DRAINAGE REPORT AND STORMWATER POLLUTION PREVENTION PLAN

2401 INTER

PUYALLUP, WASHINGTON
PARCEL NO. 2105200150

December 5, 2025

PROJECT ADDRESS:
2401 INTER AVE SE
PUYALLUP, WA 98372

PROPERTY OWNER:
MIKE PHAIR
615 EAST PIONEER #209
PUYALLUP, WA 98372

ENGINEER:
MCINNIS ENGINEERING
202 E 34th St. Tacoma, WA
CONTACT: WILL MCINNIS
(253) 414-1992

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Project Engineer's Certification:

"I hereby state that this Storm Drainage Report and Stormwater Pollution Prevention Plan for the 2401 Inter project has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the city of Puyallup does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."

12/5/25

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Section 1: Proposed Project Description

The project address is 2401 Inter Ave SE Puyallup, WA 98372. Parcel Number 2105200150. See Figure 1 in Appendix A. The project parcel consists of approximately 80,436 square feet (SF).

The proposed projects limits consist of approximately 89,332 SF. This includes the proposed parking for trucks, with another parking area for employees of the neighboring Western parcel. Contech water quality chamber, ADS detention chamber and landscaped areas. Areas cleared or regraded not proposed for impervious surface shall be restored to meet the soil amendment BMP requirements per the 2021 Pierce County Stormwater Management and Site Development Manual Volume III, Section 3.1 and establish a dense cover of lawn, landscape, or groundcover.

The project is accessed from Inter Ave at the south side of the parcel and will utilize the proposed driveway for access. According to the SCS soil mapping, the soils on the site are comprised completely of Briscot loam soils. The site is flat and maintains a 0%-2% slope. The parcel area within the clearing limits is flat with most of the slopes beyond the extents of the proposed site area. See Figure 2 in Appendix A. The parcel area within the Clearing limits is flat with most of the slopes beyond the extents of the proposed site area as shown in Figure 3: Surface Exhibit.

Table 1: Impervious/ Pervious Areas

Project Land Use	Existing Area (SF)	Proposed Area (SF)	Area Change (SF)
Roofs	891	0	-891
Asphalt Parking	-	59,312	+59,312
Landscape Area	-	21,412	+21,412
Gravel	50,100	-	-50,100
Native Land / Undisturbed	30,000	267	-29,733
Offsite Hard Surface	8,341	8,341	-
Total Impervious	59,332	67,653	+8,321
Total Pervious	30,000	21,679	-8,321
Project Area	**89,332**	**89,332**	-

1.1 Compliance with Minimum Requirement

The proposed project on-site improvements consist of approximately 61,242 SF of new hard surface. The proposed total hard area results in 77% of the site. Per the 2019 Western Washington Stormwater Management Manual this project must comply with all minimum requirements.

Minimum Requirement # 1: Preparation of Stormwater Site Plan

A stormwater site plan has been prepared and will be submitted to the City of Puyallup with this report. Additionally, see Figure 3 in Appendix A attached with this report.

Minimum Requirement # 2: Construction Stormwater Pollution Prevention

A temporary erosion and sediment control plan is part of the construction documents provided with this report (Figure 4, Appendix A). The proposed project has an approximate clearing and grading area of 89,332 SF. Earthwork estimates consist of 0 cubic yards (CY) of cut, 11,124 CY of fill with a net import of 11,124 CY. These estimates do not include stripping. The excess soil will be stockpiled for reuse on the site for amending the soils per soil amendment BMP requirements. See below for how each of the 13 elements of the Stormwater Pollution Prevention Plan (SWPPP) are addressed as follows.

- Element # 1: Preserve vegetation/mark clearing limits
  - Clearing limits are shown on the plan and as noted, shall be marked using high visibility plastic fencing. All vegetated area outside the marked clearing limits shall be preserved in existing conditions.

- Element # 2: Established Construction Entrance
  - As shown on the plans, a construction entrance is provided per City of Puyallup standards.

- Element # 3: Control Flow Rates
  - The proposed silt fence will be placed along all the downgradient boundaries of the proposed project limits as a precautionary measure. Contractor shall adjust silt fencing as necessary to keep sediment laden runoff onsite and are noted in the ESC plan.

- Element # 4: Install Sediment Control
  - Silt fence will be placed along all the downgradient boundaries of the proposed project limits to remove any sediment laden runoff from leaving the site, as shown on plans. Contractor shall adjust silt fencing as necessary to keep sediment laden runoff onsite.

- Element # 5: Stabilize Soils
  - Per the standard erosion control notes provided on the plans, all exposed soils shall be hydroseeded and exposed soils shall be covered if left unworked for longer than 14 days.

- Element # 6: Protect Slopes
  - No slopes over 20% are being disturbed. All exposed soils not covered by the parking surfaces will be hydroseeded and there will be no slopes greater than 2:1.

- Element # 7: Protect Drain Inlets.
  - Drain inlets are being protected from sediment and high energy flows through the use of catch basin inserts. Catch basin inserts will be installed in any existing catch basins within 500 feet from the project site.

- Element # 8: Stabilize Channels and Outlets.
  - There are no proposed channels or outlets proposed as part of the SWPPP. There is an existing swale that will need to be maintained according to the checklist in Appendix D.

- Element # 9: Control Pollutants.
  - The only pollutants generated by this project are those that are commonly associated with the construction operations. Contractor is responsible to follow all city of Puyallup pollution prevention measures. Contractor to follow all city of Puyallup pollution control standard, particularly when handling concrete, vehicle activity, and paving operations.

- Element # 10: Control De-watering.
  - Because of high groundwater, dewatering may be required on the site. If dewatering is required, the contractor will use Baker Tanks and every effort will be made to avoid discharge into the storm system

- Element # 11: Maintain BMPs
  - The contractor and property owner will be responsible for checking and maintaining all stormwater BMPs. Contractor to repair as needed or as specified by the inspector.

- Element # 12: Manage the Project.
  - The contractor will be tasked with managing the project and are responsible for ensuring all SWPPP measures are followed per the provided plans and this report.

- Element # 13: Protect Low Impact Development BMPs
  - The proposed project improvements consist of an underground Contech water quality system and an ADS stormtech detention chamber. The TESC plan provided with this document as Figure 4: Temporary Erosion and Sediment Control Plan, in Appendix A, shows silt fence at the top of all native flowpath areas and around all dispersion trenches. Contractor shall inspect LID proposed facility location pre and post construction to ensure no sediment laden water can enter the LID facilities area.

Minimum Requirement # 3: Source Control of Pollution

The plans provided with this report will be followed in the field to reduce the potential of pollution. It is anticipated that the only source of pollution generated on site will be from the grading. There is no anticipated pollutant post construction other than pollutants from vehicular traffic typical for a commercial parking lot. The property owners are responsible for the control of pollutants on their property, post construction.

Minimum Requirement # 4: Preservation of Natural Drainage System and Outfalls

The site flows to a swale at the north end of the property. The water then drains from east to west into a control structure. Data for the storm system is not yet available on the Puyallup GIS system but the water likely flows from the control structure to East Main, and ultimately discharges in the Puyallup River (see the control structure in Appendix E). The grade of the swale at the north end of the property will not be changed. The site drainage plan can be found on Figure 3 in Appendix A.

Minimum Requirement # 5: Onsite Stormwater Management

This project proposes more than 5,000 SF of new plus replaced hard surfaces and is therefore required achieve all minimum requirements per Volume 1, Chapter 2, of the Department of Ecology Stormwater Management Manual for Western Washington. According to the geotechnical report, the soil infiltrates at 0.35 in/hr, however, the groundwater was very high and therefore storm water will not be infiltrated but routed to a Contech water quality chamber, then stored in a StormTech Chamber, and then routed to the swale at the north end of the property.

Asphalt Area: The storm water from the asphalt parking area will flow through a catch basin to a water quality chamber for cleaning which will also flow into the Stormtech Chamber for storage and then will be directed to the swale at the north end of the property.

Minimum Requirement # 6: Runoff Treatment

This project proposes more than 5,000 square feet of new or replaced hard surfaces and therefore will be required to treat all runoff from PGHS. This project proposes Contech water quality system to treat runoff from proposed PGHS. Runoff from PGHS will enter the Contech water quality system before entering the StormTech Chamber where stormwater will be directed to the swale at the north end of the property. Entry velocity of runoff from the proposed PGHS will remain under a velocity of 1 foot per second as recommended by the Western Washington Stormwater and Site Development Manual, Volume 5, Hydrologic Analysis and Flow Control BMPs (3.7.7.1).

Minimum Requirement # 7: Flow Control

This project is responsible for meeting Minimum Requirement #7 as it creates more than 5,000 square feet of new impervious surface. To satisfy minimum requirement #7, an ADS StormChamber detention system was designed to place beneath the new paved area that will receive stormwater immediately downstream of the water quality chamber.

The project will utilize the StormChamber model 3500 and the outflow will be attenuated with a control manhole with orifices as shown on the project plan. The details for the StormChamber 3500 are also shown on the plans, and the WWHM calculations for the sizing of the StormChamber system is included as an appendix in this report.

Minimum Requirement # 8: Wetland Protection

There is one very small wetland at the North end of the property. This wetland will not be disturbed during or after the construction process per City of Puyallup requirements. It will be protected during construction and identified with an orange fence.

Minimum Requirement # 9: Operation and Maintenance

Conveyance pipes and catch basin shall be checked per maintenance recommendations and after major storm events. A maintenance checklist has been provided in Appendix D. The StormTech Storm System has a separate O&M manual that has also been submitted with the plans.

Minimum Requirement # 10: Financial Liability

The owner shall bond or provide an assignment of funds as required by the code in order to ensure compliance with the Western Washington Stormwater Manual.

Section 2: Existing Condition Description

The project site is bounded by industrial/commercial parcels. The project site is accessed from Inter Ave. The site is sloping on the order of 0% to 2% trending down to the north. The site contains mostly natural landscaping with a gravel driveway, shed, and house on the southwest side of the lot. There is a small wetland located on the north side of the property. No obvious signs of surface water were observed or reported.

Section 3: Infiltration Rates / Soils Report

The USDA National Resource Conservation Service (NRCS) Web Soil Survey maps the proposed project as consisting of 100% Briscot loam (6A). According to the geotechnical report, the soil infiltrates at 0.35 in/hr, however, the groundwater was very high and therefore storm water will not be infiltrated but stored in a Stormtech Chamber and drain to the swale at the north end of the property. (see Figure 2 in Appendix A)

Section 4: Wells and Septic Systems

There are no existing wells or septic systems identified on the property.

Section 5: Fuel Tanks

There are no identified fuel tanks on the property.

Section 6: Subbasins Description

The proposed project will consider this site as a single drainage basin. The asphalt area will drain to catch basins, followed by the water quality system followed by the StormTech Chamber for storage, and ultimately to the outlet on the north end of the property.

Section 7: Floodplain Analysis

The project does not have a stream located within the parcel. A flood area study is not required for the current storm drainage plan application.

Section 8: Aesthetic Consideration for Facilities

The proposed dispersion facilities for stormwater quality and management are based on city standards and contractor shall take aesthetics into consideration when installing stormwater management BMPs.

Section 9: Facility Sizing and Downstream Analysis

Facility Sizing

The proposed stormwater facilities were designed and sized per 2019 Western Washington Stormwater Management Manual. The Stormtech Chamber is included in the WWHM calculated sizing parameters. The proposed sheet flow dispersion facilities were sized according to Volume III, Section 3.2.3. See Appendix B for Stormtech Chamber sizing calculations.

Water Quality

The project proposes more than 5,000 square feet of new or replaced hard surfaces and is required to apply water quality control. Water quality will be achieved by means of a Contech water quality system.

Flow Control

The project will utilize the StormChamber model 3500 and the outflow will be attenuated with a control manhole with orifices as shown on the project plan. The details for the StormChamber 3500 are also shown on the plans, and the WWHM calculations for the sizing of the StormChamber system is included as an appendix in this report.

Conveyance System

The asphalt runoff will be collected via PVC storm drainage piping and conveyed directly to the Stormtech Storm Chamber. All proposed pipes are required to be 12" diameter and minimum 0.5% slope. Per the Washington State Department of Ecology Western Washington Hydrology Model Version 2012 (WWHM).

Downstream Analysis

All stormwater will be directed to the swale at the southern end of the property, which conveys flows east to west into a control structure. From the control structure, the public system continues along Inter Ave and ultimately discharges to Upper Deer Creek, which then flows into Deer Creek and, ultimately, the Puyallup River. No adverse downstream impacts are anticipated from the proposed project. See Figure 5 for the Downstream Analysis Map.

Section 10: Utilities

All utilities will be designed and installed per City of Puyallup standards, storm facilities and conveyance systems will be designed and constructed with appropriate cover. Utility separation from water and sanitary sewer systems will meet minimum requirements of Washington State Department of Ecology Pipeline Separation Design and Installation Reference Guide, Version 9. Pipeline separation details has been included in the stormwater sheet of the plans.

Section 11: Covenants, Dedications, Easements

There are no covenants, dedications or easements proposed for this property at this time.

Section 12: Property Owners' Association Articles of Incorporation

There are no articles on incorporation proposed for this property.

