154	138	32	43	218

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	460	152	261	0	0
Stage 1	152	-	-	-	-
Stage 2	308	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	559	894	1303	-	-
Stage 1	876	-	-	-	-
Stage 2	745	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	499	894	1303	-	-
Mov Cap-2 Maneuver	499	-	-	-	-
Stage 1	781	-	-	-	-
Stage 2	745	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.5	6.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1303	-	624	-	-
HCM Lane V/C Ratio	0.106	-	0.546	-	-
HCM Control Delay (s)	8.1	0	17.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	3.3	-	-

HCM 6th TWSC
2: I-5 NB Ramps & Rush Rd

EXHIBIT 2
Existing 2022
PM Peak Hour

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↗			↕				
Traffic Vol, veh/h	180	205	0	0	210	130	80	5	120	0	0	0
Future Vol, veh/h	180	205	0	0	210	130	80	5	120	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	7	7	7	22	22	22	0	0	0
Mvmt Flow	191	218	0	0	223	138	85	5	128	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	361	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.15	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.245	-	-
Pot Cap-1 Maneuver	1181	0	0
Stage 1	-	0	0
Stage 2	-	0	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1181	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	4	0	23.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	404	1181	-	-	-
HCM Lane V/C Ratio	0.54	0.162	-	-	-
HCM Control Delay (s)	23.9	8.6	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	3.1	0.6	-	-	-

HCM 6th TWSC
3: I-5 SB Ramps & Rush Rd

EXHIBIT 2
Existing 2022
PM Peak Hour

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔						↔	↔
Traffic Vol, veh/h	0	275	160	90	200	0	0	0	0	110	0	340
Future Vol, veh/h	0	275	160	90	200	0	0	0	0	110	0	340
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	11	11	11	0	0	0	8	8	8
Mvmt Flow	0	296	172	97	215	0	0	0	0	118	0	366

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	-	0	0	468	0	0		791	877	215
Stage 1	-	-	-	-	-	-		409	409	-
Stage 2	-	-	-	-	-	-		382	468	-
Critical Hdwy	-	-	-	4.21	-	-		6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-		5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.48	5.58	-
Follow-up Hdwy	-	-	-	2.299	-	-		3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1048	-	0		350	281	810
Stage 1	0	-	-	-	-	0		658	586	-
Stage 2	0	-	-	-	-	0		677	551	-
Platoon blocked, %	-	-	-	-	-	-		-	-	-
Mov Cap-1 Maneuver	-	-	-	1048	-	-		313	0	810
Mov Cap-2 Maneuver	-	-	-	-	-	-		313	0	-
Stage 1	-	-	-	-	-	-		658	0	-
Stage 2	-	-	-	-	-	-		606	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.7	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1048	-	313	810
HCM Lane V/C Ratio	-	-	0.092	-	0.378	0.451
HCM Control Delay (s)	-	-	8.8	0	23.3	13
HCM Lane LOS	-	-	A	A	C	B
HCM 95th %tile Q(veh)	-	-	0.3	-	1.7	2.4

SimTraffic Performance Report

4: Rush Rd & Hamilton Rd Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	3.7	0.2	0.2	1.3
Total Del/Veh (s)	0.8	0.8	1.6	12.9	3.3	13.0	14.7	3.4

HCM 6th TWSC
1: Kirkland Rd & Rush Rd

Intersection						
Int Delay, s/veh	9.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	185	150	135	30	40	215
Future Vol, veh/h	185	150	135	30	40	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	197	160	144	32	43	229

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	478	158	272	0	0
Stage 1	158	-	-	-	-
Stage 2	320	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	546	887	1291	-	-
Stage 1	871	-	-	-	-
Stage 2	736	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	484	887	1291	-	-
Mov Cap-2 Maneuver	484	-	-	-	-
Stage 1	772	-	-	-	-
Stage 2	736	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	6.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1291	-	608	-	-
HCM Lane V/C Ratio	0.111	-	0.586	-	-
HCM Control Delay (s)	8.1	0	19	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	3.8	-	-

HCM 6th TWSC
2: I-5 NB Ramps & Rush Rd

Intersection												
Int Delay, s/veh	18.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Traffic Vol, veh/h	225	215	0	0	220	135	125	5	120	0	0	0
Future Vol, veh/h	225	215	0	0	220	135	125	5	120	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	7	7	7	22	22	22	0	0	0
Mvmt Flow	239	229	0	0	234	144	133	5	128	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	378	0	- - - 0 1013 1085 229
Stage 1	-	-	- - - 707 707 -
Stage 2	-	-	- - - 306 378 -
Critical Hdwy	4.15	-	- - - 6.62 6.72 6.42
Critical Hdwy Stg 1	-	-	- - - 5.62 5.72 -
Critical Hdwy Stg 2	-	-	- - - 5.62 5.72 -
Follow-up Hdwy	2.245	-	- - - 3.698 4.198 3.498
Pot Cap-1 Maneuver	1164	-	0 0 - 243 199 763
Stage 1	-	-	0 0 - 454 409 -
Stage 2	-	-	0 0 - 704 582 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	1164	-	- - - 186 0 763
Mov Cap-2 Maneuver	-	-	- - - 186 0 -
Stage 1	-	-	- - - 347 0 -
Stage 2	-	-	- - - 704 0 -

Approach	EB	WB	NB
HCM Control Delay, s	4.5	0	68.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	295	1164	-	-	-
HCM Lane V/C Ratio	0.902	0.206	-	-	-
HCM Control Delay (s)	68.8	8.9	0	-	-
HCM Lane LOS	F	A	A	-	-
HCM 95th %tile Q(veh)	8.3	0.8	-	-	-

HCM 6th TWSC
3: I-5 SB Ramps & Rush Rd

Intersection												
Int Delay, s/veh	8.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔						↔	↔
Traffic Vol, veh/h	0	325	240	95	250	0	0	0	0	115	0	420
Future Vol, veh/h	0	325	240	95	250	0	0	0	0	115	0	420
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	11	11	11	0	0	0	8	8	8
Mvmt Flow	0	349	258	102	269	0	0	0	0	124	0	452

Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	-	0	0	607	0	0				951	1080	269
Stage 1	-	-	-	-	-	-				473	473	-
Stage 2	-	-	-	-	-	-				478	607	-
Critical Hdwy	-	-	-	4.21	-	-				6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-				5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.48	5.58	-
Follow-up Hdwy	-	-	-	2.299	-	-				3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	929	-	0				281	213	755
Stage 1	0	-	-	-	-	0				615	548	-
Stage 2	0	-	-	-	-	0				611	477	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	-	-	-	929	-	-				245	0	755
Mov Cap-2 Maneuver	-	-	-	-	-	-				245	0	-
Stage 1	-	-	-	-	-	-				615	0	-
Stage 2	-	-	-	-	-	-				532	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.6	20.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	929	-	245	755
HCM Lane V/C Ratio	-	-	0.11	-	0.505	0.598
HCM Control Delay (s)	-	-	9.4	0	33.8	16.6
HCM Lane LOS	-	-	A	A	D	C
HCM 95th %tile Q(veh)	-	-	0.4	-	2.6	4

SimTraffic Performance Report

4: Rush Rd & Hamilton Rd Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	1.1	3.5	0.2	0.2	1.4
Total Del/Veh (s)	0.9	1.0	1.5	24.2	7.2	20.2	19.8	5.4

HCM 6th TWSC
1: Kirkland Rd & Rush Rd

Intersection						
Int Delay, s/veh	9.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	185	140	130	30	40	215
Future Vol, veh/h	185	140	130	30	40	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	197	149	138	32	43	229

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	466	158	272	0	0
Stage 1	158	-	-	-	-
Stage 2	308	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	555	887	1291	-	-
Stage 1	871	-	-	-	-
Stage 2	745	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	495	887	1291	-	-
Mov Cap-2 Maneuver	495	-	-	-	-
Stage 1	776	-	-	-	-
Stage 2	745	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.3	6.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1291	-	611	-	-
HCM Lane V/C Ratio	0.107	-	0.566	-	-
HCM Control Delay (s)	8.1	0	18.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	3.5	-	-

HCM 6th TWSC
2: I-5 NB Ramps & Rush Rd

Intersection												
Int Delay, s/veh	179.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				
Traffic Vol, veh/h	325	215	0	0	225	125	230	5	110	0	0	0
Future Vol, veh/h	325	215	0	0	225	125	230	5	110	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	7	7	7	22	22	22	0	0	0
Mvmt Flow	346	229	0	0	239	133	245	5	117	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	372	0	- - - 0 1227 1293 229
Stage 1	-	-	- - - 921 921 -
Stage 2	-	-	- - - 306 372 -
Critical Hdwy	4.15	-	- - - 6.62 6.72 6.42
Critical Hdwy Stg 1	-	-	- - - 5.62 5.72 -
Critical Hdwy Stg 2	-	-	- - - 5.62 5.72 -
Follow-up Hdwy	2.245	-	- - - 3.698 4.198 3.498
Pot Cap-1 Maneuver	1170	-	0 0 - ~ 179 149 763
Stage 1	-	-	0 0 - 357 324 -
Stage 2	-	-	0 0 - 704 585 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	1170	-	- - - ~ 118 0 763
Mov Cap-2 Maneuver	-	-	- - - ~ 118 0 -
Stage 1	-	-	- - - ~ 236 0 -
Stage 2	-	-	- - - 704 0 -

Approach	EB	WB	NB
HCM Control Delay, s	5.6	0	\$ 634.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	162	1170	-	-	-
HCM Lane V/C Ratio	2.266	0.296	-	-	-
HCM Control Delay (s)	\$ 634.1	9.4	0	-	-
HCM Lane LOS	F	A	A	-	-
HCM 95th %tile Q(veh)	30.2	1.2	-	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
3: I-5 SB Ramps & Rush Rd

Intersection												
Int Delay, s/veh	14.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔						↔	↔
Traffic Vol, veh/h	0	435	340	85	365	0	0	0	0	105	0	525
Future Vol, veh/h	0	435	340	85	365	0	0	0	0	105	0	525
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	11	11	11	0	0	0	8	8	8
Mvmt Flow	0	468	366	91	392	0	0	0	0	113	0	565

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	-	0	0	834	0	0		1225	1408	392
Stage 1	-	-	-	-	-	-		574	574	-
Stage 2	-	-	-	-	-	-		651	834	-
Critical Hdwy	-	-	-	4.21	-	-		6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-		5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.48	5.58	-
Follow-up Hdwy	-	-	-	2.299	-	-		3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	762	-	0		192	135	644
Stage 1	0	-	-	-	-	0		552	494	-
Stage 2	0	-	-	-	-	0		508	375	-
Platoon blocked, %	-	-	-	-	-	-		-	-	-
Mov Cap-1 Maneuver	-	-	-	762	-	-		163	0	644
Mov Cap-2 Maneuver	-	-	-	-	-	-		163	0	-
Stage 1	-	-	-	-	-	-		552	0	-
Stage 2	-	-	-	-	-	-		430	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2	42.2
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	762	-	163	644
HCM Lane V/C Ratio	-	-	0.12	-	0.693	0.877
HCM Control Delay (s)	-	-	10.4	0	65.9	37.4
HCM Lane LOS	-	-	B	A	F	E
HCM 95th %tile Q(veh)	-	-	0.4	-	4.1	10.4

SimTraffic Performance Report

4: Rush Rd & Hamilton Rd Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.1	8.9	9.0	1.4	1.4	2.8
Total Del/Veh (s)	1.9	1.8	3.4	62.7	57.1	94.7	89.9	38.5

HCM 6th TWSC
5: Hamilton Rd & South Site Driveway

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations	W		T			T
Traffic Vol, veh/h	5	210	165	5	210	90
Future Vol, veh/h	5	210	165	5	210	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	228	179	5	228	98

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	736	182	0	0	184
Stage 1	182	-	-	-	-
Stage 2	554	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	386	861	-	-	1391
Stage 1	849	-	-	-	-
Stage 2	575	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	319	861	-	-	1391
Mov Cap-2 Maneuver	319	-	-	-	-
Stage 1	849	-	-	-	-
Stage 2	476	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	11	0	5.7
HCM LOS	B		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1391	-	828	-	-
HCM Lane V/C Ratio	0.164	-	0.282	-	-
HCM Control Delay (s)	8.1	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.6	-	1.2	-	-

HCM 6th TWSC
6: Hamilton Rd & North Site Driveway

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations	Y		B			A
Traffic Vol, veh/h	1	60	110	1	65	35
Future Vol, veh/h	1	60	110	1	65	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	65	120	1	71	38

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	301	121	0	0	121
Stage 1	121	-	-	-	-
Stage 2	180	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	691	930	-	-	1467
Stage 1	904	-	-	-	-
Stage 2	851	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	657	930	-	-	1467
Mov Cap-2 Maneuver	657	-	-	-	-
Stage 1	904	-	-	-	-
Stage 2	809	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.2	0	4.9
HCM LOS	A		

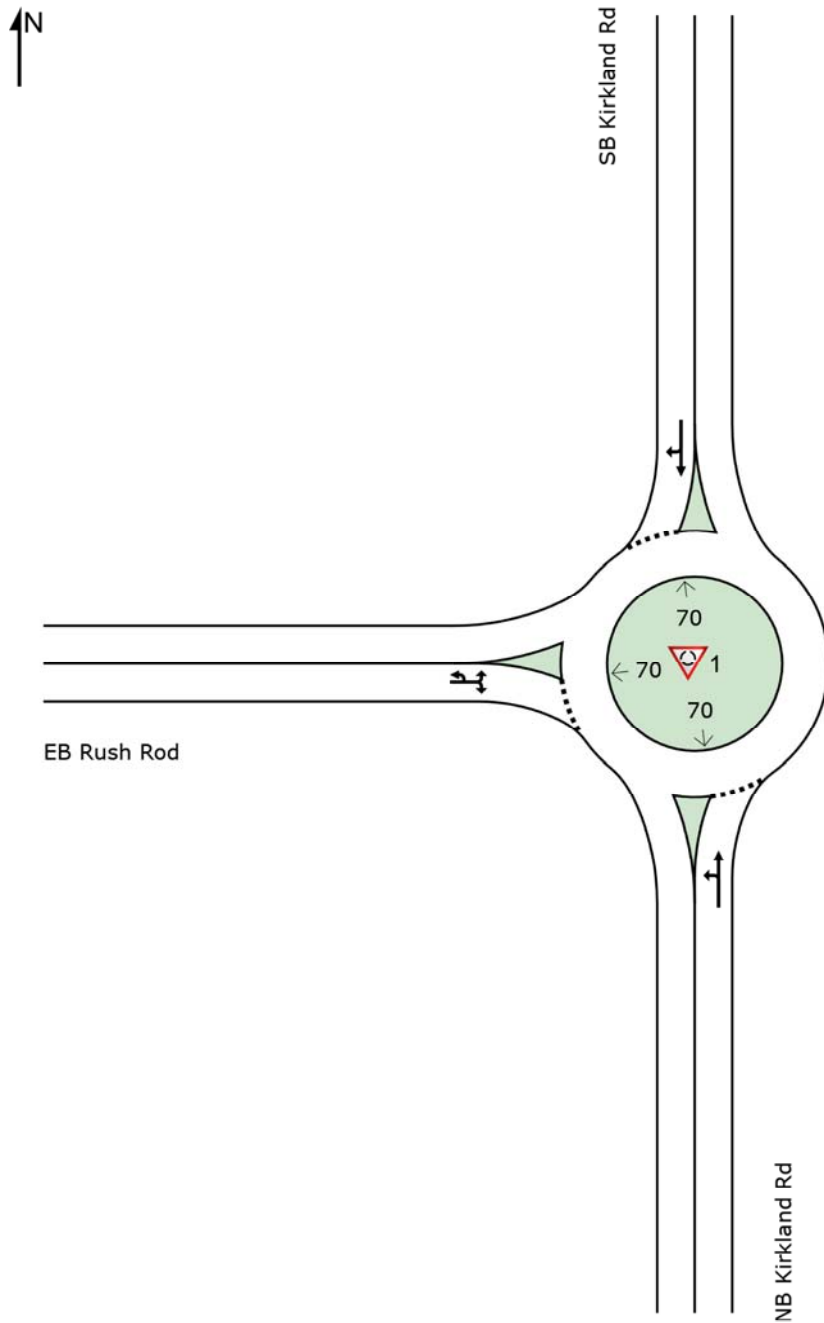
Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1467	-	924	-	-
HCM Lane V/C Ratio	0.048	-	0.072	-	-
HCM Control Delay (s)	7.6	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

SITE LAYOUT

 Site: 1 [Rush Road-Kirkland Rd - NB RIRO (Site Folder: General)]

Projected 2023 With Project
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 1 [Rush Road-Kirkland Rd - NB RIRO (Site Folder: General)]

Projected 2023 With Project
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: NB Kirkland Rd														
3	L2	130	2.0	138	2.0	0.199	6.3	LOS A	0.9	22.1	0.54	0.48	0.54	31.9
8	T1	30	2.0	32	2.0	0.199	6.3	LOS A	0.9	22.1	0.54	0.48	0.54	32.0
Approach		160	2.0	170	2.0	0.199	6.3	LOS A	0.9	22.1	0.54	0.48	0.54	31.9
North: SB Kirkland Rd														
4	T1	40	2.0	43	2.0	0.299	7.1	LOS A	1.4	36.6	0.56	0.49	0.56	33.3
14	R2	215	2.0	229	2.0	0.299	7.1	LOS A	1.4	36.6	0.56	0.49	0.56	32.5
Approach		255	2.0	271	2.0	0.299	7.1	LOS A	1.4	36.6	0.56	0.49	0.56	32.6
West: EB Rush Rod														
5u	U	230	2.0	245	2.0	0.456	7.4	LOS A	3.3	82.8	0.24	0.09	0.24	31.7
5	L2	185	2.0	197	2.0	0.456	7.4	LOS A	3.3	82.8	0.24	0.09	0.24	31.2
12	R2	140	2.0	149	2.0	0.456	7.4	LOS A	3.3	82.8	0.24	0.09	0.24	30.6
Approach		555	2.0	590	2.0	0.456	7.4	LOS A	3.3	82.8	0.24	0.09	0.24	31.2
All Vehicles		970	2.0	1032	2.0	0.456	7.1	LOS A	3.3	82.8	0.37	0.26	0.37	31.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th TWSC
2: I-5 NB Ramps & Rush Rd

Projected 2023 with Project with Improvements
PM Peak hour

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔			
Traffic Vol, veh/h	325	215	0	0	450	135	1	5	335	0	0	0
Future Vol, veh/h	325	215	0	0	450	135	1	5	335	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	100	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	5	5	5	7	7	7	22	22	22	0	0	0
Mvmt Flow	346	229	0	0	479	144	1	5	356	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	623	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.15	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.245	-	-
Pot Cap-1 Maneuver	944	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	944	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	6.6	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	73	763	944	-	-	-
HCM Lane V/C Ratio	0.087	0.467	0.366	-	-	-
HCM Control Delay (s)	59	13.8	11	0	-	-
HCM Lane LOS	F	B	B	A	-	-
HCM 95th %tile Q(veh)	0.3	2.5	1.7	-	-	-

HCM 6th TWSC
3: I-5 SB Ramps & Rush Rd

Projected 2023 with Project with Improvements

PM Peak hour

Intersection												
Int Delay, s/veh	18.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗			↖						↖	↗
Traffic Vol, veh/h	0	435	425	0	450	0	0	0	0	105	0	530
Future Vol, veh/h	0	435	425	0	450	0	0	0	0	105	0	530
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	11	11	11	0	0	0	8	8	8
Mvmt Flow	0	468	457	0	484	0	0	0	0	113	0	570

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	-	0	0	-	-	0		1181	1409	484
Stage 1	-	-	-	-	-	-		484	484	-
Stage 2	-	-	-	-	-	-		697	925	-
Critical Hdwy	-	-	-	-	-	-		6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-		5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.48	5.58	-
Follow-up Hdwy	-	-	-	-	-	-		3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	0	-	0		204	135	571
Stage 1	0	-	-	0	-	0		607	542	-
Stage 2	0	-	-	0	-	0		483	340	-
Platoon blocked, %	-	-	-	-	-	-				
Mov Cap-1 Maneuver	-	-	-	-	-	-		204	0	571
Mov Cap-2 Maneuver	-	-	-	-	-	-		337	0	-
Stage 1	-	-	-	-	-	-		607	0	-
Stage 2	-	-	-	-	-	-		483	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	57
HCM LOS			F

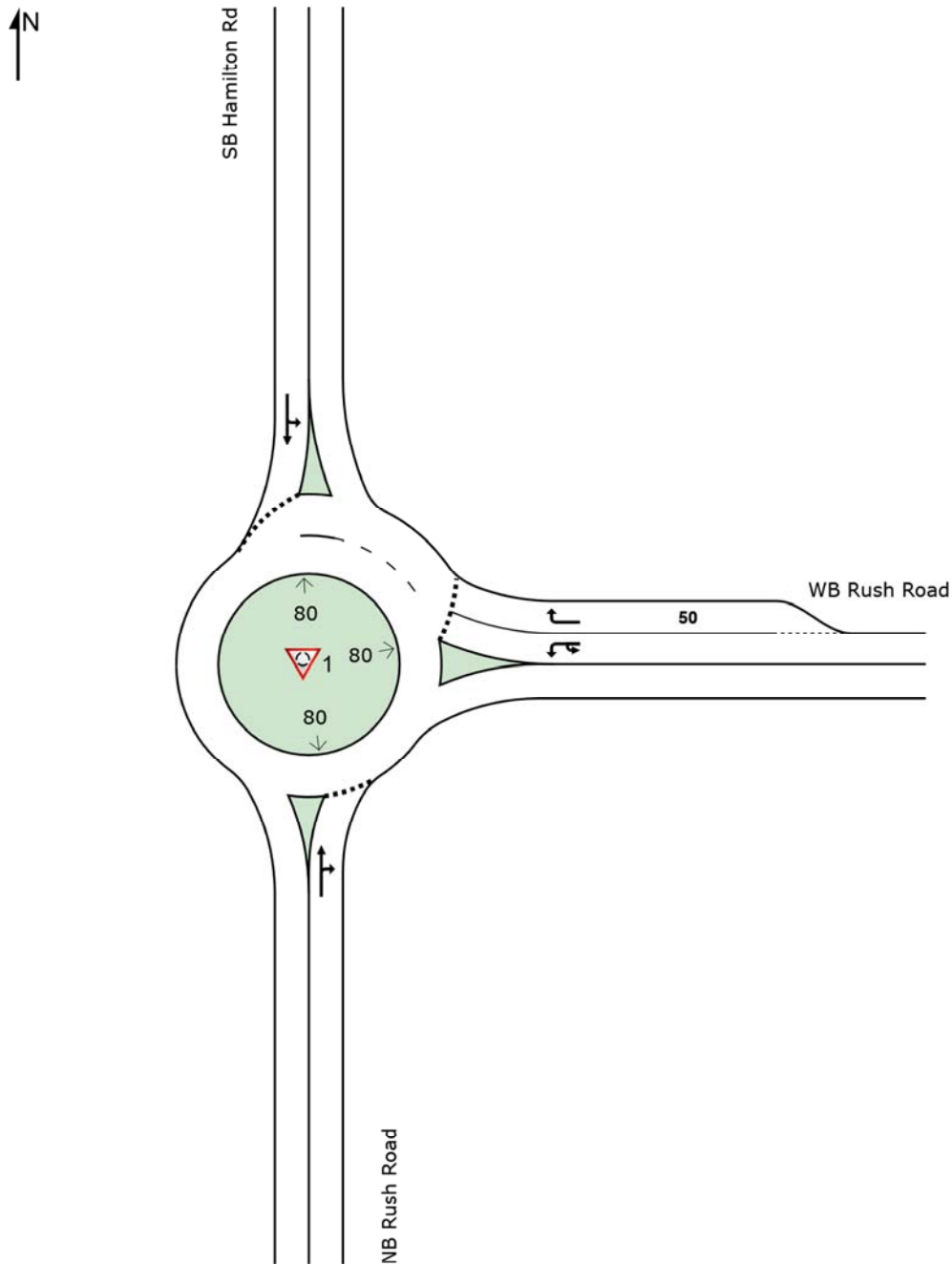
Minor Lane/Major Mvmt	EBT	EBR	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	-	337	571
HCM Lane V/C Ratio	-	-	-	0.335	0.998
HCM Control Delay (s)	-	-	-	21	64.1
HCM Lane LOS	-	-	-	C	F
HCM 95th %tile Q(veh)	-	-	-	1.4	14.6

SITE LAYOUT

 Site: 1 [Hamilton Road at Rush Road - SB Ramps partial RIRO
2nd WB lane (Site Folder: General)]

Projected 2023 With Project
PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Hamilton Road at Rush Road - SB Ramps partial RIRO 2nd WB lane (Site Folder: General)]

Projected 2023 With Project
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist ft]				
South: NB Rush Road														
8	T1	30	8.0	30	8.0	0.553	4.1	LOS A	4.5	119.8	0.76	0.71	0.84	35.2
18	R2	450	8.0	450	8.0	0.553	4.1	LOS A	4.5	119.8	0.76	0.71	0.84	34.2
Approach		480	8.0	480	8.0	0.553	4.1	LOS A	4.5	119.8	0.76	0.71	0.84	34.3
East: WB Rush Road														
1u	U	85	10.0	85	10.0	0.480	0.2	LOS A	4.3	117.3	0.23	0.08	0.23	34.4
1	L2	585	10.0	585	10.0	0.480	0.2	LOS A	4.3	117.3	0.23	0.08	0.23	33.7
16	R2	300	10.0	300	10.0	0.267	0.2	LOS A	1.8	47.3	0.19	0.07	0.19	35.5
Approach		970	10.0	970	10.0	0.480	0.2	LOS A	4.3	117.3	0.22	0.08	0.22	34.3
North: SB Hamilton Rd														
7	L2	325	8.0	325	8.0	0.598	8.2	LOS A	4.6	121.5	0.79	0.89	1.06	31.1
4	T1	70	8.0	70	8.0	0.598	8.2	LOS A	4.6	121.5	0.79	0.89	1.06	31.1
Approach		395	8.0	395	8.0	0.598	8.2	LOS A	4.6	121.5	0.79	0.89	1.06	31.1
All Vehicles		1845	9.1	1845	9.1	0.598	2.9	LOS A	4.6	121.5	0.48	0.42	0.56	33.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: N:\Projects\5557 GMD Land Company LLC\22-000051 Napavine Truck Stop\TIA\Operations\RABs\TIA Scenarios.sip9

HCM 6th TWSC
5: Hamilton Rd & South Site Driveway

Projected 2023 with Project with Improvements
PM Peak hour

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	5	210	165	5	210	90
Future Vol, veh/h	5	210	165	5	210	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	228	179	5	228	98

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	736	182	0	0	184
Stage 1	182	-	-	-	-
Stage 2	554	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	386	861	-	-	1391
Stage 1	849	-	-	-	-
Stage 2	575	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	319	861	-	-	1391
Mov Cap-2 Maneuver	319	-	-	-	-
Stage 1	849	-	-	-	-
Stage 2	476	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	11	0	5.7
HCM LOS	B		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1391	-	828	-	-
HCM Lane V/C Ratio	0.164	-	0.282	-	-
HCM Control Delay (s)	8.1	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.6	-	1.2	-	-

HCM 6th TWSC
6: Hamilton Rd & North Site Driveway

Projected 2023 with Project with Improvements
PM Peak hour

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	0	60	110	0	65	35
Future Vol, veh/h	0	60	110	0	65	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	65	120	0	71	38

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	300	120	0	0	120	0
Stage 1	120	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	691	931	-	-	1468	-
Stage 1	905	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	657	931	-	-	1468	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	809	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.2	0	4.9
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1468	-	931	-	-
HCM Lane V/C Ratio	0.048	-	0.07	-	-
HCM Control Delay (s)	7.6	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Appendix E

Queue Analysis Worksheets

Queuing and Blocking Report

Intersection: 1: Kirkland Rd & Rush Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	118	76	35
Average Queue (ft)	69	30	3
95th Queue (ft)	106	64	19
Link Distance (ft)	104	810	543
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	3		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: I-5 NB Ramps & Rush Rd

Movement	EB	WB	NB	NB
Directions Served	LT	TR	LT	R
Maximum Queue (ft)	168	94	768	125
Average Queue (ft)	72	15	484	93
95th Queue (ft)	133	60	956	172
Link Distance (ft)	359	104	784	
Upstream Blk Time (%)		1	24	
Queuing Penalty (veh)		2	0	
Storage Bay Dist (ft)				100
Storage Blk Time (%)			69	1
Queuing Penalty (veh)			76	2

Intersection: 3: I-5 SB Ramps & Rush Rd

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	R
Maximum Queue (ft)	44	367	1056	325
Average Queue (ft)	3	175	396	217
95th Queue (ft)	19	359	1193	381
Link Distance (ft)	162	359	1566	
Upstream Blk Time (%)		2	6	
Queuing Penalty (veh)		11	0	
Storage Bay Dist (ft)				300
Storage Blk Time (%)			9	22
Queuing Penalty (veh)			45	23

Queuing and Blocking Report

Intersection: 4: Rush Rd & Hamilton Rd

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	R	LT
Maximum Queue (ft)	160	77	699	125	689
Average Queue (ft)	46	62	302	88	353
95th Queue (ft)	138	78	735	181	684
Link Distance (ft)	162		732		969
Upstream Blk Time (%)	1		9		
Queuing Penalty (veh)	9		0		
Storage Bay Dist (ft)		50		100	
Storage Blk Time (%)	0	5	3	50	
Queuing Penalty (veh)	0	27	12	15	

Intersection: 5: Hamilton Rd & South Site Driveway

Movement	EB	NW
Directions Served	LR	LT
Maximum Queue (ft)	102	66
Average Queue (ft)	46	28
95th Queue (ft)	78	61
Link Distance (ft)	366	969
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Hamilton Rd & North Site Driveway

Movement	EB	NW
Directions Served	LR	LT
Maximum Queue (ft)	48	40
Average Queue (ft)	24	7
95th Queue (ft)	40	29
Link Distance (ft)	412	315
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 226

Queuing and Blocking Report

Intersection: 2: I-5 NB Ramps & Rush Rd

Movement	EB	B4	B4	WB	NB	NB
Directions Served	LT	T		TR	LT	R
Maximum Queue (ft)	240	71	43	31	143	123
Average Queue (ft)	116	6	3	2	14	80
95th Queue (ft)	218	45	38	14	85	126
Link Distance (ft)	189	112	112	319	784	
Upstream Blk Time (%)	4	0	0			
Queuing Penalty (veh)	20	1	1			
Storage Bay Dist (ft)						100
Storage Blk Time (%)					0	3
Queuing Penalty (veh)					0	0

Intersection: 3: I-5 SB Ramps & Rush Rd

Movement	EB	WB	SB	SB
Directions Served	TR	T	LT	R
Maximum Queue (ft)	20	14	814	325
Average Queue (ft)	1	1	311	270
95th Queue (ft)	10	10	788	398
Link Distance (ft)	222	112	1329	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				300
Storage Blk Time (%)			2	44
Queuing Penalty (veh)			9	46

Intersection: 5: Hamilton Rd & South Site Driveway

Movement	EB	NW
Directions Served	LR	LT
Maximum Queue (ft)	88	85
Average Queue (ft)	45	30
95th Queue (ft)	74	69
Link Distance (ft)	366	340
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Intersection: 6: Hamilton Rd & North Site Driveway

Movement	EB	NW
Directions Served	LR	LT
Maximum Queue (ft)	50	35
Average Queue (ft)	23	7
95th Queue (ft)	41	28
Link Distance (ft)	412	315
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 77

Stormwater Site Plan

TA Travel Center
Napavine, WA

Prepared For:

GMD Land Company LLC
7664 N Santa Fe Avenue
Fresno, CA 93722

Prepared By:

SCJ Alliance
8730 Tallon Lane NE, Suite 200
Lacey, WA 98516
360-352-1465

December 2022



SCJ ALLIANCE
CONSULTING SERVICES

Stormwater Site Plan

Project Information

Project: **TA Travel Center Napavine WA**

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Jurisdiction: City of Napavine

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Project Reference: **SCJ #22-000419**
Path: N:\Projects\5557 GMD Land Company LLC\22-000419 Napavine Truck
Stop Site Entitlements\Design\Storm\22-000419 TA Napavine Stormwater
Site Plan.docx



SIGNATURE

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

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- Appendix 9: Design Calculations and Computations
- Appendix 10: NRCS Soils Report
- Appendix 11: Critical Areas Memo



1. PROJECT OVERVIEW

The following report was prepared for the Napavine Truck Stop project in Napavine, WA. This report was prepared to comply with the March 2005 City of Napavine Public Works Standards and the Stormwater Management Manual for Western Washington, 2019 Edition (SWMMWW).

Project Proponent:	GMD Land Company LLC
Parcel Numbers:	018050005002
Total Parcel Area:	14.00 Acres
Current Zoning:	Commercial Retail
Required Permits:	Grading, Utility, Paving, Building, etc.
Site Address:	121 Hamilton Rd Napavine, Washington
Section, Township, Range:	Section 15, Township 13N, Range 02

The proposed TA Travel Center site is located on a parcel, APN 018050005002, that contain 14.00 acres total. The project is located at the west side of Hamilton Road in Napavine, Washington. The proposed construction includes a travel center building with convenience store, quick service restaurant with drive-through window, and associated travel amenities, a vehicle maintenance building, fueling stations for commercial vehicles and passenger vehicles, a platform scale, parking lots for commercial vehicles and passenger vehicles, utilities, landscaping, wetland buffer enhancements, and stormwater improvements disturbing approximately 14.00 acres. The proposed site improvements/construction activities for this project include the following:

- Erosion control and demolition of existing facilities and structures.
- Site preparation and grading.
- Construction of travel center buildings and fueling stations/canopies.
- Utility construction including, water, sewer, storm, and other dry utilities.
- Construction of parking lots.
- Construction/installation of on-site stormwater collection, conveyance, and detention and treatment facilities.
- Landscape and restoration.

A site vicinity map of the proposed project location is enclosed herein as Appendix 1.

1.1 SUMMARY OF COMPLIANCE ON-SITE

The project is defined as a new development project because the existing site does not have 35% or more of existing hard surface coverage. Following the Flow Chart for Determining Requirements for New Development , Figure I-3.1 of the SWMMWW, the project is required to comply with all of the Minimum Requirements as described in Volume I of the SWMMWW because the project results in 5,000 square feet or greater of new hard surface area, see Figure 1.

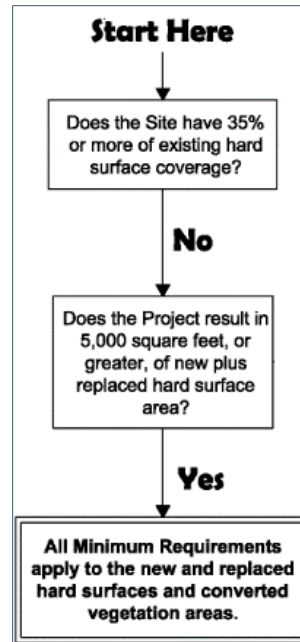


Figure 1: Flow Chart for Determining Requirements for New Development

The stormwater design complies with the Minimum Requirements as follows:

Minimum Requirement #1 – Preparation of Stormwater Site Plans – The Stormwater Site Plan is prepared per the 2019 SWMMWW.

Minimum Requirement #2 – Construction Stormwater Pollution Prevention – A Construction Stormwater Pollution Prevention Plan (SWPPP) will be completed at the time of civil permit submittal and attached herein as Appendix 7. Further, an Erosion Control Plan will be prepared and included as part of the final civil plan set. During construction the contractor will amend and update these plans as part of development and/or management of the SWPPP. The contractor will be responsible for implementing the SWPPP which shall comply with all of the required elements and the Washington Department of Ecology’s requirements for coverage under the NPDES Construction Stormwater General Permit.

Minimum Requirement #3 – Source Control of Pollution – BMPs listed below are the minimum required for the site, additional BMPs not listed here may need to be implemented to meet the minimum requirements discussed in the 2019 SWMMWW.

- Source Control BMPs Applicable to All Sites
 - S410 BMPs for Correcting Illicit Discharges to Storm Drains
 - S453 BMPs for Formation of a Pollution Prevention Team
 - S454 BMPs for Preventive Maintenance / Good Housekeeping
 - S455 BMPs for Spill Prevention and Cleanup
 - S456 BMPs for Employee Training
 - S457 BMPs for Inspections
 - S458 BMPs for Record Keeping
- Roads, Ditches, and Parking Lot Source Control BMPs
 - S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems
- Soil Erosion, Sediment Control, and Landscaping Source Control BMPs
 - S411 BMPs for Landscaping and Lawn / Vegetation Management
- Storage and Stockpiling Source Control BMPs
 - S428 BMPs for Storage of Liquids in Permanent Aboveground Tanks



- Transfer of Liquid or Solid Materials Source Control BMPs
 - S409 BMPs for Fueling At Dedicated Stations
 - S412 BMPs for Loading and Unloading Areas for Liquid or Solid Material
- Other Source Control BMPs
 - S414 BMPs for Maintenance and Repair of Vehicles and Equipment

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls – Currently, stormwater runoff from the site sheet flows to the west/southwest. Some of this is collected in an existing pond. The wetland to the south of the site and the Newaukum River beyond receive the stormwater runoff from the site in its predeveloped condition. After development, the stormwater runoff from the proposed improvements will be collected and conveyed to a new stormwater treatment and detention facility where a portion of it will be infiltrated and a portion of it released to the same wetland buffer and the Newaukum River beyond.

Minimum Requirement #5 – On-site Stormwater Management – In accordance with Minimum Requirement #7, this project is not flow control exempt. The project is located in the City of Napavine, that is, inside of the UGA, therefore the project is required to meet the LID Performance Standard through the use of any Flow Control BMP in the SWMMWW and required to apply BMP T5.13 Post-Construction Soil Quality and Depth. The proposed stormwater detention systems meets the LID Performance Standard, see Figure 2, which is output from the stormwater model produced and analyzed in MGSFlood, version 4.58.

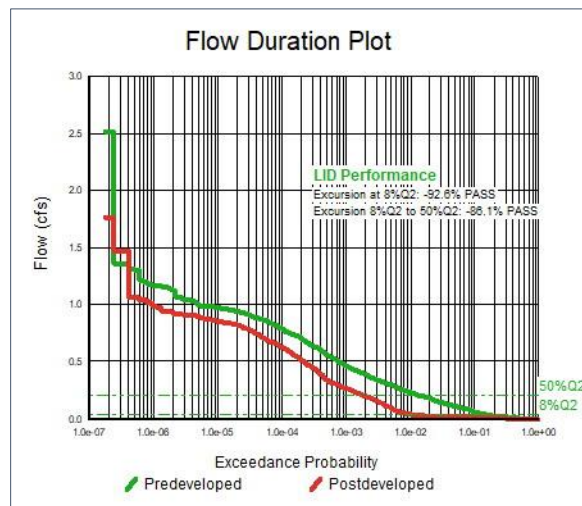


Figure 2: LID Performance

Minimum Requirement #6 – Runoff Treatment – The proposed project will construct over 5,000 square feet of pollution-generating impervious surface, therefore a stormwater treatment facility is required. The proposed project generates more than 300 total trip ends and will store and transfer in excess of 1,500 gallons per year of petroleum, therefore, Oil Control is required and provided by oil/water separators. The Newaukum River is not reported under section 305(b) of the Clean Water Act as not supporting beneficial use due to phosphorous contamination, nor is it listed in Washington State’s Nonpoint Source Assessment under section 319(a) of the Clean Water Act due to nutrients, and no TMDL for the Newaukum River for phosphorous is found in the EPA’s database for impaired waters and TMDLs in Region 10 (<https://www.epa.gov/tmdl/impaired-waters-and-tmdls-region-10>), therefore, phosphorus treatment is not required. The project proposes to infiltrate stormwater within ¼ mile of a fresh water that has an existing aquatic life use per Table 602 in WAC 173-201A-602, the Newaukum River, and is a commercial development therefore Enhanced Treatment is required and provided by bioretention.



Minimum Requirement #7 – Flow Control – The project is not flow control exempt. Stormwater is infiltrated and discharged to the surface. The flow control standard is met, see Figure 3, which is output from the stormwater model produced and analyzed in MGSFlood, version 4.58.

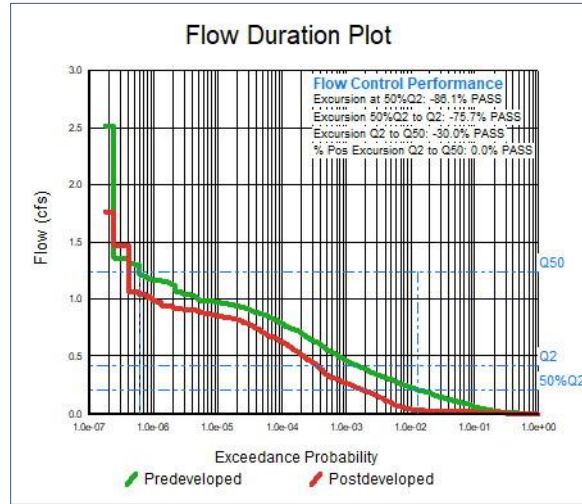


Figure 3: Flow Control Performance

Minimum Requirement #8 – Wetlands Protection – There are no wetlands on the project site nor does the project site discharge directly into a wetland. The discharge from the stormwater detention facility is directed to the wetland buffer and is protected by a level spreader. The wetland buffer adjacent to the stormwater detention facility will be enhanced per the Wetland and Streams Report included here in Appendix 3. The wetland buffer on the site is used to disperse stormwater from the buffer into the wetland. Stormwater from the developed portion of the site does not enter the buffer except at the level spreader at the end of the detention facility discharge pipes.

Minimum Requirement #9 – Operation and Maintenance – An operations and maintenance manual will be completed as part of the civil permit submittal and will be attached herein as Appendix 6.

2. EXISTING CONDITIONS SUMMARY

2.1 EXISTING ON-SITE CONDITIONS

The subject site is +/- 14.00 acres in size. Topography within the property is generally flat throughout sloping to the south at slopes between 0 and 5%. The site was used for agricultural and residential purposes with a single family home built in 1980. Several outbuildings were constructed on the site and the north-eastern portion of the parcel was used for the sale of manufactured homes. Fill was placed throughout the site for many years, and appears to have stopped by the mid-2010s. By 2012 the manufactured home business appears to have been abandoned and outbuildings started to be removed. The site has remained relatively unchanged since then and the house and several outbuildings remain in poor condition. Vegetation includes grasses and common weeds. See Figure 4 and Figure 5.

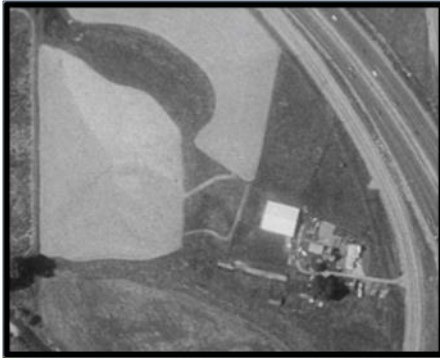


Figure 4: Existing Conditions (1990)



Figure 5: Existing Conditions (2021)

2.1.1 Flood Hazard Zone

The project parcel is located within Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 5301021781C. According to the FIRM Map, the majority of the parcel is determined to be in Zone X, an area of minimal flood hazard. A portion of the site is determined to be in Zone AE. It appears that the Zone AE was mapped prior to the site being filled and that the area mapped Zone AE is reduced. See Appendix 8 for the FIRM Map.

2.1.2 On-Site Soils Information

A geotechnical investigation was conducted by Landau Associates in early 2022. Site soils can be categorized in three units: uncontrolled fill material, alluvium, and glacial outwash. Uncontrolled fill was observed in borings B-1, B-2, and B-3 and test pits TP-2, TP-3, TP-5, and TP-6 and consists of clay silt and sand with variable gravel, brick, concrete, asphalt, and rubber debris and is underlain with topsoil. Alluvium was observed below the topsoil and consisted of brown to reddish-brown silt with variable sand and gravel content in a soft to very stiff and moist to wet condition. Glacial outwash was observed below the alluvium and consists of brown to reddish-brown sand and gravel with variable silt and cobble content in a dense to very dense and moist to wet condition. Groundwater was observed from 5.0 to 23.5 feet below the ground surface. The groundwater elevation found in TP-1 near the south end of the proposed treatment and detention facility is estimated to be 222.75 and the groundwater elevation in B-2 near the north end of the proposed treatment and detention facility is estimated to be 208.40. The groundwater elevation found in TP-1 may be perched in the underlying alluvium layer. The groundwater elevations are based on the boring map in the Landau report compared to the existing surface elevation as provided in an existing conditions survey by MTN2COAST, LLC. All elevations referenced in this report are in the NAVD 88 datum. An infiltration rate of 0.9 inches/hour was measured in the glacial outwash found in TP-5 and TP-6. See Appendix 5 for the geotechnical report. Per the USDA NRCS Web Soil Survey the soils on the site are primarily Olequa silt loam with Reed silty clay loam, Chehalis silty clay loam, and Alvor silty clay loam. These soil groups belong to the hydrologic soil group C. An NRCS Soil Resource Report for the project site is included in Appendix 10.

3. HYDROLOGY

The preliminary stormwater design is done in compliance with the Stormwater Management Manual for Western Washington, 2019 version (SWMMWW). MGSFlood version 4.58 has been used to model the predeveloped and postdeveloped scenarios and design the treatment and flow control devices using continuous simulation modeling.

The predeveloped conditions are modeled as Type C soil, forest, flat. The post developed conditions are modeled per the proposed ground cover type and slope: Roof Tops, Flat; Driveways, Flat; Sidewalks, Flat; Type C, Lawn, Flat;



and Pond. The wetland buffer enhancement area is modeled as C, Pasture, Moderate. This is done to simulate the plantings proposed in the wetland buffer enhancement area.

A summary of the land type designations and areas is included in Table 1.

Land Type Designation	Area (acres)	Percent Total Area
Predeveloped		
Subbasin 1 – C, Forest, Flat	12.98	92.7%
Buffer Enhancement Area -C, Forest, Flat	1.02	7.3%
Total Basin Area	14.00	
Postdeveloped		
Pavement	9.12	65.1%
Sidewalk	0.27	1.9%
Roof Area	0.84	6.0%
Stormwater Detention Area	0.55	3.9%
Pervious Area – C, Lawn, Flat	1.87	13.4%
Pervious Bypass Area – C, Lawn, Mod	0.33	2.4%
Buffer Enhancement Area – C, Pasture, Mod	1.02	7.3%
Total Basin Area	14.00	

Table 1: Land Type Designations within Project Site Limits

4. ONSITE STORMWATER DESIGN

4.1 OVERVIEW

The stormwater collection, conveyance, treatment, and detention for the site is designed to comply with the SWMMWW requirements. Stormwater will sheet flow from pavement areas and be collected in catch basins and conveyed to the stormwater treatment and detention facility on the west end of the site. The detention system is a bioretention facility with an underdrain. Infiltrating stormwater through the 18-inch thick layer of bioretention soil media provides enhanced treatment of the stormwater prior to being infiltrated into the ground or released to the surface through the underdrain pipe. This treatment is in compliance with Minimum Requirement #6 – Runoff Treatment. Additionally, two oil/water separators are proposed for the project. These devices are for the areas where fuel is being unloaded into the onsite storage tanks and the areas where fuel is being dispensed into vehicles. Flows that exceed the required treatment flow are detained in the bioretention facility and released through an outlet control structure with orifices sized to provide discharge flows that in combination with the discharge from the underdrain provide flow control in compliance with Minimum Requirement #7 – Flow Control. The southern side of the site from the back of the curb to the property line is not tributary to the stormwater treatment and detention facility. Part of this area in the wetland buffer enhancement area to the west, and to the east a catch slope that will be a landscape area. Neither area is pollution generating. These two areas are included in the stormwater modeling to ensure compliance with Minimum Requirement #7.

4.2 LOW IMPACT DEVELOPMENT FEATURES

Per Table I-3.1 of the SWMMWW the project site is located inside the UGA, that is, in the incorporated portion of the City of Napavine, therefore a LID BMP shall be used for each type of surface. Bioretention is used to provide compliance with the LID Performance Standard. BMP T5.13 will be applied to lawn and landscaped areas. The LID performance standard is met for flow durations as shown previously in Figure 2.



4.3 STORMWATER TREATMENT

4.3.1 Enhanced Treatment

Enhanced treatment is required for the site. This is proposed to be achieved by bioretention. The stormwater treatment and detention facility has been sized using MGSFlood version 4.58, using the ecology bioretention element. The pond section proposed is based on BMP T7.30, Bioretention. Stormwater will infiltrate through an 18-inch thick layer of bioretention soil media before either being discharged through the 6-inch underdrain pipe or infiltrated into the ground. The bioretention facility treats 98.09% of the total volume of runoff, which exceeds the requirement from Volume III, Chapter 1 of the SWMMWW that at least 91% of the influent runoff pass through the bioretention soil mix in order for the runoff to receive enhanced treatment. See Figure 6 for a portion of the MSGFlood Project Report. The full MGSFlood Report is found in Appendix 9.

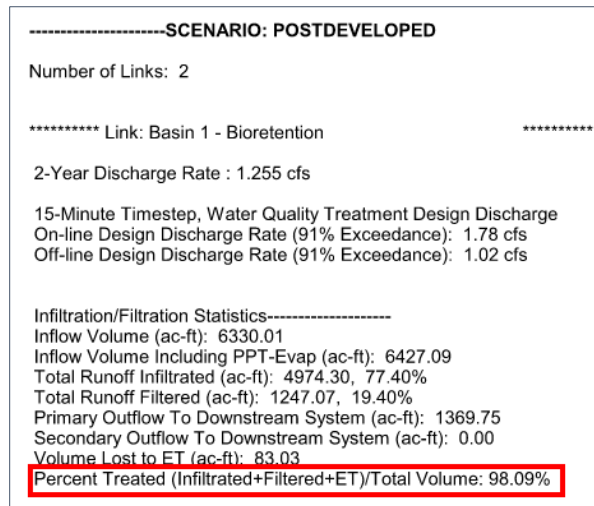


Figure 6: Percent Stormwater Treated by Passing Through Bioretention Soil Media

4.3.2 Oil Control

Oil control is required for portions of the site. The areas of the site where oil control are proposed are the area where diesel fuel is to be offloaded into the above ground storage tanks, the truck fueling canopy where diesel fuel is being dispensed to vehicles, and the auto drive and parking area at the convenience store where fuel will be dispensed to vehicles and there will be a high turnover of vehicles. The truck parking area is not proposed to have oil control applied, per Volume III, Chapter 1 of the SWMMWW all-day parking areas are not intended to require oil control BMPs. Two oil/water separators are proposed and are shown on sheet UT-01 of the preliminary plan set, see Appendix 2 for the complete preliminary plan set. Sizing of the oil/water separators will be done with the final engineering plan development.



4.4 STORMWATER DETENTION

The grading of the proposed stormwater treatment and detention facility is shown on CG-01 of the plan set, see Appendix 2. The details of the basin geometry and water surface elevations are found in Table 2.

Bottom Surface Elevation (Top of Course Mulch)	228.67
Bottom Surface Area	15,737 sf
Overflow Riser Elevation	231.50
Surface Area at Overflow Riser Elevation	24,131 sf
Effective Storage Volume	79,736 cf
Top of Freeboard	232.50
2-year Storm Event Water Surface Elevation	229.45
50-year Storm Event Water Surface Elevation	231.20
100-year Storm Event Water Surface Elevation	231.44

Table 2: Bioretention Basin Statistics

The stormwater will be released from the proposed detention basin via a multiple-orifice flow control structure. The peak inflow from the subbasin during the 100-year storm event is 12.52 cfs, a 24-inch outlet pipe sloped at 1.20% is used to provide sufficient capacity to pass the 100-year storm event should the outlet control structure fail. The orifice sizes and elevations of the proposed outlet control structure are found in Table 3.

Outlet Control Structure Diameter	60 inch
Orifice 1 Diameter	3.5 inch
Orifice 1 Elevation	228.67
Orifice 2 Diameter	3.0 Inch
Orifice 2 Elevation	229.50
Outlet Pipe	24-inch
Outlet Pipe Full Flow Capacity	26.85 cfs

Table 3: Bioretention Basin Outlet Control Structure Statistics

The underdrain below the bioretention soil media is proposed to be 6-inch diameter perforated pipe. This perforated underdrain pipe is proposed to have an invert elevation of 226.50. The bottom of the drainage stone in the bioretention section is proposed to be 226.00. The underdrain pipe will transition to solid wall pipe and daylight to the surface as shown on SD-01 in the preliminary plan set. Stormwater that has passed through the bioretention soil media will be allowed to infiltrate into the underlying soils. Per the geotechnical investigation, the glacial outwash in TP-5 and TP-6 were found to have an infiltration rate of 0.9 inches/hour. For the design of this system an infiltration rate of 0.45 inches/hour is used. As described in Section 2.1.2, groundwater was observed in the area of the detention facility in borings B-2 and TP-1 at approximately 208.40 and 222.75 respectively. It is believed that the groundwater observed at 222.75 is perched in the alluvium layer. The groundwater elevation in B-2 (208.40) was observed in the glacial outwash layer. The bottom of the facility should be excavated to expose the top of the glacial outwash layer and backfilled with well-draining material to allow for proper infiltration.



5. OFFSITE ANALYSIS REPORT

5.1 QUALITATIVE UPSTREAM ANALYSIS

The parcel area and the surrounding parcels appear to be relatively flat. It is not anticipated that there is any off-site run-on from the adjacent parcels.

5.2 QUALITATIVE DOWNSTREAM ANALYSIS

After construction, stormwater runoff from the project areas will sheet flow across the site and collected in catch basins and then conveyed to the stormwater detention and treatment basin where it will be released at less than predeveloped rates. In the event that the system fails or overflows, stormwater runoff will sheet flow directly to the southwest and into the neighboring wetland. The Newaukum River is adjacent to the site and is flow control exempt per Table I-A.1 of Volume I of the SWMMWW, therefore, no downstream impacts are anticipated even in the event of a failure of the outlet control structure.

6. CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (C-SWPPP)

A SWPPP will be prepared with the civil permit submittal and included herein as Appendix 7.

7. SPECIAL REPORTS AND STUDIES

See Appendix 3 for the Wetland and Streams Report and Appendix 5 for the geotechnical report. A Critical Areas Memo has been prepared and is included in Appendix 11.

8. OTHER PERMITS

Construction permits will be required from the City of Napavine. Coverage under a Washington State Department of Ecology Phase II National Pollutant Discharge Elimination System Stormwater Permit will also be secured prior to beginning construction activities.

9. OPERATION AND MAINTENANCE MANUAL

The owner of the TA Travel Center will be responsible for maintaining all stormwater conveyance on-site. An operation and maintenance manual will be prepared as part of the civil permit submittal and included herein as Appendix 6.

END OF STORMWATER SITE PLAN



APPENDIX 1

SITE VICINITY MAP



SCJ ALLIANCE

CONSULTING SERVICES



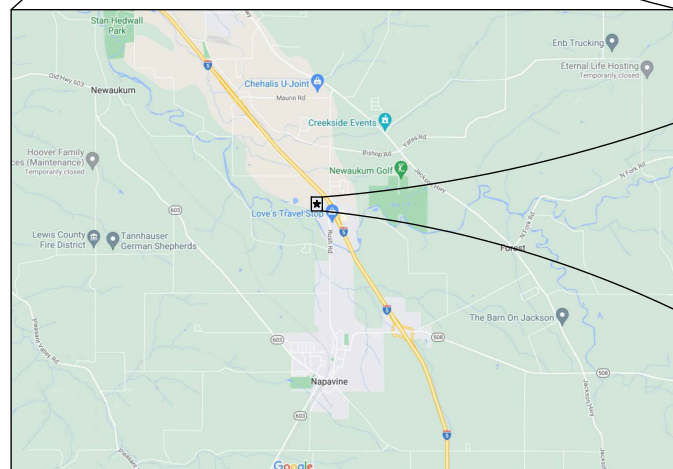
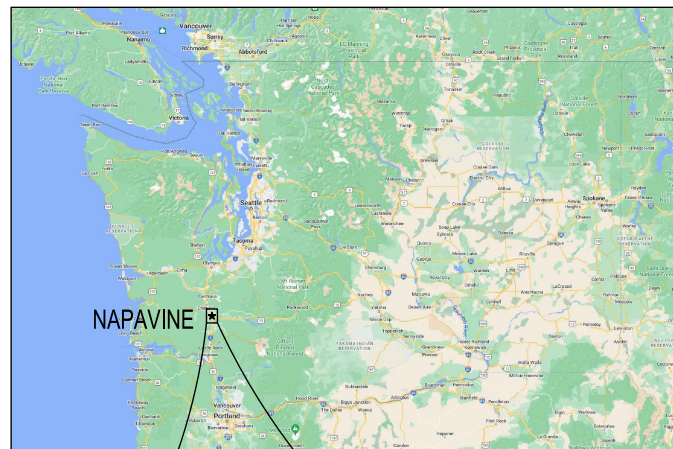


APPENDIX 2

PRELIMINARY PLAN SET

SEC. 15, T 13N., R 2W., W.M.

TA TRAVEL CENTER
CIVIL SPR DOCUMENTS
NAPAVINE, WA



OWNER / APPLICANT

GMD LAND COMPANY LLC
7664 N SANTA FE AVE
FRESNO, CA 93722
PHONE: 559.905.9407
CONTACT: GURINDERJIT SIDHU

CONSULTANTS

SCJ ALLIANCE
8730 TALLON LANE NE, SUITE 200
LACEY, WA 98516
PHONE: 360.352.1465
CONTACT: DAN PHILLIPS, PE

ARCHITECT:
AGC DESIGN CONCEPT INC.
24620 ORCHARD VILLAGE RD., A-311
VALENCIA, CA 91355
PHONE: 611.295.111
CONTACT: ALEX G. CUEVAS

SURVEYOR:
MTN2COAST, LLC
2320 MOTTMAN RD SW STE 106
TUMWATER, WA 98512
PHONE: 360.688.1949
CONTACT: BLAIR PRIGGE, PLS, EIT

GEOTECH:
LANDAU ASSOCIATES, INC.
500 COLUMBIA ST NW STE 110
OLYMPIA, WA 98501
PHONE: 360.791.3178
CONTACT: LANCE LEVINE, PE

SITE INFORMATION

PARCEL NUMBER: 018050005002
ACRES: ±14.00
ZONING: COMMERCIAL

SITE ADDRESS:

121 HAMILTON RD
NAPAVINE, WA 98565

UTILITIES

WATER:
CITY OF NAPAVINE

SEWER:
CITY OF NAPAVINE

LEGAL DESCRIPTION:

PARCEL B OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT 07-11-2022 MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THAT PORTION OF PARCEL D OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT FILED JUNE 23RD, 2009 AND RECORDED UNDER AFN 3328812, LYING SOUTHERLY OF THE FOLLOWING DESCRIBED LINE: BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL D, FROM WHICH THE WEST LINE OF SAID PARCEL D BEARS SOUTH 02°00'22" WEST; THENCE SOUTH 87°52'08" EAST, 467.95 FEET, MORE OR LESS TO THE INTERSECTION WITH THE NORTH LINE OF SAID PARCEL "D",

SITUATE IN CITY OF NAPAVINE, COUNTY OF LEWIS, STATE OF WASHINGTON

BASIS OF BEARINGS:

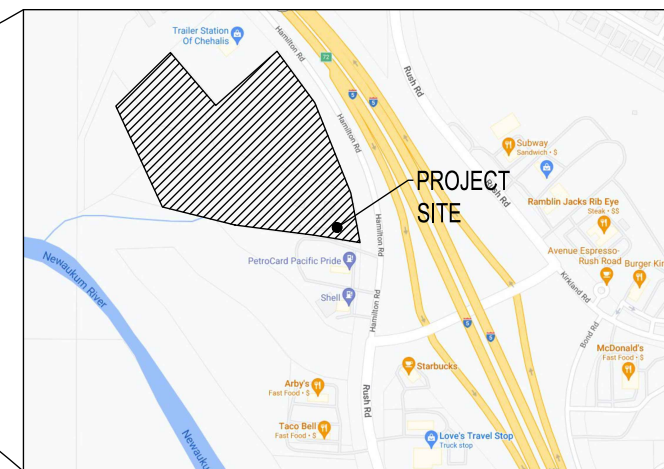
HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2011 BASED ON GPS TIES TO WSDOT MONUMENTS 7406 AND 6779, CONVERTED TO GROUND SCALE ABOUT N:47.3822.35/E:1035469.491 USING A COMBINED SCALE FACTOR OF 0.99990646.

M2C MATCHED REFERENCE SURVEYS(RS) 1, 2, AND 3 BASED ON TIES TO THE EAST QUARTER CORNER OF SECTION 15 AND 22.

DATUM:

NAVD 88 BASED ON GPS TIES TO WSDOT MONUMENT 7406, ELEVATION = 242.49.

