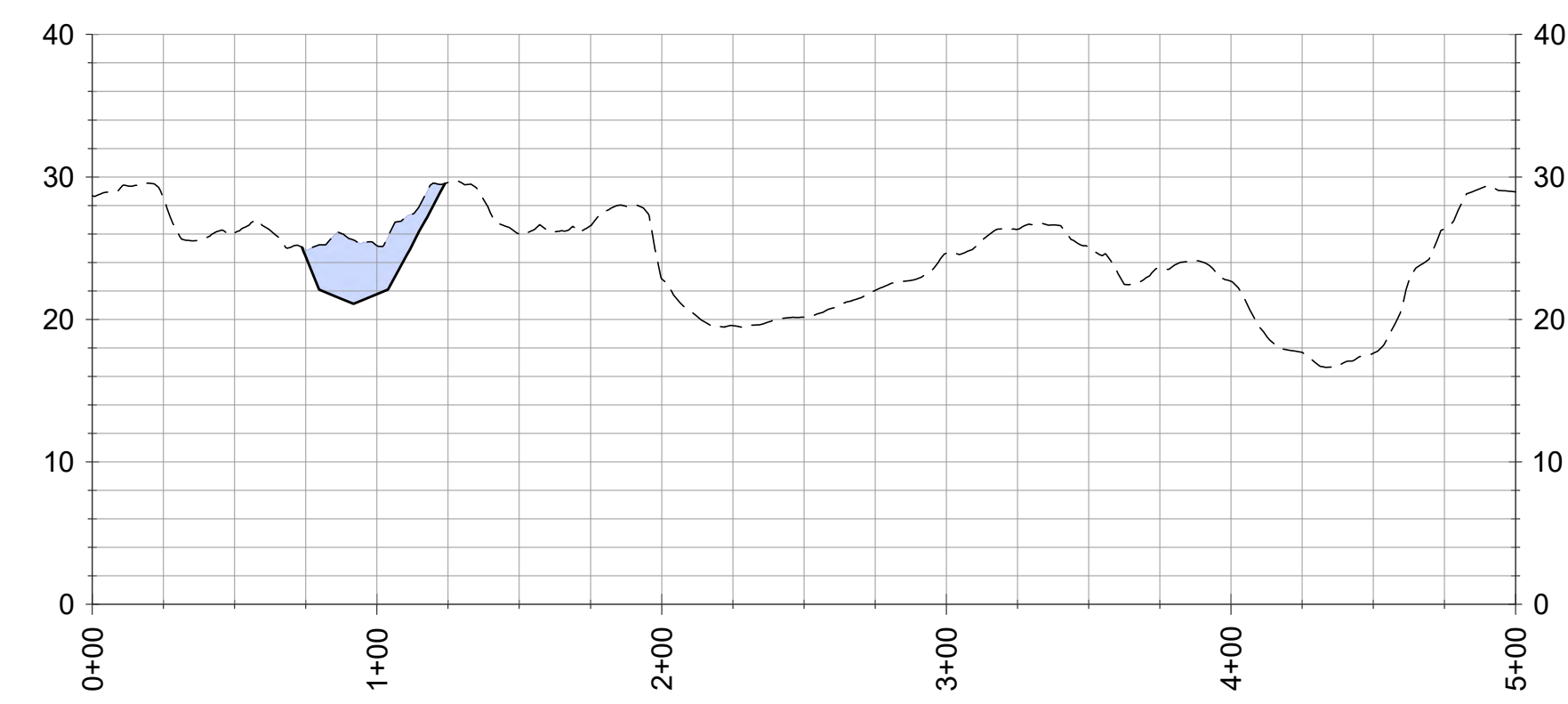
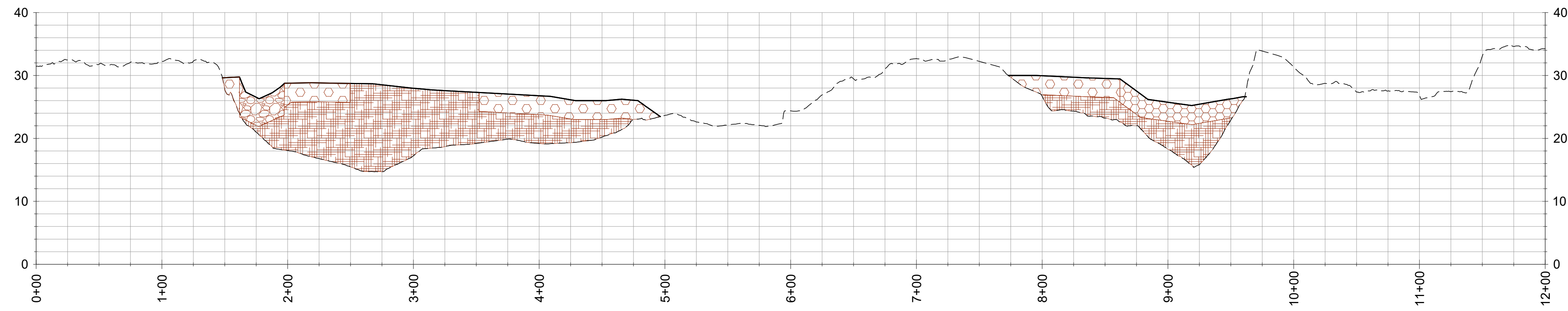


1  
40 DYER CREEK AND RIPRAP REMOVAL SECTION



2  
40 POWERLINE BEND SECTION

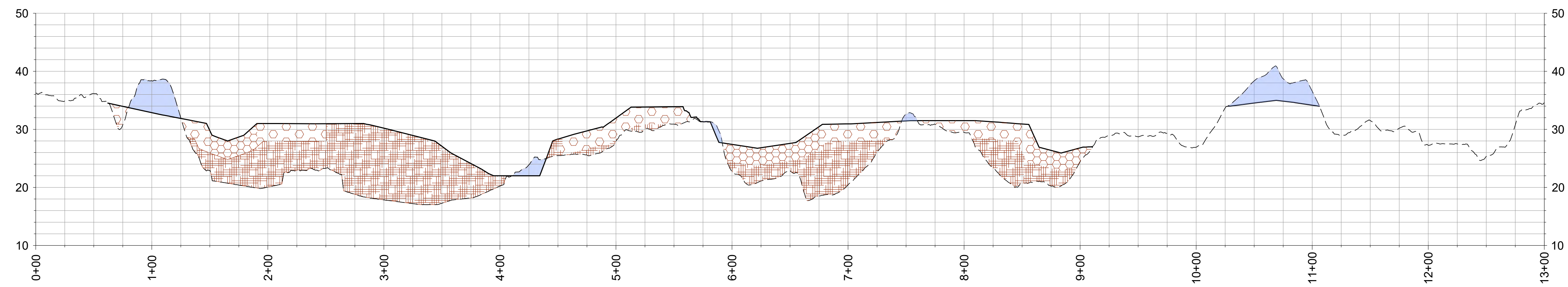


3  
41 LOWER CORE PITS SECTION - PIT 6 AREA

**LEGEND**

- EXISTING GRADE
- PROPOSED GRADE
- CUT
- ▨ FILL: RIFFLE MIX (SEE DETAIL 1, SHEET 53)
- ▨ FILL: STREAMBED SUBSTRATE
- ▨ FILL: GRAVEL BAR MIX
- ▨ FILL: NO TREATMENT

5x VERTICAL EXAGGERATION  
50'  
200'



4  
41 LOWER CORE PITS SECTION- PIT 5 AREA

NO.	BY	DATE	REVISION DESCRIPTION

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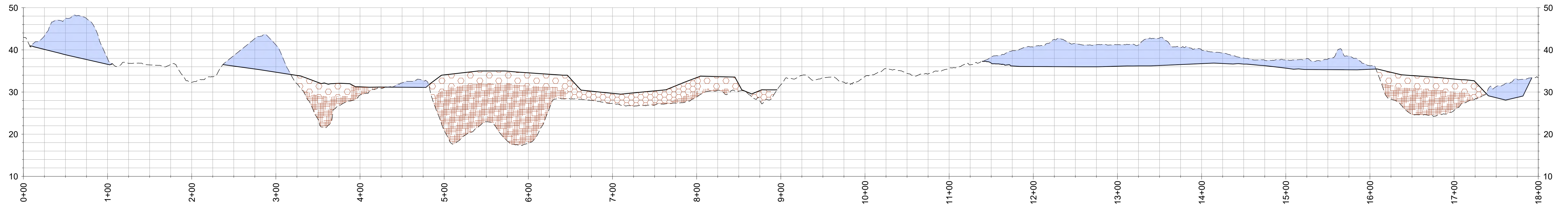


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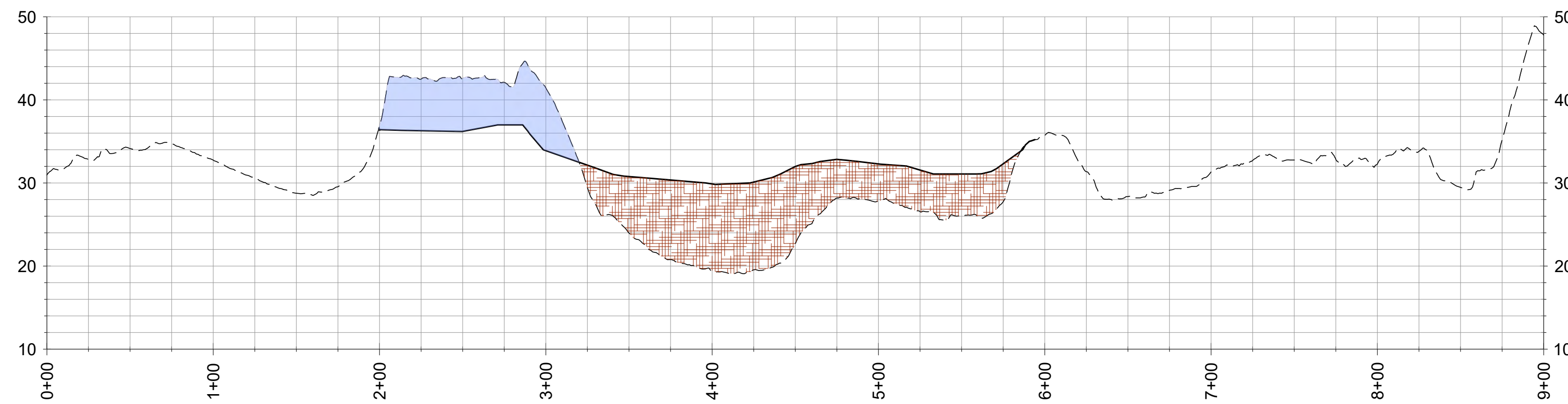
CROSS-SECTIONS 1-4

SHEET

46 OF 67



5  
42 UPPER CORE PITS SECTION

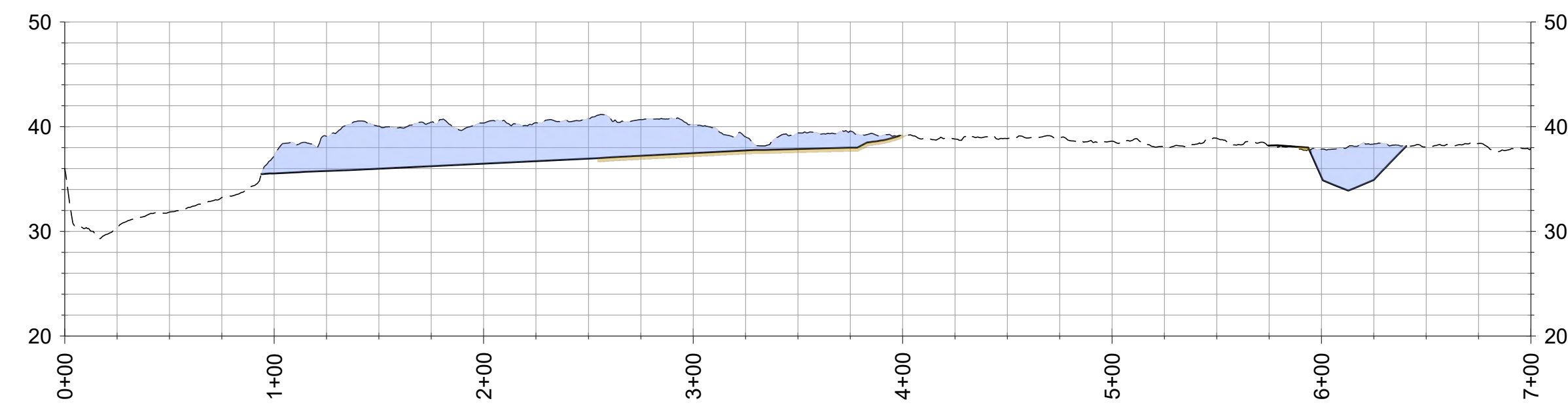


6  
42 UPPER CORE PITS SECTION - PIT 8 AREA

**LEGEND**

- EXISTING GRADE
- PROPOSED GRADE
- CUT
- FILL: STREAMBED SUBSTRATE
- FILL: GRAVEL BAR MIX
- FILL: SOIL AMENDMENT
- FILL: NO TREATMENT

5x VERTICAL EXAGGERATION  
50'  
200'



7  
43 EAST FLOODPLAIN SECTION - OLD CHANNEL FLOODPLAIN AREA

G:\LUCRP\_EastForkLewisRiverReconnection\2024\Drawings\B075\_Cross\_Section\_5.dwg, 8/24/24

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---	DATE	---
---	PROJECT	---

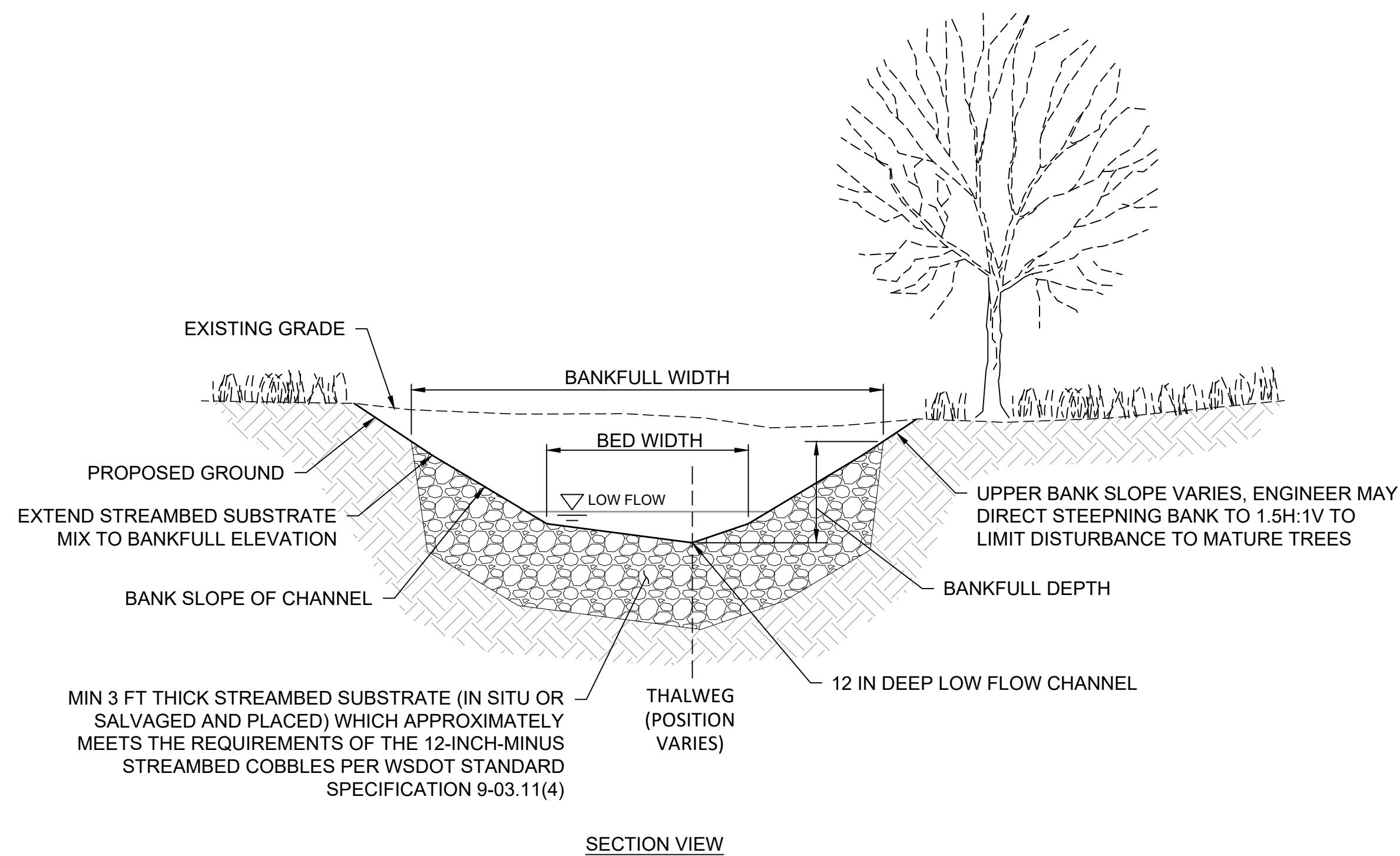
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CROSS-SECTIONS 5-7





**1** CHANNEL GEOMETRY  
TYP NOT TO SCALE

CHANNEL GEOMETRY NOTES:

1. BANKFULL WIDTHS AND DEPTHS WILL VARY ALONG EACH ALIGNMENT BASED ON THE LOCAL FLOODPLAIN ELEVATIONS. THESE DIMENSIONS ARE NOT DIRECTLY TIED TO INUNDATION FREQUENCIES.
2. TYPICAL SIDE SLOPES ARE APPLIED TO RELATIVELY STRAIGHT CHANNEL SEGMENTS. MAXIMUM AND MINIMUM SIDE SLOPES ARE APPLIED TO INNER AND OUTER CHANNEL MEANDERS, RESPECTIVELY. SOME VARIATION MAY BE REQUIRED BASED ON CONDITIONS ENCOUNTERED IN THE FIELD, AS DIRECTED BY THE ENGINEER. THE PROPOSED GRADING SURFACES ALREADY INCLUDE THESE VARIATIONS. REFER TO THE GRADING PLANS FOR MORE INFORMATION.
3. THE BANKFULL CHANNEL WILL BE DEEPER WITHIN POOLS. SEE GRADING PLANS, PROFILES, AND LARGE WOOD DETAIL SHEETS FOR MORE INFORMATION.
4. WITHIN EXCAVATED SEGMENTS OF THE PROPOSED CHANNELS, THE EXPOSED NATIVE (IN-SITU) SUBSTRATE AT THE DEPTH OF THE PROPOSED CHANNEL BED IS ANTICIPATED TO CONSIST OF A COBBLE/GRAVEL/SAND MIX WHICH WILL TYPICALLY BE CONSIDERED SUITABLE TO MEET THE SPECIFICATION FOR THE STREAMBED SUBSTRATE MIX MATERIAL. IF FINER MATERIAL IS ENCOUNTERED FOR EXTENDED LENGTHS OF CHANNEL (50 OR MORE FEET, AS DETERMINED BY THE ENGINEER IN THE FIELD), THE CONTRACTOR WILL NEED TO OVER-EXCAVATE TO A DEPTH OF 3 FEET (OR LESS IF COARSE SUBSTRATE IS INTERCEPTED) AND THEN REPLACE THE EXISTING BED MATERIAL WITH SALVAGED COARSE SUBSTRATE MEETING THE SPECIFICATION FOR THE STREAMBED SUBSTRATE MATERIAL.
5. FOR PROPOSED CHANNELS THAT ARE BUILT WITHIN FILL AREAS, THE CONTRACTOR WILL BE REQUIRED TO PLACE A MINIMUM 3 FT THICK LAYER OF STREAMBED SUBSTRATE MIX TO THE FINISHED GRADES SHOWN ON THE PLANS. REFER TO THE EARTHWORK SHEETS AND PROJECT SPECIFICATIONS FOR MORE INFORMATION.
6. RIFFLE STRUCTURES ARE AN EXCEPTION TO ABOVE NOTES, AS RIFFLES WILL REQUIRE A MINIMUM DEPTH OF 4 FT OF RIFFLE MIX MATERIAL CONSISTING OF STREAMBED SUBSTRATE MIXED WITH SALVAGED RIPRAP. REFER TO THE RIFFLE DETAIL SHEET, EARTHWORK SHEETS, AND THE PROJECT SPECIFICATIONS FOR MORE INFORMATION.

CHANNEL GEOMETRY SUMMARY TABLE										
ZONE	ALIGNMENT NAME	STATION (FT)		TYPICAL WIDTH (FT)		TYPICAL DEPTH (FT)		SIDE SLOPES (XH:1V) (FT)		
		START	END	BED	BANKFULL	LOW FLOW	BANKFULL	MIN	TYP	MAX
WEST FLOODPLAIN	DYER OUTLET CHANNEL	0+00	6+55	8	20	1	3	2	3	4
	POWERLINE BEND CHANNEL	0+00	7+87	24	48	1	5	2	3	4
EAST FORK LEWIS RIVER CORE PITS	PITS MAIN CHANNEL	137+32	168+29	62	94	1	5	2	4	6
	PITS WEST CHANNEL	0+00	29+36	20	41	1	4.5	2	3	4
	PITS EAST CHANNEL	0+00	21+14	34	55	1	4.5	2	3	4
	SPLIT FLOW CHANNEL 1	0+00	3+93	20	32	1	3	2	3	4
	SPLIT FLOW CHANNEL 2	0+00	5+02	20	32	1	3	2	3	4
EAST FLOODPLAIN	SPLIT FLOW CHANNEL 3	0+00	4+70	20	32	1	3	2	3	4
	LOWER EAST FLOODPLAIN CHANNEL	0+00	21+62	22	37	1	3.5	2	3.0	4
	UPPER EAST FLOODPLAIN CHANNEL	21+62	31+33	14	23	1	3	1.5	2.25	3
	EAST FLOODPLAIN CONNECTOR	0+00	6+40	16	34	1	4	2	3	4
	LOWER OXBOW CHANNEL	0+00	11+50	26	41	1	3.5	2	3.0	4
	UPPER OXBOW CHANNEL	0+00	17+82	32	47	1	3.5	2	3.0	4

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---      AUGUST 2024  
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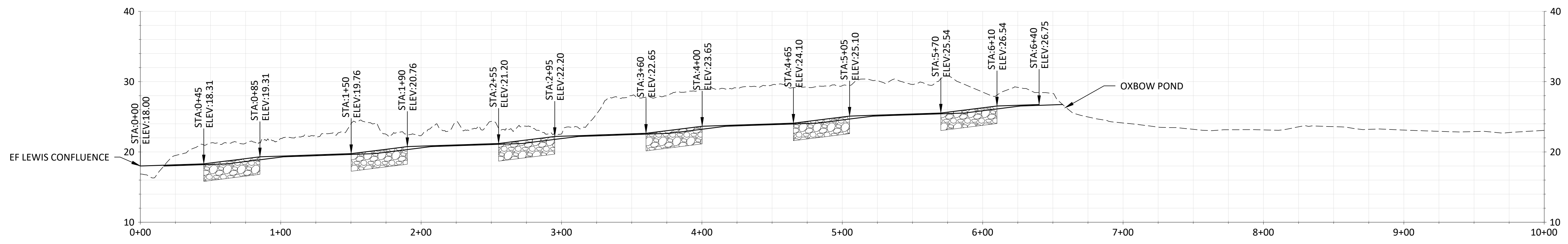
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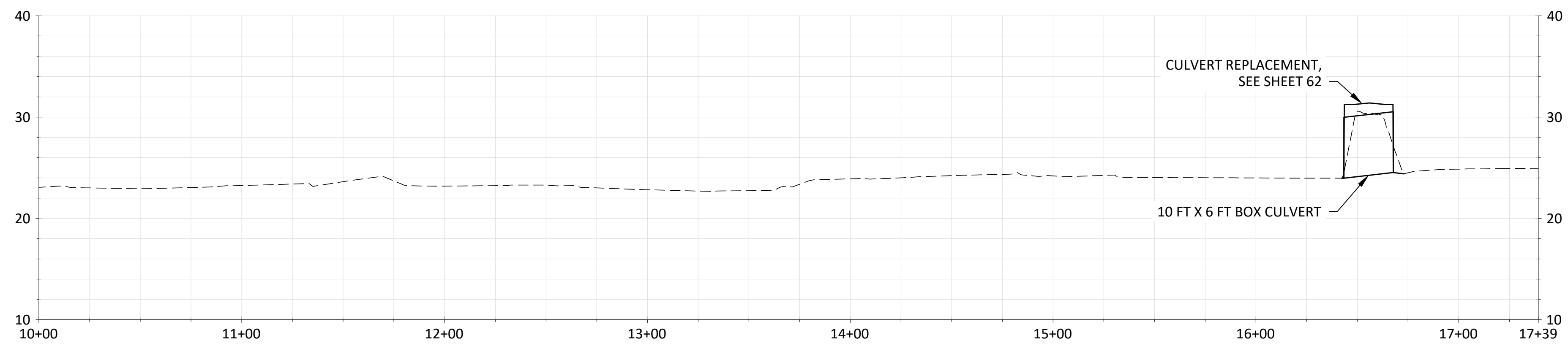
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TYPICAL CROSS-SECTIONS

