

### INDEX

SHEET NUMBER	SHEET TITLE	PRELIM	FINAL
FP5-00	SHEET INDEX	X	X
FP5-01	LAYOUT - PLAN AND ELEVATION	X	X
FP5-02	GENERAL NOTES	X	X
FP5-03	TYPICAL SECTION	X	X
FP5-04	FOOTING LAYOUT & REINFORCING PLAN		X
FP5-05	TUNNEL REINFORCING ELEVATION		X
FP5-06	NOT USED		
FP5-07	TUNNEL REINFORCING DETAILS		X
FP5-08	NOT USED		
FP5-09	NOT USED		
FP5-10	NOT USED		
FP5-11	NOT USED		
FP5-12	NOT USED		
FP5-13	SOLDIER PILE/TIEBACK WALL DETAILS 1		X
FP5-14	SOLDIER PILE/TIEBACK WALL DETAILS 2		X
FP5-15	SOLDIER PILE/TIEBACK WALL DETAILS 3		X
FP5-16	PERMANENT GROUND ANCHOR DETAILS		X
FP5-17	EAST PORTAL WALL LAYOUT	X	X
FP5-18	EAST PORTAL WALL ELEVATION VIEW	X	X
FP5-19	EAST PORTAL WALL PILE SCHEDULE	X	X
FP5-20	NOT USED		
FP5-21	EAST PORTAL WALL TYPICAL SECTIONS	X	X

SUBMITTED SEPARATELY




SUBMITTED SEPARATELY

### INDEX

SHEET NUMBER	SHEET TITLE	PRELIM	FINAL
FP5-22	EAST PORTAL WALL TYPICAL SECTIONS	X	X
FP5-23	NOT USED		
FP5-24	NOT USED		
FP5-25	WEST PORTAL WALL LAYOUT	X	X
FP5-26	WEST PORTAL WALL ELEVATION VIEW	X	X
FP5-27	NOT USED		
FP5-28	WEST PORTAL WALL PILE SCHEDULE	X	X
FP5-29	NOT USED	X	
FP5-30	NOT USED		
FP5-31	NOT USED		
FP5-32	NOT USED		
FP5-33	WEST PORTAL WALL TYPICAL SECTIONS	X	X
FP5-34	WEST PORTAL WALL TYPICAL SECTIONS	X	X
FP5-35	WEST PORTAL WALL TYPICAL SECTIONS	X	X
FP5-36	REINFORCEMENT DETAILS		X
FP5-37	NOT USED		
FP5-38	EAST HEADWALL REINFORCEMENT		X
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FP5-40	EAST HEADWALL DETAILS 1 OF 2		X
FP5-41	EAST HEADWALL DETAILS 2 OF 2		X
FP5-42	WEST HEADWALL DETAILS 1 OF 2		X
FP5-43	WEST HEADWALL DETAILS 2 OF 2		X

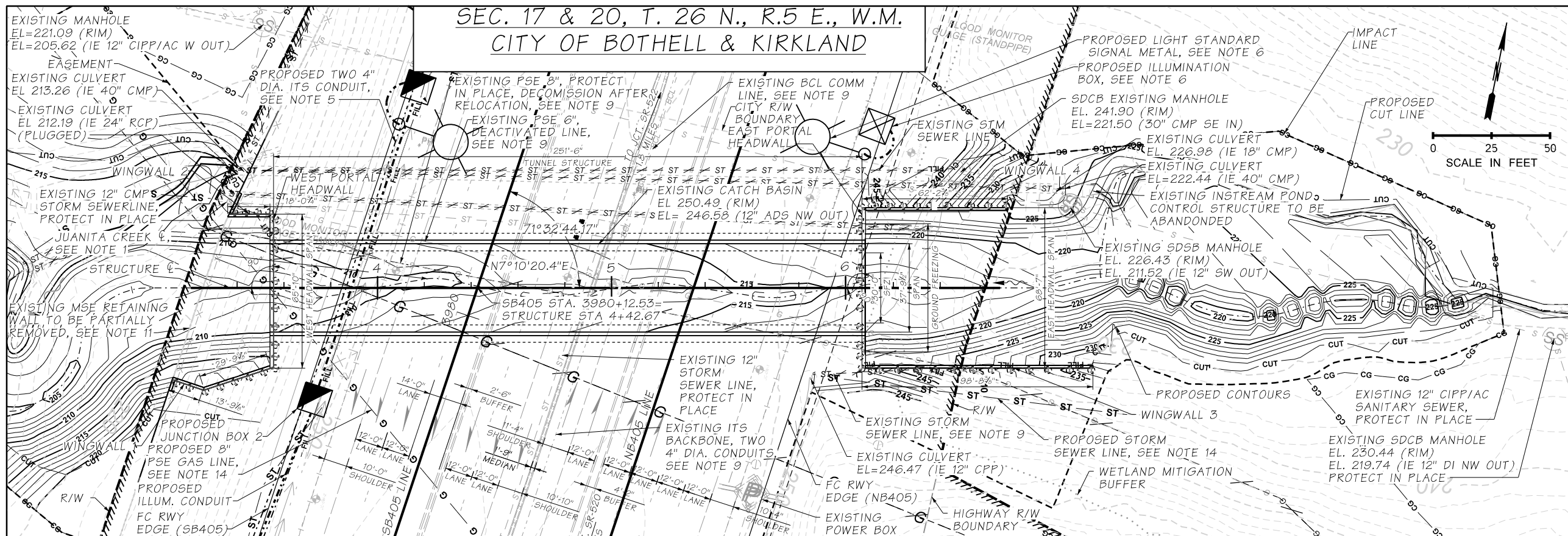
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SR FILE NO. SHEET

FILE NAME c:\pwworking\uswaldms06730\C9727_DE_FP5_00.dgn		REGION NO. 10		STATE WASH	FED.AID PROJ.NO.				I-405 BRICKYARD TO SR527 IMPROVEMENT PROJECT	PLAN REF NO FP5-00
TIME 08:30:51	DATE 2/7/2025	JOB NUMBER 22AB17	CONTRACT NO. 9727	LOCATION NO. XL5446	DATE					SKANSKA
PLOTTED BY EscribanoRosilloN	DESIGNED BY I RIVERO	ENTERED BY S SANCHEZ	CHECKED BY M WONGKAEW	PROJ. ENGR. J SLAVICEK	REGIONAL ADM. L HODGSON	REVISION	DATE	BY		

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

SEC. 17 & 20, T. 26 N., R.5 E., W.M.  
CITY OF BOTHELL & KIRKLAND



**LEGEND**

EXISTING PROPOSED

- CATCH BASIN
- JUNCTION BOX
- LUMINAIRE STANDARD
- GUIDE POST
- MANHOLE
- SAN SEWER MANHOLE

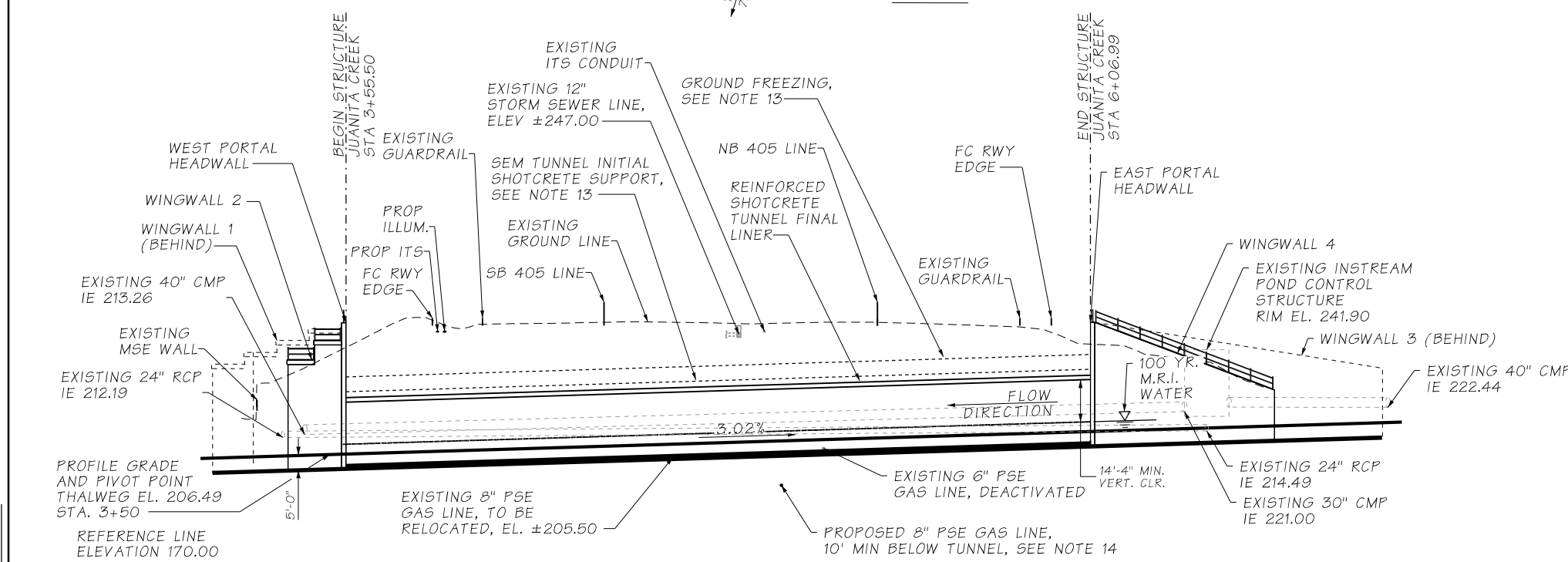
EXISTING

- DITCH DIRECTION
- STORM SEWER LINE
- WETLAND MIT. BUFFER
- CONDUIT AND WIRING
- GUARDRAIL
- FENCE
- RIGHT OF WAY LINE
- BCL BACK OF CURB COMM
- SAN SEWER LINE
- GAS LINE
- CONDUIT AND WIRING
- HIGHWAY R/W BOUNDARY
- CITY R/W BOUNDARY

PROPOSED

- GAS LINE
- CUT LINE
- FILL LINE
- CLEAR GRUB LINE
- CONDUIT, WIRING
- PROPOSED STORM SEWER LINE
- SEWER STORM LINE, TO BE DEACTIVATED
- IMPACT LINE
- FORWARD COMPATIBILITY LINE

PLAN



ELEVATION VIEW

SHOWN LOOKING RIGHT ALONG JUANITA CREEK STRUCTURE LINE  
GRADE ELEVATIONS SHOWN ARE FINISHED GRADE AT TOP OF  
STREAM BED ON JUANITA CREEK STRUCTURE LINE

NOTES:

- SEE FISH PASSAGE STREAM PLANS FOR STREAM INFORMATION.
- SEE RETAINING WALL PLANS FOR RETAINING WALL INFORMATION.
- SEE ROADWAY PLANS FOR ROADWAY INFORMATION.
- SEE DRAINAGE PLANS FOR STORM DRAINAGE INFORMATION.
- SEE ITS PLANS FOR FIBER OPTIC AND CONDUIT INFORMATION.
- SEE ILLUMINATION PLANS FOR LIGHTING AND ELECTRICAL CONDUITS INFORMATION.
- SEE UTILITY PLANS FOR MORE UTILITIES INFORMATION.
- SFZ= STRUCTURE FREE ZONE.
- FIELD VERIFY UTILITY LOCATION AND DEPTH BEFORE CONSTRUCTION.
- PROTECT EXISTING UTILITIES IN PLACE, UNO.
- INSTALL TEMPORARY SHORING AND REMOVE EXISTING MSE FILL WALL AS REQUIRED TO CONSTRUCT THE FISH PASSAGE AND WEST PORTAL STRUCTURE. REBUILD THE FILL WALL BACK TO JOIN THE PERMANENT SW AND NW WINGWALLS USING MSE, GEOSYNTHETIC SEW W/ CONCRETE FASCIA OR OTHER APPROVED MEANS. SUBMIT WORK PLAN AND SHOP DRAWING FOR REVIEW AND APPROVAL.
- NEW FILL AND CUT WALL FACE TO HAVE ASTHETIC TREATMENT, COPING AND FALL PROTECTION FENCE PER RFP APPENDIX L2 AND MATCH EXISTING.
- SEQUENTIAL EXCAVATION METHOD (SEM) TUNNEL AND GROUND FREEZING SHOWN ARE INDICATIVE AND DESIGNED BY OTHERS.
- THE SCOPE, CONFIGURATION AND LOCATION OF UTILITY WORK DESIGNATED AS BY OTHERS IS INDICATED ON THIS DRAWING IN AN ASSUMED LOCATION THAT MUST BE DETERMINED AND VALIDATED BY THE UTILITY OWNER.

