

DEVORE RESIDENCE REDMOND, WASHINGTON

SOIL AMENDMENT NOTES:

- Retain and Protect Undisturbed Soil:**
 - Leave undisturbed vegetation and soil, and protect from compaction by fencing and keeping materials storage and equipment off these areas during construction.
 - For all areas where soil or vegetation are disturbed, use option 2, 3, or 4.
 - Import Soil:**
 - Import topsoil mix of sufficient organic content and depth to meet the requirements. Imported soils should not contain excessive clay or silt fines (more than 5 percent passing the US #200 sieve) because that could restrict stormwater infiltration. Use imported topsoil that meets default "pre-approved" rates.
 - Scarify subsoil and mulch planting beds, as described under the Soil Amendment heading below.
- Note: more than one method may be used on different portions of the same site.**

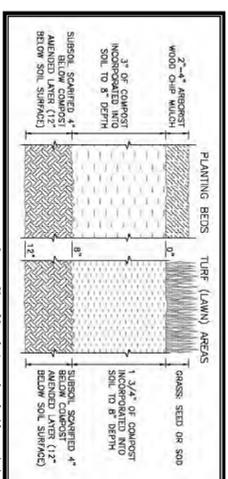


Figure 3.1. Cross-section of Soil Amendment.

- Amend Soil:**
 - Soil amendments shall be applied to all areas which are being set aside as non-buildable areas (open space or natural resource protection areas) and are in need of rehabilitation because of past land use disturbances such as clearing and intrusion of invasive species. The purpose is to enhance and accelerate the rehabilitation of the soil structure. The application will be non-destructive to the existing vegetation that is retained by taking care to taper depths of soil amendment near the surface roots.
 - Amend existing site topsoil or subsoil either at default "pre-approved" rates, or at custom calculated rates to meet the soil quality guidelines based on engineering tests of the soil and amendment. (Refer to the Building Soil Manual [Stem et al. 2012] or web site www.buildingsoil.org for custom calculation methods.)
- Stockpile Soil:**
 - Stockpile existing topsoil during grading and replace it prior to planting. Amend stockpiled topsoil if needed to meet the organic matter or depth requirements either at the default "pre-approved" rate or at a custom calculated rate (refer to the *Building Soil* manual [Stem et al. 2012] or web site www.buildingsoil.org for custom calculation method). Scarify subsoil and mulch planting beds, as described under the Soil Amendment heading below.

LEGEND

STORM PIPE		TOP OF WALL/TOE OF WALL	
CATCH BASIN		TOP AND TOE OF SLOPES	
STORM MANHOLE		SLOPE INDICATORS	
SANITARY SEWER PIPE		RIP RAP	
SANITARY SEWER MANHOLE		FILTER FABRIC FENCING	
WATER MAINS		RAIN WATER LEADERS (RWL)	
FIRE HYDRANT AND PVC		CLEANOILS (CO), SS, AND RHL	
WATER METERS		INTERCEPTOR AND BIO-SUMLES	
WATER VALVES		CEMENT CONCRETE	
FITTINGS WITH THRUST BLOCKS		STUBBED & PLUGGED LINE	
SURFACE WITH AND PIPE DIRECTION FLOW		EXTRUDED CONC. CURB	
EXISTING CONTOUR LABELS		CURB & GUTTER	
PROPOSED CONTOUR LABELS		ASPHALT CONCRETE PAVEMENT	
GROUND SPOT ELEVATIONS (TENTHS)		SLOPING WALL	
FINISHED SURFACE ELEVATIONS (NUMBERS)		ROCKERY WALL	
COORDINATES & LEADERS		CONCRETE RETAINING WALL	

CONSTRUCTION SEQUENCE

- FLAG CLEARING LIMITS AS SHOWN.
- INSTALL TEMPORARY QUARRY ROCK CONSTRUCTION ENTRANCE.
- INSTALL FILTER FENCE, CLEAR AND GRUB SITE. INSTALL TEMPORARY EROSION CONTROL MEASURES (SILT FENCE) AS CONSTRUCTION ACTIVITIES PROGRESS. ADDITIONAL FILTER FENCE MAY BE REQUIRED AROUND THE PERIMETER TO PREVENT SILT LOOSE WATER FROM LEAVING THE SITE.
- ANY AREA STRIPPED OF VEGETATION, WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 7 DAYS (2 DAYS DURING WET SEASON), SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED EROSION & SEDIMENT CONTROL METHODS, (E.G., SEEDING, MULCHING, NETTING, EROSION & SEDIMENT CONTROL METHODS.)
- ROUGH GRADE SITE, CONSTRUCT RESIDENCE AND DRIVEWAY.
- HYDROSEED AND MULCH AND AMEND ALL EXPOSED AREAS.
- REMOVE TEMPORARY EROSION CONTROL FACILITIES, ONLY, AFTER ENTIRE SITE IS STABILIZED AND THE POTENTIAL FOR EROSION HAS PASSED.
- CLEAN ANY SILT THAT HAS ACCUMULATED IN THE PERMANENT STORM DRAINAGE SYSTEM.

BENCHMARK AND DATUM

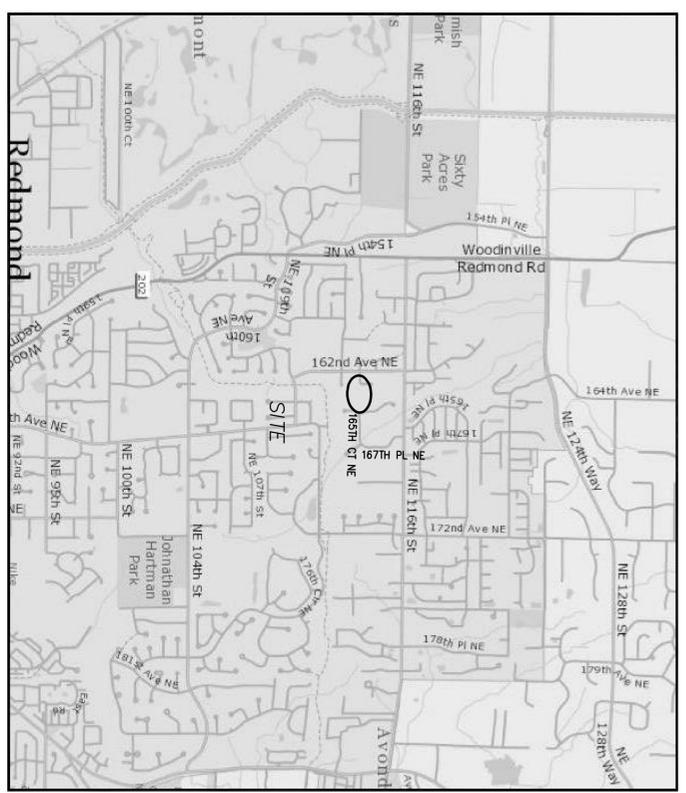
TOPOGRAPHIC INFORMATION IS BASED ON FIELD SURVEY INFORMATION PROVIDED BY OTHER'S AND HAS BEEN GENERALLY CONFIRMED IN THE FIELD BY DEVELOPMENT ENGINEERING, PLLC PERSONNEL, (SEE CONTRACTOR NOTE).

LEGAL DESCRIPTION

LOT 20 EQUESTRIAN TRACTS TGV UND INT TRS A, B, C & D.

VICINITY MAP

SCALE: 1" = 1/4 MILE



OWNER
JOHN DEVORE
11235 - 165TH CT NE
REDMOND, WA 98052
(206) 730-1923

CIVIL ENGINEER
DEVELOPMENT ENGINEERING, PLLC
2306 A STREET
TACOMA, WA 98402
(253) 228-0513
WWW.DE-CIVIL.COM

CONTRACTOR/SITE PLAN NOTE

ALL EXISTING UTILITIES AND EASEMENTS SHOWN ON PLANS ARE TO BE VERIFIED HORIZONTALLY AND VERTICALLY PRIOR TO ANY CONSTRUCTION. ALL EXISTING FEATURES INCLUDING BURIED UTILITIES AND EASEMENTS ARE SHOWN AS INDICATED ON RECORD MAPS AND SURVEY INFORMATION FURNISHED BY OTHERS. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS AND SURVEY. FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO CONSTRUCTION CONTACT THE UTILITY OWNER/AGENCY. THE PROVIDED SITE PLAN DOES NOT REPRESENT A SURVEY. IT IS THE OWNERS RESPONSIBILITY TO VERIFY ANY AND ALL ENCUMBRANCES LOCATED ON THE PROPERTY PRIOR TO CONSTRUCTION.

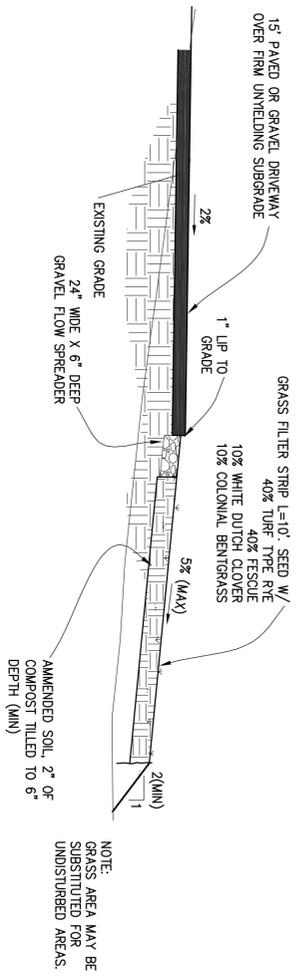
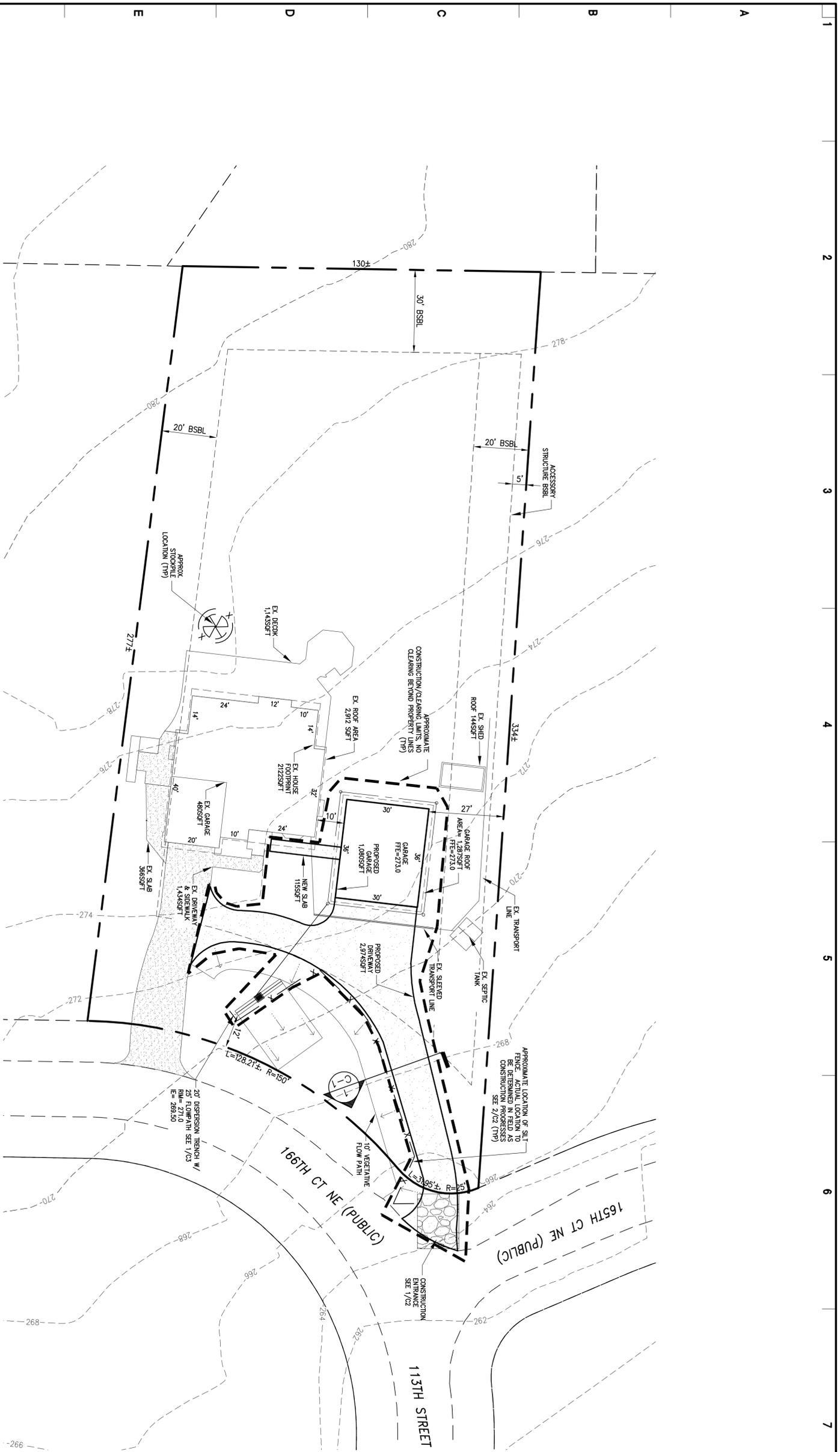
SHEET INDEX

