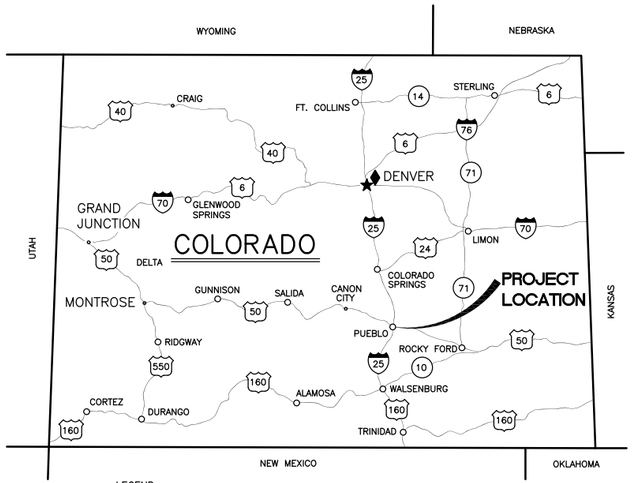
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
MOUNTAIN STATES HYDRO
HYDROELECTRIC FACILITIES
AS CONSTRUCTED 2019



PROJECT LOCATION

VICINITY MAP

S.E. SH NO		REV LTR	SHEET TITLE
GA–1	--		COVER, INDEX TO SHEETS PROJECT LOCATION & VICINITY MAP
GA–2	--		LEGEND, ABBREVIATIONS, & DETAIL/SECTION DESIGNATIONS
GA–3	--		GENERAL NOTES & SPECIFICATIONS
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GA–6	--		STRUCTURAL NOTES & DETAILS
GA–7	--		SPECIAL INSPECTIONS
C–1	--		CIVIL SITE PLAN– ACCESS & STAGING PLAN
C–2	--		CIVIL SITE PLAN– ACCESS & STAGING PLAN
C–3	--		CIVIL SITE PLAN– EXCAVATION PLAN
C–4	--		CIVIL SITE PLAN– EXCAVATION PLAN DETAIL
C–5	--		CIVIL SITE PLAN– DEWATERING/COFFERDAM MISC. DETAILS
X–1	--		CIVIL SITE PLAN– EXCAVATION PLAN CROSS SECTIONS
X–2	--		CIVIL SITE PLAN– EXCAVATION PLAN CROSS SECTIONS
X–3	--		CIVIL SITE PLAN– EXCAVATION PLAN CROSS SECTIONS
X–4	--		CIVIL SITE PLAN– EXCAVATION PLAN CROSS SECTIONS
S–4	--		POWERHOUSE STRUCTURAL– PLAN, MAIN EL 4756.88
S–5	--		POWERHOUSE STRUCTURAL– PLAN, MAIN EL 4756.88
S–5C	--		POWERHOUSE STRUCTURAL– PLAN, MAIN EL 4756.88
S–6	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–7	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–8	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–9	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–10	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–11	--		POWERHOUSE STRUCTURAL– GALLEY FLOOR PLAN–COOLING/DRAIN WATER PLAN
S–12	--		POWERHOUSE STRUCTURAL– OIL/WATER SEPARATOR
S–13	--		POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH
S–14	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–15	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–16	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–17	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–18	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–19	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–20	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–21	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–22	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–23	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–24	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
S–25	--		POWERHOUSE STRUCTURAL– MISC. POWERHOUSE DETAILS
FD–1	--		FABRICATED DETAILS– BIFURCATIONS & PENSTOCKS, GENERAL INSTALLATION PLAN
FD–2	--		FABRICATED DETAILS– INCREASER & PENSTOCK MISC. DETAILS
FD–3	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–4	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–5	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–6	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–7	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–8	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–9	--		FABRICATED DETAILS– PENSTOCK MISC. DETAILS
FD–10	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–11	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–12	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–13	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–14	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–15	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–16	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–17	--		FABRICATED DETAILS– ROLLER GATE DETAILS
FD–18	--		FABRICATED DETAILS– ROLLER GATE DETAILS

Mountain States Hydro, LLC
P.O. Box 918 Ofc: (509) 837–6822
Sunnyside, WA 98944 FAX: (509) 837–6801

SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
COVER, INDEX TO SHEETS, PROJECT LOCATION & VICINITY MAP

AS CONSTRUCTED 2019

REV NO	YYYY-MM-DD	DESCRIPTION
1	NNNN_PROF_ABBR.	

COVER, INDEX TO SHEETS, PROJECT LOCATION & VICINITY MAP

GA–1

DATE AND TIME PLOTTED October 1, 2019 13:05
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LEGEND

UTILITY POLE

GATE OR FENCE POST

SURVEY CONTROL POINT

MONITORING WELL

TELEPHONE PED.

SURFACE WATER FLOW DIRECTION

DRILL OR TEST HOLE

SPOT ELEVATION (GRADING) x 181.0

STRUCTURE ELEVATION 181.0

PROJECT BENCH MARK

US BOR INSTURMENTATION POINT

SLOPE DIRECTION INDICATOR

FEATURE LINE

HIDDEN FEATURE LINE

SECTION LINE

CENTERLINE

2840 EXISTING 5–FOOT CONTOUR

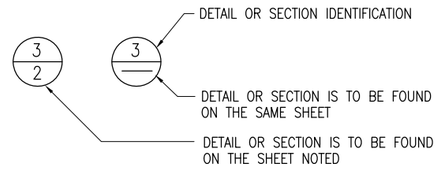
EXISTING 1–FOOT CONTOUR

FENCE LINE

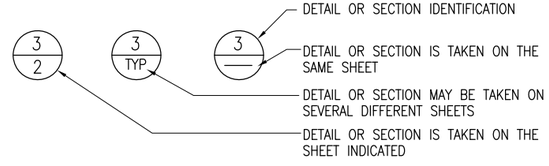
OHP OVERHEAD POWER LINE

DETAIL & SECTION DESIGNATION

TYPICAL CALLOUT WHERE DETAIL OR SECTION IS TAKEN



TYPICAL CALLOUT WHERE DETAIL OR SECTION IS SHOWN



ABBREVIATIONS

AB	ANCHOR BOLT
AC	ASPHALTIC CONCRETE
ADDL	ADDITIONAL
AL	ALUMINUM
APPROX	APPROXIMATE
BC	BOTTOM OF CURB OR BOLT CIRCLE
BLDG	BUILDING
BM	BENCH MARK
BOT	BOTTOM
BVC	BEGIN VERTICAL CURVE
C	CONDIUT
CI	CAST IRON
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL	CENTERLINE
CLR	CLEAR
CMP	CORRIGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONN	CONNECT OR CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUATION
CORP	CORPORATION
CPLG	COUPLING
CTR	CENTER
CU	CUBIC
CW	COLD WATER
CF	CUBIC FEET
D	DRAIN
DI	DUCTILE IRON
DIMJ	DUCTILE IRON MECHANICAL JOINT
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DWG	DRAWING
E	EAST
EA	EACH
EF	EACH FACE
EFF	EFFLUENT
EG	EXISTING GRADE
EJ	EXPANSION JOINT
ELB	ELBOW
ELEC	ELECTRICAL
EQ	EQUAL
EQUIP	EQUIPMENT
EVC	END VERTICAL CURVE
EW	EACH WAY
EWEF	EACH WAY EACH FACE
EXP	EXPANSION OR EXPAND
EXIST	EXISTING
EXT	EXTERIOR
F	FLANGE
FCA	FLANGED COUPLING ADAPTER
FF	FINISHED FLOOR
FG	FINAL GRADE
FLEX	FLEXIBLE
FL	FLOW LINE
FLG	FLANGE
FM	FORCE MAIN
FIN	FINISH
FT	FOOT OR FEET
FTG	FOOTING OR FITTING
FUT	FUTURE
GALV	GALVANIZED
GD	GROUND
HORIZ	HORIZONTAL
HW	HOW WATER
IE	INVERT ELEVATION
INF	INFLUENT
INV	INVERT
INT	INTERIOR OR INTERSECTION
L	LENGTH
LB	POUND
LF	LINEAL FEET
LG	LONG
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MFGR	MANUFACTURER
MH	MAN HOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH
NIC	NOT IN CONTRACT
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OPNG	OPENING
PC	POINT OF CURVE
PT	POINT OF TANGENT
PCF	POUNDS PER CUBIC FOOT
PEN	PENETRATION
PE	PLAIN END
PERF	PERFORATED
PI	POINT OF INTERSECTION
PJF	PREMOLDED JOINT FILLER
PL	PLATE
PNL	PANEL
PRC	POINT OF REVERSE CURVE
PRES	PRESSURE
PSF	POUNDS PER SQUARE FOOT
PUD	PUBLIC UTILITY DISTRICT
PVC	POLYVINYL CHLORIDE
RAD,R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REINF	REINFORCING
REM	REMOVE
REQD	REQUIRED
RM	ROOM
ROW	RIGHT OF WAY
SCH	SCHEDULE
SG	SUB GRADE
SH OR SHT	SHEET
SIM	SIMILAR
SL OR S	SLOPE
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STA	STATION
STD	STANDARD
STL	STEEL
SYM	SYMBOL
T	TANGENT
T&B	TOP & BOTTOM
TBD	TO BE DETERMINED
TC	TOP OF CURVE
THK	THICK OR THICKNESS
THRU	THROUGH
TYP	TYPICAL
UD	UNDER DRAIN
VERT	VERTICAL
VPI	VERTICAL POINT OF INTERSECTION
W	WATER LINE
W/	WITH
W/O	WITHOUT
WS	WELDED STEEL
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
YD	YARD

CODE INFORMATION

Project: PUEBLO DAM HYDROELECTRIC PROJECT
Address: PUEBLO CO
Engineer: Sorenson Engineering,Ted S. Sorenson P.E.
1032 GRANDVIEW DRIVE, IVINS, UT 84738
Owner: SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
31717 E UNITED AVE, PUEBLO, CO 81001

Project Type: New
Occupancy Group: F-1/Special Purpose, Industrial
Construction Type: IIB - NON-COMBUSTABLE
Auto Fire Extinguishing System: No
Rated Corridor System: No
Maximum distance to Exit: 113 ft.
Number of Exits Required: 02
Maximum distance of Common Path of Travel: 49 ft.
Fire Resistance of Exterior Walls-Based on Separation Dist: 0 HR
60' Yard around building perimeter
Fire Resistance Rating Requirements for Building Elements
Structural Frame: 0 HR
Bearing Walls: Exterior 0 HR Interior 0 HR
Non–Bearing Walls: Exterior 0 HR Interior 0 HR
Floor Construction: 0 HR
Roof Construction: 0 HR
Shafts: 0 HR
Allowable Building Height: UL FT. 1 Story
Actual Building Area: UL SF
Ground Floor Area and Occupant Load
Floor area: 2282 SF Occupant Load: 23
Basement Floor Area and Occupant Load
Floor area: 3826 SF Occupant Load: 39

Mountain States Hydro, LLC
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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
LEGEND, ABBREVIATIOINS, & DETAIL/SECTION DESIGNATIONS

AS CONSTRUCTED 2019

REV NO	TTTT-MM-DD	NAME, PROF ABBR.	DESCRIPTION
1			

LEGEND, ABBREVIATIOINS, & DETAIL/SECTION DESIGNATIONS

GA–2

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GENERAL NOTES (UNLESS OTHERWISE SPECIFIED)

1. ALL INSTRUCTIONS AND SPECIAL CONDITIONS CONTAINED ON THIS PLAN SET SHALL BE STRICTLY ADHERED TO. ANY DEVIATIONS SHALL BE APPROVED IN WRITING BY SORENSON ENGINEERING.

2. THE CONSTRUCTION METHODS AND MATERIALS SHALL MEET THE STANDARDS OF THE PROJECT ENGINEER AND AS SHOWN ON THESE PLANS AND SPECIFICATIONS. IN AREAS OF CONFLICT, THE DECISION OF THE ON-SITE PROJECT ENGINEER SHALL APPLY UNLESS OTHERWISE DIRECTED BY SORENSON ENGINEERING.

3. VERIFY THE EXACT LOCATION AND DEPTH OF UNDERGROUND FEATURES, POSSIBLE PIPELINES OR ELECTRICAL SERVICE AND WATERLINES TO IDENTIFY POSSIBLE AREAS OF CONFLICTS AND TO PREVENT DAMAGE TO SUCH UNDERGROUND UTILITIES. UNDERGROUND UTILITIES. THE ACTUAL LOCATIONS ARE TO BE VERIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION ACTIVITIES.

4. GRADE ALL DISTURBED OR CUT AND FILLED AREAS ON SITE, AFTER CONSTRUCTION, WITH A UNIFORM SLOPE THAT WILL DRAIN WITHOUT PONDING OR DAMAGE TO EITHER ON-SITE OR OFF-SITE PROPERTY IMPROVEMENTS. GRADE ALL DISTURBED OR CUT AND FILL AREAS ON THE EXISTING EMBANKMENT TO MATCH THE EXISTING ADJOINING EMBANKMENT FINISHED GRADE SLOPES UNLESS OTHERWISE SPECIFIED.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN AS-CONSTRUCTED DRAWING RECORD FOR THIS PROJECT. THE ENGINEER SHALL PROVIDE ONE ADDITIONAL SET OF DRAWINGS TO THE CONTRACTOR FOR THIS PURPOSE. THE AS-CONSTRUCTED DRAWING RECORD SHALL INDICATE ALL CHANGES OR DEVIATIONS FROM THE ENGINEERS DESIGN AS SHOWN ON THESE PLANS. APPROVED CHANGES OF FITTINGS, APPURTENANCES, GRADES, STRUCTURE DEPTHS, STATIONING AND ALIGNMENT SHALL BE DULY NOTED ON THESE AS-CONSTRUCTED PLANS. THE CONTRACTOR SHALL MAINTAIN THE AS-CONSTRUCTED DRAWINGS AND THE DEVIATIONS OF CONSTRUCTION FROM THE APPROVED CONSTRUCTION DRAWINGS AS WELL AS ALL FIELD VERIFIED LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES ENCOUNTERED SHALL BE NOTED. THE AS-CONSTRUCTED DRAWINGS SHALL BE KEPT UP-TO-DATE AT ALL TIMES AND AVAILABLE FOR DAILY INSPECTIONS BY THE ON SITE PROJECT ENGINEER. AT THE COMPLETION OF CONSTRUCTION, THE AS-CONSTRUCTED DRAWINGS WILL BE RETURNED TO THE ENGINEER ALONG WITH A "STATEMENT OF COMPLETION IN ACCORDANCE WITH THE AS-CONSTRUCTED DRAWINGS".

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, SUPERVISING, AND COMPLYING WITH ALL APPLICABLE FEDERAL SAFETY AND HEALTH REGULATIONS AS DETERMINED BY THE STATE OF COLORADO AND BUREAU OF RECLAMATION HEALTH AND SAFETY REQUIREMENTS. THE CONTRACTOR SHALL BE REQUIRED TO COMPLY WITH ALL REGULATIONS AND REQUIREMENTS OF LOCAL COUNTY CODES & ORDINANCES.

7. SHOP DRAWINGS, INCLUDING SUPPLIERS MANUFACTURERS DRAWINGS, DATA SHEETS, CATALOG CUTS, BROCHURES OR OTHER PRINTED INFORMATION THAT CLEARLY DESCRIBES THE ITEM PROPOSED FOR USE AND ITS INSTALLATION CONFIGURATION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE FOR ALL SPECIFIED EQUIPMENT AND MATERIALS PRIOR TO SITE DELIVERY. THIS INCLUDES, BUT IS NOT LIMITED TO BUILDING SYSTEMS, CONTROLS, VALVES & PIPING ACCESSORIES, ELECTRICAL CONDUCTORS AND CONDUITS J-BOXES, AND MISCELLANEOUS HARDWARE.

NOTES (UNLESS OTHERWISE SPECIFIED)

G1 SCOPE

THE NOTES & TABLES ON THIS SHEET ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY.

G2 APPLICABLE SPECIFICATIONS AND CODES

CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE INTERNATIONAL BUILDING CODE. THE ABOVE SHALL GOVERN EXCEPT WHERE OTHER APPLICABLE CODES OR THE FOLLOWING NOTES ARE MORE RESTRICTIVE.

G3 ALTERNATIVE DESIGNS

THE STRUCTURAL SYSTEMS AND DETAILS ON THESE PLANS ARE THE PRIORITY DESIGN. ALTERNATIVE SYSTEMS AND DETAILS MAY BE USED IF THE CONTRACTOR SUBMITS PLANS WITH SUBSTANTIATING CALCULATIONS AND TEST DATA, AND IF THE ALTERNATIVE PLANS ARE ACCEPTED BY THE ENGINEER.

G4 DIMENSIONS

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

G5 PROVISIONS FOR EQUIPMENT

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND EMBEDMENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.

G6 CONSTRUCTION LOADS

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON COMPLETED STURCTURES AFTER THEY HAVE BEEN PROPERLY CURED. DURING CONSTRUCTION THE STRUCTURES SHALL BE PROTECTED BY BRACING AND SHORING WHEREEVER EXCESSIVE LOADS MAY OCCUR.

G7 DRAINAGE SURFACES

SLOPE DRAINAGE SURFACES UNIFORMLY TO DRAIN. SLOPE SHALL BE 1/4" PER FOOT EXCEPT WHERE OTHERWISE NOTED OR SHOWN ON THE PLANS.

G8 FLOOR DRAINS & FLOOR GRATES

SEE MECHANICAL DRAWINGS FOR SIZE AND TYPES.

STRUCTURAL STEEL (UNLESS OTHERWISE SPECIFIED)

S1 APPLICABLE CODE

STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS PRESENTED IN THE LATEST EDITION OF AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION.

S2 MATERIALS

ALL STRUCTURAL SHAPES, BARS, PLATES AND SHEETS INDICATED ON THE DRAWINGS SHALL BE CARBON STEEL MEETING THE REQUIREMENTS OF ASTM A36, ASTM A529 OR AS NOTED ON THE PLAN SHEETS.

S3 WELDING

WELDING SHALL CONFORM TO THE AMERICAN WELD SOCIETY SPECIFICATIONS FOR STRUCTURAL WELDING. INSPECTION AND NON-DESTRUCTIVE TESTING OF WELDS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ANSI/AWS B1.10-86, LATEST EDITION. THE WELDING AND NON-DESTRUCTIVE TESTING SYMBOLS ARE IN ACCORDANCE WITH THE AWS A2.4-79, LATEST REVISION.

S4 ENCASED STEEL

STEEL COMPLETELY ENCASED IN CONCRETE SHALL NOT BE GALVANIZED OR PAINTED AND SHALL HAVE A RUST FREE CLEAN SURFACE FOR BONDING TO CONCRETE. GALVANIZED ANCHOR BOLTS MAY BE PLACED IN CONCRETE.

S5 PAINTING

ALL STRUCTURAL STEEL SHALL BE PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS OR AS NOTED ON THE FABRICATION DRAWING SHEETS.

SPECIFICATIONS (UNLESS OTHERWISE SPECIFIED)

EMBANKMENT REPAIR

THE PORTION OF THE EXISTING EMBANKMENT AND/OR EXISTING NATIVE MATERIALS THAT WILL BE EXCAVATED FOR THE CONSTRUCTION OF FEATURES ASSOCIATED WITH THIS PROJECT SHALL BE REPLACED IN ACCORDANCE WITH THE PLANS PREPARED FOR THIS PROJECT. BACKFILL MATERIALS SHALL BE PLACED IN ACCORDANCE WITH THE PROJECT PLANS. EXCAVATION BELOW THE BOTTOM ELEVATIONS SHOWN ON THE PLAN SHEETS SHALL BE REPLACED WITH STRUCTURAL CONCRETE UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE REQUIRED COMPACTION IN PIPE ZONES SHALL BE 95% OF LABORATORY STANDARD MAXIMUM DENSITY IN ACCORDANCE WITH AASHTO T99. BACKFILL IN THE PIPE ZONE SHALL BE PLACED IN 8-INCH MAXIMUM THICK LIFTS AND COMPACTED PRIOR TO THE PLACEMENT OF THE NEXT LIFT. COMPACTION ABOVE THE PIPE ZONE SHALL BE AS SHOWN ON THE PLAN SHEETS. REFER TO SECTION 02302 OF THE PROJECT SPECIFICATIONS FOR ADDITIONAL COMPACTION REQUIREMENTS.

EROSION CONTROL FABRIC

THE EROSION CONTROL FABRIC SHALL BE A BIODEGRADABLE NATURAL FIBER EROSION CONTROL FABRIC MANUFACTURED FROM UN-DYED AND UN-BLEACHED WOVEN JUTE MAT. THE MATERIAL SHALL HAVE A GRAB TENSILE OF 300 LBS/FT DRY AND 125 LBS/FT WET IN ACCORDANCE WITH ASTM D-4632. THE MATERIAL SHALL HAVE AN OPEN AREA OF 60 TO 65 PERCENT. THE MATERIAL SHALL BE ATTACHED TO THE COVERED SLOPE IN ACCORDANCE WITH THE SUPPLIER RECOMMENDATIONS. THE MATERIAL SHALL BE TOTALLY BIODEGRADEABLE WITHIN TWO YEARS. THE EROSION CONTROL FABRIC SHALL BE ANTI-WASH GEOJUTE AS MANUFACTURED BY BELTON INDUSTRIES, 8613 ROSWELL ROAD, ATLANTA, GA. 30350 (800) 225-4099 OR APPROVED EQUAL.

3/4" BACKFILL

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES

SIEVE SIZE	JOB MIX TARGET LIMITS	JOB MIX TOLERANCE
1 INCH (25.4 MM)	100	
3/4 INCH (19.0 MM)	82-88	± 8
3/8 INCH (9.5 MM)	52-64	± 12
NO. 4 (4.75 MM)	36-48	± 12
NO. 40 (0.425 MM)	16-24	± 10
NO. 200 (0.075 MM)	0-2	± 2

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GENERAL NOTES & SPECIFICATIONS

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DESCRIPTION

REV NO TITT-MM-DD NAME_PROF ABBR.
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GENERAL NOTES & SPECIFICATIONS

GA-3

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A. DESIGN CODE:

1. COLORADO BUILDING CODE (2015 IBC)
2. ALL REFERENCE TO OTHER CODES AND STANDARDS (ACI, ASTM, ETC.) SHALL BE FOR THE LATEST OR MOST CURRENT EDITION AVAILABLE.
3. ACI 350-06 "ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES"

B. DESIGN CRITERIA:

TYPE III STRUCTURE- POWER GENERATION STRUCTURE (NON-ESSENTIAL)

SNOW LOAD-(GROUND)	30PSF
BASIC WIND SPEED	120 MPH
WIND EXPOSURE	C
SITE SOIL CLASSIFICATION:	B
MAPPED SPECTRAL RESPONSE, SS	0.177
MAPPED SPECTRAL RESPONSE, S1	0.063
SPECTRAL RESPONSE COEFF.,SDS	0.118
SPECTRAL RESPONSE COEFF.,SD1	0.042
SEISMIC RISK CATEGORY:	B

C. GENERAL:

1. UNLESS OTHERWISE NOTED, ALL MATERIAL AND DESIGN SPECIFICATIONS CITED HEREIN SHALL CONFORM TO THE MOST RECENTLY ADOPTED SPECIFICATION OF CODE.
2. THESE STRUCTURAL NOTES ARE A SUPPLEMENT TO THE PROJECT SPECIFICATIONS. ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND ANY SITE CONDITIONS SHALL BE REPORTED IN A TIMELY MANNER TO THE ENGINEER OF RECORD WHO SHALL CORRECT ANY DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION.
4. THE STRUCTURAL DRAWINGS REPRESENT THE COMPLETED STRUCTURE AND ARE NOT INTENDED TO INDICATE THE MEANS AND METHOD OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION AND CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCING, AND SAFETY REQUIRED FOR THIS PROJECT.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ALL ERECTION BRACING, FORM WORK, AND TEMPORARY SHORING REQUIRED FOR THIS PROJECT.
6. SEE SUBMITTAL KEY FOR REQUIRED SHOP DRAWING SUBMITTALS. UNLESS STATED OTHERWISE IN THE PROJECT SPECIFICATIONS, PROVIDE A MINIMUM OF TWO SETS OF SUBMITTALS FOR APPROVAL OR CORRECTIONS.
7. ALL FEATURES OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME TYPE AND CHARACTER AS SHOWN FOR SIMILAR CONDITIONS SUBJECT TO REVIEW BY THE ARCHITECT AND STRUCTURAL ENGINEER OF RECORD.
8. ALL PRODUCTS AND MATERIALS USED BY THE CONTRACTOR SHALL BE APPLIED, PLACED, ERECTED OR INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
9. THESE DOCUMENTS CONTAIN NOTES THAT MAY APPLY GENERALLY TO ALL STRUCTURAL ELEMENTS, SPECIFICALLY TO ONE SHEET, OR SPECIFICALLY TO ONE OR MORE STRUCTURAL ELEMENTS. THE NOTES ARE NOT MERE GUIDELINES; THEY ARE PART AND PARCEL OF OUR DESIGN. ANY WORK THAT IS PERFORMED THAT IS NOT IN COMPLIANCE WITH THE NOTES IS NOT IN COMPLIANCE WITH THE DESIGN AND IS SUBJECT TO REJECTION. ANY ALTERATION, MODIFICATION, DELETION, OR ADDITION TO THE NOTES BY WRITING, ACT OR FAILURE TO ACT, SHALL BE CARRIED OUT ONLY WITH THE PRIOR EXPRESS WRITTEN CONSENT AND APPROVAL OF SORENSON ENGINEERING.

D. FOUNDATIONS:

1. FOUNDATIONS ARE BASED UPON MAXIMUM TOTAL LOAD SOIL BEARING PRESSURE = 4,000 PSI, REF GEOTECHNICAL REPORT.
2. ALL EXCAVATIONS ARE TO BE INSPECTED BY THE ENGINEER.
3. ALL DISTURBED SOIL SHALL BE REMOVED BY HAND OPERATION FROM FOOTING.
4. ALL GENERAL EXCAVATIONS AND FOOTINGS SHALL BE INSPECTED AND APPROVED PRIOR TO THE PLACEMENT OF ANY SOIL BACKFILL AND/OR CONCRETE.

E. CONCRETE (CAST IN PLACE):

1. ALL CONCRETE SHALL BE NORMAL WEIGHT TYPE V AND SHALL DEVELOP A MINIMUM 28 DAY LABORATORY CURED COMPRESSIVE-CYLINDER STRENGTH OF:
   4500 PSI FOR WALLS- 4000 PSI FOR FLOORS-
   3000 PSI FOR FILL CONCRETE AROUND EQUIPMENT-
   2000 PSI FOR FILL CONCRETE AROUND PENSTOCKS-
2. A MINIMUM OF 4 CONCRETE TEST CYLINDERS SHALL BE PROVIDED FOR EACH 100 CU. YARDS OF EACH CONCRETE STRENGTH, EACH DAY. CYLINDERS SHALL BE TESTED AS FOLLOWS: 1 AT 7 DAYS, 1 AT 28 DAYS, 1 PRIOR TO REMOVAL OF FORMS FOR SLABS AND BEAMS AND 1 HELD IN RESERVE. SLUMP, AIR ENTRAINMENT, LOCATION IN STRUCTURE, ETC., SHALL BE MEASURED AND RECORDED FOR EACH SET OF CYLINDERS, PER ASTM.
3. CONCRETE CYLINDER AND TESTING SHALL CONFORM TO ASTM SPECIFICATIONS.
4. CONCRETE, FORMS, MIXING, PLACING AND CURING SHALL CONFORM TO ACI MANUAL OF CONCRETE PRACTICE, LATEST EDITION, AND SPECIFICATIONS.
5. CONCRETE WATER CEMENT RATIO SHALL NOT EXCEED 0.40.
6. CONCRETE EXPOSED TO WEATHER SHALL HAVE 6% +/- 1% ENTRAINED AIR.
7. SIZE AND LOCATION OF SLEEVES THRU FLOORS OR WALLS FOR MECHANICAL OR ELECTRICAL ACCESS SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
8. ALL BOLTS IN CONCRETE SHALL CONFORM TO ASTM SPECIFICATION A307 (UNLESS NOTED OTHERWISE ON DRAWINGS) AND SHALL BE OF THE SIZE INDICATED ON THE DRAWINGS. INSTALL STAINLESS STEEL ANCHORS WHERE CONNECTIONS WILL BE EXPOSED TO MOISTURE.

F. REINFORCING STEEL:

1. ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615 OF THE FOLLOWING GRADES: ASTM A615 GRADE 60 FOR ALL REINFORCEMENT INCLUDING BEAM STIRRUPS, COLUMN TIES AND AS NOTED.
2. ALL WELDED REINFORCING BARS SHALL CONFORM TO ASTM A-706 OF THE FOLLOWING GRADES: GRADE 60 FOR ALL WELDED REINFORCEMENT
3. ALL WELDED REINFORCING STEEL, METAL INSERTS AND CONNECTIONS SHALL CONFORM TO IBC STANDARDS NO. 19-2.
4. ALL WELDING OF REINFORCING STEEL SHALL CONFORM TO AWS SPECIFICATIONS. ALL WELDING SHALL BE DONE BY WELDERS CERTIFIED UNDER AWS SPECIFICATIONS USING LOW HYDROGEN E70XX ELECTRODES.
5. REINFORCEMENT SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACI CODE 318 AND ACI MANUAL 315, UNLESS OTHERWISE NOTED. ALL REINFORCEMENT SHALL BE FREE OF LOOSE MILL AND RUST SCALE, OIL, DIRT AND COATINGS OF ANY MANNER THAT WILL REDUCE BOND. ALL REINFORCEMENT IS CONTINUOUS WITH ADEQUATE LAPS.
6. REINFORCEMENT SHALL BE SECURED IN FORMS WITH SUITABLE TIES AND ANCHORAGE TO PREVENT DISPLACEMENT. BARS ADJACENT TO EARTH SHALL BE SUPPORTED BY CEMENT MORTAR CUBES.
7. REINFORCING STEEL SHALL NOT BE DISPLACED FOR THE CONVENIENCE OF OTHER TRADES UNLESS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
8. 'WET SETTING' OF REINFORCEMENT, ANCHOR BOLTS, AND INSERTS IS NOT PERMITTED
9. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR CAST-IN-PLACE REINFORCEMENT:
   A) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
   B) CONCRETE EXPOSED TO EARTH OR WEATHER
      #6 THROUGH #18 BARS 2"
      #5 BAR AND SMALLER 1-1/2"
   C) CONCRETE NOT EXPOSED TO EARTH OR WEATHER
      SLABS, WALLS AND JOISTS: #14 AND #18 BARS 1-1/2"
      #11 BAR AND SMALLER 3/4"
      BEAMS AND COLUMNS: PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS 1-1/2"
10. PLACE 2'-0" x 2'-0" BARS AT CORNERS AND INTERSECTIONS FOR WALLS AND FOUNDATIONS EQUAL IN SIZE, NUMBER AND SPACING TO HORIZONTAL REINFORCING U.N.O.
11. REINFORCEMENT SPLICES, SHALL BE 48 BAR DIA. (24" MIN.), UNLESS NOTED OTHERWISE.
12. UNLESS OTHERWISE NOTED, DOWEL CONCRETE WALLS TO FOOTING WITH BARS OF SAME SIZE & SPACING AS WALL REINFORCEMENT.
13. UNLESS OTHERWISE NOTED, PLACE 2-#6 OVER, 2-#6 UNDER AND 2-#6 EACH SIDE OF ALL WALL OPENINGS, VERTICAL BARS STORY HEIGHT + 2'-6" HORIZONTAL BARS OPENING WIDTH + 4'-0" EACH END, PLACE 2-#6 x 4'-0" DIAGONAL BARS AT EACH CORNER OF ALL OPENINGS.
14. BEAM, JOIST OR SLAB TOP REINFORCING BARS THAT TERMINATE IN A WALL OR COLUMN SHALL HAVE A STANDARD 90 DEGREE HOOK, UNLESS OTHERWISE DETAILED. BEAM, JOIST OR SLAB BOTTOM BARS THAT TERMINATE IN A COLUMN OR WALL SHALL EXTEND TO WITHIN 2" OF OPPOSITE FACE OF COLUMN OR WALL, UNLESS DETAILED OTHERWISE.
15. PLACE 2-#6 x OPENING DIMENSION PLUS 4'-0" EACH SIDE OF ALL OPENINGS AND 2-#6 x 4'-0" DIAGONAL BARS AT EACH CORNER OF ALL SLAB OPENINGS GREATER THAN 1'-6" IN DIMENSION.
16. PROVIDE CARRIER BAR #6 @ 3'-0" O/C MAX. SPACING FOR ALL SLAB, JOIST AND WALL REINFORCING NOT SUPPORTED BY OTHER TRANSVERSE REINFORCING.

G. PRE-ENGINEERED METAL BUILDING:

1. PRE-ENGINEERED METAL BUILDING SHALL BE DESIGNED AND DETAILED UNDER THE DIRECT SUPERVISION OF A CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE OF COLORADO.
2. SUBMIT STRUCTURAL DRAWINGS AND CALCULATIONS SEALED AND SIGNED BY A CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE OF COLORADO.
3. DRAWINGS SHALL PROVIDE SCALE OF PLANS, BUILDING SECTIONS, DETAILS OF ALL PRIMARY FRAMES, COLUMNS, BRACES, ROOF AND WALL FRAMING, FASTENERS, ACCESSORIES, AND ROOFING AND SIDING MATERIAL.
4. PROVIDE ANCHOR BOLT LAYOUT DRAWINGS TO THE CONTRACTOR FOR PRECISE LOCATIONS OF ALL BUILDING ANCHORS WITH THE BUILDING FOUNDATION.
5. ALL SHOP WELDING SHALL BE PERFORMED BY AN AWS APPROVED SHOP.
6. IN ADDITION TO THE INDICATED DESIGN CRITERIA, PROVIDE FOR AN ADDITIONAL COLLATERAL LOAD OF 5 PSF APPLIED AT THE ROOF OF THE STRUCTURE.
7. THE BUILDING MANUFACTURER SHALL FOLLOW THE STANDARDS ESTABLISHED AND MAINTAINED BY THE METAL BUILDING MANUFACTURER ASSOCIATION (MBMA).
8. THE CONTRACTOR TO VERIFY ALL WEIGHTS AND LOCATIONS OF CONCENTRATED LOADS DUE TO ROOF TOP MECHANICAL UNITS, MECHANICAL PIPING, ELECTRICAL UNITS, FOLDING PARTITIONS, HOISTS, CRANEWAYS, AND OTHER CONCENTRATED LOADS PRIOR TO BUILDING FABRICATION.
9. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF FOUNDATIONS WITH THE METAL BUILDING.

H. COMPACTION:

1. OVER EXCAVATION BELOW THAT SHOWN ON THE PLANS SHALL BE FILLED WITH NON-STRUCTURAL CONCRETE.
2. ALL EARTH EMBANKMENTS w/CONCRETE CORE WALLS ARE TO BE FOUNDED ON EXISTING BEDROCK.
3. TESTING TO BE COMPLETED UNDER THE DIRECTION OF THE ENGINEER AS OUTLINED IN THE QCIP.
4. SEE SHEET GA-3 FOR ADDITIONAL COMPACTION REQUIREMENTS.

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SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
STRUCTURAL NOTES & SPECIFICATIONS

AS CONSTRUCTED 2019

REV NO	TTTT-MM-DD	DESCRIPTION
1	MMC_PROF_ABBR.	

STRUCTURAL NOTES & SPECIFICATIONS

GA-4

DATE AND TIME PLOTTED
October 1, 2019 13:05
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I. EXISTING FACILITIES

1. CONTRACTOR IS TO RETAIN AND PROTECT ALL EXISTING RECLAMATION FACILITIES UNLESS OTHERWISE NOTED. RECLAMATION FACILITIES ARE TO BE USED WITHIN THEIR DESIGN LIMITS AND INTENT. PRIOR TO USE OF ANY RECLAMATION FACILITIES WHICH WILL EXCEED THE DESIGN LOADINGS PLANS FOR STRENGTHENING OR SHORING THE FACILITIES MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY RECLAMATION. RECLAMATION WILL REQUIRE A MINIMUM OF 30 CALENDAR DAYS TO REVIEW EACH SUBMITTAL.

J. STRUCTURAL STEEL:

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING MINIMUM ASTM SPECIFICATIONS AND GRADES:
   - i. WIDE FLANGE SECTIONS — ASTM A-992, GRADE 50 (FY=50 KSI)
   - ii. CHANNELS, ANGLES, PLATES — ASTM A-36 (FY=36 KSI)
   - iii. HOLLOW STRUCTURAL SECTIONS — A-500, GRADE B (FY=46 KSI)
   - iv. PIPE — ASTM A53, TYPE E OR S (FY=35 KSI)
2. ALL FABRICATION, ERECTION AND IDENTIFICATION OF STRUCTURAL STEEL SHALL CONFORM TO AISC-LRFD, AISC 335, OR AISC-HSS.
3. ALL WELDING SHALL CONFORM TO AWS SPECIFICATIONS. ALL WELDING SHALL BE DONE BY WELDERS QUALIFIED UNDER AWS SPECIFICATIONS, USING E70XX, LOW HYDROGEN, AND ELECTRODES.
4. ALL SHOP WELDING SHALL BE PERFORMED IN AN AWS APPROVED SHOP.
5. WELD TESTING AND INSPECTION SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF AWS D1.1 AND AISC.
6. THE STEEL FABRICATOR AND ERECTOR SHALL DEVELOP A WELDING PROCEDURE SPECIFICATION (WPS) PER AWS D1.1 FOR ALL WELDS. SUBMIT WRITTEN COPIES TO THE INSPECTOR FOR APPROVAL.
7. ALL BOLTED CONNECTIONS SHALL BE MADE WITH MACHINE BOLTS (M.B.) CONFORMING TO ASTM A307. INSTALL STAINLESS STEEL ANCHORS WHERE CONNECTIONS WILL BE EXPOSED TO MOISTURE.
8. HIGH STRENGTH (H.S.) BOLTS SHALL CONFORM TO ASTM A325-SC WHERE NOTED.
9. SUBMIT ALL PRE QUALIFIED JOINT WELDING PROCEDURES FOR REVIEW.
10. ALL FULL PENETRATION WELDS SHALL BE INSPECTED BY ULTRASONIC OR OTHER APPROVED NON-DESTRUCTIVE TESTING PROCEDURES. RESULTS OF TESTS SHALL BE SUBMITTED IN WRITING TO THE ENGINEER OF RECORD.
11. ALL STEEL EXPOSED TO WEATHER, MOISTURE, SOIL, OR AS NOTED SHALL BE HOT DIP GALVANIZED PER ASTM A-123, OR HAVE AN APPROVED PROTECTIVE COATING.
12. THE DRAWINGS ARE DIMENSIONED FOR GENERAL LAYOUT AND NOT NECESSARILY DIMENSIONED PER AISC STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE SHOP DRAWINGS WITH DETAIL DIMENSIONS PER AISC CODE OF STANDARD PRACTICE.

K. STEEL/CONCRETE ACCESSORIES:

1. HEADED STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS OR APPROVED EQUAL.
2. DEFORMED BARS ANCHORS (DBA) SHALL BE NELSON TYPE D2L OR APPROVED EQUAL.
3. HEADED STUDS AND DBA SHALL BE AUTOMATICALLY END WELDED WITH MANUFACTURER'S STANDARD EQUIPMENT, PER MANUFACTURER'S PRODUCT SPECIFICATIONS.

L. DEFERRED SUBMITTALS:

1. SUBMITTAL DOCUMENTS FOR THE FOLLOWING ITEMS SHALL BE PROVIDED TO THE ENGINEER AND/OR THE STRUCTURAL ENGINEER OF RECORD FOR REVIEW PRIOR TO FABRICATION OR DELIVERY.
   - I. STRUCTURAL STEEL SHOP DRAWINGS
   - II. GROUT/CONCRETE MIX DESIGN REINF.
   - III. STEEL SHOP DRAWINGS WELDING PROCEED. SPECS (AWS D1.1)
   - IV. PRE-ENG MTL BUILDING
   - V. PENSTOCK AND LARGE MECHANICAL EQUIPMENT HOLD/TIE DOWN ANCHOR/ENCASEMENT PLAN
   - VI. REBAR SHOP DRAWINGS
   - VII. CATWALK, STAIRWAY, AND HANDRAIL DETAILS

SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
STRUCTURAL NOTES & SPECIFICATIONS

AS CONSTRUCTED 2019

DESCRIPTION

REV NO. | TITT-MM-DD | NAME, PROF ABBR.
1

STRUCTURAL NOTES & SPECIFICATIONS

GA-5

Mountain States Hydro, LLC
P.O. Box 918 Off: (509) 837-6822
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CONCRETE (UNLESS OTHERWISE SPECIFIED)

C1 APPLICABLE CODES

CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318).

C2 REINFORCING STEEL DETAILS

ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315), LATEST EDITION.

C3 BAR LAP SPLICES

DOWELS SHALL BE THE SAME SIZE AND SPACING AS THE BARS WITH WHICH THEY ARE LAPPED. VERTICAL REINFORCING BAR SPLICES IN COLUMNS SHALL BE AS NOTED ON THE DRAWINGS, AND ALL OTHER BAR SPLICES SHALL BE LAPPED AS FOLLOWS UNLESS OTHERWISE NOTED:

BAR SIZE	SPLICE LENGTH: TOP BARS	OTHER
#3	22"	17"
#4	29"	22"
#5	36"	28"
#6	43"	33"
#7	63"	49"
#8	72"	55"
#9	81"	63"

THE LENGTH OF THE LAP SPLICES SHALL BE MADE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318, LATEST EDITION) IF THE SPLICE LENTH SHOWN ON THE PLAN SHEETS IS DIFFERENT FROM THAT LISTED IN THE ACI 318, THE ACI 318 SHALL GOVERN. LAP SPLICES MAY BE MADE BY WELDING IN ACCORDANCE WITH THE AMERICAN WELD SOCIETY SPECIFICATION AWS D1.4, LATEST EDITION.

