NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

# CRESTVIEW II

## CONSTRUCTION DOCUMENTS

## 2318 132ND ST SE, MILL CREEK, WA 98012

05/04/2020

Approved as submitted.
Gina N. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020


PACE
An Engineering Services Company
1724 W Marine View Drive, Suite 140
Everett, WA 98201
*p.* 425.486.6533 | *f.* 425.486.6593
Civil | Structural | Planning | Survey
www. paceengrs.com


### Sheet List Table




**OWNER/APPLICANT:**
ROBERT FITZMAURICE
CRESTVIEW II, LLC.
15 LAKE BELLEVUE DRIVE #102
BELLEVUE, WA. 98005
(425) 869-1300

**PROJECT ENGINEER:**
KEN MCINTYRE, PE
PACE ENGINEERS, INC.
1724 WEST MARINE VIEW DRIVE, SUITE 140
EVERETT, WA 98201
(425) 486-6533

**SURVEYOR:**
TRAVIS BRADLEY, PLS
AXIS SURVEYING & MAPPING
15241 NE 90TH ST.
REDMOND, WA 98052
(425) 823-5700


**SITE:**
PROJECT AREA= 3.2± ACRES
ZONE CLASSIFICATION= MDR
TAX LOT NO. = 28053200201000, 28053200202300, 28053200200800

**ADDRESS:**
2318 132ND ST SE,
MILL CREEK, WA 98012

**HORIZONTAL DATUM:**
WASHINGTON COORDINATE SYSTEM NAD83/91, NORTH ZONE
BASED ON GPS RTK TIES TO:
SNOHOMISH CONTROL POINTS:
MP11 (DB ID 22386) N 323340.197, E 1303376.091
(HELD FOR POSITION)
2805V07 (DB ID 22578) N 323239.283, E 1306000.302

DISTANCES ARE GROUND US SURVEY FEET WITH AN
APPLIED COMBINED SCALE FACTOR OF 0.99993187503

**VERTICAL DATUM:**
ORIGINATING BENCHMARK:

SNOHOMISH COUNTY MONUMENT ID. 22562, AS PUBLISHED
IN WGS SURVEY DATA WAREHOUSE.

VERTICAL DATUM: NAVD '88

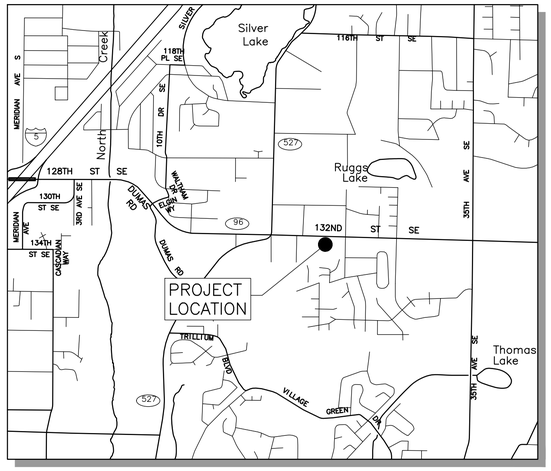
ELEVATION: 483.23'

TBM 'E': SET CHISELED SQUARE AT INTERIOR CORNER OF CONCRETE WALKWAY AT THE EASTERLY EDGE DRIVEWAY FOR 2316 & 2318 132ND ST SE

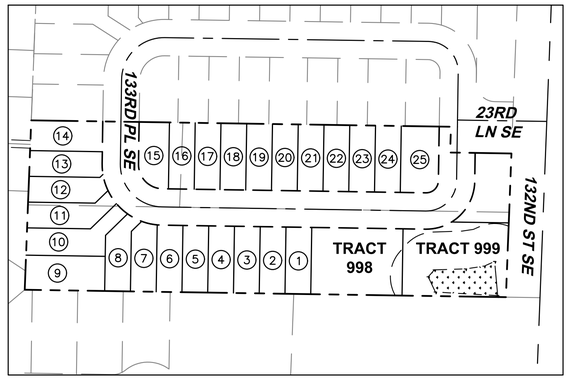
ELEV: 487.23'

TBM 'F': SET CHISELED SQUARE AT THE TOP OF CURB AT THE EASTERLY EDGE DRIVEWAY FOR ADDRESS 2308 133RD PL SE.

ELEV: 490.04'




VICINITY MAP
SCALE 1"=2000'




SITE MAP
SCALE 1"=100'

**LEGAL DESCRIPTION:**
TPN 280532-002-010-00

BEGINNING AT THE NORTHWEST CORNER OF SECTION 32, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M., IN SNOHOMISH COUNTY, WASHINGTON;
THENCE SOUTH 30.00 FEET;
THENCE SOUTHERLY 89°30'30" EAST 1415.48 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUE SOUTH 89°30'30" EAST 111.66 FEET;
THENCE SOUTH 00°49'50" EAST 450 FEET;
THENCE NORTH 89°30'30" WEST 111.66 FEET;
THENCE NORTH 00°49'50" WEST 450 FEET TO THE TRUE POINT OF BEGINNING;
EXCEPT THE NORTH 15.00 FEET THEREOF CONVEYED TO SNOHOMISH COUNTY FOR ROAD PURPOSES BY DEED RECORDED UNDER AUDITOR'S FILE NO. 8407050189; AND ALSO
EXCEPT THE NORTH 96 FEET OF THE WEST 34 FEET THEREOF AS DEDICATED FOR RIGHT OF WAY FACILITIES BY INSTRUMENT RECORDED UNDER AUDITORS FILE NO. 201602240432, RECORDS OF SNOHOMISH COUNTY, WASHINGTON.
SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

TPN 280532-002-023-00

THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 28 NORTH, RANGE 5 EAST OF THE WILLAMETTE MERIDIAN, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF THE NORTHWEST QUARTER OF SAID SECTION 32;
THENCE SOUTH 30 FEET;
THENCE SOUTH 89°30'30" EAST 1415.48 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUE SOUTH 89°30'30" EAST 111.66 FEET;
THENCE SOUTH 0°49'50" EAST 650 FEET;
THENCE NORTH 89°30'30" WEST 111.66 FEET;
THENCE NORTH 0°49'50" WEST 650 FEET TO THE TRUE POINT OF BEGINNING;
LESS THE NORTH 450 THEREOF;
TOGETHER WITH A NON-EXCLUSIVE EASEMENT OVER THE WEST 20 FEET OF THE NORTH 450 FEET ABOVE THE ABOVE DESCRIBED DESCRIPTION.
SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

TPN 280532-002-008-00

A PORTION OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M., LYING NORTHERLY OF BLOCK 2, THE PLAT OF HEATHERWOOD GARDEN TRACTS #3 AS PER PLAT RECORDED IN VOLUME 10 OF PLATS, PAGE 23A, RECORDS OF SNOHOMISH COUNTY, WASHINGTON AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT A POINT ON THE WEST LINE OF SAID SECTION 32, 30.00 FEET SOUTH OF THE NORTHWEST CORNER THEREOF;
THENCE SOUTH 89°30'30" EAST ALONG THE SOUTH MARGIN OF THE COUNTY ROAD FOR 1527.14 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUE SOUTH 89°30'30" EAST FOR 111.67 FEET;
THENCE SOUTH 00°49'50" EAST FOR 650.00 FEET TO THE NORTHERLY LINE OF SAID BLOCK 2, HEATHERWOOD GARDEN TRACTS #3;
THENCE NORTH 89°30'30" WEST ALONG SAID NORTH LINE OF SAID BLOCK 2 FOR 111.67 FEET;
THENCE NORTH 00°49'50" WEST FOR 650.00 FEET TO THE TRUE POINT OF BEGINNING;
EXCEPT THE NORTH 15 FEET THEREOF CONVEYED TO SNOHOMISH COUNTY FOR ROAD PURPOSES BY DEED RECORDED UNDER AUDITOR'S FILE NO. 8401110248 RECORDS OF SNOHOMISH COUNTY.
SITUATE IN THE COUNTY OF SNOHOMSIH, STATE OF WASHINGTON.

**GRADING QUANTITIES**

| | |
|---|---|
| CUT: | 800 CY |
| FILL: | 8,350 CY |
| NET: | 7,550 CY (FILL) |

811
Know what's **below.**
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| DATE | REVISION | SYM |
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KENNETH J. McINTYRE
STATE OF WASHINGTON
39018
REGISTERED PROFESSIONAL ENGINEER
05-04-20

**CRESTVIEW II, LLC**
15 LAKE BELLEVUE DRIVE #102
BELLEVUE, WA 98005
(425)869-1300

**CRESTVIEW II**
2318 132ND ST SE
MILL CREEK, WA 98012

TITLE SHEET

**VERIFY SCALE**
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

| SCALE: | DATE: |
|---|---|
| AS SHOWN | 2/3/20 |
| DESIGNED BY: NKJ | CHECKED BY: KJM |
| PACE PROJECT NO. 19462 | |

SHEET **C1.0**


FILE NAME: P:\19\19462 CRESTVIEW II\CAD\ENGINEERING SHEETS\CONSTRUCTION DOCS\P19462_CVR.DWG
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XREF FILES: X19462_22x34.dwg X19462_SITE.dwg X19462_BASE.dwg X19462_STMP_KJM.dwg

NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

**TREE NOTE**

ALL SIGNIFICANT TREES TO BE REMOVED EXCEPT IN TRACT 999 (CRITICAL AREAS)

23RD LN SE

132ND ST SE

## LEGEND

- SET BENCHMARK
- FOUND IRON PIPE
- FOUND MONUMENT IN CASE
- FOUND REBAR AND CAP AS NOTED
- POWER JUNCTION BOX
- POWER METER
- POWER VAULT
- STREET LIGHT
- FIBER OPTICS MANHOLE
- TELECOMMUNICATIONS RISER
- CABLE TV RISER
- GUY ANCHOR
- UTILITY POLE W/ LIGHT & TRANSFORMER
- UTILITY POLE W/ LIGHT, UNDERGROUND CONDUIT & TRANSFORMER
- UTILITY POLE W/UNDERGROUND CONDUIT
- SANITARY SEWER CLEANOUT
- SANITARY SEWER MANHOLE
- CATCH BASIN
- YARD DRAIN
- FIRE HYDRANT
- HOSE BIB
- IRRIGATION CONTROL VALVE
- WATER METER
- WATER VALVE
- WATER VAULT
- WETLAND FLAG
- WATER INDICATOR POST
- GAS INDICATOR POST
- GAS VALVE
- SOIL LOG/TEST PIT
- SIGN
- POST
- LOCAL HIGH POINT
- LOCAL LOW POINT
- DITCH LINE
- SANITARY SEWER LINE
- STORM DRAIN LINE
- OVERHEAD POWER LINE
- 100 AMP UNDERGROUND LINE PER DISCUSSION WITH THOMAS CLEMANS
- TELECOMMUNICATIONS LINE
- FIBER OPTICS LINE
- WATER LINE
- GAS LINE
- CHAIN LINK FENCE LINE (CLFNC)
- WOOD FENCE LINE (BFNC)
- ROOF OVERHANG/EAVE
- EXISTING RETAINING WALL
- CMU RETAINING WALL
- CONCRETE PAVING
- ASPHALT PAVING
- BUILDINGS
- WETLANDS
- ALDER
- DECIDUOUS
- FIR
- FRUIT
- MAPLE
- CLUSTER

HORIZ. 0 15 30 60 Scale In Feet

Approved as submitted.
Gina M. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

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FILE NAME: P:\19\19462_CRESTVIEW II\CAD\ENGINEERING\SHEETS\CONSTRUCTION DOCS\P19462_EC.DWG
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| SYM | REVISION | DATE |
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KENNETH J. McINTYRE 39018 STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER
05-04-20

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BELLEVUE, WA 98005
(425)869-1300

**CRESTVIEW II**
2318 132ND ST SE
MILL CREEK, WA 98012

**EXISTING CONDITIONS**

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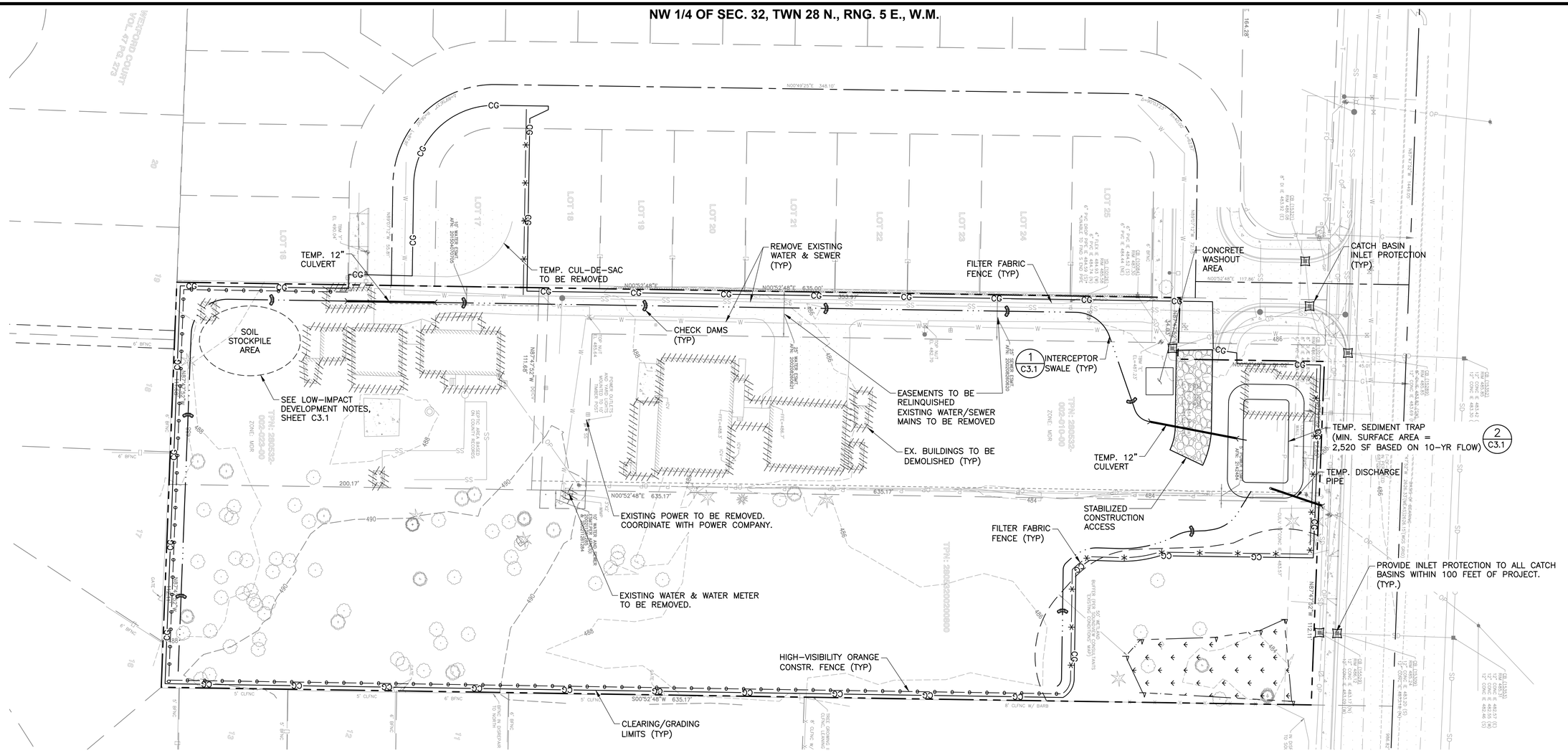
| DESIGNED BY: | CHECKED BY: |
| NKJ | KJM |

PACE PROJECT NO. 19462

SHEET **C2.0**

NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

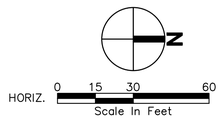



## TEMPORARY EROSION & SEDIMENT CONTROL

- CG — CLEARING & GRADING LIMITS
- HIGH VISIBILITY SILT FENCE
- ORANGE FENCE
- SILT FENCE
- STRAW WATTLE
- INTERCEPTOR SWALE/DITCH
- EX. SWALE/DITCH
- PROJECT LIMITS
- CATCH BASIN PROTECTION/INSERT
- CHECK DAM
- STRAW BALE
- RIP RAP PAD
- TEMPORARY CONSTRUCTION ENTRANCE

## CONSTRUCTION SEQUENCE:

1. SCHEDULE AND ATTEND A PRE-CONSTRUCTION MEETING WITH CITY INSPECTOR.
2. POST SIGN WITH CONTACT INFORMATION OF THE EROSION/SEDIMENT CONTROL LEAD.
3. INSTALL PERIMETER FENCING (SILT FENCING & HIGH-VISIBILITY ORANGE CONSTRUCTION FENCING) TO IDENTIFY CLEARING LIMITS. GRADE & INSTALL CONSTRUCTION ENTRANCE.
4. INSTALL CATCH BASIN INLET PROTECTION AS SHOWN FOR EXISTING NEARBY CATCH BASINS. INLET PROTECTION SHALL BE PROVIDED FOR ALL NEW CATCH BASINS UPON INSTALLATION.
5. INSTALL SURFACE WATER CONTROLS (TEMP. SEDIMENT TRAP, INTERCEPTOR SWALES, CHECK DAMS) SIMULTANEOSLY WITH CLEARING/GRADING FOR PROJECT DEVELOPMENT. REVISE EROSION CONTROL MEASURES AS SITE CONDITIONS CHANGE TO MAINTAIN COMPLIANCE WITH THE CITY'S EROSION/SEDIMENT CONTROL REGULATIONS.
6. INSTALL UNDERGROUND UTILITIES, PERFORM ALL REMAINING GRADING ACTIVITY, AND CONSTRUCT SURFACE HARDSCAPE IMPROVEMENTS.
7. COVER ALL AREAS THAT WILL BE UNWORKED FOR MORE THAN SEVEN-DAYS (TWO-DAYS DURING THE WET SEASON) WITH STRAW, WOOD FIBER MULCH, PLASTIC SHEETING, OR AS OTHERWISE DIRECTED BY THE PROJECT EROSION/SEDIMENT CONTROL LEAD.
8. STABILIZE ALL AREAS THAT REACH FINAL GRADE OR ARE EXPECTED TO REMAIN UNWORKED. THESE AREAS SHALL BE STABILIZED WITH SEED OR SOD.
9. UPON COMPLETION OF CONSTRUCTION, REMOVE ACCUMULATED SEDIMENT FROM STORM DRAINAGE SYSTEM, STABILIZE ANY REMAINING EXPOSED AREAS, AND REMOVE ALL APPLICABLE BMPS.

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Gina M. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
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(425)869-1300

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MILL CREEK, WA 98012

**TESC PLAN**

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|---|---|
| AS SHOWN | 2/3/20 |
| DESIGNED BY: NKJ | CHECKED BY: KJM |
| PACE PROJECT NO. 19462 | |

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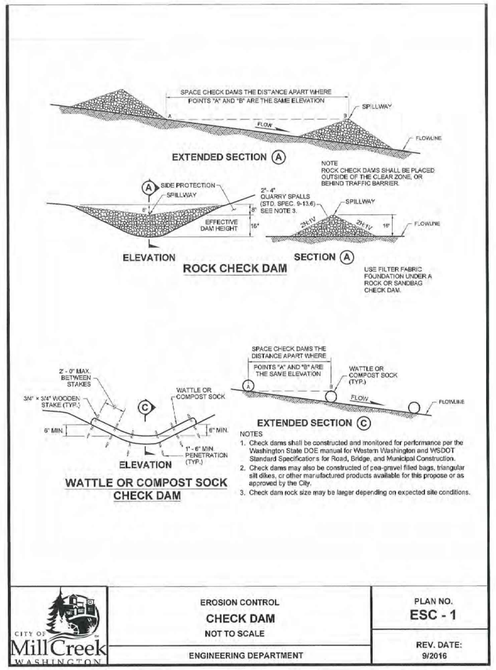
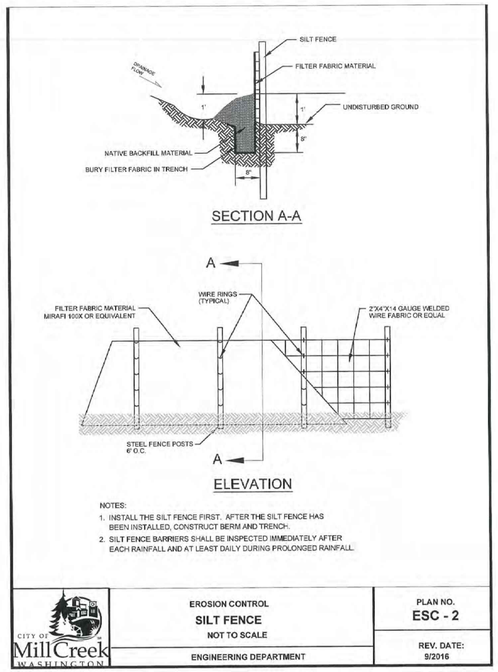
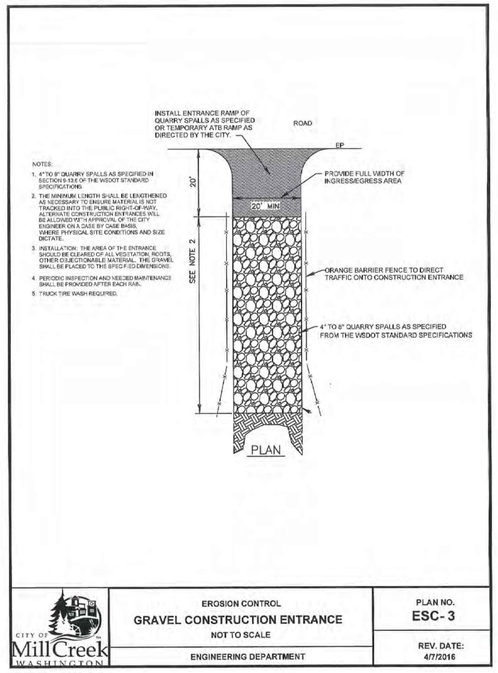
NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.