TITLE SHEET & VICINITY MAP	C-0
GRADING & DRAINAGE PLAN	C-1
GENERAL NOTES & DETAILS	C-2
GENERAL NOTES & DETAILS	C-3

SITE ADDRESS

11235 - 165TH CT NE
PARCEL NUMBER: 2366400200



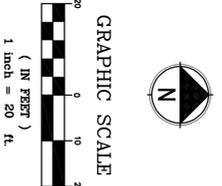


DRIVEWAY SECTION

SCALE : NTS
1

SITE STATISTICS

LOT AREA	= 0.95 ACRES 41550SQFT
CLEARED/WORK AREA	= 0.20 ACRES
EXISTING HOUSE ROOF AREA	= 2912SQFT
EXISTING DRIVEWAY & SIDEWALK AREA	= 1300SQFT
EXISTING DECK AREA	= 1143SQFT
EXISTING SHED ROOF AREA	= 1443SQFT
EXISTING SLAB AREA	= 3683SQFT
PROPOSED GARAGE ROOF IMPERVIOUS AREA	= 1287SQFT
PROPOSED DRIVEWAY IMPERVIOUS AREA	= 2974SQFT
PROPOSED NEW WALKWAY SLAB AREA	= 1155SQFT
MAXIMUM LOT COVERAGE FOR STRUCTURES	12% ACTUAL= 0%
MAXIMUM IMPERVIOUS SURFACE AREA	20% ACTUAL= 0%



SHEET NO. C-1	SHEET TITLE: CIVIL & T.E.S.C. PLAN	PROJECT TITLE: DEVORE RESIDENCE 11235 - 165TH CT NE REDMOND, WASHINGTON PN: 2366400200	APPROVALS: Job No.: 17-172 Proj. Manager: WGC Drawn: CJM Reviewed: WGC Dwg. Chk.: WGC Date: 9/27-7 Scale: AS NOTED	REVISIONS:	SIGNATURE: 9/27/17	PREPARED BY: DEVELOPMENT ENGINEERING, PLLC 2306 A STREET TACOMA, WA 98402 CIVIL - GEOTECHNICAL PHONE: (253) 228-0513 WWW.DE-CIVIL.COM
		SECTION 36 TOWNSHIP 26 RANGE 05 E W.M.				

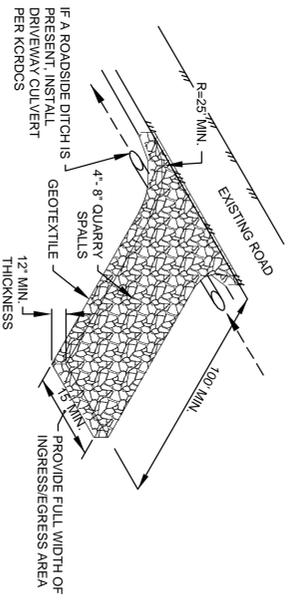
SEEDING NOTES

1. SEEDING MIXTURE SHALL BE GRASS SEED AND SHALL BE APPLIED AT A RATE OF 1LB PER 1000SQFT.
2. SEED BEDS PLANTED BETWEEN MAY 1 AND OCTOBER 31 WILL REQUIRE IRRIGATION AND OTHER MAINTENANCE AS NECESSARY TO FOSTER AND PROTECT FOOT STRUCTURE.
3. FOR SEED BEDS PLANTED BETWEEN OCTOBER 31 AND APRIL 30, AMENDING OF SEED BEDS 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 SEED BEDS 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 SUPPLIERS RECOMMENDATIONS. AMOUNTS USED SHOULD BE MINIMIZED, ESPECIALLY ADJACENT TO WATER BODIES AND WETLANDS.

GRADING NOTES

1. CUT SLOPES < 2 HORIZONTAL TO 1 VERTICAL OR AS RECOMMENDED BY A SOILS ENGINEER. (17A.30.010.A.1)
 2. THE CATCH POINT OF THE TOP OF THE SLOPE SET BACK FROM THE BOUNDARY LINE PER THE TABLE: (17A.30.010.A.2) (17A.30.010.B)
- | | |
|-----------|------------------|
| CUT DEPTH | SETBACK DISTANCE |
| < 5' | 2' |
| 5' - 20' | HEIGHT/2 |
| > 20' | 10' |

3. FILL SLOPES NOT STEEPER THAN 1 1/2 HORIZONTAL TO 1 VERTICAL OR AS RECOMMENDED BY A SOILS ENGINEER. (17A.30.010.B)
 4. GROUND SURFACE FOR FILLS OVER 5' IN HEIGHT PREPARED BY REMOVING VEGETATION, NONCOMPACTING FILL, TOPSOIL AND OTHER UNSUITABLE MATERIALS AND SCARPING. (17A.30.010.C)
 5. GROUND SURFACE FOR FILLS WHERE EXISTING SLOPES ARE > 5 HORIZONTAL TO 1 VERTICAL PREPARED BY BENCHING INTO COMPETENT MATERIAL. THE BENCH IS AT LEAST 10" WIDE OR AS RECOMMENDED BY A SOILS ENGINEER. (17A.30.010.C)
 6. NO MATERIAL OTHER THAN EARTH MATERIAL BURIED OR PLACED IN FILLS. (17A.30.010.D)
 7. THE TOE OR CATCH POINT OF FILL SLOPES SET BACK FROM THE SITE BOUNDARY LINE IN ACCORDANCE WITH THE FOLLOWING TABLE, UNLESS A RETAINING WALL IS DESIGNED BY AN ENGINEER AND CONSTRUCTED FOR THIS PROJECT: (17A.30.010.F)
- | | |
|------------|------------------|
| FILL DEPTH | SETBACK DISTANCE |
| < 5' | 2' |
| 5' - 40' | HEIGHT/2 |
| > 40' | 20' |



NOTES:
 - PER KING COUNTY ROAD DESIGN AND CONSTRUCTION STANDARDS (KCRDSS), DRIVEWAYS SHALL BE PAVED TO EDGE OF R.O.-W PRIOR TO INSTALLATION OF THE CONSTRUCTION ENTRANCE TO AVOID DAMAGING OF THE ROADWAY.
 - IT IS RECOMMENDED THAT THE ENTRANCE BE CROWNED SO THAT RUNOFF DRAINS OFF THE PAD.

CONSTRUCTION ENTRANCE

FIG. C.3.1.A - 2016 SMDM

SCALE : NTS

1

STORMWATER NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS AND THE MOST CURRENT COPY OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (MSDOT / AWA) AND AS AMENDED BY THE COUNTY OR STATE.
2. TEMPORARY EROSION/WATER POLLUTION PREVENTION MEASURES SHALL BE REQUIRED IN ACCORDANCE WITH THE Pierce County Stormwater Management Manual AND THE DEPT. OF ECOLOGY'S CONSTRUCTION STORMWATER GENERAL PERMIT.
3. THE STORM DRAINAGE SYSTEM SHALL BE CONSTRUCTED ACCORDING TO APPROVED PLANS ON FILE WITH THE COUNTY, ANY SIGNIFICANT DEVIATION FROM THE APPROVED PLANS WILL REQUIRE WRITTEN APPROVAL FROM THE COUNTY.
4. A COPY OF THE APPROVED STORMWATER PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
5. ALL EROSION CONTROL AND STORMWATER FACILITIES SHALL BE REGULARLY INSPECTED AND MAINTAINED BY THE DESIGNATED CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL) DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER IN THE EVENT OF DISCOVERY OF POOR SOILS, STANDING GROUNDWATER, OR SEVERE DISCREPANCIES FROM SOIL LOG DESCRIPTIONS AS NOTED ON THE PLANS.
7. FOR PUBLIC SYSTEMS, THE CONTRACTOR SHALL CALL FOR INSPECTION 48 HOURS PRIOR TO COVERING ANY DRAINAGE STRUCTURE.
8. ALL DRAINAGE STRUCTURES, SUCH AS CATCH BASINS AND MANHOLES, NOT LOCATED WITHIN A TRAVELED ROADWAY OR SIDEWALK, SHALL HAVE SOLID LOOKING UDS. ALL DRAINAGE STRUCTURES ASSOCIATED WITH A PERMANENT RETENTION/DETENTION FACILITY SHALL HAVE SOLID LOOKING UDS.

MULCHING NOTES

1. MUCH MATERIALS USED SHALL BE STRAW AND SHALL BE APPLIED AT A RATE OF 100LBS PER 1000SQFT.
2. MULCHING 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 SEEDD BECAUSE OF THE SEASON.
4. ALL AREAS NEEDING MULCH SHALL BE COVERED BY NOVEMBER 1.

CONSTRUCTION ENTRANCE NOTES

1. MATERIAL SHALL BE 4" TO 8" QUARRY SPALLS (4" TO 6" FOR RESIDENTIAL SINGLE FAMILY LOTS) AND MAY BE TOP DRESSED WITH 1" TO 3" ROCK.
2. THE ROCK PAD SHALL BE AT LEAST 12" THICK AND 50' LONG (20 FEET FOR SITES WITH LESS THAN 1 ACRE OF DISTURBED SOIL). WIDTH SHALL BE THE FULL LENGTH OF THE VEHICLE INGRESS AND EGRESS AREA. SMALLER PADS MAY BE APPROVED FOR SINGLE FAMILY, RESIDENTIAL, AND SMALL COMMERCIAL SITES.
3. ADDITIONAL ROCK SHALL BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
4. IF THE PAD DOES NOT ADEQUATELY REMOVE THE MUD FROM THE VEHICLE WHEELS, THE WHEELS THE VEHICLE 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 SLIT FENCE.

SILT FENCE NOTES

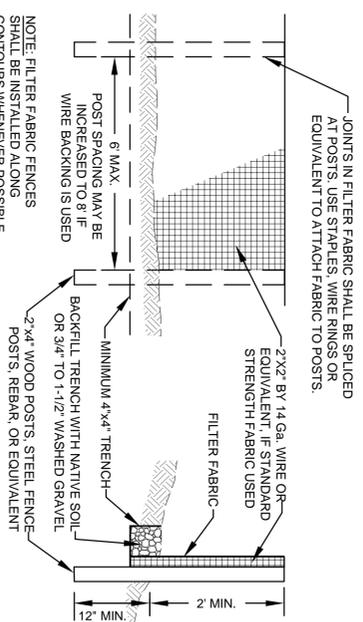
1. FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST. WITH A MINIMUM 6" OVERLAP, AND SECURELY FASTENED ON BOTH ENDS TO POST.
2. POSTS SHALL BE A MAXIMUM OF 6' APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 30").
3. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 8" WIDE AND 12" DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER. THIS TRENCH SHALL BE BACKFILLED WITH WASHED GRAVEL.
4. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE PASTED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1' LONG, THE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 4" AND SHALL NOT EXTEND MORE THAN 24" ABOVE THE ORIGINAL GROUND SURFACE.
5. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 20" OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 24" ABOVE THE ORIGINAL GROUND SURFACE.
6. WHEN EXTRA STRENGTH FILTER FABRIC AND CLOSER POST SPACING IS USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POST WITH ALL OTHER PROVISIONS OF ABOVE NOTES APPLICABLE.
7. FILTER FABRIC FENCES SHALL NOT BE REMOVED BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
8. FILTER FABRIC FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
9. SILT FENCES WILL BE INSTALLED PARALLEL TO ANY SLOPE CONTOURS.
10. CONTRIBUTING LENGTH TO FENCE WILL NOT BE GREATER THAN 100'.
11. DO NOT INSTALL BELOW AN OUTLET PIPE OR WEIR.
12. INSTALL DOWNSLOPE OF EXPOSED AREAS.
13. DO NOT DRIVE OVER OR FILL OVER SILT FENCES.

STOCKPILING SOIL NOTES

1. STOCKPILES SHALL BE STABILIZED (WITH PLASTIC COVERING OR OTHER APPROVED DEVICE) DAILY BETWEEN NOVEMBER 1 AND MARCH 31.
2. IN ANY SEASON, SEDIMENT LEACHING FROM PILES MUST BE PREVENTED.
3. TOPSOIL SHALL NOT BE PLACED WHILE IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBGRADE IS EXCESSIVELY WET, OR WHEN CONDITIONS EXIST THAT MAY BE OTHERWISE DETRIMENTAL TO PROPER GRADING OR PROPOSED SODDING OR SEEDING.
4. PREVIOUSLY ESTABLISHED GRADES ON THE AREAS TO BE TOPSOILED SHALL BE MAINTAINED ACCORDING TO THE APPROVED PLAN.

TEMPORARY EROSION AND SEDIMENTATION CONTROL NOTES:

1. APPROVAL OF THIS TEMPORARY EROSION AND SEDIMENTATION CONTROL (TESC) PLAN DOES NOT CONSTITUTE AND APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G. UTILITIES, ETC.).
2. THE IMPLEMENTATION OF THESE EROSION AND SEDIMENT CONTROL PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPTECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.
6. THE TESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
7. ANY AREAS OF EXPOSED SOILS, INCLUDING ROADWAY EMBANKMENTS, THAT WILL NOT BE DISTURBED FOR TWO DAYS DURING THE WET SEASON OR SEVEN DAYS DURING THE DRY SEASON SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED TESC METHODS (E.G. SEEDING, MULCHING, PLASTIC COVERING, ETC.).
8. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 48 HOURS FOLLOWING A STORM EVENT.
9. AT NO TIME SHALL MORE THAN ONE (1) FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSLOPE SYSTEM.
10. STABILIZED CONSTRUCTION ENTRANCES AND ROADS SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES, SUCH AS WASH PADS, MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.