SHEET INDEX		
SHEET NO.	SHEET TITLE	SHEET DESCRIPTION
1	CV-01	COVER SHEET
2	SV-01	ALTA/NSPS LAND TITLE SURVEY
3	SV-02	ALTA/NSPS LAND TITLE SURVEY
4	SV-03	ALTA/NSPS LAND TITLE SURVEY
5	SV-04	ALTA/NSPS LAND TITLE SURVEY
6	SV-05	ALTA/NSPS LAND TITLE SURVEY
7	SV-06	RECORD OF SURVEY OF BOUNDARY LINE ADJUSTMENT
8	SV-07	RECORD OF SURVEY OF BOUNDARY LINE ADJUSTMENT
9	SV-08	RECORD OF SURVEY OF BOUNDARY LINE ADJUSTMENT
10	SP-01	PRELIMINARY SITE PLAN
11	SP-02	FEMA FLOOD ZONES MAP
12	SP-03	ADJACENT ZONING MAP
13	PV-01	PRELIMINARY PAVING & LANDSCAPE PLAN
14	CG-01	PRELIMINARY GRADING PLAN
15	UT-01	PRELIMINARY UTILITY PLAN
16	SD-01	PRELIMINARY STORMWATER PLAN
17	SD-02	PRELIMINARY STORMWATER PROFILES



NTS

A PORTION OF SEC 15, T 13N., R 2W., W.M.
NAPAVINE, WA

Dec 12, 2022 10:07:34am User: dphillips
V:\PROJECTS\2557_GMD LAND COMPANY LLC\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\22-000419 CV-01.DWG

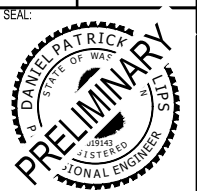
CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	DATE	BY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: COVER SHEET
PROJECT NAME: TA TRAVEL CENTER
121 HAMILTON RD
NAPAVINE, WA



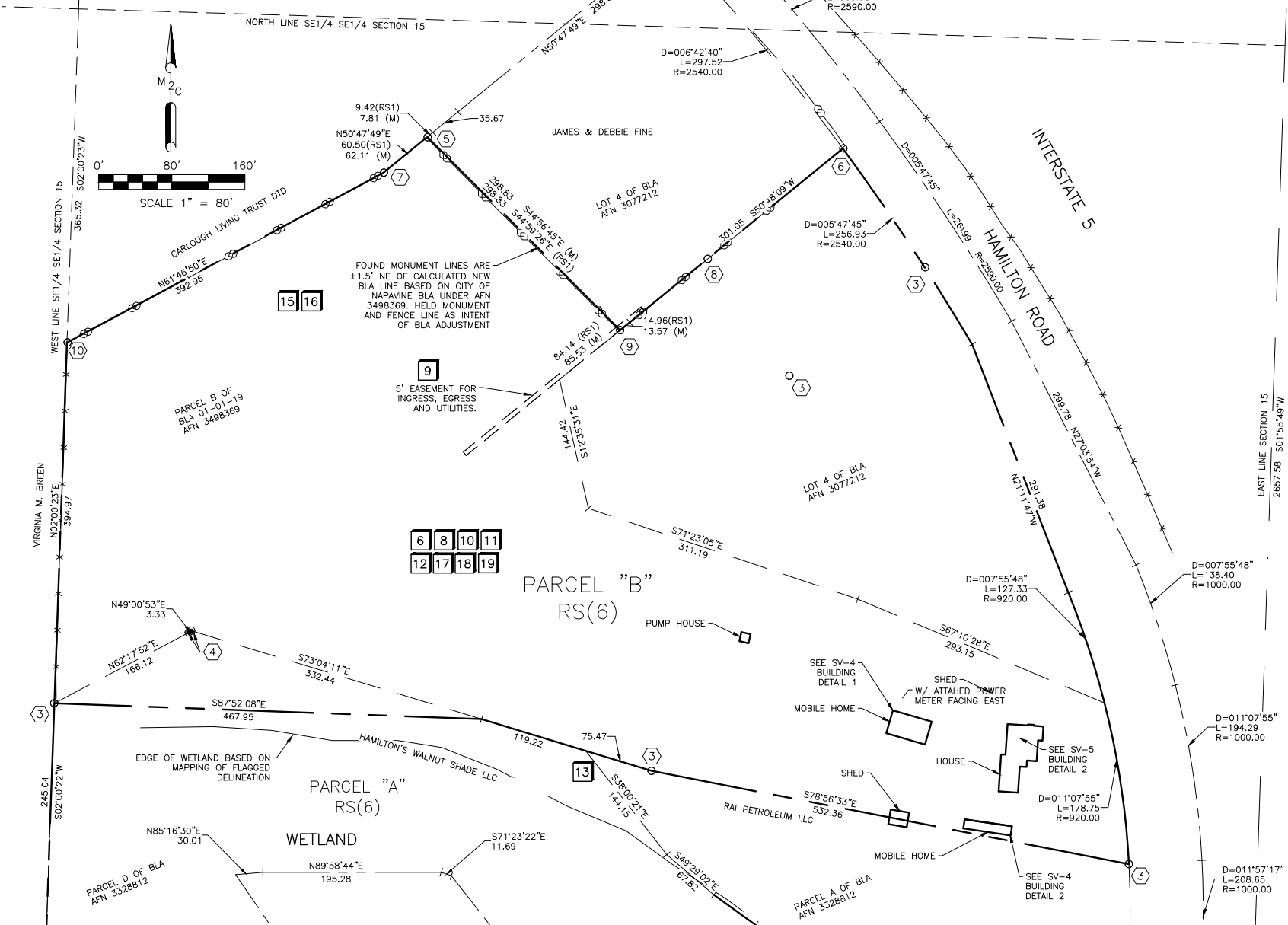
DESIGNER: D. PHILLIPS
DRAWN BY: K. GANS
APPROVED BY: D. PHILLIPS
DATE: DECEMBER 2022
JOB NO: 22-000419
DRAWING FILE NO: 22-000419 CV-01
DRAWING NO: CV-01
SHEET NO: 1 OF 17

DATUM

HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2011 BASED ON GPS TIES TO WSDOT MONUMENTS 7406 AND 6779, CONVERTED TO GROUND SCALE ABOUT N:473822.35/E:1035469.491 USING A COMBINED SCALE FACTOR OF 0.99990646.

M2C MATCHED REFERENCE SURVEYS(RS) 1, 2, AND 3 BASED ON TIES TO THE EAST QUARTER CORNER OF SECTION 15 AND 22.

VERTICAL - NAVD 88 BASED ON GPS TIES TO WSDOT MONUMENT 7406, ELEVATION = 242.49.



- EXCEPTION ABBREVIATIONS
S - SHOWN ON SURVEY
N - NOT SURVEYABLE
A - AFFECTS PART OF THE SITE
B - BLANKET EASEMENT
DN - DOES NOT AFFECT SITE
AS - ADJACENT SURVEYS
NS - NOT SHOWN ON MAP

TITLE EXCEPTIONS FROM OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, COMMITMENT NO. LE23540, DATED NOVEMBER 15, 2021

- SCHEDULE B EXCEPTIONS A THROUGH K AND SPECIAL EXCEPTIONS 1 THROUGH 5 AND 20 THROUGH 23 ARE GENERAL EXCEPTIONS AND ARE NOT APPLICABLE TO SURVEY.
SPECIAL EXCEPTIONS
6. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: PUBLIC UTILITY DISTRICT NO. 1 OF LEWIS COUNTY
PURPOSE: ELECTRIC TRANSMISSION LINES
RECORDING DATE: MAY 7, 1975
RECORDING NO.: 802044
AFFECTS: PORTION OF PARCEL
SURVEYORS NOTE: EASEMENT AFFECTS A PORTION OF THE SITE. EASEMENT IS BLANKET IN NATURE. UTILITY DISTRICT HAS THE RIGHT TO CONSTRUCT, MAINTAIN, REMOVE, AND RELOCATE LINES, POLES AND ASSOCIATED TRANSMISSION LINE FEATURES. APPROXIMATE LOCATIONS OF CONSTRUCTED POLES ARE DESCRIBED IN EASEMENT.

SURVEY NOTES

- 1. INSTRUMENT USED: TOPCON VR GPS.
2. THIS SURVEY MEETS OR EXCEEDS THE STANDARDS OF WAC 332-130-090.
3. SURVEY COMPLETED 03/03/2022.
4. ALL MONUMENTS SHOWN AS FOUND VISITED 02/2022.
5. PURPOSE OF TOPOGRAPHICAL MAPPING IS FOR FUTURE DEVELOPMENT OF SITE.
6. CONTOURS WERE ESTABLISHED FROM FIELD MAPPING.
7. MTN2COAST (M2C) WAS RETAINED BY GURINDERJIT SIDHU WITH GMD LAND COMPANY LLC TO COMPLETE AN ALTA SURVEY OF THE DESCRIBED PROPERTY IN THE LEGAL DESCRIPTION.
8. WETLAND FLAGGED BY OTHERS.
9. REFERENCE SURVEY 1 WAS USED AS A BASIS FOR THE BOUNDARY, M2C HELD THE EAST LINE OF SECTION FOR ALIGNMENT OF RS(1) FINDING MONUMENTS BEST FIT. M2C HELD FOUND MONUMENTS AND CALLED OUT ERROR FOUND. MEASUREMENTS DIFFERENCE BETWEEN REFERENCE SURVEY 1 (RS1) VS MEASURED (M) SHOWN ON MAP.

LEGAL DESCRIPTION

PARCEL B OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT NO. BLA 07-11-2022, RECORDED UNDER AFN 3581283, RECORDS OF LEWIS COUNTY, WASHINGTON; SUBJECT TO AND TOGETHER WITH EASEMENTS AND CONDITIONS OF RECORD.

DRAWING UPDATE

- 1) DRAWING UPDATE 9/16/2022 WITH REVISED BOUNDARY FROM BLA, UPDATED REFERENCE SURVEYS, LEGAL DESCRIPTIONS, AND BOUNDARY.

REFERENCED SURVEYS

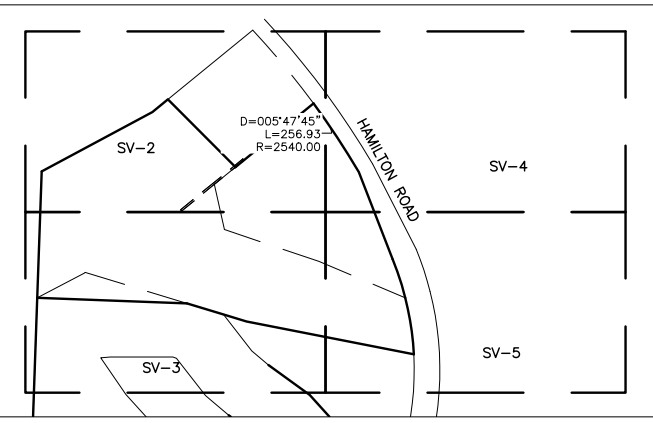
- 1) CITY OF NAPAVINE BLA-01-01-19 RECORDED ON PAGE 311 IN BOOK 3 OF BLAM UNDER AFN 3498369.
2) CITY OF NAPAVINE BLA RECORDED ON PAGE 158 IN BOOK 2 OF BLAM UNDER AFN 3328812.
3) LEWIS COUNTY BLA RECORDED ON PAGE 62 IN BOOK 19 OF SURVEYS UNDER AFN 3077212.
4) LEWIS COUNTY BLA RECORDED ON PAGE 244 IN BOOK 16 OF SURVEYS UNDER AFN 3029065.
5) LEWIS COUNTY BLA RECORDED ON PAGE 288 IN BOOK 18 OF SURVEYS UNDER AFN 3061686.

MONUMENT NOTES

- 1) FOUND 3-1/2" DIAMETER WSDOT BRASS MONUMENT 7406 IN CASE.
2) FOUND 3-1/2" DIAMETER WSDOT ALUMINUM DISC MONUMENT 6779 ON 1" METAL PIPE IN CASE.
3) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269".
4) FOUND 1/2" DIAMETER REBAR WITHOUT CAP.
5) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±1.8' NORTHEAST OF CALCULATED POSITION.
6) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.6' EAST OF CALCULATED POSITION.
7) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.7' NORTHEAST OF CALCULATED POSITION.
8) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.3' SOUTHWEST OF PROPERTY LINE.
9) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±1.4' NORTHEAST OF CALCULATED POSITION.
10) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.8' EAST OF CALCULATED POSITION.
11) FOUND 3.5" DIAMETER BRASS SURFACE MONUMENT WITH PUNCH MARKED "LEWIS COUNTY T13NR2W LS 35981", HELD FOR EAST QUARTER CORNER SECTION 15.
12) FOUND 3.5" DIAMETER BRASS SURFACE MONUMENT WITH PUNCH MARKED "LEWIS COUNTY T13NR2W LS 35981", HELD FOR EAST QUARTER CORNER SECTION 22.
13) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.5' NORTH OF CALCULATED POSITION.
14) FOUND 1/2" DIAMETER REBAR WITH ILLEGIBLE YELLOW PLASTIC CAP ±.5' NORTH OF CALCULATED POSITION.

SHEET INDEX

- SV-1 ALTA TITLE SHEET, LEGAL DESCRIPTION, DATUM, SURVEY NOTES
SV-2 TOPOGRAPHIC MAP
SV-3 TOPOGRAPHIC MAP
SV-4 TOPOGRAPHIC MAP, LEGEND, UTILITY NOTE, BUILDING DIMENSION
SV-5 TOPOGRAPHIC MAP, BUILDING DIMENSION



ALTA/NSPS LAND TITLE TABLE A SURVEY NOTES

- 1. MONUMENTS PLACED OR FOUND AT ALL MAJOR CORNERS OF THE PROPERTY ARE SHOWN ON MAP.
2. ADDRESS: 0 HAMILTON RD, CHEHALIS, WA 98532
121 HAMILTON RD, CHEHALIS, WA 98532
3. THE PROPERTY LIES IN MULTIPLE FLOOD ZONES BASED ON FEMA FIRM MAP 5301021781C W/ AN EFFECTIVE DATE 7/17/2006 W/ LETTER OF MAP REVISION LOMR 15-10-0078P W/ AN EFFECTIVE DATE OF 12/18/2015. MAJORITY OF THE PROPERTY LIES IN FLOOD ZONE "X", AREA OF MINIMAL FLOOD HAZARD. THE SOUTHWEST PORTION OF THE SITE FALLS WITHIN FLOOD ZONE "AE" W/ A BASE FLOOD ELEVATION OF 222' TO 223.8'. BASED ON THE FEMA FIRM MAP, A SMALL PORTION OF THE SITE MAY FALL WITHIN THE REGULATORY FLOODWAY; FURTHER DETERMINATION MAY BE NEEDED.
4. GROSS LAND AREA PARCEL A: 178,463.10 SQUARE FEET/4.10 ACRES.
GROSS LAND AREA PARCEL B: 412,210.50 SQUARE FEET/9.46 ACRES.
5. VERTICAL RELIEF: SEE CONTOURS ON MAP (SEE SV-2 THROUGH SV-5), VERTICAL DATUM - NAVD 88 BASED ON GPS TIES TO WSDOT MONUMENT 7406, ELEVATION = 242.49.
6. ZONING REPORT NOT PROVIDED BY THE CLIENT.
7. OUTSIDE BUILDING DIMENSIONS, SEE SV-4 AND SV-5.
8. SUBSTANTIAL FEATURES OBSERVED IN THE PROCESS OF CONDUCTING FIELDWORK ARE SHOWN ON MAP.
- PAVED WALKWAY IS ENCRUCHING ±8' INTO HAMILTON ROAD RIGHT OF WAY (SEE SV-4).
- NORTH FACE OF SHED ENCRUCHES ±9' OVER THE SOUTH PROPERTY LINE (SEE SV-5).
- GRAVEL PARKING LOT ENCRUCHES ±4' OVER THE SOUTH PROPERTY LINE (SEE SV-5).
9. 12 DESIGNATED PARKING SPACES MARKED BY CONCRETE CURBS ARE SHOWN ON SV-4.
10. LOCATION OF UTILITIES SHOWN ON MAP (ALSO SEE UTILITY NOTE ON SV-4).
11. NAMES OF ADJOINING OWNERS ACCORDING TO LEWIS COUNTY GEO DATABASE SHOWN ON MAP SV-1.
12. THE SITE WAS CLEARED IN THE PAST, BUT SHOWS NO EVIDENCE OF RECENT EARTH MOVING WORK.
13. TO THE BEST OF MTN2COAST KNOWLEDGE THERE IS NO PROPOSED CHANGES IN STREET RIGHT-OF-WAY LINES OR EVIDENCE OF STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
14. WETLAND DELINEATION FLAGS WERE SET BY A QUALIFIED SPECIALIST HIRED BY CLIENT AND SHOWN ON MAP SV-1 AND SV-3.

CERTIFICATION

TO: GMD LAND COMPANY, LLC

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2022 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 5, 6, 7(A), 8, 9, 11(A), 11(B), 13, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED IN MARCH 2022.

DATE OF PLAT OR MAP: SEPTEMBER 8, 2022.

Signature of Seth Prigge, SETH PRIGGE, PLS 21013244

GRAPHICAL INDEX T13N R2W, W.M.

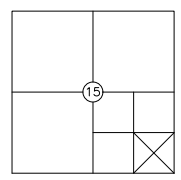
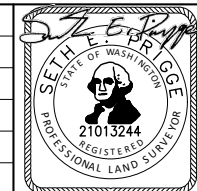


Table with columns: DATE (9/8/2022), SCALE (1" = 80'), M2C PROJECT NO. (22-043), DRAWN (TLM), CHECKED (SEP), APPROVED (SEP).

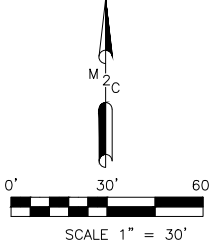
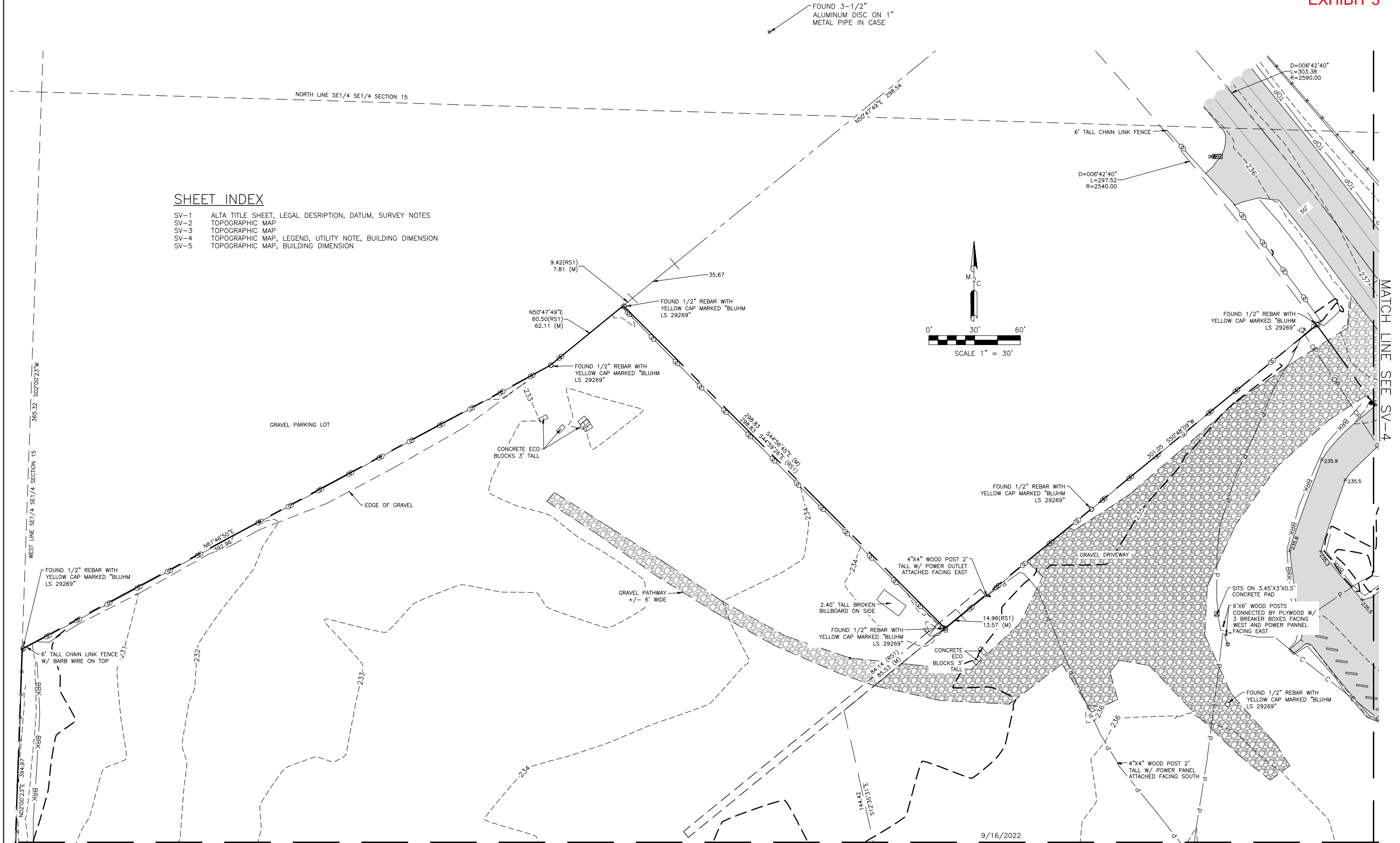


MTN2COAST LLC
PROFESSIONAL LAND SURVEYORS
2320 MOTTMAN RD SW, STE 106
TUMWATER, WA 98512
360.688.1949

Table with columns: PROJECT NAME (0 & 120 HAMILTON RD CHEHALIS, WA 98532 ALTA/NSPS LAND TITLE SURVEY), CLIENT NAME (GMD LAND COMPANY LLC), SHEET NAME (SV-1), SHEET NO. (SV-1 OF 5).

SHEET INDEX

- SV-1 ALTA TITLE SHEET, LEGAL DESCRIPTION, DATUM, SURVEY NOTES
- SV-2 TOPOGRAPHIC MAP
- SV-3 TOPOGRAPHIC MAP
- SV-4 TOPOGRAPHIC MAP, LEGEND, UTILITY NOTE, BUILDING DIMENSION
- SV-5 TOPOGRAPHIC MAP, BUILDING DIMENSION

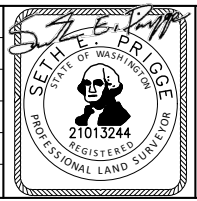


MATCH LINE SEE SV-3

MATCH LINE SEE SV-4

9/16/2022

DATE	9/8/2022
SCALE	1" = 30'
M2C PROJECT NO.:	22-043
DRAWN	TLM
CHECKED	SEP
APPROVED	SEP



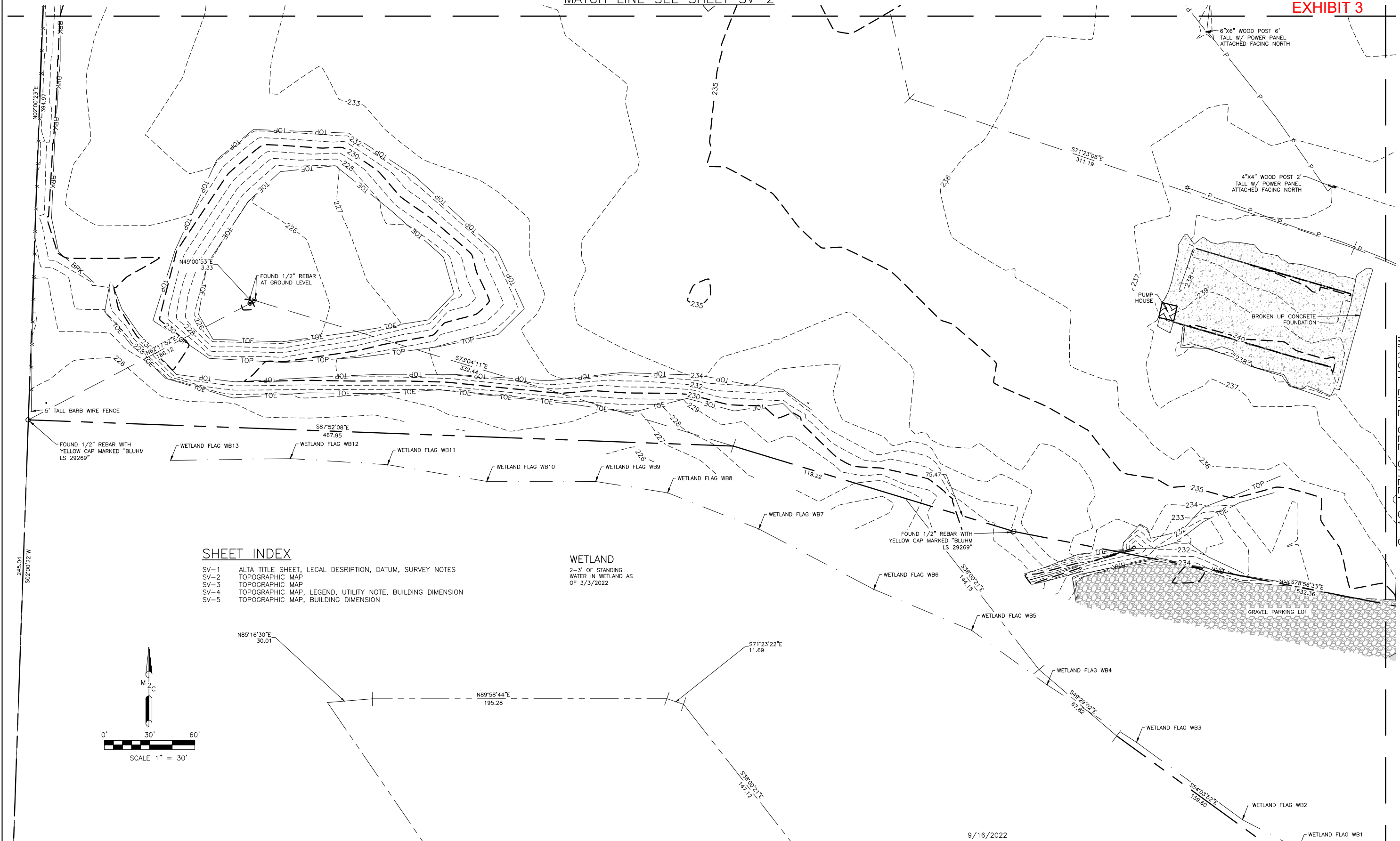
MTN 2 COAST LLC
 PROFESSIONAL LAND SURVEYORS
 2320 MOTTMAN RD SW, STE 106
 TUMWATER, WA 98512
 360.688.1949

PROJECT NAME:
 0 & 120 HAMILTON RD
 CHEHALIS, WA 98352
 ALTA/NSPS LAND TITLE
 SURVEY

CLIENT NAME:
 GMD LAND COMPANY LLC

SHEET NAME:
 SV-2

SHEET NO.
 SV-2 OF 5

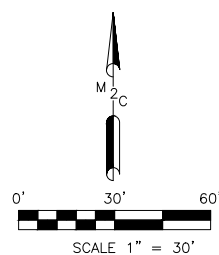


SHEET INDEX

- SV-1 ALTA TITLE SHEET, LEGAL DESCRIPTION, DATUM, SURVEY NOTES
- SV-2 TOPOGRAPHIC MAP
- SV-3 TOPOGRAPHIC MAP
- SV-4 TOPOGRAPHIC MAP, LEGEND, UTILITY NOTE, BUILDING DIMENSION
- SV-5 TOPOGRAPHIC MAP, BUILDING DIMENSION

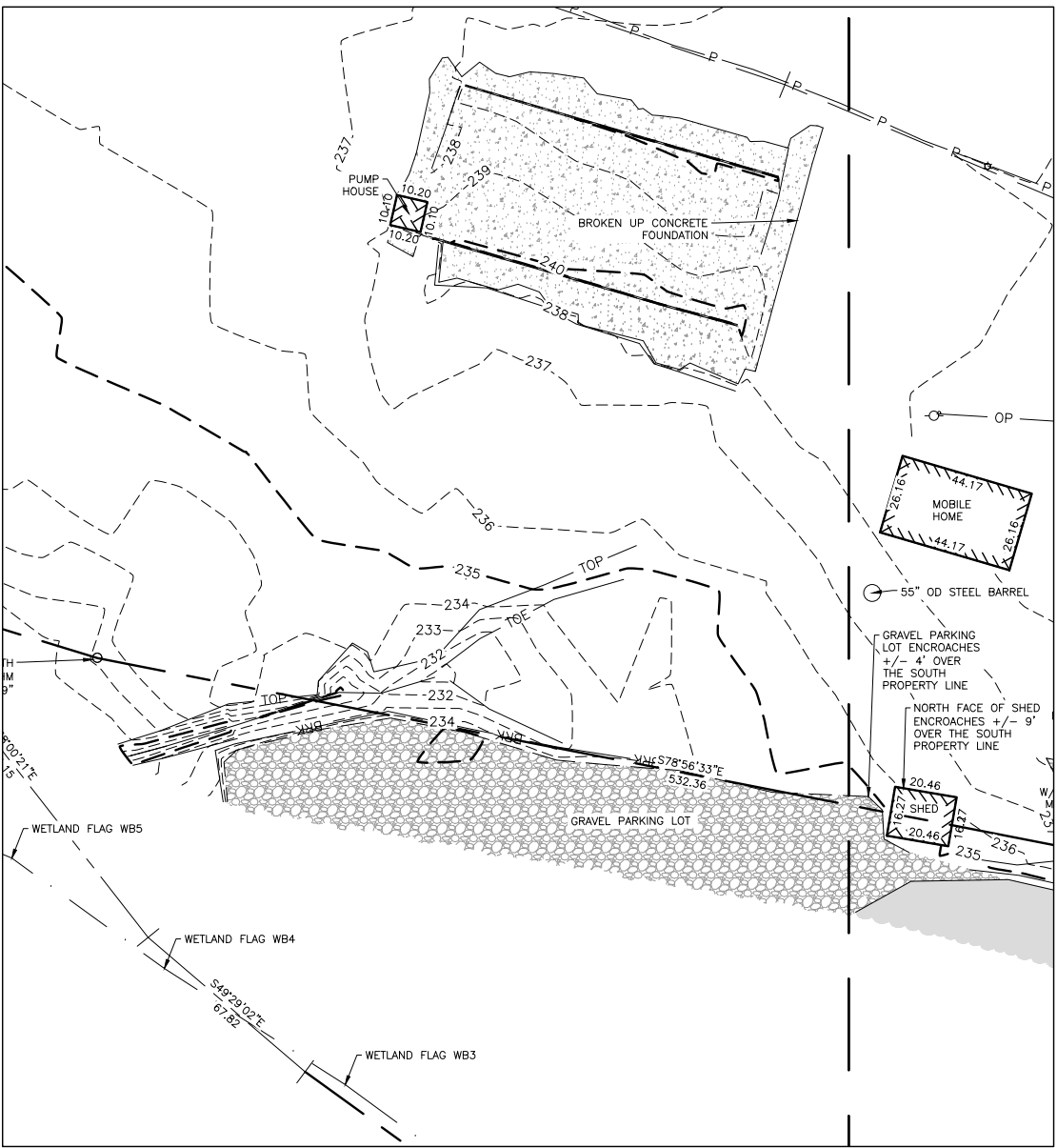
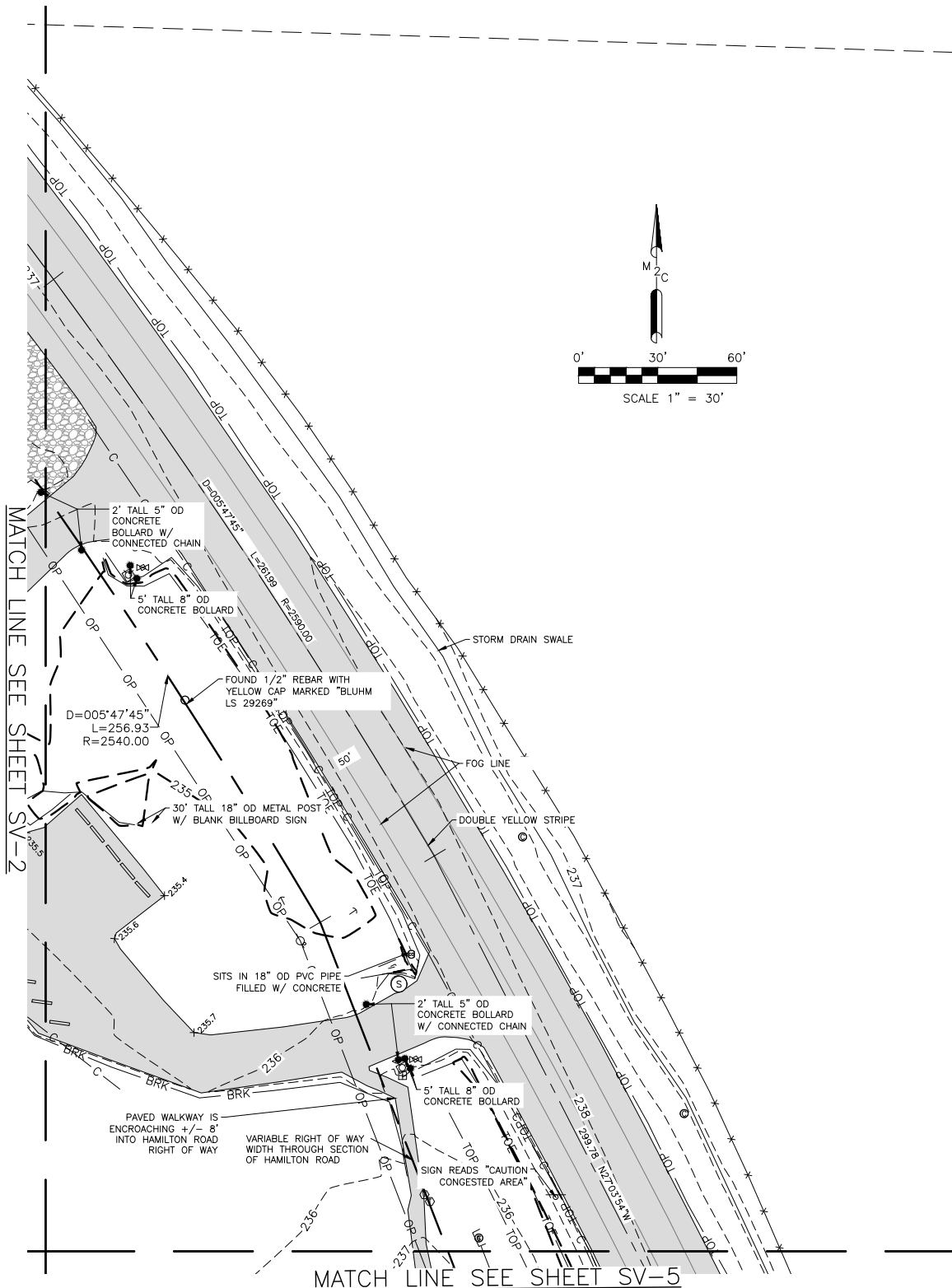
WETLAND

2-3' OF STANDING WATER IN WETLAND AS OF 3/3/2022



9/16/2022

DATE	9/8/2022			PROJECT NAME:	O & 120 HAMILTON RD CHEHALIS, WA 98352 ALTA/NSPS LAND TITLE SURVEY	SHEET NAME:	SV-3
SCALE	1" = 30'			CLIENT NAME:	GMD LAND COMPANY LLC	SHEET NO.	SV-3 OF 5
M2C PROJECT NO.:	22-043	PROFESSIONAL LAND SURVEYORS 2320 MOTTMAN RD SW, STE 106 TUMWATER, WA 98512 360.688.1949					
DRAWN	TLM						
CHECKED	SEP						
APPROVED	SEP						



BUILDING DETAIL 1

UTILITY NOTE

UTILITIES SHOWN HEREON ARE FROM FIELD MAPPING VISIBLE SURFACE APPURTENANCES, AND MAPPING UTILITY PAINT MARKS FROM A UTILITY LOCATING SERVICE. BURIED UTILITIES ARE ONLY SHOWN AS APPROXIMATE AND SHOULD BE VERIFIED BEFORE CONSTRUCTION.

SHEET INDEX

- SV-1 ALTA TITLE SHEET, LEGAL DESCRIPTION, DATUM, SURVEY NOTES
- SV-2 TOPOGRAPHIC MAP
- SV-3 TOPOGRAPHIC MAP
- SV-4 TOPOGRAPHIC MAP, LEGEND, UTILITY NOTE, BUILDING DIMENSION
- SV-5 TOPOGRAPHIC MAP, BUILDING DIMENSION

LINE TYPES

- WOOD FENCE
- CHAIN LINK FENCE
- PROPERTY LINE
- LOT LINE
- CENTERLINE RIGHT-OF-WAY
- ROAD RIGHT-OF-WAY
- SECTION LINE
- 1/16TH SECTION LINE
- GROUND TOE
- GROUND TOP
- GROUND BREAK
- FOG LINE
- DOUBLE YELLOW STRIPE
- BURIED POWER
- OVERHEAD POWER
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF CONCRETE
- STORM SWALE
- WETLAND LINE
- MAJOR CONTOUR
- MINOR CONTOUR

HATCHING

- GRAVEL
- ASPHALT
- CONCRETE

LEGEND (UTILITIES)

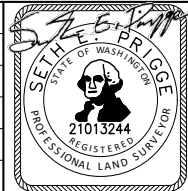
- CABLE VAULT/MANHOLE
- CULVERT
- LIGHT POLE
- NATURAL GAS VALVE
- GUY ANCHOR
- POWER JUNCTION BOX
- POWER POLE
- PP WITH DROP LINE
- POWER TRANSFORMER
- SS CLEANOUT
- SS MANHOLE
- TELEPHONE JUNCTION BOX
- TELEPHONE RISER
- TELEPHONE VAULT/MANHOLE
- HOSE BIB
- IRRIGATION CONTROL VALVE
- WATER VALVE
- WATER FIRE HYDRANT

LEGEND (SURFACE FEATURES)

- BRASS CAP
- HUB AND TACK
- LEAD AND TACK
- MONUMENT IN CASE
- REBAR AND CAP
- REBAR AND CONTROL CAP
- REBAR WITHOUT CAP
- MAIL BOX
- STREET SIGN (AS DESCRIBED)
- WHEEL STOP

9/16/2022

DATE	9/8/2022
SCALE	1" = 30'
M2C PROJECT NO.:	22-043
DRAWN	TLM
CHECKED	SEP
APPROVED	SEP



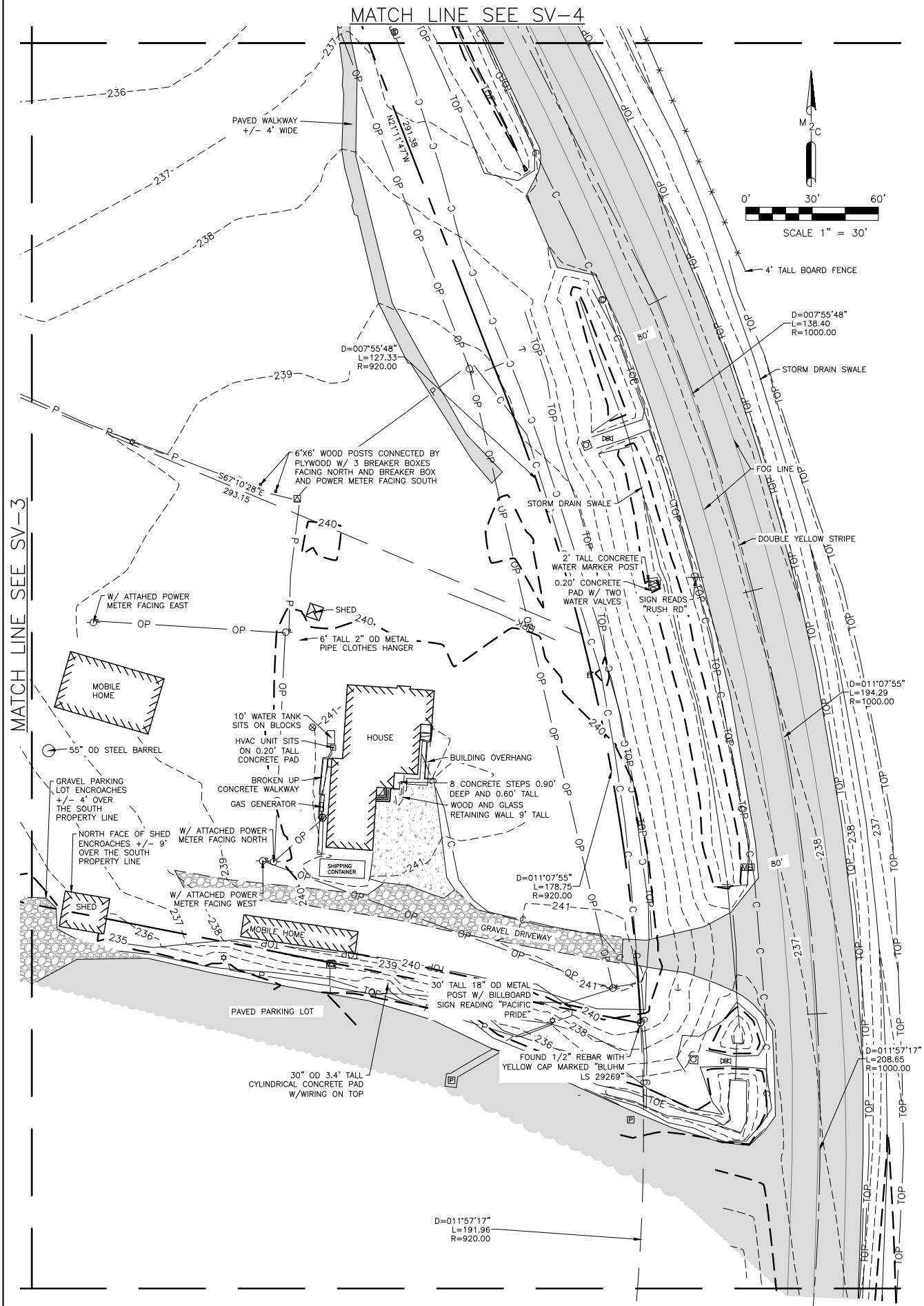
MTN 2 COAST LLC
 PROFESSIONAL LAND SURVEYORS
 2320 MOTTMAN RD SW, STE 106
 TUMWATER, WA 98512
 360.688.1949

PROJECT NAME:
 0 & 120 HAMILTON RD
 CHEHALIS, WA 98352
 ALTA/NSPS LAND TITLE SURVEY

CLIENT NAME:
 GMD LAND COMPANY LLC

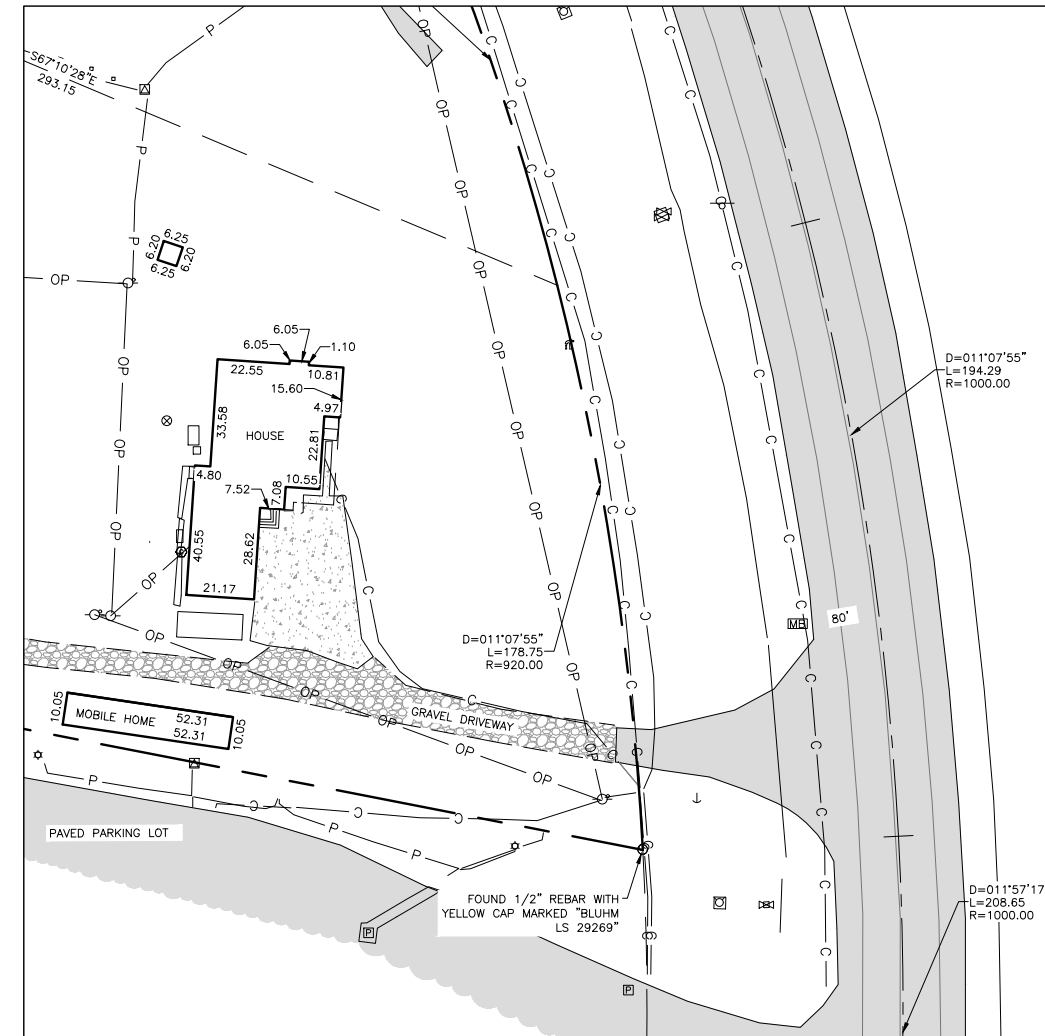
SHEET NAME:
 SV-4

SHEET NO.
 SV-4 OF 5



SHEET INDEX

- SV-1 ALTA TITLE SHEET, LEGAL DESCRIPTION, DATUM, SURVEY NOTES
- SV-2 TOPOGRAPHIC MAP
- SV-3 TOPOGRAPHIC MAP
- SV-4 TOPOGRAPHIC MAP, LEGEND, UTILITY NOTE
- SV-5 TOPOGRAPHIC MAP, BUILDING DIMENSION

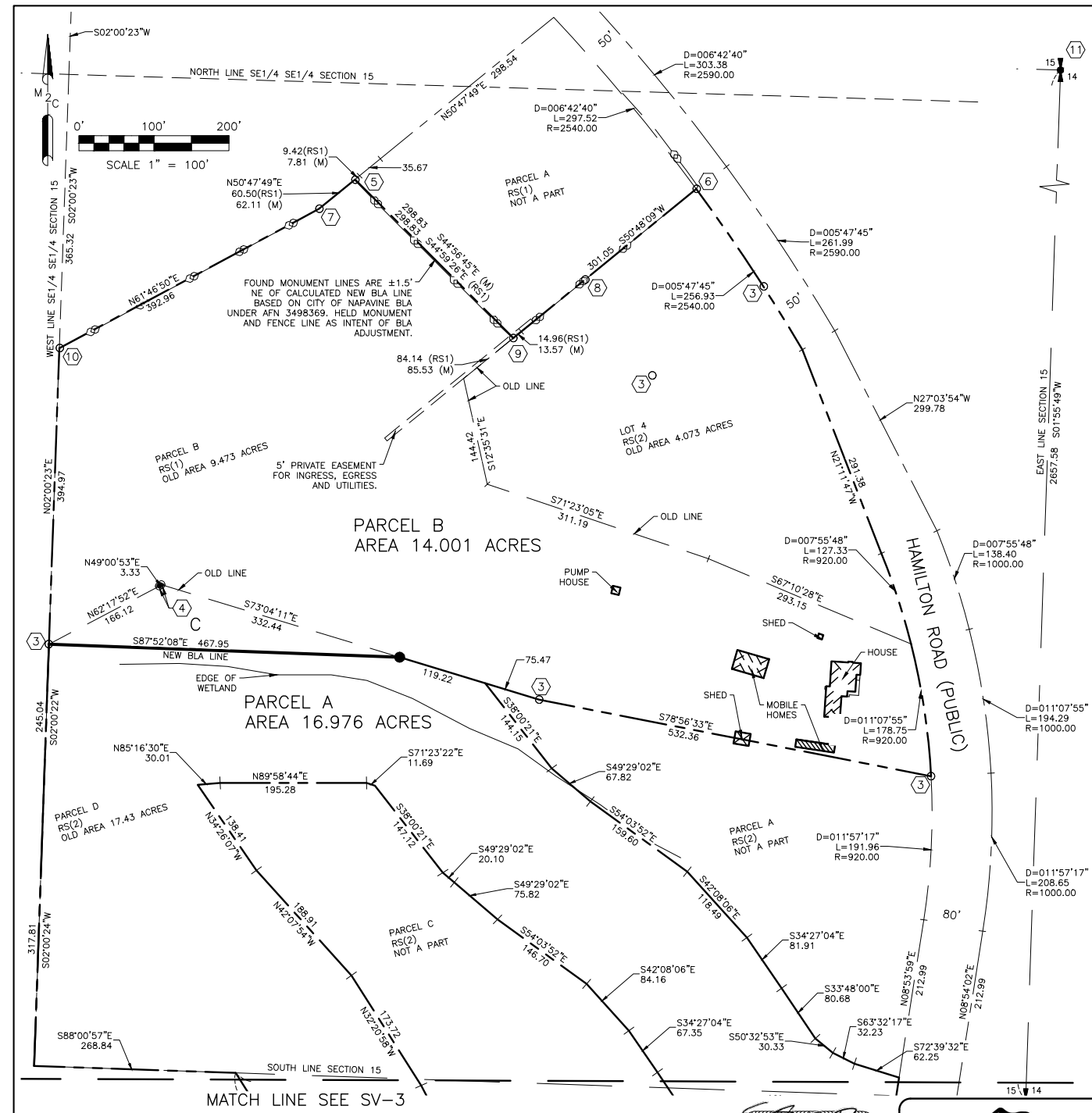


DATE	9/8/2022			PROJECT NAME:	0 & 120 HAMILTON RD CHEHALIS, WA 98352 ALTA/NSPS LAND TITLE SURVEY	SHEET NAME:	SV-5
SCALE	1" = 30'			CLIENT NAME:	GMD LAND COMPANY LLC	SHEET NO.	SV-5 OF 5
M2C PROJECT NO.:	22-043	PROFESSIONAL LAND SURVEYORS	2320 MOTTMAN RD SW, STE 106 TUMWATER, WA 98512 360.688.1949				
DRAWN	TLM						
CHECKED	SEP						
APPROVED	SEP						

<p>ADMINISTRATION APPROVAL — CITY OF NAPAVINE</p> <p>EXAMINED AND APPROVED THIS ____ DAY OF _____, 20__</p> <p>_____ COMMUNITY DEVELOPMENT DIRECTOR</p> <p>EXAMINED AND APPROVED THIS ____ DAY OF _____, 20__</p> <p>_____ PUBLIC WORKS DIRECTOR</p>	<p>CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT NO. BLA 07-11-2022</p> <p>PART OF THE SE1/4 OF THE SE1/4, AND THE NE1/4 OF THE SE1/4, SECTION 15, AND THE NE1/4 OF THE NE1/4, SECTION 22 ALL IN TOWNSHIP 13 NORTH, RANGE 2 WEST, W.M. LEWIS COUNTY, WASHINGTON</p>	<p>THIS BOUNDARY LINE ADJUSTMENT SHALL NOT CREATE ANY ADDITIONAL BUILDING LOT, TRACT, PARCEL, BUILDING SITE OF DIVISION NOR CREATE ANY BUILDING LOT, TRACT, PARCEL, BUILDING SITE, OR DIVISION WHICH CONTAINS INSUFFICIENT AREA AND DIMENSION TO MEET MINIMUM REQUIREMENTS FOR A BUILDING SITE, THE PORTION BEING TRANSFERRED SHALL BE COMBINED WITH THE GRANTEE'S PARCEL. ALL NEWLY CONFIGURED LOTS MUST COMPLY WITH APPLICABLE STANDARDS FOR SEWAGE DISPOSAL AND PROVISIONS OF WATER CONTAINED IN TITLE 13 NMC AND TITLE 70 RCW.</p> <p>THIS BOUNDARY LINE ADJUSTMENT IS REQUESTED AND APPROVED BY THE UNDERSIGNED, WHO CERTIFY THAT THEY ARE THE OWNERS OF THE RESPECTIVE PARCELS IDENTIFIED IN THIS BOUNDARY LINE ADJUSTMENT:</p> <p>GRANTOR _____ DATED _____</p> <p>GRANTEE _____ DATED _____</p> <p>GRANTEE: HAMILTONS WALNUT SHADE LLC 121 HAMILTON RD. CHEHALIS, WA 98532 TPN 018050005000</p> <p>GRANTOR: HAMILTONS WALNUT SHADE LLC 121 HAMILTON RD. CHEHALIS, WA 98532 TPN 018050004000</p> <p>GRANTOR: HAMILTONS WALNUT SHADE LLC 121 HAMILTON RD. CHEHALIS, WA 98532 TPN 018050016004</p>
<p>REVIEWED FOR APPLICABLE TAXES APPROVED FOR RECORDING LEWIS COUNTY TREASURER</p> <p>BY: _____ DATE: _____</p>	<p>REVIEWED AND APPROVED FOR RECORDING LEWIS COUNTY ASSESSOR</p> <p>BY: _____ DATE: _____</p>	

<p>ORIGINAL LEGAL DESCRIPTION</p> <p>TPN 018050005000: PARCEL "B" OF THE CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT NO. BLA 01-01-19 UNDER AUDITOR'S FILE NUMBER 3498369, RECORDS OF LEWIS COUNTY, WASHINGTON.</p> <p>TPN 018050016004: PARCEL "D" OF THE CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT RECORDED UNDER AUDITOR'S FILE NUMBER 3328812.</p> <p>TPN 018050004000: LOT 4 OF SURVEY RECORDED WITH THE LEWIS COUNTY AUDITOR ON MARCH 8, 1999, UNDER AUDITOR'S FILE NO. 3061686, IN BOOK 18 OF SURVEYS, PAGE 88, RECORDS OF LEWIS COUNTY, WASHINGTON.</p>	<p>SURVEY NOTES</p> <ol style="list-style-type: none"> INSTRUMENT USED: TOPCON VR GPS, TOPCON GR5 GPS, AND SOKKIA IX TOTAL STATION. THIS SURVEY MEETS OR EXCEEDS THE STANDARDS OF WAC 332-130-090. SURVEY COMPLETED 03/03/2022. ALL MONUMENTS SHOWN AS FOUND VISITED 02/2022. MTN2COAST (M2C) WAS RETAINED BY GURINDERJIT SIDHU WITH GMD LAND COMPANY LLC TO COMPLETE A BOUNDARY LINE ADJUSTMENT FOR TAX PARCELS 018050005000, 018050004000, AND 018050016004. REFERENCE SURVEY 1 WAS USED AS A BASIS FOR THE BOUNDARY, M2C HELD THE EAST LINE OF SECTION FOR ALIGNMENT OF RS(1) FINDING MONUMENTS BEST FIT, M2C HELD FOUND MONUMENTS AND CALLED OUT ERROR FOUND, MEASUREMENTS DIFFERENCE BETWEEN REFERENCE SURVEY 1 (RS1) VS MEASURED (M) SHOWN ON MAP.
<p>NEW LEGAL DESCRIPTION</p> <p>PARCEL A OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT 07-11-2022 MORE PARTICULARLY DESCRIBED AS FOLLOWS:</p> <p>PARCEL B OF THE CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT NO. BLA 01-01-19 FILED JUNE 23RD, 2009 AND RECORDED UNDER AUDITOR'S FILE NUMBER 3498369;</p> <p>TOGETHER WITH LOT 4 OF SURVEY RECORDED ON MARCH 8, 1999, UNDER AUDITOR'S FILE NO. 3061686,</p> <p>TOGETHER WITH THAT PORTION OF PARCEL D OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT RECORDED UNDER AUDITOR'S FILE NUMBER 3328812, LYING NORTHERLY OF THE FOLLOWING DESCRIBED LINE: BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL D, FROM WHICH THE WEST LINE OF SAID PARCEL D BEARS SOUTH 02°00'22" WEST; THENCE SOUTH 87°52'08" EAST, 467.95 FEET, MORE OR LESS TO THE INTERSECTION WITH THE NORTH LINE OF SAID PARCEL "D",</p> <p>SITUATE IN CITY OF NAPAVINE, COUNTY OF LEWIS, STATE OF WASHINGTON.</p> <p>PARCEL B OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT 07-11-2022 MORE PARTICULARLY DESCRIBED AS FOLLOWS:</p> <p>THAT PORTION OF PARCEL D OF CITY OF NAPAVINE BOUNDARY LINE ADJUSTMENT FILED JUNE 23RD, 2009 AND RECORDED UNDER AFN 3328812, LYING SOUTHERLY OF THE FOLLOWING DESCRIBED LINE: BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL D, FROM WHICH THE WEST LINE OF SAID PARCEL D BEARS SOUTH 02°00'22" WEST; THENCE SOUTH 87°52'08" EAST, 467.95 FEET, MORE OR LESS TO THE INTERSECTION WITH THE NORTH LINE OF SAID PARCEL "D",</p> <p>SITUATE IN CITY OF NAPAVINE, COUNTY OF LEWIS, STATE OF WASHINGTON.</p>	<p>RS(X) REFERENCED SURVEYS</p> <ol style="list-style-type: none"> CITY OF NAPAVINE BLA-01-01-19 RECORDED ON PAGE 311 IN BOOK 3 OF BLAM UNDER AFN 3498369. CITY OF NAPAVINE BLA RECORDED ON PAGE 158 IN BOOK 2 OF BLAM UNDER AFN 3328812. LEWIS COUNTY BLA RECORDED ON PAGE 62 IN BOOK 19 OF SURVEYS UNDER AFN 3077212. LEWIS COUNTY BLA RECORDED ON PAGE 244 IN BOOK 16 OF SURVEYS UNDER AFN 3029065. LEWIS COUNTY BLA RECORDED ON PAGE 288 IN BOOK 18 OF SURVEYS UNDER AFN 3061686.
	<p>VICINITY MAP</p>
	<p>GRAPHICAL INDEX T13N R2W, W.M.</p>

<p>AUDITOR'S CERTIFICATE</p> <p>FILED FOR RECORD THIS ____ DAY OF _____</p> <p>AT _____ M. IN BOOK ____ OF _____</p> <p>AT PAGE ____ AT THE REQUEST OF MTN2COAST, LLC.</p> <p>_____ COUNTY AUDITOR</p> <p>AUDITOR'S FILE NUMBER _____</p>	<p>SURVEYOR'S CERTIFICATE</p> <p>THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF: GMD LAND COMPANY LLC, IN JULY, 2022</p> <p>_____ SETH E. PRIGGE, PLS #21013244</p>	<p>7/11/2022</p>	<p>MTN2COAST LLC</p> <p>PROFESSIONAL LAND SURVEYORS 2320 MOTTMAN RD SW, STE 106 TUMWATER, WA 98512 360-688-1949</p>	<p>RECORD OF SURVEY OF BOUNDARY LINE ADJUSTMENT FOR GMD LAND COMPANY LLC.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">DRAWN BY GMB</td> <td style="width:33%;">DATE 7/11/2022</td> <td style="width:33%;">JOB NUMBER 22-043</td> </tr> <tr> <td>CHECKED BY SEP</td> <td>SCALE N/A</td> <td>SHEET NUMBER SV-1 (SHEET 1 OF 3)</td> </tr> <tr> <td colspan="3">AUDITORS INDEX SE1/4 SE1/4, AND NE1/4 SE1/4 SEC15 AND NE1/4 NE1/4, SEC22, T13N, R2W, W.M.</td> </tr> </table>	DRAWN BY GMB	DATE 7/11/2022	JOB NUMBER 22-043	CHECKED BY SEP	SCALE N/A	SHEET NUMBER SV-1 (SHEET 1 OF 3)	AUDITORS INDEX SE1/4 SE1/4, AND NE1/4 SE1/4 SEC15 AND NE1/4 NE1/4, SEC22, T13N, R2W, W.M.		
DRAWN BY GMB	DATE 7/11/2022	JOB NUMBER 22-043											
CHECKED BY SEP	SCALE N/A	SHEET NUMBER SV-1 (SHEET 1 OF 3)											
AUDITORS INDEX SE1/4 SE1/4, AND NE1/4 SE1/4 SEC15 AND NE1/4 NE1/4, SEC22, T13N, R2W, W.M.													



CITY OF NAPAVINE
 BOUNDARY LINE ADJUSTMENT
 NO. BLA 07-11-2022
 PART OF THE SE1/4 OF THE SE1/4, AND THE
 NE1/4 OF THE SE1/4, SECTION 15, AND THE
 NE1/4 OF THE NE1/4, SECTION 22
 TOWNSHIP 13 NORTH, RANGE 2 WEST, W.M.
 LEWIS COUNTY, WASHINGTON

BASIS OF BEARING

HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2011 BASED ON GPS TIES TO WSDOT MONUMENTS 7406 AND 6779, CONVERTED TO GROUND SCALE ABOUT N:473822.35/E:1035469.491 USING A COMBINED SCALE FACTOR OF 0.99990646.