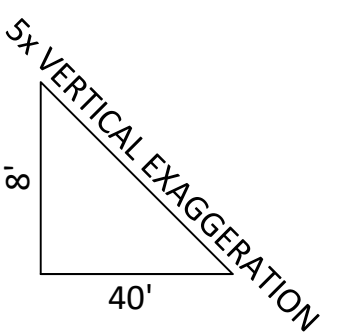
SHEET  
49 OF 67



PROFILE - DYER OUTLET CHANNEL



PROFILE - DYER CREEK THROUGH OXBOW POND



LEGEND

- EXISTING GRADE
- PROPOSED GRADE

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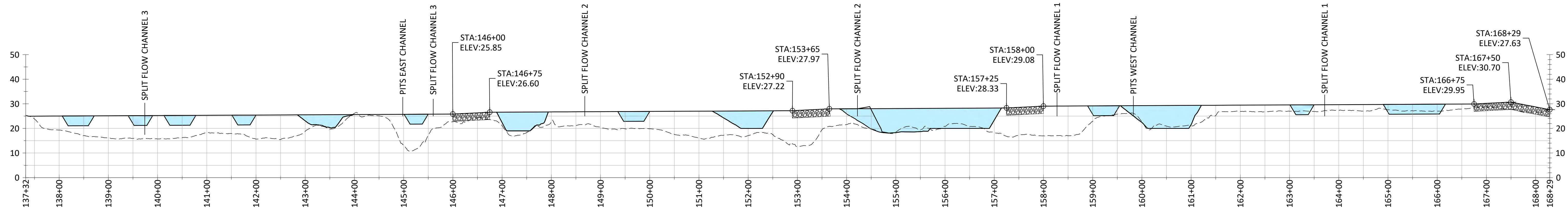


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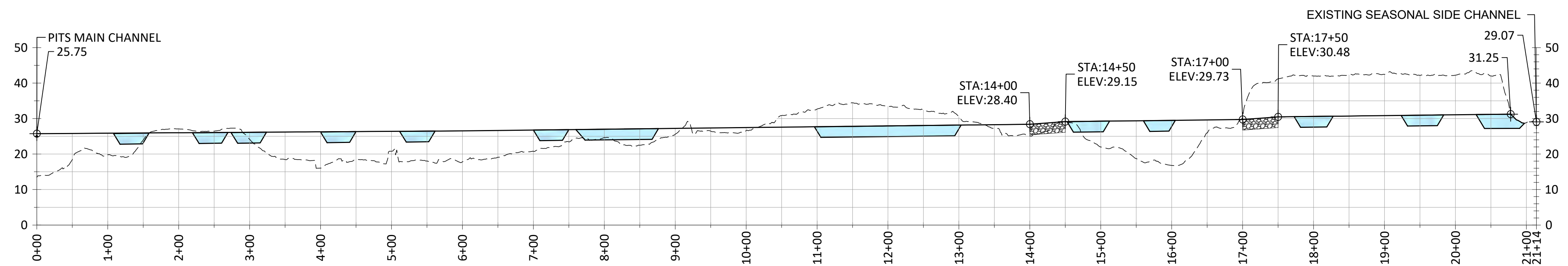
PROFILES - DYER CREEK

SHEET

50 OF 67



PROFILE - PITS MAIN CHANNEL



PROFILE - PITS EAST CHANNEL

**LEGEND**

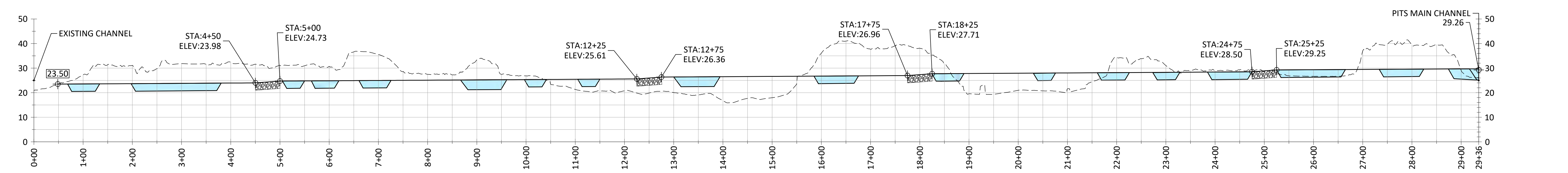
5x VERTICAL EXAGGERATION

50' / 200'

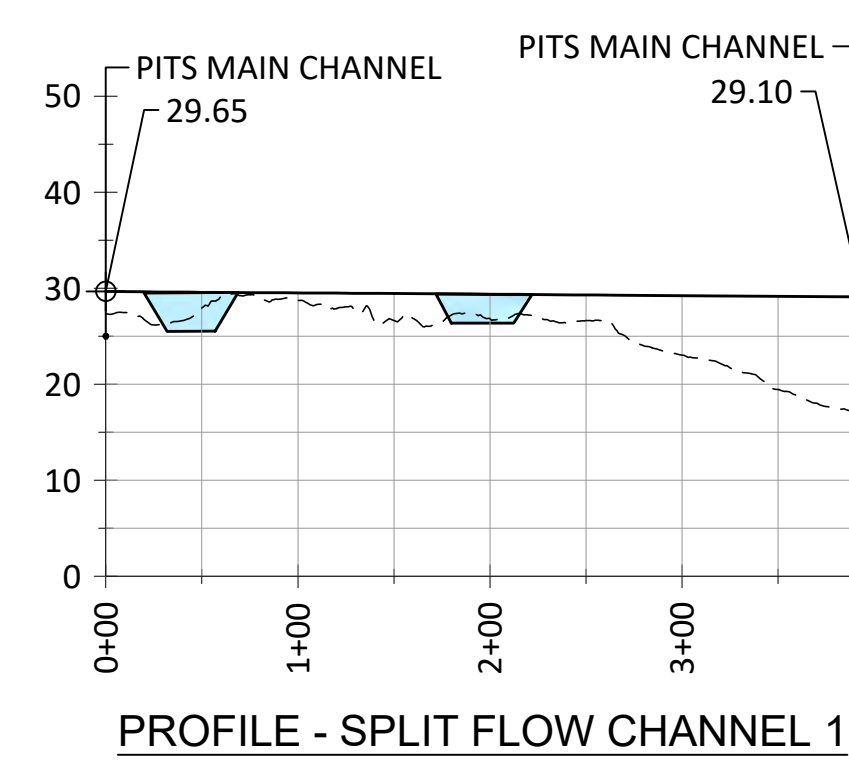
--- EXISTING GRADE

— PROPOSED GRADE

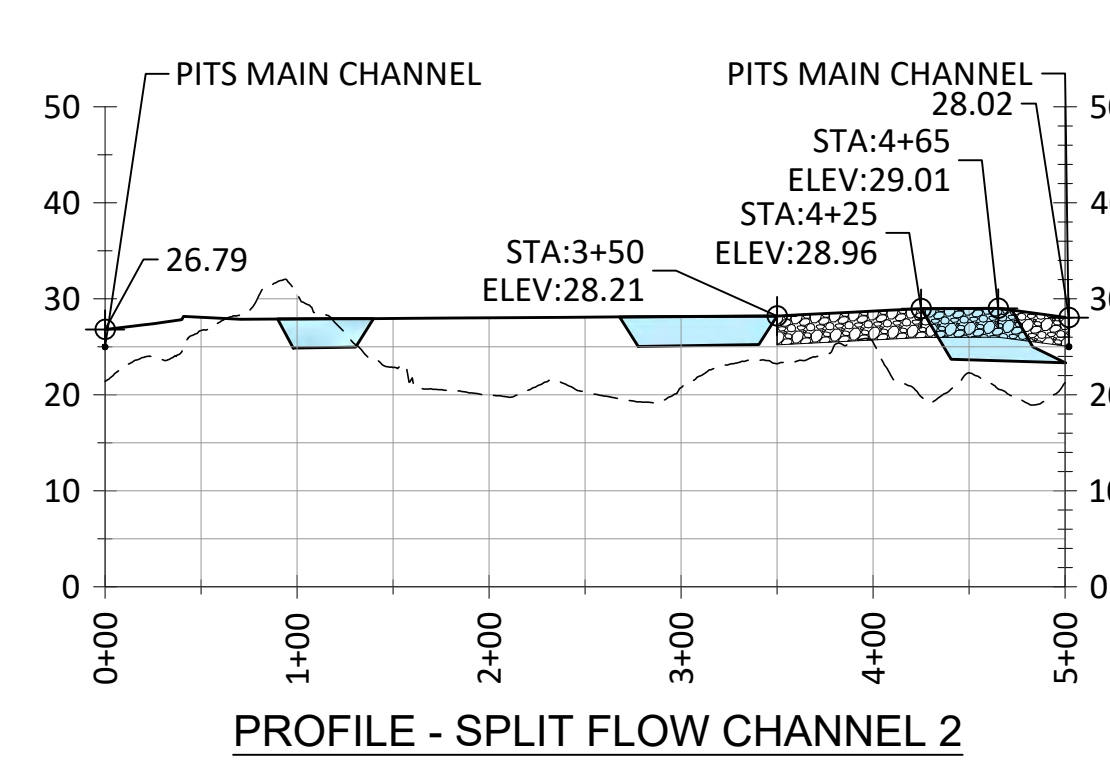
- PROFILE NOTES:**
1. THE PROFILES DEPICT MASS GRADING OF NEW CHANNELS, WHICH INCLUDES A 12-INCH DEEP LOW FLOW CHANNEL.
  2. THE POOLS SHOWN ON THIS SHEET ARE PROJECTED TO THE CENTERLINE AND THE POOL LOCATIONS AND EXTENTS MAY VARY IN THE FIELD, AS DIRECTED BY THE ENGINEER.
  3. REFER TO THE MAIN CHANNEL GRADING PLAN AND THE LARGE WOOD DETAIL SHEETS FOR MORE INFORMATION ABOUT POOL DEPTHS.



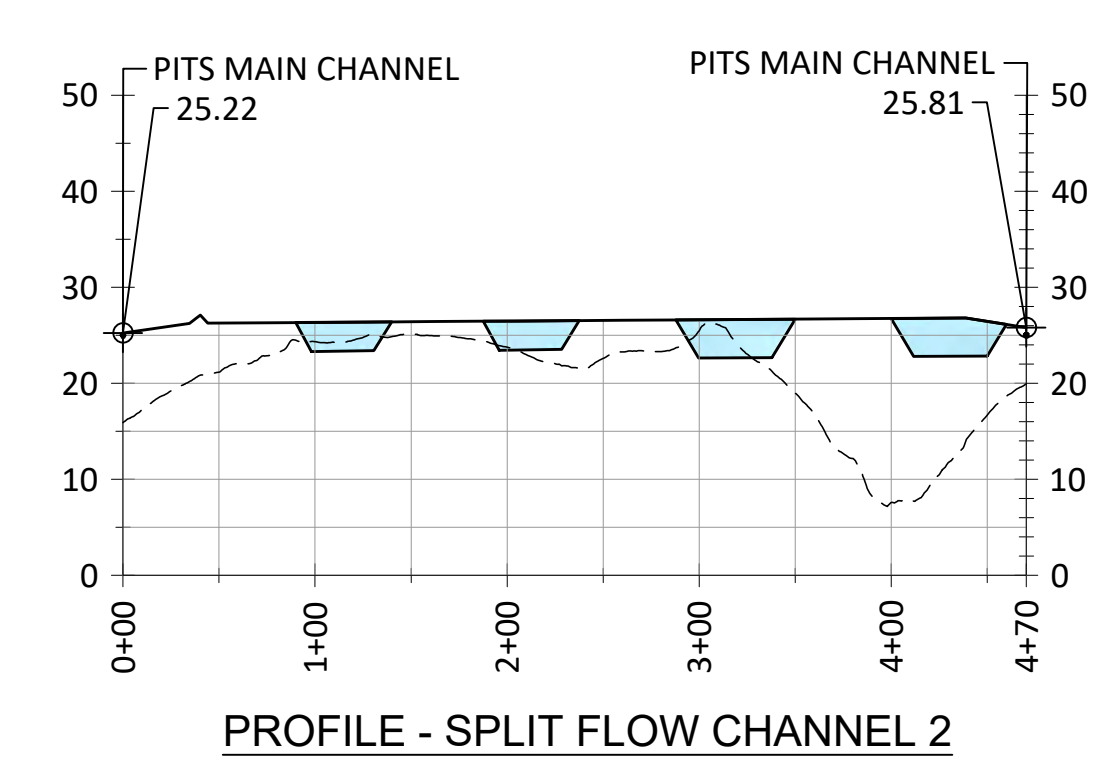
PROFILE - PITS WEST CHANNEL



PROFILE - SPLIT FLOW CHANNEL 1



PROFILE - SPLIT FLOW CHANNEL 2



PROFILE - SPLIT FLOW CHANNEL 2

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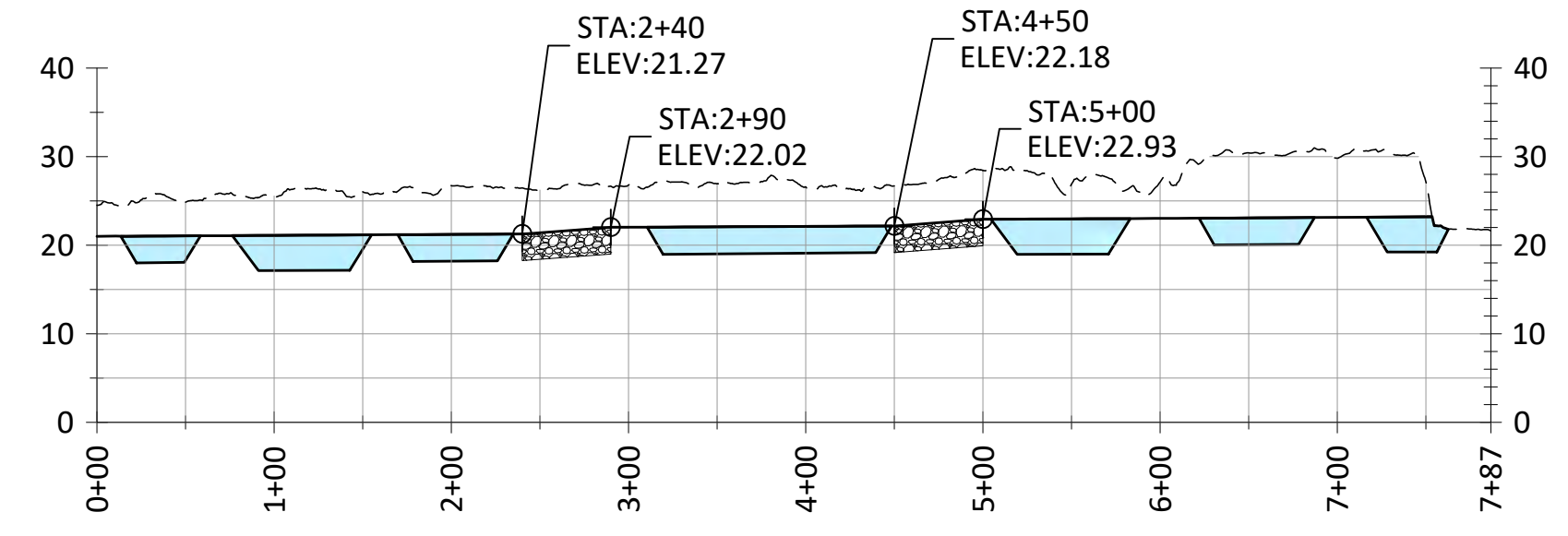
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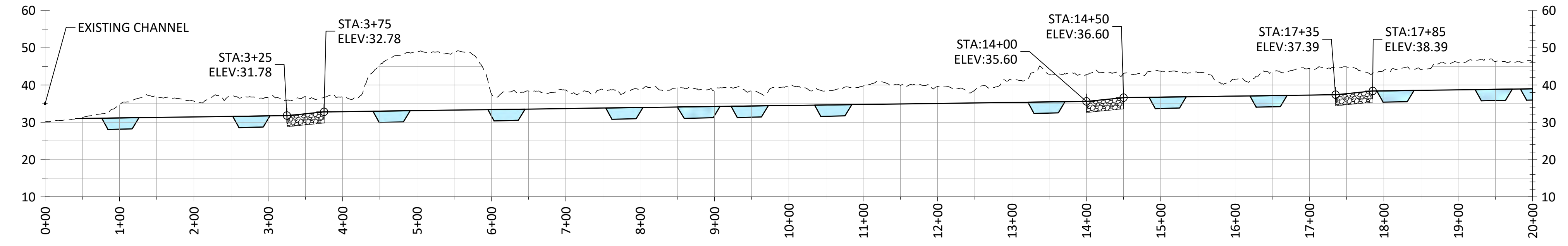
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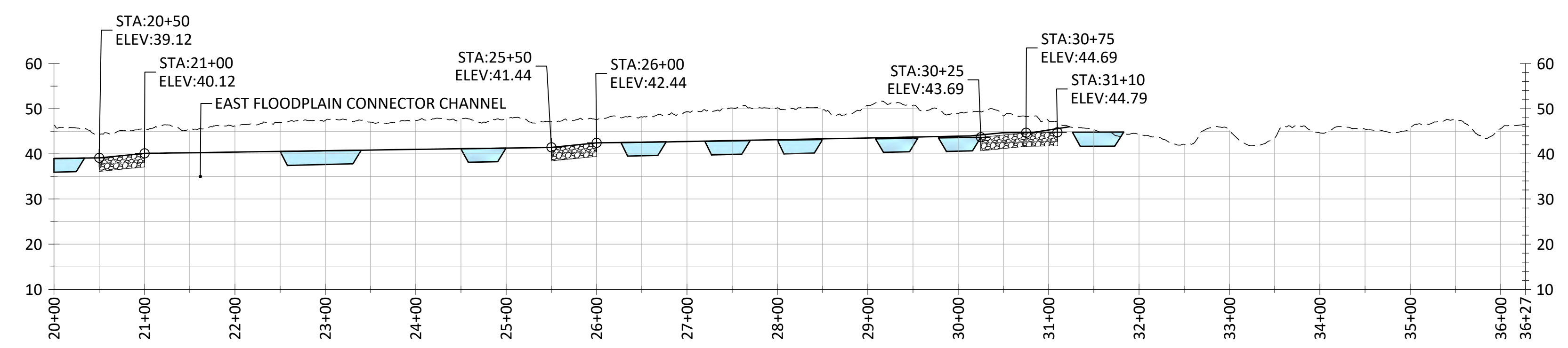
PROFILES - CORE PITS



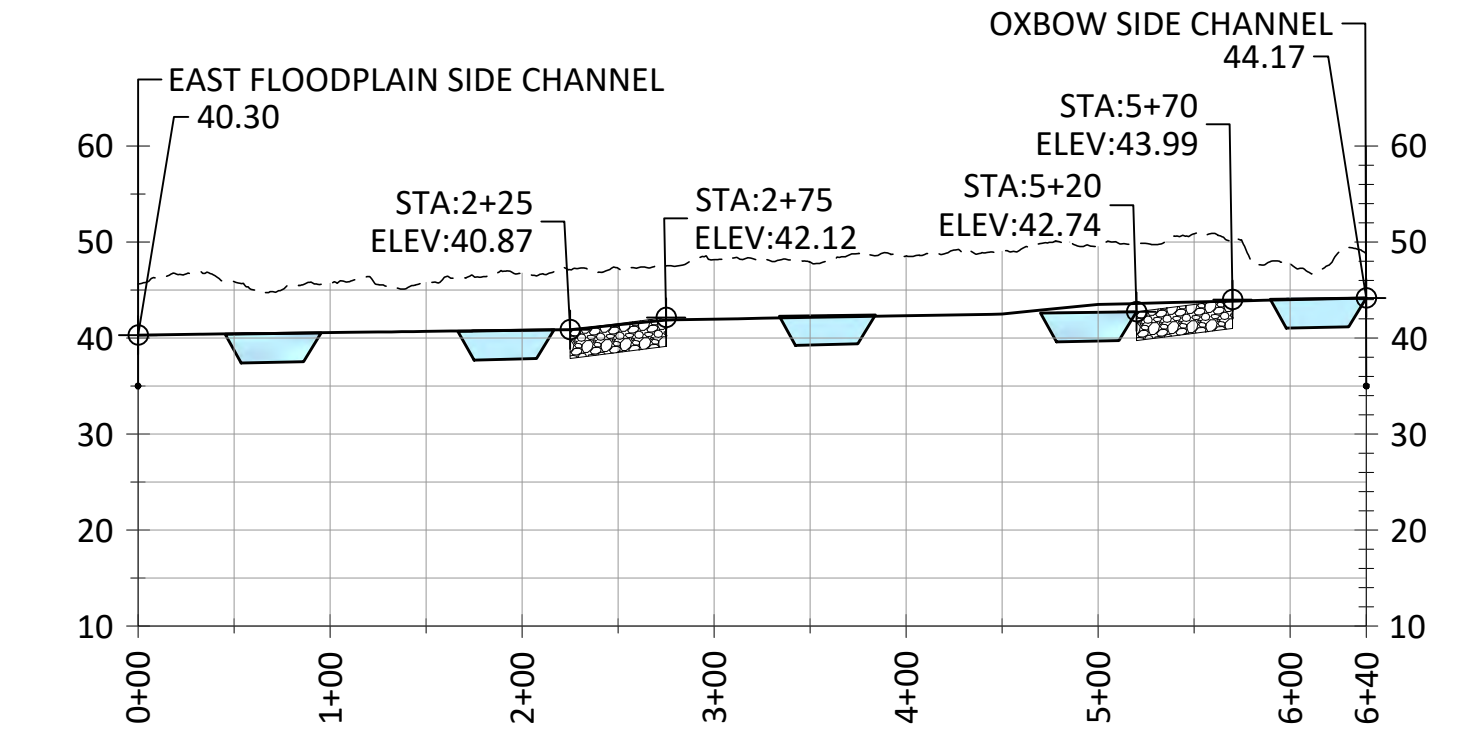
PROFILE - POWERLINE BEND SIDE CHANNEL



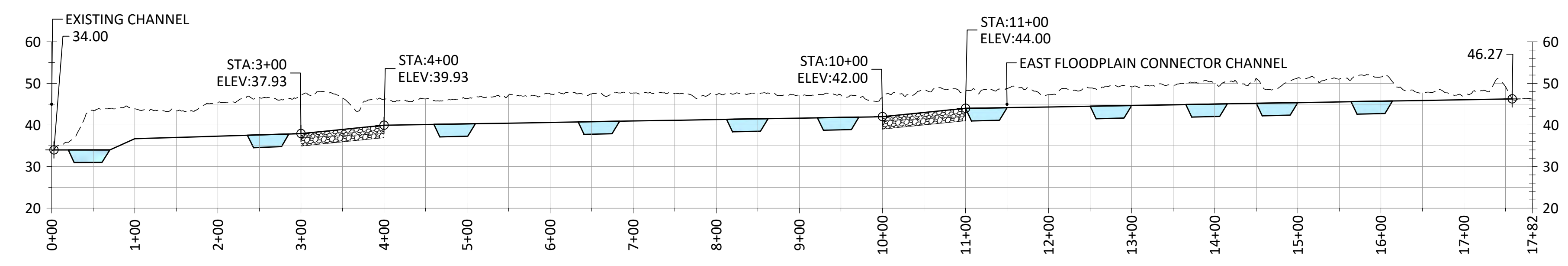
PROFILE - EAST FLOODPLAIN SIDE CHANNEL STA 0+00 TO STA 25+00



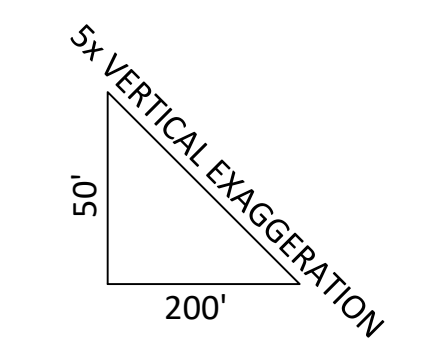
PROFILE - EAST FLOODPLAIN SIDE CHANNEL STA 25+00 TO STA 36+27



PROFILE - EAST FLOODPLAIN CONNECTOR CHANNEL



PROFILE - OXBOW SIDE CHANNEL



LEGEND

- EXISTING GRADE
- PROPOSED GRADE

PROFILE NOTES:

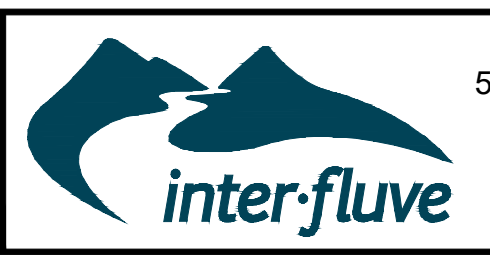
1. THE PROFILES DEPICT MASS GRADING OF NEW CHANNELS, WHICH INCLUDES A 12 IN DEEP LOW FLOW CHANNEL.
2. THE POOLS SHOWN ON THIS SHEET ARE PROJECTED TO THE CENTERLINE AND THE POOL LOCATIONS AND EXTENTS MAY VARY IN THE FIELD, AS DIRECTED BY THE ENGINEER.
3. REFER TO THE MAIN CHANNEL GRADING PLAN AND THE LARGE WOOD DETAIL SHEETS FOR MORE INFORMATION ABOUT POOL DEPTHS.