Section 13: Other Permits or Conditions Placed on the Project

No other permits

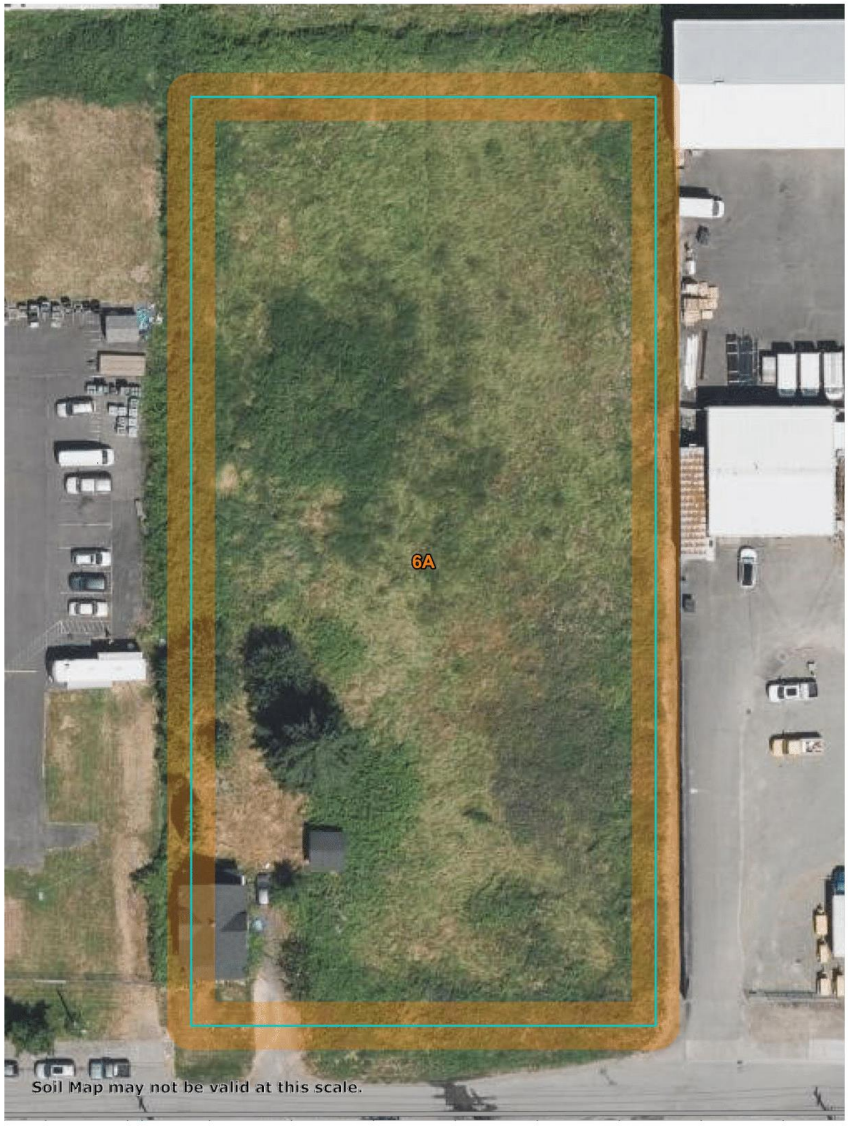
Appendix A – Supporting Figures

Figure 1: Vicinity Map

SITE ADDRESS
2401 INTER AVE SE
PUYALLUP, WA 98372

Figure 2: Site Soils

SITE ADDRESS
2401 INTER AVE SE
PUYALLUP, WA 98372



6A = BRISCOT LOAM

Figure 3: Grading and Drainage Plan Concept

2401 INTER

GRADING, DRAINAGE, AND UTILITY PLAN

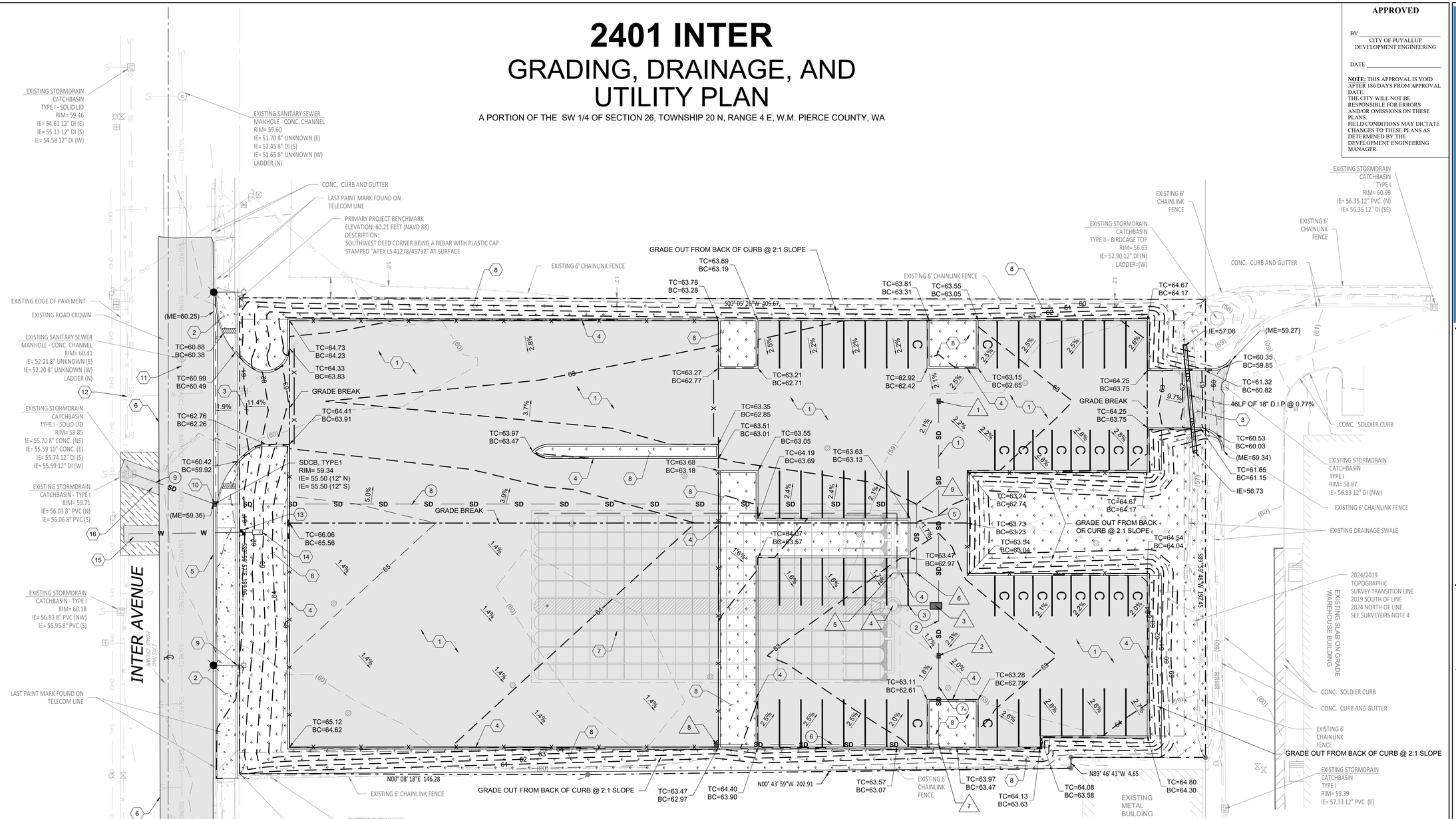
A PORTION OF THE SW 1/4 OF SECTION 26, TOWNSHIP 20 N, RANGE 4 E, W.M. PIERCE COUNTY, WA

APPROVED

BY _____
CITY OF PUYALLUP
DEVELOPMENT ENGINEERING

DATE _____

NOTE: THIS APPROVAL IS VOID AFTER 180 DAYS FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS.
FIELD CONDITIONS MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE DEVELOPMENT ENGINEERING MANAGER.



STORM DRAIN PIPE SECTIONS

(#) EACH PIPE SECTION IS NUMBERED IN A BUBBLE AND THE ASSOCIATED LENGTHS AND SLOPES ARE PROVIDED BELOW

1. 85 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
2. 20 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
3. 13 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
4. 10 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
5. 29 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
6. 93 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
7. 37 LF 12" DUAL WALLED POLYPROPYLENE @ 0.5% SLOPE
8. 295 LF 12" DUAL WALLED POLYPROPYLENE @ 0.6% SLOPE
9. 37 LF 12" RCP @ 0.98% SLOPE

STORM STRUCTURE DETAILS:

(#) EACH STORM STRUCTURE IS NUMBERED IN A TRIANGLE BUBBLE AND THE ASSOCIATED INVERTS AND RIM ELEVATIONS ARE PROVIDED BELOW

1. TYPE 1 CATCH BASIN RIM = 62.11 IE 12" E = 59.98 — 6 / C9
2. TYPE 1 CATCH BASIN RIM = 62.28 IE 12" W = 58.32 IE 12" W = 58.32 — 6 / C9
3. CONTECH WATER QUALITY SYSTEM RIM = 62.51 IE 12" W = 59.55 IE 12" E = 58.22 IE 12" S = 57.72 — 4-5-6 / C13
4. MANHOLE RIM = 62.77 IE 12" NE = 57.66 — 3 / C9
5. FLOW CONTROL MANHOLE RIM = 62.96 IE 12" NE = 57.66 — 4-5 / C9
6. CLEAN OUT RIM = 62.85 IE 12" = 57.61 — 7 / C9
7. CLEAN OUT RIM = 63.33 IE 12" = 58.51 — 7 / C9
8. TYPE 1 CATCH BASIN RIM = 62.97 IE 12" N = 58.98 — 6 / C9
9. CLEAN OUT RIM = 63.00 IE 12" = 57.47 — 7 / C9

KEYNOTES

1. PROPOSED ASPHALT PAVEMENT — 8 / C8
2. PROPOSED CONCRETE PAVEMENT PER FRONTAGE IMPROVEMENT PLAN SEE SHEET C6
3. PROPOSED MINOR DRIVEWAY APPROACH — 6 / C8
4. PROPOSED EXTRUDED CURB — 8 / C10
5. PROPOSED CURB AND GUTTER PER FRONTAGE IMPROVEMENT PLAN SEE SHEET C6
6. PROPOSED SAW CUT AND ASPHALT RESTORATION PER FRONTAGE IMPROVEMENT PLAN SEE SHEET C6
7. PROPOSED STORM TECH SYSTEM — 1-4 / C11 — 1-2 / C12
8. PROPOSED LANDSCAPE — 3 / C12
9. PROPOSED STREET LIGHTING PER STREET LIGHTING PLAN SEE SHEET C7
10. PROPOSED TYPE 1 CATCH BASIN PER FRONTAGE IMPROVEMENT PLAN SEE SHEET C6
11. EXISTING SANITARY LATERAL TAP TO BE CUT AND CAPPED AT THE MAIN LINE
12. REMOVE THE CORPORATON STOP ON THE WATER MAIN AND INSTALL A BRASE PLUG
13. PROPOSED 1" WATER SERVICE CONNECTION — 1 / C13
14. PROPOSED 2" AND SMALLER DOUBLE CHECK VALVE ASSEMBLY INSTALLATION — 2 / C13
15. PROPOSED TRENCH BACKFILL — 2 / C8
16. PROPOSED PAVING PATCH — 1 / C8

LEGEND

- PROPERTY LINE
- SETBACK
- PROPOSED CONCRETE
- PROPOSED ASPHALT
- PROPOSED LANDSCAPE
- PROPOSED ADS SYSTEM
- 2" GRIND AND OVERLAY
- PAVING PATCH
- SD — STORM DRAIN
- W — WATER LINE
- X — PROPOSED FENCE
- CATCH BASIN
- CLEAN OUT
- WATER METER
- DOUBLE CHECK VALVE ASSEMBLY
- 58 — PROPOSED CONTOUR LINES

0 10 20 40

SCALE: 1" = 20' FOR 24" X 36" SHEET
LINE IS 1" AT FULL SCALE

CALL BEFORE YOU DIG 1-800-424-5555 OR 811

McInnis ENGINEERING
mcinnisengineering.com
253.414.1992
202 East 34th Street
Tacoma, Washington 98404

2401 INTER GRADING, DRAINAGE, AND UTILITY PLAN

2401 INTER AVE SE PUYALLUP, WA 98372

JEFFREY W. McINNIS — STATE OF WASHINGTON — 37390 — REGISTERED PROFESSIONAL ENGINEER — 11/25/2025

NUM	DATE	DESCRIPTION
V1	01/24/25	INITIAL RELEASE
V2	08/23/25	SECOND RELEASE

DESIGNED W. MCINNIS	SCALE 1"=20'
DRAWN W. MCINNIS	CHECKED J. MCINNIS
DATE 11/25/2025	APPROVED J. MCINNIS

JOB NO. 24-166

SHEET C5 OF C14

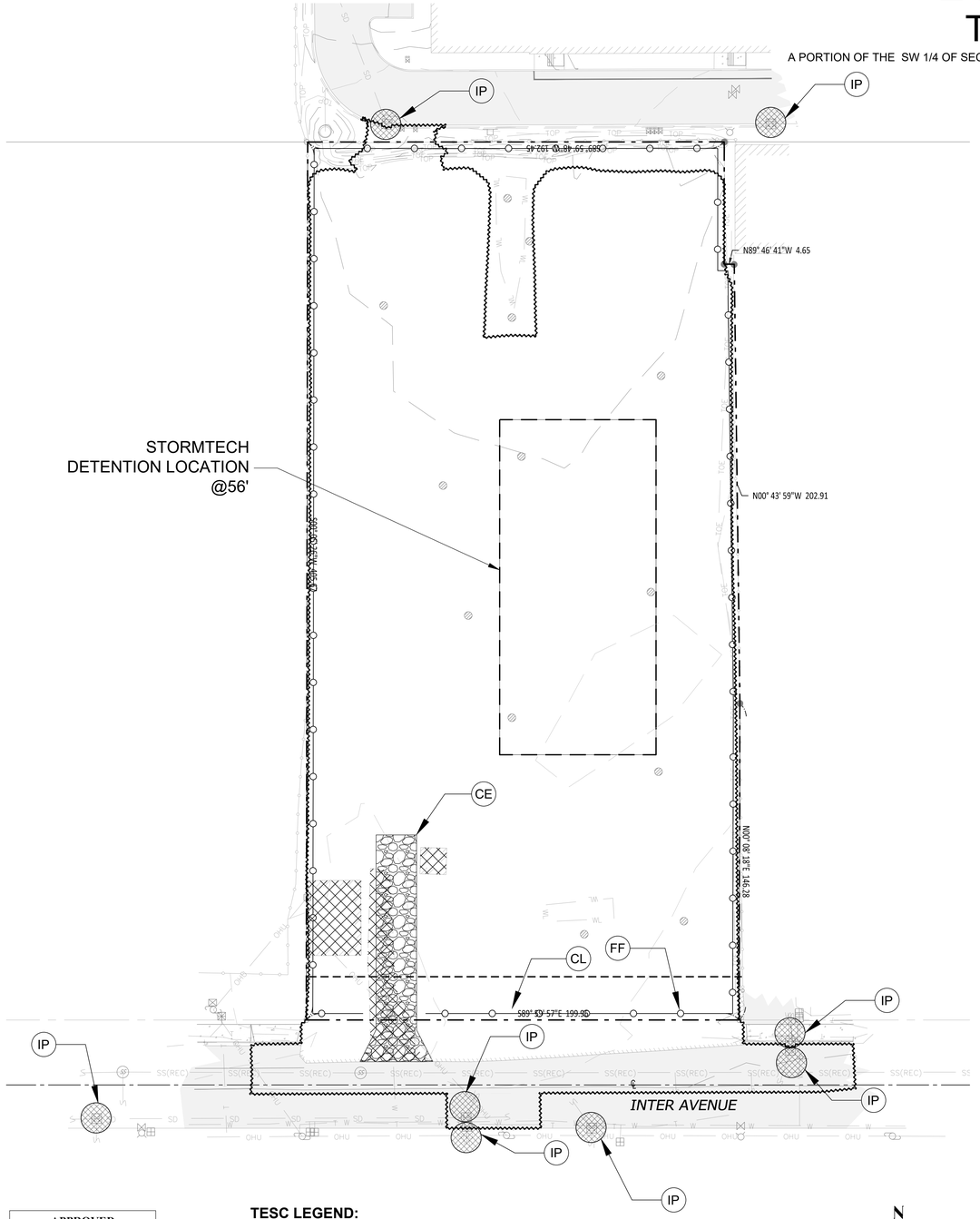
C5

File: O:\MCINNIS ENGINEERING\PROJECTS_PROJECT 2025\2401 Inter_DRAWINGS\SDEV Sheets\24-166 - SDEV - 2401 INTER - C5 - GRADING PLAN.dwg
Plotted: 11/25/25 Plotted By: ----

Figure 4: Erosion Control Plan

2401 INTER
TESC PLAN

A PORTION OF THE SW 1/4 OF SECTION 26, TOWNSHIP 20 N, RANGE 4 E, W.M. PIERCE COUNTY, WA



TESC INSPECTION NOTES:

1. INSPECT ALL INLET PROTECTION ON CATCH BASINS. CLEAN OR REPLACE IF FULL OF SEDIMENT /DEBRIS AND REPAIR/REPLACE AS NEEDED IF DAMAGED TO MAINTAIN PROTECTION.
2. INSPECT ALL PERMANENT AND TEMPORARY STABILIZED SLOPES. REPAIR ANY DAMAGED SECTIONS AND RE-VEGETATE AS NEEDED TO ENSURE THE ESTABLISHMENT OF VEGETATION AND THAT NO EROSION OF THE SLOPES OCCUR.
3. INSPECT ALL FILTER FABRIC FENCING FOR SIGNS OF EROSION, DAMAGE OR FAILURES. REPAIR AND/OR REPLACE AS NEEDED. SEE FILTER FABRIC NOTES. SEDIMENT BUILD-UP ALONG FENCE SHALL BE REMOVED WHEN REACHES 1/3 THE FENCE HEIGHT. IF EROSION IS OCCURRING, CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL MEASURES AS NEEDED TO PREVENT EROSION.
4. ANY FILL/CUT SLOPES SHALL BE INSPECTED FOR EROSION. IF SIGNS OF EROSION ARE PRESENT, INSTALL APPROPRIATE BMPS AS NEEDED TO STOP EROSION AND STABILIZE SLOPES.
5. TESC LEAD RESPONSIBLE FOR NOTIFYING ENGINEER IF ADDITIONAL MEASURES ARE WARRANTED.

PERMANENT STABILIZATION NOTES:

1. ALL EXPOSED SOILS AND SLOPES SHALL BE SEEDED OR OTHERWISE STABILIZED IMMEDIATELY AFTER CONSTRUCTION AND GRADING ACTIVITIES HAVE BEEN COMPLETED.
2. SILT FENCE, IF DEEMED APPROPRIATE, SHALL REMAIN FOR A MINIMUM OF 30 DAYS AFTER THE FINAL STABILIZATION OF THE SLOPES HAS OCCURRED.
3. ALL TEMPORARY EROSION CONTROL BMP'S SHALL BE REMOVED 30 DAYS AFTER FINAL STABILIZATION HAS OCCURRED AS DIRECTED BY CITY OR COUNTY INSPECTOR.
4. CONTRACTOR SHALL REFER TO THE CONSTRUCTION SWPP FOR APPLICABLE BMPS.

