

DRAWING LIST

DWG NO. SHEET NO. TITLE

A. GENERAL SHEETS

A-01	1	COVER SHEET
A-02	2	DRAWING LIST
A-03	3	GENERAL NOTES, LEGEND, AND ABBREVIATIONS
A-04	4	EXISTING CONDITIONS
A-05	5	SURVEY CONTROL, SITE ACCESS, AND EROSION CONTROL PLAN
A-06	6	GENERAL PLAN OF MODIFICATIONS
A-07	7	EROSION PROTECTION AND SEDIMENT CONTROL DETAILS
A-08	8	CLEARING, GRUBBING, DEMOLITION PLAN, AND FISH HABITAT STRUCTURE
A-09	9	CONSTRUCTION LAYOUT CONTROL
A-10	10	DAM MODIFICATIONS MATERIAL DISTRIBUTION CHART
A-11	11	BORROW AREA PLAN AND SECTIONS
A-12	12	HYDRAULIC INFORMATION (1 OF 2)
A-13	13	HYDRAULIC INFORMATION (2 OF 2)
A-14	14	STRUCTURAL NOTES (1 OF 2)
A-15	15	STRUCTURAL NOTES (2 OF 2)
A-16	16	TYPICAL STRUCTURAL DETAILS

B. EMBANKMENT DAM

B-01	17	EMBANKMENT DAM GENERAL PLAN
B-02	18	EMBANKMENT DAM EXCAVATION PLAN AND PROFILE (1 OF 2)
B-03	19	EMBANKMENT DAM EXCAVATION PLAN AND PROFILE (2 OF 2)
B-04	20	EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS (1 OF 2)
B-05	21	EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS (2 OF 2)
B-06	22	EMBANKMENT DAM PLAN
B-07	23	EMBANKMENT DAM SECTIONS AND DETAILS (1 OF 4)
B-08	24	EMBANKMENT DAM SECTIONS AND DETAILS (2 OF 4)
B-09	25	EMBANKMENT DAM SECTIONS AND DETAILS (3 OF 4)
B-10	26	EMBANKMENT DAM SECTIONS AND DETAILS (4 OF 4)
B-11	27	EMBANKMENT DAM CREST DETAILS
B-12	28	TOE DRAIN PLAN AND PROFILE (1 OF 2)
B-13	29	TOE DRAIN PLAN AND PROFILE (2 OF 2)
B-14	30	TOE DRAIN DETAILS
B-15	31	INSPECTION WELL DETAILS
B-16	32	PRIMARY ACCESS ROAD PLAN AND PROFILE (1 OF 2)
B-17	33	PRIMARY ACCESS ROAD PLAN AND PROFILE (2 OF 2)
B-18	34	DOWNSTREAM ACCESS ROAD PLAN, PROFILE, AND SECTIONS
B-19	35	ACCESS ROAD SECTIONS

C. OUTLET WORKS

C-01	36	OUTLET WORKS GENERAL PLAN
C-02	37	OUTLET WORKS EXCAVATION AND DEMOLITION PLAN AND PROFILE
C-03	38	OUTLET WORKS EXCAVATION AND DEMOLITION SECTIONS
C-04	39	INTAKE STRUCTURE
C-05	40	INTAKE STRUCTURE STRUCTURAL DETAILS (1 OF 3)
C-06	41	INTAKE STRUCTURE STRUCTURAL DETAILS (2 OF 3)
C-07	42	INTAKE STRUCTURE STRUCTURAL DETAILS (3 OF 3)
C-08	43	EMERGENCY RELEASE CONDUIT PROFILE
C-09	44	EMERGENCY RELEASE OUTLET STRUCTURAL DETAILS (1 OF 2)
C-10	45	EMERGENCY RELEASE OUTLET STRUCTURAL DETAILS (2 OF 2)
C-11	46	NEW MEXICO CANAL CONDUIT PROFILE (1 OF 2)
C-12	47	NEW MEXICO CANAL CONDUIT PROFILE (2 OF 2)
C-13	48	NEW MEXICO CANAL OUTLET STRUCTURAL DETAILS
C-14	49	ARIZONA CANAL CONDUIT PROFILE
C-15	50	ARIZONA CANAL OUTLET STRUCTURAL DETAILS
C-16	51	INTAKE CHANNEL AND CONDUIT SECTIONS (1 OF 4)
C-17	52	INTAKE CHANNEL AND CONDUIT SECTIONS (2 OF 4)
C-18	53	INTAKE CHANNEL AND CONDUIT SECTIONS (3 OF 4)
C-19	54	INTAKE CHANNEL AND CONDUIT SECTIONS (4 OF 4)
C-20	55	OUTLET WORKS - MISCELLANEOUS DETAILS
C-21	56	METER VAULT - INTAKE STRUCTURE PLAN AND DETAILS
C-22	57	METER VAULT - INTAKE STRUCTURE STRUCTURAL DETAILS

D. IRRIGATION PIPELINE

D-01	58	IRRIGATION PIPELINE PLAN AND PROFILE (1 OF 2)
D-02	59	IRRIGATION PIPELINE PLAN AND PROFILE (2 OF 2) AND DETAILS

E. SPILLWAY

E-01	60	SPILLWAY PLAN, PROFILE, SECTIONS, AND DETAILS
------	----	---

F. EARLY WARNING SYSTEM, CONTROL STRUCTURE, AND INSTRUMENTATION

F-01	61	INSTRUMENTATION PLAN AND TYPICAL SECTION
F-02	62	INSTRUMENTATION DETAILS (1 OF 2)
F-03	63	INSTRUMENTATION DETAILS (2 OF 2)
F-04	64	EARLY WARNING SYSTEM BUILDING PLANS
F-05	65	EARLY WARNING SYSTEM BUILDING ELEVATIONS
F-06	66	EARLY WARNING SYSTEM BUILDING SECTIONS
F-07	67	EARLY WARNING SYSTEM BUILDING ARCHITECTURAL DETAILS
F-08	68	EARLY WARNING SYSTEM BUILDING CONCRETE DETAILS
F-09	69	EARLY WARNING SYSTEM BUILDING SECURITY FENCING
F-10	70	EARLY WARNING SYSTEM ELECTRICAL EQUIPMENT LAYOUT
F-11	71	EARLY WARNING SYSTEM ELECTRICAL INSTALLATION SCHEMATIC DIAGRAM

G. SITE CONTROLS

G-01	72	STOCK FENCING BARBED WIRE
G-02	73	GATE DETAILS

H. PARKING AREA, BOAT RAMP, AND TOILET FACILITIES

H-01	74	PARKING AREA AND BOAT RAMP PLAN, SECTION, AND DETAILS
H-02	75	PARKING AREA TOILET FACILITIES

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
 RED LAKE DAM MODIFICATIONS

DRAWING LIST

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015

P. EGGERS
 DESIGNED
 H. IEZZONI
 DRAWN
 K. PRICE
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

DRAWING LIST

Drawing A-02

SHEET 2 OF 75

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-02-DRAWING LIST.DWG OCT 2015 KPRICE

SURVEY NOTES

- THE 1927 NORTH AMERICAN DATUM (NAD 27) AND THE 1929 NATIONAL GEODETIC VERTICAL DATUM (NGVD 29) ARE THE HORIZONTAL AND VERTICAL DATUM UTILIZED ON ALL DRAWINGS. ALL TOPOGRAPHY, COORDINATES, AND ELEVATIONS SHOWN ARE IN GRID NEW MEXICO STATE PLANE COORDINATE SYSTEM, NEW MEXICO WEST ZONE, U.S. SURVEY FEET. THE TOPOGRAPHY WAS GENERATED FROM AERIAL PHOTOGRAPHY DATED NOVEMBER 2006.
COMBINED SCALE FACTOR = 0.9997217
GRID TO GROUND = 1.0002783775

GENERAL NOTES

- THE OUTLET GATE WILL BE OPEN AND THE RESERVOIR ACTIVELY DRAINING. THE CONTRACTOR SHOULD EXPECT SOME LOCALIZED STANDING WATER AND DEWATERING NEAR THE UPSTREAM EMBANKMENT CONSTRUCTION.
- RESTRICTED AREAS SHALL BE STAKED/FENCED IN FIELD AS DIRECTED BY CONTRACTING OFFICER'S REPRESENTATIVE (COR) OR BIA REPRESENTATIVE.
- EXISTING FENCING IN THE BORROW AREA SHALL BE REMOVED AS REQUIRED. FENCE SHALL BE REINSTALLED FOLLOWING CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL POST A SIGN INDICATING VERTICAL CLEARANCE OF OVERHEAD UTILITIES. OVERHEAD UTILITIES SHALL BE PROTECTED.
- CONTRACTOR IS RESPONSIBLE FOR DESIGN, IMPLEMENTATION, OPERATION, AND MAINTENANCE OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES DURING CONSTRUCTION.
- RESERVOIR OPERATIONS – IRRIGATION DIVERSIONS THROUGH THE RESERVOIR WILL NOT BE ALLOWED FOR THE DURATION OF THE PROJECT UNLESS OTHERWISE AGREED TO BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ROUTING STORM RUNOFF THROUGH THE PROJECT TO MAINTAIN THE DEWATERED RESERVOIR STATE.
- LOCATIONS OF EXISTING FEATURES SHOWN ON THE DRAWING ARE APPROXIMATE. CONFIRM LOCATIONS AS REQUIRED TO COMPLETE THE WORK. IMMEDIATELY NOTIFY COR OR BIA REPRESENTATIVE OF ANY DISCREPANCIES.
- LIMIT CONSTRUCTION ACTIVITY TO THE PROJECT CONSTRUCTION LIMITS SHOWN ON THE DRAWINGS OR ALLOWED BY THE COR OR BIA REPRESENTATIVE. RESTORE ALL DAMAGED AREAS TO CONDITIONS EQUAL TO OR BETTER THAN CONDITIONS AT THE START OF CONSTRUCTION.
- PRIOR TO EXCAVATION AND COMMENCEMENT OF THE OUTLET WORKS REPLACEMENT, CONSTRUCT A COFFERDAM TO EL. 7072 TO TEMPORARILY STORE STORM INFLOWS. PROVIDE CONTROLLED MEANS TO ROUTE INFLOWS THROUGH THE OUTLET WORKS EXCAVATION BY PUMPING OR PIPING WHILE PROTECTING THE FINISHED WORK. SEE SPECIFICATIONS SECTION 31 03 10.
- TREES SHALL BE REMOVED BEFORE MARCH 15TH IN AREAS INDICATED ON THE DRAWINGS AND AS DIRECTED BY THE COR OR BIA REPRESENTATIVE.

ABBREVIATIONS

- ABC = AGGREGATE BASE COURSE
- ADDN = ADDITIONAL
- APPROX = APPROXIMATE
- AR = ACCESS ROAD
- AZC = ARIZONA CONDUIT
- BLDG = BUILDING
- BFV = BUTTERFLY VALVE
- BH = BORE HOLE
- BIA = BUREAU OF INDIAN AFFAIRS
- BM = BENCHMARK
- B.O.B. = BOTTOM OF BOREHOLE
- B.O.C. = BOTTOM OF CONCRETE
- BOR = U.S. BUREAU OF RECLAMATION
- BTW = BETWEEN
- BVCE = BEGIN VERTICAL CURVE
- BVCS = BEGIN VERTICAL CURVE STATION
- CFS = CUBIC FEET PER SECOND
- CJ = CONSTRUCTION JOINT
- CL = CENTERLINE
- CLR = CLEAR
- CMP = CORRUGATED METAL PIPE
- CONC = CONCRETE
- CONT = CONTINUOUS
- COR = CONTRACTING OFFICER'S REPRESENTATIVE
- CP = CONTROL POINT
- CTJ = CONTRACTION JOINT
- CEN, CTR = CENTER
- DIA, Ø = DIAMETER
- DIAG = DIAGONAL
- DR = DIMENSION RATIO
- DS AR = DOWNSTREAM ACCESS ROAD
- DWG, DWGS = DRAWING OR DRAWINGS
- DWL, DWLS = DOWEL OR DOWELS
- EA = EACH
- EF = EACH FACE
- EJ = EXPANSION JOINT
- EL = ELEVATION
- EQ = EQUAL
- EW = EACH WAY
- ERC = EMERGENCY RELEASE CONDUIT
- ETW = EDGE OF TRAVELED WAY
- EWS = EARLY WARNING SYSTEM
- EVCE = END VERTICAL CURVE ELEVATION
- EVSE = END VERTICAL CURVE STATION
- FC = FEEDER CANAL
- FCV = FIXED CONE VALVE
- FDN = FOUNDATION
- FT = FEET OR FOOT
- GALV = GALVANIZED
- GR = GRADE
- HDPE = HIGH DENSITY POLYETHYLENE
- HPU = HYDRAULIC PUMP UNIT
- ID = INSIDE DIAMETER
- IDF = INFLOW DESIGN FLOOD
- IE = INVERT ELEVATION
- IF = INSIDE FACE
- INV = INVERT
- IW = INSPECTION WELL
- JT = JOINT
- LCE = COMPRESSION EMBEDMENT LENGTH
- LCS = COMPRESSION LAP SPLICE
- LDH = HOOK DEVELOPMENT LENGTH
- LT = LEFT
- LTE = TENSION EMBEDMENT LENGTH
- LTS = LAP TENSION SPLICE
- LVS = LENGTH OF VERTICAL CURVE
- MAX = MAXIMUM
- MIN = MINIMUM
- MH = MANHOLE
- MJ = MECHANICAL JOINT
- MFG = MANUFACTURER
- MISC. = MISCELLANEOUS
- NMC = NEW MEXICO CONDUIT
- NMDOT = NEW MEXICO DEPARTMENT OF TRANSPORTATION
- NN = NAVAJO NATION
- NO. = NUMBER
- NTS = NOT TO SCALE
- NWS = NORMAL WATER SURFACE
- OC = ON CENTER
- OD = OUTSIDE DIAMETER
- OE = OVERHEAD ELECTRIC
- OF = OUTSIDE FACE
- OW = OUTLET WORKS

- PC = POINT OF CURVATURE
- PD = PLAIN DOWELS
- PE = POLYETHYLENE
- PI = POINT OF INTERSECTION
- PL = PLATE
- PMF = PROBABLE MAXIMUM FLOOD
- PP = PARALLEL PIPELINE
- PT = POINT OF TANGENCY, PIEZOMETER
- PVC = POLYVINYL CHLORIDE
- PVI = POINT OF VERTICAL INTERSECTION
- PZ = PIEZOMETER
- R = RADIUS
- RCP = REINFORCED CONCRETE PIPE
- RD = ROAD
- REIN = REINFORCEMENT
- REQ'D = REQUIRED
- RES = RESERVOIR
- RO = ROUGH OPENING
- R.O.W. = RIGHT OF WAY
- SCH = SCHEDULE
- S = SLOPE
- SG = STAFF GAUGE
- SL = SPRINGLINE
- SM = SURVEY MONUMENT
- SOE = STRUCTURAL ENGINEER OF RECORD
- SPC = SPACE
- SP = SPILLWAY
- SS = STAINLESS STEEL
- STA = STATION
- STL = STEEL
- SQ = SQUARE
- T&B = TOP & BOTTOM
- TD = TOE DRAIN
- T.O. = TOP OF
- TOC = TOP OF CONCRETE
- T.O.W. = TOP OF WALL
- TP = TEST PIT
- TPRL = TEST PIT RED LAKE
- T.W. = TAILWATER
- TYP = TYPICAL
- USGS = UNITED STATES GEOLOGICAL SURVEY
- VERT = VERTICAL
- WS = WATER SURFACE
- W = WIDE OR WIDTH
- W/ = WITH

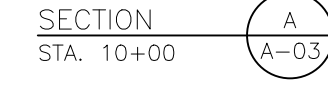
LEGEND

- EARTH SLOPE
- PROPERTY LINE
- CONSTRUCTION LIMITS (PROJECT LIMITS)
- CENTERLINE
- WATER
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- CONSTRUCTION LIMITS AND BORROW AREA CONTROL POINT
- BENCH MARK/CONTROL POINT
- TEST PITS, UNITED STATES BUREAU OF RECLAMATION, MAY AND JUNE 2012
- BOREHOLE
- PIEZOMETERS
- EARTH

	STEEL		STRUCTURAL CONCRETE		COARSE AGGREGATE
	NON-SHRINK GROUT		RIPRAP		MUD MAT/ MASS CONCRETE/ ZONE 2/ PIPE BEDDING
	ROCK		GRAVEL SURFACING		ZONE 3
	PIPE ZONE FILL		25' SETBACK LOCATION BETWEEN CONSTRUCTION LIMITS AND BORROW AREA EXCAVATION		



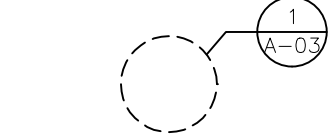
DETAIL TITLE. THE NUMBER "1" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "A-03" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS CALLED OUT.



SECTION TITLE. THE LETTER "A" REFERS TO THE SECTION DESIGNATION. THE NUMBER "A-03" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS CALLED OUT.

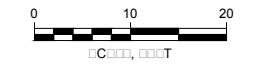


SECTION LOCATION. THE LETTER "A" REFERS TO THE SECTION DESIGNATION. THE NUMBER "A-03" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS SHOWN.



DETAIL LOCATION. THE NUMBER "1" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "A-03" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS SHOWN.

PLAN
DAM MODIFICATIONS



GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

BUREAU OF INDIAN AFFAIRS – SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
GENERAL NOTES, LEGEND, AND ABBREVIATIONS

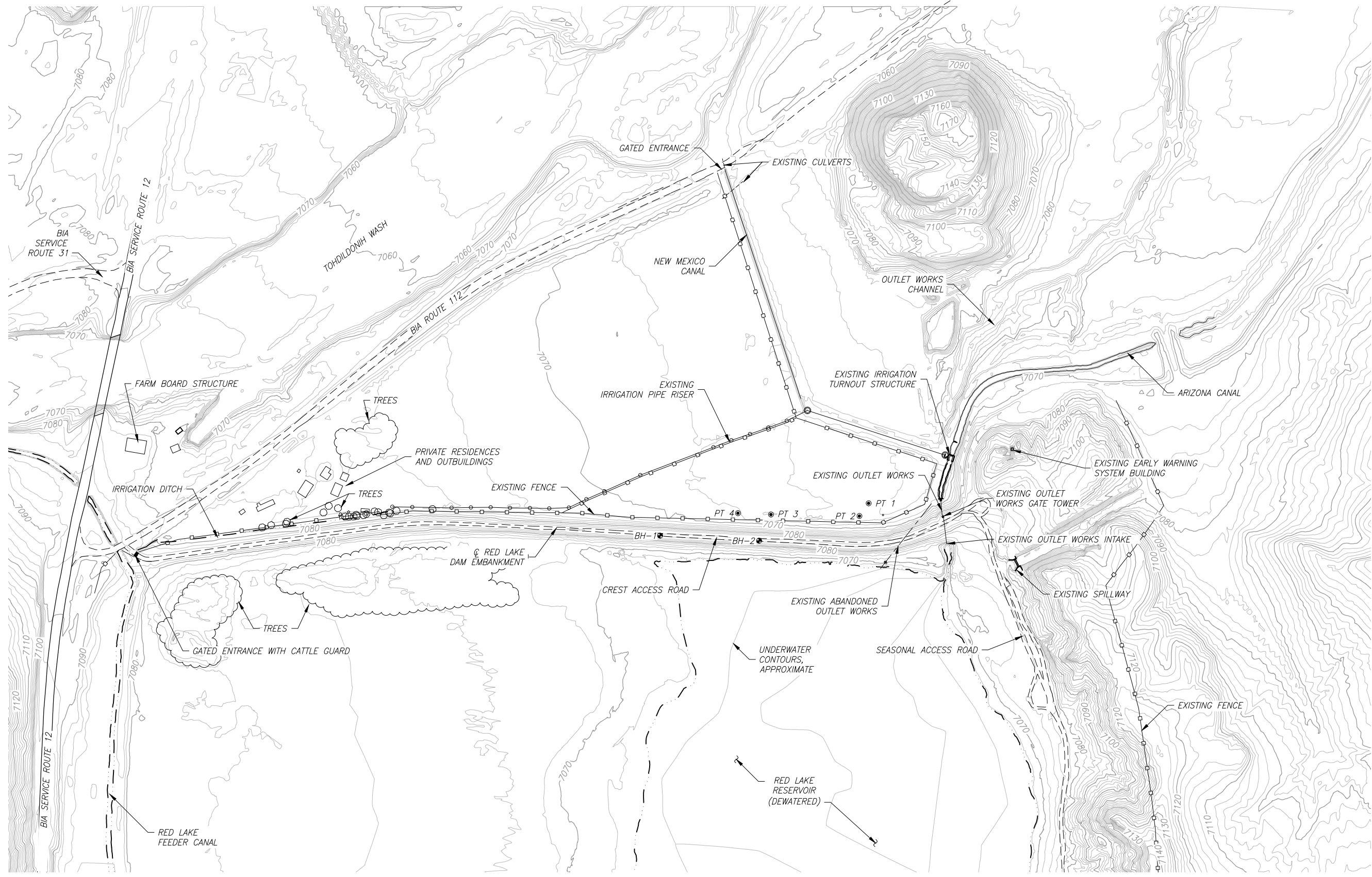
ISSUED FOR SOLICITATION
OCTOBER 2, 2015

P. EGGERS
DESIGNED
S. MICKELL
DRAWN
K. PRICE
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

GENERAL NOTES, LEGEND, AND ABBREVIATIONS

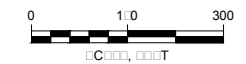
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-03-GENERAL NOTES, LEGEND, AND ABBREVIATIONS.DWG OCT 2015 JHEITLAND

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-04-EXISTING CONDITIONS.DWG OCT 2015 JHEITLAND



LEGEND

- BOREHOLE
- PIEZOMETER



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

EXISTING CONDITIONS

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

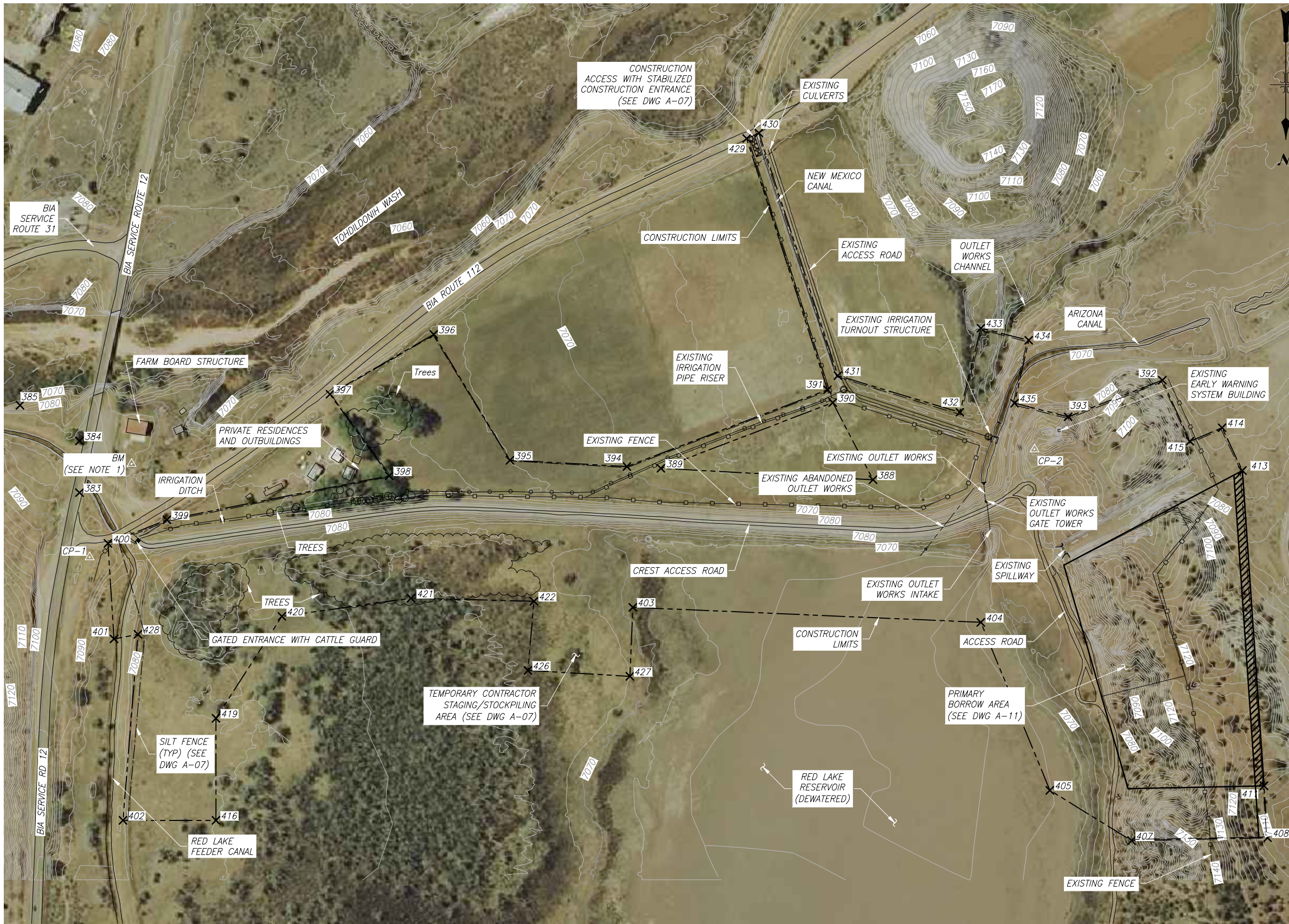
P. EGERS
DESIGNED
S. MICKELL
DRAWN
K. PRICE
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

EXISTING CONDITIONS

Drawing A-04

SHEET 4 OF 75

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-05-SURVEY CONTROL, SITE ACCESS, AND EROSION CONTROL.DWG OCT 2015 KPRICE



CONSTRUCTION LIMITS

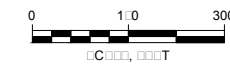
Point #	Northing	Easting
380	1790506.66	145803.54
381	1790697.50	145767.14
382	1790772.39	145368.48
383	1790943.78	145083.03
384	1790794.80	145083.03
385	1790691.92	145254.37
386	1790621.56	145628.92
387	1790479.94	145655.93
388	1790906.47	142796.91
389	1790873.71	143407.85
390	1790684.27	142912.72
391	1790647.32	142928.01
392	1790619.81	141963.45
393	1790725.25	142234.85
394	1790868.45	143506.03
395	1790850.39	143842.86
396	1790487.76	144062.38
397	1790660.21	144361.33
399	1791021.86	144831.39
400	1791089.91	145001.02
401	1791365.22	144983.65
402	1791887.85	144957.76
403	1791274.16	143488.67
404	1791317.33	142486.25
405	1791801.27	142287.45
407	1791946.34	142051.96
408	1791938.08	141660.11
411	1791788.43	141670.41
413	1790880.01	141732.92
414	1790756.62	141791.19
415	1790795.70	141883.66
416	1791887.85	144689.89
419	1791593.83	144689.89
420	1791300.06	144499.72
421	1791248.00	144128.00
422	1791256.64	143773.80
426	1791455.83	143791.07
427	1791472.97	143497.30
428	1791351.86	144914.60
429	1789923.24	143160.88
430	1789907.26	143125.67
431	1790606.72	142898.16
432	1790712.27	142546.68
433	1790469.66	142485.87
434	1790504.83	142348.14
435	1790685.91	142389.23
938	1790895.36	144190.73

CONTROL POINTS

POINT #	NORTHING	EASTING
BM*	1790860.61	144932.80
CP-1	1791129.93	145053.84
CP-2	1790818.66	142331.73

* SEE NOTE 1

- NOTES**
- VERTICAL CONTROL, UNITED STATES GEOLOGIC SURVEY BENCHMARK 14 BE 1952. 2" BRASS CAP SET IN CONCRETE. ELEVATION 7083.0.
 - IMAGE: 2014 NATIONAL AGRICULTURAL IMAGERY PROGRAM (NAIP) FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, FOR MCKINNEY COUNTY, NEW MEXICO.