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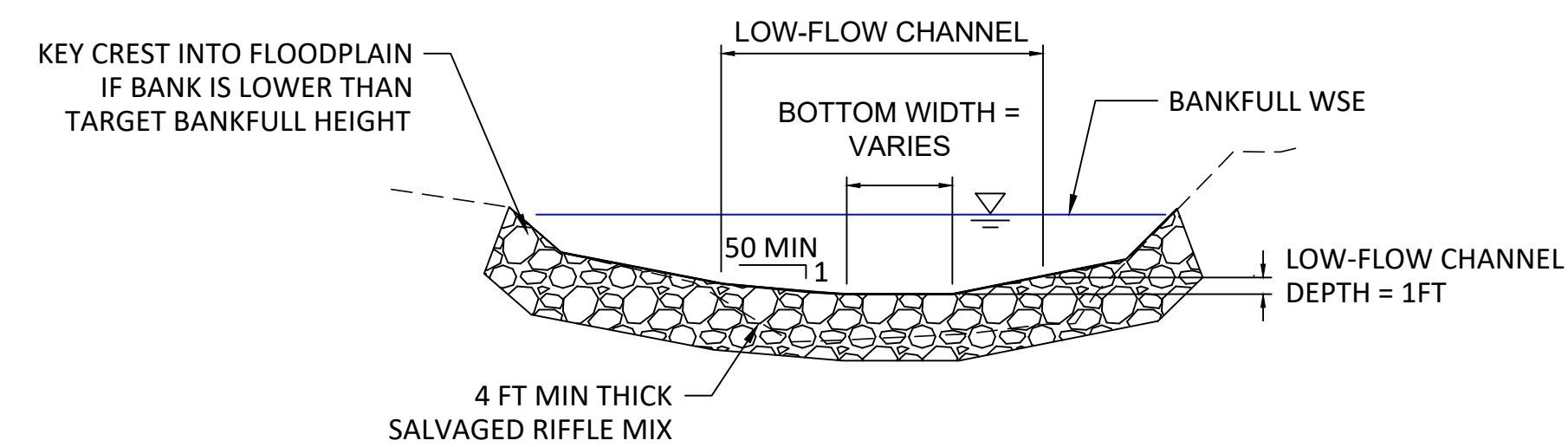
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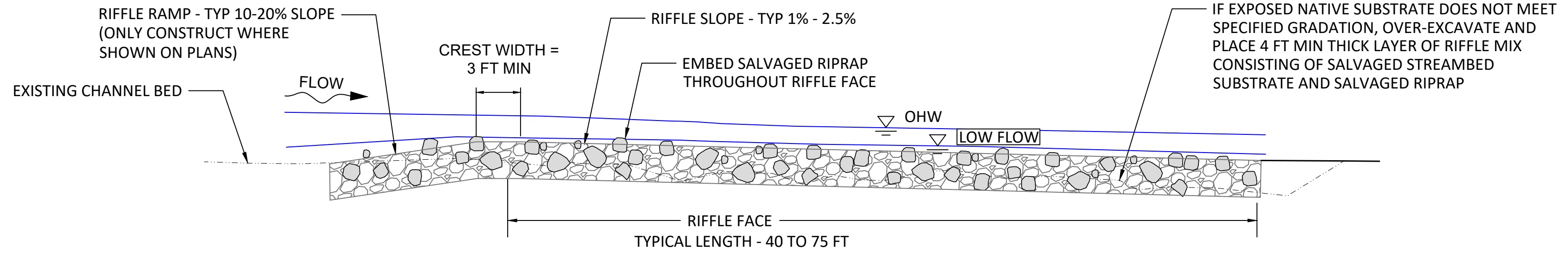
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PROFILES - WEST & EAST  
FLOODPLAINS

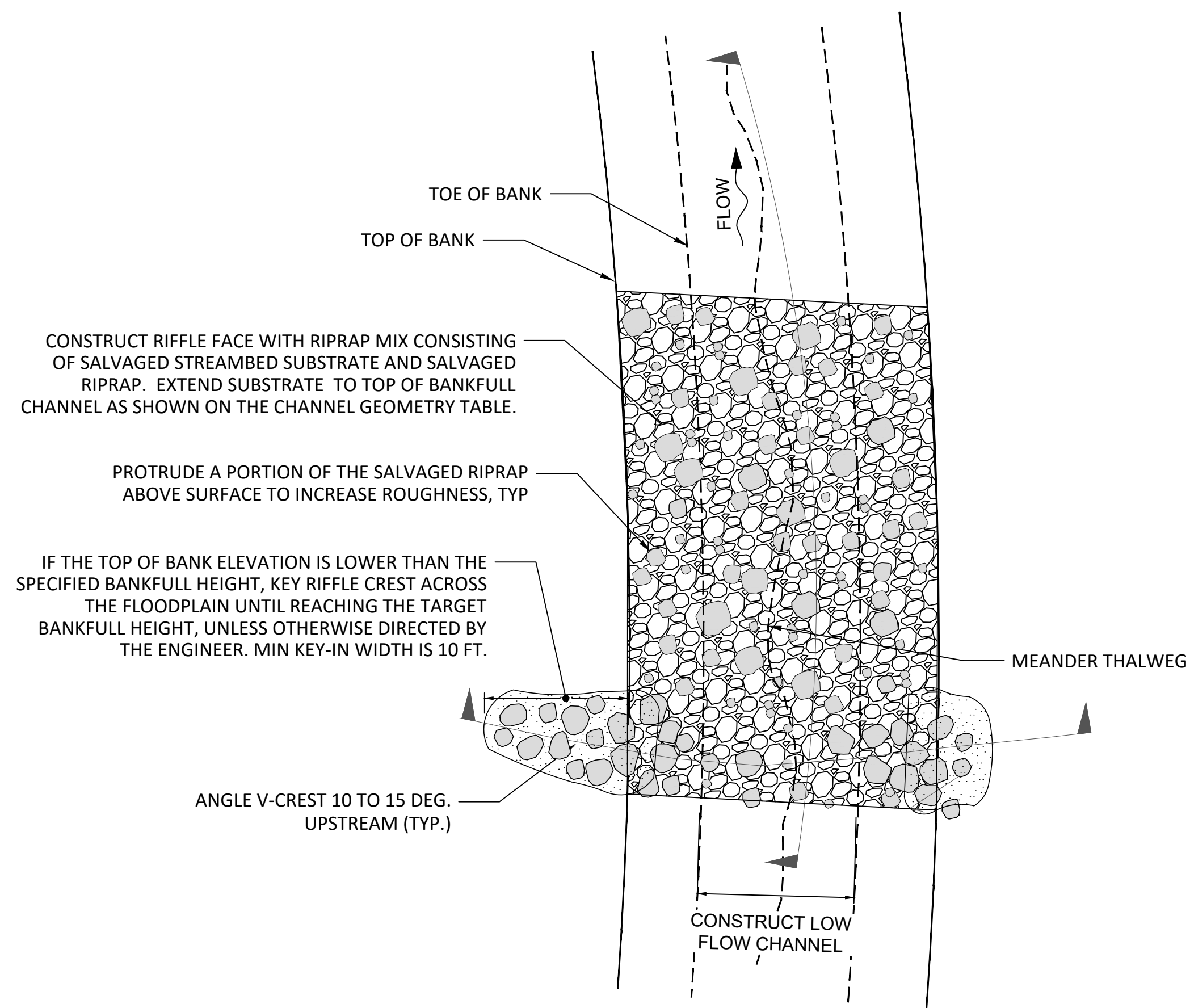
SHEET  
52 OF 67



SECTION A-A'



PROFILE B-B'



PLAN

**1**  
TYP CONSTRUCTED RIFFLE  
NOT TO SCALE

RIFFLE CREST GEOMETRY TABLE					SALVAGED 18-36 IN RIPRAP QTY (EA)
ALIGNMENT	STATION	CREST ELEV (FT)	LENGTH (FT)	SLOPE	
DYER OUTLET CHANNEL	0+85	19.31	40	2.5%	-
	1+90	20.76	40	2.5%	-
	2+95	22.20	40	2.5%	-
	4+00	23.65	40	2.5%	-
	5+05	25.10	40	2.5%	-
POWERLINE BEND SIDE CHANNEL	2+90	22.02	50	1.5%	80
	5+00	22.93	50	1.5%	80
PITS MAIN CHANNEL	146+75	26.60	75	1%	300
	153+65	27.97	75	1%	300
	158+00	29.08	75	1%	300
PITS WEST CHANNEL	167+50	30.70	75	1%	300
	5+00	24.73	50	1.5%	70
	12+75	26.36	50	1.5%	70
PITS EAST CHANNEL	18+25	27.71	50	1.5%	70
	25+25	29.25	50	1.5%	70
	14+50	29.15	50	1.5%	115
EAST FLOODPLAIN SIDE CHANNEL	17+50	30.48	50	1.5%	115
	3+75	32.78	50	2%	-
	14+50	36.60	50	2%	-
	17+85	38.39	50	2%	-
	21+00	40.12	50	2%	-
EAST FLOODPLAIN CONNECTOR	26+00	42.44	50	2%	-
	30+75	44.69	50	2%	-
OXBOW SIDE CHANNEL	2+75	42.12	50	2.5%	-
	5+70	43.99	50	2.5%	-
CHANNEL	4+00	39.93	100	2%	-
	11+00	44.00	100	2%	-

RIFFLE STRUCTURE NOTES:

- THE RIFFLE MIX SHALL BE CONSTRUCTED USING THE FOLLOWING COMPONENTS:
  - SALVAGED STREAMBED SUBSTRATE THAT APPROXIMATELY MEETS THE REQUIREMENTS OF THE 12-INCH-MINUS STREAMBED COBBLES SET FORTH IN WSDOT STANDARD SPECIFICATION 9-03.11(4).
  - SALVAGED RIPRAP WITH SIZES RANGING BETWEEN 18 AND 36-INCHES (AS MEASURED BY THE AVERAGE AXIS LENGTH). REQUIRED RIPRAP QUANTITIES ARE SHOWN IN THE RIFFLE CREST GEOMETRY TABLE.
- APPROXIMATE LIMITS OF EACH RIFFLE STRUCTURE ARE SHOWN ON THE PLAN AND PROFILE SHEETS. THE RIFFLE MATERIAL SHALL BE PLACED TO THE TOP OF BANKFULL CHANNEL.
- SHAPE RIFFLE BED TO CREATE A SINUOUS 1 FT DEEP LOW FLOW PATH.
- WITHIN EXCAVATED SEGMENTS OF THE PROPOSED CHANNELS, THE EXPOSED NATIVE (IN-SITU) SUBSTRATE AT THE DEPTH OF THE PROPOSED CHANNEL BED IS ANTICIPATED TO CONSIST OF A COBBLE/GRAVEL/SAND MIX WHICH WILL TYPICALLY BE CONSIDERED SUITABLE TO MEET THE SPECIFICATION FOR THE STREAMBED SUBSTRATE MIX MATERIAL. IN THESE CASES, AS APPROVED BY THE ENGINEER, RIFFLE STRUCTURES WILL NOT NEED TO BE CONSTRUCTED.
- FOR PROPOSED CHANNEL SEGMENTS THAT ARE BUILT WITHIN FILL AREAS, THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT 4 FT THICK RIFFLES TO THE FINISHED GRADES SHOWN ON THE PLANS. WHERE PRACTICAL, KEY THE RIFFLE INTO IN-SITU GRAVEL/COBBLE MATERIAL. REFER TO THE EARTHWORK SEQUENCING SHEETS AND PROJECT SPECIFICATIONS FOR MORE INFORMATION.
- IF NECESSARY, WASH FINES TO SEAL BED PROPERLY TO PREVENT FLOWS FROM GOING SUBSURFACE.
- CONTRACTOR SHALL SALVAGE AND STOCKPILE FROM WITHIN THE PROJECT AREA FOR RE-USE IN SELECTED RIFFLES. THE LARGEST COLLECTION OF EXISTING RIPRAP CAN BE FOUND ALONG THE MAIN EF LEWIS RIVER NEAR THE DYER CREEK PROJECT AREA. A LESSER QUANTITY CAN BE FOUND WITHIN A CONSTRUCTED BERM BETWEEN THE CORE PITS AND EAST FLOODPLAIN ZONES.
- FOR RIFFLES THAT INCLUDE SUPPLEMENTAL RIPRAP, EMBED THE LARGER ROCKS SO LESS THAN ONE-THIRD OF THE RIPRAP IS EXPOSED AT THE SURFACE.

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RIFFLE DETAILS

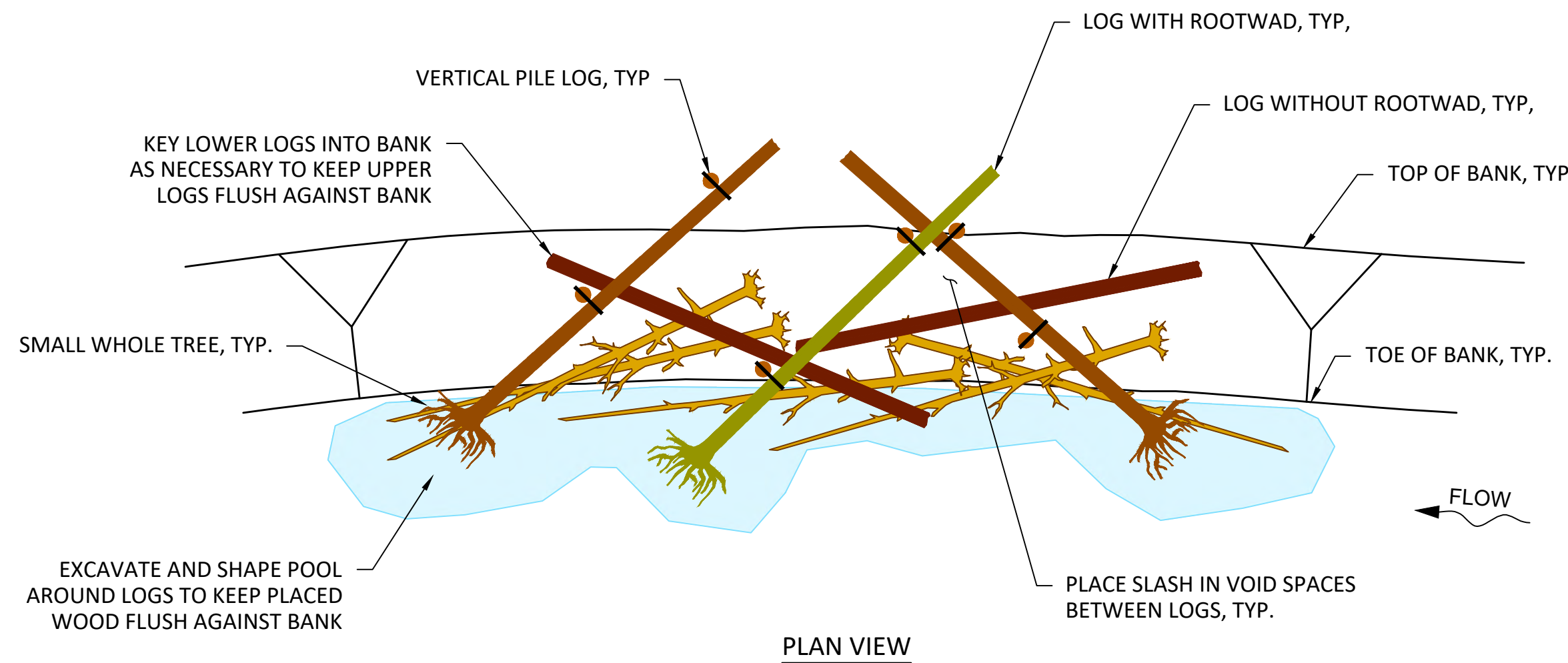
SHEET

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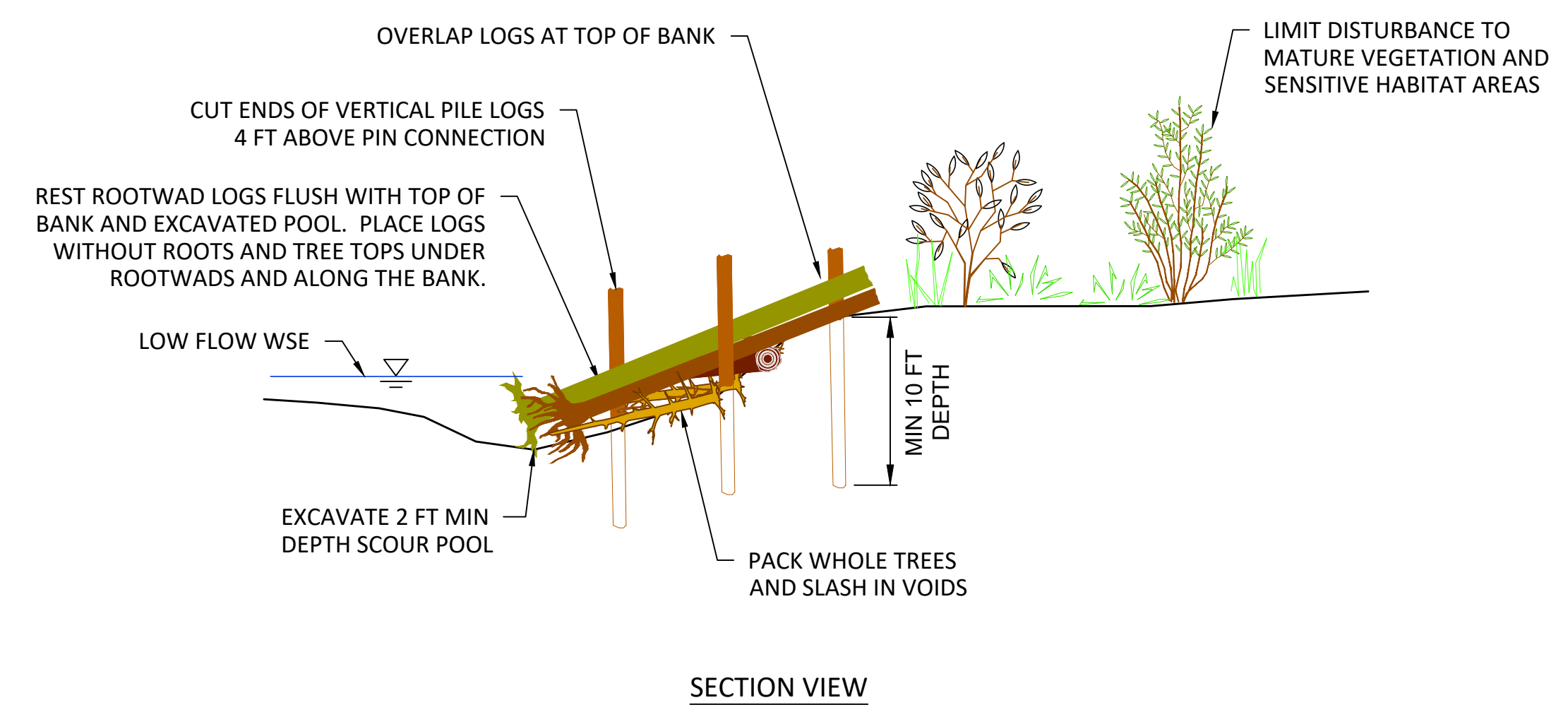