ABBREVIATIONS:

BDM	WSDOT BRIDGE DESIGN MANUAL
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
EL	ELEVATION
FC	FORWARD COMPATIBLE
HEF	HORIZONTAL EACH FACE
HSS	HOLLOW STRUCTURAL SECTION
PGA	PERMANENT GROUND ANCHOR
R/W	RIGHT OF WAY
SDCB	STORM DRAIN CATCH BASIN
SOE	SUPPORT OF EXCAVATION
STA	STATION
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VEF	VERTICAL EACH FACE



CLASS 2 BURIED STRUCTURE  
REINFORCED SHOTCRETE ARCH  
LOADING: HL-93

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DATE	7/7/2025		
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DESIGNED BY	A AVANESSIAN		
ENTERED BY	G PEDRAZA		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON		
REVISION	DATE	BY	

REGION NO.	STATE	FED.AID PROJ.NO.			<b>I-405</b> <b>BRICKYARD TO SR527</b> <b>IMPROVEMENT PROJECT</b>	PLAN REF NO.
10	WASH					FP5-01
JOB NUMBER	CONTRACT NO.	LOCATION NO.		<b>JUANITA CREEK (MP 21.94)</b> <b>FISH PASSAGE STRUCTURE NO. 405/61</b> <b>LAYOUT</b>	SHEET	
22AB17	9727	XL5446			XX	
DATE	P.E. STAMP BOX				SHEETS	

C9727 FISH PASSAGE TUNNEL (BURIED STRUCTURE)  
 REINFORCED SHOTCRETE ARCH  
 SHOTCRETE STRENGTH 4,000 PSI  
 SR FILE NO. SHEET

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

### STRUCTURE GENERAL NOTES

- ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION DATED 2023.
- THIS BURIED STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020). THE STRUCTURE HAS BEEN DESIGNED FOR LESS THAN 1-INCH PER 100-FOOT OF SPAN OF DIFFERENTIAL SETTLEMENT, AND 2" TOTAL SETTLEMENT.
- THE SEISMIC DESIGN OF THIS BURIED STRUCTURE HAS BEEN COMPLETED IN ACCORDANCE WITH THE AASHTO TECHNICAL MANUAL FOR DESIGN AND CONSTRUCTION OF ROAD TUNNELS - CIVIL ELEMENTS USING PEAK GROUND ACCELERATION OF 0.50g, AND 0.2 SECOND AND 1.0 SECOND SPECTRAL ACCELERATION COEFFICIENTS OF 1.10g AND 0.60g, RESPECTIVELY, FOR SITE WITH  $V_{530} = 967 \text{ ft/sec}$ .
- THIS BURIED STRUCTURE HAS BEEN DESIGNED FOR SCOUR IN ACCORDANCE WITH THE FINAL HYDRAULIC REPORT DATED JANUARY 2025.
- THIS BURIED STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE RFC GEOTECHNICAL REPORT DATED FEBRUARY 2025.
- CAST-IN-PLACE CONCRETE SHALL BE CLASS 4000. SHOTCRETE 28-DAY COMPRESSIVE STRENGTH SHALL BE 4,000 PSI. REINFORCING STEEL YIELD STRENGTH SHALL BE 60,000 PSI, UNLESS NOTED OTHERWISE. REINFORCING STEEL EMBEDDED IN SHOTCRETE FINAL LINER SHALL BE EPOXY COATED.
- STRUCTURAL STEEL
  - STEEL SHAPES: ASTM A572 OR A992, GRADE 50  $F_y = 50 \text{ KSI}$
  - STIFFENER PLATES AT TIEBACKS: ASTM A572, GRADE 50  $F_y = 50 \text{ KSI}$
  - OTHER STIFFENER PLATES: ASTM A36,  $F_y = 36 \text{ KSI}$
  - OTHER PLATES; SUCH AS BEARING PLATES: ASTM A572, GRADE 50  $F_y = 50 \text{ KSI}$
  - STEEL ANGLES: ASTM A36,  $F_y = 36 \text{ KSI}$
  - STEEL PIPE SECTIONS: ASTM A53 GRADE B  $F_y = 35 \text{ KSI}$   
STEEL PIPE STRUTS: ASTM A252 GRADE 2  $F_y = 35 \text{ KSI}$  OR ASTM A500 GRADE B  $F_y = 42 \text{ KSI}$
  - ALL BOLTS, NUTS, AND WASHERS (UNLESS NOTED OTHERWISE) SHALL BE ASTM A307, AND SHALL CONFORM TO STD. SPEC. 9-16.3(4).
  - ALL RESIN BONDED ANCHORS SHALL BE ASTM A193 GRADE B7, OR ASTM A449.
- UNLESS OTHERWISE SHOWN IN THE PLANS, CONCRETE COVER, MEASURED FROM THE FACE OF CONCRETE TO THE FACE OF ANY REINFORCING STEEL, SHALL BE 2" AT ALL LOCATIONS AND 3" AT THE BOTTOM OF BURIED STRUCTURE OR WINGWALL FOOTINGS AND WHERE CONCRETE IS PLACED AGAINST THE GROUND
- EXPOSED EDGES OF CONCRETE SHALL HAVE 3/4" CHAMFER UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL SUBMIT DETAILED WORK PLAN AND DESIGN OF TEMPORARY WORK FOR REVIEW AND APPROVAL. THESE INCLUDE: INSTRUMENTATION AND MONITORING, DEWATERING, TEMPORARY SUPPORT OF EXCAVATION, GROUND FREEZING, AND SEQUENTIAL EXCAVATION METHOD (SEM) TUNNEL INCLUDING ITS INITIAL SHOTCRETE SUPPORT.

### LOAD COMBINATIONS

THE FOLLOWING COMBINATIONS HAVE BEEN INVESTIGATED AT THE LIMIT STATES SHOWN, IN ACCORDANCE WITH BDM SECTION 8.3.3-B.

$$\begin{aligned} \text{STRENGTH I} &= \gamma \text{ DC} + \gamma \text{ DW} + \gamma \text{ EH} + \gamma \text{ EV} + \gamma \text{ ES} \\ &\quad + 1.75 \text{ LS} + 1.75 (\text{LL+IM}) + 1.00 \text{ WA} + 1.00 \text{ BY} \\ \text{SERVICE} &= 1.00 \text{ DC} + 1.00 \text{ DW} + 1.00 \text{ EH} + 1.00 \text{ EV} + 1.00 \text{ ES} + 1.00 \text{ LS} \\ &\quad + 1.00 (\text{LL+IM}) + 1.00 \text{ WA} + 1.00 \text{ BY} \\ \text{EXTREME I} &= 1.00 \text{ DC} + 1.00 \text{ DW} + 1.00 \text{ EH} + 1.00 \text{ EV} + 1.00 \text{ ES} + 1.00 \text{ LS} \\ &\quad + \gamma (\text{LL+IM}) + 1.00 \text{ WA} + 1.00 \text{ BY} + 1.00 \text{ EQ} \\ \text{EXTREME II} &= 1.00 \text{ DC} + 1.00 \text{ DW} + 1.00 \text{ EH} + 1.00 \text{ EV} + 1.00 \text{ ES} + 1.00 \text{ LS} \\ &\quad + 0.50 (\text{LL+IM}) + 1.00 \text{ WA} + 1.00 \text{ BY} + 1.00 \text{ IC} \end{aligned}$$

DC = DEAD LOAD OF STRUCTURAL COMPONENTS  
 DW = DEAD LOAD OF WEARING SURFACE  
 EH = HORIZONTAL EARTH PRESSURE  
 ES = EARTH SURCHARGE  
 EQ = EARTHQUAKE  
 EV = VERTICAL EARTH PRESSURE  
 LL + IM = LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE  
 LS = LIVE LOAD SURCHARGE  
 WA = HYDRO-STATIC PRESSURE  
 BY = BUOYANCY  
 IC = ICE LOAD

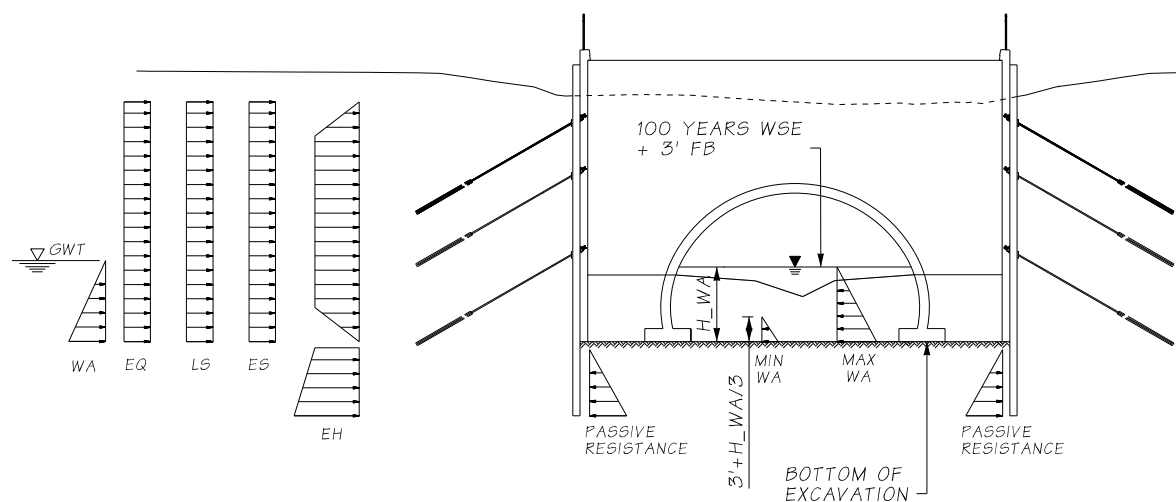
#### LOADING NOTES:

- $K_0$  WAS USED IN EH COMPUTATIONS FOR TUNNEL DESIGN IN ALL LIMIT STATES. KA/KP WERE USED FOR THE WINGWALLS DESIGN.
- EQ LOADING INCLUDES BOTH LATERAL RACKING DEFORMATION AND VERTICAL SEISMIC LOAD.
- EXTREME II LIMIT STATE LOAD COMBINATION RELATES TO SCOUR AND ICE DESIGN.
- LOADS AND LOAD FACTORS FOR CONSTRUCTION WERE IN ACCORDANCE WITH BDM SECTION 3.6.

### CONSTRUCTION SEQUENCE

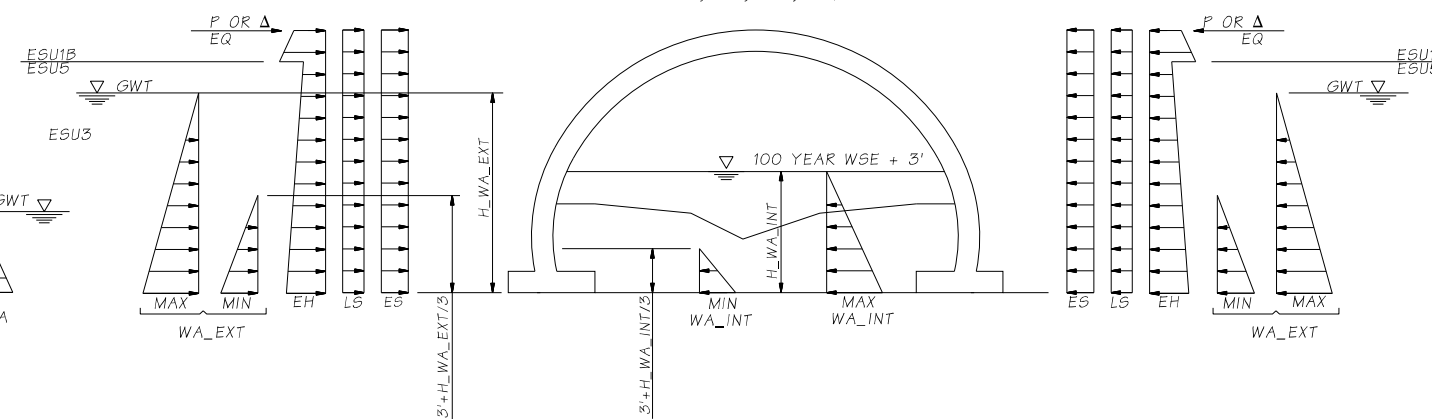
GENERAL CONSTRUCTION SEQUENCE (TO BE CONFIRMED AND DEFINED BY CONTRACTOR):

- IMPLEMENT INSTRUMENTATION AND MONITORING PROGRAM.
- INSTALL WORKING BENCH.
- INSTALL SOLDIER PILES.
- INSTALL DEWATERING SYSTEM.
- INSTALL LAGGING IN THE EXPOSED PORTION OF SOLDIER PILE, BACKFILL AND COMPACT BEHIND THE LAGGING.
- EXCAVATE MAX. 3-FT BELOW THE FIRST PERMANENT GROUND ANCHOR LEVEL. INSTALL LAGGING AS EXCAVATION PROGRESSES.
- INSTALL THE FIRST PERMANENT GROUND ANCHOR.
- PERFORM PRODUCTION ANCHOR TESTING AND LOCK-OFF THE ANCHOR TO THE DESIGNATED LOCK-OFF LOAD.
- REPEAT STEPS 6-8 FOR SUBSEQUENT PERMANENT GROUND ANCHOR LEVELS. FOR SPECIFIC STAGES AND DETAILS ON THE HEADWALLS CONSTRUCTION SEQUENCE REFER TO SUPPORT OF EXCAVATION PLANS FROM BRIERLEY ASSOCIATES. INSTALL FREEZE PIPES, INSTALL SOIL NAILS, AND SHOTCRETE FASCIA FOR THE HEADWALL. INSTALL WEEP HOLES AS EXCAVATION REACHES INSTALLATION ELEVATIONS.
- EXCAVATE TO BOTTOM OF FASCIA ELEVATION.
- INSTALL GROUND FREEZING SYSTEM.
- SEQUENTIALLY EXCAVATE TUNNEL, INSTALL INITIAL SHOTCRETE TUNNEL SUPPORT, AND CONSTRUCT FOOTINGS.
- CONSTRUCT FINAL TUNNEL LINER.
- TURNOFF GROUND FREEZING.
- INSTALL SUPPORT STUDS AND REINFORCEMENT.
- FORM AND PLACE PERMANENT FASCIA, AND CAP BEAM (WHERE REQUIRED).
- INSTALL FENCE, AND APPLY PIGMENTED SEALER.
- BACKFILL TO FORM STREAM BANKS AND BED.