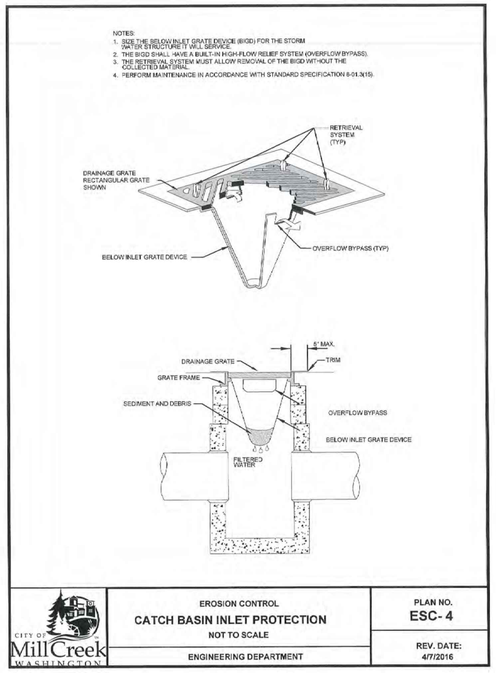

| CITY OF Mill Creek WASHINGTON | EROSION CONTROL<br>CHECK DAM<br>NOT TO SCALE | PLAN NO.<br>ESC - 1 |
|---|---|---|
| | ENGINEERING DEPARTMENT | REV. DATE:<br>9/2016 |




| CITY OF Mill Creek WASHINGTON | EROSION CONTROL<br>SILT FENCE<br>NOT TO SCALE | PLAN NO.<br>ESC - 2 |
|---|---|---|
| | ENGINEERING DEPARTMENT | REV. DATE:<br>9/2016 |




| CITY OF Mill Creek WASHINGTON | EROSION CONTROL<br>GRAVEL CONSTRUCTION ENTRANCE<br>NOT TO SCALE | PLAN NO.<br>ESC- 3 |
|---|---|---|
| | ENGINEERING DEPARTMENT | REV. DATE:<br>4/7/2016 |




| CITY OF Mill Creek WASHINGTON | EROSION CONTROL<br>CATCH BASIN INLET PROTECTION<br>NOT TO SCALE | PLAN NO.<br>ESC- 4 |
|---|---|---|
| | ENGINEERING DEPARTMENT | REV. DATE:<br>4/7/2016 |

## GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE WSDOT "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION", CITY OF MILL CREEK STANDARD PLANS AND ANY DEVELOPMENT CONDITIONS OF APPROVAL. IT SHALL BE THE SOLE RESPONSIBILITY OF THE APPLICANT AND THEIR PROFESSIONAL ENGINEER TO CORRECT AND NOTE ANY ERRORS, OMISSIONS, OR VARIATIONS FROM THE REQUIREMENTS FOUND IN THESE PLANS.
2. A CITY RIGHT-OF-WAY (ROW) PERMIT IS REQUIRED FOR ANY WORK THAT WILL IMPACT THE PUBLIC ROW IN ACCORDANCE WITH MCMC CHAPTER 12.04.
3. PRIOR TO BEGINNING ANY SITE CONSTRUCTION, THE APPLICANT, THEIR ENGINEER AND CONTRACTOR SHALL MEET WITH THE ENGINEERING DEPARTMENT FOR A PRE-CONSTRUCTION MEETING.
4. A COPY OF THE APPROVED PLANS MUST BE ON THE SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
5. PRIOR TO ANY TREE REMOVAL ON SITE, THE CLEARING LIMITS SHALL BE LOCATED AND PROTECTED AS REQUIRED ON THE APPROVED PLANS. BARRIER FENCING SHALL BE PLACED AROUND THE DRIPLINE OF THE TREES TO RETAINED AND CITY STAFF SHALL FIELD INSPECT THE TREES TO BE RETAINED PRIOR TO COMMENCEMENT OF CLEARING AND GRADING ACTIVITIES.
6. IN ACCORDANCE WITH MCMC SECTION 15.10.075.B, WHERE TREES DESIGNATED TO BE RETAINED ARE DAMAGED, DESTROYED OR REMOVED DURING THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS, A PENALTY IN THE AMOUNT OF $1,000 MAY BE ASSESSED PER TREE, AND EACH TREE SHALL BE REPLACED AT A 3:1 RATIO.
7. APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) FOR EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED PRIOR TO ANY GRADING OR LAND CLEARING IN ACCORDANCE WITH THE APPROVED STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THESE BMP'S MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION AND LANDSCAPING IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED.
8. BETWEEN OCTOBER 1 AND APRIL 30, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN TWO DAYS. FROM MAY 1 THROUGH SEPTEMBER 30, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN SEVEN DAYS. ANY UNWORKED SOIL SHALL BE STABILIZED WITH AN APPROVED BMP UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
9. PUBLIC STREETS SHALL BE CLEANED ONCE PER DAY WITH A REGENERATIVE AIR VACUUM SWEEPER OR AS DIRECTED BY THE CITY. FLUSHING OF STREETS WITH WATER WILL NOT BE ALLOWED.
10. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITY LOCATE CENTER AT 811 NO LESS THAN 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION.
11. THE CONTRACTOR SHALL COMPLY WITH ALL OTHER NECESSARY PERMITS AND REQUIREMENTS BY THE CITY OF MILL CREEK OR OTHER GOVERNING AUTHORITY/AGENCY.

## DEVELOPMENT INSPECTION REQUIREMENTS

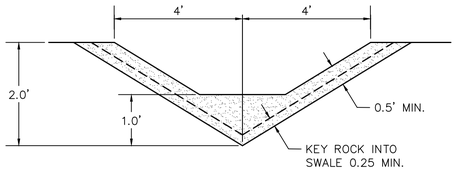
1. ALL WORK WITHIN THE SITE SHALL BE SUBJECT TO THE INSPECTION OF THE CITY ENGINEER OR DESIGNATED REPRESENTATIVE IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   a) INSPECTIONS SHALL BE SCHEDULED ONLINE NO LESS THAN 24 HOURS IN ADVANCE.
   b) UNDERGROUND PUBLIC INFRASTRUCTURE SHALL NOT BE BACKFILLED WITHOUT A VISUAL INSPECTION BY THE CITY.
   c) ANY WORK COVERED WITHOUT PRIOR ACCEPTANCE MAY BE REQUIRED TO BE EXPOSED FOR CITY INSPECTION.
   d) THE CONTRACTOR SHALL REQUEST A SUBSTANTIAL COMPLETION INSPECTION ONCE SITE WORK HAS BEEN COMPLETED FOR ANY PUNCH LIST ITEMS.
   e) THE CONTRACTOR SHALL REQUEST A PHYSICAL COMPLETION INSPECTION AFTER ALL RESTORATION AND REPAIR WORK HAS BEEN COMPLETED FOR FINAL CITY ACCEPTANCE.
2. COMPACTION TESTING IS REQUIRED FOR ALL BACKFILLING, GRADING, EMBANKMENT AND ASPHALT PAVING WORK WITHIN THE PUBLIC RIGHT-OF-WAY.
   a) EARTHWORK SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) UNDER PAVED AREAS, AND A MINIMUM OF90% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) IN UNPAVED AREAS.
   b) ASPHALT PAVEMENT SHALL BE COMPACTED TO A MINIMUM OF 91% OF THE MAXIMUM (RICE) DENSITY.
   c) THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPACTION TESTING SERVICES, AND SHALL PROVIDE SATISFACTORY TEST REPORTS TO THE CITY PRIOR TO FINAL ACCEPTANCE.
3. MATERIAL SAMPLING AND TESTING IS REQUIRED FOR ALL CONCRETE WORK WITHIN THE PUBLIC RIGHT-OF-WAY.
   a) SAMPLING AND TESTING REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 6-02.3 OF THE WSDOT STANDARD SPECIFICATIONS.
   b) THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING MATERIAL TESTING SERVICES, AND SHALL PROVIDE SATISFACTORY TEST REPORTS TO THE CITY PRIOR TO FINAL ACCEPTANCE.

## LOW-IMPACT DEVELOPMENT STANDARDS

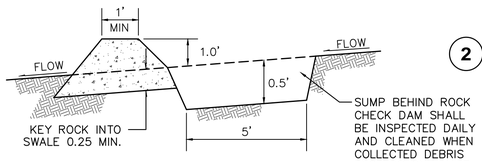
1. ALL LANDSCAPED AREAS SHALL BE AMENDED WITH A MINIMUM OF FOUR INCHES OF COMPOST TO A MINIMUM DEPTH OF SIX INCHES TO IMPROVE THE ON-SITE RETENTION OF STORMWATER.
2. DURING CLEARING AND GRADING THE DUFF LAYER AND NATIVE TOPSOIL SHALL BE RETAINED IN AN UNDISTURBED STATE TO THE MAXIMUM EXTENT PRACTICABLE. IN ANY AREAS REQUIRING GRADING, REMOVE AND STOCKPILE THE DUFF LAYER AND NATIVE TOPSOIL ON-SITE IN A DESIGNATED, CONTROLLED AREA, NOT ADJACENT TO A CRITICAL AREA, TO BE REAPPLIED TO OTHER PORTIONS OF THE SITE WHERE FEASIBLE.
3. STOCKPILED TOPSOIL MUST ALSO BE AMENDED IF NEEDED TO MEET THE ORGANIC MATTER OR DEPTH REQUIREMENTS (TO ACHIEVE 12 INCHES OF UNCOMPACTED DEPTH (TOP 8 INCHES SHALL BE AMENDED SOIL AND 4 INCHES OF LOOSE OR FRACTURED SUBSOIL).

## AS-BUILT REQUIREMENTS

1. THE AS-BUILT DRAWINGS SHALL SHOW THE FINAL LOCATION OF ALL INFRASTRUCTURE LOCATED WITHIN THE PUBLIC RIGHT-OF-WAY, INCLUDING BUT NOT LIMITED TO: STREETS, CURBS, STORM DRAIN FACILITIES, CITY OWNED STREET LIGHTS, MEDIANS, SIDEWALKS, ETC. FINAL ELEVATIONS AND LOCATIONS OF ROADWAY AND DRAINAGE FACILITIES SHALL BE MEASURED BY A LICENSED SURVEYOR.
2. ELEVATIONS OF THE ROADWAY CENTERLINE AND CURB FLOW LINE SHALL BE MEASURED EVERY FIFTY FEET AFTER THE FINAL LIFT OF ASPHALT HAS BEEN PLACED, INCLUDING THE BEGINNING AND END OF BOTH HORIZONTAL AND VERTICAL CURVES AND ALL POINTS OF INTERSECTION.
3. THE AS-BUILT INFORMATION OF ALL STORM DRAINAGE CONVEYANCE FACILITIES SUCH AS CATCH BASINS, INLETS, PIPES AND SWALES SHALL INCLUDE INVERTS AND RIM ELEVATIONS, AS WELL AS THE MATERIAL TYPE AND SIZE. OPEN CHANNELS SHALL ALSO INCLUDE CROSS-SECTIONS AT APPROPRIATE LOCATIONS TO VERIFY DESIGN REQUIREMENTS.
4. THE FINAL AS-BUILT STORAGE VOLUME AND DIMENSIONS OF THE STORM WATER DETENTION FACILITIES, ALONG WITH THE ORIFICE SIZE(S) OF THE CONTROL STRUCTURE, SHALL BE FIELD MEASURED AND INCLUDED ON THE AS-BUILT DRAWINGS.
5. AS-BUILT INFORMATION CAN EITHER BE SHOWN BY ADDING NEW INFORMATION TO A SET OF THE APPROVED DRAWINGS OR CREATING A NEW SEPARATE PLAN SET. FOR ELEVATION DIFFERENCES, A LINE SHOULD CROSS OUT OLD ELEVATIONS AND NEW ELEVATIONS SHOULD BE ENTERED NEXT TO THE ORIGINAL INFORMATION. ORIGINAL INFORMATION SHALL NOT BE REMOVED FROM THE APPROVED PLANS UNLESS APPROVED BY THE CITY ENGINEER.




**INTERCEPTOR DITCH X-SECTION & ROCK CHECK DAM**
(FRONT VIEW)




**ROCK CHECK DAM X-SECTION**
(SIDE VIEW)

| DITCH SLOPE | CHECK DAM SPACING |
|---|---|
| 0 – 5 % | 150' |
| 5 – 10 % | 100' |
| > – 10 % | 50' |

(1) **INTERCEPTOR SWALE WITH CHECK DAMS**
NOT TO SCALE

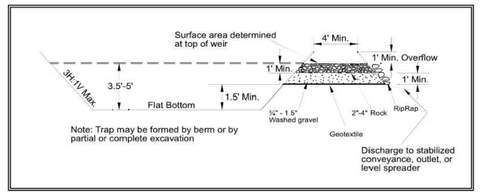



**Figure 4.2.16 – Cross Section of Sediment Trap**

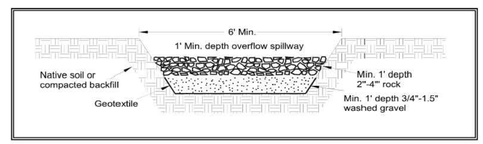



**Figure 4.2.17 – Sediment Trap Outlet**

(2) **SEDIMENT TRAP**
NOT TO SCALE

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

Approved as submitted.
Gina N. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
**05/05/2020**

| DATE | REVISION | SYM |
|---|---|---|

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STATE OF WASHINGTON
39018
REGISTERED PROFESSIONAL ENGINEER
05-04-20

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15 LAKE BELLEVUE DRIVE #102
BELLEVUE, WA 98005
(425)869-1300

**CRESTVIEW II**
2318 132ND ST SE
MILL CREEK, WA 98012

**TESC DETAILS & NOTES**

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0 1"
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| SCALE: | DATE: |
|---|---|
| AS SHOWN | 2/3/20 |
| DESIGNED BY: | CHECKED BY: |
| NKJ | KJM |

PACE PROJECT NO. 19462

SHEET **C3.1**

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USER NAME: KEN MCINTYRE
XREF FILES: X19462_23x34.dwg X19462_STMP_KJM.dwg 1501-INTERCEPTOR DITCH WITH ROCK CHECK DAM.dwg

NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

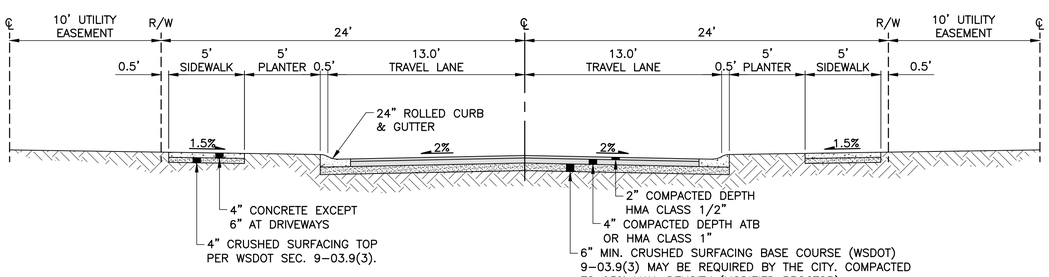
MDR
(RESIDENCES)

MR
(COUNTY)
(SINGLE/MF
RESIDENCES)

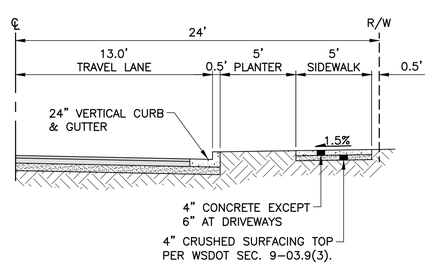
LDR
(RESIDENCES)
(ZONING TYP)

LDR
(RESIDENCES)

18+00
N0°49'25"E
348.10'
Δ=89°56'27"
R=56.00'
L=87.91'
2
17+00
MATCH EX CURB,
PLANTER, WALK
STA. 18+08±
CRESTVIEW VILLAGE
(CONSTRUCTED UNDER
PERMIT NO. CG2014-0006)
133RD PL SE
STA: 16+40.74
N=322724.24
E=1304775.89
EXISTING TEMPORARY CUL-DE-SAC
TO BE REMOVED. 133RD PL SE
TO BE RESTORED AS SHOWN.
STA: 10+00.00
N=323168.32
E=1304779.26
MATCH EX. PVMT, CURB,
PLANTER, WALK
STA 10+37.75±
23RD LN SE
10+00
N00°52'48"E 554.15'
N89°07'12"W
111.46'
16+00
5' SIDE
SETBACK (TYP)
PROPOSED POSTAL
CLUSTER BOXES
N87°47'52"W
34.03'
N00°52'48"E
81.02'
S89°07'15"E
80.66'
TRACT 997
OPEN SPACE
4760 SF
14 3796 SF
13 3259 SF
12 3376 SF
11 3633 SF
10 20' ACCESS
EASEMENT
4539 SF
9 4803 SF
10' WATER ESMT
15 3286 SF
16 2980 SF
17 2980 SF
18 2980 SF
19 2980 SF
20 2980 SF
21 2980 SF
22 2980 SF
23 2980 SF
24 2980 SF
25 4335 SF
8 3182 SF
7 3006 SF
6 2995 SF
5 2995 SF
4 2995 SF
3 2995 SF
2 2995 SF
1 2995 SF
R=56.00'
Δ=90°00'00"
L=87.96'
15+00
14+00
348.08'
S0°52'48"W
13+00
12+00
R=40.00'
L=62.83'
Δ=90°00'00"
11+00
15' FRONT SETBACK (TYP)
(20' GARAGE SETBACK)
10' UTILITY
EASEMENT (TYP)
PROPOSED SURVEY
MONUMENT (TYP)
TRACT 998
STORM DRAINAGE
10613 SF
TRACT 999
CRITICAL AREA TRACT
13029 SF
50'
WETLAND
BUFFER
25' REAR
SETBACK (TYP)
S00°52'48"W 635.17'
N87°47'52"W
189.76'
132ND ST SE
25' R/W
HORIZ. 0 15 30 60
Scale In Feet




1 ROAD SECTION
1"=5'




2 ROAD SECTION
1"=5'

Approved as submitted.
Gina N. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

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SITE PLAN

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| NKJ | KJM |

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SHEET C4.0

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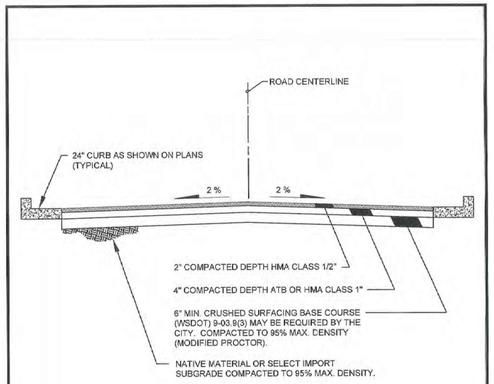
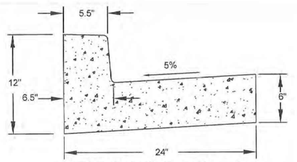
NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

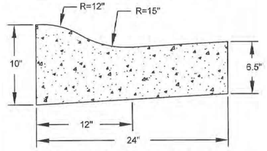



CITY OF Mill Creek WASHINGTON

| STREET | PLAN NO. |
|---|---|
| TYPICAL ROAD CROSS SECTION | STR-1 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |




VERTICAL CURB & GUTTER

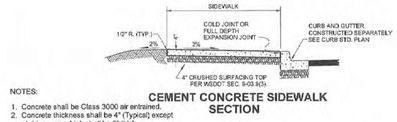



ROLLED CURB & GUTTER

NOTES:
1. Concrete shall be Class 3000 air-entrained.
2. Base shall be Crushed Surfacing Top Course, per WSDOT sec. 9-03.9(3) with a minumum depth of 4 inch. In-situ native material may be used for a base if approved by the City. Sub-grade compaction shall meet a min. 95% of max. density.
3. Steel forms shall be used on all straight sections. Wood forms shall be used on radius.
4. Full depth expansion joints shall be placed at 10 feet center to center, at the top of each driveway, at top of access ramps, and on both sides of a catch basin. (Joint material shall be min. 3/8" premolded joint material factory cut to the shape of the curb. Strips of joint material shall not be stacked.)
5. Finish shall be broomed with tooled edges. All joints shall be clean.

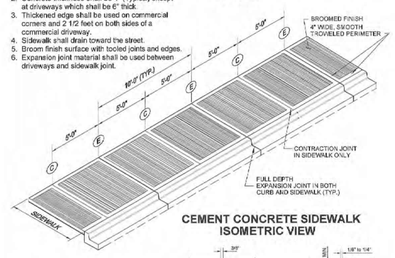
CITY OF Mill Creek WASHINGTON

| STREET | PLAN NO. |
|---|---|
| ROLLED AND VERTICAL CURB | STR-2 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |



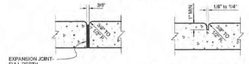

CEMENT CONCRETE SIDEWALK SECTION

NOTES:
1. Concrete shall be Class 3000 air entrained.
2. Concrete thickness shall be 4" (Typical) except at driveways which shall be 6" thick.
3. Thickened edge shall be used on commercial corners and 2 1/2 feet on both sides of a commercial driveway.
4. Sidewalk shall drain toward the street.
5. Broom finish surface with tooled joints and edges.
6. Expansion joint material shall be used between driveways and sidewalk joint.




CEMENT CONCRETE SIDEWALK ISOMETRIC VIEW

MIN. SIDEWALK WIDTHS
RESIDENTIAL & COMMERCIAL 5 FT.
ARTERIALS 6 FT.
USE AS MULTI-PURPOSE TRAIL 10 FT.

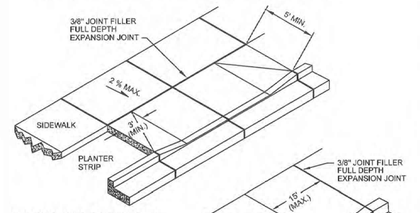



(E) EXPANSION JOINT (C) CONTRACTION JOINT

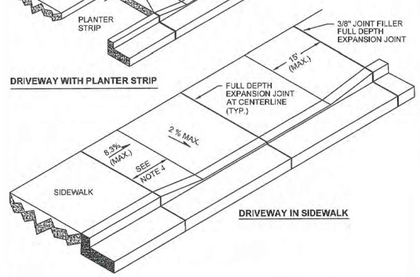
CITY OF Mill Creek WASHINGTON

| STREET | PLAN NO. |
|---|---|
| CEMENT CONCRETE SIDEWALK | STR-3 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |

NOTES:
1. Curb and Apron to be poured separately. Monolithic curb and apron is not allowed.
2. Driveway shall be 6 inches thick Class 3000 concrete air entrained.
3. Broom finish surface with tooled joints and edges.
4. The maximum running slope shall not exceed 15 feet to avoid chasing the slope indefinitely when connecting to steep road and curb grades. Transition panels on each side of driveway shall be equal in length for each driveway.



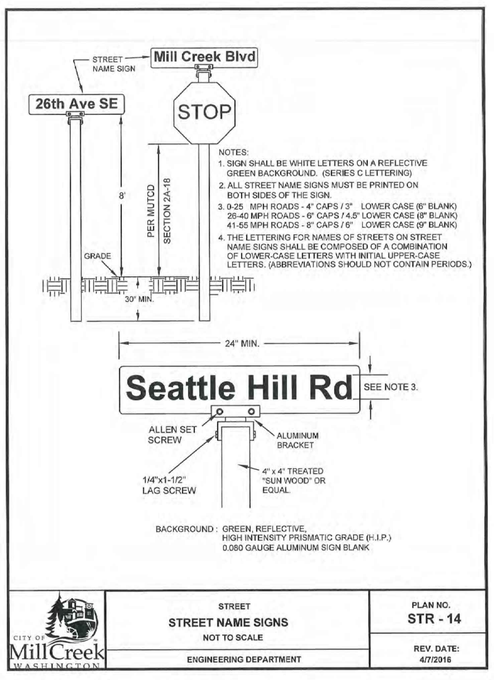

DRIVEWAY WITH PLANTER STRIP




DRIVEWAY IN SIDEWALK

CITY OF Mill Creek WASHINGTON

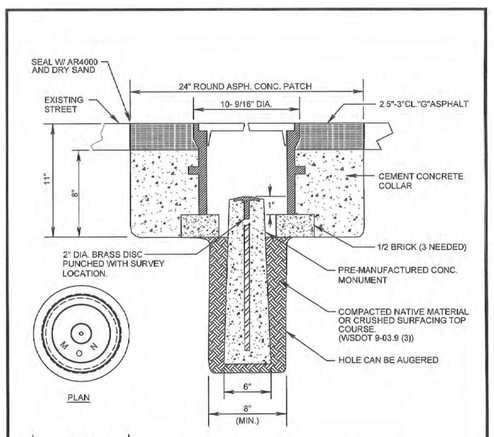
| STREET | PLAN NO. |
|---|---|
| VERTICAL CURB DRIVEWAY | STR - 6 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |




NOTES:
1. SIGN SHALL BE WHITE LETTERS ON A REFLECTIVE GREEN BACKGROUND. (SERIES C LETTERING)
2. ALL STREET NAME SIGNS MUST BE PRINTED ON BOTH SIDES OF THE SIGN.
3. 0-25 MPH ROADS - 4" CAPS / 3" LOWER CASE (6" BLANK)
   26-40 MPH ROADS - 6" CAPS / 4.5" LOWER CASE (8" BLANK)
   41-55 MPH ROADS - 8" CAPS / 6" LOWER CASE (9" BLANK)
4. THE LETTERING FOR NAMES OF STREETS ON STREET NAME SIGNS SHALL BE COMPOSED OF A COMBINATION OF LOWER-CASE LETTERS WITH INITIAL UPPER-CASE LETTERS. (ABBREVIATIONS SHOULD NOT CONTAIN PERIODS.)