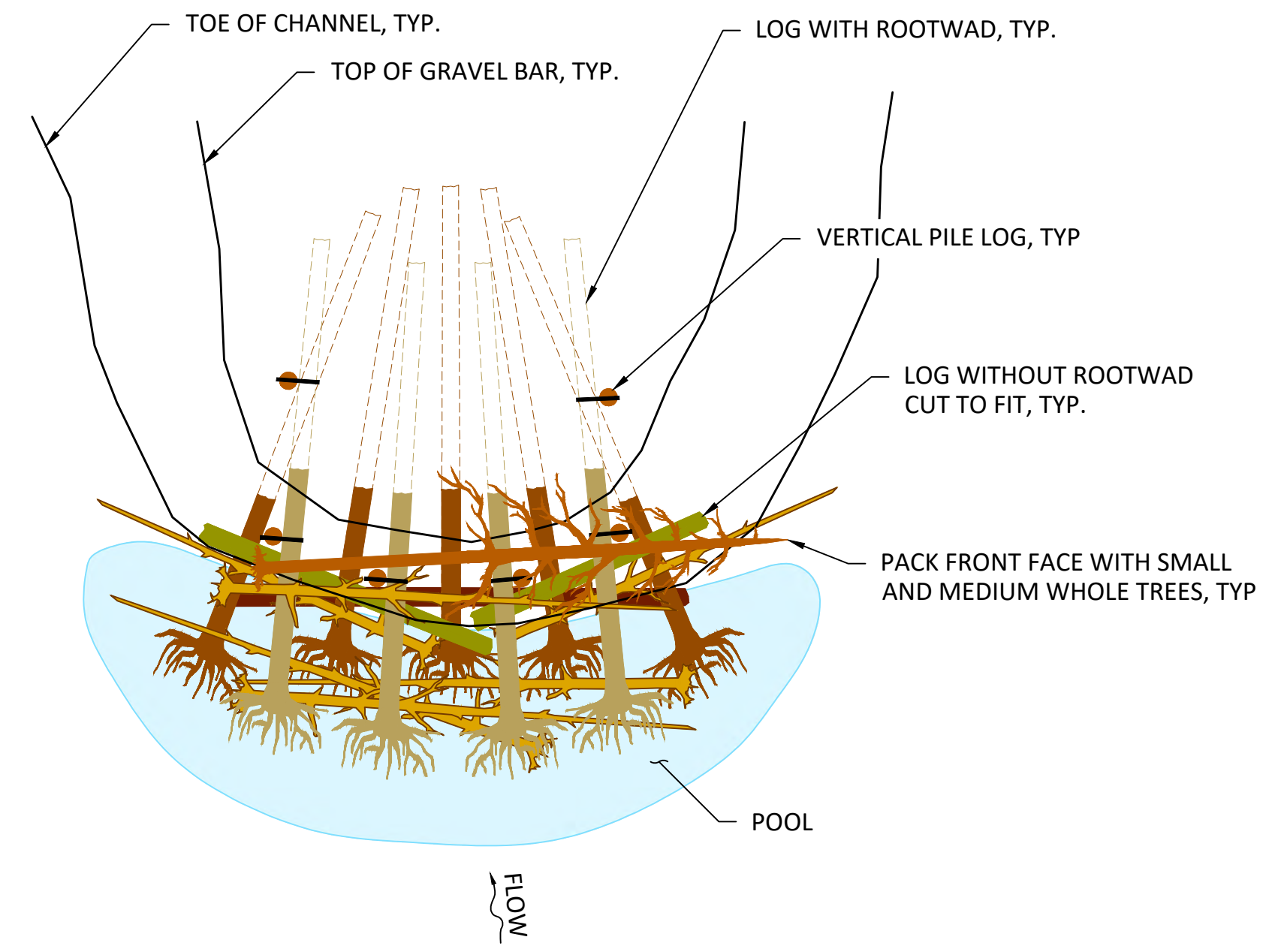
PLAN VIEW



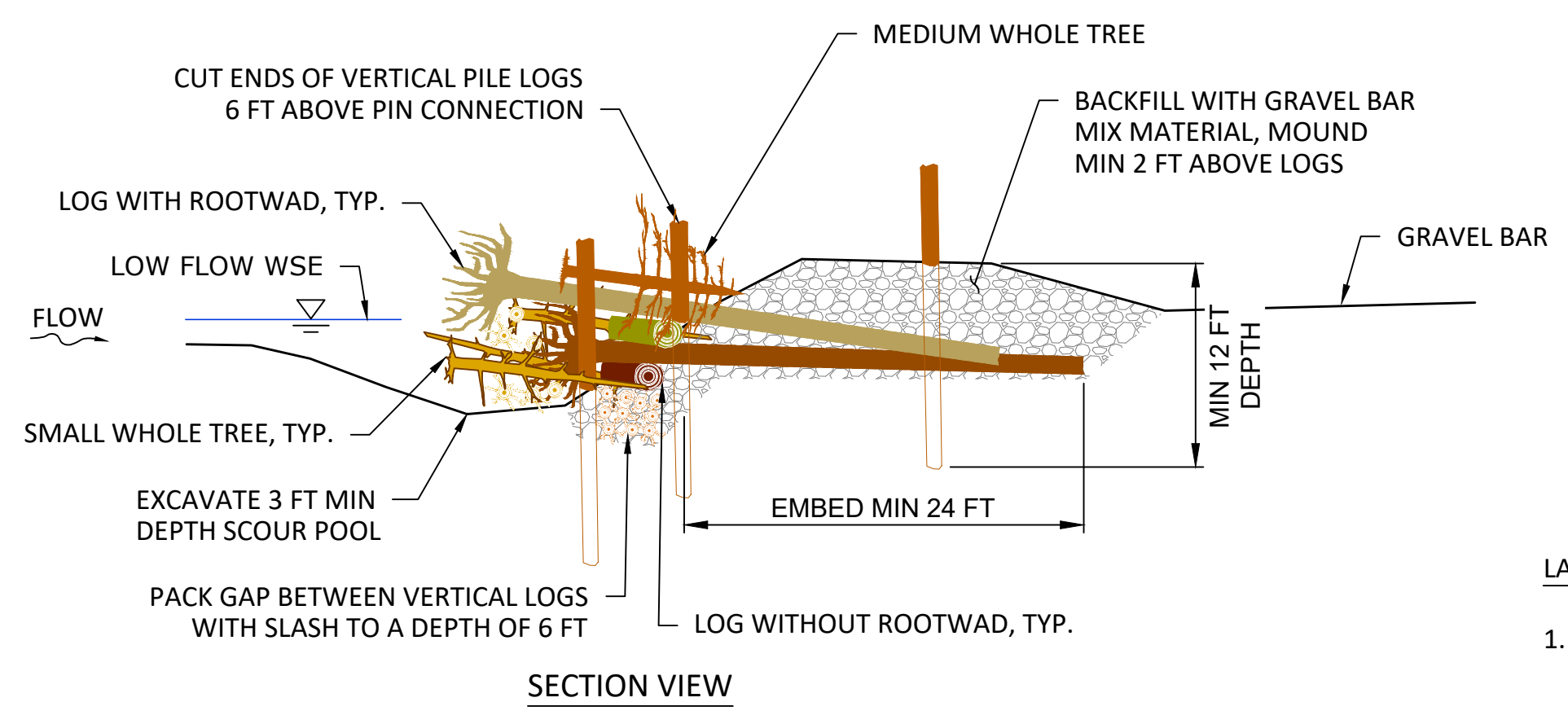
SECTION VIEW

**E** MARGIN HABITAT WOOD STRUCTURE  
TYP NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)					
ITEM	UNITS	QTY	LAYER 1	LAYER 2	LAYER 3
LOGS WITH ROOTS	EA	3	-	-	3
LOGS WITHOUT ROOTS	EA	2	-	2	-
SMALL WHOLE TREES	EA	5	5	-	-
VERTICAL PILE LOGS	EA	6	-	-	6
THREADED ROD	EA	6	-	-	6
MIN. PULLOUT RESISTANCE	LBF	7.5K			
APPROX. POOL EXCAVATION	CY	30			
APPROX. BANK EXCAVATION	CY	10			



PLAN VIEW



SECTION VIEW

**F** APEX WOOD STRUCTURE  
TYP NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)							
ITEM	UNITS	QTY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5
LOGS WITH ROOTS	EA	9	-	5	-	4	-
LOGS WITHOUT ROOTS	EA	3	1	-	2	-	-
SMALL WHOLE TREES	EA	6	3	-	2	-	1
MEDIUM WHOLE TREES	EA	1	-	-	-	-	1
VERTICAL PILE LOGS	EA	6	-	-	-	6	-
THREADED ROD	EA	6	-	-	-	6	-
MIN. PULLOUT RESISTANCE	LBF	9K					
APPROX. POOL EXCAVATION	CY	85					
APPROX. BANK EXCAVATION	CY	50					

- LARGE WOOD STRUCTURE NOTES:**
1. SPECIFIC ORIENTATION OF LOGS MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SITE CONDITIONS AND SIZE AND SHAPE OF DELIVERED LARGE WOOD MATERIAL.
  2. ENGINEER MAY DIRECT SOME OF THE LOGS TO BE CUT TO SHORTER LENGTHS TO AVOID IMPACTS TO VEGETATION OR SENSITIVE AREAS.
  3. BACKFILL EACH LAYER OF THE STRUCTURE AND COMPACT WITH EXCAVATOR BUCKET BEFORE PROCEEDING TO THE NEXT LOG LAYER.
  4. EACH VERTICAL PILE LOG SHOULD ONLY BE MECHANICALLY CONNECTED TO THE TOP LOG LAYER UNLESS OTHERWISE DIRECTED BY THE ENGINEER IN THE FIELD. REFER TO VERTICAL PILE LOG DETAIL FOR MORE INFORMATION ON BALLAST REQUIREMENTS.
  5. THE VERTICAL PILE LOGS SHALL NOT BE MECHANICALLY CONNECTED TO THE WHOLE TREES.
  6. TOP OF VERTICAL PILE LOGS SHALL HAVE A SLOPING CUT (APPROXIMATELY 45 DEG).
  7. IF COARSE SUBSTRATE IS LIMITED FOR BACKFILL, PRIORITIZE PLACING THE SALVAGED STREAMBED SUBSTRATE MATERIAL IN THE LOWER LIFTS OF THE STRUCTURE BACKFILL. ALSO, RECONSTRUCT THE FRONT FACE OF THE BANK WITH A MINIMUM 3 FT THICK LAYER OF SALVAGED STREAMBED SUBSTRATE MATERIAL TO PREVENT EROSION.
  8. TOP 1 FT LAYER OF BACKFILL SHALL CONSIST OF AT LEAST 75% SALVAGED SOIL MATERIAL TO PROVIDE A SUITABLE GROWING MEDIUM FOR PLANTS.

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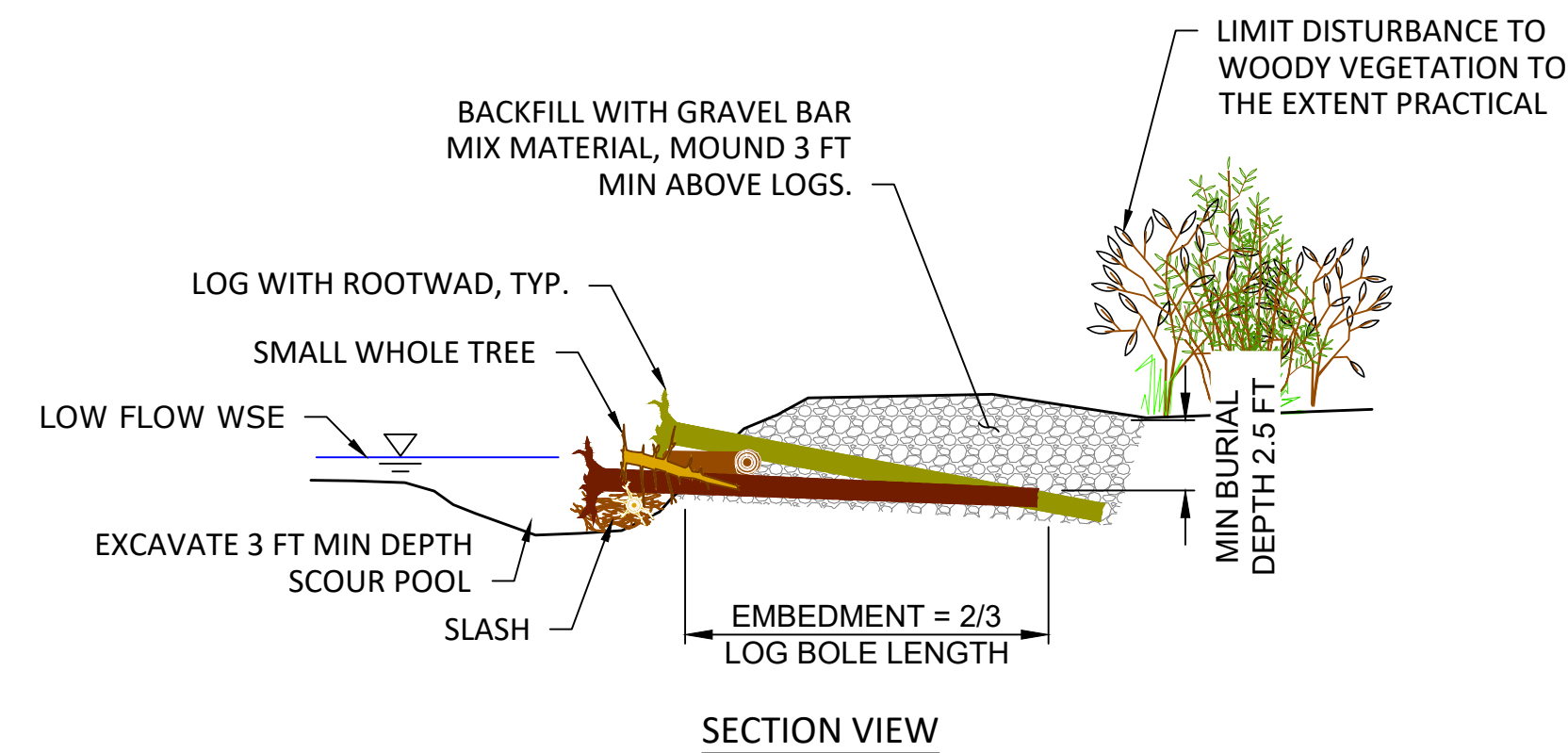
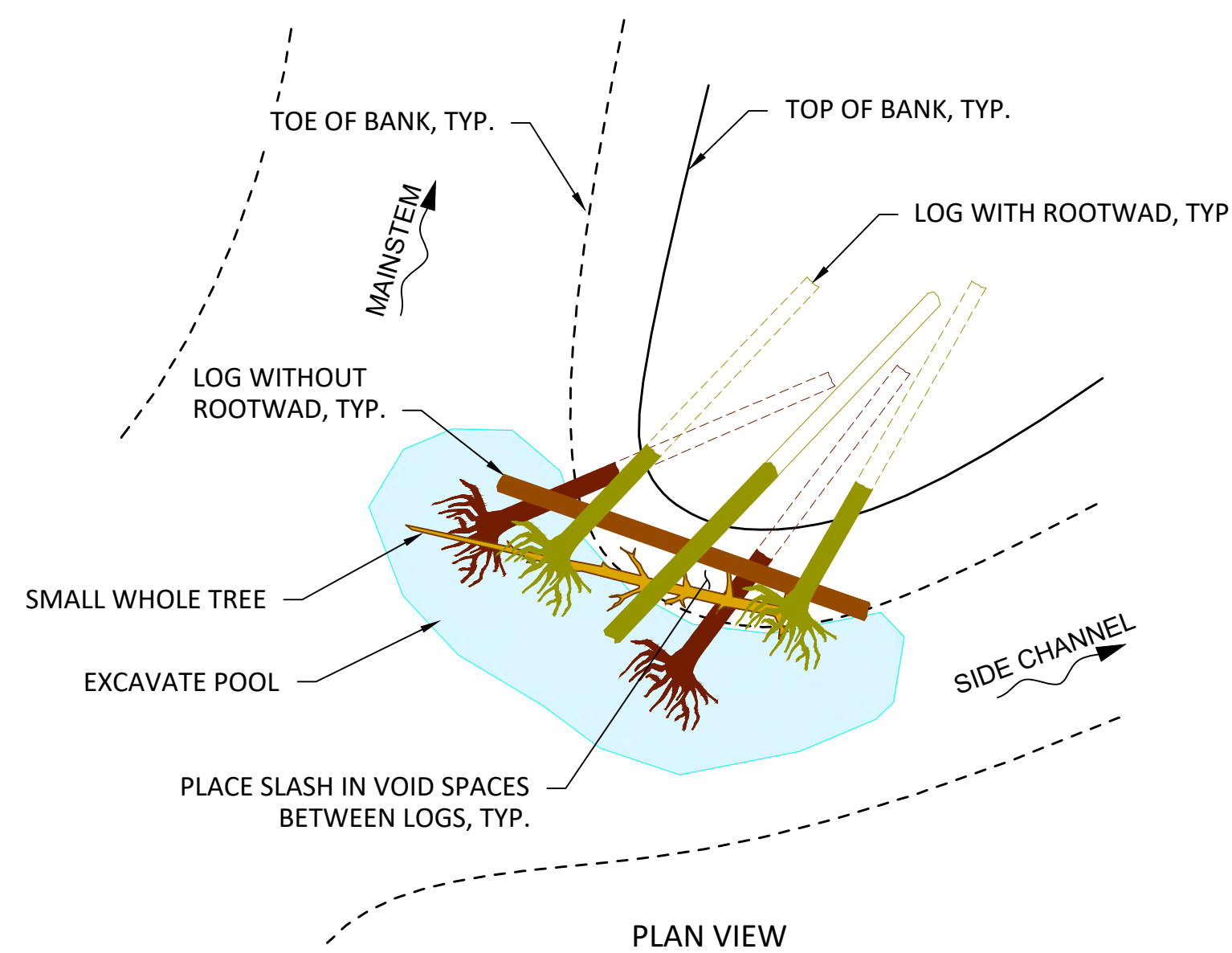
JR, NS	MR, GJ	---
DRAWN	DESIGNED	CHECKED
---	AUGUST 2024	---
APPROVED	DATE	PROJECT

LOWER COLUMBIA ESTUARY PARTNERSHIP  
EAST FORK LEWIS RIVER  
RECONNECTION PROJECT



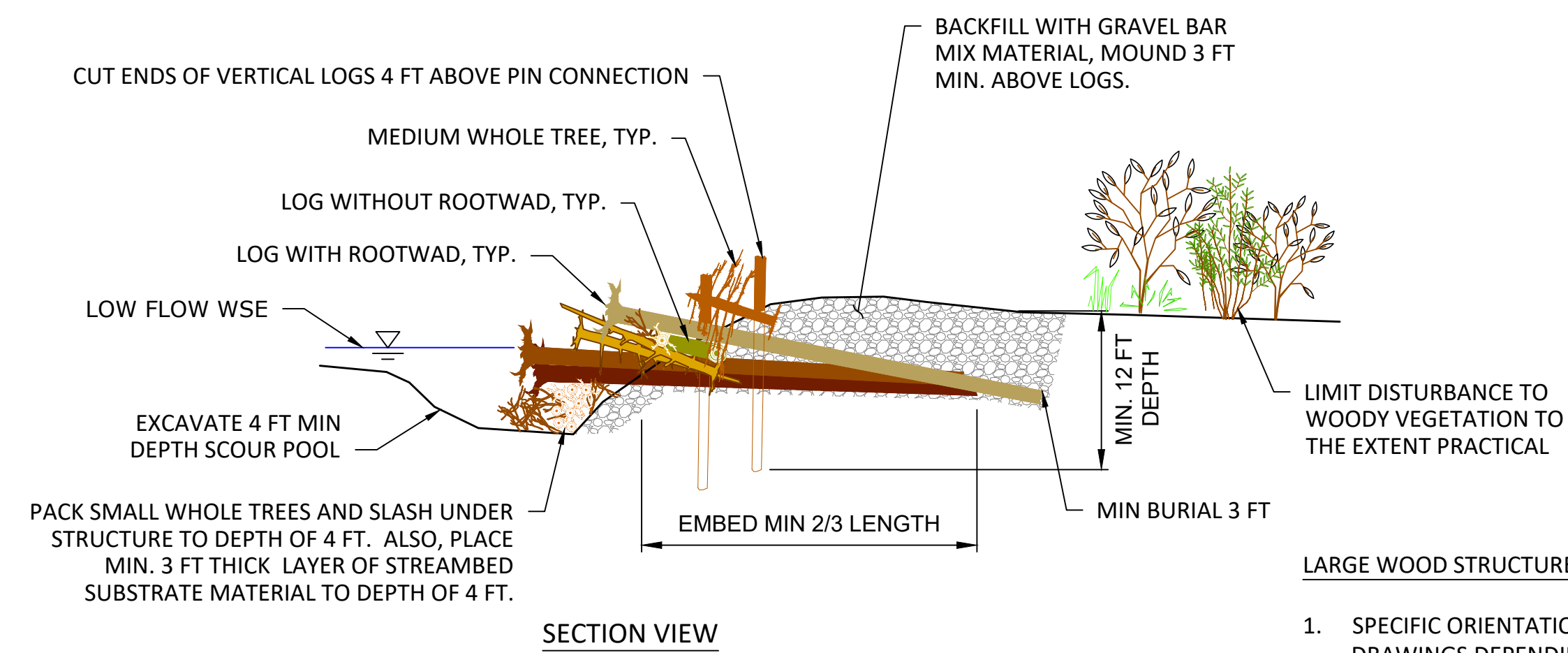
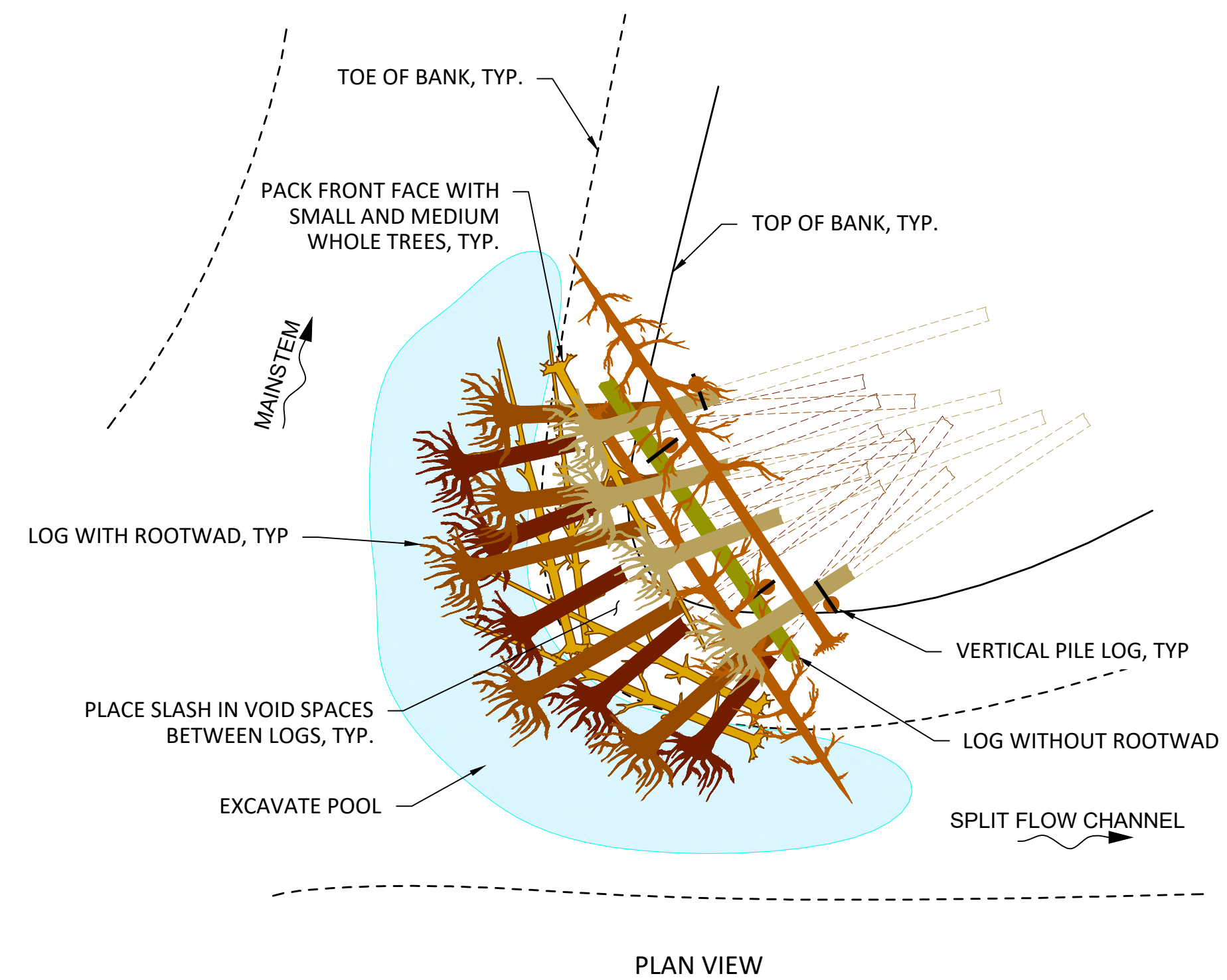
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LARGE WOOD STRUCTURE  
DETAILS (3 OF 6)



**G** MINOR INLET WOOD STRUCTURE  
TYP NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)					
ITEM	UNITS	QTY	LAYER 1	LAYER 2	LAYER 3
LOGS WITH ROOTS	EA	4	2	-	2
LOGS WITHOUT ROOTS	EA	2	-	1	1
SMALL WHOLE TREES	EA	1	-	1	-
APPROX. POOL EXCAVATION	CY	45			
APPROX. BANK EXCAVATION	CY	120			



**H** MAJOR INLET WOOD STRUCTURE  
TYP NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)						
ITEM	UNITS	QTY	LAYER 1	LAYER 2	LAYER 3	LAYER 4
LOGS WITH ROOTS	EA	14	5	5	-	4
LOGS WITHOUT ROOTS	EA	1	-	-	1	-
SMALL WHOLE TREES	EA	5	4	-	1	-
MEDIUM WHOLE TREES	EA	2	-	-	1	1
VERTICAL PILE LOGS	EA	4	-	-	2	2
THREADED ROD	EA	4	-	-	2	2
MIN. PULLOUT RESISTANCE	LBF	9K				
APPROX. POOL EXCAVATION	CY	130				
APPROX. BANK EXCAVATION	CY	285				

**LARGE WOOD STRUCTURE NOTES:**

- SPECIFIC ORIENTATION OF LOGS MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SITE CONDITIONS AND SIZE AND SHAPE OF DELIVERED LARGE WOOD MATERIAL.
- ENGINEER MAY DIRECT SOME OF THE LOGS TO BE CUT TO SHORTER LENGTHS TO AVOID IMPACTS TO VEGETATION OR SENSITIVE AREAS.
- BACKFILL EACH LAYER OF THE STRUCTURE AND COMPACT WITH EXCAVATOR BUCKET BEFORE PROCEEDING TO THE NEXT LOG LAYER.
- EACH VERTICAL PILE LOG SHOULD ONLY BE MECHANICALLY CONNECTED TO THE TOP LOG LAYER UNLESS OTHERWISE DIRECTED BY THE ENGINEER IN THE FIELD. REFER TO VERTICAL PILE LOG DETAIL FOR MORE INFORMATION ON BALLAST REQUIREMENTS.
- THE VERTICAL PILE LOGS SHALL NOT BE MECHANICALLY CONNECTED TO THE WHOLE TREES.
- TOP OF VERTICAL PILE LOGS SHALL HAVE A SLOPING CUT (APPROXIMATELY 45 DEG).
- IF COARSE SUBSTRATE IS LIMITED FOR BACKFILL, PRIORITIZE PLACING THE SALVAGED STREAMBED SUBSTRATE MATERIAL IN THE LOWER LIFTS OF THE STRUCTURE BACKFILL. ALSO, RECONSTRUCT THE FRONT FACE OF THE BANK WITH A MINIMUM 3 FT THICK LAYER OF SALVAGED STREAMBED SUBSTRATE MATERIAL TO PREVENT EROSION.
- TOP 1 FT LAYER OF BACKFILL SHALL CONSIST OF AT LEAST 75% SALVAGED SOIL MATERIAL TO PROVIDE A SUITABLE GROWING MEDIUM FOR PLANTS.