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 SURVEY CONTROL, SITE ACCESS,
 AND EROSION CONTROL PLAN

ISSUED FOR SOLICITATION

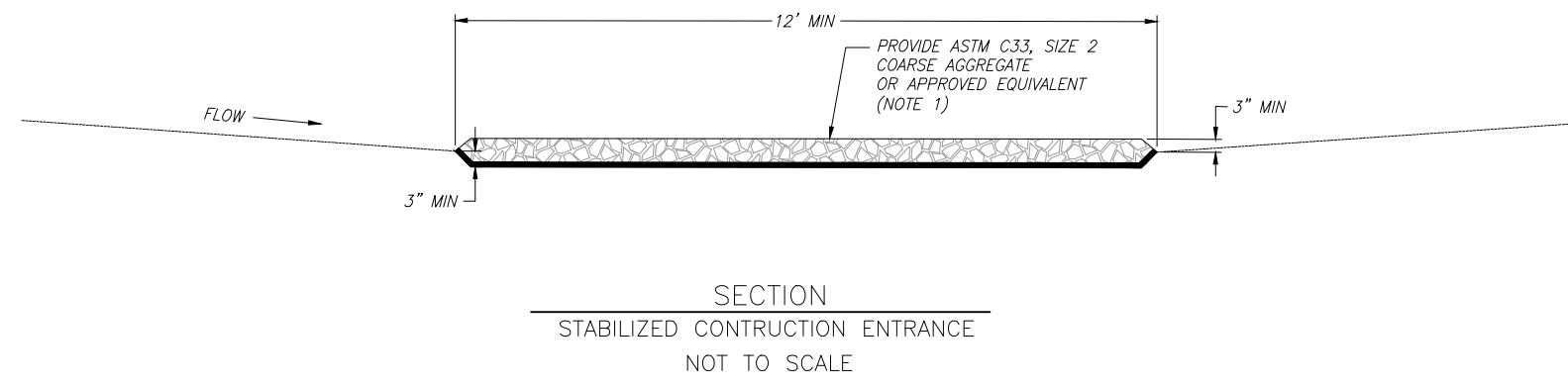
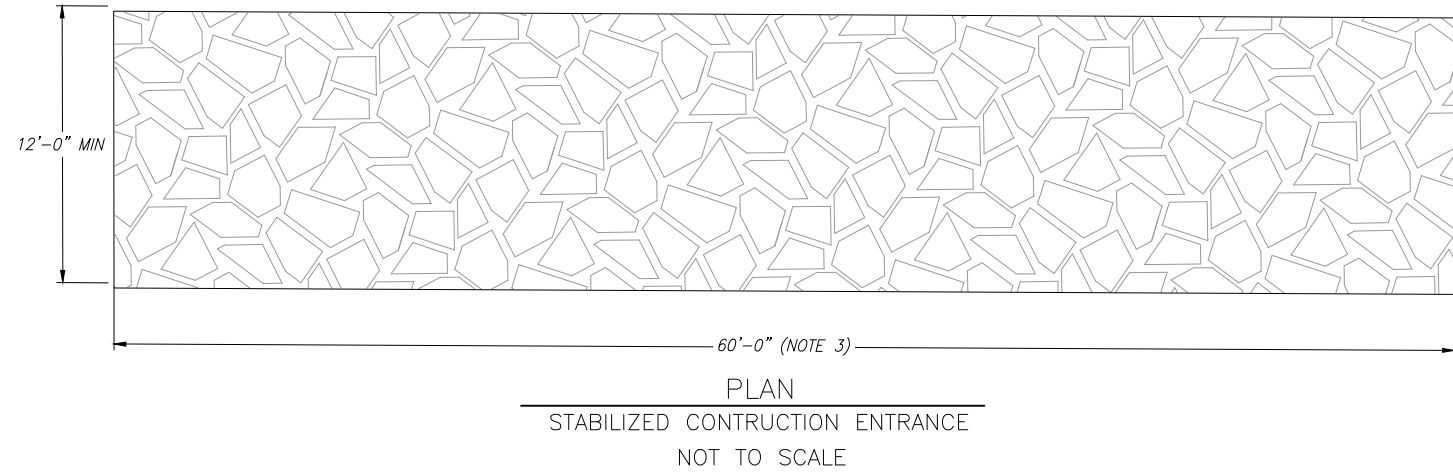
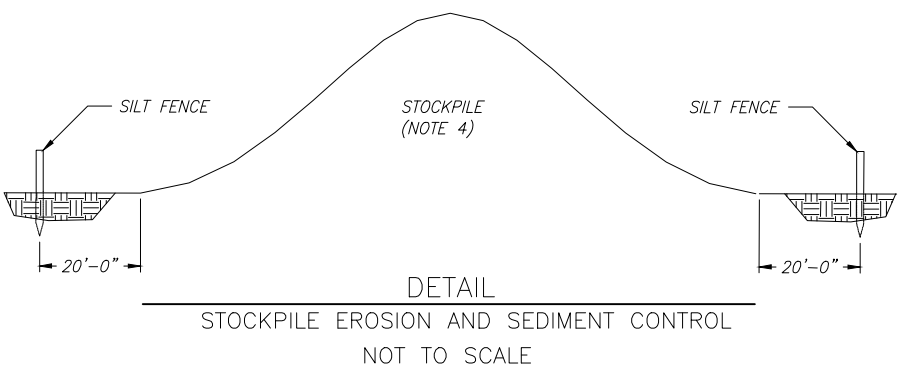
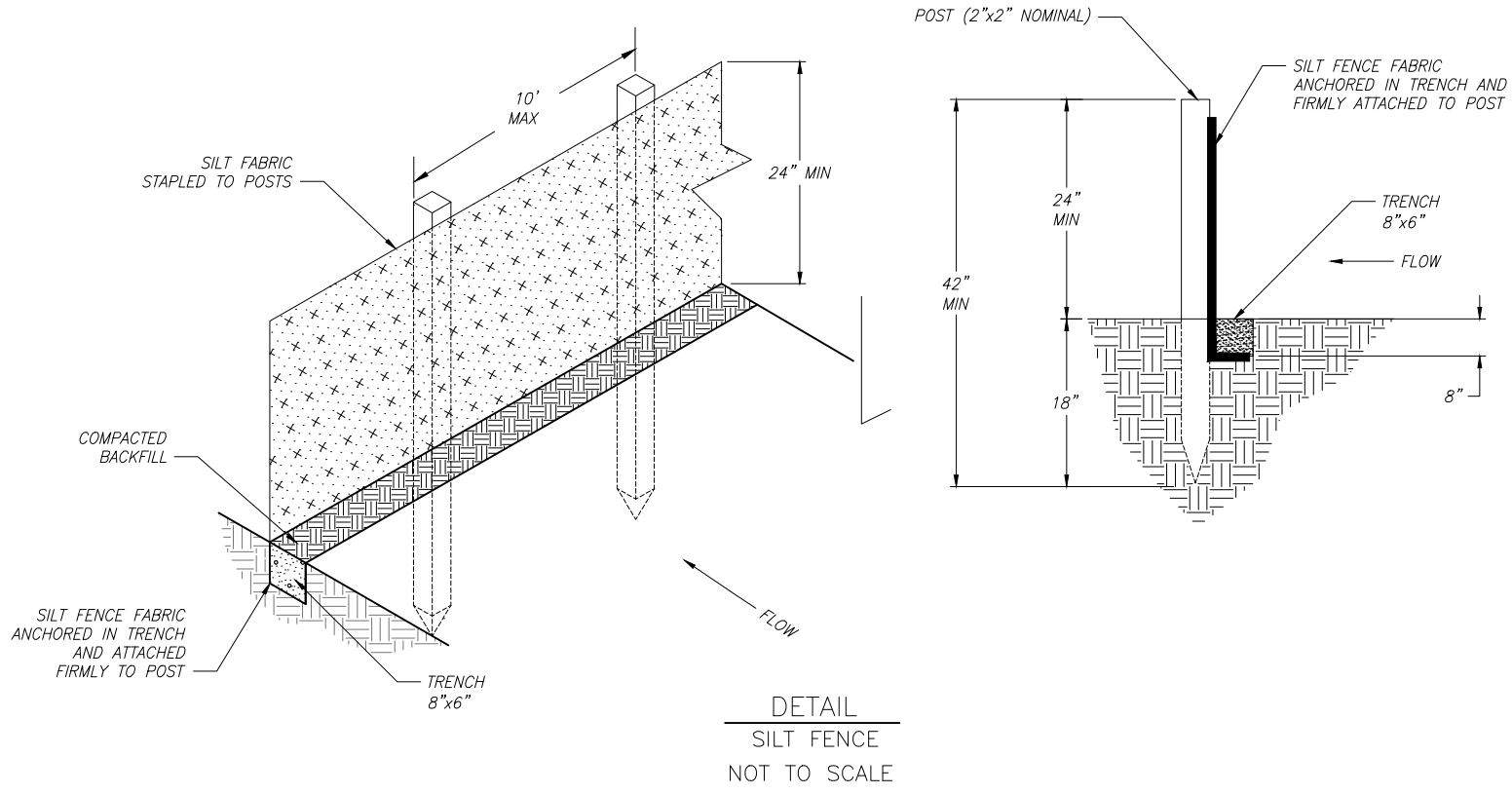
P. EGGERS
 DESIGNED
 S. MICKELL
 DRAWN
 K. PRICE
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

**SURVEY CONTROL, SITE ACCESS,
 AND EROSION CONTROL PLAN**

Drawing A-05

SHEET 5 OF 75

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-07-EROSION PROTECTION AND SEDIMENT CONTROL DETAILS.DWG OCT 2015 KPRICE



- NOTES**
- SEE DWG A-05 FOR EROSION CONTROL PLAN.
 - REFER TO SPECIFICATION SECTION 32 31 40 EROSION CONTROL.
 - STABILIZED CONSTRUCTION ENTRANCE TO BE 60' LONG OR AS REQUIRED BY COR OR BIA REPRESENTATIVE.
 - STOCKPILES MUST HAVE EROSION PROTECTION AND SEDIMENT CONTROL MEASURES IN PLACE IN ACCORDANCE WITH THE SPECIFICATIONS AND AS DIRECTED BY THE COR OR BIA REPRESENTATIVE.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EROSION PROTECTION AND SEDIMENT CONTROL
 DETAILS

DESIGNED	K. PRICE
DRAWN	H. IEZZONI
CHECKED	K. PRICE
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015
 0

EROSION PROTECTION AND
 SEDIMENT CONTROL
 DETAILS

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-09-CONSTRUCTION LAYOUT CONTROL.DWG KPRICE OCT 2015

DAM BASELINE LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L1, L2, L3.

DAM BASELINE CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Rows C1, C2.

PRIMARY ACCESS ROAD CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Rows C5, C6, C7.

TOE DRAIN CENTERLINE LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L4 through L26.

TOE DRAIN CENTERLINE CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Rows C3, C4.

DOWNSTREAM ACCESS ROAD CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Rows C8 through C12.

NEW MEXICO CANAL CONDUIT CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Rows C14, C15.

INTAKE CHANNEL CURVE DATA

Table with 10 columns: CURVE, BC STA, PI STA, EC STA, LENGTH, RADIUS, DELTA, TANGENT, CHORD. Row C13.

PRIMARY ACCESS ROAD LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L27 through L30.

INTAKE CHANNEL LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Row L48.

DOWNSTREAM ACCESS ROAD LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L31 through L47.

EMERGENCY RELEASE CONDUIT LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L49, L50.

NEW MEXICO CANAL CONDUIT LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L51, L52, L53.

ARIZONA CANAL CONDUIT LINE DATA

Table with 9 columns: LINE, START STA, END STA, LENGTH, START EASTING, START NORTHING, END EASTING, END NORTHING, BEARING. Rows L54, L55.



4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

CONSTRUCTION LAYOUT CONTROL

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

P. EGGERS
DESIGNED
P. EGGERS
DRAWN
K. PRICE
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

CONSTRUCTION LAYOUT CONTROL

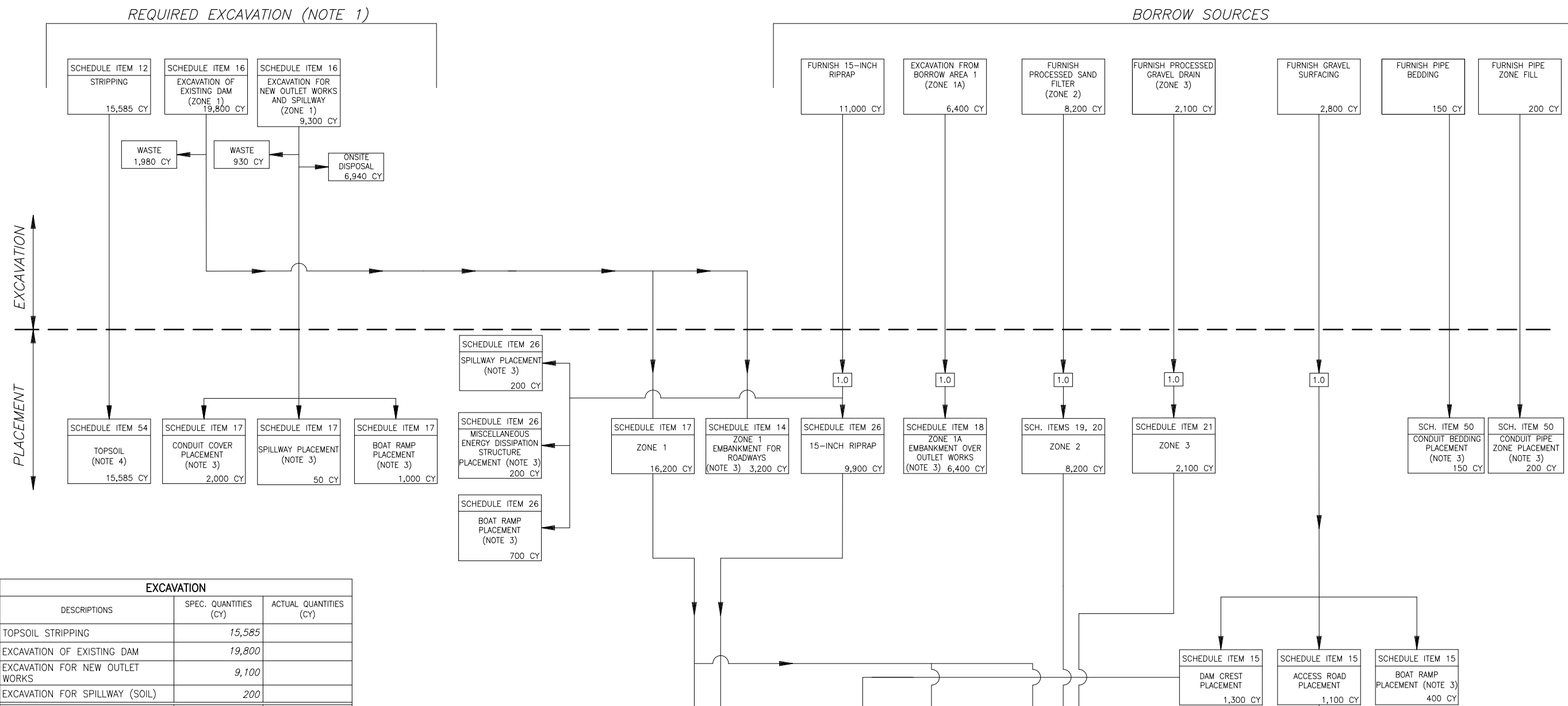
Drawing A-09

SHEET 9 OF 75

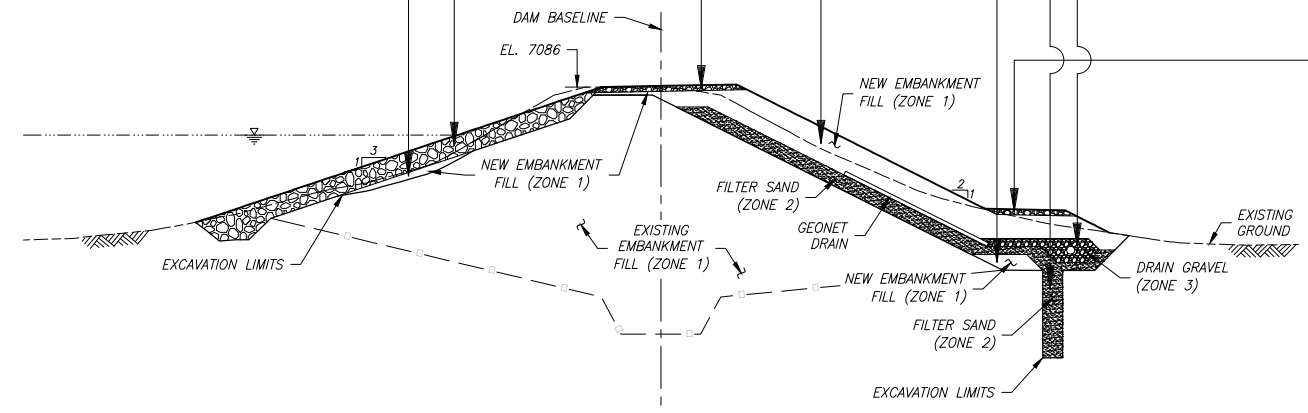
K. PRICE
 DESIGNED
 H. IEZZONI
 DRAWN
 N. JORGENSEN
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

DAM MODIFICATIONS
 MATERIAL DISTRIBUTION
 CHART

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-10-DAM MODIFICATIONS MATERIAL DISTRIBUTION CHART.DWG SEP 2015 KPRICE



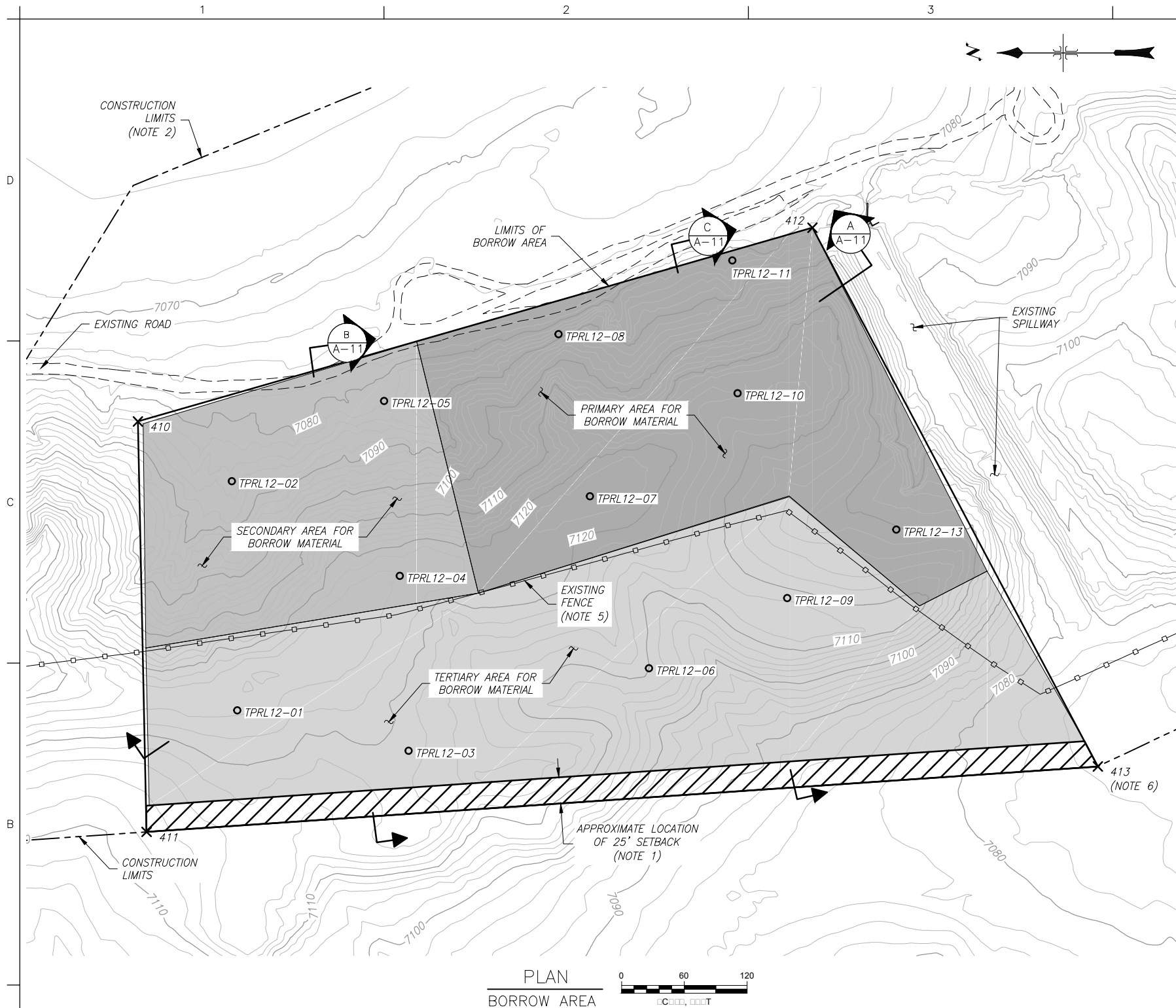
EXCAVATION		
DESCRIPTIONS	SPEC. QUANTITIES (CY)	ACTUAL QUANTITIES (CY)
TOPSOIL STRIPPING	15,585	
EXCAVATION OF EXISTING DAM	19,800	
EXCAVATION FOR NEW OUTLET WORKS	9,100	
EXCAVATION FOR SPILLWAY (SOIL)	200	
TOTAL EXCAVATION OF EXISTING EMBANKMENT AND STRUCTURE FOUNDATION	44,685	
EXCAVATION FROM BORROW AREA 1	6,400	
FURNISHED MATERIAL	24,450	
PLACEMENT		
DESCRIPTIONS	SPEC. QUANTITIES (CY)	ACTUAL QUANTITIES (CY)
TOPSOIL	15,585	
ZONE 1	22,450	
ZONE 1A	6,400	
ZONE 2	8,200	
ZONE 3	2,100	
15-INCH RIPRAP	11,000	
EMBANKMENT FOR ROADWAYS	3,200	
GRAVEL SURFACING	2,800	
CONDUIT BEDDING	150	
CONDUIT PIPE ZONE	200	
TOTAL PLACEMENT	71,935	



DAM SECTION
 NOT TO SCALE

- NOTES**
1. THIS CHART WAS PREPARED TO SHOW CONTRACTOR ANTICIPATED SOURCES OF MATERIAL AND THEIR PROPOSED DISTRIBUTION. THIS DISTRIBUTION OF MATERIAL SHOULD ONLY BE USED AS A GUIDE AND SHOULD BE MODIFIED DURING PROJECT WORK TO FIT FIELD CONDITIONS.
 2. THE WASTE QUANTITIES AND SHRINKAGE FACTORS ARE ESTIMATES AND MAY VARY SIGNIFICANTLY.
 3. NOT SHOWN ON DAM SECTION.
 4. TOPSOIL SHALL BE STOCKPILED AND REPLACED IN THE BORROW AREA AND DOWNSTREAM EMBANKMENT SLOPE.

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-11-BORROW AREA - PLAN AND SECTIONS.DWG SEP 2015 RPR/RC



NOTES

1. MINIMUM 25' SETBACK BETWEEN CONSTRUCTION LIMITS AND BORROW AREA.
2. SEE DRAWING A-05 FOR CONSTRUCTION LIMITS.
3. RECLAIM BORROW AREA PER SPECIFICATIONS SECTION 31 23 23 EXCAVATION.
4. SEE DESIGN SUMMARY REPORT FOR ADDITIONAL SUBSURFACE INFORMATION.
5. MAINTAIN EXISTING FENCE UNLESS OTHERWISE DIRECTED BY CONTRACTING OFFICER.
6. SEE DWG A-06 FOR CONTROL POINT LOCATIONS.