M2C MATCHED REFERENCE SURVEYS(RS) 1, 2, AND 3 BASED ON TIES TO THE EAST QUARTER CORNER OF SECTION 15 AND 22.

MONUMENT NOTES

- 1) FOUND 3-1/2" DIAMETER WSDOT BRASS MONUMENT 7406 IN CASE.
- 2) FOUND 3-1/2" DIAMETER WSDOT ALUMINUM DISC MONUMENT 6779 ON 1" METAL PIPE IN CASE.
- 3) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269".
- 4) FOUND 1/2" DIAMETER REBAR WITHOUT CAP.
- 5) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±1.8' NORTHEAST OF CALCULATED POSITION.
- 6) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.6' EAST OF CALCULATED POSITION.
- 7) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.7' NORTHEAST OF CALCULATED POSITION.
- 8) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.3' SOUTHEAST OF PROPERTY LINE.
- 9) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±1.4' NORTHEAST OF CALCULATED POSITION.
- 10) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.8' EAST OF CALCULATED POSITION.
- 11) FOUND 3.5" DIAMETER BRASS SURFACE MONUMENT WITH PUNCH MARKED "LEWIS COUNTY T13NR2W LS 35981", HELD FOR EAST QUARTER CORNER SECTION 15.
- 12) FOUND 3.5" DIAMETER BRASS SURFACE MONUMENT WITH PUNCH MARKED "LEWIS COUNTY T13NR2W LS 35981", HELD FOR EAST QUARTER CORNER SECTION 22.
- 13) FOUND 1/2" DIAMETER REBAR WITH YELLOW PLASTIC CAP MARKED "BLUHM LS 29269" ±.5' NORTH OF CALCULATED POSITION.
- 14) FOUND 1/2" DIAMETER REBAR WITH ILLEGIBLE YELLOW PLASTIC CAP ±.5' NORTH OF CALCULATED POSITION.

LEGEND

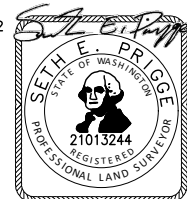
- FOUND REBAR AND CAP MARKED AS NOTED
- SET 5/8"x24" LONG REBAR AND YELLOW PLASTIC CAP MARKED "MTN2COAST LS 21013244"
- ⊙ BRASS CAP
- ⊙ REBAR WITHOUT CAP

LINE TYPES

- CHAIN LINK FENCE
- x—x—x— WIRE FENCE
- — — — — PROPERTY LINE
- — — — — LOT LINE
- — — — — 1/16TH SECTION LINE
- — — — — ROAD RIGHT-OF-WAY
- — — — — CENTERLINE ROAD RIGHT-OF-WAY
- — — — — NEW BLA LINE
- — — — — OLD BLA LINE
- — — — — LOT LINES BLA RS(1)
- — — — — EASEMENT LINE
- — — — — SECTION LINE
- — — — — SHEET MATCHLINE

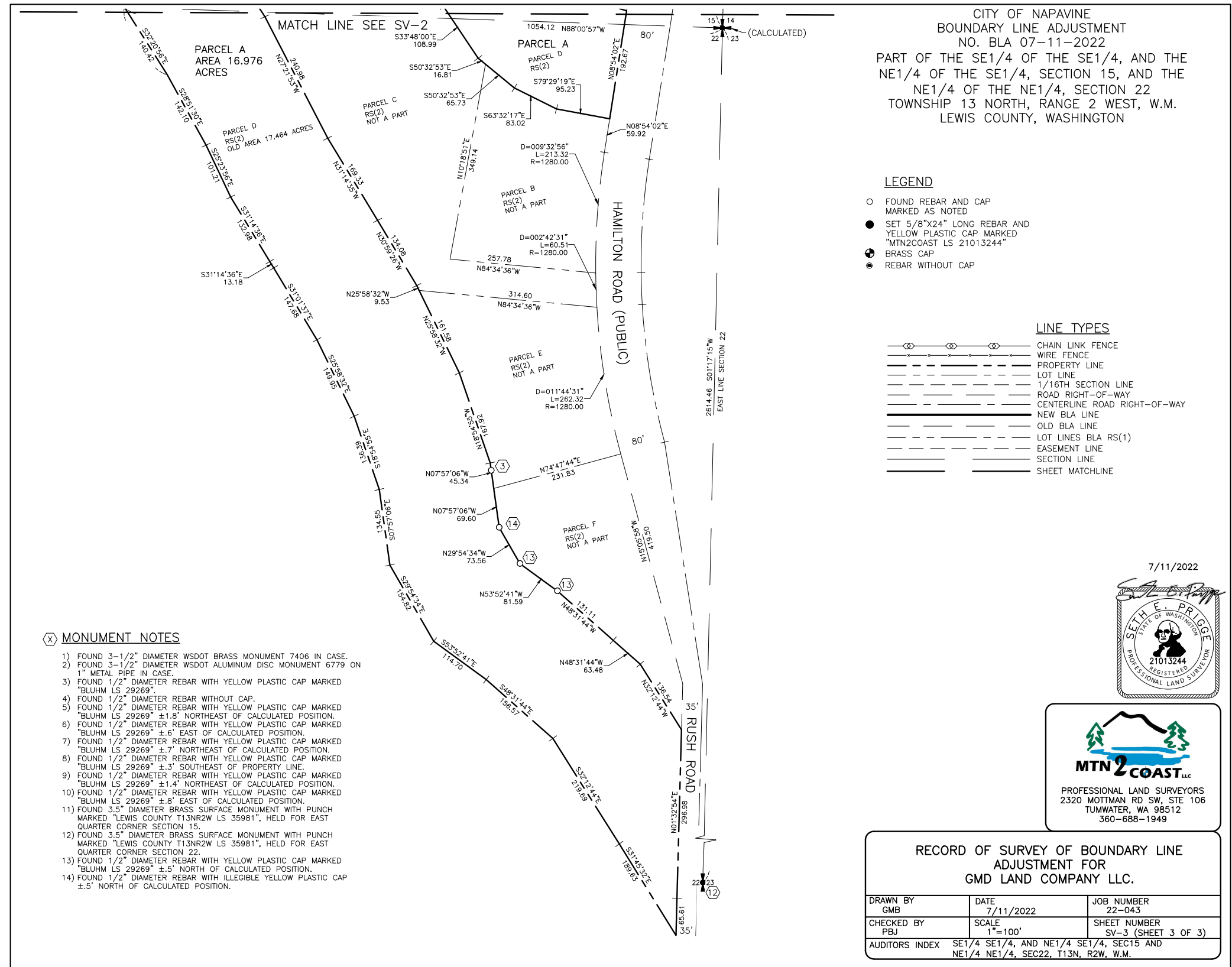
MATCH LINE SEE SV-3

7/11/2022

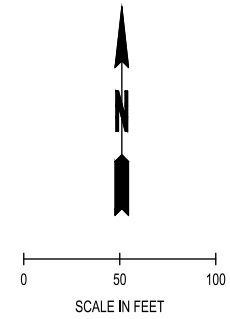


MTN2COAST LLC
 PROFESSIONAL LAND SURVEYORS
 2320 MOTTMAN RD SW, STE 106
 TUMWATER, WA 98512
 360-688-1949

RECORD OF SURVEY OF BOUNDARY LINE ADJUSTMENT FOR GMD LAND COMPANY LLC.		
DRAWN BY GMB	DATE 7/11/2022	JOB NUMBER 22-043
CHECKED BY SEP	SCALE 1"=100'	SHEET NUMBER SV-2 (SHEET 2 OF 3)
AUDITORS INDEX SE1/4 SE1/4, AND NE1/4 SE1/4, SEC15, AND NE1/4 NE1/4, SEC22, T13N, R2W, W.M.		



SEC. 15, T 13N., R 2W., W.M.



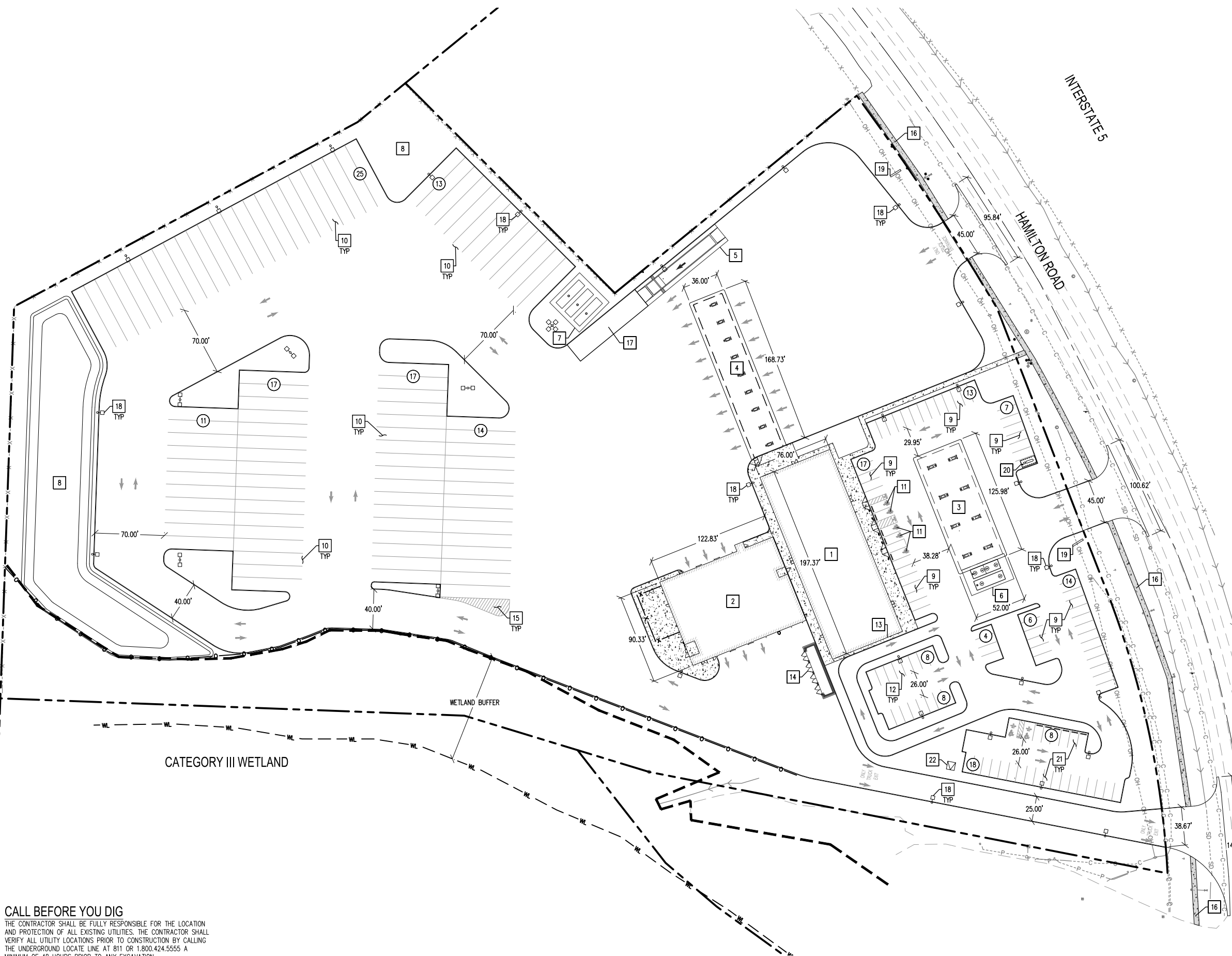
LEGEND

- PROPERTY LINE
- WETLAND BOUNDARY
- WETLAND BUFFER
- PROPOSED BUILDING
- STALL COUNT
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED WETLAND PRIVACY FENCE
- CEMENT CONCRETE TRAFFIC CURB
- ONSITE CEMENT CONCRETE SIDEWALK
- 4" CEMENT CONCRETE FRONTAGE SIDEWALK
- DIRECTIONAL ARROWS
- ONSITE LUMINAIRE

- XX KEYED NOTES**
1. TA TRAVEL CENTER BUILDING
 2. TRUCK SHOP, 3 BAY
 3. AUTO FUELING CANOPY
 4. TRUCK FUELING CANOPY
 5. TRUCK SCALE
 6. UNDERGROUND FUEL TANK
 7. ABOVE GROUND DIESEL FUEL TANK
 8. STORMWATER TREATMENT & DETENTION FACILITY
 9. AUTO PARKING STALL (9'x20') TYP.
 10. TRUCK PARKING STALL (13'x70') TYP.
 11. ACCESSIBLE PARKING STALL
 12. AUTO PARKING STALL (9'x18') TYP.
 13. DRIVE THROUGH WINDOW
 14. TRASH ENCLOSURE
 15. PAINTED ISLAND
 16. 5' WIDE 4" CONCRETE SIDEWALK AT FRONTAGE PER CITY OF NAPAVINE PUBLIC WORKS STANDARDS
 17. CONCRETE PAD FOR FUEL DELIVERY
 18. ONSITE LUMINAIRE
 19. MONUMENT SIGN
 20. PROPANE TANK
 21. TESLA CHARGING STATIONS (9'x18") TYP.
 22. EV CHARGING EQUIPMENT

PARKING DATA

AUTO PARKING STALLS TOTAL	103
ADA ACCESSIBLE PARKING STALLS	7
TRUCK PARKING STALLS	97
TOTAL PARKING STALLS	200



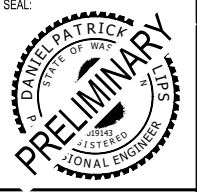
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V:\PROJECTS\2257_000 LAND COMPANY LLC\22-000419 NAPAVINE TRUCK STOP SITE ENTIREMENTS\CADD\22-000419 SP-01.DWG

CALL BEFORE YOU DIG
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

BY	
DATE	
REVISIONS	

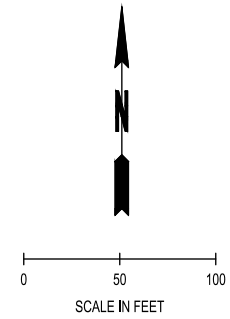
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: **PRELIMINARY SITE PLAN**
PROJECT NAME: **TA TRAVEL CENTER**
121 HAMILTON RD
NAPAVINE, WA



DESIGNER: D. PHILLIPS
DRAWN BY: K. GANS
APPROVED BY: D. PHILLIPS
DATE: DECEMBER 2022
JOB NO: 22-000419
DRAWING FILE NO: 22-000419 SP-01
DRAWING NO: SP-01
SHEET NO: 10 OF 17

SEC. 15, T 13N., R 2W., W.M.

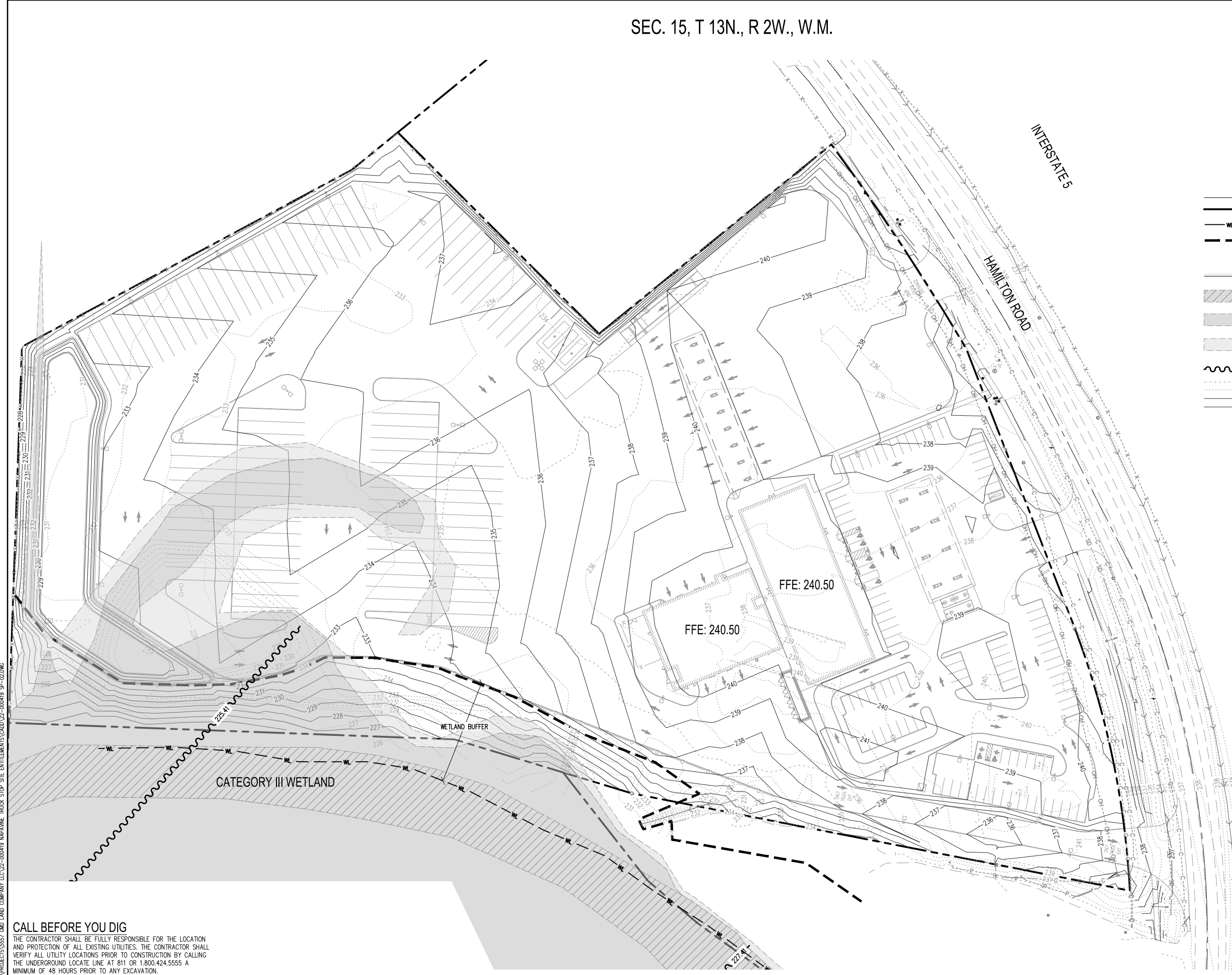


LEGEND

	PROPERTY LINE
	WETLAND BOUNDARY
	WETLAND BUFFER
	PROPOSED BUILDING
	REGULATORY FLOODWAY ZONE AE
	ZONE AE
	ZONE X (SHADED); SEE GENERAL NOTE 3
	BASE FLOOD ELEVATION (NAVD88)
	EXISTING CONTOURS (MAJOR/MINOR)
	PROPOSED CONTOURS (MAJOR/MINOR)

GENERAL NOTES

1. BASE FLOOD ELEVATIONS CONVERTED FROM NGVD29 TO NAVD88 BY ADDING 3.405 FEET
2. FEMA FLOOD ZONE DATA DOWNLOADED FROM FEMA'S NATIONAL FLOOD HAZARD LAYER VIEWER (<https://hazards-fema.maps.arcgis.com/>)
3. ZONE X (SHADED) INDICATES 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
4. FILL PLACED AT THE SITE HAS ALTERED THE FLOOD ZONE VERSUS WHAT HAS BEEN MAPPED



Dec 12, 2022 10:07:46am User: dphillips
VA PROJECTS 0557 GND LAND COMPANY LLC 22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS (CAD) 22-000419 SP-02.DWG

CALL BEFORE YOU DIG
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

BY	
DATE	
REVISIONS	

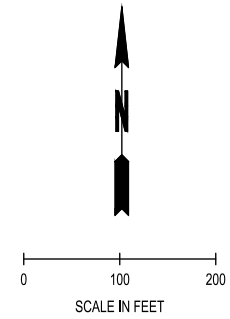
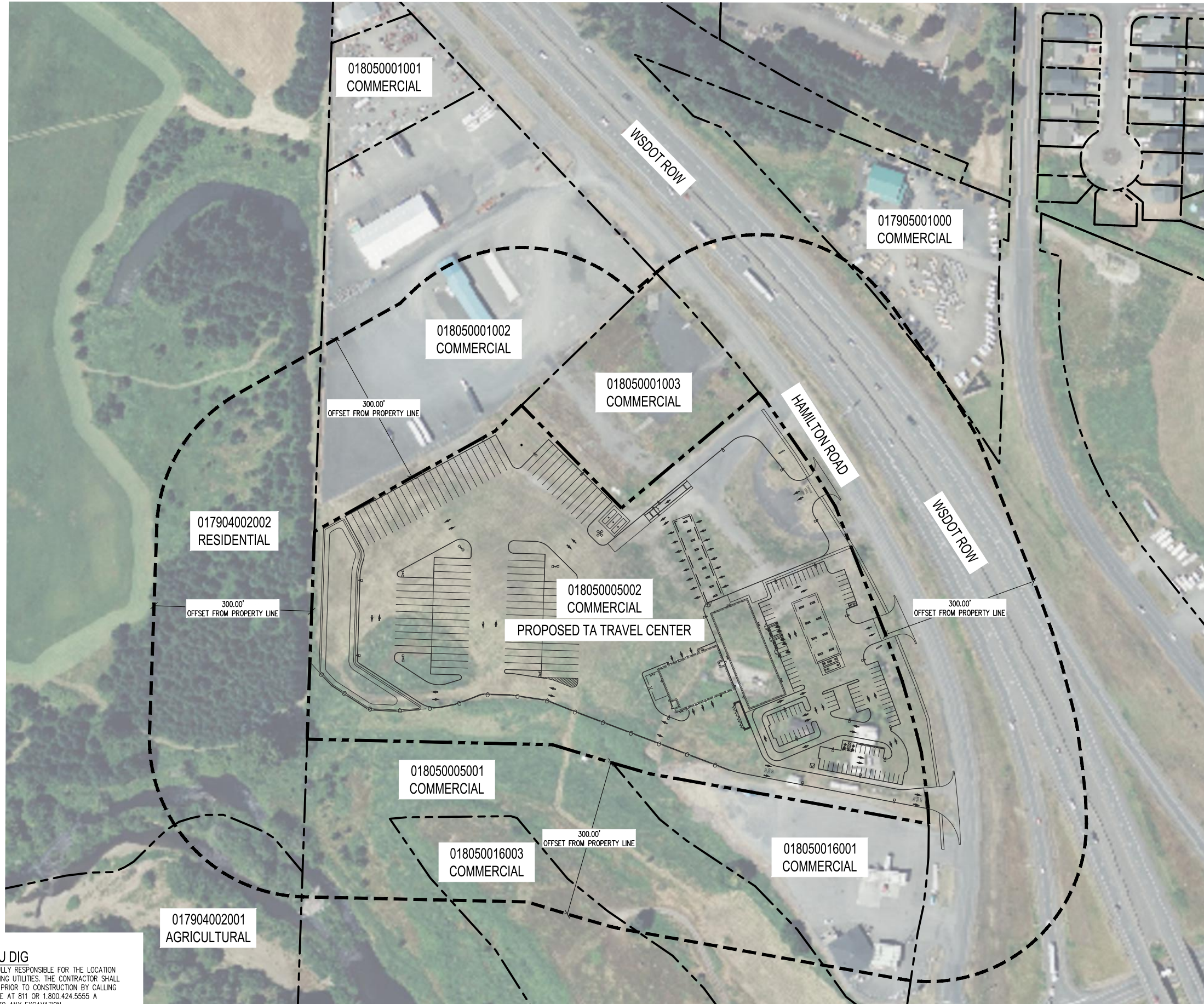
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: FEMA FLOOD ZONES MAP
PROJECT NAME: TA TRAVEL CENTER
121 HAMILTON RD
NAPAVINE, WA



DESIGNER:	D. PHILLIPS
DRAWN BY:	K. GANS
APPROVED BY:	D. PHILLIPS
DATE:	DECEMBER 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 SP-02
DRAWING NO:	SP-02
SHEET NO:	11 OF 17

SEC. 15, T 13N., R 2W., W.M.



LEGEND

- PROPERTY LINE
- TA TRAVEL STOP PROPERTY LINE
- 300-FOOT OFFSET FROM TA TRAVEL CENTER PROPERTY LINE

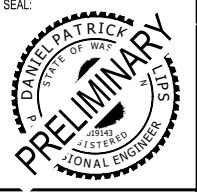
GENERAL NOTES:

1. PARCEL LINES, PARCEL NUMBERS, AND ZONING TAKEN FROM LEWIS COUNTY GIS MAPPING (<https://gis.lewiscountywa.gov/webmap/>)
2. TA TRAVEL STOP SITE PLAN SHOWN FOR REFERENCE ONLY. GROUND SURVEY AND GIS MAPPING DO NOT OVERLAY PRECISELY.

REVISIONS	DATE	BY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

ADJACENT ZONING MAP
TA TRAVEL CENTER
121 HAMILTON RD
NAPAVINE, WA

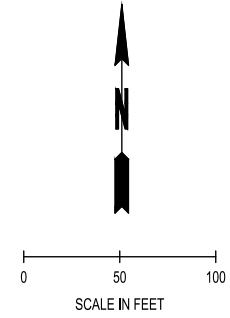


DESIGNER: D. PHILLIPS
DRAWN BY: K. GANS
APPROVED BY: D. PHILLIPS
DATE: DECEMBER 2022
JOB NO: 22-000419
DRAWING FILE NO: 22-000419 SP-03
DRAWING NO: SP-03
SHEET NO: 12 OF 17

Dec 12, 2022 10:26:10am User: dphillips
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CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

SEC. 15, T 13N., R 2W., W.M.

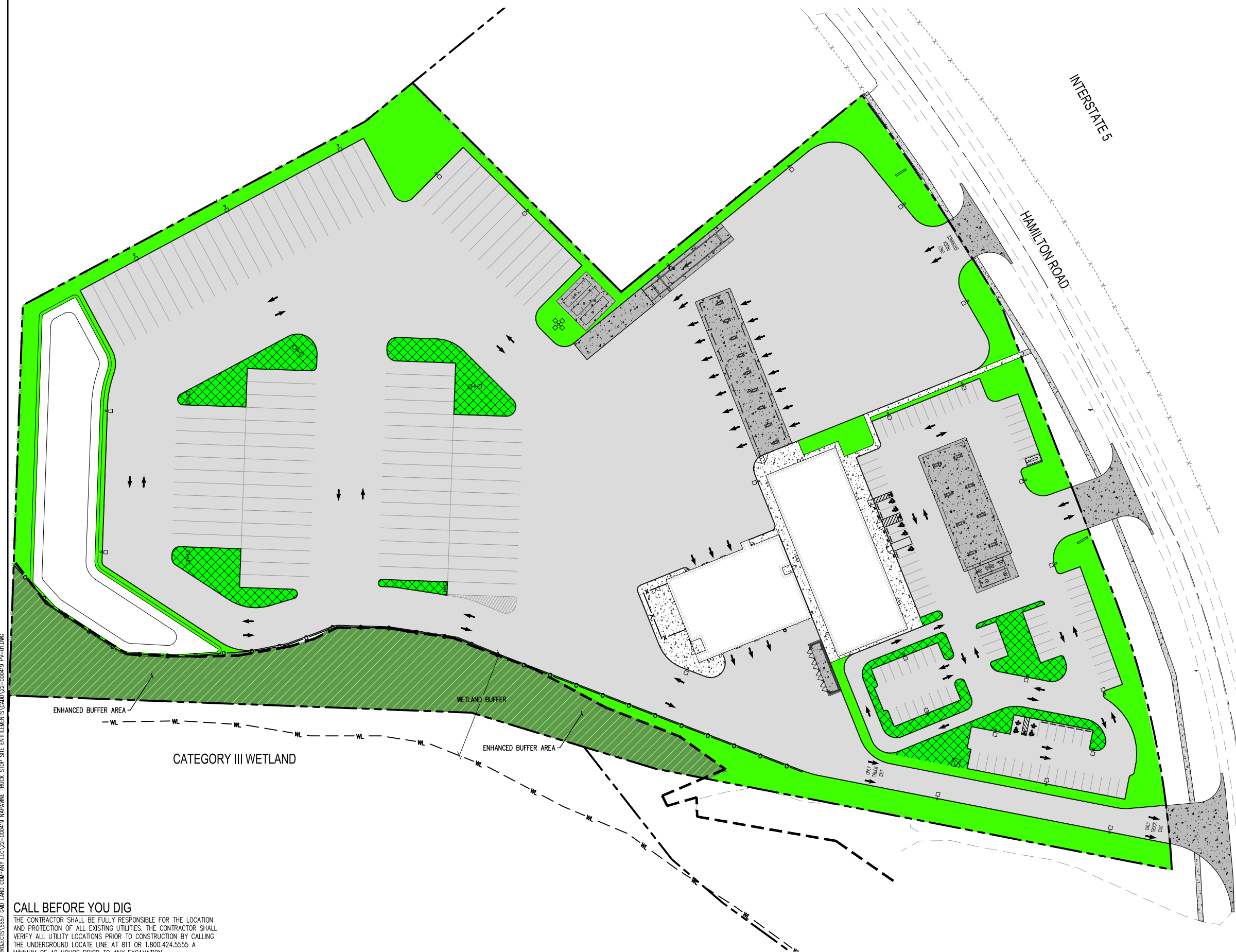


LEGEND

- PROPERTY LINE
- EXISTING FENCE
- CEMENT CONCRETE TRAFFIC CURB
- PROPOSED BUILDING
- ONSITE CEMENT CONCRETE SIDEWALK
- 4" CEMENT CONCRETE FRONTAGE SIDEWALK
- CEMENT CONCRETE PAVING
- ASPHALT PAVING
- LANDSCAPE AREA
- PARKING ISLAND LANDSCAPE AREA
- ENHANCED WETLAND BUFFER AREA

ONSITE SURFACE DATA

ASPHALT PAVEMENT	394,510 SF
CEMENT CONCRETE PAVEMENT	19,950 SF
CONCRETE SIDEWALK	11,265 SF
BUILDING	26,085 SF
PARKING LOT	394,510 SF
PARKING ISLAND LANDSCAPE	21,200 SF (5.4% OF PARKING)
OTHER LANDSCAPE	71,505 SF
BUFFER ENHANCEMENT AREA	44,610 SF
TOTAL LANDSCAPE	133,900 SF
STORMWATER BASIN	24,130 SF



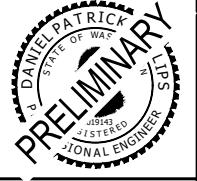
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V:\PROJECTS\2557_000 LAND COMPANY LLC\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\22-000419 PV-01.DWG

CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	BY	DATE

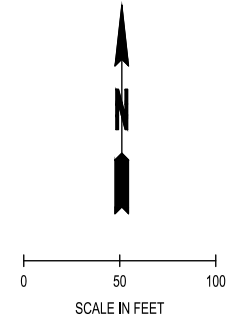
SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **PRELIMINARY PAVING & LANDSCAPE PLAN**
 PROJECT NAME: **TA TRAVEL CENTER**
 121 HAMILTON RD
 NAPAVINE, WA



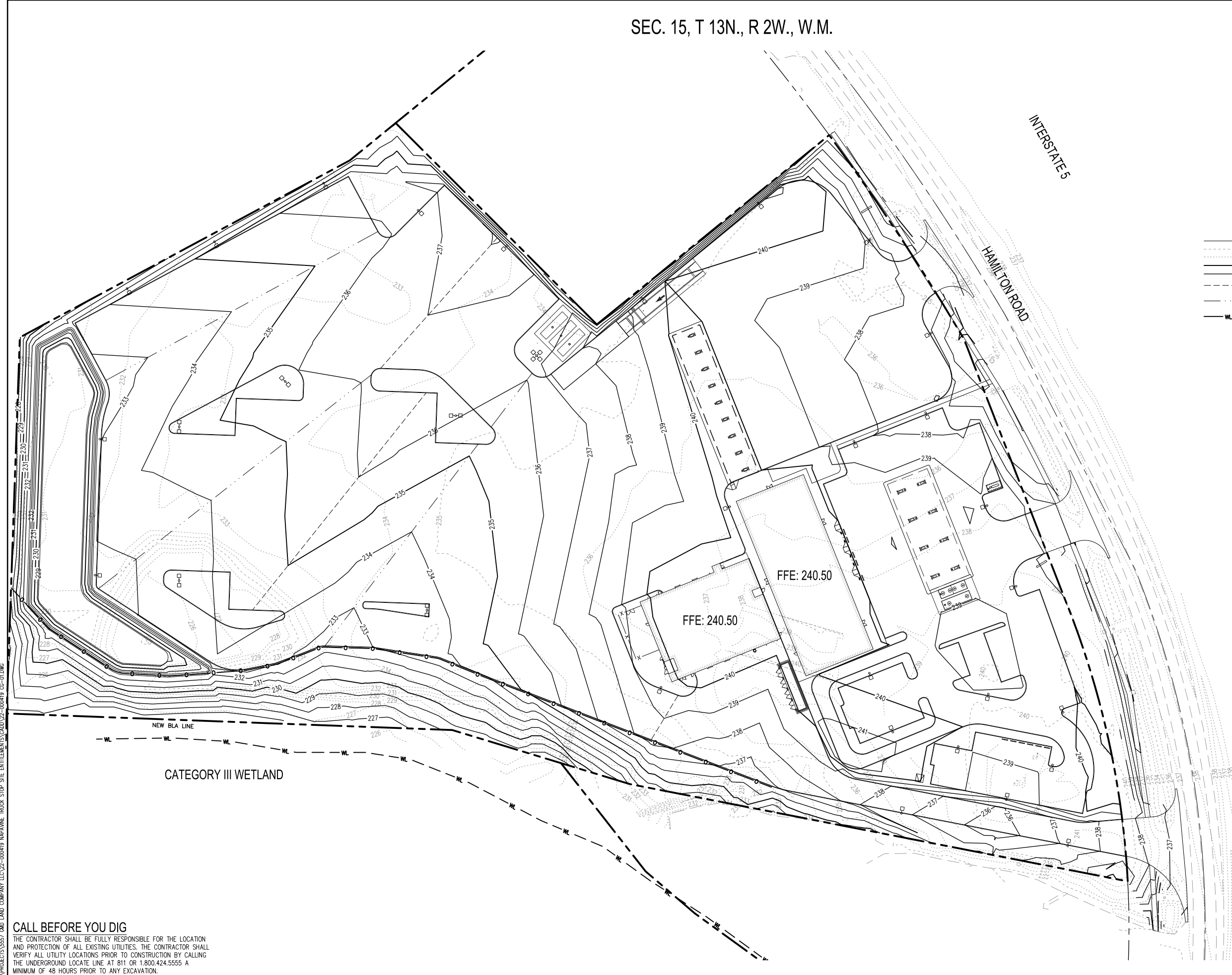
DESIGNER:	D. PHILLIPS
DRAWN BY:	K. GANS
APPROVED BY:	D. PHILLIPS
DATE:	DECEMBER 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 PV-01
DRAWING NO:	PV-01
SHEET NO:	13 OF 17

SEC. 15, T 13N., R 2W., W.M.



LEGEND

---XX---	EXISTING CONTOURS (MAJOR/MINOR)
---XX---	PROPOSED CONTOURS (MAJOR/MINOR)
---	GRADE BREAK
---	FLOWLINE
-WL-	WETLAND
-WL-	WETLAND BUFFER



CATEGORY III WETLAND

NEW B/LA LINE

FFE: 240.50

FFE: 240.50

INTERSTATE 5

HAMILTON ROAD

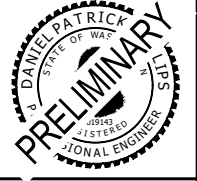
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CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	BY	DATE

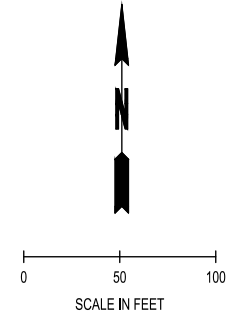
SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **PRELIMINARY GRADING PLAN**
 PROJECT NAME: **TA TRAVEL CENTER**
 121 HAMILTON RD
 NAPAVINE, WA



DESIGNER:	D. PHILLIPS
DRAWN BY:	K. GANS
APPROVED BY:	D. PHILLIPS
DATE:	DECEMBER 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 CG-01
DRAWING NO:	CG-01
SHEET NO:	14 OF 17

SEC. 15, T 13N., R 2W., W.M.



LEGEND

	PROPERTY LINE
	EXISTING FENCE
	EXISTING CABLE LINE
	EXISTING POWER LINE
	EXISTING OVERHEAD POWER LINE
	EXISTING STORM LINE
	EXISTING WATER LINE
	EXISTING SEWER FORCE MAIN LINE
	EXISTING SWALE
	PROPOSED STORM LINE
	PROPOSED WATER LINE
	PROPOSED WATER SERVICE LINE
	PROPOSED SEWER LINE
	PROPOSED SEWER FORCE MAIN

KEYED NOTES

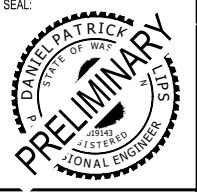
- STEP SYSTEM SERVICE CONNECTION
- SEWER PUMP STATION
- OIL/WATER SEPARATOR
- GREASE INTERCEPTOR
- CONNECT TO EXISTING 8" WATER STUB
- CONNECT TO EXISTING 12" WATER MAIN
- 3" COMPOUND WATER METER WITH BYPASS AND 3" REDUCED PRESSURE BACKFLOW ASSEMBLY
- FIRE HYDRANT
- STORMWATER OUTLET CONTROL STRUCTURE
- FIRE DEPARTMENT CONNECTION W/ DCDA FOR SINGLE SERVICE
- LEVEL SPREADER

Dec 12, 2022 10:04:56am User: dphillips
V:\PROJECTS\2557_000 LAND COMPANY LLC\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\22-000419 UT-01.DWG

CALL BEFORE YOU DIG
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

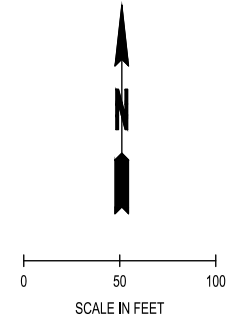
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

PRELIMINARY UTILITY PLAN
PROJECT NAME:
TA TRAVEL CENTER
121 HAMILTON RD
NAPAVINE, WA



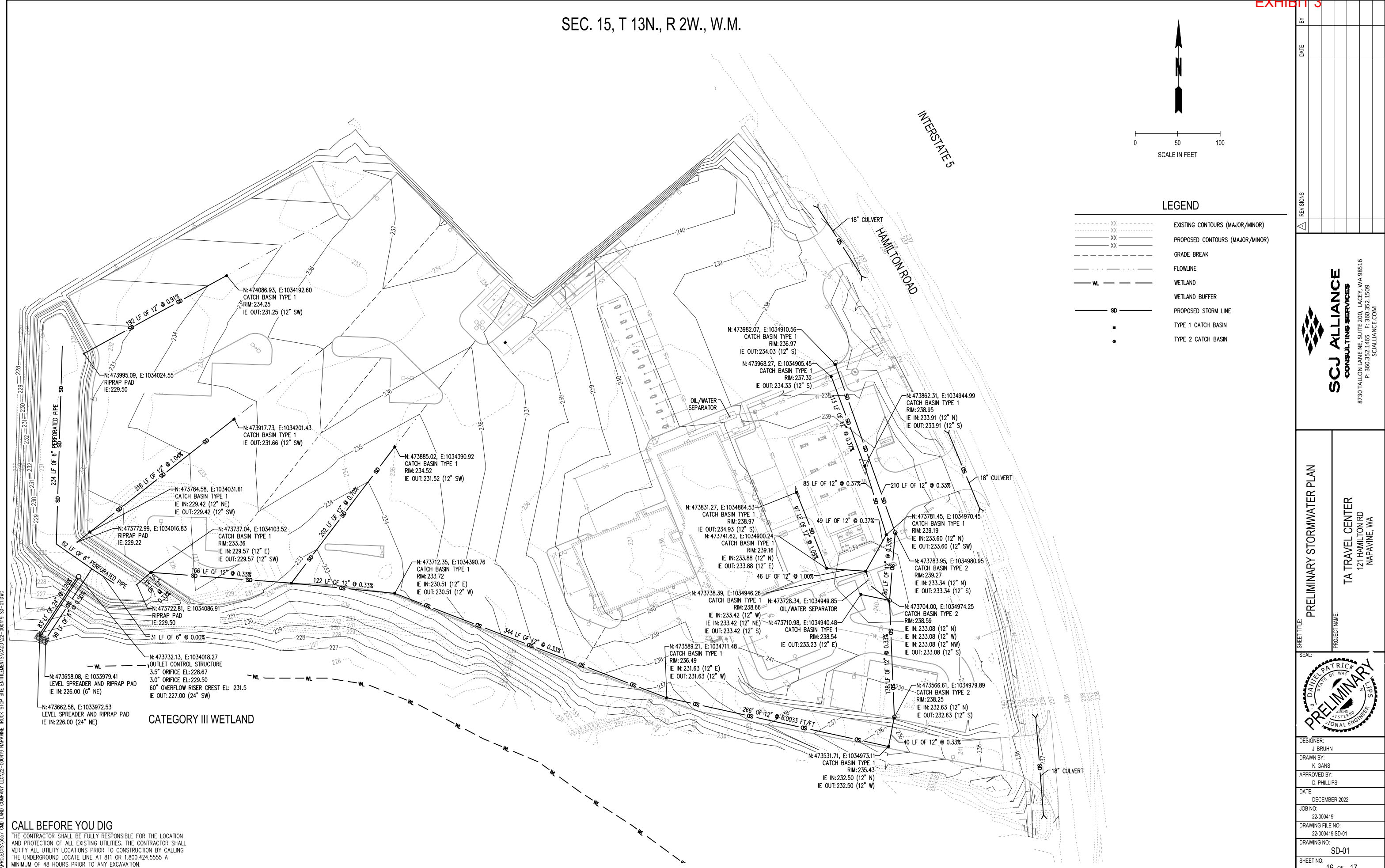
DESIGNER:	D. PHILLIPS
DRAWN BY:	K. GANS
APPROVED BY:	D. PHILLIPS
DATE:	DECEMBER 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 UT-01
DRAWING NO:	UT-01
SHEET NO:	15 OF 17

SEC. 15, T 13N., R 2W., W.M.



LEGEND

- XX --- EXISTING CONTOURS (MAJOR/MINOR)
- XX --- PROPOSED CONTOURS (MAJOR/MINOR)
- XX --- GRADE BREAK
- FL --- FLOWLINE
- WL --- WETLAND
- WL --- WETLAND BUFFER
- SD --- PROPOSED STORM LINE
- TYPE 1 CATCH BASIN
- TYPE 2 CATCH BASIN



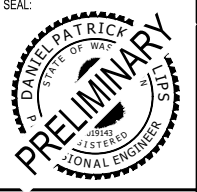
CATEGORY III WETLAND

CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

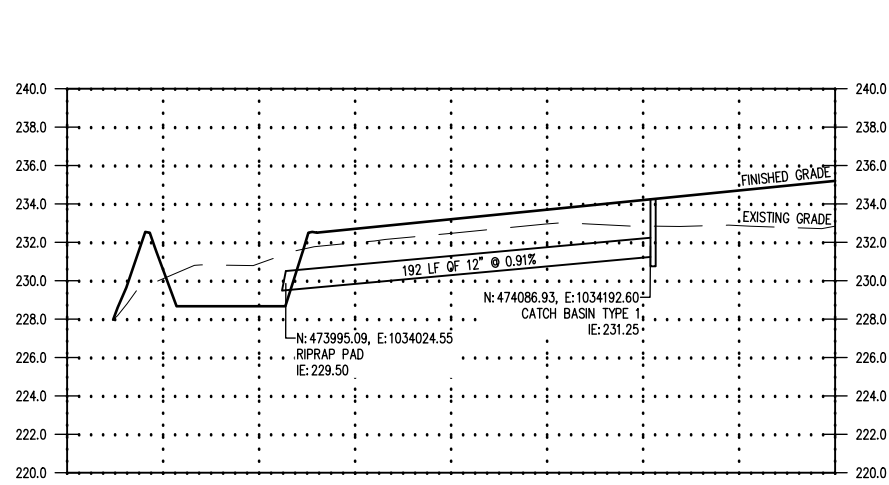
REVISIONS	DATE	BY

SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

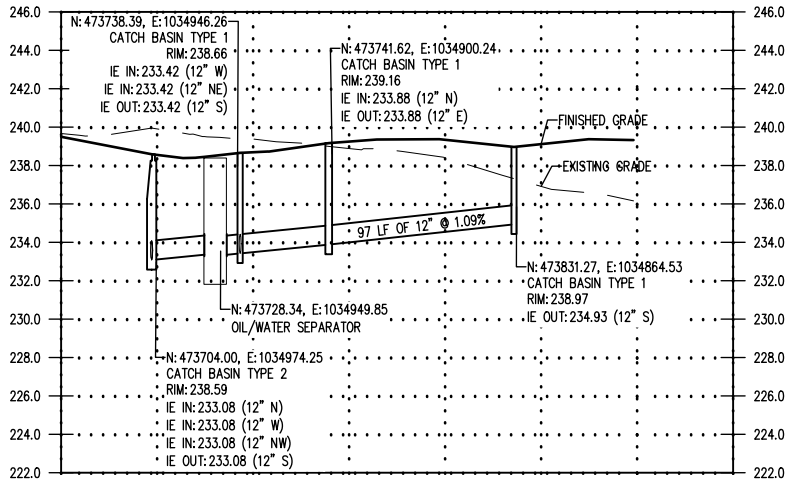
PRELIMINARY STORMWATER PLAN
 TA TRAVEL CENTER
 121 HAMILTON RD
 NAPAVINE, WA



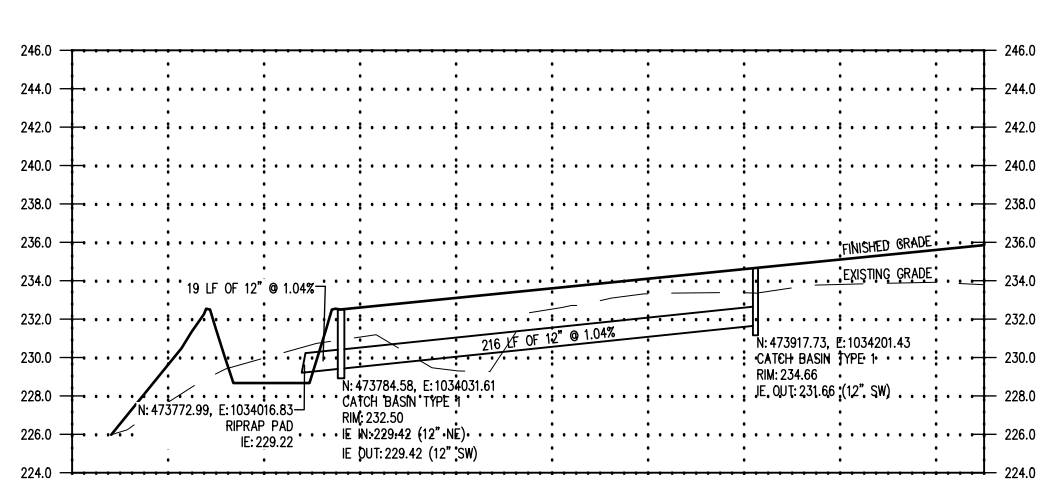
DESIGNER:	J. BRUHN
DRAWN BY:	K. GANS
APPROVED BY:	D. PHILLIPS
DATE:	DECEMBER 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 SD-01
DRAWING NO:	SD-01
SHEET NO:	16 OF 17



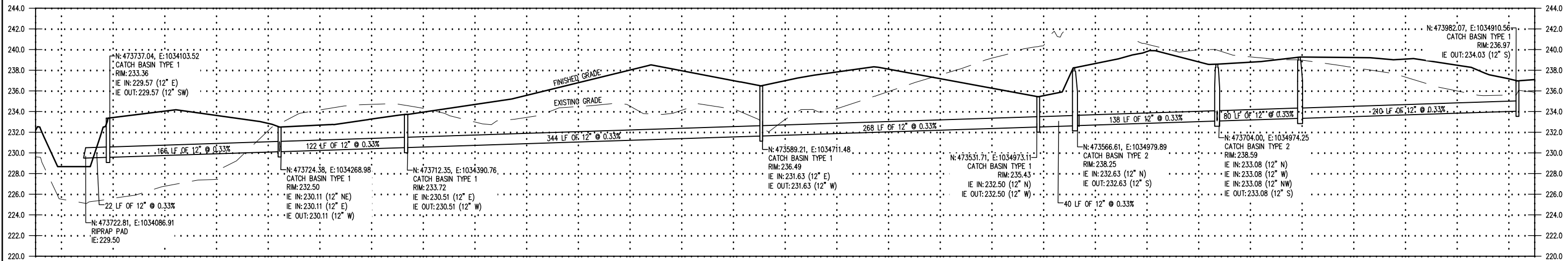
STORM PROFILE 1



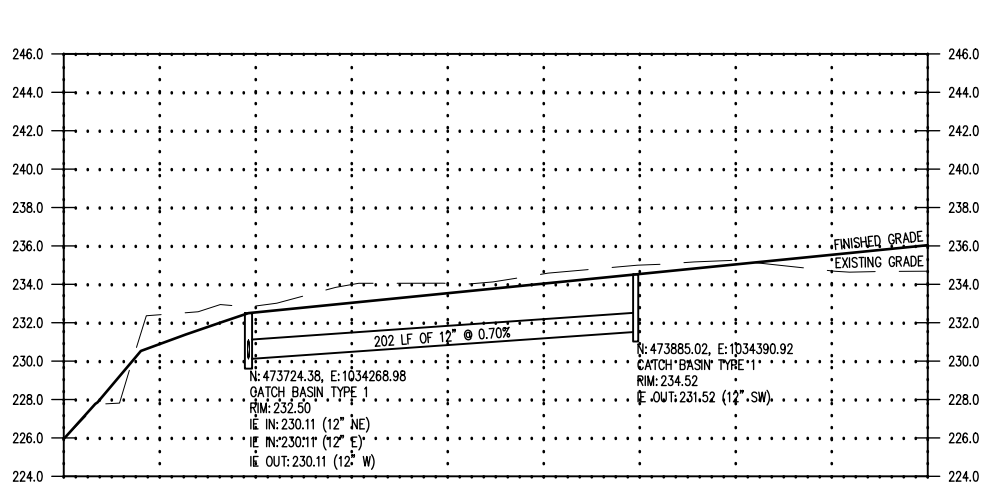
STORM PROFILE 3



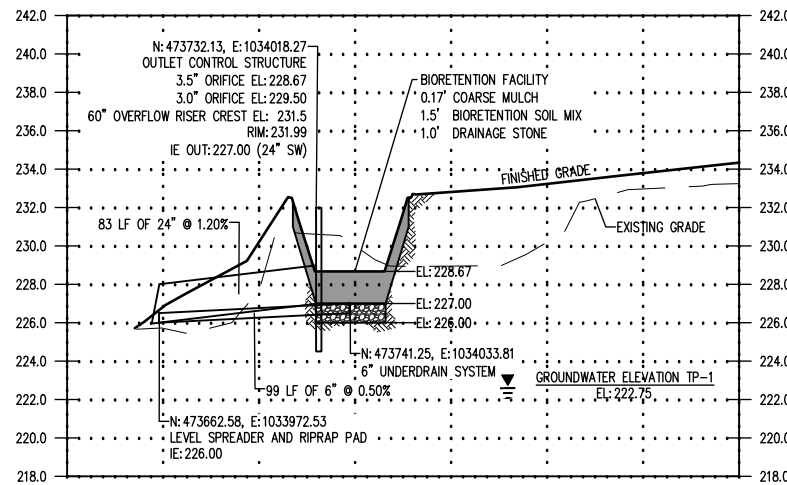
STORM PROFILE 4



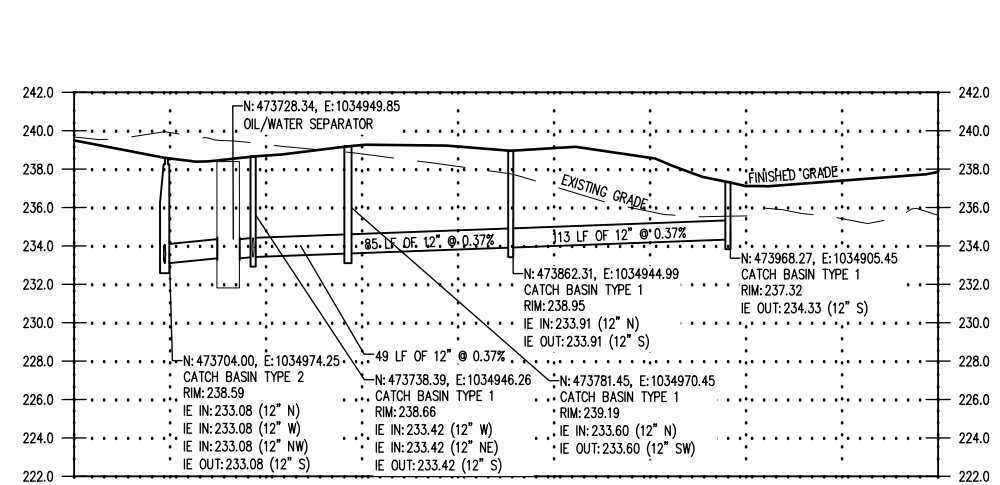
STORM PROFILE 2



STORM PROFILE 5



STORM PROFILE 6



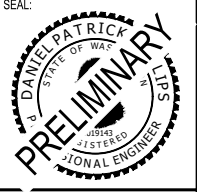
STORM PROFILE 7



REVISIONS	DATE	BY

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PRELIMINARY STORMWATER PROFILES
 TA TRAVEL CENTER
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APPENDIX 3

WETLAND AND STREAMS REPORT

Wetlands and Streams Report
for
121 Hamilton Road
Napavine, Washington

Prepared for:
GMD Land Company, LLC
710 Brookmere Dr
Edmonds, WA 98020-2609

Project # 279.01

Prepared by:
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SIGNATURE PAGE

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned:

A handwritten signature in blue ink, appearing to read "Timothy J. Haderly". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Timothy J. Haderly, Principal Scientist/Owner
Loowit Consulting Group, LLC

INTRODUCTION

Purpose and Need

Loowit Consulting Group, LLC (LCG) was retained by GMD Land Company, LLC (Applicant) to complete a critical areas investigation and report at 121 Hamilton Road (Subject Site) north of Napavine, Washington (Figure 1 & 2). The Applicant has proposed the construction of a new Travel Centers of America travel service facility on the subject site (Figure 3). Mapped critical areas within the subject site prompted the City of Napavine to request an investigation of critical areas, wetlands and streams, according to Napavine Critical Areas Ordinance (NCAO) Title 14.010 – Critical Areas Ordinance.

Site Description

The subject site consists of two parcels totaling approximately 13.56 acres of commercial zoned property. Site specifics include:

<u>Site Address:</u>	121 Hamilton Road Napavine, WA
<u>Current Owner:</u>	Hamilton's Walnut Shade LLC
<u>Tax Parcel Number:</u>	018050005000 018150004000
<u>Legal Description:</u>	Section 15, Township 13 North, Range 2 West, W.M.
<u>Property Size:</u>	13.56 Acres
<u>Jurisdiction:</u>	City of Napavine

The subject site is located west of Hamilton Road, which is situated north of Napavine, Washington adjacent to the southbound lanes of Interstate 5 (Figure 1, Photographs 1 and 2). The site consists of a large, fairly level, mowed-grass field (Photograph 3) in the western half; a single-family residence and outbuildings in the southeast corner (Photograph 4) of the eastern half; and the remnants of a manufactured-home retail business in the middle and northern sections of the eastern half of the site. The buildings associated with the manufactured-home business have all been removed, but the graveled and paved remnants of the driveways and parking areas remain, as well as the remnants of old signs, and utility poles (Photograph 5).

The western half of the subject site (Photograph 3) is undeveloped with the exception of a storm water collection pond in the southwest corner of the site (Photograph 6). Access to the subject site is via four points of access from Hamilton Road: (1) driveway access to the existing

residence, (2) two access points associated with the circular driveway, and (3) a wide access in the north end of the site



Photograph 1: Subject site, and paved circular access drive that served the former manufactured home business. Photo taken from Hamilton Road, at the southern end of the circular driveway, near the center of the eastern site boundary, looking northwest across the site. The large cottonwood tree, in the upper left of this photo, is near the southwest corner of the site.



Photograph 2: Photo taken from near the center of the southern site boundary, looking southwest across the site. The large cottonwood tree, in the upper right of this photo, is near

the southwest corner of the site. The home and buildings visible in the distance on the left side of the photo is the on-site single-family residence.



Photograph 3: Level mowed field that comprises the majority of the western half of the subject site. Photo taken from approximately the midpoint of the southern site boundary looking north across the site.



Photograph 4: The single-family residence and driveway located at the southeast corner of the subject site. Photo taken looking west from Hamilton Road.



Photograph 5: The location of the former manufactured-home retail business in the middle and northern sections of the eastern half of the subject site. Photo is looking southeast from near the northern site boundary.



Photograph 6: Constructed storm water collection pond in the southwest corner of the subject site. Photo is looking north near the western property boundary.



Photograph 7: Wetland area along southern boundary of subject site positioned mostly off-site on the adjacent parcel to the south. Photograph taken near the southwest corner of the subject site, looking east toward the single-family residence and its outbuildings that occupy the southeast corner of the site.



Photograph 8: Northernmost gravelled site access, looking east toward Hamilton Road and I-5, along the northern site boundary. Subject site is to the right, as well as behind the photographer.

Land uses adjacent to the subject site include:

- To the North – Commercial retail
- To the South – Gas Station and undeveloped commercial land
- To the East – Hamilton Road and Interstate 5
- To the West – Agriculture, forest land, and rural residential

METHODS

Desktop Review

Prior to visiting the subject site, LCG conducted a desktop review of readily available mapping resources and other pertinent information including:

- Lewis County Web Map (<http://ims.lewiscountywa.gov/webmaps/composite2/viewer.htm>). This source provided parcel information, aerial photographs, physical attributes, and other information from the Lewis County Assessor.
- US Fish and Wildlife Service National Wetlands Inventory Wetlands Mapper (<https://www.fws.gov/wetlands/data/mapper.html>). This mapping source depicts wetlands and streams throughout the United States.
- US Department of Agriculture Natural Resources Conservation Service Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>). This source depicts mapped soils including hydric soils throughout the United States.
- Washington Department of Natural Resources Forest Practices Application Mapping Tool (<https://fpamt.dnr.wa.gov/default.aspx>). This mapping source depicts streams and wetlands in Washington State.
- Washington Department of Fish and Wildlife Salmonscape (<http://apps.wdfw.wa.gov/salmonscape/map.html>). This mapping source depicts streams and fish distribution in Washington State.
- Washington Department of Fish and Wildlife Priority Habitat and Species (<http://apps.wdfw.wa.gov/phsontheweb/>). This mapping source depicts priority habitats and species throughout Washington State.

State Regulations

Wetlands are regulated by Washington Department of Ecology (Ecology) under the Water Pollution Control Act and the Shoreline Management Act. The State Environmental Policy Act (SEPA) process is also used to identify potential wetland-related concerns early in the permitting process. All proposed direct and identified indirect impacts to wetlands are reviewed and approved/denied by Ecology using the regulations previously listed.

Streams are regulated by Washington Department of Fish and Wildlife under the State Hydraulic Code, Chapter 77.55 Revised Code of Washington. Projects involving activities within,

over, or beneath jurisdictional streams are subject to the Hydraulic Project Approval (HPA) permitting process administered by WDFW.

Federal Regulations

Wetlands are regulated as “waters of the United States” under Section 404 of the Clean Water Act. Section 404 regulations are administered by the US Army Corps of Engineers (USACE).

Local Regulations

Wetlands and other critical areas are regulated by the Napavine Municipal Code (NMC) Critical Areas Ordinance Chapter 14.10.

Field Investigations

On March 2, 2022, LCG visited the subject site to collect site information, delineate jurisdictional wetlands, and collect site data. Weather conditions at the time of the site investigation consisted of clear skies with a high of 53.3°F and 0.30 inches of rain the previous 24 hours. Recorded climatological history from the Chehalis Airport two weeks prior to visiting the site was characterized with high temperatures ranging from 37.4 to 61.7°F and low temperatures ranging from 18.6 to 51.6°F. Total recorded precipitation two weeks prior to the site visit (February 16 – March 1) was recorded at 4.31 inches (Table 1, Appendix C).

Table 1: Weather Data at Chehalis Airport, Washington.