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APPROVED	DATE	PROJECT

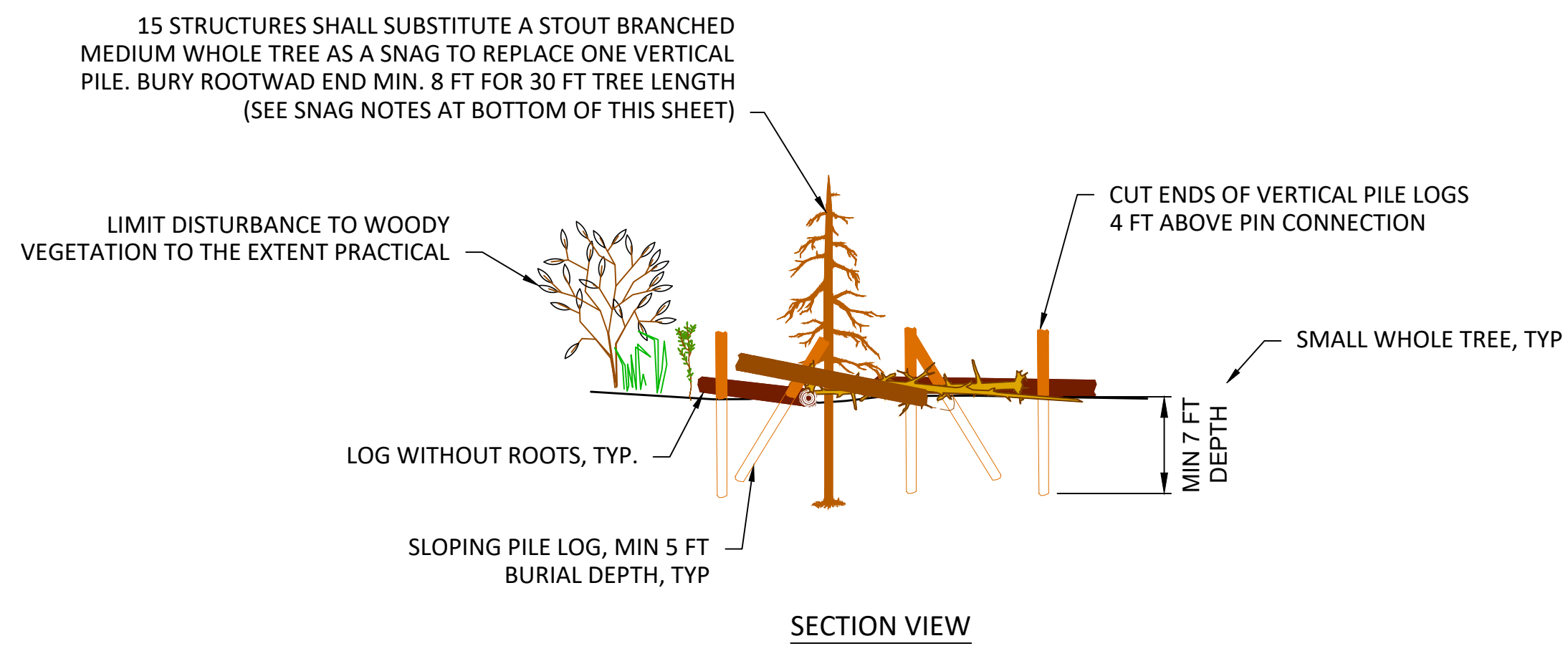
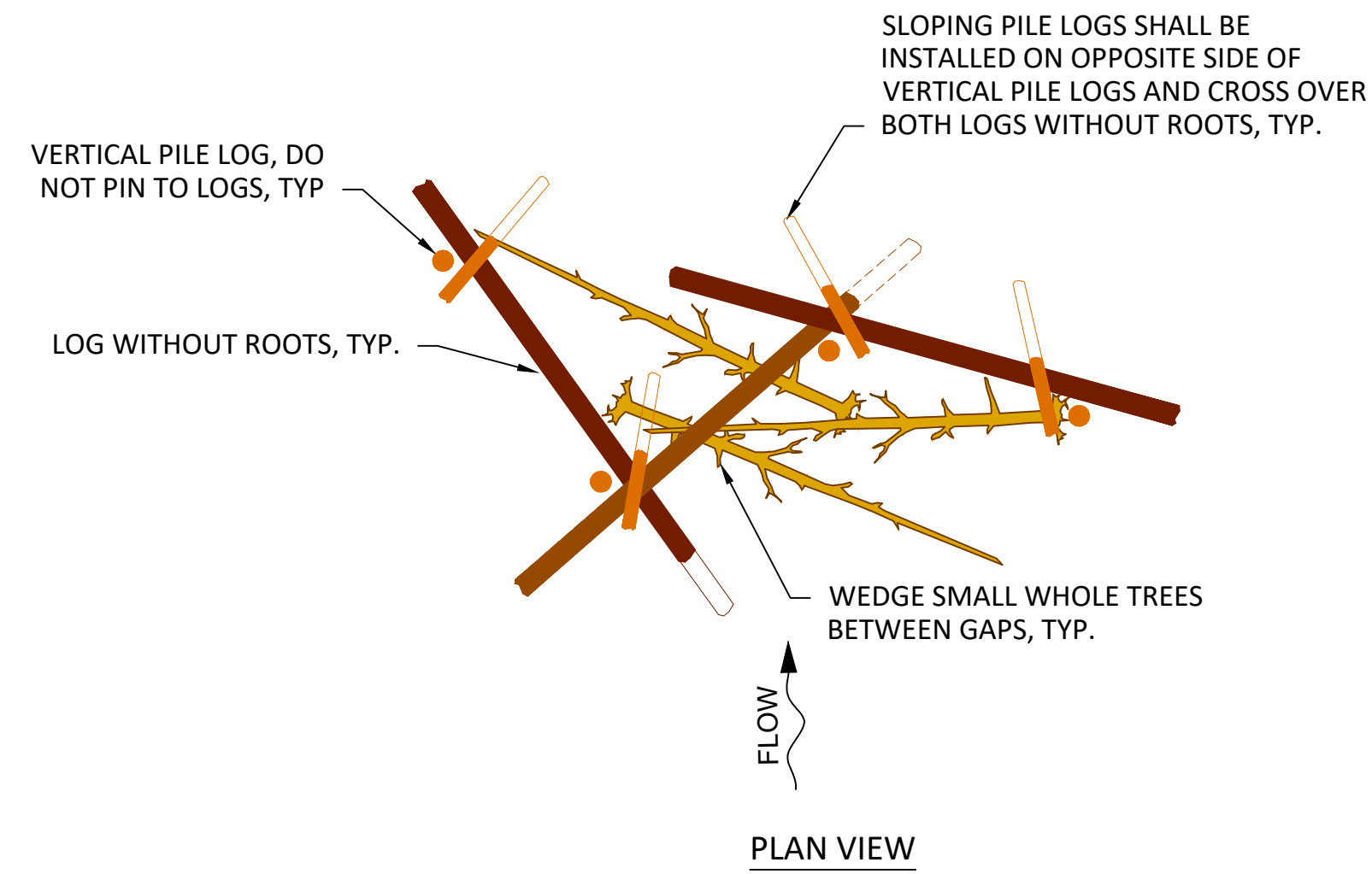
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LARGE WOOD STRUCTURE  
DETAILS (4 OF 6)



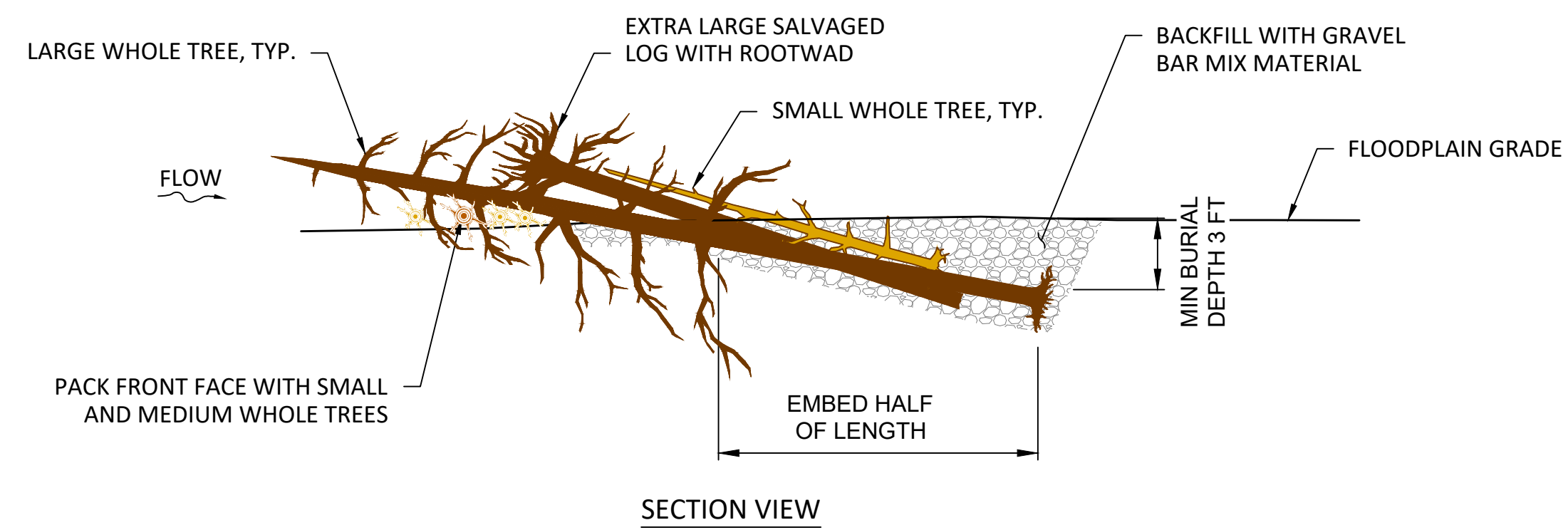
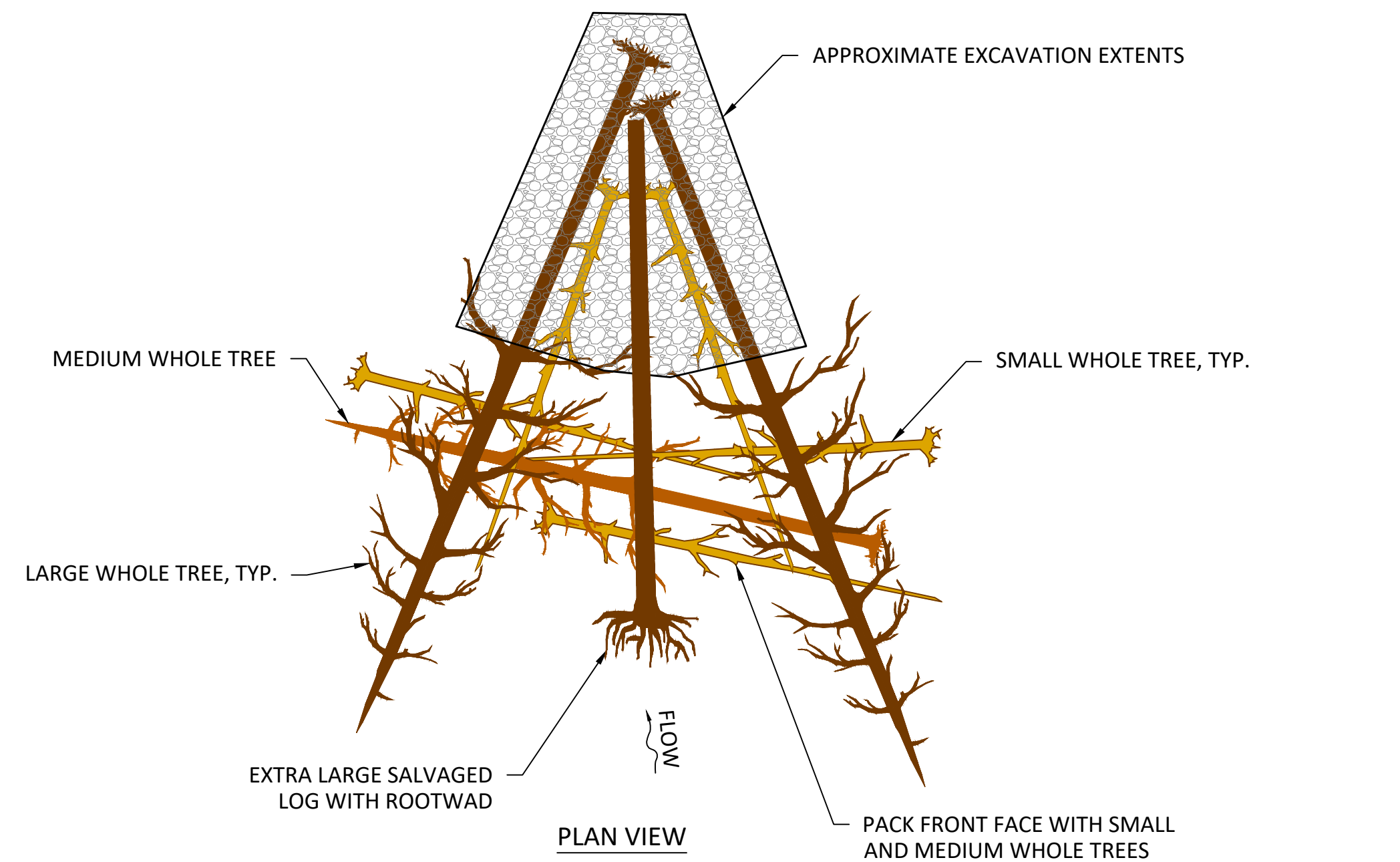


**K**  
TYP FLOODPLAIN ROUGHNESS WOOD STRUCTURE - TYPE 1  
NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)				
ITEM	UNITS	QTY	LAYER 1	LAYER 2
LOGS WITHOUT ROOTS	EA	3	2	2
SMALL WHOLE TREES	EA	3	3	-
VERTICAL/SLOPING PILE LOGS	EA	6	-	8
MIN. PULLOUT RESISTANCE	LBF	5K		
FLOODPLAIN EXCAVATION	CY	20		

**SNAG NOTES:**

- A TOTAL OF 15 STRUCTURES WILL INCORPORATE A MEDIUM WHOLE TREE AS A SNAG LOG, AS DIRECTED BY THE ENGINEER IN THE FIELD.
- SNAGS SHALL PREFERABLY BE INSTALLED ON THE FRINGES OF THE PROPOSED CHANNELS AND WITHIN THE FILLED GRAVEL PITS.
- CONTRACTOR SHALL ANTICIPATE THE FOLLOWING QUANTITY OF SNAGS PER PROJECT REGION:  
CORE PITS -- 10 SNAGS  
EAST FLOODPLAIN -- 3 SNAGS  
COUNTY YARD -- 2 SNAGS



**L**  
TYP FLOODPLAIN ROUGHNESS WOOD STRUCTURE - TYPE 2  
NOT TO SCALE

MATERIAL SCHEDULE (PER STRUCTURE)				
ITEM	UNITS	QTY	LAYER 1	LAYER 2
SMALL WHOLE TREES	EA	5	3	2
MEDIUM WHOLE TREES	EA	1	1	-
LARGE WHOLE TREES	EA	2	-	2
EXTRA LARGE ROOTWADS	EA	1	-	1
FLOODPLAIN EXCAVATION	CY	50		

**LARGE WOOD STRUCTURE NOTES:**

- SPECIFIC ORIENTATION OF LOGS MAY VARY FROM TYPICAL DRAWINGS DEPENDING ON SITE CONDITIONS AND SIZE AND SHAPE OF DELIVERED LARGE WOOD MATERIAL.
- ENGINEER MAY DIRECT SOME OF THE LOGS TO BE CUT TO SHORTER LENGTHS TO AVOID IMPACTS TO VEGETATION OR SENSITIVE AREAS.
- TOP OF VERTICAL PILE LOGS SHALL HAVE A SLOPING CUT (APPROXIMATELY 45 DEG).
- THE EARTHWORK QUANTITY SHOWN ON THE MATERIAL SCHEDULE TABLE FOR THE FLOODPLAIN ROUGHNESS WOOD STRUCTURE - TYPE 1 ASSUMES THE SLOPING PILE LOGS ARE INSTALLED THROUGH EXCAVATION, BUT THE CONTRACTOR IS ENCOURAGED TO DRIVE THE SLOPING PILES IF POSSIBLE.

NO.	BY	DATE	REVISION DESCRIPTION

JR, NS DRAWN	MR, GJ DESIGNED	--- CHECKED
---	AUGUST 2024	---
---	DATE	PROJECT

LOWER COLUMBIA ESTUARY PARTNERSHIP  
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RECONNECTION PROJECT

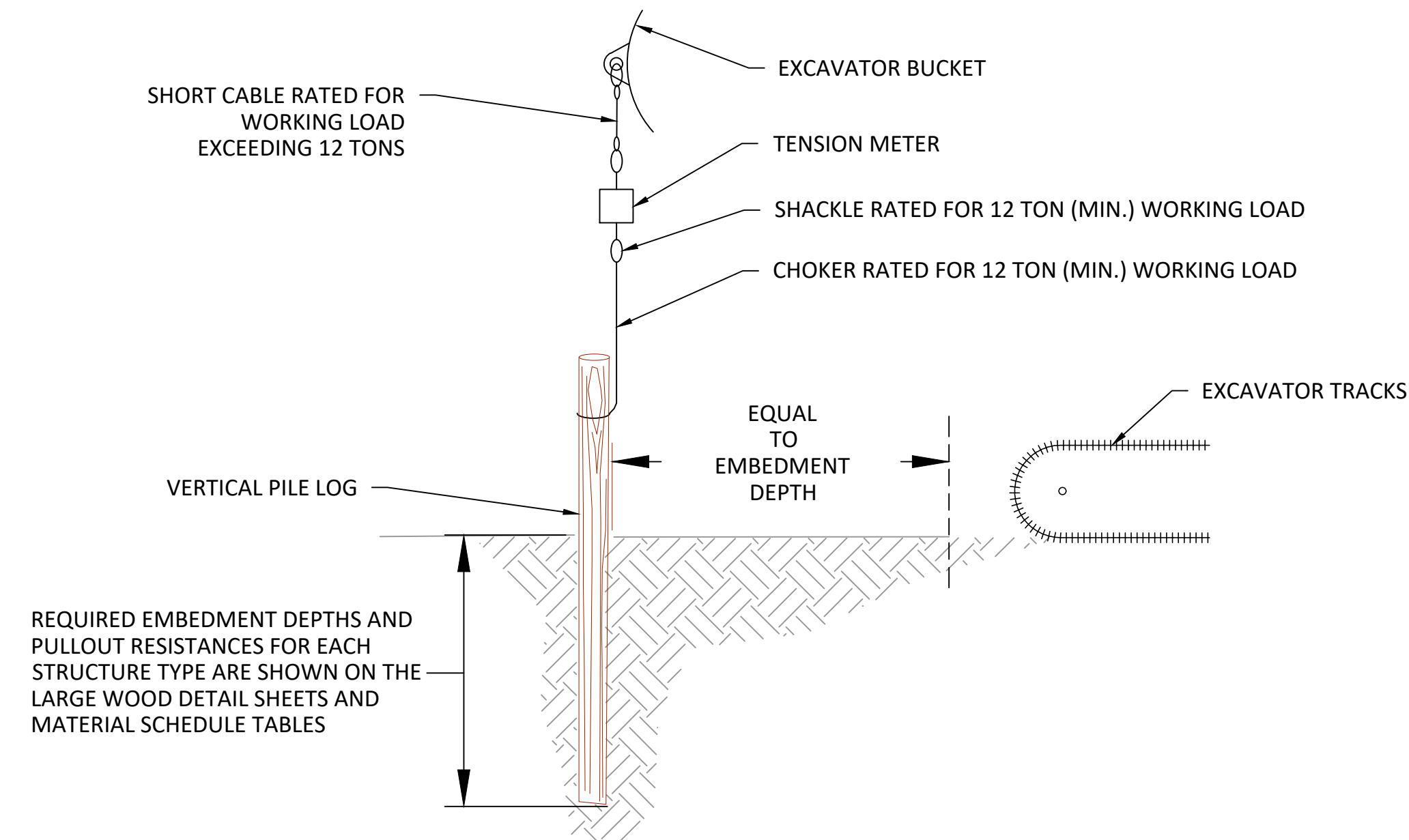


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LARGE WOOD STRUCTURE  
DETAILS (6 OF 6)

SHEET

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**VERTICAL PILE LOG INSTALLATION GENERAL NOTES:**

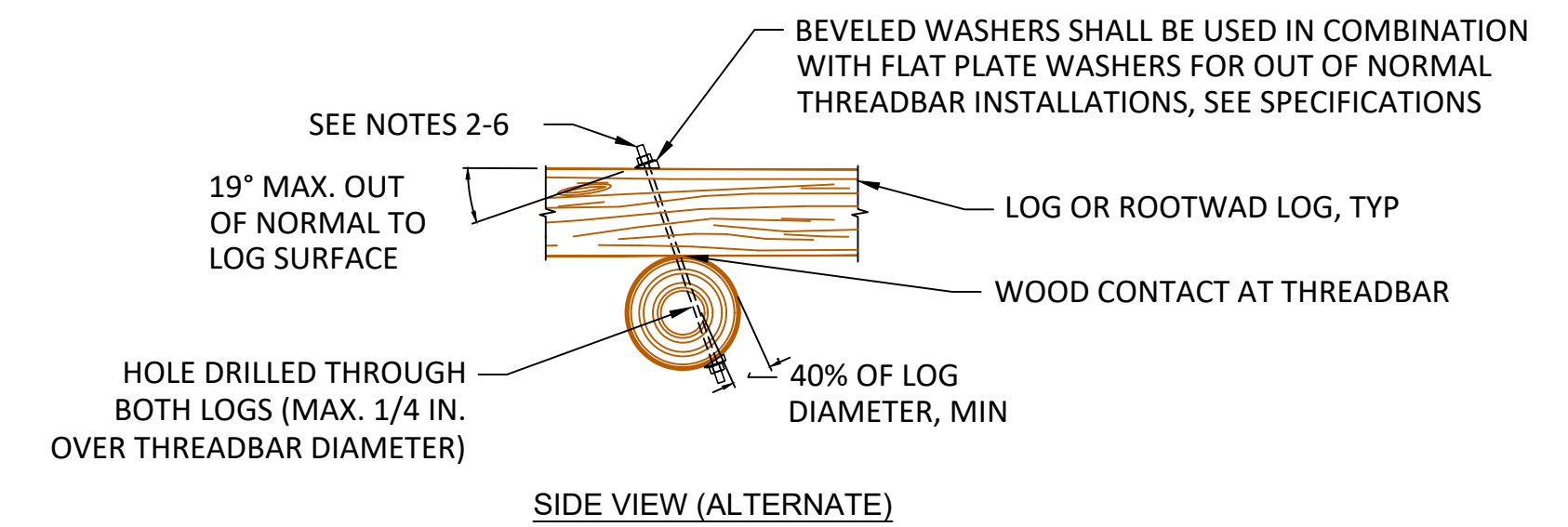
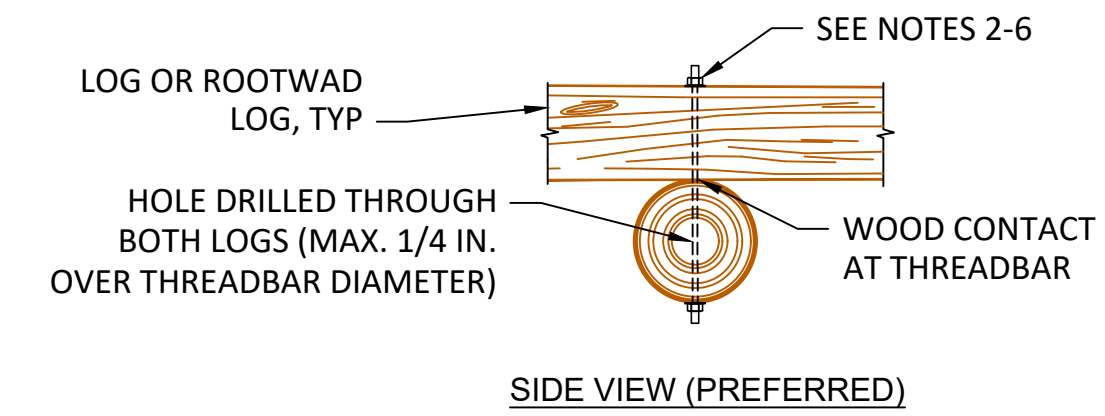
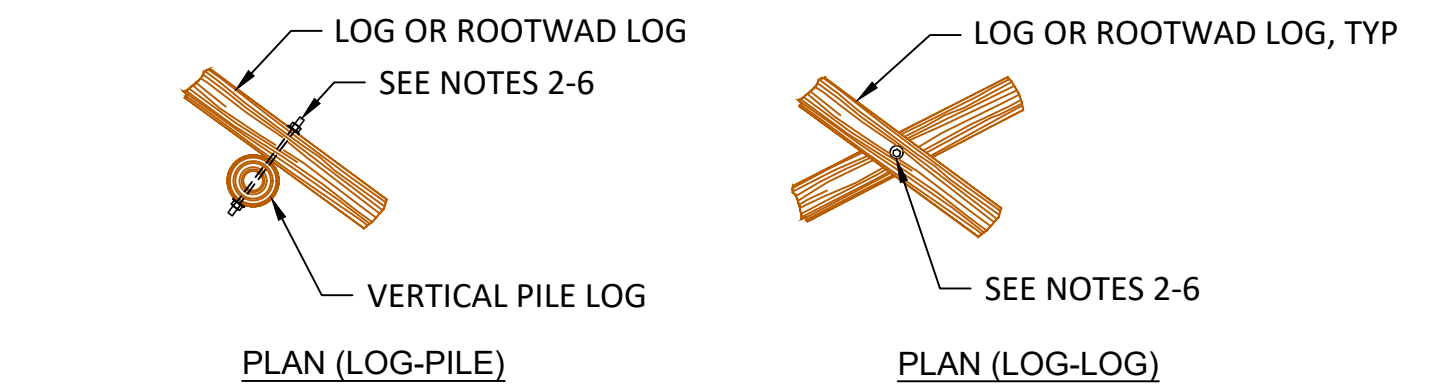
**RIGGING**

1. RIGGING FOR VERTICAL PILE LOG TESTING SHALL CONFORM TO THE TENSION SCALE MANUFACTURER'S RECOMMENDATIONS.
2. CHOKERS, CABLES AND AND SHACKLES SHALL HAVE MINIMUM WORKING LOAD RATING OF 12 TONS. FITTINGS SHALL BE SIZED ACCORDINGLY.