CITY OF Mill Creek WASHINGTON

| STREET | PLAN NO. |
|---|---|
| STREET NAME SIGNS | STR - 14 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |




GRAY IRON LID

NOTES:
1. THE CASTINGS SHALL BE GRAY-IRON CASTINGS, ASTM DESIGNATION A-48, CLASS 35B.
2. MONUMENT CASE AND COVER SHALL BE EAST JORDAN IRON WORKS PRODUCT NO. 369505 OR APPROVED EQUAL.

CITY OF Mill Creek WASHINGTON

| STREET | PLAN NO. |
|---|---|
| SURVEY CONTROL MONUMENT | STR - 19 |
| NOT TO SCALE | |
| ENGINEERING DEPARTMENT | REV. DATE: 4/7/2016 |

Approved as submitted.
Gina M. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

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

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SHEET C4.1

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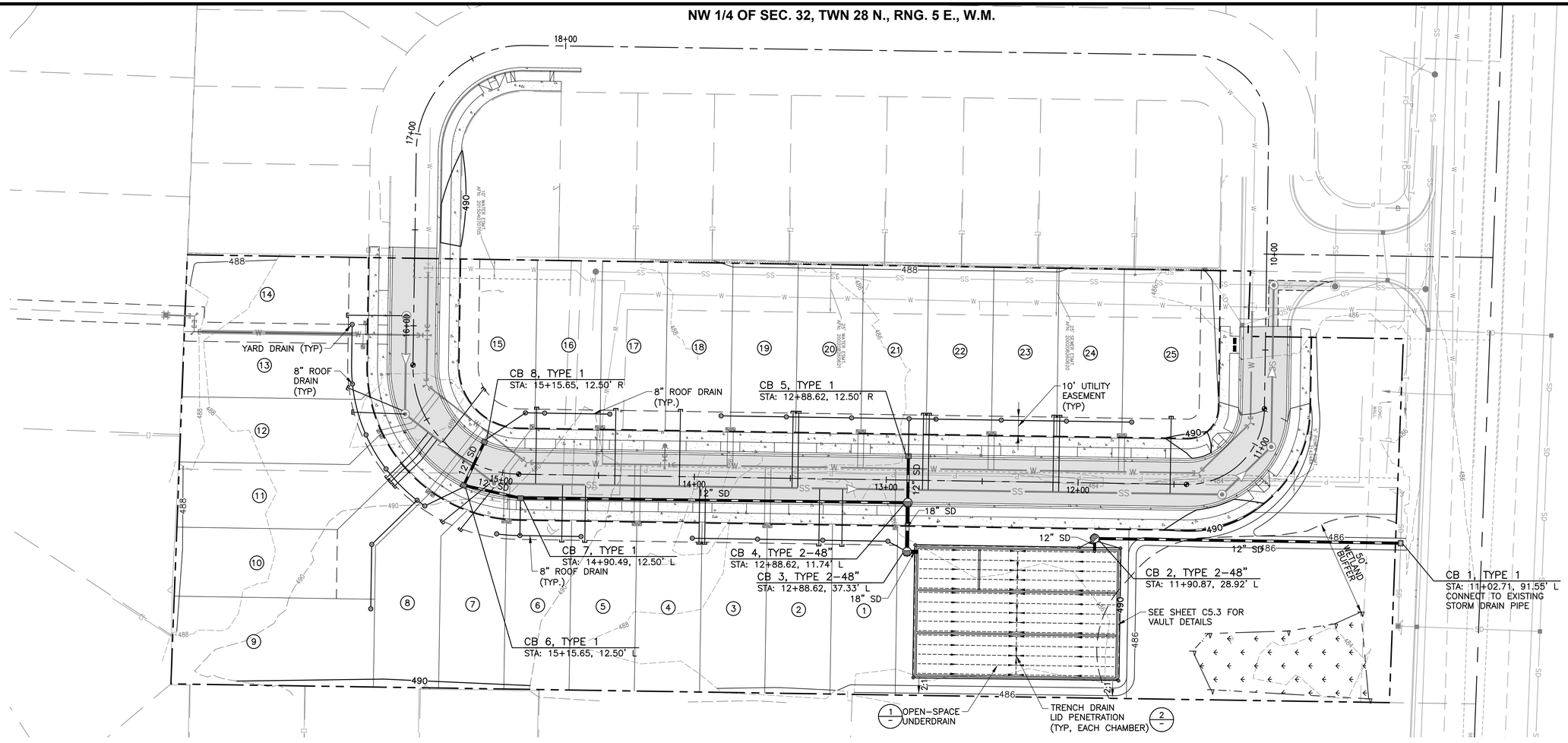
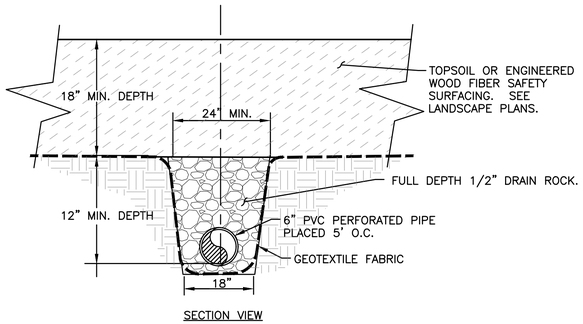
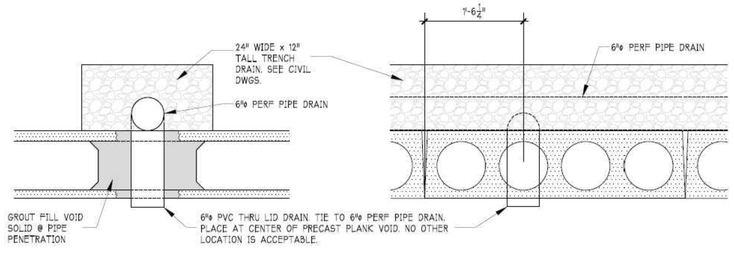
SAVE TIME: 2/3/2020 8:16:49 AM PLOT TIME: 5/4/2020 11:25 AM
USER NAME: KEN MCINTYRE
XREF FILES: X19462_22x34.dwg X19462_STMP_KJM.dwg

NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.




1 **OPEN SPACE UNDERDRAIN**
NTS



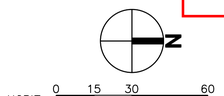

2 **TRENCH DRAIN LID PENETRATION**
NTS

**YARD DRAIN SCHEDULE**

| LOT # | RIM EL. | INVERT EL. | LOT # | RIM EL. | INVERT EL. | NOTES |
|---|---|---|---|---|---|---|
| 1 | 489.0 | 486.0 | 13 | 489.5 | 486.5 | |
| 2 | 489.2 | 486.2 | 14 | 489.7 | 486.7 | |
| 3 | 489.4 | 486.4 | 15 | 489.2 | 486.2 | |
| 4 | 489.8 | 486.8 | 16 | 489.3 | 486.3 | |
| 5 | 489.5 | 486.5 | 17 | 489.6 | 486.6 | |
| 6 | 489.2 | 486.2 | 18 | 489.8 | 486.8 | |
| 7 | 489.0 | 486.0 | 19 | 489.3 | 486.3 | |
| 8 | 489.0 | 485.9 | 20 | 489.1 | 486.1 | |
| 9 | 490.1 | 487.1 | 21 | 489.0 | 486.0 | |
| 10(N) | 489.1 | 486.1 | 22 | 489.1 | 486.1 | |
| 10(S) | 489.9 | 486.9 | 23 | 489.2 | 486.2 | SOLID LID |
| 11 | 489.1 | 486.1 | 24 | 489.5 | 486.5 | |
| 12 | 489.3 | 486.3 | 25 | 489.8 | 486.8 | |

NOTE: PERFORATED STUB OUT CONNECTION PER DETAIL ON C5.2.

Approved as submitted.
Gina M. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
**05/05/2020**

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|---|---|---|
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**CRESTVIEW II**
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MILL CREEK, WA 98012

**GRADING & DRAINAGE PLAN**

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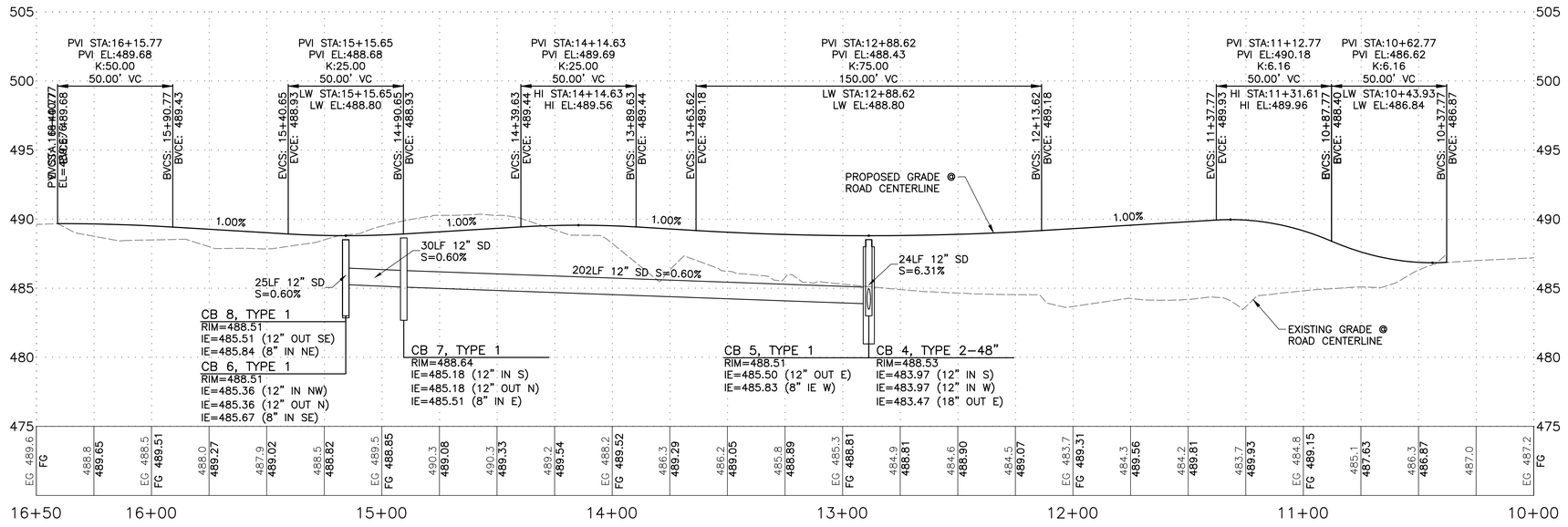
NW 1/4 OF SEC. 32, TWN 28 N., RNG. 5 E., W.M.

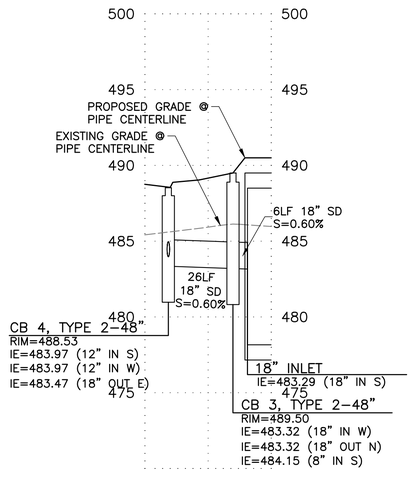



10-CL, STA: 10+00 - 16+50

SCALE= H= 1"=30'
V= 1"=5'

## STORM DRAINAGE NOTES

1. ALL CATCH BASINS TO BE TYPE I UNLESS OTHERWISE REQUIRED.
2. ALL CATCH BASINS WITH A DEPTH OVER FIVE FEET TO THE FLOW LINE SHALL BE TYPE II.
3. STANDARD LADDER STEPS SHALL BE PROVIDED IN ALL CATCH BASINS AND MANHOLES EXTENDING OVER FIVE FEET IN DEPTH.
4. ALL DRAINAGE STRUCTURES SHALL INCORPORATE A DUCTILE IRON FRAME AND GRATE OR SOLID LID IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
   a) STRUCTURES RECEIVING FLOW IN ONLY ONE DIRECTION SHALL INCLUDE A VANED FRAME AND GRATE.
   b) STRUCTURES IN A CURB LINE RECEIVING FLOW IN TWO DIRECTIONS SHALL USE A THROUGH CURB INLET WITH A VANED BI-DIRECTIONAL GRATE WITH A FULL HEIGHT DIAMOND PLATE HOOD.
   c) ROLLED FRAME AND GRATES MAY BE USED ONLY WHERE APPROVED BY THE CITY ENGINEER.
   d) STRUCTURES OUTSIDE A CURB LINE (E.G. PARKING LOTS) RECEIVING FLOW FROM MULTIPLE DIRECTIONS MAY USE A FRAME AND GRATE WITH A FLAT HERRINGBONE PATTERN OR EQUIVALENT.
   e) ALL DRAINAGE STRUCTURES OUTSIDE A WATER COLLECTION AREA SHALL HAVE SOLID LIDS UNLESS OTHERWISE APPROVED BY THE CITY.
   f) ALL GRATES OR SOLID LIDS WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE NON-LOCKING. GRATES AND SOLID LIDS OUTSIDE THE PUBLIC RIGHT-OF-WAY MAY BE LOCKING AT THE OWNER'S DISCRETION.
   g) ALL FRAME AND GRATES OR SOLID LIDS SHALL HAVE AN HS-25 RATING.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL FRAMES AND GRATES OR SOLID LIDS PRIOR TO FINAL PAVING. ALL UTILITY MANHOLES, VALVES AND SURVEY MONUMENTS SHALL BE ADJUSTED AFTER PAVING.
6. STUB OUTS FOR TRADITIONAL YARD, FOUNDATION AND ROOF DRAINS SHALL BE INSTALLED BEHIND THE SIDEWALK AS REQUIRED. POSITIVE DRAINAGE IS TO BE PROVIDED WITH A CONNECTION TO THE NEAREST CATCH BASIN STRUCTURE. THE LOCATION AND TYPE OF STUB-OUT SHALL BE INDICATED WITH AN ABOVE GROUND MARKER. EXCEPT WHEN THEY USE LID FOUNDATION DRAIN.
7. ALL STORM WATER DETENTION AND WATER QUALITY FACILITIES, FLOW CONTROL STRUCTURES, PIPES AND CATCH BASINS SHALL BE JETTED AND CLEANED PRIOR TO FINAL CITY ACCEPTANCE.
8. ALL STORM DRAIN PIPES SHALL BE 12" MINIMUM DIAMETER UNLESS APPROVED BY THE CITY ENGINEER. PIPE AND JOINT MATERIALS SHALL BE IN ACCORDANCE WITH SECTIONS 7-04 AND 9-05 OF THE WSDOT STANDARD SPECIFICATIONS.




SD01, STA: 1+00 - 1+50

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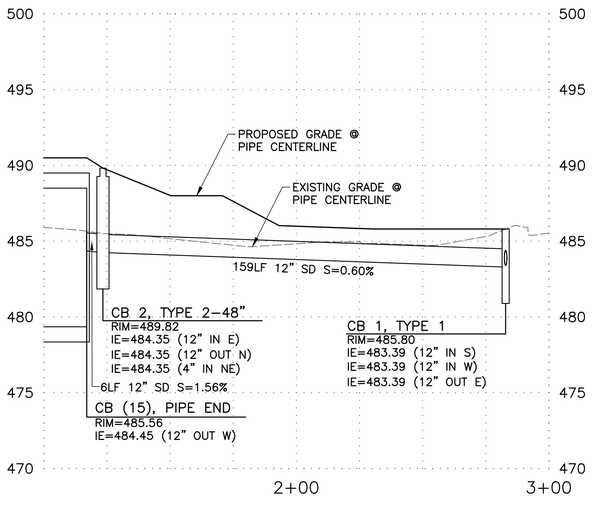
V= 1"=5'




SD02, STA: 1+00 - 3+00

SCALE= H= 1"=30'
V= 1"=5'

VERT. 0 2.5 5 10 Scale In Feet

HORIZ. 0 15 30 60 Scale In Feet

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Approved as submitted.
Gina M. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

| DATE | REVISION | SYM |
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05-04-20

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BELLEVUE, WA 98005
(425)869-1300

CRESTVIEW II
2318 132ND ST SE
MILL CREEK, WA 98012

ROAD & DRAINAGE PROFILES & NOTES

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

| SCALE: AS SHOWN | DATE: 2/3/20 |
|---|---|
| DESIGNED BY: NKJ | CHECKED BY: KJM |

PACE PROJECT NO. 19462

SHEET C5.1


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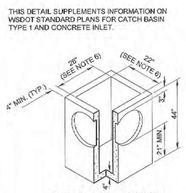
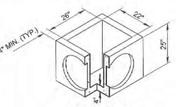
THIS DETAIL SUPPLEMENTS INFORMATION ON WSDOT STANDARD PLANS FOR CATCH BASIN TYPE 1 AND CONCRETE INLET.




PRECAST BASE SECTION

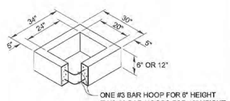
REBAR NOT SHOWN FOR CLARITY.

FRAME AND VANED GRATE




CONCRETE INLET

REBAR NOT SHOWN FOR CLARITY.




6" or 12" CONCRETE RISER

| PIPE ALLOWANCES FOR CATCH BASIN TYPE 1 and CONCRETE INLET | |
|---|---|
| PIPE MATERIAL | MAXIMUM INSIDE DIAMETER |
| REINFORCED OR PLAIN CONCRETE | 12" |
| ALL METAL PIPE | 15" |
| CPSSP-II (STD. SPEC. 9-05.20) | 12" |
| SOLID WALL PVC (STD. SPEC. 9-05.12(1)) | 15" |
| PROFILE WALL PVC (STD. SPEC. 9-05.12(2)) | 15" |

a CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. Base to be constructed and installed in accordance with WSDOT specifications (Section 7-08) for Catch Basin Type I and Concrete Inlet, or as approved by the City Engineer.
2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with WSDOT Standard Specification 9-04.3. All side access into the base shall be through a precast knockout.
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.
4. The frame and grate may be installed with the flange down, or integrally cast into the adjustment section with flange up.
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.
6. The opening shall be measured at the top of the precast base section.
7. All pickup holes shall be grouted full after the basin has been placed.

| CITY OF Mill Creek WASHINGTON | STORM WATER<br>CATCH BASIN TYPE 1 AND CONCRETE INLET<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STM - 1<br>REV. DATE:<br>4/7/2016 |
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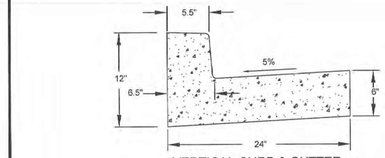
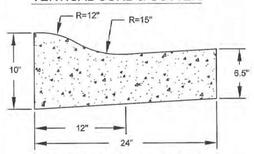



VERTICAL CURB & GUTTER




ROLLED CURB & GUTTER

NOTES:

1. Concrete shall be Class 3000 air-entrained.
2. Base shall be Crushed Surfacing Top Course, per WSDOT sec. 9-03.9(3) with a minumum depth of 4 inch. In-situ native material may be used for a base if approved by the City. Sub-grade compaction shall meet a min. 95% of max. density.
3. Steel forms shall be used on all straight sections. Wood forms shall be used on radius.
4. Full depth expansion joints shall be placed at 10 feet center to center, at the top of each driveway, at top of access ramps, and on both sides of a catch basin. (Joint material shall be min. 3/8" premolded joint material factory cut to the shape of the curb. Strips of joint material shall not be stacked.)
5. Finish shall be broomed with tooled edges. All joints shall be clean.

| CITY OF Mill Creek WASHINGTON | STREET<br>ROLLED AND VERTICAL CURB<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STR-2<br>REV. DATE:<br>4/7/2016 |
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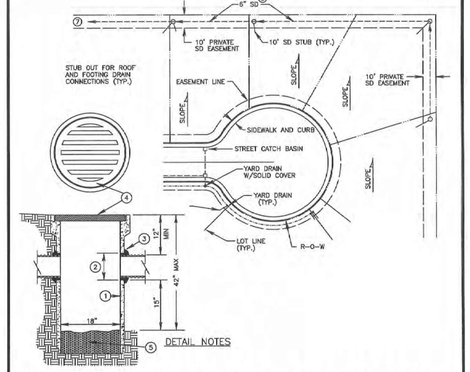


1. YARD DRAINS TO BE CONSTRUCTED FROM CONCRETE PIPE, IN ACCORDANCE WITH ASTM C 14 OR 18" LINED CORRUGATED HDPE (HIGH DENSITY POLYETHYLENE PIPE) ADS N-12 OR APPROVED EQUAL. SPECIAL CAST YARD DRAIN MAY BE REQUIRED FOR MULTIPLE PIPE CONNECTIONS.
2. CUTOUT HOLE SIZE EQUAL TO OUTLET PIPE OUTSIDE DIAMETER PLUS YARD DRAIN WALL THICKNESS FOR CONC. PIPE OR USE INSERTA TEE COMPRESSION FITTING FOR USE WITH PVC DRAIN PIPE CONNECTION.
3. CONNECTION TO OUTLET PIPE TO BE SEALED WITH GROUT AND MADE FLUSH WITH INSIDE OF THE YARD DRAIN WALL FOR CONCRETE PIPE OR COMPRESSION TEE FOR PLASTIC PIPE.
4. CAST IRON BELL GRATE. FITS INSIDE BELL OF CONC. PIPE AND ON THE OUTSIDE OF HDPE PIPE. HDPE PIPE GRATE — OLYMPIC FOUNDARY 10—1800 OR EAST JORDAN IRON WORKS— PRODUCT NO. 601830. CONC. PIPE GRATE— E. JORDAN IRON WORKS PRODUCT NO. 601832. OR APPROVED EQUAL.
5. 6" MIN. DEPTH GRAVEL BACKFILL FOR DRAINS PER WSDOT SEC. 9-03.12(4).
7. CONNECT TO CITY OWNED AND MAINTAINED SD SYSTEM IN THE STREET.
8. IF SERVICE LINE SERVES MORE THAN 4 LOTS, INCREASE SIZE TO 8".

| CITY OF Mill Creek WASHINGTON | STORM WATER<br>YARD DRAIN<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STM - 8<br>REV. DATE:<br>4/7/2016 |
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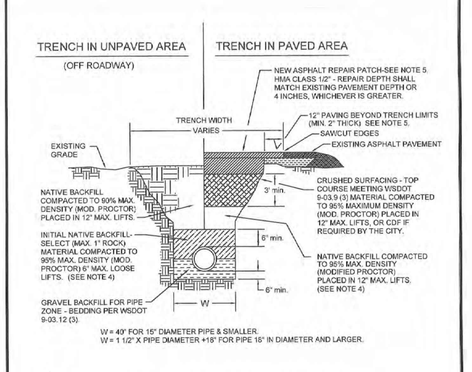


NOTES:

1. EXISTING ASPHALT PAVEMENT MUST BE SAWCUT TO PROVIDE A CLEAN STRAIGHT EDGE BEFORE PIPE PLACEMENT.
2. EXISTING MATERIAL DISTURBED UNDER THE PIPE SHALL BE REPLACED WITH BEDDING MATERIAL AND COMPACTED TO 95% MAX. DENSITY.
3. BACK MATERIAL SHALL BE INSTALLED IN AN APPROVED MANNER TO ENSURE NO DAMAGES TO THE PIPE.
4. IF NATIVE BACKFILL IS DETERMINED UNSATISFACTORY BY THE CITY, USE CRUSHED SURFACING TOP COURSE PER WSDOT 9-03.9 (3)
5. SEE MILL CREEK MUNICIPAL CODE SECTION 12.18.060 FOR PAVEMENT PATCHING STANDARDS.