Date	Minimum Temp (Deg F)	Maximum Temp (Deg F)	Total Precipitation (in)
2/16/2022	36.3	53.1	0.00
2/17/2022	34.5	48.9	0.01
2/18/2022	37.8	54.0	0.00
2/19/2022	37.2	49.8	0.00
2/20/2022	36.4	47.3	0.10
2/21/2022	34.3	44.3	0.12
2/22/2022	23.4	37.4	0.00
2/23/2022	18.6	39.6	0.00
2/24/2022	25.0	42.5	0.00
2/25/2022	20.4	50.2	0.00
2/26/2022	26.3	44.3	0.18
2/27/2022	42.1	51.5	0.82
2/28/2022	51.6	55.5	2.78
3/1/2022	47.2	61.7	0.30
		Total:	4.31
3/2/2022	44.7	53.3	0.16

Data from Agweathernet

Site investigation work tasks included:

- Documentation of current site conditions
- Documentation of adjacent land uses
- Delineating and flagging of wetlands and streams
- Documentation of wetland/upland conditions with Test Plots

Wetlands were delineated according to methods outlined in the U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*. Data documenting vegetation, soils, and hydrology were collected and used to determine wetland and uplands at the site (Appendix A). A single depressional wetland (Wetland A) to the south of the subject site, and its associated buffers, encroach onto the subject site. Wetland boundaries were delineated using documented test plots and the boundary flagging subsequently mapped by MTN 2 Coast, LLC.

Vegetation

Vegetation at the subject site is primarily a mix of grasses and common weeds, which are mowed and maintained by the current owner. Vegetation along the southern property boundary is comprised of dense Himalayan Blackberry transitioning to reed canary grass in the wetland. There is an active bald eagle nest in a large cottonwood tree located off-site near the SW corner of the subject site. After successful protection and significant population increases, bald eagles were removed from the federal endangered species list in 2007, then from the State of Washington list in 2017. The State of Washington currently lists bald eagles as “sensitive,” and most of the state’s special protective measures for bald eagles have been eliminated. Table 2 summarizes the vegetation observed at the subject site.

Table 2: Vegetation Observed

Scientific Name	Common Name	Wetland Indicator Code
<i>Cirsium arvense</i>	Canada Thistle	FAC
<i>Daucus carota</i>	Queen Anne’s Lace	FACU
<i>Fraxinus latifolia</i>	Oregon Ash	FACW
<i>Geranium molle</i>	Dovefoot Geranium	UPL
<i>Holcus lanatus</i>	Velvet Grass	FAC
<i>Lupinus polycarpus</i>	Small-flowered Lupine	UPL
<i>Phalaris arundinacea</i>	Reed Canary Grass	FACW
<i>Populus balsamifera</i>	Black Cottonwood	FAC
<i>Ranunculus repens</i>	Creeping Buttercup	FAC
<i>Rubus armeniacus</i>	Himalayan Blackberry	FAC
<i>Rumex crispus</i>	Curled Dock	FAC
<i>Schedonorus arundinaceus</i>	Tall Fescue	FAC
<i>Trifolium repens</i>	White Clover	FAC

Wetland Indicator Code

OBL = Obligate (Almost always occur in wetlands)

FACW = Facultative Wetland (usually occur in wetlands, but may occur in non-wetlands)

FAC = Facultative (Occur in wetlands and non-wetlands)

FACU = Facultative Upland (Usually occur in non-wetlands, but may occur in wetlands)

UPL = Obligate Upland (Almost never occur wetlands)

Soils

According to the US Department of Agriculture Natural Resources Conservation Service (NRCS), the east half of the subject site is situated on mapped Olequa silt loam, a soil common to the floodplain and terrace deposits in the area. The western half of the subject site is comprised of three soils. The middle portion of the western half of the site is mapped Alvor silty clay loam, an alluvial soil common in floodplains and terraces in the local area. The southern portion of the western half of the site is mapped Chehalis silty clay, an alluvial soil common in floodplains and terraces in the local area. The northern portion of the western half of the subject site, as well as the southeastern and southwestern corners of the western half of the subject site, are mapped Reed silty clay loam, a soil common on floodplains and terraces in the local area. Soils at the site are mapped as summarized in Table 3 and Figure 4.

Table 3: Soil Summary.

Soil #	Soil Name	Slope %	Hydric %
1	Alvor silty clay loam	0-3	85
48	Chehalis silty clay	0-3	10
152	Olequa silt loam	0-5	3
173	Reed silty clay loam, channeled	0-3	95

Historic land disturbance activities including extensive placement of earthen fill, agricultural practices, timber harvest, and general grading may have altered natural soil conditions at the site resulting in soils that may be somewhat different than those mapped by NRCS.

Hydrology

The subject site gently slopes to the southwest towards the Newaukum River southwest corner of the site. Washington Department of Natural Resources (WADNR) mapping application depicts an unnamed Type N (Non-fish) stream, south and west of the subject site which flows west/southwest to the Type S (Shoreline) Newaukum River southwest of the subject site. Another mapped Type N is depicted transecting the subject site from north to south but LCG confirmed this mapped feature is not present as the site has been historically filled with earthen material (Figure 6).

According to the US Fish and Wildlife Service National Wetlands Inventory (NWI) map (Figure 5), the subject site is entirely upland, however three wetlands are depicted on or near the subject site in its mapping:

- 1) The first is a kidney-shaped Freshwater Emergent Wetland in the mid-section of the western half of the subject site (Figure 5). LCG did not observe a wetland in this area during its field study.
- 2) The second is a channelized, U-shaped Freshwater Emergent Wetland to the north and west of the subject site (Figure 5). LCG did not observe a wetland in this area.
- 3) The third is a Freshwater Emergent Wetland which the NWI map depicts (Figure 5) as running southeast to northwest immediately south of the southern site boundary. LCG flagged the northern boundary of this wetland during the course of its site study (Figure 3).

Mapping

Wetland boundary flagging, roads, property boundaries, topography, and other site features were derived from public mapping sources and subsequently mapped by MTN 2 Coast, LLC.

RESULTS and DISCUSSION

Wetlands

A single depressional freshwater emergent wetland (Wetland A) was located to the south of the subject site within a historic meander channel of the Newaukum River (Figure 3). Wetland A is rated as a Category III wetland (17 points) with a moderate water quality score of 7 points, a low hydrologic score of 4 points, and a moderate habitat score of 6 points (Table 4) according to the *Washington State Wetland Rating System for Western Washington, 2014 Update* (Appendix B).

Wetland Buffers

Buffer conditions at the subject site are characterized as having nominal functions & values as a result of dense invasive plant cover (Himalayan blackberry) and a lack of vertical/horizontal habitat structure as a result of historic earthen fill placed very near the wetland edge. Wetland buffers are vegetated with a dense covering of Himalayan blackberry, reed canary grass, and Scotch broom growing on earthen fill material that was historically placed on the property. The flatter portions of the site are routinely mowed but the slope along the southern property boundary is not maintained resulting in dense coverage of Himalayan blackberry.

According to *NMC 14.010.120 .E*, the City of Napavine requires buffers on jurisdictional wetlands depending on category, habitat score, and proposed land use intensity. A Category III wetland with a moderate habitat score next to a proposed high intensity land use, requires a standard 150-foot wide buffer. *NMC 14.010.120.E.8.e* allows buffers to be reduced from High Intensity, 150 feet, to a Moderate Intensity of 110 feet (see Buffer Reduction Section of this report).

Table 4: Wetland Summary.

Wetland ID	HGM ^A	Wetland Rating System ^B				Category ^B	Standard Buffer ^C (ft)
		Improving Water Quality	Hydrologic	Habitat	Total		
Wetland A	Depressional	7	4	6	17	III	110-150

^A Hydrogeomorphic Classification

^B Washington State Wetland Rating System for Western Washington: 2014 Update

^C NMC Ord.464, Table 14.010.120.E.7.a.2 Buffers Required to Protect Habitat Functions in Category III Wetlands and NMC 14.010.120.E.8.e for buffer reduction.

Buffer Reduction

The applicant has proposed a reduction in buffer width to allow an efficient design and use of the site as a truck fueling a travel stop facility. To compensate for the reduction of the 150 foot buffer to 110 feet, the applicant will implement all of the required provisions listed in NMC 14.010.120.E.8.e:

General Site Design Measures. High intensity buffers may be reduced to moderate intensity buffers if all of the following mitigation measures are applied to the greatest extent practicable, and there is a proven low wildlife function.

- i. *Buffer Enhancement. The intent and effect of an approved buffer enhancement program shall be to measurably improve low functioning buffers by increasing the identified functions of the buffer. This may include the removal and management of noxious weeds and/or invasive vegetation or specific measures to improve hydrologic or habitat function. **[The Applicant will remove invasive species from the protected buffer area, implement shielding provisions, and plant the buffer with a mix of native forbs, shrubs, and trees. Given that the area wetland buffer consists of mowed fields, commercial development, has been filled with earthen materials, and is vegetated with invasive species; existing and future wildlife utilization is very low with the exception of limited shelter for small mammals such mice, voles, and rabbits. Removing invasive species and installing native trees and shrubs will significantly increase the potential for wildlife to utilize the buffer and adjacent wetland.]***
- ii. *Shielding of High Intensity Uses.*
 - A. *Lights. Direct all lights away from wetlands; **[All outside lighting, including parking lot light standards, will be shielded away from the wetland buffer area.]***
 - B. *Noise. Locate activity that generates noise away from wetlands; **[The proposed site layout was designed to locate less noisy components of the facility next to the wetland buffer. These components include the storm pond and drive lanes to access truck parking areas. The noisier components located farther away from the wetland buffer include short term parking, convenience store, drive through food services, and consumer fueling area.]***

- C. *Pets and Human Disturbance. Use privacy fencing; plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the eco-region; place wetland and its buffer in a separate tract. **The outer edge of the wetland buffer will be demarcated with fencing, the buffer will be planted with a dense coverage of native trees & shrubs, and the area will be protected under a conservation easement.***
- iii. *Surface Water Management.*
- A. *Existing runoff. Retrofit storm water detention and treatment for roads and existing development and disperse direct discharge of channelized flows from lawns and landscaping; **Untreated storm water will not be allowed to flow directly into wetlands or buffers without first being collected and treated according to State and City requirements.***
- B. *Change in water regime. Infiltrate and/or disperse storm water runoff from impervious surfaces and drainage from lawns and landscaping into the buffer at multiple locations, except where the infiltration or dispersal would either be in opposition to the recommendations contained in the geo-technical report for the project or where the infiltration of dispersal would occur in a geologically hazardous area. **The existing storm pond will be expanded and upgraded to properly collect and treat all storm water from the proposed development footprint prior to discharge into the wetland buffer. The proposed upgraded storm water basin will infiltrate and there will be an outlet pipe that discharges at rates that are below the predeveloped flow rates as allowed in the City's design standards. The outlet will be rock lined to reduce the potential for erosion and allow dispersed sheet flow off the site into the buffer. Design of the storm water system by a licensed engineer will closely follow State and City of Napavine requirements.***

Functionally Isolated Buffers

Functionally isolated buffers include areas that functionally isolated from wetlands and do not protect the wetland from adjacent land uses. The City of Napavine recognizes functionally isolated buffers in the critical areas code and provides provisions to reduce buffers in areas that are functionally isolated. Functionally isolated buffers are addressed in *NMC 4.010.120.E.8.a: Functionally Isolated Buffer Areas. Areas which are functionally separated from a wetland and do not protect the wetland from adverse impacts due to pre-existing roads, structures or vertical separation, shall be excluded from buffers otherwise required by this Chapter.*

There are two areas at the subject site that met the definition of functionally isolated buffers: (1) Southeast Fill Area and (2) Southwest Storm Pond Area. The Southeast Fill Area consists of historic fill including concrete, bricks, asphalt, rocks, and soil (Photograph 9). Not only is the area non-functional, it is elevated above the wetland by a very steep slope vegetated with

invasive blackberries. The fill is historic and does not appear to be of recent vintage based on well-established vegetative coverage and no recent grading in the area.

The Southwest Storm Pond Area is functionally isolated from Wetland A by a created earthen berm around the pond that is routinely mowed as is the entire storm pond when not inundated with water (Photograph 10). The pond was constructed when the site was filled in the mid-2000s as a measure to collect, control, and treat, storm water at the site.



Photograph 9: Southeast Fill Area along the left side of the photograph directly below the parked cargo trailers.



Photograph 10: Southwest Storm Pond Area to the left looking along the maintained berm area between the pond and Wetland A to the right.

Buffer Enhancement Plan

Approximately 45,600 sq ft of nearly non-functional wetland buffer will be enhanced by the installation of native forbs, shrubs, and trees. Removing invasive species and installing native plantings will significantly increase the ecological functions of the wetland buffer thereby providing increased protection of the adjacent wetland. Table 5 summarizes proposed plantings for the wetland buffer enhancement area. In addition to the plantings, a native upland grass seed will be used in areas of bare soil to help prevent erosion and provide vegetative ground cover.

The following sequencing will be applied during the course of enhancing the buffer area:

1. Invasive plants and other debris will be removed from the planting area.
2. Area will be lightly scarified to a depth of 4-6 inches.
3. Project biologist or landscape architect will identify and flag areas for plant installation.
4. Native trees and shrubs installed.
5. Native upland grass seed mix (or similar) applied to reduce erosion.
6. Periodic maintenance including mowing, trimming, fertilization, dead plant replacement, and irrigation implemented as required.

Table 5: Proposed Buffer Plantings (~45,600 sq ft)

Species	Size	Spacing	Type	Estimated # of Plants
Douglas Fir (<i>Pseudotsuga menziesii</i>)	4-6' high	16' oc	B&B or 5-gal Container	45
Western Red Cedar (<i>Thuja plicata</i>)	3-5' high	16' oc	B&B or 5-gal Container	45
Vine Maple (<i>Acer circinatum</i>)	3-5' high	10' oc	B&B or 5-gal Container	45
Red Osier Dogwood (<i>Cornus sericea</i>)	2 gallon	3.5' oc	Container	75
Salal (<i>Gaultheria shallon</i>)	1-2 gallon	3.5' oc	Container	75
Sword Fern (<i>Polystichum munitum</i>)	1-2 gallon	3' oc	Container	75
Tall Oregon Grape (<i>Mahonia aquifolium</i>)	1-2 gallon	3.5' oc	Container	75

Native Upland Grass Mix #8	Various	Dry Seed	20 lbs/acre	---
			Total	435

The final species list and estimated number of plants will be determined by the landscape architect and approved by the project biologist. In addition, a buffer enhancement plan report may be required by the City of Napavine as part of final project approval.

Streams

Newaukum River, a Type S (Shoreline) stream is located off-site to the southwest of the subject site (Figures 3 and 6). No other jurisdictional streams were observed within or adjacent to the subject site.

Stream Buffers

According to NMC 14.010.120 (B), the City of Napavine requires buffers on all jurisdictional streams including Newaukum River, which requires a 200-foot wide buffer (Table 6) measured from the ordinary high water mark (OHWM). Buffers on the Newaukum River are encompassed by the adjacent wetland and associated wetland buffers. The southwest corner of the site is approximately 150 feet from the OHWM of the Newaukum River while the existing storm water pond berm is approximately 260 feet from the OHWM. There are no developments proposed within the 200 foot buffer of the Newaukum River with the exception of invasive plant removal and limited graded necessary to install native trees and shrubs.

Table 6: Stream Summary.

Stream ID	Type ^A	Standard Buffer ^C (ft)
Newaukum River	S	200

^A Washington Department of Natural Resources and NMC 14.010.120(B).

^B NMC Table 14.010.120.B.5 Riparian Area Buffers

CONCLUSIONS

Development of the subject site into a travel center facility can be accomplished with no direct long-term impact on wetlands or streams. Enhancement of a degraded wetland buffer along the southern portion of the site will significantly increase ecological functions and provide greater protect to the adjacent wetland.

LIMITATIONS

The findings and conclusions contained in this document were based on information and data available at the time this document was prepared and evaluated using standard Best Professional Judgment. LCG assumes no responsibility for the accuracy of information and data

generated by others. Local, State, and Federal regulatory agencies may or may not agree with the findings and conclusions contained in this document.

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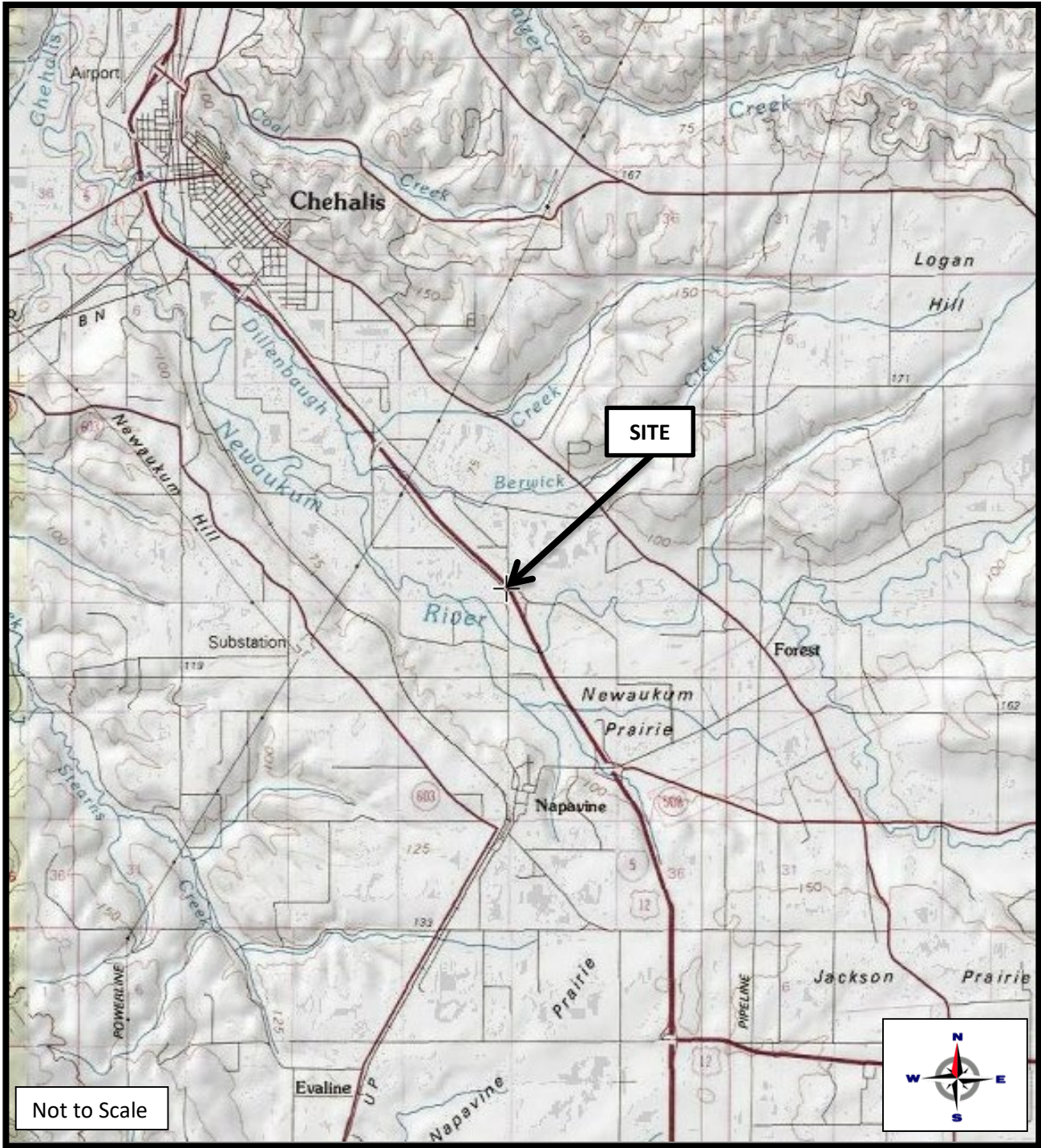
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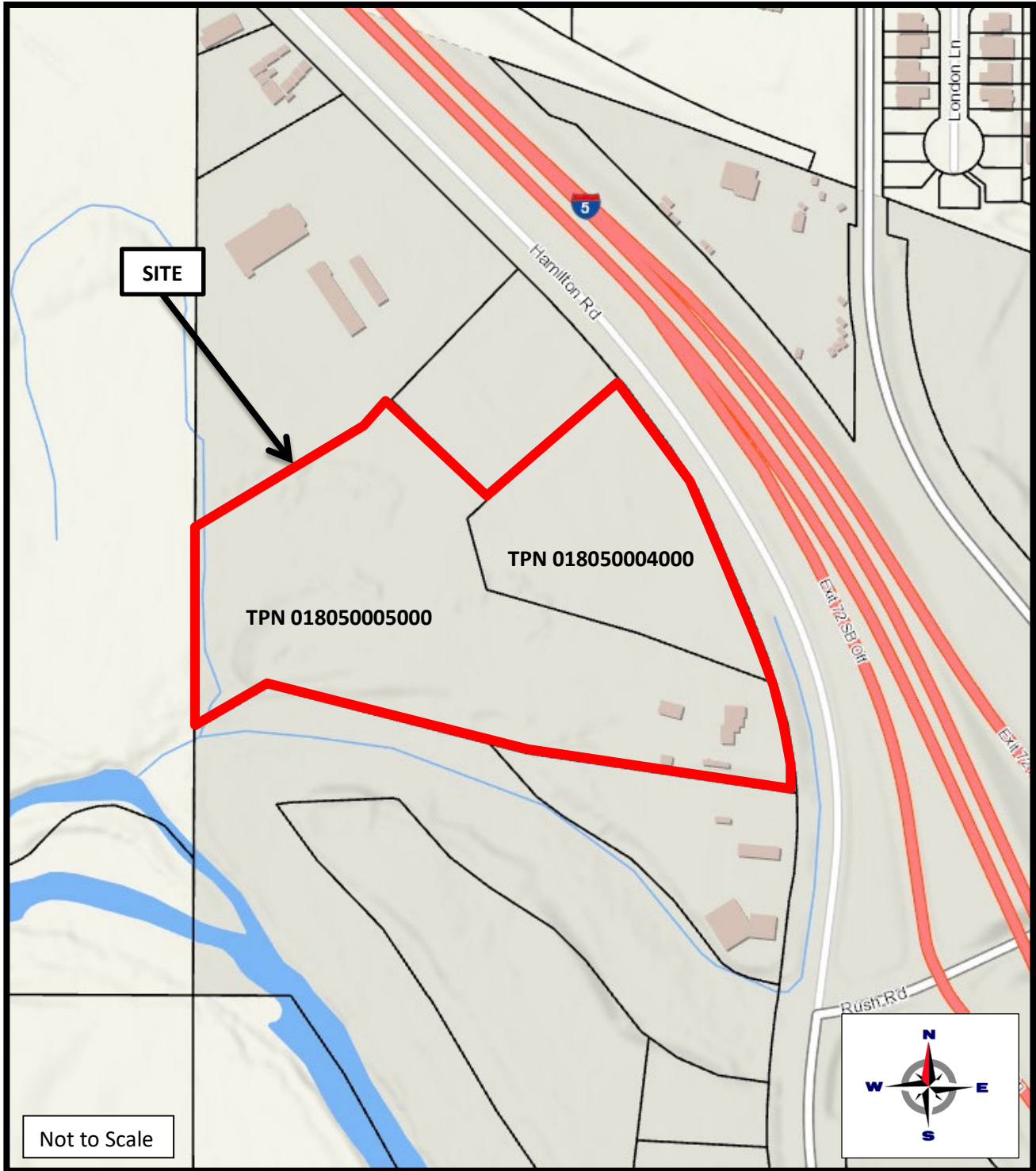
FIGURES

- Figure 1 – Site Location Map
- Figure 2 – Parcel Map
- Figure 3 - Site Map
- Figure 4 – Soils Map
- Figure 5 - National Wetlands inventory Map
- Figure 6 – Stream Map



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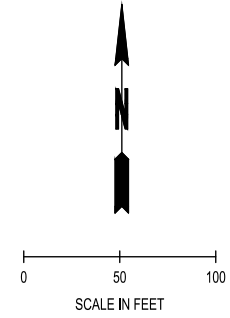
Figure 1
Site Location Map
Napavine TA Travel Center



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Figure 2
Parcel Map
Napavine TA Travel Center

SEC. 15, T 13N., R 2W., W.M.

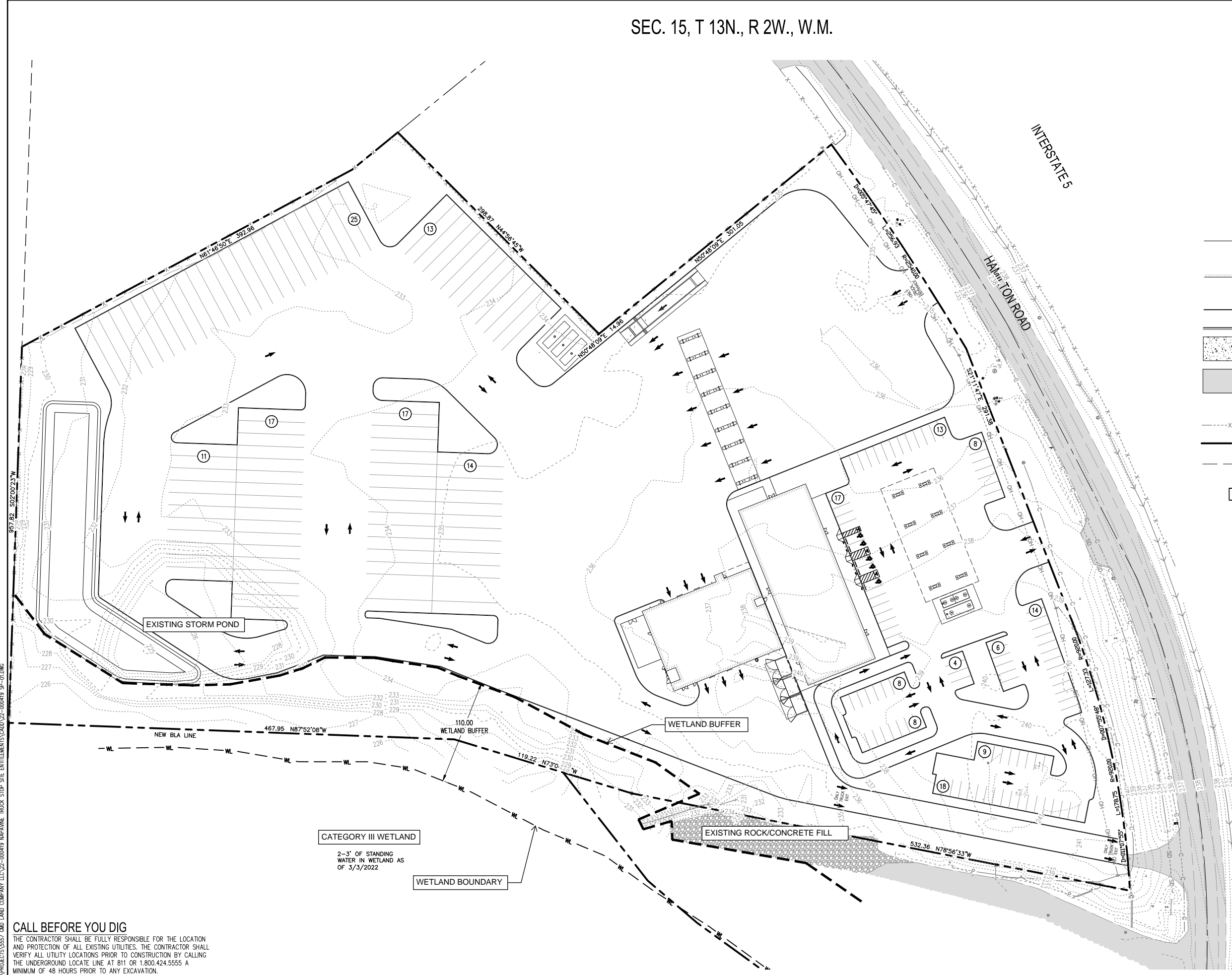


LEGEND

- PROPOSED BUILDING
- STALL COUNT
- CEMENT CONCRETE TRAFFIC CURB
- CEMENT CONCRETE CURB AND GUTTER
- CONCRETE SIDEWALK
- ASPHALT PAVING
- WHEELSTOP
- EXISTING FENCE
- PROPERTY LINE
- EASEMENT

GENERAL NOTE:

1. -



CATEGORY III WETLAND
2-3' OF STANDING WATER IN WETLAND AS OF 3/3/2022

WETLAND BOUNDARY

WETLAND BUFFER

EXISTING ROCK/CONCRETE FILL

EXISTING STORM POND

NEW BLA LINE

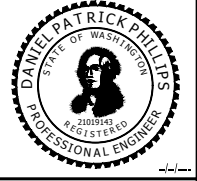
Aug 10, 2022 12:04:08pm User: dphillips
M:\PROJECTS\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\22-000419 SP-01.DWG

CALL BEFORE YOU DIG
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

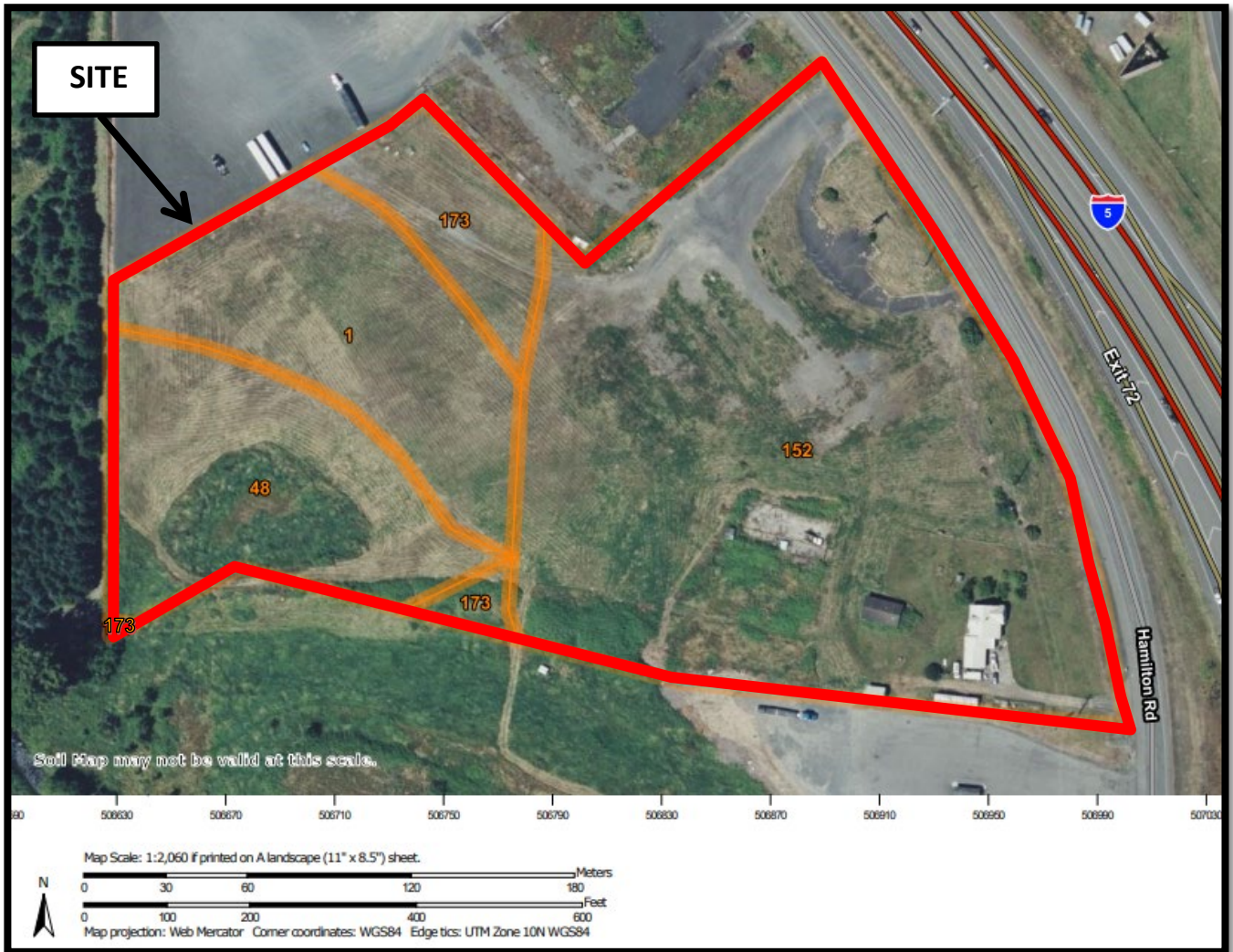
REVISIONS	DATE	BY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: **SITE PLAN**
PROJECT NAME: **NAPAVINE TRUCK STOP
0 & 121 HAMILTON RD
CHEHALIS, WA**



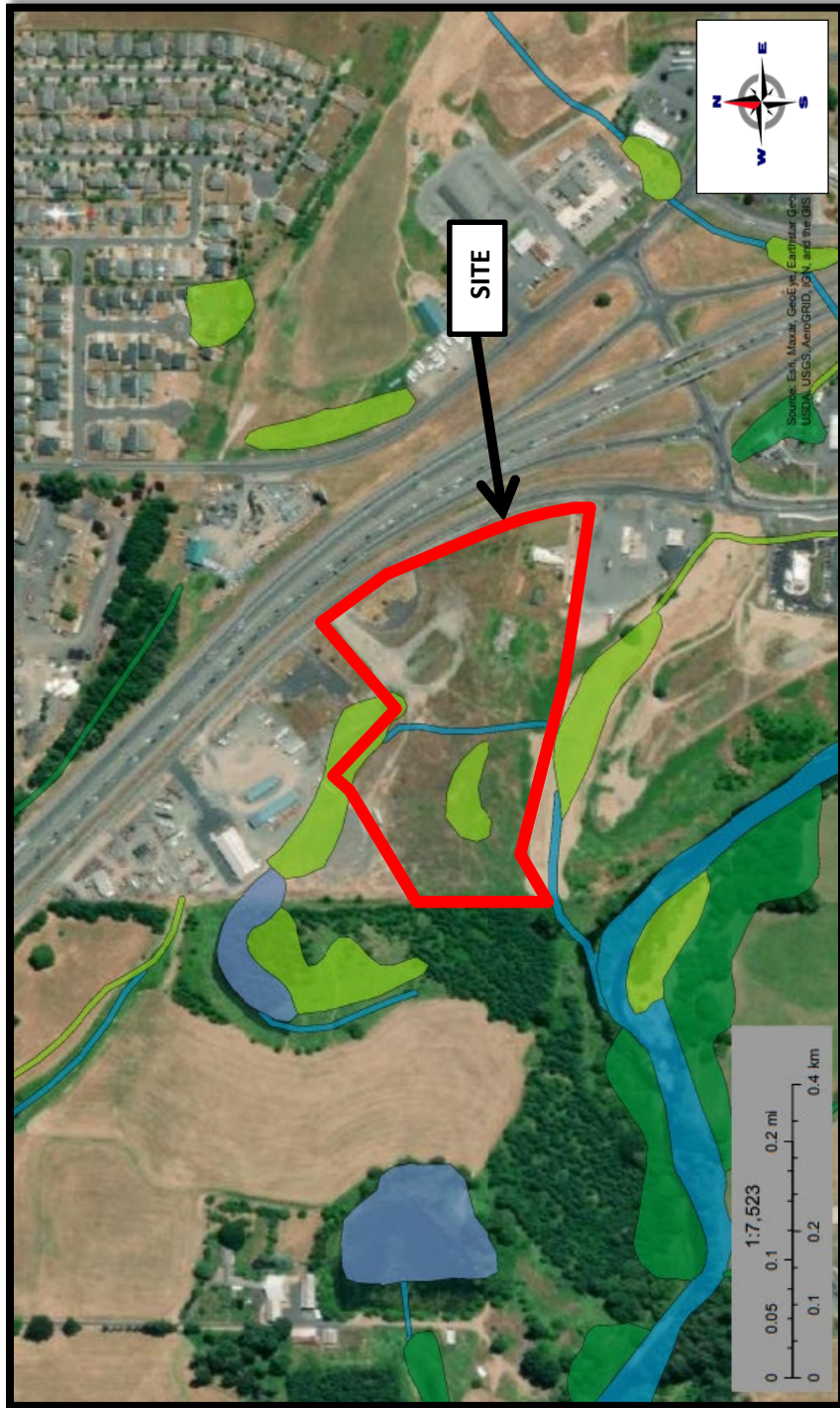
DESIGNER:	D. PHILLIPS
DRAWN BY:	E. ORDONEZ
APPROVED BY:	D. PHILLIPS
DATE:	AUGUST 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 SP-01
DRAWING NO:	SP-01
SHEET NO:	01 OF 01



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alvor silty clay loam	2.4	16.3%
48	Chehalis silty clay	2.4	16.2%
152	Olequa silt loam, 0 to 5 percent slopes	8.9	60.6%
173	Reed silty clay loam, channeled	1.0	7.0%
Totals for Area of Interest		14.7	100.0%

Loowit Consulting Group, LLC
 Natural Resources & Project Management
 360.431.5118

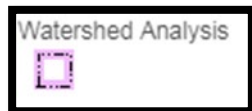
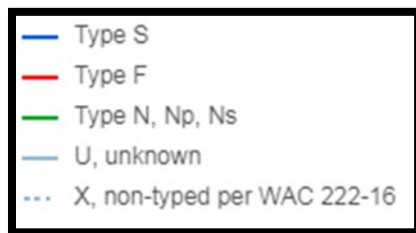
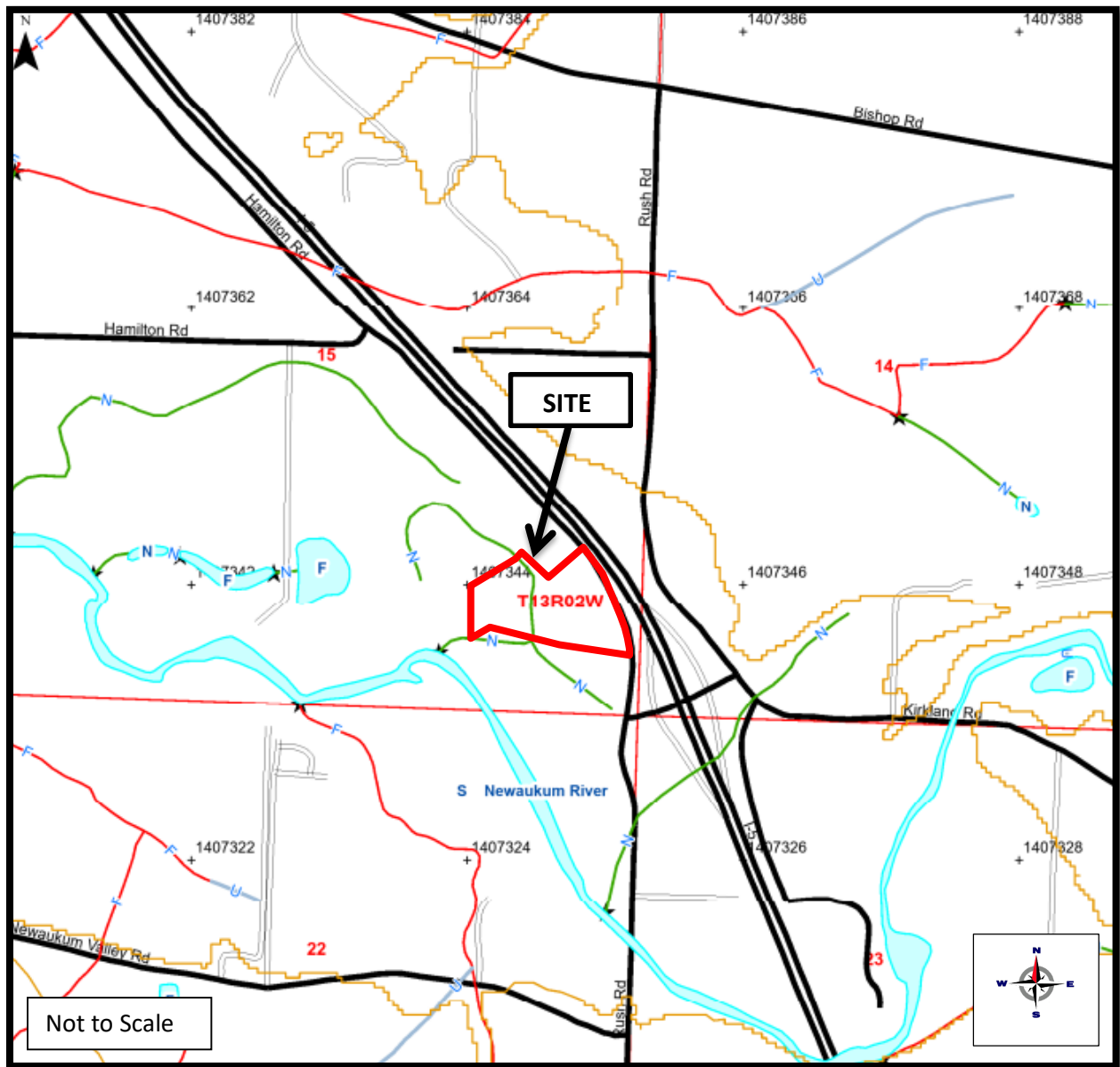
Figure 4
Soils Map
Napavine TA Travel Center



- | | | | | |
|---|---|---|---|------|
| Wetlands |  | Estuarine and Marine Deepwater |  | Lake |
|  | Estuarine and Marine Wetland |  | Freshwater Emergent Wetland | |
|  | Other |  | Freshwater Forested/Shrub Wetland | |
|  | Riverine |  | Freshwater Pond | |

Figure 5
National Wetlands Inventory Map
Napavine TA Travel Center

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Figure 6
Stream Map
Napavine TA Travel Center

APPENDIX A - DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region **EXHIBIT 3**

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-1
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60669 Long: -122.91201 Datum: WGS84

Soil Map Unit Name: #173 Reed silt loam, channeled NWI classification: PEMC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

Remarks:

VEGETATION (Use scientific names)

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u> ft radius)				Dominance Test Worksheet Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover:	%			
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species <u>0</u> x 1= <u>0</u> FACW species <u>0</u> x 2= <u>0</u> FAC species <u>0</u> x 3= <u>0</u> FACU species <u>0</u> x 4= <u>0</u> UPL species <u>0</u> x 5= <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A= _____
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover:	%			
Herb Stratum (Plot size: <u>5</u> ft radius)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Phalaris arundinacea</u>	100%	yes	FACW	
2. _____	%			
3. _____	%			
4. _____	%			
5. _____	%			
6. _____	%			
7. _____	%			
Total Cover:	100%			
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
1. <u>Rubus armeniacus</u>	%			
2. _____	%			
Total Cover:	%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	10YR4/2	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks:

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)	Secondary Indicators (2 or more required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:

Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>6-12</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	
Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	

(Includes Capillary fringe)

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region **EXHIBIT 3**

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-2
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60690 Long: -122.91193 Datum: WGS84

Soil Map Unit Name: #152 Olequa silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

VEGETATION (Use scientific names)

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u> ft radius)				Dominance Test Worksheet
1. _____	%			Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. _____	%			
3. _____	%			Total Number of Dominant Species Across All Strata: <u>4</u> (B)
4. _____	%			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
Total Cover: _____	%			
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet
1. _____	%			Total % Cover of: _____ Multiply by:
2. _____	%			OBL species <u>0</u> x 1= <u>0</u>
3. _____	%			FACW species <u>0</u> x 2= <u>0</u>
4. _____	%			FAC species <u>0</u> x 3= <u>0</u>
5. _____	%			FACU species <u>0</u> x 4= <u>0</u>
Total Cover: _____	%			UPL species <u>0</u> x 5= <u>0</u>
Herb Stratum (Plot size: <u>5</u> ft radius)				Column Totals: <u>0</u> (A) <u>0</u> (B)
1. <u>Schedonorus arundinaceus</u>	30%	yes	FAC	Prevalence Index = B/A= _____
2. <u>Phalaris arundinacea</u>	20%	yes	FACW	
3. <u>Trifolium repens</u>	20%	yes	FAC	
4. <u>Rumex crispus</u>	10%	no	FAC	
5. _____	%			
6. _____	%			
7. _____	%			
8. _____	%			
Total Cover: _____	80%			
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				
1. <u>Rubus armeniacus</u>	70%	yes	FAC	
2. _____	%			
Total Cover: _____	70%			
% Bare Ground in Herb Stratum <u>0%</u>				

Hydrophytic Vegetation Indicators:

1 – Rapid Test for Hydrophytic Vegetation

2 – Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data In Remarks or on a separate sheet)

Wetland Non-Vascular Plants¹

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	various	100%		%			Gravel fill with clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

2 cm Muck (A10)
 Red Parent Material (TF2)
 Very Shallow Dark Surface (TF12)
 Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks:

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

<p>Primary Indicators (min. of one required; check all that apply)</p> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<p>Secondary Indicators (2 or more required)</p> <input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D4)
--	---	---

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	
Saturation Present? (Includes Capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region EXHIBIT 3

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-3
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 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60641 Long: -122.91098 Datum: WGS84

Soil Map Unit Name: #173 Reed silt loam, channeled NWI classification: PEMC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

VEGETATION (Use scientific names)

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u> ft radius)				Dominance Test Worksheet Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover:	%			
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species <u>0</u> x 1= <u>0</u> FACW species <u>0</u> x 2= <u>0</u> FAC species <u>0</u> x 3= <u>0</u> FACU species <u>0</u> x 4= <u>0</u> UPL species <u>0</u> x 5= <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A= _____
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover:	%			
Herb Stratum (Plot size: <u>5</u> ft radius)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
1. <u>Phalaris arundinacea</u>	100%	yes	FACW	
2. _____	%			
3. _____	%			
4. _____	%			
5. _____	%			
6. _____	%			
7. _____	%			
8. _____	%			
Total Cover:	100%			
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. <u>Rubus armeniacus</u>	%			
2. _____	%			
Total Cover:	%			
% Bare Ground in Herb Stratum <u>0%</u>				
Remarks:				

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	10YR4/2	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks: _____

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

<p>Primary Indicators (min. of one required; check all that apply)</p> <p><input checked="" type="checkbox"/> Surface Water (A1)</p> <p><input checked="" type="checkbox"/> High Water Table (A2)</p> <p><input checked="" type="checkbox"/> Saturation (A3)</p> <p><input type="checkbox"/> Water Marks (B1)</p> <p><input type="checkbox"/> Sediment Deposits (B2)</p> <p><input type="checkbox"/> Drift Deposits (B3)</p> <p><input type="checkbox"/> Algal Mat or crust (B4)</p> <p><input type="checkbox"/> Iron Deposits (B5)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p>	<p>Secondary Indicators (2 or more required)</p> <p><input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)</p> <p><input type="checkbox"/> Salt Crust (B11)</p> <p><input type="checkbox"/> Aquatic Invertebrates (B13)</p> <p><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</p> <p><input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</p> <p><input type="checkbox"/> Presence of Reduced Iron (C4)</p> <p><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</p> <p><input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>	<p><input type="checkbox"/> Drainage Patterns (B10)</p> <p><input type="checkbox"/> Dry-Season Water Table (C2)</p> <p><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</p> <p><input type="checkbox"/> Geomorphic Position (D2)</p> <p><input type="checkbox"/> Shallow Aquitard (D3)</p> <p><input type="checkbox"/> FAC-Neutral Test (D5)</p> <p><input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)</p> <p><input type="checkbox"/> Frost-Heave Hummocks (D4)</p>
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Field Observations:

Surface Water Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>6-12</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	
Saturation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	

(Includes Capillary fringe)

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region **EXHIBIT 3**

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-4
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60662 Long: -122.91091 Datum: WGS84

Soil Map Unit Name: #152 Olequa silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Remarks:

VEGETATION (Use scientific names)

Tree Stratum (Plot size: <u>30</u> ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>1</u> (A)
2. _____	%	_____	_____	Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____	%	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC	<u>100</u> (A/B)
4. _____	%	_____	_____		
Total Cover:	%	_____	_____		
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet	
1. _____	%	_____	_____	Total % Cover of: _____ Multiply by:	
2. _____	%	_____	_____	OBL species	<u>0</u> x 1= <u>0</u>
3. _____	%	_____	_____	FACW species	<u>0</u> x 2= <u>0</u>
4. _____	%	_____	_____	FAC species	<u>0</u> x 3= <u>0</u>
5. _____	%	_____	_____	FACU species	<u>0</u> x 4= <u>0</u>
Total Cover:	%	_____	_____	UPL species	<u>0</u> x 5= <u>0</u>
Herb Stratum (Plot size: <u>5</u> ft radius)				Column Totals:	<u>0</u> (A) <u>0</u> (B)
1. _____	%	_____	_____	Prevalence Index = B/A= _____	
2. _____	%	_____	_____	Hydrophytic Vegetation Indicators:	
3. _____	%	_____	_____	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
4. _____	%	_____	_____	<input checked="" type="checkbox"/> 2 – Dominance Test is >50%	
5. _____	%	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
6. _____	%	_____	_____	4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet)	
7. _____	%	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
8. _____	%	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
Total Cover:	%	_____	_____	¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				Hydrophytic Vegetation Present?	
1. <u>Rubus armeniacus</u>	100%	yes	FAC		
2. _____	%	_____	_____		
Total Cover:	100%	_____	_____	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
% Bare Ground in Herb Stratum <u>0%</u>					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	various	100%		%			Gravel fill with clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

2 cm Muck (A10)
 Red Parent Material (TF2)
 Very Shallow Dark Surface (TF12)
 Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks:

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	
Saturation Present? (Includes Capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B - WETLAND RATING SUMMARY

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland "A" Date of site visit: 2/22/2022

Rated by T. Haderly Trained by Ecology? Yes No Date of training Dec-14

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? Yes No

NOTE: Form is not complete with out the figures requested (figures can be combined).

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions or special characteristics)

1. Category of wetland based on FUNCTIONS

- Category I - Total score = 23 - 27
- Category II - Total score = 20 - 22
- X Category III - Total score = 16 - 19
- Category IV - Total score = 9 - 15

Score for each function based on three ratings
(order of ratings is not important)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>List appropriate rating (H, M, L)</i>				
Site Potential	M	M	L	
Landscape Potential	M	H	M	
Value	H	H	M	Total
Score Based on Ratings	7	4	6	17

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	A3
Hydroperiods	D 1.4, H 1.2	A1
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	A1
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	A1
Map of the contributing basin	D 4.3, D 5.3	A6
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	A2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	A4
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	A5

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to another figure</i>)	S 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

- NO - go to 2 YES - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

- NO - Saltwater Tidal Fringe (Estuarine)** **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

- NO - go to 3 YES - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
 At least 30% of the open water area is deeper than 6.6 ft (2 m).

- NO - go to 4 YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- The wetland is on a slope (*slope can be very gradual*),
 The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
 The water leaves the wetland **without being impounded**.

- NO - go to 5 YES - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
 The overbank flooding occurs at least once every 2 years.

- NO - go to 6 YES - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 YES - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3	2
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2	
<input type="checkbox"/> Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
<input type="checkbox"/> Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions).	Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	5
Wetland has persistent, ungrazed, plants > 1/2 of area	points = 3	
Wetland has persistent, ungrazed plants > 1/10 of area	points = 1	
Wetland has persistent, ungrazed plants < 1/10 of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:		
<i>This is the area that is ponded for at least 2 months. See description in manual.</i>		
Area seasonally ponded is > 1/2 total area of wetland	points = 4	0
Area seasonally ponded is > 1/4 total area of wetland	points = 2	
Area seasonally ponded is < 1/4 total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	7

Rating of Site Potential If score is: 12 - 16 = H 6 - 11 = M 0 - 5 = L Record the rating on the first page

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3?		0
Source	Yes = 1 No = 0	
Total for D 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3 or 4 = H 1 or 2 = M 0 = L Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (answer YES if there is a TMDL for the basin in which the unit is found)?	Yes = 2 No = 0	2
Total for D 3	Add the points in the boxes above	3

Rating of Value If score is: 2 - 4 = H 1 = M 0 = L Record the rating on the first page

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. <u>Characteristics of surface water outflows from the wetland:</u> Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2	
D 4.2. <u>Depth of storage during wet periods: Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.</u> Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 <input type="checkbox"/> Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 <input checked="" type="checkbox"/> The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3	
D 4.3. <u>Contribution of the wetland to storage in the watershed: Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.</u> <input type="checkbox"/> The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 <input type="checkbox"/> Entire wetland is in the Flats class points = 5	3	
Total for D 4 Add the points in the boxes above		8

Rating of Site Potential If score is: 12 - 16 = H 6 - 11 = M 0 - 5 = L Record the rating on the first page

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1	
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1	
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1	
Total for D 5 Add the points in the boxes above		3

Rating of Landscape Potential If score is: 3 = H 1 or 2 = M 0 = L Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met. The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): <ul style="list-style-type: none"> <input type="checkbox"/> • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 <input type="checkbox"/> • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 <input type="checkbox"/> Flooding from groundwater is an issue in the sub-basin. points = 1 <input type="checkbox"/> The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 <input type="checkbox"/> There are no problems with flooding downstream of the wetland. points = 0 	2	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0	
Total for D 6 Add the points in the boxes above		2

Rating of Value If score is: 2 - 4 = H 1 = M 0 = L Record the rating on the first page

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- Aquatic bed 4 structures or more: points = 4
 - Emergent 3 structures: points = 2
 - Scrub-shrub (areas where shrubs have > 30% cover) 2 structures: points = 1
 - Forested (areas where trees have > 30% cover) 1 structure: points = 0
- If the unit has a Forested class, check if:*
- The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- Permanently flooded or inundated 4 or more types present: points = 3
- Seasonally flooded or inundated 3 types present: points = 2
- Occasionally flooded or inundated 2 types present: points = 1
- Saturated only 1 types present: points = 0
- Permanently flowing stream or river in, or adjacent to, the wetland
- Seasonally flowing stream in, or adjacent to, the wetland
- Lake Fringe wetland** **2 points**
- Freshwater tidal wetland** **2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft². *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*

- If you counted:
- > 19 species points = 2
 - 5 - 19 species points = 1
 - < 5 species points = 0

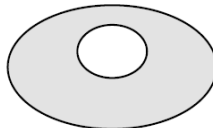
1

H 1.4. Interspersion of habitats

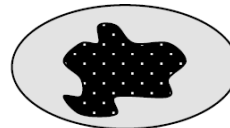
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



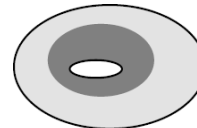
None = 0 points



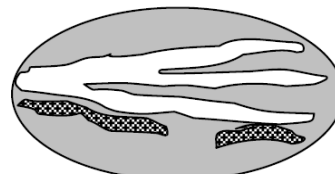
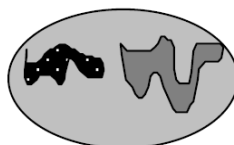
Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH = 3 points**



1

<p>H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) <input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) <input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (see H 1.1 for list of strata) 		0
<p>Total for H 1 Add the points in the boxes above</p>		5

Rating of Site Potential If Score is: 15 - 18 = H 7 - 14 = M 0 - 6 = L *Record the rating on the first page*

<p>H 2.0. Does the landscape have the potential to support the habitat function of the site?</p>		
<p>H 2.1 Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). Calculate: 28 % undisturbed habitat + (_____ 0 % moderate & low intensity land uses / 2) = 28%</p> <p>If total accessible habitat is:</p> <ul style="list-style-type: none"> > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0 		2
<p>H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate: 0 % undisturbed habitat + (_____ 48 % moderate & low intensity land uses / 2) = 24%</p> <ul style="list-style-type: none"> Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0 		1
<p>H 2.3 Land use intensity in 1 km Polygon: If</p> <ul style="list-style-type: none"> > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0 		0
<p>Total for H 2 Add the points in the boxes above</p>		3

Rating of Landscape Potential If Score is: 4 - 6 = H 1 - 3 = M < 1 = L *Record the rating on the first page*

<p>H 3.0. Is the habitat provided by the site valuable to society?</p>		
<p>H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose only the highest score that applies to the wetland being rated.</i></p> <p>Site meets ANY of the following criteria: points = 2</p> <ul style="list-style-type: none"> <input type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW priority species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan <p>Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1</p> <p>Site does not meet any of the criteria above points = 0</p>		1

Rating of Value If Score is: 2 = H 1 = M 0 = L *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.