**TESTING**

1. TESTING OF VERTICAL PILE LOGS SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED VERTICAL LOG. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE VERTICAL LOG WITH A DIFFERENT INSTALLED DEPTH.
2. EACH VERTICAL PILE LOG TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS CLOSELY ALIGNED TO AXIS OF PILE AS POSSIBLE. RECORD THE VERTICAL PILE LOG DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE VERTICAL PILE LOG TO A NEW DEPTH IN CONSULTATION WITH THE ENGINEER. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE VERTICAL PILE LOG TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS FOR EACH VERTICAL PILE LOG. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MAY INCLUDE 8 FT, 10 FT, 12 FT, AND 14 FT. TESTS AT 12 FT AND 14 FT WILL ONLY BE REQUIRED IF PILES MUST BE DRIVEN DEEPER THAN 10 FT TO ACHIEVE TARGET PULLOUT RESISTANCE. SEE NOTE BELOW.
4. EXCAVATOR CONDUCTING PULL OUT LOADING SHALL BE POSITIONED NO CLOSER THAN EMBEDMENT DEPTH OF VERTICAL PILE LOG, IF POSSIBLE. IF A CLOSER POSITIONING IS REQUIRED, EXCAVATOR SHALL BE NO CLOSER THAN THAT REQUIRED TO GENERATE DESIRED LOADING WITH DISTANCE FROM VERTICAL PILE LOG NOTED IN THE TEST RECORD. LIMIT COMPRESSIVE LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
5. PULL OUT RESISTANCE READING SHALL BE COMPARED AGAINST EXCAVATOR MAX LIFT OFFSET TABLE.
6. UP TO 10% OF PRODUCTION VERTICAL PILE LOGS SHALL BE PROOF TESTED. IF RESULTS VARY MORE THAN 50% THEN IT SHOULD BE ANTICIPATED THAT UP TO 25% OF THE PRODUCTION VERTICAL PILE LOGS SHALL BE PROOF TESTED.
7. VERTICAL LOG EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MAY BE INCREASED, AT NO ADDITIONAL COST, PENDING COMPARISON OF PULL OUT TEST RESULTS TO AN ASSUMED RAW PULLOUT RESISTANCE OF 15,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, VERTICAL LOGS MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED. ENGINEER WILL DETERMINE WHETHER THE NUMBER OF VERTICAL LOGS MAY BE REDUCED IF TESTING YIELDS VALUES THAT EXCEED ASSUMED VALUES, BASED ON EVALUATION OF VERTICAL PULLOUT AND LATERAL BRACING OBJECTIVES AT EACH LOCATION. (THE RESISTANCE VALUE MAY BE ADJUSTED DURING A FUTURE PHASE OF DESIGN.)
8. TO INSTALL A SNAG INSTEAD OF A VERTICAL LOG, EXCAVATE TO A DEPTH OF AT LEAST 8 FEET, AND PLACE THE SNAG WITH THE ROOTWAD (REQUIRED TO BE ATTACHED) BURIED IN THE GROUND.
9. VERTICAL PILES ARE PREFERRED INSTEAD OF SNAGS IF MECHANICAL CONNECTIONS (THREADED ROD) ARE REQUIRED. SNAGS AND SLOPING PILE LOGS MAY BE USED AS BRACE POINTS FOR SURFACE LOGS, AS APPROVED BY THE ENGINEER.

**1 VERTICAL PILE LOG TESTING**  
TYP NOT TO SCALE



**NOTES:**

1. REQUIREMENTS FOR LOG TO LOG AND LOG TO VERTICAL PILE CONNECTIONS AT LOCATIONS SHOWN ON THE LARGE WOOD TYPICAL DETAIL OR AS OTHERWISE REQUIRED BY THE ENGINEER. THREADBAR SHALL BE #8 FULLY THREADED REBAR WITH A MIN. TENSILE YIELD RATING OF 75,000 POUNDS PER SQUARE INCH (75KSI). WASHERS SHALL BE 3" SQUARE AND 3/16" THICK. NUTS SHALL MATCH THREADBAR AND BE CAPABLE OF DEVELOPING 100% OF THE THREADBAR CAPACITY IN TENSION.
2. INSERT THREADBAR THROUGH HOLE DRILLED IN BOTH LOGS.
3. PLACE WASHER(S) OVER EACH END OF THREADBAR. THREAD A NUT ONTO EACH END OF THREADBAR AND TIGHTEN UNTIL WOOD SURFACE CRUSHES UNDER THE WASHER.
4. IF END OF THREADBAR EXTENDS MORE THAN 2 IN. BEYOND NUT. CUT OFF EXCESS TO NO CLOSER THAN 1 IN. FROM THE NUT.
5. PEEN END OF THREADBAR OR CHISEL THREADS SO NUT CANNOT BE BACKED OFF.
6. FILE OR GRIND OFF SHARP EDGES.

**2 THREAD BAR CONNECTION**  
TYP NOT TO SCALE

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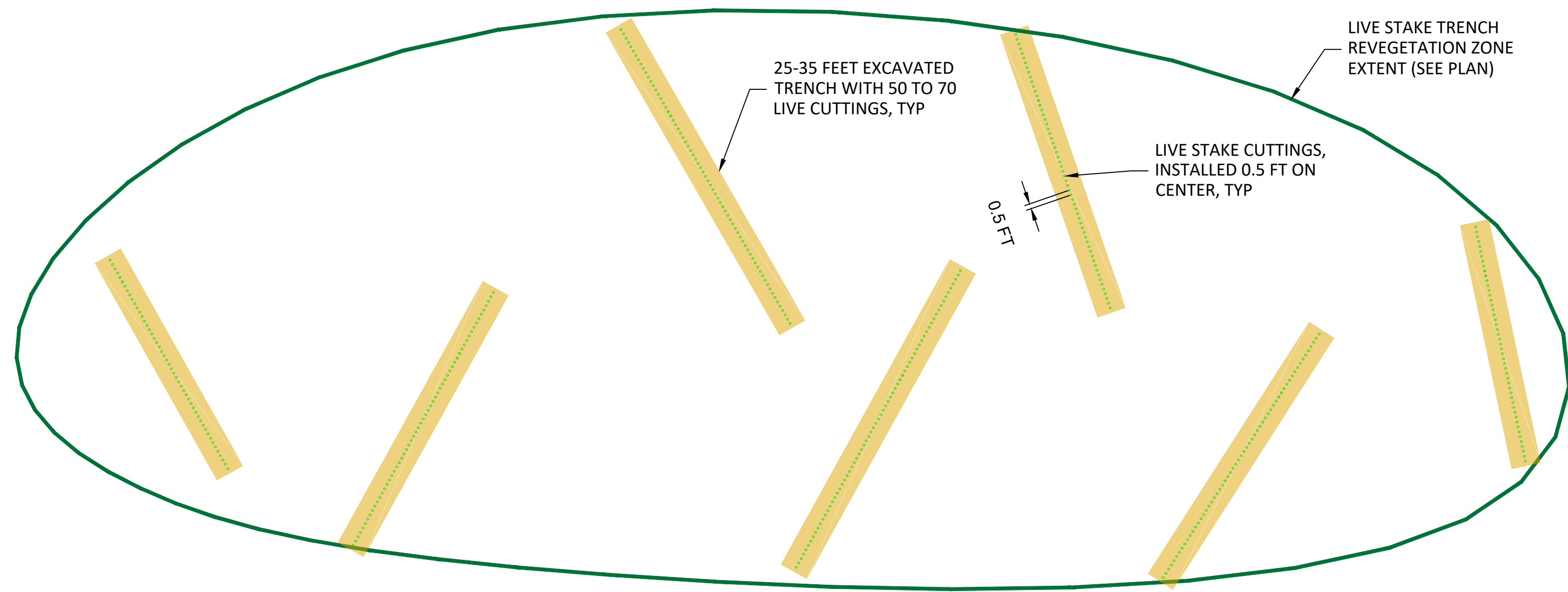
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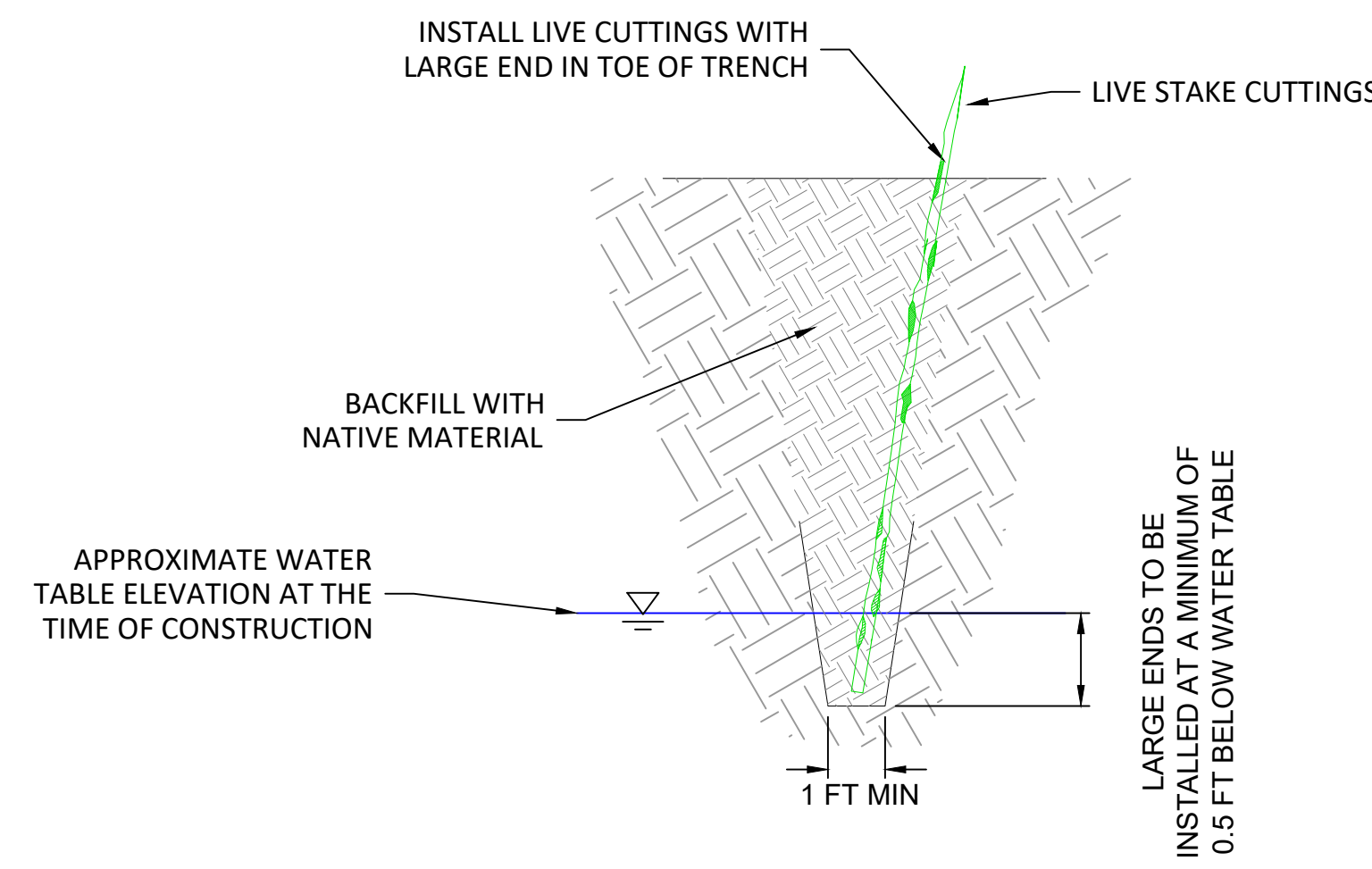
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LARGE WOOD BALLASTING  
DETAILS

SHEET  
60 OF 67



PLAN



SECTION

NOTES:

1. TRENCHES TO BE EXCAVATED TO A MINIMUM OF 2 FT AND A MAXIMUM OF 4 FT.
2. EXCAVATE TRENCH TO 0.5 FT BELOW WATER TABLE DEPTH. PUMP WATER INTO TRENCH. INSTALL LIVE STAKE CUTTINGS WITH LARGE ENDS IN TOE OF TRENCH.
3. COMPACT BACKFILL IN 12 INCH LIFTS TO IMPROVE STEM TO SOIL CONTACT.
4. PUMP WATER INTO THE TRENCH WHILE BACKFILLING EACH LIFT UNTIL WATER VISIBLY "BUBBLES" ON SURFACE.
5. EXCESS SLASH MATERIAL SHALL BE HALF-BURIED IN TRENCHES TO PROVIDE ADDED ROUGHNESS.
6. BOTH SPECIES OF WILLOW SHALL BE PLANTED IN ALL TRENCHES.

**1**  
TYP WILLOW TRENCH  
NOT TO SCALE

WILLOW TRENCH PLANTINGS (7,770 LF)						
COMMON NAME	SCIENTIFIC NAME	STOCK	TYPE	SIZE	DENSITY	QUANTITY
PACIFIC WILLOW	<i>Salix lasiandra</i>	SHRUB	STAKE	48 INCHES	2/LF ALONG LINE	3,210
PACIFIC WILLOW	<i>Salix lasiandra</i>	SHRUB	STAKE	60 to 72+ INCHES	2/LF ALONG LINE	4,560
SITKA WILLOW	<i>Salix sitchensis</i>	SHRUB	STAKE	48 INCHES	2/LF ALONG LINE	3,210
SITKA WILLOW	<i>Salix sitchensis</i>	SHRUB	STAKE	60 to 72+ INCHES	2/LF ALONG LINE	4,560
<b>TOTAL</b>						<b>15,540</b>

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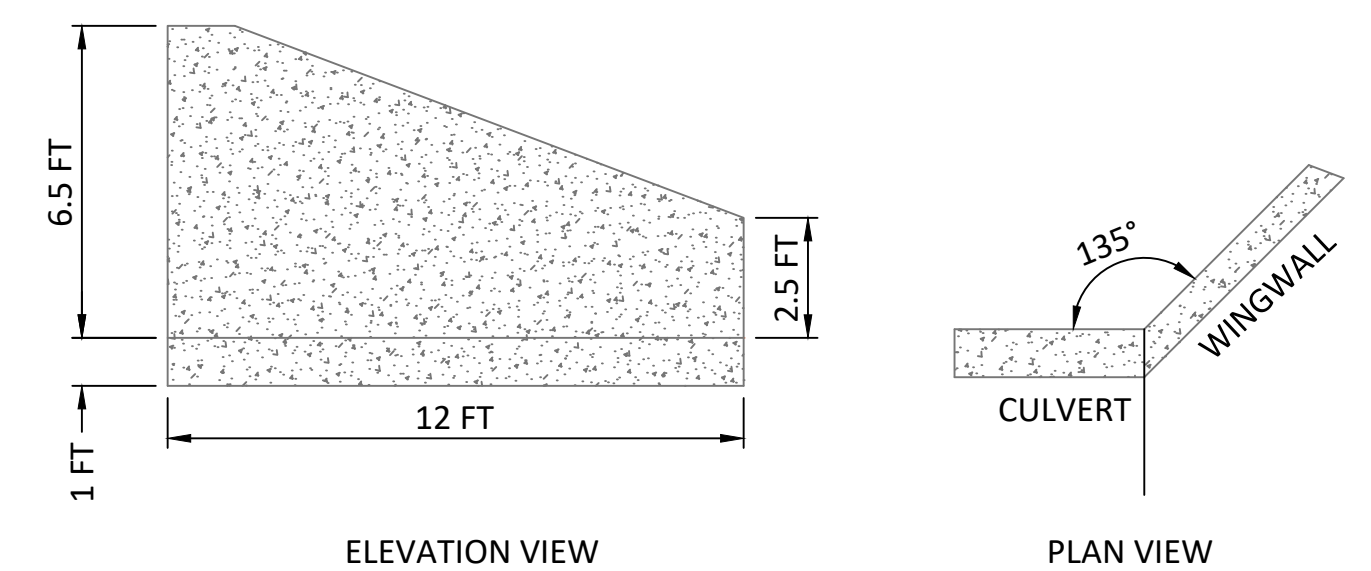
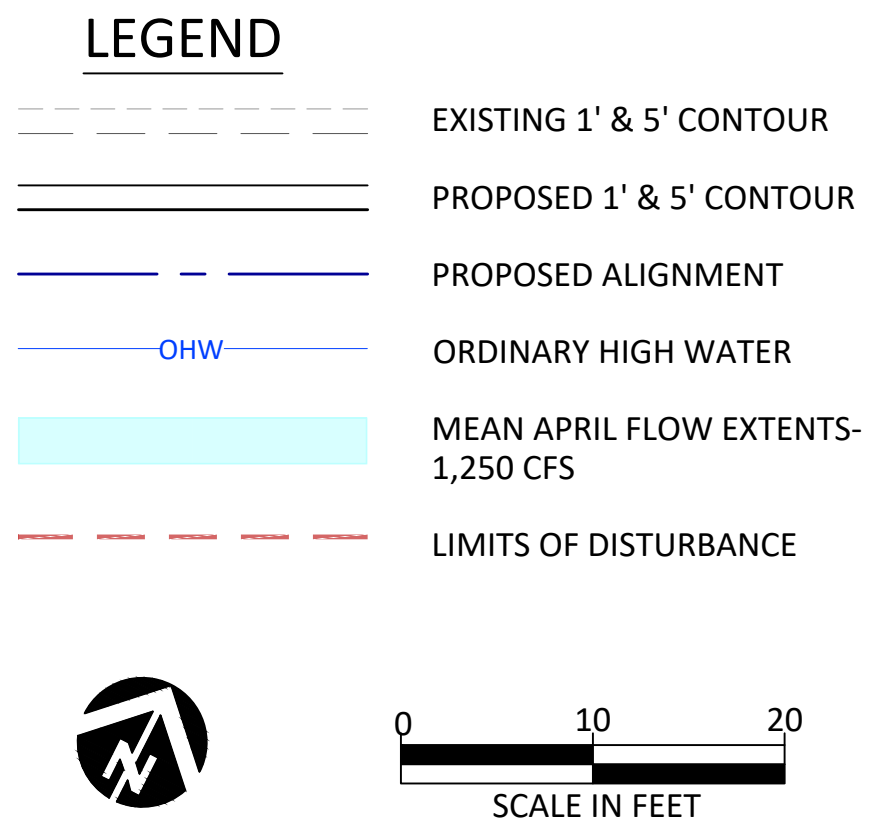
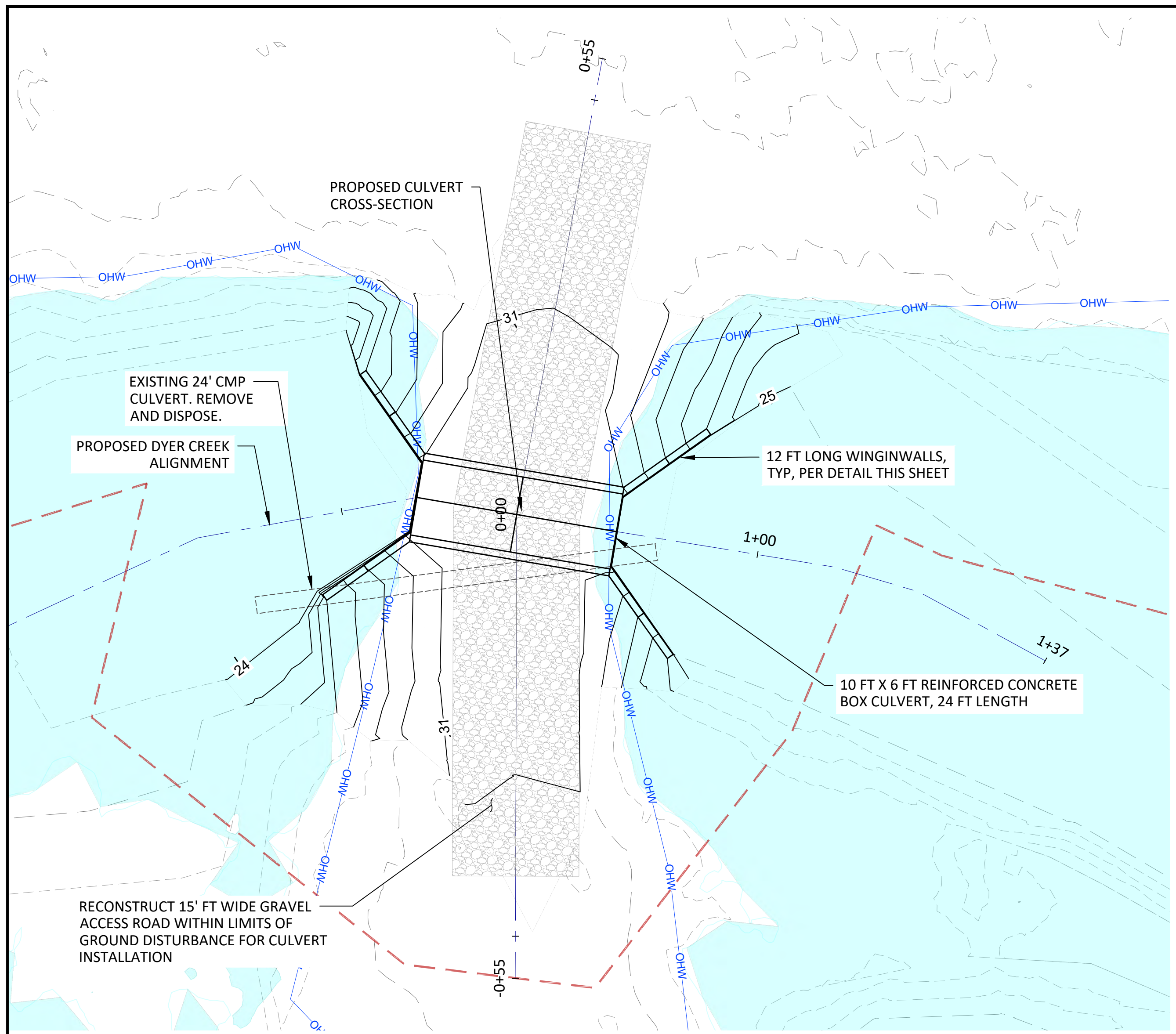
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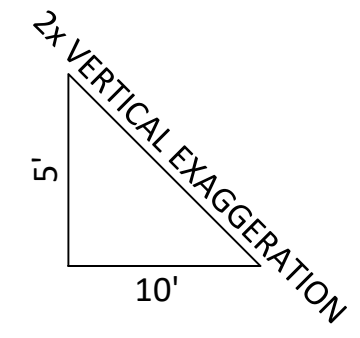
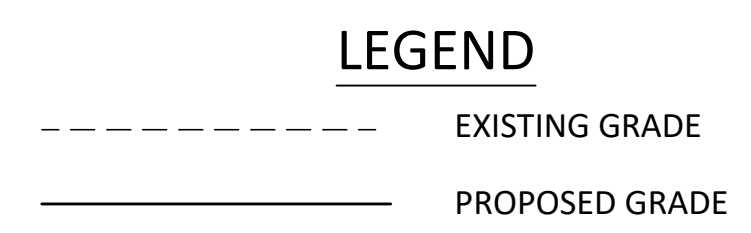
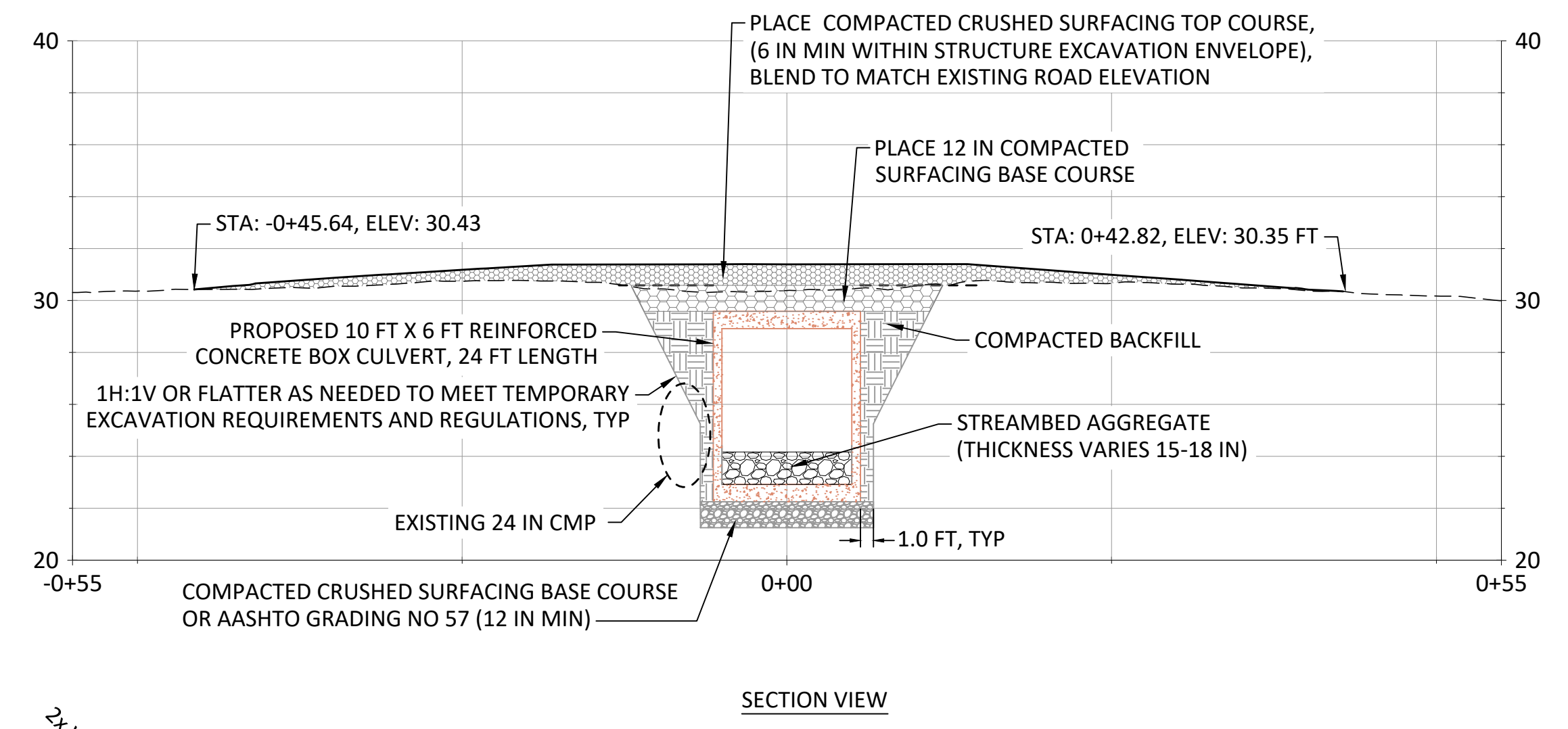
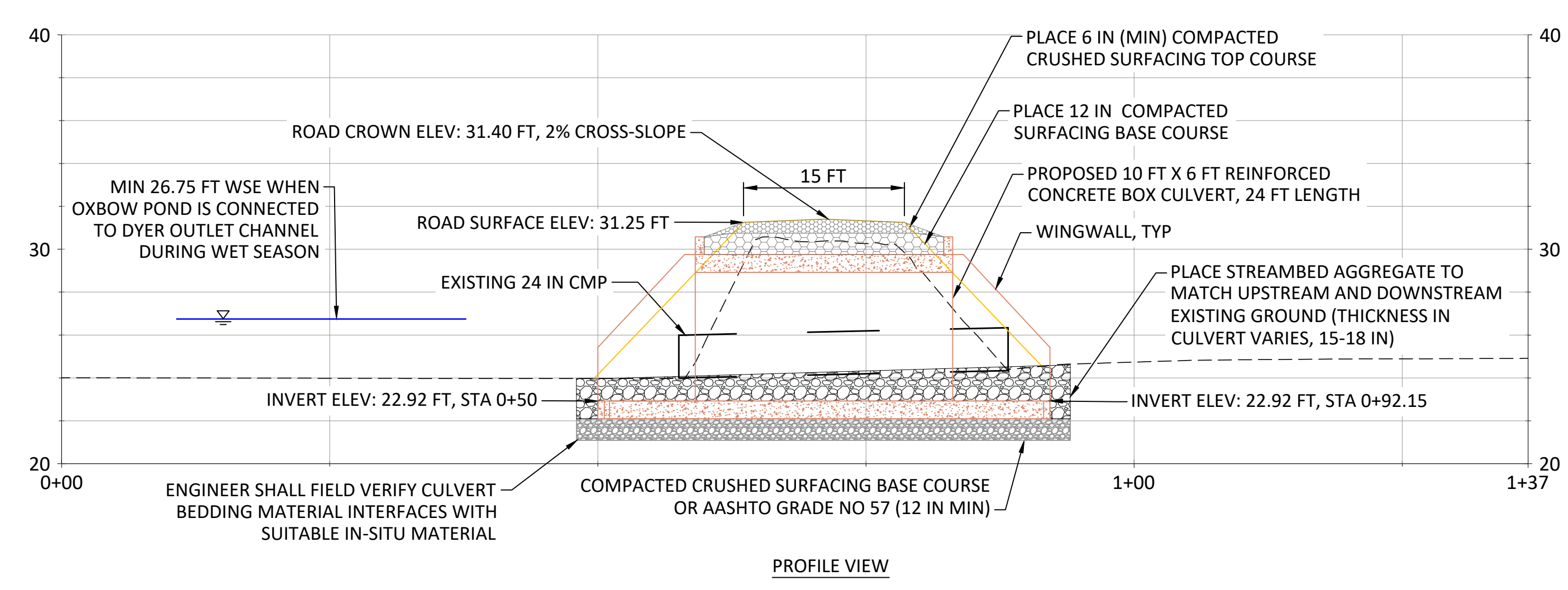
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WILLOW TRENCH DETAIL





