

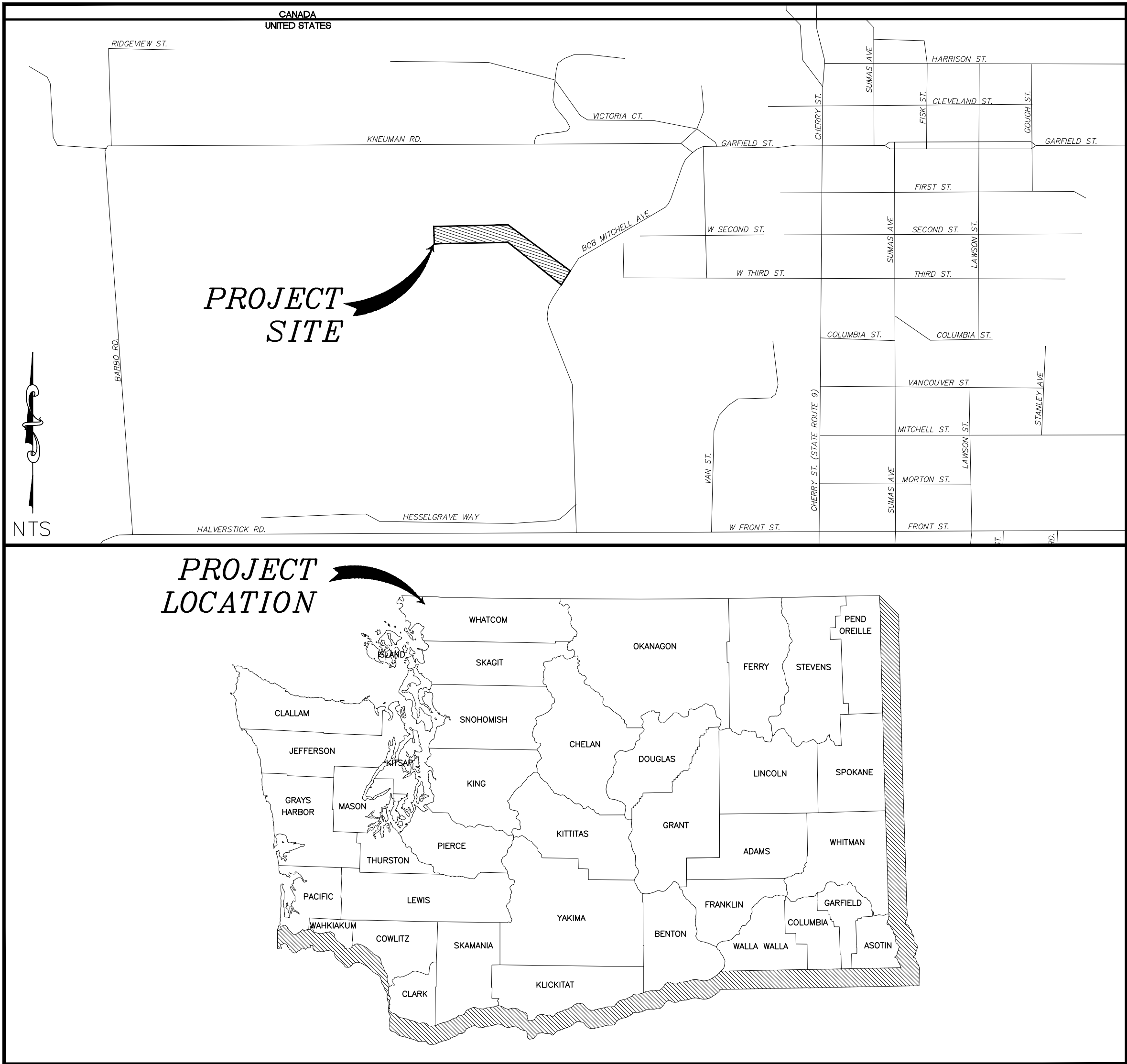
SUMAS DEVELOPMENTS

GRAINGER WAY

SUMAS, WA

VICINITY MAP

PROJECT LOCATED IN SECTION 34, TOWNSHIP 41N, RANGE 04E, W.M.



SHEET SERIES INDEX

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DETAILED GRADING OF THE PROJECT, INCLUDING CHECKING INVERTS AND RIMS OF STORMWATER FACILITIES, HAVE NOT BEEN COMPLETED SINCE THE LATEST PROJECT REDESIGN PER OWNER INSTRUCTION. ADDITIONALLY, DETAILED TESC AND DEMO PLANS, AND RESTORATION PLANS HAVE NOT BEEN REVISED.



EXHIBIT

DESIGNED BY
BLB
DRAWN BY
BLB/LMH
CHECKED BY
DLB

R&E Reichhardt & Ebe
ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
COVER

DWG 8053.4 COVER

JOB#

8053.4

SCALE

H: N/A

V: N/A

DATE

1/20/2023

SHEET

1
of 18

LINETYPES

EXISTING	
	= EXISTING TOP OF BANK
	= EXISTING BOTTOM OF BANK
	= EXISTING DITCH CL
	= EXISTING GRADE BREAK
	= EXISTING MAJOR CONTOUR
	= EXISTING MINOR CONTOUR
	= EXISTING GUARDRAIL
	= EXISTING FENCE
	= EXISTING HANDRAIL
	= EXISTING GRAVEL
	= EXISTING WALL
	= EXISTING BUILDING
	= EXISTING PROPERTY BOUNDARY
	= EXISTING RIGHT OF WAY
	= EXISTING RIGHT OF WAY CL
	= EXISTING EASEMENT
	= EXISTING SECTION LINE
	= EXISTING ROAD CL
	= EXISTING WETLANDS BOUNDARY
	= EXISTING STRIPE
	= EXISTING EDGE OF PAVEMENT
	= EXISTING FLOWLINE
	= EXISTING TOP BACK OF CURB
	= EXISTING SIDEWALK
	= EXISTING BURIED POWER
	= EXISTING OVERHEAD POWER
	= EXISTING BURIED COMMUNICATIONS
	= EXISTING OVERHEAD COMMUNICATIONS
	= EXISTING BURIED FIBER OPTICS
	= EXISTING BURIED TV
	= EXISTING BURIED TELEPHONE
	= EXISTING CONDUIT
	= EXISTING GAS MAIN
	= EXISTING WATER MAIN
	= EXISTING IRRIGATION LINE
	= EXISTING SANITARY SEWER FORCE MAIN
	= EXISTING SANITARY SEWER
	= EXISTING STORM DRAIN
	= EXISTING ORDINARY HIGH WATER
	= EXISTING RR TRACKS
	= EXISTING CULVERT
	= EXISTING TREE LINE
	= EXISTING CONCRETE
	= EXISTING WETLAND

PROPOSED

	= PROPOSED TOP OF BANK
	= PROPOSED BOTTOM OF BANK
	= PROPOSED DITCH CL
	= PROPOSED GRADE BREAK
	= PROPOSED MAJOR CONTOUR
	= PROPOSED MINOR CONTOUR
	= PROPOSED GUARDRAIL
	= PROPOSED FENCE
	= PROPOSED HANDRAIL
	= PROPOSED GRAVEL
	= PROPOSED WALL
	= PROPOSED BUILDING
	= PROPOSED PAVEMENT VALLEY
	= PROPOSED RIGHT OF WAY
	= PROPOSED CONSTRUCTION EASEMENT
	= PROPOSED ROAD CL
	= PROPOSED SAWCUT
	= PROPOSED STRIPE
	= PROPOSED EDGE OF PAVEMENT
	= PROPOSED CURB AND GUTTER
	= PROPOSED PATH
	= PROPOSED SIDEWALK
	= PROPOSED BURIED POWER
	= PROPOSED OVERHEAD POWER
	= PROPOSED TRAFFIC SIGNAL CONDUCTOR
	= PROPOSED FIBER OPTICS
	= PROPOSED BURIED COMMUNICATIONS
	= PROPOSED OVERHEAD COMMUNICATIONS
	= PROPOSED HIGH VISIBILITY SILT FENCE
	= PROPOSED SILT FENCE
	= PROPOSED CONDUIT
	= PROPOSED IRRIGATION LINE
	= PROPOSED WATER MAIN
	= PROPOSED SANITARY SEWER FORCE MAIN
	= PROPOSED SANITARY SEWER
	= PROPOSED STORM DRAIN
	= PROPOSED CULVERT
	= PROPOSED TREE/SHRUB LINE
	= PROPOSED CONC. SIDEWALK/DRIVEWAY
	= PROPOSED INFILTRATION TRENCH
	= PROPOSED INFILTRATION FILTER MEDIA
	= PROPOSED GRIND
	= PROPOSED DEMOLITION AREA
	= PROPOSED ASPHALT
	= PROPOSED RIGHT OF WAY ACQUISITION

LEGEND

EXISTING

	= EXISTING SIGNAL POLE
	= EXISTING SIGNAL POLE W/ LUMINAIRE
	= EXISTING STREET LIGHT ASSEMBLY
	= EXISTING YARD LIGHT
	= EXISTING GUY WIRE
	= EXISTING TRANSFORMER PAD
	= EXISTING POWER VAULT
	= EXISTING JBOX
	= EXISTING UTILITY POLE
	= EXISTING TRAFFIC SIGNAL VAULT
	= EXISTING GAS METER
	= EXISTING GAS VALVE
	= EXISTING TELEPHONE PEDESTAL
	= EXISTING COMMUNICATIONS MANHOLE
	= EXISTING COMMUNICATIONS VAULT
	= EXISTING WATER SPIGOT
	= EXISTING WATER BLOW OFF
	= EXISTING WATER METER
	= EXISTING WATER VALVE
	= EXISTING FIRE HYDRANT
	= EXISTING RIP RAP OR QUARRY SPALLS
	= EXISTING STORM AREA DRAIN
	= EXISTING STORM DRAIN CATCH BASIN TYPE I/INLET
	= EXISTING STORM DRAIN CATCH BASIN TYPE II
	= EXISTING STORM CLEANOUT
	= EXISTING SEWER CLEANOUT
	= EXISTING SEWER MANHOLE
	= EXISTING SOIL BORING LOCATION
	= EXISTING MONITORING WELL
	= EXISTING STOP BAR OR CROSSWALK
	= EXISTING MAIL BOX
	= EXISTING SIGN
	= EXISTING BENCH MARK
	= EXISTING NAIL AND SHINER
	= EXISTING IRON PIPE
	= EXISTING MONUMENT (IN CASE)
	= EXISTING MONUMENT (SURFACE)
	= EXISTING ANGLE POINT
	= EXISTING ROCK WALL
	= EXISTING TREE STUMP
	= EXISTING SHRUB
	= EXISTING TREE

SYMBOLS

PROPOSED

	= PROPOSED HYDRANT
	= PROPOSED COUPLER
	= PROPOSED WATER METER
	= PROPOSED WATER VALVE
	= PROPOSED RIP RAP OR QUARRY SPALLS
	= PROPOSED STORM AREA DRAIN
	= PROPOSED STORM DRAIN CATCH BASIN TYPE I/INLET
	= PROPOSED STORM DRAIN CATCH BASIN TYPE II
	= PROPOSED STORM CLEANOUT
	= PROPOSED SANITARY SEWER CLEAN OUT
	= PROPOSED SANITARY SEWER MANHOLE
	= PROPOSED UTILITY POLE
	= PROPOSED JBOX (TYPE I, II, III)
	= PROPOSED MONITORING WELL
	= PROPOSED STOP BAR OR CROSSWALK
	= PROPOSED SIGN
	= PROPOSED FLOW ARROW
	= PROPOSED ROCK WALL
	= PROPOSED TREE
	= SECTION MARK

EXISTING

	= MONITORING WELL
	= ADAPTER, FLxMJ
	= 90° BEND, FL
	= 45° BEND, FL
	= 22.5° BEND, FL
	= 11.25° BEND, FL
	= 90° BEND, MJ
	= 45° BEND, MJ
	= 22.5° BEND, MJ
	= 11.25° BEND, MJ
	= REDUCER
	= REDUCER, FL
	= REDUCER, MJ
	= REDUCER, MJxFL
	= REDUCER, MJxPE
	= REDUCER, PEXMJ/FLxMJ
	= TAPPING TEE & VALVE, FLxMJ
	= TEE, FL
	= TEE, MJ
	= TEE, MJxFL
	= AIR-RELIEF VALVE
	= BLOW-OFF VALVE
	= BUTTERFLY VALVE
	= BUTTERFLY VALVE, FLxMJ
	= BUTTERFLY VALVE, MJ
	= CHECK VALVE
	= PRESSURE REDUCING VALVE
	= GATE VALVE, FL
	= GATE VALVE, FLxMJ
	= GATE VALVE, MJ
	= PLUG VALVE
	= SPIGOT
	= SPRINKLER
	= CAP/PLUG
	= COUPLING
	= GUARD POST
	= THRUST BLOCK
	= METER
	= FIRE HYDRANT, 3-NOZZLE
	= FIRE HYDRANT, 2-NOZZLE
	= JOINTS, FL/BLIND FL
	= JOINTS, MJ
	= JOINTS, PUSH-ON/HUB
	= JOINTS, THREAD
	= IRRIGATION VALVE
	= FIRE DEPARTMENT CONNECTION
	= POST INDICATOR VALVE

WATER DETAILS

PROPOSED

	= MONITORING WELL
	= ADAPTER, FLxMJ
	= 90° BEND, FL
	= 45° BEND, FL
	= 22.5° BEND, FL
	= 11.25° BEND, FL
	= 90° BEND, MJ
	= 45° BEND, MJ
	= 22.5° BEND, MJ
	= 11.25° BEND, MJ
	= REDUCER
	= REDUCER, FL
	= REDUCER, MJ
	= REDUCER, MJxFL
	= REDUCER, MJxPE
	= REDUCER, PEXMJ/FLxMJ
	= TAPPING TEE & VALVE, FLxMJ
	= TEE, FL
	= TEE, MJ
	= TEE, MJxFL
	= AIR-RELIEF VALVE
	= BLOW-OFF VALVE
	= BUTTERFLY VALVE
	= BUTTERFLY VALVE, FLxMJ
	= BUTTERFLY VALVE, MJ
	= CHECK VALVE
	= PRESSURE REDUCING VALVE
	= GATE VALVE, FL
	= GATE VALVE, FLxMJ
	= GATE VALVE, MJ
	= PLUG VALVE
	= SPIGOT
	= SPRINKLER
	= CAP/PLUG
	= COUPLING
	= GUARD POST
	= THRUST BLOCK
	= METER
	= FIRE HYDRANT, 3-NOZZLE
	= FIRE HYDRANT, 2-NOZZLE
	= JOINTS, FL/BLIND FL
	= JOINTS, MJ
	= JOINTS, PUSH-ON/HUB
	= JOINTS, THREAD
	= IRRIGATION VALVE
	= FIRE DEPARTMENT CONNECTION
	= POST INDICATOR VALVE

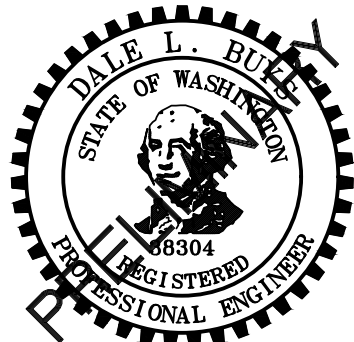
NOTES:

- (WA) ADJUST WATER VALVE BOX TO FINISHED GRADE.
- (SS) ADJUST SANITARY SEWER MANHOLE RING & COVER OR CLEANOUT TO FINISHED GRADE.