C4 RESTRICTIVE BAR ANCHORAGE

IN CASES WHERE REINFORCING BARS CANNOT BE EXTENDED AS FAR AS REQUIRED DUE TO THE LIMITED EXTENT OF THE ADJACENT CONCRETE STRUCTURE, THE BARS SHALL EXTEND AS FAR AS POSSIBLE AND END IN STANDARD HOOKS.

C5 STANDARD HOOKS

BARS ENDING IN RIGHT ANGLE BENDS OR HOOKS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 7 OF THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318, LATEST EDITION).

C6 SLOPING SLABS

MONOLITHIC SLABS WITH TOPS THAT ARE SLOPED SHALL HAVE BOTTOMS SLOPED THE SAME AMOUNT, MAINTAINING A UNIFORM SLAB THICKNESS, UNLESS OTHERWISE NOTED ON THE PLAN SHEETS.

C7 GROUND SUPPORTED SLABS

CONCRETE SLABS SUPPORTED BY GROUND, UNLESS OTHERWISE NOTED, SHALL BE 4" THICK AND REINFORCED WITH 4 x 4 W2.9 WWF AT MID-DEPTH OF THE SLAB AND DOWELED ALONG THE EDGE OF THE SLAB TO ALL ADJACENT WALLS, COLUMNS AND FOUNDATIONS WITH #4 @ 8" OC THAT LAP 12" WITH THE WWF AND EXTEND INTO THE WALLS, COLUMNS AND FOUNDATIONS AT LEAST 12". IF THE SLAB IS DESIGNATED AS AN ISOLATED SLAB ON THE DRAWINGS, OMIT THE DOWELS AND SUBSTITUTE 1/4" THICK PRE-MOLDED JOINT FILLER TO ISOLATE THE SLAB FROM CONTACT WITH THE STRUCTURE ALONG ITS PERIMETER.

C8 CHAMFERS

EXCEPT AS OTHERWISE NOTED, EXPOSED CONCRETE CORNERS AND EDGES SHALL HAVE 3/4" CHAMFERS. RE-ENTRANT CORNERS (INSIDE) SHALL NOT HAVE FILLETS.

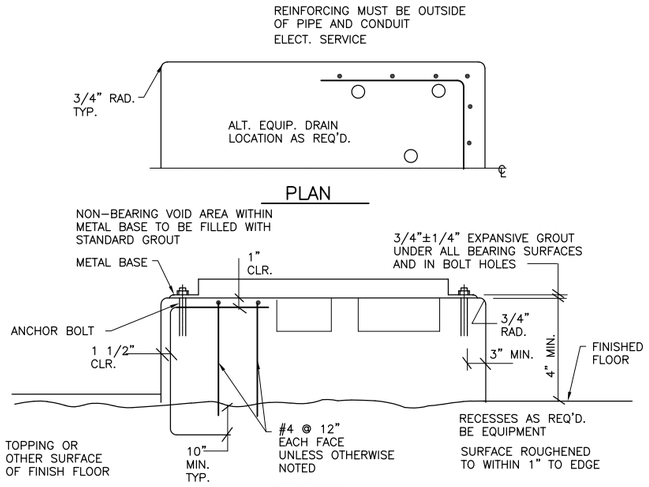
C9 ANCHOR BOLTS

THE USE OF ANCHOR BOLTS SHALL BE GOVERNED BY THE FOLLOWING TABLE UNLESS OTHERWISE SPECIFIED ON THE DRAWING SHEETS:

BOLT DIA	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
MIN EMBED.	6"	6"	8'	8"	10"	12"	12'
ALLOWABLE SHEAR	1000#	1500#	1780#	2075#	2175#	2250#	2650#

ALL BOLTS SHALL BE HOT DIPPED GALVANIZED UNLESS OTHERWISE NOTED. EMBEDMENT LENGTH FOR BOLTS SHALL BE AS SHOWN ON THE PLAN SHEET OR AS DETERMINED BY THE ENGINEER.

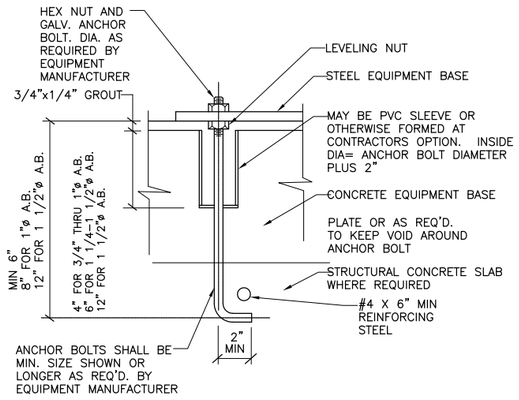
ANCHOR BOLT FOR EQUIPMENT

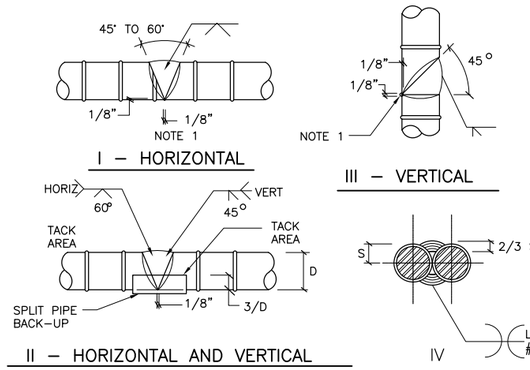


PLAN

SECTION

EQUIPMENT BASE

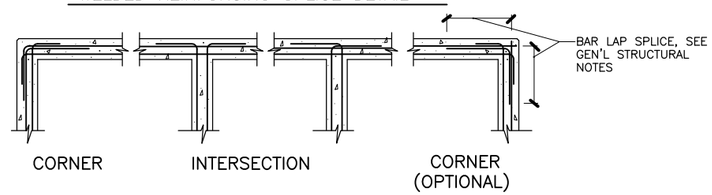




REINFORCING WELDING NOTES:

1. CHIP, GRIND OR GOUGE TO SOUND METAL BEFORE WELDING OTHER SIDE.
2. DETAIL I AND III FOR NO. 9 AND LARGER. DETAIL II FOR NO. 8 AND SMALLER. DETAIL IV FOR NO. 6 AND SMALLER.
3. E70 ELECTRODE FOR GR40 E90 ELECTRODE FOR GR60.
4. SEE AWS D12-1 FOR WELDING PROCESS AND OTHER DETAILS.
5. GRADE 60 WELDABLE REBAR IN ACCORDANCE WITH ASTM A706 REBAR SHALL BE USED WHEN WELDING OF REBAR IS REQUIRED.

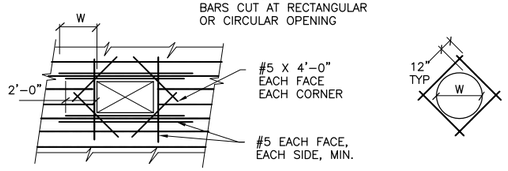
WELDED REINFORCING SPLICE DETAIL



DETAIL

NTS

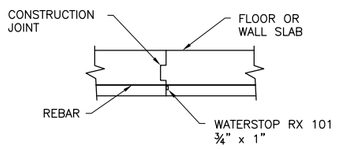
NOTE:
ALL 90° BENDS SHALL BE STANDARD HOOKS PER ACI 315 UNLESS OTHERWISE SPECIFIED.



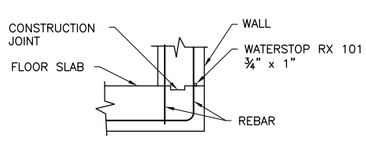
REINFORCEMENT AT SLAB AND WALL OPENINGS

NOTES:

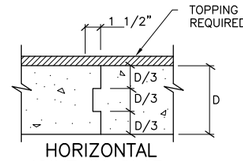
1. TRANSVERSE REINFORCEMENT NOT SPECIFIED, BUT SHALL BE TREATED IN SAME MANNER AS BARS SHOWN.
2. W= DIMENSION OF OPENING PERPENDICULAR TO BARS CUT. FOR CIRCULAR OPENINGS W= DIAMETER.
3. SEE MECH AND SRCH DRAWINGS FOR SLAB AND WALL OPENINGS NOT SPECIFIED ON STUCTURAL DRAWINGS.
4. SUPPLEMENTARY REINF. MAY BE OMITTED ONLY WHERE OPENING IS FRAMED BY BEAMS OR WALLS.



FLOOR OR WALL JOINT



FLOOR SLAB TO WALL



HORIZONTAL JOINT IN SLAB

(UNLESS OTHERWISE NOTED ON PLAN SHEETS)

NOTE: PLACE WATER STOPS WHERE SHOWN ON THE PLANS AND AS REQUIRED BY THE SPECIFICATIONS. INSTALLATION SHALL BE PER THE SUPPLIER INSTRUCTIONS.

COLD JOINT WATER STOP DETAIL

NOTE:
WATER STOP SHALL BE A PVC MATERIAL, 6" WIDE & AND RATED FOR 25 FT OF HEAD PRESSURE AS MANUFACTURED BY THE GREENSTREAK GROUP, INC. 1-800-325-9504 OR 1" x ¾" VOLCLAY RX-101 WATERSTOPS AS CALLED OUT ON THE DRAWINGS AND NOTED IN THE PROJECT SPECIFICATIONS. USE A MIN. OF 3" COVER REQUIREMENT FOR ALL VOLCLAY RX-101 AS RECOMMENDED BY THE MANUFACTURER. OR APPROVED EQUAL.

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
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SPECIAL INSPECTION AND TESTING:

1. SPECIAL INSPECTION WILL BE PROVIDED BY THE OWNER BASED ON THE REQUIREMENTS OF THE IBC AS SUMMARIZED IN THE SPECIAL INSPECTION AND TESTING PROGRAM ON SHEET ***S0.0X***. THE CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE AND ACCESS FOR THE SPECIAL INSPECTOR TO PERFORM THESE INSPECTIONS.

TABLE 1
REQUIRED GEOTECHNICAL SPECIAL INSPECTIONS

SYSTEM or MATERIAL	INSPECTION: IBC CODE REFERENCE	INSPECTION: CODE or STANDARD REFERENCE	FREQUENCY: CONTINUOUS	FREQUENCY: PERIODIC	REMARKS
SOILS					
GEOTECHNICAL INVESTIGATIONS	TABLE 1705.6 1803				GEOTECHNICAL INVESTIGATION SHALL INCLUDE ITEMS OF SPECIAL INSPECTION AND TESTING AS NOTED IN TABLE 5 OF THE GUIDELINES
VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	TABLE 1705.6			X (a)	BY THE GEOTECHNICAL ENGINEER
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	TABLE 1705.6			X	
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	TABLE 1705.6 1803.5.1			X	TESTING OF COMPACTED FILL MATERIALS (SEE TABLE 5)
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	TABLE 1705.6		X		BY THE GEOTECHNICAL ENGINEER
PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	TABLE 1705.6			X	
MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS					
INSTALLATION	1707.1	GEOTECHNICAL RESEARCH AND/OR REPORT AND ICC EVALUATION REPORTS	X		BY THE GEOTECHNICAL ENGINEER SPECIAL INSPECTIONS APPLY TO MODULAR UNIT PRODUCT NAME, TYPE, AND DIMENSIONS, FOUNDATION PREPARATION, MODULAR UNIT PLACEMENT, INCLUDING ALIGNMENT AND INCLINATION, GEOSYNTHETIC REINFORCEMENT PRODUCT NAME, TYPE, AND PLACEMENT, BACKFILL PLACEMENT AND COMPACTION, AND DRAINAGE PROVISIONS

TABLE 2
REQUIRED STRUCTURAL SPECIAL INSPECTIONS

SYSTEM or MATERIAL	INSPECTION: IBC CODE REFERENCE	INSPECTION: CODE or STANDARD REFERENCE	FREQUENCY: CONTINUOUS	FREQUENCY: PERIODIC	REMARKS
FABRICATORS					
FABRICATORS	1704.2.5			X	SPECIAL INSPECTION IS REQUIRED FOR STRUCTURAL LOAD-BEARING MEMBERS AND ASSEMBLIES FABRICATED ON THE PREMISES OF A FABRICATOR'S SHOP.
	1704.2.5.1				THE SPECIAL INSPECTOR SHALL VERIFY THAT THE FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES AND SHALL REVIEW FOR COMPLETENESS AND ADEQUACY RELATIVE TO THE CODE REQUIREMENT.
	1704.2.5.2				SPECIAL INSPECTIONS REQUIRED BY SECTION 1705 ARE NOT REQUIRED WHERE THE WORK IS DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION. APPROVAL SHALL BE BASED UPON REVIEW OF THE FABRICATOR'S WRITTEN PROCEDURAL AND QUALITY CONTROL MANUALS AND PERIODIC AUDITING OF FABRICATION PRACTICES BY A NATIONALLY RECOGNIZED ACCREDITING AUTHORITY. AT COMPLETION OF FABRICATION, THE APPROVED FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE TO THE BUILDING OFFICIAL STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS.
CONCRETE					
INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE	1909.1 TABLE 1705.3	ACI 318: 3.8.6, 8.1.3, 21.1.8		X	SPECIAL INSPECTIONS APPLY TO ANCHOR PRODUCT NAME, TYPE, AND DIMENSIONS, HOLE DIMENSIONS, COMPLIANCE WITH DRILL BIT REQUIREMENTS, CLEANLINESS OF THE HOLE AND ANCHOR, ADHESIVE EXPIRATION DATE, ANCHOR/ADHESIVE INSTALLATION, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE
REINFORCING STEEL PLACEMENT	1705.3 1910.4 1901.3.2	ACI 318: 3.5 ACI 318: 7.1-7.7		X	TOLERANCES AND REINFORCING PLACEMENT PER ACI 7.5; SPACING LIMITS FOR REINFORCING ACI 7.6 PROTECTION OF REINFORCEMENT PER ACI 7.7
WELDING REINFORCING STEEL	1705.2.2.1.2 1903.1	ACI 318: 3.5.2 AWS D1.4	X		REFER TO STEEL FOR WELDING REQUIREMENTS TABLE 1705.2.2, ITEM 2b
a. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706	TABLE 1705.2.2	AWS D1.4 ACI 318: SECTION 3.5.2		X	
PLACEMENT OF BOLTS INSTALLED IN CONCRETE	TABLE 1705.3 1908.5 1909.1	ACI 318: 1.3.2.C ACI 318: 8.1.3 ACI 318: 21.1.8 ACI 318 - APPENDIX D		X	ALL BOLTS VISUALLY INSPECTED
VERIFYING USE OF REQUIRED MIX DESIGN(S)	TABLE 1705.3 1904 1904.2 1910.2 1910.3	ACI 318: CHAPTER 4 ACI 318: 5.2-5.4		X	
CONCRETE PLACEMENT	TABLE 1705.3	ACI 318: 1.3.2.D ACI 318: 5.9 - 5.10	X		
SHOTCRETE PLACEMENT	TABLE 1705.3 1910.6-8		X		
CONCRETE PLACEMENT AT COMPOSITE SLABS		ASCE 9, CHAPTER 3	X		
CONCRETE/SHOTCRETE CURING	TABLE 1705.3 1910.9.1-3	ACI 318: 5.11-5.13		X	
VERIFICATION OF IN-SITU CONCRETE PRIOR TO REMOVAL OF FORMS AND SHORES FROM ELEVATED BEAMS AND STRUCTURAL SLABS	TABLE 1705.3	ACI 318: 6.2		X	
VERIFICATION OF FORMWORK	TABLE 1705.3	ACI 318: 6.1.1		X	SPECIAL INSPECTIONS APPLY TO SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED

TABLE 2- CONTINUED
STEEL

FABRICATION OF STRUCTURAL ELEMENTS	1704.2.5.2	AISC 360 N2		X	REFER TO INSPECTION OF FABRICATOR REQUIREMENTS APPROVAL BASED ON NATIONALLY RECOGNIZED ACCREDITING AUTHORITY
MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS		AISC 360 A3.3 AISC 360 N 3.2 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS RCSC 2.1		X	MANUFACTURER'S CERTIFIED TEST REPORTS
SNUG-TIGHT JOINT HIGH-STRENGTH BOLT INSTALLATION	1705.2.1.1			X	ALL CONNECTIONS INSPECTED AND VERIFIED SNUG
PRETENSIONED AND SLIP-CRITICAL JOINT HIGH-STRENGTH BOLT INSTALLATION USING TURN-OF-THE-NUT METHOD WITH MATCH MARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHOD	1705.2.1.1			X	ALL CONNECTIONS INSPECTED. CONNECTIONS USING DIRECT TENSION INDICATORS, ALL BOLTS SHALL BE INSPECTED AFTER SNUGGING AND AFTER PRETENSIONING
PRETENSIONED AND SLIP-CRITICAL JOINT HIGH-STRENGTH BOLT INSTALLATION USING TURN-OF-THE-NUT METHOD WITHOUT MATCH MARKING OR CALIBRATED WRENCH METHOD	1705.2.1.1		X		ALL CONNECTIONS INSPECTED
MATERIAL VERIFICATION OF STRUCTURAL STEEL	1705.2.1 2203.1 TABLE 1705.2	ASTM A6 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS AISC 360 N3.2 AISC 360 A3.1 AISC 360 M5.5		X	CERTIFIED MILL TEST REPORTS
FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS	TABLE 1705.2	APPLICABLE ASTM MATERIAL STANDARDS		X	MANUFACTURER'S CERTIFIED TEST REPORTS
MATERIAL VERIFICATION OF WELD FILLER METALS	TABLE 1705.2	AISC 360 N3.2 AISC 360 A3.5 APPLICABLE AWS A5 DOCUMENTS		X	MANUFACTURER'S CERTIFICATE OF COMPLIANCE
COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS	TABLE 1705.2	AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
MULTIPASS FILLET WELDS	TABLE 1705.2	AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
SINGLE PASS FILLET WELDS GREATER THAN 5/16"	TABLE 1705.2	AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
PLUG AND SLOT WELDS	TABLE 1705.2	AWS D1.1 SECTION 6	X		ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
SINGLE PASS FILLET WELDS LESS THAN OR EQUAL TO 5/16"	TABLE 1705.2	AWS D1.1 SECTION 6		X	ALL WELDS VISUALLY INSPECTED PER AWS D1.1 6.9
FLOOR AND ROOF DECK WELDS	TABLE 1705.2	AWS D1.3 SECTION 7		X	ALL WELDS INSPECTED PER AWS D1.3 7.1
MATERIAL VERIFICATION OF REINFORCING STEEL FOR WELDING	TABLE 1705.2 1705.2.2.1.2	ACI 318: 3.5.2 AWS D1.4		X	CERTIFIED MILL TEST REPORTS
WELDING REINFORCING EXCEPT AS NOTED OTHERWISE	TABLE 1705.2 1705.2.2.1.2	ACI 318: 3.5.2 AWS D1.4		X	
VERIFICATION OF FRAME JOINT DETAILS INCLUDING MEMBER AND COMPONENT LOCATIONS, BRACING, AND STIFFENERS	TABLE 1705.2	AISC 360 N5.7		X (a)	
MATERIAL VERIFICATION OF ANCHOR BOLTS AND THREADED RODS		AISC 360 N3.2 AISC 360 A3.4 ASTM STANDARDS SPECIFIED IN CONSTRUCTION DOCUMENTS		X	MANUFACTURER'S CERTIFIED TEST REPORTS
VERIFYING USE OF PROPER WPS'S		AISC 360 N3.2			COPY OF WELDING PROCEDURE SPECIFICATIONS
VERIFYING WELDER AND WELDING INSPECTOR QUALIFICATIONS	1705.2.2.1			X	COPY OF QUALIFICATION CARDS
INSTALLATION OF ROOF DECKING	1705.1.1	ICC EVALUATION REPORT		X	SPECIAL INSPECTIONS APPLY TO DECKING TYPE, DEPTH AND GAGE, POWER ACTUATED FASTENERS, SCREWS, PROPRIETARY SIDE SEAM ATTACHMENTS, BUTTON PUNCHES AND SHEAR CONNECTORS
WELDING STUDS EXCEPT AS NOTED OTHERWISE			X		

TABLE 4
REQUIRED INSPECTIONS FOR SPECIAL CASES

SYSTEM or MATERIAL	INSPECTION: IBC CODE REFERENCE	INSPECTION: CODE or STANDARD REFERENCE	FREQUENCY: CONTINUOUS	FREQUENCY: PERIODIC	REMARKS
PRE-ENGINEERED STRUCTURES					
FABRICATION AND ERECTION	1705.1.1		X (b)	X	REFER TO TABLE 2 OF THIS PLAN FOR FABRICATOR, WELDING, AND HIGH STRENGTH BOLTING SPECIAL INSPECTION REQUIREMENTS

TABLE 5
REQUIRED TESTING FOR SPECIAL INSPECTIONS

SYSTEM or MATERIAL	TESTING: IBC CODE REFERENCE	TESTING: CODE or STANDARD REFERENCE	FREQUENCY: CONTINUOUS	FREQUENCY: PERIODIC	REMARKS
GEOTECHNICAL					
GEOTECHNICAL ENGINEER TO PERFORM TESTING OF COMPACTED FILL MATERIALS	1803				TESTING PER GEOTECHNICAL REPORT
FILL IN-PLACE DENSITY OR PREPARED SUBGRADE DENSITY	1705.6			X (a)	BY THE GEOTECHNICAL ENGINEER
MATERIAL VERIFICATION		VARIES: CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS		X (a)	BY THE GEOTECHNICAL ENGINEER
TENSION ANCHORS	1705.6		PERFORMANCE TEST FIRST (X) ANCHORS TO ***xxx%*** DL AND PROOF LOAD REMAINING ANCHORS TO ***xxx%*** DL		PER GEOTECHNICAL REPORT
CONCRETE					
AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	TABLE 1705.3	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	X		FABRICATE SPECIMENS AT TIME FRESH CONCRETE IS PLACED ONCE EACH DAY FOR A GIVEN CLASS OF CONCRETE, OR LESS THAN ONCE FOR EACH 150 YDS OF CONCRETE. OR LESS THAN ONCE FOR EACH 5,000 FT2 OF SURFACE AREA FOR SLABS/WALLS. ONCE EACH SHIFT FROM IN-PLACE WORK OR FROM TEST PANEL AND MINIMUM ONE SPECIMEN FOR EACH 50 CUBIC YARDS. "PRECONSTRUCTION TESTS AS REQUIRED PER THE BUILDING OFFICIAL."
CONCRETE STRENGTH	TABLE 1705.3	ASTM C39	X		
CONCRETE SLUMP	TABLE 1705.3	ASTM C143	X		
CONCRETE AIR CONTENT		ASTM C231	X		
CONCRETE TEMPERATURE		ASTM C1064	X		
SHOTCRETE STRENGTH	1910.10	ASTM C42	X		IBC 1910.10: SPECIMENS SHALL BE TAKEN FROM THE IN-PLACE OR FROM TEST PANELS, AND SHALL BE TAKEN AT LEAST ONCE EACH SHIFT, BUT NOT LESS THAN ONE FOR EACH 50 CUBIC YARDS OF SHOTCRETE
STEEL					
MAGNETIC PARTICLE (MT) AND ULTRASONIC (UT) TESTING OF WELDS	1705.2.2	MT - AWS D1.1 6.14.4 UT - AWS D1.1 6.13 & 6.14.3	PER DRAWINGS		
PRE-CONSTRUCTION TESTING OF WELDING STUDS	1705.2.2	AWS D1.1 7.7.1	EACH SIZE AND TYPE OF STUD EACH SHIFT		THIS TESTING PERFORMED BY CONTRACTOR AND CONFIRMED BY SPECIAL INSPECTOR.
STUD APPLICATION QUALIFICATION	1705.2.2	AWS D1.1 7.6	NON-PREQUALIFIED APPLICATIONS		THIS TESTING PERFORMED BY CONTRACTOR AND CONFIRMED BY SPECIAL INSPECTOR.
PRE-INSTALLATION VERIFICATION OF PRETENSIONED HIGH STRENGTH BOLTS	1705.2.2	RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS SECTION 7	EACH COMBINATION OF DIAMETER, LENGTH, GRADE, AND LOT TO BE USED IN THE WORK		

SORENSON ENGINEERING

DRAWING NUMBER

PROJECT

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
STRUCTURAL INSPECTIONS

AS CONSTRUCTED 2019

REV NO	DESCRIPTION	NAME, PROF ABBR.
1	????-##-##	

STRUCTURAL INSPECTIONS

GA-7

Mountain States Hydro, LLC
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Sunnyside, WA 98944 FAX: (509) 837-6801

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NOTES:
1. NEW 15' MIN. ROADWAY ACCESS TO REMAIN OPEN THROUGHOUT DURATION OF PROJECT CONSTRUCTION.

CIVIL SITE ACCESS & STAGING PLAN

SCALE: 1" = 80'-0"

1 / C-1

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– PLAN VIEW
ACCESS & STAGING PLAN

AS CONSTRUCTED 2019

REV NO	???-##-??	DESCRIPTION
1	MMR, PROF ####	

CIVIL SITE– PLAN VIEW
ACCESS & STAGING PLAN

C-1

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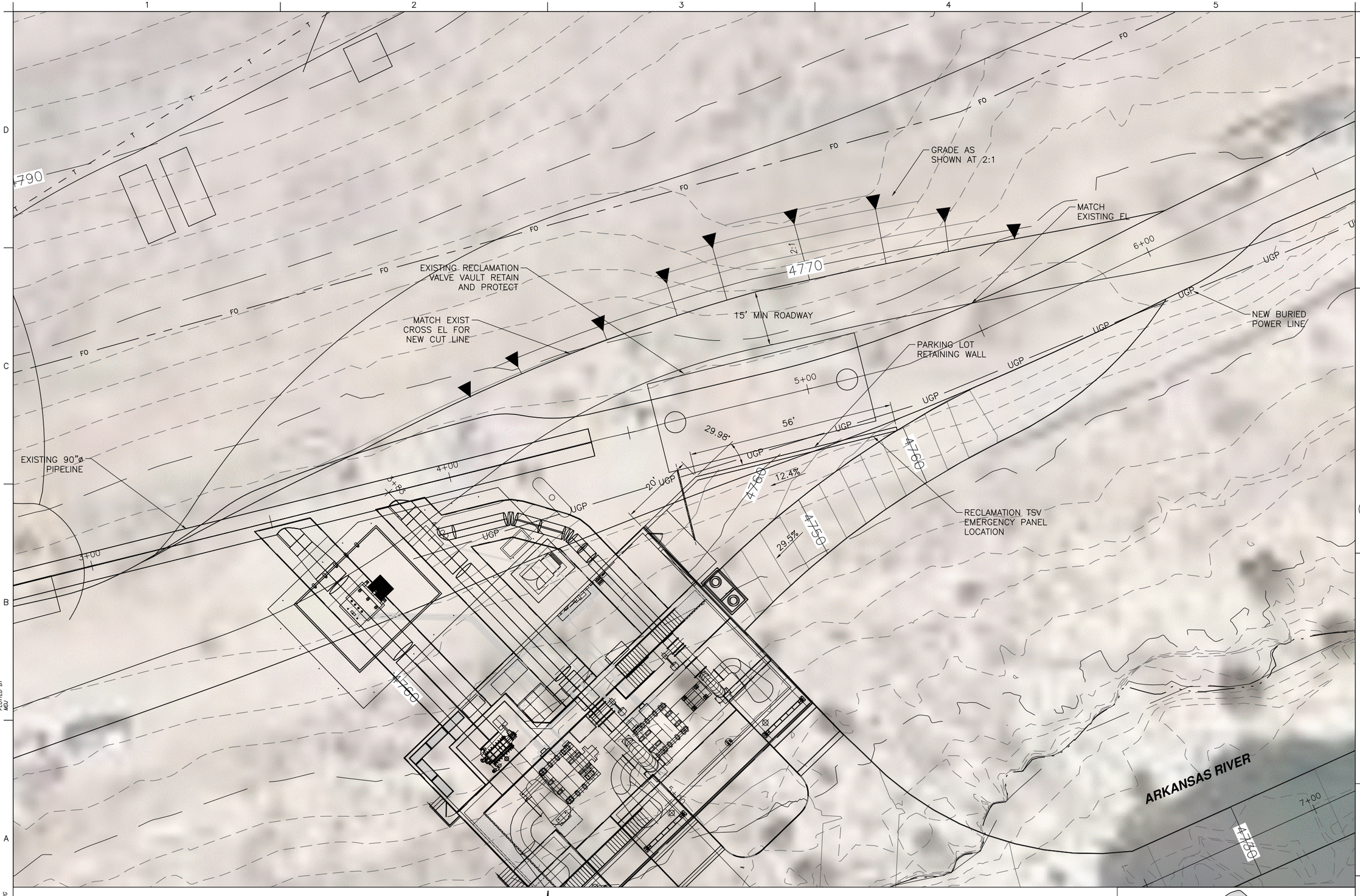

NOTES:
1. NEW 15' MIN. ROADWAY ACCESS TO REMAIN OPEN THROUGHOUT DURATION OF PROJECT CONSTRUCTION.

CIVIL SITE
ACCESS & STAGING PLAN (1 / C-2)
SCALE: 1" = 25'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– PLAN VIEW
ACCESS & STAGING PLAN

AS CONSTRUCTED 2019

REV. NO	DATE	DESCRIPTION
1	MM-DD-YYYY	NAME, PROF ####

CIVIL SITE– PLAN VIEW
ACCESS & STAGING PLAN

C-2

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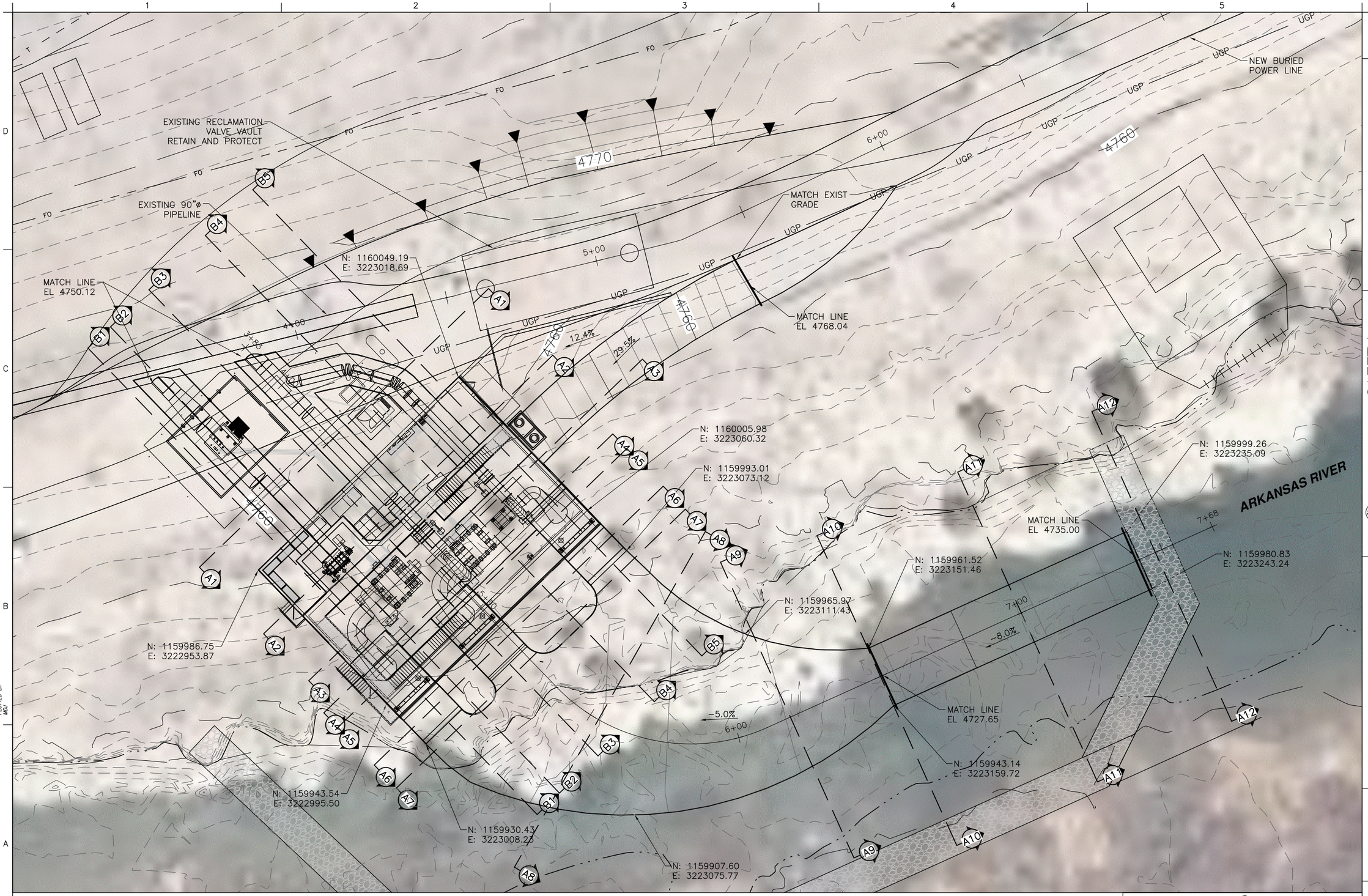

CIVIL SITE
EXCAVATION PLAN

1
C-3

SCALE: 1" = 30'-0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– PLAN VIEW
EXCAVATION PLAN

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CIVIL SITE– PLAN VIEW
EXCAVATION PLAN

C-3

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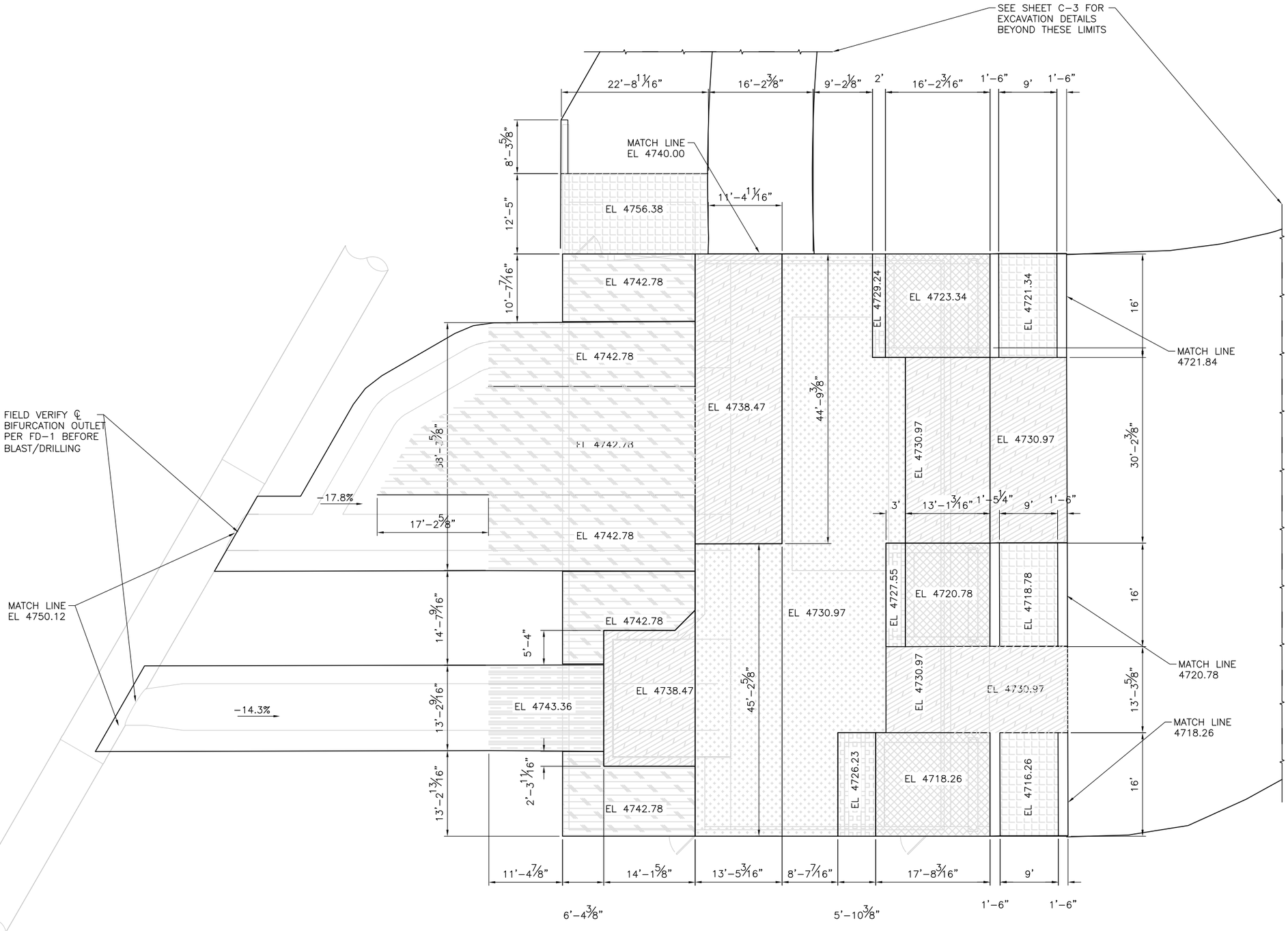

PROJECT EXCAVATION PLAN DETAIL

SCALE: 1/16" = 1'-0"

1 / C-4

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

CIVIL SITE–
PROJECT EXCAVATION
PLAN DETAIL

AS CONSTRUCTED 2019

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CIVIL SITE–
PROJECT EXCAVATION
PLAN DETAIL

C–4

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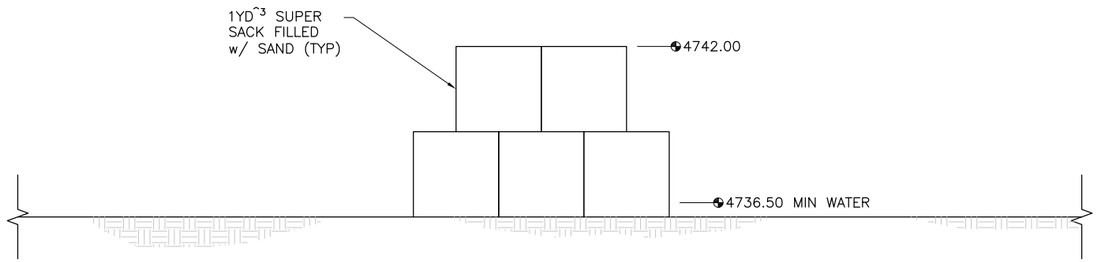
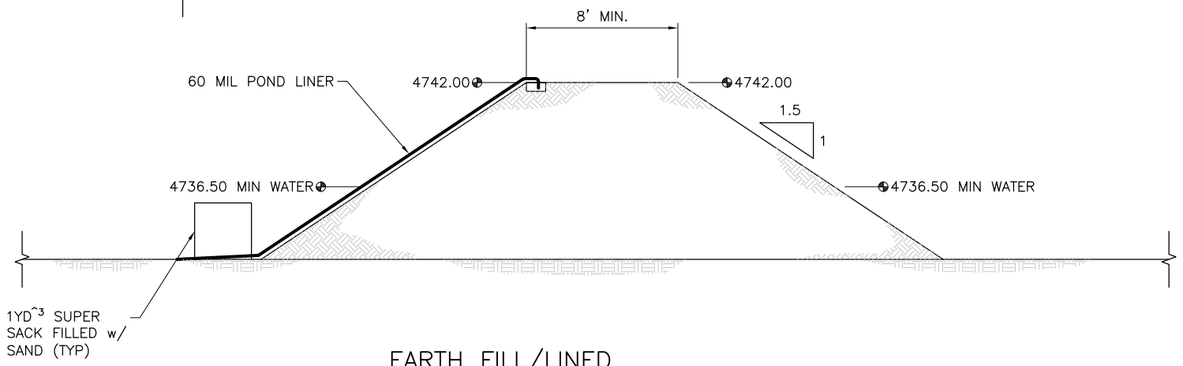
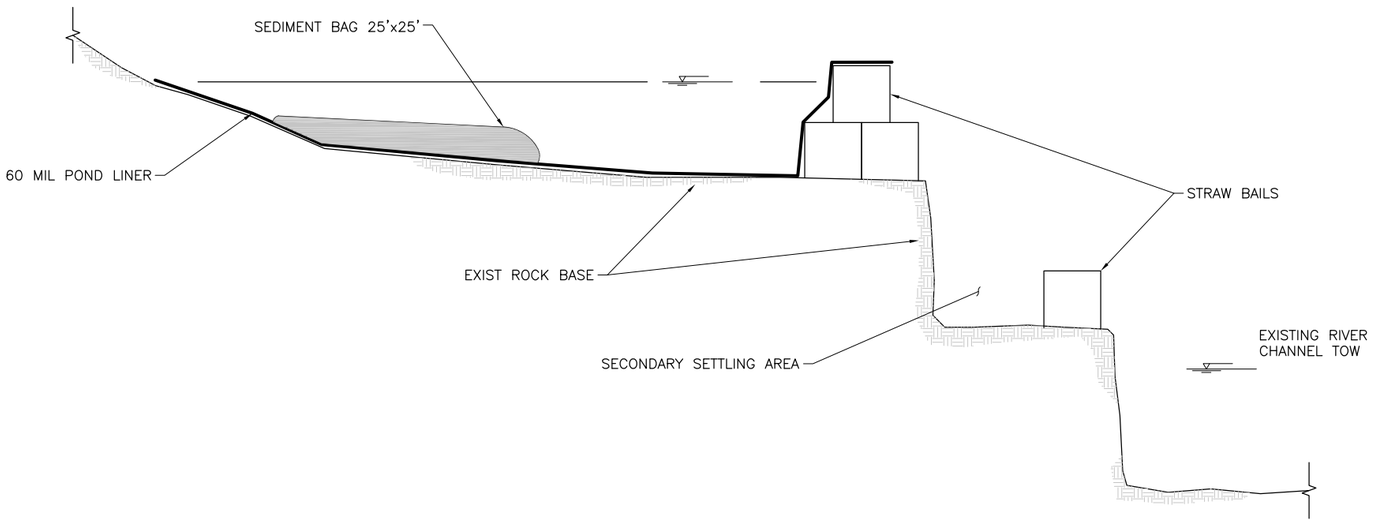


NOTE:
1. 2 OR 3 SACK HEIGHT AS REQUIRED.

