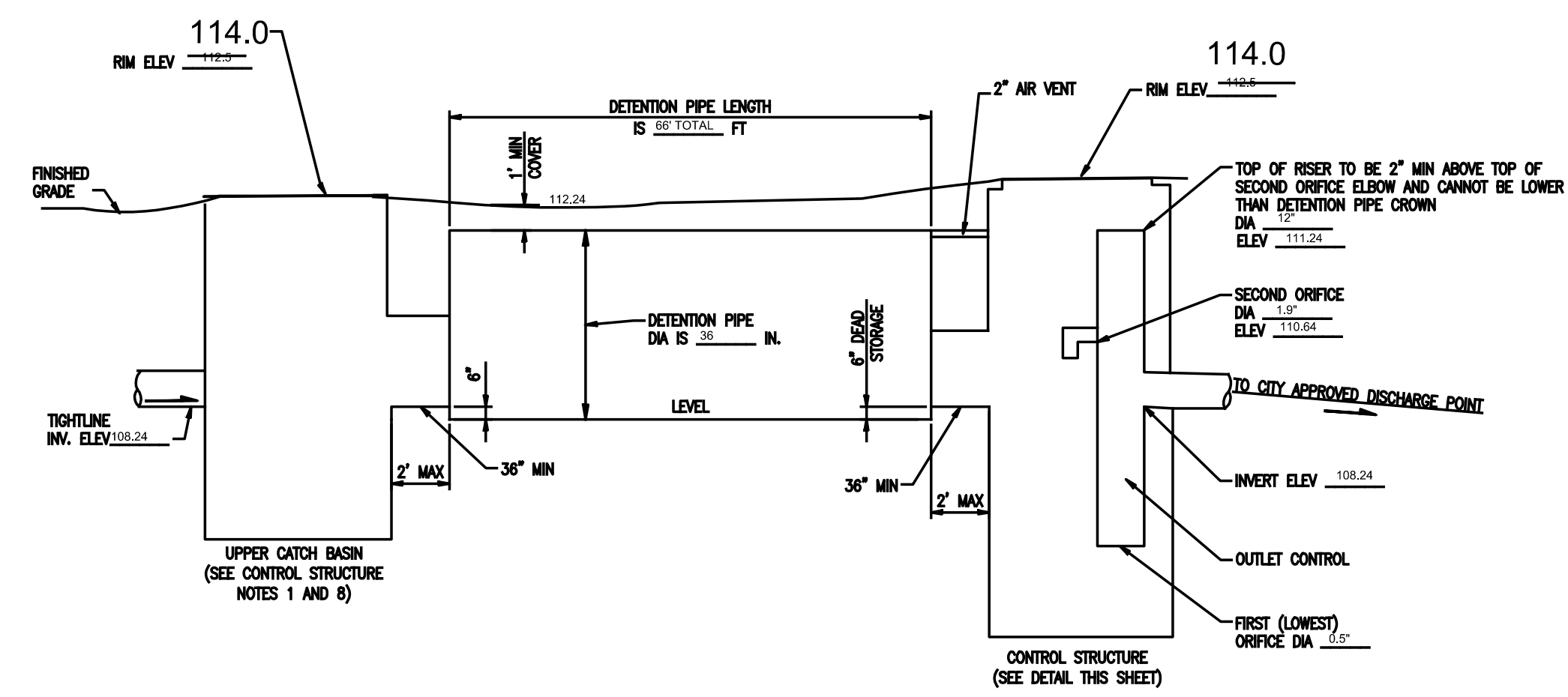
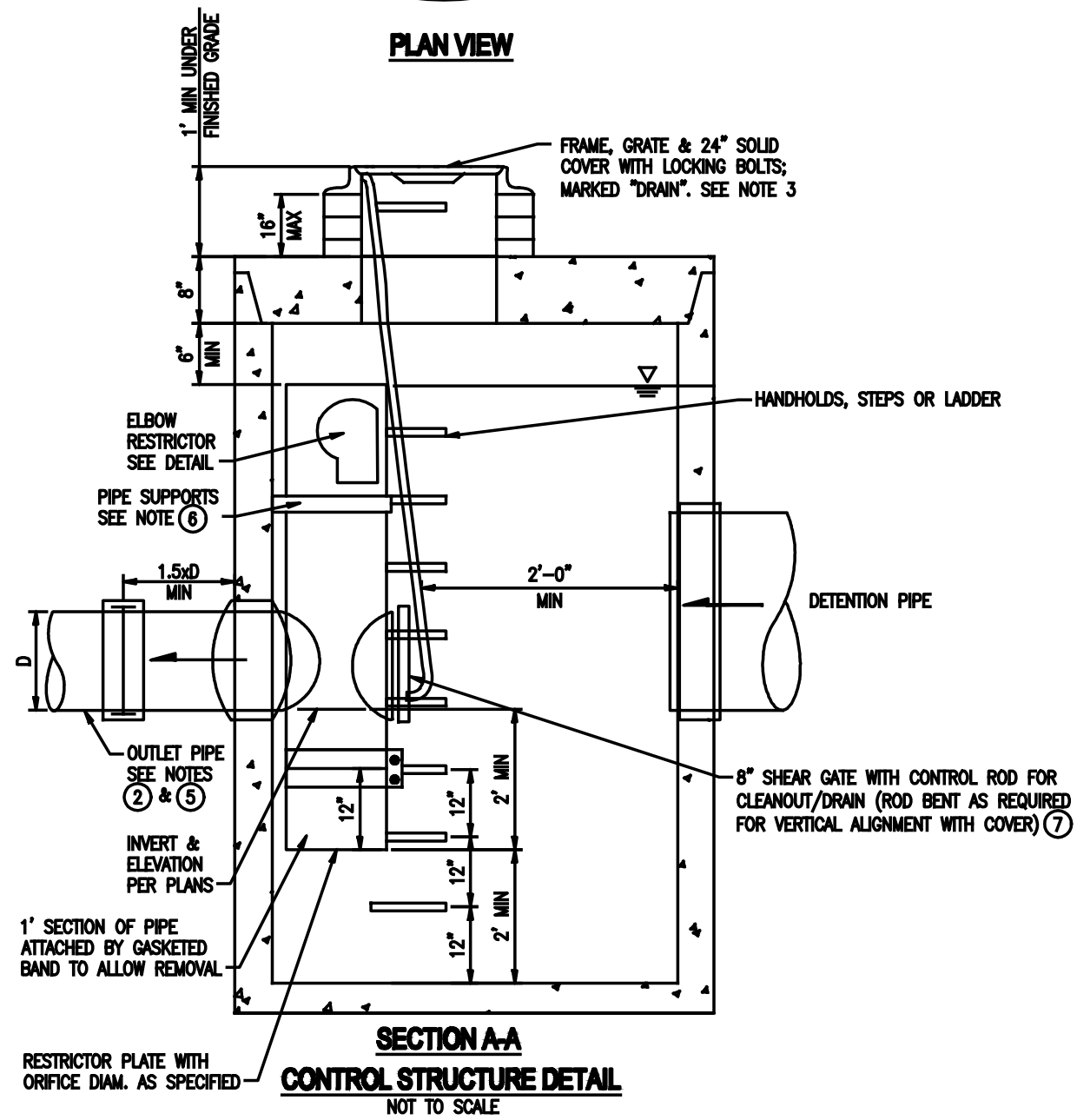