| CITY OF Mill Creek WASHINGTON | STORM WATER<br>TYPICAL TRENCH DETAIL<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STM - 10<br>REV. DATE:<br>4/7/2016 |
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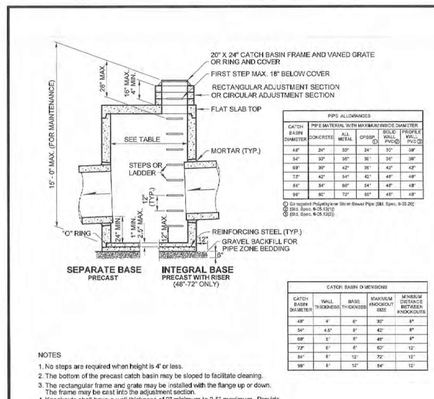


| CATCH BASIN DIAMETER | PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER | | | | |
|---|---|---|---|---|---|
| | CONCRETE | ALL METAL | CPSSP (2) | SOLID WALL PVC (2) | PROFILE WALL PVC (2) |
| 48" | 24" | 30" | 24" | 30" | 36" |
| 54" | 30" | 36" | 30" | 36" | 36" |
| 60" | 30" | 42" | 30" | 42" | 42" |
| 72" | 42" | 54" | 42" | 48" | 48" |
| 84" | 54" | 60" | 54" | 48" | 48" |
| 96" | 60" | 72" | 60" | 48" | 48" |

(2) Or Ingalls Polyethylene Slit-in-Sewer Pipe (Std. Spec. 9-05.20)

| CATCH BASIN DIAMETER | WALL THICKNESS | BASE THICKNESS | MAXIMUM KNOCKOUT SIZE | MINIMUM DISTANCE BETWEEN KNOCKOUTS |
|---|---|---|---|---|
| 48" | 4" | 6" | 30" | 6" |
| 54" | 4.5" | 6" | 42" | 8" |
| 60" | 5" | 6" | 48" | 8" |
| 72" | 6" | 6" | 60" | 10" |
| 84" | 6" | 12" | 72" | 10" |
| 96" | 6" | 12" | 84" | 10" |

NOTES

1. No steps are required when height is 4' or less.
2. The bottom of the precast catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

| CITY OF Mill Creek WASHINGTON | STORM WATER<br>CATCH BASIN TYPE 2<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STM - 2<br>REV. DATE:<br>4/7/2016 |
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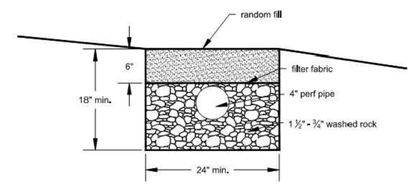
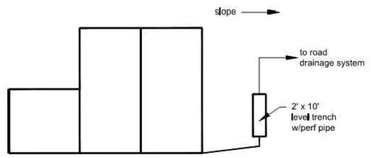



Trench X-Section



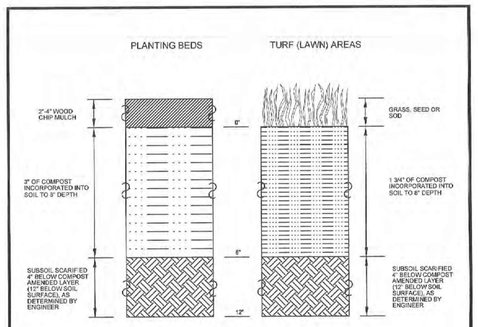

Plan View of Roof

NOT TO SCALE

DEPARTMENT OF ECOLOGY State of Washington

Figure III-3.1.8
Perforated Stub-Out Connection
Revised December 2015






NOTES

1. ALL SOIL AREAS DISTURBED OR COMPACTED DURING CONSTRUCTION, AND NOT COVERED BY BUILDINGS OR PAVEMENT, SHALL BE AMENDED WITH COMPOST AS DESCRIBED BELOW.
2. SUBSOIL SHOULD BE SCARIFIED (LOOSENED) A MINIMUM OF 4 INCHES BELOW AMENDED LAYER (12 INCHES BELOW SOIL SURFACE) WHERE COMPACTED SOIL EXCEEDS 85% DRY DENSITY OR WOULD DAMAGE TREE ROOTS OR AS DETERMINED BY THE ENGINEER.
3. COMPOST SHALL BE TILLED IN TO 6 INCH DEPTH INTO EXISTING SOIL OR PLACE 9 INCHES OF COMPOST-AMENDED SOIL, PER SOIL SPECIFICATIONS.
4. TURF AREAS SHALL RECEIVE 1.75 INCHES OF COMPOST TILLED IN TO 6 INCH DEPTH, OR MAY SUBSTITUTE 6 INCHES OF IMPORTED SOIL CONTAINING 30-33% COMPOST BY VOLUME. PLANT GRASS SEED OR SOD PER SPECIFICATION.
5. PLANTING BEDS SHALL RECEIVE 3 INCHES OF COMPOST TILLED IN TO 8 INCH DEPTH, OR MAY SUBSTITUTE 8 INCH OF IMPORTED SOIL CONTAINING 35-40% COMPOST BY VOLUME. MULCH AFTER PLANTING, WITH 2-4 INCHES OF ARBORIST WOOD CHIP MULCH OR APPROVED EQUAL.
6. SETBACKS: TO PREVENT UNEVEN SETTLING, DO NOT COMPOST- AMEND SOIL WITHIN 5 FEET OF UTILITY INFRASTRUCTURES (POLES, VAULTS, METERS ETC.). WITHIN ONE FOOT OF PAVEMENT EDGE, CURBS AND SIDEWALKS, SOIL SHOULD BE COMPACTED TO APPROXIMATELY 90% PROCTOR TO ENSURE A FIRM SURFACE.

| CITY OF Mill Creek WASHINGTON | LANDSCAPE<br>SOIL AMENDMENT AND DEPTH<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>LND-4<br>REV. DATE:<br>4/7/2016 |
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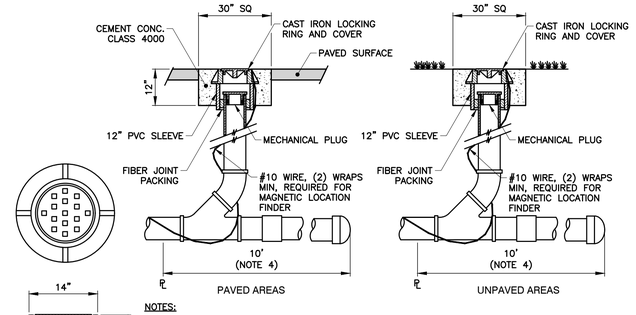


NOTES:

1. CLEANOUT PIPE AND FITTINGS SHALL BE PVC.
2. A SANITARY TEE OR SWEEP MAY BE INSTALLED IN LIEU OF A WYE AS SHOWN. STRAIGHT TEES ARE NOT ACCEPTABLE.
3. FOR NEW PLATS THE VERTICAL RISER PORTION OF THE CLEANOUT WILL BE CONSTRUCTED AT TIME OF CONNECTION TO BUILDING TO MINIMIZE DAMAGE, THE 6" WYE AND 6" PVC PIPE WITH GASKETED CAPS WILL BE INSTALLED PRIOR TO BUILDING CONNECTION.
4. SEWER STUB WILL BE EXTENDED 10' BEYOND PROPERTY LINE TO PREVENT DAMAGE TO CLEANOUT AND MINIMIZE CONFLICTS WITH OTHER UTILITIES WHEN SERVICE TO BUILDING IS ACCOMPLISHED.

1 CLEAN OUT DETAIL
NOT TO SCALE

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

Approved as submitted.
Gina N. Hortillosa
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

| DATE | REVISION | SYM |
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CRESTVIEW II
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MILL CREEK, WA 98012

DRAINAGE DETAILS

VERIFY SCALE
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

| SCALE: | DATE: |
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| AS SHOWN | 2/3/20 |
| DESIGNED BY: NKJ | CHECKED BY: KJM |

PACE PROJECT NO. 19462

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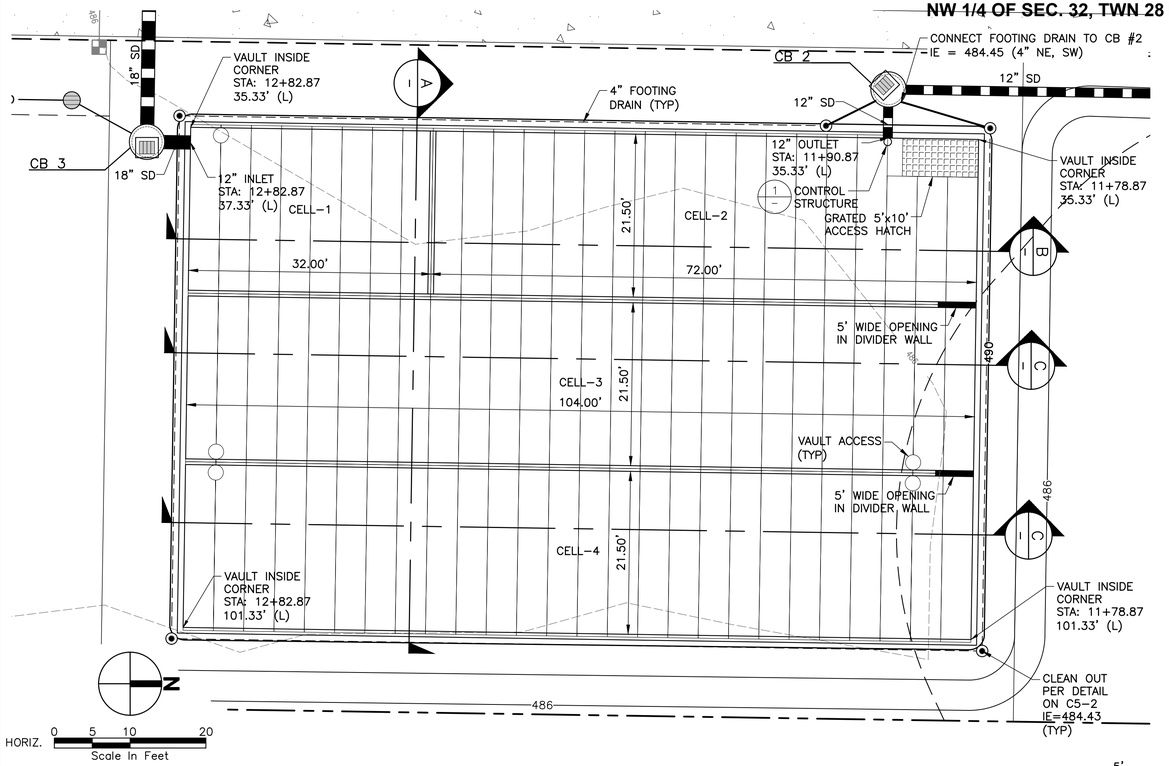
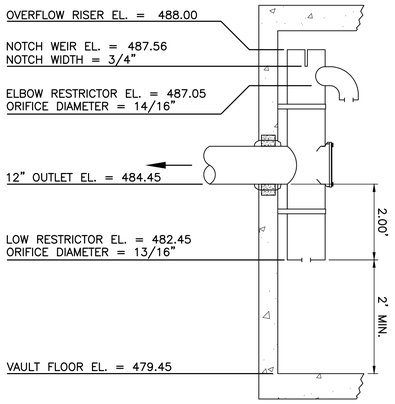
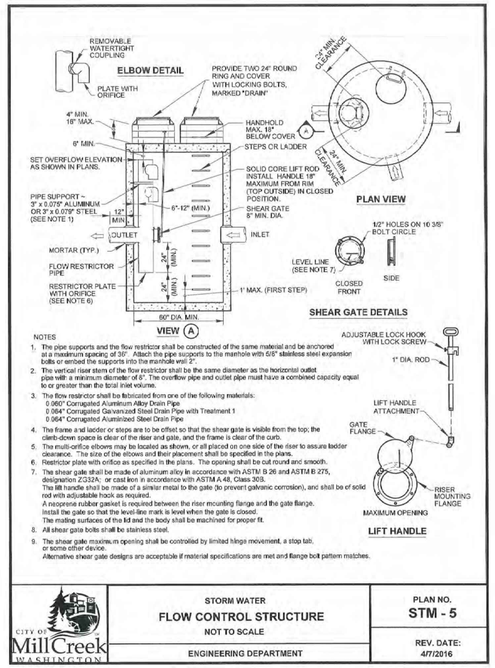


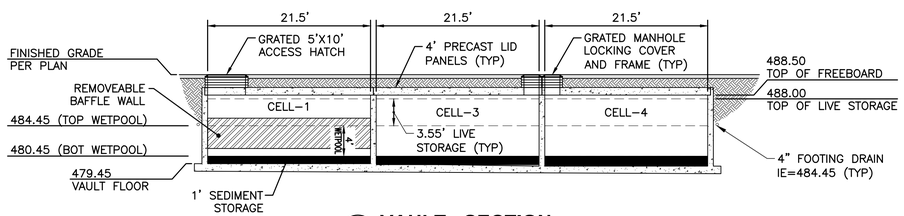




## 1 CONTROL RISER DIMENSIONS
1"=2'

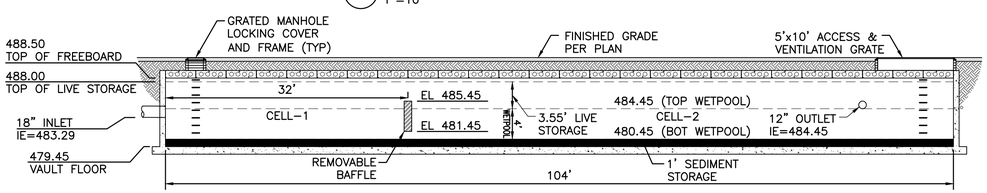



NOTES
1. The pipe supports and the flow restrictor shall be constructed of the same material and be anchored at a maximum spacing of 36". Attach the pipe supports to the manhole with 5/8" stainless steel expansion bolts or embed the supports into the manhole wall 2".
2. The vertical riser stem of the flow restrictor shall be the same diameter as the horizontal outlet pipe with a minimum diameter of 6". The overflow pipe and outlet pipe must have a combined capacity equal to or greater than the total inlet volume.
3. The flow restrictor shall be fabricated from one of the following materials:
   0.060" Corrugated Aluminum Alloy Drain Pipe
   0.064" Corrugated Galvanized Steel Drain Pipe with Treatment 1
   0.064" Corrugated Aluminized Steel Drain Pipe
4. The frame a nd ladder or steps are to be offset so that the shear gate is visible from the top; the climb-down space is clear of the riser and gate, and the frame is clear of the curb.
5. The multi-orifice elbows may be located as shown, or all placed on one side of the riser to assure ladder clearance. The size of the elbows and their placement shall be specified in the plans.
6. Restrictor plate with orifice as specified in the plans. The opening shall be cut round and smooth.
7. The shear gate shall be made of aluminum alloy in accordance with ASTM B 26 and ASTM B 275, designation Z33A, or cast iron in accordance with ASTM A 48, Class 30B.
   The lift handle shall be made of a similar metal to the gate (to prevent galvanic corrosion), and shall be of solid rod with adjustable hook as required.
   A neoprene rubber gasket is required between the riser mounting flange and the gate flange.
   Install the gate so that the level-line mark is level when the gate is closed.
   The mating surfaces of the lid and the body shall be machined for proper fit.
8. All shear gate bolts shall be stainless steel.
9. The shear gate maximum opening shall be controlled by limited hinge movement, a stop tab, or some other device.
   Alternative shear gate designs are acceptable if material specifications are met and flange bolt pattern matches.

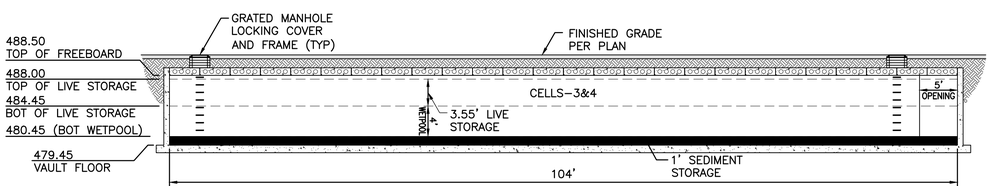
| CITY OF MILL CREEK WASHINGTON | STORM WATER<br>FLOW CONTROL STRUCTURE<br>NOT TO SCALE<br>ENGINEERING DEPARTMENT | PLAN NO.<br>STM - 5<br>REV. DATE:<br>4/7/2016 |
|---|---|---|




## A VAULT - SECTION
1"=10'




## B CELL 1 & 2 - SECTION
1"=10'




## C CELL 3 & 4 - SECTION
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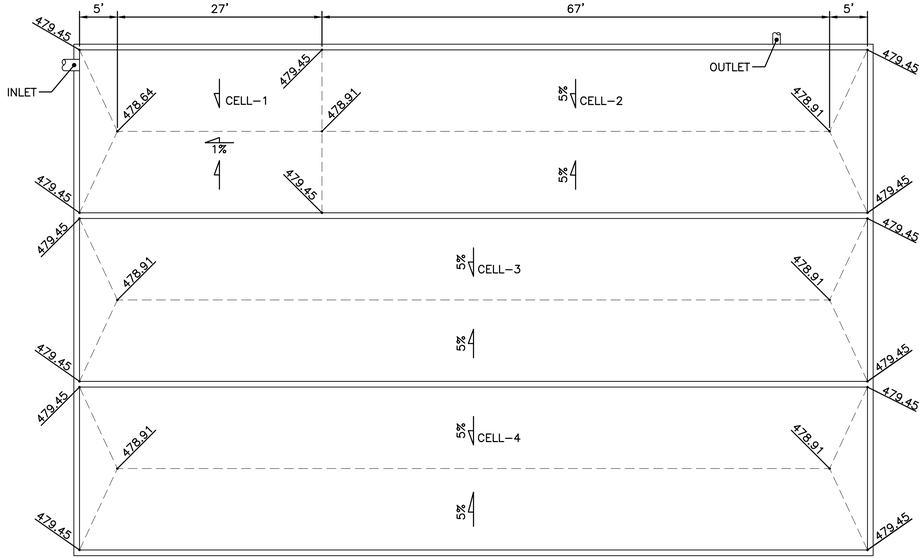


## D VAULT FLOOR ELEVATIONS
1"=10'

Approved as submitted.
Gina Hortillosa, PE
Director of Public Works & Development Services
05/05/2020

| DATE | REVISION | SYM |
|---|---|---|

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KENNETH J. McINTYRE STATE OF WASHINGTON 39018 REGISTERED PROFESSIONAL ENGINEER
05-04-20

CRESTVIEW II, LLC
15 LAKE BELLEVUE DRIVE #102
BELLEVUE, WA 98005
(425)869-1300

CRESTVIEW II
2318 132ND ST SE
MILL CREEK, WA 98012

DETENTION PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

| SCALE: AS SHOWN | DATE: 2/3/20 |
|---|---|
| DESIGNED BY: NKJ | CHECKED BY: KJM |
| PACE PROJECT NO. 19462 | |

SHEET C5.3

FILE NAME: P:\P\19462 CRESTVIEW II\CAD\ENGINEERING SHEETS\CONSTRUCTION DOCS\P19462_VAULT.DWG
SAVE TIME: 2/28/2020 10:01:24 PM
PLOT TIME: 5/4/2020 11:25:39 AM
USER NAME: KEN McINTYRE
XREF FILES: X19462_BASE.dwg X19462_FC.dwg X19462_HATCH.dwg X19462_SITE.dwg X19462_SD.dwg X19462_STMP_KJM.dwg X19462_WK.dwg X19462_SS.dwg

Approved as submitted.

Gina Hortillosa, PE
Director of Public Works & Development Services
**05/05/2020**

# *Crestview Village II*

# *Drainage Report*

Prepared For:

**Crestview II, LLC**
15 Lake Bellevue Dr., #102
Bellevue, WA 98005

January 13, 2020
Revised: February 14, 2020

*Prepared By:*

PACE Engineers, Inc.
1724 W. Marine View Dr.
#140
Everett, WA 98201
p. 425.486.6533

# *CRESTVIEW VILLAGE II*

# *DRAINAGE REPORT*

Prepared For:

Crestview II, LLC
15 Lake Bellevue Dr. #102
Bellevue, WA  98005

**January 13, 2020**
**Revised: February 14, 2020**

**Prepared By:**

Ken McIntyre, PE
PACE Engineers, Inc.
1724 W. Marine View Dr, #140
Kirkland, WA  98033-3417
p.  425.486.6533

PACE Project No. 19462

# PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers, Inc., under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.


02-14-20

PACE Engineers, Inc.
1724 W. Marine View Dr. #140
Everett, WA 98201
Phone: 425.486.6533
www.paceengrs.com

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## LIST OF FIGURES



## APPENDICES

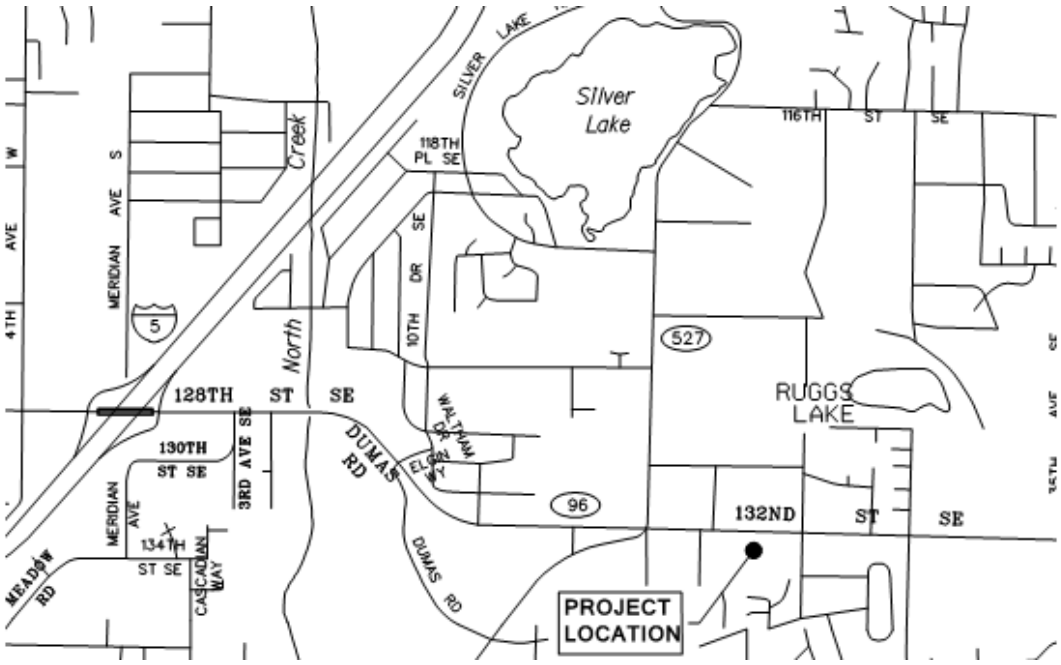
## 1. PROJECT OVERVIEW

Crestview Village II proposes the subdivision of three existing parcels into 25 single-family residential lots, along with the associated roadways and utilities. The project site is located within the NW ¼ of Section 32, Township 28 North, Range 5 East, W.M. More specifically, the project is located within the City of Mill Creek, occupying the Snohomish County Tax Parcels listed below:

**Table 1: Property Summary**

| Snohomish County Tax Lot # | Size |
|---|---|
| 28053200201000 | 1.04 acres |
| 28053200202300 | 0.51 acres |
| 28053200200800 | 1.68 acres |

The project site has frontage on 132nd St. SE, which is classified as a state highway. Full frontage improvements currently exist along the entire frontage, and access to the site will be via a road connection that currently serves a neighboring parcel which was recently developed.




PACE

**Figure 1: Vicinity Map**

The NRCS web soil survey identifies the underlying soil unit as a “till” variety of soil. This type of soil is often referred to as “hardpan”, and typically does not support infiltration of surface runoff as a stormwater management technique. With that in mind, the project is proposing a conventional stormwater detention system. The project site is located within a single drainage basin, which generally falls to the north.

The project is located within the City of Mill Creek’s “MDR” (Medium Density Residential) zone, and is subject to the provisions of the Mill Creek Municipal Code. The City has adopted the 2014 edition of the WA State Dept. of Ecology’s Stormwater Management Manual for Western Washington (SWMMM) for stormwater regulations. A discussion of the minimum stormwater management requirements from that manual is provided in the following section of this report, and the remainder of the report provides supporting information to demonstrate how those minimum requirements are met.