- HERRINGBONE GRATES SHALL BE USED ON ALL STORM DRAIN STRUCTURES UNLESS OTHERWISE NOTED.
- CATCH BASIN & MANHOLE CENTER OF STRUCTURE ORIENTATION RELATIVE TO FRAME & GRATE OR RING & COVER SHALL BE AS SHOWN ON THE PLANS.
- ALL NON-SURVEYED WATER VALVE BOXES DISCOVERED IN A PAVED AREA SHALL BE ADJUSTED TO FINISHED GRADE.

ABBREVIATIONS

Δ = DELTA	EX, EXIST = EXISTING	MON = MONUMENT	SD = STORM DRAIN
Ø = DIAMETER	IR = EXISTING IRRIGATION	MPOC = MID-POINT ON CURVE	SDCO = STORM DRAIN CLEAN OUT
AC = ASBESTOS CEMENT	F&C = FRAME & COVER	MTR = METER	SDCB = STORM DRAIN CATCH BASIN
AD = ALGEBRAIC DIFFERENCE	F&G = FRAME & GRATE	MW = MONITORING WELL	SDMH = STORM DRAIN MANHOLE
ASPH = ASPHALT	FDC = FIRE DEPARTMENT CONNECTION	N = NORTH	SE = SOUTHEAST
BLDG = BUILDING	FF = FINISHED FLOOR	N/A = NOT APPLICABLE	SN = EXISTING SIGN
BVCE = BEGIN VERTICAL CURVE ELEVATION	FG = FINISHED GRADE	NE = NORTHEAST	SP = STANDARD PLAN
BVCS = BEGIN VERTICAL CURVE STATION	FL = FLOWLINE	NW = NORTHWEST	SSCO = SANITARY SEWER CLEAN OUT
C&G = CURB & GUTTER	FT = FEET	NTS = NOT TO SCALE	SSMH = SANITARY SEWER MANHOLE
C&TV = CABLE TELEVISION	FND = FOUND	OC = ON CENTER	STA = STATION
CDF = CONTROLLED DENSITY FILL	FT = FEET	PWMT = PAVEMENT	STD = STANDARD
CL = CENTERLINE	FT/FT = FEET PER FOOT	PC = POINT OF CURVATURE	SW = SOUTHWEST
CL = CLASS	GALV = GALVANIZED	PCC = POINT OF COMPOUND CURVATURE,	TBC = TOP BACK OF CURB
OMP = CORRUGATED METAL PIPE	GRVL = GRAVEL	PORTLAND CEMENT CONCRETE	TEL = TELEPHONE
CMU = CONCRETE MASONRY UNIT	GV = GATE VALVE	PED = PEDESTAL	TL = TRAFFIC LOOP
COMP = COMPACTED	HDPE = HIGH DENSITY POLYETHYLENE	PIV = POST INDICATOR VALVE	TYP = TYPICAL
CON = CONIFER	HMA = HOT MIX ASPHALT	POC = POINT ON CURVE	UP = UTILITY POLE
CONC = CONCRETE	HP = HIGH POINT	POSS = POSSIBLE	UTIL = UTILITY
CONT = CONTOUR	HYD = HYDRANT	PRC = POINT OF REVERSE CURVE	VC = VERTICAL CURVE
CPSSP = CORRUGATED POLYETHYLENE STORM SEWER PIPE	IE, INV = INVERT ELEVATION	PROP = PROPOSED	VLT = VAULT
CULV = CULVERT	IW = INJECTION WELL	PT = POINT OF TANGENCY	VPC = VERTICAL POINT OF CURVATURE
D/W = DRIVEWAY	L = LENGTH	PVC = POLYVINYL CHLORIDE	VPI = VERTICAL POINT OF INTERSECTION
DEC = DECIDUOUS	LDSC = LANDSCAPING	PVI = POINT OF VERTICAL INTERSECTION	VPT = VERTICAL POINT OF TANGENCY
DI = DUCTILE IRON	LF = LINEAR FEET	PWR = POWER	W = WEST
E = EAST	LDC = LOCATION	R = RADIUS	WM = WATER METER / WATER MAIN
EL = ELEVATION	LP = LOW POINT	R&C = RING & COVER	WSEL = WATER SURFACE ELEVATION
EOP, EP = EDGE OF PAVEMENT	LT = LEFT	RET = RETAINING	WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
EQUIV = EQUIVALENT	MAX = MAXIMUM	ROW = RIGHT OF WAY	
EVCE = END VERTICAL CURVE ELEVATION	MIN = MINIMUM	RT = RIGHT	
EVCS = END VERTICAL CURVE STATION	MJ = MECHANICAL JOINT	S = SOUTH	
	MOD = MODIFIED	SCH = SCHEDULE	



EXHIBIT

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BLB
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DLB

R&E Reichhardt & Ebe
ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
LEGEND AND ABBREVIATIONS

DWG 8053.4 PLOT

JOB#

8053.4

SCALE

H: N/A

V: N/A

DATE

1/20/2023

SHEET

2

of 18

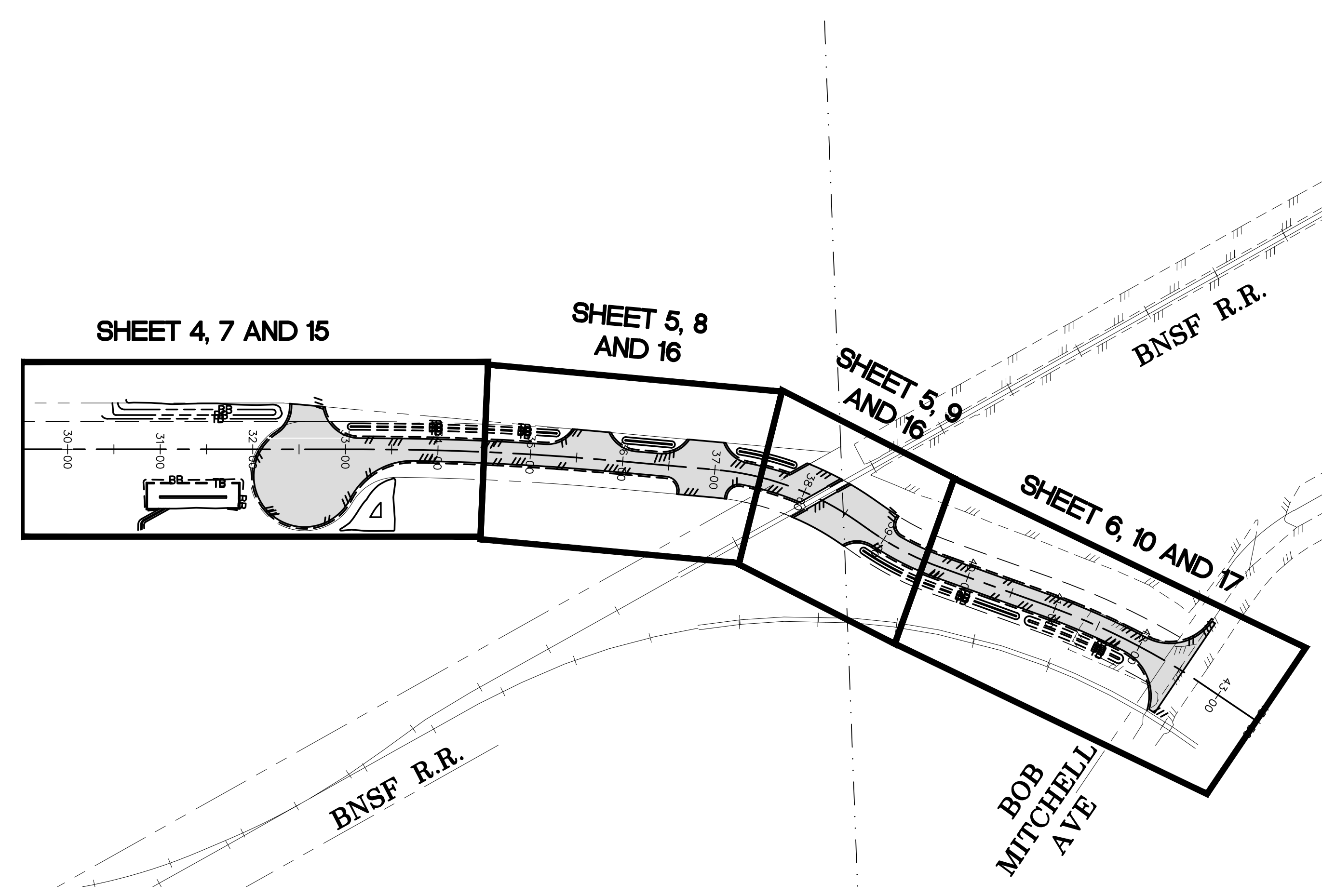
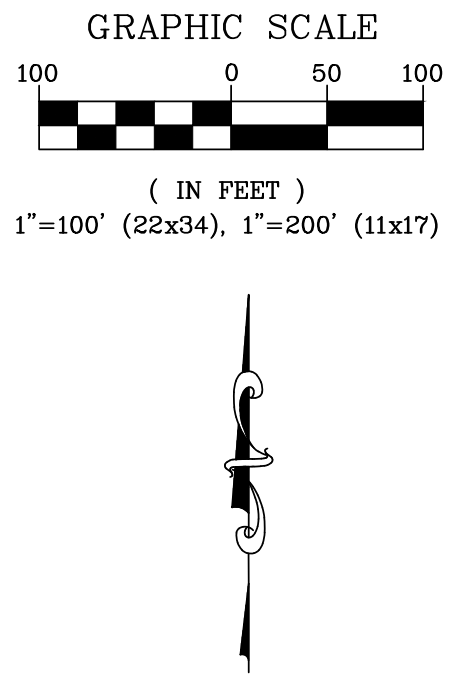
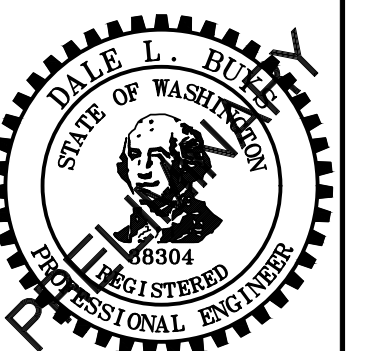
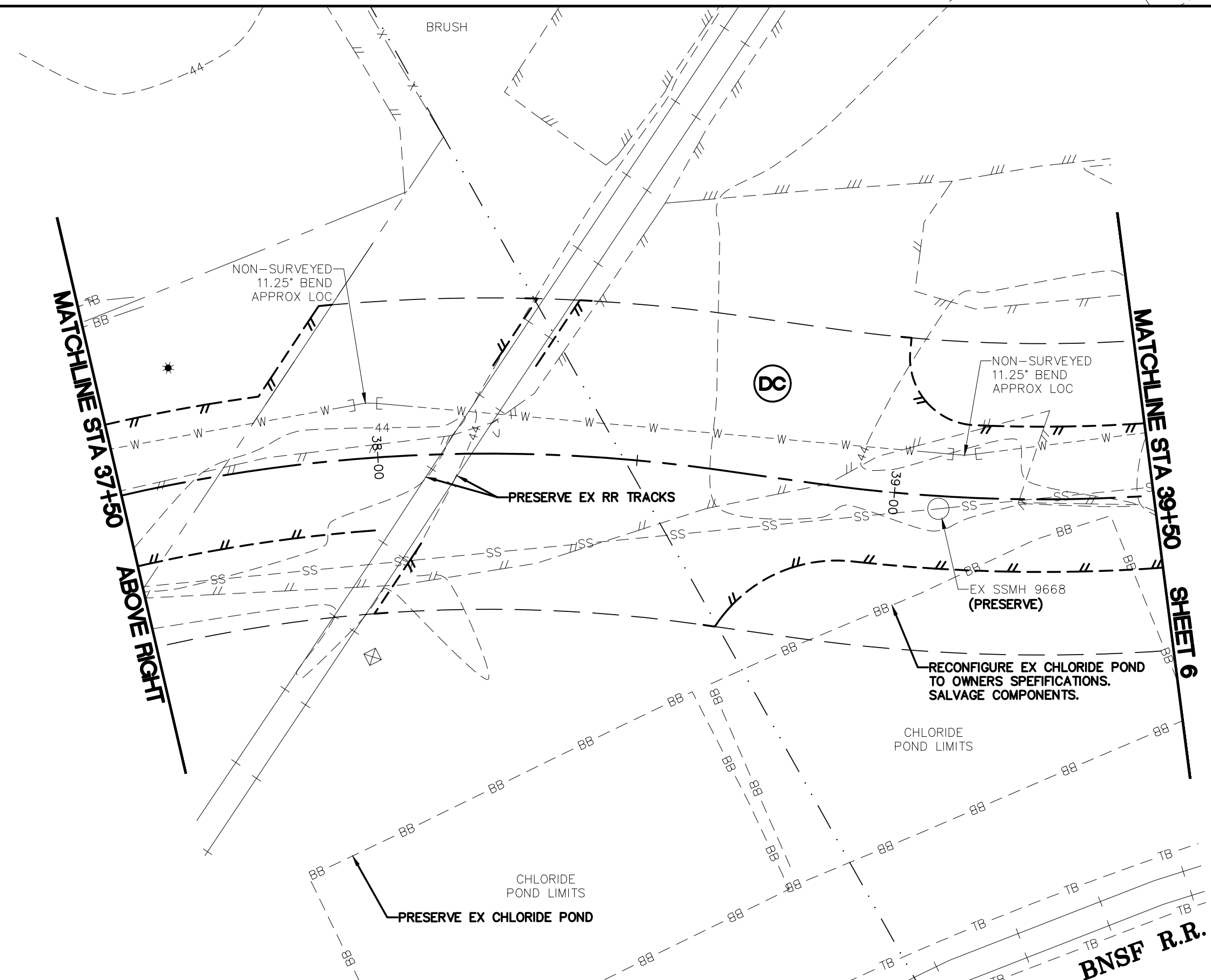
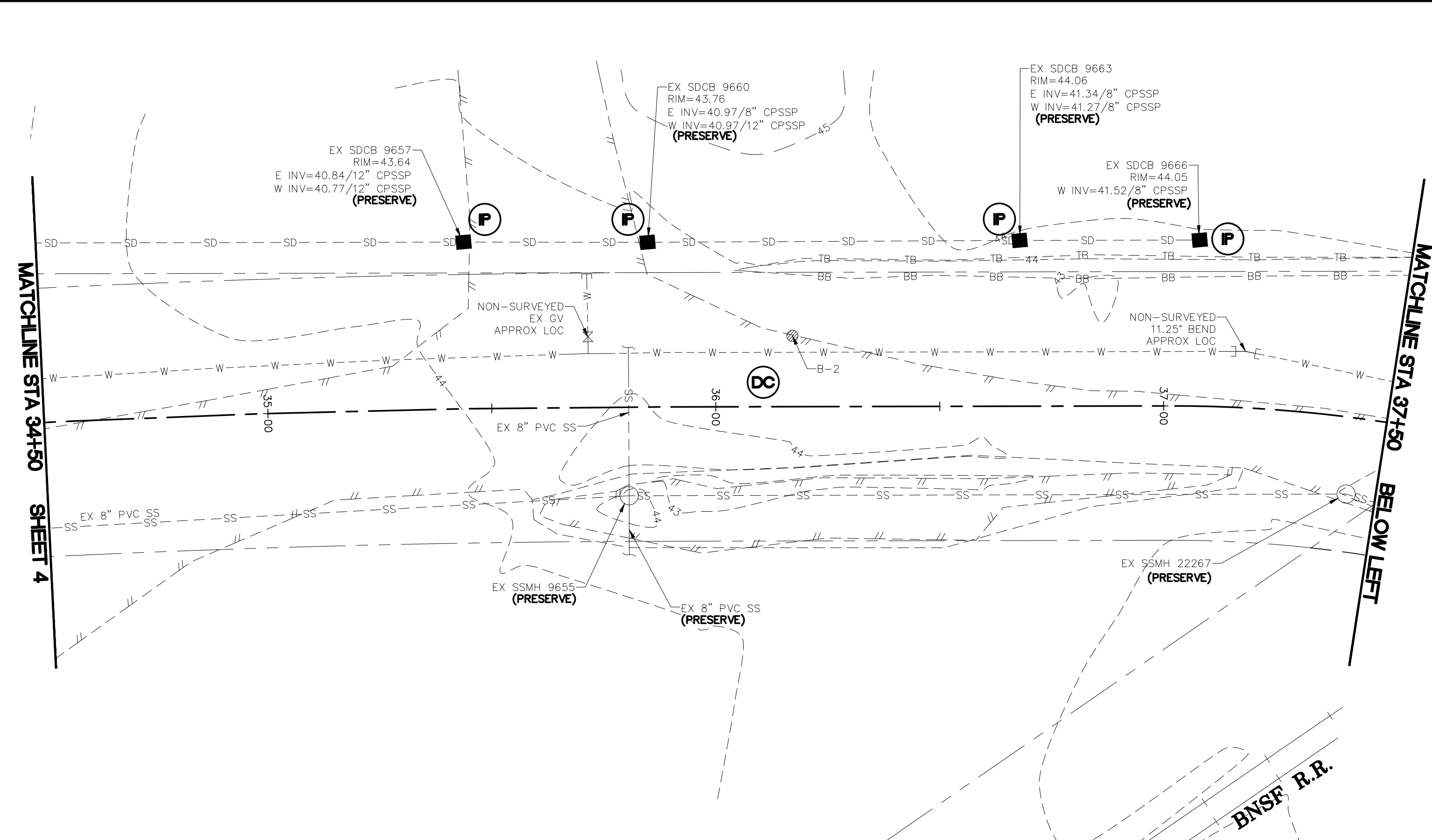