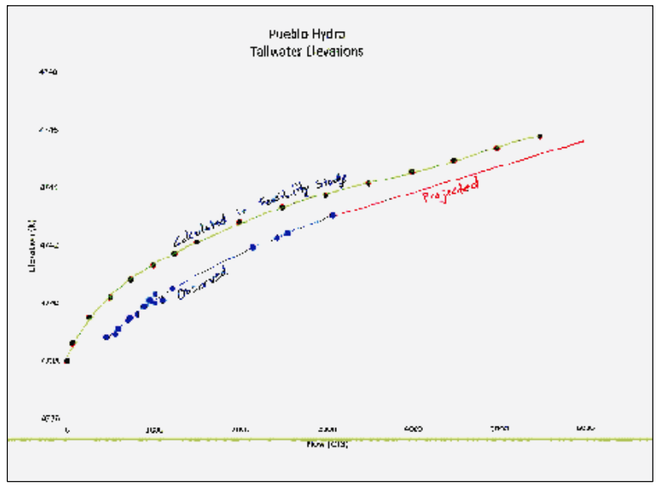
SUPER SACK
COFFER DAM
SCALE: 3/16" = 1'-0"
1 C-5



EARTH FILL/LINED
COFFER DAM
SCALE: 1/8" = 1'-0"
2 C-5



DE-WATERING POND
MISC. DETAILS
SCALE: 3/16" = 1'-0"
3 C-5



TAILWATER CURVE
SCALE: NTS
4 C-5

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PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE-DEWATERING/COFFERDAM MISC. DETAILS

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1			

CIVIL SITE-
DEWATERING/COFFERDAM
MISC. DETAILS

C-5

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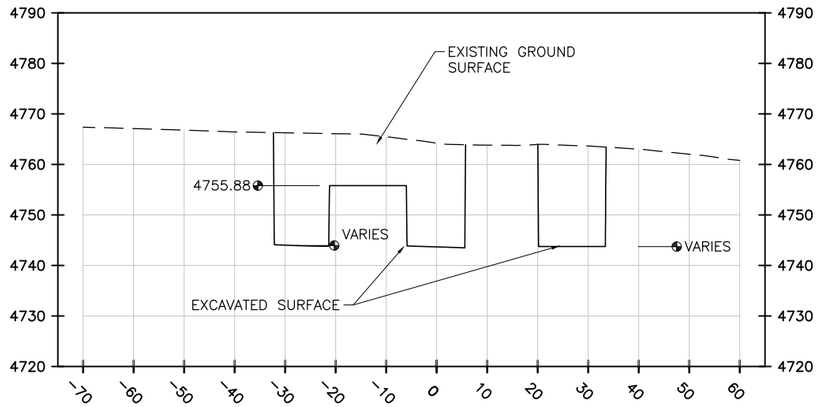
SECTION A1 STATION 4+23.93



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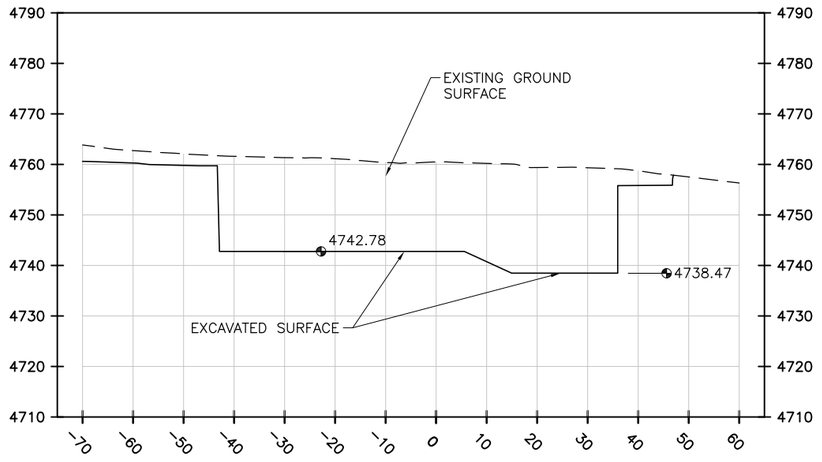

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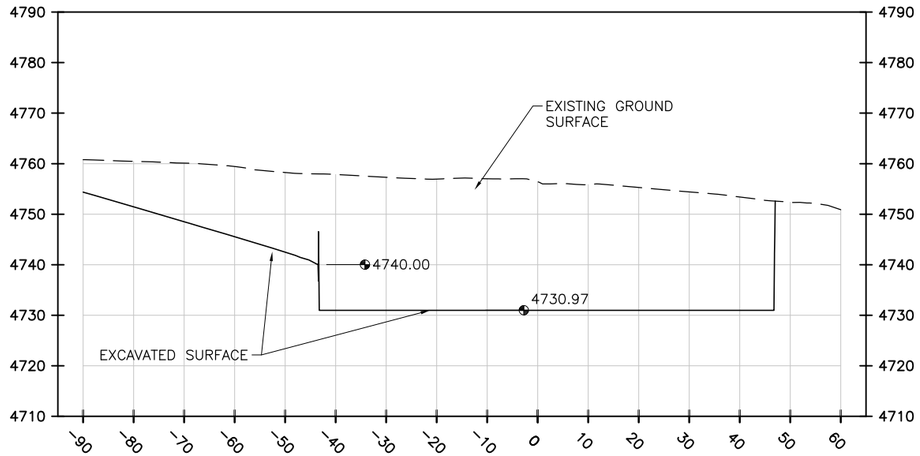

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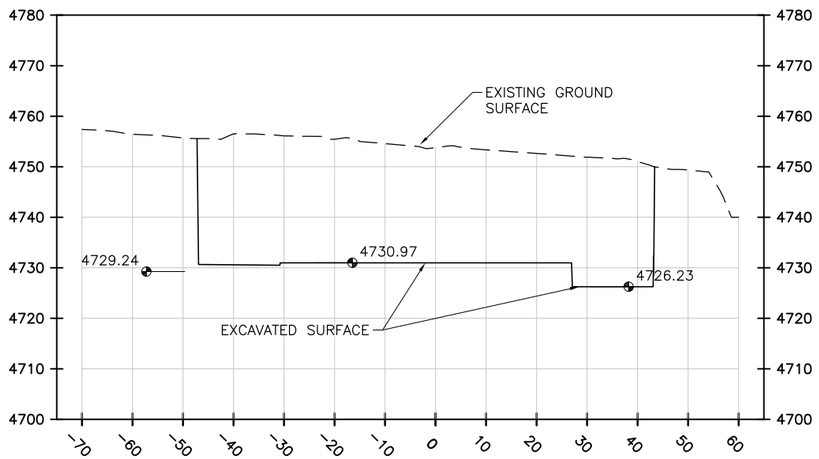

GENERAL NOTES:

1. EXCAVATION PLAN CUTS BASED ON GEOTECHNICAL DATA PRESENTED IN "SOUTHERN DELIVERY SYSTEM, GEOLOGIC AND GEOTECHNICAL DATA REPORT FOR PUEBLO DAM CONNECTIONS", BY RJH CONSULTANTS, INC. DATED SEPTEMBER 28, 2009. ALL CUTS ASSUMED TO BE IN SANDSTONE BEDROCK.
2. EXCAVATION CUTS MUST BE INSPECTED BY DOWL TO DETERMINE IF BEDDING, SEAMS, OR JOINTING IN THE SANDSTONE WARRANTS REMEDIAL RECOMMENDATIONS.
3. FREEZE/THAW CYCLES COULD CAUSE LOCALIZED SPALLING OF ROCK MATERIALS THAT COULD BE A SAFETY HAZARD TO WORKERS.
4. WHILE A REASONABLE EFFORT HAS BEEN MADE TO DESIGN THIS EXCAVATION PLAN FROM AVAILABLE INFORMATION, SUBSURFACE VARIATIONS/ANOMOLIES THAT DIFFER FROM THOSE ASSUMED MAY BE ENCOUNTERED. SUCH VARIATIONS MAY REQUIRE REMEDIAL MEASURES. THE NEED FOR SUCH MEASURES WILL BE HANDLED ON A CASE BY CASE BASIS AFTER DISCOVERY AND EVALUATION OF SUCH VARIATIONS/ANOMOLIES.

CIVIL SITE– EXCAVATION "A" CROSS SECTIONS

SCALE: 1" = 30'-0"

1
X-1

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SORENSON ENGINEERING

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PROJECT

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PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

AS CONSTRUCTED 2019

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CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

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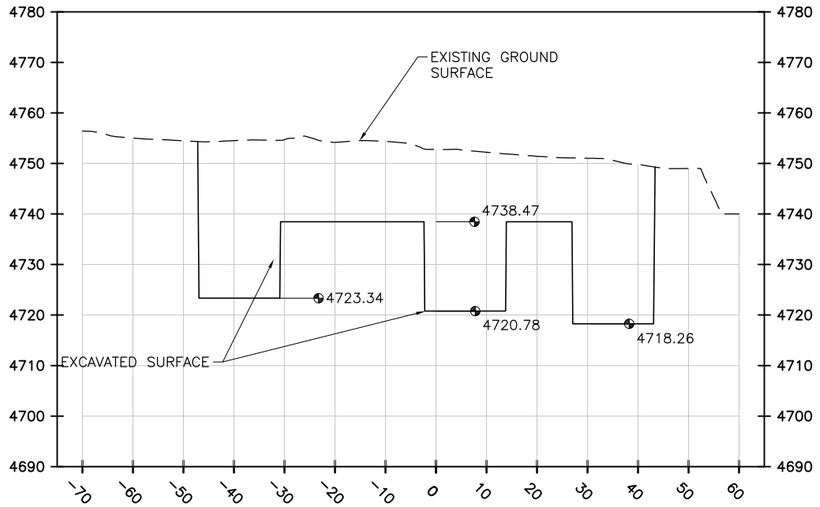
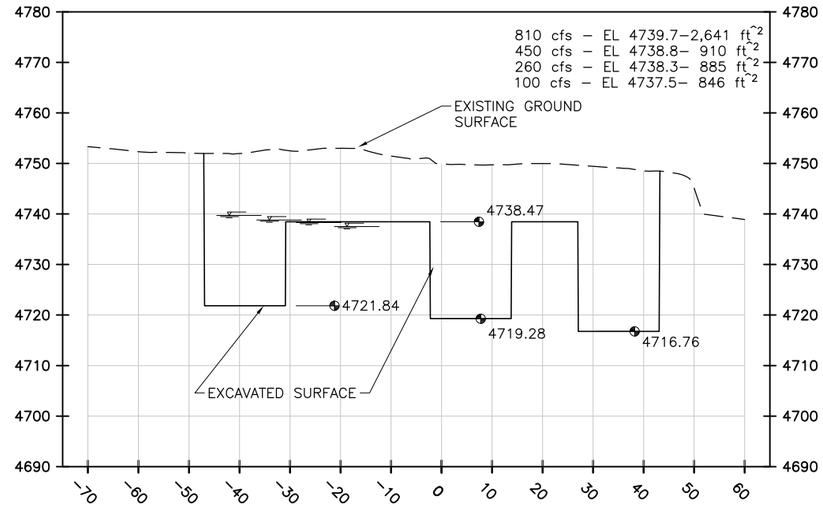
SECTION A5 STATION 4+96.02



SECTION A6 STATION 5+12.98



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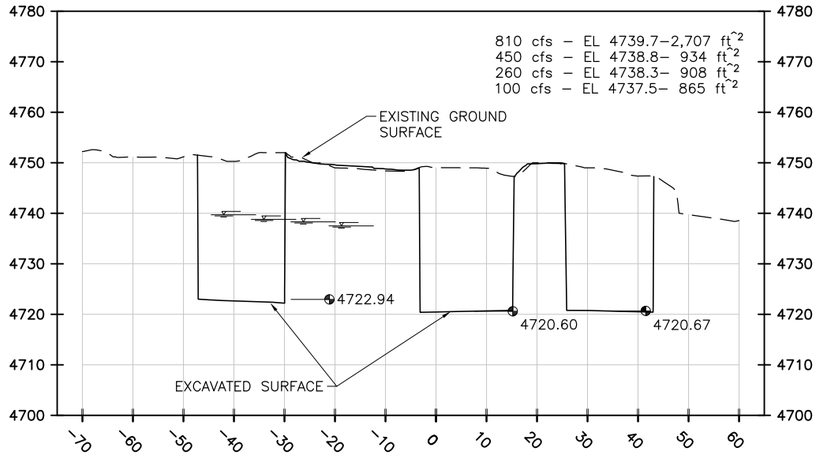
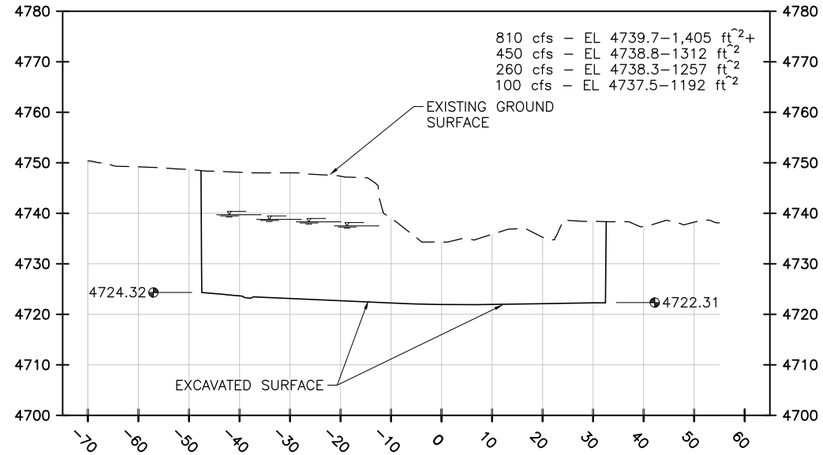


SECTION A8 STATION 5+53.00



GENERAL NOTES:

1. EXCAVATION PLAN CUTS BASED ON GEOTECHNICAL DATA PRESENTED IN "SOUTHERN DELIVERY SYSTEM, GEOLOGIC AND GEOTECHNICAL DATA REPORT FOR PUEBLO DAM CONNECTIONS", BY RJH CONSULTANTS, INC. DATED SEPTEMBER 28, 2009. ALL CUTS ASSUMED TO BE IN SANDSTONE BEDROCK.
2. EXCAVATION CUTS MUST BE INSPECTED BY DOWL TO DETERMINE IF BEDDING, SEAMS, OR JOINTING IN THE SANDSTONE WARRANTS REMEDIAL RECOMMENDATIONS.
3. FREEZE/THAW CYCLES COULD CAUSE LOCALIZED SPALLING OF ROCK MATERIALS THAT COULD BE A SAFETY HAZARD TO WORKERS.
4. WHILE A REASONABLE EFFORT HAS BEEN MADE TO DESIGN THIS EXCAVATION PLAN FROM AVAILABLE INFORMATION, SUBSURFACE VARIATIONS/ANOMOLIES THAT DIFFER FROM THOSE ASSUMED MAY BE ENCOUNTERED. SUCH VARIATIONS MAY REQUIRE REMEDIAL MEASURES. THE NEED FOR SUCH MEASURES WILL BE HANDLED ON A CASE BY CASE BASIS AFTER DISCOVERY AND EVALUATION OF SUCH VARIATIONS/ANOMOLIES.

CIVIL SITE– EXCAVATION "A" CROSS SECTIONS

SCALE: 1" = 30'–0"

1 / X-2

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DRAWING NUMBER

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

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CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

X–2

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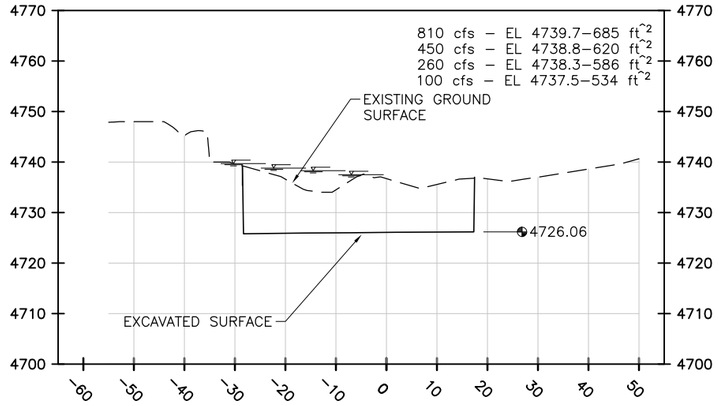
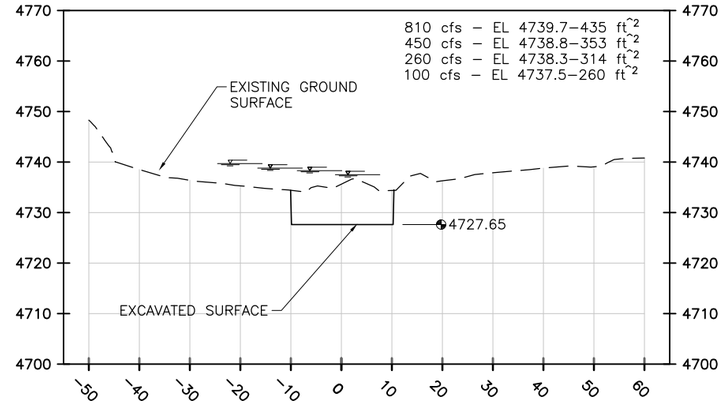
SECTION A9 STATION 6+18.00



SECTION A10 STATION 6+50.00



SECTION A11 STATION 7+00.00

SECTION A12 STATION 7+47.63

GENERAL NOTES:

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CIVIL SITE– EXCAVATION "A" CROSS SECTIONS

SCALE: 1" = 30'–0"

1 / X–3

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CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

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CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

X–3

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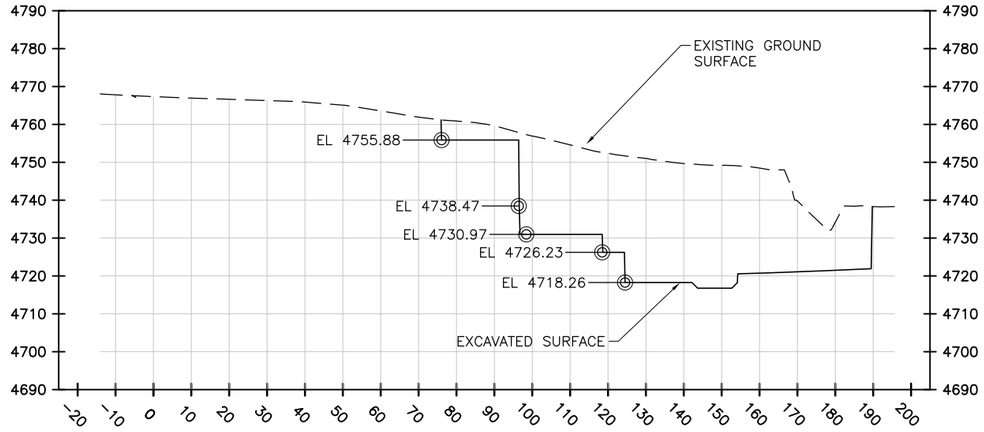
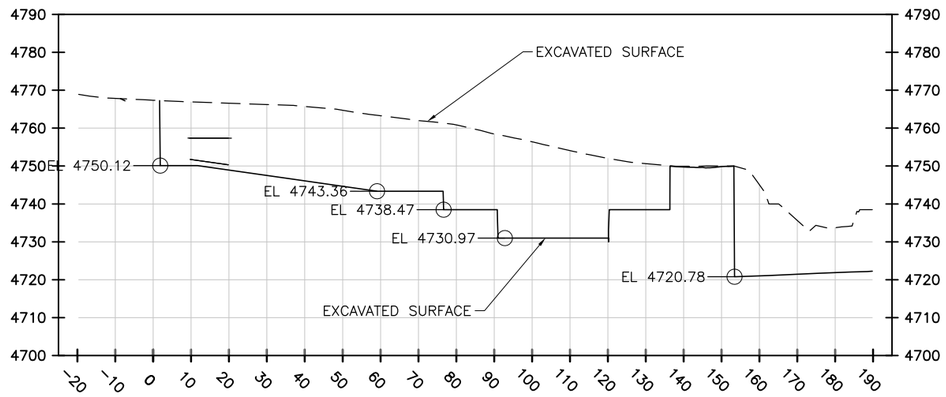
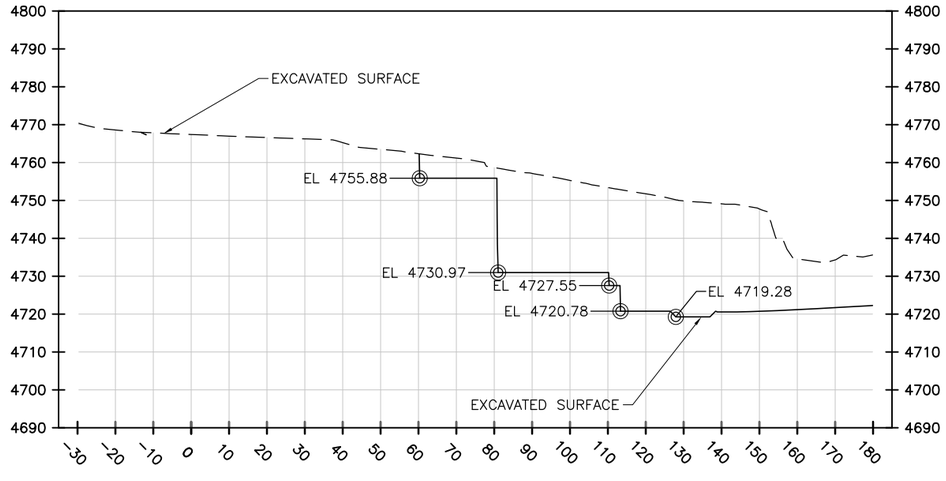
SECTION B1 STATION 3+40.41



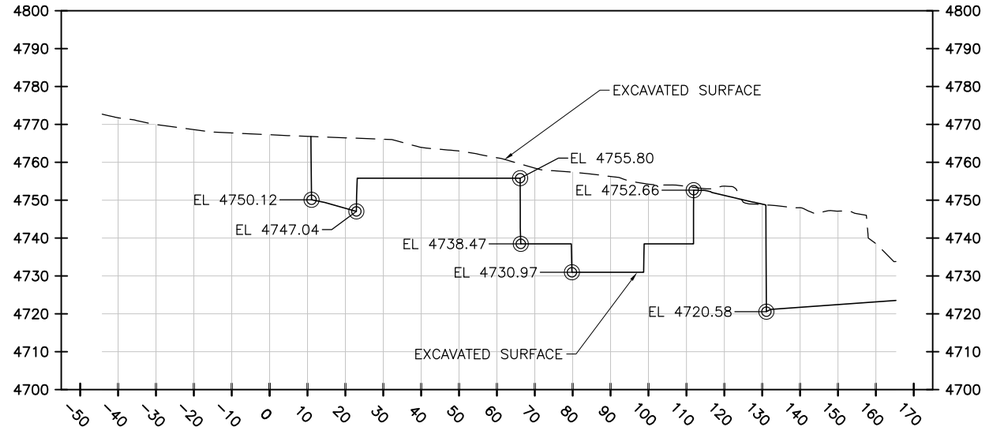
SECTION B2 STATION 3+51.96



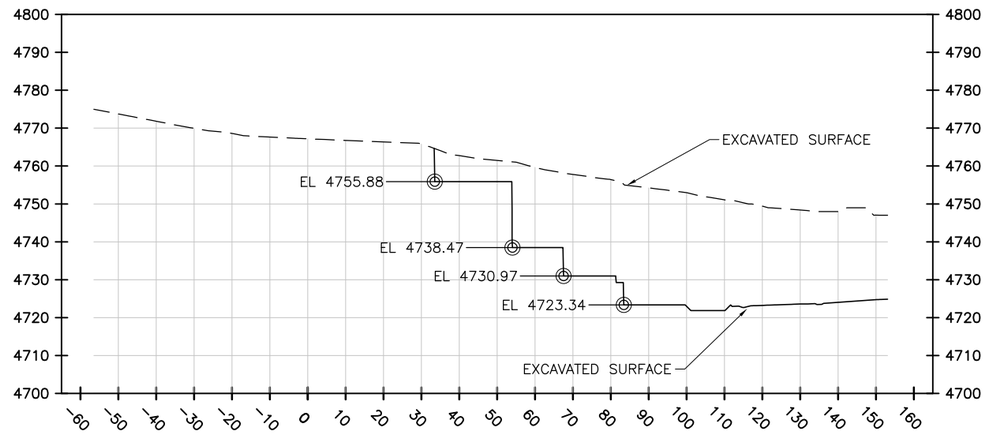
SECTION B3 STATION 3+71.93



SECTION B4 STATION 4+01.14



SECTION B5 STATION 4+25.77



GENERAL NOTES:

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CIVIL SITE– EXCAVATION "B" CROSS SECTIONS

SCALE: 1" = 30'–0"

1 / X–4

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PUEBLO DAM HYDROELECTRIC PROJECT
CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

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CIVIL SITE– EXCAVATION PLAN CROSS SECTIONS

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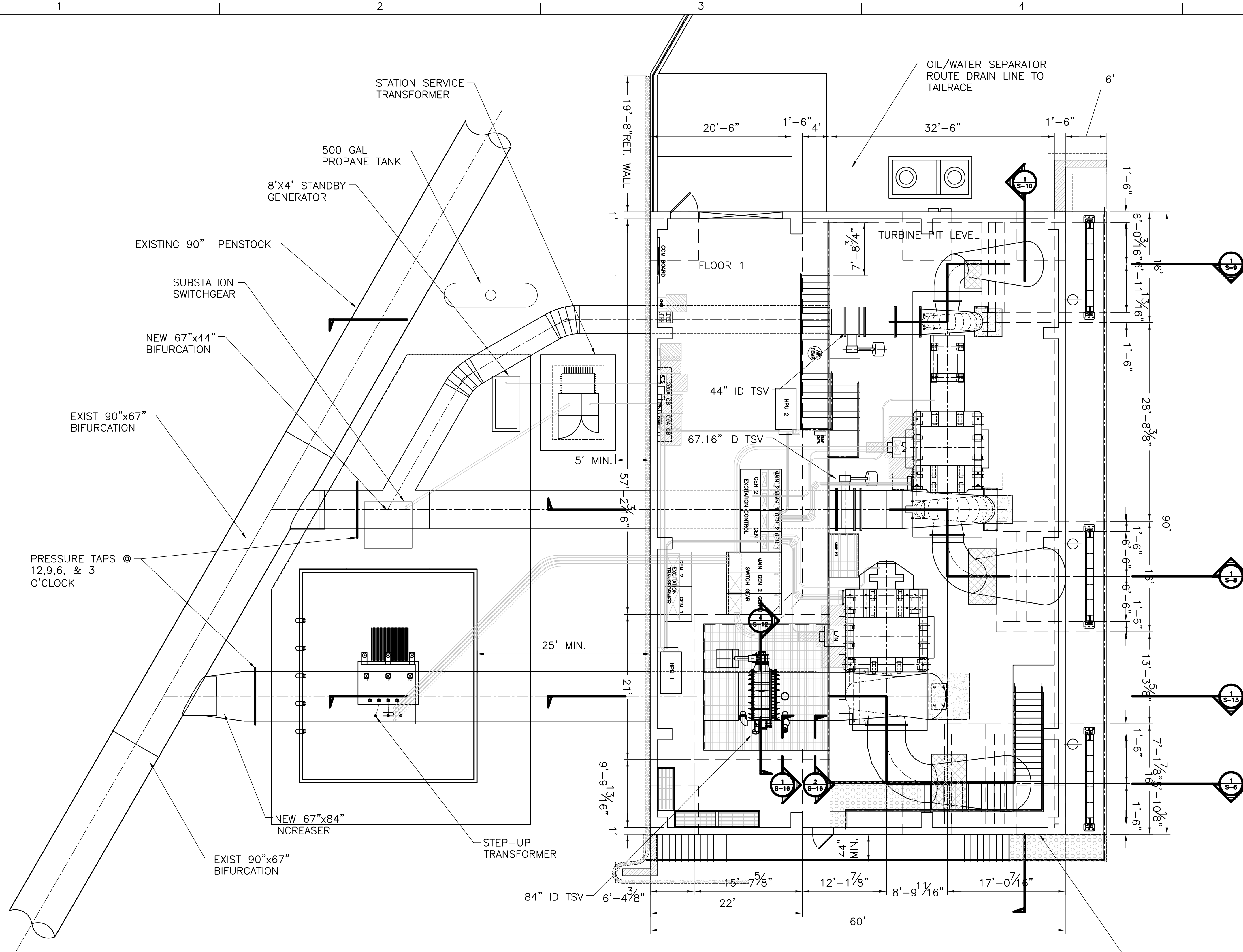

NOTE:
1. PENSTOCK COAT INSIDE WITH CARBOGUARD 61 PER SPECIFICATIONS
2. PENSTOCK TO BE ENCASED w/ MIN. 12 IN OF CONCRETE.

POWERHOUSE FINISH FLOOR PLAN EL 4756.88

SCALE: 1/16" = 1'-0"

1 / S-4

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PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4754.26

AS CONSTRUCTED 2019

REV NO | YYYY-MM-DD | NAME, PROF ABBR. | DESCRIPTION
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POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4756.88

S-4

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NOTE:
1. STAIR LANDINGS EQUAL 48" AS SHOWN.
2. Stair Rise = 6–15/16"
   Run = 11"
3. MIN. CLR WIDTH FOR STAIRS = 44"
4. STANDARD HAND RAIL HEIGHT = 42"
5. STAIR HAND RAIL HEIGHT = 36"
6. 48" MIN. LANDING AT TOP AND BOTTOM OF STAIRS.
7. 44" MIN EGRESS EACH SIDE OF DOORWAY. MAX ½" VARIANCE BETWEEN THRESHOLD AND LANDING
8. HANDRAIL EXTENSIONS– HANDRAILS SHALL RETURN TO A WALL, GUARD OR THE WALKING SURFACE OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT FLIGHT OF STAIRS OR RAMP RUN. WHERE HANDRAILS ARE NOT CONTINUOUS BETWEEN FLIGHTS, THE HANDRAILS SHALL EXTEND HORIZONTALLY NOT LESS THAN 12 INCHES BEYOND THE TOP RISER AND CONTINUE TO SLOPE FOR THE DEPTH OF ONE TREAD BEYOND THE BOTTOM RISER. AT RAMPS WHERE HANDRAILS ARE NOT CONTINUOUS BETWEEN RUNS, THE HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING 12 INCHES MINIMUM BEYOND THE TOP AND BOTTOM OF RAMP RUNS. THE EXTENSIONS OF HANDRAILS SHALL BE IN THE SAME DIRECTION OF THE FLIGHTS OF STAIRS AT STAIRWAYS AND THE RAMP RUNS AT RAMPS.
9. ALL REQUIRED DIMENSIONS FOR CATWALK, STAIRWAY, AND HANDRAIL TO BE FIELD MEASURED PRIOR TO FABRICATION.

4'–8" TALL WING WALL
4756.88
(3) TAILRACE STOP LOG GATE LOCATION (TYP)
18"ø STEEL PIPE SLEEVE w/ REMOVABLE CAP
90'
1'–6" 6'–0 3/16" 1'–6" 6'–11 13/16" 1'–6" 6' 28'–8 3/8" 1'–6" 6'–6" 1'–6" 6'–6" 1'–6" 13'–3 5/8" 1'–6" 7'–1 7/8" 1'–6" 5'–10 1/8" 1'–6" 16'
4.3 MW GENERATOR
6'
1'–6"
32'–6"
TURBINE PIT LEVEL
3.8 MW GENERATOR
–6" RECESSED GENERATOR FLOOR
–2.5FT DRAFT TUBE RECESS
4739.47
–4FT DRAFT TUBE RECESS
17'–0 7/16"
8'–9 1/16"
7'–8 3/4"
44" ID TSV
CATHODIC PROTECTION JUNCTION BOXES
OIL/WATER SEPERATOR
4739.47
–3FT DRAFT TUBE RECESS
L/N
SUMP PIT
SUMP CONTROL
AIR COMP
MIN. 44"
12'–1 7/8"
60'
1'–6" 4'
HPU 2
4756.88
67.16" ID TSV
MAIN 2 MAIN 1 GEN 2 GEN 1 EXCITATION CONTROL
MAIN GEN 2 GEN 1 SWITCH GEAR
4756.88
84" ID TSV
MAIN LEVEL EXIT
FRENCH DRAIN OUTFALL
15'–7 5/8"
22"
20'–6"
FLOOR 1
FACILITY STORAGE
4756.88
GEN 2 GEN 1 EXCITATION TRANSFORMER
HPU 1
6'–4 3/8"
COM BOARD
CHGR
200A CB ATS
100A CB PNL BMT
19'–8"RET. WALL
1'
57'–2 3/16"
21'
9'–9 13/16"
1'
6"ø FRENCH DRAIN
7.5' TALL RET. WALL
4756.88

POWERHOUSE FINISH FLOOR PLAN EL 4756.88

1 / S–5

SCALE: 3/32" = 1'–0"

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DRAWING NUMBER

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4754.26

AS CONSTRUCTED 2019

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1	MAR. PROJ #886	

POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4756.88

S–5

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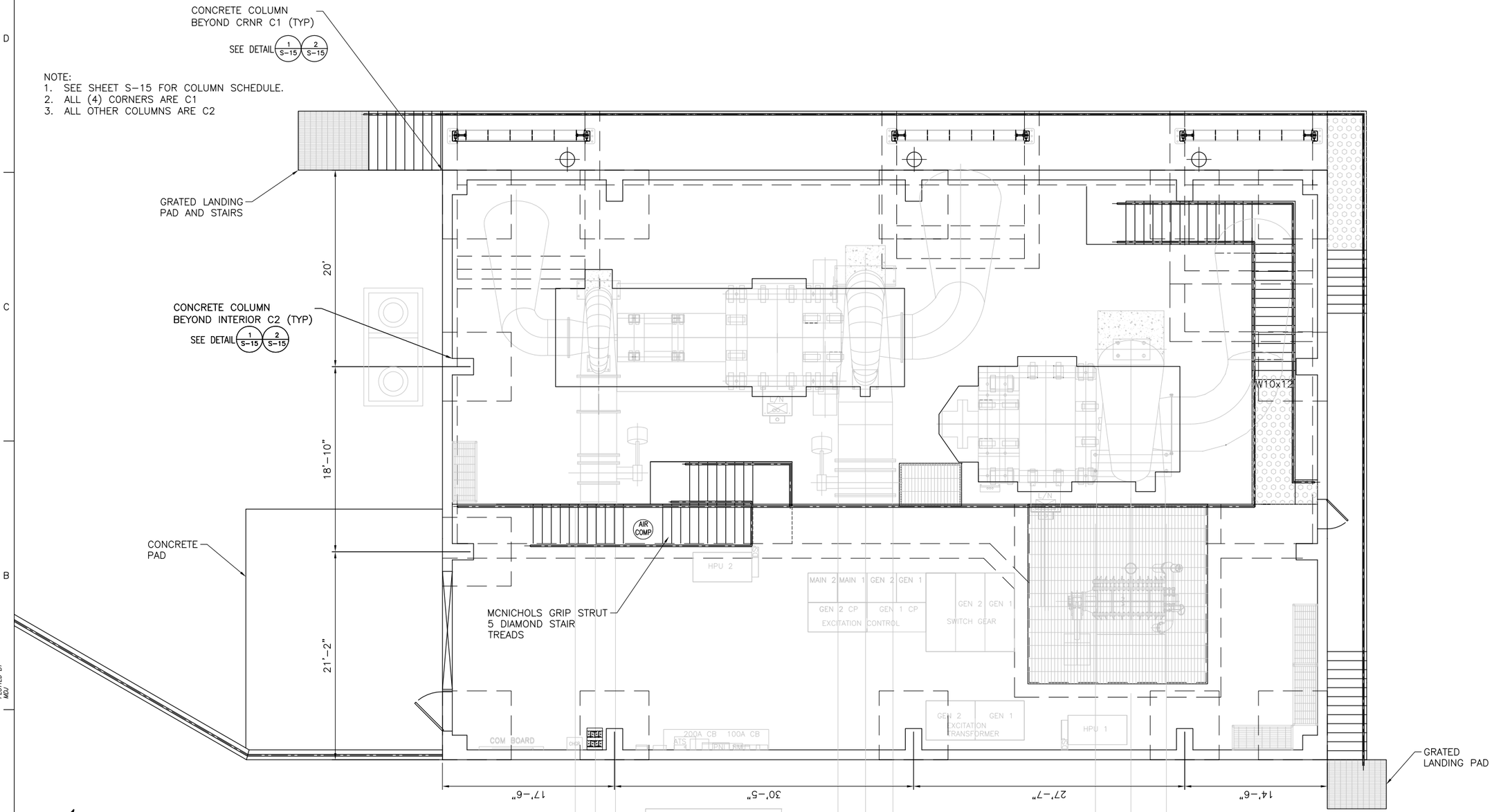
NOTE:
1. SEE SHEET S–15 FOR COLUMN SCHEDULE.
2. ALL (4) CORNERS ARE C1
3. ALL OTHER COLUMNS ARE C2



POWERHOUSE BLDG COLUMN PLAN EL 4756.88

SCALE: 3/32" = 1'–0"

1 / S–5C

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POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4754.26

AS CONSTRUCTED 2019

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1	11-4-20		

POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4756.88

S–5C

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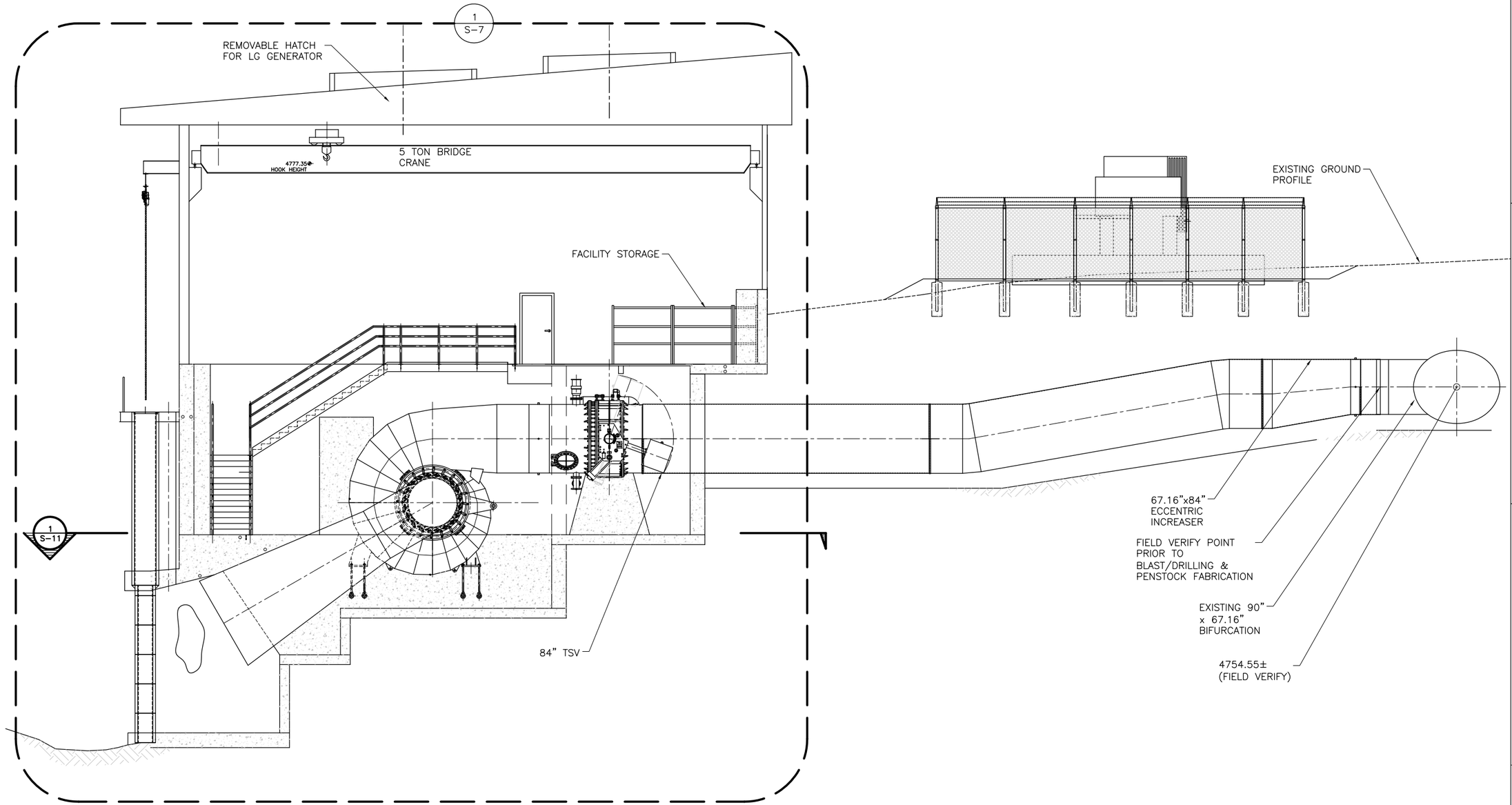

POWERHOUSE SECT. THRU 450 CFS TURBINE, GENERATOR, & PH (1 / S-6)

SCALE: 3/32" = 1'-0"

SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH

AS CONSTRUCTED 2019

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POWERHOUSE STRUCTURAL– SECTION THRU TURBINE, GENERATOR, & PH

S-6

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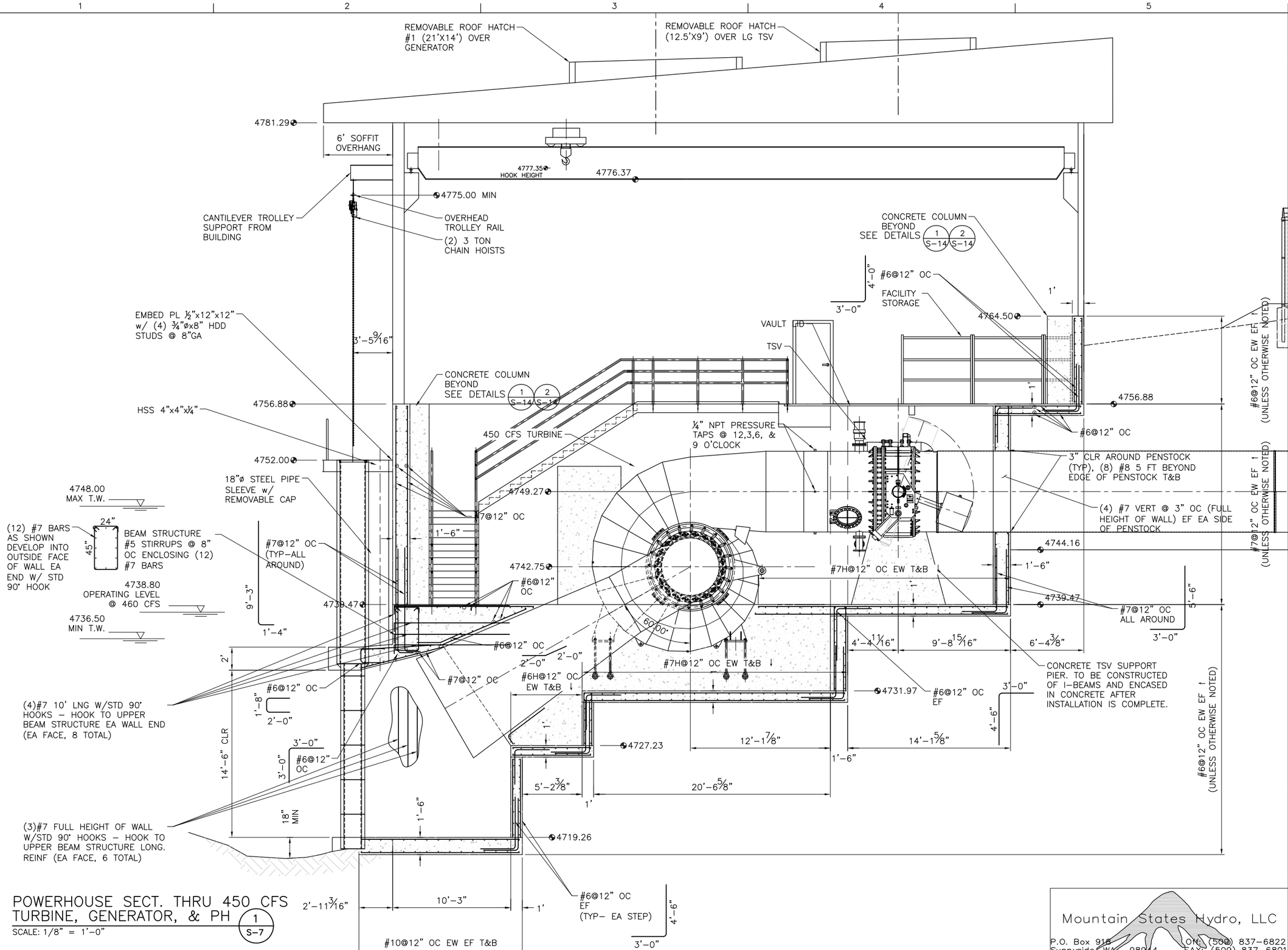

POWERHOUSE SECT. THRU 450 CFS TURBINE, GENERATOR, & PH

1 / S-7

SCALE: 1/8" = 1'-0"

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL - SECTION THRU TURBINE, GENERATOR, & PH

ALWAYS THINK SAFETY

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REV NO	TYP-AM-DD	DESCRIPTION
1	NAME, PROF. ABBR.	