WALL DESIGN LOADING DIAGRAM

NOT TO SCALE



TUNNEL DESIGN LOADING DIAGRAM

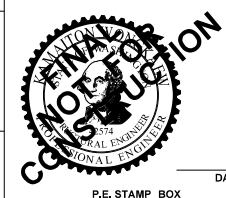
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LATERAL SUPPORT AND SOIL-STRUCTURE INTERACTION MODELED USING COMPRESSION-ONLY GROUND SPRINGS.

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DESIGNED BY	S SANCHEZ		
ENTERED BY	IRIVERO		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON		
REVISION	DATE	BY	
REGION NO.	STATE	FED.AID PROJ.NO.	
10	WASH		
JOB NUMBER			
22AB17			
CONTRACT NO.	LOCATION NO.		
9727	XL5446		



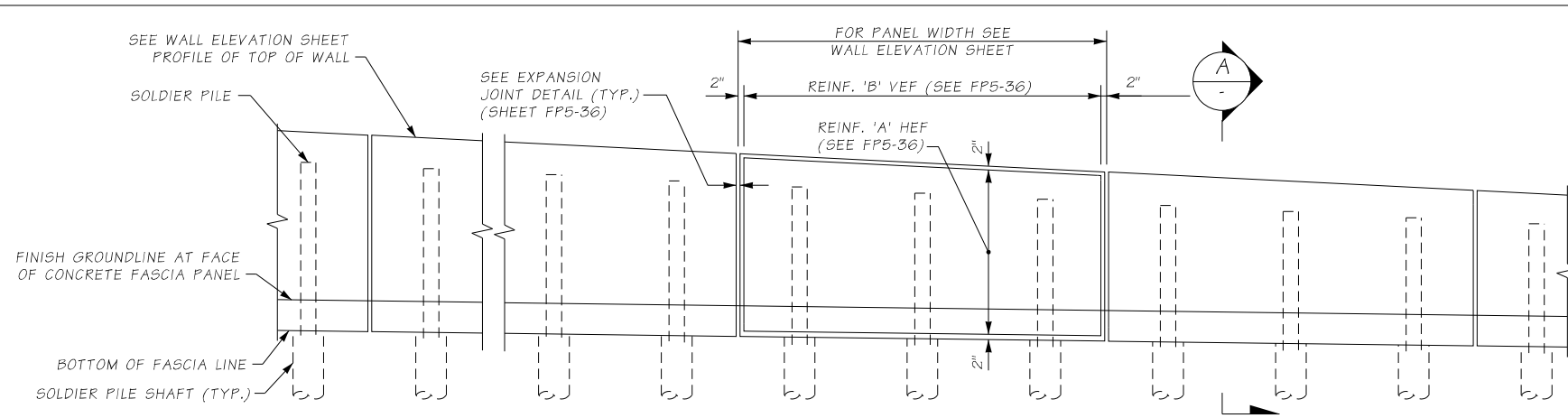
I-405  
 BRICKYARD TO SR527  
 IMPROVEMENT PROJECT  
 JUANITA CREEK (MP 21.94)  
 FISH PASSAGE STRUCTURE NO. 405/61  
 GENERAL NOTES

PLAN REF NO  
 FP5-02  
 SHEET  
 XX  
 OF  
 SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

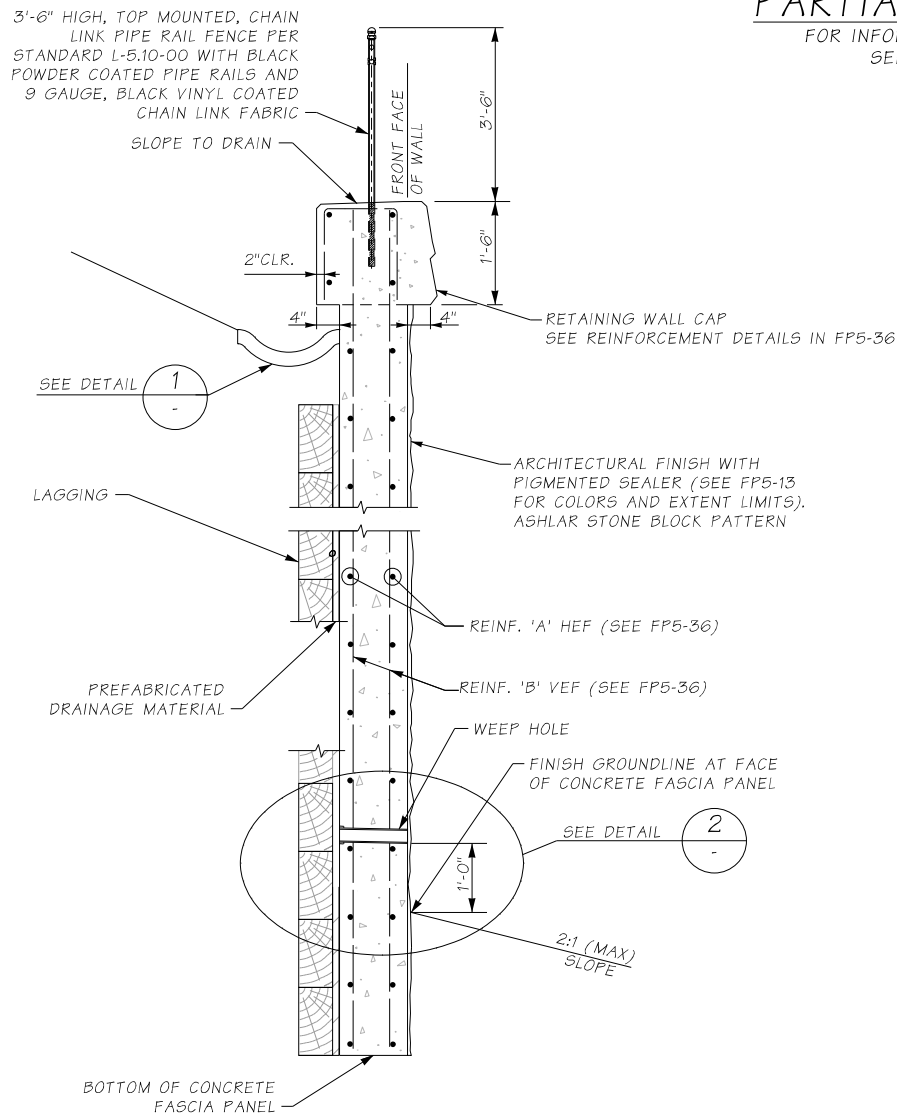






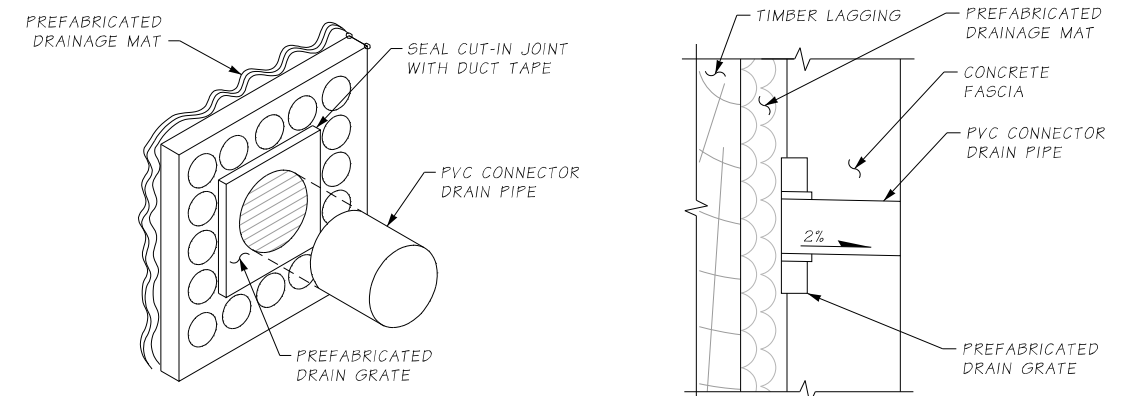
**PARTIAL WALL ELEVATION**

FOR INFORMATION NOT SHOWN OR NOTED, SEE WALL ELEVATION SHEET



**SECTION A**

FOR INFORMATION NOT SHOWN OR NOTED, SEE TYPICAL SECTION

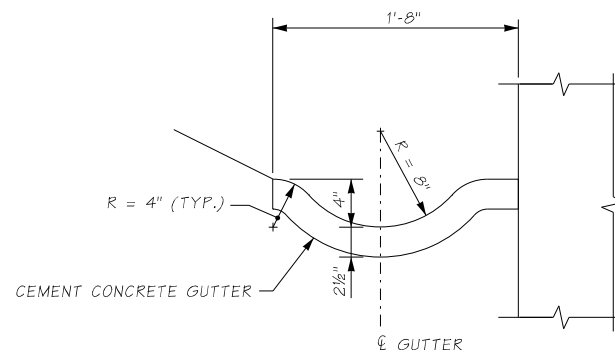


**ISOMETRIC VIEW**

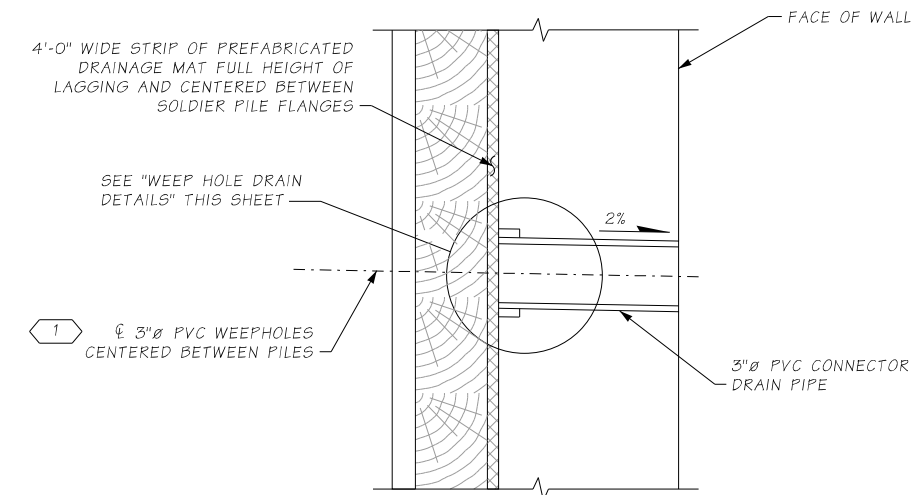
**SECTIONAL VIEW**

**WEEP HOLE DRAIN DETAILS**

DRAIN GRATE INSTALLATION SHALL NOT DISRUPT PREFABRICATED DRAINAGE MAT



**DETAIL 1**



**DETAIL 2**

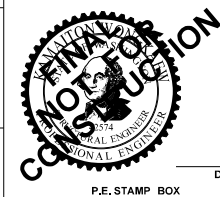
**NOTES:**

1 WEEP HOLES LOCATED AT AN EXPANSION JOINT MAY BE ADJUSTED 6" TO 1'-0" AWAY FROM THE EXPANSION JOINT, BUT REMAIN WITHIN THE MIDDLE HALF OF THE PREFABRICATED DRAINAGE MAT.