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	DRAWN BY BLB/LMH								JOB# 8053.4	SCALE H: 1"=100' V: N/A	SHEET 3
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ENGINEERING INC
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SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
EX COND, TESC AND DEMO - STA 34+50 TO 39+50

DWG 8053.4 PLOT

JOB#
8053.4

SCALE	
H: 1"=20'	V: N/A

DATE

HEET **5**
of 18

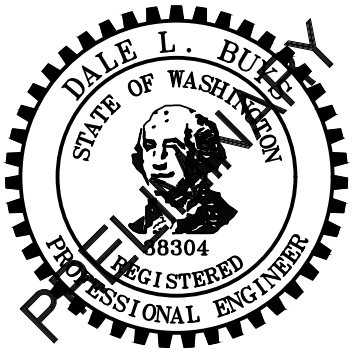
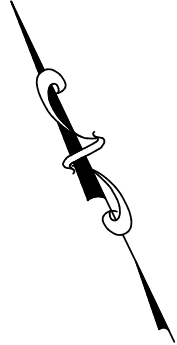
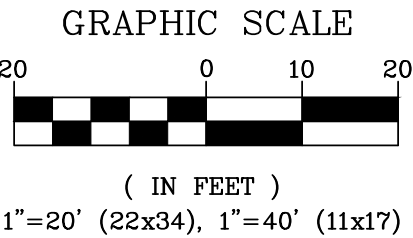
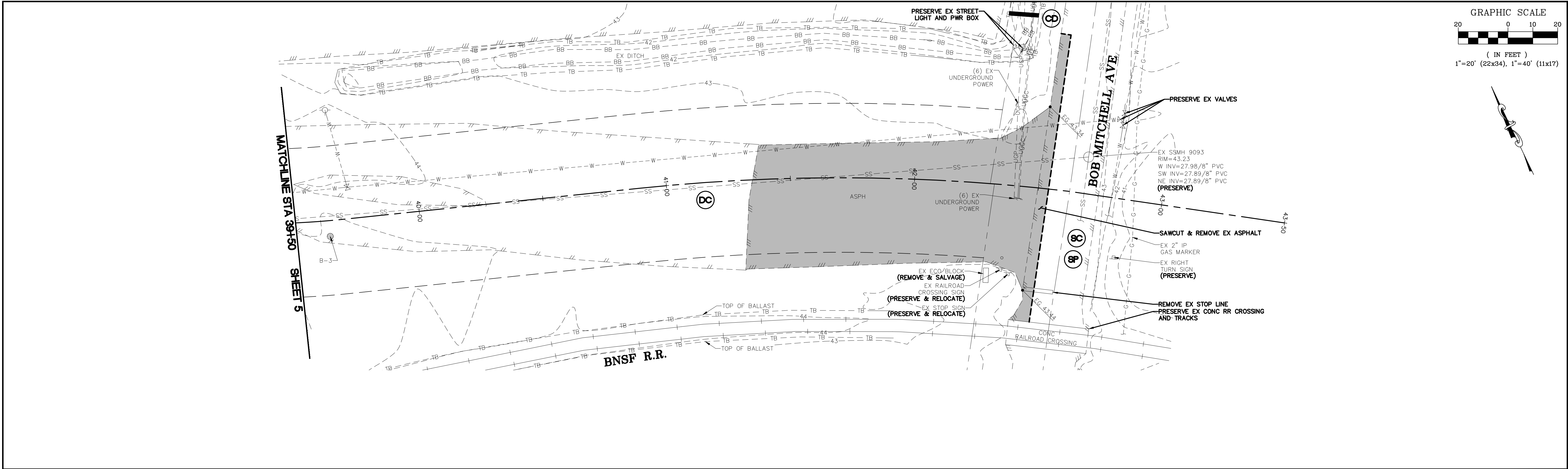
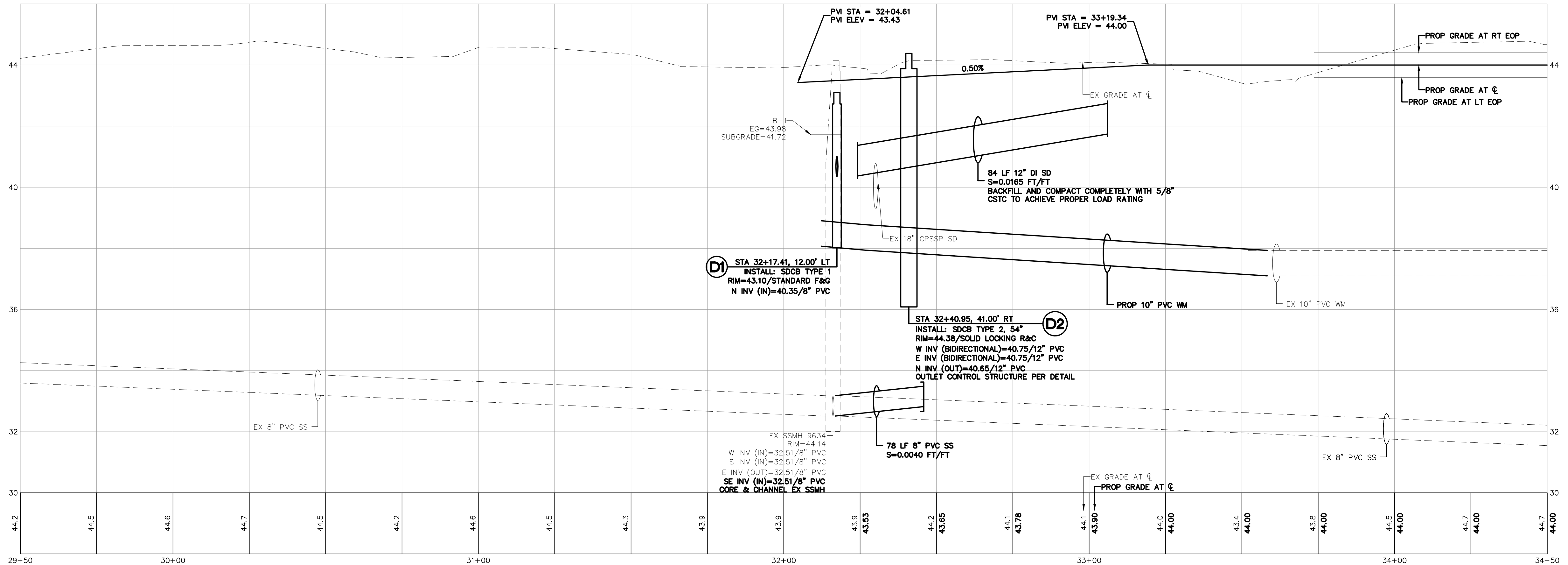
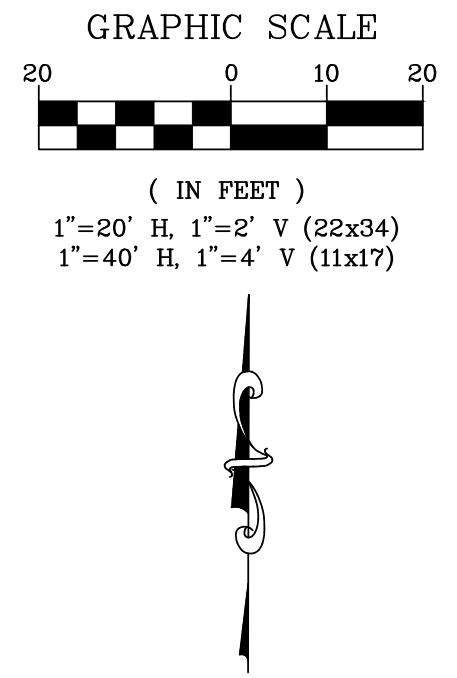
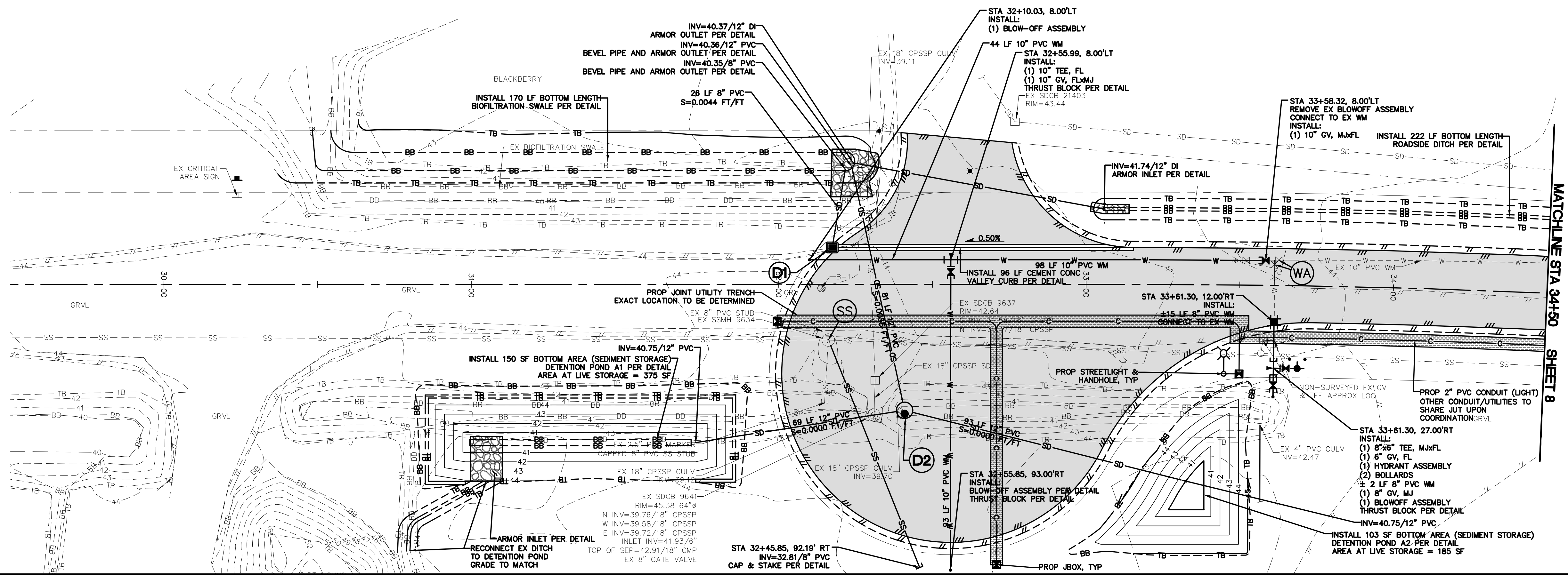


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	DRAWN BY BLB/LMH							JOB# 8053.4	SCALE H: 1"=20' V: N/A	SHEET 6	
	CHECKED BY DLB		NO.	DATE	DESCRIPTION	BY		of 18			