POWERHOUSE STRUCTURAL - SECTION THRU TURBINE, GENERATOR, & PH

S-7

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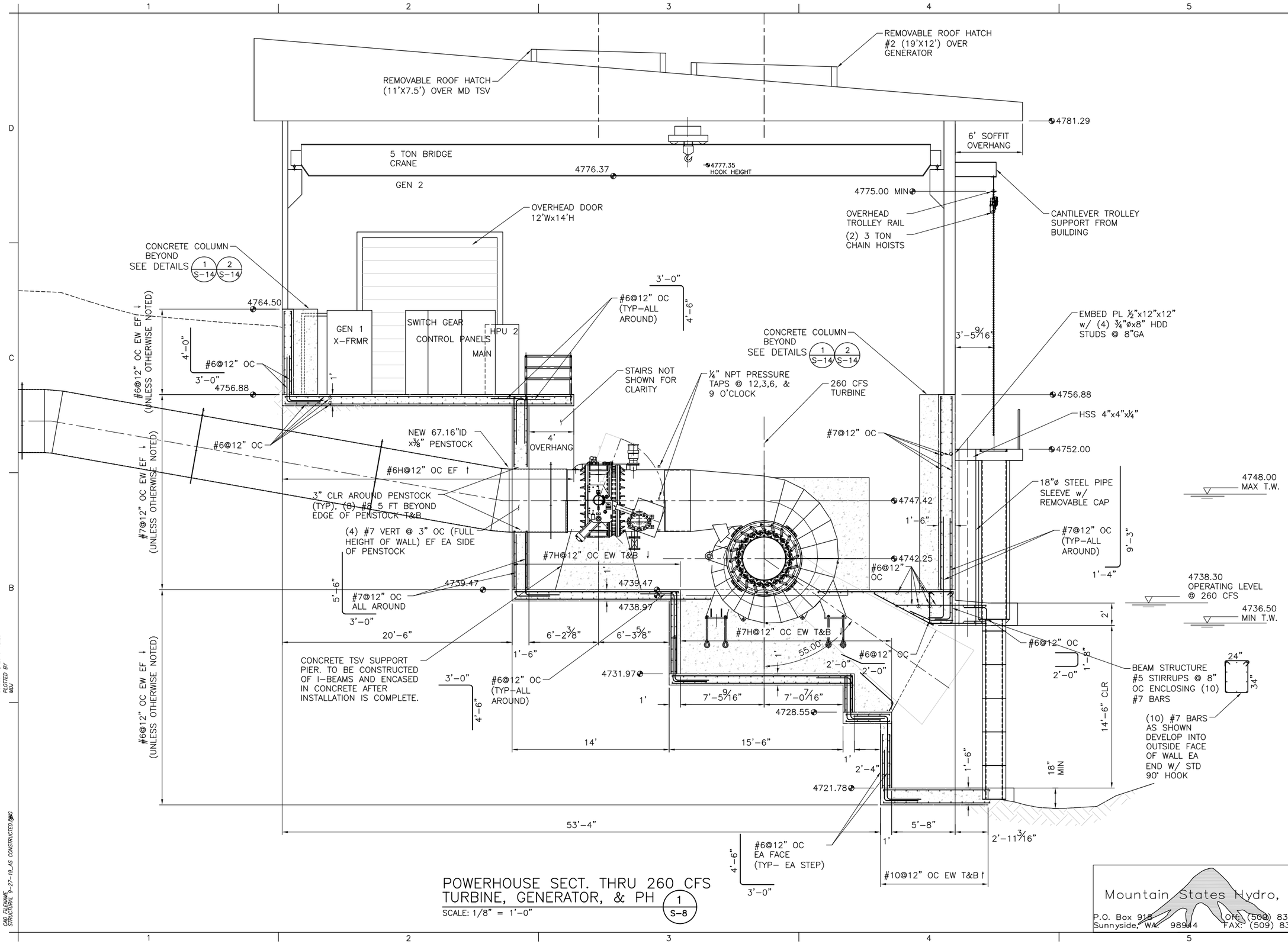

POWERHOUSE SECT. THRU 260 CFS TURBINE, GENERATOR, & PH (1 / S-8)

SCALE: 1/8" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL – SECTION THRU TURBINE, GENERATOR, & PH

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1	NAME, PROJ ABBR.	

POWERHOUSE STRUCTURAL – SECTION THRU TURBINE, GENERATOR, & PH

S-8

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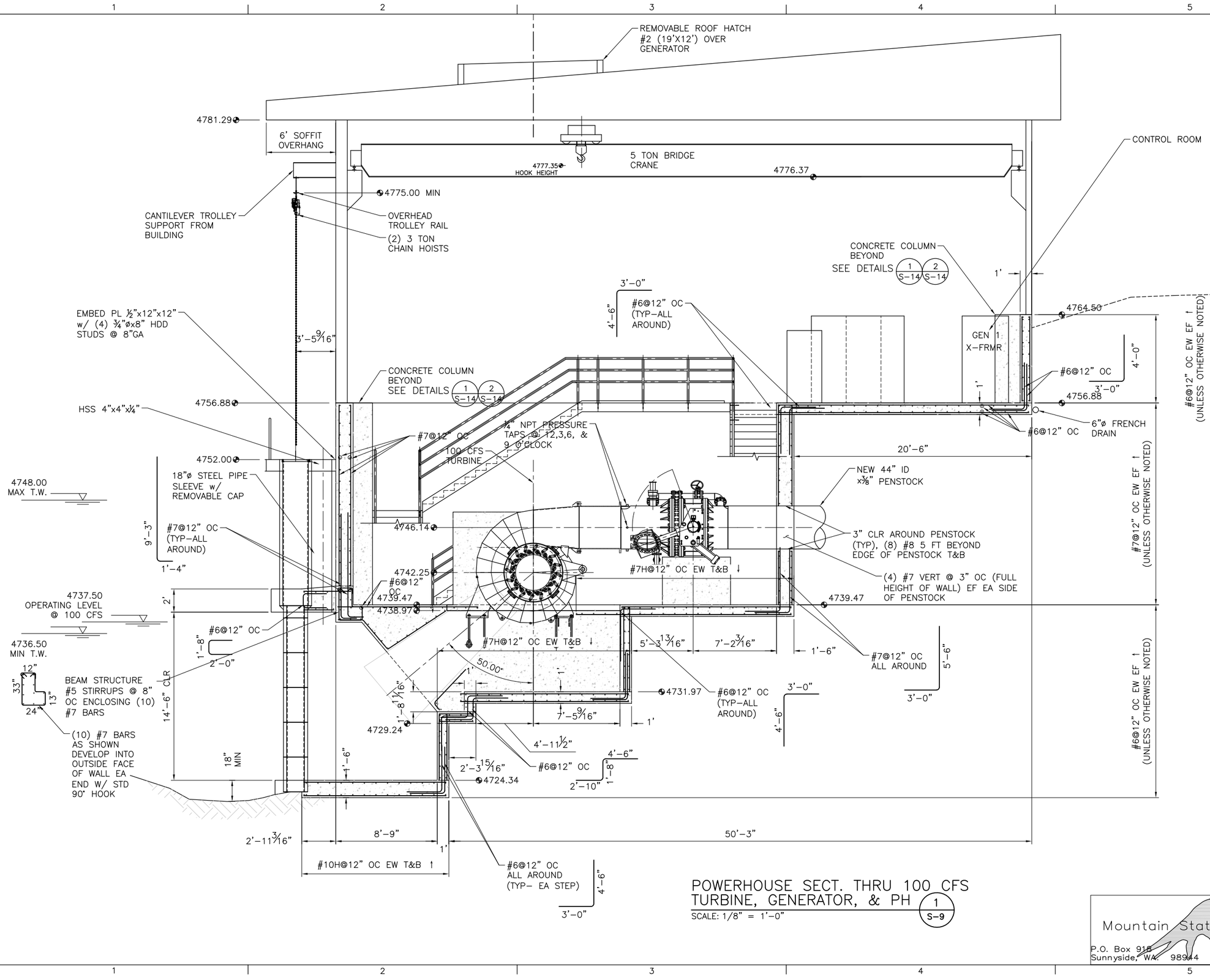

POWERHOUSE SECT. THRU 100 CFS TURBINE, GENERATOR, & PH (1 / S-9)

SCALE: 1/8" = 1'-0"

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PROJECT

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POWERHOUSE STRUCTURAL – SECT. THRU TURBINE, GENERATOR, & PH

AS CONSTRUCTED 2019

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1	MMC PROF ABBR.	

POWERHOUSE STRUCTURAL – SECT. THRU TURBINE, GENERATOR, & PH

S-9

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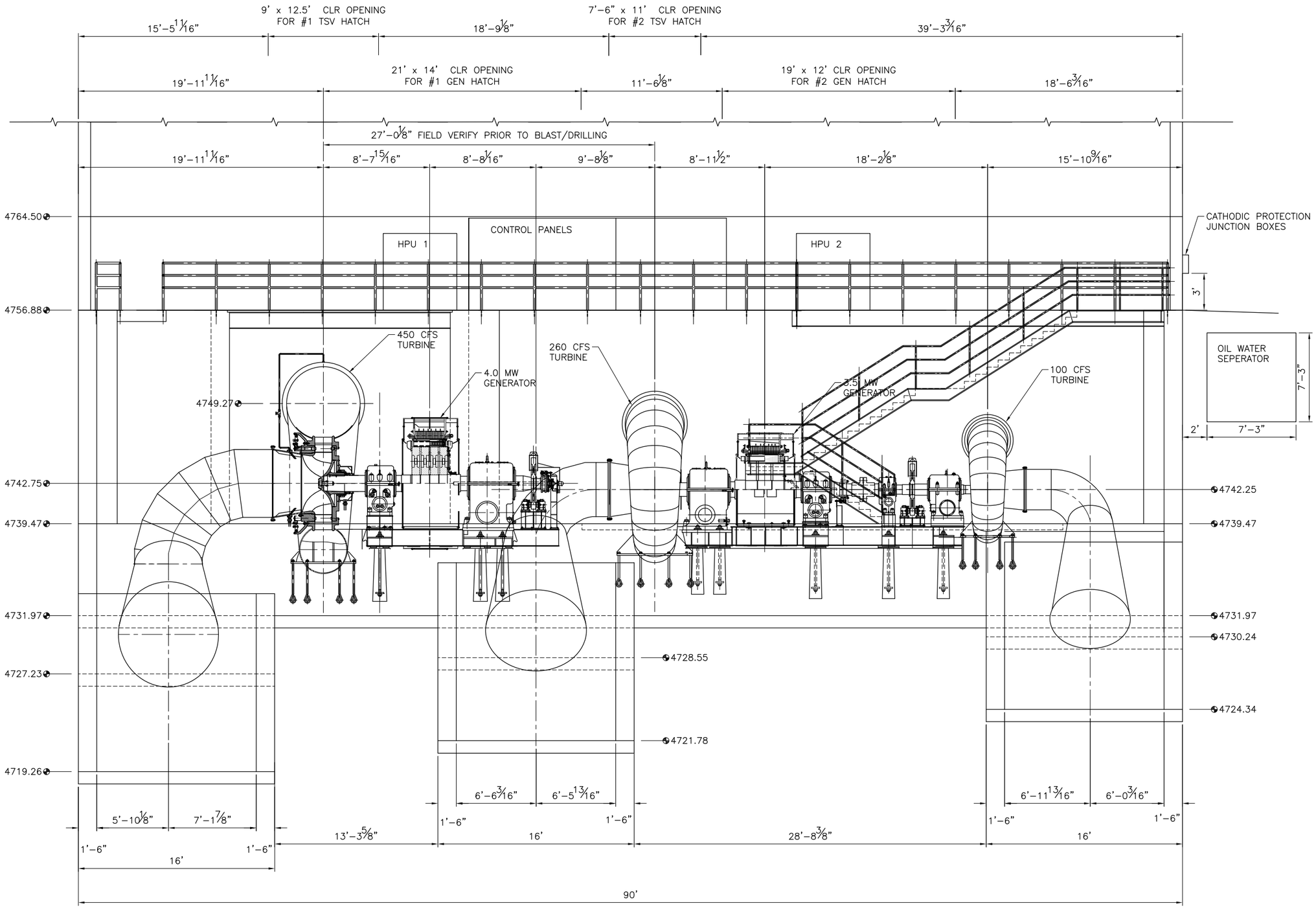

POWERHOUSE SECT. THRU TURBINE, GENERATOR, & PH

SCALE: 1/8" = 1'-0"

1 / S-10

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POWERHOUSE STRUCTURAL – SECT. THRU TURBINE, GENERATOR, & PH

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POWERHOUSE STRUCTURAL – SECT. THRU TURBINE, GENERATOR, & PH

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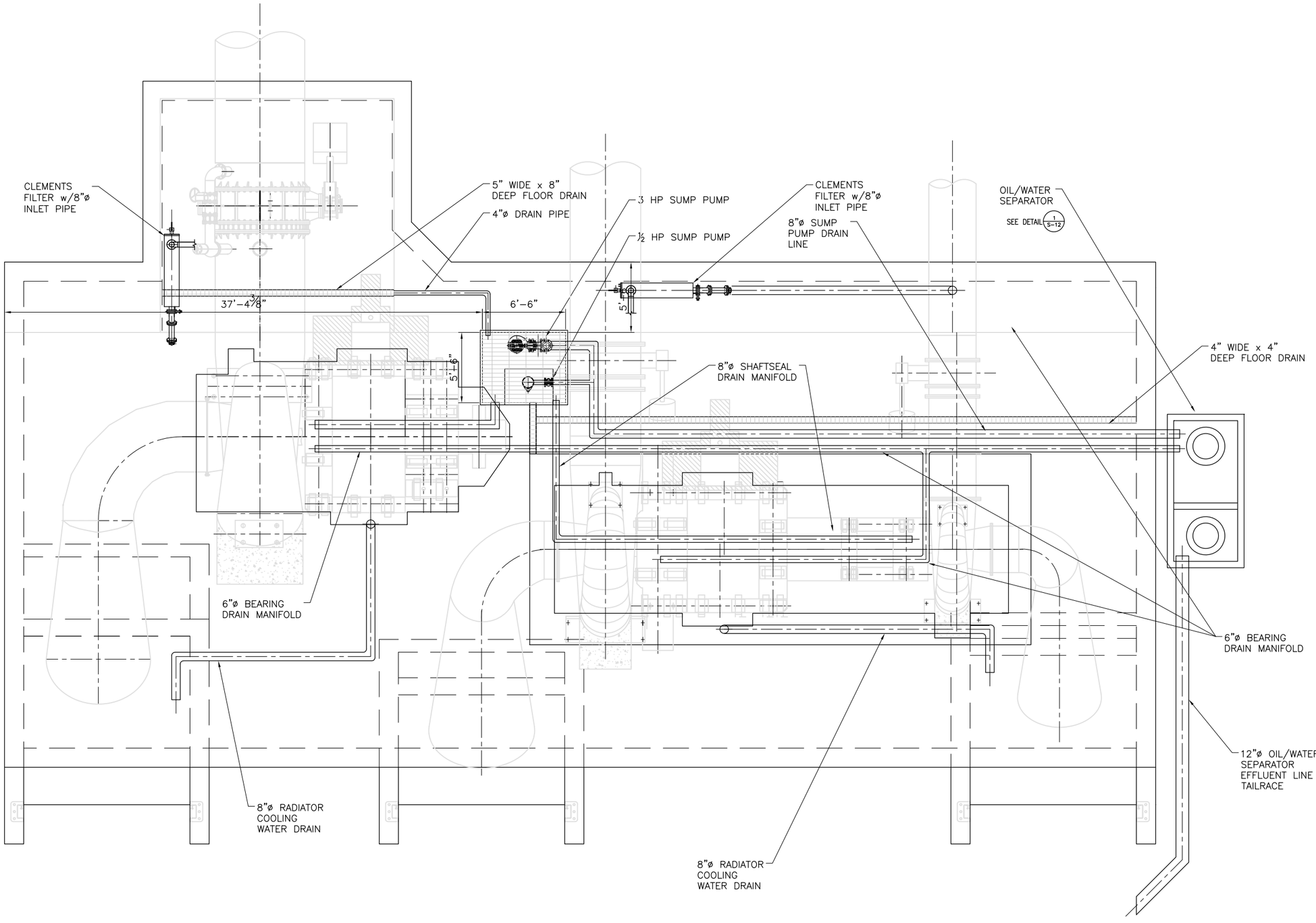

POWERHOUSE GALLEY PLAN
COOLING/DRAIN WATER PIPING PLAN

SCALE: 1/8" = 1'-0"

1 / S-11

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STRUCTURAL 9-27-19_AS CONSTRUCTED.DWG

SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–
POWERHOUSE GALLEY PLAN
COOLING/DRAIN WATER PLAN

AS CONSTRUCTED 2019

REV NO	TYP-MM-DD	NAME, PROF ABBR.	DESCRIPTION
1			

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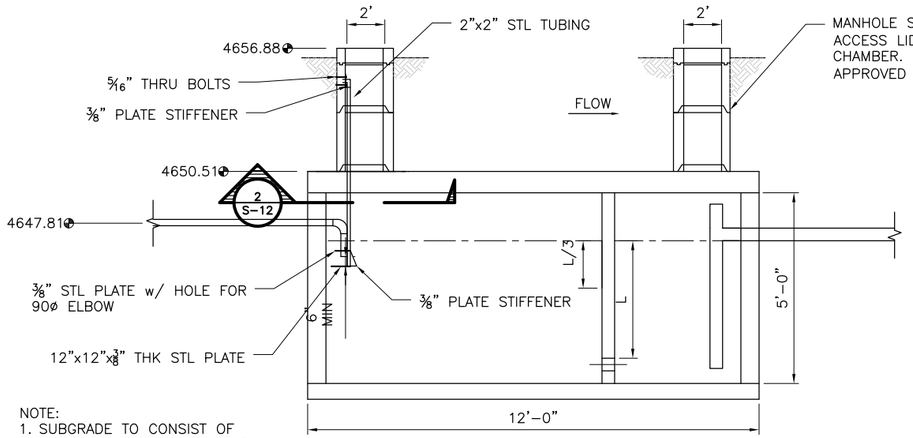
POWERHOUSE STRUCTURAL–
POWERHOUSE GALLEY PLAN
COOLING/DRAIN WATER PLAN

S-11



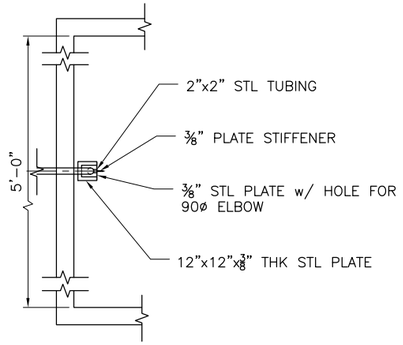
NOTE:
1. SUBGRADE TO CONSIST OF GEOTEXTILE FABRIC AND 15" TO 20" OF DRAIN ROCK
2. COAT BAFFLE ASSY W/ 2 COATS OF INDUSTRIAL GRADE ENAMEL.

OIL/WATER SEPARATOR

SCALE: NTS

1 / S-12

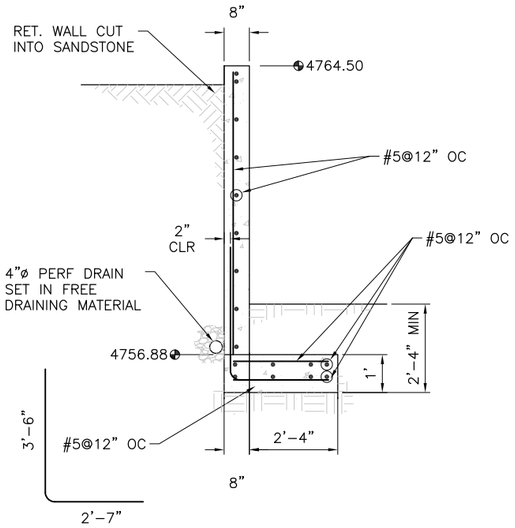
NOTE:
APPROX DETENTION TIME W/ SINGLE DE-WATERING PUMP IS 30 MIN.



ADDITIONAL BAFFLE SECTION

SCALE: NTS

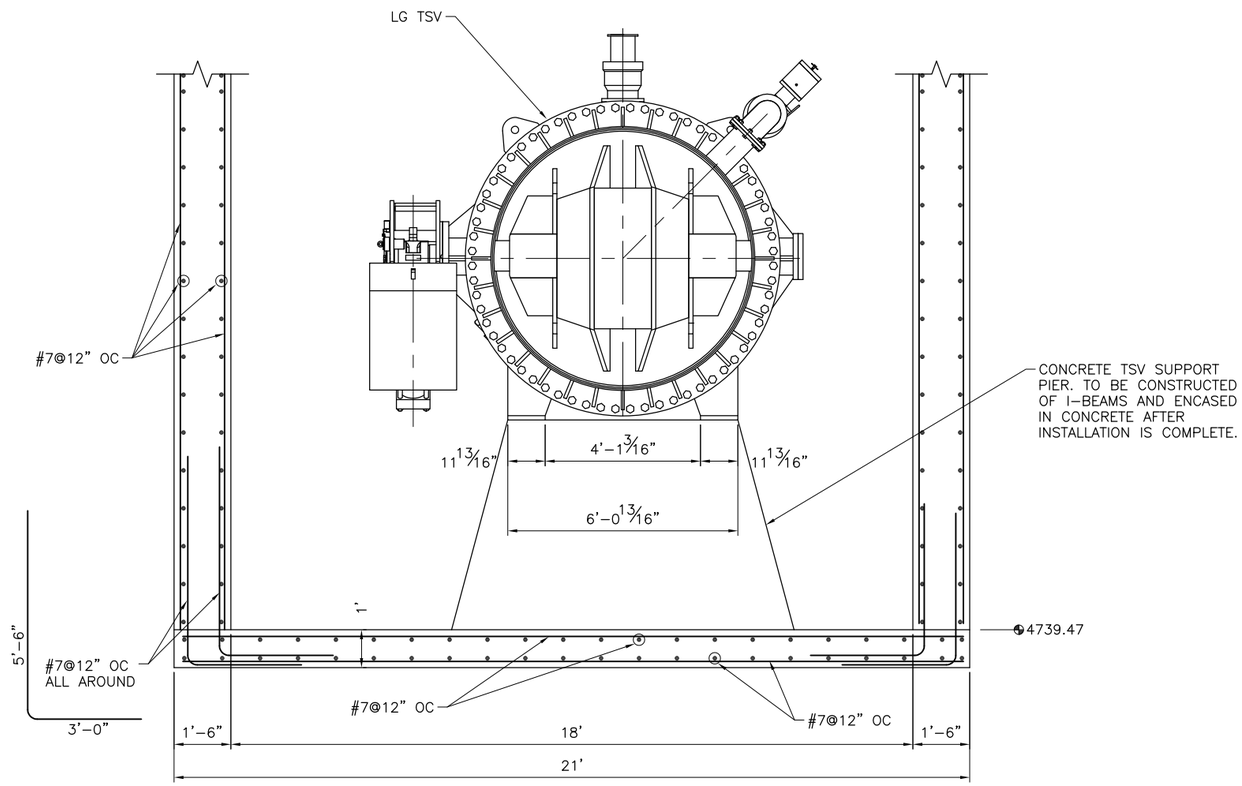
2 / S-12



RET. WALL DETAIL

SCALE: 1/4" = 1'-0"

3 / S-12



LG TSV SUPPORT SECTION DETAIL

SCALE: 1/4" = 1'-0"

4 / S-12

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL - OIL/WATER SEPERATOR

AS CONSTRUCTED 2019

REV NO	DATE	DESCRIPTION
1	11-20	MAKE PROF ADDED

POWERHOUSE STRUCTURAL - OIL/WATER SEPERATOR

S-12

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REMOVABLE ROOF HATCH (12.5'X9') OVER LG TSV

REMOVABLE ROOF HATCH #1 (21'X14') OVER GENERATOR

4781.29

6' SOFFIT OVERHANG

5 TON BRIDGE CRANE

4776.37

4777.35 HOOK HEIGHT

4775.00 MIN

OVERHEAD TROLLEY RAIL

CANTILEVER TROLLEY SUPPORT FROM BUILDING

CONCRETE COLUMN BEYOND SEE DETAILS 1/S-14 2/S-14

#6@12" OC EW EF ↓ (UNLESS OTHERWISE NOTED)

#6@12" OC

4'-0" / 3'-0"

1'

4764.50

4756.88

1'

CONCRETE COLUMN BEYOND SEE DETAIL 1/14 2/14

4756.88

#6@12" OC

¼" NPT PRESSURE TAPS @ 12,3,6, & 9 O'CLOCK

EXTEND HOOPS AND TIES TO CAPTURE RADIUS SKIN REINF.

3" CLR AROUND PENSTOCK (TYP), (4) #7 5 FT BEYOND EDGE OF PENSTOCK T&B

BARS TO MATCH SKIN REINF. BEND BARS AROUND RADIUS OF SCROLL CASE

4752.00

4749.27

#7@12" OC EF EW ↓ (UNLESS OTHERWISE NOTED)

(4) #7 VERT @ 3" OC (FULL HEIGHT OF WALL) EF EA SIDE OF PENSTOCK

#7@12" OC

1'-6"

4748.00 MAX T.W.

4744.16

1'-6"

#7H@12" OC EF EW ↓

4742.75

STD LAP

#7@12" OC (TYP-ALL AROUND)

5'-6"

3'-0"

5'-6"

#7@12" OC ALL AROUND

4739.47

3'-0"

4738.80 OPERATING LEVEL @ 460 CFS

4739.47

4736.50 MIN T.W.

#6@12" OC EW EF ↓ (UNLESS OTHERWISE NOTED)

6'-4 3/8"

9'-8 15/16"

4'-4 11/16"

1'

1'-6"

1'-6"

CONCRETE TSV SUPPORT PIER. TO BE CONSTRUCTED OF I-BEAMS AND ENCASED IN CONCRETE AFTER INSTALLATION IS COMPLETE.

3'-0"

#6@12" OC 4731.97 (TYP ALL AROUND)

4'-6"

SET THRUST BLOCK REINF. INTO CONCRETE AS SHOWN WITH 90 DEG HOOKS STD

15'-7 5/8"

12'-1 7/8"

14'-3 1/8"

29'-6"

#7H@12" OC EF ↓

NOTE:
THRUST BLOCK REINF. DETAILS SHOWN HERE ARE TYPICAL FOR EACH SCROLL CASE. SEE ONSITE ENGINEER FOR INDIVIDUAL REBAR AND SIZE REQUIREMENTS FOR EACH THRUST BLOCK.

TOP & BTM REINF., 3" CLR

POWERHOUSE SECT. THRU 450 CFS TURBINE, GENERATOR, & PH

1 / S-13

SCALE: 1/8" = 1'-0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL – SECTION THRU TURBINE, GENERATOR, & PH

AS CONSTRUCTED 2019

DESCRIPTION

REV NO | ITT-AM-00 | NAME, PROF ABBR.

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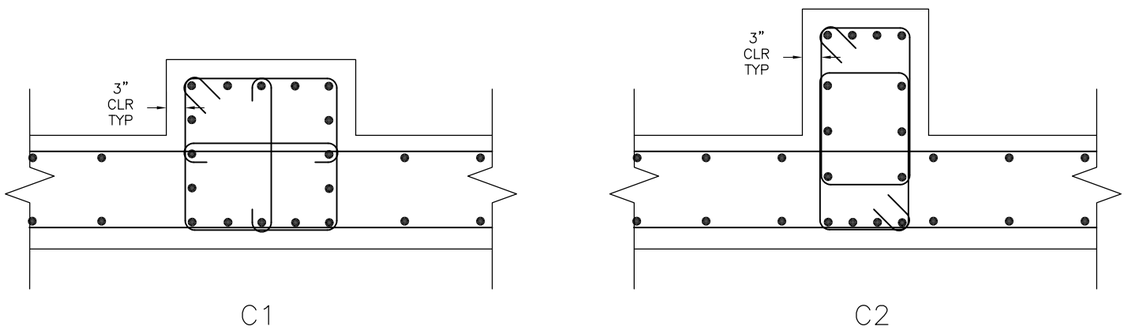
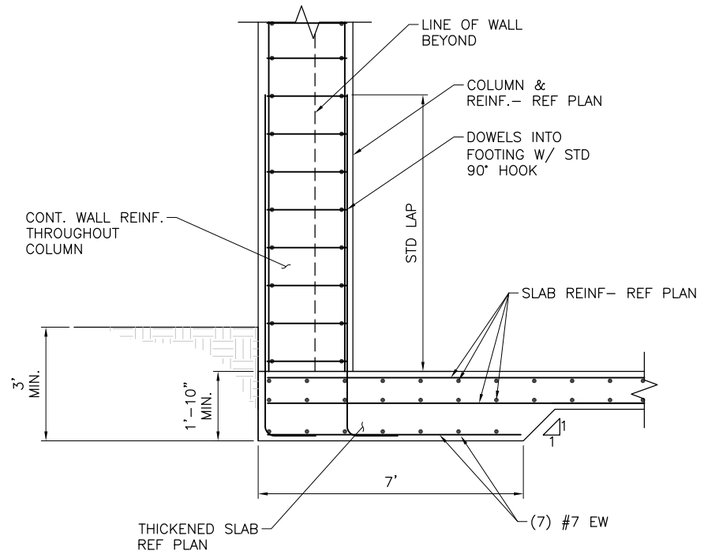
POWERHOUSE STRUCTURAL – SECTION THRU TURBINE, GENERATOR, & PH

S-13

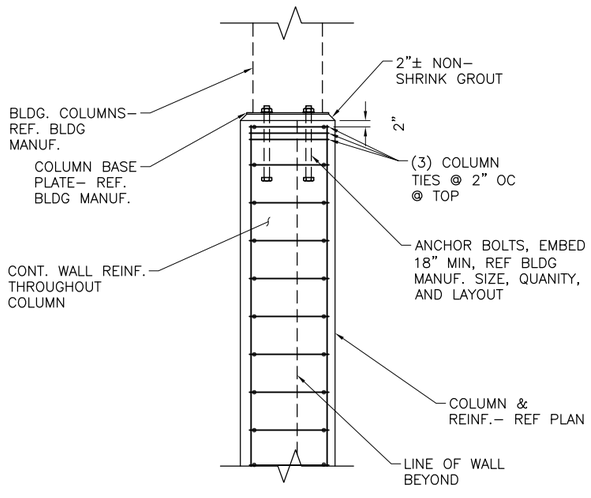
COLUMN & FOOTING SCHEDULE				
COLUMN	SIZE	REINF	FOOTING	FOOTING REINF.
C1	30"x 30"	(16) #7 #4 TIES @ 12" OC	7'-0" x 7'-0"x 1'-10"	TOP: MATCH SLAB REINF BTM: (7) 7 EW
C2	38"x 20"	(14) #7 #4 TIES @ 12" OC	7'-0" x 7'-0"x 1'-10"	TOP: MATCH SLAB REINF BTM: (7) 7 EW



COLUMN REINFORCING
LAYOUT– C1 & C2
SCALE: 1/2" = 1'–0"
1 S–14



COLUMN REINFORCING
CONCRETE FOOTING
SCALE: 1/4" = 1'–0"
2 S–14



TOP OF COLUMN
CONCRETE PIER
SCALE: 1/4" = 1'–0"
3 S–14

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PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	ITTT–MM–DD	NAME, PROF ASSOC	DESCRIPTION
1			

POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

S–14

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NOTE:
1. STAIR LANDINGS EQUAL 48" AS SHOWN.
2. Stair Rise = 6–15/16"
   Run = 11"
3. MIN. CLR WIDTH FOR STAIRS = 44"
4. STANDARD HAND RAIL HEIGHT = 42"
5. STAIR HAND RAIL HEIGHT = 36"
6. 48" MIN. LANDING AT TOP AND BOTTOM OF STAIRS.
7. 44" MIN EGRESS EACH SIDE OF DOORWAY. MAX ½" VARIANCE BETWEEN THRESHOLD AND LANDING
8. HANDRAIL EXTENSIONS– HANDRAILS SHALL RETURN TO A WALL, GUARD OR THE WALKING SURFACE OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT FLIGHT OF STAIRS OR RAMP RUN. WHERE HANDRAILS ARE NOT CONTINUOUS BETWEEN FLIGHTS, THE HANDRAILS SHALL EXTEND HORIZONTALLY NOT LESS THAN 12 INCHES BEYOND THE TOP RISER AND CONTINUE TO SLOPE FOR THE DEPTH OF ONE TREAD BEYOND THE BOTTOM RISER. AT RAMPS WHERE HANDRAILS ARE NOT CONTINUOUS BETWEEN RUNS, THE HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING 12 INCHES MINIMUM BEYOND THE TOP AND BOTTOM OF RAMP RUNS. THE EXTENSIONS OF HANDRAILS SHALL BE IN THE SAME DIRECTION OF THE FLIGHTS OF STAIRS AT STAIRWAYS AND THE RAMP RUNS AT RAMPS.
9. ALL REQUIRED DIMENSIONS FOR CATWALK, STAIRWAY, AND HANDRAIL TO BE FIELD MEASURED PRIOR TO FABRICATION.

HSS 4x2x¼ ALIGN w/GUARDRAIL POSTS– TYP

HSS4x4x¼

TYP (3)

MC12x10.6

W10x12

MC8x8.5 TYP

C15x33.9

W10x22

TYP (2)

WHERE OCCURS

MCNICHOLS GRIP STRUT 5 DIAMOND STAIR TREADS

McNICHOLS GW 1¼" x ⅛" BEARING BARS @ 1 3/16" OC

MCNICHOLS GRIP STRUT 5 DIAMOND STAIR TREADS

COM BOARD

200A CB 100A CB

HPU 2 HPU 1

MAIN 2 MAIN 1 GEN 2 GEN 1

GEN 2 CP GEN 1 CP EXCITATION CONTROL

GEN 2 GEN SWITCH GEAR

GEN 2 GEN 1 EXCITATION TRANSFORMER

AIR COMP

POWERHOUSE BLDG STEEL PLAN EL 4756.88

SCALE: 3/32" = 1'-0"

1 S-5S

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4754.26

AS CONSTRUCTED 2019

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POWERHOUSE STRUCTURAL– PLAN– MAIN LEVEL EL 4756.88

S–15

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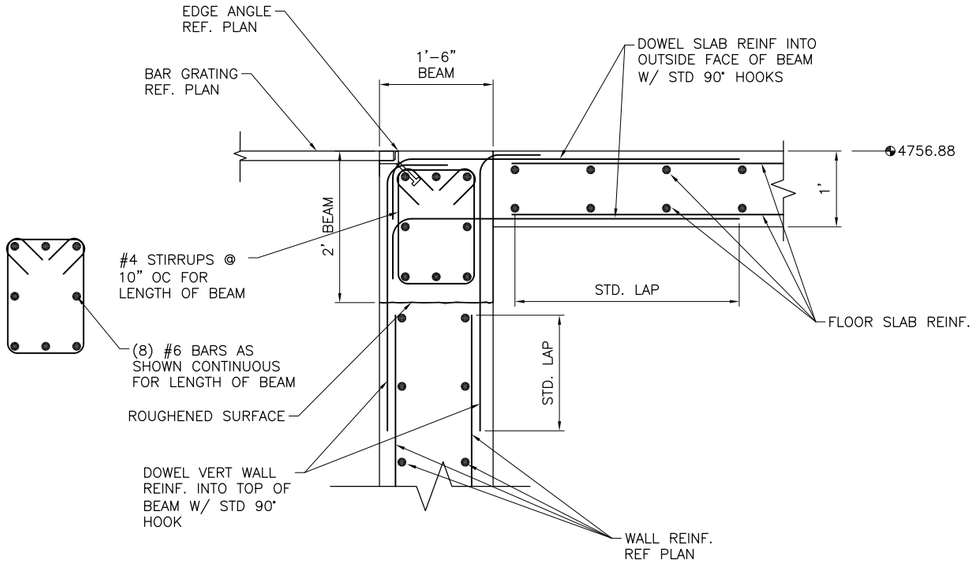
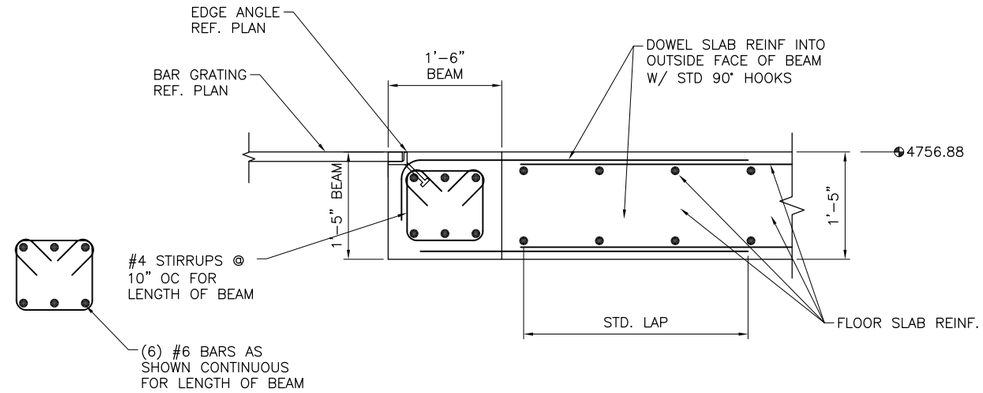


EDGE BEAM
AT WALL

SCALE:1/2" = 1'-0"

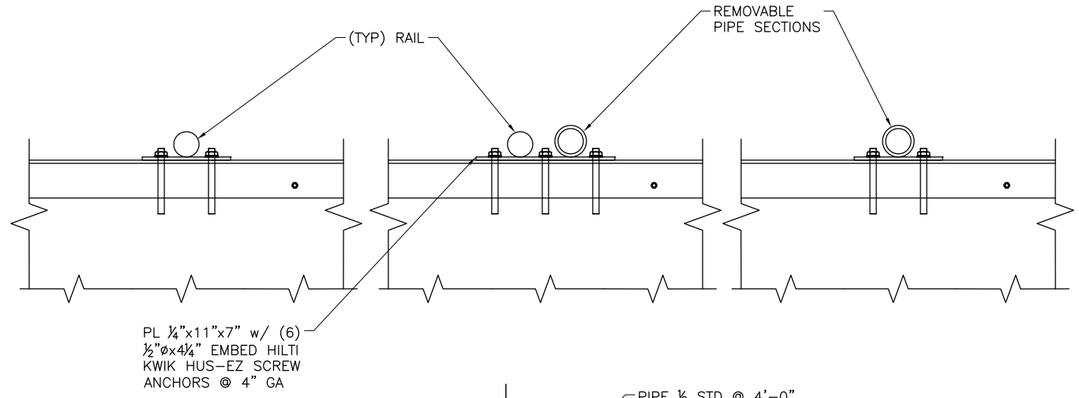
1 / S-16

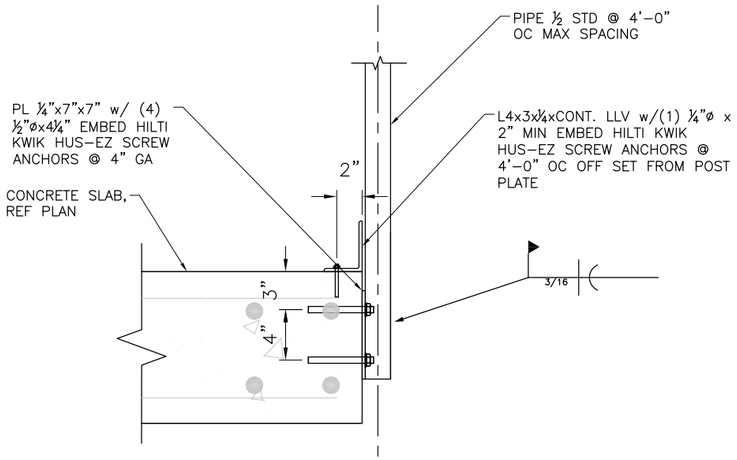


EDGE BEAM
AT CANTILEVER

SCALE:1/2" = 1'-0"

2 / S-16

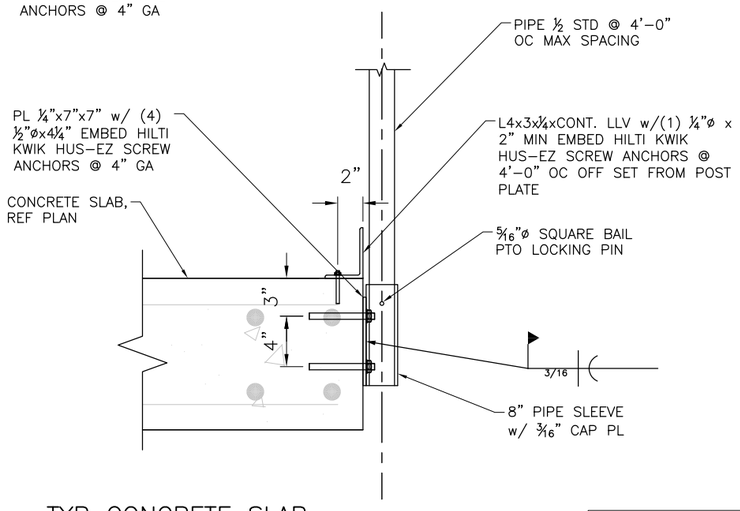




TYP CONCRETE SLAB
EDGE HANDRAIL

SCALE:1" = 1'-0"

3 / S-16



TYP CONCRETE SLAB
REMOVABLE EDGE HANDRAIL

SCALE: 1/2" = 1'-0"

4 / S-16

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

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1	MAR. PROJ. MGR.	

POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

S-16

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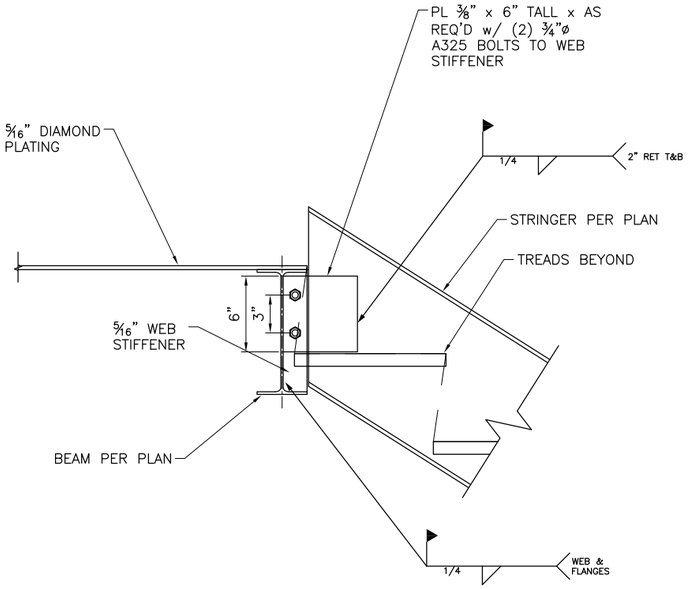
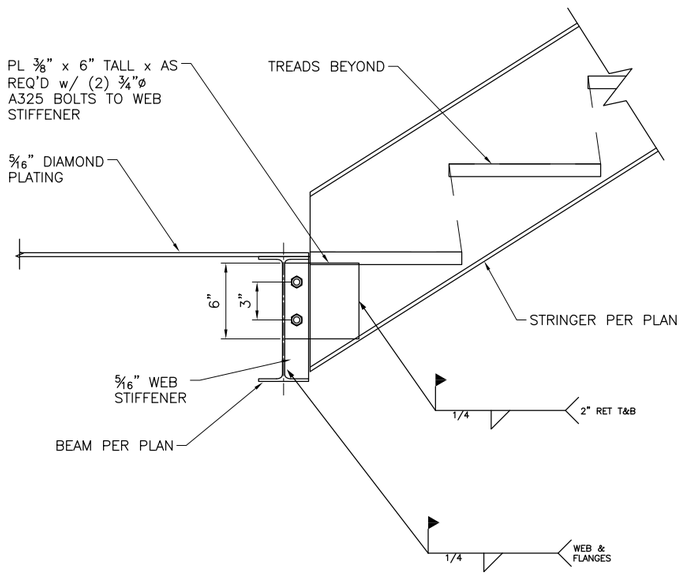


STRINGER TO LANDING BEAM

SCALE:1" = 1'-0"

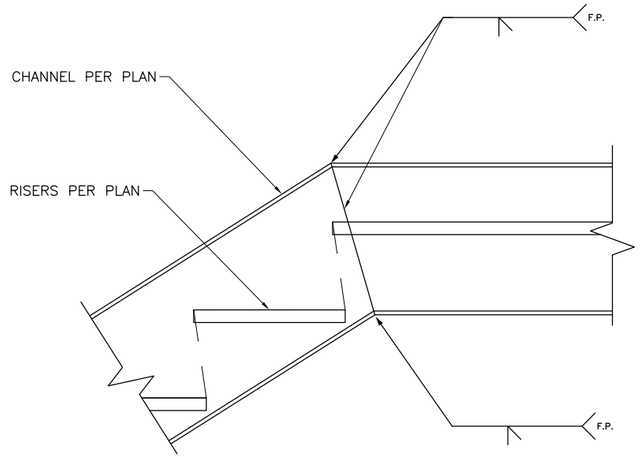
1 S-17



STRINGER TO LANDING BEAM

SCALE:1" = 1'-0"

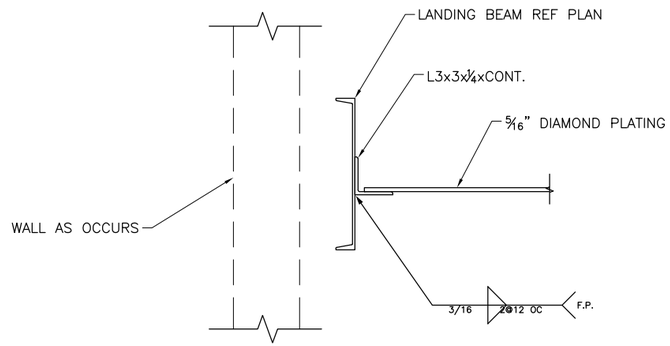
2 S-17



BENT STRINGER CONNECTION

SCALE:1" = 1'-0"

3 S-17



LANDING END CONNECTION

SCALE:1" = 1'-0"

4 S-17

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

POWERHOUSE STRUCTURAL-MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	TTTT-MM-DD	NAME, PROF ABBR.	DESCRIPTION
1			

POWERHOUSE STRUCTURAL-MISC. POWERHOUSE DETAILS

S-17

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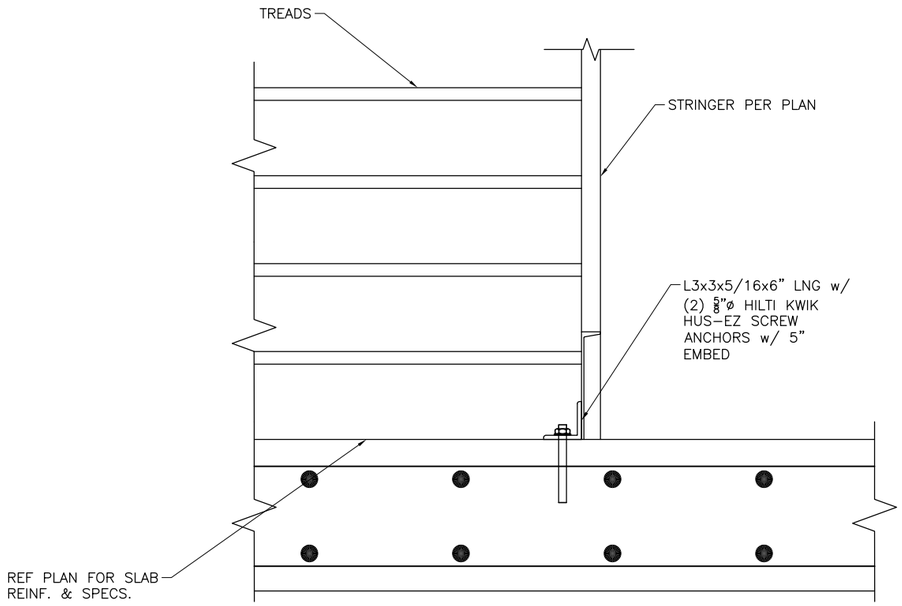
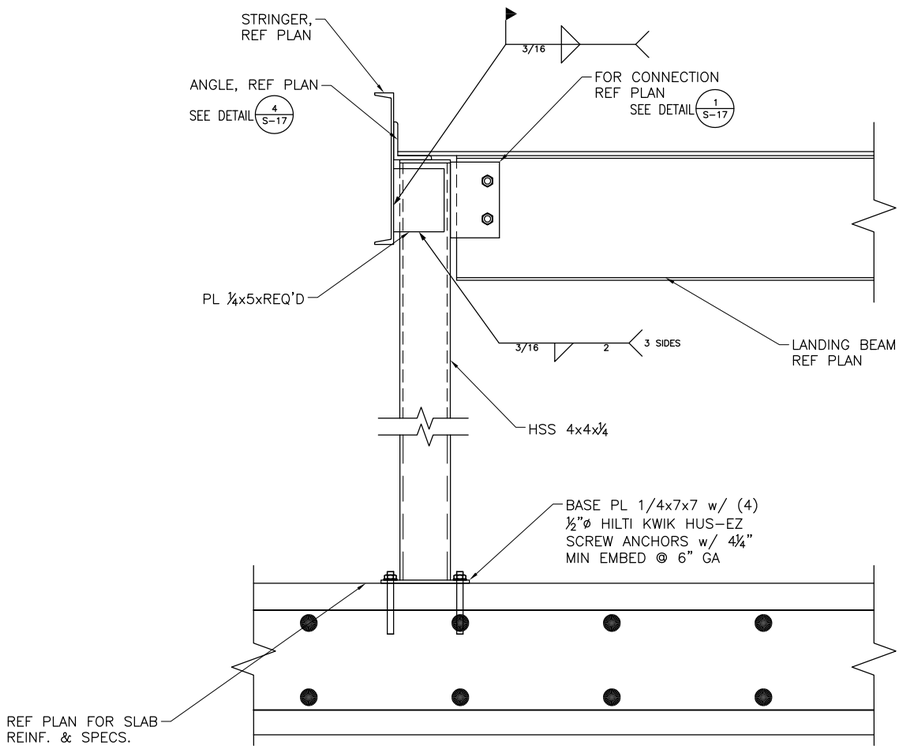


STAIR STRINGER TO SLAB

SCALE:1" = 1'-0"

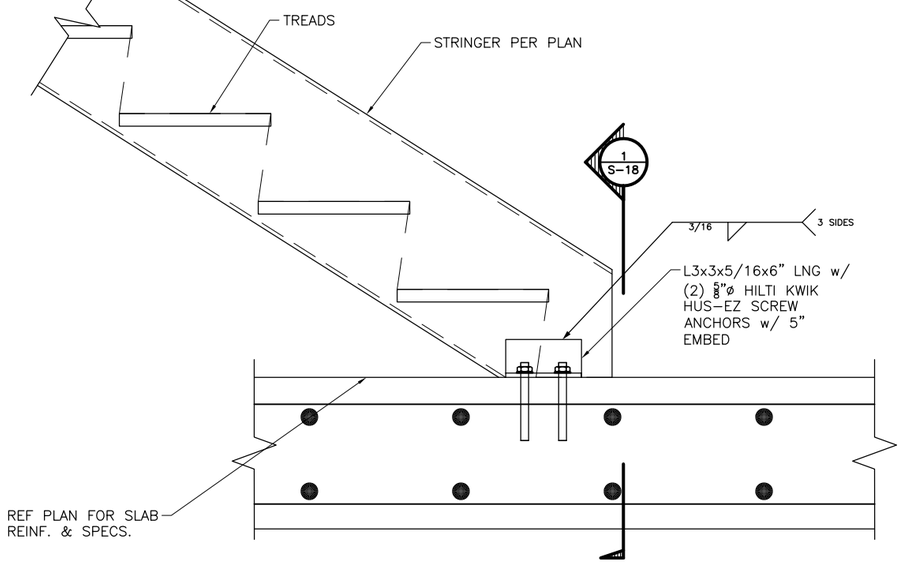
1 / S-18



COLUMN BASE & BEAM CONNECTION

SCALE:1" = 1'-0"

3 / S-18



STAIR STRINGER TO SLAB

SCALE:1" = 1'-0"

2 / S-18

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

POWERHOUSE STRUCTURAL–MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV	NO	????	MM	DD	DESCRIPTION
1					MMR, PROF ABBR.

POWERHOUSE STRUCTURAL–MISC. POWERHOUSE DETAILS

S-18

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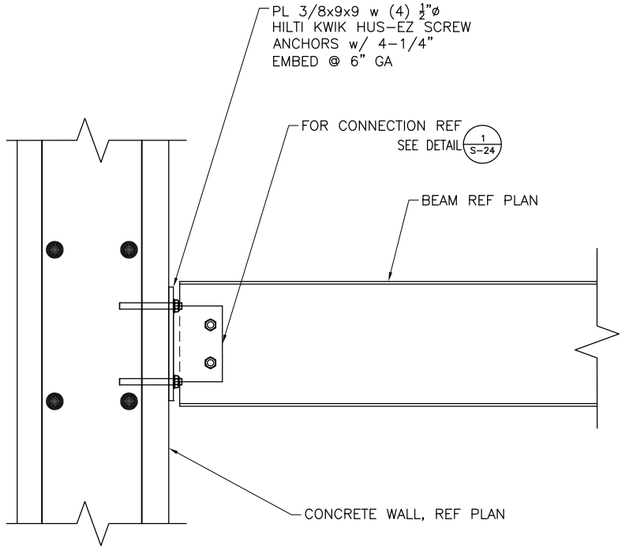
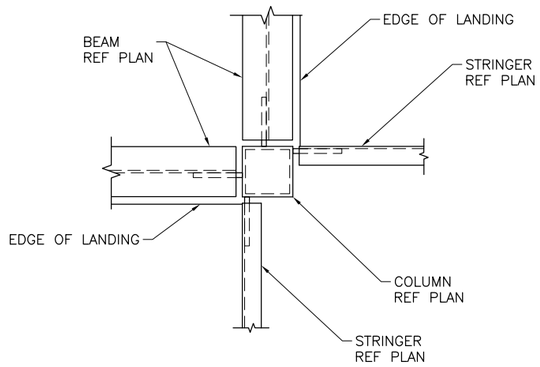


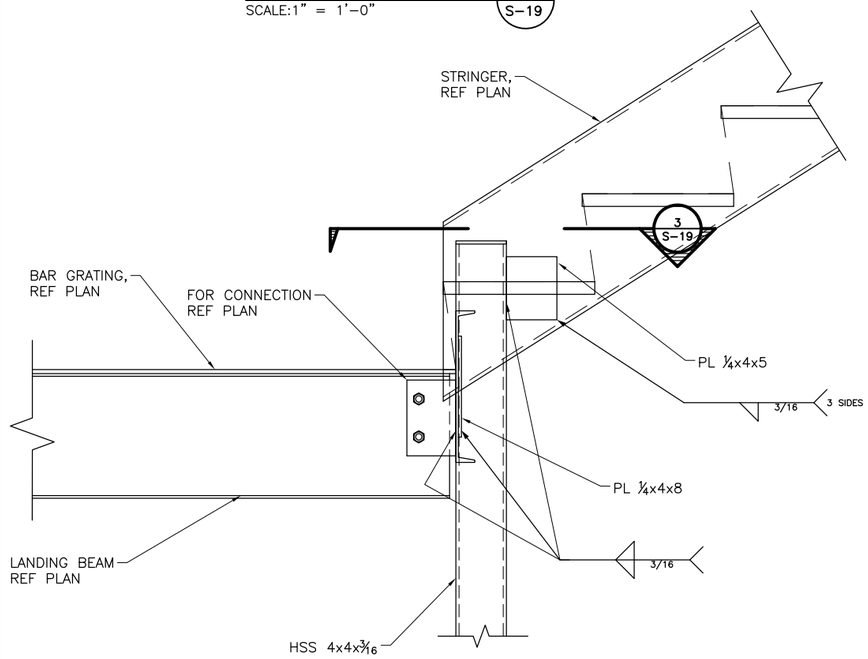
COLUMN BASE & BEAM CONNECTION 1 S-19

SCALE:1" = 1'-0"



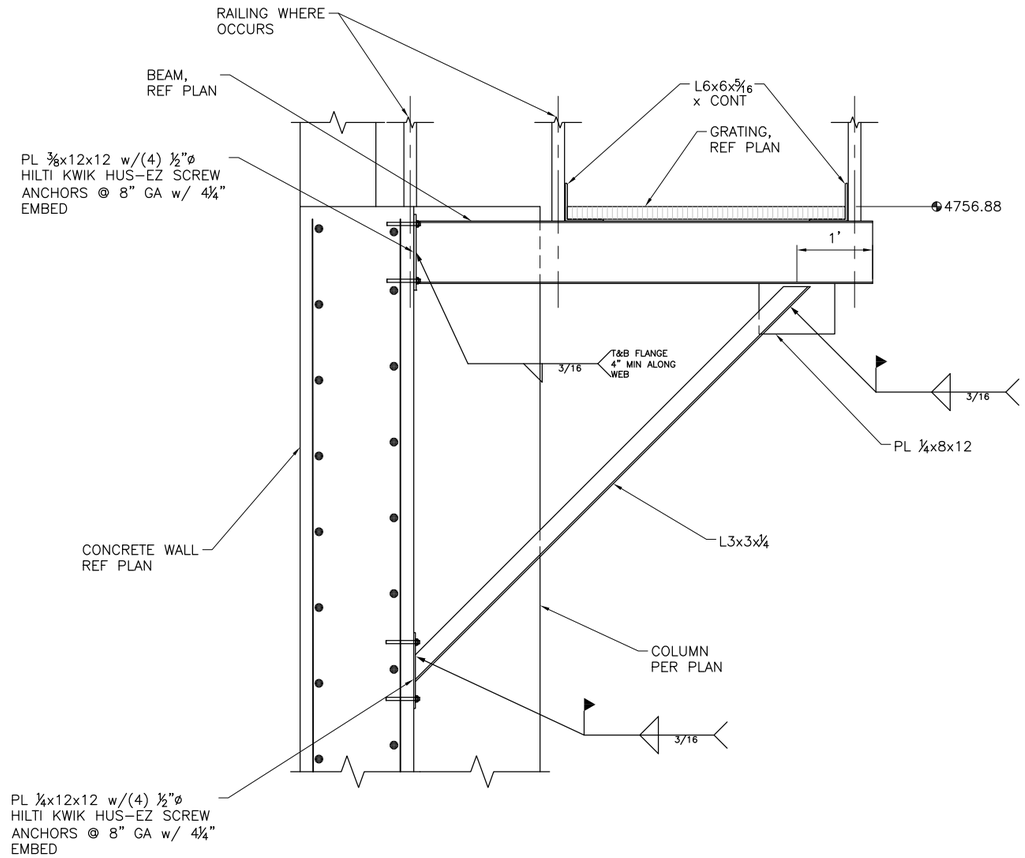
STAIR COLUMN CONNECTIONS 3 S-19

SCALE:1" = 1'-0"



STAIR COLUMN CONNECTIONS 2 S-19

SCALE:1" = 1'-0"



CAT WALK BEAM ATTACHMENT 4 S-19

SCALE:1/2" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	DATE	DESCRIPTION	NAME, PROF. ABBR.
1	11-04-20		

POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

S-19

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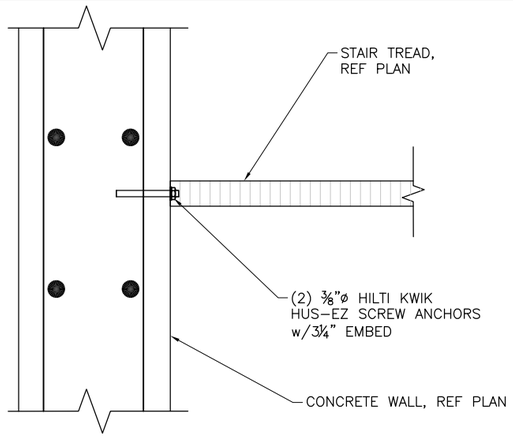
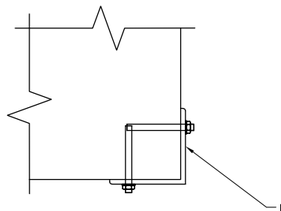
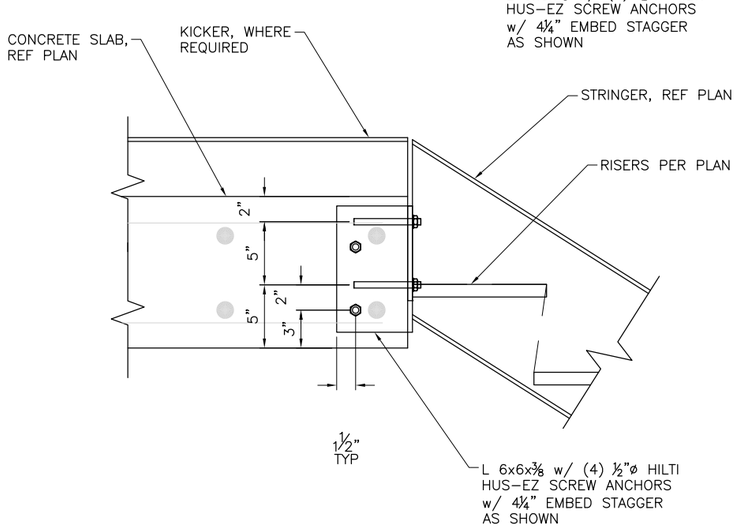


STAIR TREAD TO CONCRETE WALL

SCALE:1" = 1'–0"

1 / S–20





STRINGER TO CONCRETE EDGE

SCALE:1" = 1'–0"

2 / S–20

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SORENSON ENGINEERING

PROJECT

DRAWING NUMBER

ALWAYS THINK SAFETY

PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	TITT-MM-DD	NAME, PROF ABBR.	DESCRIPTION
–			

POWERHOUSE STRUCTURAL–MISC. POWERHOUSE DETAILS

S–20

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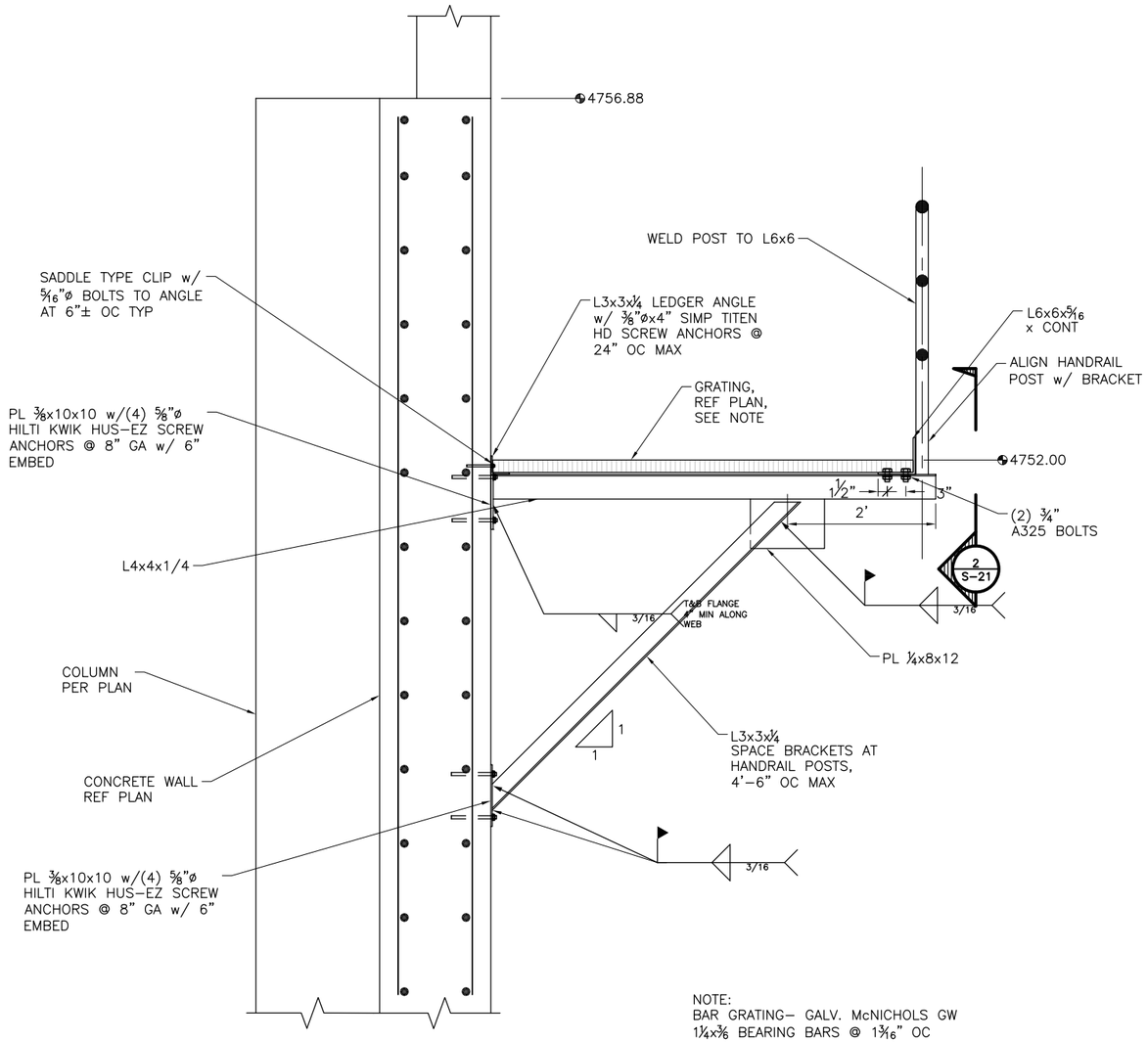
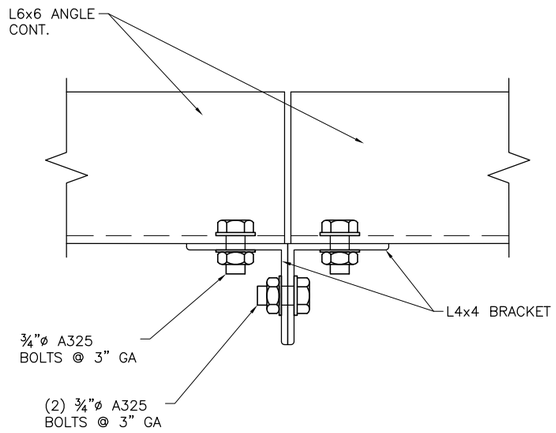


NOTE:
BAR GRATING- GALV. McNICHOLS GW
1¼x⅜ BEARING BARS @ 1 3/16" OC

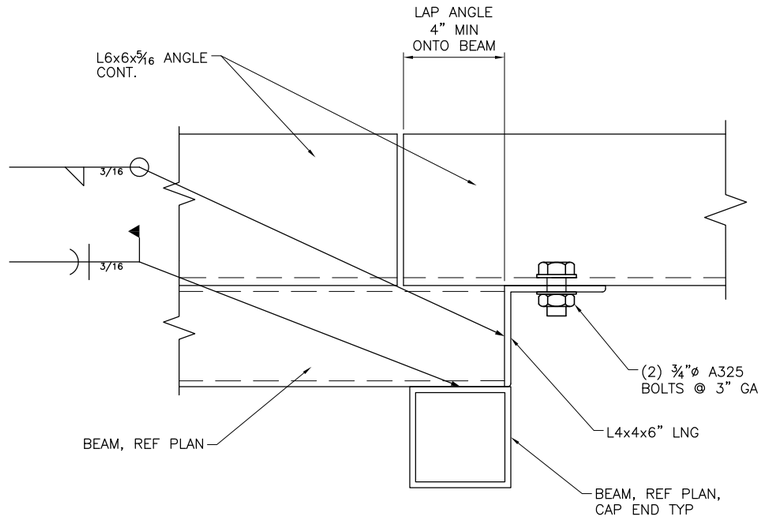
CAT WALK BEAM ATTACHMENT

SCALE:1" = 1'-0" — 1 / S-21



L 6x6 SPLICE SECTION

SCALE:2" = 1'-0" — 2 / S-21



CAT WALK AT STOP GATE BEAM CONNECTIONS

SCALE:2" = 1'-0" — 3 / S-21

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	TYPE-MM-DD	NAME, PROF. ABBR.	DESCRIPTION
1			

POWERHOUSE STRUCTURAL-
MISC. POWERHOUSE DETAILS

S-21

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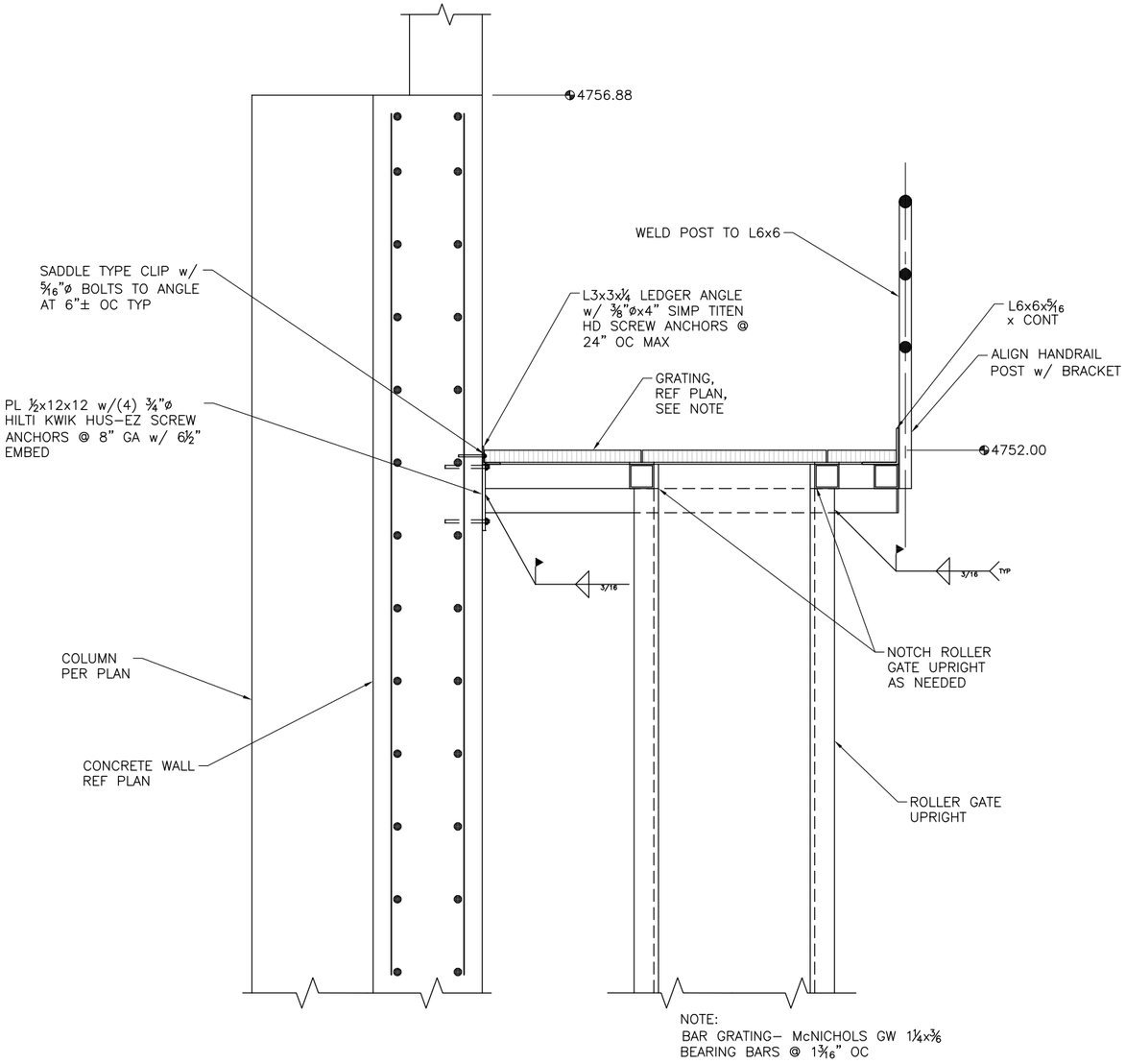
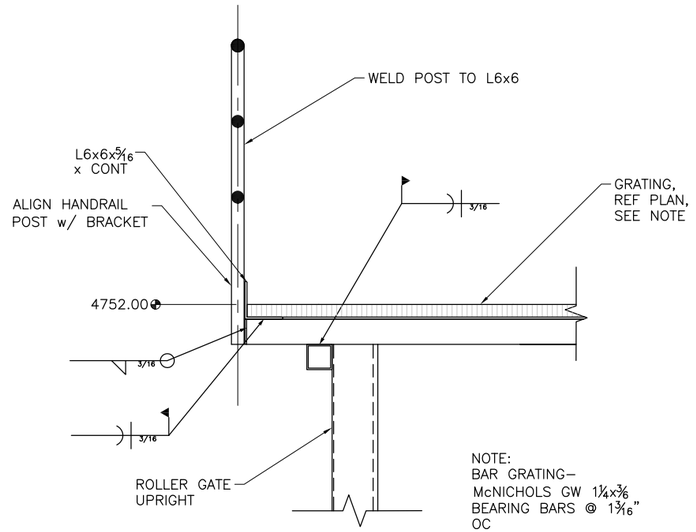


CAT WALK- AT GATE EDGE BEAM ATTACHMENT

SCALE: 1" = 1'-0"

1 / S-22



CAT WALK- AT END BEAM ATTACHMENT

SCALE:1" = 1'-0"

2 / S-22

SORENSON ENGINEERING

DRAWING NUMBER

PROJECT

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

POWERHOUSE STRUCTURAL- MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	DATE	DESCRIPTION
1	11-MAY-20	MAKE_PROF ADDED.

POWERHOUSE STRUCTURAL- MISC. POWERHOUSE DETAILS

S-22

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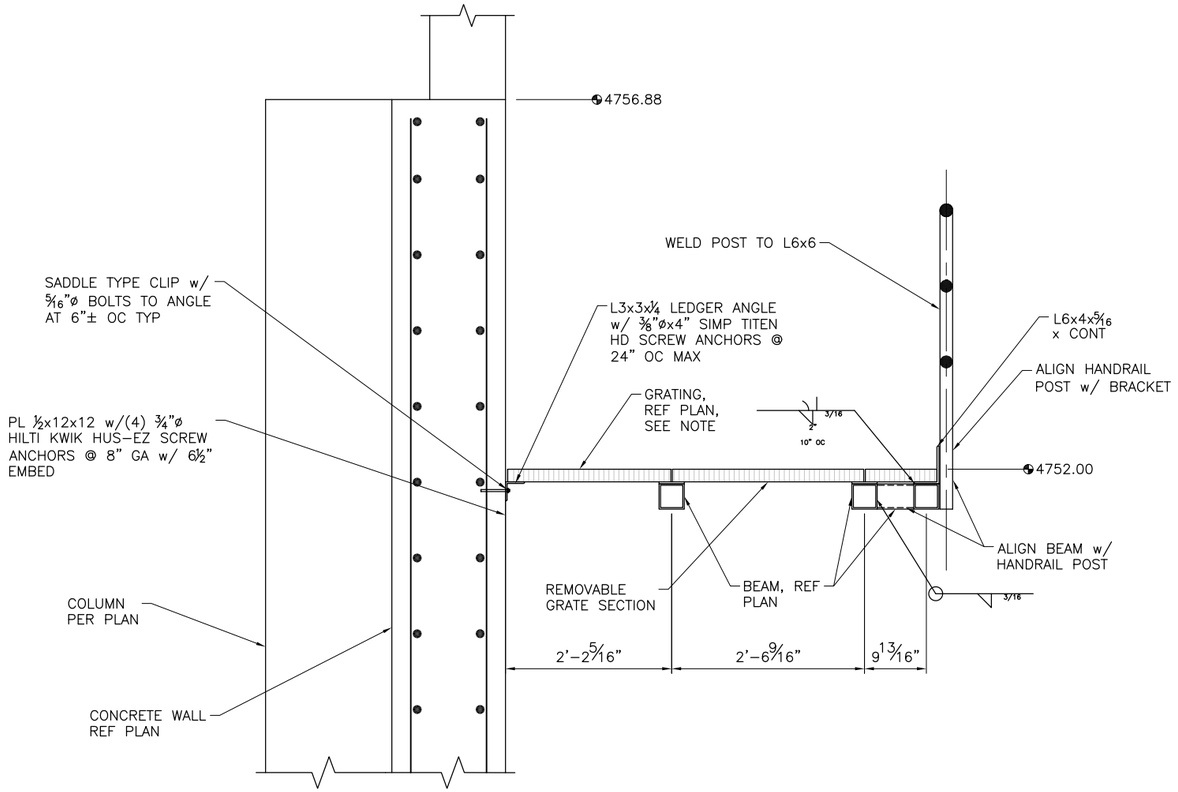
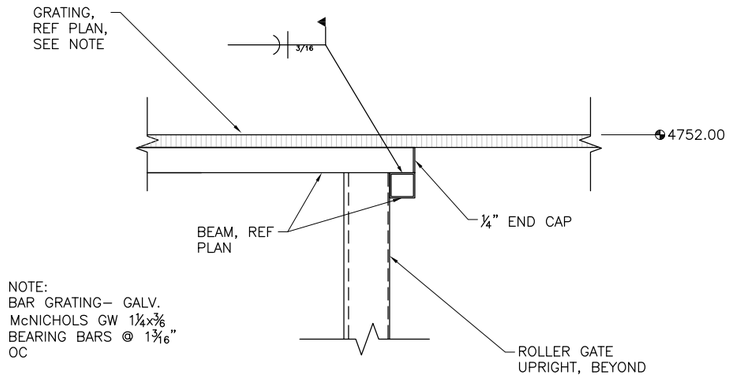


NOTE:
BAR GRATING– GALV. McNICHOLS GW 1¼x⅜ BEARING BARS @ 1 3/16" OC

CAT WALK– BETWEEN GATE BEAM ATTACHMENT

SCALE: 1" = 1'–0"

1 / S–23



NOTE:
BAR GRATING– GALV. McNICHOLS GW 1¼x⅜ BEARING BARS @ 1 3/16" OC

CAT WALK– AT END BEAM ATTACHMENT

SCALE:1" = 1'–0"

2 / S–23

SORENSON ENGINEERING

DRAWING NUMBER

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

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–	NAME, PROF ABBR.	

POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

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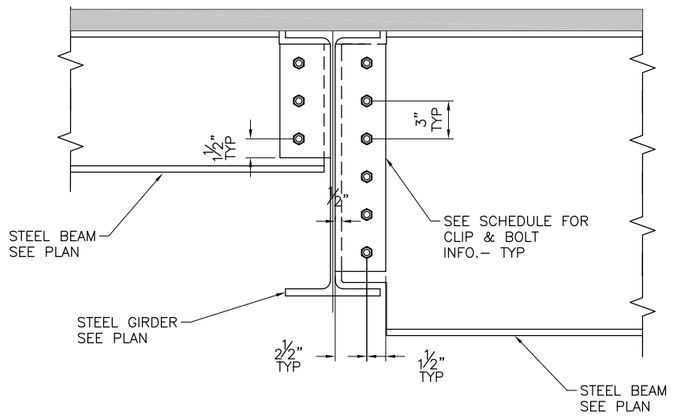
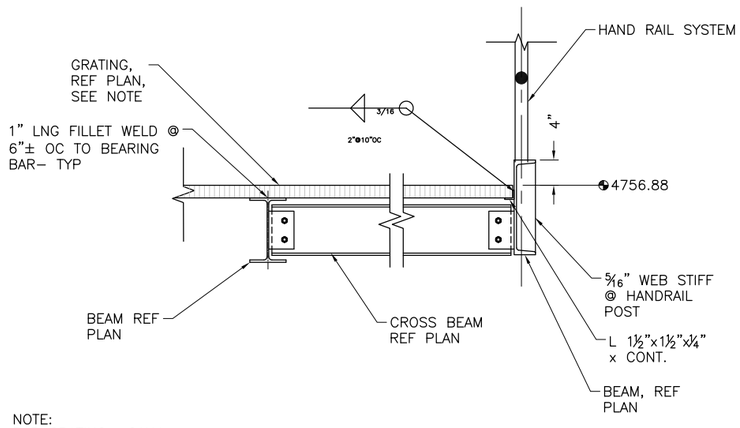
CONNECTION SCHEDULE			
BEAM SIZE	PLATE DIMENSIONS	# BOLTS	FILLET WELD SIZE
C8x, BC10x, W8x, W10X	5/16"x4"x6"	(2) 3/4"Ø A325	1/4" BOTH SIDES
W12x, W14x	5/16"x4"x9"	(3) 3/4"Ø A325	1/4" BOTH SIDES
W16x, W18x	5/16"x4"x1'-0"	(4) 3/4"Ø A325	1/4" BOTH SIDES
W21x	3/8"x4"x1'-3"	(5) 3/4"Ø A325	1/4" BOTH SIDES
W24x	3/8"x4"x1'-6"	(6) 3/4"Ø A325	1/4" BOTH SIDES

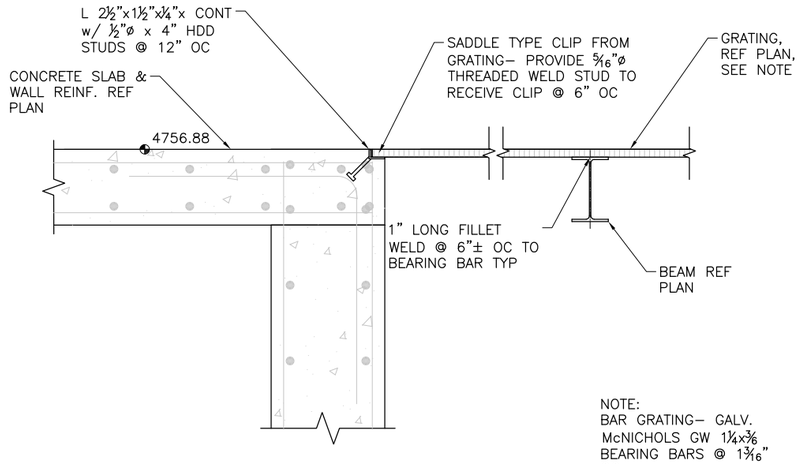


BEAM CONNECTION SCHEDULE (TYP) — 1 / S–24
SCALE:1" = 1'–0"



NOTE:
BAR GRATING– GALV.
McNICHOLS GW 1¼x⅜
BEARING BARS @ 1 3/16" OC

FLOOR EDGE CHANNEL OVER TSV — 2 / S–24
SCALE:1/2" = 1'–0"



NOTE:
BAR GRATING– GALV.
McNICHOLS GW 1¼x⅜
BEARING BARS @ 1 3/16" OC

FLOOR EDGE TO CONCRETE OVER TSV — 3 / S–24
SCALE:1/2" = 1'–0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV	NO	DESCRIPTION
1	11717–MM–00	IMME. PROF. ABBR.

POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

S–24

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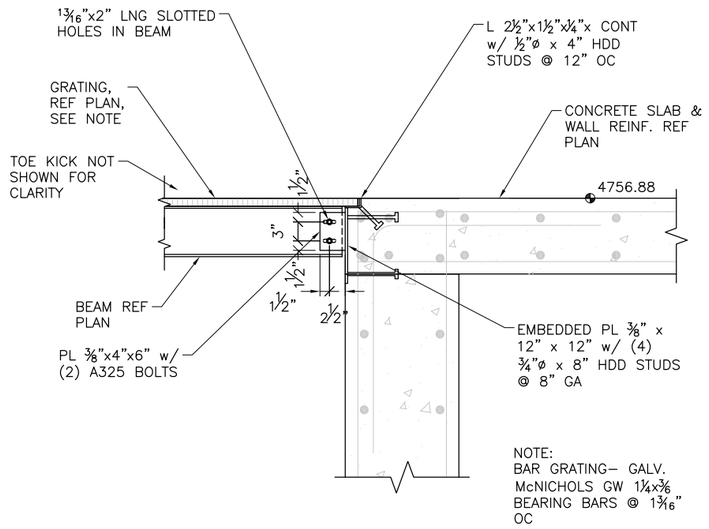
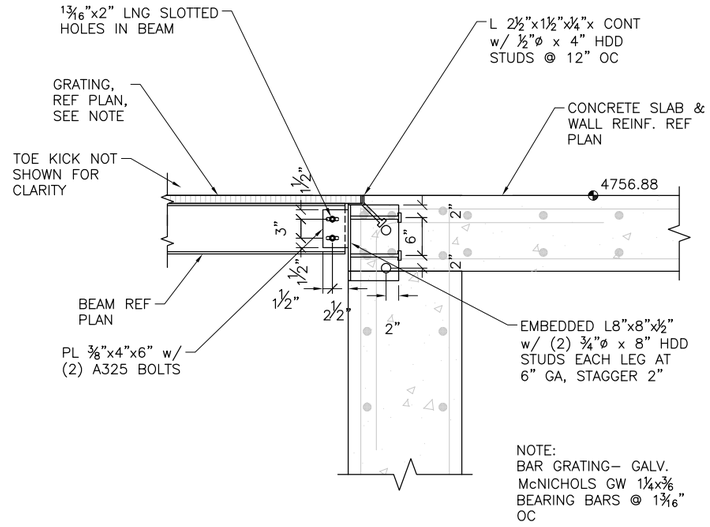


WF BEAM TO CONC. OVER TSV

SCALE:1/2" = 1'–0"

1 / S–25



WF BEAM TO CONC. BEAM OVER TSV

SCALE:1/2" = 1'–0"

2 / S–25

SORENSON ENGINEERING

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

AS CONSTRUCTED 2019

REV NO	TTTT-MM-DD	DESCRIPTION
–	NAME, PROF ABBR.	

POWERHOUSE STRUCTURAL–
MISC. POWERHOUSE DETAILS

S–25

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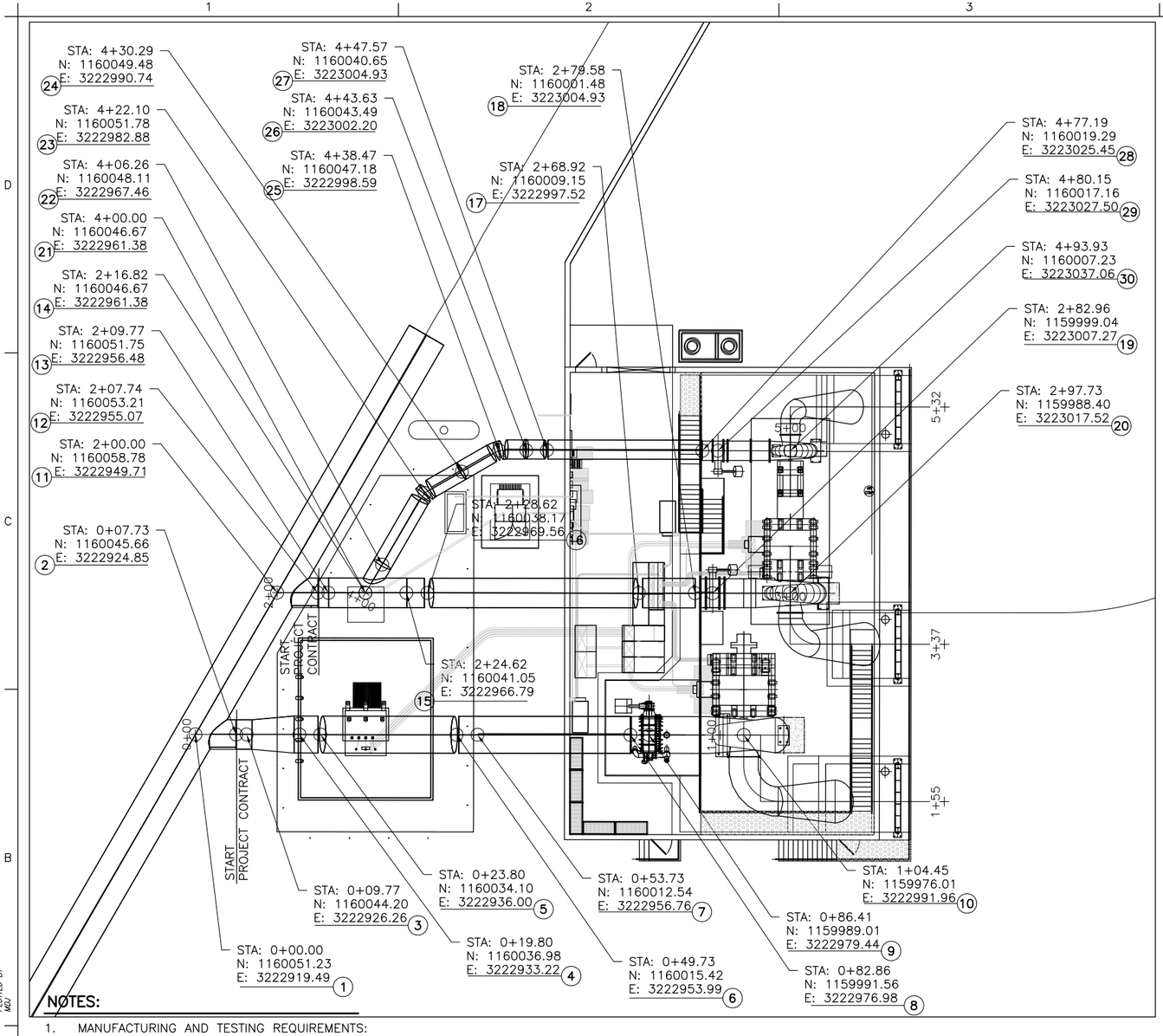

PENSTOCK DEFLECTION POINT TABLE				
84" ID PENSTOCK				
POINT #	STATION	CL EL. (FT)	HORIZ. ∠	VERT. ∠
1	0+00.00	4754.55	NA	NA
2	0+07.73	4754.55	0.00°	0.00°
3	0+09.77	4754.55	0.00°	0.00°
4	0+19.80	4753.84	0.00°	0.00°
5	0+23.80	4753.84	0.00°	0.00°
6	0+49.73	4749.27	0.00°	−10.00°
7	0+53.73	4749.27	0.00°	10.00°
8	0+82.86	4749.27	0.00°	0.00°
9	0+86.41	4749.27	0.00°	0.00°
10	1+04.45	4749.27	0.00°	0.00°
67" ID PENSTOCK				
11	2+00.00	4754.52	NA	NA
12	2+07.74	4754.52	0.00°	0.00°
13	2+09.77	4754.52	0.00°	0.00°
14	2+16.82	4754.52	0.00°	0.00°
15	2+24.62	4754.52	0.00°	0.00°
16	2+28.62	4754.52	0.00°	−10.00°
17	2+68.92	4747.42	0.00°	10.00°
18	2+79.58	4747.42	0.00°	0.00°
19	2+82.96	4747.42	0.00°	0.00°
20	2+97.73	4747.42	0.00°	0.00°
44" ID PENSTOCK				
21	4+00.00	4754.52	NA	NA
22	4+06.26	4753.42	0.00°	−10.00°
23	4+22.10	4750.63	0.00°	0.00°
24	4+30.29	4749.19	−28.15°	0.00°
25	4+38.47	4747.75	0.00°	0.00°
26	4+43.63	4746.83	−28.15°	0.00°
27	4+47.57	4746.14	0.00°	10.00°
28	4+77.19	4746.14	0.00°	0.00°
29	4+80.15	4746.14	0.00°	0.00°
30	4+93.93	4746.14	0.00°	0.00°

BIFURCATION & PENSTOCK INSTALLATION PLAN

SCALE: 1" = 25'-0"

1 / FD-1

NOTES:

1. MANUFACTURING AND TESTING REQUIREMENTS:
   A) ALL WELDING SHALL BE 100% PENETRATION WELDS. POCKETS AND RECESSED AREAS SHALL BE RE-WELDED AND GROUND FLUSH.
   B) THE FABRICATED STRUCTURAL STEEL BIFURCATION WYE SHALL BE FABRICATED AND TESTED IN ACCORDANCE WITH THE AMERICAN WATER WORKS (AWWA) STANDARD SPECIFICATION C200-80 AND MANUAL M11.
   C) NO EXTERIOR FINISH IS REQUIRED IN AREAS THAT ARE TO BE ENCASED IS CONCRETE. FIELD TOUCH UP IN AREAS WHERE FIELD WELDING HAS BEEN ACCOMPLISHED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. SEE PENSTOCK DRAWINGS FOR REQ'D EXTERIOR (OD) PAINT LOCATIONS. WHERE REQ'D PAINT A MINIMUM 2 COATES OF CARBOGUARD 60 (8-10 MILLS DFT TOTAL)
   D) INTERIOR PAINTING SHALL BE A MINIMUM OF TWO COATES OF CARBOGUARD 61 FOR 8-10 MILS DFT TOTAL, SSPC-CP10, OR APPROVED EQUAL. NTERIOR SURFACES ARE TO BE SANDBLASTED TO A NEAR WHITE FINISH.
2. ALL WELDING ON THE BIFURCATION, WYES, PENSTOCK, AND MANIFOLD PIPING, BOTH SHOP AND FIELD, SHALL BE ACCOMPLISHED BY AWS QUALIFIED WELDERS. SUBMIT WELDER CERTIFICATIONS AND PRE-QUALIFICATION OF WELDS TO THE ENGINEER PRIOR TO FABRICATION.
3. THE PENSTOCK BIFURCATION ASSEMBLY SHALL BE MANUFACTURED FROM ASTM A36 STEEL PLATE AND PIPE SECTIONS. THE OPTION FOR SUBSTITUTION WITH HIGHER STRENGTH STEEL AS IDENTIFIED IN AWWA C200 WILL NOT BE ALLOWED FOR THE FABRICATION OF THE PENSTOCK BIFURCATION ASSEMBLY.
4. MIL CERTIFICATION FOR THE MATERIALS USED TO FABRICATE THE BIFURCATION WYE SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF FABRICATION. ALL CERTIFICATION SHALL BE IN ACCORDANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION AND ASTM A6.
5. AFTER THE BIFURCATION ASSEMBLY HAS BEEN COMPLETED AND HYDROSTATIC TESTING OF THE COMPLETED ASSEMBLY UP TO 225 PSI, WELDING ON THE ASSEMBLY WILL NOT BE ALLOWED WITHOUT A COMPLETE RE-TEST IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE AFOREMENTIONED HYDROSTATIC TEST.
6. HOLD PAINT BACK 2" FROM FIELD JOINTS. COAT SURFACES IN HOLD BACK AREAS W/WELDABLE PRIMER.

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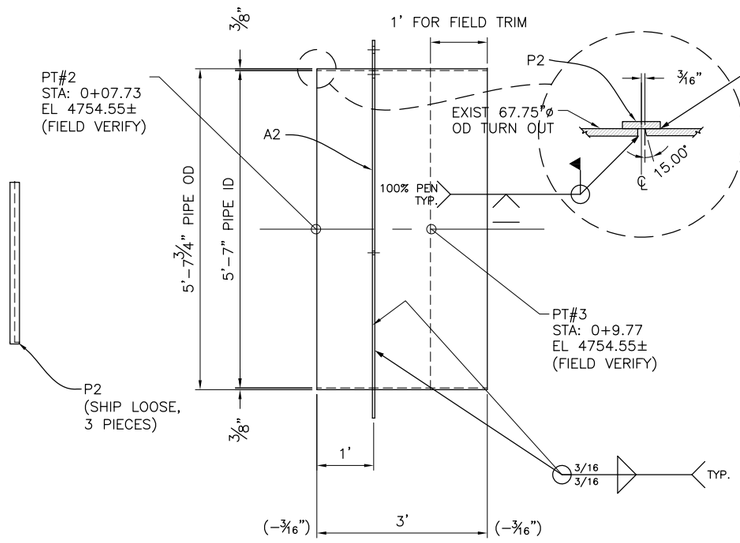
PROJECT
SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS-
BIFURCATIONS & PENSTOCKS
GENERAL INSTALLATION PLAN

AS CONSTRUCTED 2019

REV	NO	????	MM	DD	MAME, PROF ABBR.	DESCRIPTION
1						

FABRICATED DETAILS-
BIFURCATIONS & PENSTOCKS
GENERAL INSTALLATION PLAN

FD-1



SPOOL– EL/TRUE VIEW
5'–7" ID

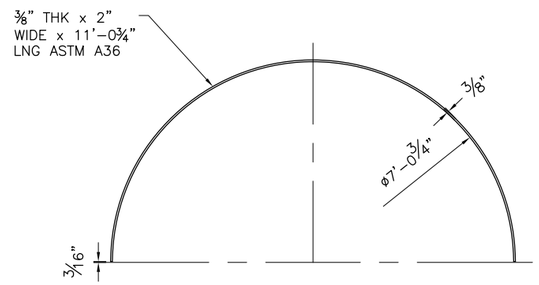
SCALE: 3/8" = 1'–0"

1 FD-2

INCREASER– EL/TRUE VIEW
5'–7" ID x 7'–0" ID

SCALE: 3/8" = 1'–0"

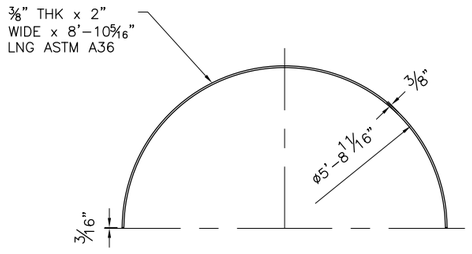
2 FD-2



STEEL 3/8" RING BACKING
PLATE DETAIL P1

SCALE: 3/8" = 1'–0"

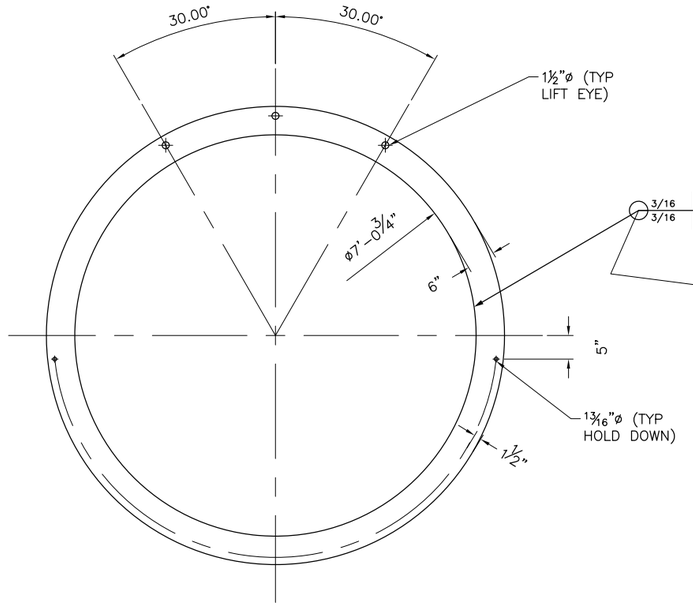
3 FD-2



STEEL 3/8" RING BACKING
PLATE DETAIL P2

SCALE: 3/8" = 1'–0"

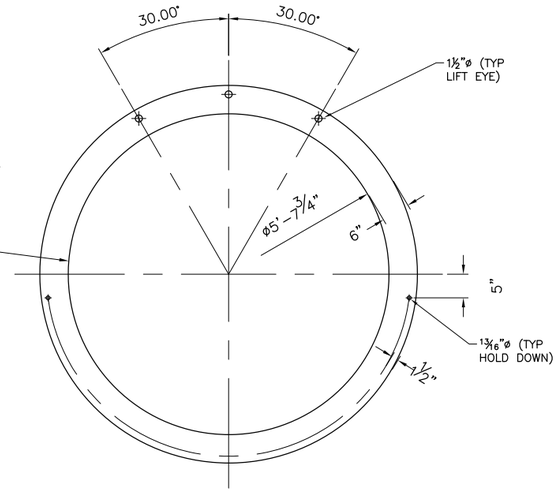
4 FD-2



STEEL 1/2" RING STIFFENER
SECTION DETAIL A1

SCALE: 3/8" = 1'–0"

5 FD-2



STEEL 1/2" RING STIFFENER
SECTION DETAIL A2

SCALE: 3/8" = 1'–0"

6 FD-2

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SORENSON ENGINEERING

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
INCREASER & PENSTOCK
MISC. DETAILS

AS CONSTRUCTED 2019

REV	NO	DESCRIPTION
1	TTTT-MM-DD	NAME, PROF ABBR.

FABRICATED DETAILS–
INCREASER & PENSTOCK
MISC. DETAILS

FD-2

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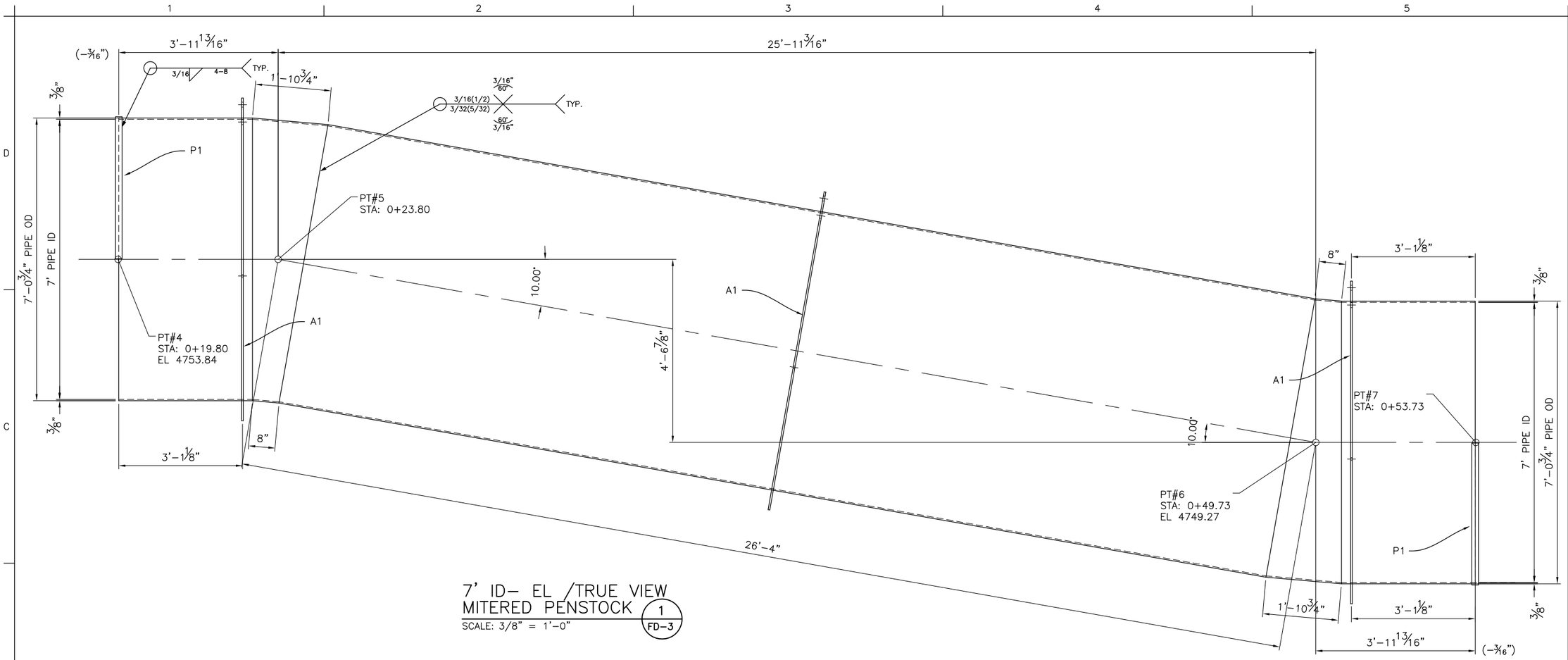
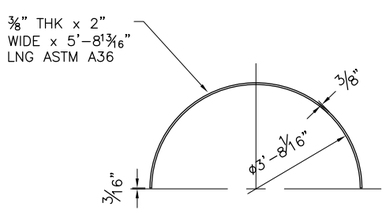


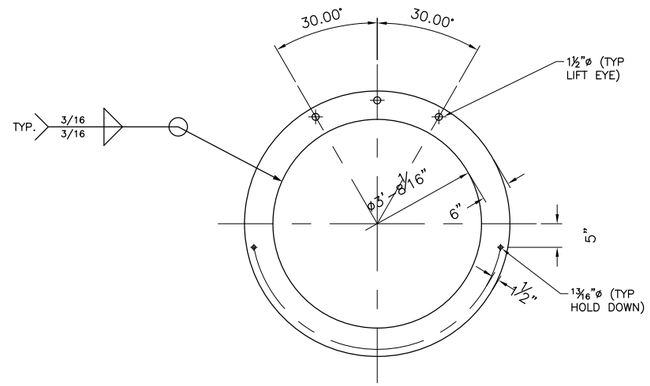
7' ID– EL /TRUE VIEW MITERED PENSTOCK (1 / FD-3)

SCALE: 3/8" = 1'–0"



STEEL 3/8" RING BACKING PLATE DETAIL P5 (2 / FD-3)

SCALE: 3/8" = 1'–0"



STEEL 1/2" RING STIFFENER SECTION DETAIL A5 (3 / FD-3)

SCALE: 3/8" = 1'–0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
PENSTOCK MISC. DETAILS

AS CONSTRUCTED 2019

REV	NO	TTTT-MM-DD	DESCRIPTION
1		MMM. PROF. ABBR.	

FABRICATED DETAILS–
PENSTOCK MISC. DETAILS

FD-3

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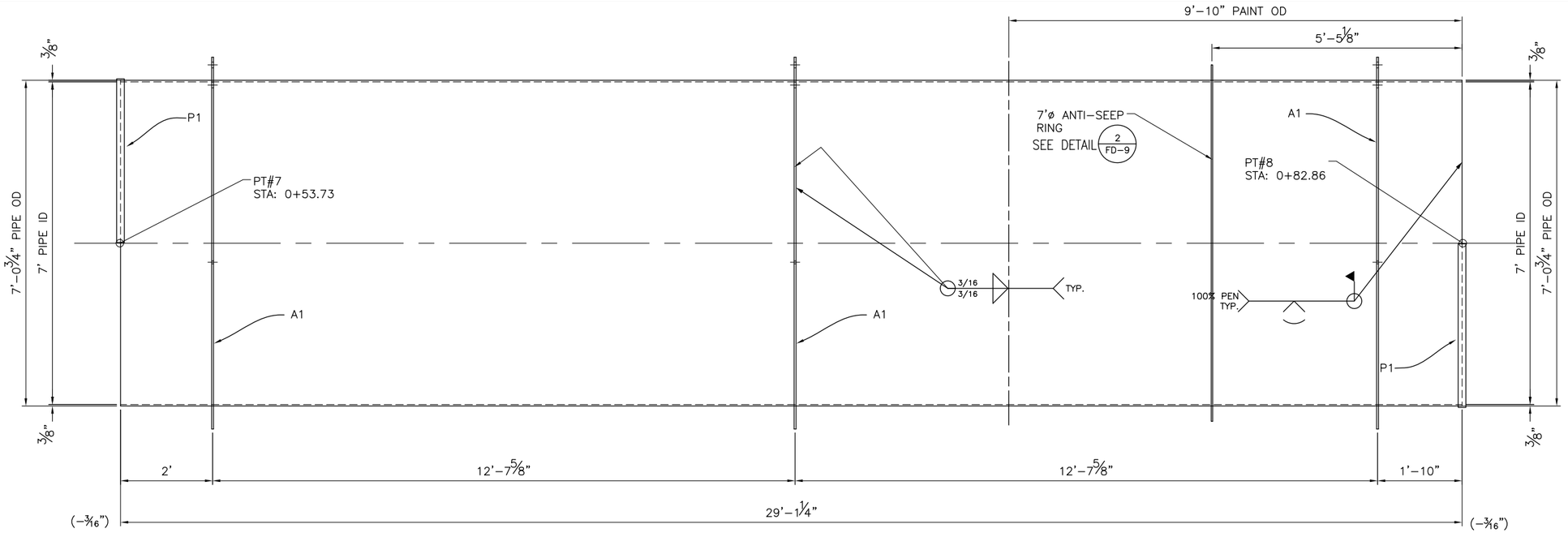
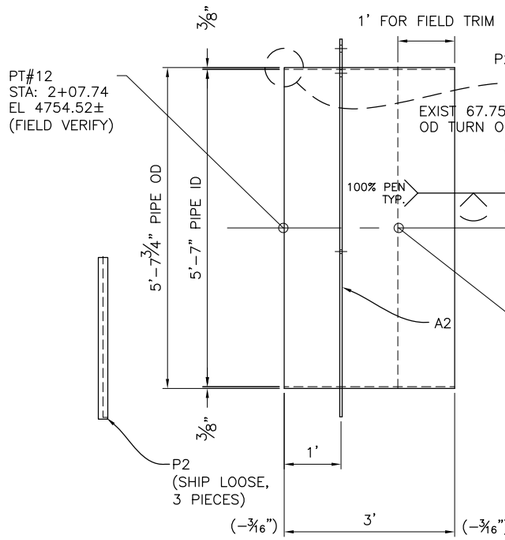
CAD FILENAME
FD PENSTOCK 9-27-19.DWG



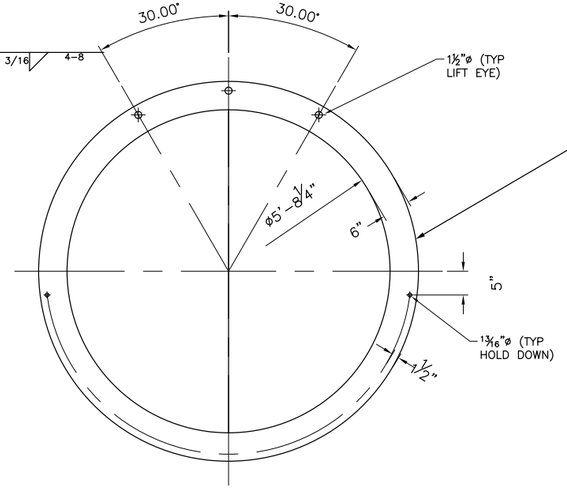
7' ID- EL/TRUE VIEW PENSTOCK (1 / FD-4)

SCALE: 3/8" = 1'-0"



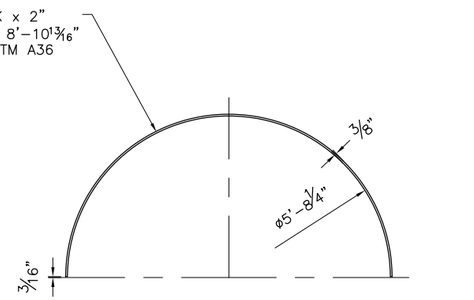
5'-7" ID PENSTOCK (2 / FD-4)

SCALE: 3/8" = 1'-0"



STEEL 1/2" RING STIFFENER SECTION DETAIL A3 (3 / FD-4)

SCALE: 3/8" = 1'-0"



STEEL 3/8" RING BACKING PLATE DETAIL P3 (4 / FD-4)

SCALE: 3/8" = 1'-0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
PENSTOCK MISC. DETAILS

AS CONSTRUCTED 2019

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FABRICATED DETAILS– PENSTOCK MISC. DETAILS

FD-4

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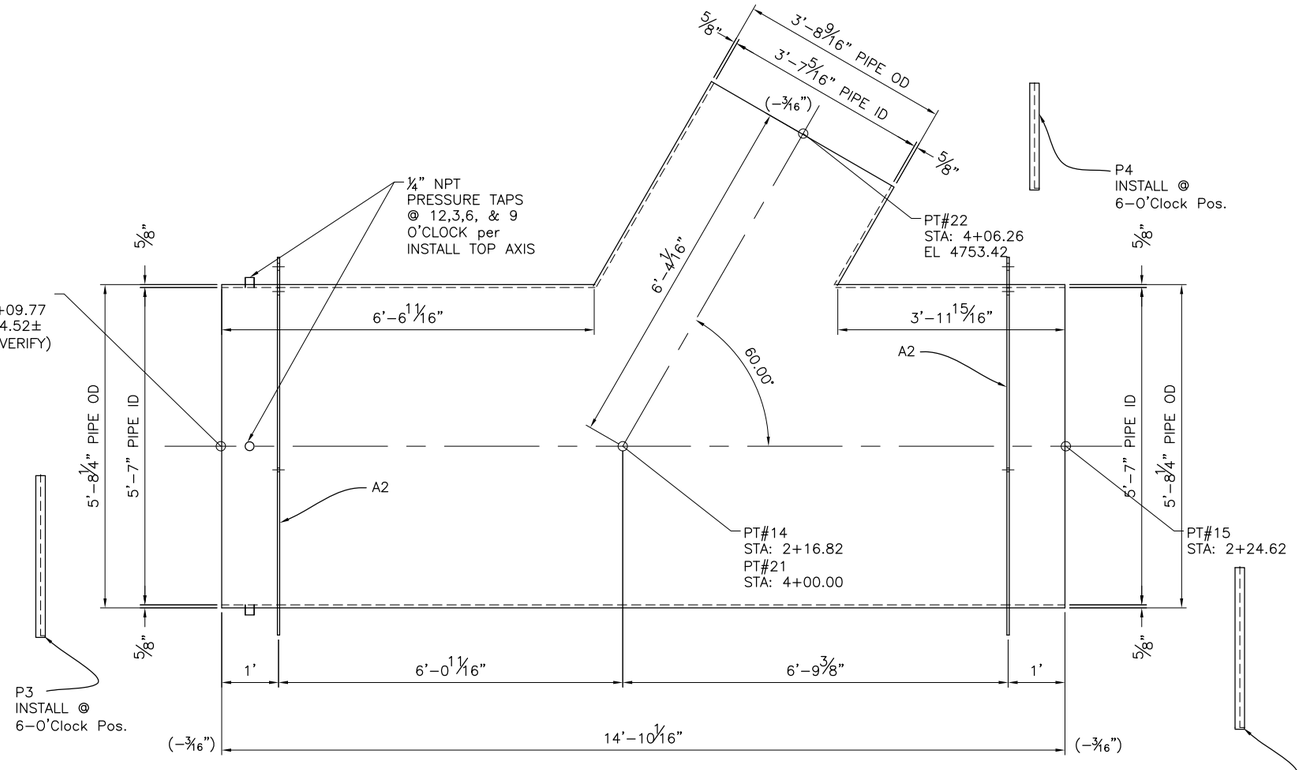
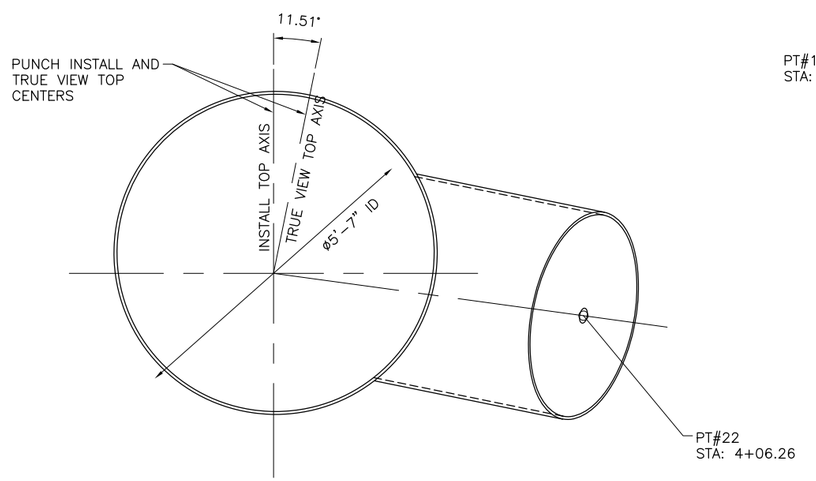


5'-7" ID x 3'-8" ID
BIFURCATION- TRUE VIEW

SCALE: 3/8" = 1'-0"

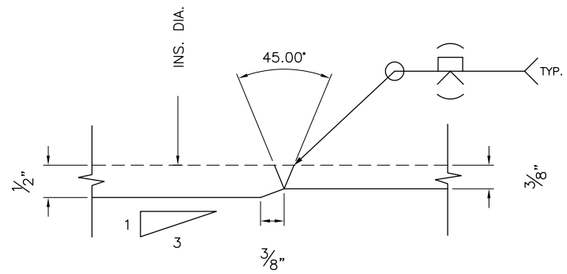
1 FD-5



5'-7" ID x 3'-8" ID
BIFURCATION- INSTALL VIEW

SCALE: 3/8" = 1'-0"

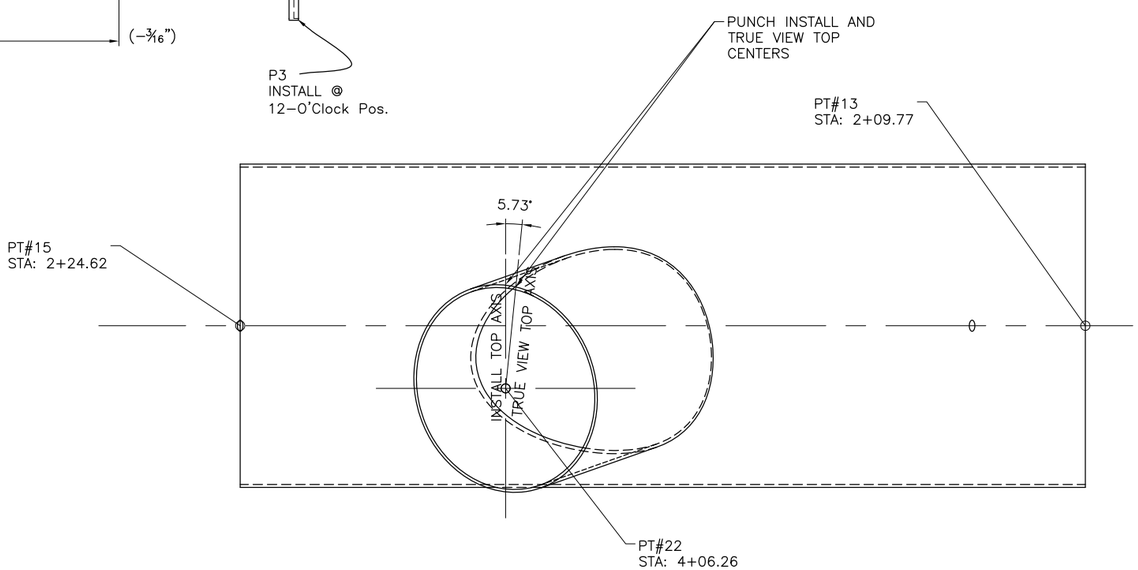
2 FD-5



5/8" TO 3/8" TRANSITION
SECTION DETAIL

SCALE: 3/8" = 1'-0"

4 FD-5



5'-7" ID x 3'-8" ID
BIFURCATION- INSTALL VIEW

SCALE: 3/8" = 1'-0"

3 FD-5

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS-
PENSTOCK MISC. DETAILS

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1			

FABRICATED DETAILS-
PENSTOCK MISC. DETAILS

FD-5

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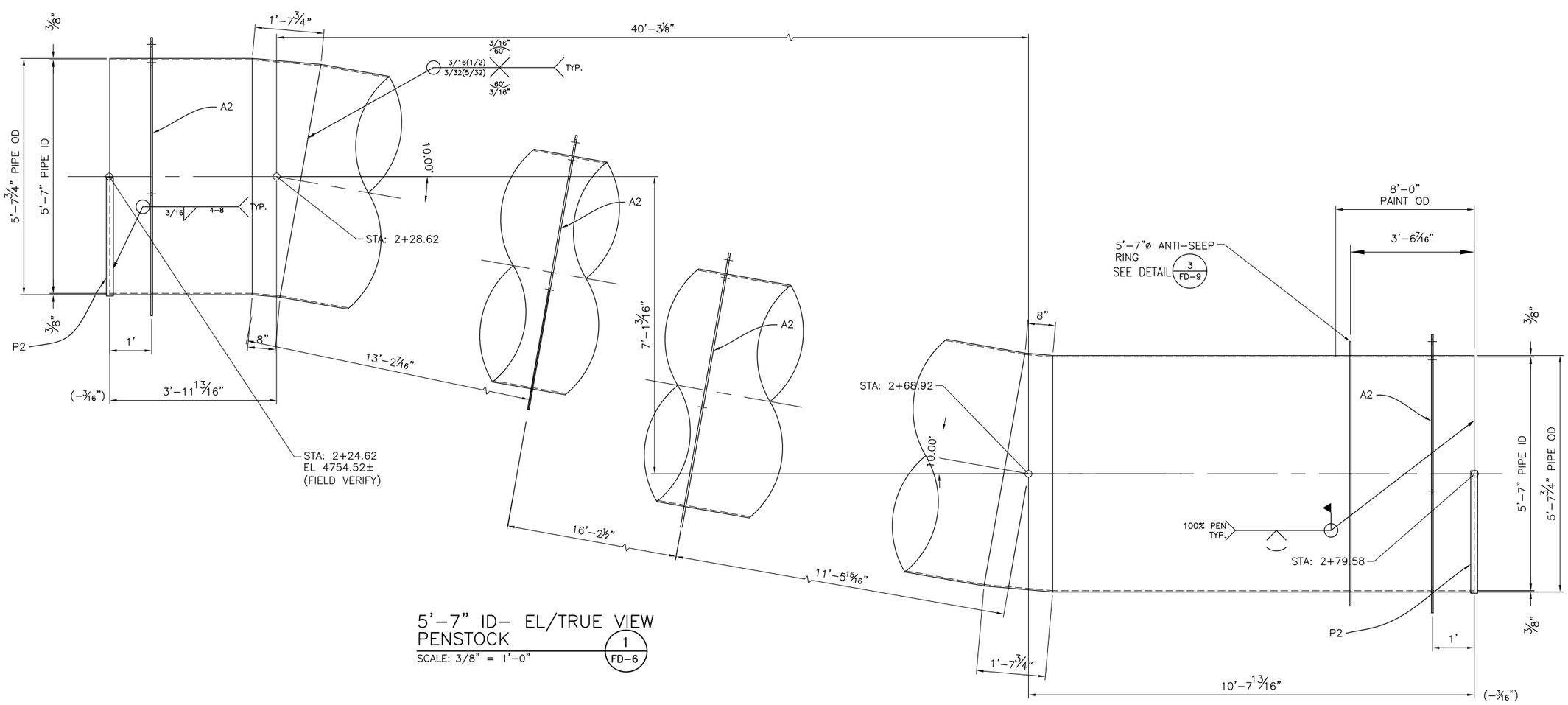
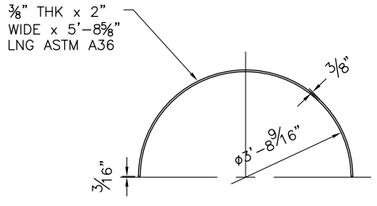