<http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here:

<http://wdfw.wa.gov/conservation/phs/list/>

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

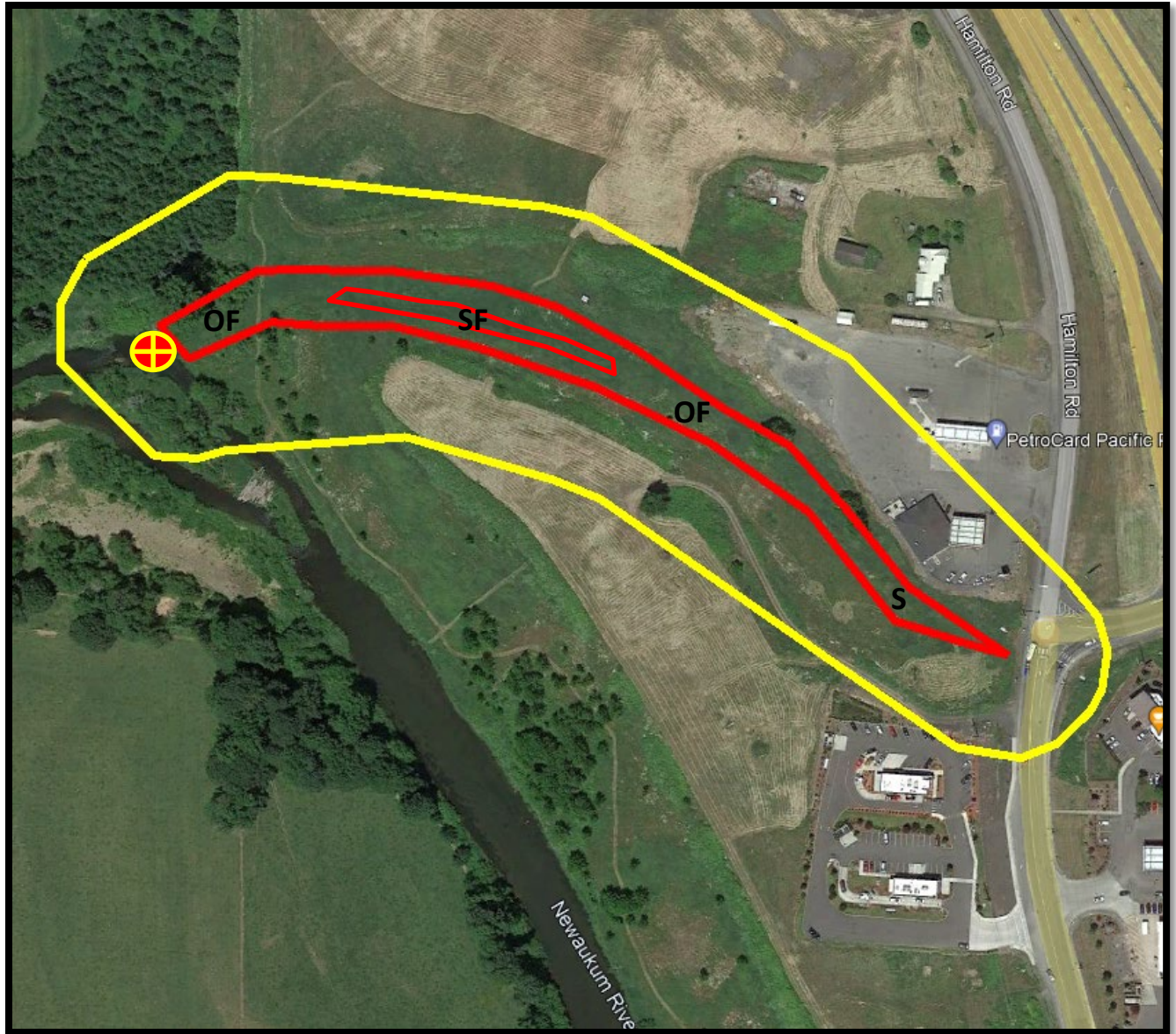
- Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt <input type="checkbox"/> Yes - Go to SC 1.1 <input checked="" type="checkbox"/> No = Not an estuarine wetland	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No - Go to SC 1.2	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Category II	
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <input type="checkbox"/> Yes - Go to SC 2.2 <input checked="" type="checkbox"/> No - Go to SC 2.3 SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Not WHCV SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <input type="checkbox"/> Yes - Contact WNHP/WDNR and to SC 2.4 <input checked="" type="checkbox"/> No = Not WHCV SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Not WHCV	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <input type="checkbox"/> Yes - Go to SC 3.3 <input checked="" type="checkbox"/> No - Go to SC 3.2 SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <input type="checkbox"/> Yes - Go to SC 3.3 <input checked="" type="checkbox"/> No = Is not a bog SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <input type="checkbox"/> Yes = Is a Category I bog <input type="checkbox"/> No - Go to SC 3.4 NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <input type="checkbox"/> Yes = Is a Category I bog <input type="checkbox"/> No = Is not a bog	

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.</p> <p><input type="checkbox"/> Mature forests (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).</p> <p><input type="checkbox"/> Yes = Category I <input checked="" type="checkbox"/> No = Not a forested wetland for this section</p>	
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> Yes - Go to SC 5.1 <input checked="" type="checkbox"/> No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 ac (4350 ft²)</p> <p><input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Category II</p>	
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <p><input type="checkbox"/> Long Beach Peninsula: Lands west of SR 103</p> <p><input type="checkbox"/> Grayland-Westport: Lands west of SR 105</p> <p><input type="checkbox"/> Ocean Shores-Copalis: Lands west of SR 115 and SR 109</p> <p><input type="checkbox"/> Yes - Go to SC 6.1 <input checked="" type="checkbox"/> No = Not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?</p> <p><input type="checkbox"/> Yes = Category I <input type="checkbox"/> No - Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?</p> <p><input type="checkbox"/> Yes = Category II <input type="checkbox"/> No - Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?</p> <p><input type="checkbox"/> Yes = Category III <input type="checkbox"/> No = Category IV</p>	
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	

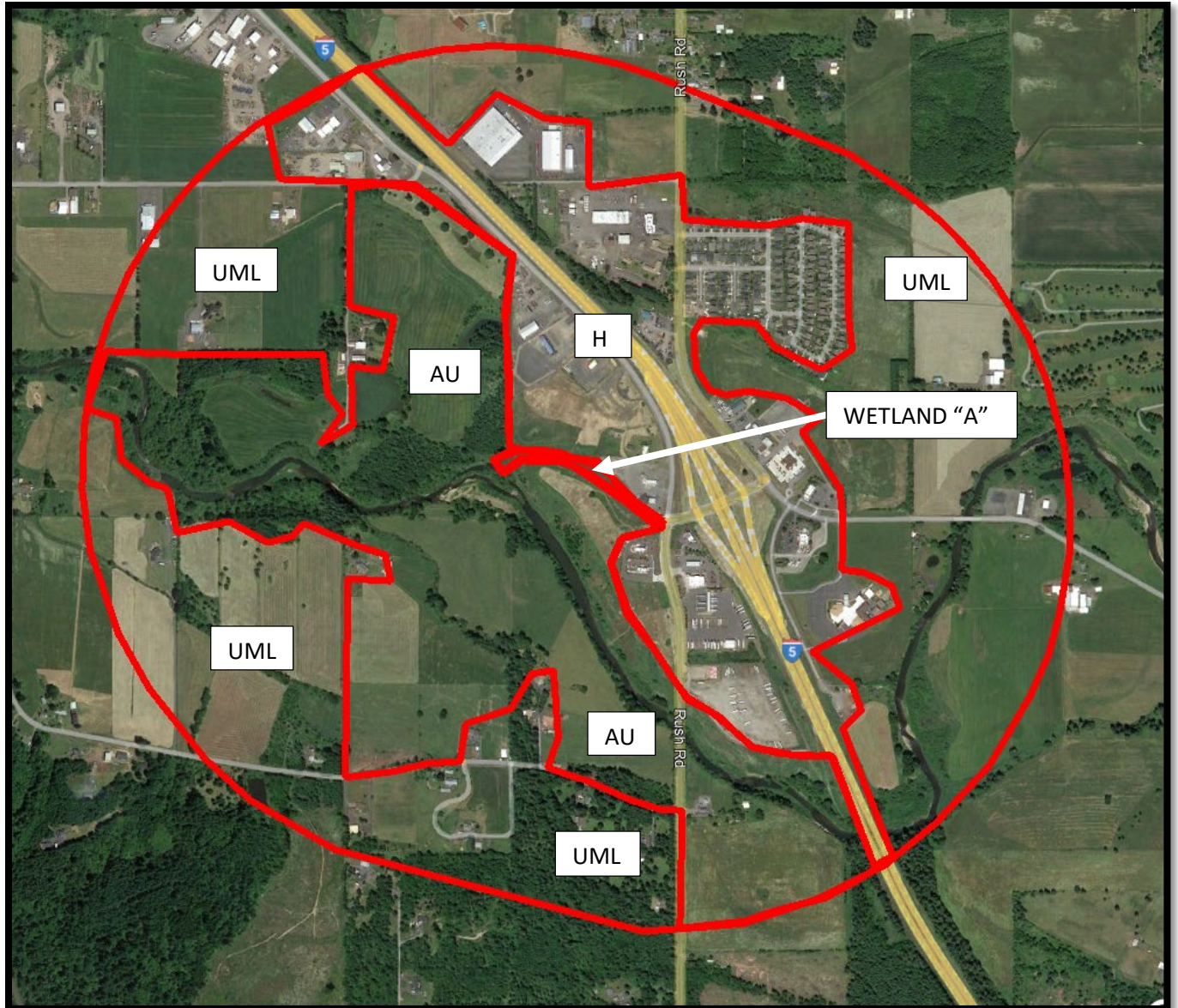


SF = Seasonally Flooded
OF = Occasionally Flooded
S = Saturated

Outlet  150 ft Offset 

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Management
360.431.5118

Figure A1
Hydroperiods
121 Hamilton Road – Napavine, WA



Google Earth Pro

Accessible Habitat

- 28% Undisturbed (AU)
- 0% Moderate & Low Intensity Land Use/2 = (AML)

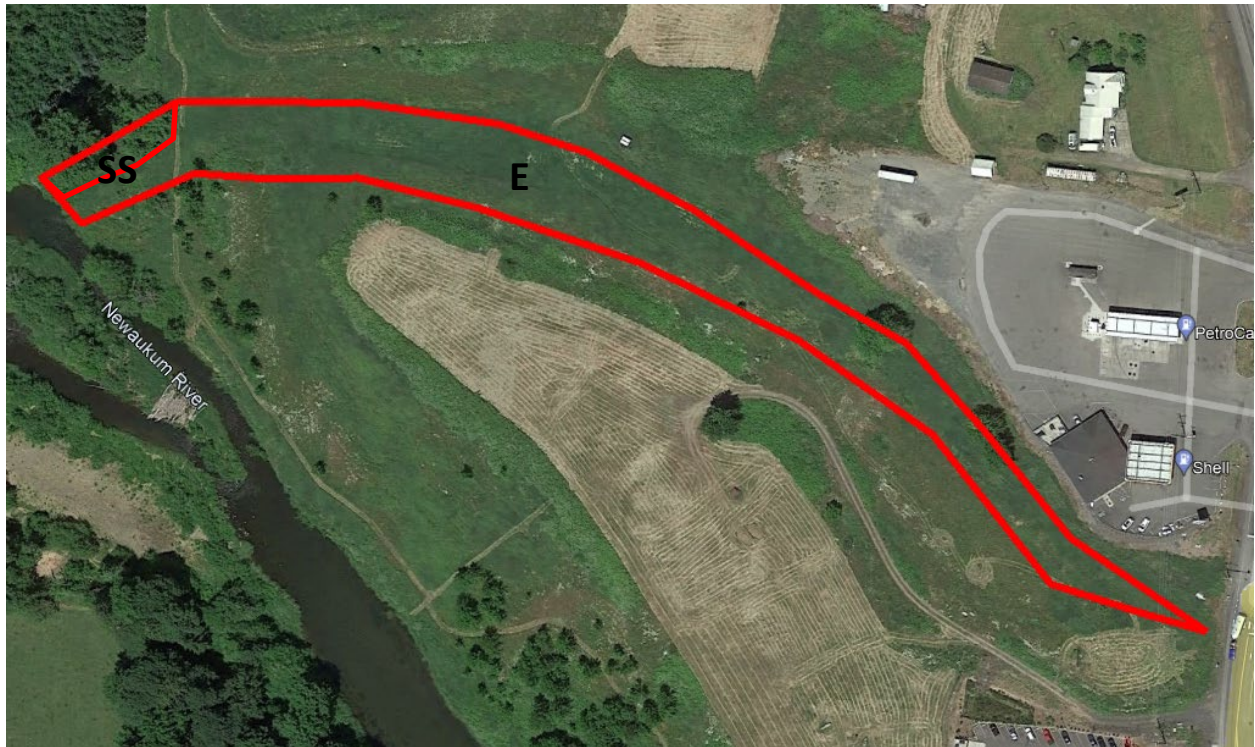
Undisturbed Habitat

- 0% Undisturbed (UH)
- 48% Moderate & Low Intensity Land Use/2 = (UML)

High Intensity = HI (24%)

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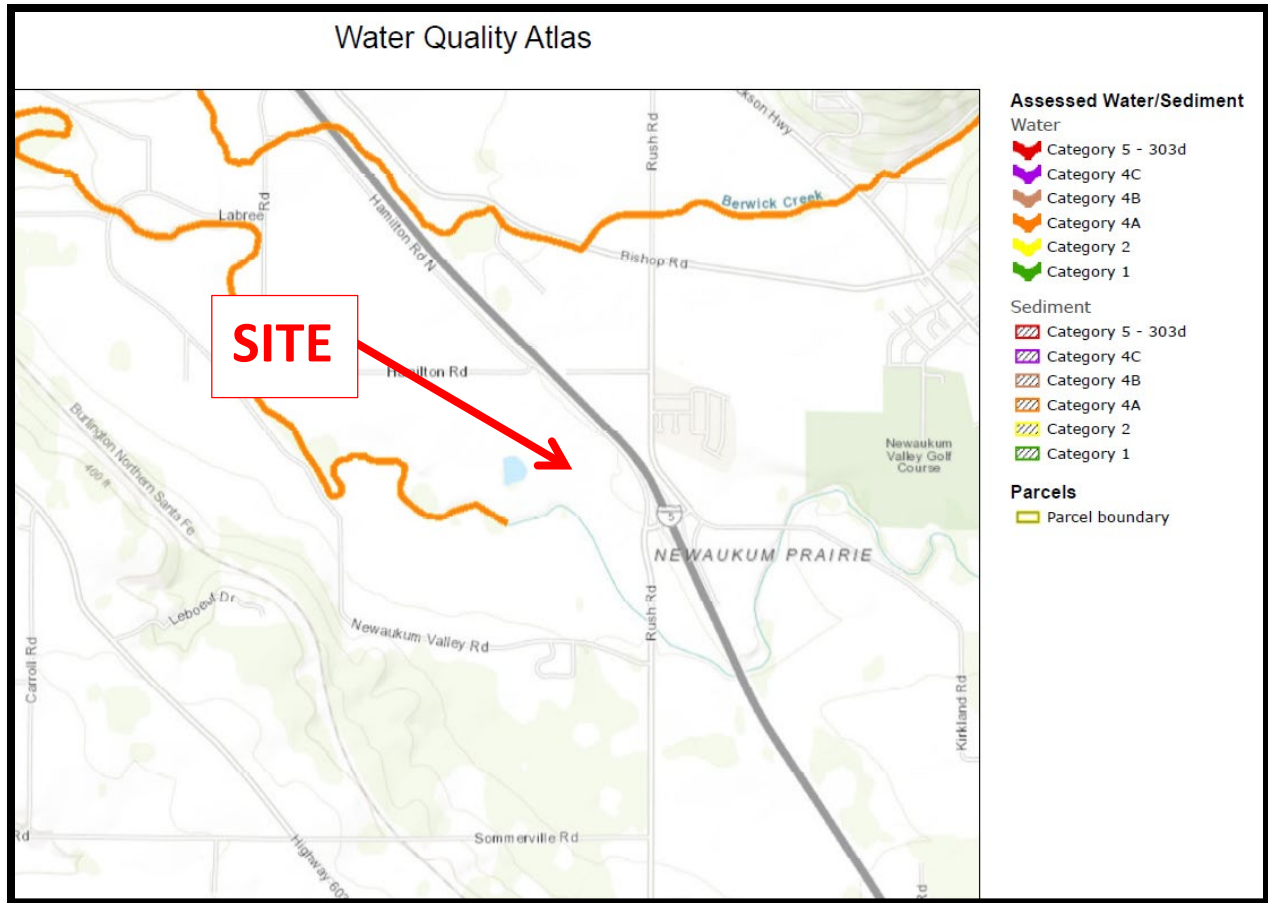
Figure A2
1km Polygon
121 Hamilton Road – Napavine, WA



E = Emergent
SS = Scrub Shrub

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Figure A3
Cowardin Plant Classes
121 Hamilton Road – Napavine, WA



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Figure A4
303(d) Listed Waters
121 Hamilton Road – Napavine, WA

EXHIBIT 3

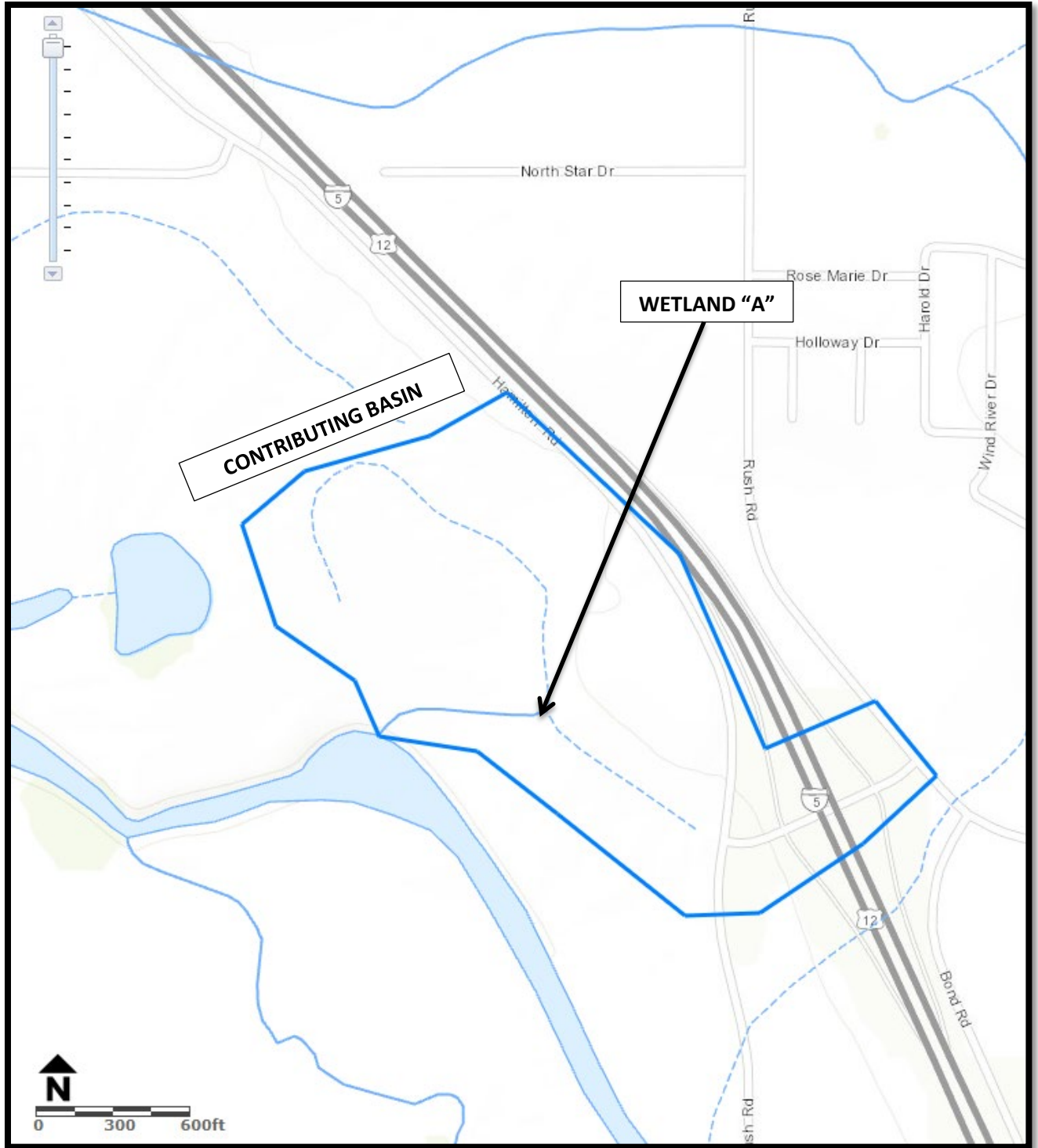
Category 3 listings contain data insufficient in determining water quality, therefore are removed from your results.

[Include these 2 omitted listings.](#)

ListingID	AU ID	Medium	Parameter	Category	Waterbody Name	WRIA	WQ Improvement Project
7770	17100103000226	Water	Temperature	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Basin Temperature TMDL
11003	17100103000226	Water	Dissolved Oxygen	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Basin Dissolved Oxygen TMDL
16758	17100103000226	Water	Bacteria	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Bacteria TMDL

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Figure A5
TMDL
121 Hamilton Road – Napavine, WA



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Figure A6
Contributing Basin
121 Hamilton Road – Napavine, WA

APPENDIX C – CLIMATOLOGICAL SUMMARY

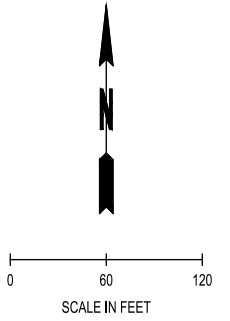
Daily Data | AgWeatherNet at Washington State University

Date	Date	Min°F	Avg°F	Max°F	Avg1.5m DP°F	Avg1.5m RH%	Avg1.5m LWu.	AvgDir	Avg Speedmph	2m MaxGustmph	2 in. °F	Min°F	Avg°F	AvgSoilVWC%	TotPrecin	TotalSolarRadMJ/m²	EToin	E1
2022/02/16	16	36.3	45.6	53.1	39.3	79.6	0.00	SW	2.0	8.2	47.1	45.3	45.9	42.9	0.00	8.39	0.03	0.0
2022/02/17	17	34.5	42.7	48.9	39.7	89.7	0.05	S	3.1	13.9	45.8	45.9	46.3	42.6	0.01	4.56	0.02	0.0
2022/02/18	18	37.8	43.0	54.0	40.1	90.4	0.07	W	1.6	8.2	46.7	46.0	46.4	42.5	0.00	8.14	0.03	0.0
2022/02/19	19	37.2	42.4	49.8	39.1	88.5	0.04	S	4.9	17.1	45.3	45.7	46.1	42.2	0.00	4.13	0.03	0.0
2022/02/20	20	36.4	41.2	47.3	37.3	86.3	0.07	SW	4.2	16.4	45.3	45.3	45.8	42.2	0.10	8.07	0.03	0.0
2022/02/21	21	34.3	37.6	44.3	33.3	84.8	0.07	E	4.2	16.7	43.3	44.7	45.2	43.1	0.12	5.94	0.03	0.0
2022/02/22	22	23.4	32.0	37.4	23.4	71.5	0.00	N	6.1	16.7	40.4	43.2	44.0	43.3	0.00	5.36	0.03	0.0
2022/02/23	23	18.6	28.2	39.6	16.5	67.0	0.00	W	2.0	10.3	36.9	40.7	41.6	42.6	0.00	13.37	0.03	0.0
2022/02/24	24	25.0	32.4	42.5	25.4	77.4	0.00	S	2.3	12.4	38.4	40.3	40.9	42.3	0.00	8.95	0.03	0.0
2022/02/25	25	20.4	32.5	50.2	24.7	77.7	0.00	N	1.7	11.0	37.5	39.5	40.4	42.1	0.00	13.90	0.04	0.0
2022/02/26	26	26.3	36.6	44.3	31.0	82.5	0.04	S	4.1	15.7	37.2	39.7	40.2	42.2	0.18	3.03	0.03	0.0
2022/02/27	27	42.1	48.0	51.5	45.8	92.1	0.13	S	7.0	19.2	42.9	40.3	41.3	44.4	0.82	2.38	0.02	0.0
2022/02/28	28	51.6	53.4	55.5	51.5	93.4	0.21	S	6.3	19.2	48.6	43.0	45.0	45.6	2.78	1.36	0.02	0.0
2022/03/01	1	47.2	53.2	61.7	49.0	86.7	0.11	S	3.4	15.0	51.9	47.0	47.9	44.7	0.30	9.61	0.05	0.0
2022/03/02	2	44.7	49.3	53.3	46.6	90.3	0.08	S	2.9	10.7	50.2	48.9	49.2	44.1	0.16	3.65	0.03	0.0







APPENDIX 4

BASIN MAP EXHIBIT



LEGEND

-  PROPERTY LINE
-  STORMWATER BASIN AREA
-  PERVIOUS BYPASS AREA
-  WETLAND BUFFER ENHANCEMENT AREA



D:\13_2022_11\03_24\m... User: dschiff... V:\PROJECTS\0557_080_LAND_COMPANY_LLC\22-000419_NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\EXHIBITS\22-000419_EX BASIN.DWG



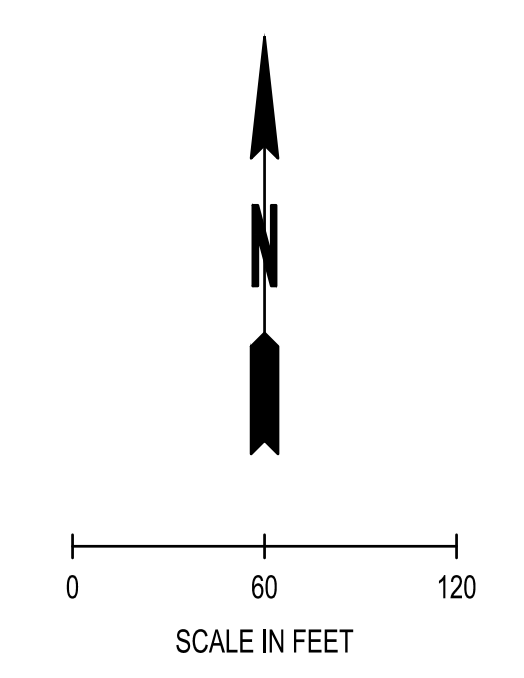
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

HORIZONTAL SCALE	1"=60'
DATE	DECEMBER 2022
JOB No.	22-000419
DRAWING FILE No.	22-000419 Ex Basin.dwg

EXISTING CONDITIONS MAP
NAPAVINE TRUCK STOP, NAPAVINE, WA

EXHIBIT No:
EX-01

SHEET No:
1



LEGEND

	PROPERTY LINE
	STORMWATER BASIN AREA
	PROPOSED BUILDING
	PAVEMENT AREA
	SIDEWALK AREA
	ROOF AREA
	STORMWATER DETENTION AREA
	PERVIOUS AREA
	PERVIOUS BYPASS AREA
	WETLAND BUFFER ENHANCEMENT AREA

PROPOSED BASIN AREAS:

PAVEMENT AREA:	9.12 ACRES
SIDEWALK AREA:	0.27 ACRES
ROOF AREA:	0.84 ACRES
STORMWATER DETENTION AREA:	0.55 ACRES
PERVIOUS AREA:	1.87 ACRES
PERVIOUS BYPASS AREA:	0.33 ACRES
BUFFER ENHANCEMENT AREA:	1.02 ACRES
STORMWATER BASIN AREA:	14.00 ACRES

Dec 13, 2022 11:24:20am User: dschultz
 M:\PROJECTS\2022\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\EXHIBITS\22-000419 Prop Basin.dwg


SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

HORIZONTAL SCALE:	1"=60'
DATE:	DECEMBER 2022
JOB No.:	22-000419
DRAWING FILE No.:	22-000419 Prop Basin.dwg

PROPOSED CONDITIONS MAP
 NAPAVINE TRUCK STOP, NAPAVINE, WA

EXHIBIT No.:	EX-02
SHEET No.:	2



APPENDIX 5

GEOTECHNICAL REPORT

TO: Mr. Gurinderjit Sidhu, GMD Land Company LLC
FROM: Lance Levine, PE, and Calvin McCaughan, PE
DATE: April 7, 2022
RE: **Summary of Geotechnical Engineering Services
Napavine Truck Stop
Napavine, Washington
Project No. 2045001.010.011**

Introduction

This memorandum summarizes the results of geotechnical engineering services provided by Landau Associates, Inc. (Landau) in support of the Napavine Truck Stop project, located at 121 Hamilton Road in Napavine, Washington (site; Figure 1). Services were provided in accordance with the scope outlined in Landau's February 7, 2022 proposal.

This memorandum has been prepared with information provided by JSA Civil, LLC (project civil engineer) and GMD Land Company LLC (GMD; project owner) and with data collected during Landau's field exploration and laboratory testing programs.

Project Understanding

GMD proposes to demolish an existing residence and ancillary structures and construct a 15,000-square-foot truck stop; fuel stations; a three-bay truck repair shop; a weigh scale; underground utilities; and paved parking and drive lanes.

Site Conditions

The 13.56-acre site encompasses two parcels: Lewis County parcels 018050005000 and 018050004000. The site is bordered by Hamilton Road to the east, a fuel station and wetland to the south, forest and farmland to the west, and a recreational vehicle- and trailer-sales business to the north.

In, or around, 2005, the western portion of the site was raised with uncontrolled fill. Site topography is generally flat and level, with the exception of an excavated depression in the southwest corner.

Geologic Setting

Geologic information for the site and the surrounding area was obtained from the *Geologic Map of the Centralia Quadrangle, Washington* (Schasse 1987). Surficial deposits in the vicinity of the site are mapped as alluvium (Qa) underlain by alpine glacial outwash (Qapo[h]). The alluvium consists of silt, sand, and gravel deposited in streambeds. The alpine glacial outwash consists of sand and gravel

deposits. The subsurface conditions observed in Landau's February and March 2022 explorations were generally consistent with the mapped geology for the site.

Subsurface Conditions

On February 21, 2022, Landau's drilling subcontractor advanced three hollow-stem auger borings (B-1 through B-3) 25.5 to 31.5 feet (ft) below ground surface (bgs). On March 3, 2022, Landau's excavating subcontractor advanced six test pits (TP-1 through TP-6) 7 to 13.5 ft bgs. The approximate locations of the explorations are shown on Figure 2.

Landau personnel coordinated and monitored the field explorations, collected representative soil samples, and maintained detailed logs of the subsurface soil and groundwater conditions observed. Subsurface conditions were described using the soil classification system shown on Figure 3, in general accordance with ASTM International (ASTM) standard D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)*. Summary exploration logs are presented on Figures 4 through 12.

A standard penetration test split-spoon sampler (with a 1.5-inch inside-diameter) was used to collect soil samples from the borings. A 140-pound automatic hammer, falling approximately 30 inches, was used to drive the sampler 18 inches (or a portion thereof) into the undisturbed soil.

Natural moisture content determinations were performed on select samples in accordance with ASTM standard test method D2216-19, *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. The natural moisture content is shown as "W = xx" (i.e., percent of dry weight) in the "Test Data" column on Figures 4 through 12.

U.S. Standard No. 200 sieve washes were performed on select samples in accordance with ASTM standard test method D1140, *Standard Test Methods for Determining the Amount of Material Finer than 75- μ m (No. 200) Sieve in Soils by Washing*. The results of the sieve washes are shown as "-200 = xx" in the "Test Data" column on Figure 5.

Grain size, or sieve, analyses were performed on select samples in accordance with ASTM standard test method D6913, *Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis*. Samples selected for grain size analysis are designated with a "GS" on Figures 4 through 12. The results of the grain size analyses are presented on Figures 13 and 14.

Atterberg limits tests were performed on select samples in accordance with ASTM standard test method D4318, *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*. Samples selected for Atterberg limits tests are designated with an "AL" in the "Test Data" column on Figures 4 through 12. The results of the Atterberg limits tests are presented on Figure 15.

Soil Conditions

The soils observed underlying existing surface conditions (i.e., topsoil, crushed gravel, and pavement) were categorized into three general units:

- Uncontrolled Fill Material:** Uncontrolled fill material was observed in borings B-1, B-2, and B-3 and in test pits TP-2, TP-3, TP-5, and TP-6. The fill typically consisted of clay, silt, and sand with variable gravel, brick, concrete, asphalt, and rubber debris. The fill also included crushed gravel surfacing. Buried topsoil was observed beneath the fill in test pits TP-2, TP-3, and TP-5. The fill was brown, dark brown, or gray and in a loose to very dense/stiff, moist to wet condition. It extended 1 to 6 ft bgs.
- Alluvium:** Alluvium was observed beneath the topsoil or fill in all of the explorations. The alluvium typically consisted of brown to reddish-brown silt with variable sand and gravel content in a soft to very stiff, moist to wet condition. It extended from 3 ft bgs to more than 13.5 ft bgs. Test pits TP-2 and TP-3 were terminated in this unit.
- Glacial Outwash:** Glacial outwash was observed beneath the alluvium in borings B-1, B-2, and B-3 and in test pits TP-1, TP-4, TP-5, and TP-6. The glacial outwash typically consisted of brown to reddish-brown sand and gravel with variable silt and cobble content in a dense to very dense, moist to wet condition. It extended to the maximum depth explored (31.5 ft bgs).

Groundwater Conditions

During Landau's February and March 2022 field investigations, groundwater was observed from 5.0 to 23.5 ft bgs, as shown in Table 1. Test pit TP-1 was completed at the bottom of an excavated depression, resulting in an unusually shallow depth-to-groundwater of 3.5 ft bgs.

Site groundwater elevations will vary depending on local subsurface conditions, weather conditions, and other factors. Site groundwater levels are expected to fluctuate seasonally, with maximum levels occurring during late winter and early spring.

Table 1. Depth to Groundwater

Exploration	Depth to Groundwater (ft)	Date ^(a)
B-1	13.0	2.21.2022
B-2	23.5	2.21.2022
B-3	22.5	2.21.2022
TP-1	3.5 ^(b)	3.3.2022
TP-2	12.0	3.3.2022
TP-3	9.0	3.3.2022
TP-4	6.0	3.3.2022

Exploration	Depth to Groundwater (ft)	Date ^(a)
TP-5	9.0	3.3.2022
TP-6	5.0	3.3.2022

(a) = at time of drilling

(b) = Test TP-1 was completed in an excavated depression.

B = boring

ft = feet

TP = test pit

Conclusions and Recommendations

Based on the subsurface conditions observed in Landau's explorations, site soils will provide adequate support for the proposed improvements, provided the following recommendations are incorporated into the project design:

- **Site soils:** Shallow, moisture-sensitive soils (i.e., alluvium and uncontrolled fill) are not suitable for reuse as structural fill. Landau recommends that earthwork is completed during the dry season (typically July through late October) to limit subgrade disturbance. Use of an asphalt-treated base may allow earthwork to continue into the wet season.
- **Foundation support:** Shallow foundations with footing depths up to 5 ft bgs will provide suitable structural support for buildings in the eastern portion of the site (see Figure 2).
- **Overexcavation of loose foundation soils:** Loose/soft soils were observed in the eastern portion of the site; the soils typically extended 5 ft bgs. For building foundations, Landau recommends that these soils are overexcavated and replaced with structural fill. Alternatively, deeper footings that extend to dense soils could be used.
- **Slab on-grade support:** Lightly loaded slabs can be supported on 1-ft of imported structural fill. Landau should be consulted regarding the potential need to overexcavate loose soils from beneath any heavily loaded equipment slabs.
- **Differential pavement settlement:** Compressible soils (i.e., alluvium and uncontrolled fill) are present at variable thicknesses across pavement areas. Landau estimates that 1-ft of new fill may result in 2 inches of settlement, which may take up to one year to materialize. Within a horizontal distance of 50 ft, other areas may experience no settlement. Soil preloading should be considered to limit the risk of differential pavement settlement and its associated maintenance cost.
- **Cement treatment:** Cement treatment may be a viable alternative to preloading near-surface soils; it would help provide more uniform settlement. The topsoil should be stripped from cement-treated areas. Approximately 18 inches of cement-treated soils would be needed to reduce the pavement subbase to a 6-inch leveling course. A cement-treatment contractor should determine the amount of cement needed to treat the soils.
- **Dewatering:** Groundwater is relatively shallow. Construction dewatering for deep utilities and buried tanks could be a significant cost consideration.

Seismic Design Considerations

Seismic design will be completed using 2018 International Building Code standards (ICC 2017). The parameters in Table 2 can be used to compute seismic base shear forces.

Table 2. 2018 International Building Code Seismic Design Parameters

Spectral response acceleration at short periods (S_s) = 1.133g
Spectral response acceleration at 1-second periods (S_1) = 0.469g
Site class = D
Site coefficient (F_a) = 1.047
Site coefficient (F_v) = 1.831 ^(a)

(a) When using the coefficient $F_v = 1.831$, adhere to Exception 2 requirements for a ground motion hazard analysis. See Section 11.4.8 of the American Society of Civil Engineers' *Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16)*.

F_a, F_v = acceleration (0.2-second period) and velocity (1.0-second period) site coefficients, respectively

g = force of gravity

S_s, S_1 = 0.2-second and 1.0-second period spectral accelerations, respectively

Medium dense to very dense glacial outwash soils will support building foundations. In Landau's opinion, these soils have a low risk of seismically induced liquefaction or lateral spreading. Paved areas, in which loose/soft alluvial soils remain, may experience minor settlement and cracking follow a design-level earthquake. Given the distance between the site and the nearest known active crustal fault, the risk of ground rupture due to surface faulting is low.

Foundation Support

The surficial alluvium and uncontrolled fill are likely to consolidate and settle under building loads. Shallow foundations should be supported on the gravelly glacial outwash soils present from 4 to 5 ft bgs. Chart 1 shows preliminary soil bearing capacities versus footing widths.

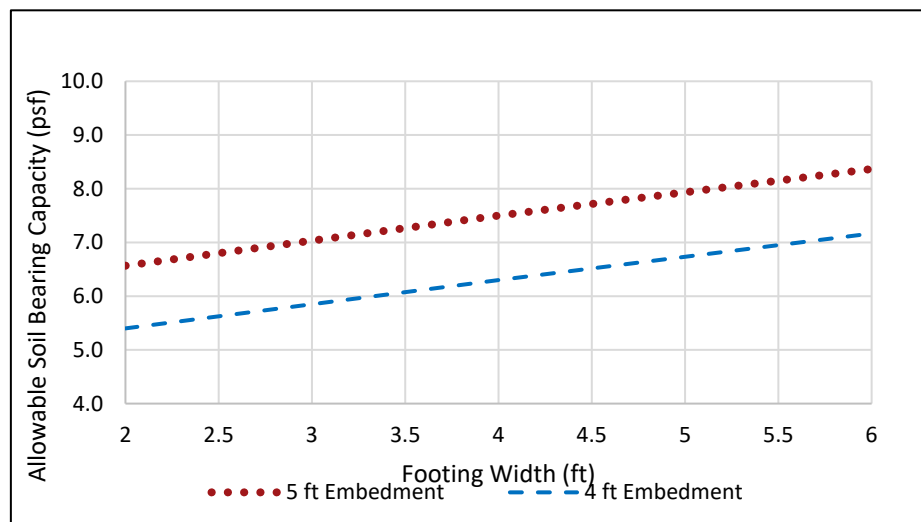


Chart 1. Allowable soil bearing capacity versus footing width.

Table 3. Summary of Design Parameters for Shallow Foundations

Friction coefficient (factored) = 0.35
Passive earth pressure = 300 pcf
Minimum foundation width = 18 inches (continuous), 24 inches (isolated)
Maximum foundation width (for settlement considerations) = 10 ft (continuous), 15 ft (isolated)

ft = feet

pcf = pounds per cubic foot

When calculating design parameters, Landau assumed that shallow foundations would be established on dense native soils or on imported fill material extending to such soils. The geotechnical engineer should evaluate foundation subgrades prior to placement of formwork, rebar, or structural fill.

The allowable soil bearing pressure on Chart 1 applies to long-term dead and live loads, exclusive of the weight of the footing and any overlying backfill. The bearing pressure includes a factor of safety of 3.0 on the calculated ultimate bearing capacity. The maximum allowable bearing pressure can be increased by one-third for transient loads, such as those induced by wind and seismic forces.

Landau recommends a minimum width of 18 inches for continuous wall footings and 24 inches for isolated column footings. Lewis County's frost protection code requires that perimeter footings are embedded at least 12 inches below the lowest adjacent grade, where the ground is flat. Interior footings should be embedded at least 6 inches below the nearest adjacent grade. Landau estimates that continuous and isolated foundations will settle less than 1 inch, if constructed as recommended. Similarly loaded foundation elements will likely experience ½ inch or less of differential settlement over 50-ft spans. Settlement is expected to occur as building loads are applied during construction.

An allowable coefficient of sliding resistance of 0.35, applied to vertical dead loads only, can be used to compute frictional resistance acting on the base of footings. This coefficient includes a factor of safety of 1.5 on the calculated ultimate value.

The passive resistance of properly compacted structural fill placed against the sides of foundations can be considered equivalent to a fluid with a density of 300 pounds per cubic foot (pcf). The foundation passive earth pressure has been reduced by a factor of 1.5 to limit deflections to less than 2 percent of the embedded depth. The passive earth pressure and friction components can be combined, provided the passive component does not exceed two-thirds of the total. The top 1 ft of soil should be excluded from the calculation, unless the foundation perimeter will be covered by slab-on-grade or pavement.

Slabs-On-Grade

Slabs-on-grade should be installed on 12 inches of import structural fill placed on a uniformly firm, unyielding subgrade. A modulus of vertical subgrade reaction (subgrade modulus) can be used to design slabs-on-grade. The subgrade modulus will vary based on the dimensions of the slab and the magnitude of applied loads on the slab surface; slabs with larger dimensions and loads are influenced by soils to a greater depth. Landau recommends using a subgrade modulus of 80 pounds per cubic inch to design on-grade floor slabs. This subgrade modulus is for a 1-ft-by-1-ft square plate and is not the overall modulus of a larger area.

Interior slabs-on-grade should include a vapor barrier and a capillary break layer, designed and installed in accordance with industry standards.

Soil Preloading

Soil preloading is recommended to reduce pavement settlement anticipated to be several inches. After vegetation and topsoil have been stripped, 5 to 6 ft of soil should be placed in areas designated for pavement; the soil should extend beyond the footprint a distance equal to the preload height. There are several options for preload soil type and height. The preload should result in a ground surcharge pressure of 600 pounds per square foot, which correlates to 6 ft of loosely compacted fill or 5 ft of well-compacted fill.

Preload fill should be left in place for 3 months and removed prior to pavement construction. A licensed surveyor should be hired to monitor settlement of the preload fill; weekly during month 1 and monthly thereafter. Settlement data should be provided to the geotechnical engineer for review prior to fill removal.

Twelve inches of imported material, such as gravel borrow, may be left in place as a pavement subbase. Pavement construction should be completed within 1 month of removing the preload fill.

Cement-Treated Soils

Cement-treating soils may be a viable alternative to soil preloading for pavement areas. Although long-term settlement would still occur, cement treatment would provide a bridging effect and reduce differential settlement. After grading plans are available, Landau can further evaluate the application of cement-treated soils.

Landau estimates that at least 18 inches of cement-treated soil beneath the planned pavement section will be sufficient to stabilize soft or unsuitable soils. Typically, 5 to 8 percent cement added by dry weight will be needed. After mixing, the treated soils must be compacted with a heavy drum roller. Density testing should occur 2 to 3 days after mixing.

Cement-treated soil must be cured for a minimum of 7 days before exposing to heavy truck traffic. During the cure period, the soils must be kept wet to reach maximum strength. After the cure period, heavy rubber tire equipment should be used to conduct a proof roll test.

Final design of cement-treated soils should be prepared by a specialty contractor.

Pavement Design

Pavement sections should be constructed on a firm, unyielding subgrade overlain by at least 12 inches of import structural fill over pre-loaded or cement-treated subgrade soils. Design recommendations for flexible and rigid pavement sections are provided in Tables 4 and 5, respectively.

A 20-year design life, a reliability of 85 percent, an initial serviceability index of 4.5, and a terminal serviceability index of 2.0 were used to calculate pavement thickness. Landau assumed that Portland cement concrete (PCC) had a mean modulus of rupture of at least 650 pounds per square inch (psi) and an elastic modulus of 3,900,000 psi. A load transfer coefficient (J) of 3.2 was used to complete rigid pavement design. The light-duty pavement section should be used in areas that will not experience high-volume or heavy vehicle traffic.

Table 4. Recommended Asphalt Pavement Design Sections

Pavement Section Type ^(a)	ESALs	Asphalt Pavement Thickness (inches)	Crushed Surfacing Thickness (inches)
Flexible light duty	100,000	3	6
Flexible heavy duty	10,000,000	5	8
Flexible extra heavy duty	17,000,000	6	10

(a) = Assumes pavement section is founded on a subbase consisting of 12 inches of import structural fill.
ESALs = equivalent single-axle loads

Table 5. Recommended PCC Pavement Design Sections

Pavement Section Type ^(a)	ESALs	PCC Pavement Thickness (inches)	Crushed Surfacing Thickness (inches)
Rigid light duty	100,000	6	6
Rigid heavy duty	10,000,000	10	8
Rigid extra heavy duty	17,000,000	12	10

(a) = Assumes pavement section is founded on a subbase consisting of 12 inches of import structural fill.
ESALs = equivalent single-axle loads
PCC = Portland cement concrete

Base course material should be compacted to at least 95 percent of the maximum dry density, determined in accordance with ASTM standard test method D1557, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ [2,700 kN-m/m³])*. Compacted base course should meet the requirements for Crushed Surfacing Base Course in Section 9-03.9(3) of the Washington State Department of Transportation's 2022 *Standard Specifications for Road, Bridge, and Municipal Construction (2022 WSDOT Standard Specifications)*. To facilitate fine grading of the surface, the upper 2 inches of crushed surfacing could consist of crushed surfacing top course. Prevention of road-base saturation is essential for pavement durability; efforts should be made to limit the amount of water entering the base course.

Asphalt concrete should be Class B aggregate material or hot-mix asphalt class ½-inch and PG58H-22 binder, conforming to the requirements in Section 5-04 of the 2022 *WSDOT Standard Specifications*. The asphalt should be compacted to at least 91 percent of the Rice density.

PCC pavement should meet the requirements in Section 5-05 of the 2022 *WSDOT Standard Specifications*. The pavement edges should be fully supported with a thickened edge or integral curb, and the joint spacing should be no more than 15 ft apart. Landau recommends using dowel bars to provide load transfer across joints, per WSDOT's Standard Plan A-40.10-04. Dowel bars are not recommended for concrete pavement 6 inches thick or less, as an adequate embedment depth will be difficult to achieve.

Stormwater Facilities

Stormwater should not be infiltrated in shallow alluvium and uncontrolled fill soils. The glacial outwash observed in test pits TP-5 and TP-6 has an infiltration rate of 0.9 inch per hour, but infiltration may be limited by perched or shallow groundwater.

Stormwater facilities should be designed in accordance with local stormwater codes. Permanent slopes should be no steeper than 3 horizontal to 1 vertical (3H:1V). Permanent and temporary slopes should be protected from erosion and reseeded or revegetated as soon as practical.

Site Drainage

Landau recommends that perimeter foundation footing drains are included in the design of all structures. In addition, sitewide interceptor/French drains may be required to protect pavement subgrades from saturation. During final design, Landau should be asked to review grading plans and recommend interceptor drain locations.

Construction Considerations

The following key points should be reviewed when developing project specifications:

- **Stripping:** Topsoil should be stripped from areas designated for footings, slabs-on-grade, or pavement sections. Stripped soils are not suitable for reuse as structural fill.
- **Subgrade preparation:** Before structural fill, formwork, or pavement base course is placed, the prepared subgrade should be proof-rolled in the presence of a qualified geotechnical engineer, who is familiar with the site and can check for soft/disturbed areas. Areas of limited access can be evaluated with a steel T-probe. If probing or proof-rolling reveals loose and/or disturbed subgrades, the upper 1 ft of subgrade should be scarified, moisture conditioned, and compacted to a firm, unyielding condition. Alternatively, unsuitable soils can be overexcavated and replaced with import structural fill.

To limit subgrade disturbance, heavy construction equipment should not be allowed on subgrade soil. Construction haul roads, built with quarry spalls, may be required.

- **Utility trench excavation and backfill:** Landau anticipates that utility trenches will be excavated in stiff, sandy silt or sandy gravel with cobbles. A heavy-duty hydraulic excavator should be able to excavate trenches to the required depths. A smooth-bladed bucket should be used to remove loose and/or disturbed soil from the trench bottom. The final trench bottom should be firm and free of roots, topsoil, lumps of silt and clay, construction debris, and organic and inorganic debris.
- **Site soil:** Shallow, moisture-sensitive site soils are not suitable for reuse as structural fill. Based on the results of Landau's geotechnical laboratory testing, the natural moisture content of some shallow site soils exceeds 50 percent. The contractor should be prepared to moisture condition subgrade soils. Earthwork should be avoided during heavy and/or extended periods of precipitation.
- **Oversized material:** Cobbles and boulders are often found in glacial soil deposits and could be present throughout the site. The contractor should be prepared to manage cobbles and boulders as well as debris or rubble from previous site structures and/or filling activities.
- **Import structural fill:** Gravel Borrow, as described in Section 9-03.14(1) of the *2022 WSDOT Standard Specifications*, is a suitable source of import structural fill. During periods of wet weather, the fines content should not exceed 5 percent, based on the minus $\frac{3}{4}$ -inch fraction.
- **Fill placement and compaction:** Structural fill should be placed on an approved subgrade that consists of uniformly firm, unyielding, inorganic native soils or of compacted structural fill extending to such soils. Structural fill should be placed and compacted in accordance with the requirements in Section 2-03.3(14)C, Method C of the *2022 WSDOT Standard Specifications*. Method A is appropriate for non-structural areas, such as landscaping. Each layer of structural fill should be compacted to at least 95 percent of the maximum dry density, determined in accordance with the compaction control tests in Section 2-03.3(14)D of the *2022 WSDOT Standard Specifications*. Alternatively, the maximum dry density can be determined using ASTM standard test method D1557.
- **Construction dewatering:** Temporary excavations should be dewatered to allow construction to be completed in the dry. Where groundwater seepage is encountered, conventional sumps

and pumps should be sufficient to dewater excavations. Rapid groundwater seepage encountered in several of the explorations suggests that required pumping efforts may be significant. The contractor should be responsible for the design, monitoring, and maintenance of any dewatering systems.

- **Temporary slopes:** Temporary excavations should be completed in accordance with Section 2-09 of the *2022 WSDOT Standard Specifications*. The contractor should be responsible for actual excavation configurations and the maintenance of safe working conditions, including temporary excavation stability. Temporary excavations in excess of 4 ft should be shored or sloped in accordance with the requirements outlined in Safety Standards for Construction Work, Part N (Washington Administrative Code Chapter 296-155). The soil likely to be exposed in the excavations should be considered Type C, with a maximum allowable excavation inclination of 1½H:1V. All applicable local, state, and federal safety codes should be followed.
- **Permanent slopes:** Permanent cut or fill slopes should be no steeper than 2H:1V. This design recommendation does not apply to stormwater pond slopes, which are typically 3H:1V or flatter. Stormwater pond slopes should be designed in accordance with local stormwater codes. Permanent and temporary slopes should be protected from erosion and reseeded or revegetated as soon as practical.

Construction Monitoring

Monitoring, testing, and consultation should be provided during construction to confirm that site conditions are consistent with those observed in Landau's explorations and to provide expedient recommendations should conditions differ from those anticipated. Monitoring will also allow Landau to evaluate construction activities for compliance with the project plans and specifications and the recommendations herein. Activities include evaluation of fill material; compaction testing of structural fill; and preparation of slab, pavement, and structural foundation subgrades. Landau would be pleased to provide construction monitoring services.

Use of This Technical Memorandum

Landau Associates has prepared this technical memorandum for the exclusive use of GMD Land Company LLC and JSA Civil, LLC for specific application to the Napavine Truck Stop project in Napavine, Washington. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Reuse of the information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that, within the limitations of scope, schedule, and budget, its services have been provided in a manner consistent with that level of skill and care ordinarily exercised by members of the profession currently practicing in the same locality, under similar conditions as this project. Landau Associates makes no other warranty, either express or implied.

Closing

We trust that this memorandum provides you with the information needed to proceed. If you have questions or comments, or if we can be of further service, please contact Lance Levine at 360.791.3178 or at llevine@landauinc.com.

LANDAU ASSOCIATES, INC.

Lance Levine, PE
Senior Engineer



Calvin McCaughan, PE
Principal

LGL/CAM/tac

[\\OLYMPIA1\PROJECTS\2045\001.010\R\NAPAVINE TRUCK STOP TECHNICAL MEMORANDUM 4.7.2022.DOCX]

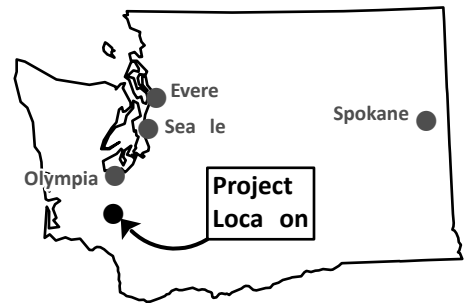
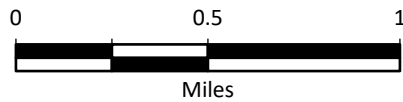
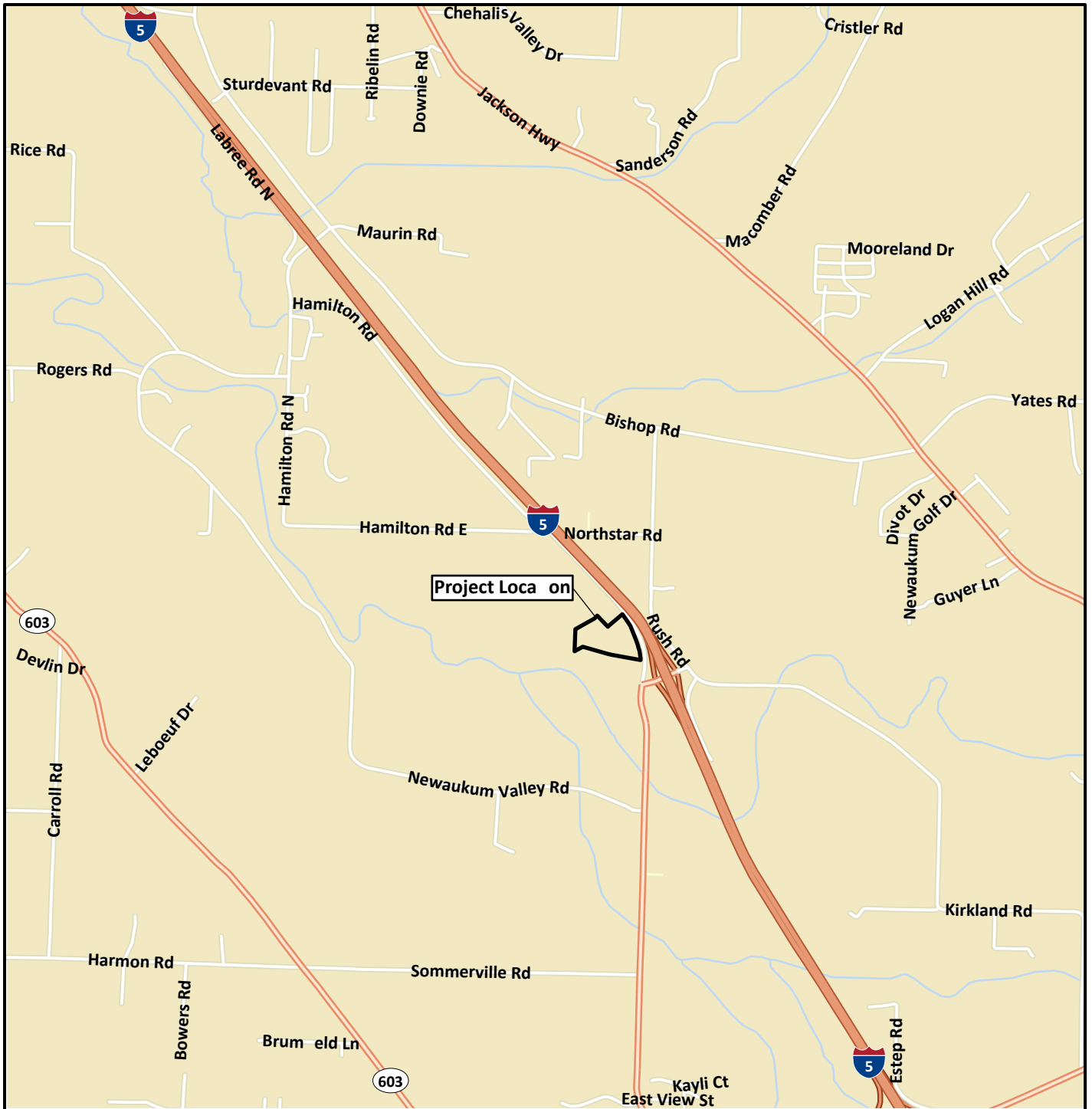
Attachments: Figure 1. Vicinity Map
Figure 2. Site and Exploration Location Plan
Figure 3. Soil Classification System and Key
Figures 4–6. Logs of Borings B-1 through B-3
Figures 7–12. Logs of Test Pits TP-1 through TP-6
Figures 13 and 14. Grain Size Distribution
Figure 15. Plasticity Chart

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Data Source: Esri.

Napavine Truck Stop
Napavine, Washington

Vicinity Map

Figure
1

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Legend

- B-1** Approximate Boring Location and Designation
- TP-1** Approximate Test Pit Location and Designation
- (3') Approximate Depth to Soils Suitable for Shallow Foundation Support
- Approximate Area Suitable for Shallow Foundation Support



Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Maps 2022

Napavine Truck Stop
Napavine, Washington

Site and Exploration Location Plan

Figure **2**

Soil Classification System

	MAJOR DIVISIONS	CLEAN GRAVEL (Little or no fines)	GRAPHIC SYMBOL	LETTER SYMBOL ⁽¹⁾	TYPICAL DESCRIPTIONS ⁽²⁾⁽³⁾
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GP GM GC	Poorly graded gravel; gravel/sand mixture(s); little or no fines Silty gravel; gravel/sand/silt mixture(s) Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SP	Poorly graded sand; gravelly sand; little or no fines
				SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)		ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity	
			CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay	
			OL	Organic silt; organic, silty clay of low plasticity	
	SILT AND CLAY (Liquid limit greater than 50)		MH	Inorganic silt; micaceous or diatomaceous fine sand	
			CH	Inorganic clay of high plasticity; fat clay	
			OH	Organic clay of medium to high plasticity; organic silt	
	HIGHLY ORGANIC SOIL		PT	Peat; humus; swamp soil with high organic content	

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

- Notes:
- USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
 - Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
 - Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:
 - Primary Constituent: > 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
 - Secondary Constituents: > 30% and < 50% - "very gravelly," "very sandy," "very silty," etc.
> 15% and < 30% - "gravelly," "sandy," "silty," etc.
 - Additional Constituents: > 5% and < 15% - "with gravel," "with sand," "with silt," etc.
< 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.
 - Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

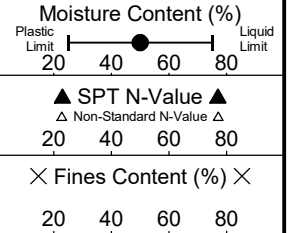
Drilling and Sampling Key		Field and Lab Test Data	
SAMPLER TYPE	SAMPLE NUMBER & INTERVAL	Code	Description
Code	Description		
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon	PP = 1.0	Pocket Penetrometer, tsf
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon	TV = 0.5	Torvane, tsf
c	Shelby Tube	PID = 100	Photoionization Detector VOC screening, ppm
d	Grab Sample	W = 10	Moisture Content, %
e	Single-Tube Core Barrel	D = 120	Dry Density, pcf
f	Double-Tube Core Barrel	-200 = 60	Material smaller than No. 200 sieve, %
g	2.50-inch O.D., 2.00-inch I.D. WSDOT	GS	Grain Size - See separate figure for data
h	3.00-inch O.D., 2.375-inch I.D. Mod. California	AL	Atterberg Limits - See separate figure for data
i	Other - See text if applicable	GT	Other Geotechnical Testing
1	300-lb Hammer, 30-inch Drop	CA	Chemical Analysis
2	140-lb Hammer, 30-inch Drop		
3	Pushed		
4	Vibrocore (Rotasonic/Geoprobe)		
5	Other - See text if applicable		
Groundwater			
			Approximate water level at time of drilling (ATD)
			Approximate water level at time after drilling/excavation/well

B-1

LAI Project No: 2045001.010

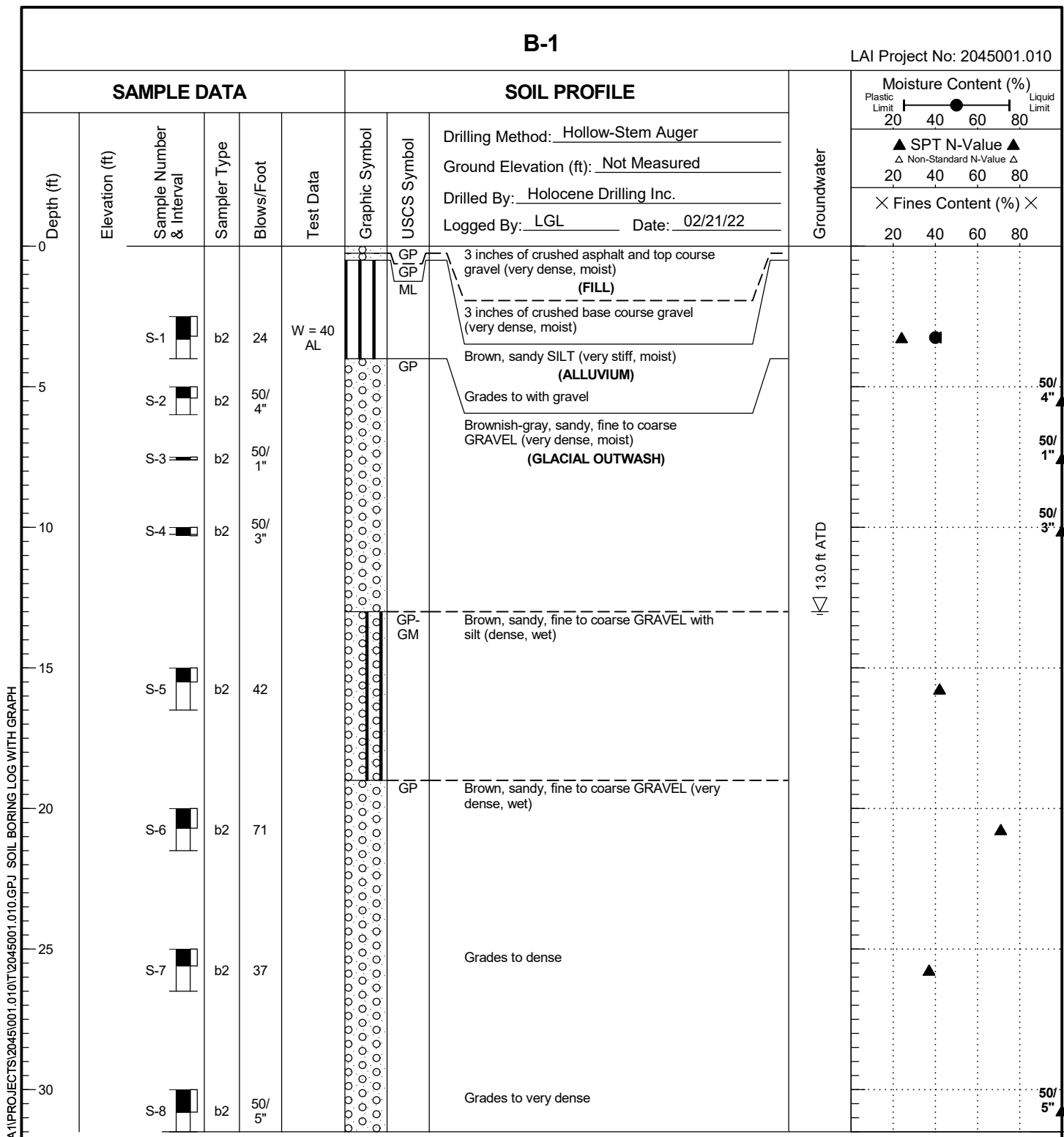
SAMPLE DATA

SOIL PROFILE



Drilling Method: Hollow-Stem Auger
 Ground Elevation (ft): Not Measured
 Drilled By: Holocene Drilling Inc.
 Logged By: LGL Date: 02/21/22

Groundwater



Boring Completed 02/21/22
 Total Depth of Boring = 31.5 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2045001.01 4/7/22 \NOLYMPIA\PROJECTS\2045001.010\T\2045001.010.GPJ SOIL BORING LOG WITH GRAPH



Napavine Truck Stop
 Napavine, Washington

Log of Boring B-1

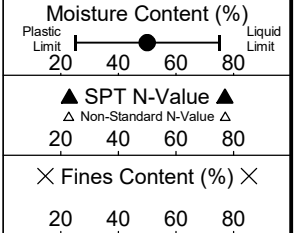
Figure
4

B-2

LAI Project No: 2045001.010

SAMPLE DATA

SOIL PROFILE



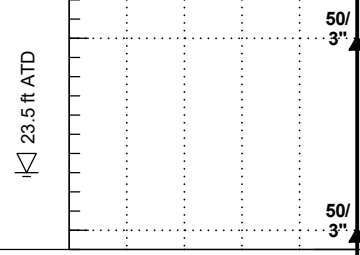
Drilling Method: Hollow-Stem Auger
 Ground Elevation (ft): Not Measured
 Drilled By: Holocene Drilling Inc.
 Logged By: LGL Date: 02/21/22

Groundwater

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045001.010\T\2045001.010.GPJ SOIL BORING LOG WITH GRAPH

Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description
0						SM	2 inches of sod and topsoil (TOPSOIL)
~1	S-1	b2	7	W = 22 -200 = 60		ML	Brown, silty, fine to coarse SAND with gravel (loose, moist) (FILL) Light brown, sandy SILT (medium stiff, moist)
~2	S-2	b2	11	W = 34		ML	Reddish-brown, very sandy SILT with small weathered pieces (medium stiff, moist) (ALLUVIUM) Grades to sandy Grades to very soft
~3	S-3	b2	1	W = 31			
~4	S-4	b2	0	W = 50 -200 = 62 AL			Grades to very sandy Grades to bluish-gray and brown
~14	S-5	b2	51			GP	Brownish-gray, sandy, fine to coarse GRAVEL (very dense, moist) (GLACIAL OUTWASH)
~20	S-6	b2	50/3"				Grades to moist to wet
~25	S-7	b2	50/3"				Grades to wet

▽ 23.5 ft ATD



Boring Completed 02/21/22
 Total Depth of Boring = 25.5 ft.