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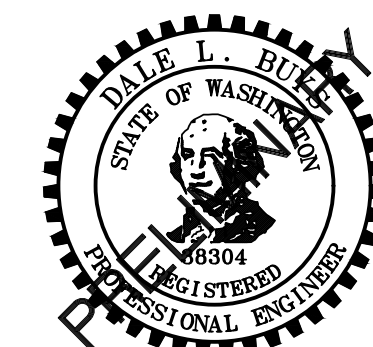
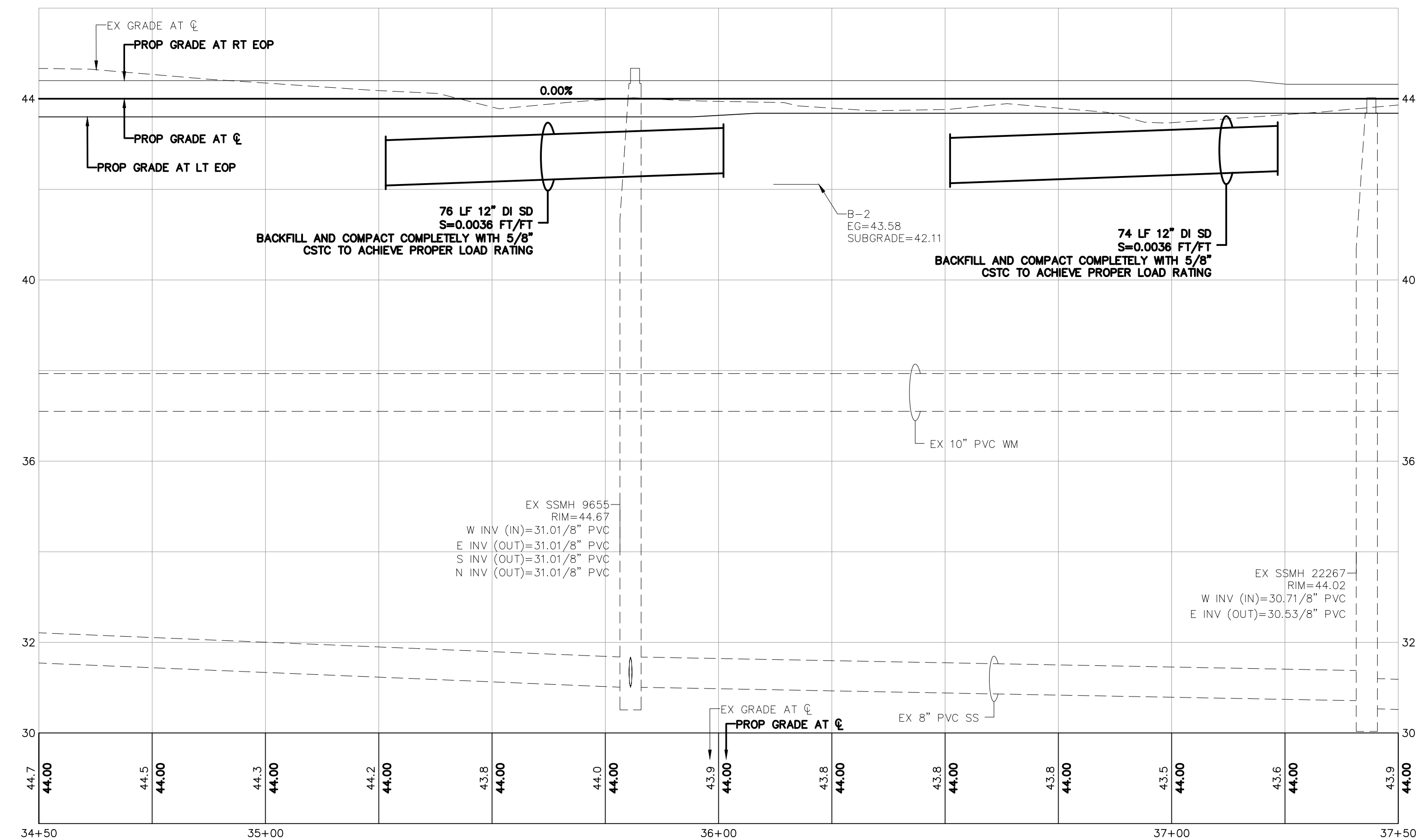
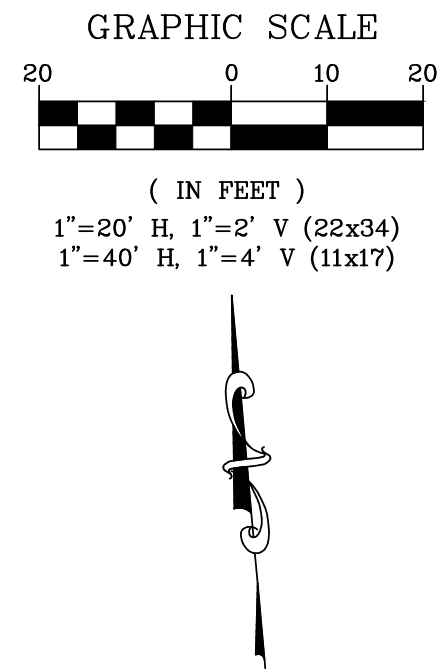
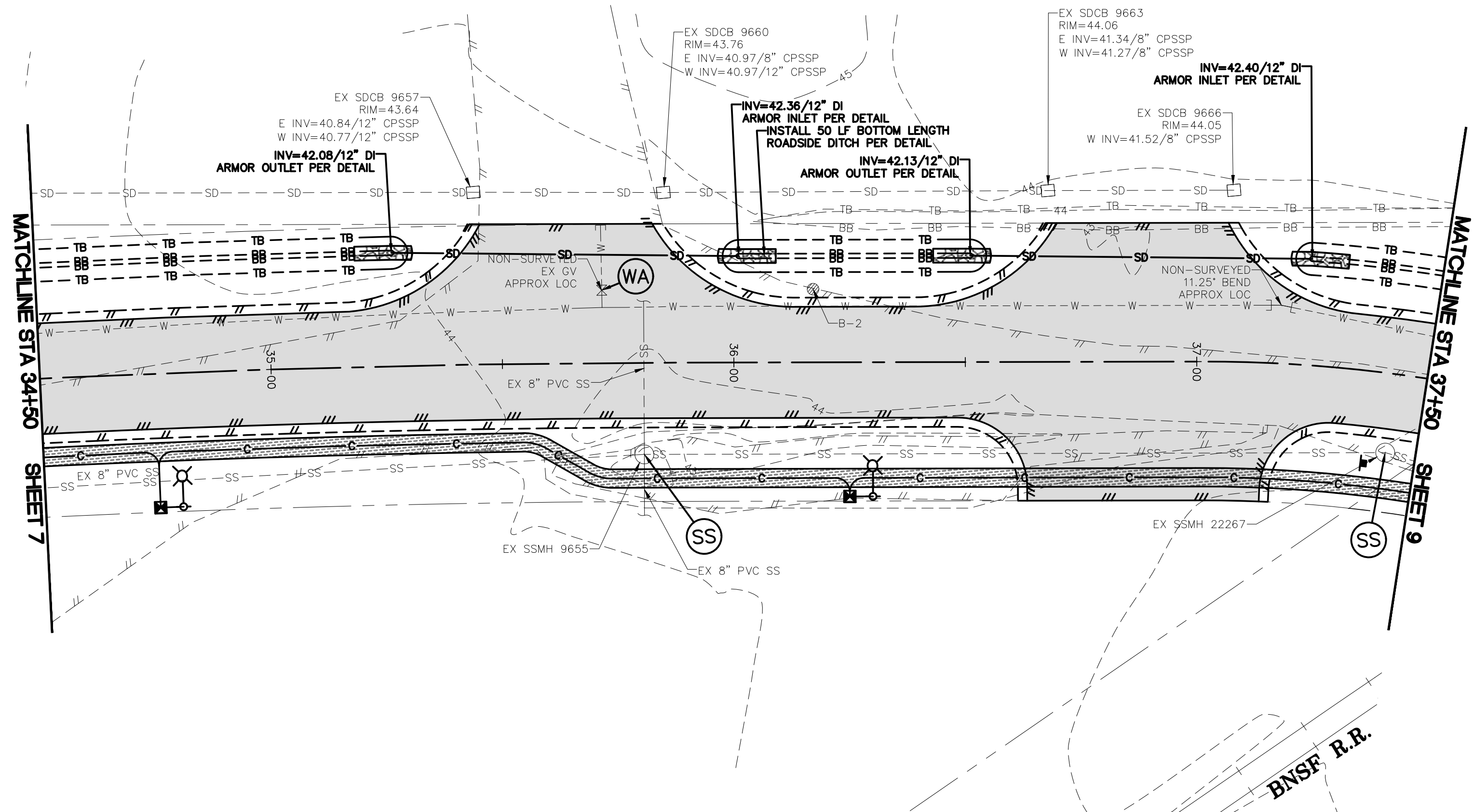
R&E Reichhardt & Ebe
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SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
WATER, SEWER, AND STORM - STA 29+50 TO 34+50

DWG # 8053.4 PLOT	DATE 1/20/2023
JOB # 8053.4	SCALE H: 1"=20' V: 1"=2'
SHEET 7 of 18	



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SUMAS DEVELOPMENTS LLC
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SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
WATER, SEWER, AND STORM - STA 34+50 TO 37+50

DWG 8053.4 PLOT
JOB# 8053.4

SCALE
H: 1"=20' V: 1"=2'

DATE
1/20/2023
SHEET
8 of 18

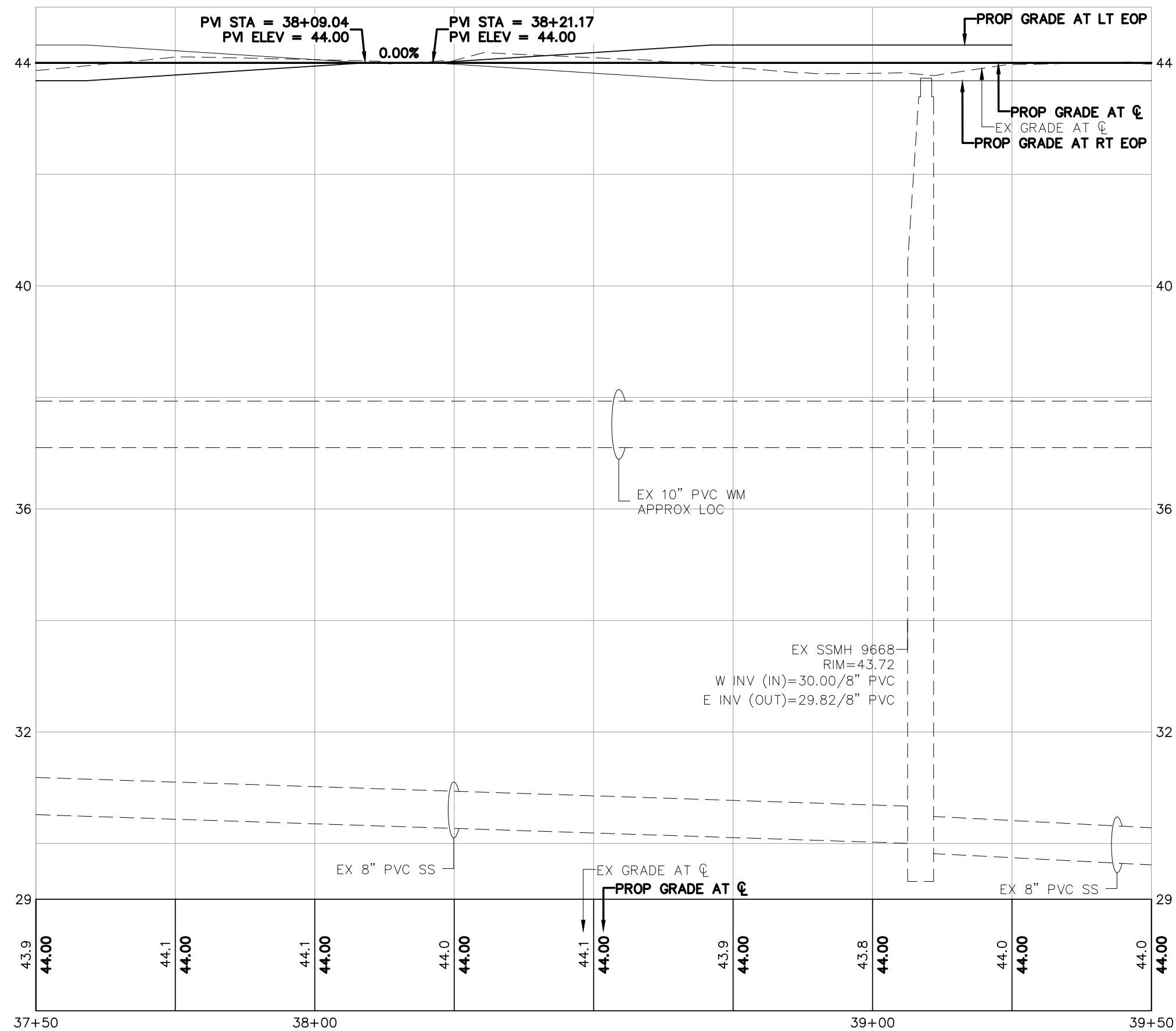
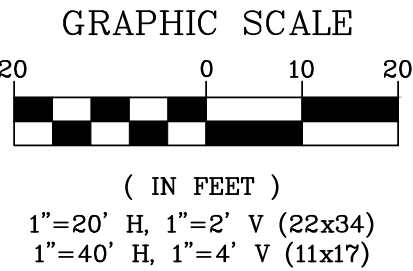
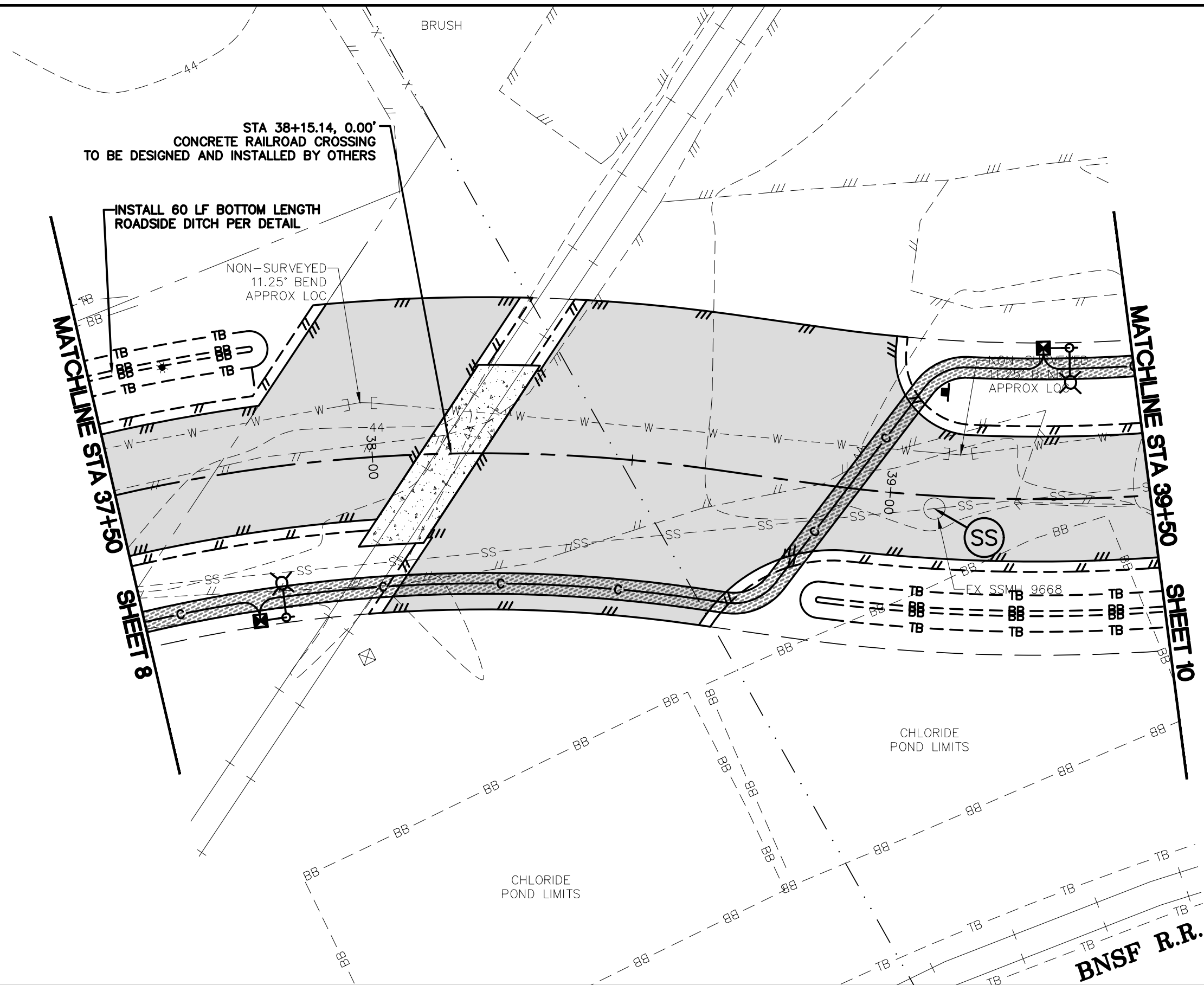