GEOLOGIC LEGEND

- PRIMARY BORROW AREA
- SECONDARY BORROW AREA
- TERTIARY BORROW AREA

GEOLOGIC EXPLANATION

- CL: LEAN CLAY
- (CL)s: LEAN CLAY WITH SAND
- s(CL): SANDY LEAN CLAY
- s(CL)g: SANDY LEAN CLAY WITH GRAVEL
- SC: CLAYEY SAND
- (SC)g: CLAYEY SAND WITH GRAVEL



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

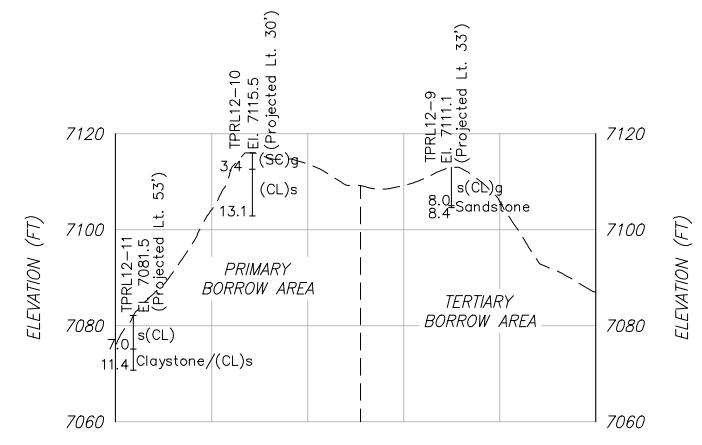
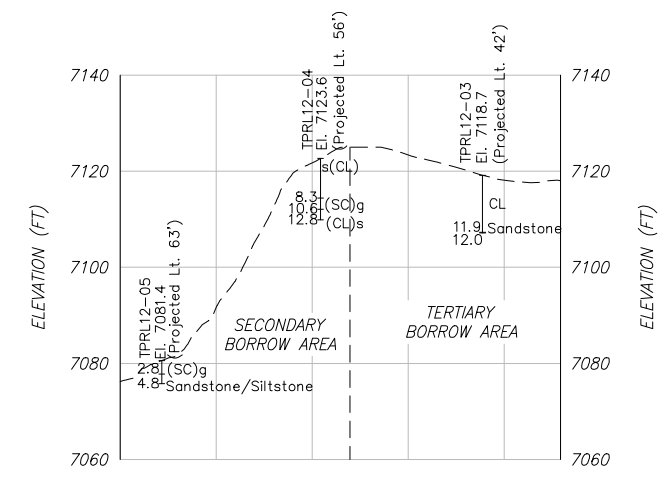
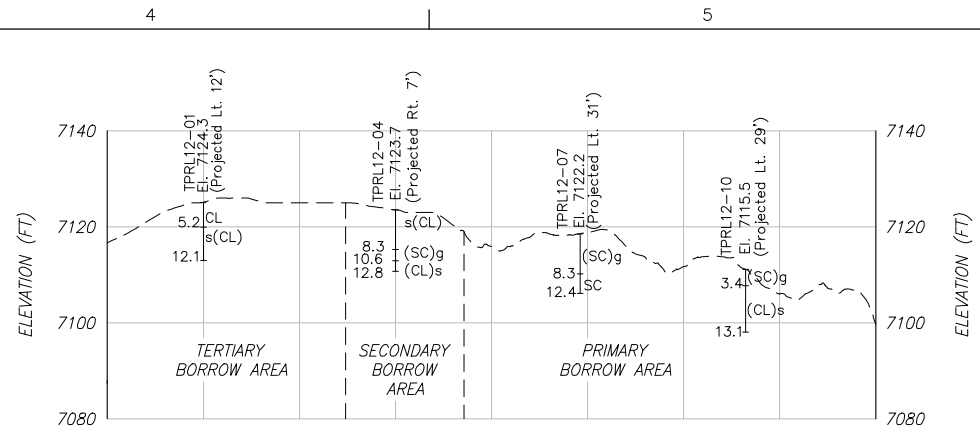
BORROW AREA
PLAN AND SECTIONS

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

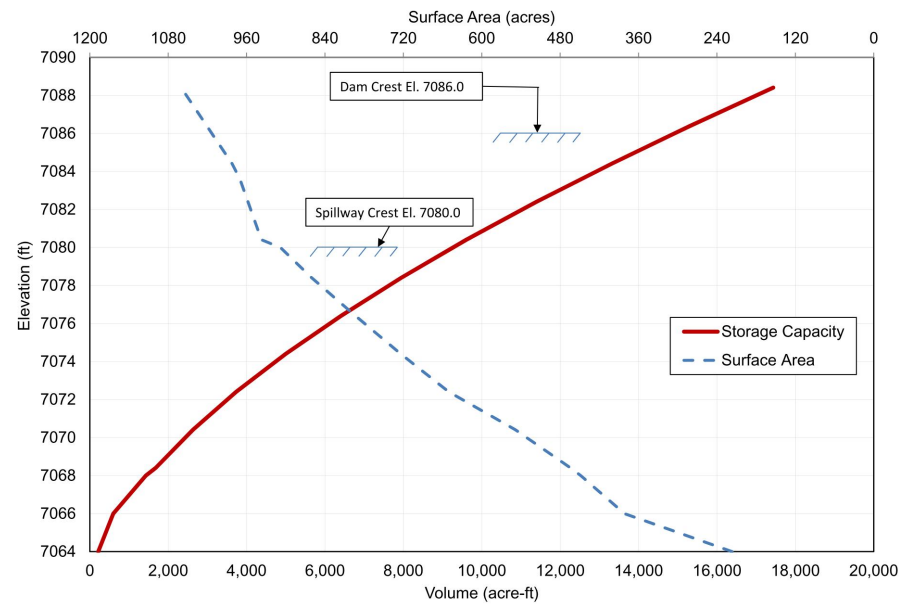
A. LOCKMAN
DESIGNED
S. MICKELL
DRAWN
N. JORGENSEN
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

BORROW AREA
PLAN AND SECTIONS

Drawing A-11
SHEET 11 OF 75

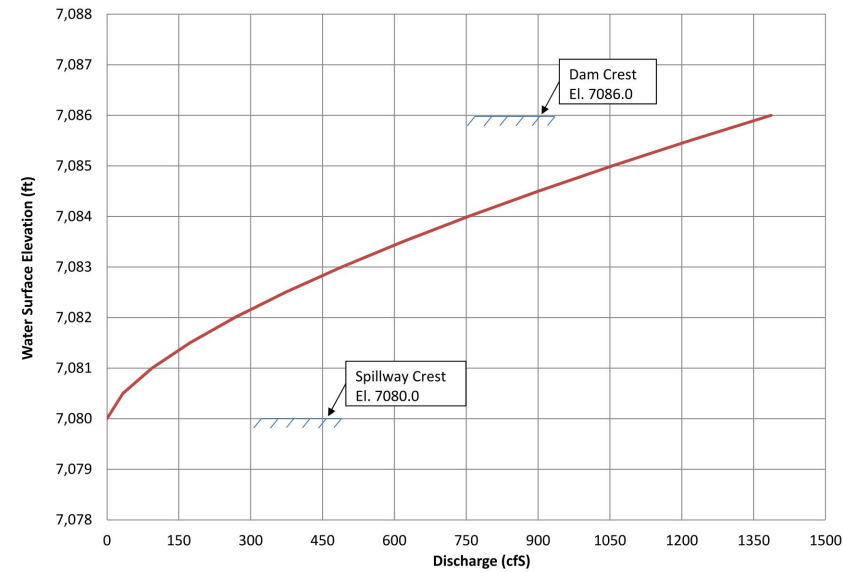


P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-12-HYDRAULIC INFORMATION (1 OF 2).DWG SEP 2015 RPRICE



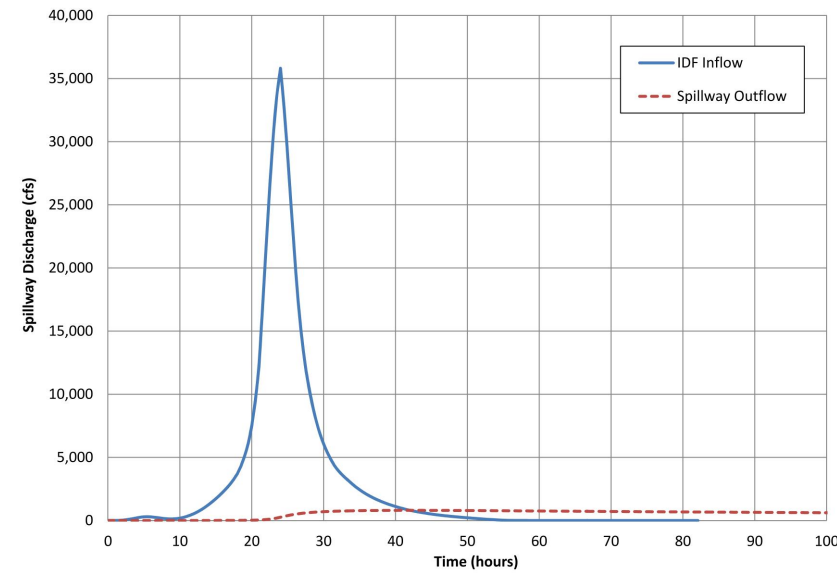
ELEVATION-AREA-CAPACITY
RED LAKE

RED LAKE ELEVATION-AREA-CAPACITY		
Elevation (ft)	Surface Area (acres)	Storage Capacity (ac-ft)
7064.0	217	217
7066.0	382	599
7068.0	449	1429
7068.4	464	1683
7070.4	549	2633
7072.4	651	3738
7074.4	724	5003
7076.4	794	6413
7078.4	861	7949
7080.0	908	9268
7080.4	937	9608
7082.4	958	11401
7083.6	970	12539
7084.4	982	13314
7086.0	1013	14915



SPILLWAY RATING CURVE
RED LAKE

SPILLWAY RATING CURVE	
Elevation (ft)	Discharge (cfs)
7080.0	0.0
7080.5	33.3
7081.0	94.3
7081.5	173.3
7082.0	266.8
7082.5	372.9
7083.0	490.1
7083.5	617.6
7084.0	754.6
7084.5	900.4
7085.0	1054.6
7085.5	1216.7
7086.0	1386.3



INFLOW DESIGN FLOOD ROUTING
RED LAKE

NOTES

1. ORIGINAL 1952 ELEVATION-AREA-CAPACITY BASED ON NGVD29 DATUM AS PRESENTED IN THE COMPREHENSIVE DAM REVIEW FOR RED LAKE DAM (DECEMBER 2009).
2. ELEVATIONS ADJUSTED FROM NGVD29 TO NGVD88 USING USGS VERTCON SOFTWARE. NAVD ELEVATIONS ADJUSTED DOWN BY 3.59 FEET TO OBTAIN NGVD29 ELEVATIONS.



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

HYDRAULIC INFORMATION (1 OF 2)

REV NO 0
OCTOBER 2, 2015
ISSUED FOR SOLICITATION

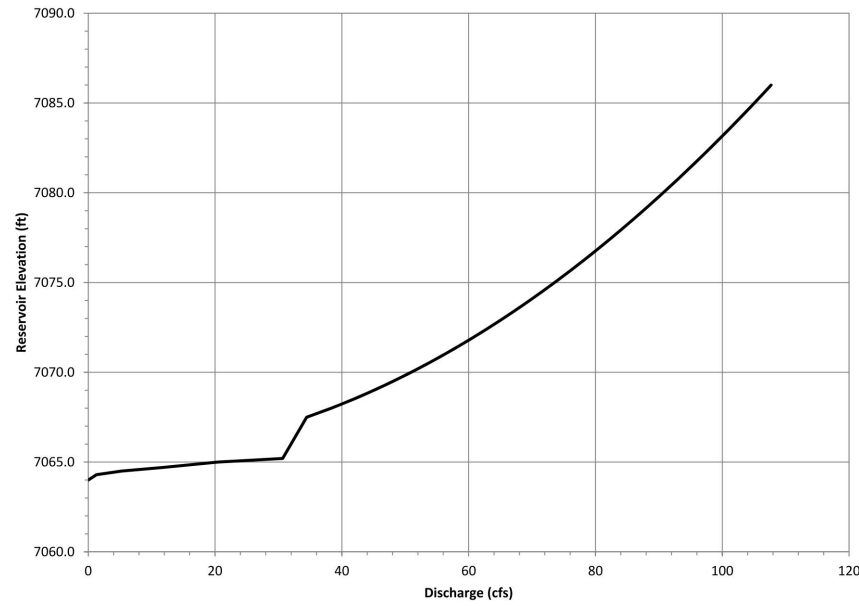
K. PRICE
DESIGNED
K. PRICE
DRAWN
R. WESTMORE
CHECKED
C. MASCHING
DESIGN APPROVAL
T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW

HYDRAULIC INFORMATION
(1 OF 2)

Drawing A-12

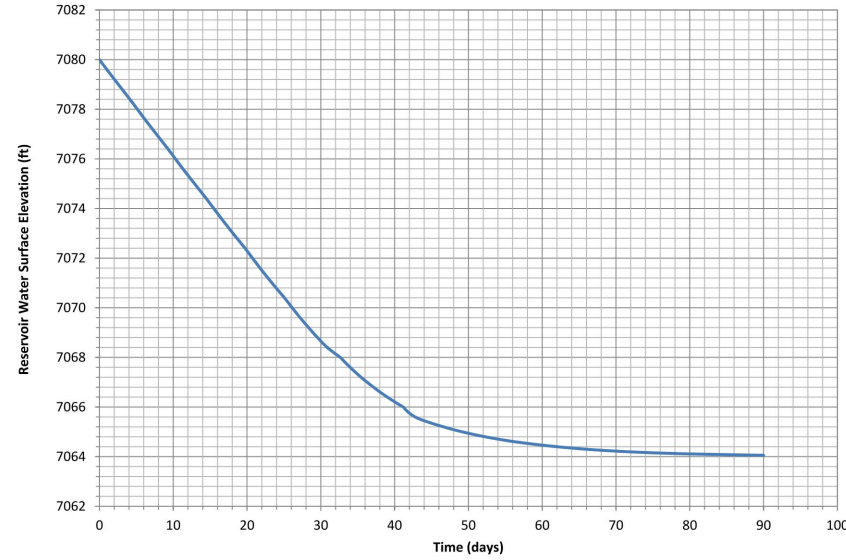
SHEET 12 OF 75

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-13-HYDRAULIC INFORMATION (2 OF 2).DWG SEP 2015 RPRICE



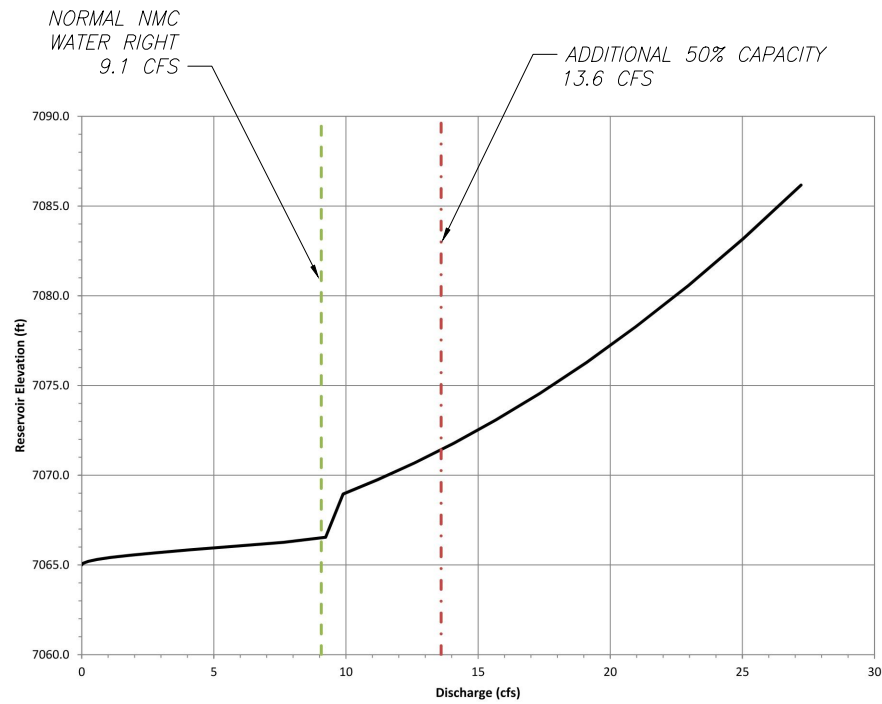
EMERGENCY RELEASE CONDUIT RATING CURVE
RED LAKE

Elevation (ft)	Discharge (cfs)
7064.00	0.0
7064.50	5.3
7065.0	20.4
7068.0	38.3
7069.0	45.1
7070.0	50.9
7071.0	56.2
7072.0	61.0
7073.0	65.5
7074.0	69.6
7075.0	73.6
7076.0	77.3
7077.0	80.8
7078.0	84.3
7079.0	87.5
7080.0	89.1
7081.0	93.7
7082.0	96.7
7083.0	99.6
7084.0	102.4
7085.0	105.1
7086.0	107.7



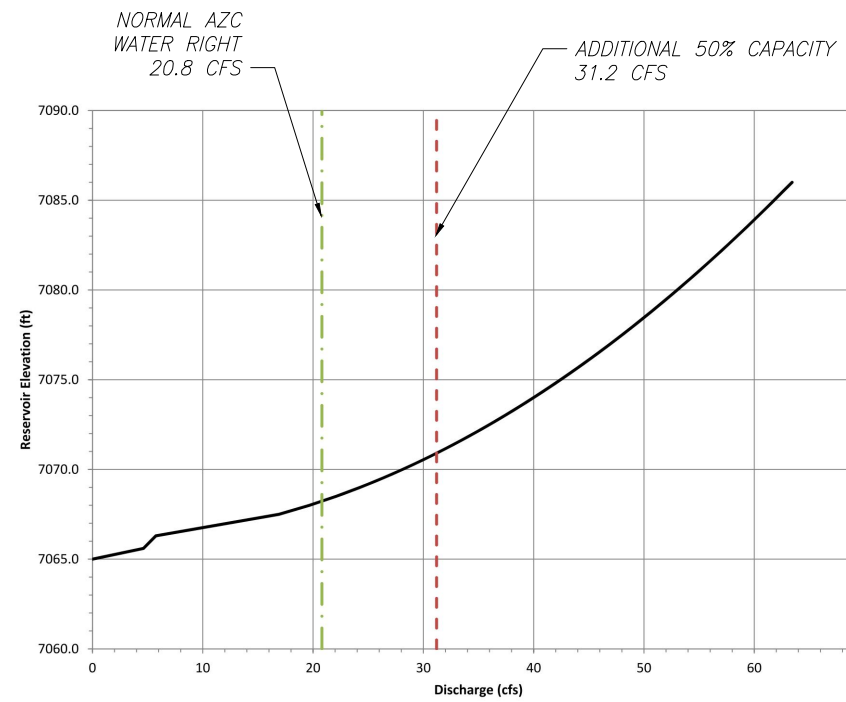
RESERVOIR EVACUATION CURVE
RED LAKE

Elevation (ft)	Elapsed Time (days)
7080.0	0
7079.8	1
7078.9	5
7078.5	7
7077.9	10
7075.7	20
7073.6	30
7071.5	40
7069.5	50
7067.8	60
7066.4	70
7065.4	80
7064.9	90



NEW MEXICO CANAL DIVERSION RATING CURVE
RED LAKE

Elevation (ft)	Discharge (cfs)
7065.0	0.0
7066.0	3.2
7067.0	6.3
7068.0	8.5
7069.0	10.4
7070.0	12.1
7071.0	13.5
7072.0	14.9
7073.0	16.1
7074.0	17.3
7075.0	18.3
7076.0	19.4
7077.0	20.4
7078.0	21.3
7079.0	22.2
7080.0	23.1
7081.0	23.9
7082.0	24.8
7083.0	25.5
7084.0	26.3
7085.0	27.1
7086.0	27.8



ARIZONA CANAL DIVERSION RATING CURVE
RED LAKE

Elevation (ft)	Discharge (cfs)
7065.0	0.0
7066.0	11.1
7067.0	13.6
7068.0	19.7
7069.0	24.0
7070.0	28.1
7071.0	31.5
7072.0	34.6
7073.0	37.4
7074.0	40.0
7075.0	42.4
7076.0	44.8
7077.0	47.0
7078.0	49.1
7079.0	51.1
7080.0	53.0
7081.0	54.9
7082.0	56.7
7083.0	58.5
7084.0	60.2
7085.0	61.8
7086.0	63.4



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

HYDRAULIC INFORMATION (2 OF 2)

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

K. PRICE
DESIGNED
K. PRICE
DRAWN
R. WESTMORE
CHECKED
C. MASCHING
DESIGN APPROVAL
T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW

HYDRAULIC INFORMATION
(2 OF 2)

Drawing A-13

SHEET 13 OF 75

A. GENERAL STRUCTURAL NOTES:

1. SOE: REFERENCES ON THE STRUCTURAL DRAWINGS TO "SOE" MEAN THE STRUCTURAL ENGINEER OF RECORD. OTHER ENTITIES ARE SPECIFICALLY NOTED AS "CONTRACTOR'S ENGINEER", "GEOTECHNICAL ENGINEER", ETC.
2. THESE NOTES SUPPLEMENT THE SPECIFICATIONS, WHICH SHALL BE REFERENCED FOR ADDITIONAL REQUIREMENTS.
3. UNDERGROUND UTILITIES: LOCATE EXISTING UTILITIES AND NOTIFY CONTRACTOR OFFICER REPRESENTATIVE OF EXISTING UTILITIES OR SUBGRADE CONDITIONS WHICH INTERFERE WITH WORK.
4. EXISTING STRUCTURES:
 - 4.1. CONTRACT DOCUMENTS HAVE BEEN PREPARED USING AVAILABLE DRAWINGS AND SITE OBSERVATION AS PERMITTED BY ACCESS RESTRICTIONS DURING DESIGN.
 - 4.2. DURING CONSTRUCTION, THE CONTRACTOR MAY ENCOUNTER EXISTING CONDITIONS THAT ARE NOT NOW KNOWN OR ARE AT VARIANCE WITH PROJECT DOCUMENTATION. CONTRACTOR SHALL NOTIFY THE COR OR BIA REPRESENTATIVE OF ALL CONDITIONS NOT PER THE CONTRACT DOCUMENTS. EXAMPLES INCLUDE:
 - 4.2.1. SIZES OR DIMENSIONS OTHER THAN THOSE SHOWN.
 - 4.2.2. DAMAGE OR DETERIORATION TO MATERIALS AND COMPONENTS.
 - 4.2.3. CONDITIONS OF INSTABILITY OR LACK OF SUPPORT.
 - 4.2.4. ITEMS NOTED AS EXISTING ON THE DRAWINGS BUT NOT FOUND IN THE FIELD.
 - 4.3. PREPARE DIMENSIONAL DRAWINGS OF ALL DISCOVERED ITEMS.
 - 4.4. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING STRUCTURAL CONDITIONS PRIOR TO SUBMITTING SHOP DRAWINGS.
 - 4.5. CONTRACTOR SHALL MAKE ALLOWANCE FOR THE RESOLUTION OF SUCH DISCOVERIES IN THE CONSTRUCTION SCHEDULE.
5. USE OF DRAWINGS:
 - 5.1. DO NOT SCALE DRAWINGS.
 - 5.2. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS AND NOTES, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN. DETAILS ON DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. DETAILS NOTED TYPICAL APPLY TO ALL SIMILAR CONDITIONS.
 - 5.3. WHERE NO SPECIFIC DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ELSEWHERE ON THE PROJECT.
6. TEMPORARY CONDITIONS:
 - 6.1. THE STRUCTURES ARE DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
 - 6.2. CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.
 - 6.3. FOUNDATION WALLS SHALL NOT BE BACKFILLED UNTIL THE SLABS-ON-GRADE ARE IN-PLACE AND REACH FULL STRENGTH UNLESS ADEQUATE BRACING IS PROVIDED. USE ONLY HAND OPERATED TOOLS FOR COMPACTION ADJACENT TO FOUNDATION WALLS.
7. SUBMITTALS:
 - 7.1. SEE SPECIFICATIONS FOR SUBMITTAL REQUIREMENTS.
 - 7.2. SHOP DRAWINGS:
 - 7.2.1. IF THE CONTRACTOR REQUESTS A CHANGE FROM THE DRAWINGS, IT SHALL BE APPROVED BY THE COR OR BIA REPRESENTATIVE AND DESIGNED BY THE SOE PRIOR TO SUBMITTING SHOP DRAWINGS. VARIATION SHALL BE INDICATED ON THE SHOP DRAWINGS. CONTRACTOR SHALL COMPENSATE GEI CONSULTANTS, INC. FOR MAKING THE CHANGE.
 - 7.2.2. CONSTRUCTION DOCUMENTS SHALL NOT BE REPRODUCED FOR USE IN SUBMITTALS.
 - 7.2.3. ALL SHOP DRAWINGS SHALL REFERENCE THE DRAWING NUMBER AND DETAIL USED TO PREPARE THE SUBMITTAL.
8. SUBSTITUTIONS:
 - 8.1. COR OR BIA REPRESENTATIVE APPROVAL SHALL BE SECURED FOR ALL SUBSTITUTIONS.
 - 8.2. NONCONFORMANCE: NOTIFY COR OR BIA REPRESENTATIVE OF CONDITIONS NOT CONSTRUCTED PER THE CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH CORRECTIVE WORK. SUBMIT PROPOSED REPAIR TO THE COR OR BIA REPRESENTATIVE FOR ACCEPTANCE.
9. OSHA STANDARDS:
 - 9.1. THE STRUCTURES ARE DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. NOTHING SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE CONSTRUED AS ELIMINATING THE NEED FOR THE CONTRACTOR TO COMPLY WITH ALL OSHA REQUIREMENTS.

- 9.2. THE CONTRACTOR SHALL ADD ALL NECESSARY BOLTS, ANCHOR BOLTS, PLATES, STIFFENER PLATES, STABILIZER PLATES, BRIDGING, BRACING, BEARING SEATS, COLUMN SPLICES, ETC. AS WELL AS CLOSURES FOR OPENINGS. IN ADDITION, FIELD WELD ANYTHING THAT MAY BE CONSIDERED A TRIP HAZARD.
- 9.3. WHERE THE STRUCTURAL DRAWINGS APPEAR TO CONFLICT WITH OSHA REQUIREMENTS, THE STRUCTURAL DRAWINGS REPRESENT FINAL CONDITIONS ONLY. THE CONTRACTOR SHALL ADD ALL ERECTION FRAMING NECESSARY TO COMPLY WITH OSHA.
10. CONSTRUCTION ENGINEERING:
 - 10.1. THE STRUCTURES DEFINED ON THE CONTRACT DOCUMENTS HAVE BEEN DESIGNED ONLY FOR LOADS ANTICIPATED ON THE STRUCTURES DURING THEIR SERVICE LIFE. PROVIDE ALL REQUIRED ENGINEERING AND OTHER MEASURES TO ACHIEVE THE MEANS, METHODS, AND SEQUENCES OF WORK. SUCH ENGINEERING MAY INCLUDE, BUT IS NOT LIMITED TO:
 - 10.1.1. LAYOUT.
 - 10.1.2. DESIGN FOR FORMWORK, SHORING, AND RESHORING.
 - 10.1.3. DESIGN OF CONCRETE MIXES.
 - 10.1.4. DESIGN OF TEMPORARY BRACING.
 - 10.1.5. SURVEYING TO VERIFY CONSTRUCTION TOLERANCES.
 - 10.1.6. EVALUATION OF TEMPORARY CONSTRUCTION LOADS ON STRUCTURE DUE TO EQUIPMENT AND MATERIALS.
 - 10.1.7. STRUCTURAL ENGINEERING TO RESIST ANY OTHER LOADS NOT IDENTIFIED ON DESIGN DRAWINGS.
11. COORDINATION:
 - 11.1. STRUCTURAL DRAWINGS ARE NOT STAND-ALONE DOCUMENTS AND ARE INTENDED TO BE USED IN CONJUNCTION WITH DRAWINGS FROM OTHER DISCIPLINES. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS INTO SHOP DRAWINGS AND WORK.
 - 11.2. COORDINATE DIMENSIONS WITH FIELD CONDITIONS AND DRAWINGS PRIOR TO SHOP DRAWING SUBMITTAL.

B. EXCAVATION GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF TEMPORARY EXCAVATION SUPPORT SYSTEMS. USE APPROPRIATE DESIGN LOADING AND CRITERIA TO ENSURE SATISFACTORY PERFORMANCE.
2. ACCOUNT FOR ALL STAGES OF CONSTRUCTION, INCLUDING INTERMEDIATE EXCAVATION STAGES AND REMOVAL OF BRACING. SHOW CONSTRUCTION SEQUENCE ON THE DESIGN DRAWINGS.
3. DESIGN FOR A MINIMUM FACTOR OF SAFETY OF 1.5 AGAINST LATERAL SLIDING AND OVERTURNING. WHERE THE LOADING CONDITIONS ON OPPOSITE SIDES OF AN EXCAVATION ARE NOT EQUAL, ANALYZE THE OVERALL STABILITY OF THE EXCAVATION SUPPORT SYSTEM AND DESIGN THE STRUCTURAL MEMBERS TO TAKE THIS CONDITION INTO ACCOUNT.
4. UNLESS NOTED OTHERWISE, TEMPORARY EXCAVATION SUPPORT SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING REFERENCE STANDARDS:
 - 4.1. "STEEL CONSTRUCTION MANUAL" OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, 14TH EDITION.
 - 4.2. "STRUCTURAL WELDING CODE - STEEL, AWS D1.1" OF THE AMERICAN WELDING SOCIETY (AWS).
 - 4.3. "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI-318-08" OF THE AMERICAN CONCRETE INSTITUTE (ACI).
 - 4.4. "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" OF THE AMERICAN WOOD COUNCIL, 2015 EDITION.
 - 4.5. "FHWA-RD-75-128 LATERAL SUPPORT SYSTEMS AND UNDERPINNING" TABLE 4 "RECOMMENDED THICKNESSES OF WOOD LAGGING" OF THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).
5. EXCAVATE SOIL FILL, SEGREGATE, AND STOCKPILE ON SITE. SHEET OR STABILIZE THE EXCAVATION PER OSHA SAFETY STANDARDS.