SILT FENCE

FIG. C.3.1.A - 2016 SMDM

SCALE : NTS

2



DEVELOPMENT ENGINEERING, PLLC
 2306 A STREET TACOMA, WA 98402
 PHONE: (253) 228-0513
 WWW.DE-CIVIL.COM
 CIVIL - GEOTECHNICAL

SIGNATURE:

 9/27/17

REVISIONS:

APPROVALS:

Job No.: 17-172
 Proj. Manager: WGC
 Drawn: CJM
 Reviewed: WGC
 Dwg. Chk.: WGC
 Date: 9/27-17
 Scale: AS NOTED

PROJECT TITLE:
DEVORE RESIDENCE
 11235 - 165TH CT NE
 REDMOND, WASHINGTON
 PN: 2366400200

SHEET TITLE:
 CIVIL
 GENERAL NOTES
 & DETAILS

SHEET NO.:
C-2

DRAINAGE TECHNICAL INFORMATION REPORT

Proposed Single Family Residence
11235 – 165th Ct NE
Redmond, Washington
PN: 236640-0200

For

John & Karen Devore
11235 – 165th Ct NE
October 3, 2017

By

Development Engineering, PLLC

P.O. Box 446
Tacoma, WA 98401
Ph: (253) 228-0513
www.de-civil.com



TABLE OF CONTENTS

	Page
Cover	1
Table of Contents	2
Section 1: Project Overview	3
Section 2: Conditions and Requirements Summary	3
Section 3: Offsite Analysis	4
Section 4: Flow Control and Water Quality	5
Section 5: Conveyance System	6
Section 6: Special Reports and Studies	7
Section 7: Other Permits	7
Section 8: CSWPPP	7
Section 9: Bond Quantities	7
Section 10: Operations and Maintenance	7
Table A: Proposed Imperious Surface	8
Figure 1 – TIR Worksheets	9
Figure 2 – Vicinity Map	14
Figure 3 – Existing Site Conditions	15
Figure 4 – USDA Soils Map	16
Figure 5 – USDA Soils Map Table	17
Figure 6 – Downstream Analysis Table	18
Figure 7 – Downstream Analysis Map	19
Figure 8a-8c – Downstream Analysis Pictures	20
Figure 9 – Basin Study Map	23
Figure 10 – Sensitive Area	24
Figure 11 – Drainage Complaints	25
Figure 12 – 100yr 24hr Isopluvial Map	26
Figure 13 – Drainage Basin Map	27
Appendix A Maintenance	28
Appendix B Declaration of Covenant	32
Appendix C WWHM	37

Section 1 - PROJECT OVERVIEW

We are pleased to submit this drainage report for the construction of the proposed garage and driveway on the existing tax parcel, to be located at 11235 – 165th Ct NE in Redmond, in King County Washington, as shown on the attached Site Vicinity Map, Figure 2. It is our understanding from the discussions that we have had, our knowledge with the area and our site visit on **July 23, 2017**, that you intend to construct a garage/shop on this tax parcel which will utilize conventional wood framing and concrete footings.

Since the impervious surfacing you've planned to install totals to less than 5,000sqft, King County will require you to submit a "Simplified Drainage Review", requiring you to comply with all nine core requirements from section 1.2 and all five special requirements from section 1.3 of the King County SWDM 2016.

Pre-Developed Site Conditions

The site is an existing lot of record that is currently the location of a single family residence. The site consists of a single parcel that is irregular in shape, encompassing a total area of 0.95 acres. The site has remained in this developed state since 2000 according to King County Imap historical aerial photos. The site is generally slopes down from west to east at slopes of approximately 0 to 8 percent. Total topographic relief across the parcel is approximately 15 feet.

Post-Developed Conditions

Based on our conversations with the owner and our review of the provided site plan, it is our understanding that the proposed development will include the construction of a garage and an access to it, stemming from the point where 133th St splits into 165th Ct NE and 166th Ct NE. The proposed garage will measure 1,287sqft; the additional driveway will measure 2,974sqft in area. A new 115sqft impervious walkway will also be installed, for a total of 4,376sqft of new impervious area since 2000. Upon completion of the developments, all pervious surfacing will be allowed to regrow to native conditions, see Section 4 – Flow Control for WWHM modeling. The proposed development will result in 10,741sqft of total impervious area on the property, or 25.8% of the total lot area. Disturbed area will be limited the area surrounding the proposed impervious area, making the clearing limits for the development 0.2 acres.

See Figure 5, Developed Site Conditions and Table "A" for a complete breakdown of the site areas. Due to the amount of impervious area added, we intend to use full dispersion in accordance with King County requirements for full dispersion for managing stormwater runoff.

Site Soils

The USDA NRCS web application maps the soils on the site as Alderwood gravelly sandy loam (AgB, AgC, AgD), wich derive from glacial drift and/or outwash on slopes of 0 to 30 percent. These soils are known to have a very low to moderately low capacity to transmit water. An excerpt from the USDA soil survey is included as Figure 4.

Section 2 - Conditions and Requirements Summary

Per the FEMA Flood Map no portion of the site is located within a 100 year flood plain. According to the SWMM the site should be subject to "Full Drainage Review". The site will disturb more than 7,000sqft of area and will add more than 5,000sqft of new impervious area since 2000. It is assumed that basic dispersion will be necessary and will comply with stormwater management as they pertain to the rules and regulations set forth by King Counties SWMM, 2016.

Surface Water Design Manual Minimum Core Requirements:

Core Requirement 1. Discharge at the natural location:
The site currently drains to the southwest as sheet flow.

Core Requirement 2. Off-Site Analysis:
An Off-Site Analysis is included in Section 3 of this report. The analysis includes site inspection and research as required to meet the requirements of a “Level – 1” off-site analysis.

Core Requirement 3. Flow Control:
Flow Control is managed through the implementation of basic dispersion for all roof areas with flow paths dispersed through native forested conditions. Runoff from 2,974sqft of driveway will be sheet flowed into a vegetative flow path running adjacent to the impervious surface, whereas the other 1,287sqft of roof area will be conveyed to a dispersion trench. See WWHM calculations below for a full breakdown.

Core Requirement 4. Conveyance System:
A detailed conveyance analysis is included in Section 4 of this report.

Core Requirement 5. Temporary Erosion & Sediment Control:
Basic erosion control measures have been shown on the attached plans with a more detailed explanation given in Section 8 of this report.

Core Requirement 6. Maintenance & Operation:
An “O&M” Manual has been included as part of this report.

Core Requirement 7. Financial Guarantees & Liability:
A bond will not be required as this is a single family development.

Core Requirement 8. Water Quality:
The project will be required to meet the “Basic” water quality menu. The total amount of impervious pollution generating area is less than 5,000sqft at 2,974sqft therefore this requirement is not applicable.

King County Surface Water Design Manual Special Requirements:

Per the FEMA Flood Map no portion of the site is located within the 100 year flood plain. Wetlands are not mapped on the site, and no development is proposed within any wetland buffer areas without proper permitting and mitigation.

Section 3 – Level “1” Offsite Analysis

Task 1. Study Area Definition and Maps

The site is located within the Sammamish River Watershed. Site topography slopes down from southwest to northeast. Native drainage was difficult to observe due to vegetation and topography, but runoff from this area is directed north along 165th Ct NE until reaching a retention pond approximately 1,000 feet north of the property. Onsite stormwater is being dispersed and therefore will not affect native drainage patterns.

Task 2. Resource Review

The following is a summary of the resources reviewed to identify any potential sensitive areas within, adjacent to and downstream of the proposed site.

- Wetlands: iMap mapping shows no wetlands located within the site area.
- Streams and 100-year Floodplains: No flooding hazard is mapped on or near the property. Construction will not interfere with the pond on neighboring property.
- Erosion Hazard Areas: iMap mapping shows no erosion hazards on or near the property.
- Landslide Hazard Areas: iMap mapping shows no landslide hazard on or near the property.
- Seismic Hazard Areas: iMap shows no seismic hazard on or near the property.
- Drainage Complaints: iMap mapping shows that no drainage complaints exist near the property.

See Figures for maps.

Task 3. Field Inspection

Level 1 Inspection:

1. Investigate any problems reported or observed during the resource review.
No problems were identified within the resource review.
2. Locate all existing/potential constrictions or lack of capacity in the existing drainage system.
No problems identified.
3. Identify all existing/potential downstream drainage problems as defined in Section 1.2.2.1.
No significant drainage problems were noted on and around the site.
4. Identify existing/potential overtopping, scouring, bank sloughing, or sedimentation.
No evidence was observed of these issues.
5. Identify significant destruction of aquatic habitat or organisms.
None noted.
6. Collect qualitative data on features such as land use, impervious surfaces, topography, and soil types.
The site and surrounding areas generally consists of residential properties in close proximity to neighboring residences.
7. Collect information on pipe sizes, channel characteristics, drainage structures, and relevant critical areas (e.g., wetlands, streams, steep slopes).
No pipes or culverts noted on site. There are no steep slopes located on the site; careful attention has been paid to the proposed development to minimize any impacts to the existing natural drainage patterns.
8. Verify tributary basins delineated in Task 1.
The attached Figure 7 Basin Study Area accurately reflects the basin areas based on our field observations.
9. Contact neighboring property owners or residents in the area about past or existing drainage problems, and describe these in the report (optional).
Not done.
10. Note the date and weather conditions at the time of the inspection.
The inspection was performed in the afternoon of July 23, 2017. The weather was warm and clear (75°). It had not rained heavily for several weeks at the time of the visit.

Section 4 - Flow Control and Water Quality Analysis and Design

The proposed drainage will be maintained on site using basic dispersion techniques as they pertain to the rules and regulations set forth by King County Stormwater Management Manual (SWMM, 2016). As such we are proposing to apply basic dispersion to 2,974ft of driveway impervious surfacing. A 10-foot vegetative flow path will be installed running adjacent to the impervious surface.

For roof impervious areas, we are tightlining stormwater runoff to a dispersion trench located west of the proposed garage. The roof area of 1,287sqft requires a trench with a width of 18.4 feet in order to fully disperse stormwater runoff. The flow path associated with the dispersion trench must be 25 feet in length.

Since we are using a 20-foot wide trench with a 25-foot flow path, we have met requirements for minimum sizing of dispersion trenches for roof drainage.

We have provided WWHM calculations comparing the peak flow from the site in the pre-developed form and in the proposed developed form. The developed impervious areas being fully dispersed are not included in the calculations. The breakdown of the areas, mitigation and results of the changes to the 100yr peak flows are summarized below in Table 1 through 4, KCRS output is included for reference. It can be seen that less than a 0.1 cfs difference between predeveloped and mitigated peak flows has been achieved, therefore fulfilling the requirements for flow control.

Table 1 Pre-Developed Basin Areas	
Area (acres)	Modelled as
0.2 acres	Type C Forest

Table 2 Developed Areas & Mitigation			
	Area (acres)	BMP Used to Mitigate	Modelled As
Roof Area	0.0295	Basic Dispersion	Modeled as 90% impervious, 10% grass
Driveway	0.0683	Basic Dispersion	Modeled as 90% impervious, 10% grass

Table 3 Developed Basin	
	Area (acres)
Impervious surfacing	0.08802
Type C Lawn	0.11198
Total	0.2

Table 4 Flow Comparison	
	100yr Flow
Pre-Developed Forested	0.0158 cfs
Developed	0.1045 cfs
Difference	0.0887 cfs

Section 5 - Conveyance System Analysis and Design

Roof stormwater runoff will be tightlined to a dispersion trench located west of the proposed garage. The roof area of (1,287sqft) or (0.029acres) will be drained to the trench. Based on manning’s flow equation and an n value of 0.013, the pipe capacity will be 0.32 cfs for a 4” line and 0.66 cfs for a 6” line. Using the rational method as found in the KCSWDM the 100 year peak flow is $0.9 \times 0.029 \times 3.9 \times 0.95 = 0.097$ cfs. The 4-inch line has the capacity to convey the stormwater runoff to the dispersion trench.

Section 6 – Special Reports and Studies.

None noted

Section 7 – Other Permits

- A Building Permit will be required.

Section 8 – CSWPPP Analysis and Design

Typical erosion control measures have been shown on the provided plans. Given the limited amount of area to be worked at any given time and the near surface soils, the chance of erosion from leaving the site is minimal. While we have shown a silt fence along the down slope portions of the clearing limits, it is our opinion that little surface runoff will leave the site uncontrolled and that this will be adequate erosion protection for the site. Surface areas that are cleared are expected to be seeded or landscaped shortly after they have been cleared further minimizing the chance for erosion. In our opinion the plans as prepared are adequate for a project of this nature.