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	DRAWN BY BLB/LMH												JOB# 8053.4	SCALE H: 1"=20' V: 1"=2'	SHEET 9
	CHECKED BY DLB													of 18	
			NO.	DATE	DESCRIPTION	BY	SUMAS DEVELOPMENTS LLC PO BOX 1266 SUMAS, WA 98295	SUMAS DEVELOPMENTS GRAINGER WAY WATER, SEWER, AND STORM - STA 37+50 TO 39+50							

PIPE ALLOWANCES

PIPE MATERIAL	MAXIMUM INSIDE DIAMETER (INCHES)
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSC* (WSDOT STD. SPEC. SECT. 9-05.20)	12"
SOLID WALL PVC (WSDOT STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (WSDOT STD. SPEC. SECT. 9-05.12(2))	15"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES:

1. AS ACCEPTABLE ALTERNATIVES TO THE REBAR SHOWN IN THE PRECAST BASE SECTION, FIBERS (PLACED ACCORDING TO THE STANDARD SPECIFICATIONS), OR WIRE MESH HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT SHALL BE USED WITH THE MINIMUM REQUIRED REBAR SHOWN IN THE ALTERNATIVE PRECAST BASE SECTION. WIRE MESH SHALL NOT BE PLACED IN THE KNOCKOUTS.

2. THE KNOCKOUT DIAMETER SHALL NOT BE GREATER THAN 20" (IN). KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" (IN) MINIMUM TO 2.5" (IN) MAXIMUM. PROVIDE A 1.5" (IN) 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 SECTION 9-04.3.

3. THE MAXIMUM DEPTH FROM THE FINISHED GRADE TO THE LOWEST PIPE INVERT SHALL BE 5' (FT).

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.

RECTANGULAR ADJUSTMENT SECTION

PRECAST BASE SECTION

ALTERNATIVE PRECAST BASE SECTION

CATCH BASIN TYPE I

NTS

WSDOT STANDARD PLAN B-520-02 (MODIFIED)

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 WSDOT Standard Specification 9-04.3.

CATCH BASIN DIMENSIONS

CATCH BASIN DIAMETER	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

PIPE ALLOWANCES

CATCH BASIN DIAMETER	PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER				
	CONCRETE	ALL METAL	CPSSC ^① PP G	SOLID WALL PVC ^②	PROFILE WALL PVC ^③
48"	24"	30"	24"	30"	30"
54"	30"	36"	30"	36"	36"
60"	36"	42"	36"	42"	42"
72"	42"	54"	42"	48"	48"
84"	54"	60"	54"	48"	48"
96"	60"	72"	60"	48"	48"
120"	66"	84"	60"	48"	48"
144"	78"	96"	60"	48"	48"

① Corrugated Polyethylene Storm Sewer Pipe (See WSDOT Standard Specification Section 9-05.20)
② (See WSDOT Standard Specification Section 9-05.12(1))
③ (See WSDOT Standard Specification Section 9-05.12(2))
④ Polypropylene Pipe (See WSDOT Standard Specification Section 9-05.24)

CATCH BASIN TYPE 2

NTS

WSDOT STANDARD PLAN B-1020-02

CONCRETE AND DUCTILE IRON PIPE

THERMOPLASTIC PIPE

METAL AND STEEL RIB REINFORCED POLYETHYLENE PIPE

PIPE ZONE BEDDING AND BACKFILL

NTS

WSDOT STANDARD PLAN B-5520-02

CLEARANCE BETWEEN PIPES FOR MULTIPLE INSTALLATIONS

PIPE	SIZE	MINIMUM DISTANCE BETWEEN BARRELS
CIRCULAR PIPE (DIAMETER)	UP TO 48"	24"
METAL PIPE ARCH (SPAN)	48" AND LARGER	DIAMETER/2 OR 36" WHICHEVER IS LESS

TOP

ISOMETRIC

BOLT-DOWN DETAILS

HERRINGBONE GRATE FOR CATCH BASIN AND INLET

NTS

WSDOT STANDARD PLAN B-3050-03

NOTES:

1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC x 2" (in) Allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.

2. Refer to WSDOT Standard Specification Section 9-05.15 and 9-05.19(2) for additional requirements.

3. For frame details, see WSDOT Standard Plan B-30.10.

4. The thickness of the grate shall not exceed 1 5/8" (in).

ADJUSTING CASTINGS TO FINISHED GRADE

NTS

CASTINGS OUTSIDE OF HARDENED SURFACE

NTS

NOTES:

ALL FRAMES, COVERS AND VALVE BOXES SHALL BE ADJUSTED TO FINISHED GRADE AFTER THE FINAL LIFT OF PAVING HAS BEEN COMPLETED. THE FOLLOWING PROCEDURE SHALL BE USED:

1. CUT THE ASPHALT IN A DIAMOND AROUND THE STRUCTURE CASTING TO BE ADJUSTED.

2. REMOVE THE FILL MATERIAL WITHIN THE CUT PAVEMENT AREA TO 8 INCHES MIN. BELOW FINISH GRADE.

3. PLACE THE CASTING AT FINISH GRADE.

4. PLACE PORTLAND CEMENT CONCRETE TO WITHIN THE TOP 2 INCHES OF FINISH GRADE.

5. APPLY TACK TO THE STRUCTURE CASTING, CUT PAVEMENT, AND PC CONCRETE.

6. PLACE AND COMPACT 2 INCHES OF CL 1/2" COMMERCIAL HMA TO FINISH GRADE.

7. SEAL PAVEMENT JOINTS WITH HOT AR4000 AND TOP WITH SAND.

ADJUSTING CASTINGS TO FINISHED GRADE

NTS

CASTINGS OUTSIDE OF HARDENED SURFACE

NTS

NOTES:

ALL FRAMES, COVERS AND VALVE BOXES SHALL BE ADJUSTED TO FINISHED GRADE AFTER THE FINAL GRADING HAS BEEN COMPLETED. THE FOLLOWING PROCEDURE SHALL BE USED:

1. REMOVE THE FILL MATERIAL WITHIN THE CASTING AREA TO 8 INCHES MIN. BELOW FINISHED GRADE.

2. PLACE THE CASTING AT FINISHED GRADE.

3. PLACE PORTLAND CEMENT CONCRETE TO THE TOP OF FINISHED GRADE.

CEMENT CONCRETE VALLEY CURB

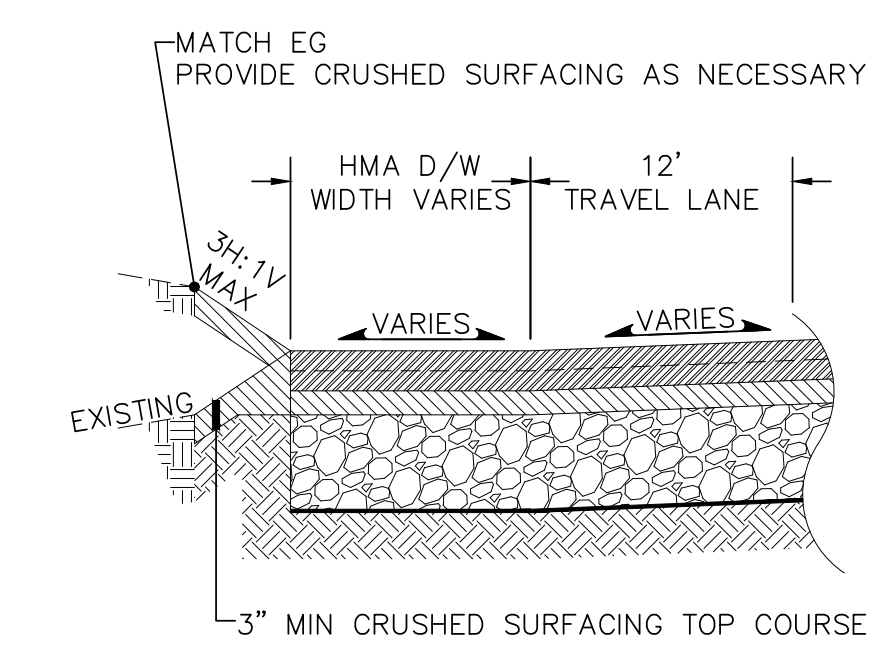
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CAP AND STAKE

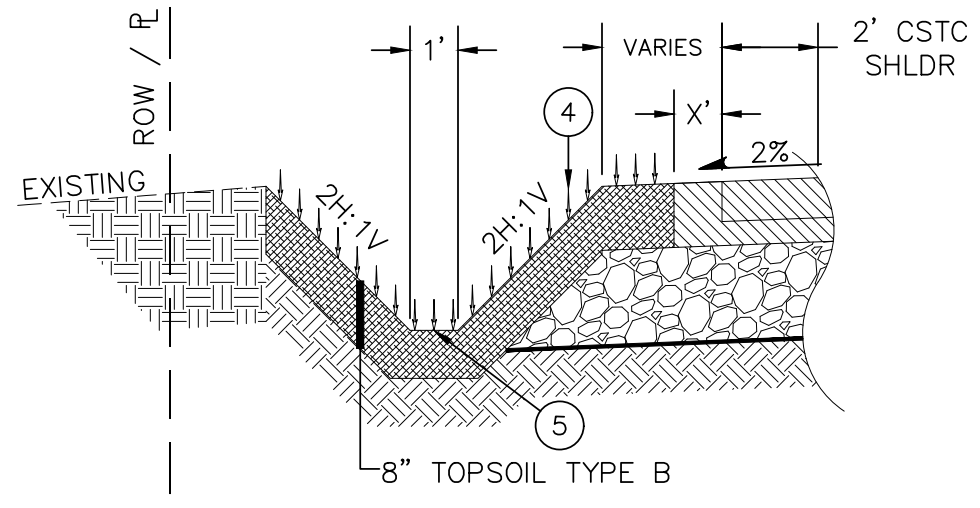
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NOTES:

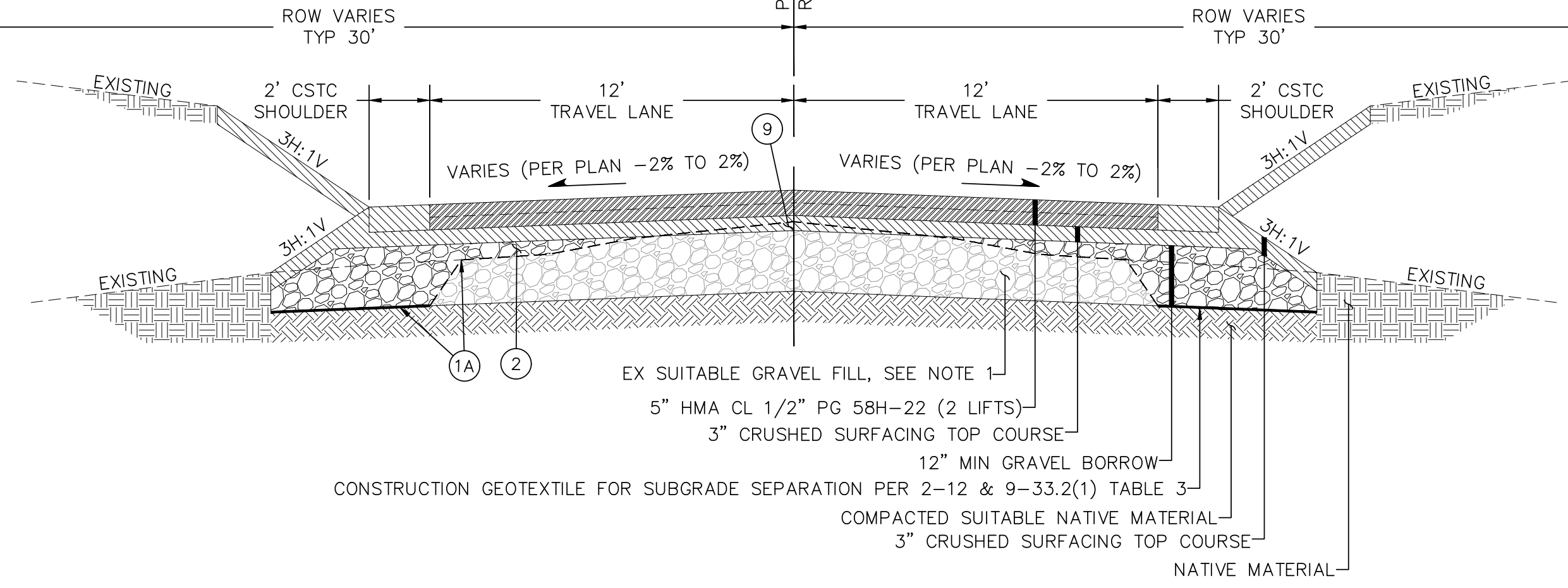
PVC SHALL BE PAINTED W/ APPROPRIATE COLOR CODE INDICATING UTILITY. (I.E. STORM/SEWER=GREEN, WATER=BLUE, ETC.)