C. DESIGN CRITERIA

1. CODES AND STANDARDS
 - 1.1. INTERNATIONAL BUILDING CODE (IBC 2009).
 - 1.2. ASCE 7-05 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
 - 1.3. ACI 301-05 SPECIFICATION FOR STRUCTURAL CONCRETE BUILDINGS.
 - 1.4. ACI 318-11 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.
 - 1.5. ANSI/AISC 360-05 SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
 - 1.6. U.S. ARMY CORPS OF ENGINEERS (USACE, 1992). STRENGTH DESIGN OF REINFORCED CONCRETE HYDRAULIC STRUCTURES. JUNE 1992.

- 1.7. U.S. ARMY CORPS OF ENGINEERS (USACE, 2005). STABILITY ANALYSIS OF CONCRETE STRUCTURES. DECEMBER 2005.
2. DEAD LOADS
 - 2.1. CONCRETE, SOIL (LATERAL AND VERTICAL), WATER SELF WEIGHT.
3. LIVE LOAD
 - 3.1. WIND LOADS
 - 3.2. ICE LOADS
 - 3.3. PEDESTRIAN AND VEHICLE LOADS
 - 3.4. SEISMIC LOADS FROM STRUCTURE, SOILS AND INTERNAL AND EXTERNAL HYDROSTATIC
4. SNOW LOADS
 - 4.1. GROUND SNOW LOAD = 15 PSF
 - 4.2. SNOW EXPOSURE FACTOR = 1.0
 - 4.3. SNOW IMPORTANCE FACTOR = 1.1
 - 4.4. THERMAL FACTOR = 1.0
5. WIND LOADS
 - 5.1. BASIC WIND SPEED, V = 90 MPH
 - 5.2. WIND IMPORTANCE FACTOR, I_w = 1.15
 - 5.3. WIND EXPOSURE CATEGORY = C
6. SEISMIC LOADS
 - 6.1. LOCATION
 - 6.1.1. LATITUDE = 39.910°
 - 6.1.2. LONGITUDE = -109.0407°
 - 6.2. SEISMIC IMPORTANCE FACTOR, I_E = 1.25
 - 6.3. MAPPED SPECTRAL RESPONSE ACCELERATION, S_S = 0.229 G
 - 6.4. MAPPED SPECTRAL RESPONSE ACCELERATION, S_1 = 0.051 G
 - 6.5. SOIL SITE CLASS = D
 - 6.6. MAPPED SPECTRAL RESPONSE ACCELERATION, S_{DS} = 0.152 G
 - 6.7. MAPPED SPECTRAL RESPONSE ACCELERATION, S_{D1} = 0.034 G
 - 6.8. SEISMIC DESIGN CATEGORY
 - 6.9. SEISMIC-FORCE-RESISTING SYSTEM: CONCRETE RETAINING WALLS
 - 6.10. DESIGN BASE SHEAR: TO BE EVALUATED
 - 6.11. LATERAL LOAD RESISTING SYSTEM DESCRIPTION
 - 6.11.1. DESCRIPTION OF LOAD TRANSFER

D. FOUNDATION NOTES

1. THE DESIGN SUMMARY REPORT PREPARED BY GEI CONSULTANTS, INC., DATED JUNE 2015, PROVIDES CRITERIA FOR THE FOUNDATION DESIGN FOR THE PROJECT.
2. SITE RETAINING WALLS:
 - 2.1. EQUIVALENT FLUID PRESSURES USED FOR WALL DESIGN.
 - 2.2. EMBANKMENT FILL:
 - 2.2.1. "ACTIVE" CONDITION: K_A = 0.307
 - 2.2.2. "PASSIVE" CONDITION: K_P = 3.25
 - 2.2.3. MAXIMUM FOOTING TOTAL LOAD SOIL BEARING PRESSURE FOR 3 FOOT STRIP = 54 PSF
 - 2.2.4. ULTIMATE COEFFICIENT OF FRICTION USED IN DESIGN TO RESIST LATERAL LOADS = 0.32
 - 2.2.5. WALL DESIGN BASED ON EMBANKMENT FILL



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
 RED LAKE DAM MODIFICATIONS

STRUCTURAL NOTES
 (1 OF 2)

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015

R. PRICE
 DESIGNED
 R. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

STRUCTURAL NOTES
 (1 OF 2)

Drawing A-14

SHEET 14 OF 75

E. CONCRETE NOTES

1. GENERAL
 - 1.1. ALL WORK SHALL CONFORM TO ACI 301, LATEST EDITION, UNLESS NOTED OTHERWISE IN DRAWINGS OR PROJECT SPECIFICATIONS.
 - 1.2. DETAIL BARS IN ACCORDANCE WITH THE LATEST EDITIONS OF PUBLICATION SP-66: "ACI DETAILING MANUAL" WITH ADDED REQUIREMENTS OF THE PROJECT SPECIFICATION AND ACI 318: "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
 - 1.3. DETAILING SHALL FOLLOW THE RECOMMENDATIONS OF ACI 315 UNLESS OTHERWISE SHOWN. NO CHANGES SHALL BE MADE WITHOUT PRIOR APPROVAL.
 - 1.4. PLACE REINFORCEMENT IN ACCORDANCE WITH APPROVED REINFORCEMENT SHOP DRAWINGS. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND THE APPROVED SHOP DRAWINGS, THE APPROVED SHOP DRAWINGS SHALL GOVERN.
 - 1.5. REINFORCEMENT PROTECTION:
 - 1.5.1. REINFORCING COVER: SEE TABLE.
 - 1.5.2. SEE ACI 318-11 7.5 AND ACI 301, SECTION 6.3 FOR REINFORCEMENT PLACING TOLERANCES AND ACI 117 FOR ADDITIONAL REQUIREMENTS.
 - 1.6. PROVIDE ACCESSORIES NECESSARY TO PROPERLY SUPPORT REINFORCING AT POSITIONS SHOWN ON PLANS. THE RECOMMENDATIONS OF ACI 315 (DETAILING MANUAL) SHALL BE USED IN SELECTING ACCESSORIES.
 - 1.7. ALL REINFORCING, DOWELS, BOLTS, AND EMBEDDED PLATES SHALL BE SET AND TIED IN PLACE BEFORE THE CONCRETE IS PLACED. "STABBING" INTO PREVIOUSLY PLACED CONCRETE IS NOT PERMITTED.
 - 1.8. BEFORE PLACING CONCRETE, CHECK ALL APPLICABLE DRAWINGS RELEASED AS SUITABLE FOR CONSTRUCTION INCLUDING MANUFACTURER'S DRAWINGS TO VERIFY THE PRESENCE OF ALL EMBEDDED MATERIAL REQUIRED IN THE PLACEMENT.
 - 1.9. REINFORCEMENT MAY BE ADJUSTED IN THE FIELD TO CLEAR FORM TIES AND ANCHOR BARS. IN SUCH CASES, RELOCATION OF THE EMBEDDED MATERIALS MUST BE CONSIDERED. IN NO CASE SHOULD BARS BE BENT IN THE FIELD.
 - 1.10. WHERE POSSIBLE, REINFORCEMENT SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1 INCH BETWEEN OTHER REINFORCEMENT, ANCHOR BOLTS, FORM TIES, OR OTHER EMBEDDED METALWORK. REINFORCEMENT PARALLEL TO ANCHOR BOLTS OR OTHER EMBEDDED METAL WORKS SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1-1/3 TIMES THE MAXIMUM SIZE AGGREGATE TO BE USED.

2. DIMENSIONS
 - 2.1. DIMENSIONS ARE TO THE CENTERLINES OF THE BARS UNLESS OTHERWISE SHOWN. CLEAR COVER DIMENSIONS ARE MARKED "CLR" ALL DIMENSIONS TO A JOINT ARE TO THE CENTERLINE OF THE JOINT. BEAMS AND WALLS ARE CENTERED ON REFERENCED LINES.
 - 2.2. THICKNESSES SHOWN FOR WALLS AND SLABS ADJACENT TO UNDISTURBED SOIL OR ROCK ARE MINIMUM DIMENSIONS.
3. STRUCTURAL CONCRETE MIX REQUIREMENTS
 - 3.1. SEE SPECIFICATIONS SECTION 03 33 00.
 - 3.2. UNLESS OTHERWISE INDICATED, CHAMFER EDGES OF ALL PERMANENTLY EXPOSED CONCRETE SURFACES WITH A 45 DEGREE BEVEL, 3/4 INCH X 3/4 INCH. CHAMFER STRIP MAY NOT BE SHOWN ON THE DESIGN DRAWINGS.
4. CONSTRUCTION/CONTROL JOINTS
 - 4.1. SUBMIT DRAWINGS SHOWING CONSTRUCTION AND CONTROL JOINT LOCATIONS ALONG WITH THE SEQUENCE OF PLACEMENTS. CONSTRUCTION JOINT LOCATIONS AND CASTING SEQUENCE SHALL BE ARRANGED TO MINIMIZE THE EFFECTS OF ELASTIC AND LONG-TERM SHORTENING/SHRINKAGE. NO OTHER JOINTS SHALL BE INTRODUCED UNLESS APPROVED BY THE COR OR BIA REPRESENTATIVE BEFORE CONCRETE IS PLACED.
 - 4.2. CONTROL JOINTS SHALL HAVE A MINIMUM OF A #8 PLAIN REINFORCING DOWEL ACROSS THE JOINT. PLAIN DOWELS SHALL BE A MINIMUM OF 36 INCHES LONG WITH EQUAL LENGTH EXTENDING ON EITHER SIDE OF THE CONTROL JOINT. IMMEDIATELY BEFORE THE SECOND CONCRETE PLACEMENT, THE PROJECTING HALF OF THE DOWEL SHALL BE GREASED TO

- PREVENT BOND TO THE CONCRETE.
5. REINFORCING FABRICATION
 - 5.1. THE FIRST AND LAST BARS IN SLABS AND WALLS, AND STIRRUPS IN BEAMS ARE TO START AND END AT A MAXIMUM OF ONE HALF THE ADJACENT BAR SPACING. ALL REINFORCING TO BE EQUALLY SPACED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
 - 5.2. MINIMUM SPLICE AND EMBEDMENT LENGTHS: SEE TABLE.
 - 5.3. SPLICING OF REINFORCEMENT PERMITTED AS NOTED ON DRAWINGS. MAKE BARS CONTINUOUS AROUND CORNERS. WHERE PERMITTED, SPLICES MAY BE MADE BY CONTACT LAPS OR MECHANICAL CONNECTORS.
 - 5.4. SPLICES ARE TO BE MADE SO THAT GIVEN CLEAR DISTANCES TO THE FACE OF CONCRETE WILL BE MAINTAINED.
 - 5.5. HOOK EMBEDMENT NOTES
 - 5.5.1. SCHEDULED HOOK EMBEDMENT LENGTHS ASSUME:
 - (a) SIDE COVER IS 2 1/2 INCHES OR GREATER
 - (b) COVER BEYOND IS 2 INCHES OR GREATER
 - 5.5.1. IF SIDE COVER IS LESS THAN 2 1/2 INCHES, INCREASE LENGTHS BY 40%
 6. MISCELLANEOUS REINFORCING REQUIREMENTS:
 - 6.1. PROVIDE ADDITIONAL BARS OR STIRRUPS REQUIRED TO SECURE REINFORCING IN PLACE DURING CONCRETE PLACEMENT.
 - 6.2. MAKE ALL REINFORCING BAR BENDS IN THE FABRICATOR'S SHOP UNLESS NOTED.
 - 6.3. NO WELDING OF REINFORCING PERMITTED UNLESS NOTED ON DRAWINGS. WHERE PERMITTED, PERFORM WELDING IN ACCORDANCE WITH AWS D1.4, LATEST EDITION.
 - 6.4. PROVIDE ADDED REINFORCING TO TRIM ALL OPENINGS, NOTCHES, AND REINFRANT CORNERS AS NOTED IN TYPICAL DETAILS.
 7. REINFORCING MATERIALS
 - 7.1. TYPICAL REINFORCING SHALL BE ASTM A615, GRADE 60.
 - 7.2. FIELD BENT REINFORCING SHALL BE ASTM A706, GRADE 60.

- F. STEEL NOTES
1. GENERAL
 - 1.1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO CURRENT AISC MANUAL OF STEEL CONSTRUCTION.
 2. BOLTED CONNECTIONS
 - 2.1. STRUCTURAL BOLTS SHALL BE STRUCTURAL STEEL, ASTM A325, STRUCTURAL NUTS SHALL BE STRUCTURAL STEEL ASTM A563. ALL BOLTED STRUCTURAL CONNECTIONS SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL JOINTS. ALL STRUCTURAL BOLTED CONNECTIONS SHALL BE BEARING-TYPE CONNECTIONS.
 3. ANCHOR BOLTS AND EMBEDDED THREADED RODS
 - 3.1. ANCHOR BOLTS AND EMBEDDED THREADED RODS SHALL BE STRUCTURAL STEEL, ASTM F 1554, GRADE 55.
 4. WELDING REQUIREMENTS
 - 4.1. WELDERS: HAVE IN POSSESSION CURRENT EVIDENCE OF PASSING THE APPROPRIATE AWS QUALIFICATION TESTS.
 - 4.2. MINIMUM WELDS: AISC SPECIFICATION, NOT LESS THAN 3/16-INCH FILLET, CONTINUOUS UNLESS OTHERWISE NOTED.
 - 4.3. WELD SIZES AND LENGTHS CALLED FOR ON THE DRAWINGS ARE THE NET EFFECTIVE REQUIRED. INCREASE WELD SIZE IF GAPS EXIST AT THE FAYING SURFACE.
 - 4.4. WELD SIZES SHALL BE AS SHOWN UNLESS A GREATER SIZE IS REQUIRED BY ANSI/AISC 360-05 TABLES J2.3 AND J2.4.
 - 4.5. WELDING ELECTRODES FOR PLAIN STRUCTURAL STEEL SHALL BE AWS SERIES E-70. WELDING ELECTRODES FOR GALVANIZED STEEL SHALL BE AWS SERIES E6010 OR E6011
 5. STRUCTURAL STEEL INSTALLATION
 - 5.1. ALL BOLTS USED IN CONNECTIONS SHALL BE INSTALLED SNUG TIGHT AS DEFINED BY AISC UNLESS NOTED OTHERWISE.

LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE (INCHES)								
BAR SIZE (US)	BAR DIAMETER	F'c = 4500 PSI						
		COMP		TENSION				
		LCE	LCS	LDH	LTE TOP	LTE	LTS TOP	L7
#3	0.375	8	12	6	17	13	23	17
#4	0.500	9	15	6	23	17	30	23
#5	0.625	11	18	8	29	22	38	29
#6	0.750	13	22	9	34	26	45	35
#7	0.875	15	26	11	50	39	66	51
#8	1.000	18	30	13	58	44	76	58
#9	1.128	20	33	14	65	50	85	66
#10	1.270	22	38	16	73	56	96	74
#11	1.410	25	42	18	82	63	107	82

GENERAL NOTES:

1. 'LCE' COMPRESSION EMBEDMENT LENGTH, 'LCS' = COMPRESSION LAP SPLICE LENGTH, 'LDH' = HOOK DEVELOPMENT LENGTH, 'LTE' = TENSION EMBEDMENT LENGTH, 'LTS' TENSION LAP SPLICE LENGTH
2. 'TOP' BARS ARE HORIZONTAL BARS PLACED WITH MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST BELOW THE BAR
3. UNLESS NOTED OTHERWISE, ALL HOOK BARS EXTEND TO THE FAR FACE (LESS COVER)

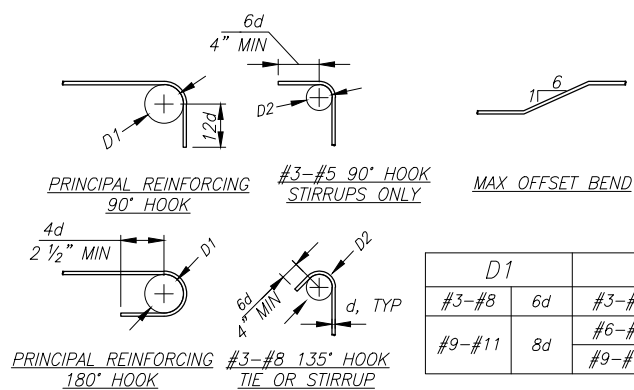
LAP SPLICE NOTES:

1. ALL SPLICES SHALL BE WIRED IN CONTACT AND STACKED VERTICALLY
2. ALL SPLICE ARE 'LTS' UNLESS NOTED OTHERWISE
3. SMALLER BAR LAP LENGTH SHALL BE USED WHEN SPLICING DIFFERENT SIZED BARS
4. LAP LENGTHS SPECIFICALLY DETAILED ON DRAWINGS SHALL GOVERN IN LIEU OF LAP LENGTHS SCHEDULE

ADJUSTMENTS FOR GIVEN LAP LENGTHS:

1. SCHEDULED LAP LENGTHS ASSUME:
 - 1.1. CLEAR COVER IS GREATER THAN BAR DIAMETER, AND NOT LESS THAN 3/4"
 - 1.2. CLEAR SPACING BETWEEN BARS IS GREATER THAN 2 BAR DIAMETERS
 - 1.3. IF EITHER CONDITION A OR B IS NOT MET FOR A GIVEN BAR, INCREASE LENGTHS BY 50%
2. SPLICE LENGTHS NOTED BASED ON Fy = 60,000 PSI. FOR OTHER YIELD STRENGTHS, MULTIPLY SPLICE LENGTHS NOTED BY Fy/60,000

TYPICAL REINFORCING BENDS



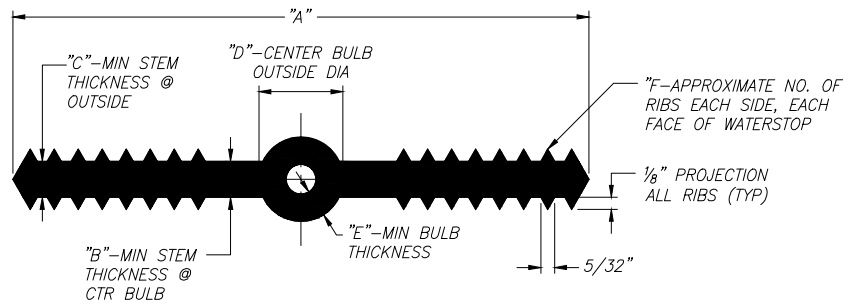
- NOTES:
1. ALL BENDS SHALL BE MADE COLD

REINFORCING COVER	
CONCRETE SECTION	MINIMUM CLEAR COVER OF REINFORCEMENT, INCHES
GREATER THAN 12 INCHES IN THICKNESS IN CONTACT WITH FOUNDATION	4
EQUAL TO OR LESS THAN 12 INCHES IN THICKNESS IN CONTACT WITH FOUNDATION	3
EQUAL TO OR GREATER THAN 24 INCHES IN THICKNESS	4
GREATER THAN 12 INCHES AND LESS THAN 24 INCHES IN THICKNESS	3
EQUAL TO OR LESS THAN 12 INCHES IN THICKNESS WILL BE IN ACCORDANCE WITH ACI CODE 318	2

HOOK EMBEDMENT NOTES:

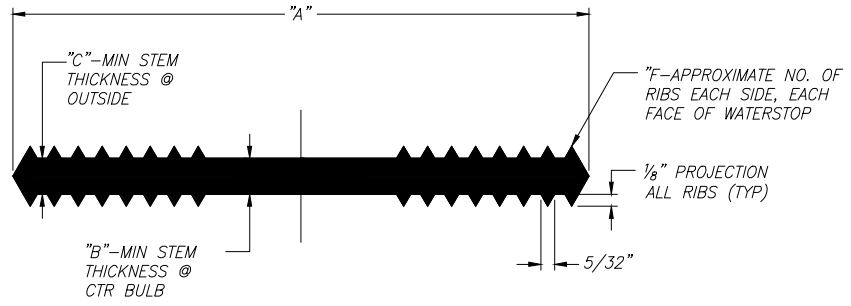
1. SCHEDULED HOOK EMBEDMENT LENGTHS ASSUME:
 - 1.1. SIDE COVER IS 2 1/2 INCHES OR GREATER
 - 1.2. COVER BEYOND IS 2 INCHES OR GREATER
2. IF SIDE COVER IS LESS THAN 2 1/2 INCHES, INCREASE LENGTHS BY 40%

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\A-15-STRUCTURAL NOTES (2 OF 2).DWG SEP 2015 RPRICE



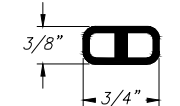
WATERSTOP 1						
SIZE	"A"	"B"	"C"	"D"	"E"	"F"
4"x3/16"	4"	3/16"	3/16"	5/8"	1/4"	5
6"x3/8"	6"	3/8"	3/8"	7/8"	1/4"	6

DETAIL
WATERSTOP TYPE 1



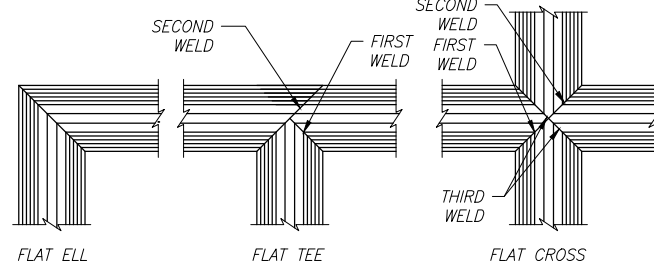
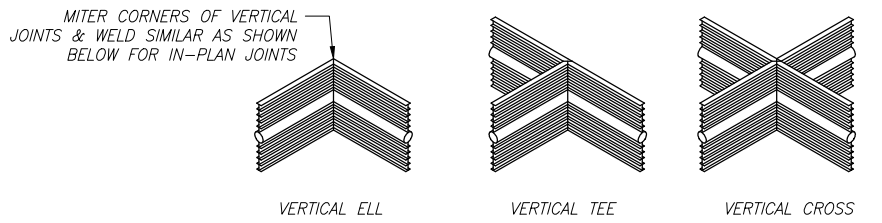
WATERSTOP 2						
SIZE	"A"	"B"	"C"	"D"	"E"	"F"
4"x3/16"	4"	3/16"	3/16"	-	-	5
6"x3/8"	6"	3/8"	3/8"	-	-	6

DETAIL
WATERSTOP TYPE 2



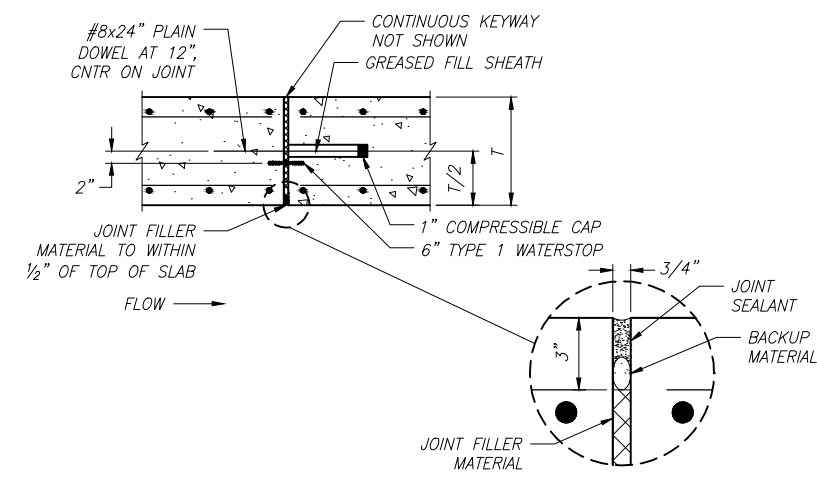
DETAIL
WATERSTOP TYPE 3
HYDROPHILIC

- WATERSTOP NOTES:**
- NON-ROUND CENTER BULBS SHALL HAVE A MINIMUM OUTSIDE DIMENSION OF 'D'.
 - BULB TYPE WATERSTOP SHOWN IS REQUIRED FOR EXPANSION AND CONTROL JOINTS. SIMILAR WATERSTOPS WITHOUT CENTER BULB MAY BE SUBSTITUTED AT CONSTRUCTION JOINTS.
 - USE 6 INCH WATERSTOPS IN ALL CONSTRUCTION JOINTS UNLESS SPECIFICALLY SHOWN OTHERWISE.
 - FOR WALLS WITH SINGLE MAT OF REINFORCING LOCATE WATERSTOP ON LIQUID FACE 1" CLEAR OF REINFORCEMENT.

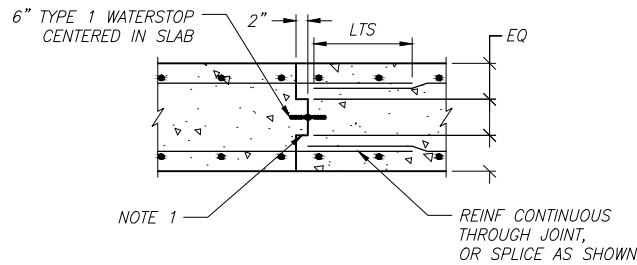


DETAIL
PVC WATERSTOP JOINTS

- NOTES:**
- ALL FIELD WELDS SHALL BE MADE PER WATERSTOP MANUFACTURER'S RECOMMENDATIONS. COR OR BIA REPRESENTATIVE SHALL INSPECT ALL FIELD WELDS FOR ACCEPTANCE PRIOR TO CONCRETE PLACEMENT OR WALL FORM PLACEMENT.
 - USE 6 INCH WATERSTOPS IN ALL CONSTRUCTION JOINTS UNLESS SPECIFICALLY SHOWN OTHERWISE.
 - FOR WALLS WITH SINGLE MAT OF REINFORCING LOCATE WATERSTOP ON LIQUID FACE 1" CLEAR OF REINFORCEMENT.



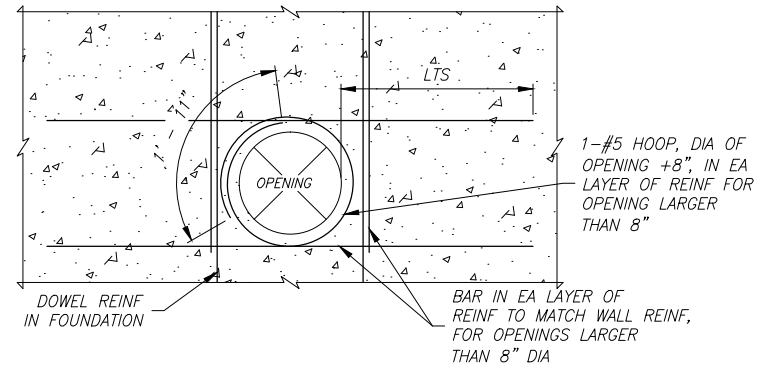
EXPANSION JOINT (EJ)



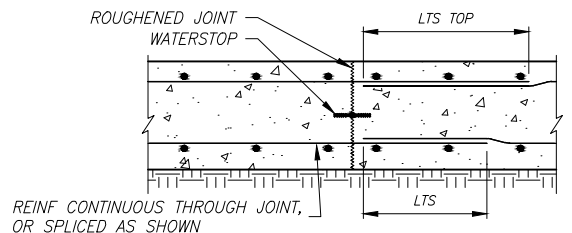
CONSTRUCTION JOINT (CJ)
WALL JOINTS

- NOTES:**
- EDGES MAY BE ANGLED AT CONTRACTOR'S OPTION.