# 2. MINIMUM REQUIREMENTS

The project is a new development which proposes more than 5,000 sq.ft. of new/replaced hard surface area, and therefore is required to satisfy all nine of the minimum requirements stipulated by the SWMWW.

## 2.1 MINIMUM REQUIREMENT #1: PREPARATION OF STORMWATER SITE PLANS

This report, along with the accompanying plans are intended to satisfy the stormwater site plan requirements. This requirement includes research of applicable site information, evaluation of any upstream tributary drainage basins and the downstream flowpath. These items are addressed in Chapter 3 of this report.

## 2.2 MINIMUM REQUIREMENT #2: CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A temporary erosion & sediment control plan is provided with the drawings, and a separate SWPPP report is also provided. A brief stormwater pollution prevention discussion is provided in Section 4 of this report.

## 2.3 MINIMUM REQUIREMENT #3: SOURCE CONTROL OF POLLUTION

The project is not a high-use site and is not expected to have significant point-sources of pollution requiring source control methods.

## 2.4 MINIMUM REQUIREMENT #4: PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

The topography of the site generally falls to the north-northeast, and the project is ultimately tributary to the public drainage system within the 132nd St SE right-of-way. The project intends to maintain this flowpath. A more detailed discussion is provided in Section 6 of this report.

## 2.5 MINIMUM REQUIREMENT #5: ONSITE STORMWATER MANAGEMENT

The project is required to either meet the low-impact flow control standard, or evaluate a series of low-impact stormwater management features, as outlined in the SWMMWW. This project is electing to evaluate the low-impact stormwater management features, and that evaluation is provided in Section 7 of this report.

## 2.6 MINIMUM REQUIREMENT #6: RUNOFF TREATMENT

The project is subject to "basic" treatment requirements, as outlined in the SWMMWW. A more detailed discussion of stormwater treatment is provided in Section 8 of this report.

## 2.7 MINIMUM REQUIREMENT #7: FLOW CONTROL

The project is subject to the flow control requirements outlined in the SWMMWW. A detailed discussion of the proposed flow control measures is provided in Section 9 of this report.

## 2.8 MINIMUM REQUIREMENT #8: WETLANDS PROTECTION

The SWMMWW requests an evaluation of wetland hydrology to minimize the effects of urbanization. A critical areas study and mitigation plan is provided separate from this document, which discusses the likely history of this particular wetland and the measures being taken to mitigate disturbance proposed within the existing wetland buffer areas. Wetland protection is also discussed in further detail in Section 10 of this report.

## 2.9 MINIMUM REQUIREMENT #9: OPERATIONS AND MAINTENANCE

General operations and maintenance recommendations are provided in Section 11 of this report.

# 3. PREPARATION OF STORMWATER SITE PLANS

This section of the report is intended to address Minimum Requirement #1, as outlined in the SWMMWW.

## 3.1 RESOURCE REVIEW SUMMARY

The NRCS Web Soil Survey classifies the underlying soil at the project site as Alderwood-Urban Land Complex. Alderwood soils are generally described as a glacially consolidated till, with a hardpan layer. Urban Land Complex describes soil that has been previously disturbed and compacted during previous urban land development activity. Both soil types are typically considered to have moderate runoff rates with little capacity for infiltration.

The Federal Emergency Management Agency (FEMA) identifies the project site on Flood Insurance Rate Map (FIRM) panel #53061C1040F, and is not shown to be in a flood hazard area. A FEMA map has been provided in **Appendix A** of this report for reference.

A critical areas study was prepared for the site by Soundview Consultants and issued in February, 2019. The critical areas study provides mitigation recommendations for the onsite wetland and is submitted separately from this report.

The WA State Dept. of Ecology's Water Quality Assessment map was consulted to determine if the project may contribute to a 303(d) assessed waterway. There are no 303(d) -listed waterways in the ¼-mile downstream flowpath required to be evaluated for the project. The project site is ultimately tributary to Penny Creek, which lies roughly ¾-mile to the east. The Water Quality Atlas indicates that Penny Creek is a fresh water body with existing aquatic life uses, but not assessed as a 303(d) waterway requiring special mitigation measures. A print from the Water Quality Assessment map is provided in **Appendix A** of this report.

## 3.2 UPSTREAM BASIN ANALYSIS

The project site is bounded on the north by 132nd St SE. A public storm drainage network within the right-of-way conveys runoff from the north away from the site. The site is bounded on the west, south, and southeast by existing residential developments which are expected to collect and convey runoff away from the project site. The site is bounded on the northeast by a small green-belt that lies lower than the project site. Considering the site conditions surrounding the project site, it does not appear that there is any upstream flow tributary to the site.

## 3.3 DOWNSTREAM FLOWPATH ANALYSIS

A downstream investigation of the site was conducted on June 19, 2019. The conditions at the time of the visit were moderate and clear, with some rainfall having occurred the previous day. No surface runoff was observed onsite or in the downstream flowpath during the investigation.

The existing topography of the site falls gently toward the northeast corner of the site. Runoff from the site is currently collected and routed to the public storm drainage system

within the 132nd St SE right-of-way. The project intends to maintain this flowpath, providing a storm drainage connection directly to the existing 132nd St. storm drainage system.

The storm drainage system within the 132nd St. SE right-of-way is conveyed easterly through a closed pipe network for a distance exceeding the ¼-mile analysis distance. A Snohomish County Drainage Inventory map is provided in Appendix B of this report, showing the downstream flowpath from the site.

The entire downstream investigation area is contained within a closed pipe network within an arterial/collector right-of-way, so safe access to the structures was limited, and only surface-visible features could be observed. No significant issues were identified during the limited downstream investigation that could be conducted.

# 4. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A formal stormwater pollution prevention plan (SWPPP) report is submitted under separate cover but the discussion below is intended to provide a brief discussion of how the 13 required SWPPP elements addressed.

## 4.1 ELEMENT 1 – PRESERVE VEGETATION/MARK CLEARING LIMITS

The project will identify the intended clearing limits and mark them in the field with high-visibility construction fencing or silt-fencing. Critical areas and buffers will also be clearly identified in the field, and the project will retain and stockpile the duff-layer, and replace it on the completed site to the greatest practical extent.

## 4.2 ELEMENT 2 – ESTABLISH CONSTRUCTION ACCESS

A rock-stabilized construction access will be provided at the entrance to the site. Sediment that is tracked off-site shall be swept at the end of each day, or as determined necessary by the project's erosion/sediment control lead.

## 4.3 ELEMENT 3 – CONTROL FLOW RATES

A temporary sediment pond will be constructed for the project, and site runoff will be routed to that facility until the permanent stormwater management facility is constructed. The calculations for the sizing of the temporary sediment pond are shown below:

Q (10 Yr Flow) = 1.21 cfs (From WWHM Flood Unmitiaged)

SA (Surface Area) = 2080*Q

SA =2516.8 Sq. Ft. (Min. Surface Area of Temp Pond)

The MGS Flood model is located in Appendix D.

## 4.4 ELEMENT 4 – INSTALL SEDIMENT CONTROLS

Sediment control is expected to be provided via a temporary sedimentation pond near the entrance of the site. A series of interceptor trenches will be proposed to route site runoff to this facility. Perimeter silt-fencing will also be installed on the downhill portions of the site, and adjacent to the existing wetland.

## 4.5 ELEMENT 5 – STABILIZE SOILS

Exposed soils which are expected to remain unworked for an extended period will be stabilized with mulch, seed, or other measures. Soil stockpiles are expected to be covered with plastic or will implement other sediment-trapping measures.

## 4.6 ELEMENT 6 – PROTECT SLOPES

The project is not expected to construct or expose any steep slopes, so no slope-protection is expected to be warranted.

## 4.7 ELEMENT 7 – PROTECT DRAIN INLETS

Catch basin inlet protection devices will be placed in all nearby downstream catch basins. These will be identified in the TESC plan of the final engineering drawings.

## 4.8 ELEMENT 8 – STABILIZE CHANNELS & OUTLETS

All temporary channels proposed for the project shall be stabilized with rock or vegetation if signs of erosion are observed by the project's erosion/sediment control lead. There are not free-outlets proposed that warrant stabilization measures.

## 4.9 ELEMENT 9 – CONTROL POLLUTANTS

The project is relatively small and is not expected to store contaminants on-site for an extended period of time. Any contaminants that are stored on-site should be protected from vandalism or theft. Maintenance, fueling, and repair of construction equipment should be conducted off-site to the greatest possible extent. A concrete washout area shall be provided to keep concrete wash-water from entering the public storm drainage system.

## 4.10 ELEMENT 10 – CONTROL DE-WATERING

No significant de-watering is expected to be needed on this project.

## 4.11 ELEMENT 11 – MAINTAIN BMPS

The project shall identify personnel to serve as an erosion/sediment control lead, who can monitor all BMPs at the site and recommend revisions and new BMPs as needed.

## 4.12 ELEMENT 12 – MANAGE THE PROJECT

The project shall identify personnel to serve as an erosion/sediment control lead, who can monitor site conditions & BMP performance, and recommend revisions as site conditions change.

## 4.13 ELEMENT 13 – PROTECT LOW-IMPACT DEVELOPMENT BMPS

The project does not appear to be well-suited to the implementation of low-impact BMPs. This element is primarily intended to protect areas where infiltration-based BMPs from compaction during construction activities. Due to the underlying soil conditions, no infiltration-based BMPs are proposed on this project.

## 5. SOURCE CONTROL OF POLLUTION

The project is not an industrial or high-use site, and no significant point-sources of pollution are expected to be present. No specific structural source-control measures are proposed.

## 6. PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

The topography of the site generally falls to the north-northeast. Runoff collects in a small existing wetland area which appears to have been created as a result of the frontage grade having been raised during the original construction of 132nd St SE. The wetland area appears to be drained by a small ditch which is tributary to the public drainage system in 132nd St. SE. The project intends to connect the proposed storm drainage system to the public drainage system in 132nd St. SE, in order to maintain the current downstream flowpath.

# 7. ON-SITE STORMWATER MANAGEMENT

## 7.1 SITE HYDROLOGY

### 7.1.1 Existing Hydrologic Conditions

The site is currently occupied by a couple of homes and detached out-buildings. All existing buildings and driveways are expected to be removed as part of the project.

The underlying topography of the site falls gently to the north. Based on field-observation and historical testimony provided in the critical areas study, it appears that the fronting road (132nd St SE) was raised at some point in the past, which has resulted in the impoundment of water near the northeast corner of the site, creating a small wetland area. A small ditch currently drains this area and discharges it to the public storm drainage network in the 132nd St SE right-of-way.

Once runoff reaches the public storm drainage system, it is conveyed easterly toward Penny Creek. A basin map depicting the existing site conditions is provided in **Appendix C**.

### 7.1.2 Developed Hydrologic Conditions

The project is proposing the construction of an internal roadway and a number of new residential lots. A stormwater conveyance network will be provided beneath the interior roadway to collect and convey the roadway runoff. Roof/footing drains will be provided for each individual lot, which will also tie-in to the roadway drainage network. Project drainage will generally be routed to an underground stormwater management facility prior to release from the site. A small portion of roadway at the north end of the site lies too low to be collected and routed to the proposed facility, so it will be considered as bypass flow in the stormwater model. A basin map depicting the developed site conditions is provided in **Appendix C**.

There is a small area immediately west of the existing wetland which will be utilized as an open-space area. This area lies at an elevation that is too low to be reasonably collected and conveyed to the proposed detention facility. There is an existing building at this location which will be removed as part of the development. This area would typically need to be considered as bypass flow, but since the building will be replaced with landscaping, it is expected to reduce the runoff response from this area. With that in mind, the project proposes to consider this area to already be mitigated. This area will also continue to drain to the on-site wetland area, in order to maintain some surface recharge. Routing this runoff through the wetland is expected to provide a small level of attenuation, further mitigating the effects downstream.

### 7.1.3 Hydrologic Modeling

Hydrologic modeling was performed for the project, in order to design the proposed detention and treatment facility. Hydrologic modeling was performed using WWHM2012, which is a continuous-runoff simulation model approved for use by the WA State Dept. of Ecology. The calculations demonstrate that the

project is in compliance with the applicable flow-control regulations, and also calculates the appropriate water quality design parameters.

Hydrologic modeling calculations are provided in Appendix D of this report. Input parameters for the hydrologic model are summarized on the basin maps provided in **Appendix C**.

## 7.2 LOW IMPACT DEVELOPMENT

The proposed project occupies less than 5-acres and is located within the urban growth area. The project is also required to satisfy all nine minimum requirements outlined in the SWMMWW. Therefore, the project is required to either meet the Low Impact Development Performance Standard, or evaluate the low-impact stormwater BMPs contained within List 2. The SWMMWW outlines the Low Impact Development Performance Standard and BMP lists in detail.

This project is electing to evaluate the low-impact BMP options contained within List #2. Minimum Requirement #5 requires evaluation of those BMP options, and implementation to the greatest feasible extent. The required evaluation is provided below:

| **Roofs** | |
|---|---|
| Full Dispersion (BMP T5.30) | Not Feasible – Most of the project was previously cleared of native vegetation, and there are no suitable dispersal flowpaths meeting the applicable requirements. |
| Biretention (Vol. 5, Ch. 7) | Not Feasible – The geotechnical report identifies the underlying soil as being a till variety of soil that is not likely to be conducive to infiltration. Section 4.4 of the geotechnical report encountered groundwater as shallow as 5.2-ft below the existing ground surface during the dry season, which would not provide the required 3-ft of separation from a large bioretention facility. The report also suggests that groundwater may become perched during winter months with depths as shallow as 2-ft. This would not provide the required separation for small bioretention facilities on each individual lot. |
| Downspout Dispersion (BMP T5.10B) | Not Feasible – Most of the project was previously cleared of native vegetation, and there are no suitable dispersal flowpaths meeting the applicable requirements. |
| Perforated Stub-out Connections (BMP T5.10C) | Feasible – Perforated stub-out connections will be specified on the final design plans for the project. |

| Other Hard Surfaces | |
|---|---|
| Full Dispersion (BMP T5.30) | Not Feasible – Most of the project was previously cleared of native vegetation, and there are no suitable dispersal flowpaths meeting the applicable requirements. |
| Permeable Pavement (BMP T5.15) | Not Feasible – The underlying soil conditions are not conducive to infiltration and permeable pavements would require an underdrain system to keep from becoming inundated with water. There is no significant flow control benefit to permeable pavement containing underdrain systems. |
| Bioretention (Vol. 5, Ch. 7) | Not Feasible – The geotechnical report identifies the underlying soil as being a till variety of soil that is not likely to be conducive to infiltration. Section 4.4 of the geotechnical report encountered groundwater as shallow as 5.2-ft below the existing ground surface during the dry season, which would not provide the required 3-ft of separation from a large bioretention facility. The report also suggests that groundwater may become perched during winter months with depths as shallow as 2-ft. This would not provide the required separation for small bioretention facilities on each individual lot. |
| Flow Dispersion (BMPs T5.11 / T5.12) | Not Feasible – Most of the project was previously cleared of native vegetation, and there are no suitable dispersal flowpaths meeting the applicable requirements. |

| Lawn & Landscape Areas | |
|---|---|
| Post-Construction Soil Quality & Depth (BMP T5.13) | Feasible – The project intends to strip the duff layer, stockpile it, and re-use it on the completed site. |

## 8. RUNOFF TREATMENT

Volume V, Chapter 2 of the SWMMWW provides a step-by-step selection process for determining the required level of treatment for the project site. That step-by-step process is provided below:

- Step 1 – Determine the receiving waters and pollutants of concern

  The project site is ultimately tributary to Penny Creek. There does not appear to be a specific basin plan or TMDL clean-up plan for Penny Creek, and the WA State Dept. of Ecology does not identify a 303(d) or 305(b) assessment for Penny Creek.

- Step 2 – Determine if an oil control facility/device is required

  Oil control is required when a site has "high-use" characteristics, such as a commercial/industrial area, heavy vehicle storage, or arterial roadways with a high traffic count. This project does not meet the high-use criteria, so oil control is not required.

- Step 3 – Determine if infiltration for pollutant removal is practicable

  The project is underlain by till soils which are not expected to be conducive to infiltration, and the geotechnical report indicates a likelihood of a shallow perched groundwater layer during the winter months, so infiltration is not expected to be practical at this site.

- Step 4 – Determine if control of phosphorus is required

  The project is ultimately tributary to Penny Creek. The WA State Dept. of Ecology does not identify a 305(b) or 319(a) designation for Penny Creek for nutrients or phosphorus control.

- Step 5 – Determine if enhanced treatment is required

  Step 5 provides several criteria where enhanced treatment is typically required, but specifically exempts projects which qualify for basic treatment under Step 6. This project qualifies for basic treatment under Step 6 (see below).

- Step 6 – Select a basic treatment facility

  Step 6 indicates that basic treatment is required for "Residential projects not otherwise needing phosphorus control in Step 4 as designated by USEPA, Ecology, or a local government". Since this is a single-family residential project which does not require phosphorus control, the project is subject to "basic" treatment, and is exempt from the "enhanced" treatment requirement specified in Step 5.

Subject to the evaluation above, the project will implement a water quality facility from the basic treatment menu. The goal of basic water quality treatment is primarily to remove suspended sediment from the runoff prior to discharging the site. This will be achieved on this project

through the use of permanent wetpool storage in the lower portion of the underground stormwater management facility.

Wetpool storage consists of a permanent pool of water, which provides sufficient residence time for suspended sediment to settle to the bottom of the facility. The facility is periodically cleaned-out to remove the sediment accumulations. Wetpool storage sizing calculations are included in the hydrologic modeling calculations provided in **Appendix D**.

## 9. FLOW CONTROL

The project is required to satisfy the flow control requirement outlined in Minimum Requirement #7 of the SWMMWW. This involves evaluating the site using a continuous runoff simulation model, and verifying that the developed discharge durations match the historic discharge durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. For this analysis, the historic runoff conditions should be assumed to have a forested land cover.

Existing and developed basin maps are provided in **Appendix C**, which tabulate the historic and anticipated land cover conditions. Those tabulated values are used as input for the hydrologic model provided in **Appendix D**. The calculations demonstrate that the flow control requirement is met with the installation of an underground stormwater detention vault.

## 10. WETLANDS PROTECTION

A critical areas assessment report has been prepared for the project, and the on-site wetland appears to have been artificially created through the impoundment of water resulting from the construction of 132nd St SE. With this in mind, the existing wetland likely did not exist historically. The critical areas report includes a mitigation plan to manage encroachments into the existing wetland buffer.

Minimum Requirement #8 in the SWMMWW provides guide-sheets with recommendations for maintaining a suitable hydrologic response within the wetland areas. However, the discussion in the guide-sheets indicates that the stormwater modeling methods currently available are not suitable for modeling of most types of wetland areas. The guide-sheets also provide recommendations for maintaining the hydroperiod in the wetland areas. However, the recommendations are typically in conflict with the flow control requirement (Minimum Requirement #5). For example, when runoff is restricted by an onsite flow control facility prior to discharge into the wetland area, it does not provide sufficient flow into the wetland area to meet the hydroperiod recommendations outlined in the guide-sheets. Conversely, if a portion of the site is allowed to discharge to the wetland undetained, the hydroperiod recommendations may be met, but the flow-control requirement will not be met.

Given that the on-site wetland essentially consists of a small, artificial closed-depression, the project is proposing to simply utilize the mitigation measures recommended in the critical areas report. Since very little infiltration of runoff is expected, rainfall that enters the wetland will likely remain perched in the wetland area until it evaporates or reaches the existing discharge route, so the effective hydrology of the wetland is not expected to be substantially altered. There is also a small open space area which will be allowed to discharge to the wetland, in order to maintain a small amount of surface recharge to the wetland.

## 11. OPERATIONS & MAINTENANCE

Operations & maintenance recommendations are included in Appendix F.

# APPENDIX A
## Resource Review Documents

# National Flood Hazard Layer FIRMette

FEMA


## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

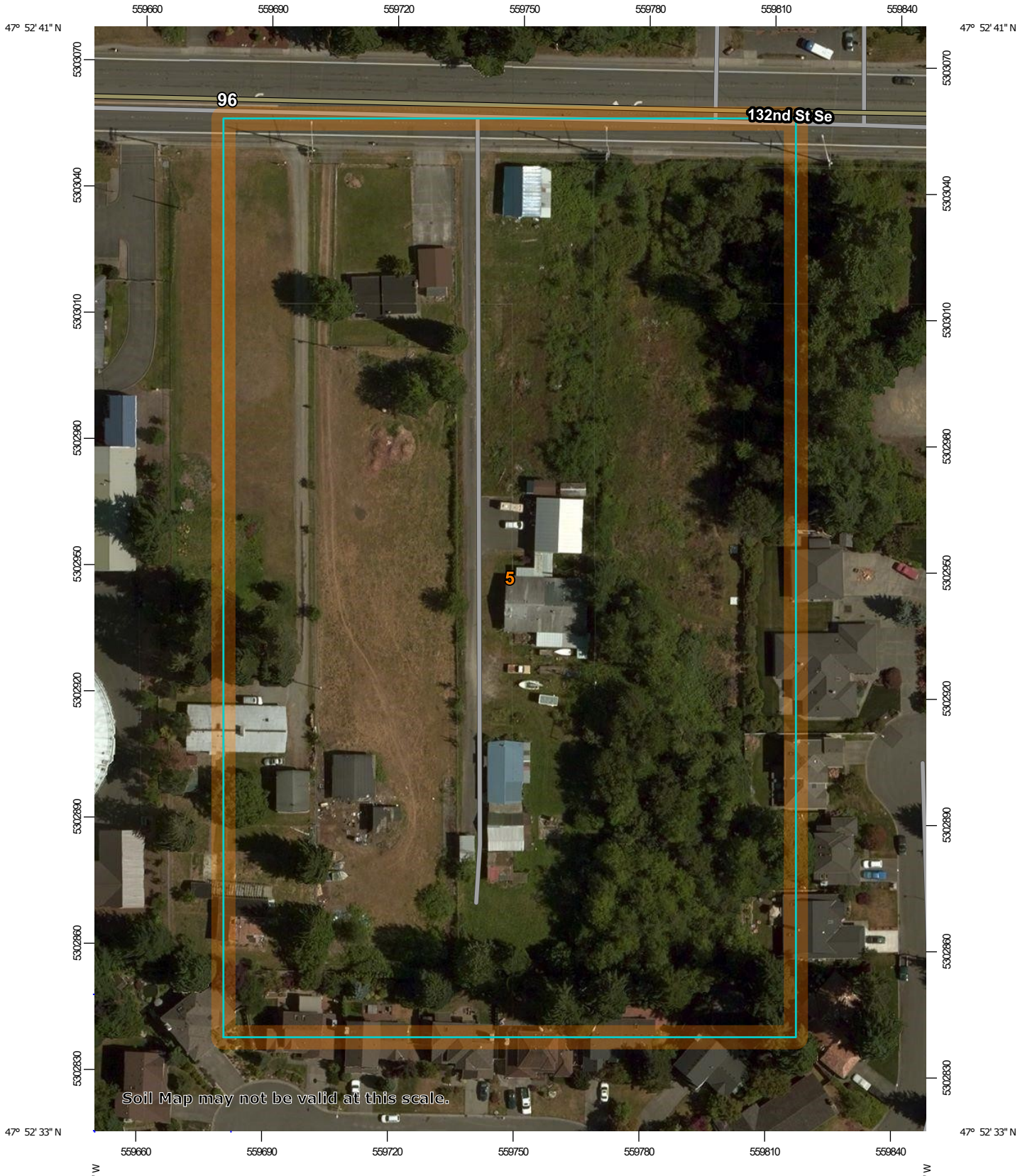
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/19/2019 at 11:46:10 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Soil Map—Snohomish County Area, Washington
(Crestview Village II)