Section 9 – Bond Quantities, Facility Summaries, and Declaration of Covenant

A Declaration of Covenant is included in this report under “Appendix B”.

Section 10 - Operations and Maintenance Manual

An operation and maintenance manual is included with this report.

Table A

Proposed Impervious Surfaces: Fill in all applicable blanks below to list the square footage of all new and existing impervious surface areas proposed on your parcel. When calculating impervious surface areas for buildings do not list living/useable space, instead list the building roof square footage, measured to the outside edge of eave or gutter.

	New	Existing	Total
Roof Area: (House, Attached Garage, Covered Patio, Deck, & Porch)	_____ sq. ft.	<u>4,055</u> sq. ft.	_____ sq. ft.
Roof Area: (Detached Garage)	<u>1,287</u> sq. ft.	_____ sq. ft.	<u>1,287</u> sq. ft.
Roof Area: (All Out Buildings)	_____ sq. ft.	<u>144</u> sq. ft.	<u>144</u> sq. ft.
On-site Driveway Area	<u>2,974</u> sq. ft.	<u>1,800</u> sq. ft.	<u>4,774</u> sq. ft.
Off-site Driveway Area:	_____ sq. ft.	_____ sq. ft.	_____ sq. ft.
Walkways/Sidewalks:	<u>115</u> sq. ft.	<u>366</u> sq. ft.	<u>841</u> sq. ft.
Uncovered Patio Area:	_____ sq. ft.	_____ sq. ft.	_____ sq. ft.
Uncovered Porch Area:	_____ sq. ft.	_____ sq. ft.	_____ sq. ft.
Uncovered Deck Area:	_____ sq. ft.	_____ sq. ft.	_____ sq. ft.
All Other Impervious Area:	_____ sq. ft.	_____ sq. ft.	_____ sq. ft.
Total New Impervious Surface		<u>4,376</u> sq. ft.	
Total Existing Impervious Surface		<u>6,365</u> sq. ft.	
Total Impervious Area		<u>10,741</u> sq. ft.	
Total Clearing Limits or Graded areas (Include Septic Drainfields, Primary & Reserve)		<u>8,712</u> sq. ft.	
Total New Pervious Area: [(Total Clearing Limits/Graded Areas)-(Total New Impervious Areas)]		<u>4,336</u> sq. ft.	
Volume of Excavation:		<u>400</u> Cubic Yards	
Volume of Fill (Exported):		_____ Cubic Yards	
Volume of Fill (Imported):		_____ Cubic Yards	
For DPER Staff Use ONLY			
Parcel Number	_____	Application Number	_____
Approved By:	_____	Date:	_____

Figure 1

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 1 PROJECT OWNER AND PROJECT ENGINEER		Part 2 PROJECT LOCATION AND DESCRIPTION	
Project Owner: John & Karen Devore Phone: _____		Project Name 17-172 Devore Rd.DP	
Address: 11235 – 165 th Ct NE		DDES Permit # _____	
Project Engineer: Glen Coad, PE		Location Township 26	
Company Development Engineering, PLLC		Range 05	
Phone (253) 228-0513		Section 36	
		Site Address 11235 – 165 th Ct NE	
Part 3 TYPE OF PERMIT APPLICATION		Part 4 OTHER REVIEWS AND PERMITS	
<input checked="" type="checkbox"/> Landuse Services Subdivison / <u>Short Subd.</u> / UPD <input checked="" type="checkbox"/> Building Services M/F / Commerical / <u>SFR</u> <input type="checkbox"/> Clearing and Grading <input type="checkbox"/> Right-of-Way Use <input type="checkbox"/> Other _____		<input type="checkbox"/> DFW HPA <input type="checkbox"/> COE 404 <input type="checkbox"/> DOE Dam Safety <input type="checkbox"/> FEMA Floodplain <input type="checkbox"/> COE Wetlands <input type="checkbox"/> Other _____	
		<input type="checkbox"/> Shoreline Management <input type="checkbox"/> Structural Rockery/Vault/_____ <input type="checkbox"/> ESA Section 7	
Part 5 PLAN AND REPORT INFORMATION			
Technical Information Report		Site Improvement Plan (Engr. Plans)	
Type of Drainage Review (circle):	<u>Full / Targeted / Large Site</u>	Type (circle one):	<u>Full / Modified / Small Site</u>
Date (include revision dates):	1/16/2017	Date (include revision dates):	7/24/17
Date of Final:	_____	Date of Final:	_____
Part 6 ADJUSTMENT APPROVALS			
Type (circle one): Standard / Complex / Preapplication / Experimental / Blanket			
Description: (include conditions in TIR Section 2) NONE			
Date of Approval: _____			
Part 7 MONITORING REQUIREMENTS			
Monitoring Required: Yes <input type="checkbox"/> <u>No</u> <input checked="" type="checkbox"/>		Describe: _____	
Start Date: _____		_____	
Completion Date: _____		_____	

Part 8 SITE COMMUNITY AND DRAINAGE BASIN	
Community Plan :	
Special District Overlays: None	
Drainage Basin: Sammamish River	
Stormwater Requirements: Conservation Flow Control & Basic Water Quality	

Part 9 ONSITE AND ADJACENT SENSITIVE AREAS	
<input type="checkbox"/> River/Stream _____ <input type="checkbox"/> Lake _____ <input type="checkbox"/> Wetlands _____ <input type="checkbox"/> Closed Depression _____ <input type="checkbox"/> Floodplain _____ <input type="checkbox"/> Other _____	<input type="checkbox"/> Steep Slope _____ <input type="checkbox"/> Erosion Hazard _____ <input type="checkbox"/> Landslide Hazard _____ <input type="checkbox"/> Coal Mine Hazard _____ <input type="checkbox"/> Seismic Hazard _____ <input type="checkbox"/> Habitat Protection _____ <input type="checkbox"/> _____

Part 10 SOILS		
Soil Type	Slopes	Erosion Potential
Alderwood gravelly sandy loam	0 – 30 %	Moderate
_____	_____	_____
<input type="checkbox"/> High Groundwater Table (within 5 feet) <input type="checkbox"/> Other _____	<input type="checkbox"/> Sole Source Aquifer <input type="checkbox"/> Seeps/Springs	
<input type="checkbox"/> Additional Sheets Attached		

Part 11 DRAINAGE DESIGN LIMITATIONS	
REFERENCE	LIMITATION / SITE CONSTRAINT
<input type="checkbox"/> Core 2 – Offsite Analysis _____	None _____
<input type="checkbox"/> Sensitive/Critical Areas _____	_____
<input type="checkbox"/> SEPA _____	_____
<input type="checkbox"/> Other _____	_____
<input type="checkbox"/> _____	_____
<input type="checkbox"/> Additional Sheets Attached	

Part 12 TIR SUMMARY SHEET (provide one TIR Summary Sheet per Threshold Discharge Area)	
Threshold Discharge Area: Site (name or description)	
Core Requirements (all 8 apply)	
Discharge at Natural Location	Number of Natural Discharge Locations: 1
Flow Control (incl. facility summary sheet)	Level: 1 <input checked="" type="radio"/> 2 <input type="radio"/> 3 or Exemption Number _____ Small Site BMPs <u>Dispersion</u>
Conveyance System	Spill containment located at: _____
Erosion and Sediment Control	ESC Site Supervisor: Contact Phone: After Hours Phone:
Maintenance and Operation	Responsibility <input checked="" type="radio"/> Private <input type="radio"/> Public If Private, Maintenance Log Required: Yes <input type="radio"/> No <input checked="" type="radio"/>
Financial Guarantees and Liability	Provided: <input checked="" type="radio"/> Yes <input type="radio"/> No
Water Quality (include facility summary sheet)	Type <input checked="" type="radio"/> Basic <input type="radio"/> Sens. Lake / Enhanced Basic / Bog or Exemption No. _____ Landscape Management Plan: Yes <input type="radio"/> No <input checked="" type="radio"/>
Special Requirements (as applicable)	
Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac. <input checked="" type="radio"/> None Name: _____
Floodplain/Floodway Delineation	Type: Major / Minor / Exemption <input checked="" type="radio"/> None 100-year Base Flood Elevation (or range): _____ Datum: _____
Flood Protection Facilities	Describe: _____
Source Control (comm./industrial landuse)	Describe landuse: Describe any structural controls:
Oil Control	High-use Site: Yes <input type="radio"/> No <input checked="" type="radio"/> Treatment BMP: _____ Maintenance Agreement: Yes / No with whom? _____
Other Drainage Structures	
Describe:	

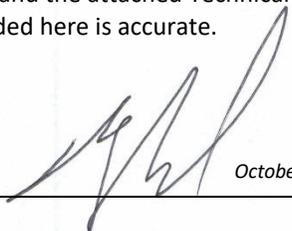
Part 13 EROSION AND SEDIMENT CONTROL REQUIREMENTS	
MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION <input checked="" type="checkbox"/> Clearing Limits <input checked="" type="checkbox"/> Cover Measures <input checked="" type="checkbox"/> Perimeter Protection <input checked="" type="checkbox"/> Traffic Area Stabilization <input type="checkbox"/> Sediment Retention <input type="checkbox"/> Surface Water Collection <input type="checkbox"/> Dewatering Control <input checked="" type="checkbox"/> Dust Control <input type="checkbox"/> Flow Control	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION <input checked="" type="checkbox"/> Stabilize Exposed Surfaces <input checked="" type="checkbox"/> Remove and Restore Temporary ESC Facilities <input checked="" type="checkbox"/> Clean and Remove All Silt and Debris, Ensure Operation of Permanent Facilities <input type="checkbox"/> Flag Limits of SAO and open space preservation areas <input type="checkbox"/> Other _____

Part 14 STORMWATER FACILITY DESCRIPTIONS (Note: Include Facility Summary and Sketch)			
Flow Control	Type/Description	Water Quality	Type/Description
<input type="checkbox"/> Detention		<input type="checkbox"/> Biofiltration	
<input type="checkbox"/> Infiltration		<input type="checkbox"/> Wetpool	
<input type="checkbox"/> Regional Facility		<input type="checkbox"/> Media Filtration	
<input type="checkbox"/> Shared Facility		<input type="checkbox"/> Oil Control	
<input checked="" type="checkbox"/> Flow Control BMPs	Basic Dispersion	<input type="checkbox"/> Spill Control	
<input type="checkbox"/> Other		<input type="checkbox"/> Flow Control BMPs	
		<input type="checkbox"/> Other	

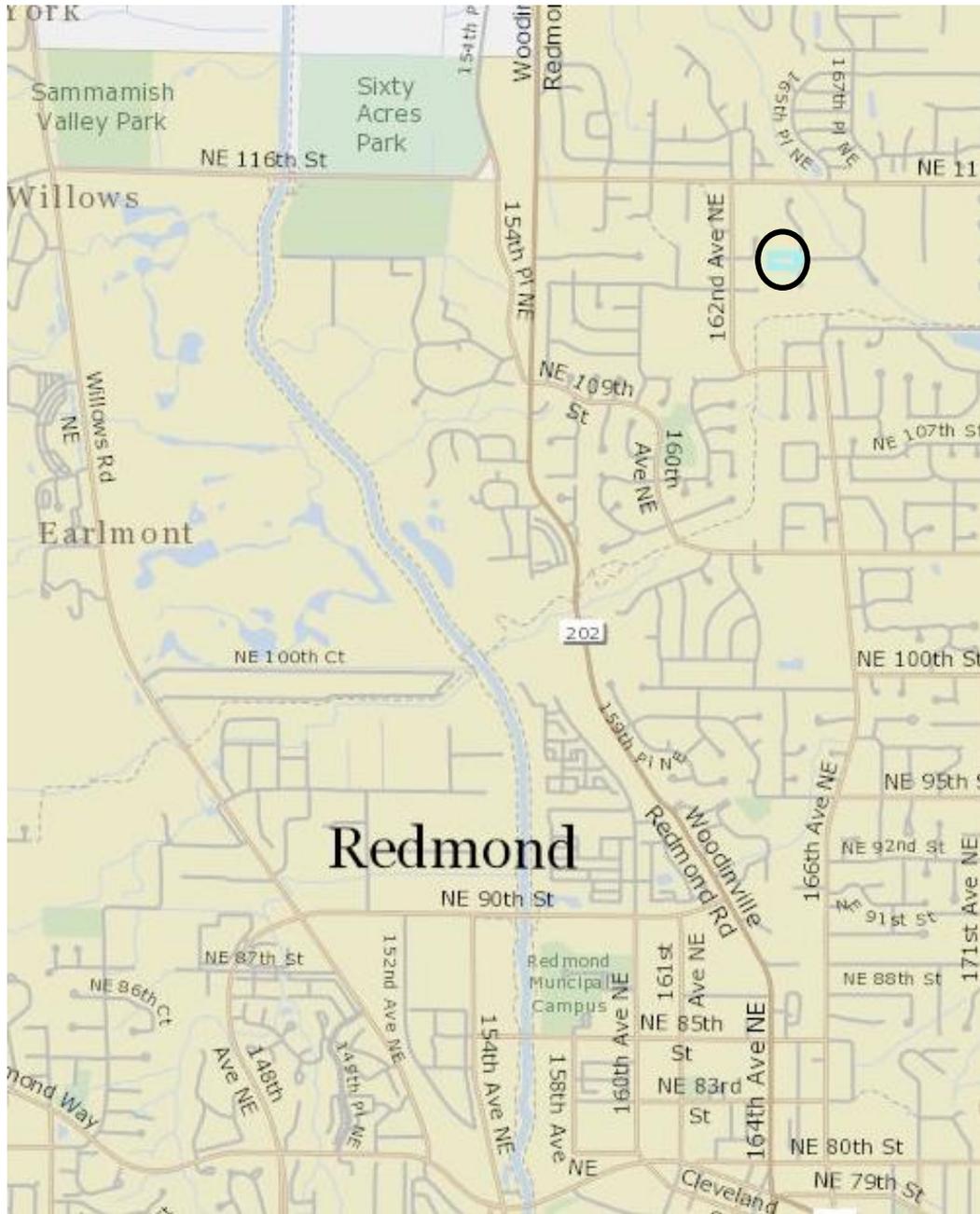
Part 15 EASEMENTS/TRACTS	Part 16 STRUCTURAL ANALYSIS
<input type="checkbox"/> Drainage Easement <input checked="" type="checkbox"/> Covenant <input type="checkbox"/> Native Growth Protection Covenant <input type="checkbox"/> Tract <input type="checkbox"/> Other	<input type="checkbox"/> Cast in Place Vault <input type="checkbox"/> Retaining Wall <input type="checkbox"/> Rockery > 4' High <input type="checkbox"/> Structural on Steep Slope <input type="checkbox"/> Other

Part 17 SIGNATURE OF PROFESSIONAL ENGINEER

I, or a civil engineer under my supervision, have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attached Technical Information Report. To the best of my knowledge the information provided here is accurate.