DETAIL
WALL JOINTS



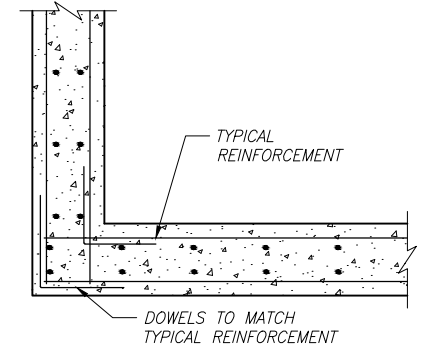
DETAIL
WALL OPENING REINFORCING
NOT TO SCALE



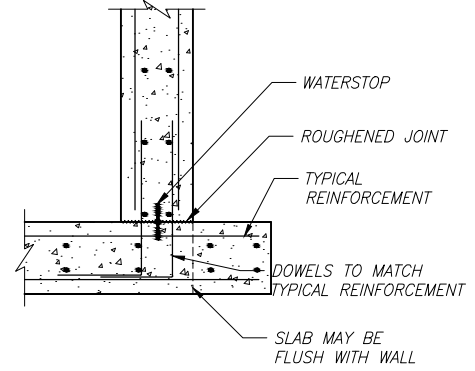
SLAB CONSTRUCTION JOINT (CJ)

- NOTES:**
- CLEAN SURFACES AND REMOVE STANDING WATER PRIOR TO PLACING CONCRETE

DETAIL
CONSTRUCTION JOINT, CJ
NOT TO SCALE



DETAIL
TYPICAL CORNER REINFORCING
NOT TO SCALE



DETAIL
TYPICAL WALL TO SLAB JOINT
NOT TO SCALE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
 RED LAKE DAM MODIFICATIONS

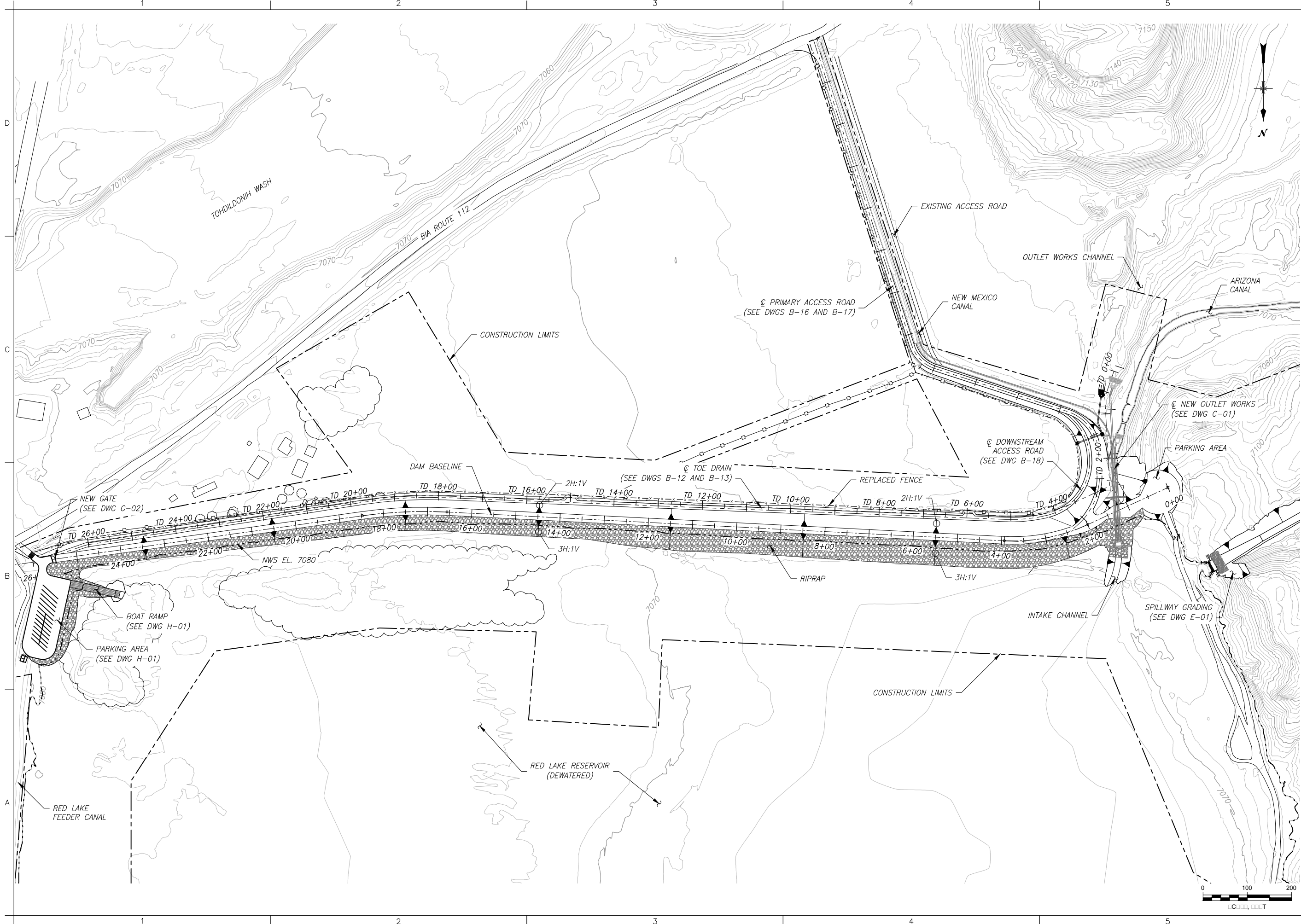
TYPICAL STRUCTURAL DETAILS

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015

M. KIMBLE
 DESIGNED
 R. PRICE
 DRAWN
 H. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

TYPICAL STRUCTURAL
 DETAILS

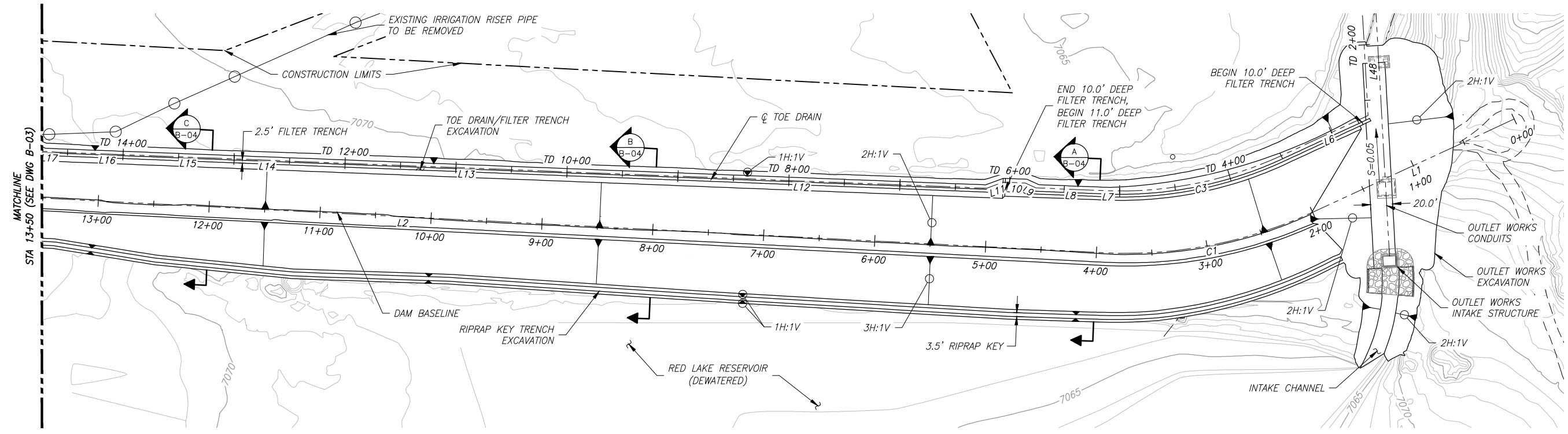
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-01-EMBANKMENT DAM GENERAL PLAN.DWG OCT 2015 JHEITLAND



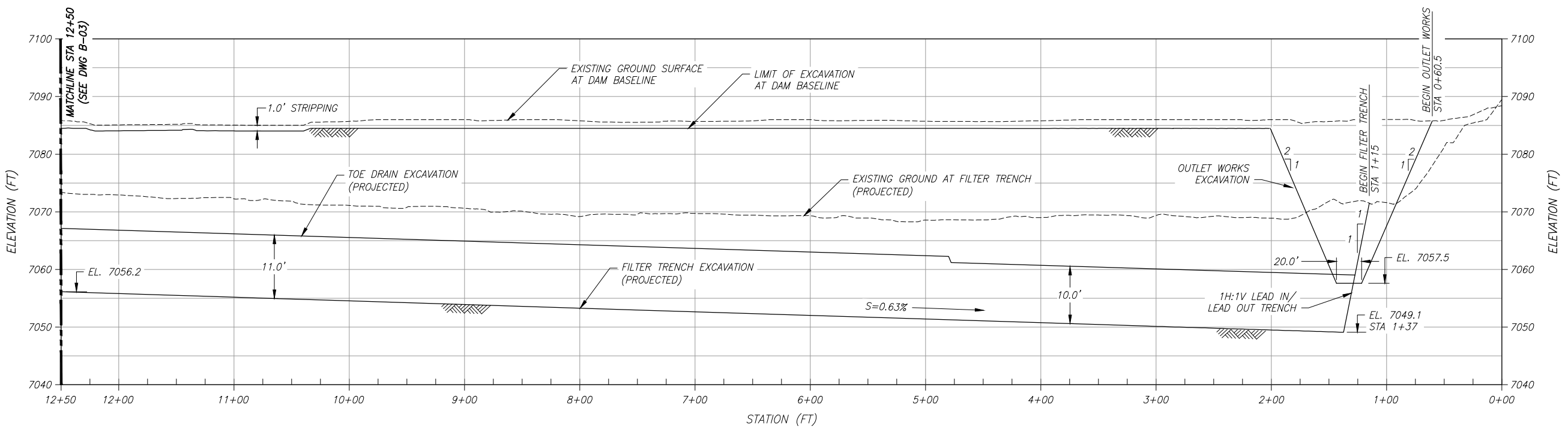
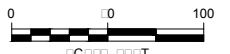
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM
 GENERAL PLAN

REV NO	0	ISSUED FOR SOLICITATION
DATE	OCTOBER 2, 2015	
DESIGNED	P. EGGERS	
DRAWN	N. JORGENSEN	
CHECKED	P. EGGERS	
DESIGN APPROVAL	C. MASCHING	
INDEPENDENT TECHNICAL REVIEW	D. MILLER	

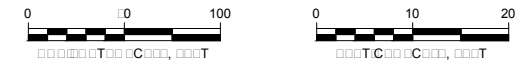
P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-02-EMBANKMENT DAM EXCAVATION PLAN AND PROFILE (1 OF 2).DWG SEP 2015 KPRICE



PLAN
EXCAVATION



PROFILE
EXCAVATION



NOTES

1. PROFILE TAKEN ALONG DAM BASELINE.
2. EXCAVATION FOR FEATURES NOT ON DAM BASELINE PROJECTED AS INDICATED.
3. FOR EXCAVATION CONTROL POINTS, SEE TABLE ON DWG B-05.

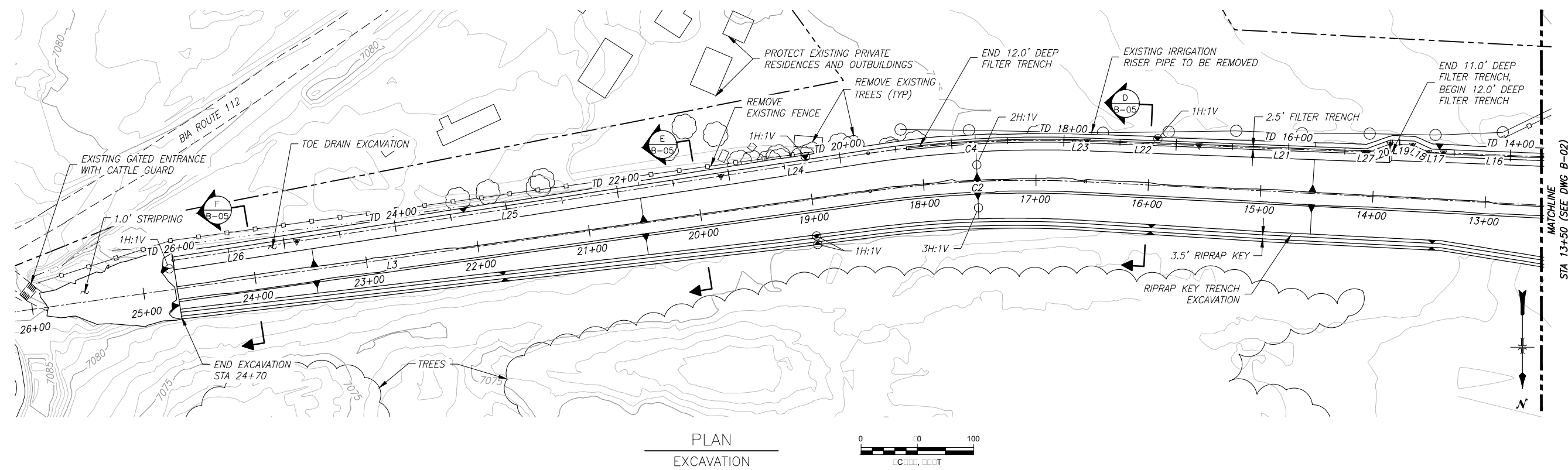
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM EXCAVATION
 PLAN AND PROFILE
 (1 OF 2)

P. EGGERS
 DESIGNED
 N. JORGENSEN
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

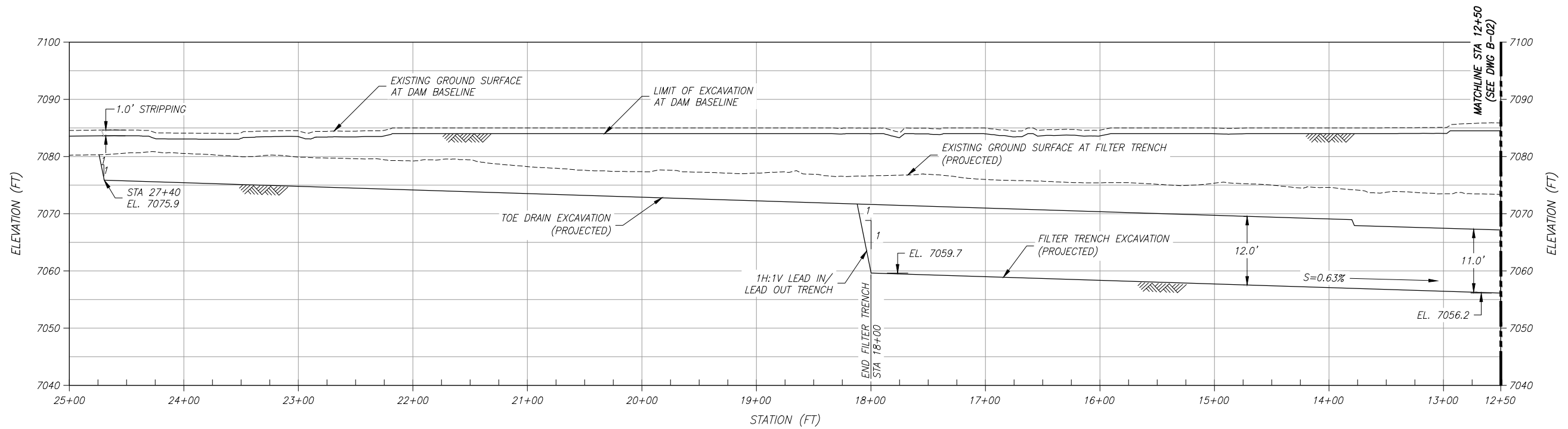
EMBANKMENT DAM
 EXCAVATION
 PLAN AND PROFILE
 (1 OF 2)

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-03-EMBANKMENT DAM EXCAVATION PLAN AND PROFILE (2 OF 2).DWG OCT 2015 JHEITLAND

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM EXCAVATION
 PLAN AND PROFILE
 (2 OF 2)



PLAN
EXCAVATION



PROFILE
EXCAVATION

NOTES

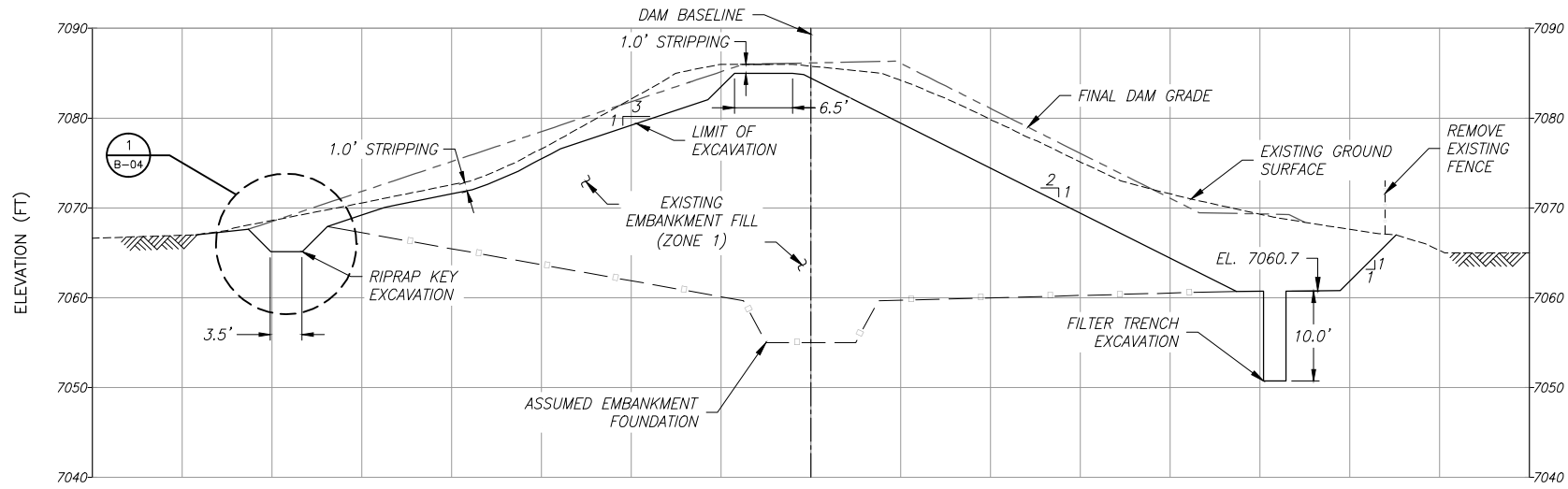
1. PROFILE TAKEN ALONG DAM BASELINE.
2. EXCAVATION FOR FEATURES NOT ON DAM BASELINE PROJECTED AS INDICATED.
3. FOR EXCAVATION CONTROL POINTS, SEE TABLE ON DWG B-05.

DESIGNED	P. EGGERS
DRAWN	N. JORGENSEN
CHECKED	P. EGGERS
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER

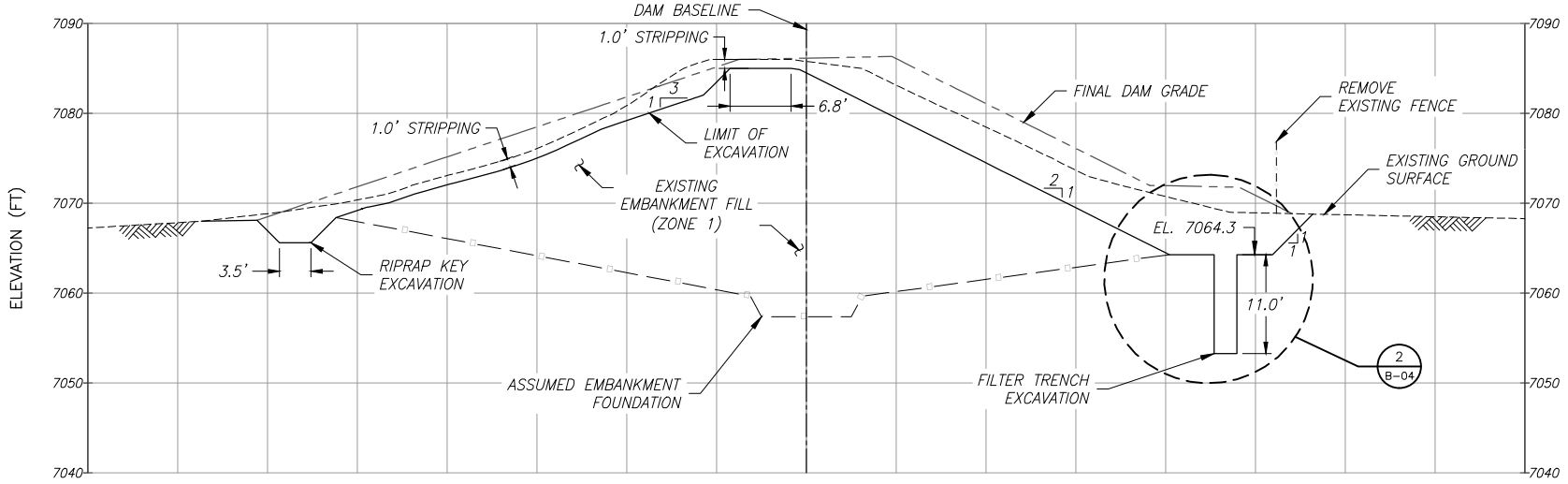
EMBANKMENT DAM EXCAVATION
 PLAN AND PROFILE
 (2 OF 2)

Drawing B-03

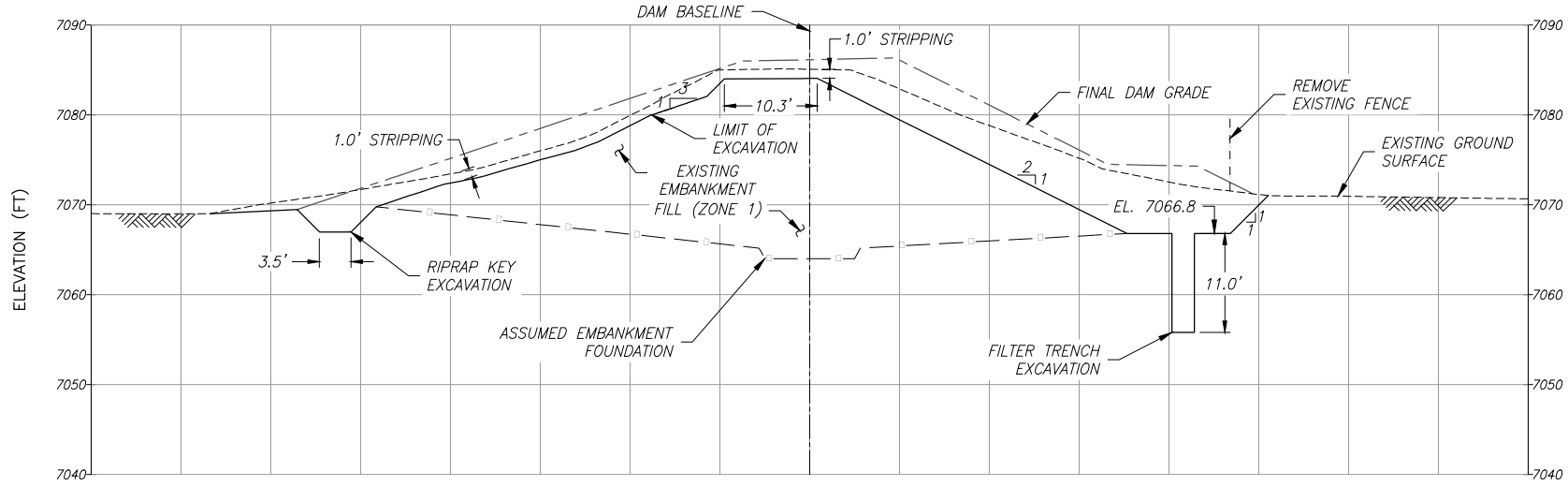
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-04-EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS (1 OF 2).DWG RPRICE SEP 2015



SECTION A
 STA. 4+00
 B-02

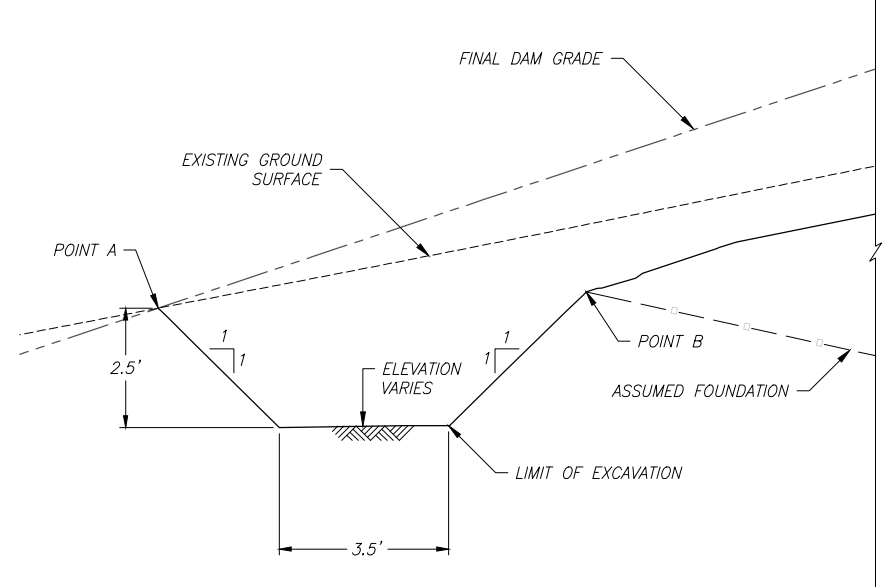


SECTION B
 STA. 8+00
 B-02

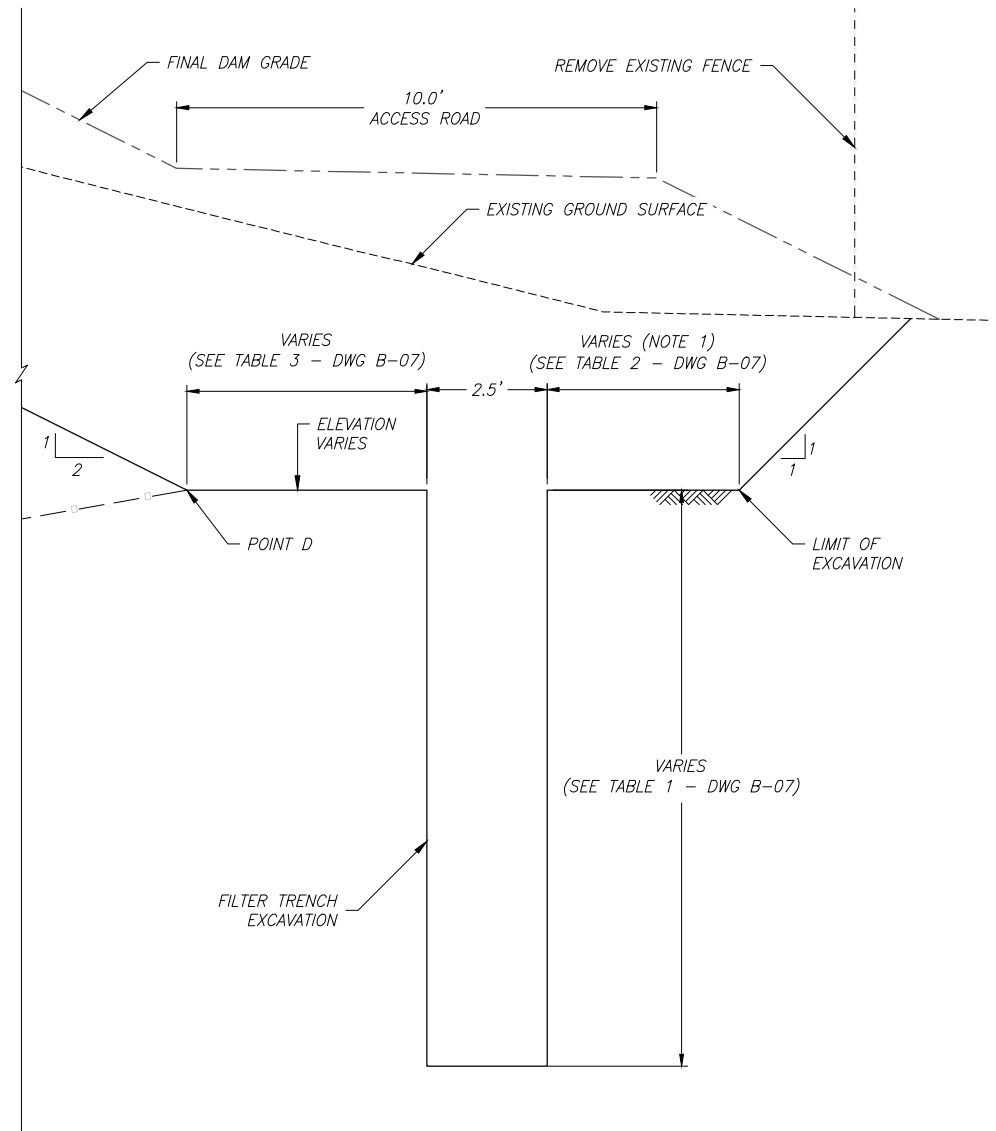


SECTION C
 STA. 12+00
 B-02

NOTE
 1. CONTRACTOR, AT HIS OPTION, MAY EXTEND TOE TRENCH WIDTH AS NEEDED FOR TRENCHER ACCESS.