AMENDED SOILS NOTES:

- SOIL AMENDMENTS ARE REQUIRED FOR ALL DISTURBED AREAS IN ACCORDANCE WITH CS 01.02.0A AND DEPTH OF THE 2019 SURFACE WATER MANAGEMENT MANUAL
- AMENDED SOILS SHALL BE A MINIMUM OF 8" (NON-COMPACTED) WITH SUBSOILS SCARIFIED AT LEAST 4" WITH INCORPORATION OF THE UPPER MATERIAL TO AVOID STRATIFIED LAYERS, WHERE FEASIBLE.
- QUALITY OF COMPOST AND OTHER MATERIALS USED TO MEET THE ORGANIC CONTENT REQUIREMENTS ARE AS FOLLOWS:

a. THE ORGANIC CONTENT FOR "PRE-APPROVED" AMENDMENT RATES CAN BE MET ONLY USING COMPOST THAT MEETS THE DEFINITION OF "COMPOSTED MATERIALS" IN WAC 173-350-220. THE WAC IS AVAILABLE ONLINE AT: HTTP://WWW.ECY.WA.GOV/PROGRAMS/SWFA/FACILITIES/350.HTML THE COMPOST MUST ALSO HAVE AN ORGANIC MATTER CONTENT OF 35% TO 65%, AND A CARBON TO NITROGEN RATIO BELOW 25:1. THE CARBON TO NITROGEN RATIO MAY BE AS HIGH AS 35: 1 FOR PLANTINGS COMPOSED ENTIRELY OF PLANTS NATIVE TO THE PUGET SOUND LOWLANDS REGION.
b. CALCULATED AMENDMENT RATES MAY BE MET THROUGH USE OF COMPOSTED MATERIALS AS DEFINED ABOVE; OR OTHER ORGANIC MATERIALS AMENDED TO MEET THE CARBON TO NITROGEN RATIO REQUIREMENTS, AND MEETING THE CONTAMINANT STANDARDS OF GRADE A COMPOST.

- USE ONE OF THE FOLLOWING OPTIONS TO MEET THE POST CONSTRUCTION SOIL QUALITY AND DEPTH REQUIREMENTS. USE THE MOST RECENT VERSION OF "GUIDELINES FOR RESOURCES FOR IMPLEMENTING SOIL QUALITY AND DEPTH BMP T5.13" TO MEET THE REQUIREMENTS OF THIS BMP. THIS GUIDANCE CAN BE FOUND ONLINE AT:WWW.SOILSFORSALMON.ORG

a. LEAVE NATIVE VEGETATION AND SOIL UNDISTURBED, AND PROTECT FROM COMPACTION DURING CONSTRUCTION
b. AMEND EXISTING SITE TOPSOIL OR SUBSOIL EITHER AT DEFAULT "PRE-APPROVED" RATES, OR AT CUSTOM CALCULATED RA TES BASED ON SPECIFIC TESTS OF THE SOIL AND AMENDMENT
c. STOCKPILE EXISTING TOPSOIL DURING GRADING, AND REPLACE IT PRIOR TO PLANTING. STOCKPILED TOPSOIL MUST ALSO BE AMENDED IF NEEDED TO MEET THE ORGANIC MATTER OR DEPTH REQUIREMENTS, EITHER AT A DEFAULT "PRE-APPROVED" RATE OR AT A CUSTOM CALCULATED RATE.
d. IMPORT TOPSOIL MIX OF SUFFICIENT ORGANIC CONTENT AND DEPTH TO MEET THE REQUIREMENTS. MORE THAN ONE METHOD MAY BE USED ON DIFFERENT PORTIONS OF THE SAME SITE. SOIL THAT ALREADY MEETS THE DEPTH AND ORGANIC MATTER QUALITY STANDARDS, AND IS NOT COMPACTED, DOES NOT NEED TO BE AMENDED.

- AMENDED SOILS SHALL BE MAINTAINED AS FOLLOWS:

a. SOIL QUALITY AND DEPTH SHOULD BE ESTABLISHED TOWARD THE END OF CONSTRUCTION AND ONCE ESTABLISHED, SHOULD BE PROTECTED FROM COMPACTION, SUCH AS FROM LARGE MACHINERY USE, AND FROM EROSION.
b. SOIL SHOULD BE PLANTED AND MULCHED AFTER INSTALLATION.
c. PLANT DEBRIS OR ITS EQUIVALENT SHOULD BE LEFT ON THE SOIL SURFACE TO REPLENISH ORGANIC MA TIER.
d. IT SHOULD BE POSSIBLE TO REDUCE USE OF IRRIGATION, FERTILIZERS, HERBICIDES AND PESTICIDES. THESE ACTIVITIES SHOULD BE ADJUSTED WHERE POSSIBLE,RATHER THAN CONTINUING TO IMPLEMENT FORMERLY ESTABLISHED PRACTICES.

- SEE PROJECT CONSTRUCTION SWPPP FOR ADDITIONAL INFORMATION OR SECTION 2.2.1.4 OF CHAPTER 2 OF VOLUME 6 OF THE 2021 SURFACE WATER MANAGEMENT MANUAL

MULCHING NOTES:

1. MULCH MATERIALS USED SHALL BE STRAW OR HAY, AND SHALL BE APPLIED AT THE RATE OF 75-100 POUNDS PER 1000 SQ. FT. (APPX 2" THICK).
2. MULCH SHALL BE APPLIED IN ALL AREAS WITH EXPOSED SLOPES GREATER THAN 2: 1.
3. MULCHING SHALL BE USED IMMEDIATELY AFTER SEEDING OR IN AREAS WHICH CANNOT BE SEEDED BECAUSE OF THE SEASON.
4. ALL AREAS NEEDING MULCH SHALL BE COVERED BY NOVEMBER 1.

CONTRACTOR NOTES:

1. INLET PROTECTION SHALL BE INSTALLED IN ALL NEWLY CONSTRUCTED CATCH BASINS AND ALONG ALL IMPACTED FRONTAGE AND OFFSITE AREAS PER THE REQUIREMENTS OF THE CITY INSPECTOR PER DETAIL 3 ON THIS SHEET.
2. CONSTRUCTION FENCE CAN BE UTILIZED IN PLACE OF FILTER FABRIC FENCE ONLY IN AREAS WHERE THE GRADES DO NOT ALLOW THE POTENTIAL FOR ANY STORMWATER TO LEAVE THE SITE.
3. ALL DEMOLISHED MATERIALS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT A CITY APPROVED LOCATION AND IN A MANNER CONSISTENT WITH CURRENT REGULATIONS AND REQUIREMENTS.
4. ALL AREAS THAT WILL BE UNWORKED FOR MORE THAN SEVEN (7) DAYS DURING THE DRY SEASON OR TWO (2) DAYS DURING THE WET SEASON, SHALL BE COVERED WITH STRAW, WOOD FIBER MULCH, COMPOST, PLASTIC SHEETING, OR OTHER EQUIVALENT PER CURRENT CITY OR COUNTY STANDARDS. SEE SEEDING NOTES AND MULCHING NOTES ON THIS SHEET.
5. CONTRACTOR SHALL DESIGNATE A WASHINGTON DEPT OF ECOLOGY CERTIFIED EROSION CONTROL LEAD PERSON, AND SHALL COMPLY WITH THE CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED FOR THE PROJECT.
6. AT ANY TIME DURING CONSTRUCTION IT IS DETERMINED BY THE CITY OR COUNTY THAT MUD AND DEBRIS ARE BEING TRACKED ONTO PUBLIC STREETS WITH INSUFFICIENT CLEANUP, ALL WORK SHALL CEASE ON THE PROJECT UNTIL THIS CONDITION IS CORRECTED. THE CONTRACTOR AND/OR THE OWNER SHALL IMMEDIATELY TAKE ALL STEPS NECESSARY TO PREVENT FUTURE TRACKING OF MUD AND DEBRIS INTO THE PUBLIC ROW, WHICH MAY INCLUDE THE INSTALLATION OF A WHEEL WASH FACILITY ON-SITE.
7. SEDIMENT LADEN RUNOFF SHALL NOT BE ALLOWED TO DISCHARGE BEYOND THE LIMITS OF THE IMPROVEMENTS. ADDITIONAL MEASURES SHALL BE INSTALLED AS NEEDED.
8. SAND BAGS SHALL BE SECURELY PLACED AROUND INSTALLED CATCH BASINS WITH INLET PROTECTION AS FIELD AND WEATHER CONDITIONS WARRANT SO TO PROTECT ALL DISPERSION AND INFILTRATION TRENCHES SEDIMENT LADEN RUNOFF.
9. TREES WITHIN WORKING LIMITS TO BE SAVED, SHALL BE MARKED AS SUCH ON SITE AND PROTECTION FENCE PLACED AROUND EACH TREE.

SEEDING NOTES:

1. THE FOLLOWING SEED MIXTURE SHALL BE AS BELOW AND SHALL BE APPLIED AT THE RATE RECOMMENDED BY THE SUPPLIER.

TABLE D.3.2.B TEMPORARY EROSION CONTROL SEED MIX

	% WEIGHT	% PURITY	% GERMINATION
CHEWINGS OR RED FESCUE FESTUCA *RUBRA VAR. COMMUTATA OR FESTUCA RUBRA*	40	98	90
ANNUAL OR PERENNIAL RYE *LOLIUM MULTIFLORUM OR LOLIUM PERENNE*	40	98	90
REDTOP OR COLONIAL BENTGRASS *AGROSTIS ALBA OR AGROSTIS TENUIS*	10	92	85
WHITE DUTCH CLOVER *TRIFOLIUM REPENS*	10	98	90

2. SEED BEDS PLANTED BETWEEN MAY 1 AND OCTOBER 31 WILL REQUIRE IRRIGATION AND OTHER MAINTENANCE AS NECESSARY TO FOSTER AND PROTECT THE ROOT STRUCTURE.
3. FOR SEED BEDS PLANTED BETWEEN OCTOBER 31 AND APRIL 30, ARMORING OF THE SEED BED WILL BE NECESSARY. (E.G., GEOTEXTILES, JUTE MAT, CLEAR PLASTIC COVERING).
4. BEFORE SEEDING, INSTALL NEEDED SURFACE RUNOFF CONTROL MEASURES SUCH AS GRADIENT TERRACES, INTERCEPTOR DIKES, SWALES, LEVEL SPREADERS AND SEDIMENT BASINS.
5. THE SEEDBED SHALL BE FIRM WITH A FAIRLY FINE SURFACE, FOLLOWING SURFACE ROUGHENING. PERFORM ALL OPERATIONS ACROSS OR AT RIGHT ANGLES TO THE SLOPE.
6. FERTILIZERS ARE TO BE USED ACCORDING TO SUPPLIER'S RECOMMENDATIONS. AMOUNTS USED SHOULD BE MINIMIZED, ESPECIALLY ADJACENT TO WATER BODIES AND WETLANDS.

APPROVED

BY _____
CITY OF PUYALLUP
DEVELOPMENT ENGINEERING

DATE _____

NOTE: THIS APPROVAL IS VOID AFTER 180 DAYS FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS.
FIELD CONDITIONS MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE DEVELOPMENT ENGINEERING MANAGER.

TESC LEGEND:

CL — CLEARING/ GRADING/ DISTURBED LIMITS
FF — FILTER FABRIC FENCE SEE DETAIL (1/C4)
CE — CONSTRUCTION ENTRANCE (3/C4)
IP — INLET PROTECTION (4/C4)
DR — DEMO AND REMOVE

N

0 15 **30** 60
SCALE: 1" = 30'
FOR 22" X 34" SHEET
LINE IS 1" AT
FULL SCALE

CALL BEFORE YOU DIG
1-800-424-5555 OR 811

McInnis ENGINEERING
mcinnisengineering.com
253.414.1992
202 East 34th Street
Tacoma, Washington 98404

2401 INTER
TESC PLAN

2401 INTER AVE SE
PUYALLUP, WA 98372

JEFFREY W. MCINNIS — STATE OF WASHINGTON — 37780 — REGISTERED PROFESSIONAL ENGINEER — 11/25/2025

NUM	DATE	DESCRIPTION
V1	01/24/25	INITIAL RELEASE
V2	06/23/25	SECOND RELEASE

DESIGNED W. MCINNIS	SCALE 1"=30'
DRAWN W. MCINNIS	CHECKED J. MCINNIS
DATE 11/25/2025	APPROVED J. MCINNIS

JOB NO. 24-166

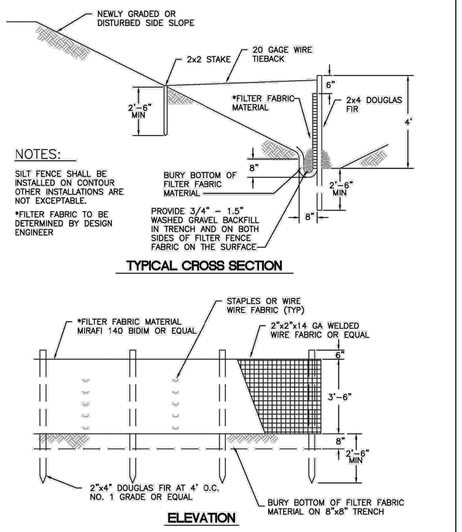
SHEET C3 OF C14

C3

2401 INTER

TESC NOTES AND DETAILS

A PORTION OF THE SW 1/4 OF SECTION 26, TOWNSHIP 20 N, RANGE 4 E, W.M. PIERCE COUNTY, WA



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

SILTATION FENCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	02.03.02
FILE NAME: P:\DWG\COMMON\STDSCITY\2009\02_SD02.03.02	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS	

1 SILTATION FENCE
SCALE:NTS

1. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION AS PRESCRIBED ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD AND OBSERVED DURING CONSTRUCTION.

2. ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE NATURAL DRAINAGE SYSTEM. THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE EROSION CONTROL FACILITIES PRIOR TO ANY LAND CLEARING AND/OR CONSTRUCTION. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION AS DETERMINED BY THE CITY, UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO THE EROSION AND SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITEE.

3. THE EROSION AND SEDIMENTATION CONTROL SYSTEM FACILITIES DEPICTED ON THESE PLANS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, FACILITIES WILL BE NECESSARY TO ENSURE COMPLETE SILTATION CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE PERMITEE TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.

4. APPROVAL OF THESE PLANS IS FOR GRADING, TEMPORARY DRAINAGE, EROSION AND SEDIMENTATION CONTROL ONLY. IT DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STORM DRAINAGE DESIGN, SIZE OR LOCATION OF PIPES, RESTRICTORS, CHANNELS, OR RETENTION FACILITIES.

5. ANY DISTURBED AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED OUTSIDE THE SPECIFIED TIME PERIOD WHENEVER IT IS IN THE INTEREST OF THE PERMITEE BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT APPROVED BY THE CITY.

6. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTIES, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL FURTHER AGGRAVATE THE SITUATION MUST CEASE, AND THE OWNER/CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.

7. NO TEMPORARY OR PERMANENT STOCKPILING OF MATERIALS OR EQUIPMENT SHALL OCCUR WITHIN CRITICAL AREAS OR ASSOCIATED BUFFERS, OR THE CRITICAL ROOT ZONE FOR VEGETATION PROPOSED FOR RETENTION.

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

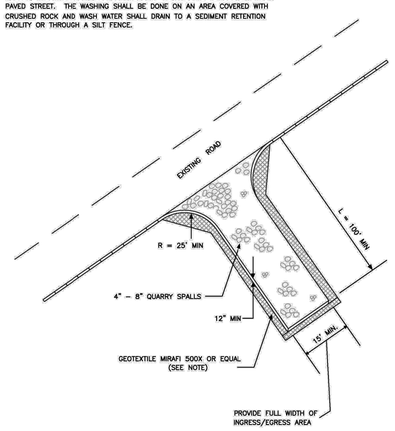
GRADING, EROSION, AND SEDIMENTATION CONTROL NOTES

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM IRWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	LINDA LIAN	05.02.01
FILE NAME: P:\DWG\COMMON\STDSCITY\2009\05_GRDNS.01.05.03.01	DATE APPROVED: 07/01/2009	DATE REVISED: 11/10/2014	SCALE: 11	

2 GRADING, EROSION, AND SEDIMENTATION CONTROL NOTES
SCALE:NTS

NOTE:

1. GEOTEXTILE MIRAFI 500 X OR APPROVED EQUAL SHALL BE PLACED UNDER THE ENTIRETY OF THE TEMPORARY ENTRANCE.
2. ADDITIONAL ROCK SHALL BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
3. IF THE PAD DOES NOT ADEQUATELY REMOVE THE MUD FROM THE VEHICLE'S WHEELS, THE WHEELS SHALL BE HOSED OFF BEFORE THE VEHICLE ENTERS A PAVED STREET. THE WASHING SHALL BE DONE ON AN AREA COVERED WITH CRUSHED ROCK AND WASH WATER SHALL DRAIN TO A SEDIMENT RETENTION FACILITY OR THROUGH A SILT FENCE.