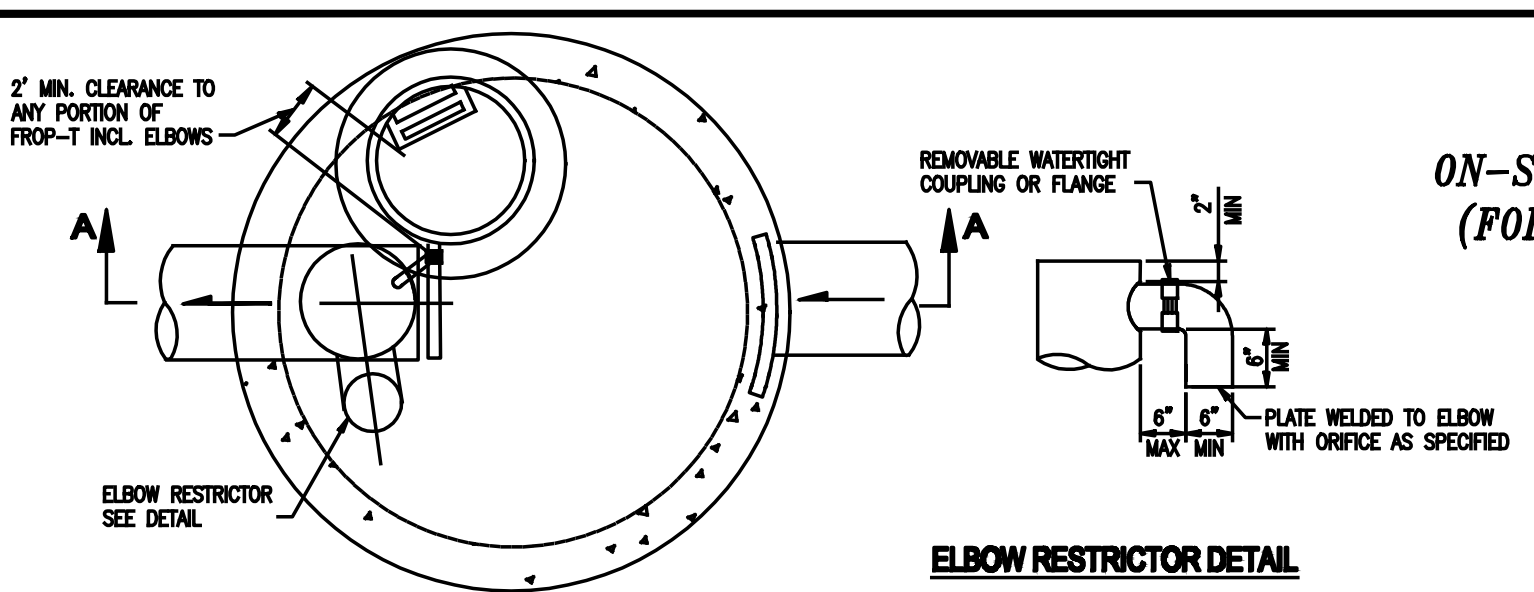