A handwritten signature in black ink, appearing to be initials or a stylized name, is written over a faint, light blue grid background.

October 3, 2017



Not to Scale

Approximate Location



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

SITE VICINITY MAP
Devore Garage
11235 – 165th Ct NE
Redmond, Washington



Not to Scale

Approximate Location 



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

EXISTING SITE CONDITIONS
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Job No: 17-172

October 2017

Figure 3



Not to Scale

Approximate Location



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

USDA SOILS MAP
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Job No: 17-172

October 2017

Figure 4

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgB	Alderwood gravelly sandy loam, 0 to 8 percent slopes	0.7	75.6%
AgC	Alderwood gravelly sandy loam, 8 to 15 percent slopes	0.2	23.0%
AgD	Alderwood gravelly sandy loam, 15 to 30 percent slopes	0.0	1.3%
Totals for Area of Interest		1.0	100.0%



DE-CIVIL, PLLC
 P.O. Box 446
 Tacoma, WA 98401
 Ph (253) 228-0513
 www.de-civil.com

USDA SOILS MAP TABLE
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Symbol	Drainage Component Type Name & Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems	Potential Problems	Observations of Field Inspector, resource reviewer, or resident
See Map	Type: sheet flow, swale, stream, channel, pipe, pond, size: diameter, surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml=1,320 ft.	constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts
A	On-site: looking north	Pasture	10 ±	0	none	none	
B	On-site: looking west	Forest	10 ±	0	none	none	
C	On-site: looking southwest	Forest	10 ±	0	none	none	
D	Off-site: looking south	Swale	10 ±	400ft	none	none	
E	Off-site – Looking west	Shadow Lake	0 ±	1,500ft	none	none	
F	Off-site – Looking southwest	Catch basin/swale	5 ±	1,200ft	none	none	



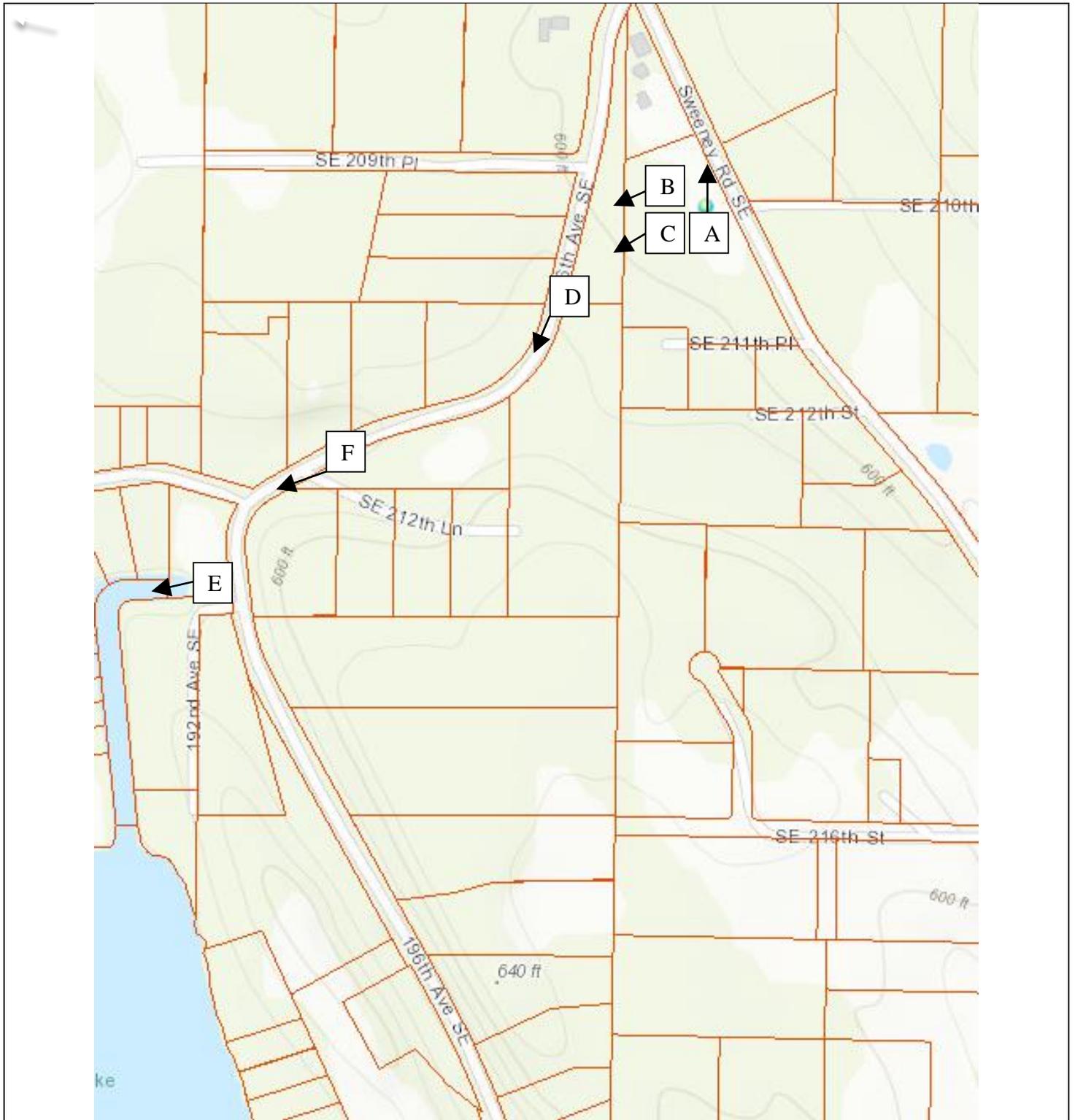
DE-CIVIL, PLLC
 P.O. Box 446
 Tacoma, WA 98401
 Ph (253) 228-0513
 www.de-civil.com

DOWNSTREAM ANALYSIS CHART
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Job No: 17-172

October 2017

Figure 6



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

DOWNSTREAM ANALYSIS MAP
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Job No: 17-172

October 2017

Figure 7



Site A



Site B



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

**Downstream Analysis Pictures
Devore Garage
11235 – 165th Ct NE
Redmond, Washington**

Job No: 17-172

October 2017

Figure 8a



Site C



Site D



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

Downstream Analysis Pictures
Devore Garage
11235 – 165th Ct NE
Redmond, Washington