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DESIGNED BY	A AVANESSIAN			CONTRACT NO.		LOCATION NO.
ENTERED BY	K TANG			9727		XL5446
CHECKED BY	M WONGKAEW					
PROJ. ENGR.	J SLAVICEK					
REGIONAL ADM.	IL HODGSON			REVISION	DATE	BY



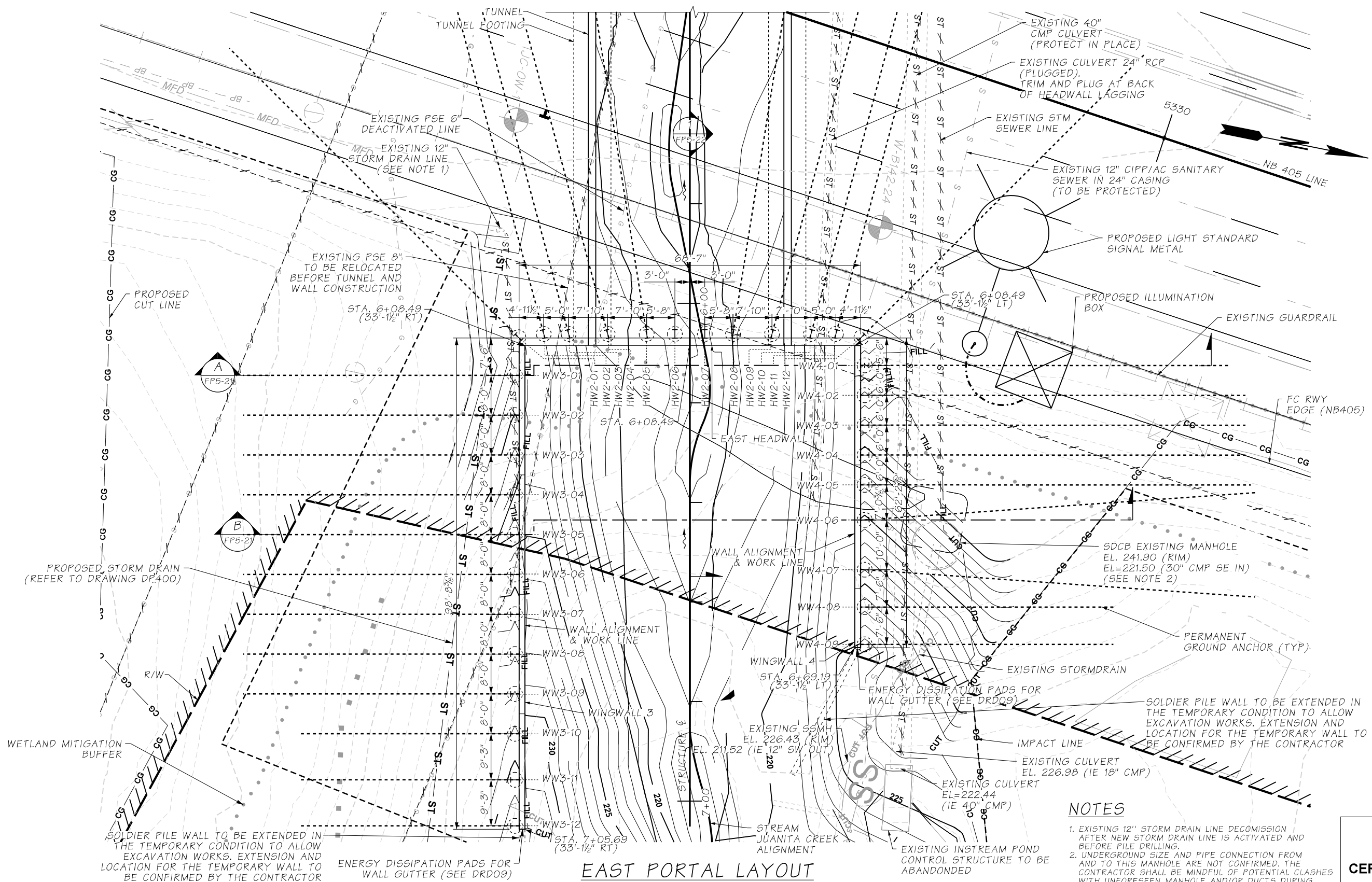
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**BRICKYARD TO SR527**  
**IMPROVEMENT PROJECT**  
**JUANITA CREEK (MP 21.94)**  
**FISH PASSAGE STRUCTURE NO. 405/61**  
**SOLDIER PILE/TIEBACK WALL DETAILS 3**

PLAN REF NO  
**FP5-15**  
 SHEET  
 XX  
 OF  
 SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61



C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

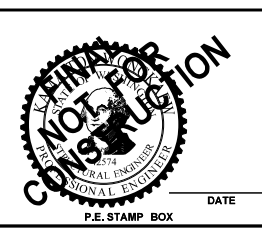


- NOTES**
- EXISTING 12" STORM DRAIN LINE DECOMMISSION AFTER NEW STORM DRAIN LINE IS ACTIVATED AND BEFORE PILE DRILLING.
  - UNDERGROUND SIZE AND PIPE CONNECTION FROM AND TO THIS MANHOLE ARE NOT CONFIRMED. THE CONTRACTOR SHALL BE MINDFUL OF POTENTIAL CLASHES WITH UNFORESEEN MANHOLE AND/OR DUCTS DURING ANCHORS INSTALLATION.

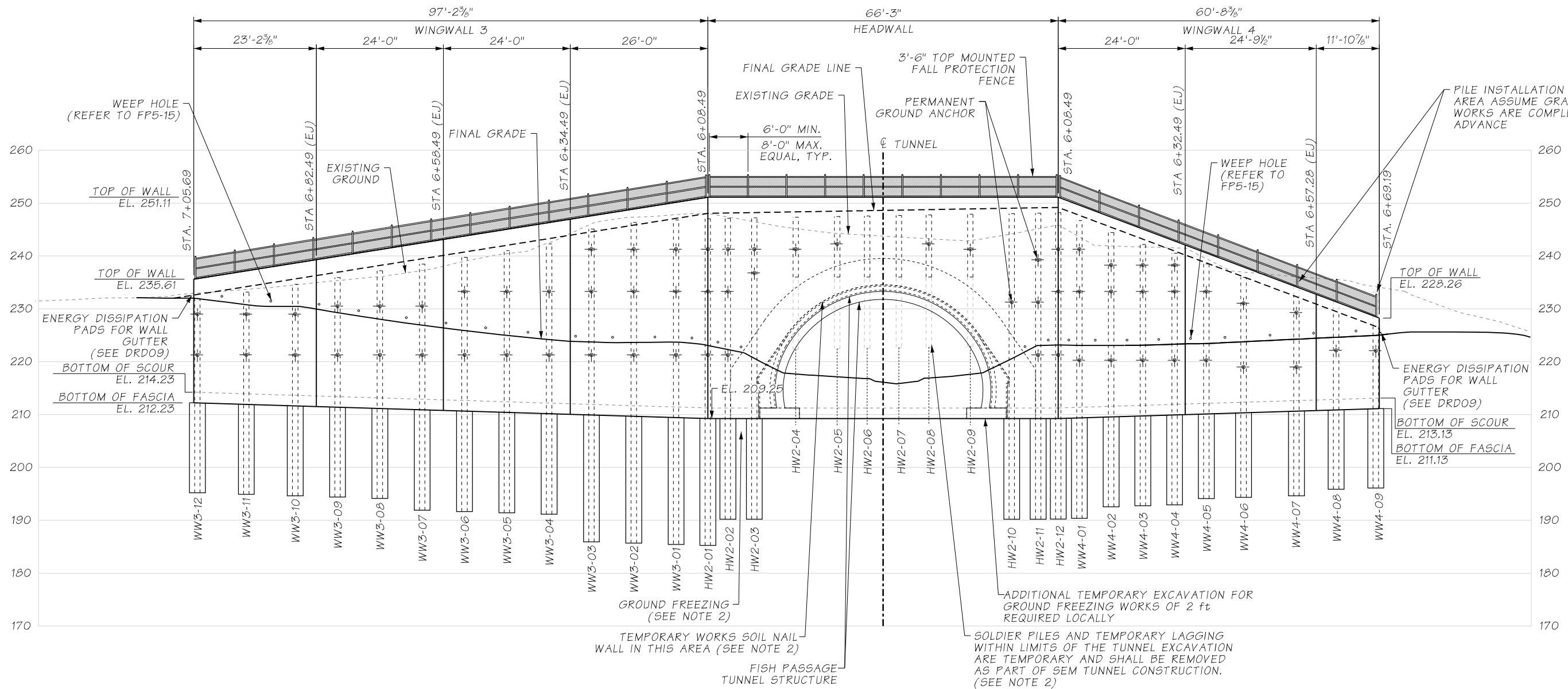
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<b>DESIGNED BY</b>	I RIVERO		
<b>ENTERED BY</b>	S SANCHEZ		
<b>CHECKED BY</b>	M WONGKAEW		
<b>PROJ. ENGR.</b>	J SLAVICEK		
<b>REGIONAL ADM.</b>	L HODGSON		
<b>REVISION</b>	<b>DATE</b>	<b>BY</b>	



<b>I-405</b>	<b>PLAN REF NO</b>
<b>BRICKYARD TO SR527</b>	<b>FP5-17</b>
<b>IMPROVEMENT PROJECT</b>	<b>SHEET</b>
<b>JUANITA CREEK (MP 21.94)</b>	<b>XX</b>
<b>FISH PASSAGE STRUCTURE NO. 405/61</b>	<b>OF</b>
<b>EAST PORTAL WALL LAYOUT</b>	<b>SHEETS</b>



ELEVATION -EAST PORTAL

NOTES

- UNLESS OTHERWISE NOTED, THE SOLDIER PILES, TIEBACKS, AND REINFORCED CONCRETE FASCIA WALL SHOWN ON THIS SHEET REPRESENT THE PERMANENT (FINAL) CONDITION.
- REFER TO PLANS PREPARED BY BRIERLEY ASSOCIATES FOR THE SEM TUNNEL, SOE, AND ADDITIONAL REQUIREMENTS FOR THE TEMPORARY WORKS.

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DESIGNED BY	I RIVERO		
ENTERED BY	S SANCHEZ		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	IL HODGSON	REVISION	DATE BY
REGION NO.	10	STATE	WASH
FED.AID PROJ.NO.			
JOB NUMBER	22AB17		
CONTRACT NO.	9727		
LOCATION NO.	XL5446		



I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT  
JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST PORTAL WALL ELEVATION VIEW

PLAN REF NO  
FP5-18  
SHEET  
XX  
OF  
SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