Map Scale: 1:1,280 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Snohomish County Area, Washington
Survey Area Data: Version 20, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 7, 2014—Jul 8, 2014

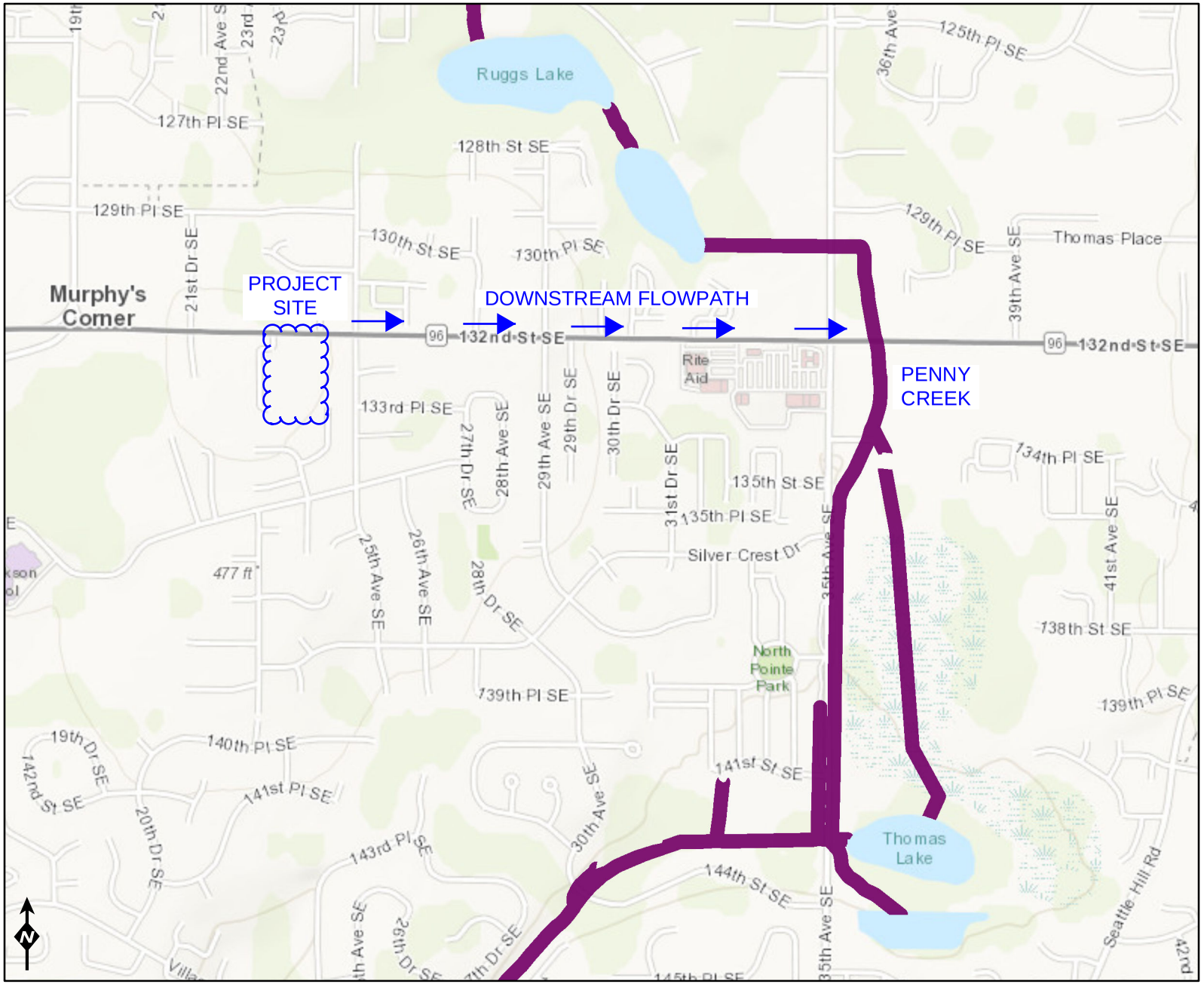
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 5 | Alderwood-Urban land complex, 2 to 8 percent slopes | 7.4 | 100.0% |
| **Totals for Area of Interest** | | **7.4** | **100.0%** |

September 17, 2019

# Crestview II




Map Source:
WA State Dept. of Ecology
Water Quality Atlas

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

Miles
0 0.125 0.25 0.5

DEPARTMENT OF ECOLOGY
State of Washington

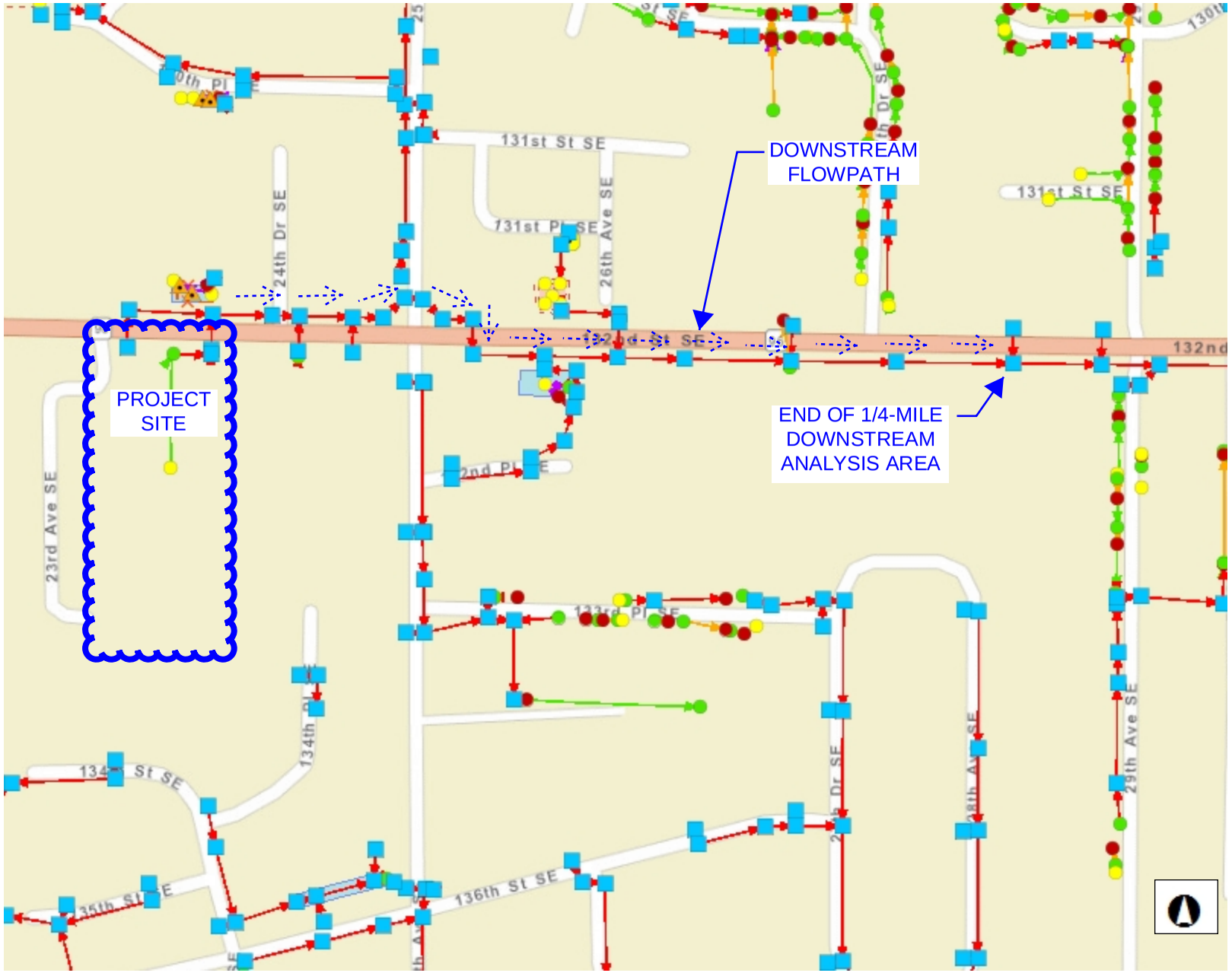
# APPENDIX B
## Downstream Flowpath Map

Snohomish County
Public Works

# Snohomish County Drainage Inventory Online Mapping Tool

## Surface Water Management

9/17/2019



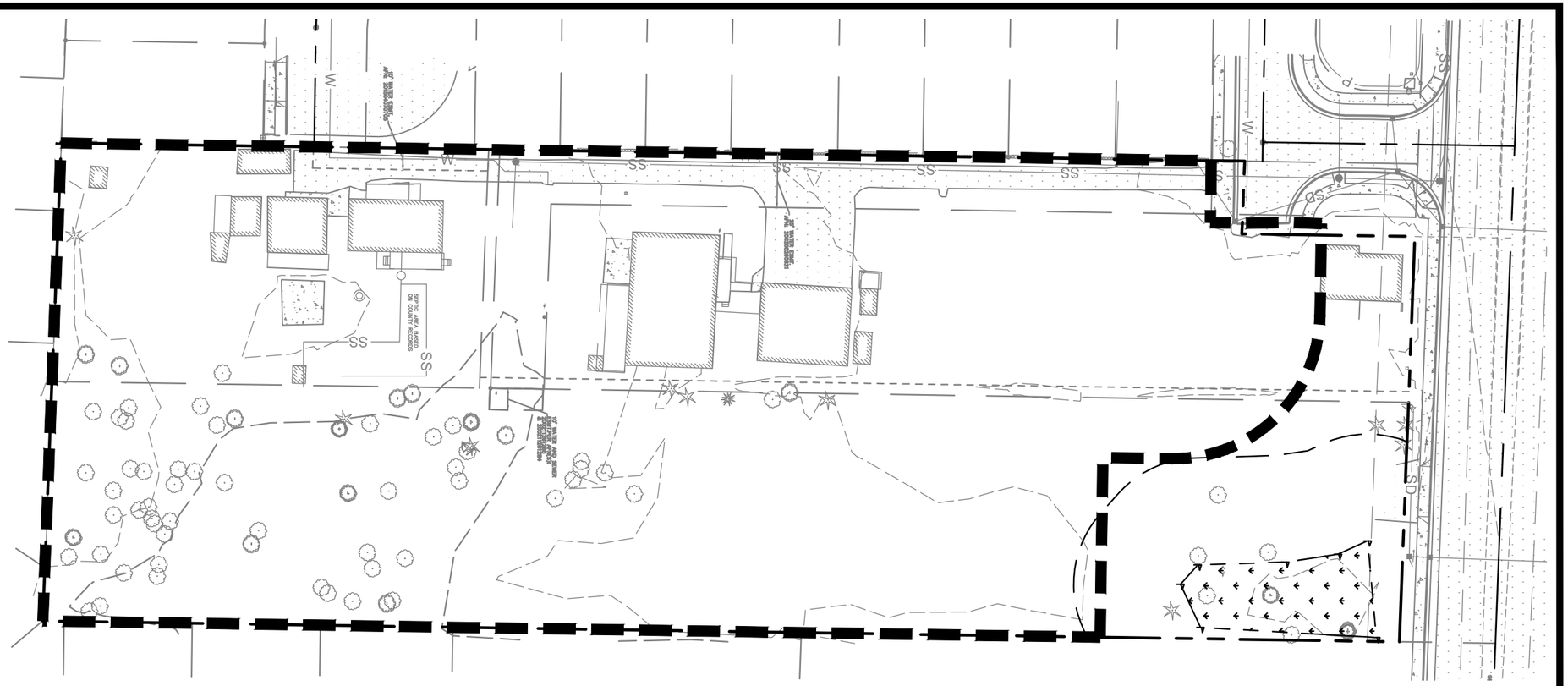

### Legend

- Catch Basin
- Media Filter Structure
- Energy Dissipator
- Overflow Control
- Auxiliary Point
  - Pipe In
  - Pipe Out
  - Pipe Invert
  - Other Auxiliary Point
- Culvert
- Enclosed Pipe
- Open Channel
- Other Flow Network
- Fence
- Facility Access
- Closed Detention
- Permeable Pavement
- Pond
- Water Quality Feature
- Watercourse
- County Boundary
- DOWNSTREAM FLOWPATH

0.1 0 0.07 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
Surface Water Management, Snohomish County Public Works

# APPENDIX C
## Basin Mapping




**PROJECT BASIN**

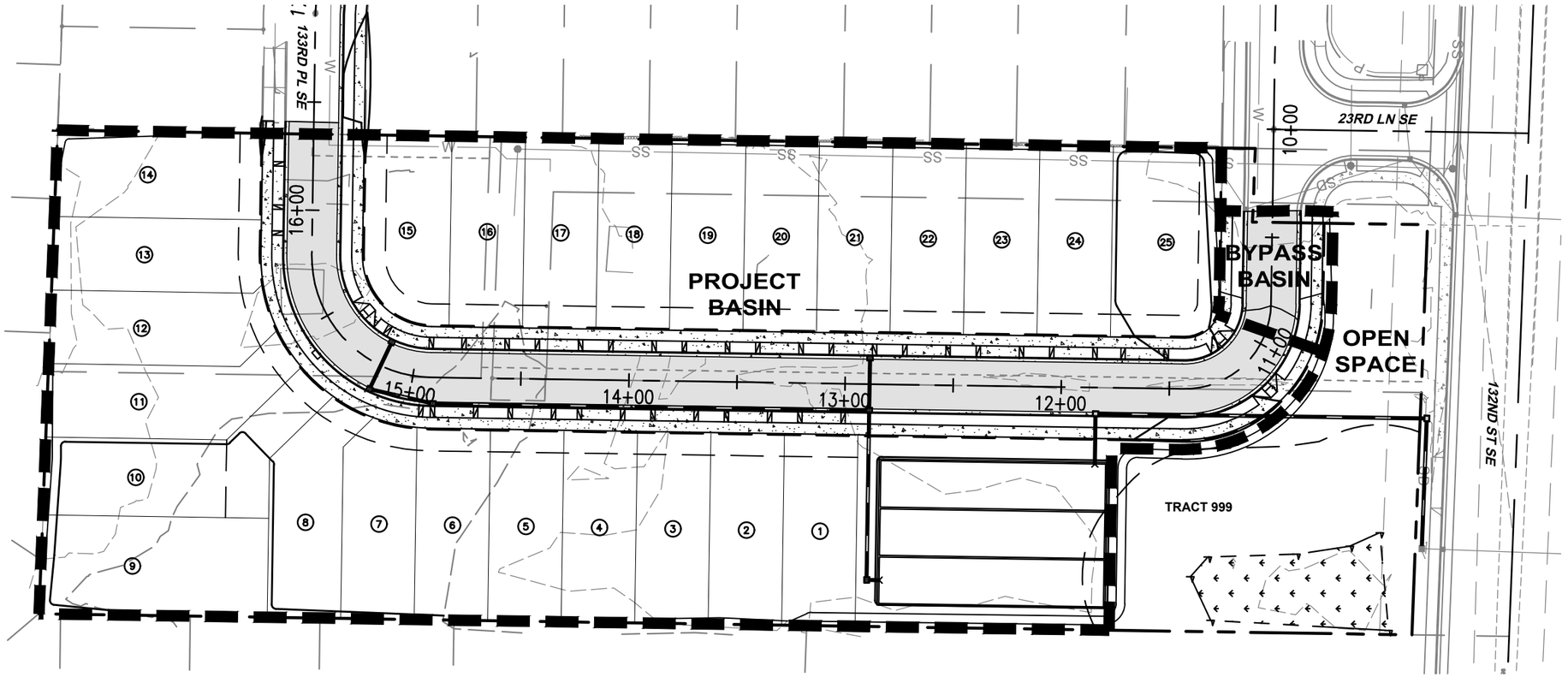
TOTAL BASIN AREA = 2.79 AC.
*(ASSUMED FULLY FORESTED)*

N

HORIZ. 0 30 60 120
Scale In Feet

| | | | | |
|---|---|---|---|---|
| DESIGNED _____<br>DRAWN _____<br>CHECKED _____ | PACE<br>An Engineering Services Company | 1724 W Marine View Drive, Suite 140<br>Everett, WA 98201<br>*p*. 425.486.6533 \| *f*. 425.486.6593<br>Civil \| Structural \| Planning \| Survey<br>www. paceengrs.com | DATE<br>SCALE<br>AS SHOWN | **CRESTVIEW VILLAGE II**<br>**EXISTING HYDROLOGY** | PACE PROJECT NO.<br>**19462**<br>SHEET NAME LAYOUT1 |

FILE NAME: P:\P19\19462 CRESTVIEW II\CAD\ENGINEERING\FIGURES\SHEETS\F19462-EX-HYDROLOGY.DWG
SAVE TIME: 6/20/2019 10:57:06 AM PLOT TIME: 6/20/2019 2:52 PM
USER NAME:KEN MCINTYRE
XREF FILES: X19462-11X17-TBLOCK.dwg X19462_BASE.dwg X19462_SITE.dwg X19462_HATCH.dwg




**PROJECT BASIN**

| | |
|---|---|
| TOTAL LOT AREA = | 1.88 AC. |
| *(MEASURED FROM DRAWING)* | |
| IMPERVIOUS LOT AREA = | 0.75 AC. |
| *(ASSUME 40% – MAX ALLOWED PER MCMC 17.12.090)* | |
| IMPERVIOUS R/W AREA = | 0.57 AC. |
| *(MEASURED FROM DRAWING)* | |
| TOTAL IMPERVIOUS AREA = | 1.32 AC. |
| LANDSCAPE/LAWN AREA = | 1.40 AC. |
| TOTAL BASIN AREA = | 2.72 AC. |

**BYPASS BASIN**

| | |
|---|---|
| IMPERVIOUS R/W AREA = | 0.05 AC. |
| *(MEASURED FROM DRAWING)* | |
| TOTAL IMPERVIOUS AREA = | 0.05 AC. |
| LANDSCAPE/LAWN AREA = | 0.02 AC. |
| TOTAL BASIN AREA = | 0.07 AC. |

N

HORIZ. 0 30 60 120

Scale In Feet

DESIGNED _____

DRAWN _____

CHECKED _____

PACE
An Engineering Services Company

1724 W Marine View Drive, Suite 140
Everett, WA 98201
*p*. 425.486.6533 | *f*. 425.486.6593

Civil | Structural | Planning | Survey
www. paceengrs.com

DATE

SCALE
AS SHOWN

# CRESTVIEW VILLAGE II

## DEVELOPED HYDROLOGY

PACE PROJECT NO.
**19462**

SHEET NAME LAYOUT1

FILE NAME: P:\P19\19462 CRESTVIEW II\CAD\ENGINEERING\FIGURES\SHEETS\F19462-DV-HYDROLOGY.DWG
SAVE TIME: 6/20/2019 2:53:51 PM PLOT TIME: 6/20/2019 2:54 PM
USER NAME:KEN MCINTYRE
XREF FILES: X19462-11X17-TBLOCK.dwg X19462_BASE.dwg X19462_SITE.dwg X19462_HATCH.dwg X19462_FG.dwg X19462_SD.dwg

Crestview Village II
City of Mill Creek, WA

# APPENDIX D
## Hydrologic Modeling Calculations

PACE

**WWHM2012**
**PROJECT REPORT**

---

**Project Name:** 2019-06-20 Vault Calcs
**Site Name:** Crestview II
**Site Address:**
**City :**
**Report Date:** 7/12/2019
**Gage :** Everett
**Data Start :** 1948/10/01
**Data End :** 2009/09/30
**Precip Scale:** 1.00
**Version Date:** 2018/10/10
**Version :** 4.2.16

---

**Low Flow Threshold for POC 1 :** 50 Percent of the 2 Year

---

**High Flow Threshold for POC 1:** 50 year

---

**PREDEVELOPED LAND USE**

**Name :** ONSITE
**Bypass:** No

**GroundWater:** No

| Pervious Land Use | acre |
|---|---|
| C, Forest, Flat | 2.79 |
| Pervious Total | 2.79 |

| Impervious Land Use | acre |
|---|---|
| Impervious Total | 0 |
| Basin Total | 2.79 |

---

**Element Flows To:**

| Surface | Interflow | Groundwater |
|---|---|---|

---

**MITIGATED LAND USE**

**Name :** ON-SITE
**Bypass:** No

**GroundWater:** No

| Pervious Land Use | acre |
|---|---|
| C, Lawn, Flat | 1.4 |
| **Pervious Total** | **1.4** |

| Impervious Land Use | acre |
|---|---|
| ROADS FLAT | 1.32 |
| **Impervious Total** | **1.32** |
| **Basin Total** | **2.72** |

---

**Element Flows To:**

| Surface | Interflow | Groundwater |
|---|---|---|
| Vault 1 | Vault 1 | |

---

**Name** : Vault 1
**Width :** 64.5 ft.
**Length :** 104 ft.
**Depth:** 4.05 ft.
**Discharge Structure**
**Riser Height:** 3.55 ft.
**Riser Diameter:** 12 in.
**Notch Type:** Rectangular
**Notch Width:** 0.063 ft.
**Notch Height:** 0.438 ft.
**Orifice 1 Diameter:** 0.8125 in. **Elevation:** 0 ft.
**Orifice 2 Diameter:** 0.875 in. **Elevation:** 2.6 ft.