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

TEMPORARY CONSTRUCTION ENTRANCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM IRWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	XXXX	05.01.01
FILE NAME: P:\DWG\COMMON\STDSCITY\2009\05_GRDNS.01.05.01.01	DATE APPROVED: 07/01/2009	DATE REVISED: XX/XX/XX	SCALE: 1.00	

3 TEMPORARY CONSTRUCTION ENTRANCE
SCALE:NTS

GENERAL NOTES

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. REPRESENTATIVES OF INVOLVED UTILITIES AND THE CITY OF PUYALLUP. CONTACT THE ENGINEERING SERVICES TO SCHEDULE THE MEETING (253-841-5568). THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A "PUNCH LIST" PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS"), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE "CITY STANDARDS").
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION THAT REQUIRES REMOVAL OR RELOCATION' RELATING TO THIS PROJECT SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE TRUE ELEVATIONS AND LOCATIONS OF HIDDEN UTILITIES. ALL VISIBLE ITEMS SHALL BE THE ENGINEER'S RESPONSIBILITY.
9. THE CONTRACTOR SHALL INSTALL, REPLACE, OR RELOCATE ALL SIGNS, AS SHOWN ON THE PLANS OR AS AFFECTED BY CONSTRUCTION, PER CITY STANDARD DETAILS.
10. POWER, STREET LIGHT, CABLE, AND TELEPHONE LINES SHALL BE IN A TRENCH LOCATED WITHIN A 10-FOOT UTILITY EASEMENT ADJACENT TO PUBLIC RIGHT-OF-WAY. RIGHT-OF-WAY CROSSINGS SHALL HAVE A MINIMUM HORIZONTAL SEPARATION FROM OTHER UTILITIES (SEWER, WATER, STORM) OF 5 FEET.
11. ALL CONSTRUCTION SURVEYING FOR EXTENSIONS OF PUBLIC FACILITIES SHALL BE DONE UNDER THE DIRECTION OF A WASHINGTON STATE LICENSED LAND SURVEYOR OR A WASHINGTON STATE LICENSED PROFESSIONAL CIVIL ENGINEER.
12. DURING CONSTRUCTION, ALL PUBLIC STREETS ADJACENT TO THIS PROJECT SHALL BE KEPT CLEAN OF ALL MATERIAL DEPOSITS RESULTING FROM ON-SITE CONSTRUCTION, AND EXISTING STRUCTURES SHALL BE PROTECTED AS DIRECTED BY THE CITY.
13. CERTIFIED RECORD DRAWINGS ARE REQUIRED PRIOR TO PROJECT ACCEPTANCE.
14. A NPDES STORMWATER GENERAL PERMIT MAY BE REQUIRED BY THE DEPARTMENT OF ECOLOGY FOR THIS PROJECT. FOR INFORMATION CONTACT THE DEPARTMENT OF ECOLOGY AT (360)407-6300.
15. ANY DISTURBANCE OR DAMAGE TO CRITICAL AREAS AND ASSOCIATED BUFFERS, OR SIGNIFICANT TREES FOR PRESERVATION AND PROTECTION SHALL BE MITIGATED IN ACCORDANCE WITH A MITIGATION PLAN REVIEWED AND APPROVED BY THE CITY'S%146S PLANNING DIVISION. PREPARATION AND IMPLEMENTATION OF THE MITIGATION PLAN SHALL BE AT THE DEVELOPER'S EXPENSE.
16. NO SURVEY MONUMENT SHALL BE REMOVED OR DESTROYED (THE PHYSICAL DISTURBANCE OR COVERING OF A MONUMENT SUCH THAT THE SURVEY POINT IS NO LONGER VISABLE OR READILY ACCESSIBLE) BEFORE A PERMIT IS OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES (DNR).WAC 332-120-030(2) STATES "IT SHALL BE THE RESPONSIBILITY OF <THOSE> PERFORMING CONSTRUCTION WORK OR OTHER ACTIVITY (INCLUDING ROAD AND STREET RESURFACING PROJECTS TO ADEQUATELY SEARCH THE RECORDS AND THE PHYSICAL AREA OF THE PROPOSED CONSTRUCTION WORK OR OTHER ACTIVITY FOR THE PURPOSE OF LOCATING AND REFERENCING ANY KNOWN OR EXISTING SURVEY MONUMENTS" CONSTRUCTION SHALL NOT COMMENCE UNTIL WAC OUTLINED IN CHAPTER 332-120 IS COMPLIED WITH. SURVEY MONUMENTS SUBJECT TO WAC 332-120-030(2) INCLUDE LOCAL CONTROL POINTS AND LAND BOUNDARY SURVEY CORNERS.
17. EXPOSED SOILS WITH AN AREA GREATER THAN 5,000 SQUARE FEET THAT ARE SCHEDULED TO REMAIN UNWORKED FOR MORE THAN 24 HOURS AND EXPOSED AREAS OF LESS THAN 5,000 SQUARE FEET THAT WILL REMAIN UNWORKED FOR MORE THAN SEVEN (7) DAYS SHALL BE STABILIZED IMMEDIATELY.

SEDIMENTATION NOTE

AT ANY TIME DURING CONSTRUCTION IT IS DETERMINED BY THE CITY THAT MUD AND DEBRIS ARE BEING TRACKED ONTO PUBLIC STREETS WITH INSUFFICIENT CLEANUP, ALL WORK SHALL CEASE ON THE PROJECT UNTIL THIS CONDITION IS CORRECTED. THE CONTRACTOR AND/OR THE OWNER SHALL IMMEDIATELY TAKE ALL STEPS NECESSARY TO PREVENT FUTURE TRACKING OF MUD AND DEBRIS INTO THE PUBLIC ROW, WHICH MAY INCLUDE THE INSTALLATION OF A WHEEL WASH FACILITY ON-SITE.

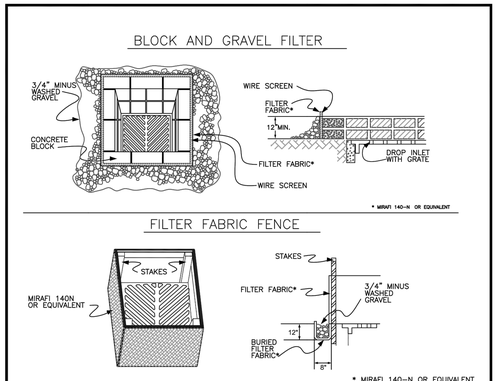
SEDIMENT LADEN RUNOFF SHALL NOT BE ALLOWED TO DISCHARGE BEYOND THE CONSTRUCTION LIMITS IN ACCORDANCE WITH CITY REGULATIONS.

CONSTRUCTION SEQUENCE

1. HOLD A PRECONSTRUCTION MEETING WITH THE CITY AND OBTAIN REQUIRED PERMITS.
2. ESTABLISH CLEARING AND GRADING LIMITS.
3. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE.
4. CONSTRUCT PERIMETER DITCHES, SILT FENCES, AND OTHER EROSION CONTROL DEVICES AS SHOWN.
5. CONSTRUCT PROTECTION DEVICES FOR CRITICAL AREAS AND SIGNIFICANT TREES PROPOSED FOR RETENTION.
6. SCHEDULE AN EROSION INSPECTION WITH THE CITY.
7. CONSTRUCT STORM DRAINAGE RETENTION/DETENTION (CONTROL AND STORAGE) FACILITIES. PROVIDE EMERGENCY OVERFLOW AS APPLICABLE.
8. ALL DITCHES AND SWALES AS SHOWN SHALL BE PROVIDED TO DIRECT ALL SURFACE WATER TO THE RETENTION/DETENTION AND SEDIMENTATION POND AS CLEARING AND GRADING PROGRESSES. NO UNCONTROLLED SURFACE WATER SHALL BE ALLOWED TO LEAVE THE SITE OR BE DISCHARGED TO A CRITICAL AREA AT ANY TIME DURING THE GRADING OPERATIONS.
9. CLEARLY STATE AT WHAT POINT GRADING ACTIVITIES CAN BEGIN, USUALLY ONLY AFTER ALL DRAINAGE AND EROSION CONTROL MEASURES ARE IN PLACE.
10. IDENTIFY EROSION CONTROL MEASURES WHICH REQUIRE REGULAR MAINTENANCE.

GRADING, EROSION, AND SEDIMENTATION CONTROL NOTES

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A "PUNCH LIST" PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS"), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HERINAFTER REFERRED TO AS THE "CITY STANDARDS").
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY ENGINEER PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS HOURS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION AS PRESCRIBED ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD AND OBSERVED DURING CONSTRUCTION.
8. ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE NATURAL DRAINAGE SYSTEM. THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE EROSION CONTROL FACILITIES PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION AS DETERMINED BY THE CITY, UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO THE EROSION AND SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.
9. THE EROSION AND SEDIMENTATION CONTROL SYSTEM FACILITIES DEPICTED ON THESE PLANS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, FACILITIES WILL BE NECESSARY TO ENSURE COMPLETE SILTATION CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE PERMITTEE TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.
10. APPROVAL OF THESE PLANS IS FOR GRADING, TEMPORARY DRAINAGE, EROSION AND SEDIMENTATION CONTROL ONLY. IT DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STORM DRAINAGE DESIGN, SIZE OR LOCATION OF PIPES, RESTRICTORS, CHANNELS, OR RETENTION FACILITIES.
11. ANY DISTURBED AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED OUTSIDE THE SPECIFIED TIME PERIOD WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT APPROVED BY THE CITY.
12. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTIES, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL FURTHER AGGRAVATE THE SITUATION MUST CEASE, AND THE OWNER/CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.
13. NO TEMPORARY OR PERMANENT STOCKPILING OF MATERIALS OR EQUIPMENT SHALL OCCUR WITHIN CRITICAL AREAS OR ASSOCIATED BUFFERS, OR THE CRITICAL ROOT ZONE FOR VEGETATION PROPOSED FOR RETENTION.



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STORM DRAIN BARRIERS

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	02.03.05
FILE NAME: P:\DWG\COMMON\STDSCITY\2009\02_SD02.03.05	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS	

4 STORM DRAINAGE BARRIERS
SCALE:NTS

CONDITIONS WHERE PRACTICE APPLIES

1. BLOCK AND GRAVEL FILTER – APPLICABLE FOR AREAS GREATER THAN 5% SLOPE.
2. FILTER FABRIC FENCE – APPLICABLE WHERE THE INLET DRAINS A RELATIVELY SMALL (ONE ACRE OR LESS) AND FLAT AREA (LESS THAN 5% SLOPE).
3. STRAW BALE BARRIER – APPLICABLE WHERE INLET DRAINS A RELATIVELY FLAT DISTURBED AREA (LESS THAN 5% SLOPE) IN WHICH SHEET FLOW (NOT EXCEEDING 0.5 FT/SEC.) OCCURES. BARRIERS OF THIS TYPE SHOULD NOT BE PLACED AROUND INLETS RECEIVING CONCENTRATED FLOWS SUCH AS THOSE ALONG MAJOR STREETS AND HIGHWAYS.

1. BLOCK AND GRAVEL FILTER – INSTALLATION PROCEDURE

A: PLACE WIRE MESH OVER THE DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF ONE FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. USE WIRE SCREEN WITH 1/2–INCH OPENINGS. IF MORE THAN ONE STRIP OF MESH IS NECESSARY, OVERLAP THE STRIPS. PLACE FILTER FABRIC* OVER WIRE MESH.

B: PLACE CONCRETE BLOCKS LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET, SO THAT THE OPEN ENDS FACE OUTWARD, NOT UPWARD. THE ENDS OF ADJACENT BLOCKS SHOULD ABUT. THE HIEGHT OF THE BARRIER CAN BE VARIED, DEPENDING ON DESIGN NEEDS, BY STACKING COMBINATIONS OF BLOCKS THAT ARE 4–INCH, 8–INCH AND 12–INCH WIDE. THE ROW OF BLOCKS SHOULD BE AT LEAST 12–INCHES BUT NO GREATER THAN 24–INCHES HIGH.

C: PLACE WIRE SCREEN OVER THE OVERSIDE VERTICAL FACE (OPEN END) OF THE CONCRETE BLOCKS TO PREVENT STONES FROM BEING WASHED THROUGH THE BLOCKS. USE WIRE SCREEN WITH 1/2–INCH OPENINGS.

D: PILE STONES AGAINST THE WIRE MESH TO THE TOP OF THE BLOCKS. USE 3/4" MINUS WASHED GRAVEL.

2. FILTER FABRIC FENCE – INSTALLATION PROCEDURE

A: PLACE 2–INCH BY 2–INCH WOODEN STAKES AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART AND DRIVE THEM AT LEAST 8–INCHES INTO THE GROUND. THE STAKES MUST BE AT LEAST 3 FEET LONG.

B: EXCAVATE A TRENCH APPROXIMATELY 8–INCHES WIDE AND 12–INCHES DEEP AROUND THE OUTSIDE PERIMETER OF THE STAKES.

C: STAPLE THE FILTER FABRIC* TO THE WOODEN STAKES SO THAT 32–INCHES OF THE FABRIC EXTENDS AND CAN BE FORMED INTO THE TRENCH, AND USE HEAVY–DUTY WIRE STAPLES AT LEAST 1/2–INCHES LONG.

D: BACKFILL THE TRENCH WITH 3/4–INCH MINUS WASHED GRAVEL ALL THE WAY AROUND.

3. STRAW BALE BARRIER – INSTALLATION PROCEDURE

A: EXCAVATE A 4–INCH DEEP TRENCH AROUND THE INLET. MAKE THE TRENCH AS WIDE AS A STRAW BALE.

B: ORIENT STRAW BALES WITH THE BINDINGS AROUND THE SIDES OF THE BALES RATHER THAN OVER AND UNDER THE BALES.

C: PLACE BALES LENGTHWISE AROUND THE INLET AND PRESS THE ENDS OF ADJACENT BALES SECURELY IN PLACE.

D: DRIVE TWO 2–INCH BY 2–INCH STAKES THROUGH EACH BALE TO ANCHOR THE BALE SECURELY IN PLACE.

E: BACKFILL THE EXCAVATED SOIL AND COMPACT IT AGAINST THE BALE.

F: WEDGE LOOSE STRAW BETWEEN BALES TO PREVENT WATER FROM FLOWING BETWEEN BALES.

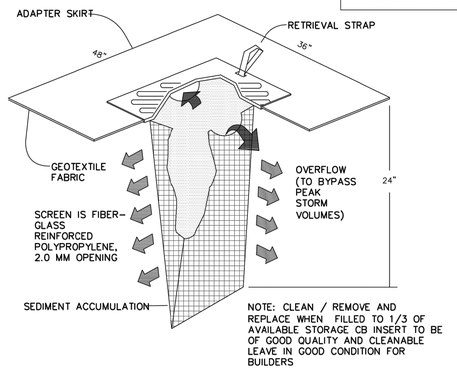
* MIRAFI 140–N OR EQUIVALENT

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STORM DRAIN BARRIERS NOTES

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	02.03.06
FILE NAME: P:\DWG\COMMON\STDSCITY\2009\02_SD02.03.06	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS	

5 STORM DRAINAGE BARRIERS NOTES
SCALE:NTS



DETAIL CBI-1
CATCH BASIN INSERT FOR TRASH & DEBRIS

6 CATCH BASIN INSERT
SCALE:NTS

CALL BEFORE YOU DIG
1-800-424-5555 OR 811

APPROVED

BY _____
CITY OF PUYALLUP
DEVELOPMENT ENGINEERING

DATE _____

NOTE: THIS APPROVAL IS VOID AFTER 180 DAYS FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS.
FIELD CONDITIONS MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE DEVELOPMENT ENGINEERING MANAGER.