DETAIL 1
 RIPRAP KEY TRENCH
 B-04



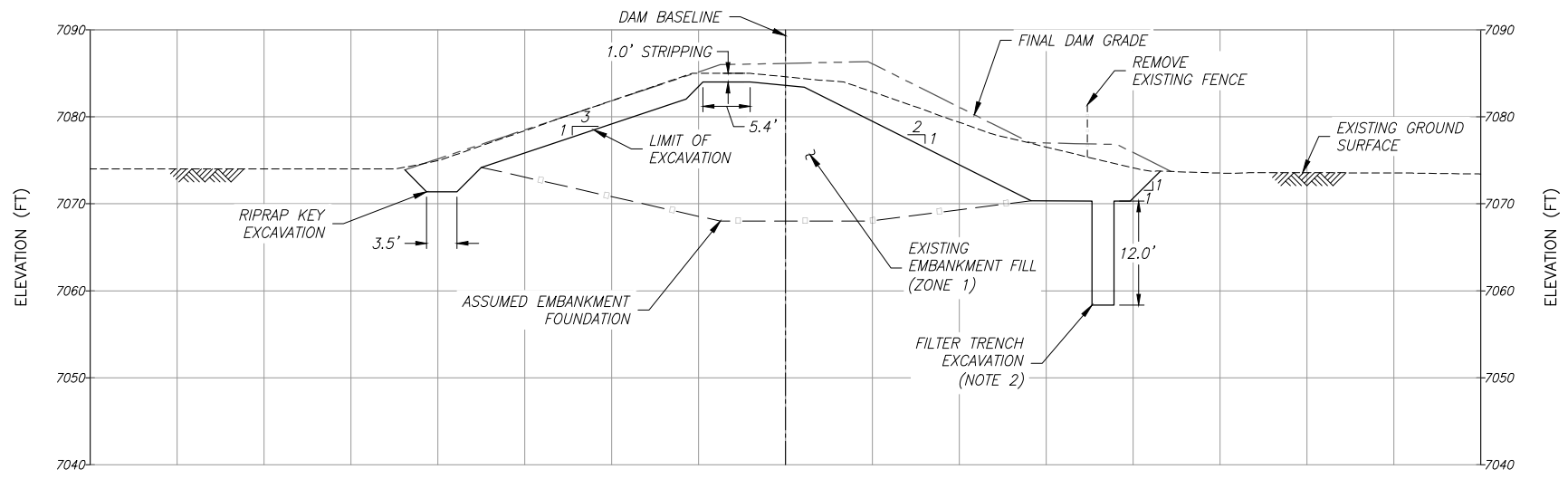
DETAIL 2
 TOE DRAIN/FILTER TRENCH
 B-04

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS
 (1 OF 2)

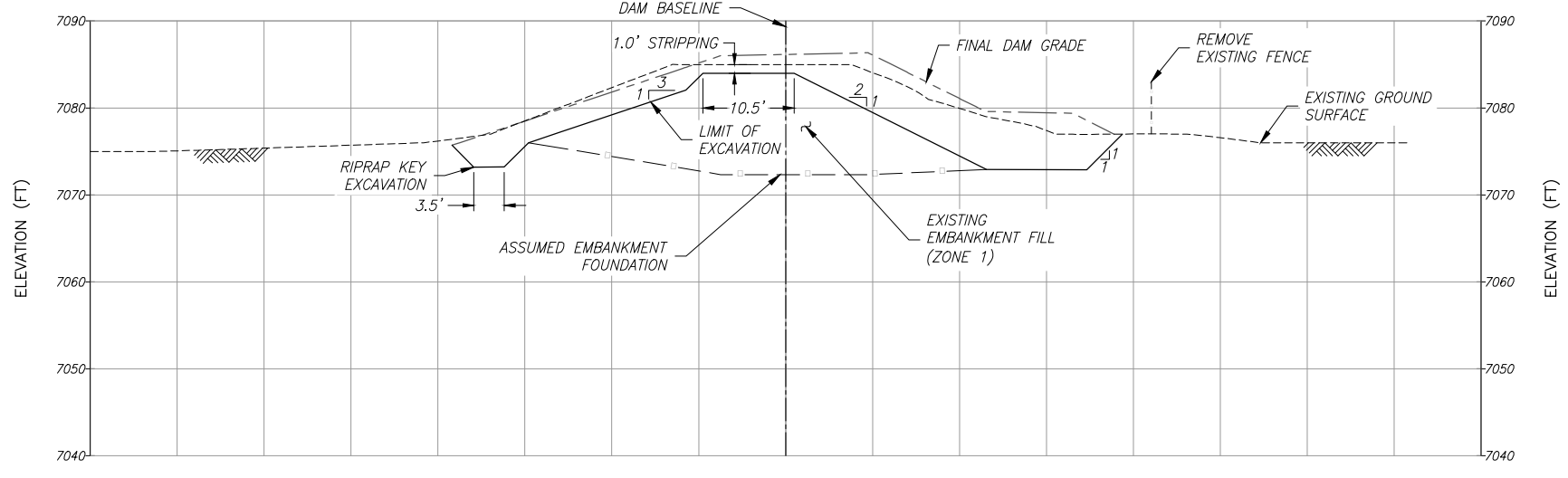
P. EGGERS
 DESIGNED
 N. JORGENSEN
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS
 (1 OF 2)

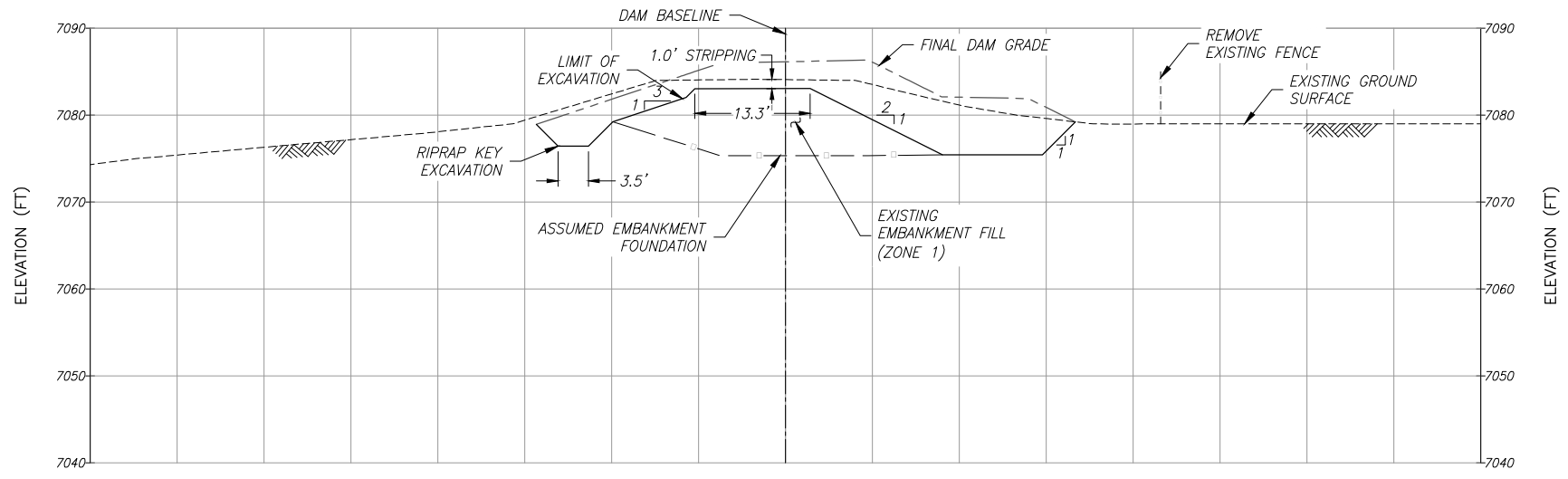
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-05-EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS (2 OF 2).DWG RPRICE SEP 2015



SECTION D
 STA. 16+00
 B-03



SECTION E
 STA. 20+00
 B-03



SECTION F
 STA. 24+00
 B-03

STATION	POINT A		POINT B		POINT C		POINT D	
	OFFSET (FT)	ELEVATION (FT)	OFFSET (FT)	ELEVATION (FT)	OFFSET (FT)	ELEVATION (FT)	OFFSET (FT)	ELEVATION (FT)
2+00	-52.8	7070.9	-44.0	7071.2	-0.8	7084.1	49.6	7059.7
3+00	-58.6	7069.0	-49.8	7069.3	-1.0	7085.0	48.6	7060.2
4+00	-62.6	7067.6	-53.8	7067.9	-0.8	7085.0	47.4	7060.7
5+00	-63.9	7067.2	-55.1	7067.5	-0.6	7084.8	44.2	7062.4
6+00	-63.2	7067.4	-54.4	7067.7	-1.0	7085.0	42.9	7063.0
7+00	-62.4	7067.7	-53.6	7068.0	-0.5	7084.7	41.7	7063.7
8+00	-61.2	7068.1	-52.4	7068.4	-0.8	7084.9	40.4	7064.3
9+00	-59.7	7068.6	-50.9	7068.9	-1.0	7085.0	39.1	7064.9
10+00	-58.8	7068.9	-50.0	7069.2	-0.6	7084.8	37.9	7065.6
11+00	-60.6	7068.3	-51.8	7068.6	0.9	7084.0	36.6	7066.2
12+00	-57.1	7069.5	-48.3	7069.8	0.8	7084.1	35.3	7066.8
13+00	-49.0	7072.2	-40.2	7072.5	0.9	7084.1	34.1	7067.5
14+00	-44.9	7073.5	-36.1	7073.8	1.0	7084.0	30.8	7069.1
15+00	-45.0	7073.5	36.2	7073.8	1.5	7083.8	29.5	7069.7
16+00	-43.8	7073.9	-35.0	7074.2	2.2	7083.4	28.3	7070.3
17+00	-42.7	7074.3	-33.9	7074.6	1.6	7083.7	27.1	7071.0
18+00	-41.6	7074.6	-32.8	7074.9	1.0	7084.0	25.7	7071.6
19+00	-40.4	7075.0	-31.6	7075.3	1.0	7084.0	24.4	7072.3
20+00	-38.4	7075.7	-29.6	7076.0	1.0	7084.0	23.1	7072.9
21+00	-36.0	7076.5	-27.2	7076.8	1.0	7084.0	21.9	7073.6
22+00	-33.5	7077.3	-24.7	7077.6	1.0	7084.0	20.6	7074.2
23+00	-31.1	7078.1	-22.3	7078.4	2.3	7083.4	19.3	7074.8
24+00	-28.7	7078.9	-19.9	7079.2	2.8	7083.1	18.1	7075.5

NOTE
 1. SEE DRAWINGS B-04 AND B-11 FOR LOCATION OF POINTS A, B, C, AND D.
 2. CONTRACTOR, AT HIS OPTION, MAY EXTEND THE TRENCH WIDTH AS NEEDED FOR TRENCHER ACCESS.

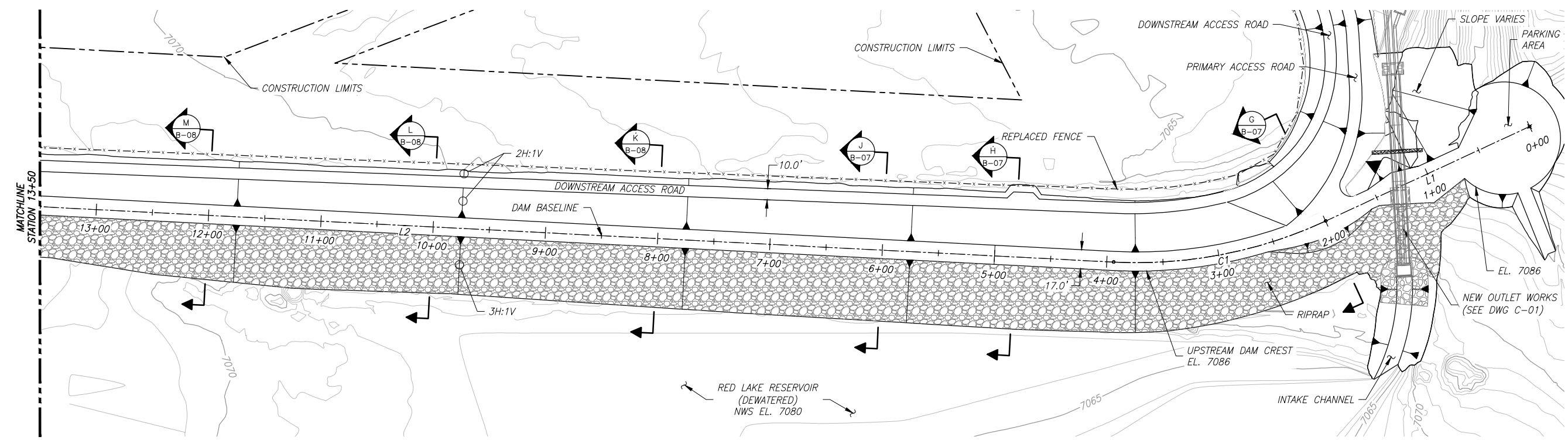
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS
 (2 OF 2)

P. EGGERS
 DESIGNED
 N. JORGENSEN
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

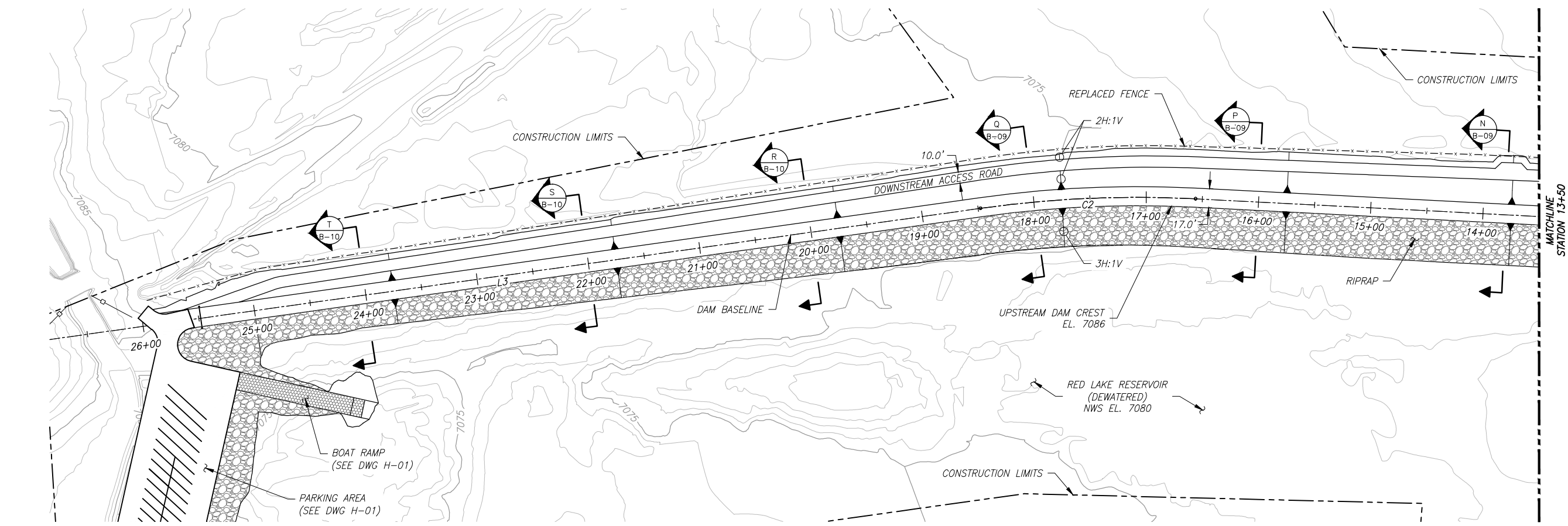
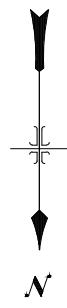
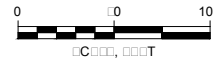
EMBANKMENT DAM EXCAVATION SECTIONS AND DETAILS
 (2 OF 2)

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-06-EMBANKMENT DAM PLAN.DWG OCT 2015 JHEITLAND

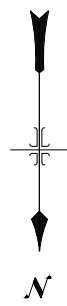
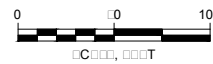
DESIGNED	J. HEITLAND
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	



PLAN
DAM MODIFICATIONS



PLAN
DAM MODIFICATIONS



P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-07-EMBANKMENT DAM SECTIONS AND DETAILS (1 OF 4).DWG RPRICE SEP 2015

J. HEITLAND
 DESIGNED
 J. HEITLAND
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

EMBANKMENT DAM SECTIONS AND DETAILS
 (1 OF 4)

Drawing B-07

SHEET 23 OF 75

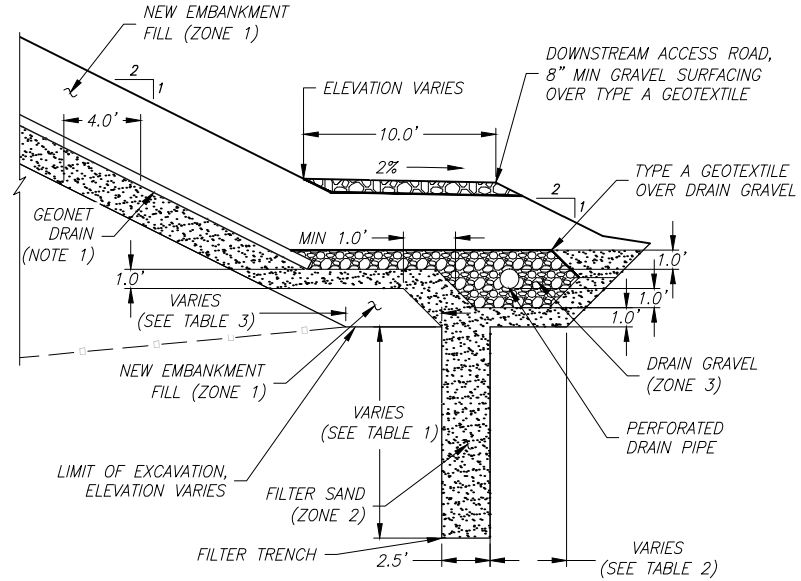
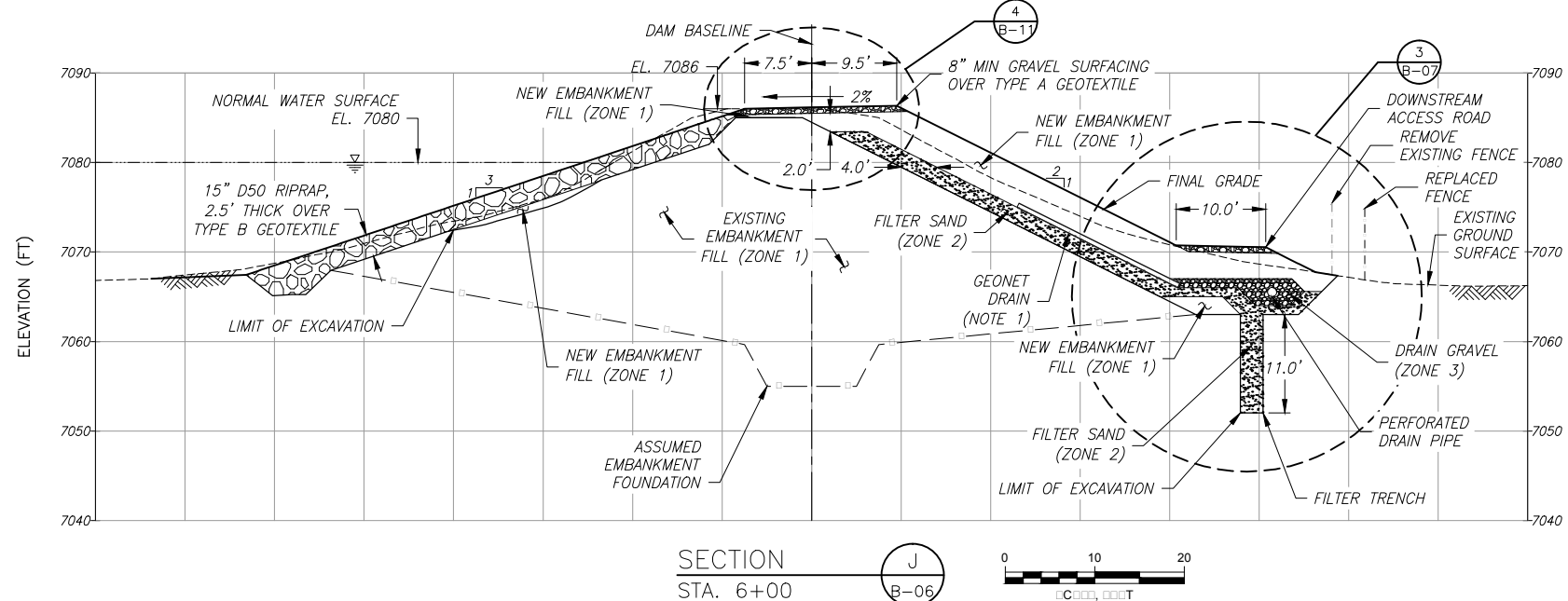
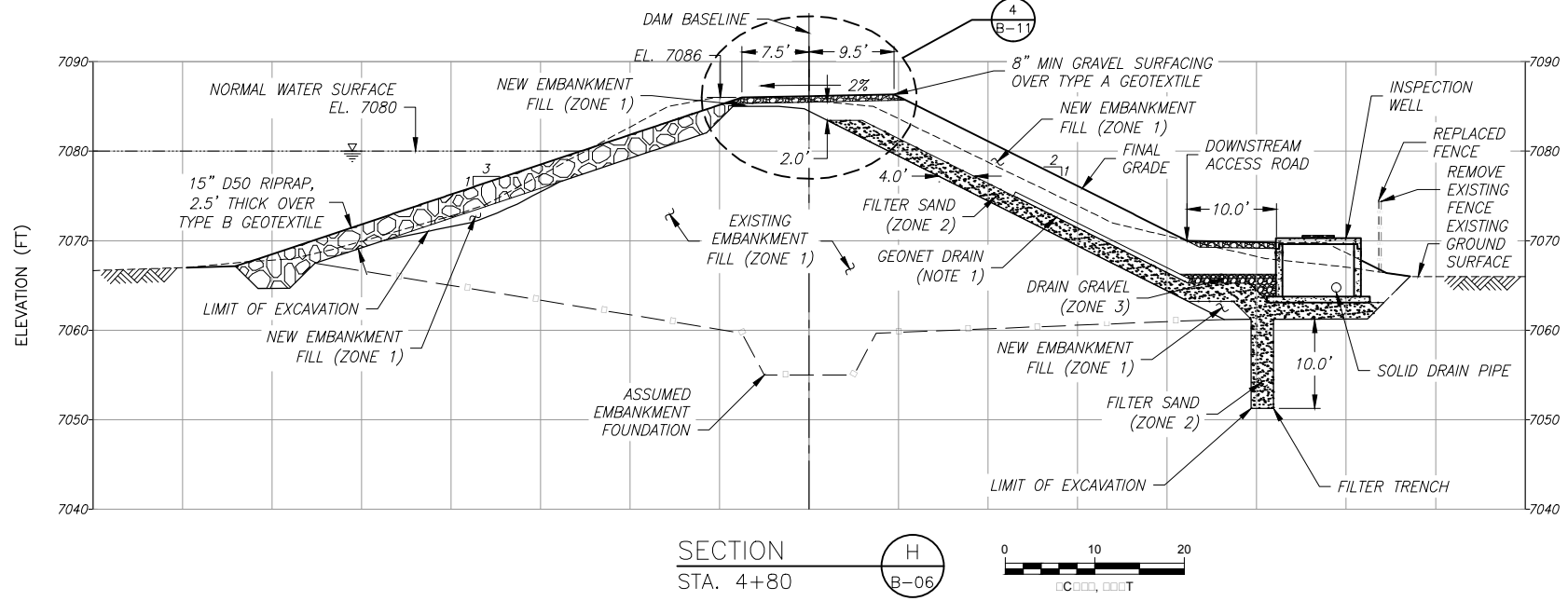
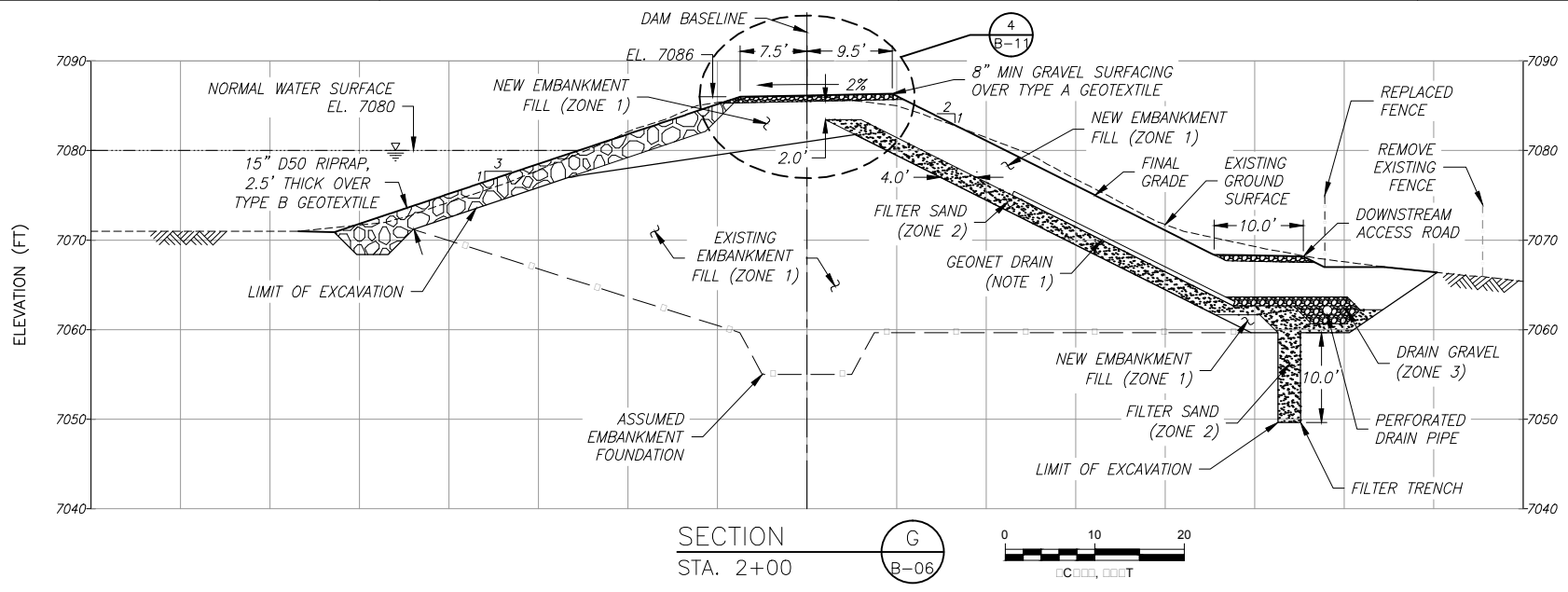