TYPICAL SECTION WITH HMA DRIVEWAY
NTS



TYPICAL SECTION WITH ROADSIDE DITCH
NTS

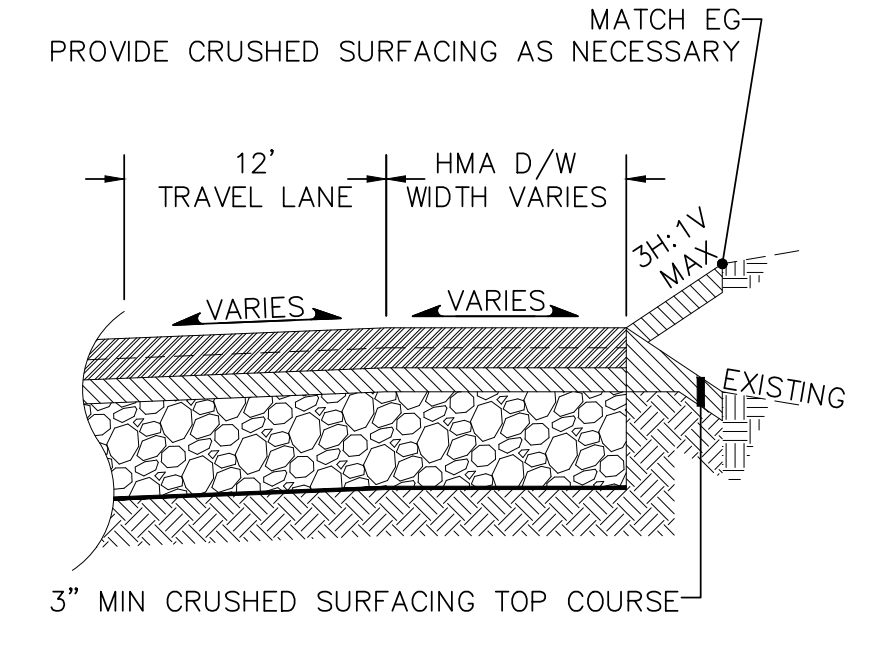


TYPICAL SECTION - GRAINGER WAY
NTS

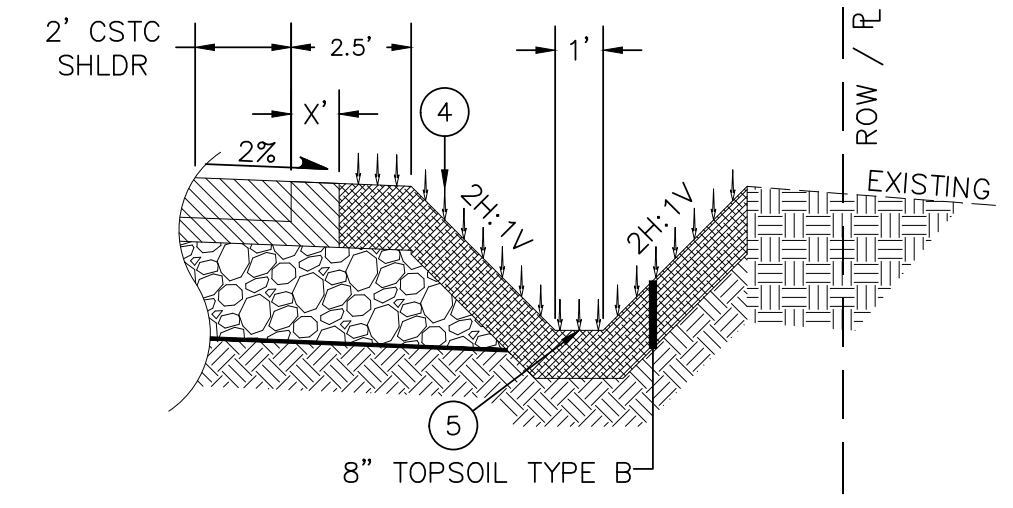
NOTE: DEPTHS SHOWN ARE COMPACTED THICKNESS

NOTES:

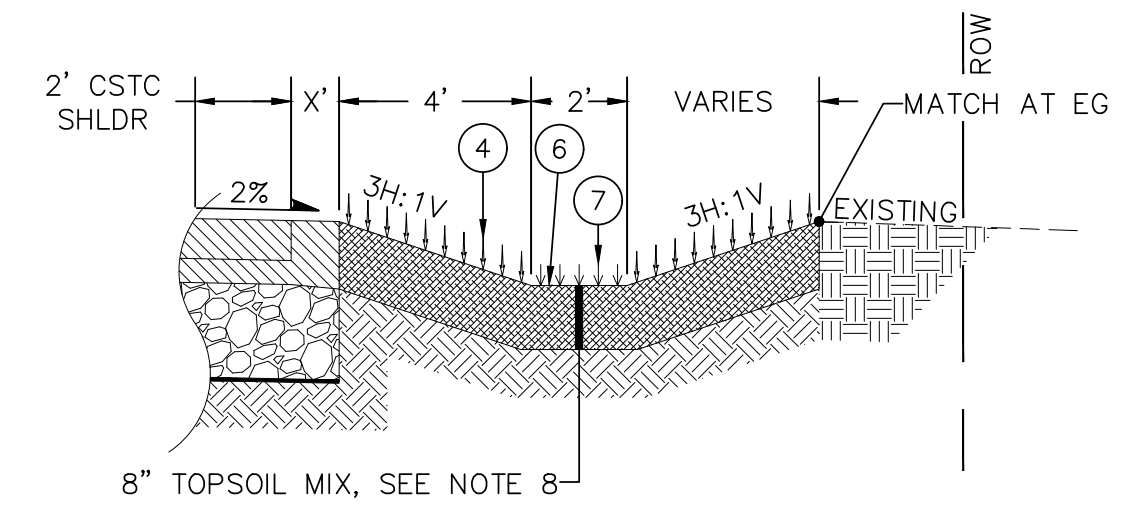
- 1 = PER GEOTECHNICAL EXPLORATIONS, LIKELY EX IMPORTED GRAVEL FILL FROM PREVIOUS PROJECTS. THIS MATERIAL MAY BE USED TO OBTAIN MIN REQUIRED 1' GRAVEL ROAD BASE PROVIDED IT IS COMPACTED TO 95% MAXIMUM DENSITY PER 2-03.3(14)D.
- 1A = GEOTECHNICAL INSPECTOR SHALL CERTIFY THAT UNSUITABLE SOIL WAS APPROPRIATELY REMOVED TO EXPOSE THE SUFFICIENT 12" MINIMUM SECTION OF EX GRAVEL FILL OR TO SUBGRADE TO INSTALL 12" MINIMUM GRAVEL BORROW.
- 2 = DEPTH VARIES. INSTALL REQUIRED DEPTH GRAVEL BORROW TO COMPACTED EX GRAVEL FILL FOR PROPOSED GRADE.
- 3 = ROADWAY SUPERELEVATION SHALL BE GRADED PER PLAN AND PROFILE. DRIVEWAYS SHALL BE GRADED PER GRADE TICKS AS SHOWN PER PLAN.
- 4 = TALL FESCUE GRASS (FESTUCA ARUNDINACEA) SHALL BE PLANTED ON THE BOTTOM AND SIDE SLOPES OF THE DITCH AND SIDE SLOPES OF THE BIOFILTRATION SWALE.
- 5 = DITCH SHALL HAVE BOTTOM SLOPE, S=0.0030 FT/FT LENGTH VARIES PER PLAN DITCH SHALL HAVE MIN DEPTH, D=1.50'
- 6 = SWALE SHALL HAVE BOTTOM SLOPE, S=0.0050 FT/FT SWALE SHALL HAVE MIN DEPTH, D=1.33 FT
- 7 = GRASS SEED MIX 1 PER TABLE 9.3 2005 SWMMWW SHALL BE PLANTED ON THE SWALE BOTTOM. THE MIX PERCENTAGES BY WEIGHT ARE AS FOLLOWS:
- | | |
|----------------------------|--------|
| TALL OR MEADOW FESCUE | 75-80% |
| SEASIDE/COLONIAL BENTGRASS | 10-15% |
| REDTOP | 5-10% |
- 8 = BIOFILTRATION SWALE TOPSOIL MIX SHALL HAVE THE FOLLOWING COMPOSITION:
- | | |
|--------------------------|--------|
| SANDY LOAM | 60-90% |
| CLAY | 0-10% |
| COMPOSTED ORGANIC MATTER | 10-30% |
- 9 = REMOVED (CUT) EX GRAVEL FILL MAY BE PLACED AS FILL IN GRAINGER WAY.



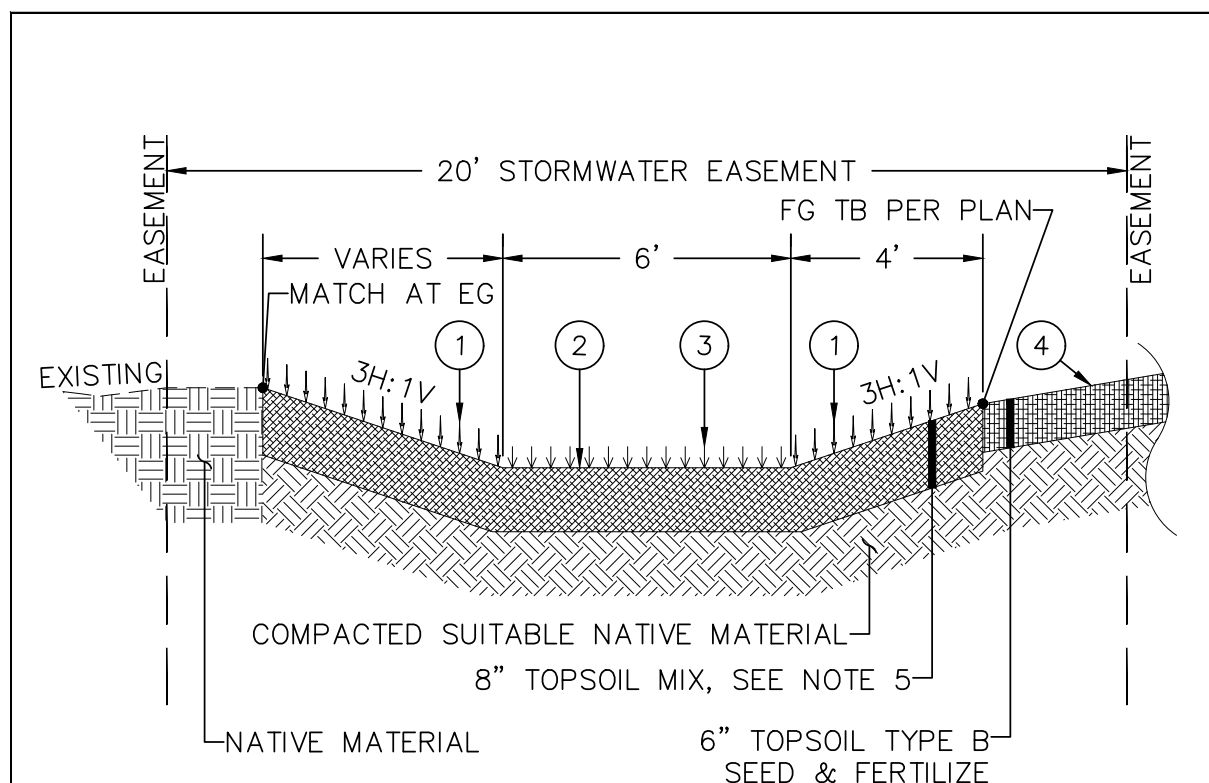
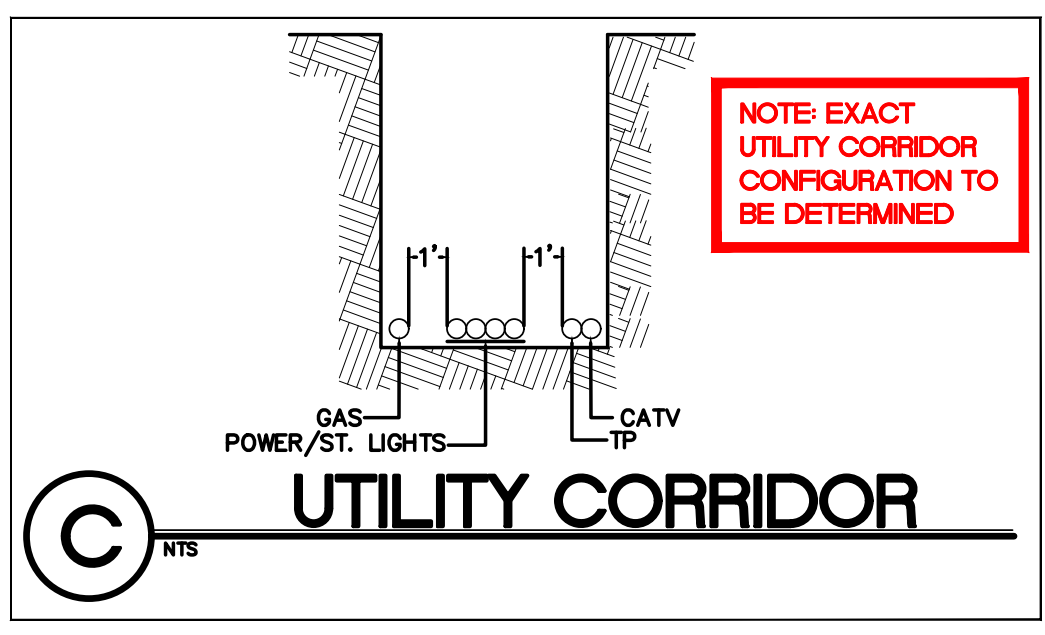
TYPICAL SECTION WITH HMA DRIVEWAY
NTS



TYPICAL SECTION WITH ROADSIDE DITCH
NTS



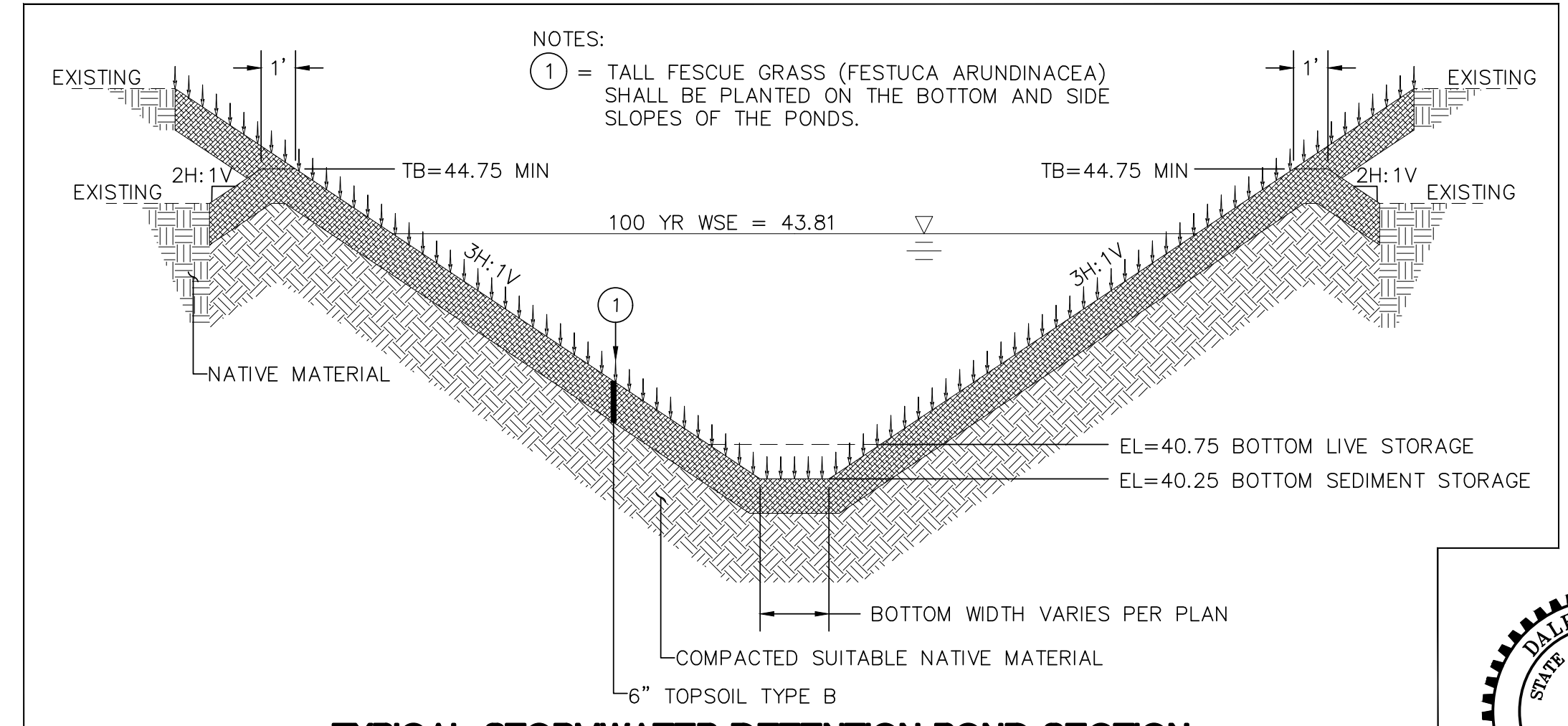
TYPICAL SECTION WITH ROADSIDE BIOFILTRATION SWALE
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TYPICAL BIOFILTRATION SWALE SECTION
NTS