**1 PRE-FABRICATED OR CAST-IN-PLACE WINGALL**  
1 IN = 4 FT



Preliminary  
Not for Construction

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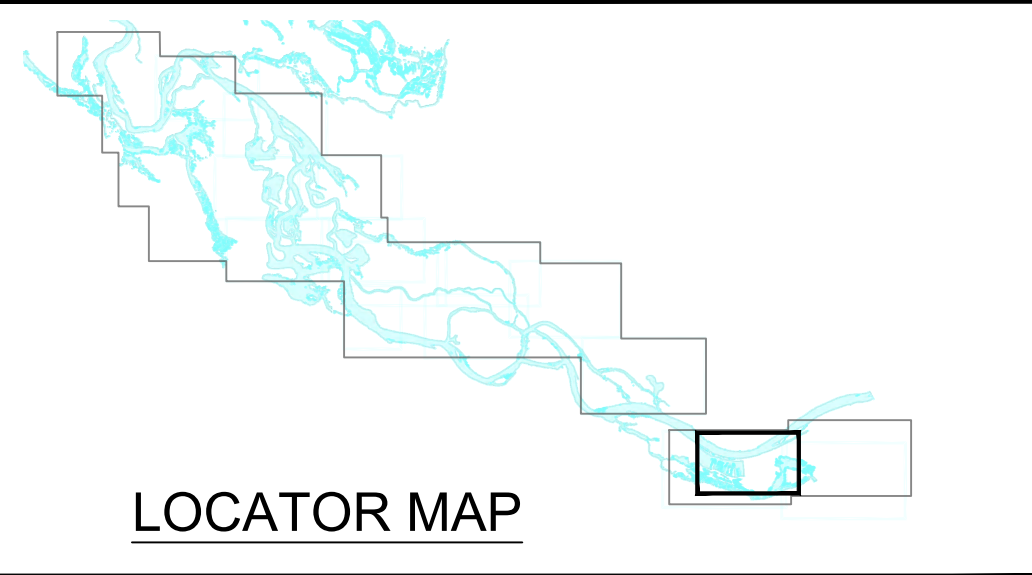
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DYER CREEK CULVERT  
REPLACEMENT

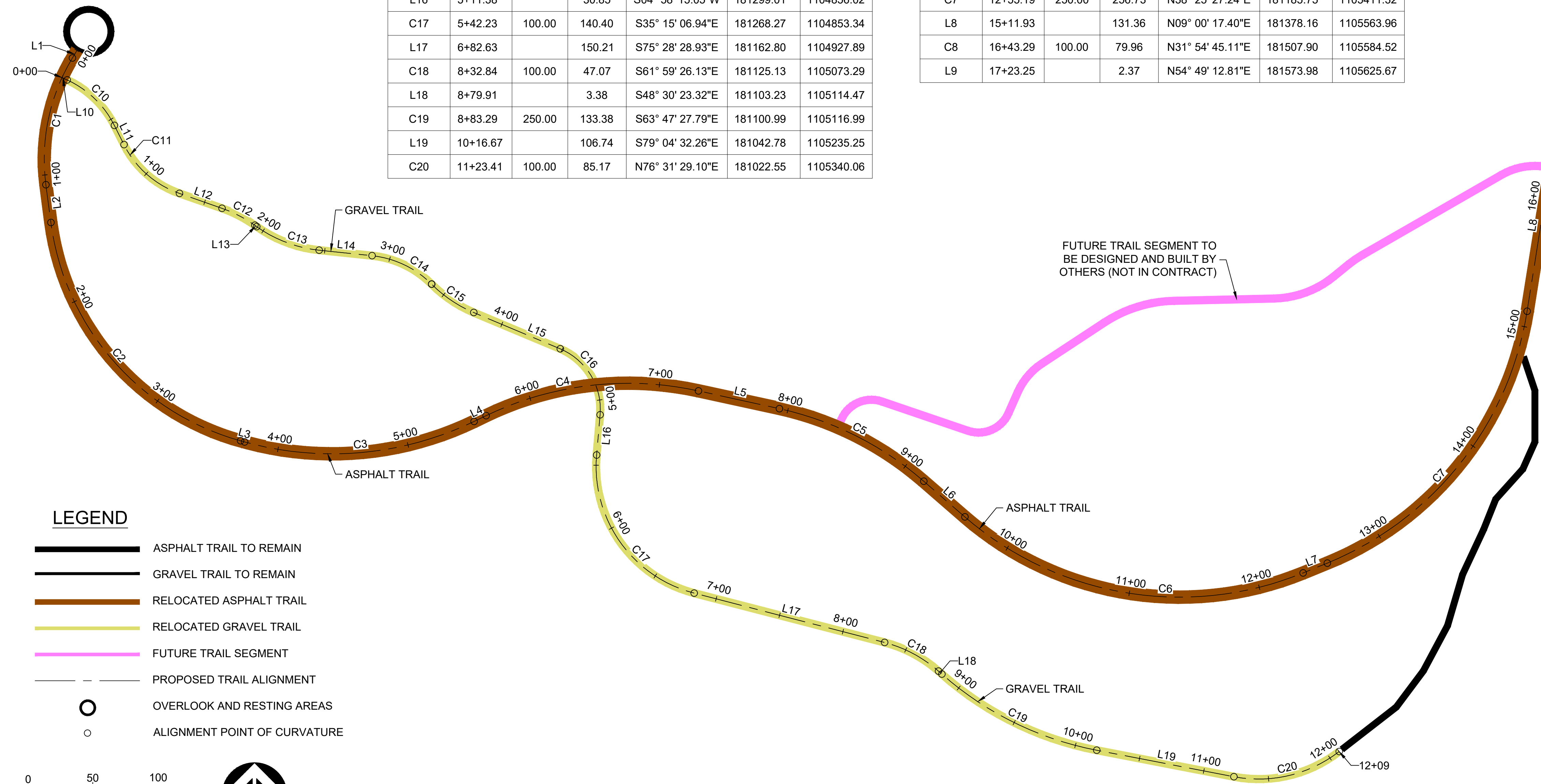




LOCATOR MAP

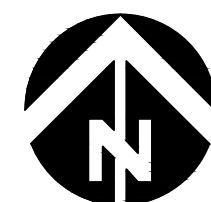
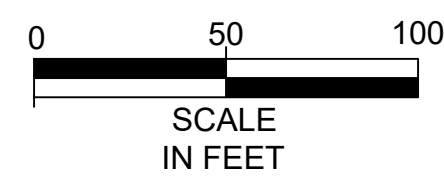
HORIZONTAL ALIGNMENT GEOMETRY - GRAVEL TRAIL						
NUMBER	START STATION	RADIUS	LENGTH	LINE/CHORD DIRECTION	START NORTHING	START EASTING
L10	0+00.00		4.29	S65° 35' 48.30"E	181556.65	1104445.10
C10	0+04.29	75.00	51.09	S46° 05' 00.54"E	181554.88	1104449.00
L11	0+55.37		16.43	S26° 34' 12.77"E	181520.13	1104485.09
C11	0+71.80	75.00	57.81	S48° 39' 02.10"E	181505.43	1104492.44
L12	1+29.61		34.47	S70° 43' 51.43"E	181468.18	1104534.77
C12	1+64.08	100.00	28.25	S62° 38' 12.67"E	181456.81	1104567.31
L13	1+92.33		1.80	S54° 32' 33.90"E	181443.86	1104592.32
C13	1+94.13	100.00	51.54	S69° 18' 27.67"E	181442.82	1104593.78
L14	2+45.67		40.64	S84° 04' 21.45"E	181424.81	1104641.46
C14	2+86.31	75.00	51.38	S64° 26' 42.41"E	181420.61	1104681.89
C15	3+37.69	100.00	39.09	S56° 01' 00.29"E	181398.88	1104727.34
L15	3+76.79		71.60	S67° 12' 57.21"E	181377.17	1104759.55
C16	4+48.39	50.00	62.99	S31° 07' 21.08"E	181349.44	1104825.57
L16	5+11.38		30.85	S04° 58' 15.05"W	181299.01	1104856.02
C17	5+42.23	100.00	140.40	S35° 15' 06.94"E	181268.27	1104853.34
L17	6+82.63		150.21	S75° 28' 28.93"E	181162.80	1104927.89
C18	8+32.84	100.00	47.07	S61° 59' 26.13"E	181125.13	1105073.29
L18	8+79.91		3.38	S48° 30' 23.32"E	181103.23	1105114.47
C19	8+83.29	250.00	133.38	S63° 47' 27.79"E	181100.99	1105116.99
L19	10+16.67		106.74	S79° 04' 32.26"E	181042.78	1105235.25
C20	11+23.41	100.00	85.17	N76° 31' 29.10"E	181022.55	1105340.06

HORIZONTAL ALIGNMENT GEOMETRY - ASPHALT TRAIL						
NUMBER	START STATION	RADIUS	LENGTH	LINE/CHORD DIRECTION	START NORTHING	START EASTING
L1	0+00.00		6.77	S31° 02' 05.58"W	181577.39	1104456.50
C1	0+06.77	150.00	100.79	S11° 47' 10.67"W	181571.59	1104453.01
L2	1+07.55		29.10	S07° 27' 44.24"E	181474.77	1104432.81
C2	1+36.65	200.00	234.00	S40° 58' 49.65"E	181445.92	1104436.58
L3	3+70.65		3.20	S74° 29' 55.07"E	181279.17	1104581.44
C3	3+73.85	250.00	179.83	N84° 53' 38.17"E	181278.32	1104584.52
L4	5+53.69		10.18	N64° 17' 11.41"E	181293.98	1104759.81
C4	5+63.86	250.00	166.30	N83° 20' 37.14"E	181298.40	1104768.98
L5	7+30.17		63.27	S77° 35' 57.13"E	181317.32	1104931.13
C5	7+93.44	250.00	124.69	S63° 18' 36.94"E	181303.73	1104992.93
L6	9+18.13		41.61	S49° 01' 16.75"E	181248.30	1105103.18
C6	9+59.74	250.00	275.48	S80° 35' 19.84"E	181221.02	1105134.60
L7	12+35.22		19.97	N67° 50' 37.08"E	181178.22	1105392.82
C7	12+55.19	250.00	256.73	N38° 25' 27.24"E	181185.75	1105411.32
L8	15+11.93		131.36	N09° 00' 17.40"E	181378.16	1105563.96
C8	16+43.29	100.00	79.96	N31° 54' 45.11"E	181507.90	1105584.52
L9	17+23.25		2.37	N54° 49' 12.81"E	181573.98	1105625.67

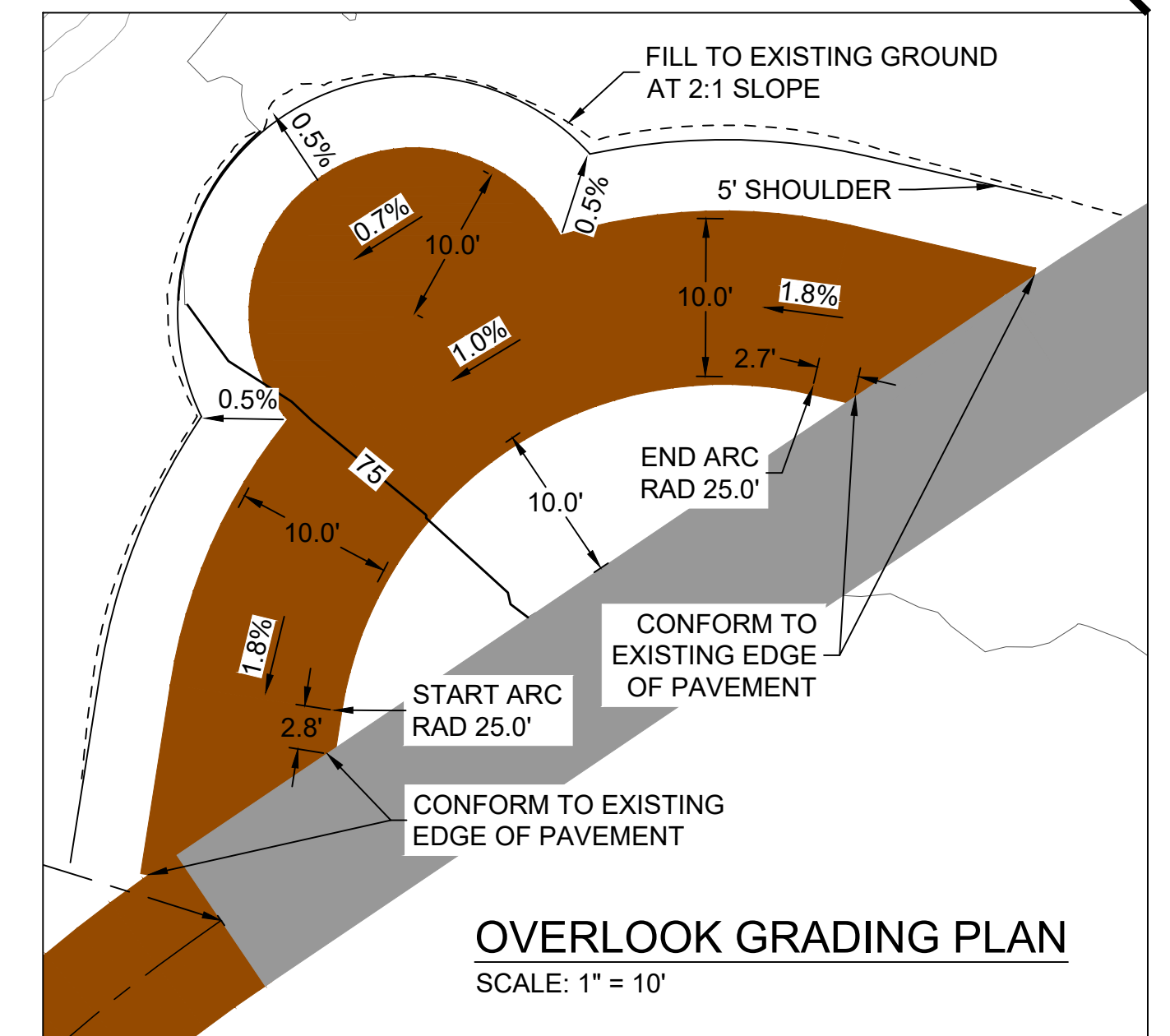
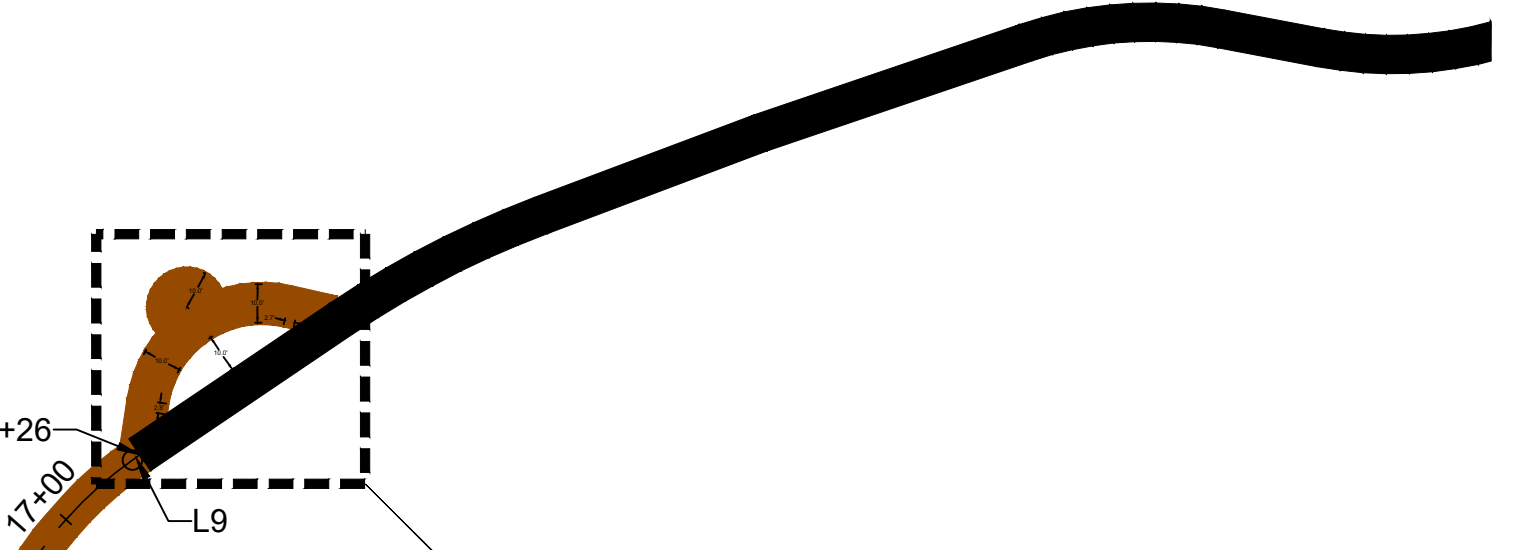


**LEGEND**

- ASPHALT TRAIL TO REMAIN
- GRAVEL TRAIL TO REMAIN
- RELOCATED ASPHALT TRAIL
- RELOCATED GRAVEL TRAIL
- FUTURE TRAIL SEGMENT
- PROPOSED TRAIL ALIGNMENT
- OVERLOOK AND RESTING AREAS
- ALIGNMENT POINT OF CURVATURE



FUTURE TRAIL SEGMENT TO BE DESIGNED AND BUILT BY OTHERS (NOT IN CONTRACT)