TABLE 1. FILTER TRENCH EXCAVATION DEPTH

DAM BASELINE STA.	TOE DRAIN STA.	EXCAVATION DEPTH
2+00 - 4+80	TD 2+64 - TD 6+00	10
4+80 - 13+80	TD 6+00 - TD 15+00	11
13+80 - 18+00	TD 15+00 - TD 19+40	12

TABLE 2. DOWNSTREAM TOE DRAIN EXCAVATION WIDTH

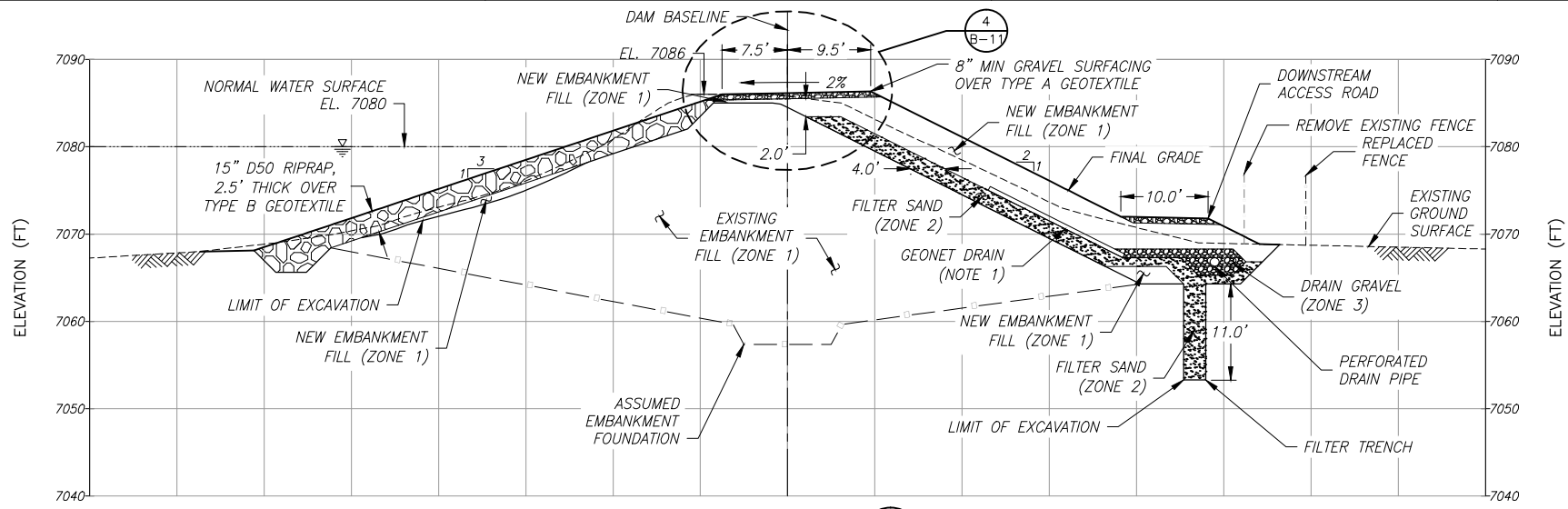
DAM BASELINE STA.	TOE DRAIN STA.	EXCAVATION WIDTH
2+00 - 4+80	TD 2+64 - TD 6+00	6
4+80 - 13+80	TD 6+00 - TD 15+00	4
13+80 - 18+00	TD 15+00 - TD 19+40	2

TABLE 3. UPSTREAM TOE DRAIN EXCAVATION WIDTH

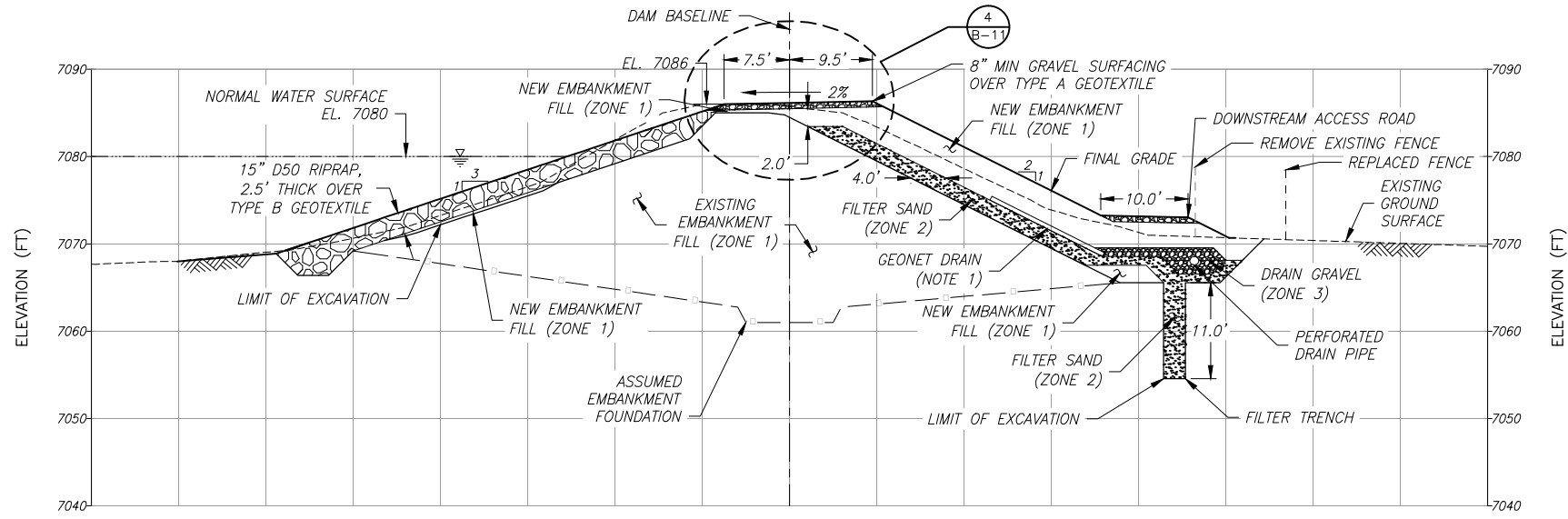
DAM BASELINE STA.	TOE DRAIN STA.	EXCAVATION WIDTH
2+00 - 4+80	TD 2+64 - TD 6+00	3
4+80 - 13+80	TD 6+00 - TD 15+00	5
13+80 - 18+00	TD 15+00 - TD 19+40	7

NOTE
 1. EXTEND GEONET DRAIN TO EL. 7075.

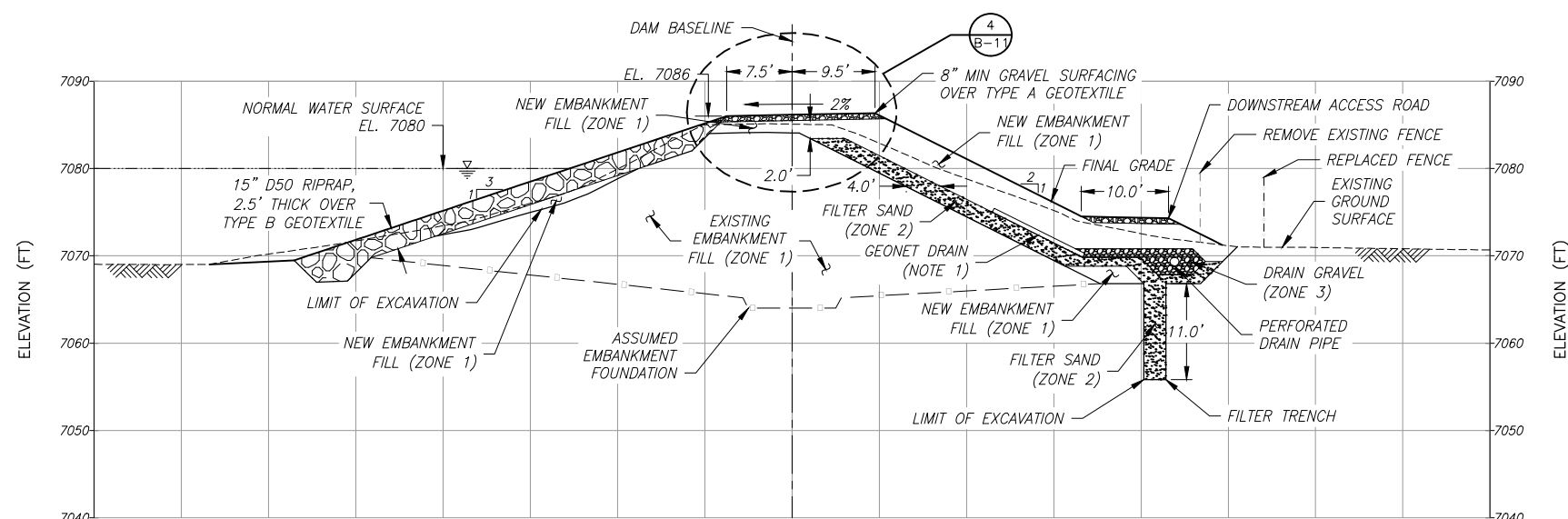
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-08-EMBANKMENT DAM SECTIONS AND DETAILS (2 OF 4).DWG SEP 2015 RPRICE



SECTION K
 STA. 8+00



SECTION L
 STA. 10+00



SECTION M
 STA. 12+00

NOTE
 1. EXTEND GEONET DRAIN TO EL. 7075.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM SECTIONS AND DETAILS
 (2 OF 4)

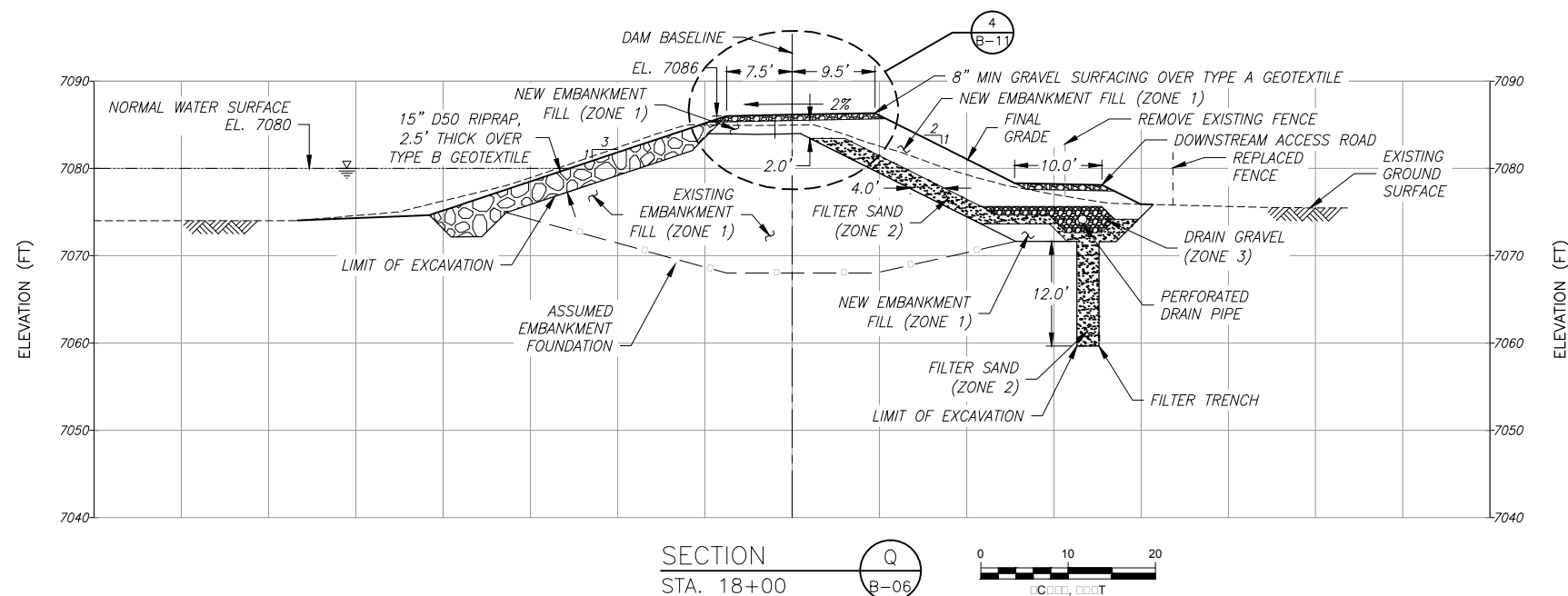
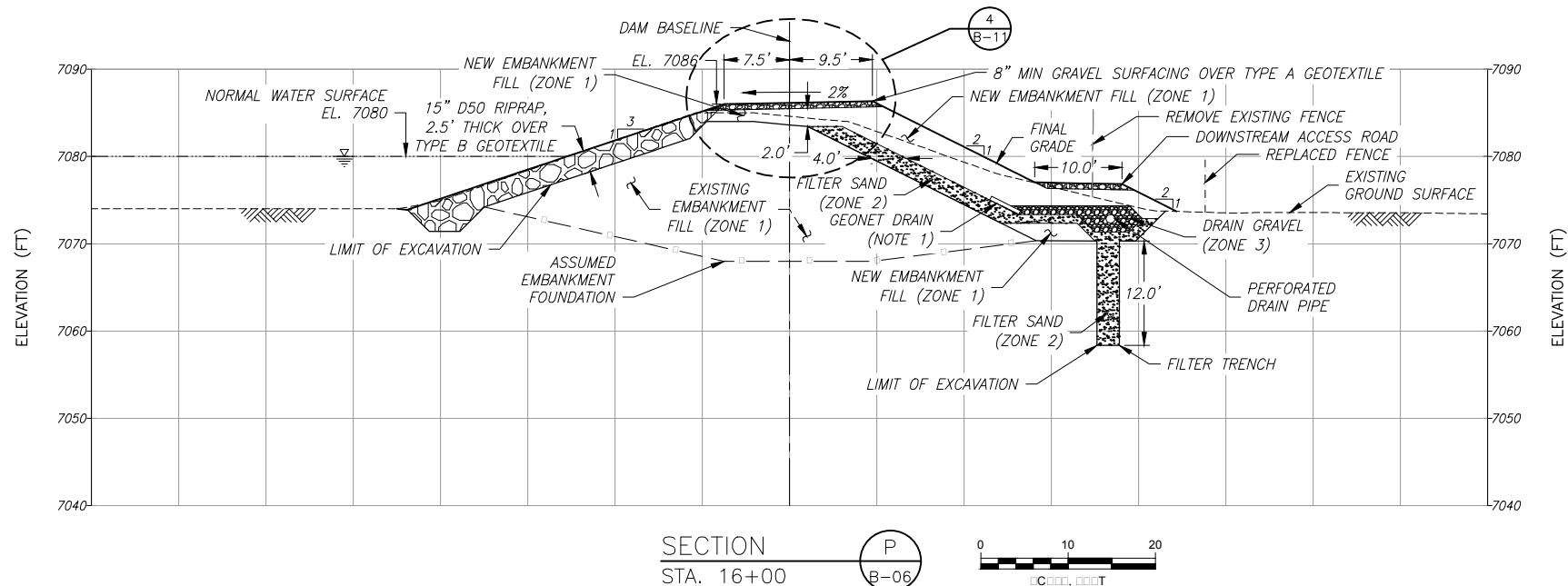
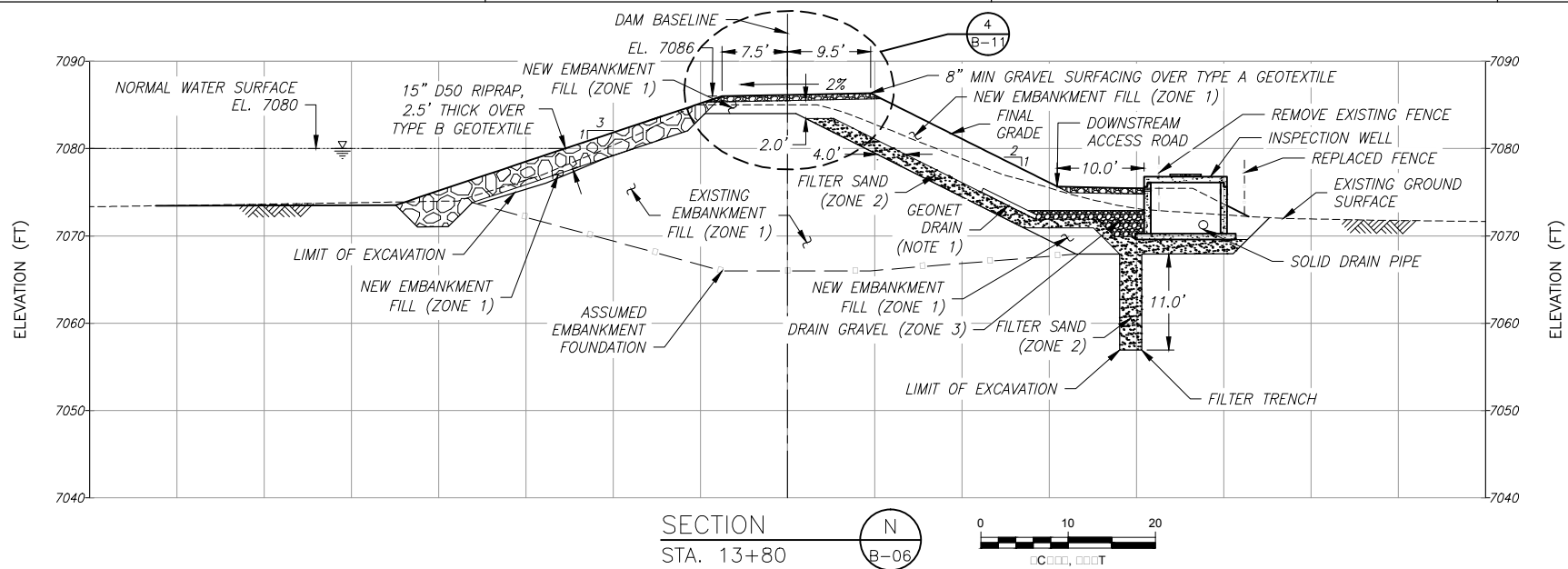
J. HEITLAND
 DESIGNED
 J. HEITLAND
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

EMBANKMENT DAM SECTIONS AND DETAILS
 (2 OF 4)

Drawing B-08

SHEET 24 OF 75

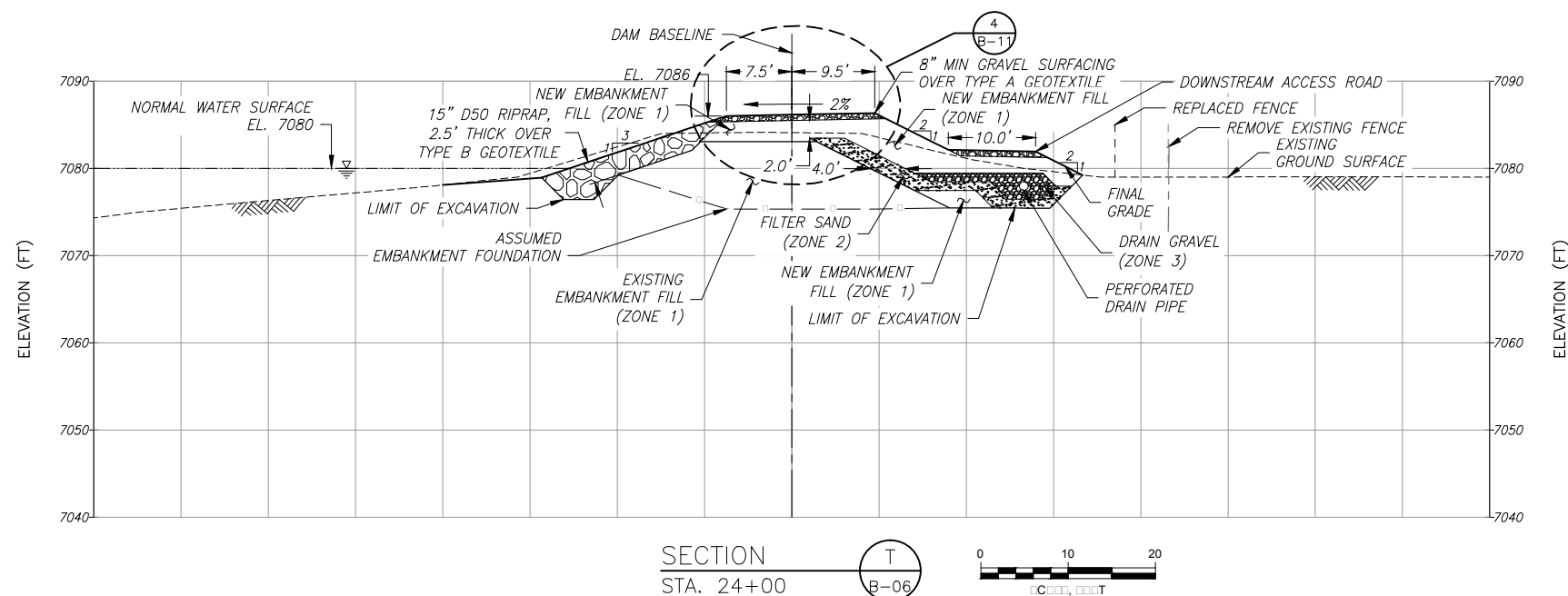
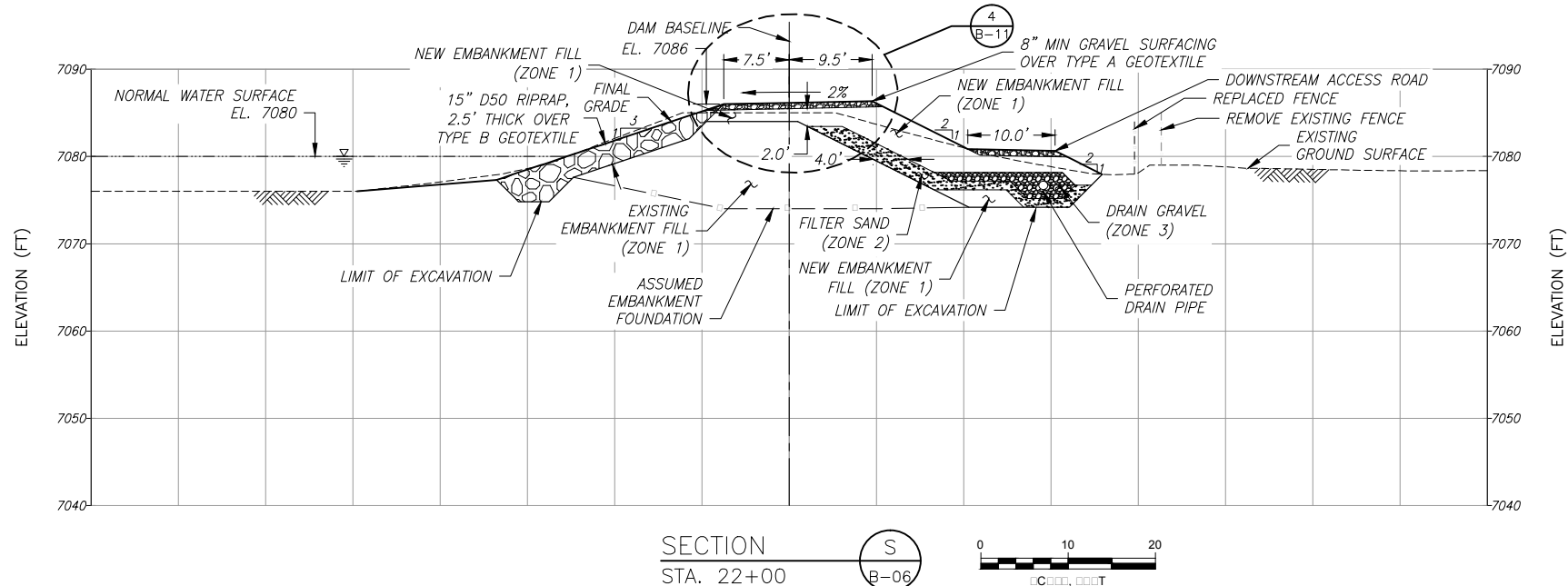
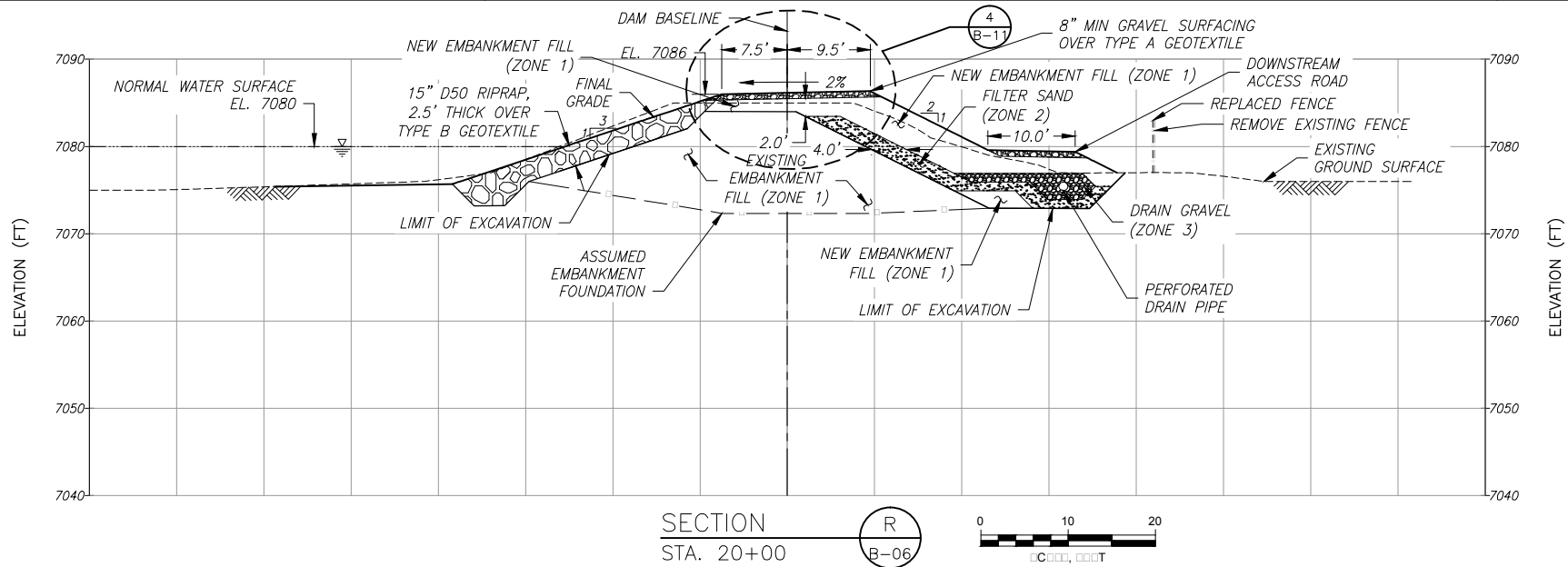
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-09-EMBANKMENT DAM SECTIONS AND DETAILS (3 OF 4).DWG SEP 2015 RPRICE



NOTE
1. EXTEND GEONET DRAIN TO EL. 7075.