NOTES:

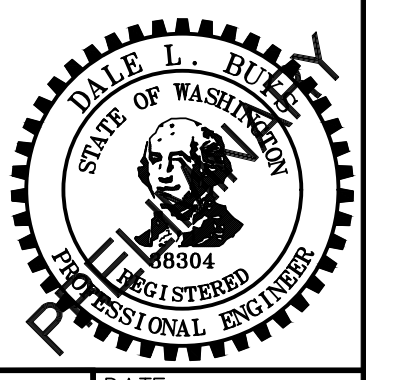
- 1 = TALL FESCUE GRASS (FESTUCA ARUNDINACEA) SHALL BE PLANTED ON THE SIDE SLOPES OF THE SWALE.
- 2 = SWALE BOTTOM SLOPE, S=0.0050 FT/FT LENGTH VARIES PER PLAN SWALE SHALL HAVE MIN DEPTH, D=1.33 FT
- 3 = GRASS SEED MIX 1 PER TABLE 9.3 2005 SWMMWW SHALL BE PLANTED ON THE SWALE BOTTOM. THE MIX PERCENTAGES BY WEIGHT ARE AS FOLLOWS:
- | | |
|----------------------------|--------|
| TALL OR MEADOW FESCUE | 75-80% |
| SEASIDE/COLONIAL BENTGRASS | 10-15% |
| REDTOP | 5-10% |
- 4 = 3H:1V MAX MATCH SLOPE
- 5 = BIOFILTRATION SWALE TOPSOIL MIX SHALL HAVE THE FOLLOWING COMPOSITION:
- | | |
|--------------------------|--------|
| SANDY LOAM | 60-90% |
| CLAY | 0-10% |
| COMPOSTED ORGANIC MATTER | 10-30% |



TYPICAL STORMWATER DETENTION POND SECTION
NTS

NOTES:

- 1 = TALL FESCUE GRASS (FESTUCA ARUNDINACEA) SHALL BE PLANTED ON THE BOTTOM AND SIDE SLOPES OF THE PONDS.



EXHIBIT

DESIGNED BY
BLB/CFR
DRAWN BY
BLB/LMH
CHECKED BY
DLB

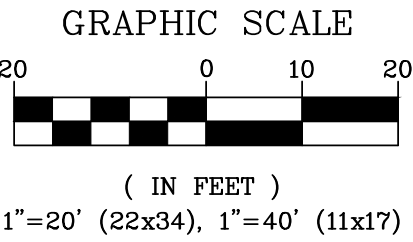
R&E Reichhardt & Ebe
ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
TYPICAL SECTIONS

DWG 8053.4 DETAILS		DATE
JOB#	SCALE	SHEET
8053.4	H: N/A V: N/A	14 of 18
		1/20/2023

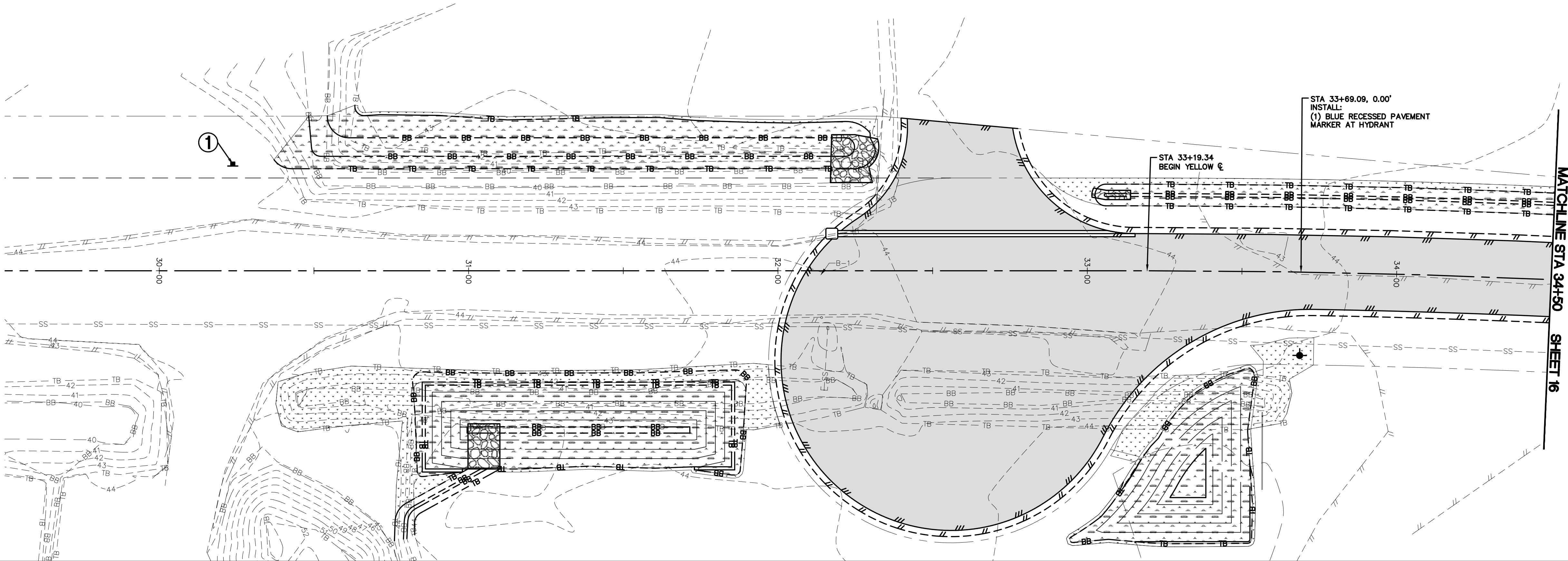
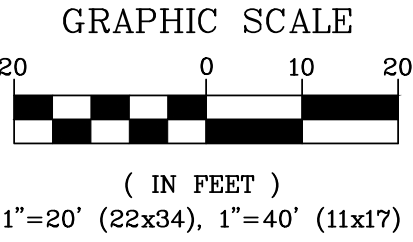


SIGN SCHEDULE							
NO.	STATION	OFFSET	SIGN DESCRIPTION	MUTCD CODE	SIZE	SHEETING TYPE	NOTES
1	30+23.77	34.50'LT	"CRITICAL AREA"	--	EXISTING	EXISTING	RELOCATE
2	37+38.35	20.00'RT	"RR"	W10-1	36"ø	IV	NEW
3	39+09.33	20.00'LT	"RR"	W10-1	36"ø	IV	NEW
4	42+02.29	20.00'LT	"NO PARKING"	R8-3A	24"x30"	IV	NEW
5	42+24.51	32.64'RT	"STOP", STREET NAMES BY OTHERS	R1-1	30"x30"	IV	NEW
6	42+29.77	40.29'RT	"RAILROAD CROSSING"	R15-1	EXISTING	EXISTING	RELOCATE
7	42+33.36	40.52'RT	"STOP", "SLOW ROUGH RAILROAD CROSSING"	R1-1, --	EXISTING	EXISTING	RELOCATE

LANDSCAPING LEGEND

- = INSTALL 6" TOPSOIL TYPE B, SEED & FERTILIZE
- = INSTALL BIOFILTRATION SWALE, ROADSIDE DITCH, OR DETENTION POND PLANTING PER DETAILS
- = INSTALL 3" CRUSHED SURFACING TOP COURSE

CHANNELIZATION NOTE:
1. BLUE RECESSED PAVEMENT MARKERS SHALL BE PLACED 1' OFF OF C, PERPENDICULAR TO & IN THE DIRECTION OF EACH FIRE HYDRANT.



EXHIBIT

DESIGNED BY
BLB
DRAWN BY
BLB/LMH
CHECKED BY
DLB

R&E Reichhardt & Ebe
ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

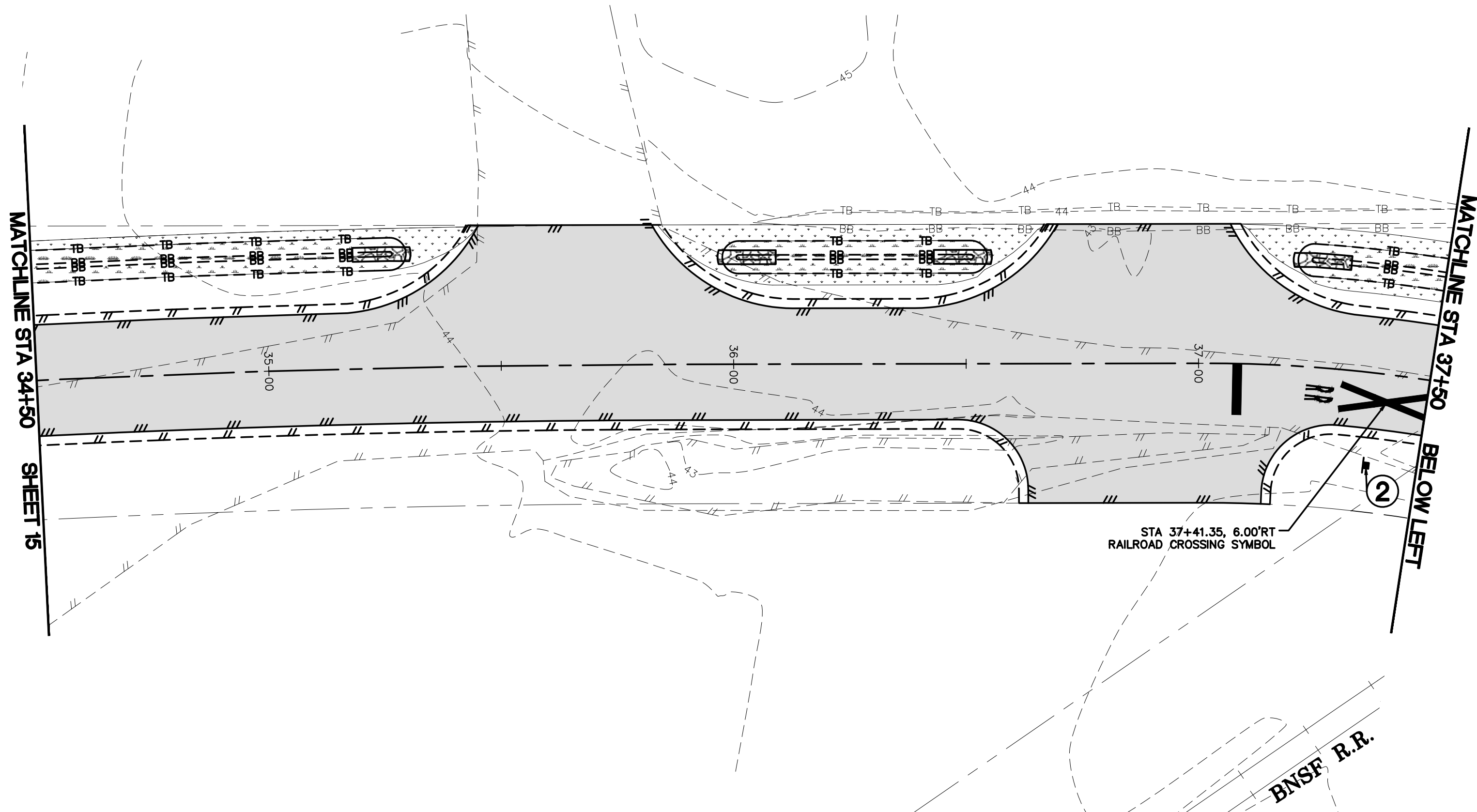
SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
CHANNELIZATION AND RESTORATION - STA 29+50 TO 34+50

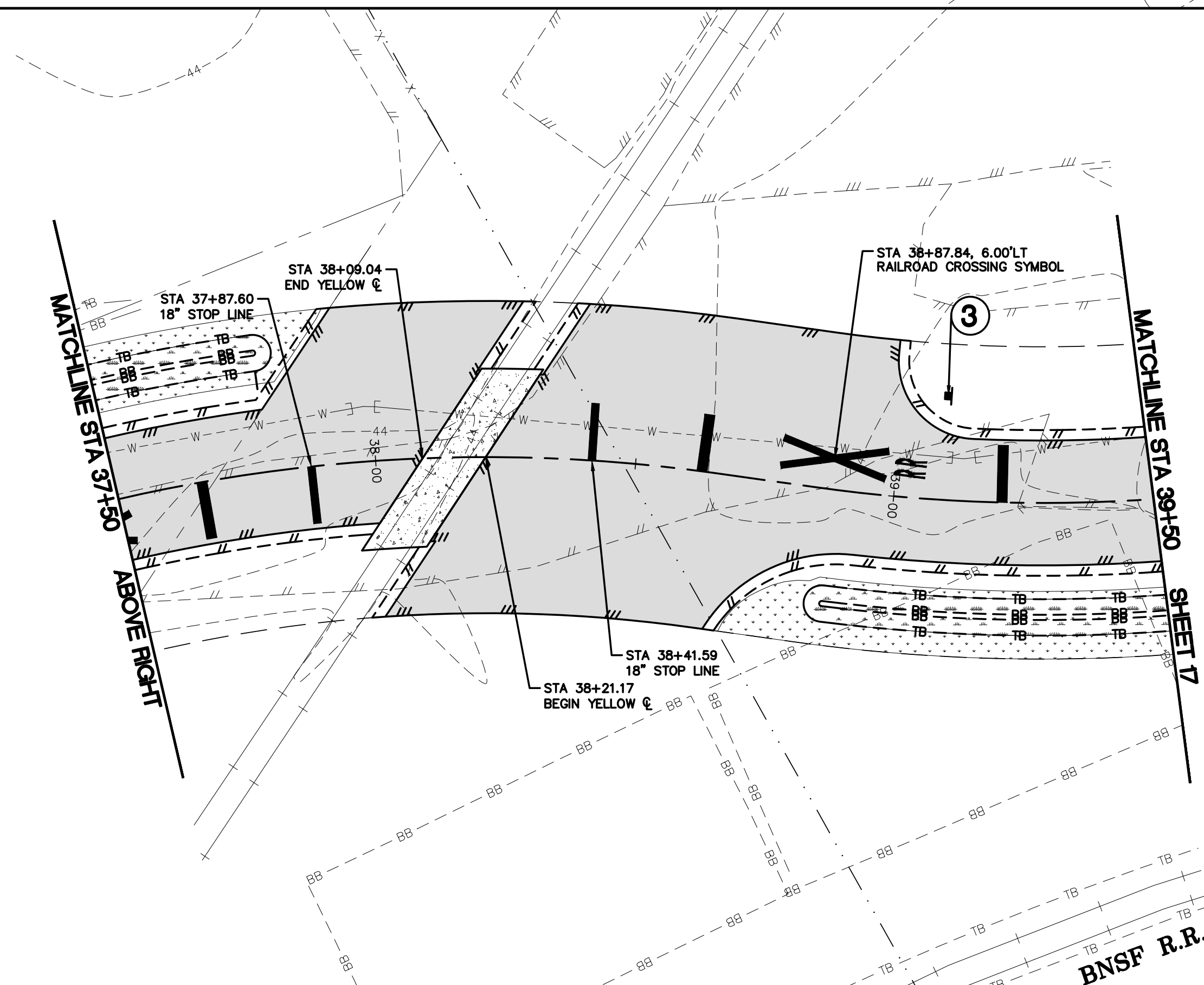
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JOB# 8053.4