Site E

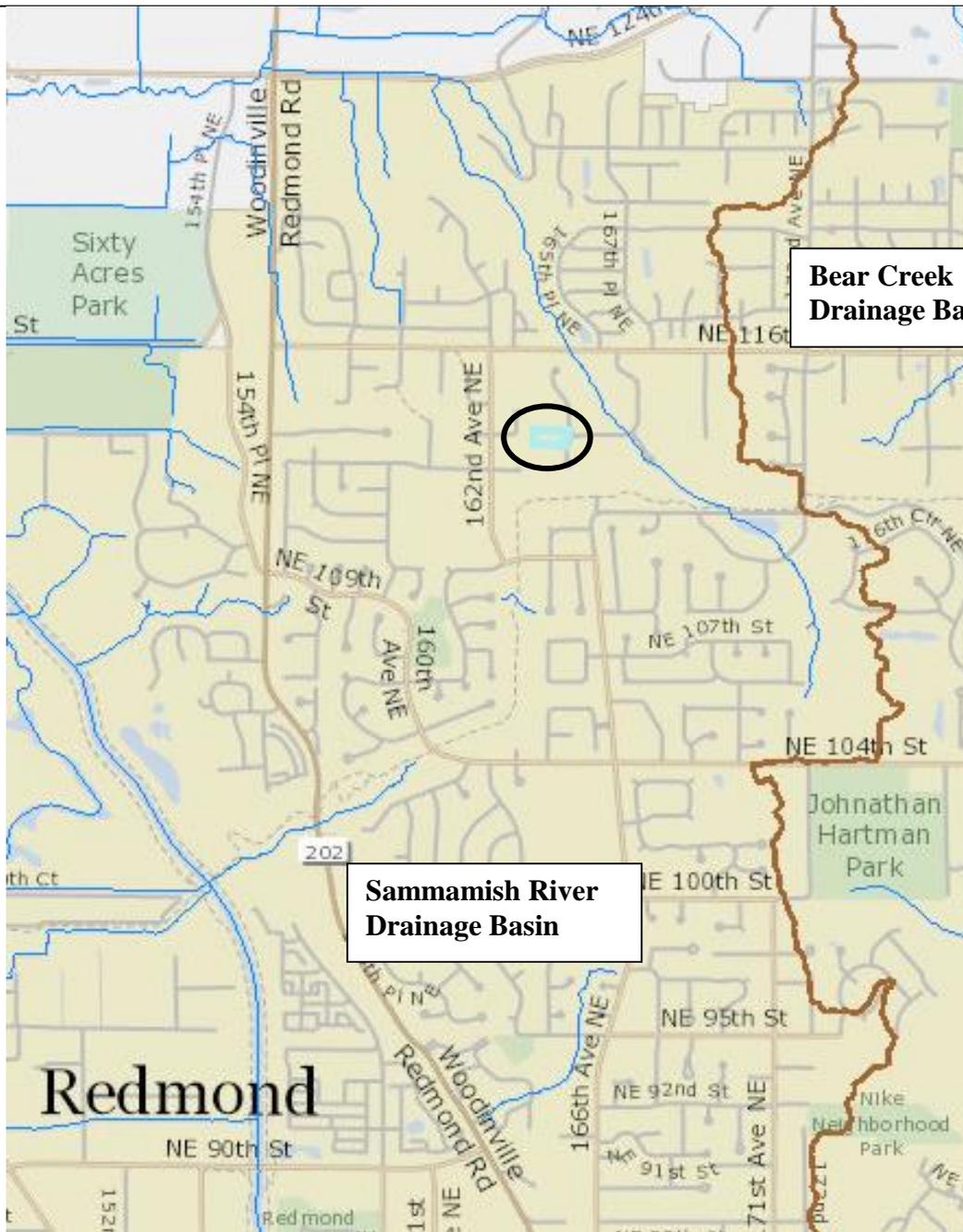


Site F



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

**Downstream Analysis Pictures
Devore Garage
11235 – 165th Ct NE
Redmond, Washington**



**Bear Creek
Drainage Basin**

**Sammamish River
Drainage Basin**

Approximate Location 



Not to Scale



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

BASIN STUDY AREAS
Devore Garage
11235 – 165th Ct NE
Redmond, Washington



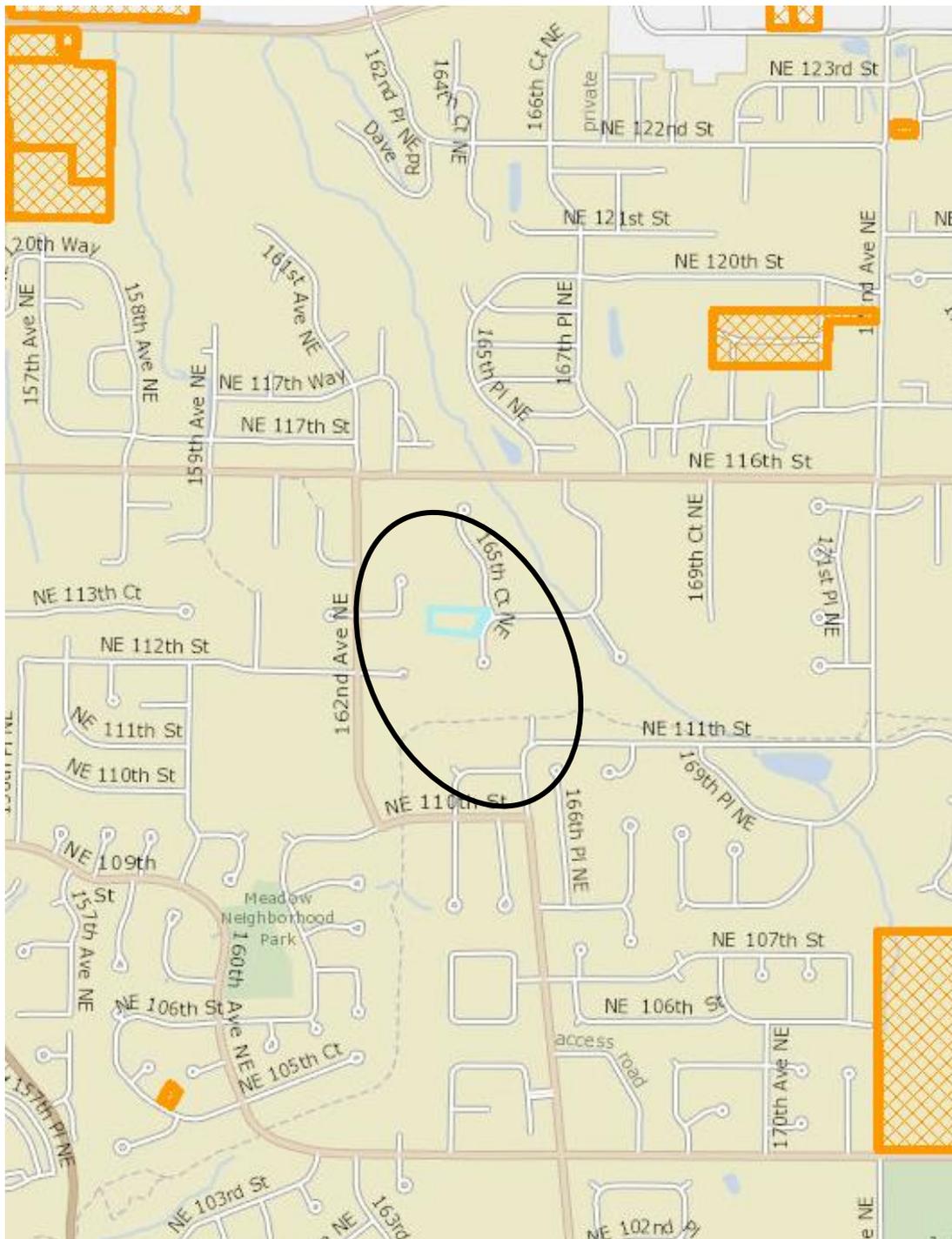
Not to Scale

Approximate Location



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

SENSITIVE AREAS
Devore Garage
11235 – 165th Ct NE
Redmond, Washington



Not to Scale

Approximate Location 



DE-CIVIL, PLLC
P.O. Box 446
Tacoma, WA 98401
Ph (253) 228-0513
www.de-civil.com

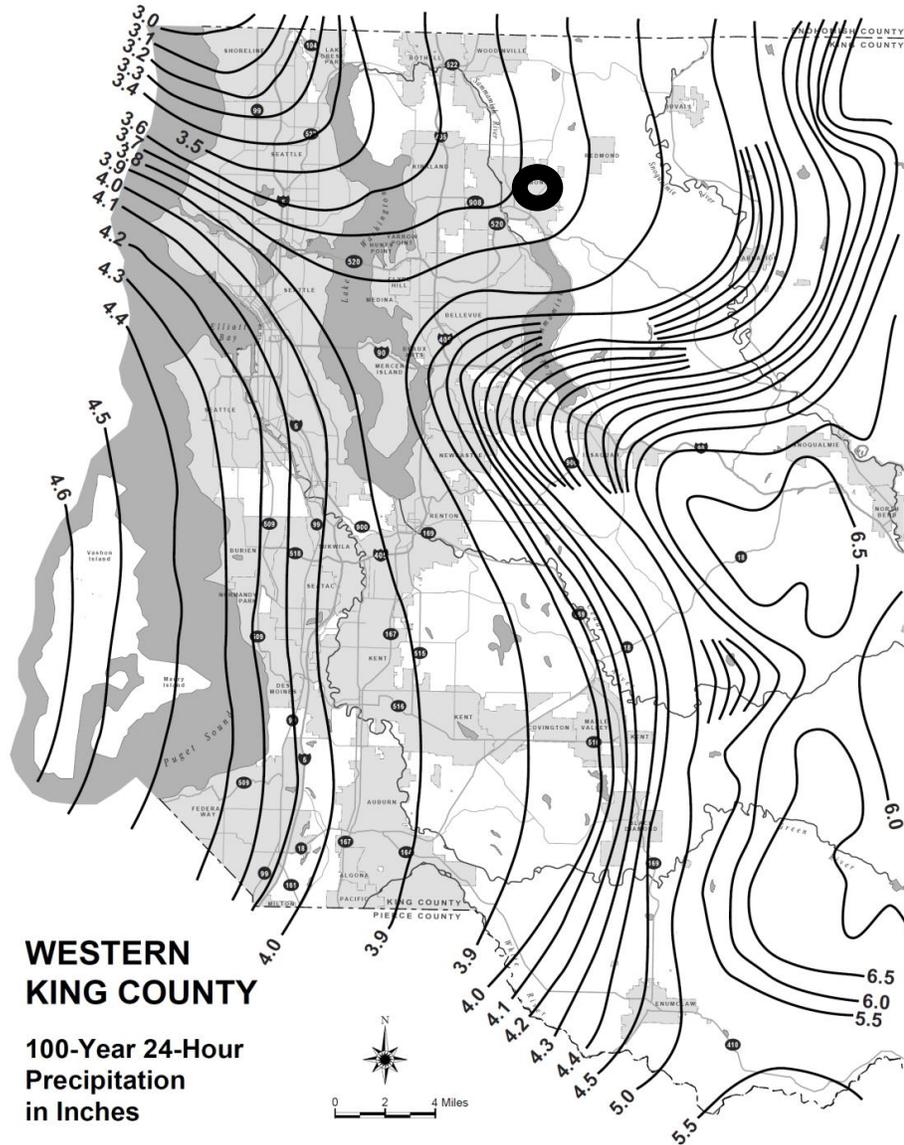
DRAINAGE COMPLAINTS
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Job No: 17-172

October 2017

Figure 11

FIGURE 3.2.1.D 100-YEAR 24-HOUR ISOPLUVIALS



**WESTERN
 KING COUNTY**
 100-Year 24-Hour
 Precipitation
 in Inches



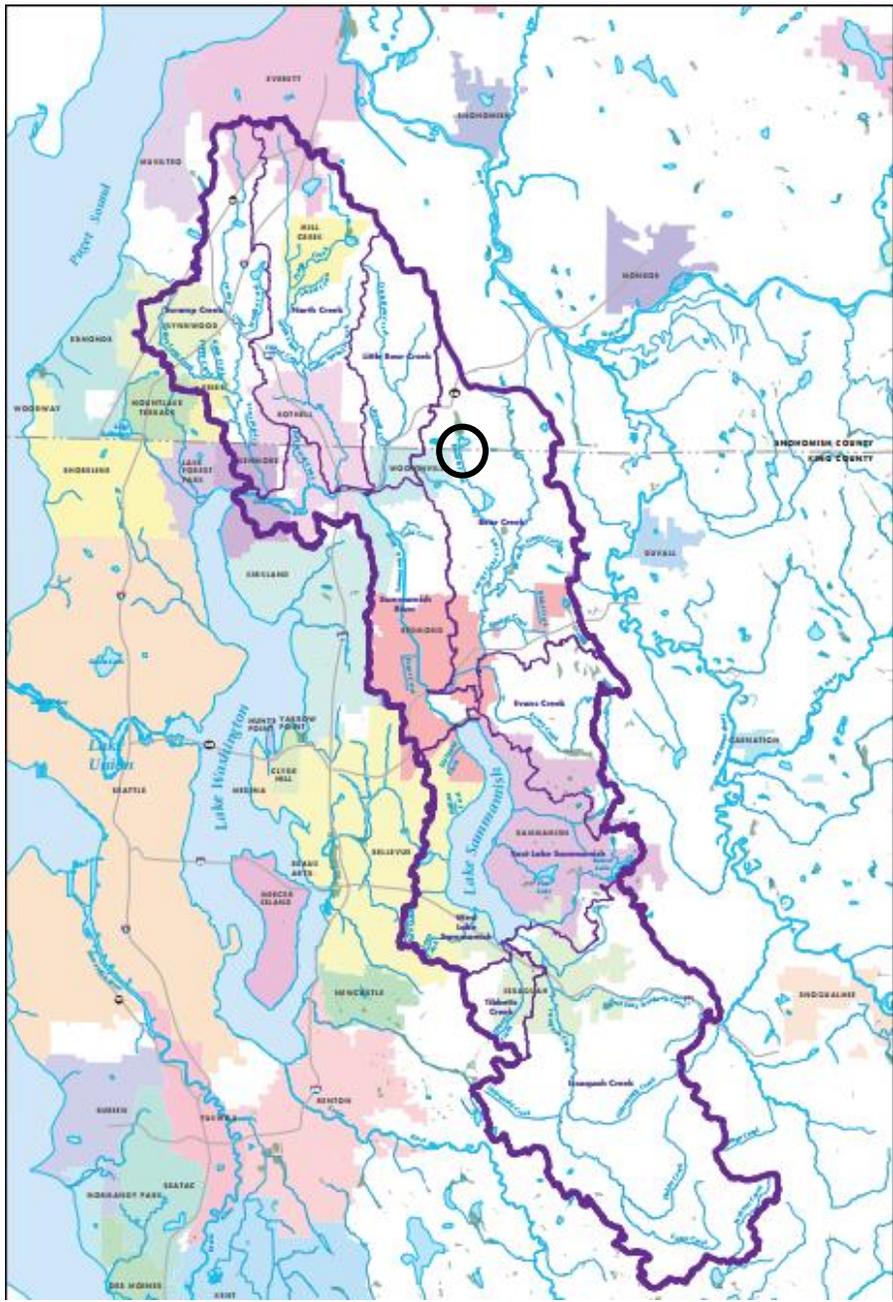
Not to Scale

Approximate Location 



DE-CIVIL, PLLC
 P.O. Box 446
 Tacoma, WA 98401
 Ph (253) 228-0513
 www.de-civil.com

100 YR 24-HOUR ISOPLUVIAL
Devore Garage
11235 – 165th Ct NE
Redmond, Washington



The Sammamish Watershed

- Watershed Boundary
- Basin Boundary
- Stream
- Major Road
- Lake & River



King County
 Department of Natural Resources and Parks
 Water and Land Resources Division

Produced by:
 12/01/04, Visual Communications & Ink Group
 File Name: 1201_2001_SammamishBasinMap.apr 4/04



Not to Scale

Approximate Location



DE-CIVIL, PLLC
 P.O. Box 446
 Tacoma, WA 98401
 Ph (253) 228-0513
 www.de-civil.com

DRAINAGE BASIN MAP
Devore Garage
11235 – 165th Ct NE
Redmond, Washington

Appendix A
"O&M Manual"

#33 – Maintenance Checklist for Downspout, Sheet Flow, and Concentrated Dispersion Systems:

Drainage System Feature	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Splash Block	Water Directed Toward Building	Water is being directed towards building structure.	Water directed away from building structure.
Splash Block	Water Causing Erosion	Water disrupts soil media.	Blocks are reconfigured/repared and media is restored.
Transition Zone	Erosion	Adjacent soil erosion, uneve surface creating concentrated flow discharge; or less than 2 feet of width.	No eroded or scoured areas. Cause of erosion or scour is addressed.
Dispersion Trench	Concentrated Flow	Visual evidence of water discharging at concentrated points along trench (normal condition is a “sheet flow” from edge fo trench; intent is to prevent erosion damage).	No debris on trench surface. Notched grade board or other distributor type is aligned to prevent erosion. Trench is rebuilt to standards, if necessary.
Surface of Trench	Accumulated Debris	Accumulated trash, debris, or sediment on drain rock surface impedes sheet flow from facility.	Trash or debris is removed/disposedin accordance with local solid waste requirements.
Surface of Trench	Vegetation Impeding Flow	Vegetation/moss present on drain rock surface impedes sheet flow from facility.	Freely draining draink rock surface.
Pipe(s) to Trench	Accumulated Debris in Drains	Accumulation of trash, debris, or sediment in roof drains, gutters, driveway drains, etc.	No trash ordebris in roof drains, gutters, driveway drains, or area drains.
Pipe(s) to Trench	Accumulated Debris in inlet Pipe	Pipe from sump to trench or drywellhas accumulated sediment or is plugged.	No sediment or debris in inlet/outlet pipe screen or inlet/outlet pipe.
Pipe(s) to Trench	Damaged Pipes	Cracked, collapsed, broken, or misaligned pipes.	No cracks more than 0.25-inch wide at the joint of the inlet/outlet pipe.
Sump	Accumulated Sediment	Sediment in the sump.	Sump contains no sediment.
Access Lid	Hard to Open	Cannot be easily opened.	Access lid is repaired or replaced.
Access Lid	Buried.	Buried.	Access lid functions as designed (refer to record drawings for design intent).
Access Lid	Missing Cover.	Cover missing.	Cover is replaced.
Rock Pad	Inadequate Rock Cover	Only one layer of rock exists above native soil in area 6 square feet or larger, or any exposure of native soil.	Rock Pad is repaired/replaced to meet design standards.
Rock Pad	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad is repaired/replaced to meet design standards.
Dispersal Area	Erosion	Erosion (gullies/rills) greater than 2 inches deep in dispersal area.	No eroded or scoured areas. Cause of erosion or scour is addressed
Dispersal Area	Accumulated Sediment	Accumulated sediment or debris to exten that block or channelizes flow path.	No excess sediment or debris in dispersal area. Sediment source is addressed (if feasible).