SOLDIER PILE SCHEDULE

PILE NO.	STA.	OFFSET (FT)	DRILL HOLE SIZE (FT)	P.G.A. ARRANGEMENT TYPE	SOLDIER PILE SECTION	TOP OF SOLDIER PILE ELEVATION (FT)	(H) (FT)(1)	(D) (FT)(1)	TOTAL PILE LENGTH (FT)
HW2-01	6+06.83	34.46' Rt.	3'-3"	HW-A	W21X201	248.18	37'-10"	24'-0"	61'-10"
HW2-02	6+06.17	29.33' Rt.	3'-3"	HW-B	W21X101	248.18	37'-10"	19'-0"	56'-10"
HW2-03	6+06.17	24.33' Rt.	3'-3"	HW-C	W24X229	248.18	38'-0"	19'-0"	57'-0"
HW2-04	6+06.17	16.15' Rt.	3'-3"	HW-D	W21X201	248.18	-	-	25'-0" (2)
HW2-05	6+06.17	8.67' Rt.	3'-3"	HW-E	W21X101	248.18	-	-	25'-0" (2)
HW2-06	6+06.17	3.00' Rt.	3'-3"	-	W21X101	248.18	-	-	25'-0" (2)
HW2-07	6+06.17	3.00' Lt.	3'-3"	-	W21X101	248.18	-	-	25'-0" (2)
HW2-08	6+06.17	8.67' Lt.	3'-3"	HW-F	W21X101	248.18	-	-	25'-0" (2)
HW2-09	6+06.17	16.15' Lt.	3'-3"	HW-G	W21X201	248.18	-	-	25'-0" (2)
HW2-10	6+06.17	24.33' Lt.	3'-3"	HW-H	W21X201	248.18	38'-10"	19'-0"	57'-10"
HW2-11	6+06.17	29.33' Lt.	3'-3"	HW-I	W21X101	248.18	38'-10"	19'-0"	57'-10"
HW2-12	6+06.83	34.46' Lt.	3'-3"	HW-J	W21X201	248.18	38'-11"	19'-0"	57'-11"
WW3-01	6+14.49	35.12' Rt.	3'-3"	A	W21X101	247.41	37'-5"	24'-0"	61'-5"
WW3-02	6+22.49	35.12' Rt.	3'-3"	A	W21X101	246.26	36'-8"	24'-0"	60'-8"
WW3-03	6+30.49	35.12' Rt.	3'-3"	A	W21X101	245.10	35'-2"	24'-0"	59'-2"
WW3-04	6+38.49	35.12' Rt.	3'-3"	B1	W21X101	243.94	32'-1"	19'-0"	51'-1"
WW3-05	6+46.49	35.12' Rt.	3'-3"	B1	W21X101	242.79	30'-7"	19'-0"	49'-7"
WW3-06	6+54.49	35.12' Rt.	3'-3"	B1	W21X101	241.63	29'-1"	19'-0"	48'-1"
WW3-07	6+62.49	35.12' Rt.	3'-3"	B2	W21X101	240.47	27'-7"	19'-0"	46'-7"
WW3-08	6+70.49	35.12' Rt.	3'-3"	B2	W21X101	239.32	26'-1"	17'-0"	43'-1"
WW3-09	6+78.49	35.12' Rt.	3'-3"	B2	W21X101	238.16	24'-6"	17'-0"	41'-6"
WW3-10	6+86.49	35.12' Rt.	3'-3"	C	W21X101	237.00	23'-0"	17'-0"	40'-0"
WW3-11	6+95.74	35.12' Rt.	3'-3"	C	W21X101	235.67	21'-3"	17'-0"	38'-3"
WW3-12	7+04.99	35.12' Rt.	3'-3"	C	W21X101	234.33	19'-9"	17'-0"	36'-9"
WW4-01	6+12.49	35.12' Lt.	3'-3"	D	W21X101	246.68	37'-4"	19'-0"	56'-4"
WW4-02	6+18.49	35.12' Lt.	3'-3"	E	W21X101	244.43	34'-10"	17'-0"	51'-10"
WW4-03	6+24.49	35.12' Lt.	3'-3"	E	W21X101	242.18	32'-5"	17'-0"	49'-5"
WW4-04	6+30.49	35.12' Lt.	3'-3"	E	W21X101	240.54	30'-7"	17'-0"	47'-7"
WW4-05	6+36.49	35.12' Lt.	3'-3"	F	W21X101	238.50	28'-5"	16'-0"	44'-5"
WW4-06	6+43.52	35.12' Lt.	3'-3"	G	W21X101	235.97	25'-8"	16'-0"	41'-8"
WW4-07	6+53.52	35.12' Lt.	3'-3"	H	W21X101	235.16	24'-6"	16'-0"	40'-6"
WW4-08	6+61.02	35.12' Lt.	3'-3"	I	W21X101	234.70	23'-8"	15'-0"	38'-8"
WW4-09	6+68.52	35.12' Lt.	3'-3"	I	W21X101	233.18	22'-1"	15'-0"	37'-1"

(1) DIMENSIONS "H" AND "D" REFER TO DESIGN HEIGHT AND EMBEDMENT DEPTH, RESPECTIVELY, REFER TO SHEET FP5-13.

(2) PILE TOE ELEVATION TO BE CUT DURING CONSTRUCTION TO ALLOW FOR THE OTHER WORKS. PILE TO BE CUT AT EL. 236 FT.

TIEBACK ANCHORS SCHEDULE

TYPE	NUMBER OF ROWS	ROW ELEVATION	INCLINATION VER. ANGLE (°)	INCLINATION HOR. ANGLE (°)	UNBONDED LENGTH (ft)	BONDED LENGTH (ft) (1)	FACTORED DESIGN LOAD (kips)	NUMBER OF STRANDS (2)	LOCKOFF LOAD (kips)
HW-A	3	241.28/233.28/221.28	30/30/30	45/45/45	52/44/31	31/20/31	102/171/213	4/6/7	80/120/140
HW-B	3	241.28/233.28/221.28	25/25/30	15/15/15	52/44/31	31/18/33	102/112/227	4/4/7	75/85/170
HW-C	2	241.28/236.78	25/25	15/15	52/48	33/32	139/196	5/7	120/150
HW-D	1	241.28	20	15	54	35	161	7	150
HW-E	1	242.28	7	9	79	37	154	5	150
HW-F	1	242.28	7	9	79	38	154	5	150
HW-G	1	241.28	20	15	54	36	162	5	150
HW-H	1	231.28	30	15	41	38	269	8	170
HW-I	3	239.28/231.28/221.28	25/25/30	15/15/15	50/42/31	31/20/26	120/170/183	5/6/6	100/150/150
HW-J	3	241.28/233.28/221.28	15/15/40	45/45/45	50/42/31	31/18/25	129/120/175	5/5/6	100/90/123
A	3	241.28/233.28/221.28	30/30/30	-	47/41/32	17/26/24	90/130/119	2/4/4	60/80/70
B1	2	233.28/221.28	30/30	-	36/27	28/27	144/139	4/4	90/90
B2	2	230.50/221.28	30/30	-	36/27	28/27	144/139	4/4	90/90
C	2	229.00/221.28	30/30	-	31/24	20/21	94/106	2/3	60/70
D	3	241.28/233.28/220.28	15/15/15	-	46/42/27	31/29/42	82/112/182	2/3/4	50/70/110
E	3	238.28/233.28/220.28	15/15/15	-	44/40/35	36/37/34	95/97/174	3/3/5	60/60/110
F	2	233.28/220.28	15/15	-	38/34	43/31	112/174	3/4	70/105
G	2	231.05/219.00	15/15	4/4	38/20	44/33	115/168	3/4	70/100
H	2	229.30/219.00	15/15	4/4	38/20	44/33	115/168	3/4	70/100
I	1	222.10	25	-	26	30	151	4	90

(1) BONDED LENGTH ARE PRELIMINARY, USING A 6" DIAMETER BOND IN WINGWALLS AND 7" DIAMETER BOND IN HEADWALL TIEBACKS, AND BASED ON AVAILABLE INFORMATION. THE GROUND ANCHORS CONTRACTOR IS TO PROVIDE THE FINAL BONDED LENGTH AND BOND DIAMETER AS PER WSDOT GDM 6-17.3.

(2) STRANDS OF GRADE 270 KSI, 0.6-INCH DIAMETER.

(3) TESTING REQUIREMENTS:

-VERIFICATION TESTING:

- 1 ANCHOR AT LEVEL AND INCLINATION OF UPPER LEVEL FROM HW-E / HW-F INTO ESU 1B
- 2 ANCHORS AT LEVEL AND INCLINATION OF LOWER LEVEL FROM HW-B/HW-I INTO ESU 6B.

-PERFORMANCE TESTING:

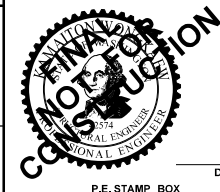
- 3 ANCHORS PER WALL (TOTAL OF 9 TESTED ANCHORS) LOCATED ON ELEVATIONS BETWEEN EL. 241.28 AND 238.28 FT.
- 3 ANCHORS PER WALL (TOTAL OF 9 TESTED ANCHORS) LOCATED ON ELEVATIONS BETWEEN EL. 233.28 AND 229.30 FT.
- 3 ANCHORS PER WALL (TOTAL OF 9 TESTED ANCHORS) LOCATED ON ELEVATIONS BETWEEN EL. 222 AND 219 FT.

- REMAINDER OF PRODUCTION ANCHORS TO BE PROOF-TESTED IN ACCORDANCE WITH GDM APPENDIX 15-G.

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RFC  
CERTIFICATION STAMP

SR FILE NO. SHEET

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DATE	10/7/2025	STATE	WASH
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DESIGNED BY	I RIVERO	JOB NUMBER	22AB17
ENTERED BY	S SANCHEZ	CONTRACT NO.	9727
CHECKED BY	M WONGKAEW	LOCATION NO.	XL5446
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON	REVISION	DATE BY

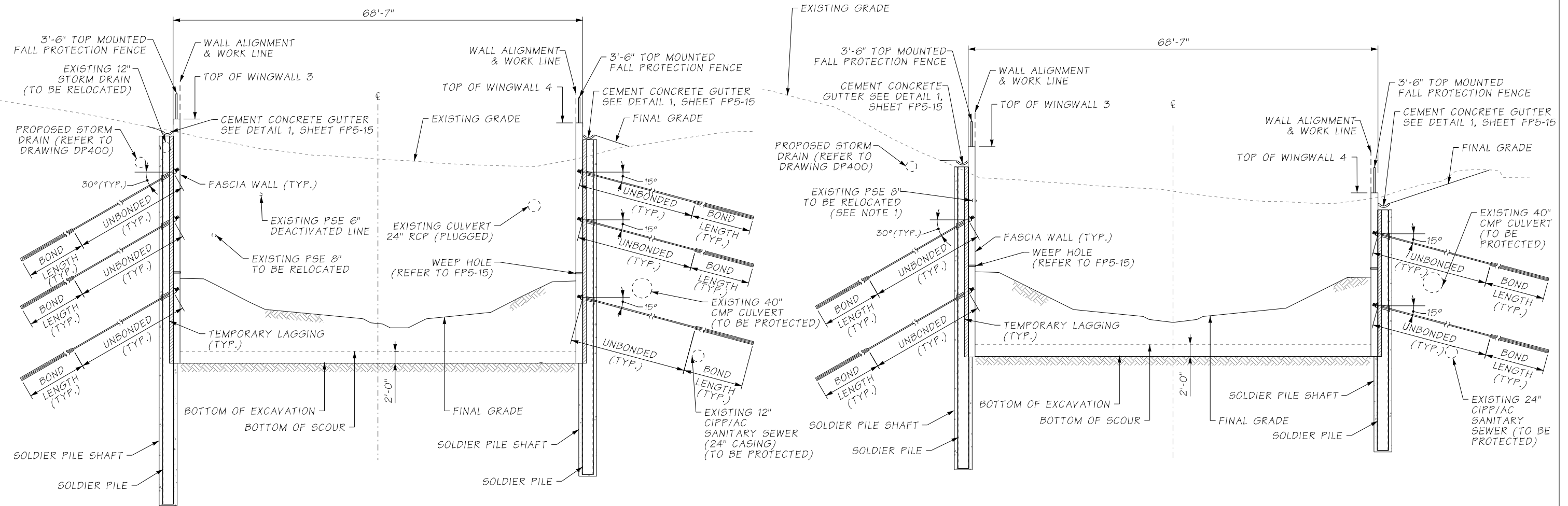


I-405 BRICKYARD TO SR527 IMPROVEMENT PROJECT		PLAN REF NO FP5-19
JUANITA CREEK (MP 21.94) FISH PASSAGE STRUCTURE NO. 405/61 EAST PORTAL WALL.PILE SCHEDULE		SHEET XX OF SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

**NOTES**

1. EXISTING UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE DECOMMISSIONED. THOSE THAT INTERSECT WITH THE WALL SHALL BE REMOVED TO THE BACK OF THE LAGGING AND PLUGGED.