**ATTACHMENT 1  
CITY OF MERCER ISLAND  
ON-SITE DETENTION SYSTEM WORKSHEET  
(FOR NEW PLUS REPLACED IMPERVIOUS  
AREA OF 9,500 SF OR LESS)**

OWNER: YONG	ADDRESS: 2423 63RD AVE SE	PREPARED BY: ANSTEY ENGINEERING
PERMIT #:	MERCER ISLAND, WA	PHONE: 206-303-7639
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF):	DETECTION PIPE DIA (INCH): 36"	DETECTION PIPE LENGTH (FT): 66'
SOIL TYPE: ALDERWOOD TYPE C	PIPE MATERIAL: LCPPE	ORIFICE #1 DIA 0.5" INCH, ELEV 108.24
		ORIFICE #2 DIA 1.0" INCH, ELEV 110.64



- CONTROL STRUCTURE NOTES:**
- USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
  - OUTLET PIPE: MIN. 6 INCH.
  - METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
  - FRAME AND LADDER OR STEPS OFFSET SO:
    - A. CLEANOUT GATE IS VISIBLE FROM TOP;
    - B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE;
    - C. FRAME IS CLEAR OF CURB.
  - IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.

- ON-SITE DETENTION SYSTEM NOTES:**
- PROVIDE AT LEAST ONE 3 X 0.080 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MAXIMUM 3'-0" VERTICAL SPACING).
  - THE SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION Z532A; 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). IT MAY BE OF SOLID ROD OR HOLLOW TUBING, 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 LD AND THE BODY SHALL BE MACHINED FOR PROPER FIT. ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
  - THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

- ON-SITE DETENTION SYSTEM NOTES:**
- CALL DEVELOPMENT SERVICES (206-275-7605) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTIONS.
  - RESPONSIBILITY FOR OPERATION AND MAINTENANCE OF DRAINAGE SYSTEMS ON PRIVATE PROPERTY IS RESPONSIBILITY OF THE PROPERTY OWNER. MATERIAL ACCUMULATED IN THE STORAGE PIPE MUST BE REMOVED FROM CATCH BASINS TO ALLOW PROPER OPERATION. THE OUTLET CONTROL ORIFICE MUST BE KEPT OPEN AT ALL TIMES.
  - PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 9.05 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST VERSION. SUCH MATERIALS INCLUDE THE FOLLOWING, LINED CORRUGATED POLYETHYLENE PIPE (LCPPE), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND PIPE ARCH (MEETS AASHTO DESIGNATIONS M274 AND M36), CORRUGATED OR SPIRAL RIB ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
  - FOOTING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

**Table 1**  
ON-SITE DETENTION DESIGN FOR PROJECTS BETWEEN 500 SF AND 9,500 SF NEW PLUS REPLACED IMPERVIOUS SURFACE AREA