Ponded Water	Ponded Water	Standing surface water in dispersion area remains for more than 3 days after the end of a storm event.	System freely drains and there is not standing water in dispersion area between storms. There cause of standing water (e.g. grade depressions, comapcted soil) is addressed.
Vegetation	Plant Survival	Dispersal areas vegetation in establishment period (1-2 years, or additional 3 rd year) during extreme dry weather.	Vegetation is health and watered weekly during periods of no rain to ensure plant establishment.
Vegetation	Lack of Vegetation Allowing Erosion	Poor vegetation cover such that erosion is occuring.	Vegetation is healthy and watered. No eroded or scoured areas are present. Cause of erosion or scour is addressed. Plant species are appropriate for the soil and moisture conditions.
Vegetation	Vegetation Blocking Flow	Vegetation inhibits dispersed flow along flow path.	Vegetation is trimmed, weeded, or replanted to restore dispersed flow path.
Vegetation	Presence of Noxious Weeds	Anynoxious or nuisance vegetation which may constitute a hazard to county personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations. No danger of noxious vegetation where county personnel or the public might normally be.
Pest Control	Mosquito Infestation	Standing water remains for more than three days following storms.	All inlets, overflows, and other openings are protected with mosquito screens. No mosquito infestation present.
Rodents	Presence of Rodents	Rodent holes or mounds disturb dispersion flow paths.	Rodents removed or destroyed, holes are filled, and flow path is revegetated.

#22 – Maintenance Checklist for Conveyance Systems (Pipes and Ditches):

Drainage System Feature	Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Pipes	Sediment and Debris	Accumulated sediment that exceeds 20 percent of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
Pipes	Vegetation	Vegetation that reduces free movement of water through pipes.	Vegetation does not impede free movement of water through pipes. Prohibit use of sand and sealant application and protect from construction runoff.
Pipes	Damaged (Rusted, Bent, or Crushed)	Protective coating is damaged: rust is causing more than 50 percent deterioration to any part of pipe.	Pipe repaired or replaced.
Pipes	Damaged (Rusted, Bent, or Crushed)	Any dent that significantly impedes flow (i.e. decreases the cross section area of pipe by more than 20 percent).	Pipe repaired or replaced.
Pipes	Damaged (Rusted, Bent, or Crushed)	Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
Open Ditches	Trash and Debris	Dumping of yard waste such as grass clippings and branches. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	No trash or debris present. Trash and debris removed and disposed of as prescribed by the County.
Open Ditches	Sediment Buildup	Accumulated sediment that exceeds 20 percent of the design depth.	Ditch cleaned of all sediment and debris so that it matches design.
Open Ditches	Vegetation	Vegetation (e.g. weedy shrubs or saplings) that reduces free movements of water through ditches.	Water flows freely through ditches. Grassy vegetation should be left alone.
Open Ditches	Erosion Damage to Slopes	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	No erosion damage present. Slopes stabilized using appropriate erosion control measure(s), e.g., rock reinforcement, planting of grass, compaction.
Open Ditches	Erosion Damage to Slopes	Any erosion observed on a compacted berm embankment.	If erosion is occurring on compacted berms a professional engineer should be consulted to resolve source or erosion.
Open Ditches	Rock Lining Out of Place or Missing (If Applicable)	Native soil is exposed beneath the rock lining.	Rocks replaced to design standards.

Appendix B
"Covenant of Declaration"

RECORDING REQUESTED BY AND
WHEN RECORDED MAIL TO:

**DECLARATION OF COVENANT
FOR MAINTENANCE AND INSPECTION OF FLOW CONTROL BMPS**

Grantor: _____

Grantee: King County

Legal Description: _____

Additional Legal(s) on: _____

Assessor's Tax Parcel ID#: _____

IN CONSIDERATION of the approved King County (check one of the following) residential building permit, commercial building permit, clearing and grading permit, subdivision permit, or short subdivision permit for Application No. _____ relating to the real property ("Property") described above, the Grantor(s), the owner(s) in fee of that Property, hereby covenants(covenant) with King County, a political subdivision of the state of Washington, and its municipal successors in interest and assigns ("King County" and "the County", or "its municipal successor"), that he/she(they) will observe, consent to, and abide by the conditions and obligations set forth and described in Paragraphs 1 through 8 below with regard to the Property. Grantor(s) hereby grants(grant), covenants(covenant), and agrees(agree) as follows:

1. Grantor(s) or his/her(their) successors in interest and assigns ("Owners") shall retain, uphold, and protect the stormwater management devices, features, pathways, limits, and restrictions, known as flow control best management practices ("BMPs"), shown on the approved Flow Control BMP Site Plan for the Property attached hereto and incorporated herein as Exhibit A.

2. The Owners shall at their own cost, operate, maintain, and keep in good repair, the Property's BMPs as described in the approved Design and Maintenance Details for each BMP attached hereto and incorporated herein as Exhibit B.

3. King County shall provide at least 30 days written notice to the Owners that entry on the Property is planned for the inspection of the BMPs. After the 30 days, the Owners shall allow King County to enter for the sole purpose of inspecting the BMPs. In lieu of inspection by the County, the Owners may elect to engage a licensed civil engineer registered in the state of Washington who has expertise in drainage to inspect the BMPs and provide a written report describing their condition. If the engineer option is chosen, the Owners shall provide written notice to the Director of the Water and Land Resources Division or its municipal successor in interest ("WLR") within fifteen days of receiving the County's notice of inspection. Within 30 days of giving this notice, the Owners, or the engineer on behalf of the Owners, shall provide the engineer's report to WLR. If the report is not provided in a timely manner as specified above, the County may inspect the BMPs without further notice.

4. If King County determines from its inspection, or from an engineer's report provided in accordance with Paragraph 3, that maintenance, repair, restoration, and/or mitigation work is required for the BMPs, WLR shall notify the Owners of the specific maintenance, repair, restoration, and/or mitigation work (Work) required under Title 9 of the King County Code ("KCC"). WLR shall also set a reasonable deadline for completing the Work or providing an engineer's report that verifies completion of the Work. After the deadline has passed, the Owners shall allow the County access to re-inspect the BMPs unless an engineer's report has been provided verifying completion of the Work. If the work is not

completed properly within the time frame set by WLR, King County may initiate an enforcement action. Failure to properly maintain the BMPs is a violation of KCC Chapter 9.04 and may subject the Owners to enforcement under the KCC, including fines and penalties.

5. Apart from performing routine landscape maintenance, the Owners are hereby required to obtain written approval from WLR before performing any alterations or modifications to the BMPs.

6. Any notice or approval required to be given by one party to the other under the provisions of this Declaration of Covenant shall be effective upon personal delivery to the other party, or after three (3) days from the date that the notice or approval is mailed with delivery confirmation to the current address on record with each Party. The parties shall notify each other of any change to their addresses.

7. This Declaration of Covenant is intended to promote the efficient and effective management of surface water drainage on the Property, and it shall inure to the benefit of all the citizens of King County and its municipal successors and assigns. This Declaration of Covenant shall run with the land and be binding upon Grantor(s), and Grantor's(s') successors in interest and assigns.

8. This Declaration of Covenant may be terminated by execution of a written agreement by the Owners and King County that is recorded by King County in its real property records.

IN WITNESS WHEREOF, this Declaration of Covenant for the Maintenance and Inspection of
Flow Control BMPs is executed this ____ day of _____, 20____.

GRANTOR, owner of the Property

GRANTOR, owner of the Property

STATE OF WASHINGTON)
COUNTY OF KING)ss.

On this day personally appeared before me:

_____, to me known to be the individual(s) described in
and who executed the within and foregoing instrument and acknowledged that they signed the same as
their free and voluntary act and deed, for the uses and purposes therein stated.

Given under my hand and official seal this ____ day of _____, 20____.

Printed name
Notary Public in and for the State of Washington,
residing at

My appointment expires _____

Appendix C
"WWHM"

WWHM2012
PROJECT REPORT

General Model Information

Project Name: 17-172
Site Name: Devore Red
Site Address: 11235 - 165th Ct NE
City:
Report Date: 10/3/2017
Gage: Seatac
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2017/04/14
Version: 4.2.13

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 C, Forest, Mod	acre 0.2
Pervious Total	0.2
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.2

Element Flows To:		
Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Lawn, Mod	acre 0.11198
Pervious Total	0.11198
Impervious Land Use ROOF TOPS FLAT	acre 0.08802
Impervious Total	0.08802
Basin Total	0.2

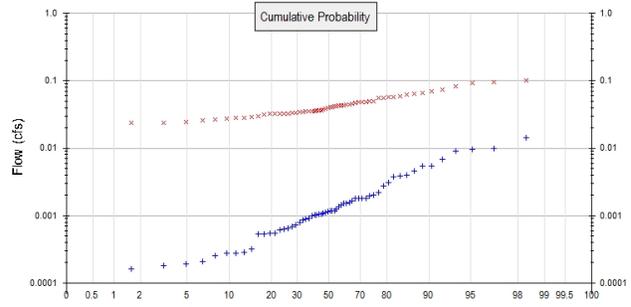
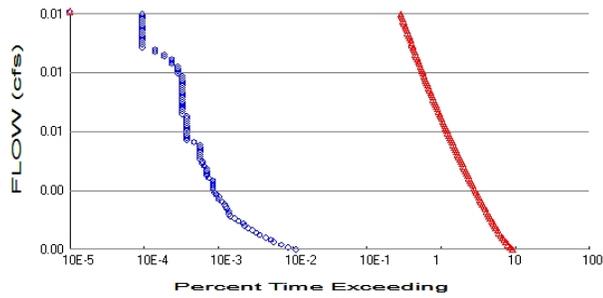
Element Flows To:		
Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.2
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.11198
 Total Impervious Area: 0.08802

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.001166
5 year	0.002923
10 year	0.004774
25 year	0.008119
50 year	0.011491
100 year	0.015751

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.04051
5 year	0.055333
10 year	0.066027
25 year	0.080571
50 year	0.092174
100 year	0.104451

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.004	0.062
1950	0.004	0.057
1951	0.001	0.034
1952	0.001	0.025
1953	0.000	0.027
1954	0.001	0.033
1955	0.001	0.037
1956	0.003	0.036
1957	0.001	0.044
1958	0.002	0.031

1959	0.001	0.028
1960	0.001	0.033
1961	0.001	0.035
1962	0.000	0.027
1963	0.001	0.036
1964	0.002	0.032
1965	0.002	0.048
1966	0.001	0.026
1967	0.004	0.055
1968	0.002	0.059
1969	0.001	0.043
1970	0.001	0.038
1971	0.001	0.047
1972	0.003	0.057
1973	0.000	0.023
1974	0.002	0.046
1975	0.002	0.045
1976	0.001	0.033
1977	0.001	0.033
1978	0.001	0.039
1979	0.000	0.050
1980	0.009	0.066
1981	0.001	0.040
1982	0.002	0.064
1983	0.001	0.044
1984	0.001	0.030
1985	0.000	0.042
1986	0.001	0.033
1987	0.002	0.050
1988	0.000	0.028
1989	0.000	0.036
1990	0.014	0.102
1991	0.005	0.073
1992	0.001	0.029
1993	0.000	0.024
1994	0.000	0.024
1995	0.002	0.036
1996	0.005	0.048
1997	0.001	0.041
1998	0.001	0.035
1999	0.010	0.094
2000	0.001	0.042
2001	0.000	0.039
2002	0.002	0.056
2003	0.005	0.048
2004	0.002	0.084
2005	0.001	0.035
2006	0.001	0.032
2007	0.010	0.092
2008	0.007	0.070
2009	0.001	0.044

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0144	0.1018
2	0.0099	0.0943
3	0.0096	0.0925