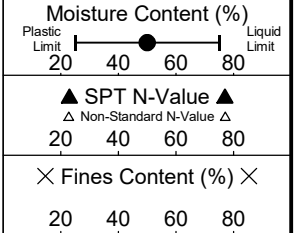
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

B-3

LAI Project No: 2045001.010

SAMPLE DATA

SOIL PROFILE



Drilling Method: Hollow-Stem Auger
 Ground Elevation (ft): Not Measured
 Drilled By: Holocene Drilling Inc.
 Logged By: LGL Date: 02/21/22

Groundwater

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045001.010\1\2045001.010.GPJ SOIL BORING LOG WITH GRAPH

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description
0							SM	2 inches of sod and topsoil (TOPSOIL)
0 - 8		S-1	b2	8			ML	Brown, silty, fine to coarse SAND with gravel (loose, moist) (FILL) Brown, sandy SILT with gravel (stiff, moist) (ALLUVIUM)
8 - 12		S-2	b2	12	W = 18			
12 - 59		S-3	b2	59			GP-GM	Reddish-brown, sandy, fine to coarse GRAVEL with silt (very dense, moist) (GLACIAL OUTWASH) Grades to medium dense
59 - 28		S-4	b2	28				
28 - 26		S-5	b2	26				
26 - 38		S-6	b2	38			GP	Brown, sandy, fine to coarse GRAVEL (dense, moist to wet) Grades to wet
38 - 53		S-7	b2	53				Grades to very dense

22.5 ft ATD

Boring Completed 02/21/22
 Total Depth of Boring = 26.5 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.



Napavine Truck Stop
 Napavine, Washington

Log of Boring B-3

Figure
6

TP-1

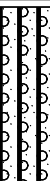




SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
0						ML	1 inch of sod Brown, sandy SILT (soft, moist) (ALLUVIUM)
2		S-1	d				Moderate seepage at 1.8 ft Grades to wet
4							▽ ATD
6		S-2	d			GP	Brown, sandy, fine to coarse GRAVEL with cobbles (dense, wet) (GLACIAL OUTWASH)

Test Pit Completed 03/03/22
Total Depth of Test Pit = 7.0 ft.

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045\001.01\01\2045001.010.GPJ SINGLE TEST PIT LOG

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

TP-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
0						GM	1 inch of sod
0 - 2		S-1	d	W = 12 GS		GM	Brown, sandy, silty, fine to medium GRAVEL with brick, asphalt, concrete, and rubber debris (medium dense, moist) (FILL) Slow seepage at 1.7 ft Slow seepage at 2.6 ft Grades to mottled Moderate caving from 4 to 12 ft
2 - 6		S-2	d	W = 27 AL		CL	Gray CLAY with residual grass layer (very stiff, moist)
6 - 8						SM	Dark brown to black, silty, fine to medium SAND (loose to medium dense, moist) (TOPSOIL)
8 - 14		S-3	d			ML	Mottled brown SILT (stiff, moist) (ALLUVIUM)
10 - 14		S-4	d				
							▽ ATD

Test Pit Completed 03/03/22
Total Depth of Test Pit = 13.5 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045\001.01\01\2045001.010.GPJ SINGLE TEST PIT LOG

TP-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
0						SM	2 inches of sod
0 - 5.5		S-1	d		[Dotted Pattern]	SM	Brown, silty, fine to medium SAND with gravel (loose, moist) (FILL) Grades to light brown, without gravel, and medium dense Grades to mottled
5.5 - 6.3		S-2	d	W = 38 GS	[Dotted Pattern]	SM	Dark brown, silty, gravelly, fine to medium SAND (medium dense, moist) (TOPSOIL)
6.3 - 7.5					[Dotted Pattern]	ML	Slow seepage at 6.3 ft
7.5 - 10.5		S-3	d	W = 41 AL	[Dotted Pattern]	ML	Mottled brown SILT with sand (medium stiff, moist) (ALLUVIUM) Rapid seepage at 7 ft
10.5 - 11.5		S-4	d		[Dotted Pattern]		Grades to wet
Test Pit Completed 03/03/22 Total Depth of Test Pit = 11.5 ft.							
Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions. 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.							

2045001.01 4/7/22 \NOLYMPIA\PROJECTS\2045\001\010\TP\2045001.010.GPJ SINGLE TEST PIT LOG

TP-4

SAMPLE DATA				SOIL PROFILE		GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol
0						
						Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
						2 inches of sod Brown, silty, fine to medium SAND (loose, moist) (TOPSOIL)
		S-1	d	W = 34 AL		ML Reddish-brown, sandy SILT (stiff, moist) (ALLUVIUM) Slow seepage at 3.2 ft
		S-2	d	W = 18 GS		GM Reddish-brown, silty, sandy, fine to coarse GRAVEL with silt and cobbles (dense, moist) (GLACIAL OUTWASH) Minor caving from 5 to 9 ft Grades to wet Rapid seepage at 6 ft
						▽ ATD

Test Pit Completed 03/03/22
Total Depth of Test Pit = 9.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045\001.01\01\2045001.010.GPJ SINGLE TEST PIT LOG

TP-5

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	
0							Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
							4 inches of sod
						GP	Dark brown, 3-inch minus crushed gravel (medium dense, moist)
						ML	(FILL) Brown, very sandy SILT (soft, moist) (TOPSOIL)
2		S-1	d	W = 46 GS			
4		S-2	d	W = 53 AL		ML	Light brown SILT with sand, gravel, and cobbles (stiff, moist) (ALLUVIUM)
6		S-3	d	W = 11 GS		GP	Reddish-brown, sandy, fine to coarse GRAVEL with cobbles (dense, moist) (GLACIAL OUTWASH) Minor caving from 6 to 9 ft
8							Grades to gray Grades to wet Rapid seepage at 9 ft
10							▽ ATD

Test Pit Completed 03/03/22
Total Depth of Test Pit = 10.5 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2045001.01 4/7/22 \NOLYMPIA\1\PROJECTS\2045\001\010\TP-5\2045001.010.GPJ SINGLE TEST PIT LOG

TP-6

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	
0							Excavation Method: <u>Tracked Excavator</u> Ground Elevation (ft): <u>Not Measured</u> Excavated By: <u>Howards Const. & Excvtg.</u> Logged By: <u>LGL</u>
0 - 2		S-1	d	W = 42 GS		GP	3-inch minus crushed gravel (dense, moist) (FILL)
2 - 3.5						ML	Brown, very sandy SILT (medium stiff, moist) (ALLUVIUM) Minor caving from 2 to 6 ft
3.5 - 9.5		S-2	d	W = 10 GS		GW	Reddish-brown, sandy, fine to coarse GRAVEL with cobbles (dense, moist) (GLACIAL OUTWASH) Moderate seepage at 5 ft Grades to very dense and wet

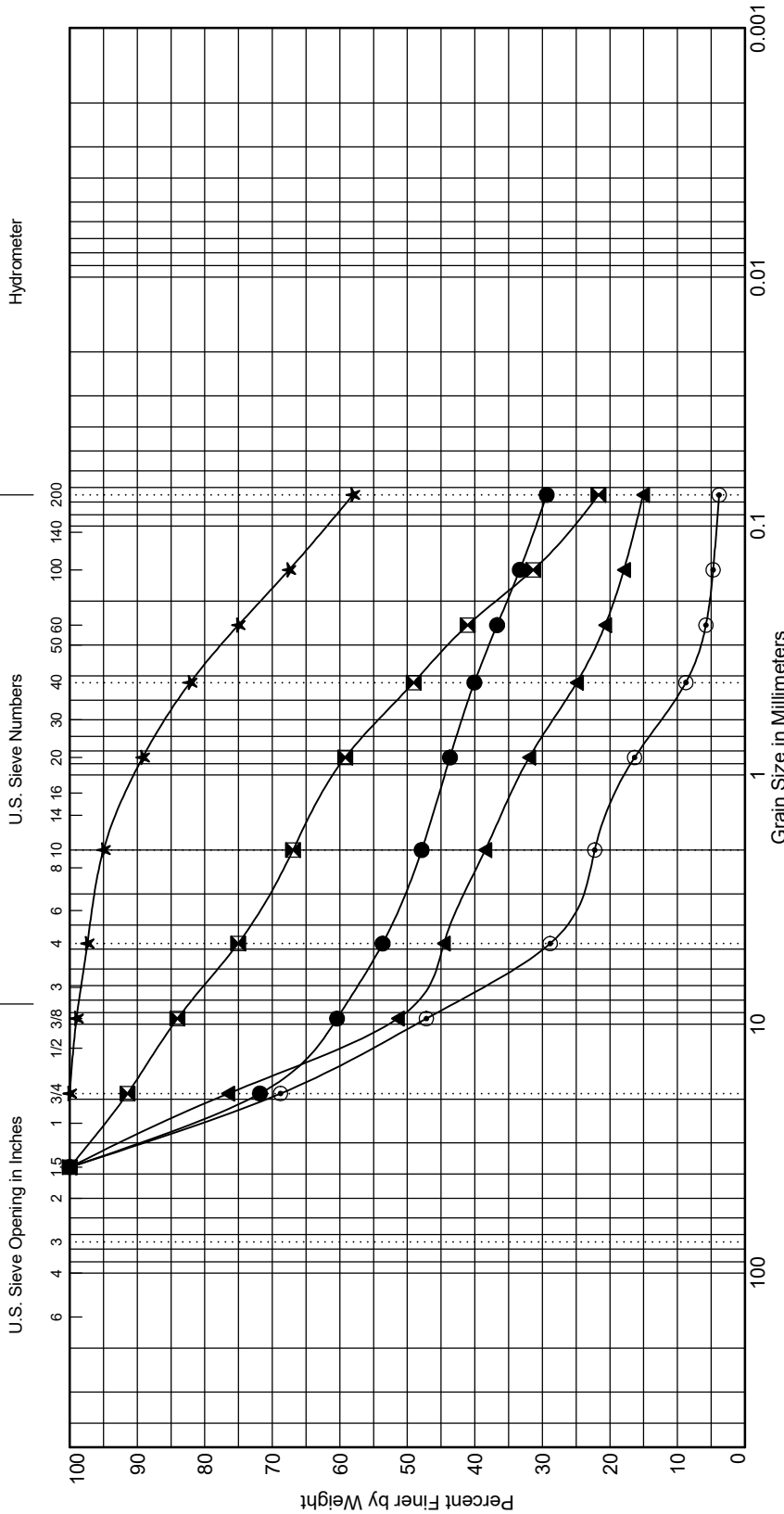
Test Pit Completed 03/03/22
Total Depth of Test Pit = 9.5 ft.

▽ ATD

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2045001.01 4/7/22 \\OLYMPIA\1\PROJECTS\2045\001\010\T\2045001.010.GPJ SINGLE TEST PIT LOG

2045001.01 4/7/22 \\OLYMPIA\PROJECTS\2045001.01\T\2045001.010.GPJ GRAIN SIZE FIGURE

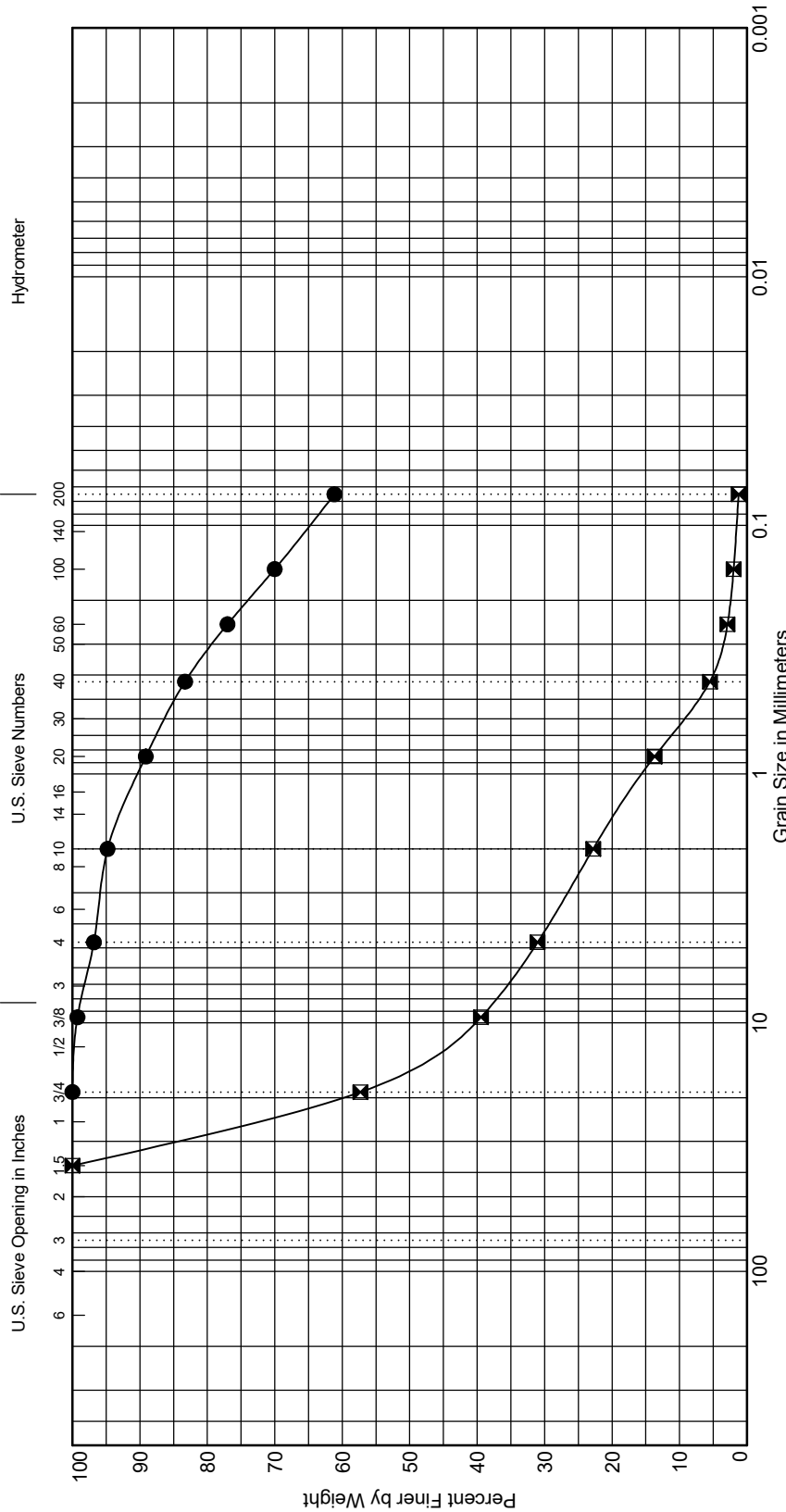


Cobbles	Gravel		Sand			Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine		

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	TP-2	S-1	1.5	12	Sandy, silty, fine to coarse GRAVEL	GM
⊠	TP-3	S-2	5.5	38	Silty, gravelly, fine to coarse SAND	SM
▲	TP-4	S-2	4.5	18	Silty, sandy, fine to coarse GRAVEL	GM
★	TP-5	S-1	2.0	46	Very sandy SILT	ML
⊙	TP-5	S-3	5.5	11	Sandy, fine to coarse GRAVEL	GP

Figure 13
Grain Size Distribution
Napavine Truck Stop
Napavine, Washington

2045001.01 4/7/22 \\OLYMPIA\PROJECTS\2045001.01\T\2045001.010.GPJ GRAIN SIZE FIGURE



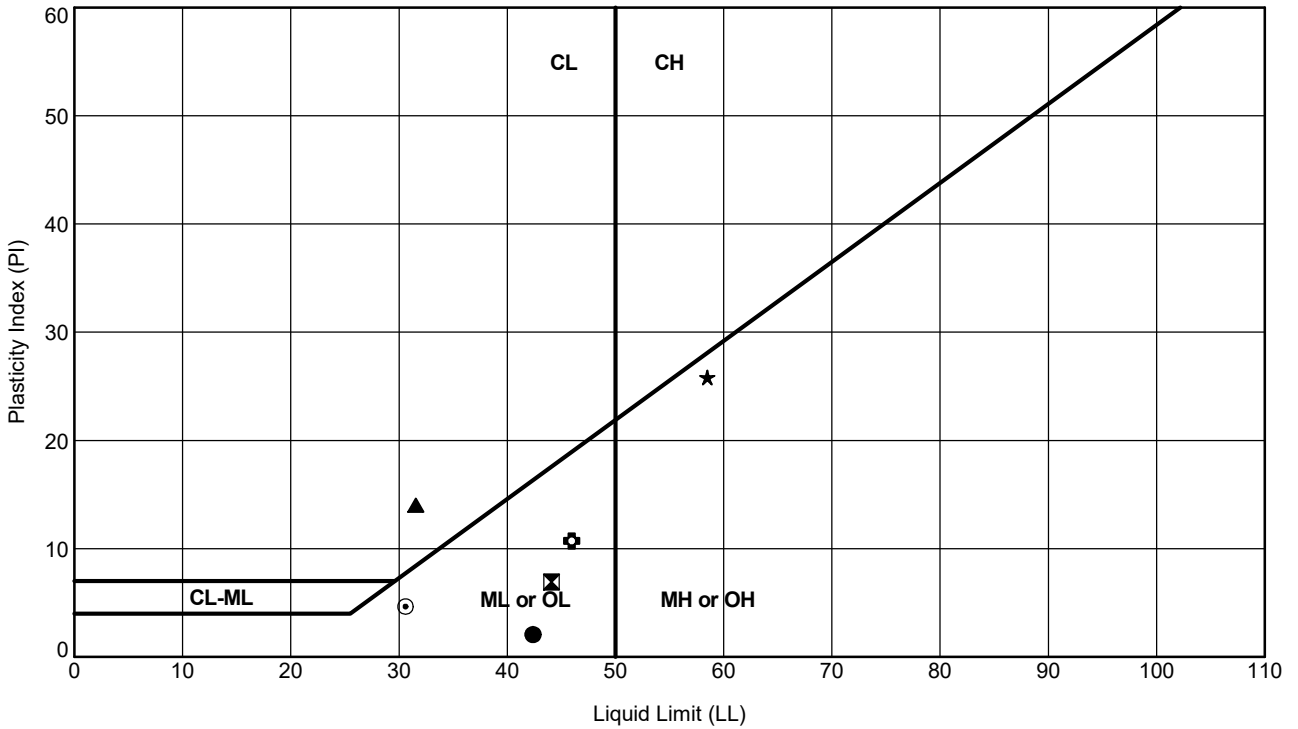
Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	TP-6	S-1	2.0	42	Very sandy SILT	ML
⊠	TP-6	S-2	5.0	10	Sandy, well-graded GRAVEL	GW

Napavine Truck Stop
Napavine, Washington

Grain Size Distribution

Figure 14



ATTERBERG LIMIT TEST RESULTS

Symbol	Exploration Number	Sample Number	Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-1	S-1	2.5	42	40	2	40	Sandy SILT	ML
⊠	B-2	S-4	10.0	44	37	7	50	Very sandy SILT	ML
▲	TP-2	S-2	5.0	32	18	14	27	CLAY	CL
★	TP-3	S-3	7.5	58	33	25	41	Elastic SILT	MH
⊙	TP-4	S-1	3.0	31	26	5	34	Sandy SILT	ML
⊕	TP-5	S-2	4.0	46	35	11	53	SILT with sand	ML

ASTM D 4318 Test Method

2045001.01 4/7/22 \\OLYMPIA\PROJECTS\2045001.01\01\2045001.010.GPJ ATTERBERG LIMITS FIGURE



APPENDIX 6

OPERATIONS AND MAINTENANCE MANUAL



APPENDIX 7

CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN



APPENDIX 8

FEMA FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette



122°54'52"W 46°36'36"N

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

Legend

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 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*

OTHER AREAS

- Area of Minimal Flood Hazard *Zone X*
- Effective LOMR
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/9/2022 at 5:19 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

EXHIBIT 3



Basemap: USGS National Map; Data refreshed October, 2020



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Lewis County Washington (Unincorporated Areas)	NO PROJECT	FLOODWAY HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 530102		
IDENTIFIER	City of Napavine Flood Map Revision	APPROXIMATE LATITUDE & LONGITUDE: 46.649, -122.994 SOURCE: Other DATUM: NAD 83	
ANNOTATED MAPPING ENCLOSURES		ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM* NO.: 5301021781C DATE: July 17, 2006 TYPE: FIRM NO.: 5301021782C DATE: July 17, 2006		DATE OF EFFECTIVE FLOOD INSURANCE STUDY: July 17, 2006 PROFILES: 32P, 33P, 33P(a) FLOODWAY DATA TABLE: 9	

Enclosures reflect changes to flooding sources affected by this revision.

* FIRM - Flood Insurance Rate Map

FLOODING SOURCE & REVISED REACH

Newaukum River - From approximately 3,800 feet downstream of Rush Road to approximately 7,600 feet upstream of Kirkland Road

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Newaukum River	Zone AE	Zone AE	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	BFEs*	BFEs	YES	YES
	Floodway	Floodway	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 530254 **Name:** City of Napavine, Washington

AFFECTED MAP PANELS

TYPE: FIRM NO.: 5302541781A DATE: July 17, 2006
TYPE: FIRM NO.: 5302541782A DATE: July 17, 2006

AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT

DATE OF EFFECTIVE FLOOD INSURANCE STUDY: July 17, 2006
PROFILE: 01P
FLOODWAY DATA TABLE: 4

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

A handwritten signature in black ink, appearing to read "Luis Rodriguez".

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Mark Carey
Director, Mitigation Division
Federal Emergency Management Agency, Region X
Federal Regional Center
130 228th Street, Southwest
Bothell, WA 98021-8627
(425) 487-4682

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a revised FIRM and FIS report for Lewis County in our countywide format; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the countywide FIRM and FIS report, which present information from the effective FIRMs and FIS reports for your community and other incorporated communities in Lewis County, were submitted to your community for review on November 11, 2010. We will incorporate the modifications made by this LOMR into the countywide FIRM and FIS report before they become effective.

report before they become effective. This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

A handwritten signature in black ink, appearing to read "Luis Rodriguez".

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

FLOODING SOURCE		FLOODWAY				BASE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE	
NEWAUKUM RIVER									
A	358	1,016	7,353	1.5	182.9	182.9	183.9	1.0	
B	2,830	2,322	26,633	0.4	183.1	183.1	184.1	1.0	
C	5,371	2,446	23,184	0.5	183.3	183.3	184.3	1.0	
D	8,228	400	3,507	3.1	183.3	183.3	184.3	1.0	
E	10,111	1,150	10,167	1.1	184.7	184.7	185.6	0.9	
F	12,534	526	4,258	2.6	185.1	185.1	186.1	1.0	
G	14,375	120	1,576	6.9	186.7	186.7	187.7	1.0	
H	16,215	841	4,605	2.4	189.8	189.8	190.7	0.9	
I	17,465	353	2,823	3.9	191.2	191.2	192.1	0.9	
J	19,249	780	4,527	2.4	193.7	193.7	194.7	1.0	
K	20,599	626	3,641	3.0	196.8	196.8	197.8	1.0	
L	23,928	940	6,376	1.7	200.2	200.2	201.2	1.0	
M	24,782	182	1,752	6.2	200.6	200.6	201.6	1.0	
N	25,192	188	1,939	5.6	201.5	201.5	202.5	1.0	
O	25,398	215	2,506	4.4	202.5	202.5	203.4	0.9	
P	26,488	700	3,941	2.9	204.0	204.0	204.7	0.7	
Q	27,875	842	4,718	2.7	205.4	205.4	206.4	1.0	
R	29,577	1,235	5,961	2.2	207.0	207.0	208.1	1.1	
S	30,989	274	2,010	6.6	208.6	208.6	209.5	0.9	
T	32,798	570	3,341	4.0	213.0	213.0	214.0	1.0	
U	35,349	620	4,271	3.1	216.6	216.6	217.6	1.0	
V	37,481	360	2,630	5.0	219.3	219.3	220.2	0.9	
W	39,348	770	2,597	5.1	223.8	223.8	224.3	0.5	
X	39,988	528	2,331	5.7	226.4	226.4	226.7	0.3	
Y	40,788	438	2,374	5.6	228.0	228.0	228.5	0.5	
Z	41,332	497	3,012	4.4	229.8	229.8	230.7	0.9	

¹Stream distance in feet above confluence with Chehalis River

REVISED DATA

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY
LEWIS COUNTY, WA
 UNINCORPORATED AREAS

FLOODWAY DATA

NEWAUKUM RIVER

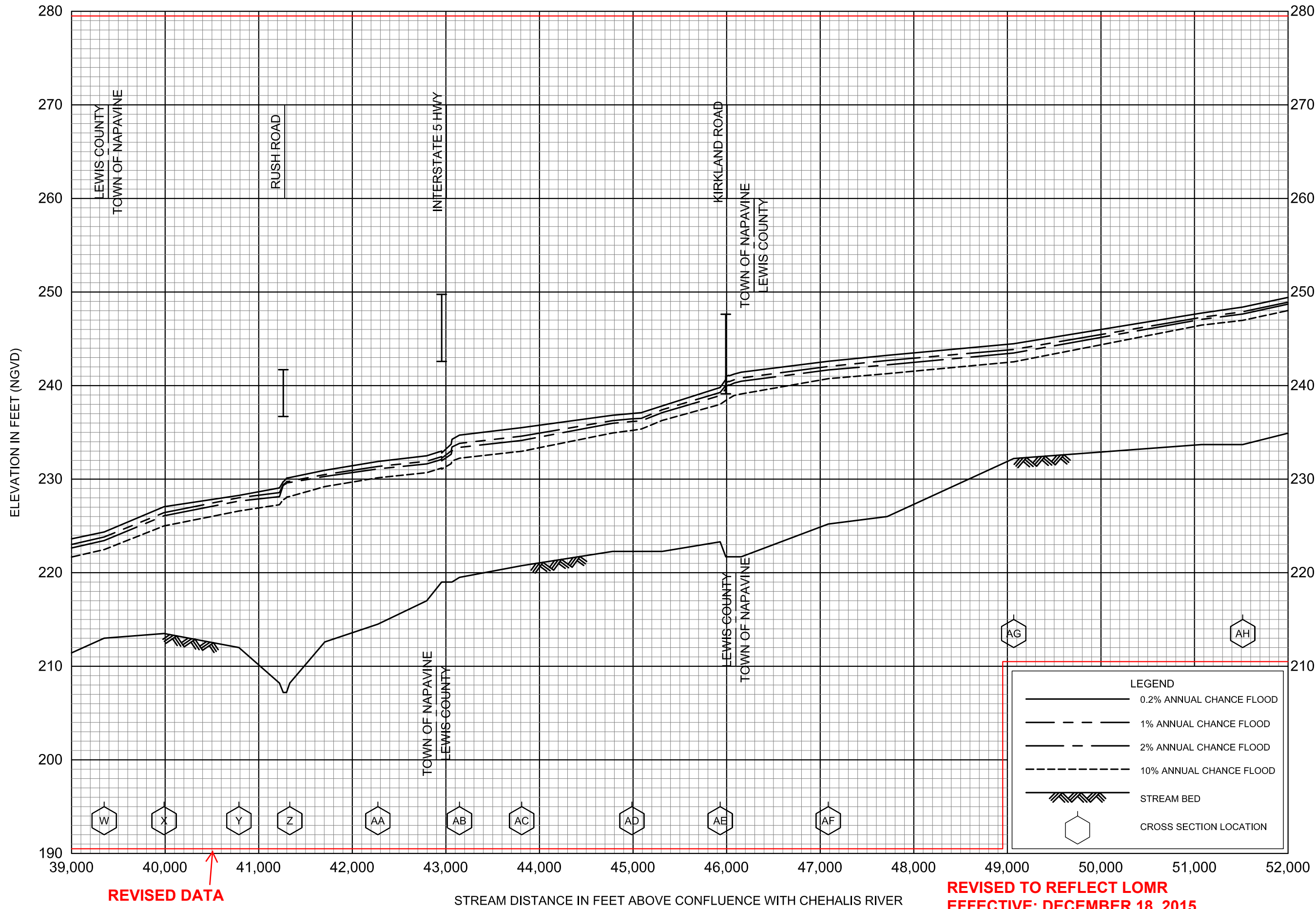
REVISED TO REFLECT LOMR EFFECTIVE: DECEMBER 18, 2015

FLOODING SOURCE		FLOODWAY				BASE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE	
NEWAUKUM RIVER (CONTINUED)									
AA	42,273	347	2,847	4.6	231.4	231.4	232.1	0.7	
AB	43,145	342	3,449	3.8	233.8	233.8	234.4	0.5	
AC	43,810	915	3,851	3.4	234.6	234.6	235.3	0.7	
AD	44,988	844	3,663	3.6	236.4	236.4	237.0	0.6	
AE	45,931	702	2,197	6.0	239.3	239.3	239.7	0.4	
AF	47,086	916	6,333	2.1	242.0	242.0	242.6	0.6	
AG	49,068	1,240	3,568	3.7	243.9	243.9	244.7	0.8	
AH	51,515	891	4,728	2.8	247.9	247.9	248.7	0.8	
AI	53,549	550	2,924	4.5	252.2	252.2	253.1	0.9	
AJ	56,409	1,049	4,553	2.9	258.3	258.3	258.8	0.5	
AK	58,587	1,100	3,913	3.4	261.7	261.7	262.7	1.0	

↑
REVISED DATA

¹ Stream distance in feet above confluence with Chehalis River

TABLE 9 FEDERAL EMERGENCY MANAGEMENT AGENCY LEWIS COUNTY, WA UNINCORPORATED AREAS	FLOODWAY DATA NEWAUKUM RIVER
--	---



REVISED DATA

REVISED TO REFLECT LOMR
EFFECTIVE: DECEMBER 18, 2015

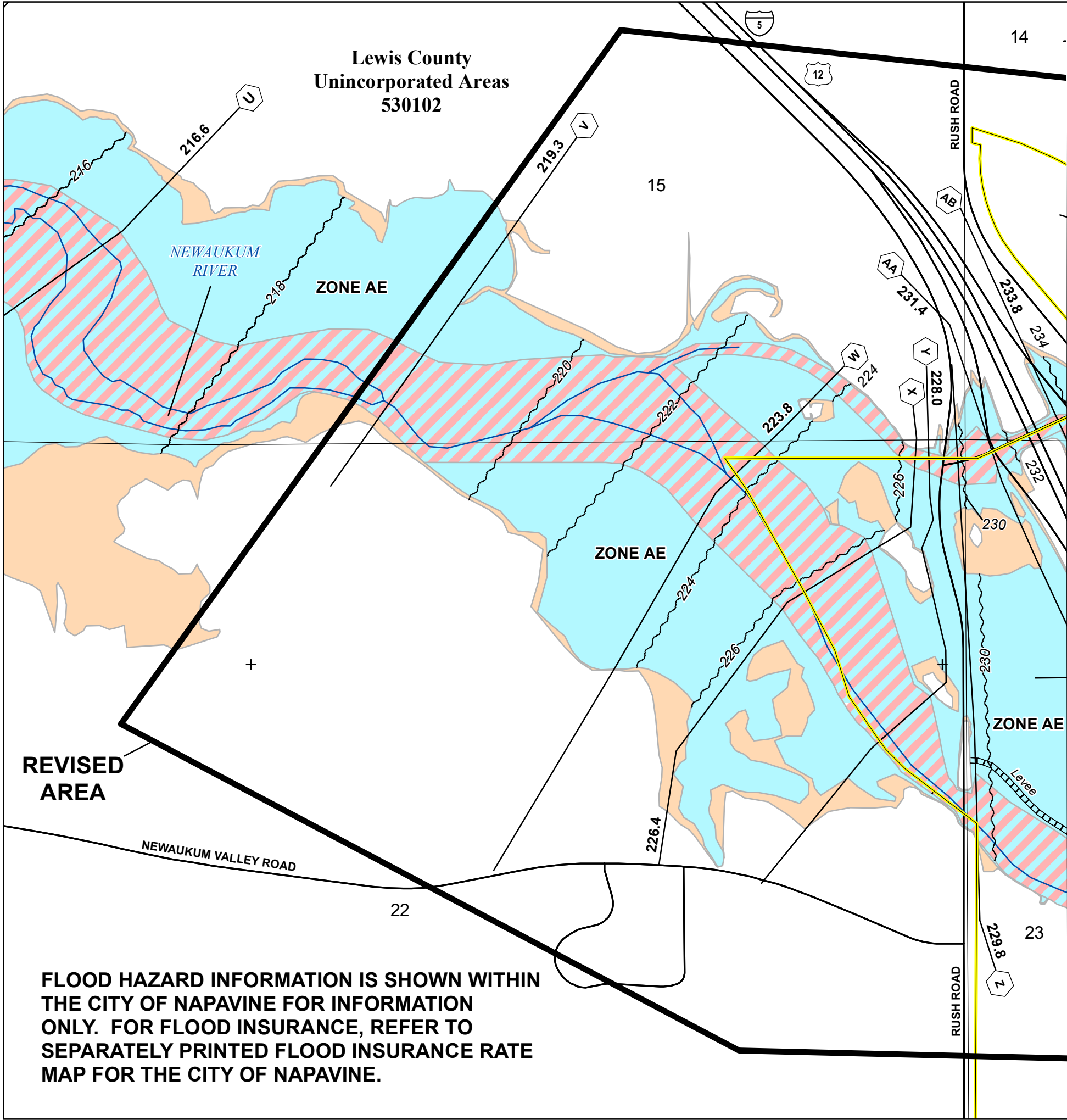
FLOOD PROFILES
NEWAUKUM RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
LEWIS COUNTY, WA
(UNINCORPORATED AREAS)

Lewis County
Unincorporated Areas
530102

City of
Napavine
530254

City of
Napavine
530254



SPECIAL FLOOD HAZARD AREAS

- 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

OTHER AREAS OF FLOOD HAZARD

SCALE

Map Projection:
NAD 1983 UTM Zone 10N;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 1,000
Feet

0 70 140 280
Meters

FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

LEWIS COUNTY, WASHINGTON
(Unincorporated Areas)

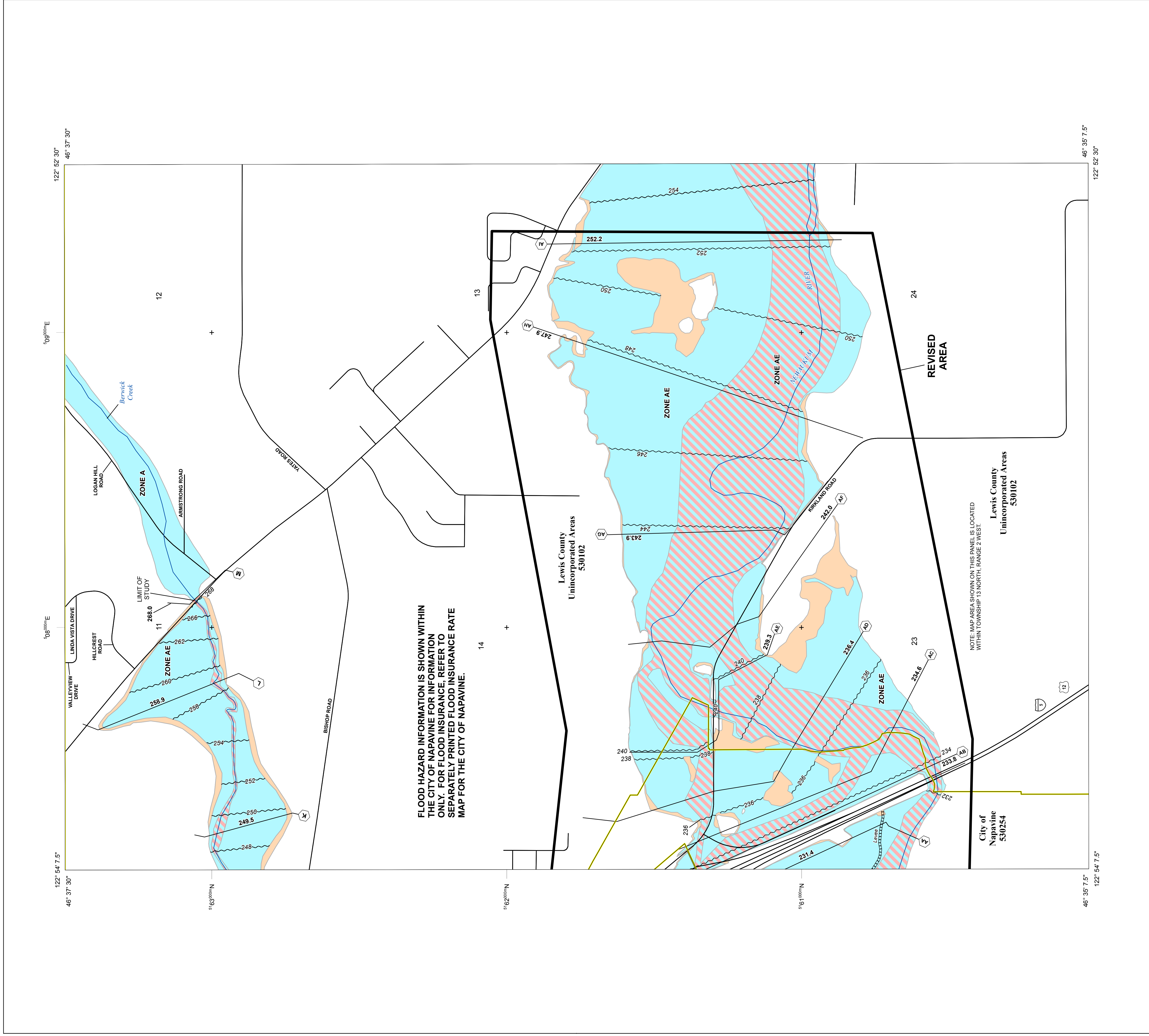
PANEL **1781** OF **2500**

Panel Contains:
COMMUNITY NUMBER PANEL SUFFIX
LEWIS COUNTY 530102 1781 C

**REVISED TO REFLECT
LOMR EFFECTIVE:
DECEMBER 18, 2015**

FLOOD HAZARD INFORMATION IS SHOWN WITHIN THE CITY OF NAPAVINE FOR INFORMATION ONLY. FOR FLOOD INSURANCE, REFER TO SEPARATELY PRINTED FLOOD INSURANCE RATE MAP FOR THE CITY OF NAPAVINE.

VERSION NUMBER
1.0.0.0
MAP NUMBER
5301021781C
EFFECTIVE DATE
July 17, 2006



FLOOD HAZARD INFORMATION IS SHOWN WITHIN THE CITY OF NAPAVINE FOR INFORMATION ONLY. FOR FLOOD INSURANCE, REFER TO SEPARATELY PRINTED FLOOD INSURANCE RATE MAP FOR THE CITY OF NAPAVINE.

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 NORTH, RANGE 2 WEST.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP 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, AR
	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
	NO SCREEN
	Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
	Area of Undetermined Flood Hazard Zone D
	Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall
	Non-accredited Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

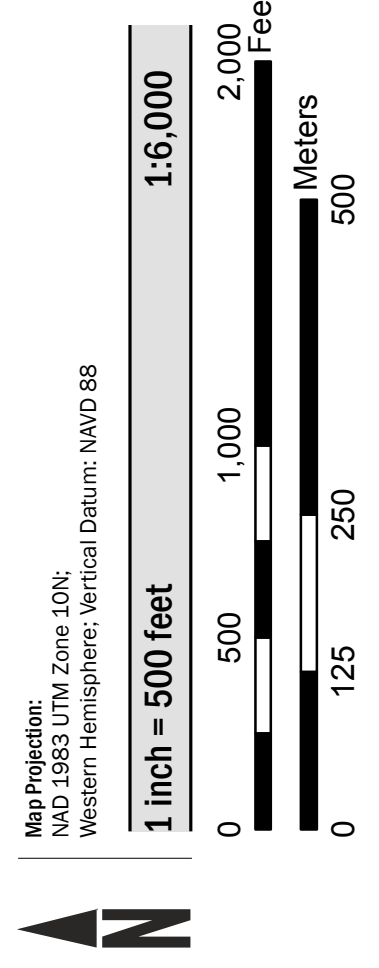
NOTES TO USERS

For information and questions about this map, available products associated with this FIRI including the National Flood Insurance Program (NFIP) Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) products, please visit the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-368-2627) or visit the FEMA Map Service Center website at <http://mex.fema.gov>. Available products may include, previously issued Letters of Map Change (LOMCs), Flood Insurance Study (FIS) reports, and Flood Insurance Rate Maps (FIRMs). LOMCs can be ordered or obtained directly from this website. Users may determine the current map date for each FIRI panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange. Communities annexing land on adjacent FIRI panels must obtain a current copy of the adjacent panel as well as the current FIRI index. These may be ordered directly from the Map Services Center at the number listed above. To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-358-6202. Base map information for this FIRI was provided by digital terrain data from the United States Geological Survey (USGS). This information was derived from digital topography at a 2-foot resolution from photography dated 2010.

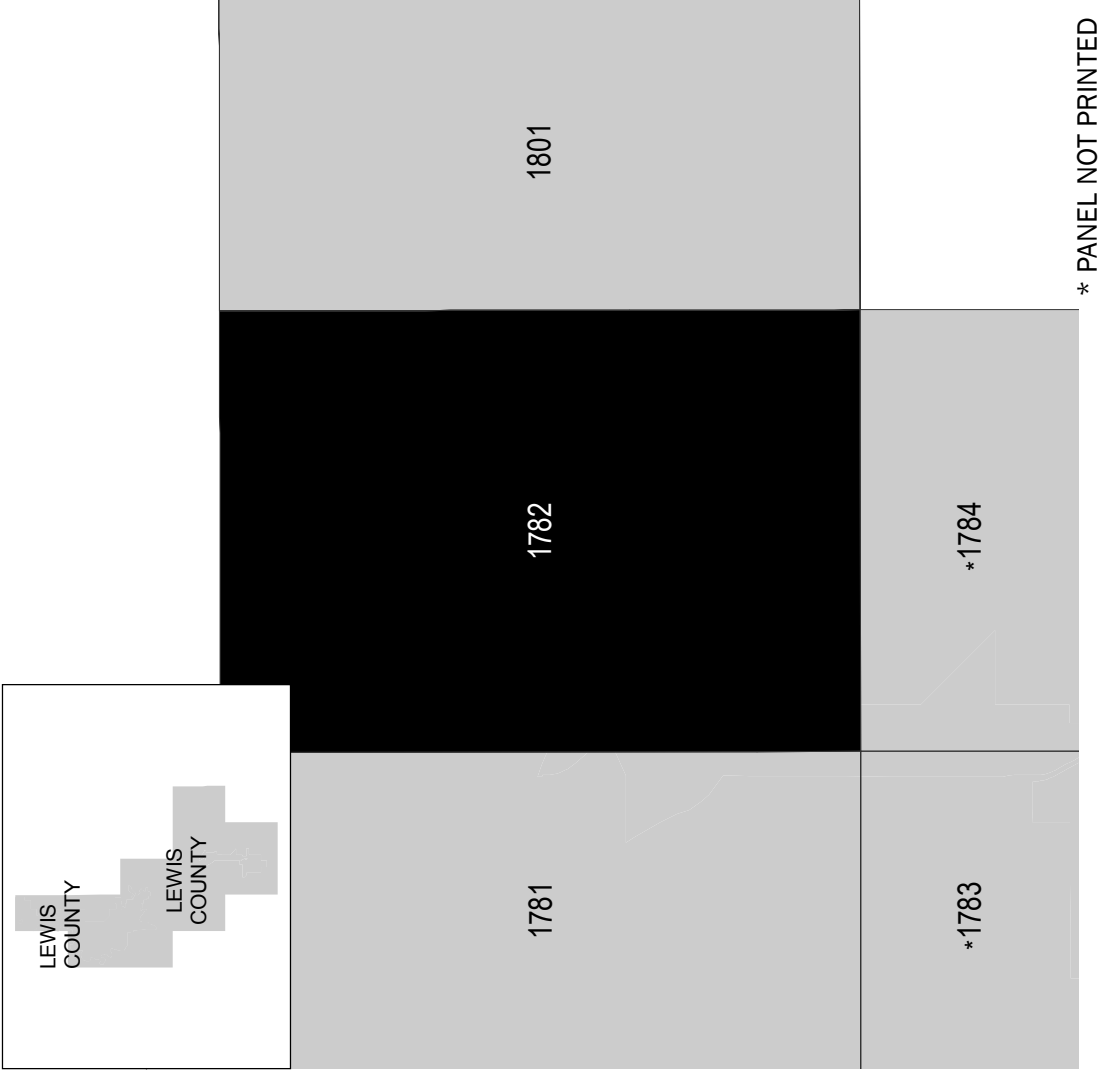
COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE
This map includes approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially damaged. For more information on the CBRS, please visit the FEMA website at http://www.fema.gov/habitatconservation/coastal_barrier.html, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

	CBRS Area
	Otherwise Protected Area

SCALE



PANEL LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
LEWIS COUNTY, WASHINGTON
(Unincorporated Areas)
PANEL 1782 of 2500

Panel Contains:
COMMUNITY LEWIS COUNTY
NUMBER 530102
PANEL SUFFIX 1782
C

REVISED TO REFLECT LOMR EFFECTIVE: DECEMBER 18, 2015

VERSION NUMBER EXHIBIT 3
1.0.0.0
MAP NUMBER 5301021782C
EFFECTIVE DATE July 17, 2006
* PANEL NOT PRINTED



APPENDIX 9

DESIGN CALCULATIONS AND COMPUTATIONS

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.58
Program License Number: 200810007
Project Simulation Performed on: 12-09-2022 3:12 PM
Report Generation Date: 12-09-2022 3:15 PM

Input File Name: 22-000419 TA Travel Stop Napavine - Bioretention_BAK.FLD
 Project Name: Napavine TA Travel Center
 Analysis Title: SPR Storm Design
 Comments: SCJ Project No.22-000419
 Dan Phillips
 2022-1122

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected

Full Period of Record Available used for Routing

Climatic Region Number: 17
 Precipitation Station : 96004805 Puget East 48 in_5min 10-01-1939-10-01-2097
 Evaporation Station : 961048 Puget East 48 in MAP

Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
 HSPF Parameter Region Name : Ecology Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	14.000	13.638
Area of Links that Include Precip/Evap (acres)	0.000	0.362
Total (acres)	14.000	14.000

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : Subbasin 1 -----

-----Area (Acres) -----

C, Forest, Flat 12.980

Subbasin Total 12.980

----- Subbasin : Buffer Enhancement Area -----

-----Area (Acres) -----

C, Forest, Flat 1.020

Subbasin Total 1.020

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 3

----- Subbasin : Buffer Enhancement Area -----

-----Area (Acres) -----

C, Pasture, Mod 1.020

 Subbasin Total 1.020

----- Subbasin : Subbasin 1 -----
 -----Area (Acres) -----
 C, Lawn, Flat 1.870
 ROOF TOPS/FLAT 0.840
 DRIVEWAYS/FLAT 9.120
 SIDEWALKS/FLAT 0.270
 POND 0.188

 Subbasin Total 12.288

----- Subbasin : Bypass Area -----
 -----Area (Acres) -----
 C, Lawn, Mod 0.330

 Subbasin Total 0.330

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED
 Number of Links: 1

Link Name: Predeveloped Discharge
 Link Type: Copy
 Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED
 Number of Links: 2

Link Name: Basin 1 - Bioretention
 Link Type: Ecology Bioretention Facility
 Downstream Link Name: Postdeveloped Discharge

Floor Elevation (ft) : 228.67
 Riser Crest Elevation (ft) : 231.50
 Storage Depth (ft) : 2.83
 Bottom Length (ft) : 358.0
 Bottom Width (ft) : 44.0
 Bottom Slope (ft/ft) : 0.000
 Side Slopes (ft/ft) : Z1= 3.00 Z2= 3.00 Z3= 3.00 Z4= 3.00
 Bottom Area (sq-ft) : 15752.
 Area at Riser Crest El (sq-ft) : 22,866.
 (acres) : 0.525
 Volume at Riser Crest (cu-ft) : 60,871.
 (ac-ft) : 1.397

Infiltration on Bottom and Sideslopes Selected

Soil Properties
 Layer No Soil Name Thickness (ft)
 1 ASTM 100 0.170
 2 SMMWW 12 in/hr (Ecol) 1.500
 3 GRAVEL 1.000

KSat Safety Factor: 4.0
 Native Soil Infiltration Rate (in/hr) : 0.45

Underdrain Present

Underdrain Offset (in): : 6.00
Orifice Diameter (in) : 6.000

Riser Geometry
Riser Structure Type : Circular
Riser Diameter (in) : 60.00
Common Length (ft) : 0.000
Riser Crest Elevation : 231.50 ft

Hydraulic Structure Geometry

Number of Devices: 2

---Device Number 1---

Device Type : Circular Orifice
Control Elevation (ft) : 228.67
Diameter (in) : 3.50
Orientation : Vertical
Elbow : Yes

---Device Number 2---

Device Type : Circular Orifice
Control Elevation (ft) : 229.50
Diameter (in) : 3.00
Orientation : Vertical
Elbow : Yes

Link Name: Postdeveloped Discharge

Link Type: Copy
Downstream Link: None

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

***** Subbasin: Subbasin 1 *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)

=====

2-Year	0.384
5-Year	0.572
10-Year	0.734
25-Year	1.057
50-Year	1.151
100-Year	1.257
200-Year	1.973
500-Year	2.937

***** Subbasin: Buffer Enhancement Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)

=====

2-Year	3.019E-02
5-Year	4.495E-02
10-Year	5.767E-02
25-Year	8.308E-02
50-Year	9.044E-02
100-Year	9.881E-02
200-Year	0.155
500-Year	0.231

***** Link: Predeveloped Discharge

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

```
=====
```

2-Year	0.414
5-Year	0.617
10-Year	0.792
25-Year	1.140
50-Year	1.241
100-Year	1.356
200-Year	2.128
500-Year	3.167

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 3

Number of Links: 2

***** Subbasin: Buffer Enhancement Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

```
=====
```

2-Year	3.953E-02
5-Year	7.259E-02
10-Year	0.110
25-Year	0.175
50-Year	0.204
100-Year	0.223
200-Year	0.323
500-Year	0.457

***** Subbasin: Subbasin 1 *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

```
=====
```

2-Year	4.642
5-Year	5.836
10-Year	7.213
25-Year	8.714
50-Year	10.902
100-Year	12.552
200-Year	13.429
500-Year	14.594

***** Subbasin: Bypass Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

```
=====
```

2-Year	4.654E-02
5-Year	7.005E-02
10-Year	9.590E-02
25-Year	0.132
50-Year	0.173
100-Year	0.210
200-Year	0.211
500-Year	0.211

***** Link: Basin 1 - Bioretention

***** Link Inflow Frequency Stats

EXHIBIT 3

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	4.642
5-Year	5.836
10-Year	7.213
25-Year	8.714
50-Year	10.902
100-Year	12.552
200-Year	13.429
500-Year	14.594

***** Link: Basin 1 - Bioretention

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	1.255
5-Year	1.464
10-Year	1.577
25-Year	1.698
50-Year	1.786
100-Year	2.215
200-Year	2.484
500-Year	2.831

***** Link: Basin 1 - Bioretention

***** Link WSEL Stats

WSEL Frequency Data(ft)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) WSEL Peak (ft)

=====	
1.05-Year	229.004
1.11-Year	229.088
1.25-Year	229.171
2.00-Year	229.455
3.33-Year	229.753
5-Year	229.929
10-Year	230.352
25-Year	230.855
50-Year	231.197
100-Year	231.444

***** Link: Postdeveloped Discharge

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	0.294
5-Year	0.518
10-Year	0.689
25-Year	0.805
50-Year	0.903
100-Year	0.984
200-Year	1.501
500-Year	2.198

*****Groundwater Recharge Summary *****

Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: Subbasin 1	2667.034
Subbasin: Buffer Enhancement A	209.582
Link: Predeveloped Dischar	0.000
Total:	2876.616

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)
Subbasin: Buffer Enhancement A	191.915
Subbasin: Subbasin 1	250.684
Subbasin: Bypass Area	44.204
Link: Basin 1 - Bioretenti	4974.301
Link: Postdeveloped Discha	0.000
Total:	5461.104

Total Predevelopment Recharge is Less than Post Developed Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 18.206 ac-ft/year, Post Developed: 34.564 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: Predeveloped Discharge *****

2-Year Discharge Rate : 0.414 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
 On-line Design Discharge Rate (91% Exceedance): 0.31 cfs
 Off-line Design Discharge Rate (91% Exceedance): 0.18 cfs

Infiltration/Filtration Statistics-----
 Inflow Volume (ac-ft): 2181.61
 Inflow Volume Including PPT-Evap (ac-ft): 2181.61
 Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
 Total Runoff Filtered (ac-ft): 0.00, 0.00%
 Primary Outflow To Downstream System (ac-ft): 2181.61
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Volume Lost to ET (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered+ET)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 2

***** Link: Basin 1 - Bioretention *****

2-Year Discharge Rate : 1.255 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
 On-line Design Discharge Rate (91% Exceedance): 1.78 cfs
 Off-line Design Discharge Rate (91% Exceedance): 1.02 cfs

Infiltration/Filtration Statistics-----
 Inflow Volume (ac-ft): 6330.01
 Inflow Volume Including PPT-Evap (ac-ft): 6427.09
 Total Runoff Infiltrated (ac-ft): 4974.30, 77.40%
 Total Runoff Filtered (ac-ft): 1247.07, 19.40%
 Primary Outflow To Downstream System (ac-ft): 1369.75
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Volume Lost to ET (ac-ft): 83.03
 Percent Treated (Infiltrated+Filtered+ET)/Total Volume: 98.09%

2-Year Discharge Rate : 0.294 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge

On-line Design Discharge Rate (91% Exceedance): 0.29 cfs

Off-line Design Discharge Rate (91% Exceedance): 0.16 cfs

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 420.66

Inflow Volume Including PPT-Evap (ac-ft): 420.66

Total Runoff Infiltrated (ac-ft): 0.00, 0.00%

Total Runoff Filtered (ac-ft): 0.00, 0.00%

Primary Outflow To Downstream System (ac-ft): 420.66

Secondary Outflow To Downstream System (ac-ft): 0.00

Volume Lost to ET (ac-ft): 0.00

Percent Treated (Infiltrated+Filtered+ET)/Total Volume: 0.00%

*****Compliance Point Results *****

Scenario Predeveloped Compliance Link: Predeveloped Discharge

Scenario Postdeveloped Compliance Link: Postdeveloped Discharge

*** Point of Compliance Flow Frequency Data ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	0.414	2-Year	0.294
5-Year	0.617	5-Year	0.518
10-Year	0.792	10-Year	0.689
25-Year	1.140	25-Year	0.805
50-Year	1.241	50-Year	0.903
100-Year	1.356	100-Year	0.984
200-Year	2.128	200-Year	1.501
500-Year	3.167	500-Year	2.198

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

**** Flow Duration Performance ****

Excursion at Predeveloped 50%Q2 (Must be Less Than or Equal to 0%):	-86.1%	PASS
Maximum Excursion from 50%Q2 to Q2 (Must be Less Than or Equal to 0%):	-75.7%	PASS
Maximum Excursion from Q2 to Q50 (Must be less than 10%):	-30.0%	PASS
Percent Excursion from Q2 to Q50 (Must be less than 50%):	0.0%	PASS

MEETS ALL FLOW DURATION DESIGN CRITERIA: PASS

**** LID Duration Performance ****

Excursion at Predeveloped 8%Q2 (Must be Less Than 0%):	-92.6%	PASS
Maximum Excursion from 8%Q2 to 50%Q2 (Must be Less Than 0%):	-86.1%	PASS

MEETS ALL LID DURATION DESIGN CRITERIA: PASS



APPENDIX 10

NRCS SOILS REPORT



A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lewis County Area, Washington

TA Travel Center



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

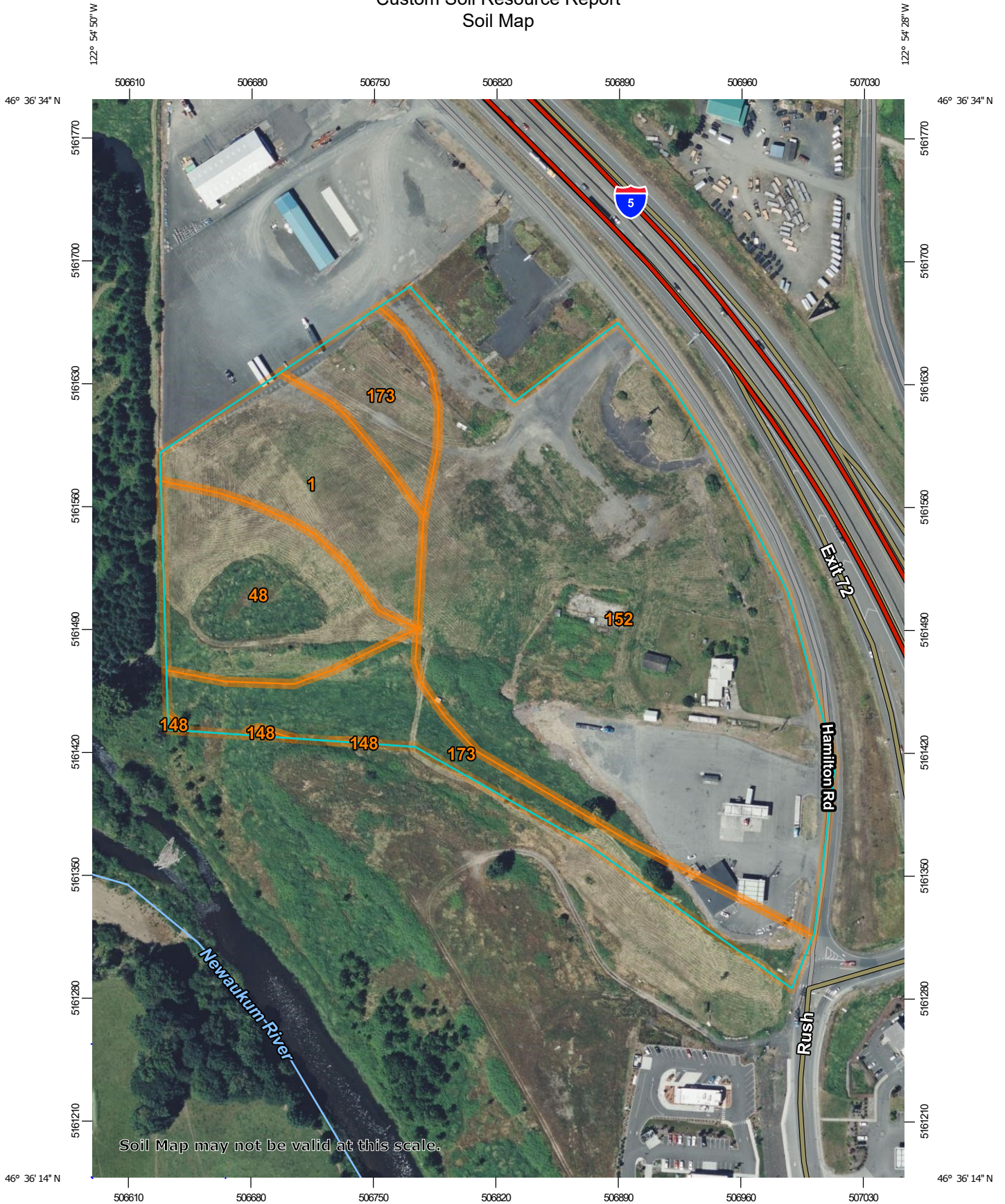
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

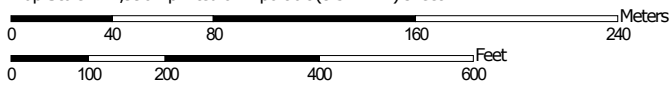
The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Soil Map

EXHIBIT 3



Map Scale: 1:2,990 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
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- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lewis County Area, Washington
 Survey Area Data: Version 22, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 21, 2021—Nov 22, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alvor silty clay loam	2.4	10.9%
48	Chehalis silty clay	2.7	12.1%
148	Newberg fine sandy loam	0.0	0.1%
152	Olequa silt loam, 0 to 5 percent slopes	13.4	59.7%
173	Reed silty clay loam, channeled	3.9	17.2%
Totals for Area of Interest		22.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

Custom Soil Resource Report

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lewis County Area, Washington

1—Alvor silty clay loam

Map Unit Setting

National map unit symbol: 2h7x

Elevation: 100 to 350 feet

Mean annual precipitation: 40 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 150 to 200 days

Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Alvor, drained, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvor, Drained

Setting

Landform: Flood plains, terraces

Parent material: Alluvium

Typical profile

H1 - 0 to 7 inches: silty clay loam

H2 - 7 to 25 inches: silty clay loam

H3 - 25 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 24 to 47 inches

Frequency of flooding: FrequentNone

Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C

Ecological site: F001XC001OR - Mesic Udic Riparian Forest

Forage suitability group: Seasonally Wet Soils (G002XV202WA)

Other vegetative classification: Seasonally Wet Soils (G002XV202WA)

Hydric soil rating: Yes

Minor Components

Alvor, undrained

Percent of map unit: 10 percent

Landform: Terraces

Other vegetative classification: Seasonally Wet Soils (G002XV202WA)

Hydric soil rating: Yes

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Reed, undrained*Percent of map unit: 5 percent**Landform: Flood plains**Other vegetative classification: Wet Soils (G002XV102WA)**Hydric soil rating: Yes***Chehalis***Percent of map unit: 5 percent**Hydric soil rating: No***48—Chehalis silty clay****Map Unit Setting***National map unit symbol: 2hgb**Elevation: 30 to 600 feet**Mean annual precipitation: 40 to 60 inches**Mean annual air temperature: 50 to 54 degrees F**Frost-free period: 150 to 210 days**Farmland classification: All areas are prime farmland***Map Unit Composition***Chehalis and similar soils: 90 percent**Minor components: 10 percent**Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Chehalis****Setting***Landform: Terraces, flood plains**Parent material: Alluvium***Typical profile***H1 - 0 to 17 inches: silty clay**H2 - 17 to 44 inches: silty clay loam**H3 - 44 to 60 inches: stratified fine sandy loam to silty clay loam***Properties and qualities***Slope: 0 to 3 percent**Depth to restrictive feature: More than 80 inches**Drainage class: Well drained**Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)**Depth to water table: More than 80 inches**Frequency of flooding: OccasionalNone**Frequency of ponding: None**Available water supply, 0 to 60 inches: High (about 11.2 inches)***Interpretive groups***Land capability classification (irrigated): 3w**Land capability classification (nonirrigated): 3w**Hydrologic Soil Group: B*

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Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Soils with Few Limitations (G002XV502WA)
Other vegetative classification: Soils with Few Limitations (G002XV502WA)
Hydric soil rating: No

Minor Components**Alvor, undrained**

Percent of map unit: 5 percent
Landform: Terraces
Other vegetative classification: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Reed, undrained

Percent of map unit: 5 percent
Landform: Flood plains
Other vegetative classification: Wet Soils (G002XV102WA)
Hydric soil rating: Yes

148—Newberg fine sandy loam**Map Unit Setting**

National map unit symbol: 2h9p
Elevation: 10 to 1,500 feet
Mean annual precipitation: 18 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Newberg and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg**Setting**

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 17 inches: fine sandy loam
H3 - 17 to 60 inches: loamy very fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches

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Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Soils with Few Limitations (G002XV502WA)
Other vegetative classification: Soils with Few Limitations (G002XV502WA)
Hydric soil rating: No

Minor Components**Alvor, undrained**

Percent of map unit: 5 percent
Landform: Terraces
Other vegetative classification: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Puget, undrained

Percent of map unit: 5 percent
Landform: Flood plains
Other vegetative classification: Wet Soils (G002XV102WA)
Hydric soil rating: Yes

Reed, undrained

Percent of map unit: 5 percent
Landform: Flood plains
Other vegetative classification: Wet Soils (G002XV102WA)
Hydric soil rating: Yes

152—Olequa silt loam, 0 to 5 percent slopes**Map Unit Setting**

National map unit symbol: 2h9v
Elevation: 40 to 300 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 150 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Olequa and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Olequa

Setting

Landform: Terraces

Typical profile

H1 - 0 to 10 inches: silt loam

H2 - 10 to 20 inches: silt loam

H3 - 20 to 51 inches: silty clay loam

H4 - 51 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: F002XA005WA - Puget Lowlands Moist Forest

Forage suitability group: Soils with Few Limitations (G002XV502WA)

Other vegetative classification: Soils with Few Limitations (G002XV502WA)

Hydric soil rating: No

Minor Components

Lacamas, undrained

Percent of map unit: 5 percent

Landform: Terraces

Other vegetative classification: Wet Soils (G002XV102WA)

Hydric soil rating: Yes

173—Reed silty clay loam, channeled

Map Unit Setting

National map unit symbol: 2hbl

Elevation: 30 to 500 feet

Mean annual precipitation: 40 to 80 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 150 to 200 days

Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Reed, undrained, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reed, Undrained

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 6 inches: silty clay loam

H2 - 6 to 14 inches: silty clay loam

H3 - 14 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: NoneFrequent

Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: F002XA008WA - Puget Lowlands Riparian Forest

Forage suitability group: Wet Soils (G002XV102WA)

Other vegetative classification: Wet Soils (G002XV102WA)

Hydric soil rating: Yes

Minor Components

Chehalis

Percent of map unit: 5 percent

Hydric soil rating: No

Alvor, undrained

Percent of map unit: 5 percent

Landform: Terraces

Other vegetative classification: Seasonally Wet Soils (G002XV202WA)

Hydric soil rating: Yes

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Custom Soil Resource Report

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APPENDIX 11

CRITICAL AREAS MEMO



Technical Memo

To Bryan Morris, Public Works/Community Development Director, City of Napavine
From: Malissa Paulsen, SCJ Alliance
Date: September 8, 2022
Project: Napavine Truck Stop
Subject Critical Areas Assessment Report

The critical areas assessed in this report are within or abut to Lewis County Parcel No. 018050005000 and No. 018150004000. The proposed project has no plans for future additions, expansion, or other activities.