**Element Flows To:**

| Outlet 1 | Outlet 2 |
|---|---|

---

**Vault Hydraulic Table**

| Stage(feet) | Area(ac.) | Volume(ac-ft.) | Discharge(cfs) | Infilt(cfs) |
|---|---|---|---|---|
| 0.0000 | 0.154 | 0.000 | 0.000 | 0.000 |
| 0.0450 | 0.154 | 0.006 | 0.003 | 0.000 |
| 0.0900 | 0.154 | 0.013 | 0.005 | 0.000 |
| 0.1350 | 0.154 | 0.020 | 0.006 | 0.000 |
| 0.1800 | 0.154 | 0.027 | 0.007 | 0.000 |
| 0.2250 | 0.154 | 0.034 | 0.008 | 0.000 |
| 0.2700 | 0.154 | 0.041 | 0.009 | 0.000 |
| 0.3150 | 0.154 | 0.048 | 0.010 | 0.000 |
| 0.3600 | 0.154 | 0.055 | 0.010 | 0.000 |
| 0.4050 | 0.154 | 0.062 | 0.011 | 0.000 |
| 0.4500 | 0.154 | 0.069 | 0.012 | 0.000 |
| 0.4950 | 0.154 | 0.076 | 0.012 | 0.000 |
| 0.5400 | 0.154 | 0.083 | 0.013 | 0.000 |

| | | | | |
|---|---|---|---|---|
| 0.5850 | 0.154 | 0.090 | 0.013 | 0.000 |
| 0.6300 | 0.154 | 0.097 | 0.014 | 0.000 |
| 0.6750 | 0.154 | 0.103 | 0.014 | 0.000 |
| 0.7200 | 0.154 | 0.110 | 0.015 | 0.000 |
| 0.7650 | 0.154 | 0.117 | 0.015 | 0.000 |
| 0.8100 | 0.154 | 0.124 | 0.016 | 0.000 |
| 0.8550 | 0.154 | 0.131 | 0.016 | 0.000 |
| 0.9000 | 0.154 | 0.138 | 0.017 | 0.000 |
| 0.9450 | 0.154 | 0.145 | 0.017 | 0.000 |
| 0.9900 | 0.154 | 0.152 | 0.017 | 0.000 |
| 1.0350 | 0.154 | 0.159 | 0.018 | 0.000 |
| 1.0800 | 0.154 | 0.166 | 0.018 | 0.000 |
| 1.1250 | 0.154 | 0.173 | 0.019 | 0.000 |
| 1.1700 | 0.154 | 0.180 | 0.019 | 0.000 |
| 1.2150 | 0.154 | 0.187 | 0.019 | 0.000 |
| 1.2600 | 0.154 | 0.194 | 0.020 | 0.000 |
| 1.3050 | 0.154 | 0.201 | 0.020 | 0.000 |
| 1.3500 | 0.154 | 0.207 | 0.020 | 0.000 |
| 1.3950 | 0.154 | 0.214 | 0.021 | 0.000 |
| 1.4400 | 0.154 | 0.221 | 0.021 | 0.000 |
| 1.4850 | 0.154 | 0.228 | 0.021 | 0.000 |
| 1.5300 | 0.154 | 0.235 | 0.022 | 0.000 |
| 1.5750 | 0.154 | 0.242 | 0.022 | 0.000 |
| 1.6200 | 0.154 | 0.249 | 0.022 | 0.000 |
| 1.6650 | 0.154 | 0.256 | 0.023 | 0.000 |
| 1.7100 | 0.154 | 0.263 | 0.023 | 0.000 |
| 1.7550 | 0.154 | 0.270 | 0.023 | 0.000 |
| 1.8000 | 0.154 | 0.277 | 0.024 | 0.000 |
| 1.8450 | 0.154 | 0.284 | 0.024 | 0.000 |
| 1.8900 | 0.154 | 0.291 | 0.024 | 0.000 |
| 1.9350 | 0.154 | 0.298 | 0.024 | 0.000 |
| 1.9800 | 0.154 | 0.304 | 0.025 | 0.000 |
| 2.0250 | 0.154 | 0.311 | 0.025 | 0.000 |
| 2.0700 | 0.154 | 0.318 | 0.025 | 0.000 |
| 2.1150 | 0.154 | 0.325 | 0.026 | 0.000 |
| 2.1600 | 0.154 | 0.332 | 0.026 | 0.000 |
| 2.2050 | 0.154 | 0.339 | 0.026 | 0.000 |
| 2.2500 | 0.154 | 0.346 | 0.026 | 0.000 |
| 2.2950 | 0.154 | 0.353 | 0.027 | 0.000 |
| 2.3400 | 0.154 | 0.360 | 0.027 | 0.000 |
| 2.3850 | 0.154 | 0.367 | 0.027 | 0.000 |
| 2.4300 | 0.154 | 0.374 | 0.027 | 0.000 |
| 2.4750 | 0.154 | 0.381 | 0.028 | 0.000 |
| 2.5200 | 0.154 | 0.388 | 0.028 | 0.000 |
| 2.5650 | 0.154 | 0.395 | 0.028 | 0.000 |
| 2.6100 | 0.154 | 0.401 | 0.031 | 0.000 |
| 2.6550 | 0.154 | 0.408 | 0.034 | 0.000 |
| 2.7000 | 0.154 | 0.415 | 0.036 | 0.000 |
| 2.7450 | 0.154 | 0.422 | 0.037 | 0.000 |
| 2.7900 | 0.154 | 0.429 | 0.039 | 0.000 |
| 2.8350 | 0.154 | 0.436 | 0.040 | 0.000 |
| 2.8800 | 0.154 | 0.443 | 0.041 | 0.000 |
| 2.9250 | 0.154 | 0.450 | 0.042 | 0.000 |
| 2.9700 | 0.154 | 0.457 | 0.043 | 0.000 |
| 3.0150 | 0.154 | 0.464 | 0.044 | 0.000 |
| 3.0600 | 0.154 | 0.471 | 0.045 | 0.000 |
| 3.1050 | 0.154 | 0.478 | 0.046 | 0.000 |

| | | | | |
|---|---|---|---|---|
| 3.1500 | 0.154 | 0.485 | 0.048 | 0.000 |
| 3.1950 | 0.154 | 0.492 | 0.052 | 0.000 |
| 3.2400 | 0.154 | 0.498 | 0.058 | 0.000 |
| 3.2850 | 0.154 | 0.505 | 0.064 | 0.000 |
| 3.3300 | 0.154 | 0.512 | 0.070 | 0.000 |
| 3.3750 | 0.154 | 0.519 | 0.077 | 0.000 |
| 3.4200 | 0.154 | 0.526 | 0.085 | 0.000 |
| 3.4650 | 0.154 | 0.533 | 0.093 | 0.000 |
| 3.5100 | 0.154 | 0.540 | 0.101 | 0.000 |
| 3.5550 | 0.154 | 0.547 | 0.112 | 0.000 |
| 3.6000 | 0.154 | 0.554 | 0.228 | 0.000 |
| 3.6450 | 0.154 | 0.561 | 0.419 | 0.000 |
| 3.6900 | 0.154 | 0.568 | 0.658 | 0.000 |
| 3.7350 | 0.154 | 0.575 | 0.926 | 0.000 |
| 3.7800 | 0.154 | 0.582 | 1.206 | 0.000 |
| 3.8250 | 0.154 | 0.589 | 1.480 | 0.000 |
| 3.8700 | 0.154 | 0.596 | 1.730 | 0.000 |
| 3.9150 | 0.154 | 0.602 | 1.941 | 0.000 |
| 3.9600 | 0.154 | 0.609 | 2.107 | 0.000 |
| 4.0050 | 0.154 | 0.616 | 2.228 | 0.000 |
| 4.0500 | 0.154 | 0.623 | 2.319 | 0.000 |
| 4.0950 | 0.154 | 0.630 | 2.441 | 0.000 |
| 4.1400 | 0.000 | 0.000 | 2.536 | 0.000 |

---

**Name** : BYPASS
**Bypass:** Yes

**GroundWater:** No

| **Pervious Land Use** | **acre** |
|---|---|
| **C, Lawn, Flat** | **.02** |
| **Pervious Total** | **0.02** |

| **Impervious Land Use** | **acre** |
|---|---|
| **ROADS FLAT** | **0.05** |
| **Impervious Total** | **0.05** |
| **Basin Total** | **0.07** |

---

**Element Flows To:**

| **Surface** | **Interflow** | **Groundwater** |
|---|---|---|

---

---

**ANALYSIS RESULTS**

**Stream Protection Duration**

---

**Predeveloped Landuse Totals for POC #1**
**Total Pervious Area:2.79**
**Total Impervious Area:0**

---

**Mitigated Landuse Totals for POC #1**
**Total Pervious Area:1.42**
**Total Impervious Area:1.37**

---

**Flow Frequency Return Periods for Predeveloped. POC #1**

| Return Period | Flow(cfs) |
|---|---|
| 2 year | 0.059807 |
| 5 year | 0.088522 |
| 10 year | 0.108182 |
| 25 year | 0.133539 |
| 50 year | 0.152722 |
| 100 year | 0.172113 |

**Flow Frequency Return Periods for Mitigated. POC #1**

| Return Period | Flow(cfs) |
|---|---|
| 2 year | 0.050061 |
| 5 year | 0.090482 |
| 10 year | 0.129857 |
| 25 year | 0.198886 |
| 50 year | 0.268072 |
| 100 year | 0.356238 |

---

**Stream Protection Duration**
**Annual Peaks for Predeveloped and Mitigated. POC #1**

| Year | Predeveloped | Mitigated |
|---|---|---|
| 1949 | 0.034 | 0.038 |
| 1950 | 0.066 | 0.046 |
| 1951 | 0.054 | 0.032 |
| 1952 | 0.043 | 0.040 |
| 1953 | 0.035 | 0.037 |
| 1954 | 0.132 | 0.053 |
| 1955 | 0.090 | 0.089 |
| 1956 | 0.079 | 0.099 |
| 1957 | 0.088 | 0.047 |
| 1958 | 0.059 | 0.066 |
| 1959 | 0.064 | 0.036 |
| 1960 | 0.057 | 0.040 |
| 1961 | 0.059 | 0.087 |
| 1962 | 0.052 | 0.036 |
| 1963 | 0.062 | 0.046 |
| 1964 | 0.053 | 0.032 |
| 1965 | 0.059 | 0.042 |
| 1966 | 0.032 | 0.034 |
| 1967 | 0.073 | 0.055 |
| 1968 | 0.085 | 0.042 |
| 1969 | 0.064 | 0.070 |
| 1970 | 0.047 | 0.036 |

| | | |
|---|---|---|
| 1971 | 0.066 | 0.106 |
| 1972 | 0.058 | 0.055 |
| 1973 | 0.047 | 0.047 |
| 1974 | 0.082 | 0.046 |
| 1975 | 0.047 | 0.040 |
| 1976 | 0.045 | 0.037 |
| 1977 | 0.038 | 0.035 |
| 1978 | 0.047 | 0.037 |
| 1979 | 0.084 | 0.051 |
| 1980 | 0.053 | 0.037 |
| 1981 | 0.043 | 0.031 |
| 1982 | 0.057 | 0.049 |
| 1983 | 0.080 | 0.041 |
| 1984 | 0.059 | 0.152 |
| 1985 | 0.078 | 0.075 |
| 1986 | 0.191 | 0.494 |
| 1987 | 0.085 | 0.224 |
| 1988 | 0.047 | 0.048 |
| 1989 | 0.040 | 0.040 |
| 1990 | 0.062 | 0.047 |
| 1991 | 0.066 | 0.044 |
| 1992 | 0.050 | 0.046 |
| 1993 | 0.033 | 0.027 |
| 1994 | 0.031 | 0.049 |
| 1995 | 0.063 | 0.060 |
| 1996 | 0.109 | 0.053 |
| 1997 | 0.209 | 0.841 |
| 1998 | 0.040 | 0.041 |
| 1999 | 0.057 | 0.039 |
| 2000 | 0.032 | 0.066 |
| 2001 | 0.010 | 0.028 |
| 2002 | 0.060 | 0.053 |
| 2003 | 0.044 | 0.033 |
| 2004 | 0.069 | 0.055 |
| 2005 | 0.051 | 0.036 |
| 2006 | 0.118 | 0.069 |
| 2007 | 0.101 | 0.058 |
| 2008 | 0.160 | 0.334 |
| 2009 | 0.050 | 0.044 |

---

**Stream Protection Duration**
**Ranked Annual Peaks for Predeveloped and Mitigated. POC #1**

| Rank | Predeveloped | Mitigated |
|---|---|---|
| 1 | 0.2090 | 0.8414 |
| 2 | 0.1913 | 0.4942 |
| 3 | 0.1601 | 0.3336 |
| 4 | 0.1324 | 0.2237 |
| 5 | 0.1181 | 0.1525 |
| 6 | 0.1095 | 0.1055 |
| 7 | 0.1006 | 0.0991 |
| 8 | 0.0897 | 0.0891 |
| 9 | 0.0880 | 0.0869 |
| 10 | 0.0855 | 0.0754 |
| 11 | 0.0851 | 0.0698 |
| 12 | 0.0842 | 0.0688 |

| | | |
|---|---|---|
| 13 | 0.0818 | 0.0658 |
| 14 | 0.0800 | 0.0656 |
| 15 | 0.0793 | 0.0599 |
| 16 | 0.0776 | 0.0580 |
| 17 | 0.0730 | 0.0555 |
| 18 | 0.0692 | 0.0551 |
| 19 | 0.0661 | 0.0546 |
| 20 | 0.0659 | 0.0533 |
| 21 | 0.0656 | 0.0532 |
| 22 | 0.0642 | 0.0528 |
| 23 | 0.0640 | 0.0508 |
| 24 | 0.0630 | 0.0493 |
| 25 | 0.0624 | 0.0492 |
| 26 | 0.0619 | 0.0483 |
| 27 | 0.0604 | 0.0469 |
| 28 | 0.0595 | 0.0467 |
| 29 | 0.0594 | 0.0465 |
| 30 | 0.0592 | 0.0465 |
| 31 | 0.0588 | 0.0460 |
| 32 | 0.0583 | 0.0455 |
| 33 | 0.0575 | 0.0455 |
| 34 | 0.0569 | 0.0438 |
| 35 | 0.0566 | 0.0436 |
| 36 | 0.0535 | 0.0425 |
| 37 | 0.0528 | 0.0418 |
| 38 | 0.0527 | 0.0413 |
| 39 | 0.0517 | 0.0411 |
| 40 | 0.0509 | 0.0400 |
| 41 | 0.0503 | 0.0399 |
| 42 | 0.0502 | 0.0396 |
| 43 | 0.0471 | 0.0395 |
| 44 | 0.0470 | 0.0390 |
| 45 | 0.0468 | 0.0378 |
| 46 | 0.0467 | 0.0371 |
| 47 | 0.0466 | 0.0367 |
| 48 | 0.0448 | 0.0366 |
| 49 | 0.0440 | 0.0366 |
| 50 | 0.0430 | 0.0359 |
| 51 | 0.0426 | 0.0358 |
| 52 | 0.0398 | 0.0358 |
| 53 | 0.0396 | 0.0356 |
| 54 | 0.0376 | 0.0353 |
| 55 | 0.0351 | 0.0343 |
| 56 | 0.0338 | 0.0332 |
| 57 | 0.0328 | 0.0324 |
| 58 | 0.0323 | 0.0317 |
| 59 | 0.0317 | 0.0311 |
| 60 | 0.0306 | 0.0281 |
| 61 | 0.0104 | 0.0272 |

---

**Stream Protection Duration**
**POC #1**
**The Facility PASSED**

**The Facility PASSED.**

| Flow(cfs) | Predev | Mit | Percentage | Pass/Fail |
|---|---|---|---|---|
| 0.0299 | 22651 | 20961 | 92 | Pass |
| 0.0311 | 20533 | 18548 | 90 | Pass |
| 0.0324 | 18585 | 17085 | 91 | Pass |
| 0.0336 | 16805 | 15913 | 94 | Pass |
| 0.0349 | 15154 | 14837 | 97 | Pass |
| 0.0361 | 13708 | 13486 | 98 | Pass |
| 0.0373 | 12459 | 12145 | 97 | Pass |
| 0.0386 | 11298 | 10928 | 96 | Pass |
| 0.0398 | 10243 | 9856 | 96 | Pass |
| 0.0411 | 9308 | 8707 | 93 | Pass |
| 0.0423 | 8455 | 7666 | 90 | Pass |
| 0.0436 | 7676 | 6746 | 87 | Pass |
| 0.0448 | 6936 | 5653 | 81 | Pass |
| 0.0460 | 6310 | 4584 | 72 | Pass |
| 0.0473 | 5771 | 3867 | 67 | Pass |
| 0.0485 | 5281 | 3418 | 64 | Pass |
| 0.0498 | 4851 | 3039 | 62 | Pass |
| 0.0510 | 4438 | 2776 | 62 | Pass |
| 0.0522 | 4092 | 2502 | 61 | Pass |
| 0.0535 | 3700 | 2220 | 60 | Pass |
| 0.0547 | 3375 | 2087 | 61 | Pass |
| 0.0560 | 3054 | 1965 | 64 | Pass |
| 0.0572 | 2748 | 1849 | 67 | Pass |
| 0.0584 | 2505 | 1745 | 69 | Pass |
| 0.0597 | 2301 | 1650 | 71 | Pass |
| 0.0609 | 2108 | 1564 | 74 | Pass |
| 0.0622 | 1949 | 1497 | 76 | Pass |
| 0.0634 | 1821 | 1434 | 78 | Pass |
| 0.0646 | 1698 | 1380 | 81 | Pass |
| 0.0659 | 1580 | 1304 | 82 | Pass |
| 0.0671 | 1479 | 1254 | 84 | Pass |
| 0.0684 | 1398 | 1215 | 86 | Pass |
| 0.0696 | 1329 | 1164 | 87 | Pass |
| 0.0708 | 1260 | 1112 | 88 | Pass |
| 0.0721 | 1197 | 1058 | 88 | Pass |
| 0.0733 | 1138 | 1016 | 89 | Pass |
| 0.0746 | 1081 | 975 | 90 | Pass |
| 0.0758 | 1024 | 929 | 90 | Pass |
| 0.0770 | 952 | 904 | 94 | Pass |
| 0.0783 | 915 | 875 | 95 | Pass |
| 0.0795 | 879 | 854 | 97 | Pass |
| 0.0808 | 845 | 833 | 98 | Pass |
| 0.0820 | 808 | 811 | 100 | Pass |
| 0.0832 | 767 | 784 | 102 | Pass |
| 0.0845 | 731 | 758 | 103 | Pass |
| 0.0857 | 700 | 731 | 104 | Pass |
| 0.0870 | 676 | 702 | 103 | Pass |
| 0.0882 | 655 | 673 | 102 | Pass |
| 0.0895 | 639 | 639 | 100 | Pass |
| 0.0907 | 620 | 621 | 100 | Pass |
| 0.0919 | 604 | 594 | 98 | Pass |
| 0.0932 | 587 | 577 | 98 | Pass |
| 0.0944 | 573 | 559 | 97 | Pass |
| 0.0957 | 560 | 539 | 96 | Pass |
| 0.0969 | 551 | 513 | 93 | Pass |

| | | | | |
|---|---|---|---|---|
| 0.0981 | 539 | 491 | 91 | Pass |
| 0.0994 | 523 | 469 | 89 | Pass |
| 0.1006 | 511 | 452 | 88 | Pass |
| 0.1019 | 497 | 436 | 87 | Pass |
| 0.1031 | 473 | 418 | 88 | Pass |
| 0.1043 | 458 | 401 | 87 | Pass |
| 0.1056 | 448 | 378 | 84 | Pass |
| 0.1068 | 438 | 366 | 83 | Pass |
| 0.1081 | 428 | 354 | 82 | Pass |
| 0.1093 | 417 | 341 | 81 | Pass |
| 0.1105 | 402 | 330 | 82 | Pass |
| 0.1118 | 396 | 318 | 80 | Pass |
| 0.1130 | 385 | 298 | 77 | Pass |
| 0.1143 | 375 | 273 | 72 | Pass |
| 0.1155 | 362 | 254 | 70 | Pass |
| 0.1167 | 355 | 244 | 68 | Pass |
| 0.1180 | 349 | 241 | 69 | Pass |
| 0.1192 | 338 | 236 | 69 | Pass |
| 0.1205 | 329 | 232 | 70 | Pass |
| 0.1217 | 320 | 226 | 70 | Pass |
| 0.1229 | 310 | 224 | 72 | Pass |
| 0.1242 | 306 | 222 | 72 | Pass |
| 0.1254 | 300 | 216 | 72 | Pass |
| 0.1267 | 296 | 214 | 72 | Pass |
| 0.1279 | 288 | 210 | 72 | Pass |
| 0.1292 | 283 | 206 | 72 | Pass |
| 0.1304 | 278 | 201 | 72 | Pass |
| 0.1316 | 270 | 199 | 73 | Pass |
| 0.1329 | 260 | 195 | 75 | Pass |
| 0.1341 | 252 | 194 | 76 | Pass |
| 0.1354 | 246 | 192 | 78 | Pass |
| 0.1366 | 239 | 186 | 77 | Pass |
| 0.1378 | 234 | 184 | 78 | Pass |
| 0.1391 | 227 | 181 | 79 | Pass |
| 0.1403 | 215 | 178 | 82 | Pass |
| 0.1416 | 205 | 176 | 85 | Pass |
| 0.1428 | 200 | 173 | 86 | Pass |
| 0.1440 | 194 | 172 | 88 | Pass |
| 0.1453 | 188 | 171 | 90 | Pass |
| 0.1465 | 184 | 171 | 92 | Pass |
| 0.1478 | 176 | 168 | 95 | Pass |
| 0.1490 | 170 | 166 | 97 | Pass |
| 0.1502 | 165 | 163 | 98 | Pass |
| 0.1515 | 159 | 160 | 100 | Pass |
| 0.1527 | 152 | 158 | 103 | Pass |

**Water Quality BMP Flow and Volume for POC #1**
**On-line facility volume:** 0.0808 **acre-feet**
**On-line facility target flow:** 0.0447 **cfs.**
**Adjusted for 15 min:** 0.0447 **cfs.**
**Off-line facility target flow:** 0.0256 **cfs.**
**Adjusted for 15 min:** 0.0256 **cfs.**

| | |
|---|---|
| **Required Wetpool Vol =** | **0.0808 ac-ft (3,520 cu. ft.)** |
| **Provided Wetpool Vol =** | **21.5’ x 104’ x 4’ (8,944 cu. ft.)** |

**LID Report**

| LID Technique | Used for Water Quality | Percent Treatment? | Total Volume Needs Treatment (ac-ft) | Volume Through Facility (ac-ft) | Infiltration Volume (ac-ft.) | Cumulative Volume Infiltration Credit | Percent Water Quality Volume Infiltrated | Comment Treated |
|---|---|---|---|---|---|---|---|---|
| Vault 1 POC | | N | 283.54 | | | N | 0.00 | |
| Total Volume Infiltrated | | | 283.54 | 0.00 | 0.00 | | 0.00 | |
| 0.00 | 0% | No Treat. Credit | | | | | | |

Compliance with LID Standard 8
Duration Analysis Result = Failed

## Perlnd and Implnd Changes

No changes have been made.

**more than 50% of the flows for the range of the duration analysis.**

---

**Water Quality BMP Flow and Volume for POC #1**
**On-line facility volume:** 0.0808 **acre-feet**
**On-line facility target flow:** 0.0447 **cfs.**
**Adjusted for 15 min:** 0.0447 **cfs.**
**Off-line facility target flow:** 0.0256 **cfs.**
**Adjusted for 15 min:** 0.0256 **cfs.**

---

**LID Report**

| LID Technique | Used for Water Quality | Total Volume Percent Treatment? | Volume Needs Treatment (ac-ft) | Infiltration Through Facility (ac-ft) | Volume (ac-ft.) | Cumulative Volume Infiltration Credit | Percent Infiltrated | Comment |
|---|---|---|---|---|---|---|---|---|
| Vault 1 POC | N | | 283.54 | | | N | 0.00 | |
| Total Volume Infiltrated | | | 283.54 | 0.00 | 0.00 | | 0.00 | |
| 0.00 | 0.00 | 0% | No Treat. Credit | | | | | |

Compliance with LID Standard 8
Duration Analysis Result = Failed

---

## Perlnd and Implnd Changes

No changes have been made.