4	0.0091	0.0837
5	0.0068	0.0734
6	0.0055	0.0702
7	0.0055	0.0660
8	0.0045	0.0638
9	0.0040	0.0623
10	0.0038	0.0587
11	0.0038	0.0573
12	0.0031	0.0566
13	0.0027	0.0565
14	0.0022	0.0553
15	0.0020	0.0504
16	0.0019	0.0500
17	0.0018	0.0482
18	0.0018	0.0480
19	0.0018	0.0477
20	0.0018	0.0468
21	0.0017	0.0461
22	0.0015	0.0445
23	0.0015	0.0440
24	0.0015	0.0437
25	0.0015	0.0435
26	0.0014	0.0430
27	0.0012	0.0421
28	0.0012	0.0419
29	0.0012	0.0408
30	0.0012	0.0405
31	0.0011	0.0395
32	0.0011	0.0388
33	0.0011	0.0377
34	0.0011	0.0367
35	0.0010	0.0363
36	0.0010	0.0360
37	0.0010	0.0356
38	0.0010	0.0355
39	0.0009	0.0354
40	0.0009	0.0352
41	0.0008	0.0347
42	0.0008	0.0340
43	0.0007	0.0333
44	0.0007	0.0330
45	0.0007	0.0329
46	0.0006	0.0329
47	0.0006	0.0325
48	0.0005	0.0324
49	0.0005	0.0324
50	0.0005	0.0314
51	0.0005	0.0301
52	0.0003	0.0294
53	0.0003	0.0285
54	0.0003	0.0284
55	0.0003	0.0272
56	0.0003	0.0268
57	0.0002	0.0260
58	0.0002	0.0246
59	0.0002	0.0239
60	0.0002	0.0237
61	0.0002	0.0233

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0006	236	195387	82791	Fail
0.0007	186	181527	97595	Fail
0.0008	152	169742	111672	Fail
0.0009	119	159411	133958	Fail
0.0010	108	150492	139344	Fail
0.0011	92	142599	154998	Fail
0.0012	77	135220	175610	Fail
0.0014	69	128589	186360	Fail
0.0015	61	122429	200703	Fail
0.0016	54	116847	216383	Fail
0.0017	48	111628	232558	Fail
0.0018	46	106687	231928	Fail
0.0019	40	102260	255650	Fail
0.0020	35	98025	280071	Fail
0.0021	31	94111	303583	Fail
0.0022	30	90389	301296	Fail
0.0023	30	86774	289246	Fail
0.0025	28	83331	297610	Fail
0.0026	27	80037	296433	Fail
0.0027	26	76978	296069	Fail
0.0028	24	73984	308266	Fail
0.0029	22	71182	323554	Fail
0.0030	22	68423	311013	Fail
0.0031	20	65920	329600	Fail
0.0032	19	63418	333778	Fail
0.0033	18	61065	339250	Fail
0.0034	18	58841	326894	Fail
0.0036	18	56744	315244	Fail
0.0037	18	54606	303366	Fail
0.0038	18	52638	292433	Fail
0.0039	16	50777	317356	Fail
0.0040	15	49002	326680	Fail
0.0041	15	47312	315413	Fail
0.0042	15	45644	304293	Fail
0.0043	15	44040	293600	Fail
0.0044	14	42478	303414	Fail
0.0045	13	41066	315892	Fail
0.0047	13	39698	305369	Fail
0.0048	12	38286	319050	Fail
0.0049	12	36938	307816	Fail
0.0050	12	35634	296950	Fail
0.0051	12	34479	287325	Fail
0.0052	12	33345	277875	Fail
0.0053	12	32190	268250	Fail
0.0054	12	31121	259341	Fail
0.0055	10	30115	301150	Fail
0.0057	8	29132	364150	Fail
0.0058	8	28190	352375	Fail
0.0059	8	27271	340887	Fail
0.0060	8	26351	329387	Fail
0.0061	8	25495	318687	Fail
0.0062	8	24661	308262	Fail
0.0063	8	23870	298375	Fail
0.0064	8	23079	288487	Fail

0.0065	8	22351	279387	Fail
0.0066	8	21645	270562	Fail
0.0068	8	20950	261875	Fail
0.0069	7	20317	290242	Fail
0.0070	7	19663	280900	Fail
0.0071	7	19068	272400	Fail
0.0072	7	18497	264242	Fail
0.0073	7	17947	256385	Fail
0.0074	7	17406	248657	Fail
0.0075	7	16867	240957	Fail
0.0076	7	16377	233957	Fail
0.0077	7	15864	226628	Fail
0.0079	7	15408	220114	Fail
0.0080	7	14910	213000	Fail
0.0081	7	14497	207100	Fail
0.0082	7	14048	200685	Fail
0.0083	7	13659	195128	Fail
0.0084	7	13246	189228	Fail
0.0085	7	12910	184428	Fail
0.0086	7	12566	179514	Fail
0.0087	6	12202	203366	Fail
0.0088	6	11896	198266	Fail
0.0090	6	11565	192750	Fail
0.0091	6	11218	186966	Fail
0.0092	5	10876	217520	Fail
0.0093	5	10551	211020	Fail
0.0094	5	10245	204900	Fail
0.0095	4	9967	249175	Fail
0.0096	4	9713	242825	Fail
0.0097	3	9428	314266	Fail
0.0098	3	9176	305866	Fail
0.0099	2	8947	447350	Fail
0.0101	2	8733	436650	Fail
0.0102	2	8493	424650	Fail
0.0103	2	8286	414300	Fail
0.0104	2	8055	402750	Fail
0.0105	2	7818	390900	Fail
0.0106	2	7589	379450	Fail
0.0107	2	7379	368950	Fail
0.0108	2	7176	358800	Fail
0.0109	2	6966	348300	Fail
0.0111	2	6782	339100	Fail
0.0112	2	6609	330450	Fail
0.0113	2	6440	322000	Fail
0.0114	2	6271	313550	Fail
0.0115	2	6113	305650	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.

The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 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
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 = Failed

Model Default Modifications

Total of 0 changes have been made.

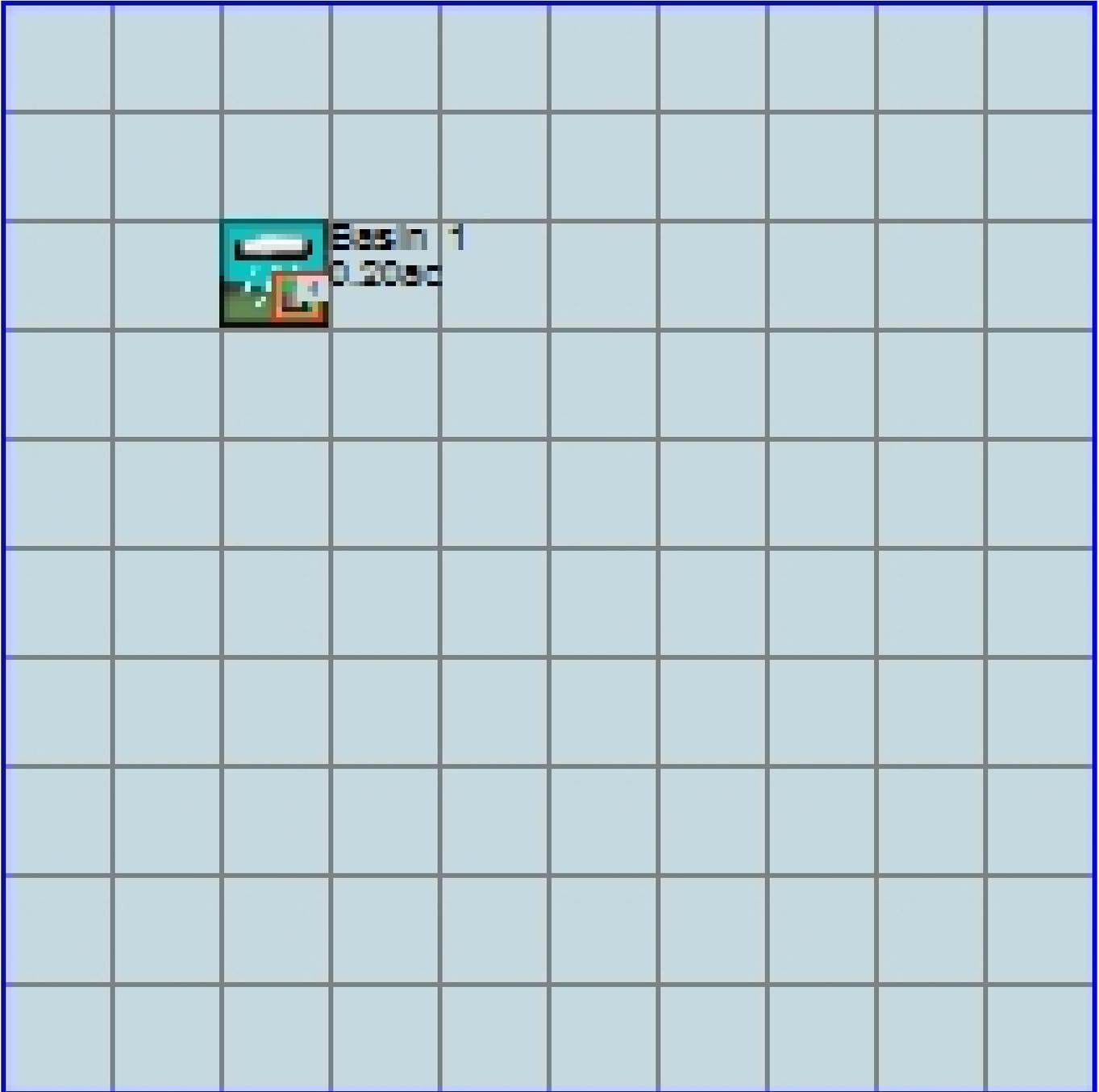
PERLND Changes

No PERLND changes have been made.

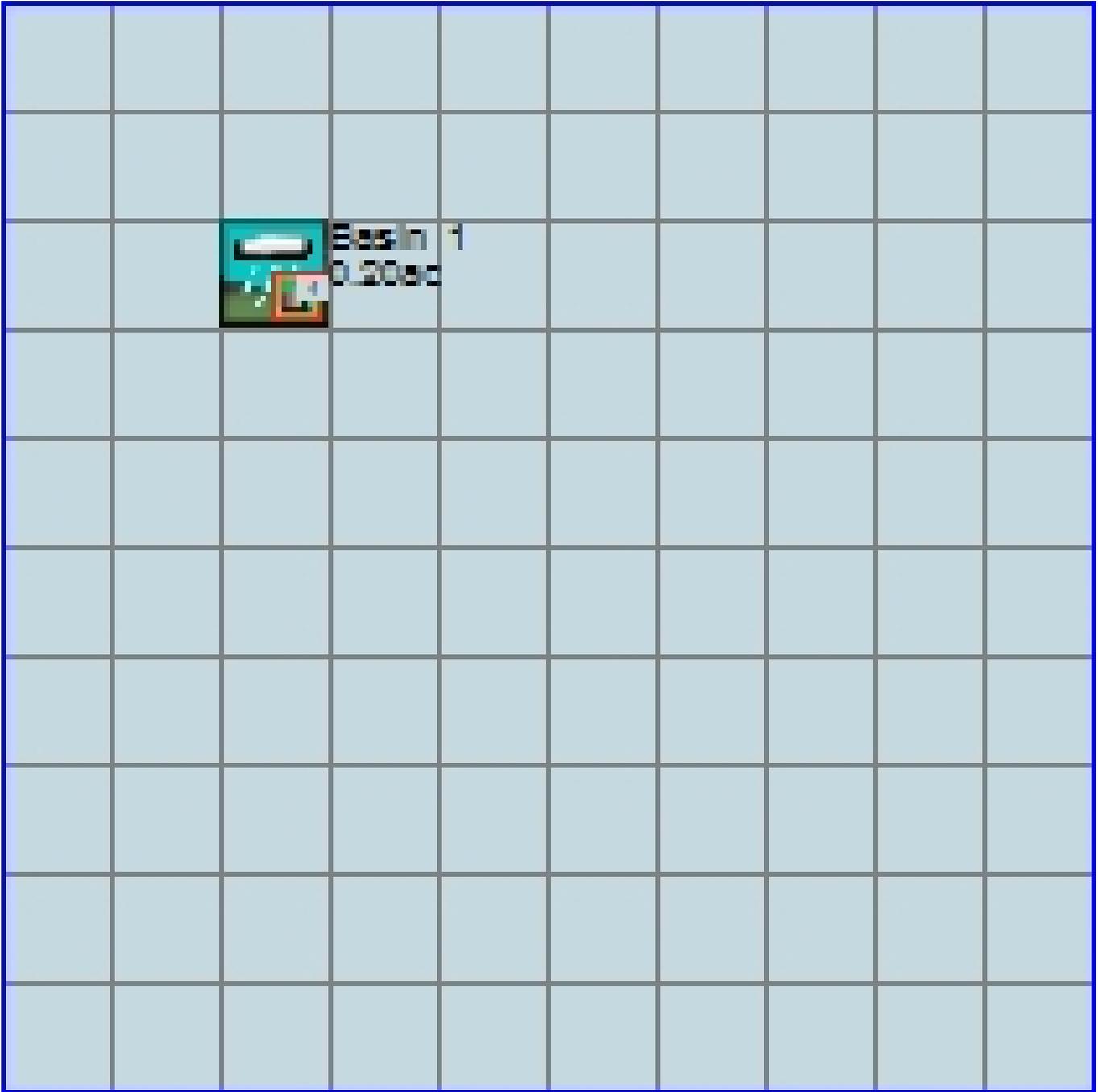
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

This program and accompanying documentation is provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by the user. Clear Creek Solutions, Inc. disclaims all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions, Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions, Inc. has been advised of the possibility of such damages.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com