New and Replaced Impervious Surface Area (sf)	Detention Pipe Diameter (in)	Detention Pipe Length (ft)		Lowest Orifice Diameter (in) <sup>(1)</sup>		Distance from Outlet Invert to Second Orifice (ft)		Second Orifice Diameter (in)	
		B soils	C soils	B soils	C soils	B soils	C soils	B soils	C soils
500 to 1,000 sf	36"	30	22	0.5	0.5	2.2	2.0	0.5	0.8
	48"	18	11	0.5	0.5	3.3	3.2	0.9	0.8
	60"	11	7	0.5	0.5	4.2	3.4	0.5	0.6
1,001 to 2,000 sf	36"	66	43	0.5	0.5	2.2	2.3	0.9	1.4
	48"	34	23	0.5	0.5	3.2	3.3	0.9	1.2
	60"	22	14	0.5	0.5	4.3	3.6	0.9	0.9
2,001 to 3,000 sf	36"	90	66	0.5	0.5	2.2	2.4	0.9	1.9
	48"	48	36	0.5	0.5	3.1	2.8	0.9	1.5
	60"	30	20	0.5	0.5	4.2	3.7	0.9	1.1
3,001 to 4,000 sf	36"	120	78	0.5	0.5	2.4	2.2	1.4	1.6
	48"	62	42	0.5	0.5	2.8	2.9	0.8	1.3
	60"	42	26	0.5	0.5	3.8	3.9	0.9	1.3
4,001 to 5,000 sf	36"	134	91	0.5	0.5	2.8	2.2	1.7	1.5
	48"	73	49	0.5	0.5	3.6	2.9	1.6	1.5
	60"	46	31	0.5	0.5	4.6	3.5	1.6	1.3
5,001 to 6,000 sf	36"	162	109	0.5	0.5	2.7	2.2	1.8	1.6
	48"	90	59	0.5	0.5	3.5	2.9	1.7	1.5
	60"	54	37	0.5	0.5	4.6	3.6	1.6	1.4
6,001 to 7,000 sf	36"	192	128	0.5	0.5	2.7	2.2	1.9	1.8
	48"	102	68	0.5	0.5	3.7	2.9	1.9	1.6
	60"	64	43	0.5	0.5	4.6	3.6	1.8	1.5
7,001 to 8,000 sf	36"	216	146	0.5	0.5	2.8	2.2	2.0	1.9
	48"	119	79	0.5	0.5	3.8	2.9	2.2	1.7
	60"	73	49	0.5	0.5	4.5	3.6	2.0	1.6
8,001 to 8,500 sf <sup>(1)</sup>	36"	228	155	0.5	0.5	2.8	2.2	2.1	1.9
	48"	124	84	0.5	0.5	3.7	2.9	1.9	1.8
	60"	77	53	0.5	0.5	4.6	3.6	2.0	1.6
8,501 to 9,000 sf	36"	NA <sup>(2)</sup>	164	0.5	0.5	NA <sup>(2)</sup>	2.2	NA <sup>(2)</sup>	1.9
	48"	NA <sup>(2)</sup>	89	0.5	0.5	NA <sup>(2)</sup>	2.9	NA <sup>(2)</sup>	1.9
	60"	NA <sup>(2)</sup>	55	0.5	0.5	NA <sup>(2)</sup>	3.6	NA <sup>(2)</sup>	1.7
9,001 to 9,500 sf <sup>(2)</sup>	36"	NA <sup>(2)</sup>	174	0.5	0.5	NA <sup>(2)</sup>	2.2	NA <sup>(2)</sup>	2.1
	48"	NA <sup>(2)</sup>	94	0.5	0.5	NA <sup>(2)</sup>	2.9	NA <sup>(2)</sup>	2.0
	60"	NA <sup>(2)</sup>	58	0.5	0.5	NA <sup>(2)</sup>	3.7	NA <sup>(2)</sup>	1.7

**Notes:**

- Minimum Requirement #7 (Flow Control) is required when the 100-year flow frequency causes a 0.15 cubic feet per second increase (when modeled in WWHM with a 15-minute timestep). Breakpoints shown in this table are based on a flat slope (0-5%). The 100-year flow frequency will need to be evaluated on a site-specific basis for projects on moderate (5-15%) or steep (> 15%) slopes.
- Soil type to be determined by geotechnical analysis or soil map.
- String includes a Volume Correction Factor of 120%.
- Upper bound contributing area used for sizing.

**Notes of Sizing Assumptions:**

- Based per ARRS in the Stormwater Management Manual for Puget Sound Basin (1992 Ecology Manual) SBUH, Type 1A, 24-hour hydrograph
- 2-year, 24-hour storm = 2 in.; 10-year, 24-hour storm = 3 in.; 100-year, 24-hour storm = 4 in.
- Predeveloped = second growth forest (CN = 72 for Type B soils, CN = 81 for Type C soils)
- Developed = impervious (CN = 98)
- 0.5 foot of sediment storage in detention pipe
- Overland slope = 5%

in = inch  
ft = feet  
sf = square feet

Last updated 1-26-18

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**Internet #100187441**  
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**Pro Series 5 in. x 40 in. Channel and Grate Kit with End Outlet**

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NO	DATE	BY	APPR	REVISIONS
1	3/14/23	bpa	bpa	CHANGE End CBs TO 54 INCH RIM TO 114
2	4/12/23	bpa	bpa	2 FT WALL FOR PLANTER AROUND MANHOLES
3	5/17/23	bpa	bpa	REMOVE EDITS TO DETENTION DETAIL

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Approved By  


BPA 12/17/19  
DESIGNED BY DATE  
BPA 12/17/19  
DRAWN BY DATE  
CHECKED BY DATE

MINGQIN LI & SUN YONG  
2423 63RD AVE SE  
MERCER ISLAND, WA 98040

**SITE & DRAINAGE  
PLAN DETAILS**

AE2019-84      SHT 2 OF 2