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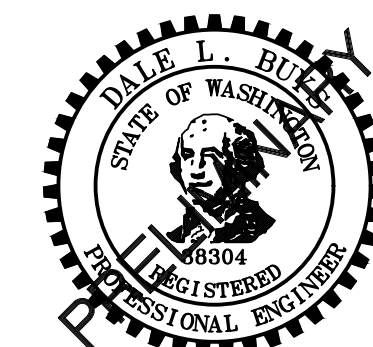
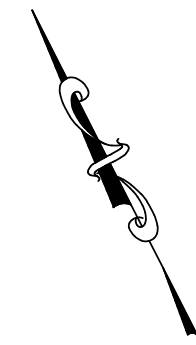
DATE
1/20/2023
SHEET
15 of 18



GRAPHIC SCALE
20 0 10 20
(IN FEET)
1"=20' (22x34), 1"=40' (11x17)



GRAPHIC SCALE
20 0 10 20
(IN FEET)
1"=20' (22x34), 1"=40' (11x17)



EXHIBIT

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DRAWN BY
BLB/LMH
CHECKED BY
DLB

R&E Reichhardt & Ebe
ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

SUMAS DEVELOPMENTS LLC
PO BOX 1266
SUMAS, WA 98295

SUMAS DEVELOPMENTS
GRAINGER WAY
CHANNELIZATION AND RESTORATION - STA 34+50 TO 39+50

DWG 8053.4 PLOT
JOB# 8053.4

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DATE
1/20/2023
SHEET
16
of 18

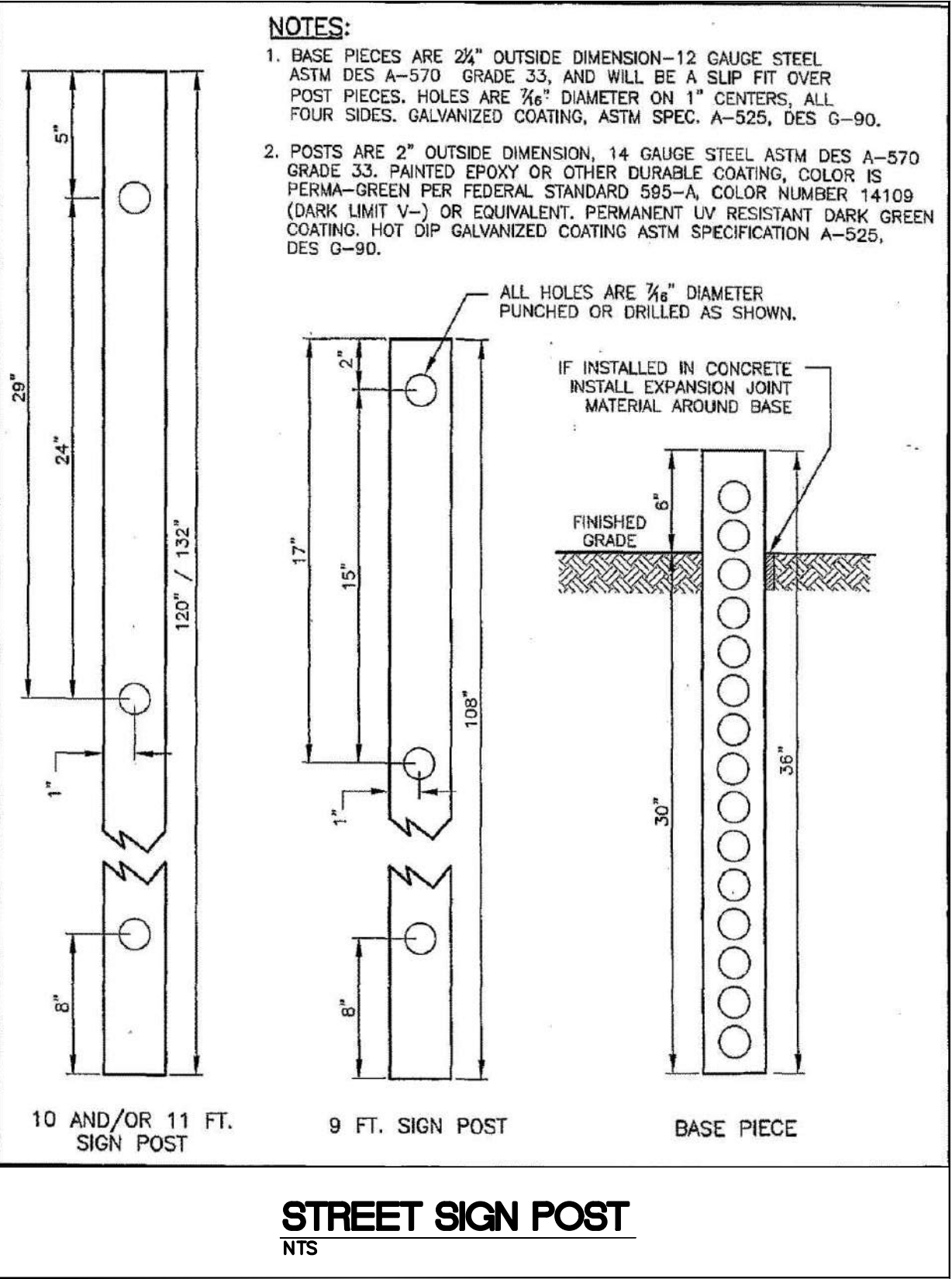
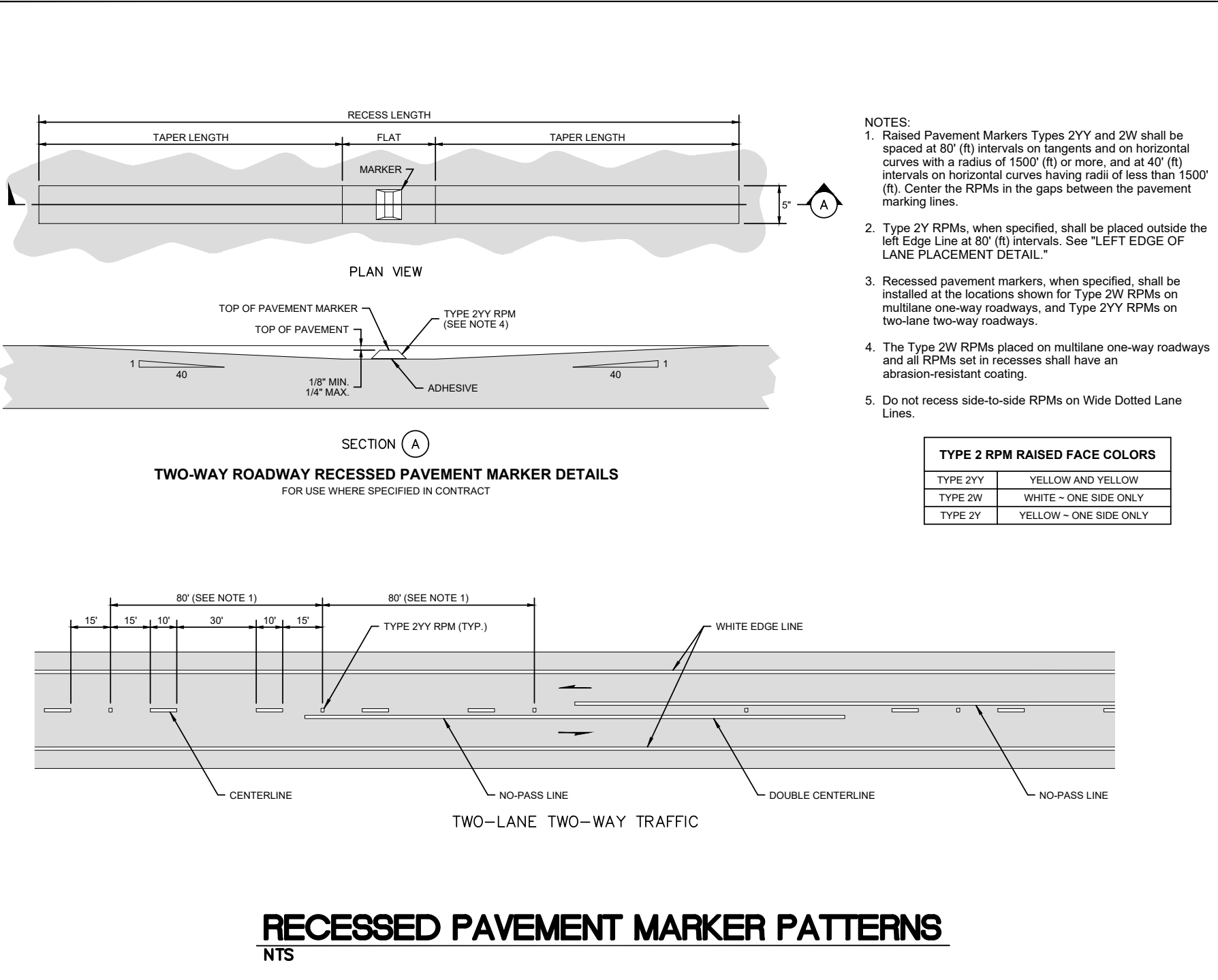
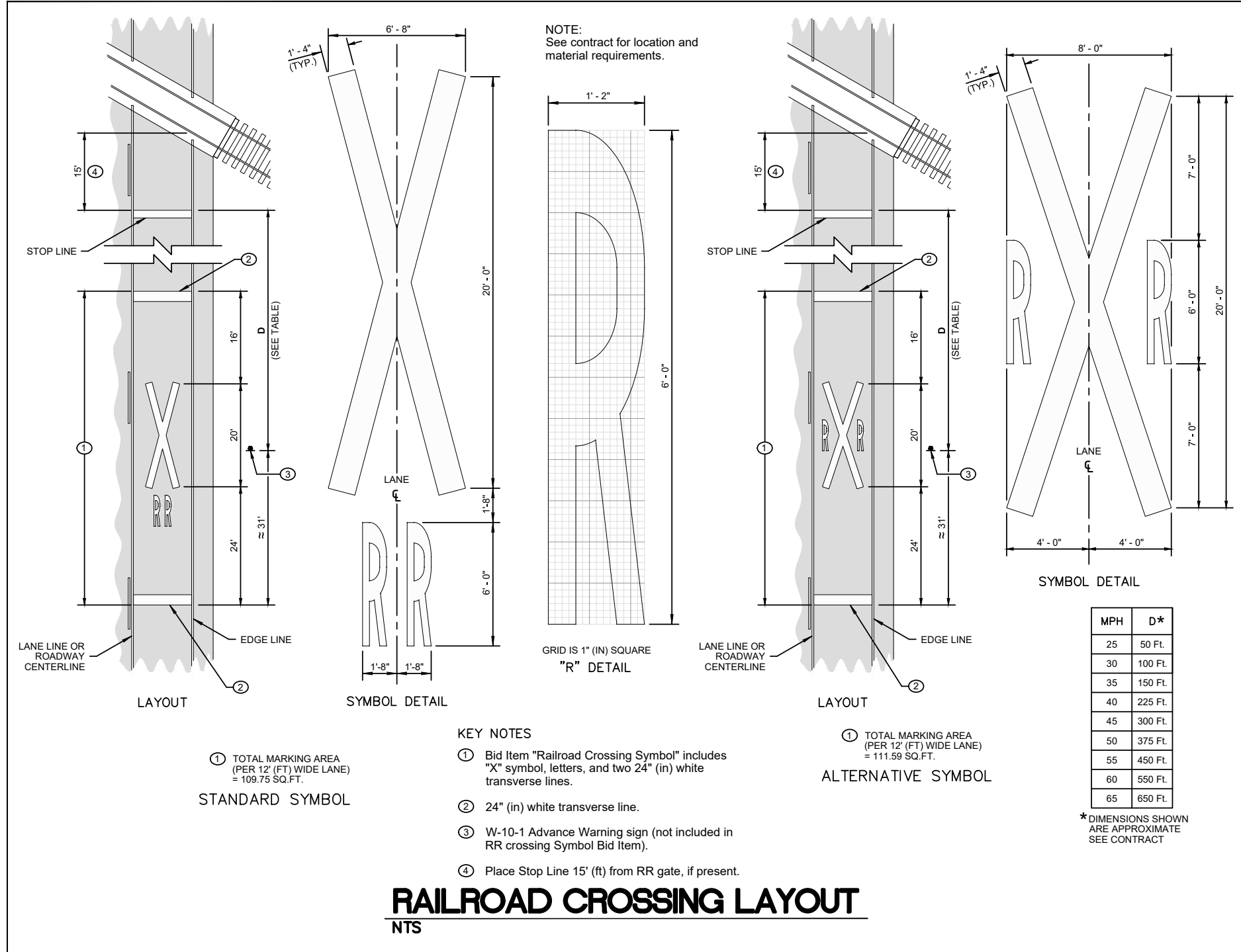


EXHIBIT	DESIGNED BY BLB	R&E Reichhardt & Ebe ENGINEERING INC P.O. Box 978 423 Front Street Lynden, WA 98264 (360) 354-3687					SUMAS DEVELOPMENTS LLC PO BOX 1266 SUMAS, WA 98295	SUMAS DEVELOPMENTS GRAINGER WAY CHANNELIZATION DETAILS	DWG 8053.4 DETAILS		DATE 1/20/2023
	DRAWN BY BLB/LMH								JOB#	SCALE	SHEET
	CHECKED BY DLB		NO.	DATE	DESCRIPTION	BY			8053.4	H: N/A V: N/A	18
											of 18