McInnis ENGINEERING
mcinnisengineering.com
253.414.1992
202 East 34th Street
Tacoma, Washington 98404

2401 INTER
TESC NOTES AND DETAILS
2401 INTER AVE SE
PUYALLUP, WA 98372

JEFFREY W. MCINNIS STATE OF WASHINGTON 37190 REGISTERED PROFESSIONAL ENGINEER
11/25/2025

NUM	DATE	DESCRIPTION
V1	01/24/25	INITIAL RELEASE
V2	06/23/25	SECOND RELEASE

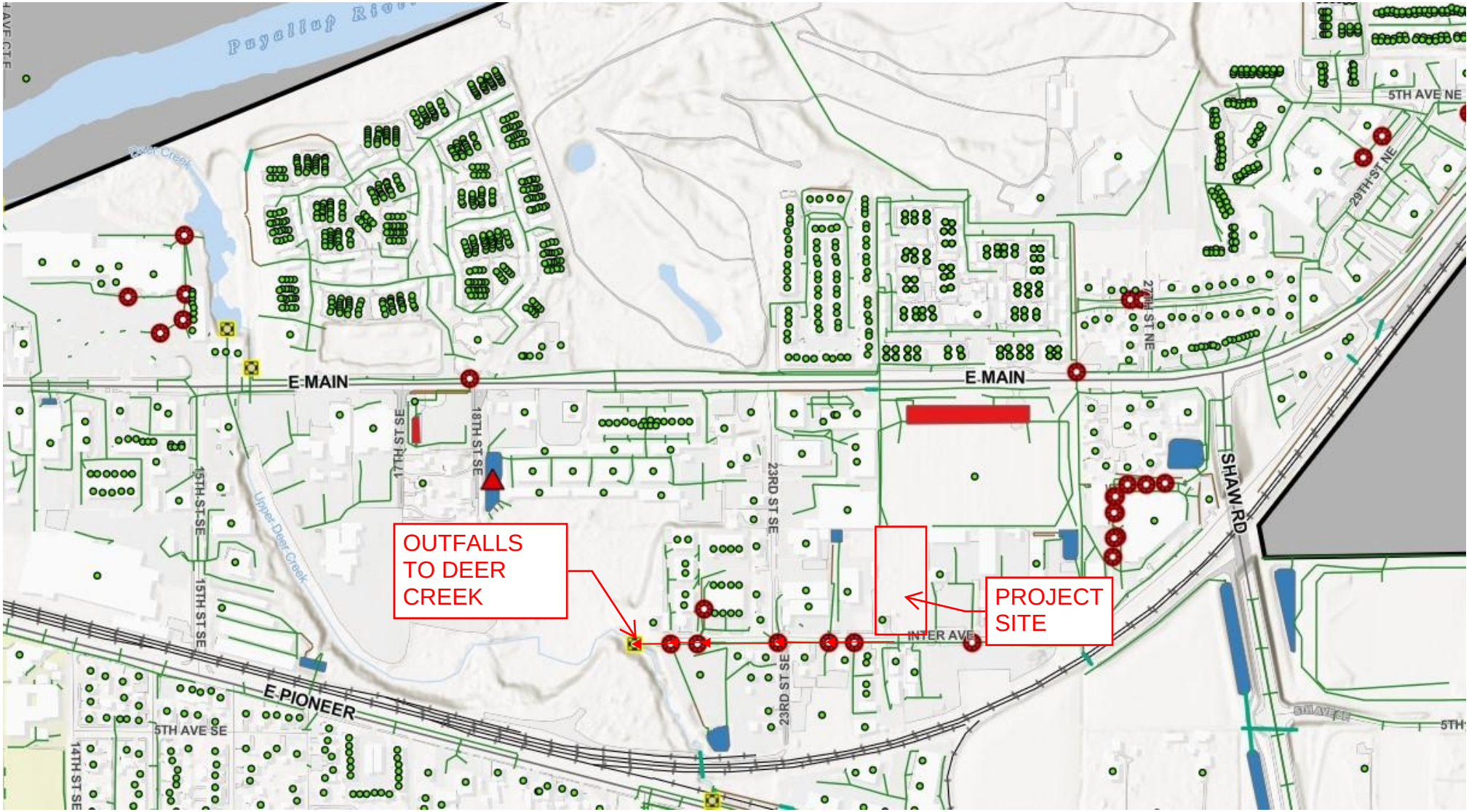
DESIGNED W. MCINNIS	SCALE N.T.S.
DRAWN W. MCINNIS	CHECKED J. MCINNIS
DATE 11/25/2025	APPROVED J. MCINNIS

JOB NO. 24-166

SHEET C4 OF C14

C4

Figure 5: Downstream Analysis Map



McInnis ENGINEERING

2401 Inter
Downstream Analysis Map
NTS

Appendix B – Hydrologic Calculation & WWHM Report

WWHM2012

PROJECT REPORT

General Model Information

WWHM2012 Project Name: 2401 StormTech
Site Name:
Site Address:
City:

Report Date:	8/8/2025
Gage:	38 IN CENTRAL
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2023/01/27
Version:	4.2.19

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	1.85
Pervious Total	1.85
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.85

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.1
A B, Lawn, Steep	0.33
Pervious Total	0.43

Impervious Land Use	acre
ROADS FLAT	1.34
Impervious Total	1.34
Basin Total	1.77

Driveway Bypass

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS MOD	0.05
SIDEWALKS FLAT	0.03
Impervious Total	0.08
Basin Total	0.08

Routing Elements
Predeveloped Routing

Mitigated Routing

SSD Table 1

Depth: 4.75 ft.
Element Flows To:
Outlet 1 Outlet 2

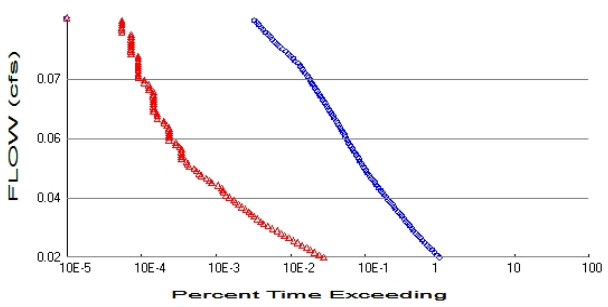
SSD Table Hydraulic Table

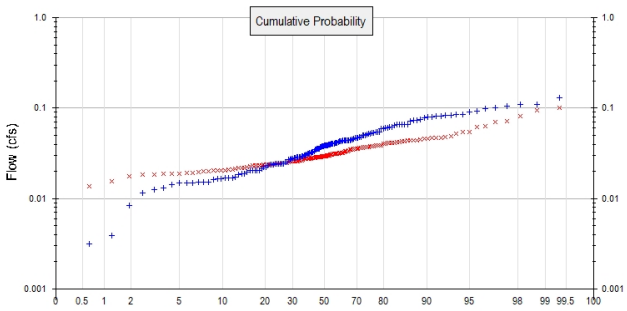
Stage (feet)	Area (ac.)	Volume (ac-ft.)	NotUsed	NotUsed	NotUsed	NotUsed	NotUsed
0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000
0.080	0.100	0.020	0.000	0.000	0.000	0.000	0.000
0.170	0.100	0.040	0.000	0.000	0.000	0.000	0.000
0.250	0.100	0.050	0.000	0.000	0.000	0.000	0.000
0.330	0.100	0.070	0.000	0.000	0.000	0.000	0.000
0.420	0.100	0.090	0.000	0.000	0.000	0.000	0.000
0.500	0.100	0.110	0.000	0.000	0.000	0.000	0.000
0.580	0.100	0.130	0.000	0.000	0.000	0.000	0.000
0.670	0.100	0.150	0.000	0.000	0.000	0.000	0.000
0.750	0.100	0.160	0.000	0.000	0.000	0.000	0.000
0.830	0.100	0.180	0.000	0.000	0.000	0.000	0.000
0.920	0.100	0.200	0.000	0.000	0.000	0.000	0.000
1.000	0.100	0.220	0.000	0.000	0.000	0.000	0.000
1.080	0.110	0.230	0.000	0.000	0.000	0.000	0.000
1.170	0.110	0.250	0.000	0.000	0.000	0.000	0.000
1.250	0.120	0.270	0.000	0.000	0.000	0.000	0.000
1.330	0.130	0.290	0.000	0.000	0.000	0.000	0.000
1.420	0.140	0.300	0.000	0.000	0.000	0.000	0.000
1.500	0.140	0.320	0.000	0.000	0.000	0.000	0.000
1.580	0.150	0.340	0.000	0.000	0.000	0.000	0.000
1.670	0.160	0.350	0.000	0.000	0.000	0.000	0.000
1.750	0.160	0.370	0.000	0.000	0.000	0.000	0.000
1.830	0.160	0.390	0.000	0.000	0.000	0.000	0.000
1.920	0.170	0.400	0.000	0.000	0.000	0.000	0.000
2.000	0.170	0.420	0.000	0.000	0.000	0.000	0.000
2.080	0.170	0.430	0.000	0.000	0.000	0.000	0.000
2.170	0.180	0.450	0.000	0.000	0.000	0.000	0.000
2.250	0.180	0.470	0.000	0.000	0.000	0.000	0.000
2.330	0.180	0.480	0.000	0.000	0.000	0.000	0.000
2.420	0.180	0.500	0.000	0.000	0.000	0.000	0.000
2.500	0.190	0.510	0.000	0.000	0.000	0.000	0.000
2.580	0.190	0.530	0.000	0.000	0.000	0.000	0.000
2.670	0.190	0.540	0.000	0.000	0.000	0.000	0.000
2.750	0.190	0.550	0.000	0.000	0.000	0.000	0.000
2.830	0.200	0.570	0.000	0.000	0.000	0.000	0.000
2.920	0.200	0.580	0.000	0.000	0.000	0.000	0.000
3.000	0.200	0.600	0.000	0.000	0.000	0.000	0.000
3.080	0.200	0.610	0.000	0.000	0.000	0.000	0.000
3.170	0.200	0.620	0.000	0.000	0.000	0.000	0.000
3.250	0.200	0.630	0.000	0.000	0.000	0.000	0.000
3.330	0.210	0.640	0.000	0.000	0.000	0.000	0.000
3.420	0.210	0.660	0.000	0.000	0.000	0.000	0.000
3.500	0.210	0.660	0.000	0.000	0.000	0.000	0.000
3.580	0.210	0.670	0.000	0.000	0.000	0.000	0.000
3.670	0.210	0.680	0.000	0.000	0.000	0.000	0.000

3.750	0.210	0.690	0.000	0.000	0.000	0.000	0.000
3.830	0.210	0.700	0.000	0.000	0.000	0.000	0.000
3.920	0.210	0.710	0.000	0.000	0.000	0.000	0.000
4.000	0.210	0.720	0.000	0.000	0.000	0.000	0.000
4.080	0.210	0.730	0.000	0.000	0.000	0.000	0.000
4.170	0.220	0.730	0.000	0.000	0.000	0.000	0.000
4.250	0.220	0.740	0.000	0.000	0.000	0.000	0.000
4.330	0.220	0.750	0.000	0.000	0.000	0.000	0.000
4.420	0.220	0.760	0.000	0.000	0.000	0.000	0.000
4.500	0.220	0.770	0.000	0.000	0.000	0.000	0.000
4.580	0.220	0.780	0.000	0.000	0.000	0.000	0.000
4.670	0.220	0.790	0.000	0.000	0.000	0.000	0.000
4.750	0.220	0.790	0.000	0.000	0.000	0.000	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.85
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 0.08

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.038985
5 year	0.060649
10 year	0.07242
25 year	0.084401
50 year	0.091522
100 year	0.097378

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.029809
5 year	0.040418
10 year	0.048189
25 year	0.058892
50 year	0.067529
100 year	0.076755

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.029	0.035
1903	0.024	0.038
1904	0.039	0.043
1905	0.019	0.020
1906	0.008	0.023
1907	0.060	0.028
1908	0.044	0.024
1909	0.044	0.029
1910	0.060	0.028
1911	0.039	0.032

1912	0.130	0.055
1913	0.062	0.026
1914	0.015	0.101
1915	0.025	0.019
1916	0.039	0.036
1917	0.013	0.015
1918	0.042	0.029
1919	0.031	0.019
1920	0.040	0.026
1921	0.044	0.020
1922	0.044	0.033
1923	0.036	0.022
1924	0.016	0.042
1925	0.020	0.018
1926	0.038	0.033
1927	0.024	0.029
1928	0.030	0.020
1929	0.062	0.041
1930	0.040	0.044
1931	0.037	0.022
1932	0.029	0.024
1933	0.028	0.022
1934	0.082	0.036
1935	0.038	0.019
1936	0.033	0.028
1937	0.053	0.042
1938	0.032	0.020
1939	0.002	0.024
1940	0.036	0.047
1941	0.017	0.047
1942	0.053	0.032
1943	0.028	0.031
1944	0.050	0.046
1945	0.045	0.034
1946	0.024	0.028
1947	0.015	0.020
1948	0.084	0.029
1949	0.072	0.044
1950	0.020	0.028
1951	0.025	0.047
1952	0.109	0.045
1953	0.099	0.039
1954	0.036	0.023
1955	0.029	0.026
1956	0.014	0.024
1957	0.051	0.023
1958	0.106	0.032
1959	0.065	0.032
1960	0.017	0.025
1961	0.066	0.070
1962	0.035	0.030
1963	0.017	0.021
1964	0.019	0.072
1965	0.073	0.030
1966	0.021	0.023
1967	0.032	0.032
1968	0.032	0.029
1969	0.032	0.024

1970	0.050	0.027
1971	0.079	0.026
1972	0.051	0.094
1973	0.065	0.053
1974	0.035	0.037
1975	0.083	0.037
1976	0.044	0.041
1977	0.015	0.018
1978	0.074	0.030
1979	0.020	0.031
1980	0.042	0.033
1981	0.040	0.030
1982	0.016	0.025
1983	0.066	0.031
1984	0.027	0.031
1985	0.043	0.038
1986	0.039	0.019
1987	0.074	0.034
1988	0.047	0.019
1989	0.042	0.020
1990	0.048	0.025
1991	0.038	0.040
1992	0.054	0.041
1993	0.052	0.037
1994	0.078	0.026
1995	0.015	0.020
1996	0.086	0.027
1997	0.033	0.024
1998	0.039	0.029
1999	0.003	0.035
2000	0.030	0.027
2001	0.015	0.026
2002	0.054	0.039
2003	0.047	0.026
2004	0.044	0.035
2005	0.080	0.081
2006	0.024	0.032
2007	0.024	0.036
2008	0.041	0.029
2009	0.028	0.022
2010	0.024	0.029
2011	0.020	0.031
2012	0.028	0.027
2013	0.022	0.027
2014	0.016	0.028
2015	0.032	0.043
2016	0.013	0.028
2017	0.060	0.042
2018	0.109	0.029
2019	0.102	0.038
2020	0.033	0.030
2021	0.054	0.026
2022	0.022	0.044
2023	0.046	0.055
2024	0.086	0.063
2025	0.040	0.030
2026	0.066	0.044
2027	0.024	0.036

2028	0.020	0.013
2029	0.044	0.022
2030	0.082	0.046
2031	0.027	0.014
2032	0.015	0.024
2033	0.024	0.031
2034	0.023	0.023
2035	0.093	0.028
2036	0.048	0.023
2037	0.012	0.037
2038	0.039	0.030
2039	0.004	0.062
2040	0.021	0.024
2041	0.029	0.030
2042	0.090	0.035
2043	0.044	0.038
2044	0.059	0.026
2045	0.040	0.021
2046	0.047	0.025
2047	0.035	0.028
2048	0.045	0.023
2049	0.040	0.035
2050	0.029	0.026
2051	0.042	0.036
2052	0.024	0.032
2053	0.043	0.024
2054	0.055	0.049
2055	0.017	0.030
2056	0.019	0.039
2057	0.029	0.019
2058	0.037	0.042
2059	0.066	0.048

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1298	0.1009
2	0.1094	0.0937
3	0.1092	0.0808
4	0.1055	0.0720
5	0.1019	0.0700
6	0.0986	0.0631
7	0.0930	0.0617
8	0.0905	0.0549
9	0.0857	0.0545
10	0.0856	0.0526
11	0.0839	0.0491
12	0.0831	0.0479
13	0.0824	0.0471
14	0.0816	0.0467
15	0.0801	0.0466
16	0.0792	0.0460
17	0.0782	0.0456
18	0.0744	0.0451
19	0.0740	0.0443
20	0.0734	0.0440
21	0.0719	0.0439
22	0.0660	0.0438