5'-7" ID- EL/TRUE VIEW PENSTOCK

SCALE: 3/8" = 1'-0"

1 FD-6



STEEL 3/8" RING BACKING PLATE DETAIL P4

SCALE: 3/8" = 1'-0"

2 FD-6

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

FABRICATED DETAILS- PENSTOCK MISC. DETAILS

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FABRICATED DETAILS- PENSTOCK MISC. DETAILS

FD-6

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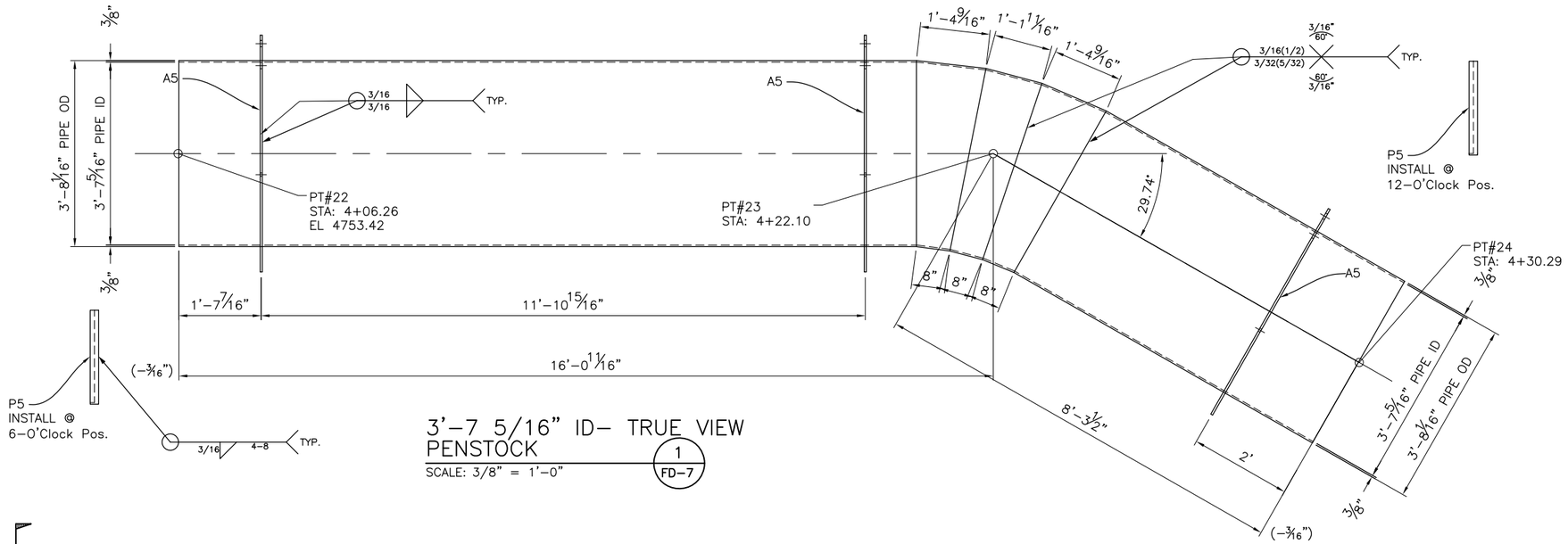
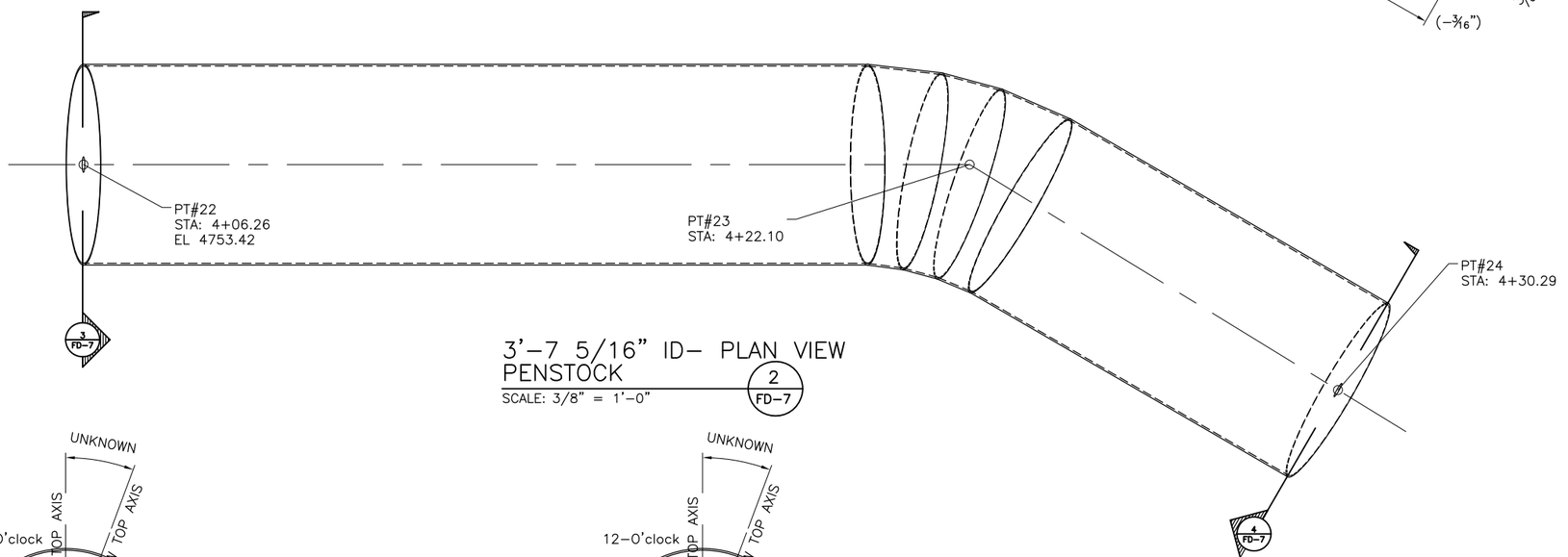


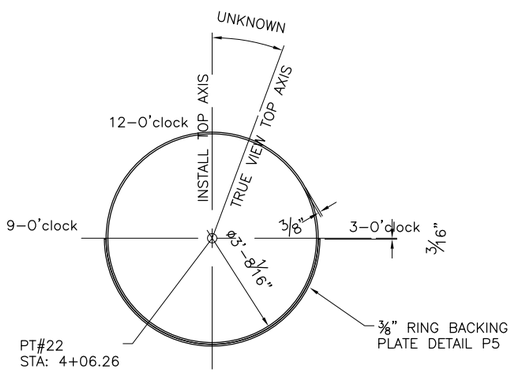
3'-7 5/16" ID- TRUE VIEW PENSTOCK (1 / FD-7)

SCALE: 3/8" = 1'-0"



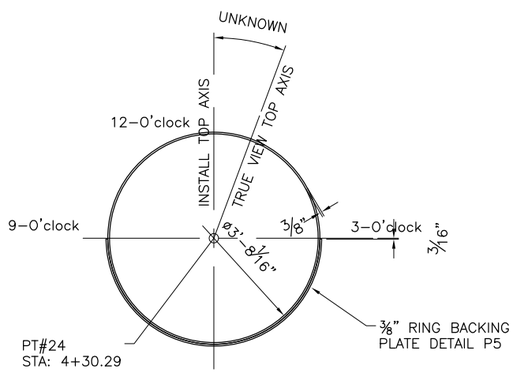
3'-7 5/16" ID- PLAN VIEW PENSTOCK (2 / FD-7)

SCALE: 3/8" = 1'-0"



TRUE VIEW PENSTOCK END (3 / FD-7)

SCALE: 3/8" = 1'-0"



TRUE VIEW PENSTOCK END (4 / FD-7)

SCALE: 3/8" = 1'-0"

NOTE:
1. ORIENT RING STIFFENERS TO MATCH INSTALL TOP AXIS
2. INSTALL 3/8"x2" WIDE BAKER BARS ACCORDING TO INDICATED POSITION (12-O'Clock or 6-O'Clock) ALONG THE INSTALL TOP AXIS

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FABRICATED DETAILS-
PENSTOCK MISC. DETAILS

FD-7

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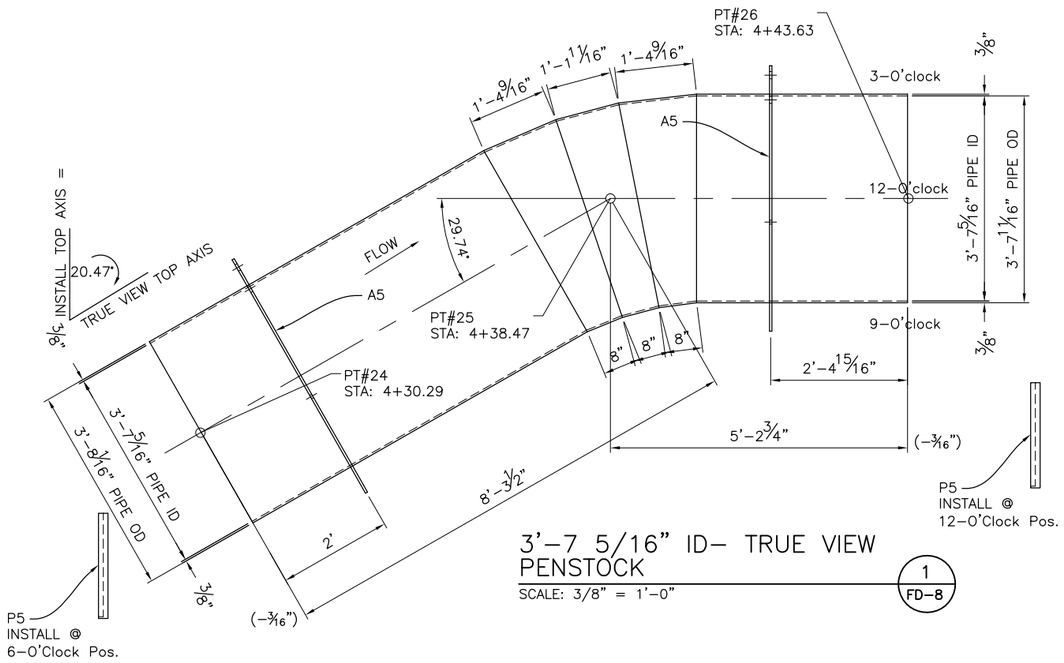
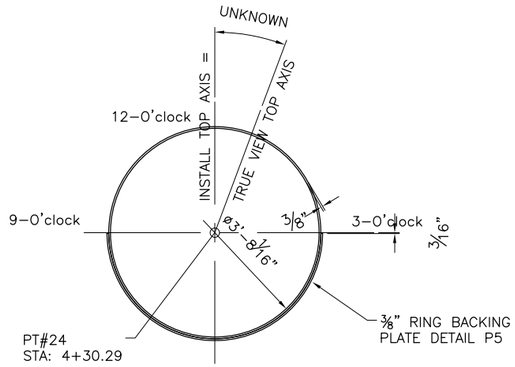


3'-7 5/16" ID- TRUE VIEW PENSTOCK

SCALE: 3/8" = 1'-0"

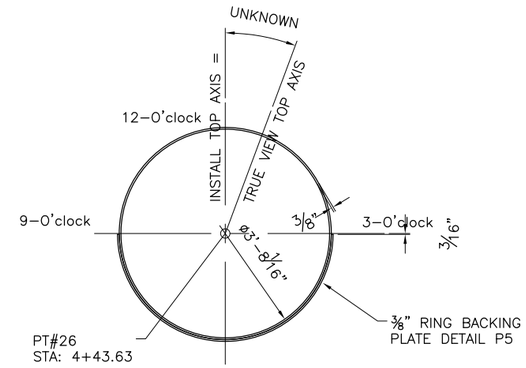
1 FD-8



TRUE VIEW PENSTOCK END

SCALE: 3/8" = 1'-0"

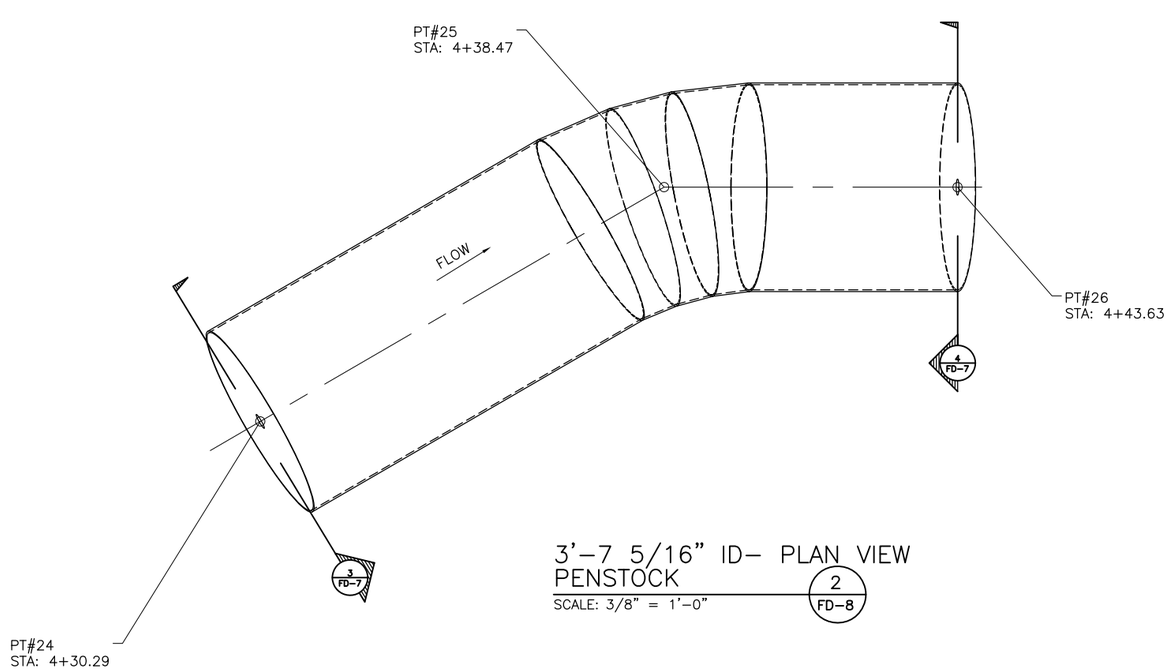
3 FD-8



TRUE VIEW PENSTOCK END

SCALE: 3/8" = 1'-0"

4 FD-8



3'-7 5/16" ID- PLAN VIEW PENSTOCK

SCALE: 3/8" = 1'-0"

2 FD-8

NOTE:
1. ORIENT RING STIFFENERS TO MATCH INSTALL TOP AXIS
2. INSTALL 3/8"x2" WIDE BAKER BARS ACCORDING TO INDICATED POSITION (12-0'Clock or 6-0'Clock) ALONG THE INSTALL TOP AXIS

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS-
PENSTOCK MISC. DETAILS

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FABRICATED DETAILS-
PENSTOCK MISC. DETAILS

FD-8

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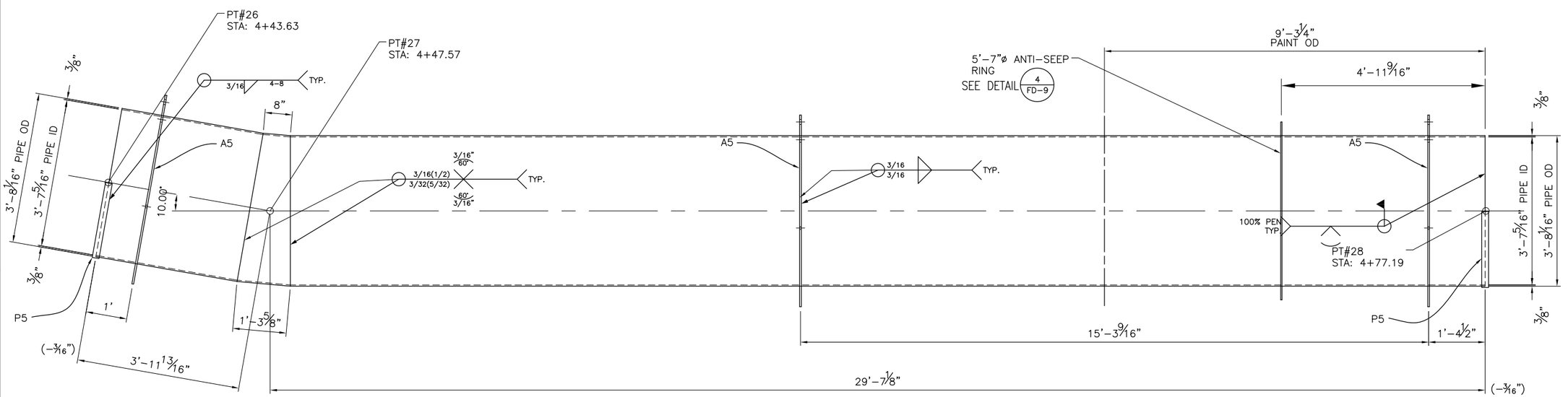
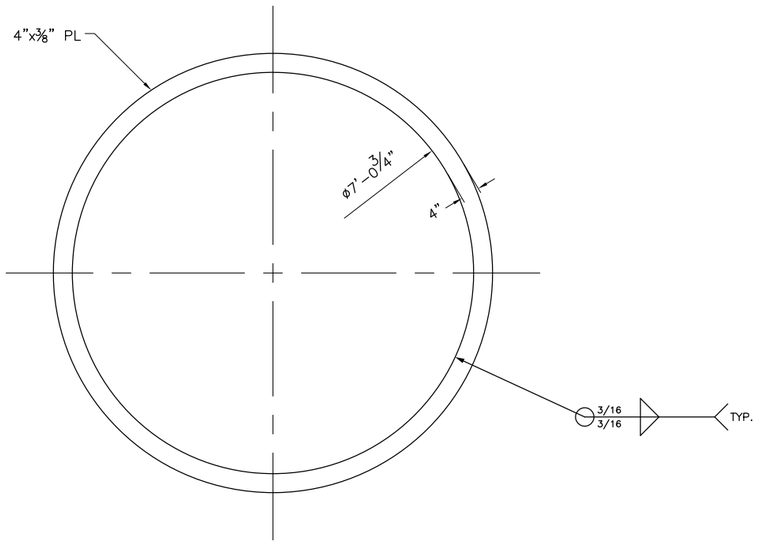


3'-7 5/16" ID- EL/TRUE VIEW PENSTOCK

SCALE: 3/8" = 1'-0"

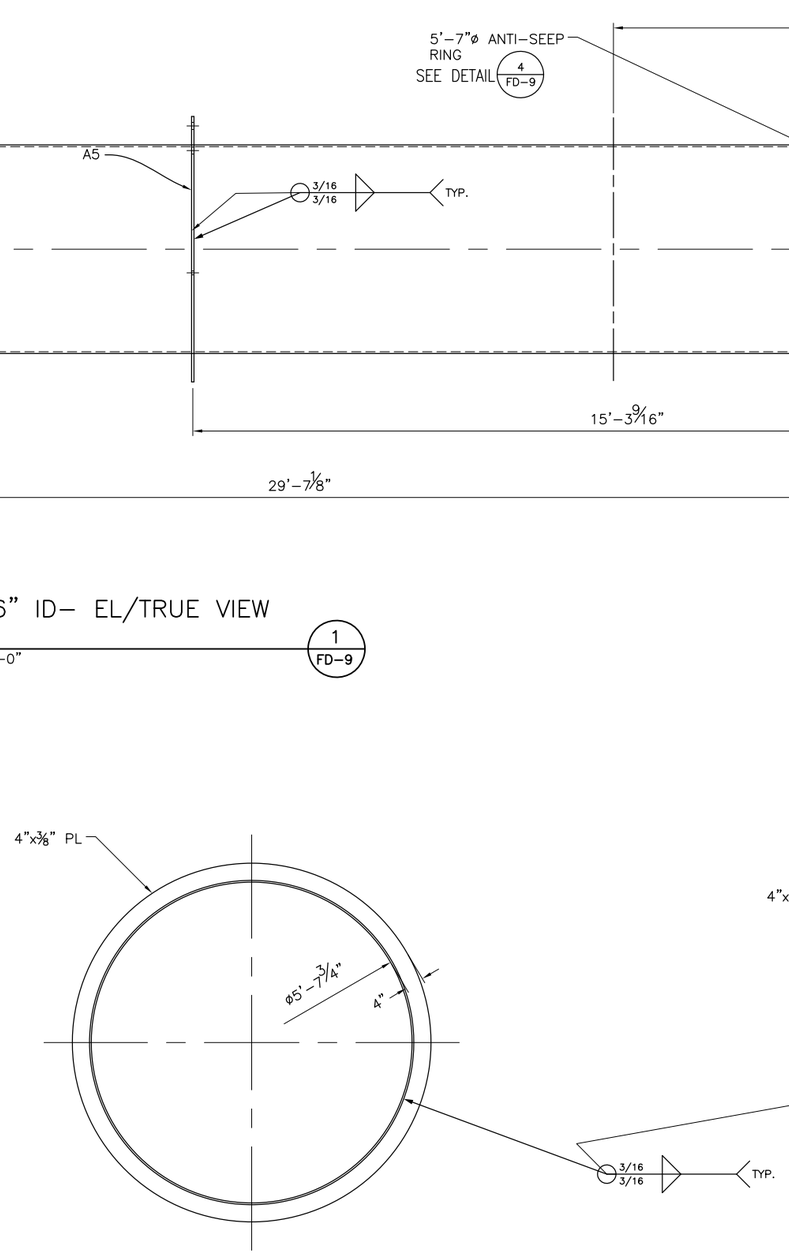
1 FD-9



7'ø PENSTOCK ANTI-SEEP RING

SCALE: 3/8" = 1'-0"

2 FD-9



5'-7"ø PENSTOCK ANTI-SEEP RING

SCALE: 3/8" = 1'-0"

3 FD-9

3'-8"ø PENSTOCK ANTI-SEEP RING

SCALE: 3/8" = 1'-0"

4 FD-9

SORENSON ENGINEERING

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS-
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FABRICATED DETAILS-
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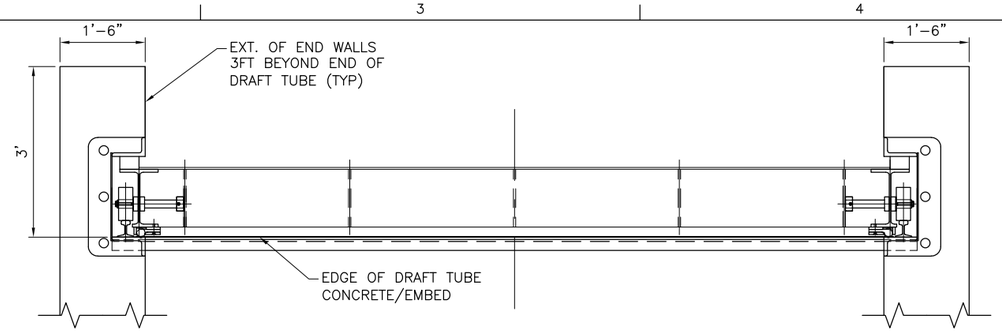

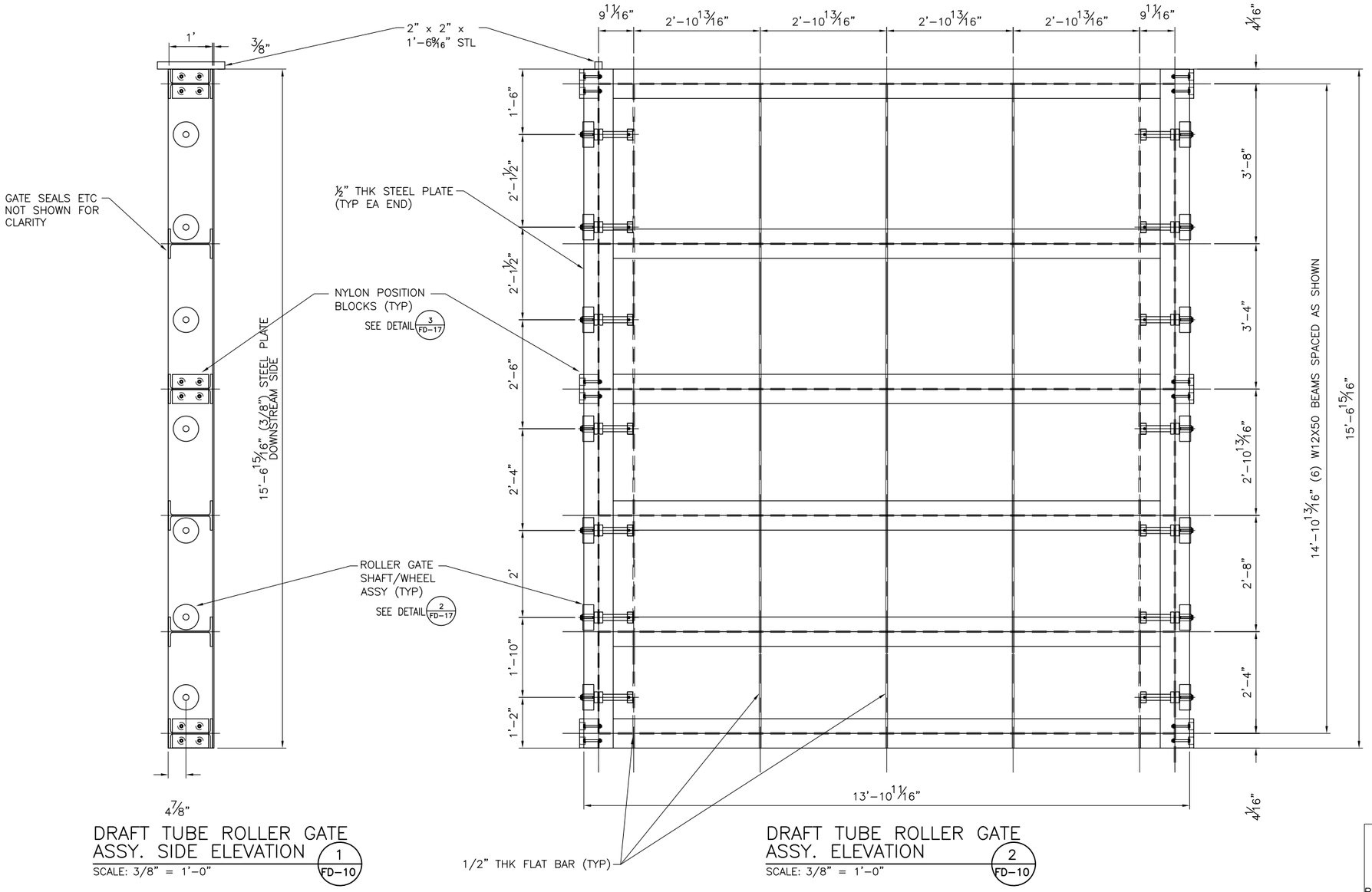

DRAFT TUBE ROLLER GATE ASSY. SIDE ELEVATION 1 FD-10
SCALE: 3/8" = 1'-0"

DRAFT TUBE ROLLER GATE ASSY. ELEVATION 2 FD-10
SCALE: 3/8" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
ROLLER GATE DETAILS

AS CONSTRUCTED 2019

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FABRICATED DETAILS–
ROLLER GATE DETAILS

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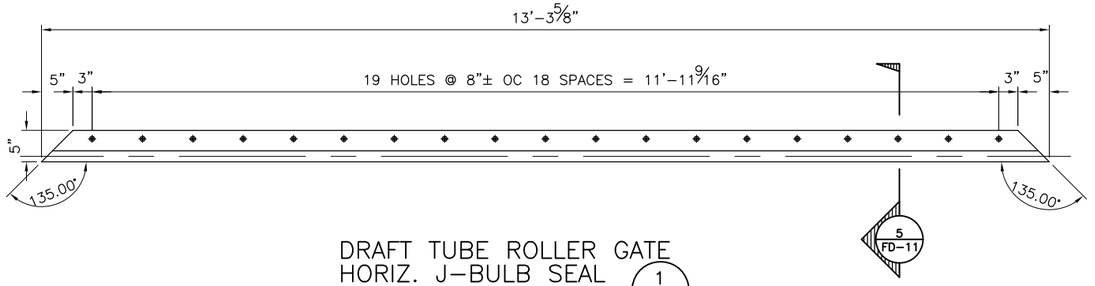
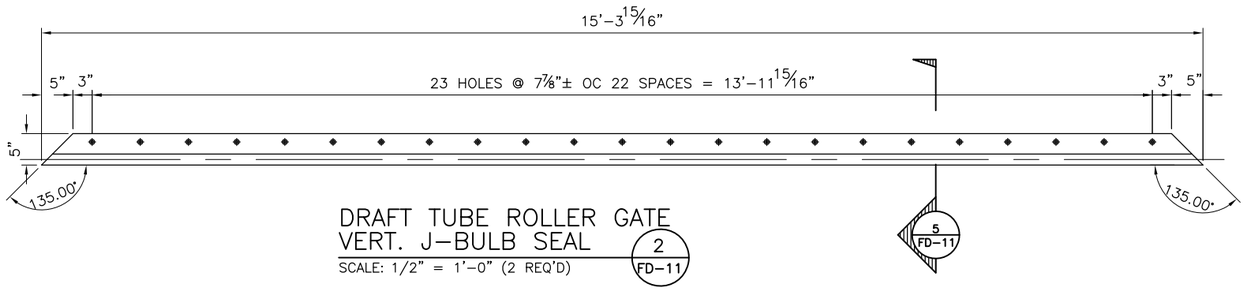
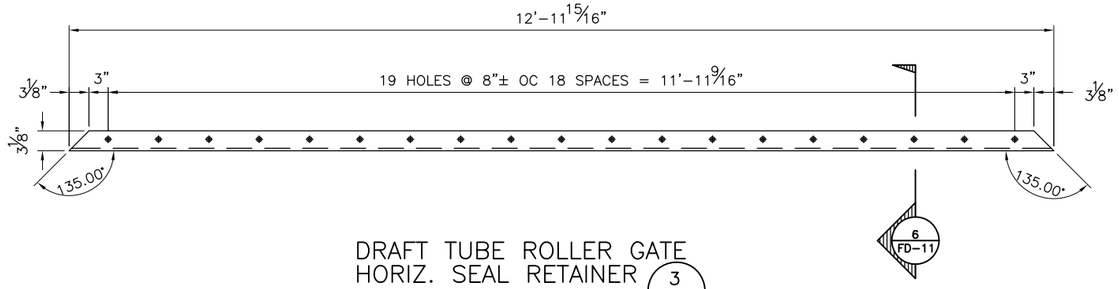


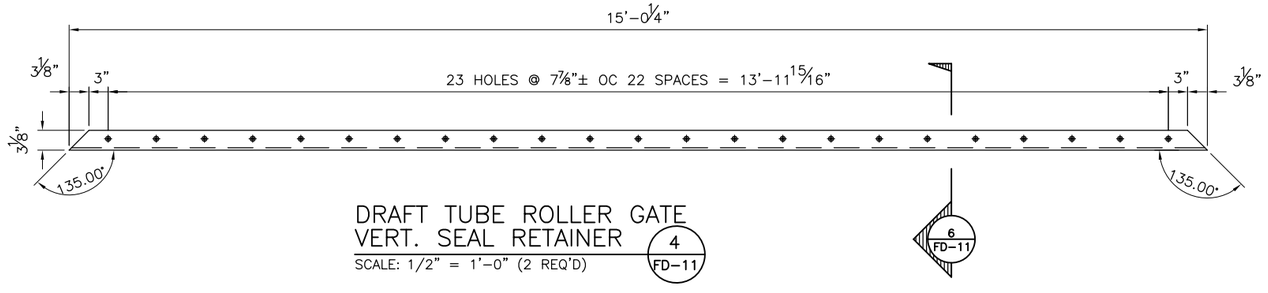
DRAFT TUBE ROLLER GATE
HORIZ. J-BULB SEAL (1 FD-11)
SCALE: 1/2" = 1'-0" (2 REQ'D)



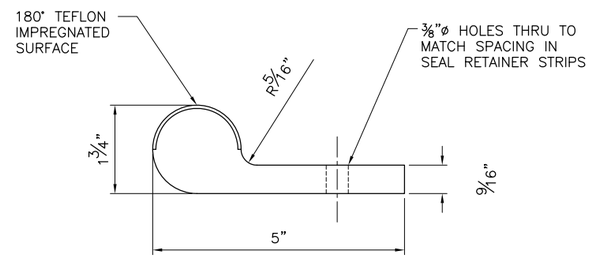
DRAFT TUBE ROLLER GATE
VERT. J-BULB SEAL (2 FD-11)
SCALE: 1/2" = 1'-0" (2 REQ'D)



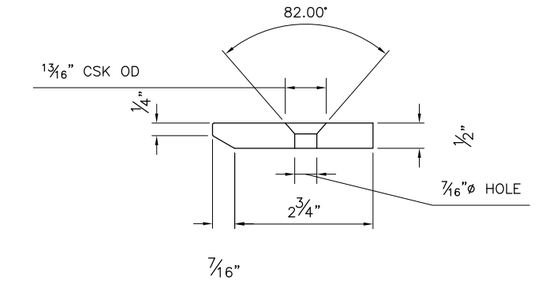
DRAFT TUBE ROLLER GATE
HORIZ. SEAL RETAINER (3 FD-11)
SCALE: 1/2" = 1'-0" (2 REQ'D)



DRAFT TUBE ROLLER GATE
VERT. SEAL RETAINER (4 FD-11)
SCALE: 1/2" = 1'-0" (2 REQ'D)



J-BULB SEAL
SECTION (5 FD-11)
SCALE: 4" = 1'-0"



J-BULB SEAL RETAINER
STRIP SECTION (6 FD-11)
SCALE: 4" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
ROLLER GATE DETAILS

AS CONSTRUCTED 2019

REV. NO.	DESCRIPTION	MM/DD/YYYY	BY
1	AS CONSTRUCTED 2019	10-08-20	MMF

FABRICATED DETAILS–
ROLLER GATE DETAILS

FD-11

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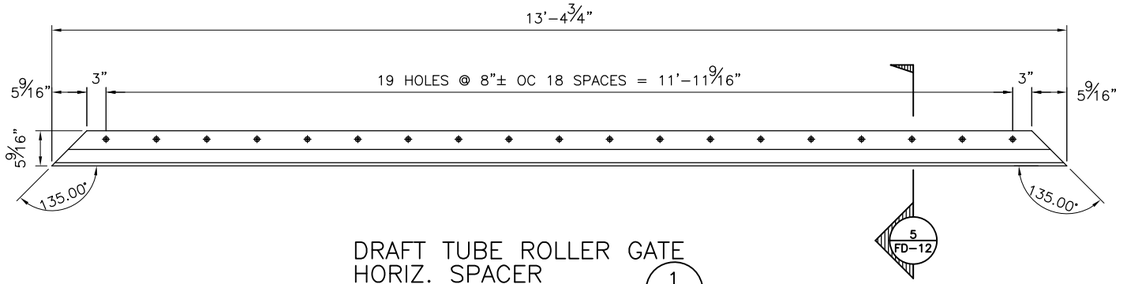
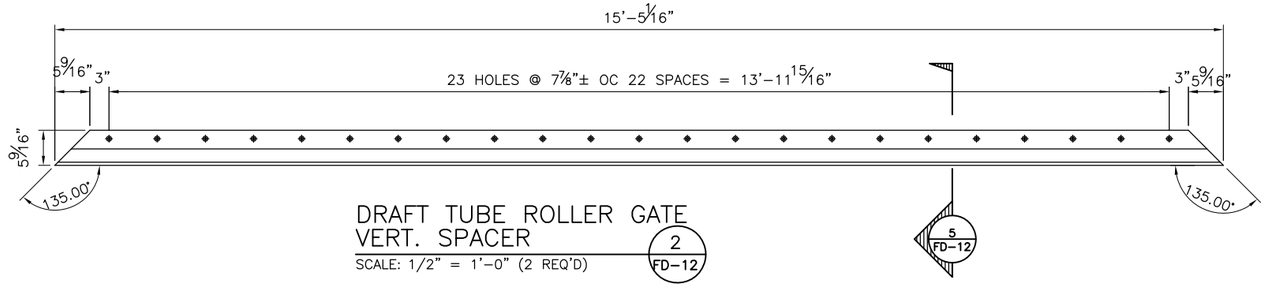
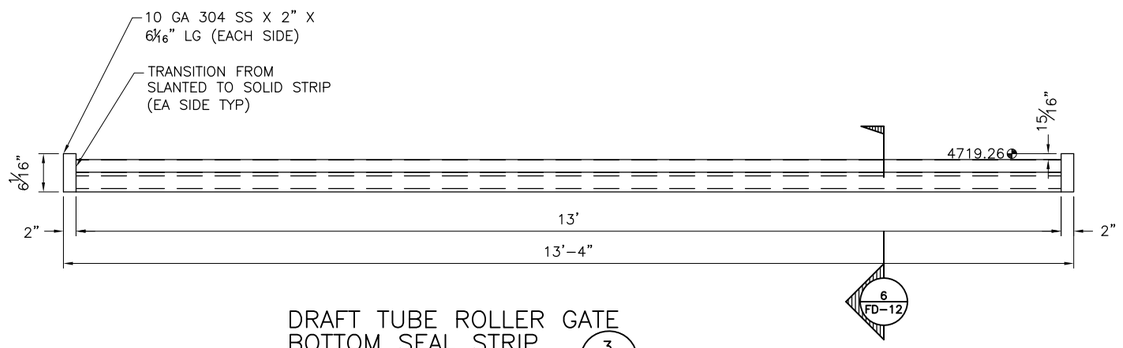


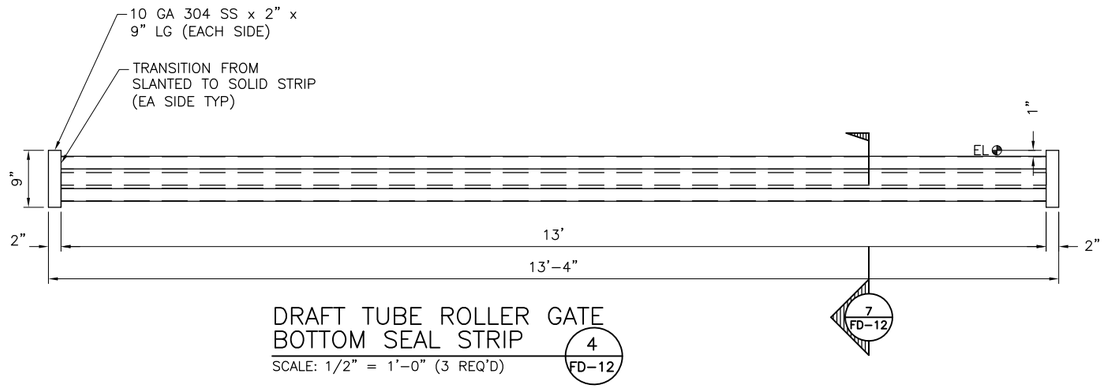
DRAFT TUBE ROLLER GATE
HORIZ. SPACER (1 / FD-12)
SCALE: 1/2" = 1'-0" (2 REQ'D)



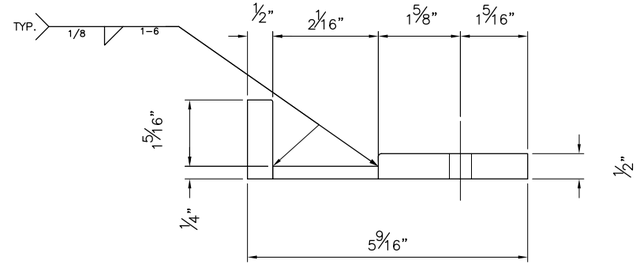
DRAFT TUBE ROLLER GATE
VERT. SPACER (2 / FD-12)
SCALE: 1/2" = 1'-0" (2 REQ'D)



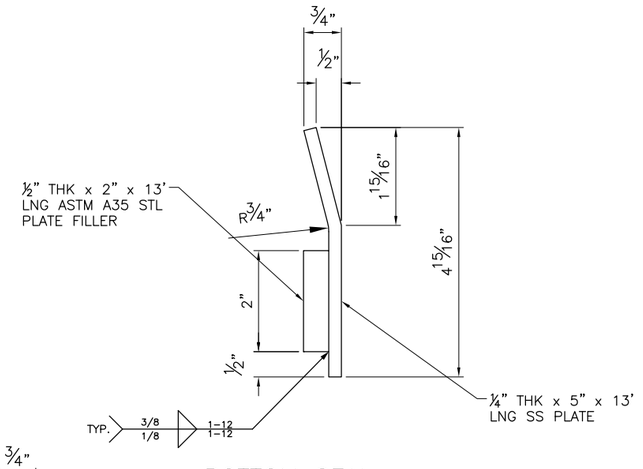
DRAFT TUBE ROLLER GATE
BOTTOM SEAL STRIP (3 / FD-12)
SCALE: 1/2" = 1'-0" (3 REQ'D)