---

Crestview Village II
City of Mill Creek, WA

# APPENDIX E
## Conveyance Calculations

PACE

| (1) | | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe Segment | | Pipe Flow | Pipe Length | Pipe Size | Manning's n' | Outlet Elev. | Inlet Elev. | Upstream Rim Elev. | Upstream Bend Angle | Tail-water Elev | Barrel Area | Barrel Vel Head | Friction Loss | Entr HGL Elev | Entr Head Loss | Outlet Cntrl Elev | Inlet Cntrl Elev | Appr Vel Head | Bend Head Loss | Junc Head Loss | HW Elev | Free-board Depth |
| From CB | To CB | (cfs) | (ft) | (in) | | (ft) | (ft) | (ft) | (°) | (ft) | ($ft^2$) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| *Vault* | *4* | *2.00* | *6* | *18* | *0.012* | *482.97* | *483.00* | *490.50* | *90* | *488.00* | 1.77 | 0.02 | 0.00 | 488.00 | 0.01 | 488.03 | 483.74 | 0.02 | 0.03 | 0.00 | **488.04** | **2.46** |
| *4* | *5* | *2.00* | *79* | *18* | *0.012* | *483.00* | *483.47* | *488.52* | *0* | *488.04* | 1.77 | 0.02 | 0.02 | 488.06 | 0.01 | 488.09 | 484.21 | 0.00 | 0.00 | 0.01 | **488.10** | **0.42** |
| *5* | *6* | *0.60* | *24* | *12* | *0.012* | *483.97* | *485.50* | *488.52* | *0* | *488.10* | 0.79 | 0.01 | 0.01 | 488.11 | 0.00 | 488.12 | 485.91 | 0.00 | 0.00 | 0.00 | **488.12** | **0.40** |
| *5* | *7A* | *1.00* | *202* | *12* | *0.012* | *483.97* | *485.18* | *488.64* | *12* | *488.10* | 0.79 | 0.03 | 0.13 | 488.23 | 0.01 | 488.27 | 485.77 | 0.03 | 0.00 | 0.00 | **488.25** | **0.39** |
| *7A* | *7* | *1.00* | *30* | *12* | *0.012* | *485.18* | *485.36* | *488.51* | *90* | *488.25* | 0.79 | 0.03 | 0.02 | 488.27 | 0.01 | 488.31 | 485.95 | 0.00 | 0.00 | 0.00 | **488.31** | **0.20** |
| *7* | *8* | *0.27* | *25* | *12* | *0.012* | *485.36* | *485.51* | *488.51* | *0* | *488.31* | 0.79 | 0.00 | 0.00 | 488.31 | 0.00 | 488.31 | 485.80 | 0.00 | 0.00 | 0.00 | **488.31** | **0.20** |

**Crestview II**

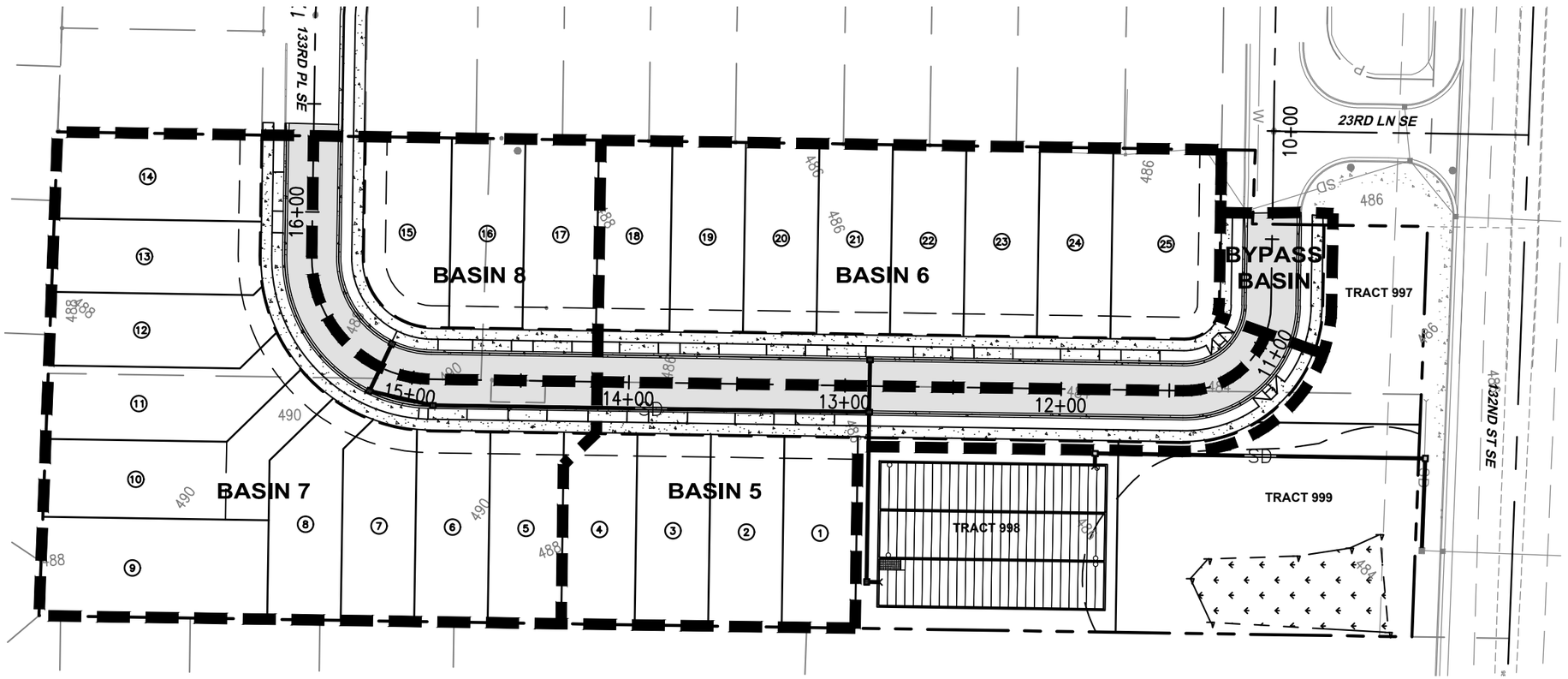
*Direct-Step Backwater*

*Conveyance Analysis*



| | |
|---|---|
| Made by: **KJM** | Date: **9/17/2019** |
| Checked by: **KJM** | Date: |
| Backchecked by: **KJM** | Date: |

PACE




**BASIN 5**

| | | |
|---|---|---|
| TOTAL LOT AREA = *(MEASURED FROM DRAWING)* | 0.27 | AC. |
| IMPERVIOUS LOT AREA = *(ASSUME 40%)* | 0.11 | AC. |
| IMPERVIOUS R/W AREA = *(MEASURED FROM DRAWING)* | 0.18 | AC. |
| TOTAL IMPERVIOUS AREA = | 0.29 | AC. |
| LANDSCAPE/LAWN AREA = | 0.19 | AC. |
| TOTAL BASIN AREA = | 0.48 | AC. |

**BASIN 6**

| | | |
|---|---|---|
| TOTAL LOT AREA = *(MEASURED FROM DRAWING)* | 0.58 | AC. |
| IMPERVIOUS LOT AREA = *(ASSUME 40%)* | 0.23 | AC. |
| IMPERVIOUS R/W AREA = *(MEASURED FROM DRAWING)* | 0.17 | AC. |
| TOTAL IMPERVIOUS AREA = | 0.40 | AC. |
| LANDSCAPE/LAWN AREA = | 0.35 | AC. |
| TOTAL BASIN AREA = | 0.75 | AC. |

**BASIN 7**

| | | |
|---|---|---|
| TOTAL LOT AREA = *(MEASURED FROM DRAWING)* | 0.82 | AC. |
| IMPERVIOUS LOT AREA = *(ASSUME 40%)* | 0.33 | AC. |
| IMPERVIOUS R/W AREA = *(MEASURED FROM DRAWING)* | 0.13 | AC. |
| TOTAL IMPERVIOUS AREA = | 0.46 | AC. |
| LANDSCAPE/LAWN AREA = | 0.49 | AC. |
| TOTAL BASIN AREA = | 0.95 | AC. |

**BASIN 8**

| | | |
|---|---|---|
| TOTAL LOT AREA = *(MEASURED FROM DRAWING)* | 0.21 | AC. |
| IMPERVIOUS LOT AREA = *(ASSUME 40%)* | 0.08 | AC. |
| IMPERVIOUS R/W AREA = *(MEASURED FROM DRAWING)* | 0.11 | AC. |
| TOTAL IMPERVIOUS AREA = | 0.19 | AC. |
| LANDSCAPE/LAWN AREA = | 0.14 | AC. |
| TOTAL BASIN AREA = | 0.33 | AC. |

N

HORIZ. 0 30 60 120

Scale In Feet

DESIGNED _____

DRAWN _____

CHECKED _____

PACE
An Engineering Services Company
1724 W Marine View Drive, Suite 140
Everett, WA 98201
*p*. 425.486.6533 | *f*. 425.486.6593
Civil | Structural | Planning | Survey
www. paceengrs.com

DATE

SCALE
AS SHOWN

# CRESTVIEW VILLAGE II

## CONVEYANCE EXHIBIT

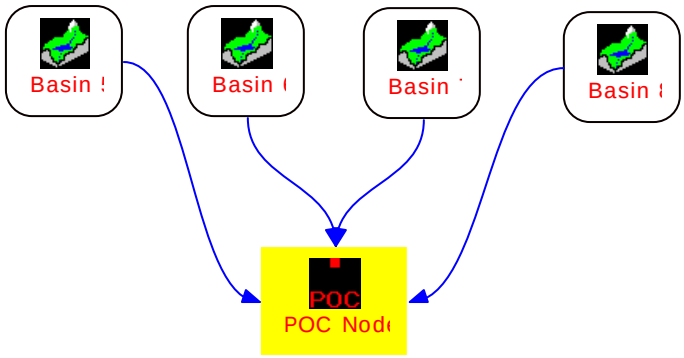
PACE PROJECT NO.
**19462**

SHEET NAME LAYOUT1

FILE NAME: P:\P19\19462 CRESTVIEW II\CAD\ENGINEERING\FIGURES\SHEETS\F19462-CONVEYANCE.DWG
SAVE TIME: 9/17/2019 8:19:31 AM PLOT TIME: 9/17/2019 8:46 AM
USER NAME: KEN MCINTYRE
XREF FILES: X19462-11X17-TBLOCK.dwg X19462_BASE.dwg X19462_SITE.dwg X19462_SD.dwg X19462_HATCH.dwg X19462_FG.dwg X19462_SD.dwg

## *PREDEVELOPED SCHEMATIC*


## *DEVELOPED CONVEYANCE SCHEMATIC*




## *BASIN SUMMARY*

---

**MGS FLOOD**
**PROJECT REPORT**

**Program Version: MGSFlood 4.46**
**Program License Number: 201110001**
**Project Simulation Performed on: 09/17/2019 8:27 AM**
**Report Generation Date: 09/17/2019 8:27 AM**

---

Input File Name: 2019-09-16 Conveyance.fld
Project Name: Crestview Div. 2
Analysis Title: Conveyance Analysis
Comments:

**PRECIPITATION INPUT**

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 15

Full Period of Record Available used for Routing
Precipitation Station : 96004005 Puget East 40 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961040 Puget East 40 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** **WATERSHED DEFINITION** **********

**Predevelopment/Post Development Tributary Area Summary**

| | Predeveloped | Post Developed |
|---|---|---|
| Total Subbasin Area (acres) | 2.510 | 2.510 |
| Area of Links that Include Precip/Evap (acres) | 0.000 | 0.000 |
| Total (acres) | 2.510 | 2.510 |

**----------SCENARIO: PREDEVELOPED**
Number of Subbasins: 1

---------- Subbasin : Total Basin ----------

| | -------Area (Acres) -------- |
|---|---|
| Till Forest | 2.510 |
| Subbasin Total | 2.510 |

**----------SCENARIO: POSTDEVELOPED**
Number of Subbasins: 4

---------- Subbasin : Basin 5 ----------

| | -------Area (Acres) -------- |
|---|---|
| Till Grass | 0.190 |
| Impervious | 0.290 |
| Subbasin Total | 0.480 |

---------- Subbasin : Basin 6 ----------

| | -------Area (Acres) -------- |
|---|---|
| Till Grass | 0.350 |
| Impervious | 0.400 |
| Subbasin Total | 0.750 |

---------- Subbasin : Basin 7 ----------

| | -------Area (Acres) -------- |
|---|---|
| Till Grass | 0.490 |
| Impervious | 0.460 |
| Subbasin Total | 0.950 |

---------- Subbasin : Basin 8 ----------

| | -------Area (Acres) -------- |
|---|---|
| Till Grass | 0.140 |
| Impervious | 0.190 |
| Subbasin Total | 0.330 |

********** **LINK DATA** **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 1

**----------**
**Link Name: POC Node**
Link Type: Copy
Downstream Link: None

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

**----------SCENARIO: PREDEVELOPED**
Number of Subbasins: 1
Number of Links: 0

**----------SCENARIO: POSTDEVELOPED**
Number of Subbasins: 4
Number of Links: 1

********** **Subbasin: Basin 5** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

| Tr (yrs) | Flood Peak (cfs) |
|---|---|
| 2-Year | 0.125 |
| 5-Year | 0.159 |
| 10-Year | 0.200 |
| 25-Year | 0.269 |
| 50-Year | 0.323 |
| 100-Year | 0.401 |
| 200-Year | 0.403 |

********** **Subbasin: Basin 6** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

| Tr (yrs) | Flood Peak (cfs) |
|---|---|
| 2-Year | 0.180 |
| 5-Year | 0.235 |
| 10-Year | 0.290 |

| | |
|---|---|
| 25-Year | 0.390 |
| 50-Year | 0.486 |
| 100-Year | 0.596 |
| 200-Year | 0.605 |

********** **Subbasin: Basin 7** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

| Tr (yrs) | Flood Peak (cfs) |
|---|---|
| 2-Year | 0.214 |
| 5-Year | 0.282 |
| 10-Year | 0.346 |
| 25-Year | 0.467 |
| 50-Year | 0.600 |
| 100-Year | 0.728 |
| 200-Year | 0.744 |

********** **Subbasin: Basin 8** **********

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

| Tr (yrs) | Flood Peak (cfs) |
|---|---|
| 2-Year | 8.335E-02 |
| 5-Year | 0.107 |
| 10-Year | 0.133 |
| 25-Year | 0.179 |
| 50-Year | 0.219 |
| 100-Year | 0.270 |
| 200-Year | 0.273 |

********** Link: POC Node ********** Link Outflow 1 Frequency Stats
Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

| Tr (yrs) | Flood Peak (cfs) |
|---|---|
| 2-Year | 0.603 |
| 5-Year | 0.787 |
| 10-Year | 0.972 |
| 25-Year | 1.304 |
| 50-Year | 1.628 |
| 100-Year | 1.996 |
| 200-Year | 2.026 |

**********Groundwater Recharge Summary **********
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

| Model Element | Total Predeveloped Recharge During Simulation Recharge Amount (ac-ft) |
|---|---|
| Subbasin: Total Basin | 432.797 |
| Total: | 432.797 |

Total Post Developed Recharge During Simulation

| Model Element | Recharge Amount (ac-ft) |
|---|---|
| Subbasin: Basin 5 | 23.220 |
| Subbasin: Basin 6 | 42.774 |
| Subbasin: Basin 7 | 59.883 |
| Subbasin: Basin 8 | 17.109 |
| Link: POC Node | 0.000 |
| Total: | 142.987 |

**Total Predevelopment Recharge is Greater than Post Developed**
**Average Recharge Per Year, (Number of Years= 158)**
**Predeveloped: 2.739 ac-ft/year, Post Developed: 0.905 ac-ft/year**

************Water Quality Facility Data **************

**----------SCENARIO: PREDEVELOPED**

Number of Links: 0

**----------SCENARIO: POSTDEVELOPED**

Number of Links: 1

********** Link: POC Node **********

Infiltration/Filtration Statistics----------
Inflow Volume (ac-ft): 836.08
Inflow Volume Including PPT-Evap (ac-ft): 836.08
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 836.08
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

************Compliance Point Results **************

Scenario Predeveloped Compliance Subbasin: Total Basin

Scenario Postdeveloped Compliance Link: POC Node

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

| Predevelopment Runoff | | Postdevelopment Runoff | |
|---|---|---|---|
| Tr (Years) | Discharge (cfs) | Tr (Years) | Discharge (cfs) |
| 2-Year | 5.349E-02 | 2-Year | 0.603 |
| 5-Year | 8.717E-02 | 5-Year | 0.787 |
| 10-Year | 0.117 | 10-Year | 0.972 |
| 25-Year | 0.149 | 25-Year | 1.304 |
| 50-Year | 0.190 | 50-Year | 1.628 |
| 100-Year | 0.206 | 100-Year | 1.996 |
| 200-Year | 0.321 | 200-Year | 2.026 |

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

Crestview Village II
City of Mill Creek, WA

# APPENDIX F
## Operations and Maintenance Manual

PACE

## No. 3 – Closed Detention Systems (Tanks/Vaults)

| Maintenance Component | Defect | Conditions 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. |
| | Debris and Sediment | Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter.<br>(Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.) | All sediment and debris removed from storage area. |
| | Joints Between Tank/Pipe Section | Any openings or voids allowing material to be transported into facility.<br>(Will require engineering analysis to determine structural stability). | All joint between tank/pipe sections are sealed. |
| | Tank Pipe Bent Out of Shape | Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability). | Tank/pipe repaired or replaced to design. |
| | Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab | Cracks wider than 1/2-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.<br>Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls. | Vault replaced or repaired to design specifications and is structurally sound.<br>No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe. |
| Manhole | Cover Not in Place | Cover is missing or only partially in place. Any open manhole requires maintenance. | Manhole is closed. |
| | Locking Mechanism Not Working | Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids). | Mechanism opens with proper tools. |
| | 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. |
| | 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. |
| Catch Basins | See “Catch Basins” (No. 5) | See “Catch Basins” (No. 5). | See “Catch Basins” (No. 5). |

## No. 4 – Control Structure/Flow Restrictor

| Maintenance Component | Defect | Condition When Maintenance is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| General | Trash and Debris (Includes Sediment) | Material exceeds 25% of sump depth or 1 foot below orifice plate. | Control structure orifice is not blocked. All trash and debris removed. |
| | Structural Damage | Structure is not securely attached to manhole wall. | Structure securely attached to wall and outlet pipe. |
| | | Structure is not in upright position (allow up to 10% from plumb). | Structure in correct position. |
| | | Connections to outlet pipe are not watertight and show signs of rust. | Connections to outlet pipe are water tight; structure repaired or replaced and works as designed. |
| | | Any holes--other than designed holes--in the structure. | Structure has no holes other than designed holes. |
| Cleanout Gate | Damaged or Missing | Cleanout gate is not watertight or is missing. | Gate is watertight and works as designed. |
| | | Gate cannot be moved up and down by one maintenance person. | Gate moves up and down easily and is watertight. |
| | | Chain/rod leading to gate is missing or damaged. | Chain is in place and works as designed. |
| | | Gate is rusted over 50% of its surface area. | Gate is repaired or replaced to meet design standards. |
| Orifice Plate | Damaged or Missing | Control device is not working properly due to missing, out of place, or bent orifice plate. | Plate is in place and works as designed. |
| | Obstructions | Any trash, debris, sediment, or vegetation blocking the plate. | Plate is free of all obstructions and works as designed. |
| Overflow Pipe | Obstructions | Any trash or debris blocking (or having the potential of blocking) the overflow pipe. | Pipe is free of all obstructions and works as designed. |
| Manhole | See “Closed Detention Systems” (No. 3). | See “Closed Detention Systems” (No. 3). | See “Closed Detention Systems” (No. 3). |
| Catch Basin | See “Catch Basins” (No. 5). | See “Catch Basins” (No. 5). | See “Catch Basins” (No. 5). |

## No. 5 – Catch Basins

| Maintenance Component | Defect | Conditions When Maintenance is Needed | Results Expected When Maintenance is performed |
|---|---|---|---|
| General | Trash & Debris | Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. | No Trash or debris located immediately in front of catch basin or on grate opening. |
| | | 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 six inches clearance from the debris surface to the invert of the lowest pipe. | No trash or debris in the catch basin. |
| | | Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. | Inlet and outlet pipes free of trash or 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. |
| | 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 |
| | Structure Damage to Frame and/or Top Slab | Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch<br>(Intent is to make sure no material is running into basin). | Top slab is free of holes and cracks. |
| | | Frame not sitting flush on top slab, i.e., separation of more than 3/4 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. |
| | Fractures or Cracks in Basin Walls/ Bottom | Maintenance person judges that structure is unsound. | Basin replaced or repaired to design standards. |
| | | Grout fillet has separated or cracked wider than 1/2 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. |
| | Settlement/ Misalignment | If failure of basin has created a safety, function, or design problem. | Basin replaced or repaired to design standards. |
| | Vegetation | Vegetation growing across and blocking more than 10% of the basin opening. | No vegetation blocking opening to basin. |
| | | Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart. | No vegetation or root growth present. |
| | Contamination and Pollution | See "Detention Ponds" (No. 1). | No pollution present. |

## No. 12 – Wetvaults

| Maintenance Component | Defect | Condition When Maintenance is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| General | Trash/Debris Accumulation | Trash and debris accumulated in vault, pipe or inlet/outlet (includes floatables and non-floatables). | Remove trash and debris from vault. |
| | Sediment Accumulation in Vault | Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6-inches. | Remove sediment from vault. |
| | Damaged Pipes | Inlet/outlet piping damaged or broken and in need of repair. | Pipe repaired and/or replaced. |
| | Access Cover Damaged/Not Working | Cover cannot be opened or removed, especially by one person. | Pipe repaired or replaced to proper working specifications. |
| | Ventilation | Ventilation area blocked or plugged. | Blocking material removed or cleared from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see design specifications). |
| | Vault Structure Damage - Includes Cracks in Walls Bottom, Damage to Frame and/or Top Slab | Maintenance/inspection personnel determine that the vault is not structurally sound. | Vault replaced or repairs made so that vault meets design specifications and is structurally sound. |
| | | Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks. | Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe. |
| | Baffles | Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection staff. | Baffles repaired or replaced to specifications. |
| | Access Ladder Damage | Ladder is corroded or deteriorated, not functioning properly, not attached to structure wall, missing rungs, has cracks and/or misaligned. Confined space warning sign missing. | Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. Replace sign warning of confined space entry requirements. Ladder and entry notification complies with OSHA standards. |

## No. 18 – Catchbasin Inserts

| Maintenance Component | Defect | Conditions When Maintenance is Needed | Results Expected When Maintenance is Performed |
|---|---|---|---|
| General | Sediment Accumulation | When sediment forms a cap over the insert media of the insert and/or unit. | No sediment cap on the insert media and its unit. |
| | Trash and Debris Accumulation | Trash and debris accumulates on insert unit creating a blockage/restriction. | Trash and debris removed from insert unit. Runoff freely flows into catch basin. |
| | Media Insert Not Removing Oil | Effluent water from media insert has a visible sheen. | Effluent water from media insert is free of oils and has no visible sheen. |
| | Media Insert Water Saturated | Catch basin insert is saturated with water and no longer has the capacity to absorb. | Remove and replace media insert |
| | Media Insert-Oil Saturated | Media oil saturated due to petroleum spill that drains into catch basin. | Remove and replace media insert. |
| | Media Insert Use Beyond Normal Product Life | Media has been used beyond the typical average life of media insert product. | Remove and replace media at regular intervals, depending on insert product. |

# Site Improvement Bond Quantity Worksheet

Web date: 04/03/2015

**Original bond computations prepared by:**

| | | | |
|---|---|---|---|
| **Name:** | Ken McIntyre | **Date:** | 1/14/2020 |
| **PE Registration Number:** | 39018 | **Tel. #:** | |
| **Firm Name:** | PACE Engineers | | |
| **Address:** | 1724 W. Marine View Dr #140, Everett, WA | **Project No:** | |

## FINANCIAL GUARANTEE REQUIREMENTS

| | | PERFORMANCE BOND* AMOUNT | MINIMUM BOND* AMOUNT REQUIRED FOR RECORDING OR TEMPORARY OCCUPANCY AT SUBSTANTIAL COMPLETION *** | PUBLIC ROAD & DRAINAGE MAINTENANCE/DEFECT BOND* |
|---|---|---|---|---|
| Stabilization/Erosion Sediment Control (ESC) | (A) | $ 33,675.9 | | |
| Existing Right-of-Way Improvements | (B) | $ 1,248.0 | | |
| Future Public Right of Way & Drainage Facilities | (C) | $ 650,389.0 | | |
| Private Improvements | (D) | $ 264,881.5 | | |
| Calculated Quantity Completed | | | | |
| Total Right-of Way and/or Site Restoration Bond*/** (First $7,500 of bond* shall be cash.) | (A+B) | $ 34,923.9 | | |
| Performance Bond* Amount (A+B+C+D) = TOTAL | (T) | $ 950,194.3 Minimum is $2000. | T x 0.30 $ 285,058.3 Minimum is $2000. | |
| Maintenance/Defect Bond* Total | | | | (B+C) x 0.25 = $ 162,909.2 Minimum is $2000. |

NAME OF PERSON PREPARING BOND* REDUCTION: _____ Date: _____

*** NOTE:** The word "bond" as used in this document means a financial guarantee acceptable to King County.

**** NOTE:** KCC 27A authorizes right of way and site restoration bonds to be combined when both are required. The restoration requirement shall include the total cost for all TESC as a minimum, not a maximum. In addition, corrective work, both on- and off-site needs to be included. Quantities shall reflect worse case scenarios not just minimum requirements. For example, if a salmonid stream may be damaged, some estimated costs for restoration needs to be reflected in this amount. The 30% contingency and mobilization costs are computed in this quantity.

***** NOTE:** Per KCC 27A, total bond amounts remaining after reduction shall not be less than 30% of the original amount (T) or as revised by major design changes.

REQUIRED BOND* AMOUNTS ARE SUBJECT TO REVIEW AND MODIFICATION BY KING COUNTY



***Check out the DDES Web site at www.kingcounty.gov/permits***

Unit prices updated: 03/02/2015
Version: 03/02/2015
Report Date: 2/17/2020