This section is summarized from the Wetlands and Streams Report, prepared by Loowit Consulting Group, LLC (August 24, 2022).

Wetlands

A single depressional freshwater emergent wetland (Wetland A) was located to the south of the subject site within a historic meander channel of the Newaukum River. Wetland A is rated as a Category III wetland with moderate water quality, a low hydrologic score, and a moderate habitat score according to the Washington State Wetland Rating System for Western Washington, 2014 Update.

According to NMC 14.010.120.E, the City of Napavine requires buffers on jurisdictional wetlands depending on category, habitat score, and proposed land use intensity. A Category III wetland with a moderate habitat score next to a proposed high intensity land use, requires a standard 150-foot-wide buffer. NMC 14.010.120.E.8.e allows buffers to be reduced from High Intensity, 150 feet, to a Moderate Intensity of 110 feet.

Functionally Isolated Buffers

There are two areas at the subject site that met the definition of functionally isolated buffers per NMC 14.010.120.E.8.a: (1) Southeast Fill Area and (2) Southwest Storm Pond Area. The Southeast Fill Area consists of historic fill including concrete, bricks, asphalt, rocks, and soil. Not only is the area non-functional, it is elevated above the wetland by a very steep slope vegetated with invasive blackberries. The fill is historic and does not appear to be of recent vintage based on well-established vegetative coverage and no recent grading in the area.

The Southwest Storm Pond Area is functionally isolated from Wetland A by a created earthen berm around the pond that is routinely mowed as is the entire storm pond when not inundated with water. The pond was constructed when the site was filled as a measure to collect, control, and treat, storm water at the site.



Fish and Wildlife Habitat Conservation Areas

Washington Department of Natural Resources (WADNR) mapping application depicts an unnamed Type N (Non-fish) stream, south and west of the subject site which flows west/southwest to the Type S (Shoreline) Newaukum River southwest of the subject site. Another mapped Type N is depicted transecting the subject site from north to south but was confirmed in the field to not be present as the site has been historically filled with earthen material.

According to NMC 14.010.120 (B), the City of Napavine requires buffers on all jurisdictional streams including Newaukum River, which requires a 200-foot wide buffer measured from the ordinary high water mark (OHWM). Buffers on the Newaukum River are encompassed by the adjacent wetland and associated wetland buffers.

Frequently Flooded Areas

A small portion of the southwest corner lies in Zone AE as shown on FEMA Flood Insurance Rate Map 5301021781C. A Letter of Map Revision was executed for the site on December 18, 2015, likely associated with fill placed on the site from prior development. The proposed project will not place any structures within the portion of the site that is mapped as floodplain.

Critical Area Impacts

No in-water work is proposed as part of the project. A wetland buffer reduction has been proposed with buffer enhancement to allow an efficient design and use of the site as a truck fueling and travel stop facility. To compensate for the reduction of the 150-foot buffer to 110 feet, the applicant will implement all of the required provisions listed in NMC 14.010.120.E.8.e, including the removal of invasive species and installation of native trees and shrubs.

Erosion and sediment control measures will be employed and maintained throughout the construction process as site conditions warrant. The proposed project will follow construction best practices by laying down silt fencing. The plan also includes buffer enhancement of approximately 45,600 sq ft of nearly non-functional wetland buffer and native upland grass seed will be used in areas of bare soil.

The existing storm pond will be expanded and upgraded to properly collect and treat all storm water from development footprint prior to discharge into wetland buffer. The majority will passively infiltrate and only discharge during periods of higher-than-normal rainfall events.

Conclusion

Development of the subject site into a travel center facility can be accomplished with no direct long-term impact on wetlands or streams. Enhancement of a degraded wetland buffer along the southern portion of the site will significantly increase ecological functions and provide greater protection to the adjacent wetland.

Wetlands and Streams Report
for
121 Hamilton Road
Napavine, Washington

Prepared for:
GMD Land Company, LLC
710 Brookmere Dr
Edmonds, WA 98020-2609

Project # 279.01

Prepared by:
Loowit Consulting Group, LLC
312 Gray Road
Castle Rock, WA 98611
360.431.5118

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SIGNATURE PAGE

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned:

A handwritten signature in blue ink, appearing to read "Timothy J. Haderly". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Timothy J. Haderly, Principal Scientist/Owner
Loowit Consulting Group, LLC

INTRODUCTION

Purpose and Need

Loowit Consulting Group, LLC (LCG) was retained by GMD Land Company, LLC (Applicant) to complete a critical areas investigation and report at 121 Hamilton Road (Subject Site) north of Napavine, Washington (Figure 1 & 2). The Applicant has proposed the construction of a new Travel Centers of America travel service facility on the subject site (Figure 3). Mapped critical areas within the subject site prompted the City of Napavine to request an investigation of critical areas, wetlands and streams, according to Napavine Critical Areas Ordinance (NCAO) Title 14.010 – Critical Areas Ordinance.

Site Description

The subject site consists of two parcels totaling approximately 13.56 acres of commercial zoned property. Site specifics include:

<u>Site Address:</u>	121 Hamilton Road Napavine, WA
<u>Current Owner:</u>	Hamilton's Walnut Shade LLC
<u>Tax Parcel Number:</u>	018050005000 018150004000
<u>Legal Description:</u>	Section 15, Township 13 North, Range 2 West, W.M.
<u>Property Size:</u>	13.56 Acres
<u>Jurisdiction:</u>	City of Napavine

The subject site is located west of Hamilton Road, which is situated north of Napavine, Washington adjacent to the southbound lanes of Interstate 5 (Figure 1, Photographs 1 and 2). The site consists of a large, fairly level, mowed-grass field (Photograph 3) in the western half; a single-family residence and outbuildings in the southeast corner (Photograph 4) of the eastern half; and the remnants of a manufactured-home retail business in the middle and northern sections of the eastern half of the site. The buildings associated with the manufactured-home business have all been removed, but the graveled and paved remnants of the driveways and parking areas remain, as well as the remnants of old signs, and utility poles (Photograph 5).

The western half of the subject site (Photograph 3) is undeveloped with the exception of a storm water collection pond in the southwest corner of the site (Photograph 6). Access to the subject site is via four points of access from Hamilton Road: (1) driveway access to the existing

residence, (2) two access points associated with the circular driveway, and (3) a wide access in the north end of the site



Photograph 1: Subject site, and paved circular access drive that served the former manufactured home business. Photo taken from Hamilton Road, at the southern end of the circular driveway, near the center of the eastern site boundary, looking northwest across the site. The large cottonwood tree, in the upper left of this photo, is near the southwest corner of the site.



Photograph 2: Photo taken from near the center of the southern site boundary, looking southwest across the site. The large cottonwood tree, in the upper right of this photo, is near

the southwest corner of the site. The home and buildings visible in the distance on the left side of the photo is the on-site single-family residence.



Photograph 3: Level mowed field that comprises the majority of the western half of the subject site. Photo taken from approximately the midpoint of the southern site boundary looking north across the site.



Photograph 4: The single-family residence and driveway located at the southeast corner of the subject site. Photo taken looking west from Hamilton Road.



Photograph 5: The location of the former manufactured-home retail business in the middle and northern sections of the eastern half of the subject site. Photo is looking southeast from near the northern site boundary.



Photograph 6: Constructed storm water collection pond in the southwest corner of the subject site. Photo is looking north near the western property boundary.



Photograph 7: Wetland area along southern boundary of subject site positioned mostly off-site on the adjacent parcel to the south. Photograph taken near the southwest corner of the subject site, looking east toward the single-family residence and its outbuildings that occupy the southeast corner of the site.



Photograph 8: Northernmost gravelled site access, looking east toward Hamilton Road and I-5, along the northern site boundary. Subject site is to the right, as well as behind the photographer.

Land uses adjacent to the subject site include:

- To the North – Commercial retail
- To the South – Gas Station and undeveloped commercial land
- To the East – Hamilton Road and Interstate 5
- To the West – Agriculture, forest land, and rural residential

METHODS

Desktop Review

Prior to visiting the subject site, LCG conducted a desktop review of readily available mapping resources and other pertinent information including:

- Lewis County Web Map (<http://ims.lewiscountywa.gov/webmaps/composite2/viewer.htm>). This source provided parcel information, aerial photographs, physical attributes, and other information from the Lewis County Assessor.
- US Fish and Wildlife Service National Wetlands Inventory Wetlands Mapper (<https://www.fws.gov/wetlands/data/mapper.html>). This mapping source depicts wetlands and streams throughout the United States.
- US Department of Agriculture Natural Resources Conservation Service Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>). This source depicts mapped soils including hydric soils throughout the United States.
- Washington Department of Natural Resources Forest Practices Application Mapping Tool (<https://fpamt.dnr.wa.gov/default.aspx>). This mapping source depicts streams and wetlands in Washington State.
- Washington Department of Fish and Wildlife Salmonscape (<http://apps.wdfw.wa.gov/salmonscape/map.html>). This mapping source depicts streams and fish distribution in Washington State.
- Washington Department of Fish and Wildlife Priority Habitat and Species (<http://apps.wdfw.wa.gov/phsontheweb/>). This mapping source depicts priority habitats and species throughout Washington State.

State Regulations

Wetlands are regulated by Washington Department of Ecology (Ecology) under the Water Pollution Control Act and the Shoreline Management Act. The State Environmental Policy Act (SEPA) process is also used to identify potential wetland-related concerns early in the permitting process. All proposed direct and identified indirect impacts to wetlands are reviewed and approved/denied by Ecology using the regulations previously listed.

Streams are regulated by Washington Department of Fish and Wildlife under the State Hydraulic Code, Chapter 77.55 Revised Code of Washington. Projects involving activities within,

over, or beneath jurisdictional streams are subject to the Hydraulic Project Approval (HPA) permitting process administered by WDFW.

Federal Regulations

Wetlands are regulated as “waters of the United States” under Section 404 of the Clean Water Act. Section 404 regulations are administered by the US Army Corps of Engineers (USACE).

Local Regulations

Wetlands and other critical areas are regulated by the Napavine Municipal Code (NMC) Critical Areas Ordinance Chapter 14.10.

Field Investigations

On March 2, 2022, LCG visited the subject site to collect site information, delineate jurisdictional wetlands, and collect site data. Weather conditions at the time of the site investigation consisted of clear skies with a high of 53.3°F and 0.30 inches of rain the previous 24 hours. Recorded climatological history from the Chehalis Airport two weeks prior to visiting the site was characterized with high temperatures ranging from 37.4 to 61.7°F and low temperatures ranging from 18.6 to 51.6°F. Total recorded precipitation two weeks prior to the site visit (February 16 – March 1) was recorded at 4.31 inches (Table 1, Appendix C).

Table 1: Weather Data at Chehalis Airport, Washington.

Date	Minimum Temp (Deg F)	Maximum Temp (Deg F)	Total Precipitation (in)
2/16/2022	36.3	53.1	0.00
2/17/2022	34.5	48.9	0.01
2/18/2022	37.8	54.0	0.00
2/19/2022	37.2	49.8	0.00
2/20/2022	36.4	47.3	0.10
2/21/2022	34.3	44.3	0.12
2/22/2022	23.4	37.4	0.00
2/23/2022	18.6	39.6	0.00
2/24/2022	25.0	42.5	0.00
2/25/2022	20.4	50.2	0.00
2/26/2022	26.3	44.3	0.18
2/27/2022	42.1	51.5	0.82
2/28/2022	51.6	55.5	2.78
3/1/2022	47.2	61.7	0.30
		Total:	4.31
3/2/2022	44.7	53.3	0.16

Data from Agweathernet

Site investigation work tasks included:

- Documentation of current site conditions
- Documentation of adjacent land uses
- Delineating and flagging of wetlands and streams
- Documentation of wetland/upland conditions with Test Plots

Wetlands were delineated according to methods outlined in the U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*. Data documenting vegetation, soils, and hydrology were collected and used to determine wetland and uplands at the site (Appendix A). A single depressional wetland (Wetland A) to the south of the subject site, and its associated buffers, encroach onto the subject site. Wetland boundaries were delineated using documented test plots and the boundary flagging subsequently mapped by MTN 2 Coast, LLC.

Vegetation

Vegetation at the subject site is primarily a mix of grasses and common weeds, which are mowed and maintained by the current owner. Vegetation along the southern property boundary is comprised of dense Himalayan Blackberry transitioning to reed canary grass in the wetland. There is an active bald eagle nest in a large cottonwood tree located off-site near the SW corner of the subject site. After successful protection and significant population increases, bald eagles were removed from the federal endangered species list in 2007, then from the State of Washington list in 2017. The State of Washington currently lists bald eagles as “sensitive,” and most of the state’s special protective measures for bald eagles have been eliminated. Table 2 summarizes the vegetation observed at the subject site.

Table 2: Vegetation Observed

Scientific Name	Common Name	Wetland Indicator Code
<i>Cirsium arvense</i>	Canada Thistle	FAC
<i>Daucus carota</i>	Queen Anne’s Lace	FACU
<i>Fraxinus latifolia</i>	Oregon Ash	FACW
<i>Geranium molle</i>	Dovefoot Geranium	UPL
<i>Holcus lanatus</i>	Velvet Grass	FAC
<i>Lupinus polycarpus</i>	Small-flowered Lupine	UPL
<i>Phalaris arundinacea</i>	Reed Canary Grass	FACW
<i>Populus balsamifera</i>	Black Cottonwood	FAC
<i>Ranunculus repens</i>	Creeping Buttercup	FAC
<i>Rubus armeniacus</i>	Himalayan Blackberry	FAC
<i>Rumex crispus</i>	Curled Dock	FAC
<i>Schedonorus arundinaceus</i>	Tall Fescue	FAC
<i>Trifolium repens</i>	White Clover	FAC

Wetland Indicator Code

OBL = Obligate (Almost always occur in wetlands)

FACW = Facultative Wetland (usually occur in wetlands, but may occur in non-wetlands)

FAC = Facultative (Occur in wetlands and non-wetlands)

FACU = Facultative Upland (Usually occur in non-wetlands, but may occur in wetlands)

UPL = Obligate Upland (Almost never occur wetlands)

Soils

According to the US Department of Agriculture Natural Resources Conservation Service (NRCS), the east half of the subject site is situated on mapped Olequa silt loam, a soil common to the floodplain and terrace deposits in the area. The western half of the subject site is comprised of three soils. The middle portion of the western half of the site is mapped Alvor silty clay loam, an alluvial soil common in floodplains and terraces in the local area. The southern portion of the western half of the site is mapped Chehalis silty clay, an alluvial soil common in floodplains and terraces in the local area. The northern portion of the western half of the subject site, as well as the southeastern and southwestern corners of the western half of the subject site, are mapped Reed silty clay loam, a soil common on floodplains and terraces in the local area. Soils at the site are mapped as summarized in Table 3 and Figure 4.

Table 3: Soil Summary.

Soil #	Soil Name	Slope %	Hydric %
1	Alvor silty clay loam	0-3	85
48	Chehalis silty clay	0-3	10
152	Olequa silt loam	0-5	3
173	Reed silty clay loam, channeled	0-3	95

Historic land disturbance activities including extensive placement of earthen fill, agricultural practices, timber harvest, and general grading may have altered natural soil conditions at the site resulting in soils that may be somewhat different than those mapped by NRCS.

Hydrology

The subject site gently slopes to the southwest towards the Newaukum River southwest corner of the site. Washington Department of Natural Resources (WADNR) mapping application depicts an unnamed Type N (Non-fish) stream, south and west of the subject site which flows west/southwest to the Type S (Shoreline) Newaukum River southwest of the subject site. Another mapped Type N is depicted transecting the subject site from north to south but LCG confirmed this mapped feature is not present as the site has been historically filled with earthen material (Figure 6).

According to the US Fish and Wildlife Service National Wetlands Inventory (NWI) map (Figure 5), the subject site is entirely upland, however three wetlands are depicted on or near the subject site in its mapping:

- 1) The first is a kidney-shaped Freshwater Emergent Wetland in the mid-section of the western half of the subject site (Figure 5). LCG did not observe a wetland in this area during its field study.
- 2) The second is a channelized, U-shaped Freshwater Emergent Wetland to the north and west of the subject site (Figure 5). LCG did not observe a wetland in this area.
- 3) The third is a Freshwater Emergent Wetland which the NWI map depicts (Figure 5) as running southeast to northwest immediately south of the southern site boundary. LCG flagged the northern boundary of this wetland during the course of its site study (Figure 3).

Mapping

Wetland boundary flagging, roads, property boundaries, topography, and other site features were derived from public mapping sources and subsequently mapped by MTN 2 Coast, LLC.

RESULTS and DISCUSSION

Wetlands

A single depressional freshwater emergent wetland (Wetland A) was located to the south of the subject site within a historic meander channel of the Newaukum River (Figure 3). Wetland A is rated as a Category III wetland (17 points) with a moderate water quality score of 7 points, a low hydrologic score of 4 points, and a moderate habitat score of 6 points (Table 4) according to the *Washington State Wetland Rating System for Western Washington, 2014 Update* (Appendix B).

Wetland Buffers

Buffer conditions at the subject site are characterized as having nominal functions & values as a result of dense invasive plant cover (Himalayan blackberry) and a lack of vertical/horizontal habitat structure as a result of historic earthen fill placed very near the wetland edge. Wetland buffers are vegetated with a dense covering of Himalayan blackberry, reed canary grass, and Scotch broom growing on earthen fill material that was historically placed on the property. The flatter portions of the site are routinely mowed but the slope along the southern property boundary is not maintained resulting in dense coverage of Himalayan blackberry.

According to *NMC 14.010.120 .E*, the City of Napavine requires buffers on jurisdictional wetlands depending on category, habitat score, and proposed land use intensity. A Category III wetland with a moderate habitat score next to a proposed high intensity land use, requires a standard 150-foot wide buffer. *NMC 14.010.120.E.8.e* allows buffers to be reduced from High Intensity, 150 feet, to a Moderate Intensity of 110 feet (see Buffer Reduction Section of this report).

Table 4: Wetland Summary.

Wetland ID	HGM ^A	Wetland Rating System ^B				Category ^B	Standard Buffer ^C (ft)
		Improving Water Quality	Hydrologic	Habitat	Total		
Wetland A	Depressional	7	4	6	17	III	110-150

^A Hydrogeomorphic Classification

^B Washington State Wetland Rating System for Western Washington: 2014 Update

^C NMC Ord.464, Table 14.010.120.E.7.a.2 Buffers Required to Protect Habitat Functions in Category III Wetlands and NMC 14.010.120.E.8.e for buffer reduction.

Buffer Reduction

The applicant has proposed a reduction in buffer width to allow an efficient design and use of the site as a truck fueling a travel stop facility. To compensate for the reduction of the 150 foot buffer to 110 feet, the applicant will implement all of the required provisions listed in NMC 14.010.120.E.8.e:

General Site Design Measures. High intensity buffers may be reduced to moderate intensity buffers if all of the following mitigation measures are applied to the greatest extent practicable, and there is a proven low wildlife function.

- i. *Buffer Enhancement. The intent and effect of an approved buffer enhancement program shall be to measurably improve low functioning buffers by increasing the identified functions of the buffer. This may include the removal and management of noxious weeds and/or invasive vegetation or specific measures to improve hydrologic or habitat function. **[The Applicant will remove invasive species from the protected buffer area, implement shielding provisions, and plant the buffer with a mix of native forbs, shrubs, and trees. Given that the area wetland buffer consists of mowed fields, commercial development, has been filled with earthen materials, and is vegetated with invasive species; existing and future wildlife utilization is very low with the exception of limited shelter for small mammals such mice, voles, and rabbits. Removing invasive species and installing native trees and shrubs will significantly increase the potential for wildlife to utilize the buffer and adjacent wetland.]***
- ii. *Shielding of High Intensity Uses.*
 - A. *Lights. Direct all lights away from wetlands; **[All outside lighting, including parking lot light standards, will be shielded away from the wetland buffer area.]***
 - B. *Noise. Locate activity that generates noise away from wetlands; **[The proposed site layout was designed to locate less noisy components of the facility next to the wetland buffer. These components include the storm pond and drive lanes to access truck parking areas. The noisier components located farther away from the wetland buffer include short term parking, convenience store, drive through food services, and consumer fueling area.]***

- C. *Pets and Human Disturbance. Use privacy fencing; plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the eco-region; place wetland and its buffer in a separate tract. **The outer edge of the wetland buffer will be demarcated with fencing, the buffer will be planted with a dense coverage of native trees & shrubs, and the area will be protected under a conservation easement.***
- iii. *Surface Water Management.*
- A. *Existing runoff. Retrofit storm water detention and treatment for roads and existing development and disperse direct discharge of channelized flows from lawns and landscaping; **Untreated storm water will not be allowed to flow directly into wetlands or buffers without first being collected and treated according to State and City requirements.***
- B. *Change in water regime. Infiltrate and/or disperse storm water runoff from impervious surfaces and drainage from lawns and landscaping into the buffer at multiple locations, except where the infiltration or dispersal would either be in opposition to the recommendations contained in the geo-technical report for the project or where the infiltration of dispersal would occur in a geologically hazardous area. **The existing storm pond will be expanded and upgraded to properly collect and treat all storm water from the proposed development footprint prior to discharge into the wetland buffer. The proposed upgraded storm water basin will infiltrate and there will be an outlet pipe that discharges at rates that are below the predeveloped flow rates as allowed in the City's design standards. The outlet will be rock lined to reduce the potential for erosion and allow dispersed sheet flow off the site into the buffer. Design of the storm water system by a licensed engineer will closely follow State and City of Napavine requirements.***

Functionally Isolated Buffers

Functionally isolated buffers include areas that functionally isolated from wetlands and do not protect the wetland from adjacent land uses. The City of Napavine recognizes functionally isolated buffers in the critical areas code and provides provisions to reduce buffers in areas that are functionally isolated. Functionally isolated buffers are addressed in *NMC 4.010.120.E.8.a: Functionally Isolated Buffer Areas. Areas which are functionally separated from a wetland and do not protect the wetland from adverse impacts due to pre-existing roads, structures or vertical separation, shall be excluded from buffers otherwise required by this Chapter.*

There are two areas at the subject site that met the definition of functionally isolated buffers: (1) Southeast Fill Area and (2) Southwest Storm Pond Area. The Southeast Fill Area consists of historic fill including concrete, bricks, asphalt, rocks, and soil (Photograph 9). Not only is the area non-functional, it is elevated above the wetland by a very steep slope vegetated with

invasive blackberries. The fill is historic and does not appear to be of recent vintage based on well-established vegetative coverage and no recent grading in the area.

The Southwest Storm Pond Area is functionally isolated from Wetland A by a created earthen berm around the pond that is routinely mowed as is the entire storm pond when not inundated with water (Photograph 10). The pond was constructed when the site was filled in the mid-2000s as a measure to collect, control, and treat, storm water at the site.



Photograph 9: Southeast Fill Area along the left side of the photograph directly below the parked cargo trailers.



Photograph 10: Southwest Storm Pond Area to the left looking along the maintained berm area between the pond and Wetland A to the right.

Buffer Enhancement Plan

Approximately 45,600 sq ft of nearly non-functional wetland buffer will be enhanced by the installation of native forbs, shrubs, and trees. Removing invasive species and installing native plantings will significantly increase the ecological functions of the wetland buffer thereby providing increased protection of the adjacent wetland. Table 5 summarizes proposed plantings for the wetland buffer enhancement area. In addition to the plantings, a native upland grass seed will be used in areas of bare soil to help prevent erosion and provide vegetative ground cover.

The following sequencing will be applied during the course of enhancing the buffer area:

1. Invasive plants and other debris will be removed from the planting area.
2. Area will be lightly scarified to a depth of 4-6 inches.
3. Project biologist or landscape architect will identify and flag areas for plant installation.
4. Native trees and shrubs installed.
5. Native upland grass seed mix (or similar) applied to reduce erosion.
6. Periodic maintenance including mowing, trimming, fertilization, dead plant replacement, and irrigation implemented as required.

Table 5: Proposed Buffer Plantings (~45,600 sq ft)

Species	Size	Spacing	Type	Estimated # of Plants
Douglas Fir (<i>Pseudotsuga menziesii</i>)	4-6' high	16' oc	B&B or 5-gal Container	45
Western Red Cedar (<i>Thuja plicata</i>)	3-5' high	16' oc	B&B or 5-gal Container	45
Vine Maple (<i>Acer circinatum</i>)	3-5' high	10' oc	B&B or 5-gal Container	45
Red Osier Dogwood (<i>Cornus sericea</i>)	2 gallon	3.5' oc	Container	75
Salal (<i>Gaultheria shallon</i>)	1-2 gallon	3.5' oc	Container	75
Sword Fern (<i>Polystichum munitum</i>)	1-2 gallon	3' oc	Container	75
Tall Oregon Grape (<i>Mahonia aquifolium</i>)	1-2 gallon	3.5' oc	Container	75

Native Upland Grass Mix #8	Various	Dry Seed	20 lbs/acre	---
			Total	435

The final species list and estimated number of plants will be determined by the landscape architect and approved by the project biologist. In addition, a buffer enhancement plan report may be required by the City of Napavine as part of final project approval.

Streams

Newaukum River, a Type S (Shoreline) stream is located off-site to the southwest of the subject site (Figures 3 and 6). No other jurisdictional streams were observed within or adjacent to the subject site.

Stream Buffers

According to NMC 14.010.120 (B), the City of Napavine requires buffers on all jurisdictional streams including Newaukum River, which requires a 200-foot wide buffer (Table 6) measured from the ordinary high water mark (OHWM). Buffers on the Newaukum River are encompassed by the adjacent wetland and associated wetland buffers. The southwest corner of the site is approximately 150 feet from the OHWM of the Newaukum River while the existing storm water pond berm is approximately 260 feet from the OHWM. There are no developments proposed within the 200 foot buffer of the Newaukum River with the exception of invasive plant removal and limited graded necessary to install native trees and shrubs.

Table 6: Stream Summary.

Stream ID	Type ^A	Standard Buffer ^C (ft)
Newaukum River	S	200

^A Washington Department of Natural Resources and NMC 14.010.120(B).

^B NMC Table 14.010.120.B.5 Riparian Area Buffers

CONCLUSIONS

Development of the subject site into a travel center facility can be accomplished with no direct long-term impact on wetlands or streams. Enhancement of a degraded wetland buffer along the southern portion of the site will significantly increase ecological functions and provide greater protect to the adjacent wetland.

LIMITATIONS

The findings and conclusions contained in this document were based on information and data available at the time this document was prepared and evaluated using standard Best Professional Judgment. LCG assumes no responsibility for the accuracy of information and data

generated by others. Local, State, and Federal regulatory agencies may or may not agree with the findings and conclusions contained in this document.

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Anderson, P., Meyer, S., Olson, P., Stockdale, E. 2016. Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State. Shorelands and Environmental Assistance Program Washington State Department of Ecology Olympia, Washington. Publication no. 16-06-029. October 2016 Final Review.

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US Fish and Wildlife Service National Wetlands Inventory Wetlands Mapper (<https://www.fws.gov/wetlands/data/mapper.html>).

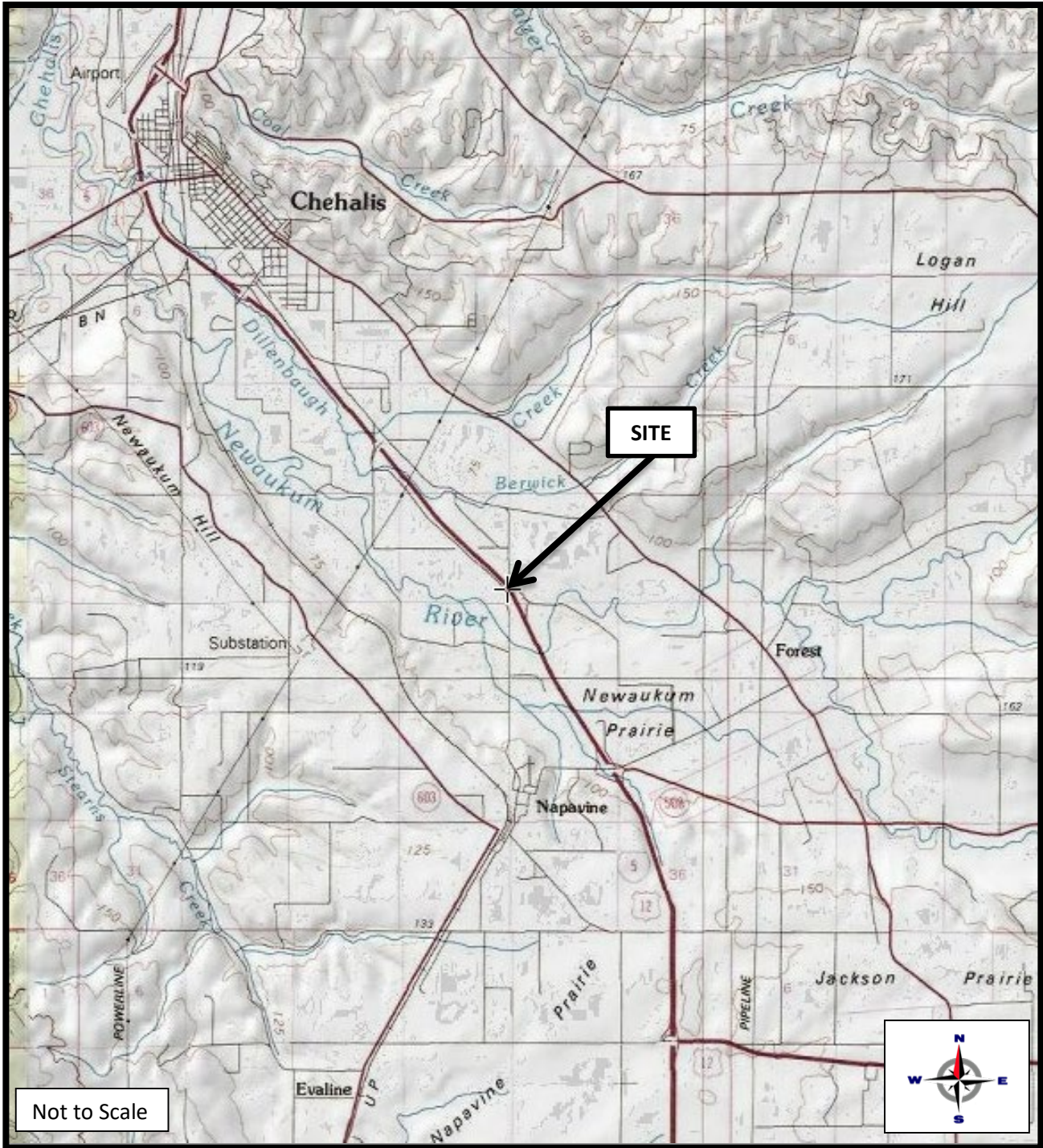
Washington Department of Natural Resources Forest Practices Application Mapping Tool (<https://fpamt.dnr.wa.gov/default.aspx>).

Washington Department of Fish and Wildlife Salmonscape (<http://apps.wdfw.wa.gov/salmonscape/map.html>).

Washington Department of Fish and Wildlife Priority Habitat and Species (<http://apps.wdfw.wa.gov/phsontheweb/>).

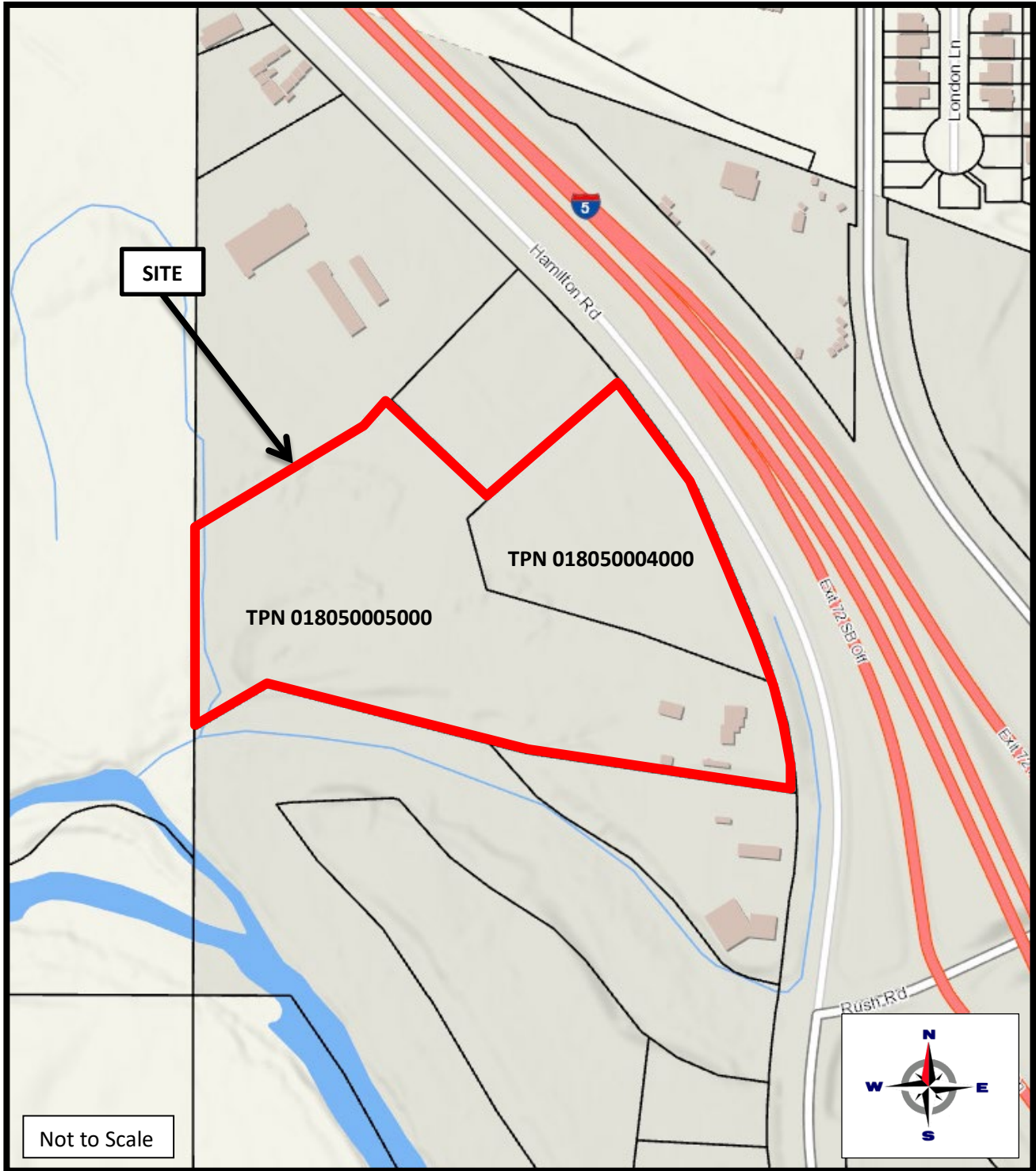
FIGURES

- Figure 1 – Site Location Map
- Figure 2 – Parcel Map
- Figure 3 - Site Map
- Figure 4 – Soils Map
- Figure 5 - National Wetlands inventory Map
- Figure 6 – Stream Map



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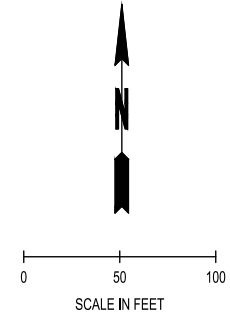
Figure 1
Site Location Map
Napavine TA Travel Center



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Figure 2
Parcel Map
Napavine TA Travel Center

SEC. 15, T 13N., R 2W., W.M.

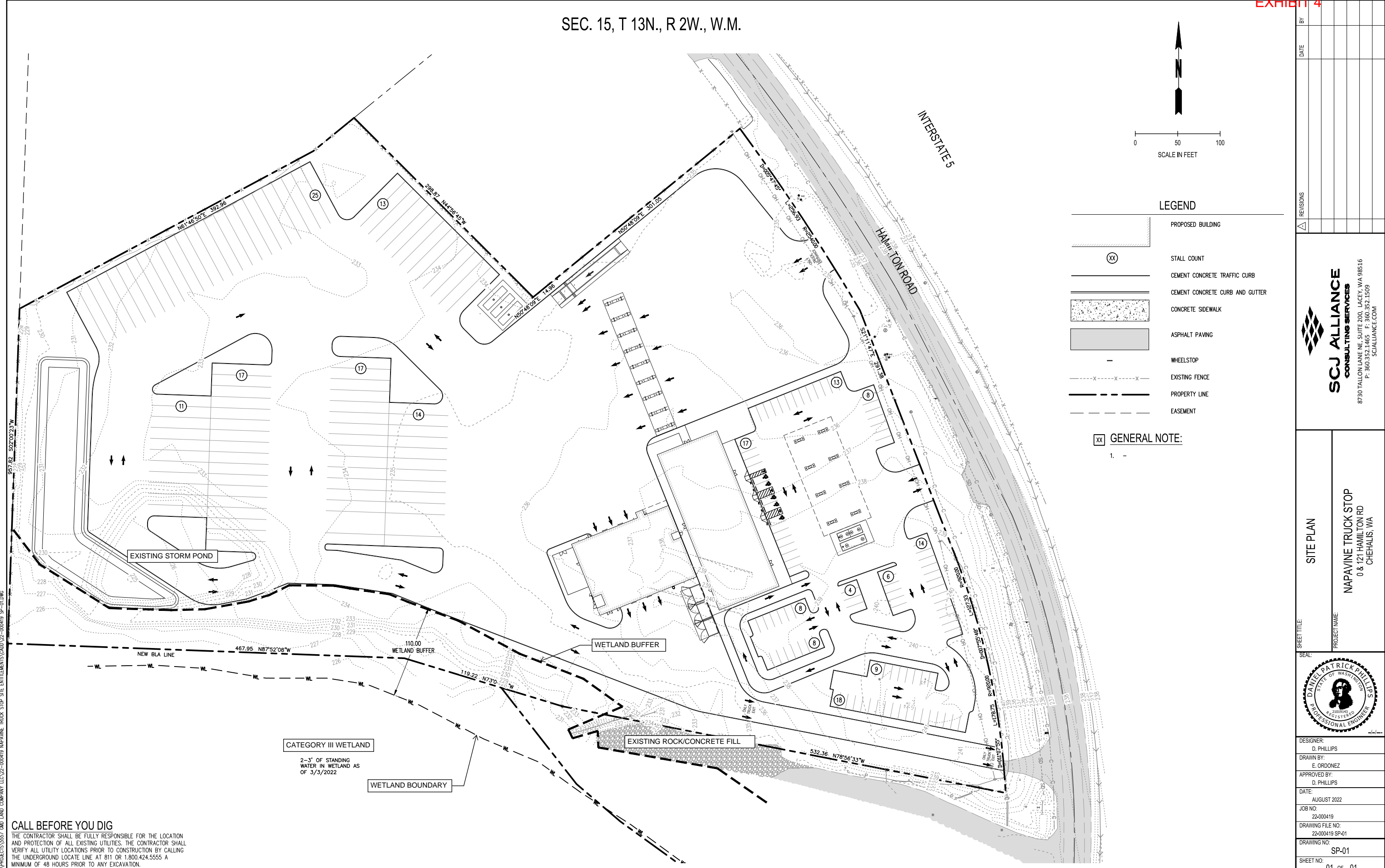


LEGEND

- PROPOSED BUILDING
- STALL COUNT
- CEMENT CONCRETE TRAFFIC CURB
- CEMENT CONCRETE CURB AND GUTTER
- CONCRETE SIDEWALK
- ASPHALT PAVING
- WHEELSTOP
- EXISTING FENCE
- PROPERTY LINE
- EASEMENT

GENERAL NOTE:

1. -



CATEGORY III WETLAND
2-3' OF STANDING WATER IN WETLAND AS OF 3/3/2022

WETLAND BOUNDARY

WETLAND BUFFER

EXISTING ROCK/CONCRETE FILL

EXISTING STORM POND

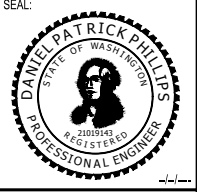
NEW BLA LINE

CALL BEFORE YOU DIG
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 811 OR 1.800.424.5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	DATE	BY

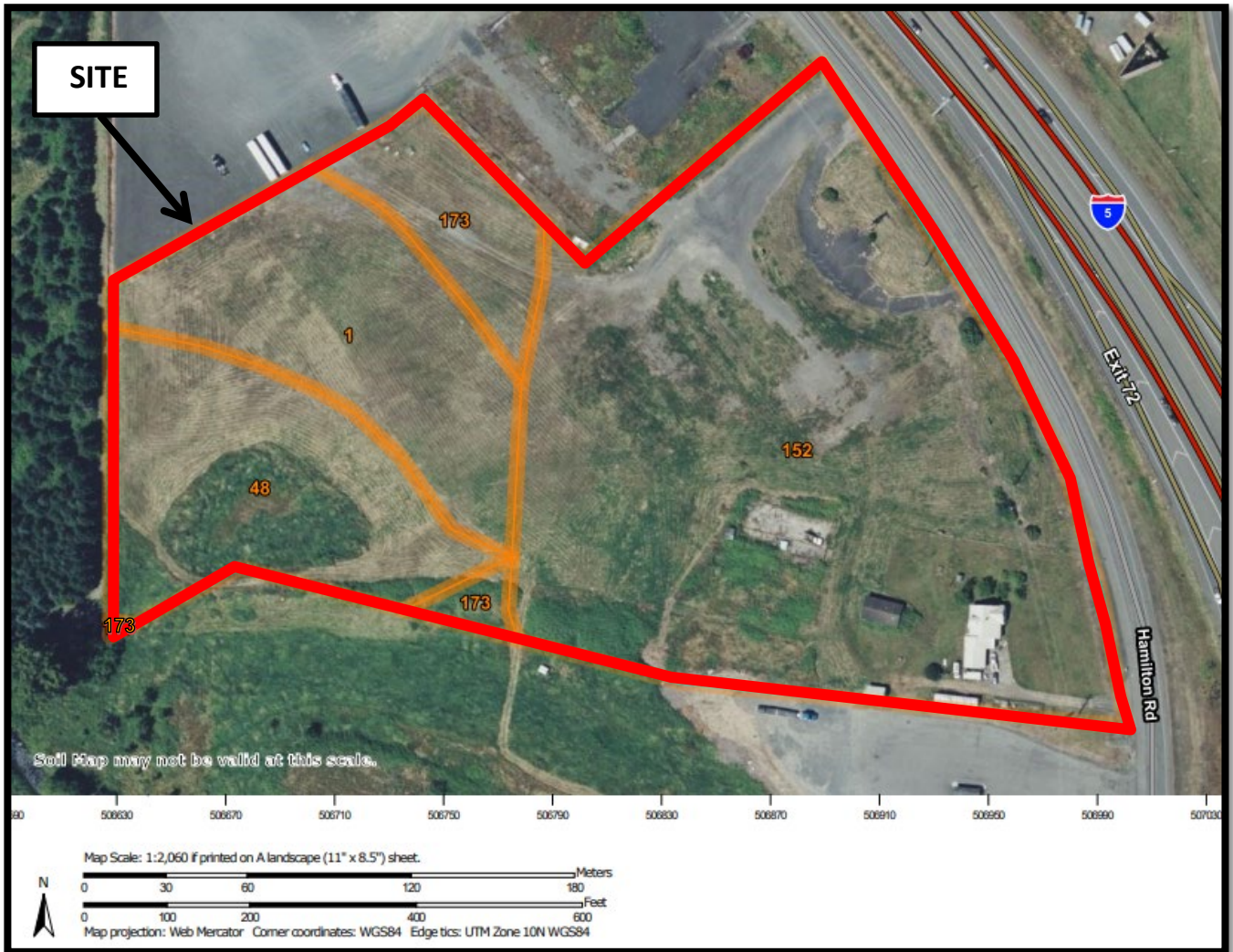
SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SITE PLAN
NAPAVINE TRUCK STOP
0 & 121 HAMILTON RD
CHEHALIS, WA



DESIGNER:	D. PHILLIPS
DRAWN BY:	E. ORDONEZ
APPROVED BY:	D. PHILLIPS
DATE:	AUGUST 2022
JOB NO:	22-000419
DRAWING FILE NO:	22-000419 SP-01
DRAWING NO:	SP-01
SHEET NO:	01 OF 01

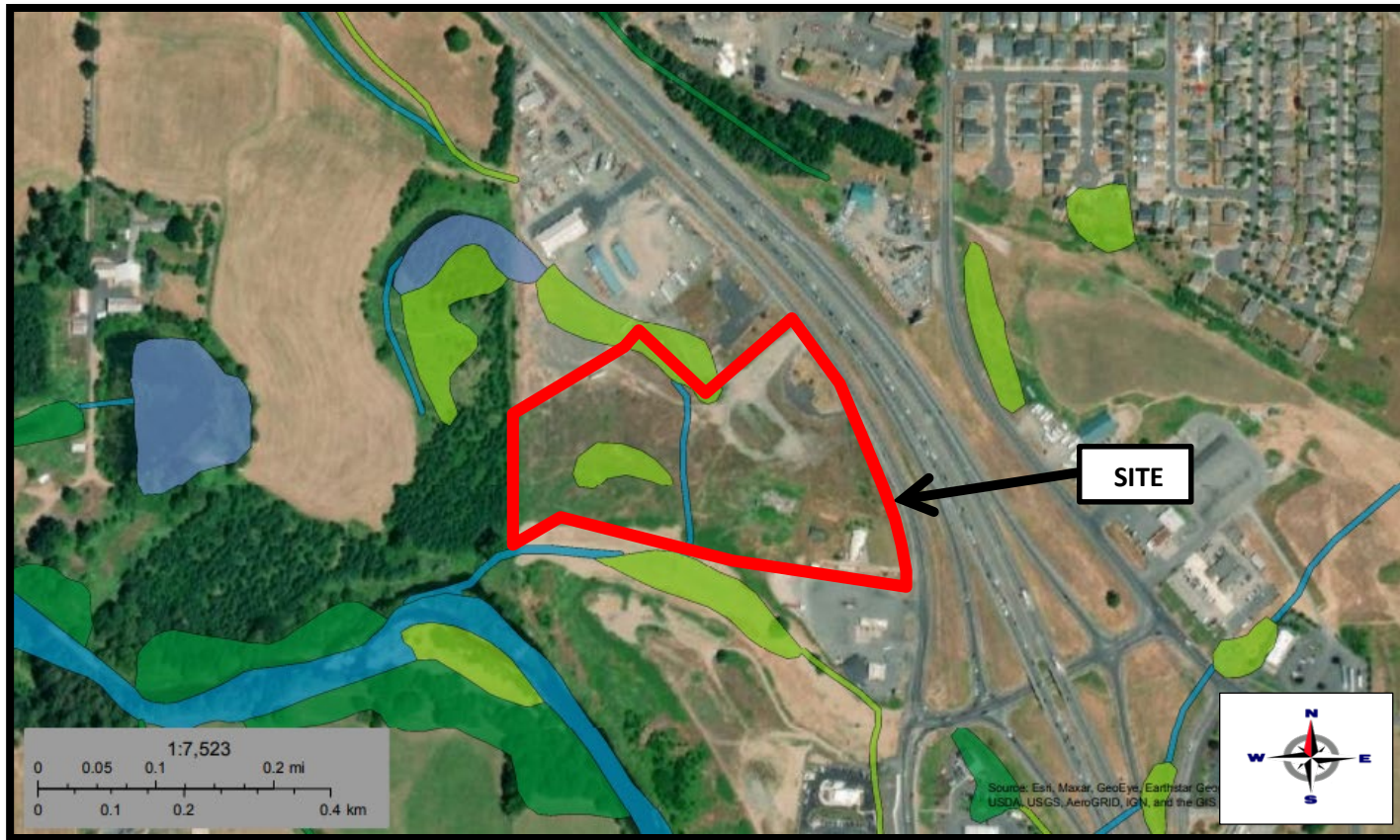
Aug 10, 2022 12:04:08pm User: dphillips
N:\PROJECTS\2257_GND_LAND_COMPANY\22-000419 NAPAVINE TRUCK STOP SITE ENTITLEMENTS\CADD\22-000419 SP-01.DWG




Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alvor silty clay loam	2.4	16.3%
48	Chehalis silty clay	2.4	16.2%
152	Olequa silt loam, 0 to 5 percent slopes	8.9	60.6%
173	Reed silty clay loam, channeled	1.0	7.0%
Totals for Area of Interest		14.7	100.0%

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Figure 4
Soils Map
Napavine TA Travel Center

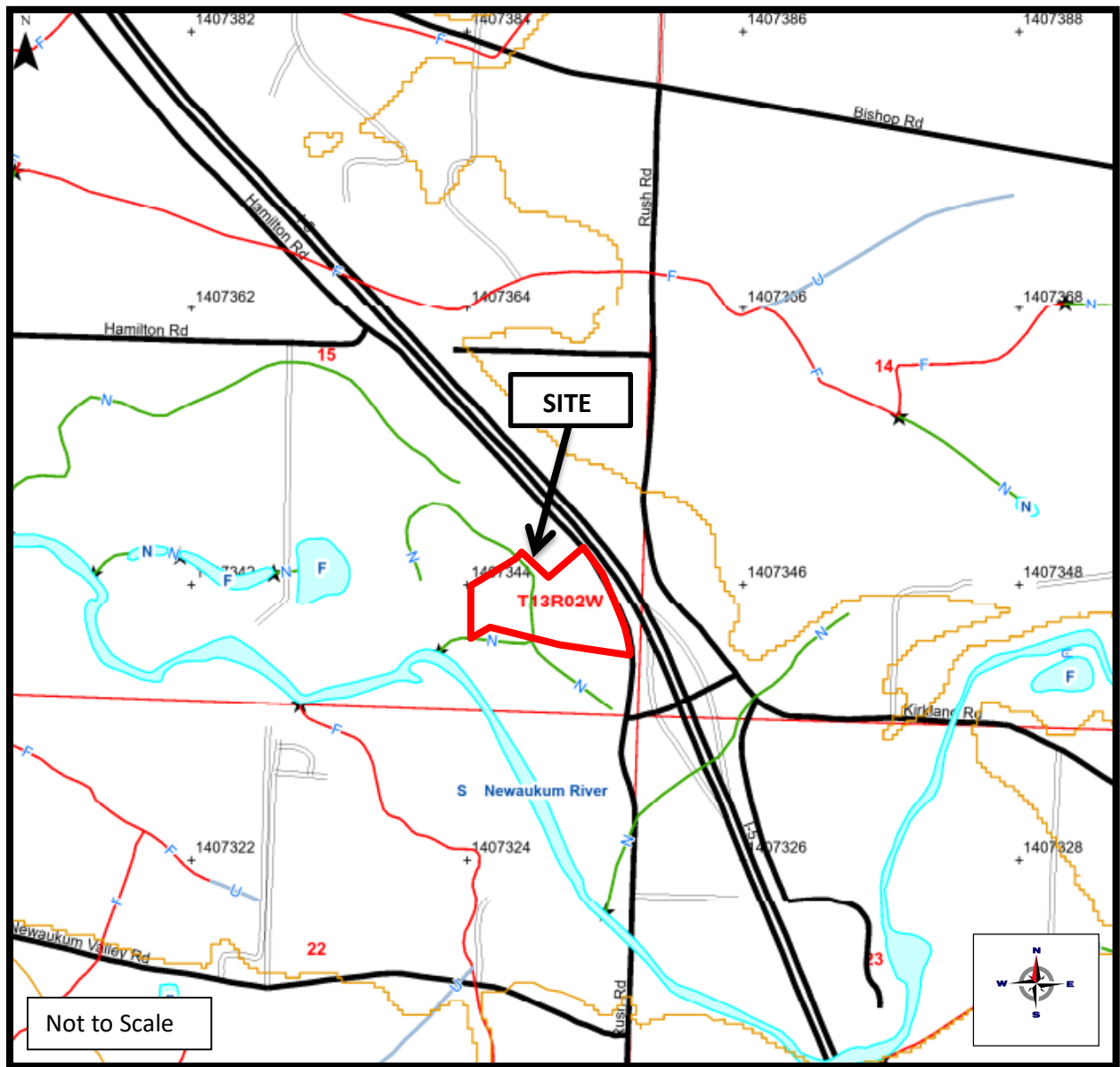


Wetlands

- | | | |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland |  Lake |
|  Estuarine and Marine Wetland |  Freshwater Forested/Shrub Wetland |  Other |
| |  Freshwater Pond |  Riverine |

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Figure 5
National Wetlands Inventory Map
Napavine TA Travel Center



- Type S
- Type F
- Type N, Np, Ns
- U, unknown
- X, non-typed per WAC 222-16

Watershed Analysis

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Figure 6
Stream Map
Napavine TA Travel Center

APPENDIX A - DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region **EXHIBIT 4**

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-1
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60669 Long: -122.91201 Datum: WGS84

Soil Map Unit Name: #173 Reed silt loam, channeled NWI classification: PEMC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

VEGETATION (Use scientific names)

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u> ft radius)				Dominance Test Worksheet
1. _____	%			Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	%			
3. _____	%			Total Number of Dominant Species Across All Strata: <u>1</u> (B)
4. _____	%			Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
Total Cover: _____	%			
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet
1. _____	%			Total % Cover of: _____ Multiply by:
2. _____	%			OBL species <u>0</u> x 1= <u>0</u>
3. _____	%			FACW species <u>0</u> x 2= <u>0</u>
4. _____	%			FAC species <u>0</u> x 3= <u>0</u>
5. _____	%			FACU species <u>0</u> x 4= <u>0</u>
Total Cover: _____	%			UPL species <u>0</u> x 5= <u>0</u>
Herb Stratum (Plot size: <u>5</u> ft radius)				Column Totals: <u>0</u> (A) <u>0</u> (B)
1. <u>Phalaris arundinacea</u>	100%	yes	FACW	Prevalence Index = B/A= _____
2. _____	%			Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
3. _____	%			
4. _____	%			
5. _____	%			
6. _____	%			
7. _____	%			
8. _____	%			
Total Cover: _____	100%			
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
1. <u>Rubus armeniacus</u>	%			
2. _____	%			
Total Cover: _____	%			
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:				

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	10YR4/2	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks: _____

	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	--

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)	Secondary Indicators (2 or more required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)

Field Observations:

Surface Water Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>6-12</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	
Saturation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	

(Includes Capillary fringe)

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region EXHIBIT 4

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-2
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60690 Long: -122.91193 Datum: WGS84

Soil Map Unit Name: #152 Olequa silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
--	---

Remarks:

VEGETATION (Use scientific names)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	%			Number of Dominant Species That Are OBL, FACW, or FAC:	<u>4</u> (A)
2. _____	%			Total Number of Dominant Species Across All Strata:	<u>4</u> (B)
3. _____	%			Percent of Dominant Species That Are OBL, FACW, or FAC	<u>100</u> (A/B)
4. _____	%				
Total Cover:	%				
Sapling/Shrub Stratum (Plot size: 5 ft. radius)				Prevalence Index worksheet	
1. _____	%			Total % Cover of: _____ Multiply by:	
2. _____	%			OBL species	0 x 1= 0
3. _____	%			FACW species	0 x 2= 0
4. _____	%			FAC species	0 x 3= 0
5. _____	%			FACU species	0 x 4= 0
Total Cover:	%			UPL species	0 x 5= 0
Herb Stratum (Plot size: 5 ft radius)				Column Totals:	0 (A) 0 (B)
1. <i>Schedonorus arundinaceus</i>	30%	yes	FAC	Prevalence Index = B/A= _____	
2. <i>Phalaris arundinacea</i>	20%	yes	FACW	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
3. <i>Trifolium repens</i>	20%	yes	FAC		
4. <i>Rumex crispus</i>	10%	no	FAC		
5. _____	%				
6. _____	%				
7. _____	%				
8. _____	%				
Total Cover:	80%				
Woody Vine Stratum (Plot size: 30 ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
1. <i>Rubus armeniacus</i>	70%	yes	FAC		
2. _____	%				
Total Cover:	70%				
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	various	100%		%			Gravel fill with clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks:

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D4)

Field Observations:

Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (Inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (Inches): _____	
Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (Inches): _____	

(Includes Capillary fringe)

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region EXHIBIT 4

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-3
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60641 Long: -122.91098 Datum: WGS84

Soil Map Unit Name: #173 Reed silt loam, channeled NWI classification: PEMC
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

VEGETATION (Use scientific names)

Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet
Tree Stratum (Plot size: <u>30</u> ft radius)				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover: _____ %				
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				Prevalence Index worksheet Total % Cover of: _____ Multiply by: OBL species <u>0</u> x 1= <u>0</u> FACW species <u>0</u> x 2= <u>0</u> FAC species <u>0</u> x 3= <u>0</u> FACU species <u>0</u> x 4= <u>0</u> UPL species <u>0</u> x 5= <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A= _____
1. _____	%			
2. _____	%			
3. _____	%			
4. _____	%			
Total Cover: _____ %				
Herb Stratum (Plot size: <u>5</u> ft radius)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 – Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.
1. <u>Phalaris arundinacea</u>	100%	yes	FACW	
2. _____	%			
3. _____	%			
4. _____	%			
5. _____	%			
6. _____	%			
7. _____	%			
8. _____	%			
Total Cover: <u>100%</u>				
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. <u>Rubus armeniacus</u>	%			
2. _____	%			
Total Cover: _____ %				
% Bare Ground in Herb Stratum <u>0%</u>				
Remarks:				

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	10YR4/2	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks: _____

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B)	<input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D4)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		

Secondary Indicators (2 or more required)

Field Observations:

Surface Water Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>6-12</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	
Saturation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Depth (Inches): <u>surface</u>	

(Includes Capillary fringe)

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region EXHIBIT 4

Project/Site: 121 Hamilton Road City/County: Napavine/Lewis Sampling Date: 3/2/2022
 Applicant/Owner: GMD Land Company State: WA Sampling Point: TP-4
 Investigator(s): T. Haderly Section, Township, Range: Section 15, Township 13 North, Range 2 West
 Landform (hillslope, terrace, etc.): Floodplain Local relief: flat Slope (%): 0-10%
 Subregion (LRR): A Lat: 46.60662 Long: -122.91091 Datum: WGS84

Soil Map Unit Name: #152 Olequa silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Area "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soils Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Remarks:

VEGETATION (Use scientific names)

Tree Stratum (Plot size: <u>30</u> ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. _____	%	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>1</u> (A)
2. _____	%	_____	_____	Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____	%	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC	<u>100</u> (A/B)
4. _____	%	_____	_____	Prevalence Index worksheet	
Total Cover: _____ %				Total % Cover of: _____ Multiply by:	
Sapling/Shrub Stratum (Plot size: <u>5</u> ft. radius)				OBL species	<u>0</u> x 1= <u>0</u>
1. _____	%	_____	_____	FACW species	<u>0</u> x 2= <u>0</u>
2. _____	%	_____	_____	FAC species	<u>0</u> x 3= <u>0</u>
3. _____	%	_____	_____	FACU species	<u>0</u> x 4= <u>0</u>
4. _____	%	_____	_____	UPL species	<u>0</u> x 5= <u>0</u>
5. _____	%	_____	_____	Column Totals:	<u>0</u> (A) <u>0</u> (B)
Total Cover: _____ %				Prevalence Index = B/A= _____	
Herb Stratum (Plot size: <u>5</u> ft radius)				Hydrophytic Vegetation Indicators:	
1. _____	%	_____	_____	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation	
2. _____	%	_____	_____	<input checked="" type="checkbox"/> 2 – Dominance Test is >50%	
3. _____	%	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹	
4. _____	%	_____	_____	4 - Morphological Adaptations ¹ (Provide supporting data In Remarks or on a separate sheet)	
5. _____	%	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹	
6. _____	%	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
7. _____	%	_____	_____		
8. _____	%	_____	_____		
Total Cover: _____ %					
Woody Vine Stratum (Plot size: <u>30</u> ft radius)				¹ Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.	
1. <u>Rubus armeniacus</u>	100%	yes	FAC		
2. _____	%	_____	_____		
Total Cover: 100%					
% Bare Ground in Herb Stratum <u>0%</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	various	100%		%			Gravel fill with clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Minerals (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

2 cm Muck (A10)
 Red Parent Material (TF2)
 Very Shallow Dark Surface (TF12)
 Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Remarks:

Hydric Soil Present? Yes No

HYDROLOGY

Wetland Hydrology Indicators:

<p>Primary Indicators (min. of one required; check all that apply)</p> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, & 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<p>Secondary Indicators (2 or more required)</p> <input type="checkbox"/> Water Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D4)
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Field Observations:

Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	
Saturation Present? (Includes Capillary fringe)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (Inches): _____	

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B - WETLAND RATING SUMMARY

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland "A" Date of site visit: 2/22/2022

Rated by T. Haderly Trained by Ecology? Yes No Date of training Dec-14

HGM Class used for rating Depressional & Flats Wetland has multiple HGM classes? Yes No

NOTE: Form is not complete with out the figures requested (figures can be combined).