23	0.0656	0.0435
24	0.0656	0.0431
25	0.0656	0.0421
26	0.0654	0.0418
27	0.0652	0.0416
28	0.0622	0.0416
29	0.0619	0.0414
30	0.0604	0.0412
31	0.0601	0.0407
32	0.0598	0.0404
33	0.0590	0.0391
34	0.0546	0.0389
35	0.0544	0.0387
36	0.0541	0.0385
37	0.0538	0.0383
38	0.0535	0.0383
39	0.0526	0.0377
40	0.0521	0.0374
41	0.0513	0.0371
42	0.0505	0.0370
43	0.0504	0.0370
44	0.0503	0.0365
45	0.0483	0.0364
46	0.0480	0.0360
47	0.0473	0.0359
48	0.0472	0.0358
49	0.0470	0.0354
50	0.0455	0.0354
51	0.0448	0.0349
52	0.0446	0.0348
53	0.0445	0.0347
54	0.0444	0.0341
55	0.0443	0.0336
56	0.0443	0.0334
57	0.0440	0.0331
58	0.0438	0.0329
59	0.0437	0.0323
60	0.0435	0.0322
61	0.0435	0.0319
62	0.0430	0.0319
63	0.0424	0.0317
64	0.0419	0.0317
65	0.0417	0.0316
66	0.0417	0.0314
67	0.0414	0.0314
68	0.0402	0.0313
69	0.0401	0.0312
70	0.0401	0.0306
71	0.0400	0.0306
72	0.0398	0.0304
73	0.0396	0.0303
74	0.0393	0.0302
75	0.0391	0.0300
76	0.0390	0.0299
77	0.0389	0.0297
78	0.0389	0.0297
79	0.0385	0.0296
80	0.0379	0.0296

81	0.0378	0.0294
82	0.0376	0.0293
83	0.0373	0.0288
84	0.0368	0.0288
85	0.0357	0.0288
86	0.0356	0.0287
87	0.0355	0.0287
88	0.0354	0.0286
89	0.0352	0.0286
90	0.0346	0.0284
91	0.0332	0.0284
92	0.0329	0.0283
93	0.0329	0.0283
94	0.0322	0.0282
95	0.0321	0.0278
96	0.0320	0.0278
97	0.0316	0.0278
98	0.0315	0.0277
99	0.0308	0.0275
100	0.0302	0.0275
101	0.0297	0.0273
102	0.0295	0.0269
103	0.0291	0.0265
104	0.0289	0.0264
105	0.0288	0.0264
106	0.0287	0.0261
107	0.0286	0.0260
108	0.0284	0.0260
109	0.0283	0.0259
110	0.0278	0.0259
111	0.0275	0.0258
112	0.0272	0.0256
113	0.0267	0.0255
114	0.0251	0.0247
115	0.0251	0.0246
116	0.0245	0.0245
117	0.0243	0.0245
118	0.0242	0.0245
119	0.0242	0.0244
120	0.0241	0.0242
121	0.0240	0.0242
122	0.0238	0.0240
123	0.0238	0.0239
124	0.0236	0.0238
125	0.0235	0.0237
126	0.0224	0.0236
127	0.0221	0.0235
128	0.0214	0.0235
129	0.0206	0.0234
130	0.0204	0.0232
131	0.0204	0.0231
132	0.0203	0.0231
133	0.0203	0.0225
134	0.0195	0.0223
135	0.0190	0.0218
136	0.0187	0.0217
137	0.0186	0.0217
138	0.0174	0.0216

139	0.0169	0.0211
140	0.0169	0.0207
141	0.0169	0.0205
142	0.0165	0.0204
143	0.0164	0.0204
144	0.0163	0.0202
145	0.0152	0.0202
146	0.0152	0.0200
147	0.0152	0.0197
148	0.0150	0.0193
149	0.0148	0.0190
150	0.0148	0.0188
151	0.0143	0.0187
152	0.0130	0.0186
153	0.0126	0.0186
154	0.0115	0.0184
155	0.0084	0.0177
156	0.0039	0.0154
157	0.0031	0.0138
158	0.0020	0.0133

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0195	54293	1528	2	Pass
0.0202	50160	1327	2	Pass
0.0209	46603	1161	2	Pass
0.0217	43329	1009	2	Pass
0.0224	40265	907	2	Pass
0.0231	37451	781	2	Pass
0.0239	34936	691	1	Pass
0.0246	32576	604	1	Pass
0.0253	30321	523	1	Pass
0.0260	28265	455	1	Pass
0.0268	26437	413	1	Pass
0.0275	24792	364	1	Pass
0.0282	23290	316	1	Pass
0.0290	21928	275	1	Pass
0.0297	20642	239	1	Pass
0.0304	19423	217	1	Pass
0.0311	18282	198	1	Pass
0.0319	17219	178	1	Pass
0.0326	16166	163	1	Pass
0.0333	15147	152	1	Pass
0.0340	14271	138	0	Pass
0.0348	13446	123	0	Pass
0.0355	12670	110	0	Pass
0.0362	11944	101	0	Pass
0.0370	11246	95	0	Pass
0.0377	10559	84	0	Pass
0.0384	9978	76	0	Pass
0.0391	9374	69	0	Pass
0.0399	8847	67	0	Pass
0.0406	8332	66	0	Pass
0.0413	7861	59	0	Pass
0.0420	7462	48	0	Pass
0.0428	7030	45	0	Pass
0.0435	6609	41	0	Pass
0.0442	6277	35	0	Pass
0.0450	5978	33	0	Pass
0.0457	5701	30	0	Pass
0.0464	5437	28	0	Pass
0.0471	5197	24	0	Pass
0.0479	4943	23	0	Pass
0.0486	4704	22	0	Pass
0.0493	4511	19	0	Pass
0.0501	4333	19	0	Pass
0.0508	4159	19	0	Pass
0.0515	3958	19	0	Pass
0.0522	3764	19	0	Pass
0.0530	3577	18	0	Pass
0.0537	3414	16	0	Pass
0.0544	3263	16	0	Pass
0.0551	3134	13	0	Pass
0.0559	3026	13	0	Pass
0.0566	2928	13	0	Pass
0.0573	2814	13	0	Pass

0.0581	2682	13	0	Pass
0.0588	2555	13	0	Pass
0.0595	2451	12	0	Pass
0.0602	2359	11	0	Pass
0.0610	2256	11	0	Pass
0.0617	2140	9	0	Pass
0.0624	2039	9	0	Pass
0.0631	1952	9	0	Pass
0.0639	1860	8	0	Pass
0.0646	1777	8	0	Pass
0.0653	1690	8	0	Pass
0.0661	1619	8	0	Pass
0.0668	1561	8	0	Pass
0.0675	1482	8	0	Pass
0.0682	1407	8	0	Pass
0.0690	1339	8	0	Pass
0.0697	1270	8	0	Pass
0.0704	1217	7	0	Pass
0.0712	1162	7	0	Pass
0.0719	1103	7	0	Pass
0.0726	1055	6	0	Pass
0.0733	1006	6	0	Pass
0.0741	963	5	0	Pass
0.0748	919	5	0	Pass
0.0755	872	5	0	Pass
0.0762	814	5	0	Pass
0.0770	772	5	0	Pass
0.0777	738	5	0	Pass
0.0784	694	5	0	Pass
0.0792	636	5	0	Pass
0.0799	601	5	0	Pass
0.0806	553	5	0	Pass
0.0813	517	4	0	Pass
0.0821	478	4	0	Pass
0.0828	433	4	0	Pass
0.0835	394	4	1	Pass
0.0842	363	4	1	Pass
0.0850	339	4	1	Pass
0.0857	310	4	1	Pass
0.0864	296	4	1	Pass
0.0872	273	4	1	Pass
0.0879	252	3	1	Pass
0.0886	237	3	1	Pass
0.0893	223	3	1	Pass
0.0901	206	3	1	Pass
0.0908	194	3	1	Pass
0.0915	180	3	1	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.1439 acre-feet
On-line facility target flow:	0.1986 cfs.
Adjusted for 15 min:	0.1986 cfs.
Off-line facility target flow:	0.1144 cfs.
Adjusted for 15 min:	0.1144 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
SSD Table 1 POC	☐	0.00			☐	0.00			
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   2401 StormTech.wdm
MESSU       25   Pre2401 StormTech.MES
            27   Pre2401 StormTech.L61
            28   Pre2401 StormTech.L62
            30   POC2401 StormTech1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                    MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                        1.85     COPY   501     12
PERLND  10                        1.85     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   2401 StormTech.wdm
MESSU       25   Mit2401 StormTech.MES
            27   Mit2401 StormTech.L61
            28   Mit2401 StormTech.L62
            30   POC2401 StormTech1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       7
      PERLND       9
      IMPLND       1
      IMPLND       2
      IMPLND       8
      RCHRES       1
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        SSD Table  1               MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
    7     A/B, Lawn, Flat         1    1    1    1   27    0
    9     A/B, Lawn, Steep        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
```

```
    7         0    0    1    0    0    0    0    0    0    0    0    0
    9         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
    7         0    0    4    0    0    0    0    0    0    0    0    0    1    9
    9         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
    7         0    0    0    0    0    0    0    0    0    0    0
    9         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
    7              0         5       0.8       400      0.05       0.3     0.996
    9              0         5       0.8       400      0.15       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    7              0         0         2         2         0         0         0
    9              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                          ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    7          0.1       0.5      0.25         0       0.7      0.25
    9          0.1       0.5      0.25         0       0.7      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
    7              0         0         0         0         3         1         0
    9              0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT              1    1    1   27    0
    2      ROADS/MOD               1    1    1   27    0
    8      SIDEWALKS/FLAT          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    2         0    0    1    0    0    0
    8         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
```

```
    1         0    0    4    0    0    4    1    9
    2         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    2         0    0    0    0    0
    8         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
    2            400      0.05       0.1      0.08
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    2              0         0
    8              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    2              0         0
    8              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Driveway Bypass***
IMPLND   2                       0.05     COPY   501     15
IMPLND   2                       0.05     COPY   601     15
IMPLND   8                       0.03     COPY   501     15
IMPLND   8                       0.03     COPY   601     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     SSD Table  1            1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***
```

```
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                        ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                           ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   58    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.100000  0.000000  0.000000
  0.080000  0.100000  0.020000  0.000000
  0.170000  0.100000  0.040000  0.000000
  0.250000  0.100000  0.050000  0.000000
  0.330000  0.100000  0.070000  0.000000
  0.420000  0.100000  0.090000  0.000000
  0.500000  0.100000  0.110000  0.000000
  0.580000  0.100000  0.130000  0.000000
  0.670000  0.100000  0.150000  0.000000
  0.750000  0.100000  0.160000  0.000000
  0.830000  0.100000  0.180000  0.000000
  0.920000  0.100000  0.200000  0.000000
  1.000000  0.100000  0.220000  0.000000
  1.080000  0.110000  0.230000  0.000000
  1.170000  0.110000  0.250000  0.000000
  1.250000  0.120000  0.270000  0.000000
  1.330000  0.130000  0.290000  0.000000
  1.420000  0.140000  0.300000  0.000000
  1.500000  0.140000  0.320000  0.000000
  1.580000  0.150000  0.340000  0.000000
  1.670000  0.160000  0.350000  0.000000
  1.750000  0.160000  0.370000  0.000000
  1.830000  0.160000  0.390000  0.000000
  1.920000  0.170000  0.400000  0.000000
  2.000000  0.170000  0.420000  0.000000
  2.080000  0.170000  0.430000  0.000000
  2.170000  0.180000  0.450000  0.000000
  2.250000  0.180000  0.470000  0.000000
```

```
  2.330000  0.180000  0.480000  0.000000
  2.420000  0.180000  0.500000  0.000000
  2.500000  0.190000  0.510000  0.000000
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  2.670000  0.190000  0.540000  0.000000
  2.750000  0.190000  0.550000  0.000000
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  3.920000  0.210000  0.710000  0.000000
  4.000000  0.210000  0.720000  0.000000
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  4.750000  0.220000  0.790000  0.000000
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL      REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Inter Conveyance Analysis

Manning's Equation

Bottom width (ft)	6.25	ft	100-yr flow	Q100 =	0.093746 cfs
Depth (ft)	3.75	ft			
Slope (ft/ft)	0.02	ft/ft			
Manning's n	0.013				
Wetted Perimeter (width + 2xdepth)	13.75	ft			
Area (width x depth)	23.4375	ft2			
Hydraulic Radius (Area/Perimeter)	1.7045455	ft			
Qcalc =	363.82175	cfs			
Qcalc is greater than Q100, the 100-year flow rate	363.8275 cfs > 0.093746 cfs				

Appendix C – Geotechnical Analysis

Cobalt Geosciences

Preliminary Geotechnical Investigation
Proposed Office Building

2401 Inter Avenue
Puyallup, Washington

June 25, 2017

Table of Contents

LIST OF APPENDICES

PRELIMINARY GEOTECHNICAL INVESTIGATION
PUYALLUP, WASHINGTON

June 25, 2017

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed a preliminary geotechnical investigation for the proposed office building located at 2401 Inter Avenue in Puyallup, Washington (Figure 1).

The purpose of the geotechnical investigation was to identify subsurface conditions and to provide preliminary geotechnical recommendations for foundation design, earthwork, soil compaction, utilities, general pavement guidelines, and suitability of the on-site soils for use as fill.

The scope of work for the geotechnical investigation consisted of a site investigation followed by engineering analyses to prepare this report. Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including foundation design, drainage, and earthwork.

2.0 Project Description

The project details have not been finalized; however, we understand that the proposed development includes a one-story office building with wood framing to be supported at or near existing site elevations. There will be paved parking areas adjacent to the new building. The location and dimensions of the proposed structure and parking areas have not been determined at the time of this writing.

We anticipate that foundation loads will be generally light and that site grading will include cuts and fills on the order of 3 feet or less for foundation placement and parking lot construction. We should be notified if site development plans change so that we may update the recommendations in this report. We should be provided with final plans prior to construction and permitting.

3.0 Site Description

The site is located at 2401 Inter Avenue in Puyallup, Washington (Figure 1). The property consists of one rectangular parcel (No. 2105200150) with a total area of approximately 1.85 acres.

The southwest portion of the property is currently developed with a single-family residence and asphalt driveway. The remainder of the site is vegetated with grasses, bushes, and sparse evergreen and deciduous trees.

The property is nearly level and is bordered to the north, east, and west by commercial developments and to the south by Inter Avenue.

4.0 Field Investigation

4.1.1 Site Investigation Program

The geotechnical field investigation program was completed on June 8, 2017 and included excavating and sampling three test pits within the property, where accessible.

P.O. Box 82243, Kenmore, WA 98028

The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

A Cobalt Geosciences field representative conducted the explorations, classified the encountered soils, kept a detailed log of each test pit, and observed and recorded pertinent site features.

The results of the test pit explorations are presented in Appendix C.

5.0 Soil and Groundwater Conditions

5.1.1 Area Geology

The site lies within the Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

The Geologic Map of Washington – Southwest Quadrant, indicates that the site is underlain by alluvium.

In this area, alluvium includes variable mixtures and layers of sand, silt, clay, cobbles, and gravels with localized areas of peat and woody debris. These deposits have variable density ranging from soft/loose to dense, and include materials deposited by rivers and streams within the last 11,000 years (approximately).

Test Pits TP-1 through TP-3

All of the test pits encountered approximately 8 to 18 inches of topsoil and vegetation underlain by about 5 to 5.5 feet of medium stiff to stiff, silt with variable amounts of sand and local woody debris (Alluvium). These materials were underlain by loose to medium dense, very fine to fine grained sand with trace to some silt (Alluvium). These materials locally contained large woody debris and interbeds of silt/clay.

Overall Soil Conditions

Based on the explorations conducted as well as past experience at nearby site locations, the site is underlain by variable composition and density alluvium. These deposits generally become denser with depth, typically becoming medium dense or firmer below about 35 feet. Drilled borings would be necessary to confirm the composition and density of the soils.

5.1.2 Groundwater

At the time of our investigation, groundwater was encountered in all of the test pits from 5 to 6.5 feet below grade. Groundwater continued below this level and likely represents a more regional groundwater regime. We anticipate that an upper perched zone of groundwater may develop during the wetter months of the year.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability.

Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 Geologic Hazards

6.1 Erosion Hazard

The Natural Resources Conservation Services (NRCS) maps for Pierce County indicate that the site is underlain by Briscot Loam. We anticipate these soils will have a "Slight" erosion potential in a disturbed state.

It is our opinion that soil erosion potential at this project site can be reduced through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches and diversion trenches. The typical wet weather season, with regard to site grading, is from October 31st to April 1st. Erosion control measures should be in place before the onset of wet weather.

6.2 Seismic Hazard

The overall subsurface profile corresponds to a Site Class *E* as defined by Table 1613.5.2 of the 2012 International Building Code (2012 IBC). A Site Class *E* applies to a soft soil profile with an undrained shear strength of less than 1,000 psf.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S, S_1, F_a, and F_v. The USGS website includes the most updated published data on seismic conditions. The site specific seismic design parameters and adjusted maximum spectral response acceleration parameters are as follows:

PGA	(Peak Ground Acceleration, in percent of g)
S_S	124.50% of g
S_1	47.70% of g
F_A	0.90
F_V	2.40

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits.

Soil liquefaction is a state where soil particles lose contact with each other and become suspended in a viscous fluid. This suspension of the soil grains results in a complete loss of strength as the effective stress drops to zero as a result of increased pore pressures. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sand, such as low plasticity silt. Liquefaction usually occurs under vibratory conditions such as those induced by seismic events.

We were not contracted to conduct deep borings or analyze the liquefaction potential. Based on our experience with nearby sites underlain by similar soils, the liquefaction potential at the site likely ranges from moderate to high. Total settlements on the order of 4 to 8 inches or more could result from liquefaction.

Resulting total and/or differential settlements can adversely affect structural developments, causing structural failure or distress. Depending on the finalized proposed construction, conducting liquefaction analyses may be warranted. We should be provided with the final plans to determine if further analysis is necessary. Our preliminary foundation support recommendations do provide options to mitigate some level of settlement due to soft soils and potentially, liquefaction.

7.0 DISCUSSION

7.1.1 General

It is our opinion that the proposed office building may be supported on a shallow mat or raft foundation bearing on a geogrid reinforced fill zone, or on a deep foundation system. One or more drilled borings would be necessary to determine deep foundation system design parameters and options.

The near surface soils consist of silt with variable amounts of sand. These materials are not suitable for use as structural fill. If allowed by the City of Puyallup, adding dry cement and mixing with the native soils could allow their use as fill; however, a mix design would be necessary.

8.0 Recommendations

8.1.1 Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil. Based on observations from the site investigation program, it is anticipated that the stripping depth will range from 8 to 18 inches. The excavated material is not suitable as fill material within the proposed building envelope but could be used as fill material in non-settlement sensitive areas such as landscaping regions. In these non-settlement sensitive areas, the fill should be placed in maximum 12 inch thick lifts that should be compacted to at least 90 percent of the modified proctor (ASTM D 1557 Test Method) maximum dry density.

Any undocumented fill should be removed and backfilled with suitable structural fill compacted to at least 90 percent of the modified proctor up to planned subgrade elevations.

The native soils below the vegetation and topsoil consist of fine-grained alluvium consisting of silt with sand. These materials should not be used as structural fill due to their high fines content and elevated moisture levels.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

8.1.2 Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 4 feet or less for foundation placement. These excavations should be sloped no steeper than 1H:1V (Horizontal:Vertical) in native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 1.5H:1V, where room permits. Excavations that extend below 4 feet should be sloped no steeper than 1.5H:1V and 2H:1V if subject to surcharge loads. This is due to severe caving that occurs in the underlying sand unit.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.

8.1.3 Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be completed during the wet season (generally October through April).

- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

8.1.4 Preliminary Foundation Design

The proposed office building may be supported on a mat/raft foundation system bearing on at least 12 inches of crushed rock overlying geogrid and existing medium stiff to stiff native soils. Deep foundation options are possible; however, one or more drilled borings would be necessary to determine design options.

Raft/Mat Foundation Option

For a mat foundation system, we recommend that the building area be over-excavated at least 12 inches below proposed bottom of footing elevations and a minimum of 2 feet beyond all footing edges. We recommend a minimum footing embedment of 2 feet below adjacent finished grades.

Tensar TX160 geogrid should be placed on the resulting subgrade with at least 2 feet of overlap onto adjacent grids. Structural fill consisting of 1-1/4 to 1-1/2 inch minus crushed rock should be placed over the resulting subgrade and compacted to at least 95 percent of the modified proctor.

An allowable bearing pressure of 500 psf may be used in rigid mat foundation design. If inter-connecting grade beams are used as a waffle system, we recommend a maximum spacing of 10 feet between grade beams. Any foundation system should be designed to resist differential settlement as noted below and in the Seismic Hazard portion of this report.

We recommend that all completed footing excavations and backfill work be observed by the geotechnical engineer prior to reinforcing steel and structural concrete placement, to confirm that the bearing surface has been prepared in a manner consistent with our recommendations and that the subsurface conditions are as expected.

Lateral loads can be resisted by a combination of friction between the footing and the supporting soil, and by the passive lateral resistance of the soil surrounding the embedded portions of the footings. A passive lateral resistance corresponding to an equivalent fluid density of 275 pounds per cubic foot (pcf) may be used for design above the groundwater table. The upper 12 inches of passive resistance should be ignored. A coefficient of friction of 0.40 may be used between the concrete and crushed rock fill.

We estimate that the post construction settlement of the foundation may be on the order of 1 to 2 inches with differential settlements measured over a distance of approximately 25 feet on the order of 1 inch.

8.1.5 Slab-on-Grade

We recommend that the upper 12 to 18 inches of the existing soils within any proposed slab areas be removed and replaced with structural fill compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method).

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 180 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined in Section 8.1.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4 inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from these buildings and preferably with a relatively impermeable surface cover immediately adjacent to the buildings.

8.1.7 Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, silty and sandy soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils.

All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

8.1.8 Groundwater Influence on Construction

At the time of our investigation, groundwater was encountered in all of the test pits at depths ranging from 5 to 6.5 feet below existing grades. We anticipate that a near-surface perched groundwater regime may be present during the winter months in addition to the observed regional groundwater level. The upper groundwater should be manageable utilizing pumps and sump excavations.

The regional groundwater level, located about 5 to 7 feet below grades, would be difficult to lower using typical pumping techniques. If deeper excavations are proposed, we recommend that a contractor familiar with groundwater removal be consulted prior to construction.

8.1.9 Pavement Recommendations

The near surface subgrade soils generally consist of silt with sand. These soils are rated as fair for pavement subgrade material (depending on silt content and moisture conditions). We estimate that the subgrade will have a California Bearing Ratio (CBR) value of 8 and a modulus of subgrade reaction value of k = 180 pci, provided the subgrade is prepared in general accordance with our recommendations.

We recommend that, at a minimum, 18 inches of the existing subgrade material be moisture conditioned (as necessary) and re-compacted to prepare for the construction of pavement sections. Deeper levels of recompaction or overexcavation and replacement may be necessary in areas where fill and/or loose soils are present. If work occurs outside of the dry grading season, overexcavation and replacement of the upper 1 to 3 feet of native soils may be necessary to achieve a firm subgrade for asphalt support. The use of a geotextile fabric or grid may be necessary.

The subgrade should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. In place density tests should be performed to verify proper moisture content and adequate compaction. However, if the subgrade soil consists of firm and unyielding native glacial soils a proof roll of the pavement subgrade soil may be performed in lieu of compaction tests.

The recommended flexible and rigid pavement sections are based on design CBR and modulus of subgrade reaction (k) values that are achieved, only following proper subgrade preparation. It should be noted that subgrade soils that have relatively high silt contents will likely be highly sensitive to moisture conditions. The subgrade strength and performance characteristics of a silty subgrade material may be dramatically reduced if this material becomes wet.

Based on our knowledge of the proposed project, we expect the traffic to range from light duty (passenger automobiles) to heavy duty (delivery trucks). The following tables show the recommended pavement sections for light duty and heavy duty use.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT

LIGHT DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **
2.0 in.	6.0 in.	18.0 in.

** 95% compaction based on ASTM Test Method D1557*
*** A proof roll may be performed in lieu of in place density tests*

HEAVY DUTY

Asphaltic Concrete	Aggregate Base*	Compacted Subgrade* **
3.5 in.	6.0 in.	18.0 in.

** 95% compaction based on ASTM Test Method D1557*
*** A proof roll may be performed in lieu of in place density tests*

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT

Min. PCC Depth	Aggregate Base*	Compacted Subgrade* **
6.0 in.	6.0 in.	18.0 in.

** 95% compaction based on ASTM Test Method D1557*
*** A proof roll may be performed in lieu of in place density tests*

The asphaltic concrete depth in the flexible pavement tables should be a surface course type asphalt, such as Washington Department of Transportation (WSDOT) ½ inch HMA. The rigid pavement design is based on a Portland Cement Concrete (PCC) mix that has a 28 day compressive strength of 4,000 pounds per square inch (psi). The design is also based on a concrete flexural strength or modulus of rupture of 550 psi.

9.0 Construction Field Reviews

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Verify the soil bearing at foundation locations for the building
- Verify slab subgrade and capillary break material below slab-on-grade
- Observe footing drainage placement

- Observe proof rolls of roadway subgrade prior to asphalt placement

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

10.0 Closure

This report was prepared for the exclusive use of the Abbey Road Group and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes, and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of the Abbey Road Group who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

Respectfully submitted,

Cobalt Geosciences, LLC

Original signed by:

Phil Haberman, PE, LG, LEG
Principal Geotechnical Engineer

PH/sc

APPENDIX A
Statement of General Conditions

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

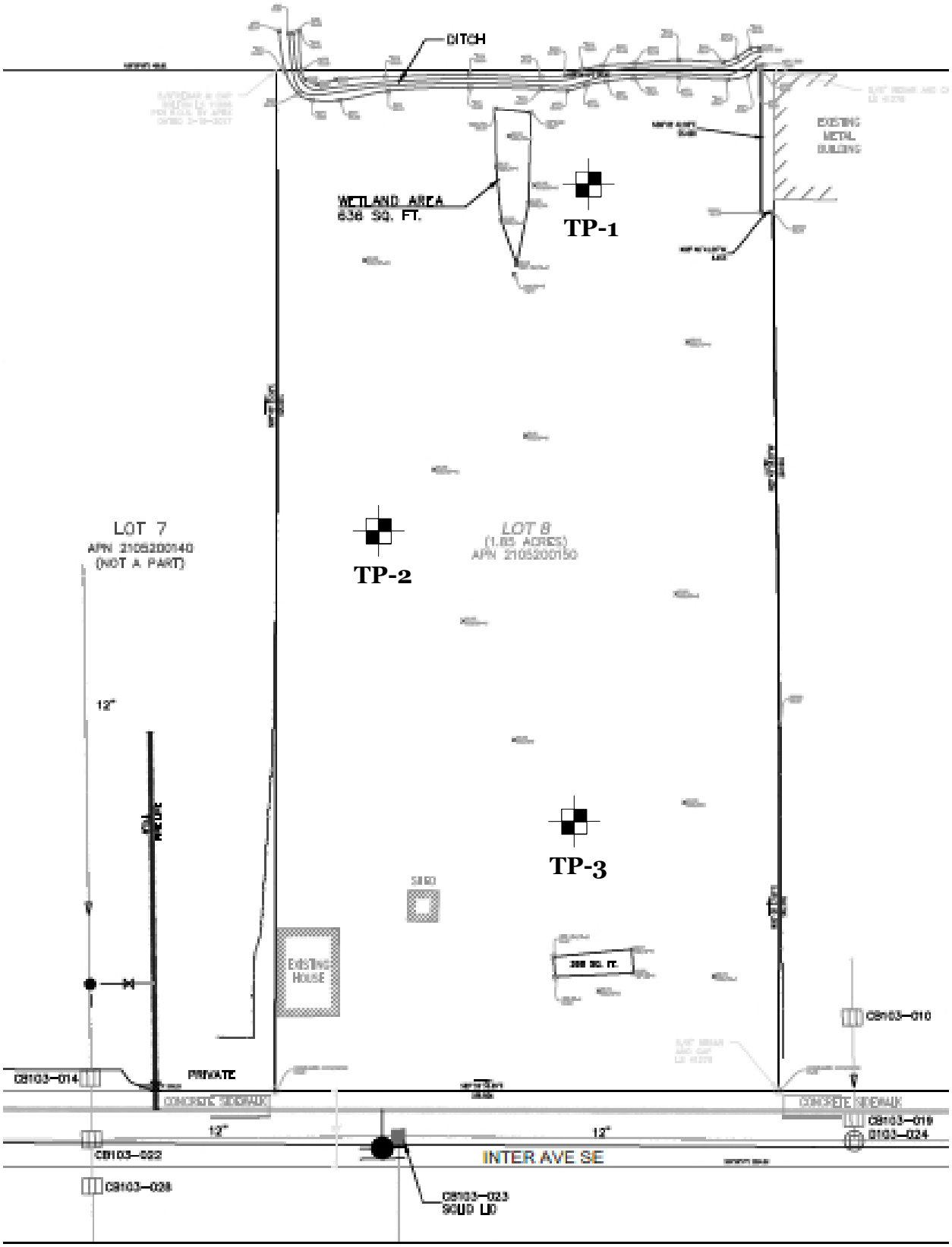
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

APPENDIX B
Figures: Vicinity Map, Site Plan

Proposed Office Building 2401 Inter Avenue Puyallup, Washington	Vicinity Map Figure 1	Cobalt Geosciences P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 cobaltgeo@gmail.com



TP-1 **Approximate Test Pit Location**

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Proposed Office Building 2401 Inter Avenue Puyallup, Washington	Site Plan Figure 2	Cobalt Geosciences P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 cobaltgeo@gmail.com

APPENDIX C
Test Pit Logs

PROJECT: **Proposed Office Building**
LOCATION: **2401 Inter Avenue, Puyallup, WA**
PROJECT NUMBER:

Test Pit No: **TP-1** PAGE 1 OF 1

DRILLING / INSTALLATION:
STARTED **6/8/17** COMPLETED: **6/8/17**
DRILLING COMPANY: **Steffen**
DRILLING EQUIPMENT: **Mini**
DRILLING METHOD:
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft): EASTING (ft):
LAT: LONG:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **6.5** WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered** BOREHOLE DEPTH (ft): **10.0**
WELL CASING DIA. (in): **---** BOREHOLE DIA. (in):
LOGGED BY: **PH** CHECKED BY: **SC**

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Recov. (feet)	Blow Count	Headspace PID (ppm)
			Grass/Topsoil					
		ML	ML; Medium stiff, silt with fine grained sand, mottled reddish brown to dark yellowish brown, moist. (Alluvium)					
5.0		SP	SP; Loose to medium dense, fine to medium grained sand trace silt, local interbeds of silt and clay, local pieces of woody debris, gray, moist to wet. (Alluvium)					
10.0			Test pit terminated at 10 feet.					

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PROJECT: **Proposed Office Building**
LOCATION: **2401 Inter Avenue, Puyallup, WA**
PROJECT NUMBER:

Test Pit No: **TP-2** PAGE 1 OF 1

DRILLING / INSTALLATION:
STARTED **6/8/17** COMPLETED: **6/8/17**
DRILLING COMPANY: **Steffen**
DRILLING EQUIPMENT: **Mini**
DRILLING METHOD:
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft): EASTING (ft):
LAT: LONG:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **6.5** WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered** BOREHOLE DEPTH (ft): **10.0**
WELL CASING DIA. (in): **---** BOREHOLE DIA. (in):
LOGGED BY: **PH** CHECKED BY: **SC**

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Recov. (feet)	Blow Count	Headspace PID (ppm)
			Grass/Topsoil					
		ML	ML; Medium stiff, silt with fine grained sand, mottled reddish brown to dark yellowish brown, moist. (Alluvium)					
5.0		SP	SP; Loose to medium dense, fine to medium grained sand trace silt, local interbeds of silt and clay, gray, moist to wet. (Alluvium)					
10.0			Test pit terminated at 10 feet.					