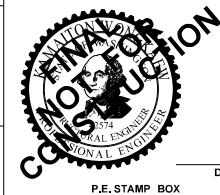
SECTION A  
FP5-17

SECTION B  
FP5-17

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DESIGNED BY	I RIVERO		
ENTERED BY	S SANCHEZ		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	IL HODGSON		
REVISION	DATE	BY	
REGION NO.	STATE	FED.AID PROJ.NO.	
10	WASH		
JOB NUMBER	22AB17		
CONTRACT NO.	9727		
LOCATION NO.	XL5446		



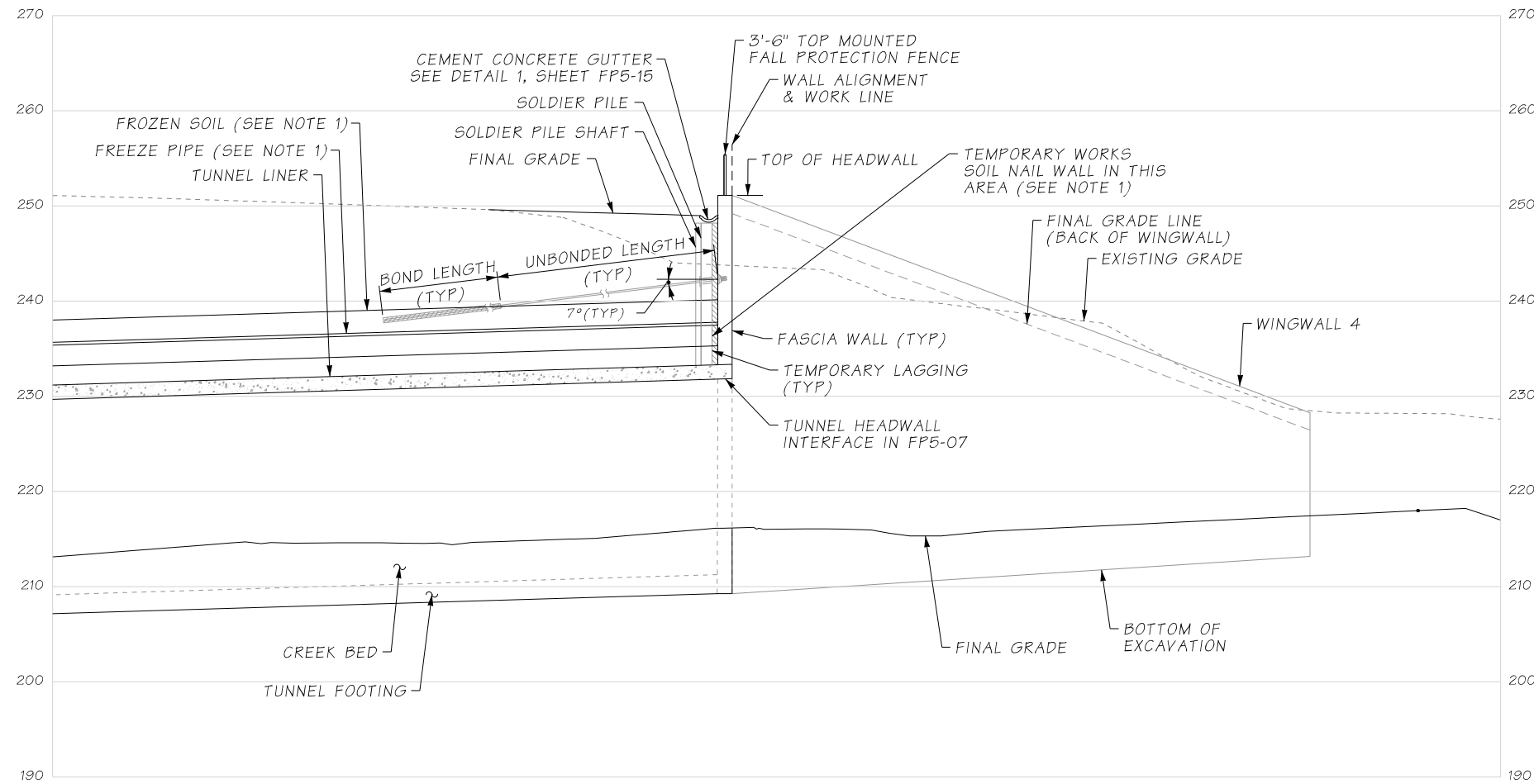
I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT  
JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST PORTAL WALL. TYPICAL SECTIONS

PLAN REF NO  
FP5-21  
SHEET XX  
OF  
SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

**NOTES**

1. REFER TO PLANS PREPARED BY BRIERLEY ASSOCIATES FOR THE SEM TUNNEL, SOE, AND ADDITIONAL REQUIREMENTS FOR THE TEMPORARY WORKS.

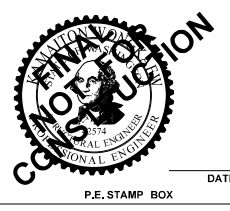


SECTION 1  
FP5-17

**RESERVED FOR  
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CERTIFICATION STAMP**

SR FILE NO. SHEET

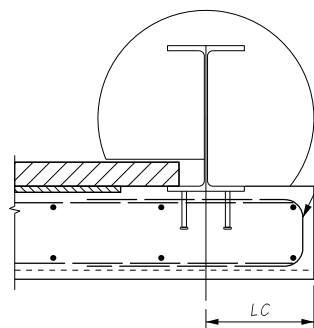
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CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	IL HODGSON	REVISION	DATE BY
REGION NO.	10	STATE	WASH
JOB NUMBER	22AB17		
CONTRACT NO.	9727		
FED.AID PROJ.NO.			
LOCATION NO.	XL5446		



I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT  
JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST PORTAL WALL. TYPICAL SECTIONS

PLAN REF NO	FP5-22
SHEET XX OF SHEETS	

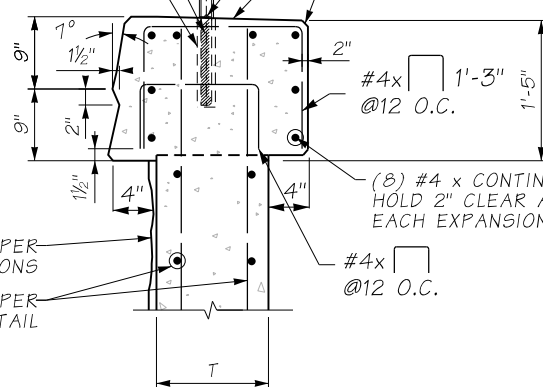
C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61



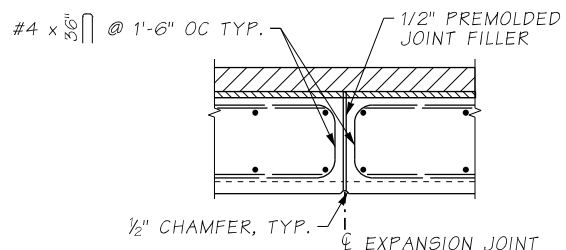
**PLAN - TYPICAL FASCIA END REINFORCEMENT DETAIL**

NOTE:  
DETAIL ALSO APPLIED TO TOP OF WALL WHEN NO CAP IS REQUIRED,  
(I.E., EAST PORTAL WALLS).  
REFER TO SITE SPECIFIC WALL DRAWINGS FOR DIMENSIONS OF "LC"

EXPANDED POLYSTYRENE IN BOTTOM OF POST  
PIPE RAIL FENCE WITH FENCE FABRIC  
1/4" DIA. DRAIN HOLE LOCATE ALONG TOP OF STRUCTURE  
WALL CAP PIGMENTED SEALER SHALL BE AS SHOWN ON FP5-13  
3/4" CHAMFER, TYP.  
3.5" O.D. 16 GA GALVANIZED STEEL SLEEVE (OR PVC IF REMOVED AFTER CASTING) @72" MAX. FILL VOID BETWEEN SLEEVE AND POST WITH EPOXY GROUT  
#4 x 1'-6" @ 1'-6" OC TYP.

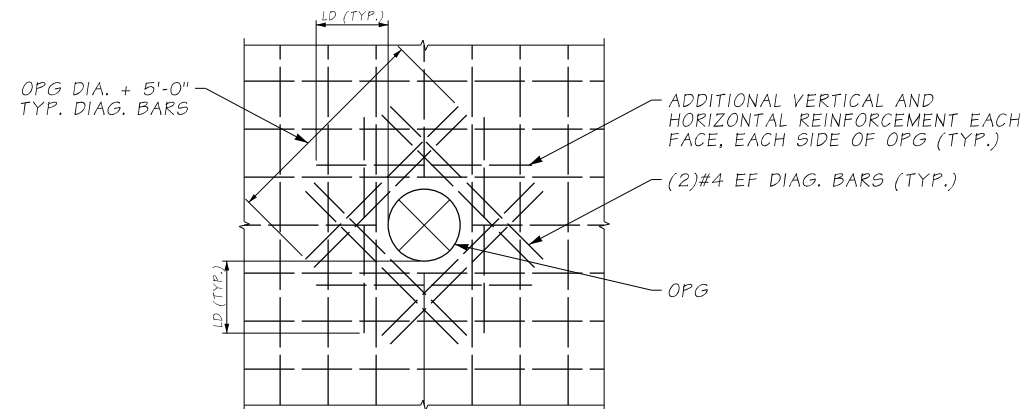


**TYPICAL CIP CAP**



**EXPANSION JOINT DETAIL**

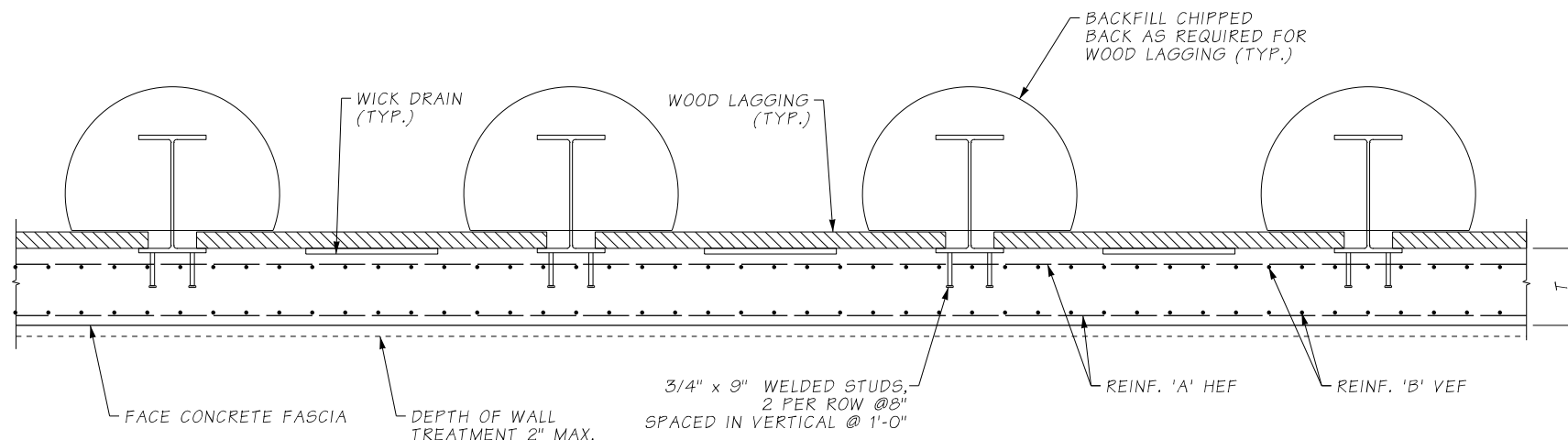
NOTE:  
EXPANSION JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS



**CONCRETE FASCIA OPENING DETAILS**

**NOTES:**

1. PROVIDE ADDITIONAL VERTICAL AND HORIZONTAL REINFORCEMENT AREA EQUIVALENT TO ONE HALF REINFORCEMENT INTERRUPTED BY THE OPENING.
2. THIS DETAIL SIMILAR FOR SQUARE AND RECTANGULAR OPENINGS.
3. DETAILS APPLY TO OPENINGS WITH A LEAST DIMENSION GREATER THAN EITHER HORIZONTAL OR VERTICAL BAR SPACING AND LESS THAN 36". DETAIL ALSO APPLICABLE AROUND TIEBACKS POCKETS (ONLY REQUIRED IN INNER FACE) DEFLECT BARS TO MAINTAIN COVER OTHERWISE.