NO.	BY	DATE	REVISION DESCRIPTION

JR, NS	MR, GJ	---
DRAWN	DESIGNED	CHECKED
---	AUGUST 2024	---
APPROVED	DATE	PROJECT

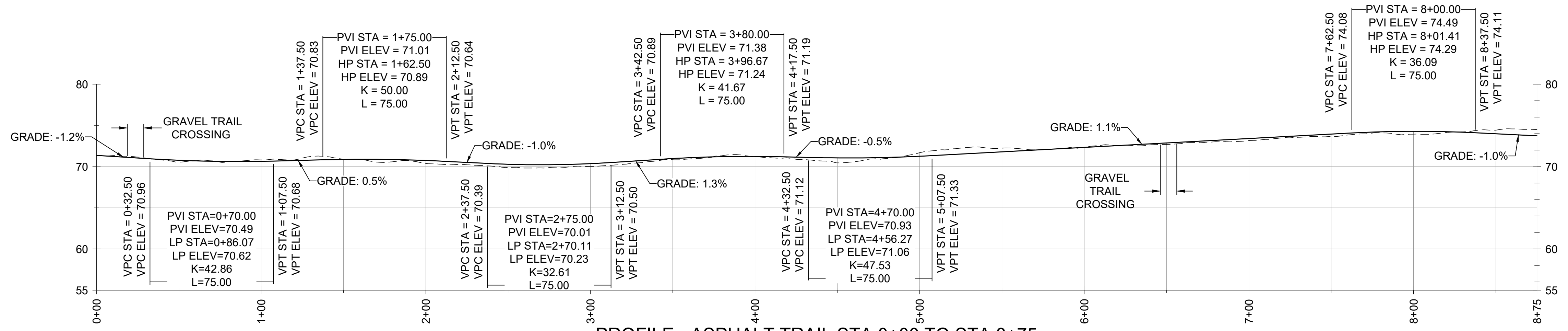
LOWER COLUMBIA ESTUARY PARTNERSHIP  
EAST FORK LEWIS RIVER  
RECONNECTION PROJECT



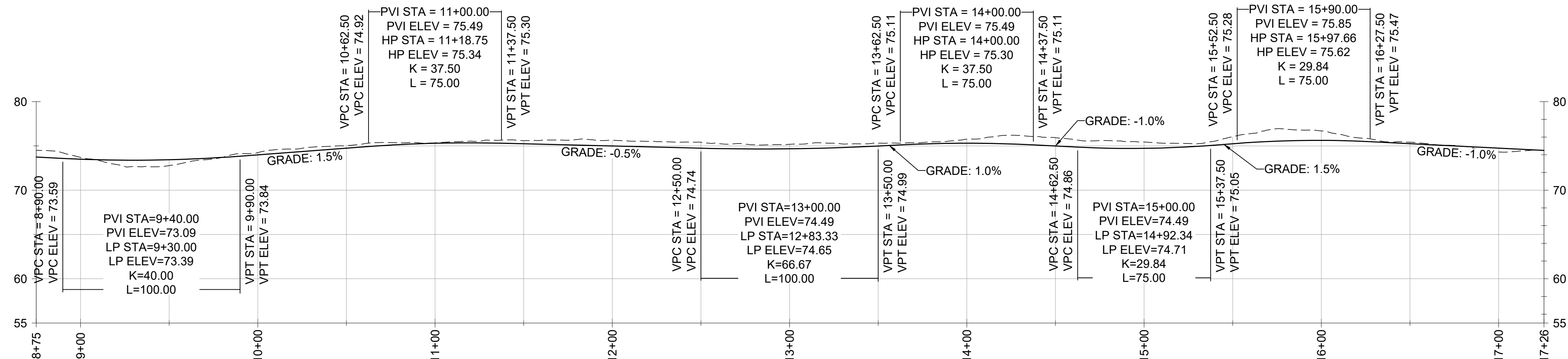
501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

DAYBREAK TRAIL ALIGNMENTS

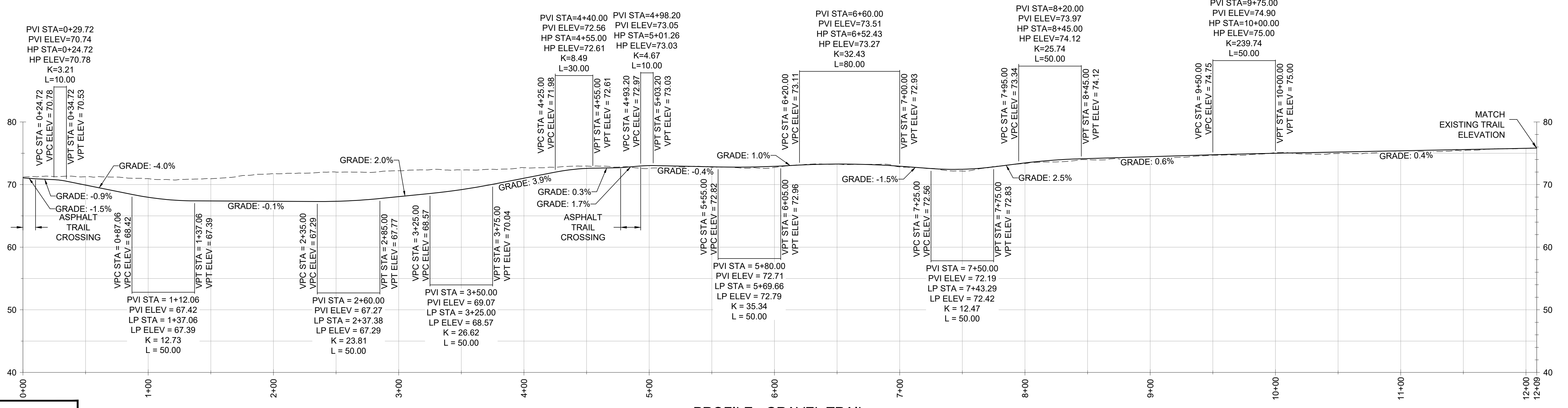
SHEET  
64 OF 67



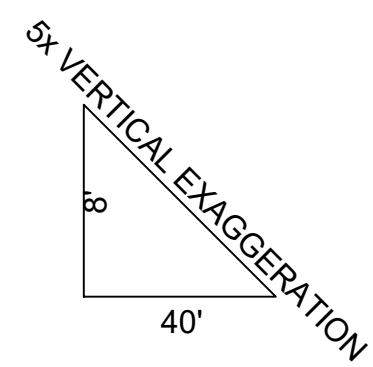
PROFILE - ASPHALT TRAIL STA 0+00 TO STA 8+75



PROFILE - ASPHALT TRAIL STA 8+75 TO STA 17+26



PROFILE - GRAVEL TRAIL



**LEGEND**

- - - - - EXISTING GROUND
- PROPOSED GROUND

NO.	BY	DATE	REVISION DESCRIPTION

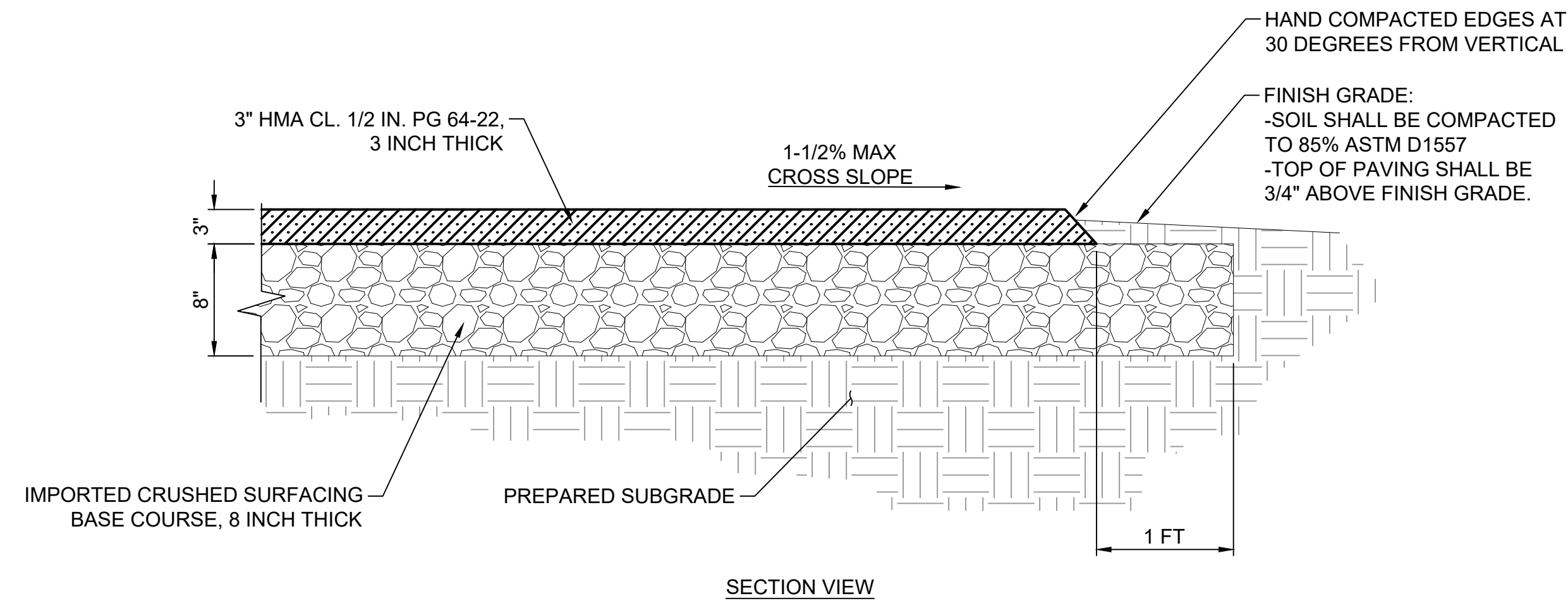
JR, NS	MR, GJ	---
DRAWN	DESIGNED	CHECKED
---	AUGUST 2024	220214
APPROVED	DATE	PROJECT

LOWER COLUMBIA ESTUARY PARTNERSHIP  
 EAST FORK LEWIS RIVER  
 RECONNECTION PROJECT

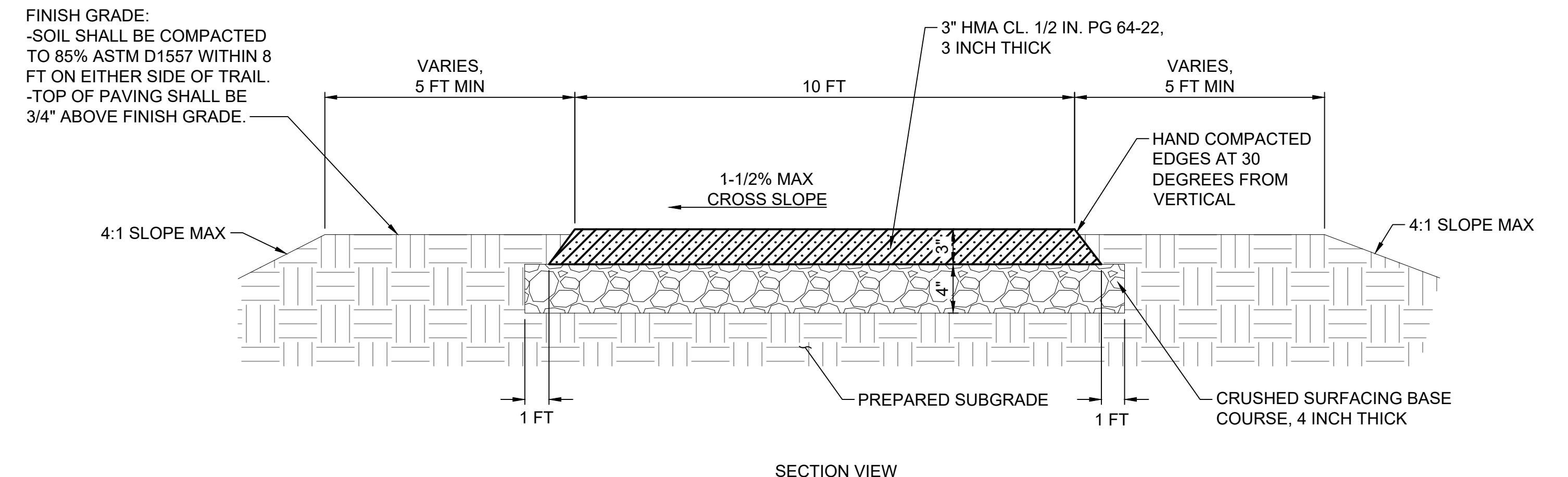


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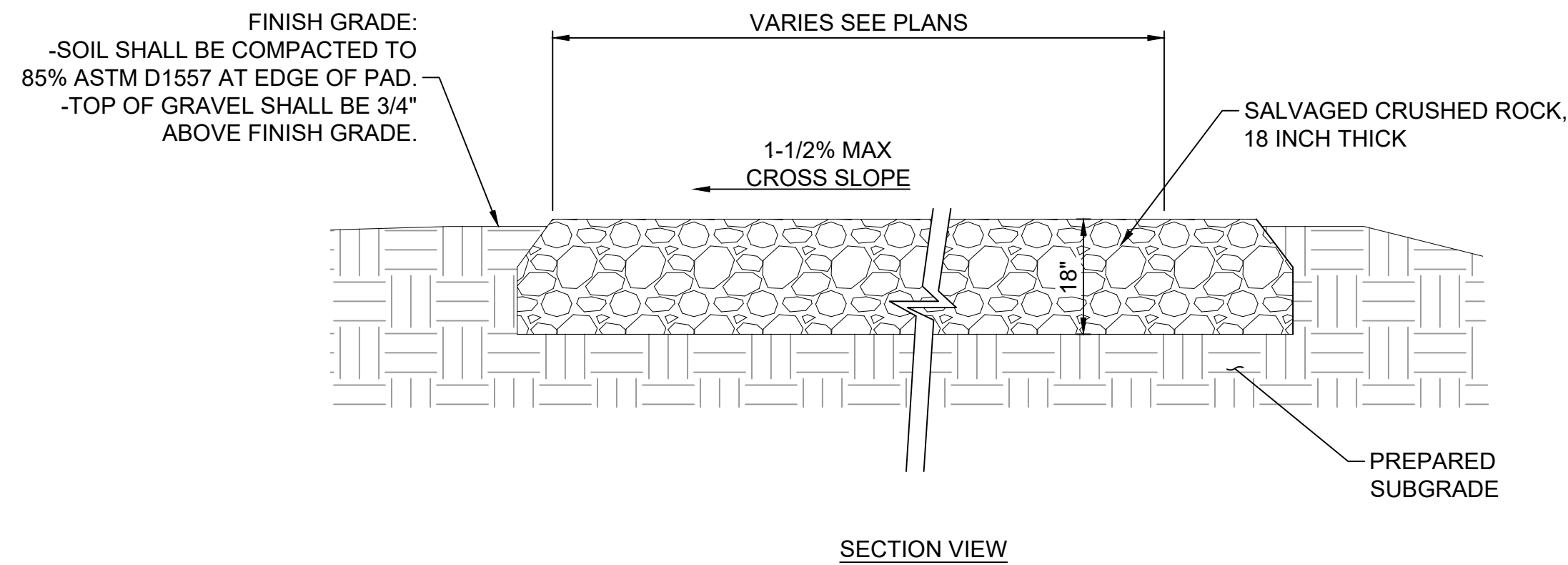
**DAYBREAK TRAIL PROFILES**



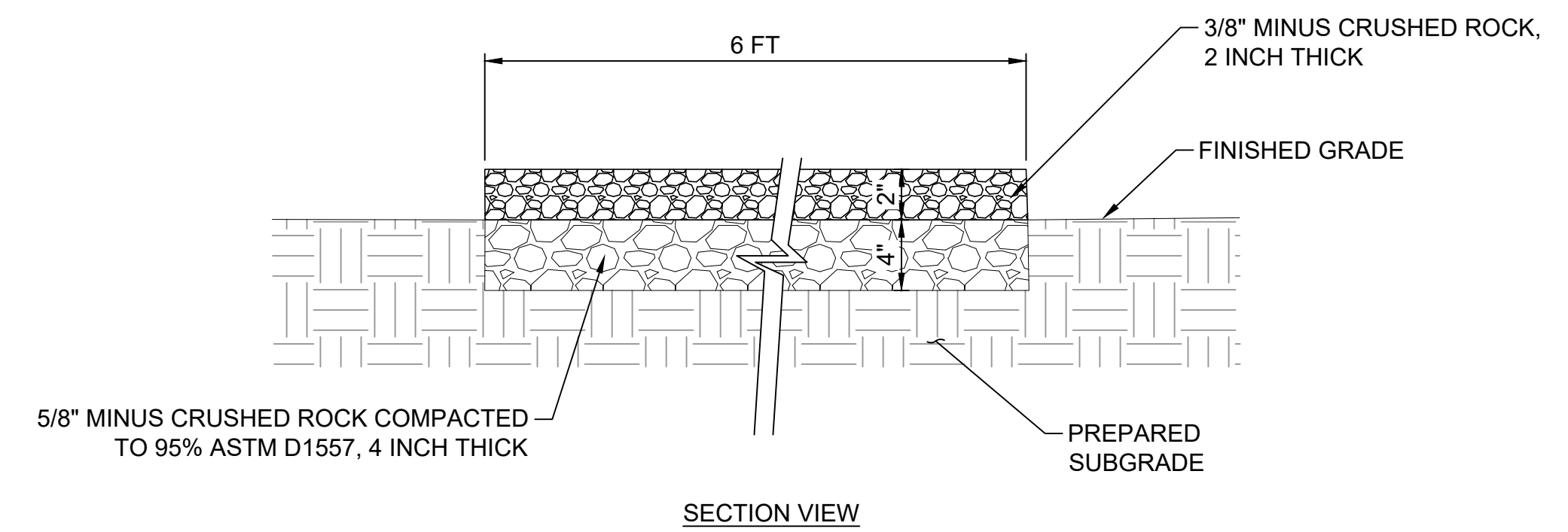
**1**  
TYP COUNTY YARD ASPHALT MAINTENANCE PAD  
NOT TO SCALE



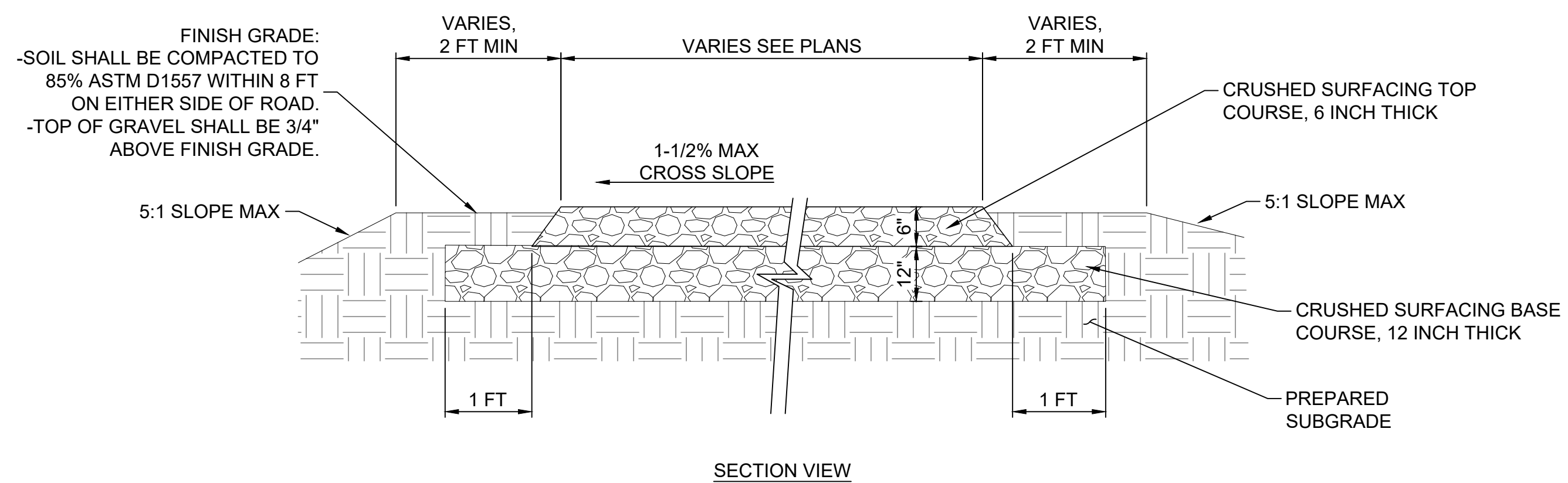
**4**  
TYP ASPHALT TRAIL  
NOT TO SCALE



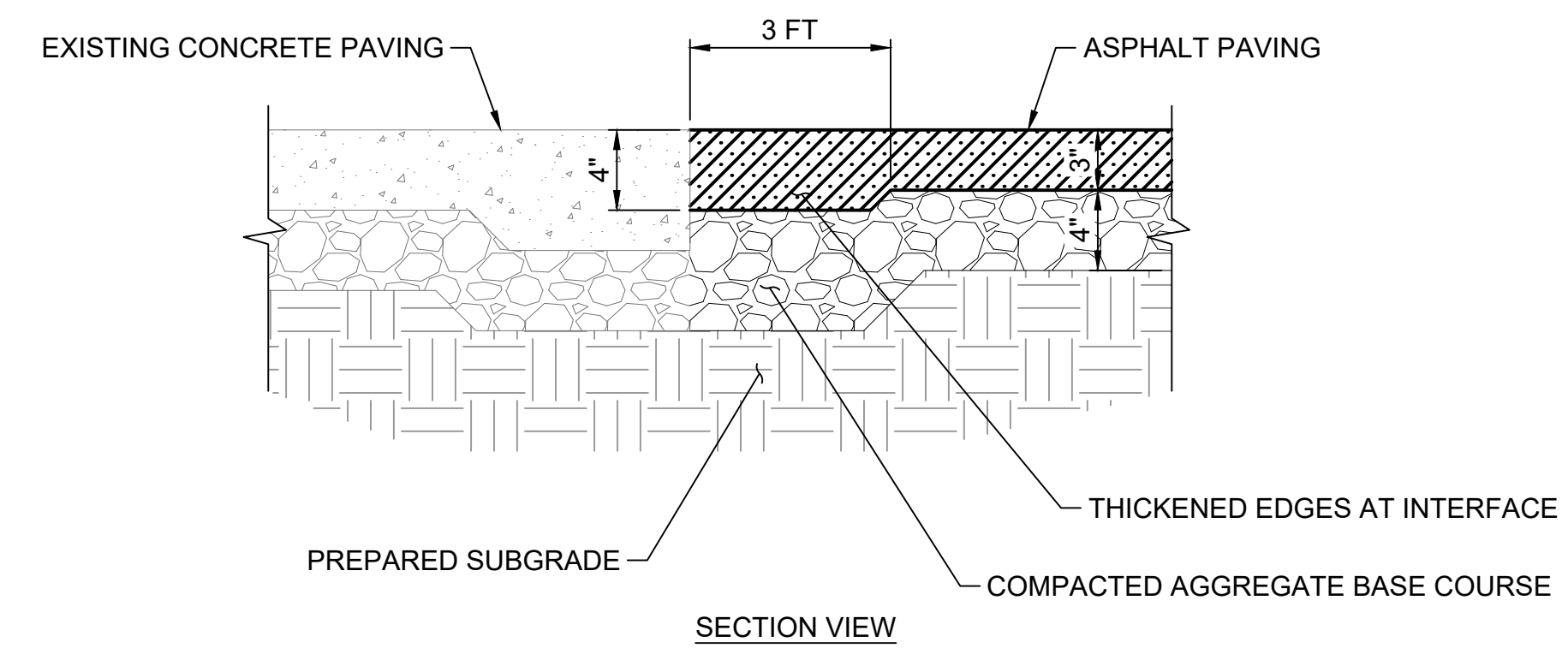
**2**  
TYP COUNTY YARD GRAVEL MAINTENANCE PAD  
NOT TO SCALE



**5**  
TYP GRAVEL TRAIL  
NOT TO SCALE



**3**  
TYP GRAVEL ACCESS ROAD  
NOT TO SCALE



**6**  
TYP CONCRETE PAVING AND ASPHALT PAVING INTERFACE  
NOT TO SCALE

**INFRASTRUCTURE NOTES:**

1. THE GRAVEL ACCESS ROADS AND THE GRAVEL MAINTENANCE PAD CAN BE CONSTRUCTED WITH CRUSHED ROCK MATERIAL SALVAGED FROM THE DECOMMISSIONED OLD MAINTENANCE PAD.
2. SURFACING BASE COARSE AND CRUSHED ROCK SHALL BE COMPACTED TO 95% ASTM D1557 (MODIFIED).
3. PREPARED SUBGRADE SHALL BE COMPACTED TO 85% ASTM D1557 (MODIFIED).

NO.	BY	DATE	REVISION DESCRIPTION

JR, NS DRAWN	MR, GJ DESIGNED	--- CHECKED
---	AUGUST 2024	---
---	APPROVED	---
---	DATE	---
---	PROJECT	---

LOWER COLUMBIA ESTUARY PARTNERSHIP  
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COUNTY INFRASTRUCTURE  
DETAILS

SHEET

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