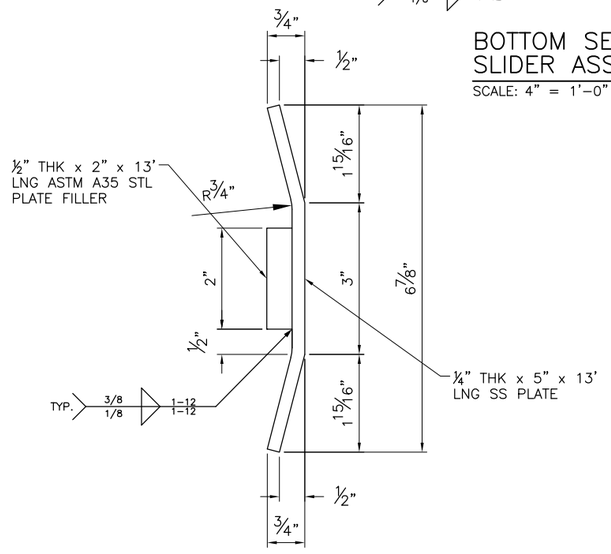
DRAFT TUBE ROLLER GATE
BOTTOM SEAL STRIP (4 / FD-12)
SCALE: 1/2" = 1'-0" (3 REQ'D)



SEAL
SPACER ASSY (5 / FD-12)
SCALE: 4" = 1'-0"



BOTTOM SEAL
SLIDER ASSY (6 / FD-12)
SCALE: 4" = 1'-0"



TOP SEAL
SLIDER ASSY (7 / FD-12)
SCALE: 4" = 1'-0"

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PROJECT

SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
ROLLER GATE DETAILS

AS CONSTRUCTED 2019

REV NO	DATE	DESCRIPTION	NAME, PROF ABBR.
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FABRICATED DETAILS–
ROLLER GATE DETAILS

FD-12

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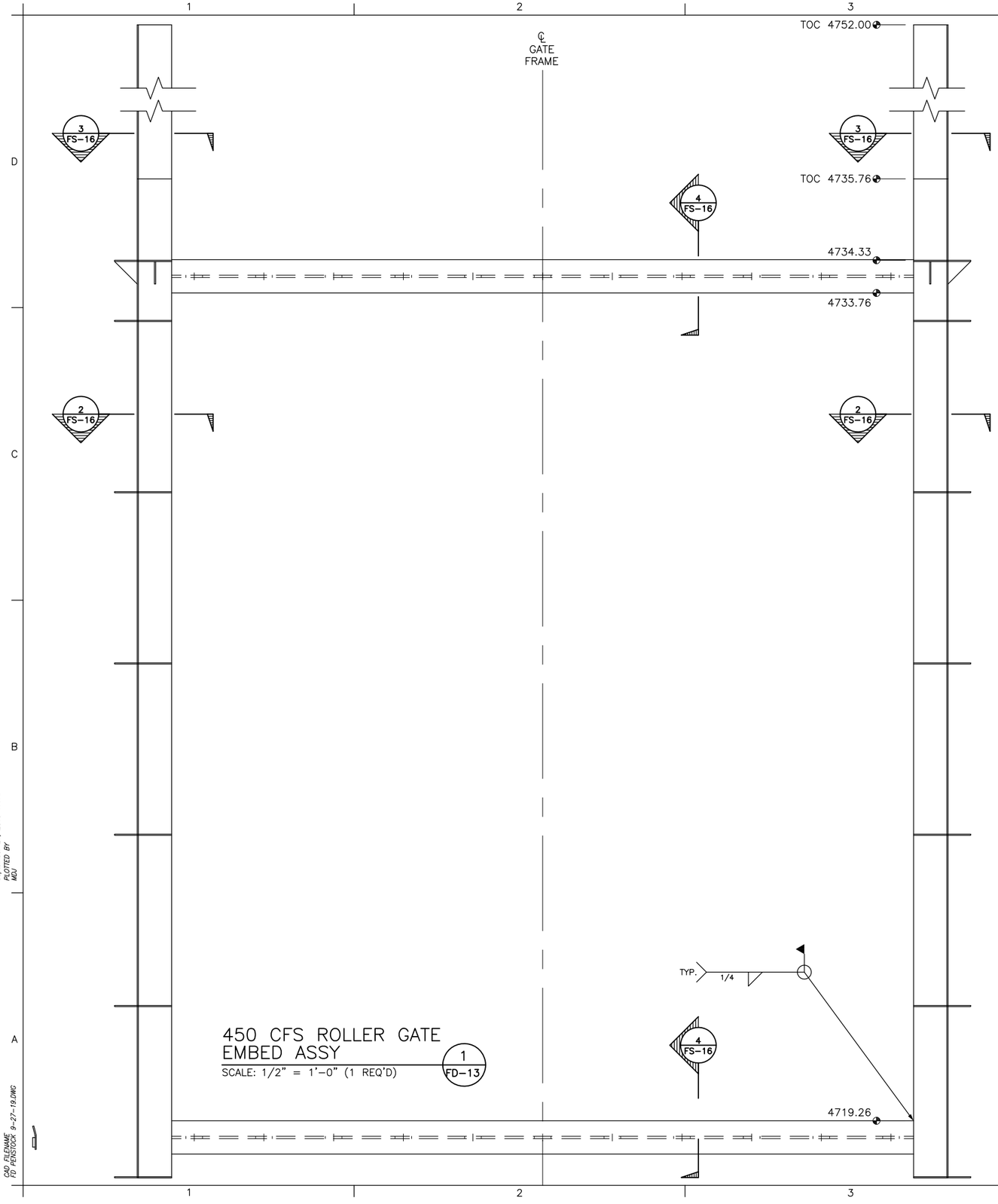
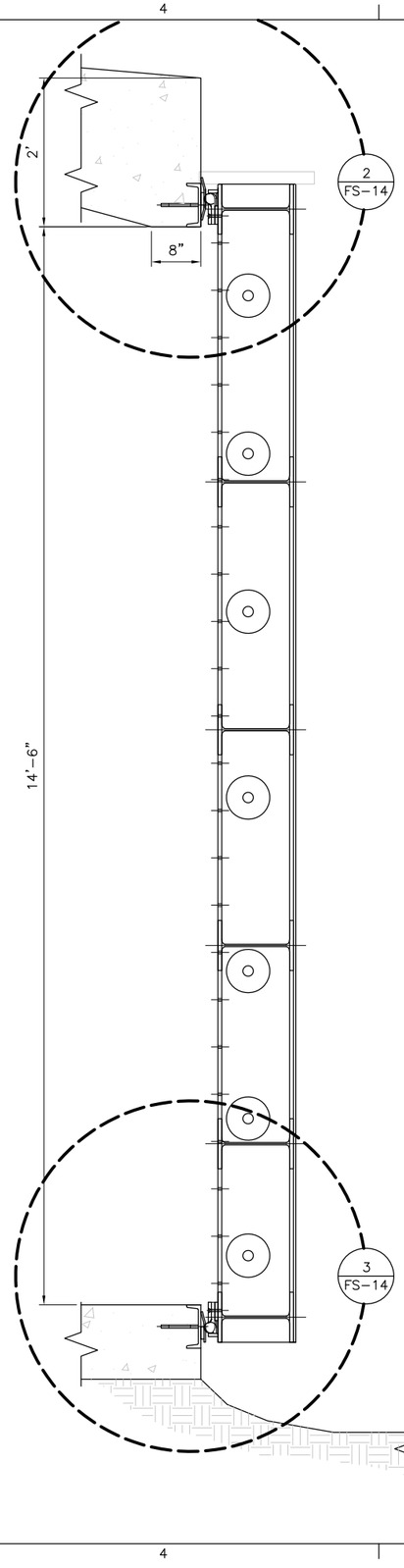


450 CFS ROLLER GATE
EMBED ASSY — 1 / FD–13
SCALE: 1/2" = 1'–0" (1 REQ'D)



ROLLER GATE
INSTALL ASSY (TYP) — 2 / FD–13
SCALE: 1/2" = 1'–0" (1 REQ'D)

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FABRICATED DETAILS–
ROLLER GATE DETAILS

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FABRICATED DETAILS–
ROLLER GATE DETAILS

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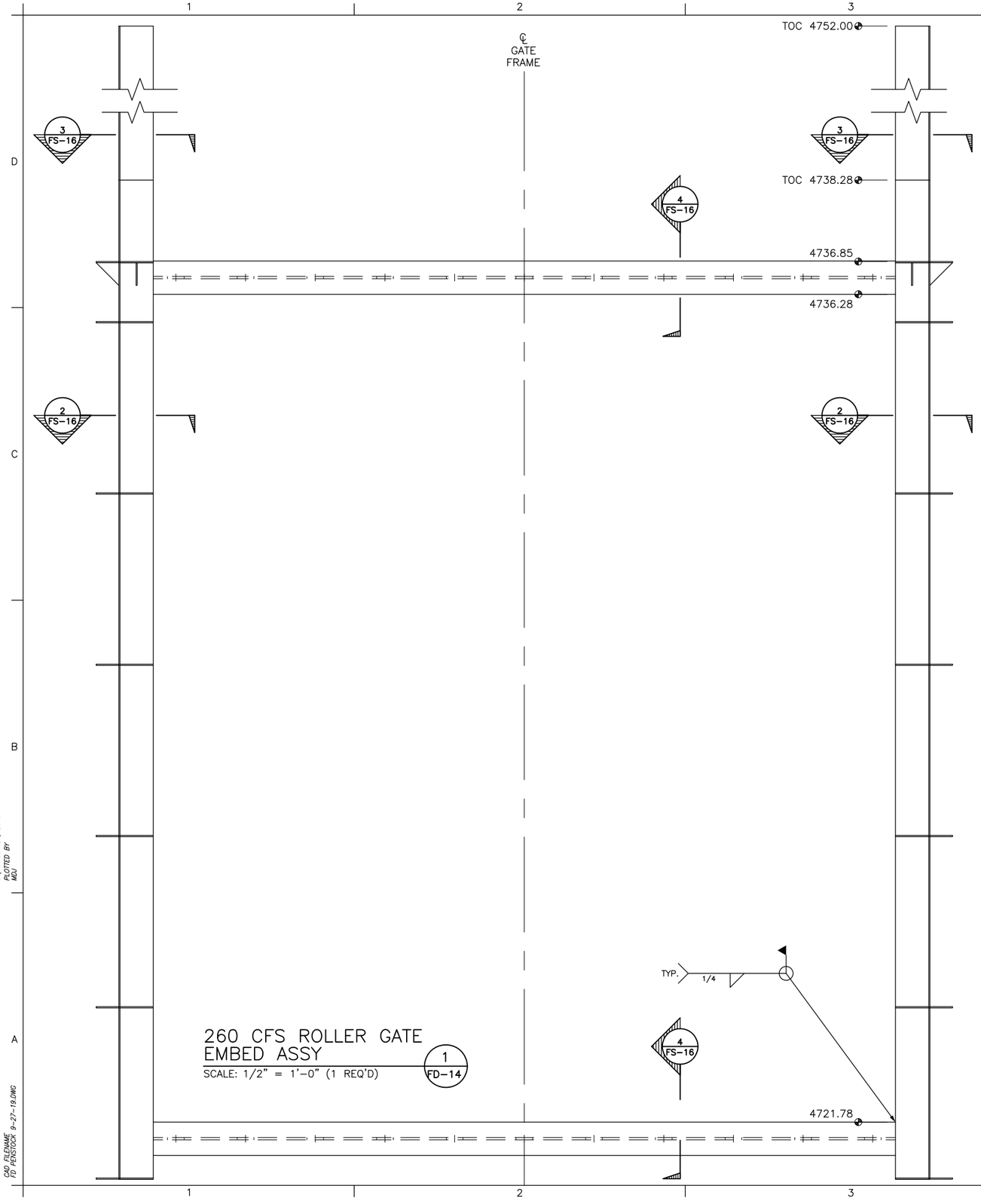
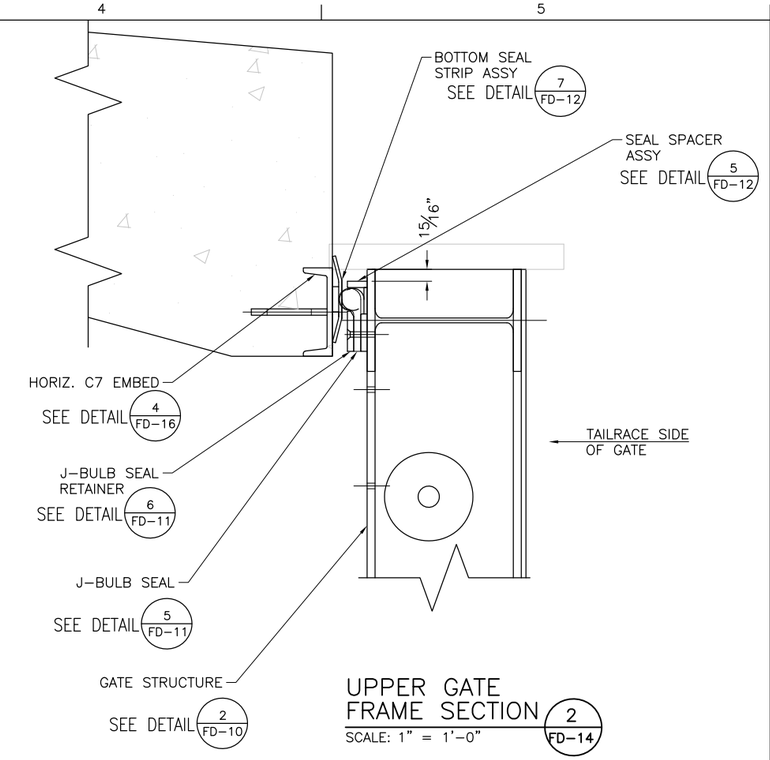
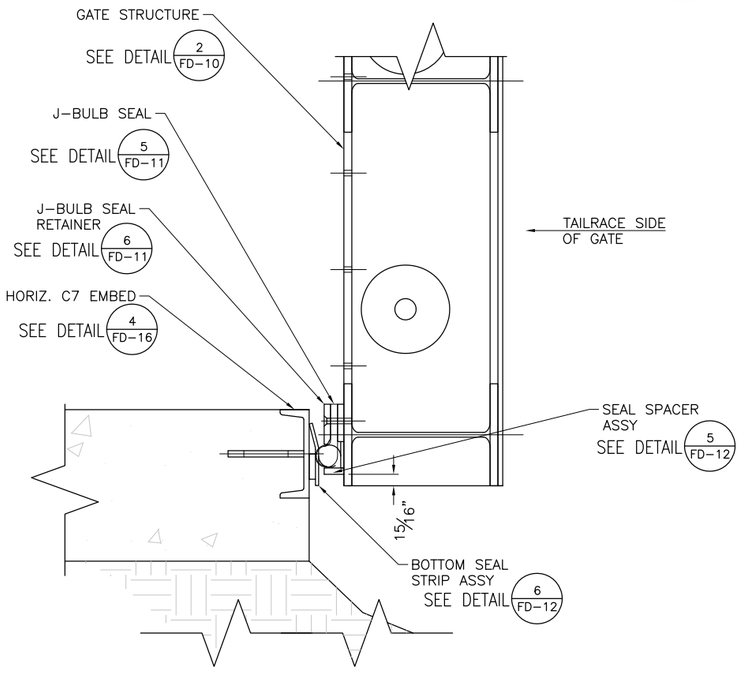


260 CFS ROLLER GATE EMBED ASSY (1 FD-14)
SCALE: 1/2" = 1'-0" (1 REQ'D)



UPPER GATE FRAME SECTION (2 FD-14)
SCALE: 1" = 1'-0"



LOWER GATE FRAME SECTION (3 FD-14)
SCALE: 1" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
ROLLER GATE DETAILS

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FABRICATED DETAILS–
ROLLER GATE DETAILS

FD–14

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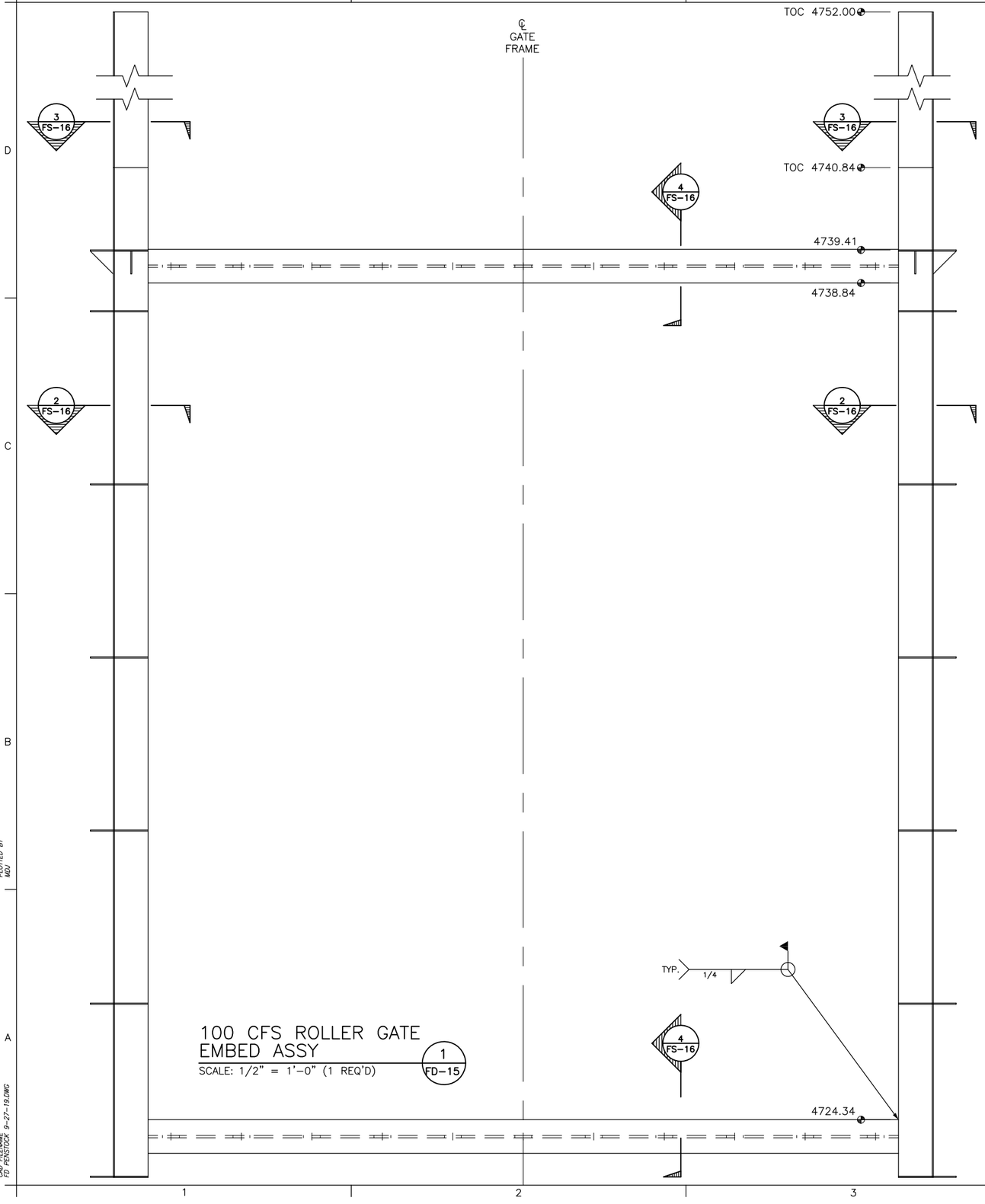
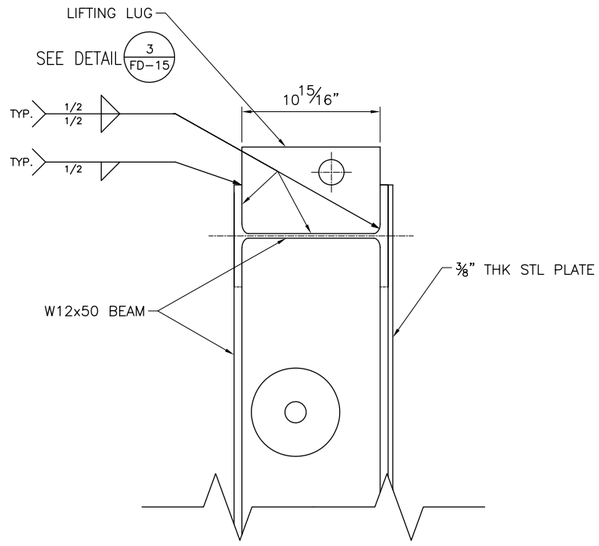


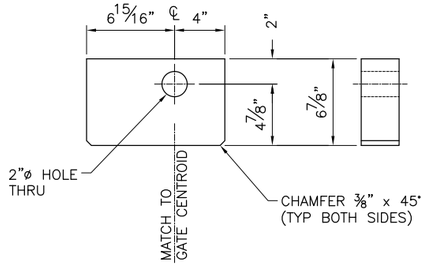
100 CFS ROLLER GATE EMBED ASSY

SCALE: 1/2" = 1'-0" (1 REQ'D) — 1 / FD-15



HOISTING LUG DETAIL

SCALE: 1" = 1'-0" — 2 / FD-15



HOISTING LUG DETAIL

SCALE: 1" = 1'-0" — 3 / FD-15

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE

PUEBLO DAM HYDROELECTRIC PROJECT

FABRICATED DETAILS– ROLLER GATE DETAILS

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FABRICATED DETAILS– ROLLER GATE DETAILS

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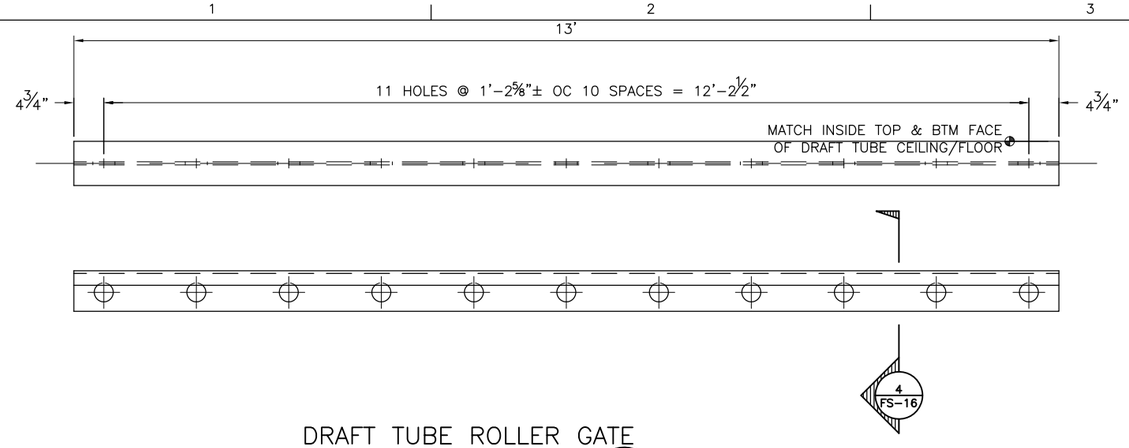
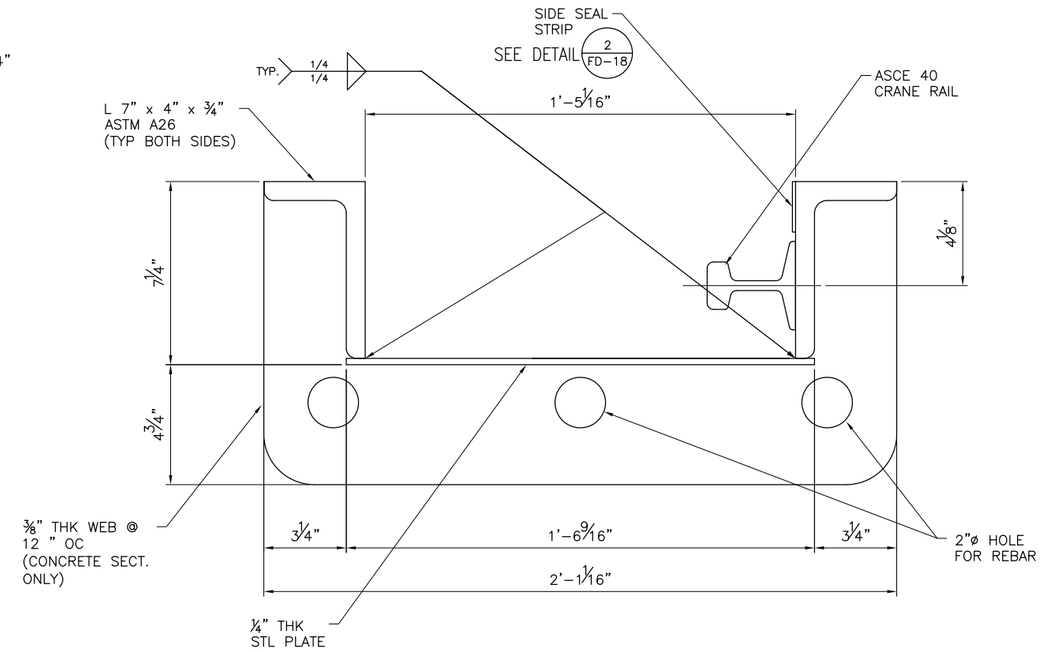


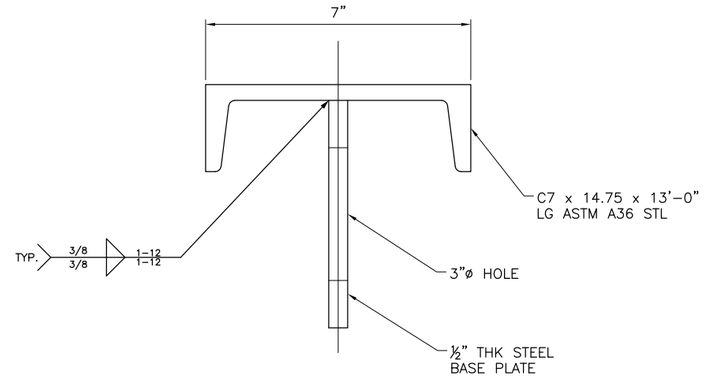
DRAFT TUBE ROLLER GATE EMBED FRAME ASSY. (1 / FD-16)

SCALE: 1/2" = 1'-0" (6 REQ'D)



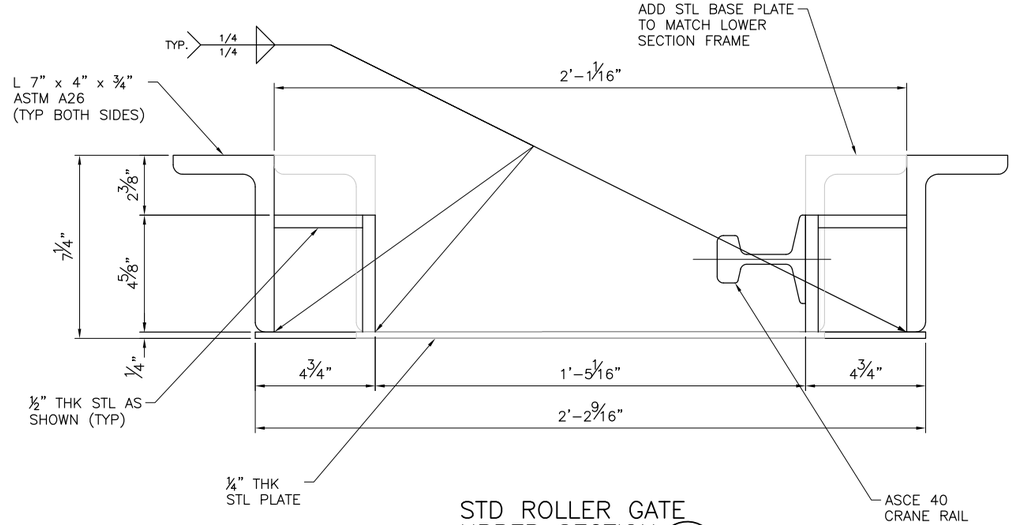
STD ROLLER GATE LOWER SECTION (2 / FD-16)

SCALE: 2" = 1'-0"



HORIZ. FRAME EMBED ASSY (4 / FD-16)

SCALE: 3" = 1'-0"



STD ROLLER GATE UPPER SECTION (3 / FD-16)

SCALE: 2" = 1'-0"

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SOUTHEASTERN COLORADO WATER ACTIVITY ENTERPRISE
PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS– ROLLER GATE DETAILS

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FABRICATED DETAILS– ROLLER GATE DETAILS

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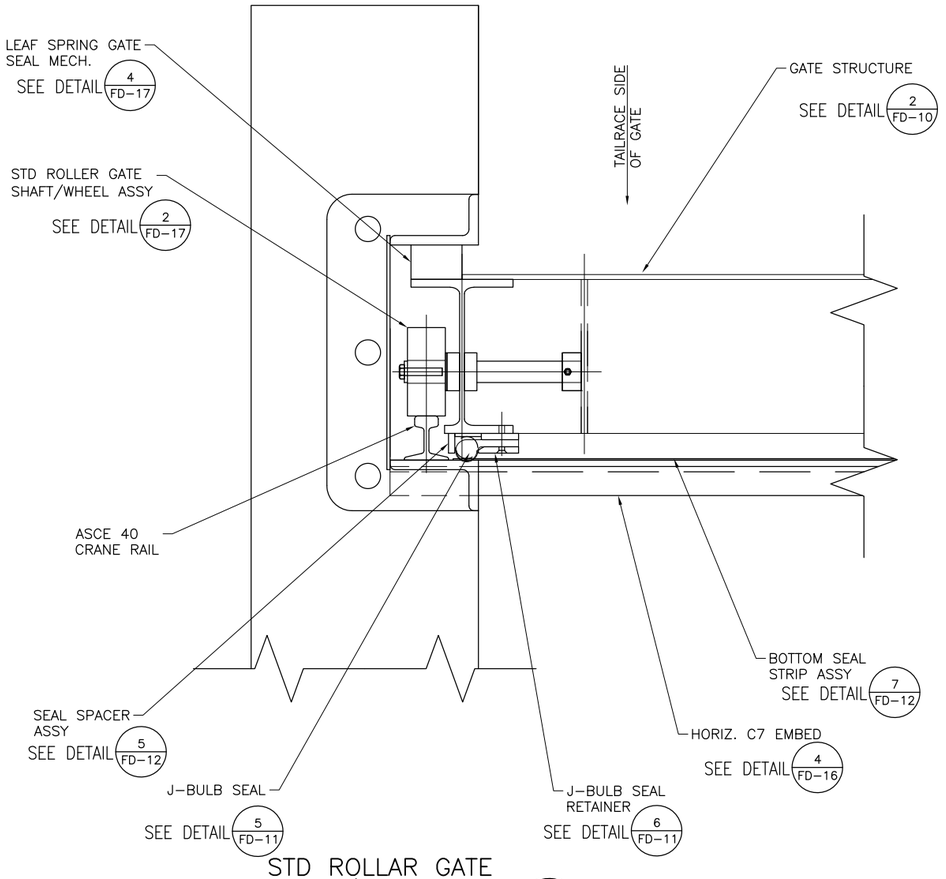
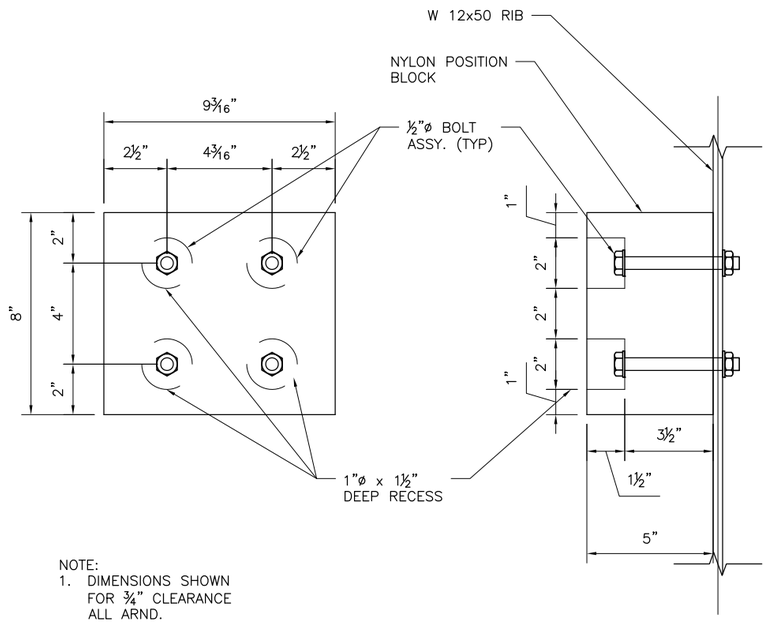


STD ROLLAR GATE SHAFT/WHEEL ASSY 1 FD-17

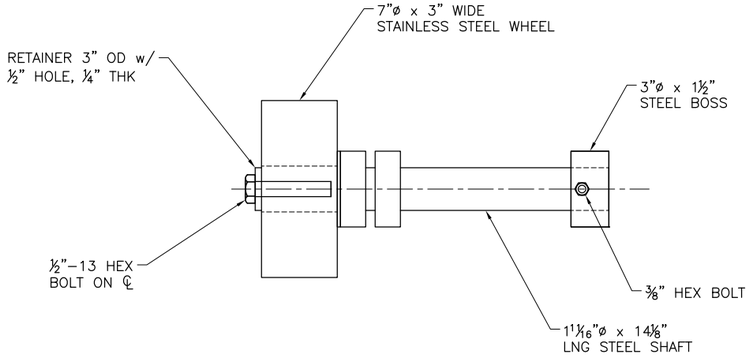
SCALE: 1" = 1'-0"



NOTE:
1. DIMENSIONS SHOWN FOR ¾" CLEARANCE ALL ARND.

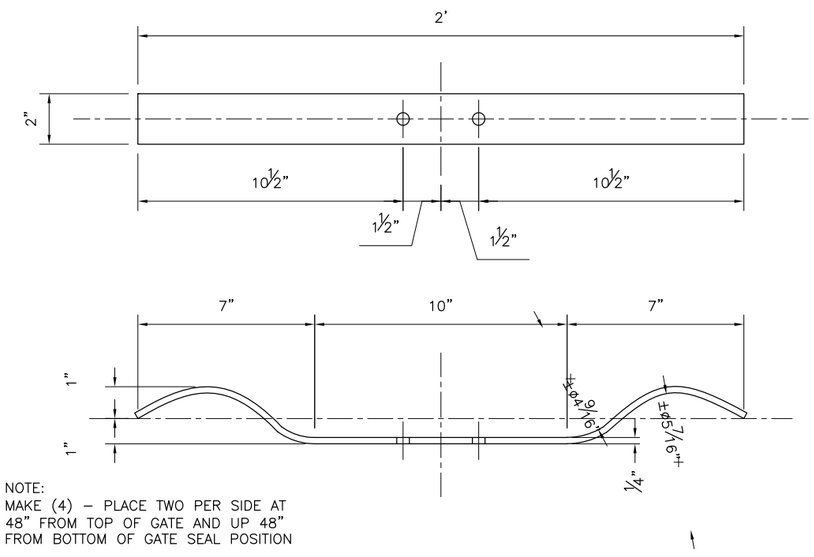
NYLON POSITIONING BLOCK DETAILS 3 FD-17

SCALE: 2" = 1'-0"



STD ROLLER GATE SHAFT/WHEEL ASSY 2 FD-17

SCALE: 2" = 1'-0"



NOTE:
MAKE (4) – PLACE TWO PER SIDE AT 48" FROM TOP OF GATE AND UP 48" FROM BOTTOM OF GATE SEAL POSITION

STD ROLLER GATE SEAL SPRING 4 FD-17

SCALE: 2" = 1'-0"

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
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FABRICATED DETAILS–
ROLLER GATE DETAILS

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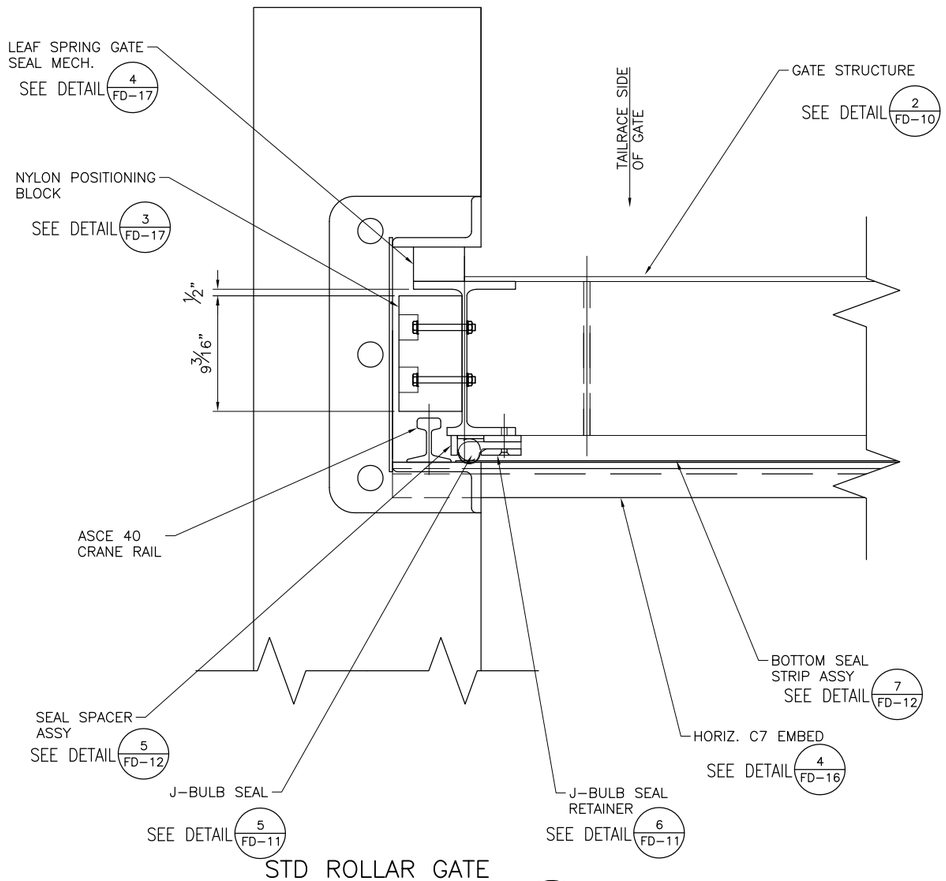
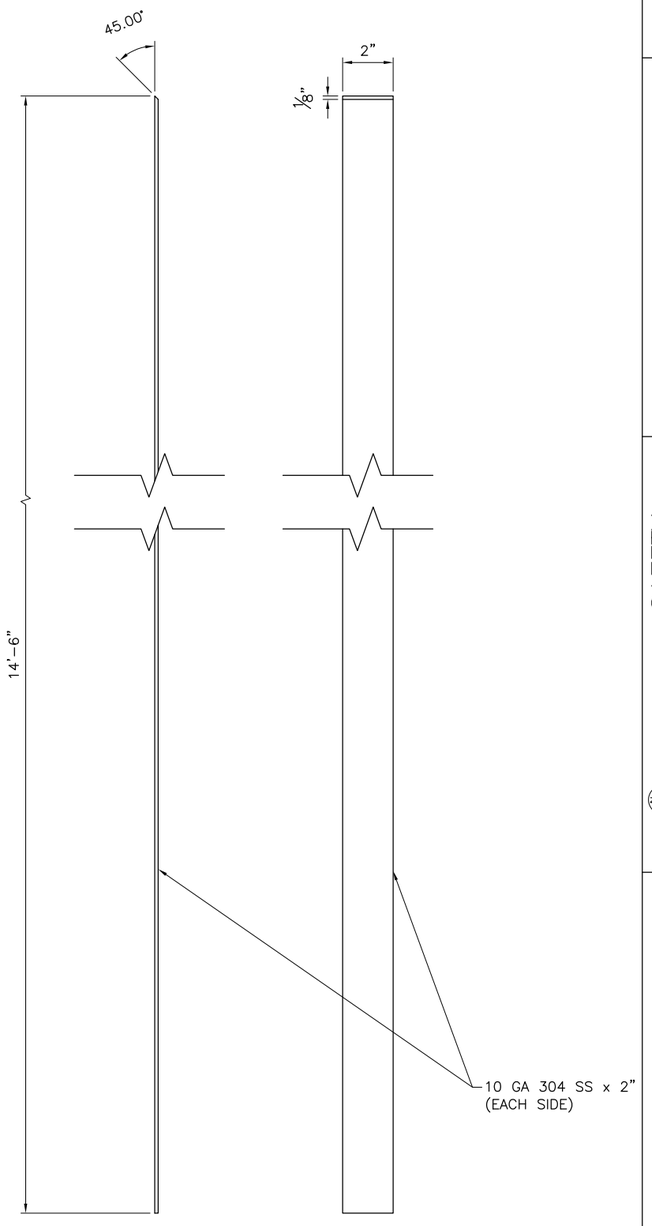


STD ROLLAR GATE NYLON BLOCK ASSY

SCALE: 1" = 1'-0" — 1 FD-18



SIDE SEAL STRIP

SCALE: 2" = 1'-0" — 2 FD-18

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PUEBLO DAM HYDROELECTRIC PROJECT
FABRICATED DETAILS–
ROLLER GATE DETAILS

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FABRICATED DETAILS–
ROLLER GATE DETAILS

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