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PROJECT: **Proposed Office Building**
LOCATION: **2401 Inter Avenue, Puyallup, WA**
PROJECT NUMBER:

Test Pit No: **TP-3** PAGE 1 OF 1

DRILLING / INSTALLATION:
STARTED **6/8/17** COMPLETED: **6/8/17**
DRILLING COMPANY: **Steffen**
DRILLING EQUIPMENT: **Mini**
DRILLING METHOD:
SAMPLING EQUIPMENT: **Hand Auger**

NORTHING (ft): EASTING (ft):
LAT: LONG:
GROUND ELEV (ft): TOC ELEV (ft):
INITIAL DTW (ft): **5** WELL DEPTH (ft): **---**
STATIC DTW (ft): **Not Encountered** BOREHOLE DEPTH (ft): **10.0**
WELL CASING DIA. (in): **---** BOREHOLE DIA. (in):
LOGGED BY: **PH** CHECKED BY: **SC**

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Recov. (feet)	Blow Count	Headspace PID (ppm)
			Grass/Topsoil					
		ML	ML; Medium stiff to stiff, silt with fine grained sand, areas of large woody debris, mottled reddish brown to dark yellowish brown, moist. (Alluvium)					
5.0		SP	SP; Loose to medium dense, fine to medium grained sand trace silt, local interbeds of silt and clay, gray, moist to wet. (Alluvium)					
10.0			Test pit terminated at 10 feet.					

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Appendix D – Maintenance and Operations

#3 – Maintenance Checklist for Closed Detention Systems (Tanks/Vaults):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Storage Area	Plugged Air Vents	One-half of the cross-section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning. Remove blockage or replace air vent if damaged.
Storage Area	Debris and Sediment	Accumulated sediment depth exceeds 10 percent of the diameter of the storage area for one-half length of storage vault or any point depth exceeds 15 percent of diameter.	All sediment and debris removed from storage area.
Storage Area	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability.)	All joint between tank/pipe sections are sealed.
Storage Area	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10 percent of its design shape. (Review required by engineer to determine structural stability.)	Tank/pipe repaired or replaced to design.
Storage Area	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications and is structurally sound.
Storage Area	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	No cracks more than one-fourth inch wide at the joint of the inlet/outlet pipe. No water or soil entering vault through joints or walls.
Crest Gauge	Crest Gauge Missing/Broken	Crest gauge is not functioning properly, has been vandalized, or is missing.	Crest gauge present and functioning. *Repair/replace crest gauge if missing or broken.*
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole access cover/ lid is in place and secure.
Manhole	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
Manhole	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
Manhole	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.

If you are unsure whether a problem exists, contact a professional engineer.

Tanks and vaults are a confined space. Visual inspections should be performed aboveground. If entry is required, it should be performed by qualified personnel.

#5 – Maintenance Checklist for Catch Basins:

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	"Dump no pollutants" (or similar) stencil or stamp not visible	Stencil or stamp should be visible and easily read.	Warning signs (e.g., "Dump No Waste-Drains to Stream" or "Only rain down the drain"/ "Puget Sound starts here") painted or embossed on or adjacent to all storm drain inlets.
General	Trash and Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inlet capacity by more than 10 percent.	No trash or debris located immediately in front of catch basin or on grate opening.
General	Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
General	Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
General	Trash and Debris	Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
General	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.
General	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch.	No holes and cracks in the top slab allowing material to run into the basin.
General	Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
General	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
General	Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regrouted and secure at basin wall.
General	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
General	Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.

#5 – Maintenance Checklist for Catch Basins:

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.
General	Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. *(Coordinate removal/cleanup with Pierce County Surface Water Management 253-798-2725 and/or Dept. of Ecology Spill Response 800-424-8802.)*
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is in place and secured.
Catch Basin Cover	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half-inch of thread.	Mechanism opens with proper tools.
Catch Basin Cover	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Grates	Grate Opening Unsafe	Grate with opening wider than seven-eighths of an inch.	Grate opening meets design standards.
Grates	Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.	Grate free of trash and debris.
Grates	Damaged or Missing	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

If you are unsure whether a problem exists, contact a professional engineer.

#20 – Maintenance Checklist for Grounds (Landscaping):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Weeds (nonpoisonous)	Weeds growing in more than 20 percent of the landscaped area (trees and shrubs only). Any evidence of noxious weeds as defined in the Pierce County Noxious Weeds List.	Weeds present in less than 5 percent of the landscaped area.
General	Insect Hazard	Any presence of poison ivy or other poisonous vegetation or insect nests.	No poisonous vegetation or insect nests present in landscaped area.
General	Trash or Litter	See Detention Ponds (Checklist #1).	See Detention Ponds (Checklist #1).
General	Erosion of Ground Surface	Noticeable rills are seen in landscaped areas.	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
Trees and shrubs	Damage	Limbs or parts of trees or shrubs that are split or broken which affect more than 25 percent of the total foliage of the tree or shrub.	Trim trees/shrubs to restore shape. Replace trees/shrubs with severe damage.
Trees and shrubs	Damage	Trees or shrubs that have been blown down or knocked over.	Tree replanted, inspected for injury to stem or roots. Replace if severely damaged.
Trees and shrubs	Damage	Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Stakes and rubber-coated ties placed around young trees/shrubs for support.

#29 – Maintenance Checklist for Bioretention (Cells, Swales, and Planter Boxes):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash	Trash and debris present.	No trash and debris present.
Concrete Sidewalls	Cracks or Failure in Concrete Planter Reservoir	Cracks wider than 0.5 inch or maintenance/inspection personnel determine that the planter is not structurally sound.	Concrete repaired or replaced.
Rockery Sidewalls	Instable Rockery	Rock walls are insecure.	Rockery sidewalls are stable (may require consultation with professional engineer, particularly for walls 4 feet or greater in height).
Earthen Side Slopes and Berms	Failure in Earthen Reservoir (Embankments, Dikes, Berms, and Side Slopes)	Erosion (gullies/rills) greater than 2 inches around inlets, outlet, and along side slopes.	Source of erosion eliminated and damaged area stabilized (regrade, rock, vegetation, erosion control blanket). For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures are in place until permanent repairs can be made.
Earthen Side Slopes and Berms	Failure in Earthen Reservoir (Embankments, Dikes, Berms, and Side Slopes)	Erosion of sides causes slope to become a hazard.	The hazard is eliminated and slopes are stabilized.
Earthen Side Slopes and Berms	Failure in Earthen Reservoir Embankments, Dikes, Berms, and Side Slopes)	Settlement greater than 3 inches (relative to undisturbed sections of berm).	The design height is restored with additional mulch.
Earthen Side Slopes and Berms	Failure in Earthen Reservoir (Embankments, Dikes, Berms, and Side Slopes)	Downstream face of berm or embankment wet, seeps or leaks evident.	Holes are plugged and berm is compacted. May require consultation with professional engineer, particularly for larger berms.
Earthen Side Slopes and Berms	Failure in Earthen Reservoir (Embankments, Dikes, Berms, and Side Slopes)	Any evidence of rodent holes or water piping around holes if facility acts as dam or berm.	Rodents (see “Pests: Insects/Rodents”) removed or destroyed and berm repaired/ compacted.
Ponding Area	Sediment or Debris Accumulation	Accumulation of sediment or debris to extent that infiltration rate is reduced (see “Ponded water”) or surface storage capacity significantly impacted.	Sediment cleaned out to restore facility shape and depth. Damaged vegetation is replaced and mulched. Source of sediment identified and controlled (if feasible).
Ponding Area	Leaf Accumulation	Accumulated leaves in facility.	No leaves clogging outlet structure or impeding water flow.
Ponding Area	Basin Inlet via Surface Flow	Soil is exposed or signs of erosion are visible.	Erosion sources repaired and controlled.
Curb Cut Inlet	Sediment or Debris Accumulation	Sediment, vegetation, or debris partially or fully blocking inlet structure.	Curb cut is clear of debris. Source of the blockage is identified and action is taken to prevent future blockages.

#29 – Maintenance Checklist for Bioretention (Cells, Swales, and Planter Boxes):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Splash Block Inlet	Water Not Properly Directed to Facility	Water is not being directed properly to the facility and away from the inlet structure.	Blocks are reconfigured to direct water to facility and away from structure.
Splash Block Inlet	Erosion	Water disrupts soil media.	Splash block is reconfigure/repaired.
Inlet/outlet pipe	Damaged Pipe	Pipe is damaged.	Pipe is repaired/replaced. No cracks more than 0.25 inched wide at the joint of inlet/outlet pipes exist.
Inlet/outlet pipe	Clogged Pipe	Pipe is clogged.	Pipe is clear of roots or debris. Source of the blockage is identified and action is taken to prevent future blockages.
Inlets/outlet and access pathways	Blocked Access	Maintain access for inspections.	Vegetation is cleared within 1 foot of inlets and outlets. Access pathways are maintained.
Ponding Area	Erosion	Water disrupts soil media.	No eroded or scoured areas in bioretention area. Cause of erosion or scour addressed. A cover of rock or cobbles or other erosion protection measure maintained (e.g., matting) to protect the ground where concentrated water enters or exits the facility (e.g., a pipe, curb cut or swale).
Trash Rack	Trash or Debris Accumulation	Trash or debris present on trash rack.	No trash or debris on trash rack. Clean and dispose trash.
Trash Rack	Damaged Trash Rack	Bar screen damaged or missing.	Barrier repaired or replaced to design standards.
Check Dams and Weirs	Sediment or Debris Accumulation	Sediment, vegetation, or debris accumulated at or blocking (or having the potential to block) check dam, weir, or orifice.	Blockage is cleared. Identify the source of the blockage and take actions to prevent future blockages.
Check Dams and Weirs	Erosion	Erosion and/or undercutting is present.	No eroded or undercut areas in bioretention area. Cause of erosion or undercutting addressed. Check dam or weir is repaired.
Check Dams and Weirs	Unlevel Top of Weir	Grade board or top of weir damaged or not level.	Weir restored to level position.
Flow Spreader	Sediment Accumulation	Sediment blocks 35 percent or more of ports/notches or, sediment fills 35 percent or more of sediment trap.	Sediment removed and disposed of.
Flow Spreader	Damaged or Unlevel Grade Board/Baffle	Grade board/baffle damaged or not level.	Board/baffle removed and reinstalled to level position.
Overflow/ emergency spillway	Sediment or Debris Accumulation	Overflow spillway is partially or fully plugged with sediment or debris.	No sediment or debris in overflow.
Overflow/ emergency spillway	Erosion	Native soil is exposed or other signs of erosion damage are present.	Erosion repaired and surface of spillway stabilized.

#29 – Maintenance Checklist for Bioretention (Cells, Swales, and Planter Boxes):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Overflow/ emergency spillway	Missing Spillway Armament	Spillway armament is missing.	Armament replaced.
Underdrain	Blocked Underdrain	Plant roots, sediment or debris reducing capacity of underdrain. Prolonged surface ponding (see "Bioretention Soil").	Underdrains and orifice are free of sediment and debris.
Bioretention soil	Ponded Water	Excessive ponding water: Water overflows during storms smaller than the design event or ponded water remains in the basin 48 hours or longer after the end of a storm.	Cause of ponded water is identified and addressed: 1. Leaf or debris buildup is removed 2. Underdrain is clear 3. Other water inputs (e.g., groundwater, illicit connections) investigated 4. Contributing area verified If steps #1-4 do not solve the problem, imported bioretention soil is replaced and replanted.
Bioretention soil	Protection of Soil	Maintenance requiring entrance into the facility footprint.	Maintenance is performed without compacting bioretention soil media.
Vegetation	Bottom Swale and Upland Slope Vegetation	Less than 75 percent of swale bottom is covered with healthy/ surviving vegetation.	Plants are healthy and pest free. Cause of poor vegetation growth addressed. Bioretention area is replanted as necessary to obtain 75 percent survival rate or greater. Plant selection is appropriate for site growing conditions.
Trees and shrubs	Causing Problems for Operation of Facility	Large trees and shrubs interfere with operation of the basin or access for maintenance.	Trees and shrubs do not hinder facility performance or maintenance activities. Prune or remove large trees and shrubs.
Trees and shrubs	Dead Trees and Shrubs	Standing dead vegetation is present.	Trees and shrubs do not hinder facility performance or maintenance activities. Dead vegetation is removed and cause of dead vegetation is addressed. Specific plants with high mortality rate are replaced with more appropriate species.
Trees and shrubs adjacent to vehicle travel areas (or areas where visibility needs to be maintained)	Safety Issues	Vegetation causes some visibility (line of sight) or driver safety issues.	Appropriate height for sight clearance is maintained. Regular pruning maintains visual sight lines for safety or clearance along a walk or drive. Tree or shrub is removed or transplanted if presenting a continual safety hazard.
Emergent Vegetation	Conveyance Blocked	Vegetation compromises conveyance.	Sedges and rushes are clear of dead foliage.
Mulch	Lack of Mulch	Bare spots (without much cover) are present or mulch covers less than 2 inches.	Facility has a maximum 3-inch layer of an appropriate type of mulch and mulch is kept away from woody stems.
Vegetation	Accumulation of Clippings	Grass or other vegetation clippings accumulate to 2 inches or greater in depth.	Clippings removed.

#29 – Maintenance Checklist for Bioretention (Cells, Swales, and Planter Boxes):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Noxious Weeds	Presence of Noxious Weeds	Listed noxious vegetation is present. See Pierce County Noxious Weeds List..	Noxious and nuisance vegetation removed according to applicable regulations. No danger of noxious vegetation where County personnel or the public might normally be. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Vegetation	Weeds	Weeds are present (unless on edge and providing erosion control).	Weed material removed and disposed of. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Excessive Vegetation	Adjacent Facilities Compromised	Low-lying vegetation growing beyond facility edge onto sidewalks, paths, or street edge poses pedestrian safety hazard or may clog adjacent permeable pavement surfaces due to associated leaf litter, mulch, and soil.	Vegetation does not impede function of adjacent facilities or pose as safety hazard. Groundcovers and shrubs trimmed at facility edge. Excessive leaf litter is removed.
Excessive Vegetation	Causes Facility to Not Function Properly	Excessive vegetation density inhibits stormwater flow beyond design ponding or becomes a hazard for pedestrian and vehicular circulation and safety.	Pruning and/or thinning vegetation maintains proper plant density and aesthetics. Plants that are weak, broken, or not true to form are removed or replaced in-kind. Appropriate plants are present.
Irrigation (if any)	NA	Irrigation system present.	Manufacturer's instructions for O&M are met.
Plant watering	Plant Establishment	Plant establishment period (1-3 years).	Plants are watered as necessary during periods of no rain to ensure plant establishment.
Summer Watering (after establishment)	Drought Period	Longer term period (3+ years).	Plants are watered as necessary during drought conditions and trees are watered up to five years after planting.
Spill Prevention and Response	Spill Prevention	Storage or use of potential contaminants in the vicinity of facility.	Spill prevention measures are implemented whenever handling or storing potential contaminants.
Spill Prevention and Response	Spill Response	Any evidence of contaminants such as oil, gasoline, concrete slurries, paint, etc.	Spills are cleaned up as soon as possible to prevent contamination of stormwater. No contaminants or pollutants present. *(Coordinate source control, removal, and/or cleanup with Pierce County Surface Water Management 253-798-2725 and/or Dept. of Ecology Spill Response 800-424-8802.)*
Safety	Safety (Slopes)	Erosion of sides causes slope to exceed 1:3 or otherwise becomes a hazard.	Actions taken to eliminate the hazard.
Safety	Safety (Hydraulic Structures)	Hydraulic structures (pipes, culverts, vaults, etc.) become a hazard to children playing in and around the facility.	Actions taken to eliminate the hazard (such as covering and securing any openings).

#29 – Maintenance Checklist for Bioretention (Cells, Swales, and Planter Boxes):

Drainage System Feature	Defect or Problem	Condition When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Aesthetics	Aesthetics	Damage/vandalism/debris accumulation.	Facility restored to original aesthetic conditions.
Aesthetics	Edging	Grass is starting to encroach on swale.	Edging repaired.
Pest Control	Pests: Insects/Rodents	Pest of concern is present and impacting facility function.	Pests removed or destroyed and facility returned to original functionality. Do not use pesticides or *Bacillus thuringiensis israelensis (Bti)*.
Pest Control	Mosquitoes	Standing water remains in the basin for more than three days following storms.	All inlets, overflows and other openings are protected with mosquito screens. No mosquito infestation present.

If you are unsure whether a problem exists, contact a professional engineer.

Appendix E – Swale Control Structure