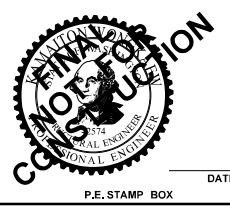
**PLAN TYPICAL DETAIL - WINGWALLS FASCIA**

CONCRETE FASCIA SCHEDULE- WINGWALLS					
LOCATION	WINGWALL	FASCIA THICKNESS (T)		REINFORCEMENT	
		T MIN. (in)	T MAX. (in)	HORIZONTAL 'A'	VERTICAL 'B'
WEST PORTAL	WW1	14	16	#4@9"	#4@9"
	WW2	14	16	#4@9"	#4@9"
EAST PORTAL	WW3	14	16	#4@8"	#4@8"
	WW4	14	16	#4@8"	#4@8"

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DATE	10/7/2025		
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DESIGNED BY	I RIVERO		
ENTERED BY	S SANCHEZ		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON		
REVISION	DATE	BY	
REGION NO.	STATE	FED.AID PROJ.NO.	
10	WASH		
JOB NUMBER	22AB17	LOCATION NO.	
CONTRACT NO.	9727	XL5446	



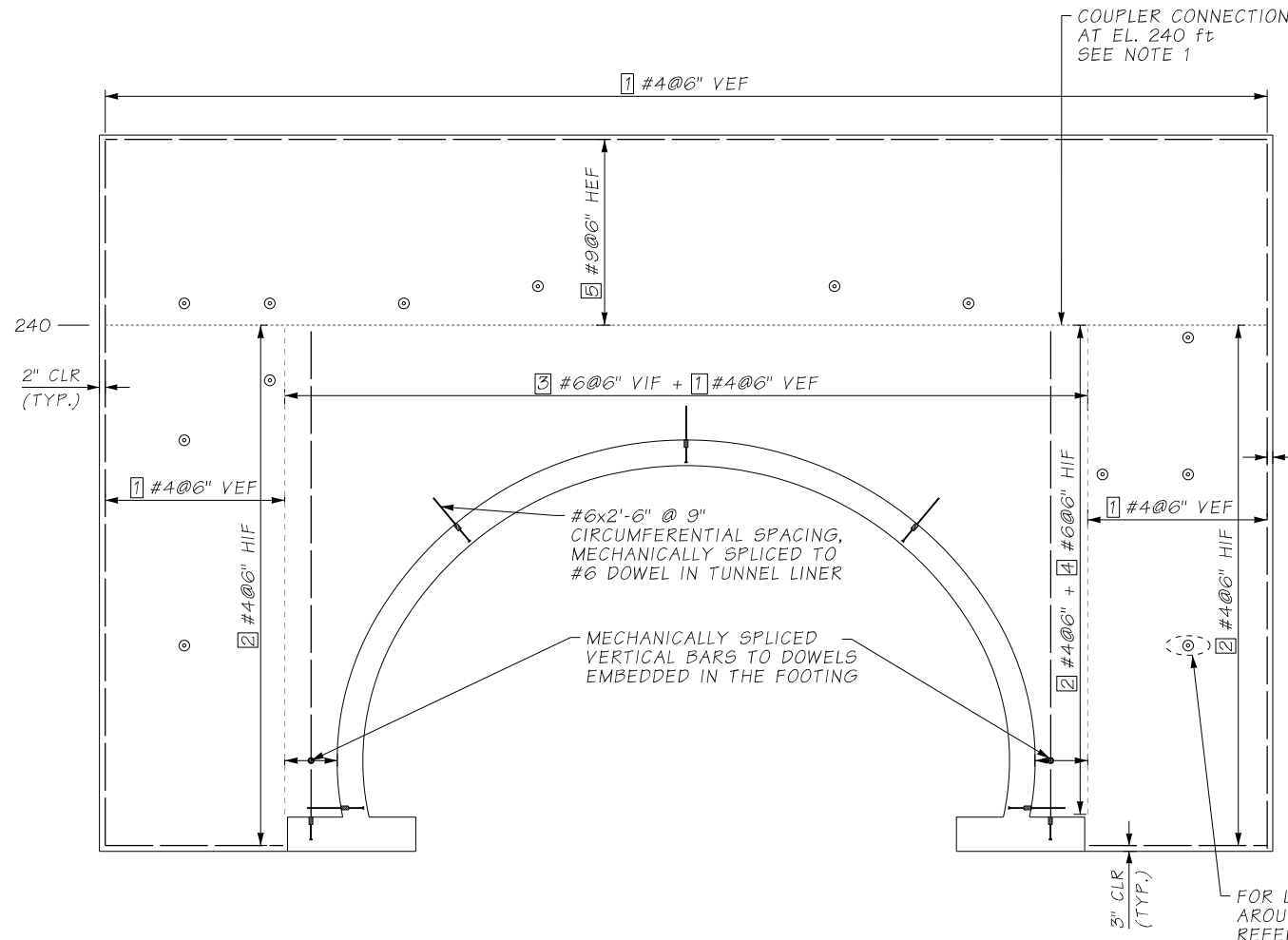
**I-405 BRICKYARD TO SR527 IMPROVEMENT PROJECT**  
**JUANITA CREEK (MP 21.94) FISH PASSAGE STRUCTURE NO. 405/61 REINFORCEMENT DETAILS**

PLAN REF NO. FP5-36  
 SHEET XX OF SHEETS

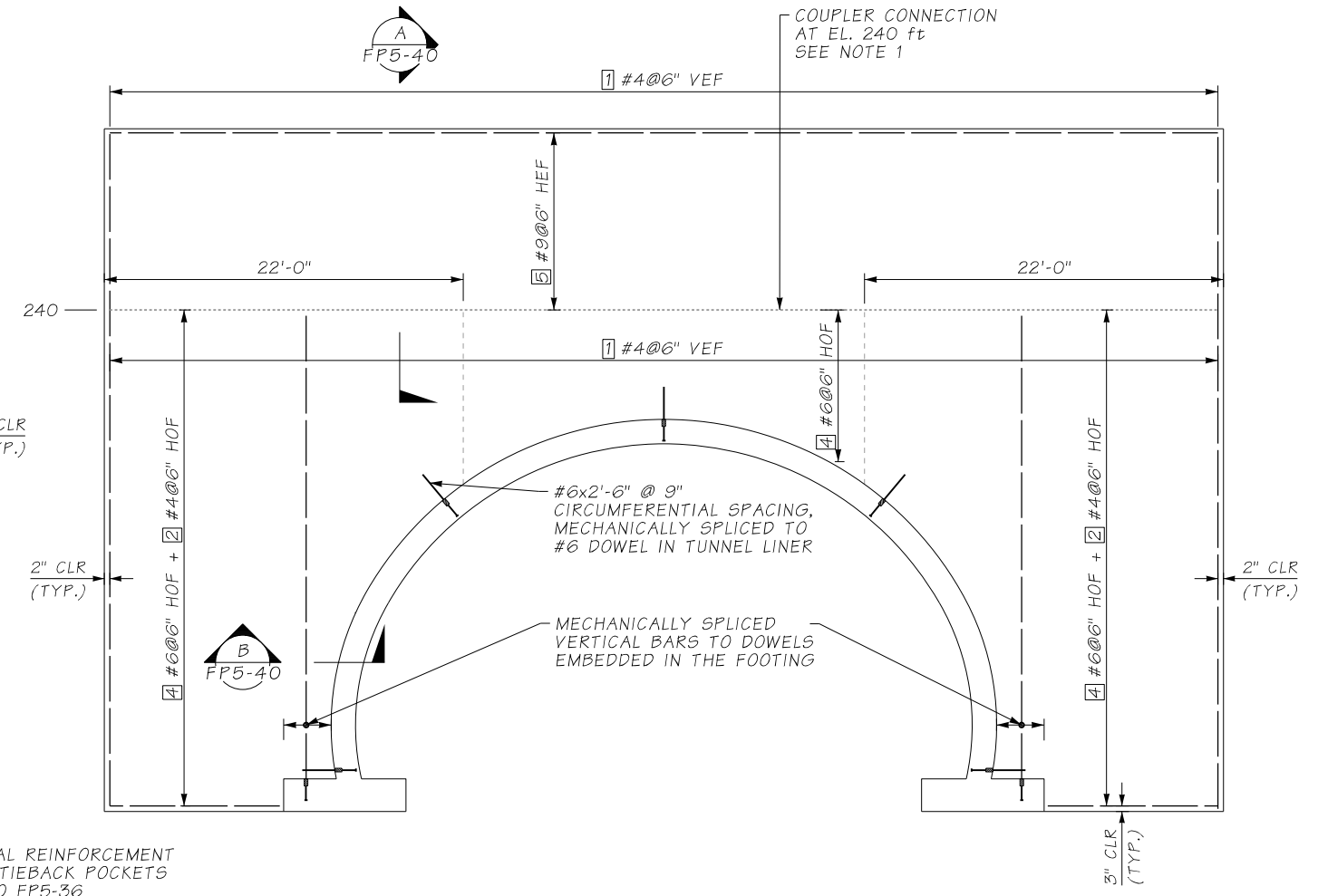
C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61

**NOTES**

1. FOR DETAILS ON REINFORCEMENT BETWEEN EL. 240 ft AND TOP OF THE WALL REFER TO FP5-40. THE VERTICAL REINFORCEMENT **1** ABOVE AND BELOW EL. 240 ft IS PLACED AT DIFFERENT STAGES AND REQUIRES COUPLER CONNECTIONS (OR SIMILAR). REFER TO PLANS PREPARED BY BRIERLEY ASSOCIATES FOR THE HEADWALL CONSTRUCTION SEQUENCE.



**HEADWALL REINFORCEMENT**  
INNER FACE



**HEADWALL REINFORCEMENT**  
OUTER FACE

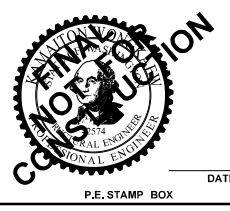
**LEGEND**

- VERTICAL REINFORCEMENT AREA DIVISION
- ..... HORIZONTAL REINFORCEMENT AREA DIVISION

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SR FILE NO. SHEET

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DESIGNED BY	I RIVERO	CONTRACT NO.	9727
ENTERED BY	S SANCHEZ	LOCATION NO.	XL5446
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON	REVISION	DATE BY