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions or special characteristics)

1. Category of wetland based on FUNCTIONS

- Category I - Total score = 23 - 27
- Category II - Total score = 20 - 22
- X Category III - Total score = 16 - 19
- Category IV - Total score = 9 - 15

Score for each function based on three ratings
(order of ratings is not important)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>List appropriate rating (H, M, L)</i>				
Site Potential	M	M	L	
Landscape Potential	M	H	M	
Value	H	H	M	Total
Score Based on Ratings	7	4	6	17

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Estuarine	
Wetland of High Conservation Value	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	X

Maps and Figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	A3
Hydroperiods	D 1.4, H 1.2	A1
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	A1
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	A1
Map of the contributing basin	D 4.3, D 5.3	A6
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	A2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	A4
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	A5

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to another figure</i>)	S 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetland in Western Washington

For questions 1 -7, the criteria described must apply to the entire unit being rated.
If hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

- NO - go to 2 YES - the wetland class is **Tidal Fringe** - go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

- NO - Saltwater Tidal Fringe (Estuarine)** **YES - Freshwater Tidal Fringe**
*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

- NO - go to 3 YES - The wetland class is **Flats**
*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
 At least 30% of the open water area is deeper than 6.6 ft (2 m).

- NO - go to 4 YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- The wetland is on a slope (*slope can be very gradual*),
 The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
 The water leaves the wetland **without being impounded**.

- NO - go to 5 YES - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
 The overbank flooding occurs at least once every 2 years.

- NO - go to 6 YES - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding.

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 **YES** - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 **YES** - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3	2
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2	
<input type="checkbox"/> Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
<input type="checkbox"/> Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions).	Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	5
Wetland has persistent, ungrazed, plants > 1/2 of area	points = 3	
Wetland has persistent, ungrazed plants > 1/10 of area	points = 1	
Wetland has persistent, ungrazed plants < 1/10 of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:		
<i>This is the area that is ponded for at least 2 months. See description in manual.</i>		
Area seasonally ponded is > 1/2 total area of wetland	points = 4	0
Area seasonally ponded is > 1/4 total area of wetland	points = 2	
Area seasonally ponded is < 1/4 total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	7

Rating of Site Potential If score is: 12 - 16 = H 6 - 11 = M 0 - 5 = L Record the rating on the first page

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3?		0
Source	Yes = 1 No = 0	
Total for D 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3 or 4 = H 1 or 2 = M 0 = L Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (answer YES if there is a TMDL for the basin in which the unit is found)?	Yes = 2 No = 0	2
Total for D 3	Add the points in the boxes above	3

Rating of Value If score is: 2 - 4 = H 1 = M 0 = L Record the rating on the first page

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?		
D 4.1. <u>Characteristics of surface water outflows from the wetland:</u> Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0		2
D 4.2. <u>Depth of storage during wet periods: Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.</u> Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 <input type="checkbox"/> Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 <input checked="" type="checkbox"/> The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0		3
D 4.3. <u>Contribution of the wetland to storage in the watershed: Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.</u> <input type="checkbox"/> The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 <input type="checkbox"/> Entire wetland is in the Flats class points = 5		3
Total for D 4 Add the points in the boxes above		8

Rating of Site Potential If score is: 12 - 16 = H 6 - 11 = M 0 - 5 = L Record the rating on the first page

D 5.0. Does the landscape have the potential to support hydrologic function of the site?		
D 5.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0		1
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0		1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0		1
Total for D 5 Add the points in the boxes above		3

Rating of Landscape Potential If score is: 3 = H 1 or 2 = M 0 = L Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?		
D 6.1. The unit is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met. The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): <ul style="list-style-type: none"> <input type="checkbox"/> Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 <input type="checkbox"/> Surface flooding problems are in a sub-basin farther down-gradient. points = 1 <input type="checkbox"/> Flooding from groundwater is an issue in the sub-basin. points = 1 <input type="checkbox"/> The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why points = 0 <input type="checkbox"/> There are no problems with flooding downstream of the wetland. points = 0 	2	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0		0
Total for D 6 Add the points in the boxes above		2

Rating of Value If score is: 2 - 4 = H 1 = M 0 = L

Record the rating on the first page

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- Aquatic bed 4 structures or more: points = 4
 - Emergent 3 structures: points = 2
 - Scrub-shrub (areas where shrubs have > 30% cover) 2 structures: points = 1
 - Forested (areas where trees have > 30% cover) 1 structure: points = 0
- If the unit has a Forested class, check if:*
- The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- Permanently flooded or inundated 4 or more types present: points = 3
- Seasonally flooded or inundated 3 types present: points = 2
- Occasionally flooded or inundated 2 types present: points = 1
- Saturated only 1 types present: points = 0
- Permanently flowing stream or river in, or adjacent to, the wetland
- Seasonally flowing stream in, or adjacent to, the wetland
- Lake Fringe wetland** **2 points**
- Freshwater tidal wetland** **2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft². *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*

- If you counted:
- > 19 species points = 2
 - 5 - 19 species points = 1
 - < 5 species points = 0

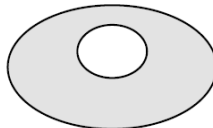
1

H 1.4. Interspersion of habitats

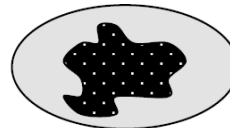
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



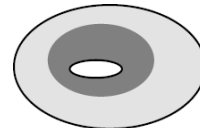
None = 0 points



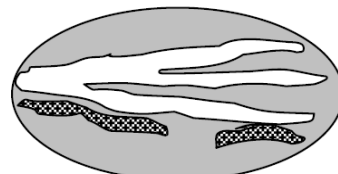
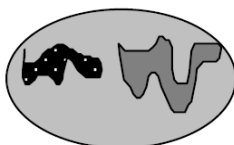
Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH = 3 points**



1

<p>H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long) <input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) <input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (see H 1.1 for list of strata) 		0
<p>Total for H 1 Add the points in the boxes above</p>		5

Rating of Site Potential If Score is: 15 - 18 = H 7 - 14 = M 0 - 6 = L Record the rating on the first page

<p>H 2.0. Does the landscape have the potential to support the habitat function of the site?</p>		
<p>H 2.1 Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). Calculate: 28 % undisturbed habitat + (_____ 0 % moderate & low intensity land uses / 2) = 28%</p> <p>If total accessible habitat is:</p> <ul style="list-style-type: none"> > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0 		2
<p>H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate: 0 % undisturbed habitat + (_____ 48 % moderate & low intensity land uses / 2) = 24%</p> <ul style="list-style-type: none"> Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0 		1
<p>H 2.3 Land use intensity in 1 km Polygon: If</p> <ul style="list-style-type: none"> > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1km Polygon is high intensity points = 0 		0
<p>Total for H 2 Add the points in the boxes above</p>		3

Rating of Landscape Potential If Score is: 4 - 6 = H 1 - 3 = M < 1 = L Record the rating on the first page

<p>H 3.0. Is the habitat provided by the site valuable to society?</p>		
<p>H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose only the highest score that applies to the wetland being rated.</i></p> <p>Site meets ANY of the following criteria: points = 2</p> <ul style="list-style-type: none"> <input type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW priority species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan <p>Site has 1 or 2 priority habitats (listed on next page) with in 100m points = 1</p> <p>Site does not meet any of the criteria above points = 0</p>		1

Rating of Value If Score is: 2 = H 1 = M 0 = L Record the rating on the first page

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.

<http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here:

<http://wdfw.wa.gov/conservation/phs/list/>

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

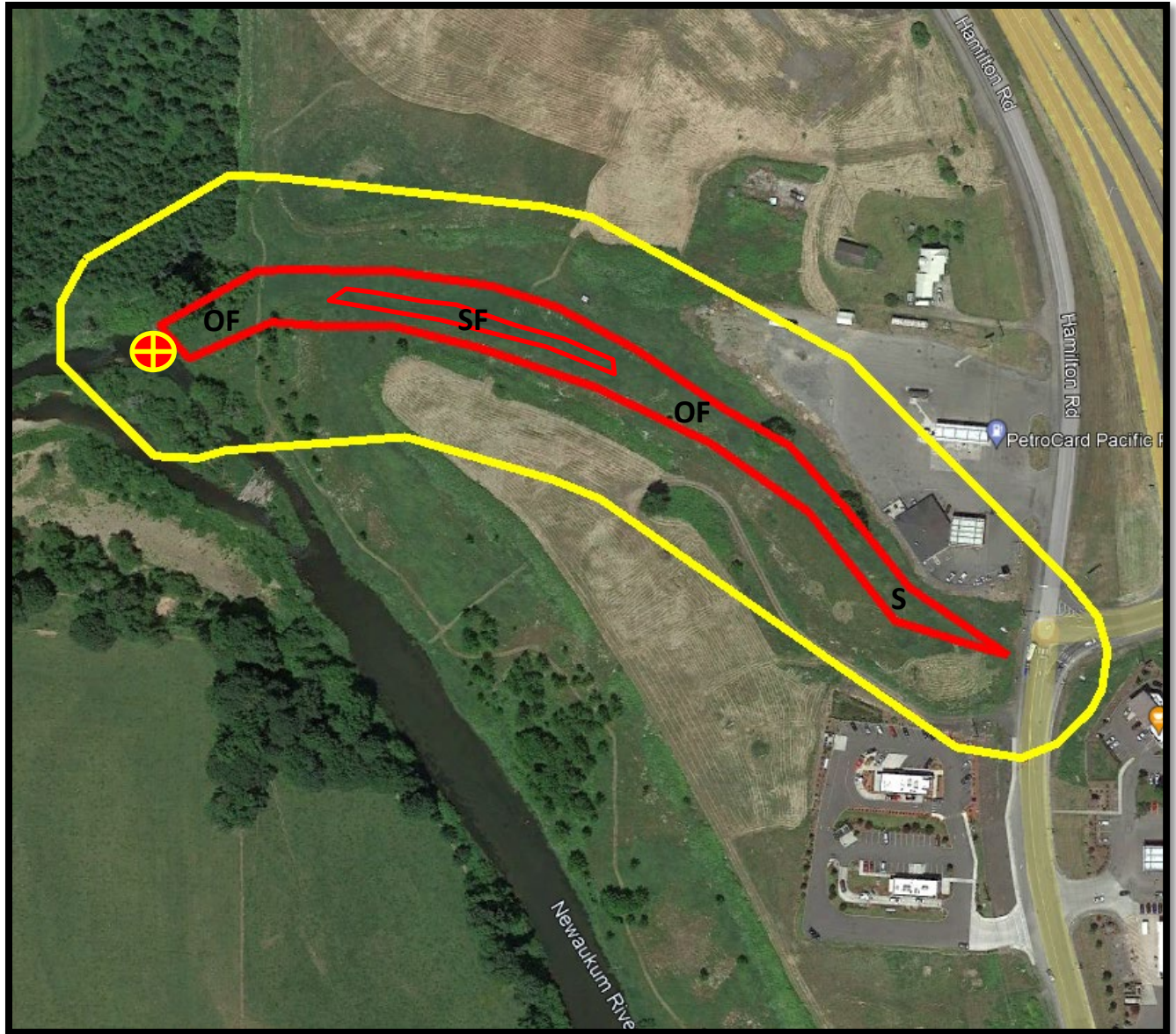
- Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine Wetlands Does the wetland meet the following criteria for Estuarine wetlands? <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt <input type="checkbox"/> Yes - Go to SC 1.1 <input checked="" type="checkbox"/> No = Not an estuarine wetland	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No - Go to SC 1.2	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Category II	
SC 2.0. Wetlands of High Conservation Value (WHCV)	
SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <input type="checkbox"/> Yes - Go to SC 2.2 <input checked="" type="checkbox"/> No - Go to SC 2.3	
SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Not WHCV	
SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <input type="checkbox"/> Yes - Contact WNHP/WDNR and to SC 2.4 <input checked="" type="checkbox"/> No = Not WHCV	
SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Not WHCV	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i>	
SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <input type="checkbox"/> Yes - Go to SC 3.3 <input checked="" type="checkbox"/> No - Go to SC 3.2	
SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <input type="checkbox"/> Yes - Go to SC 3.3 <input checked="" type="checkbox"/> No = Is not a bog	
SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <input type="checkbox"/> Yes = Is a Category I bog <input type="checkbox"/> No - Go to SC 3.4	
NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.	
SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <input type="checkbox"/> Yes = Is a Category I bog <input type="checkbox"/> No = Is not a bog	

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.</p> <p><input type="checkbox"/> Mature forests (west of the Cascade Crest): Stands where the largest trees are 80-200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).</p> <p><input type="checkbox"/> Yes = Category I <input checked="" type="checkbox"/> No = Not a forested wetland for this section</p>	
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p><input type="checkbox"/> Yes - Go to SC 5.1 <input checked="" type="checkbox"/> No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 ac (4350 ft²)</p> <p><input type="checkbox"/> Yes = Category I <input type="checkbox"/> No = Category II</p>	
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <p><input type="checkbox"/> Long Beach Peninsula: Lands west of SR 103</p> <p><input type="checkbox"/> Grayland-Westport: Lands west of SR 105</p> <p><input type="checkbox"/> Ocean Shores-Copalis: Lands west of SR 115 and SR 109</p> <p><input type="checkbox"/> Yes - Go to SC 6.1 <input checked="" type="checkbox"/> No = Not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?</p> <p><input type="checkbox"/> Yes = Category I <input type="checkbox"/> No - Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?</p> <p><input type="checkbox"/> Yes = Category II <input type="checkbox"/> No - Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?</p> <p><input type="checkbox"/> Yes = Category III <input type="checkbox"/> No = Category IV</p>	
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	

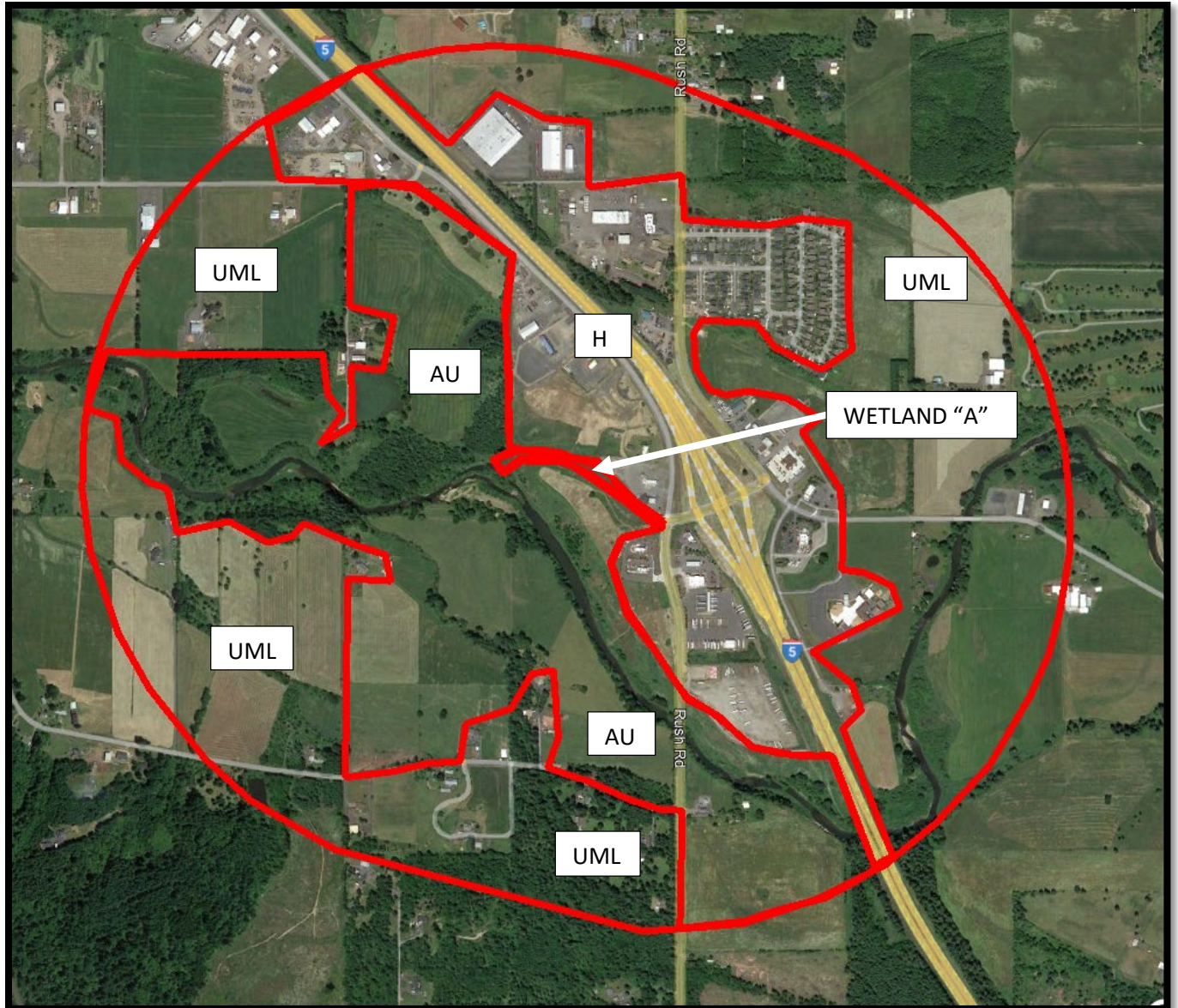


SF = Seasonally Flooded
OF = Occasionally Flooded
S = Saturated

Outlet  150 ft Offset 

Loowit Consulting Group, LLC
Natural Resources & Project
Management
360.431.5118

Figure A1
Hydroperiods
121 Hamilton Road – Napavine, WA



Google Earth Pro

Accessible Habitat

- 28% Undisturbed (AU)
- 0% Moderate & Low Intensity Land Use/2 = (AML)

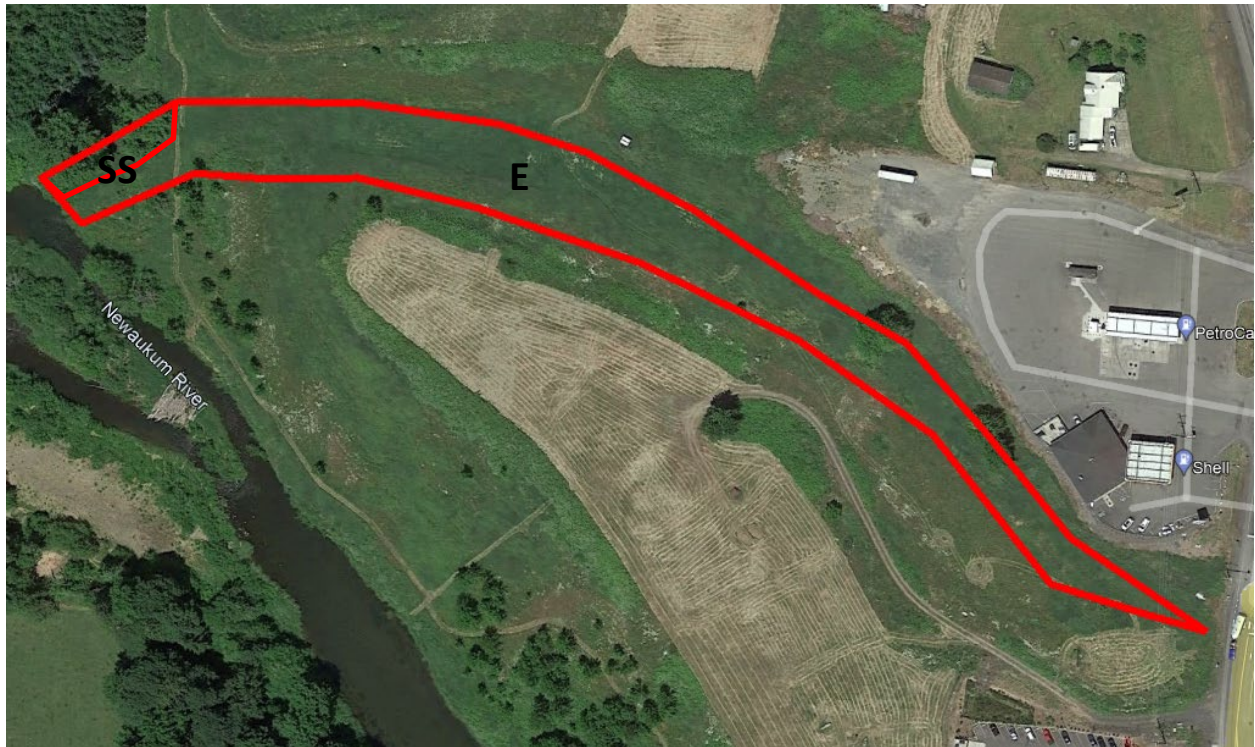
Undisturbed Habitat

- 0% Undisturbed (UH)
- 48% Moderate & Low Intensity Land Use/2 = (UML)

High Intensity = HI (24%)

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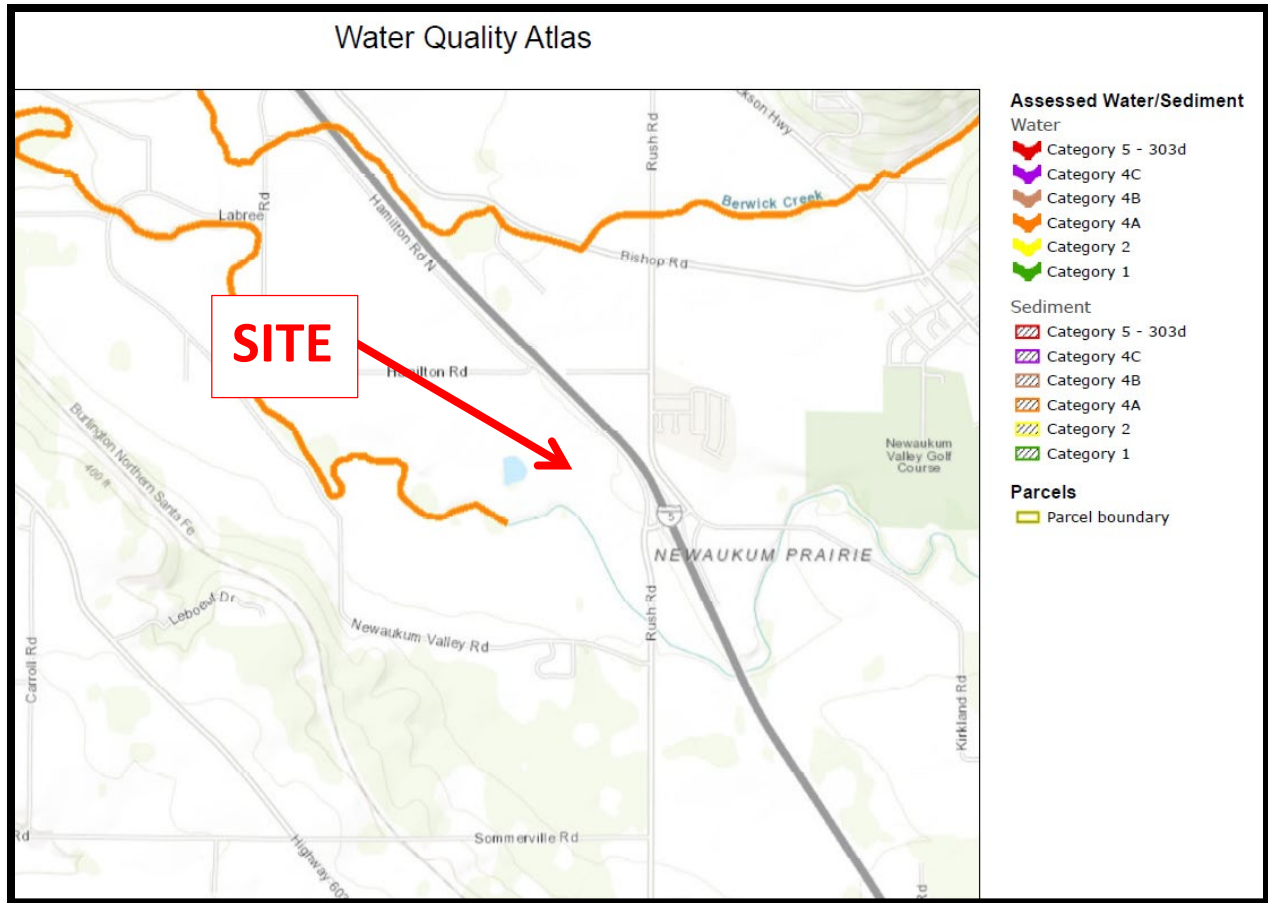
Figure A2
1km Polygon
121 Hamilton Road – Napavine, WA



E = Emergent
SS = Scrub Shrub

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Figure A3
Cowardin Plant Classes
121 Hamilton Road – Napavine, WA



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Figure A4
303(d) Listed Waters
121 Hamilton Road – Napavine, WA

EXHIBIT 4

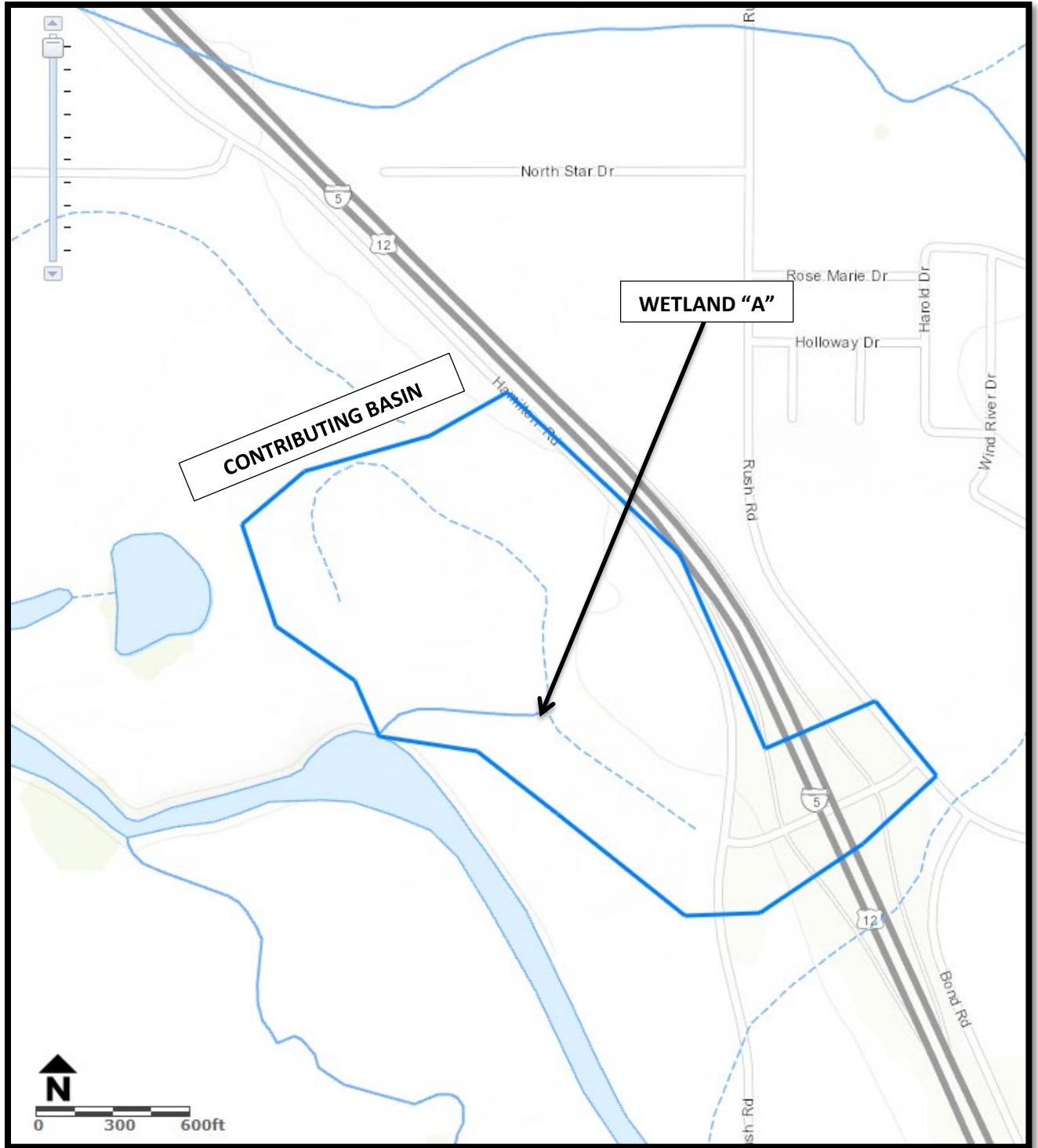
Category 3 listings contain data insufficient in determining water quality, therefore are removed from your results.

[Include these 2 omitted listings.](#)

ListingID	AU ID	Medium	Parameter	Category	Waterbody Name	WRIA	WQ Improvement Project
7770	17100103000226	Water	Temperature	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Basin Temperature TMDL
11003	17100103000226	Water	Dissolved Oxygen	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Basin Dissolved Oxygen TMDL
16758	17100103000226	Water	Bacteria	4A	NEWAUKUM RIVER	23 - Upper Chehalis	Upper Chehalis River Bacteria TMDL

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Figure A5
TMDL
121 Hamilton Road – Napavine, WA



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Figure A6
Contributing Basin
121 Hamilton Road – Napavine, WA

APPENDIX C – CLIMATOLOGICAL SUMMARY

Daily Data | AgWeatherNet at Washington State University

Date	Date	Min°F	Avg°F	Max°F	Avg1.5m DP°F	Avg1.5m RH%	Avg1.5m LWu.	AvgDir	Avg Speedmph	2m MaxGustmph	2 in. °F	Min°F	Avg°F	AvgSoilVWC%	TotPrecin	TotalSolarRadMJ/m²	EToin	E1
2022/02/16	16	36.3	45.6	53.1	39.3	79.6	0.00	SW	2.0	8.2	47.1	45.3	45.9	42.9	0.00	8.39	0.03	0.0
2022/02/17	17	34.5	42.7	48.9	39.7	89.7	0.05	S	3.1	13.9	45.8	45.9	46.3	42.6	0.01	4.56	0.02	0.0
2022/02/18	18	37.8	43.0	54.0	40.1	90.4	0.07	W	1.6	8.2	46.7	46.0	46.4	42.5	0.00	8.14	0.03	0.0
2022/02/19	19	37.2	42.4	49.8	39.1	88.5	0.04	S	4.9	17.1	45.3	45.7	46.1	42.2	0.00	4.13	0.03	0.0
2022/02/20	20	36.4	41.2	47.3	37.3	86.3	0.07	SW	4.2	16.4	45.3	45.3	45.8	42.2	0.10	8.07	0.03	0.0
2022/02/21	21	34.3	37.6	44.3	33.3	84.8	0.07	E	4.2	16.7	43.3	44.7	45.2	43.1	0.12	5.94	0.03	0.0
2022/02/22	22	23.4	32.0	37.4	23.4	71.5	0.00	N	6.1	16.7	40.4	43.2	44.0	43.3	0.00	5.36	0.03	0.0
2022/02/23	23	18.6	28.2	39.6	16.5	67.0	0.00	W	2.0	10.3	36.9	40.7	41.6	42.6	0.00	13.37	0.03	0.0
2022/02/24	24	25.0	32.4	42.5	25.4	77.4	0.00	S	2.3	12.4	38.4	40.3	40.9	42.3	0.00	8.95	0.03	0.0
2022/02/25	25	20.4	32.5	50.2	24.7	77.7	0.00	N	1.7	11.0	37.5	39.5	40.4	42.1	0.00	13.90	0.04	0.0
2022/02/26	26	26.3	36.6	44.3	31.0	82.5	0.04	S	4.1	15.7	37.2	39.7	40.2	42.2	0.18	3.03	0.03	0.0
2022/02/27	27	42.1	48.0	51.5	45.8	92.1	0.13	S	7.0	19.2	42.9	40.3	41.3	44.4	0.82	2.38	0.02	0.0
2022/02/28	28	51.6	53.4	55.5	51.5	93.4	0.21	S	6.3	19.2	48.6	43.0	45.0	45.6	2.78	1.36	0.02	0.0
2022/03/01	1	47.2	53.2	61.7	49.0	86.7	0.11	S	3.4	15.0	51.9	47.0	47.9	44.7	0.30	9.61	0.05	0.0
2022/03/02	2	44.7	49.3	53.3	46.6	90.3	0.08	S	2.9	10.7	50.2	48.9	49.2	44.1	0.16	3.65	0.03	0.0

Napavine Truck Stop

22-000419 SP-01

**SEPA Environmental
Checklist**

September 2022

Napavine Truck Stop (22-000419 SP-01)

SEPA Environmental Checklist

September 2022

Prepared for:

GMD Land Company, LLC

Prepared by:

SCJ Alliance

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ATTACHMENTS

- A Site Plan

A BACKGROUND

1. Name of proposed project, if applicable:

Napavine Truck Stop (TravelCenters of America travel service facility)

2. Name of applicant:

GMD Land Company, LLC

3. Address and phone number of applicant and contact person:

GMD Land Company LLC
Gurinderjit Sidhu
7664 N Santa Fe Avenue
Fresno, California 93722

4. Date checklist prepared:

September 8, 2022

5. Agency requesting checklist:

City of Napavine

6. Proposed timing or schedule (including phasing, if applicable):

Project is proposed to start onsite construction in spring 2023 with completion in early 2024. Offsite elements will begin as soon as final approval is received from WSDOT and is anticipated to follow the onsite schedule with completion in 2024.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

There are no plans for future additions, expansion, or other activities related to this proposal.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Wetlands and Streams Report, Loowit Consulting Group, LLC, August 24, 2022

Geotechnical Memorandum, Landau Associates, April 7, 2022

Traffic Impact Analysis, SCJ Alliance, September 2022

Preliminary Drainage Report, SCJ Alliance, September 2022

- 9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.**

There are no other applications pending or other proposals directly affecting this property.

- 10. List any government approvals or permits that will be needed for your proposal, if known.**

Development permits, City of Napavine

Construction agreement for work within the WSDOT right-of-way.

- 11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)**

The project will construct a travel center facility including a convenience store with internal fast food restaurant, drive-thru, and amenities including showers and laundry. The travel center will include an auto fueling canopy and parking area, truck fueling canopy and truck parking area, a detached vehicle maintenance building, and platform scale. Utility services, stormwater management, and landscape and wetland buffer enhancements are proposed. The travel center proposes three driveway entrances to Hamilton Road. The project site is 14.0 acres. See also the Site Plan (Attachment A). Offsite traffic mitigation is proposed to include the construction of a modern roundabout at the intersection of Hamilton Road and Rush Road, the construction of a compact roundabout at the intersection of Rush Road and Kirkland Road, and channelization improvements on the I-5 southbound ramp at the I-5 exit 72 interchange.

- 12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.**

The address of the project site is 121 Hamilton Road, Napavine, WA. The site encompasses Lewis County Parcel No. 018050005000 and No. 018150004000 (see Site Plan in Attachment A).

B ENVIRONMENTAL ELEMENTS

1. Earth

- a. **General description of the site: (underline one): flat, rolling, hilly, steep slopes, mountainous, other**

The site is mainly flat with a gentle slope towards the southwest and an excavated depression acting as a stormwater retention in the southwest corner. It is bordered by Hamilton Road to the East and a wetland to the South. In approximately 2005, the western portion of the site was raised with uncontrolled fill.

- b. **What is the steepest slope on the site (approximate percent slope)?**

Less than 3%

- c. **What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.**

Alluvium (Qa) underlain by alpine glacial outwash (Qapo[h]).

The alluvium consists of silt, sand, and gravel deposited in streambeds. The alpine glacial outwash consists of sand and gravel deposits.

- d. **Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.**

There is no indication or history of unstable soils on the site.

- e. **Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.**

Grading will be performed onsite. Grading activities will occur over the entire parcel, approximately 14 acres to prepare the site for development. Approximately 10,000 cubic yards of select fill will be required for pavement areas and will come from an approved clean fill source.

- f. **Could erosion occur as a result of clearing, construction, or use? If so, generally describe.**

Erosion could occur as part of earth moving during temporary construction activities that involve ground disturbance in all locations, particularly during precipitation events. All project components would be subject to NPDES requirements, which would include construction best management practices (BMPs) and other measures to reduce potential erosion.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?**

Approximately 73% of the site will be covered with impervious surfaces after construction.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:**

Erosion and sediment control measures will be employed and maintained throughout the construction process as site conditions warrant. The proposed project will follow construction best practices by laying down silt fencing. The plan also includes buffer enhancement of approximately 45,600 sq ft of nearly non-functional wetland buffer and native upland grass seed will be used in areas of bare soil.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.**

Emissions consistent with construction activities such as from trucks, heavy, equipment, and dust are expected during construction. Once complete, operation of the project will generate CO₂ emissions from the increase in traffic to the site. However, the project includes mitigation to reduce impacts from the additional traffic, which are summarized in Section 14.h. With the implementation of the proposed mitigation, emissions are not expected to increase greatly over the existing conditions.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.**

There are no off-site sources of emissions or odor that would affect the proposal.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:**

Proposed measures anticipated during construction are the use of dust control to prevent fugitive dust and avoiding unnecessary idling of construction equipment for extended periods of time. No measures would be required after construction is complete.

3. Water

- a. Surface Water:**

This section is summarized from the Wetlands and Streams Report, prepared by Loowit Consulting Group, LLC (August 24, 2022).

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

Washington Department of Natural Resources (WADNR) mapping application depicts an unnamed Type N (Non-fish) stream, south and west of the subject site which flows

west/southwest to the Type S (Shoreline) Newaukum River southwest of the subject site. Another mapped Type N is depicted transecting the subject site from north to south but was confirmed in the field to not be present as the site has been historically filled with earthen material.

A single depressionnal freshwater emergent wetland (Wetland A) was located to the south of the subject site within a historic meander channel of the Newaukum River. Wetland A is rated as a Category III wetland with moderate water quality, a low hydrologic score, and a moderate habitat score according to the Washington State Wetland Rating System for Western Washington, 2014 Update.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No in-water work is proposed as part of the project. A wetland buffer reduction has been proposed with buffer enhancement to allow an efficient design and use of the site as a truck fueling a travel stop facility. To compensate for the reduction of the 150-foot buffer to 110 feet, the applicant will implement all of the required provisions listed in NMC 14.010.120.E.8.e, including the removal of invasive species and installation of native trees and shrubs (see also Section 3.d, below).

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

The project will not place material in or remove material from surface water or wetlands.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The project will not require surface water withdrawals or diversions.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

A small portion of the southwest corner lies in Zone AE as shown on FEMA Flood Insurance Rate Map 5301021781C. A Letter of Map Revision (LOMR) was executed for the site on December 18, 2015, likely associated with fill placed on the site from prior development. The proposed project will not place any structures within the portion of the site that is mapped as floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No waste materials would be discharged to surface waters as a result of the project.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

The site will be connected to municipal water services for drinking water. It is unlikely that a connection to a well will occur, impact would be negligible as City code only allows well connection for irrigation purposes.

- 2) **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

No waste materials will be discharged as a result of the project.

c. **Water runoff (including stormwater):**

- 1) **Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.**

A small stormwater pond serving the existing site is located in the southwest corner of the site. As part of the proposed project, this stormwater pond will be retired and a new bioretention facility and a flow control structure will be located west of the proposed truck parking. This facility will be sized to handle runoff from the entire development.

The runoff generated by the site will be collected in catch basins and conveyed to the stormwater facility via corrugated polyethylene pipe (CPEP) or an approved equal. The stormwater leaving the proposed pond will be discharged into the existing wetland located west of the parcel.

- 2) **Could waste materials enter ground or surface waters? If so, generally describe.**

Storm water will not be allowed to flow directly into wetlands or buffers without first being collected and treated according to State and City requirements.

- 3) **Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.**

The project will not affect drainage patterns in the vicinity.

d. **Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:**

Approximately 45,600 sq ft of nearly non-functional wetland buffer will be enhanced by the installation of native forbs, shrubs, and trees. Removing invasive species and installing native plantings will significantly increase the ecological functions of the wetland buffer thereby providing increased protection of the adjacent wetland. Table 5 summarizes proposed plantings for the wetland buffer enhancement area. In addition to the plantings, a native upland grass seed will be used in areas of bare soil to help prevent erosion and provide vegetative ground cover.

The following sequencing will be applied during the course of enhancing the buffer area:

1. Invasive plants and other debris will be removed from the planting area.
2. Area will be lightly scarified to a depth of 4-6 inches.
3. Project biologist or landscape architect will identify and flag areas for plant installation.
4. Native trees and shrubs installed.
5. Native upland grass seed mix (or similar) applied to reduce erosion.
6. Periodic maintenance including mowing, trimming, fertilization, dead plant replacement, and irrigation implemented as required.

The project will comply with all State and City regulations for the treatment and handling of stormwater. No other mitigation is required.

4. Plants

a. Check the types of vegetation found on the site:

- deciduous tree: black cottonwood
- evergreen tree: Douglas fir
- shrubs: landscape shrubs
- grass
- pasture: N/A
- crop or grain: N/A
- orchards, vineyards or other permanent crops.: N/A
- wet soil plants: reed canary grass, thistle, buttercup, dock, etc.
- water plants: N/A
- other types of vegetation: Himalayan blackberry, clover, etc.

The site was previously cleared.

b. What kind and amount of vegetation will be removed or altered?

The grass will be removed during grading. Invasive species within the wetland buffer will be removed during enhancement (see Section 3.a.2, above).

c. List threatened and endangered species known to be on or near the site.

There are no known threatened or endangered species on or near the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Approximately 27% of the site will be landscaped with implementation of the project, per City requirements. In addition, the existing wetland on the site will be enhanced, as described in Section 3.d, above.

e. List all noxious weeds and invasive species known to be on or near the site.

There were several noxious weeds observed onsite during the wetlands and streams fieldwork, including Canada thistle, Queen Anne's Lace, reed canary grass, and Himalayan blackberry. All noxious and invasive species will be removed during project development.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other

mammals: deer, bear, elk, beaver, other

fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site.

There are no threatened or endangered species known to be on or near the site.

There is an active bald eagle nest in a large cottonwood tree located off-site near the SW corner of the subject site. After successful protection and significant population increases, bald eagles were removed from the federal endangered species list in 2007, then from the State of Washington list in 2017. The State of Washington currently lists bald eagles as "sensitive," and most of the state's special protective measures for bald eagles have been eliminated.

c. Is the site part of a migration route? If so, explain.

Washington is within the Pacific Flyway migratory bird route. Migration routes may exist near the site. However, it is not anticipated that the proposal will impact these migratory bird routes.

d. Proposed measures to preserve or enhance wildlife, if any:

No measures to preserve or enhance wildlife are included in the project.

e. List any invasive animal species known to be on or near the site.

There are no known invasive animal species known to be on or near the site.

6. Energy and Natural Resources

- a. **What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.**

Electricity will be used to power the proposed facility.

- b. **Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.**

The project would not affect the potential use of solar energy by adjacent properties.

- c. **What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:**

There are no energy conservation features included in the project at this time; however, the project proponent may consider the addition of EV charging stations at the facility.

7. Environmental Health

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

The proposed project will construct and operate a fueling facility and truck stop. Due to the presence of diesel and gasoline fuel, there is an elevated risk of fire and explosion, spill, and hazardous waste at the site. The project will be constructed and operated in accordance with all local, state and federal regulations for the handling and distribution of hazardous materials such as bulk fuel storage.

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

There is no known contamination at the site.

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

There are no known existing hazardous conditions that would affect the project.

- 3) **Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.**

During construction, relatively small quantities of fuel for various pieces of construction equipment would likely be stored on site. This could include diesel, gasoline, and propane. Other construction-related materials likely would include solvents and adhesives used in relatively small quantities. All chemicals used onsite will be stored in accordance with Occupational Safety and Health Administration (OSHA) requirements.

The proposed project is a fueling station and will have underground storage tanks onsite for the commercial sale of diesel and gasoline fuels.

4) Describe special emergency services that might be required.

Normal fire, police and emergency medical services will be required during construction to respond to potential spills, fire, or medical emergencies. No special services would be required for construction or operation of the project.

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

Standard construction safety practices will be in effect during construction. Operation of the facility will follow regulatory standards for operation of fueling facilities.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

There are no noise sources that would affect the proposed project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

The project will create a new noise source with the addition of automobile traffic to the site. This noise is anticipated to be similar to noise associated with the surrounding commercial land uses.

3) Proposed measures to reduce or control noise impacts, if any:

No measures are required.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The site consists of a large, fairly level, mowed-grass field in the western half; a single-family residence and outbuildings in the southeast corner of the eastern half; and the remnants of a manufactured-home retail business in the middle and northern sections of the eastern half of the site. The buildings associated with the manufactured-home business have all been removed, but the graveled and paved remnants of the driveways and parking areas remain, as well as the remnants of old signs, and utility poles. The western half of the site is undeveloped with the exception of a stormwater pond in the southwest corner.

There are commercial uses to the north, a gas station and undeveloped commercial land to the south, agriculture, forest land and rural residential to the west, and Hamilton Road and Interstate-5 to the east.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?**

The site has not been used for agricultural purposes in the last decade.

- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:**

The project will not affect or be affected by surrounding agricultural activities.

- c. Describe any structures on the site.**

There is a vacant, single-family residence and outbuildings in the southeast corner of the site.

- d. Will any structures be demolished? If so, what?**

All structures currently onsite will be demolished as part of the project.

- e. What is the current zoning classification of the site?**

The site is zoned Commercial.

- f. What is the current comprehensive plan designation of the site?**

The current comprehensive plan designation is Commercial.

- g. If applicable, what is the current shoreline master program designation of the site?**

There are no shorelines of the state on the project site.

- h. Has any part of the site been classified as a critical area by the city or county? If so, specify.**

There is one wetland located south of the site. The wetland buffer extends onto the project site, as shown on the project site plan (see also Section 3.a, above). There are no other critical areas on the site.

- i. Approximately how many people would reside or work in the completed project?**

The existing single-family home would be demolished as part of the project. The completed project would have approximately 30 employees.

- j. Approximately how many people would the completed project displace?**

The project will not displace any people. The existing residence on the site is vacant.

k. Proposed measures to avoid or reduce displacement impacts, if any:

No measures are required.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project is compatible with the current zoning as well as surrounding land uses. No additional measures are required.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

The project will not have land use impacts, thus no measures are required.

9. Housing**a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.**

Not applicable, Commercial.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable, Commercial.

c. Proposed measures to reduce or control housing impacts, if any:

The project will not have any housing impacts.

10. Aesthetics

The project will be designed to comply with all City regulations for design, setbacks, signage, landscaping and lighting. The nature of the business is compatible with the surrounding land uses.

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The retail and truck facility building will be 35 feet tall at the highest point. The exterior material is planned to be a combination of textured and smooth stucco finishes and plastic components.

b. What views in the immediate vicinity would be altered or obstructed?

The project would not obstruct or alter any views in the vicinity.

c. Proposed measures to reduce or control aesthetic impacts, if any:

The project will not have aesthetic impacts, thus no measures are required.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The project will include lighting from the proposed facilities, which are scheduled to operate 24 hours per day. All lighting will be directed downward toward the building, pump area, and parking lot. No lights would be directed off site. Proposed lighting would be similar to other commercial activities in the immediate vicinity.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No light from the site is expected to create any safety hazards. Proposed lighting would be similar to other commercial activities in the immediate vicinity.

c. What existing off-site sources of light or glare may affect your proposal?

There are no existing off-site sources of light or glare that would affect the proposed project.

d. Proposed measures to reduce or control light and glare impacts, if any:

As noted above, all lighting, including parking lot light standards, will be shielded and directed downward, away from the surrounding land uses.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

The Newaukum Golf Course is located approximately 0.5-mile east of the project site, east of I-5. No other recreational opportunities are in the immediate vicinity.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No, the project would not affect any recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The project will not affect recreation, thus no measures are required.

13. Historic and Cultural Preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

There are no buildings, structures, or sites that are over 45 years old listed in or eligible for listing in any historic register located on or near the site.

- b. **Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.**

There are no landmarks, features, or other evidence of Indian or historic use or occupation. There are no historic properties within 0.5-mile of the site.

- c. **Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.**

The EPA NEPAassist database (accessed at <https://nepassistool.epa.gov/nepassist> on September 7, 2022), was used to determine if there were any known historic or cultural resources within 0.5-mile of the project site. In addition, SCJ Alliance staff performed a reconnaissance level evaluation of the site to look for any surface indications or evidence of potential resources. None were found.

- d. **Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.**

The project will not affect historic or cultural resources. No measures are required.

14. **Transportation**

The following sections are summarized from the Traffic Impact Analysis prepared for the project (SCJ Alliance, September 2022).

- a. **Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.**

Interstate 5 (I-5) is a north-south divided highway classified an Urban Interstate and is a highway of statewide significance (HSS). This portion of I-5 has a posted speed limit of 70 mph. North of the Rush Road interchange the roadway provides three lanes in each direction. The Rush Road interchange includes a southbound drop lane and a northbound add lane. South of the interchange the roadway provides two lanes in each direction.

Rush Road is the main north-south minor arterial through Napavine providing access to and from Interstate 5. In the project vicinity, Rush Road provides a single lane in each direction with paved shoulders and a posted speed limit of 25 mph south of the project and 35 mph east of the project.

Hamilton Road is a two-lane north-south roadway extending from Labree Road to Rush Road. The roadway has a single lane in each direction with paved shoulders and a posted speed limit of 35 mph.

Kirkland Road is a two-lane roadway that generally runs north-south connecting from Rush Road to Forest Napavine Road. The roadway has a speed limit of 25 mph.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?**

The site is not currently served by public transit. The nearest transit stop is 1.3 miles north of the project site.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?**

There is currently no parking onsite. The completed project would have 105 parking spaces for use at the fueling station and retail center, plus 97 overnight parking spaces for trucks.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).**

Due to the increase in traffic resulting from operation of the project, improvements will be made to the surrounding network, as described in Section 14.h, below.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.**

The project site is approximately 5.5 miles south of the nearest airport (Chehalis-Centralia airport) and 1.1 miles east of the nearest rail line. The project would not affect operation of the airport or rail line. The project is not in the vicinity of any water transportation.

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?**

The completed project will generate approximately 7,350 total daily trips. It is expected that peak volumes will occur during the PM peak hour and that approximately 25% of the volumes will be truck traffic. Traffic generation was estimated using the current (11th) edition of the ITE Trip Generation Manual.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.**

The project will not interfere with, affect, or be affected by the movement of agricultural and forest products.

- h. Proposed measures to reduce or control transportation impacts, if any:**

As part of the proposed truck stop project the following mitigation measures will be constructed:

- A full-size single-lane roundabout at Rush Road and Hamilton Road, with single lane approaches for the north and south legs and a left-turn lane and right-turn lane on the east leg.

- Access control at the southbound ramps intersection eliminating the westbound to southbound left-turn movement onto the southbound on-ramp.
- Widen Rush Road between the southbound ramps and the I-5 bridge to provide a refuge lane for southbound to eastbound left-turn vehicles, allowing for two-stage left-turn maneuvers.
- Install a compact single-lane roundabout at Rush Road and Kirkland Road, with all single lane approaches.
- Frontage improvements on Hamilton Road as required by the City of Napavine.

15. Public Services

- a. **Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.**

The project will require additional services for the proposed new use of a currently vacant site. This new use is not expected to significantly affect the capacity or distribution of public services.

- b. **Proposed measures to reduce or control direct impacts on public services, if any.**

The project will not have public service impacts, thus no measures are required.

16. Utilities

- a. **Underline utilities currently available at the site.**

electricity, natural gas, water, refuse service, telephone/communications, sanitary sewer, septic system, other.

- b. **Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.**

The project site will be connected to sanitary sewer and water service provided by the City of Napavine. Electricity is provided to the site by Lewis County Public Utility District. There are several communications providers in the area, such as CenturyLink and Xfinity/Comcast. The general construction activities associated with the proposal are typical of commercial development: grading, utility installation, building construction, paving, and landscaping.

C SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:  _____

Name of Signee: Sharese Graham, PMP _____

Position and Agency/Organization: Senior Environmental Planner, SCJ Alliance _____

Date Submitted: September 8, 2022 _____

ATTACHMENT A

Site Plan



Technical Memo

To Bryan Morris, Public Works/Community Development Director, City of Napavine
From: Malissa Paulsen, SCJ Alliance
Date: September 8, 2022
Project: Napavine Truck Stop
Subject Critical Areas Assessment Report

The critical areas assessed in this report are within or abut to Lewis County Parcel No. 018050005000 and No. 018150004000. The proposed project has no plans for future additions, expansion, or other activities.

This section is summarized from the Wetlands and Streams Report, prepared by Loowit Consulting Group, LLC (August 24, 2022).

Wetlands

A single depressional freshwater emergent wetland (Wetland A) was located to the south of the subject site within a historic meander channel of the Newaukum River. Wetland A is rated as a Category III wetland with moderate water quality, a low hydrologic score, and a moderate habitat score according to the Washington State Wetland Rating System for Western Washington, 2014 Update.

According to NMC 14.010.120.E, the City of Napavine requires buffers on jurisdictional wetlands depending on category, habitat score, and proposed land use intensity. A Category III wetland with a moderate habitat score next to a proposed high intensity land use, requires a standard 150-foot-wide buffer. NMC 14.010.120.E.8.e allows buffers to be reduced from High Intensity, 150 feet, to a Moderate Intensity of 110 feet.

Functionally Isolated Buffers

There are two areas at the subject site that met the definition of functionally isolated buffers per NMC 14.010.120.E.8.a: (1) Southeast Fill Area and (2) Southwest Storm Pond Area. The Southeast Fill Area consists of historic fill including concrete, bricks, asphalt, rocks, and soil. Not only is the area non-functional, it is elevated above the wetland by a very steep slope vegetated with invasive blackberries. The fill is historic and does not appear to be of recent vintage based on well-established vegetative coverage and no recent grading in the area.

The Southwest Storm Pond Area is functionally isolated from Wetland A by a created earthen berm around the pond that is routinely mowed as is the entire storm pond when not inundated with water. The pond was constructed when the site was filled as a measure to collect, control, and treat, storm water at the site.



Fish and Wildlife Habitat Conservation Areas

Washington Department of Natural Resources (WADNR) mapping application depicts an unnamed Type N (Non-fish) stream, south and west of the subject site which flows west/southwest to the Type S (Shoreline) Newaukum River southwest of the subject site. Another mapped Type N is depicted transecting the subject site from north to south but was confirmed in the field to not be present as the site has been historically filled with earthen material.

According to NMC 14.010.120 (B), the City of Napavine requires buffers on all jurisdictional streams including Newaukum River, which requires a 200-foot wide buffer measured from the ordinary high water mark (OHWM). Buffers on the Newaukum River are encompassed by the adjacent wetland and associated wetland buffers.

Frequently Flooded Areas

A small portion of the southwest corner lies in Zone AE as shown on FEMA Flood Insurance Rate Map 5301021781C. A Letter of Map Revision was executed for the site on December 18, 2015, likely associated with fill placed on the site from prior development. The proposed project will not place any structures within the portion of the site that is mapped as floodplain.

Critical Area Impacts

No in-water work is proposed as part of the project. A wetland buffer reduction has been proposed with buffer enhancement to allow an efficient design and use of the site as a truck fueling and travel stop facility. To compensate for the reduction of the 150-foot buffer to 110 feet, the applicant will implement all of the required provisions listed in NMC 14.010.120.E.8.e, including the removal of invasive species and installation of native trees and shrubs.

Erosion and sediment control measures will be employed and maintained throughout the construction process as site conditions warrant. The proposed project will follow construction best practices by laying down silt fencing. The plan also includes buffer enhancement of approximately 45,600 sq ft of nearly non-functional wetland buffer and native upland grass seed will be used in areas of bare soil.

The existing storm pond will be expanded and upgraded to properly collect and treat all storm water from development footprint prior to discharge into wetland buffer. The majority will passively infiltrate and only discharge during periods of higher-than-normal rainfall events.

Conclusion

Development of the subject site into a travel center facility can be accomplished with no direct long-term impact on wetlands or streams. Enhancement of a degraded wetland buffer along the southern portion of the site will significantly increase ecological functions and provide greater protection to the adjacent wetland.