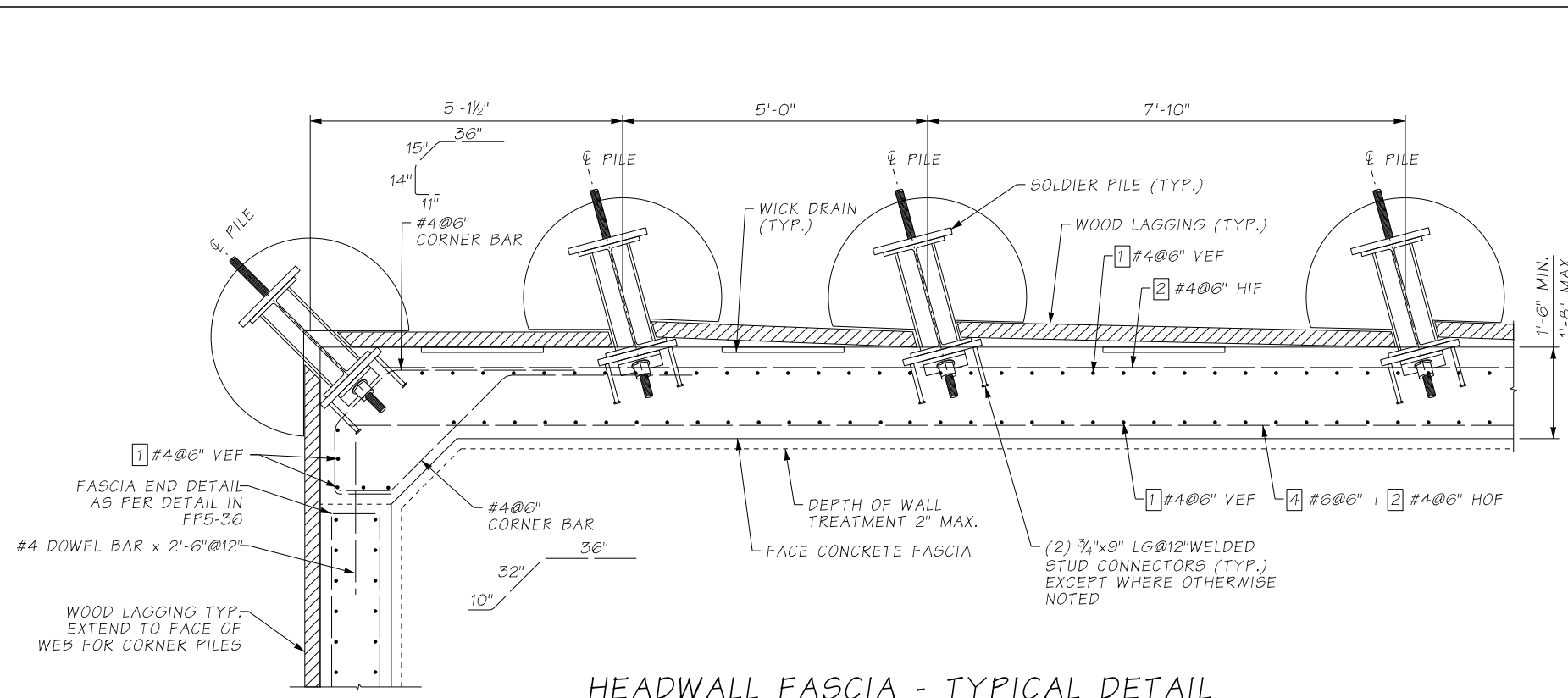


**I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT**

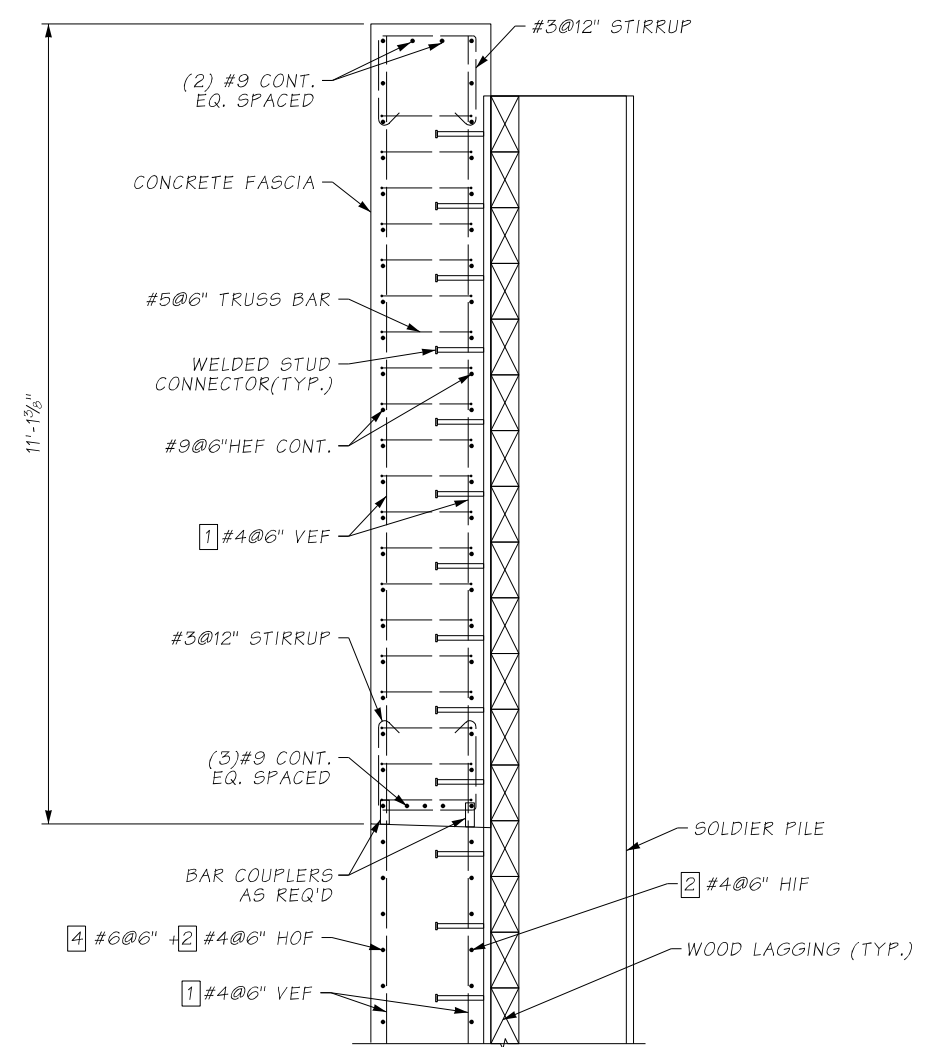
**JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST HEADWALL REINFORCEMENT**

PLAN REF NO	FP5-38
SHEET	XX
OF	
SHEETS	

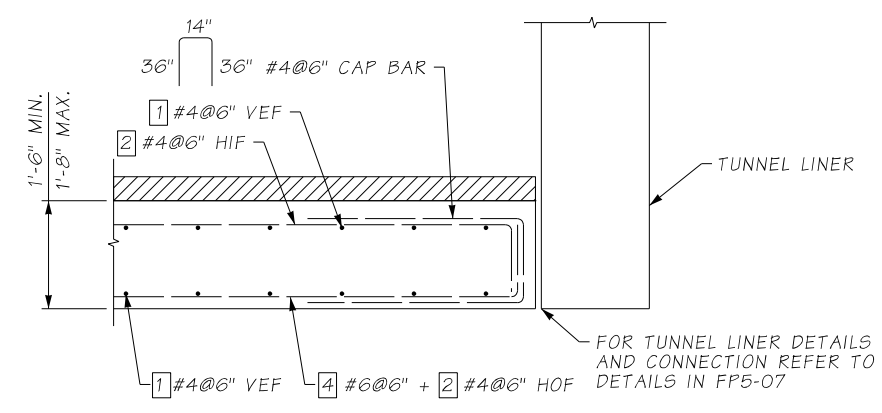
C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61



HEADWALL FASCIA - TYPICAL DETAIL

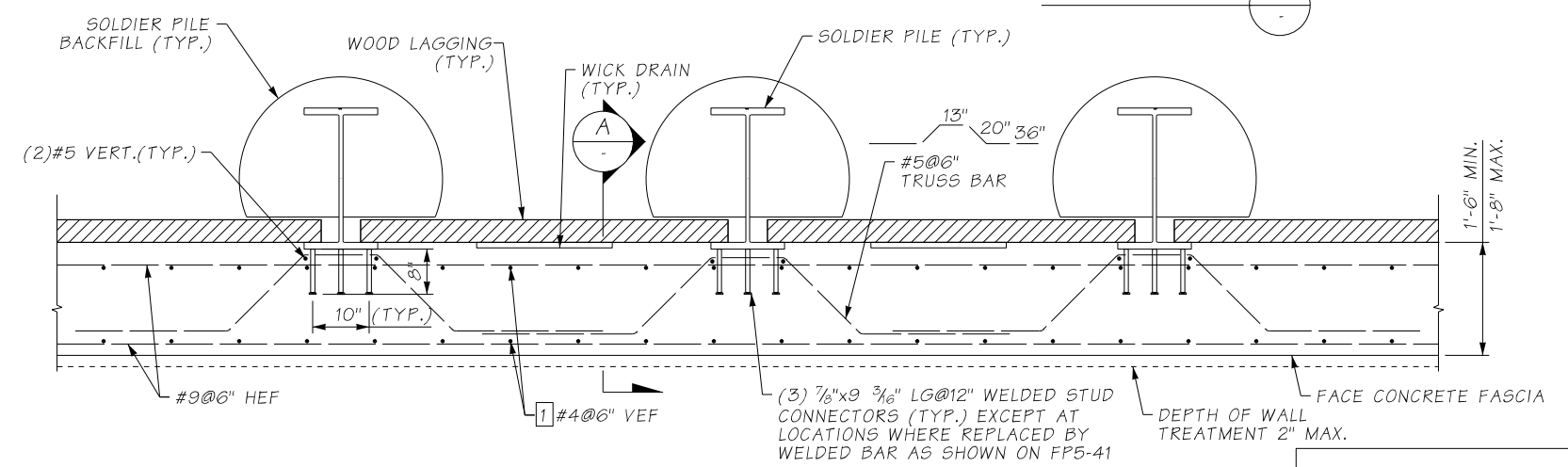


SECTION A



HEADWALL FASCIA TYPICAL END DETAIL AT TUNNEL INTERFACE

SECTION B

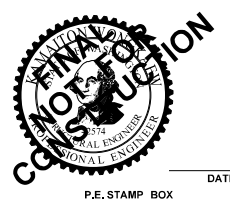


HEADWALL FASCIA TYPICAL DETAIL REINFORCED AREA EL. 240 FT TO TOP OF WALL

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SR FILE NO. SHEET

FILE NAME	c:\pwworking\uswaldms06730\I09727_DE_FP5_40.dgn		
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DATE	10/7/2025		
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DESIGNED BY	I RIVERO		
ENTERED BY	S SANCHEZ		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON		
REVISION	DATE	BY	
REGION NO.	STATE	FED.AID PROJ.NO.	
10	WASH		
JOB NUMBER			
22AB17			
CONTRACT NO.	LOCATION NO.		
9727	XL5446		

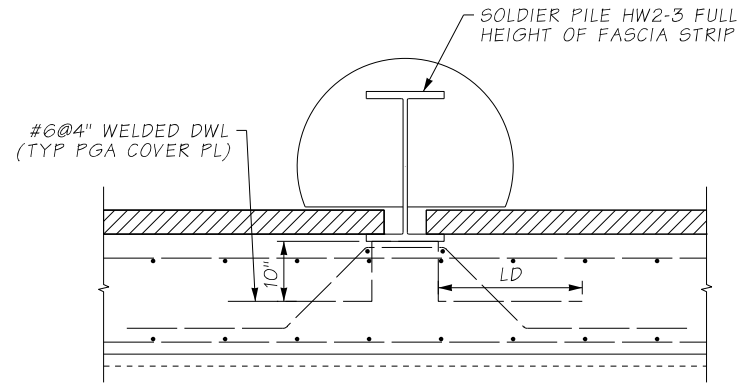


I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT  
JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST HEADWALL DETAILS 1 OF 2

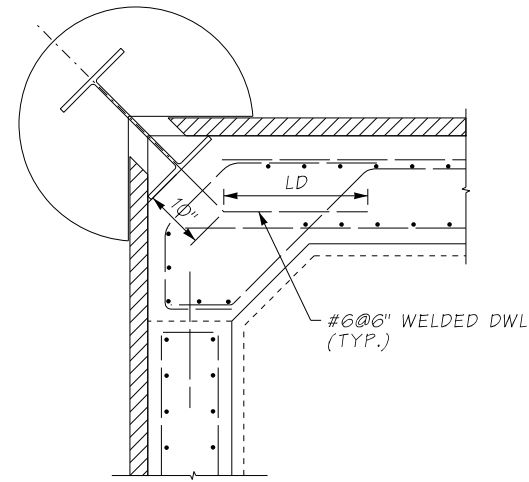
PLAN REF NO  
FP5-40  
SHEET  
XX  
OF  
SHEETS

**NOTES:**

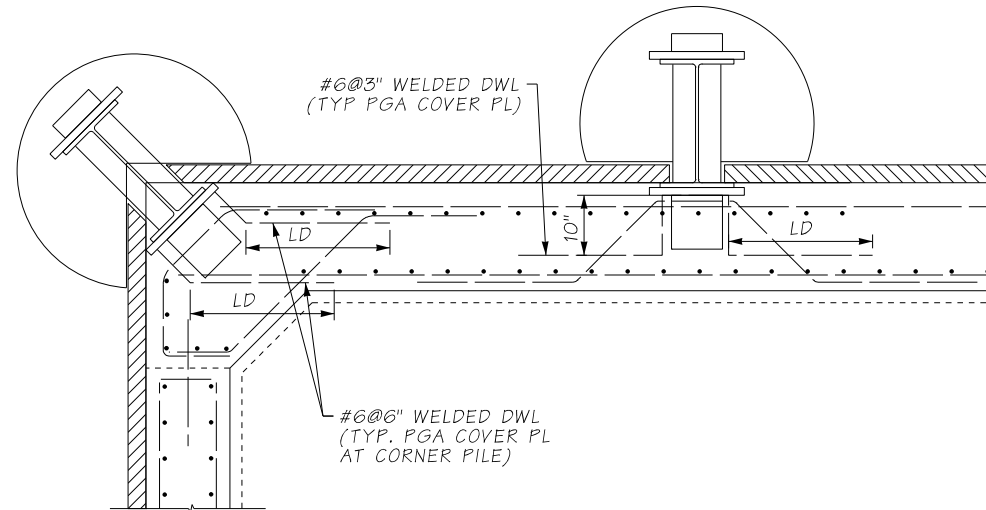
1. WELDING HEADED STUD AND WELDED DOWEL CONNECTORS SHALL BE PERFORMED IN STRICT ACCORDANCE WITH AWS D1.5 UTILIZING STUD WELDING GUN AND ACCESSORIES.
2. DEVELOPMENT LENGTH, LD FOR #6 DEFORMED BARS, PER BDM APPENDIX 5.1-A4 TABLE, SHALL NOT BE LESS THAN 28".



SOLDIER PILE CONNECTION ALONG PILE HW2-03



SOLDIER PILE CONNECTION AT CORNER PILES (HW2-01 AND HW2-12)



SOLDIER PILE CONNECTION AT PERMANENT GROUND ANCHOR LOCATIONS (2'-0\"/>

**RESERVED FOR  
RFC  
CERTIFICATION STAMP**

SR FILE NO. SHEET

FILE NAME	c:\pwworking\uswaldms06730\C9727_DE_FP5_41.dgn		
TIME	09:28:12		
DATE	10/7/2025		
PLOTTED BY	EscribanoRosilloN		
DESIGNED BY	I RIVERO		
ENTERED BY	S SANCHEZ		
CHECKED BY	M WONGKAEW		
PROJ. ENGR.	J SLAVICEK		
REGIONAL ADM.	L HODGSON	REVISION	DATE BY
REGION NO.	10	STATE	WASH
FED.AID PROJ.NO.			
JOB NUMBER	22AB17		
CONTRACT NO.	9727	LOCATION NO.	XL5446



**AECOM**



**I-405  
BRICKYARD TO SR527  
IMPROVEMENT PROJECT**

**JUANITA CREEK (MP 21.94)  
FISH PASSAGE STRUCTURE NO. 405/61  
EAST HEADWALL DETAILS 2 OF 2**

PLAN REF NO  
**FP5-41**

SHEET  
**XX**  
OF  
SHEETS

C.S. 1757 ~ PROJ. NO. 9727 ~ NORTHWEST REGION ~ I-405 MP 21.94 ~ JUANITA CREEK FISH PASSAGE STRUCTURE NO. 405/61