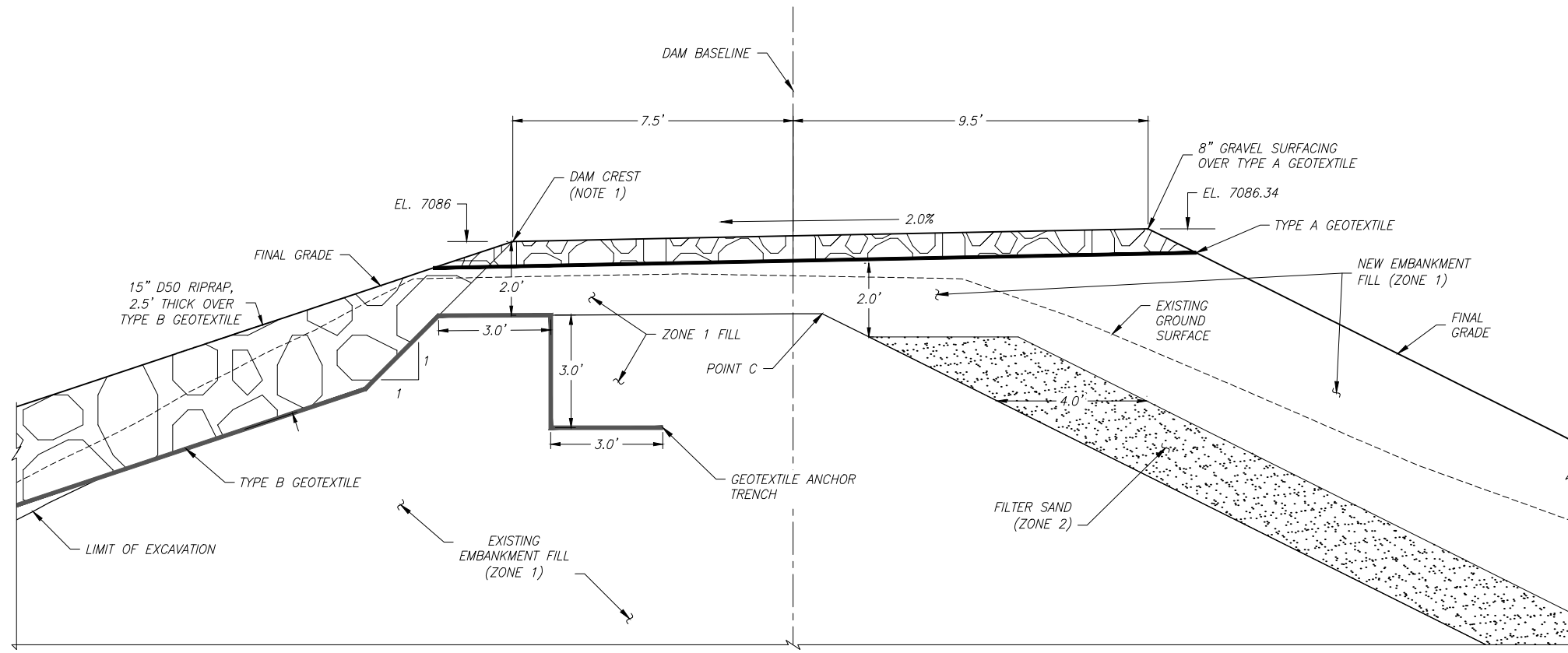
DESIGNED	J. HEITLAND
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-10-EMBANKMENT DAM SECTIONS AND DETAILS (4 OF 4).DWG SEP 2015 RPRICE

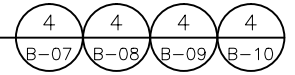


DESIGNED	J. HEITLAND
DRAWN	J. HEITLAND
CHECKED	B. EGGERS
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-11-EMBANKMENT DAM CREST DETAILS.DWG SEP 2015 RPRICE



DETAIL
 DAM CREST AND GEOTEXTILE ANCHOR TRENCH



NOTE
 1. DAM CREST ELEVATION TAKEN AT UPSTREAM LIP.
 CONSTRUCT DAM WITH CAMBER ELEVATIONS
 SHOWN.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 EMBANKMENT DAM
 CREST DETAILS

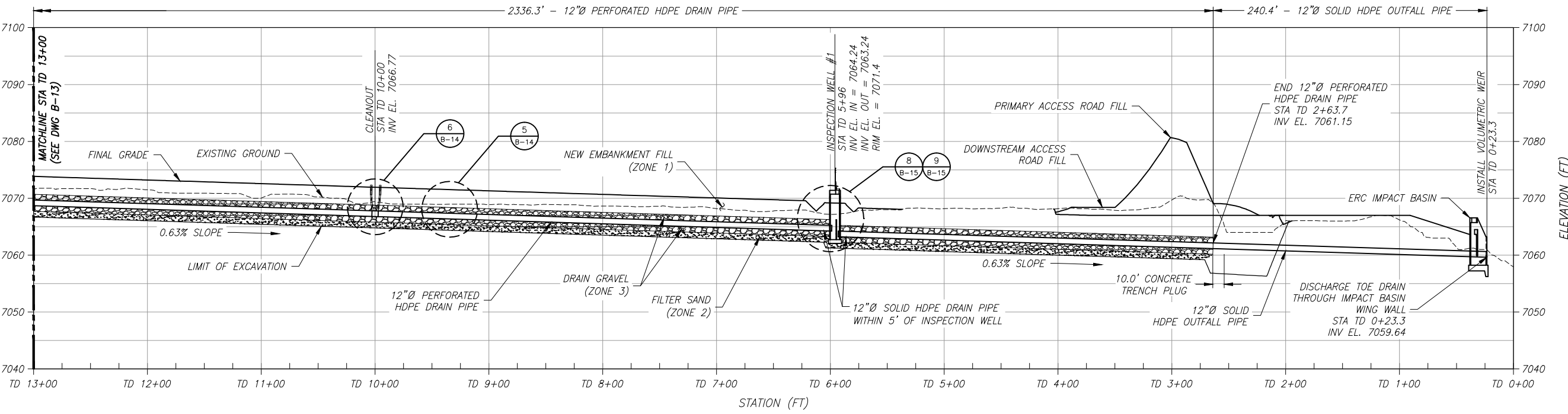
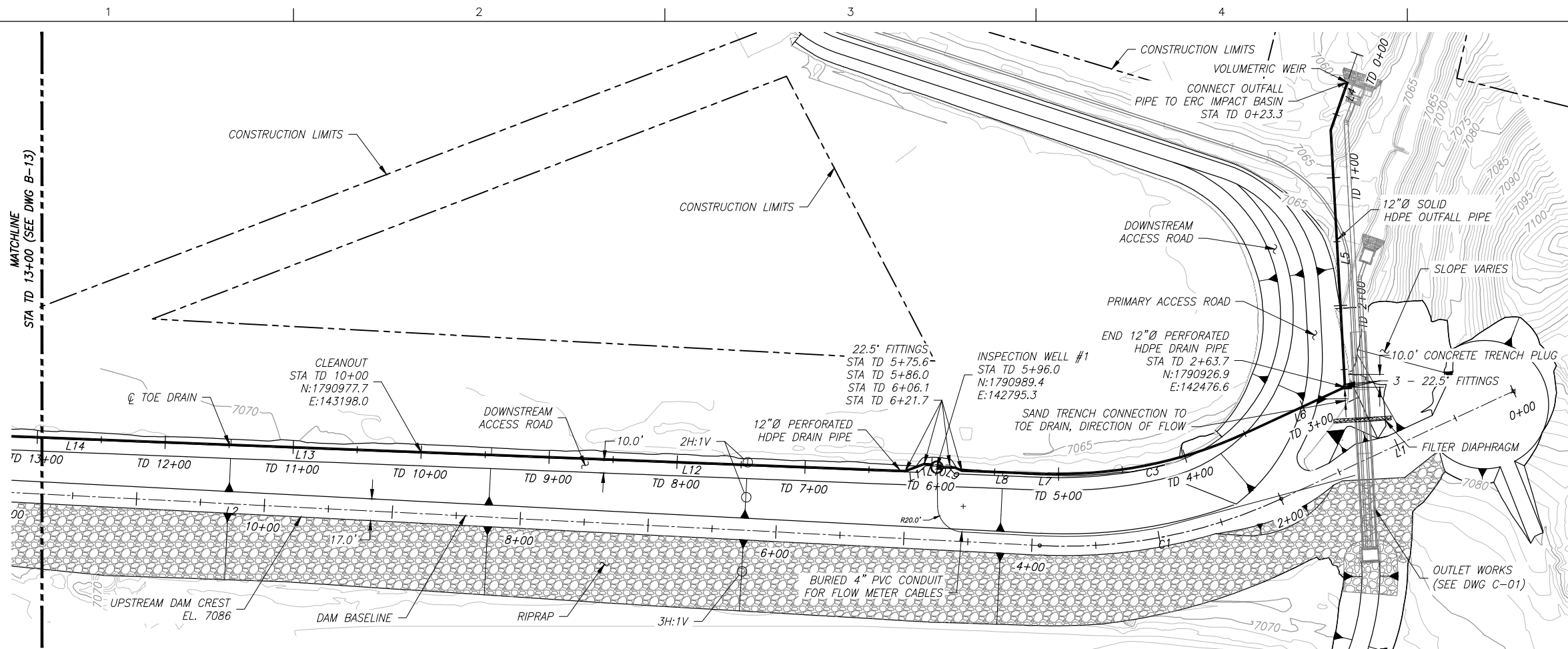
J. HETTLAND
 DESIGNED
 N. JORGENSEN
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

EMBANKMENT DAM
 CREST DETAILS

Drawing B-11
 SHEET 27 OF 75

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015
 0

P:\1411470 - RED LAKE DAM (CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-12-TOE DRAIN PLAN AND PROFILE (1 OF 2).DWG OCT 2015 JHEITLAND

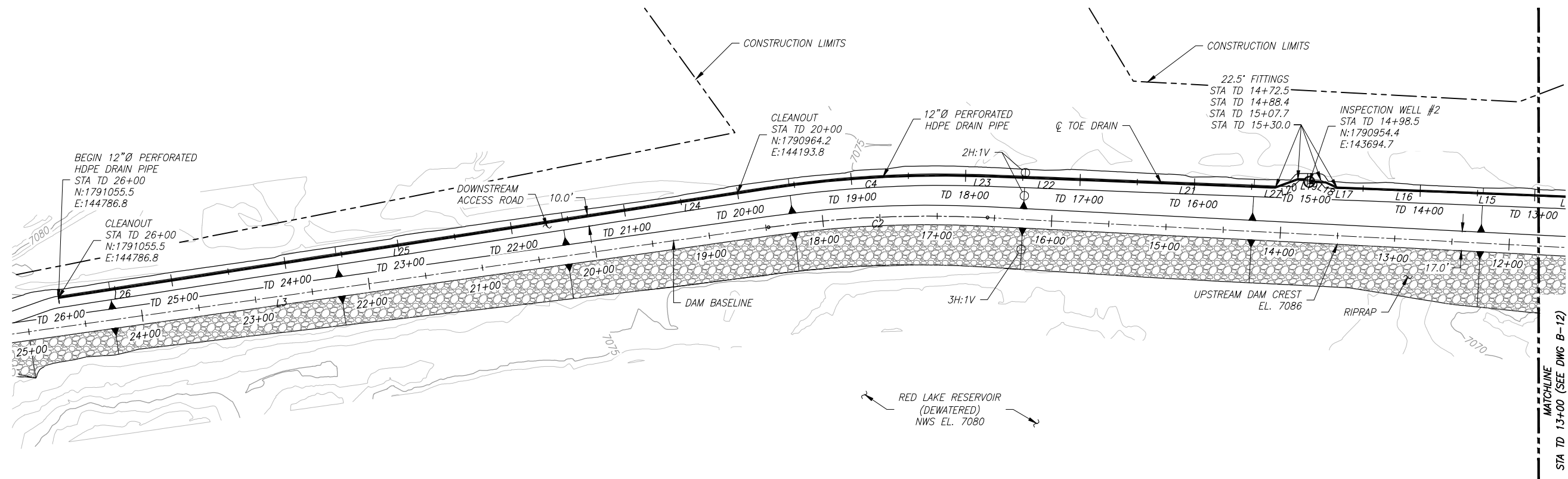
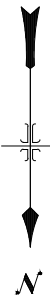


BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 TOE DRAIN
 PLAN AND PROFILE
 (1 OF 2)

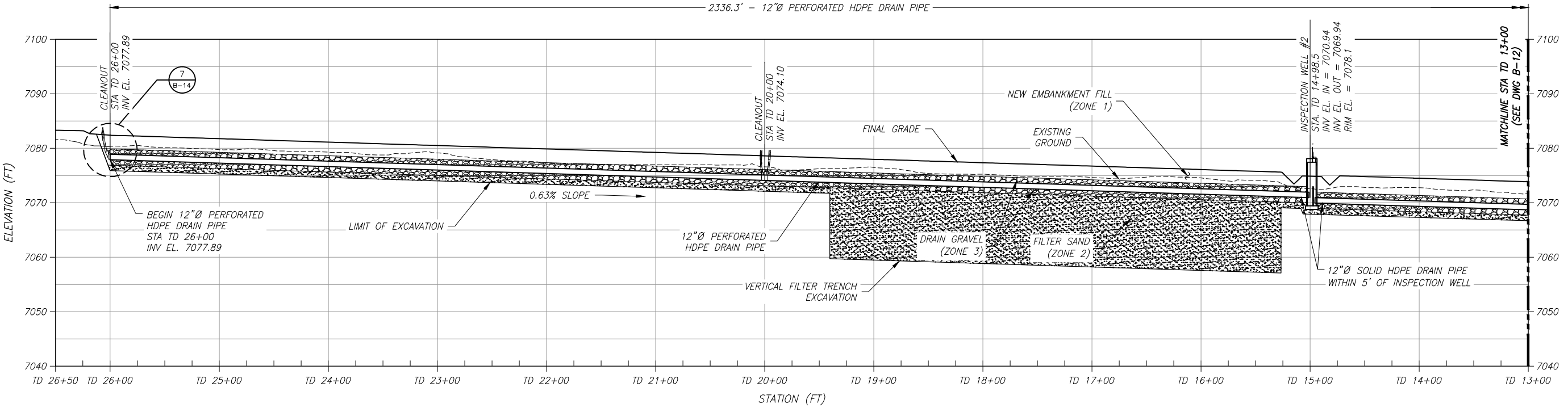
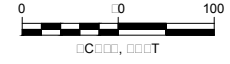
DESIGNED: P. EGGERS / J. HEITLAND
 DRAWN: P. EGGERS / J. HEITLAND
 CHECKED: C. MASCHING
 DESIGN APPROVAL: D. MILLER
 INDEPENDENT TECHNICAL REVIEW

TOE DRAIN
 PLAN AND PROFILE
 (1 OF 2)

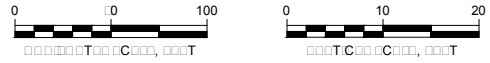
P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-13-TOE DRAIN PLAN AND PROFILE (2 OF 2).DWG SEP 2015 RPRICE



PLAN
TOE DRAIN MODIFICATIONS



PROFILE
TOE DRAIN MODIFICATIONS

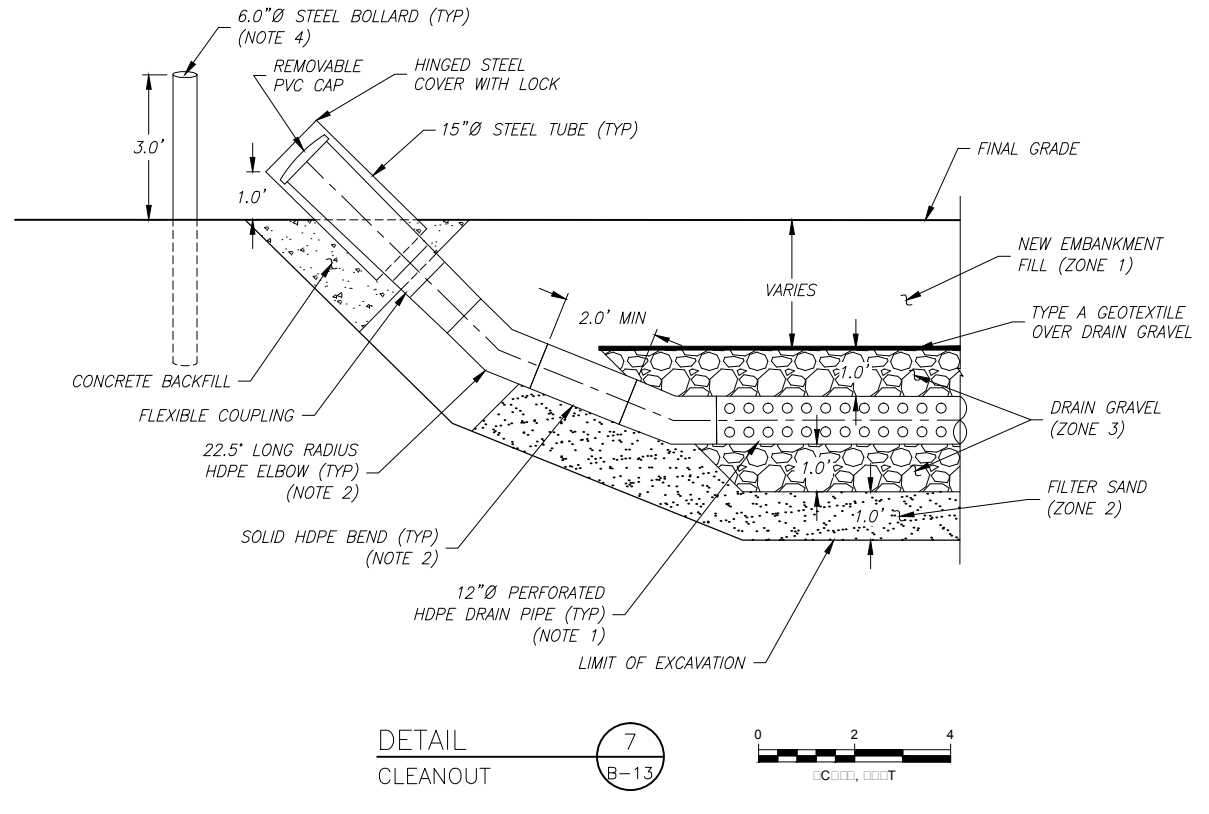
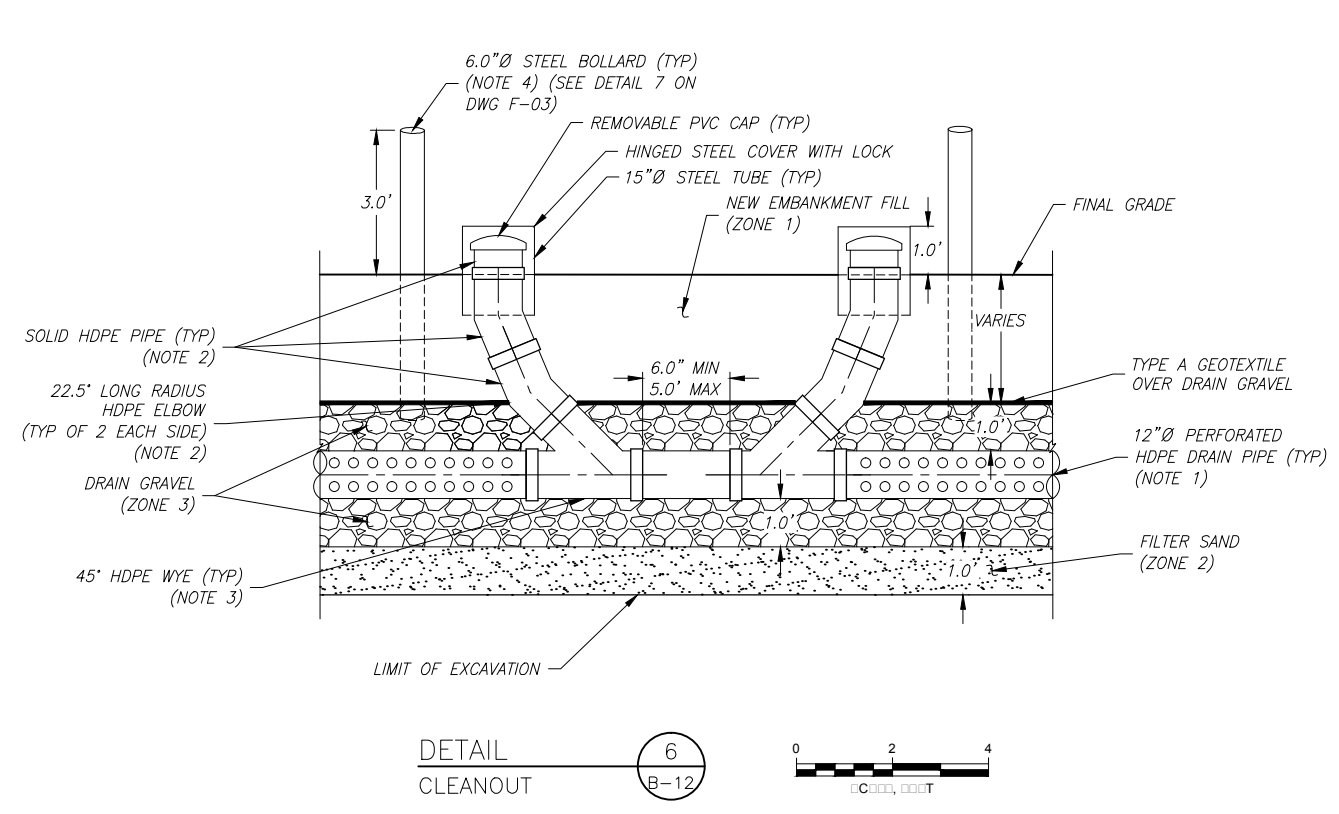
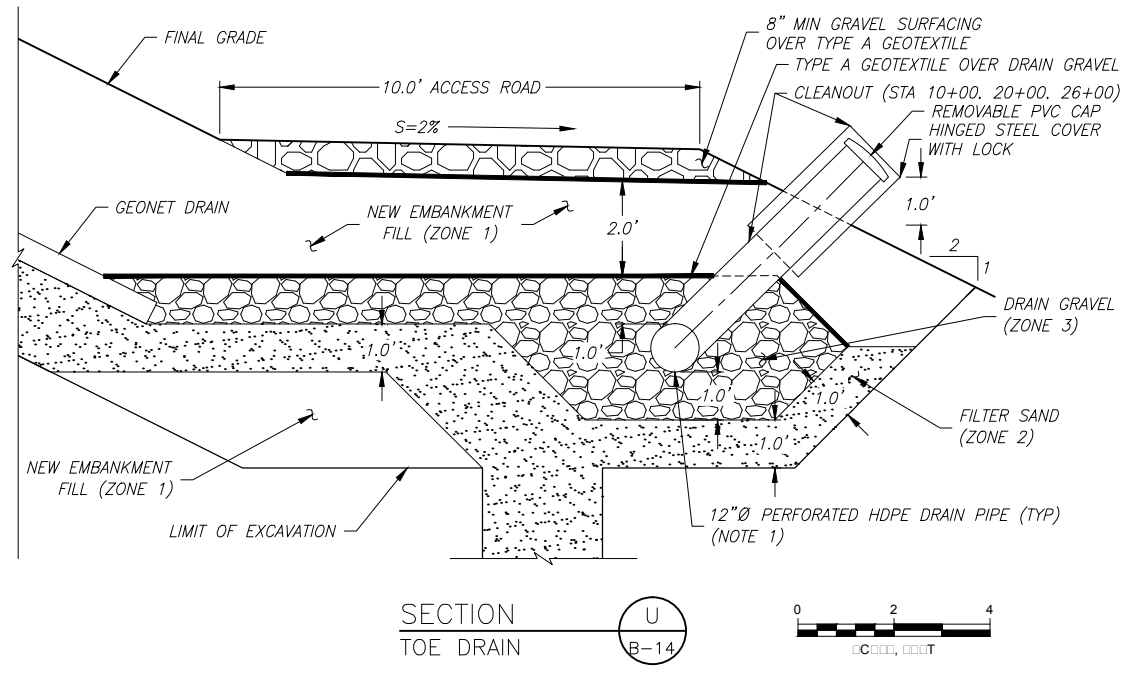
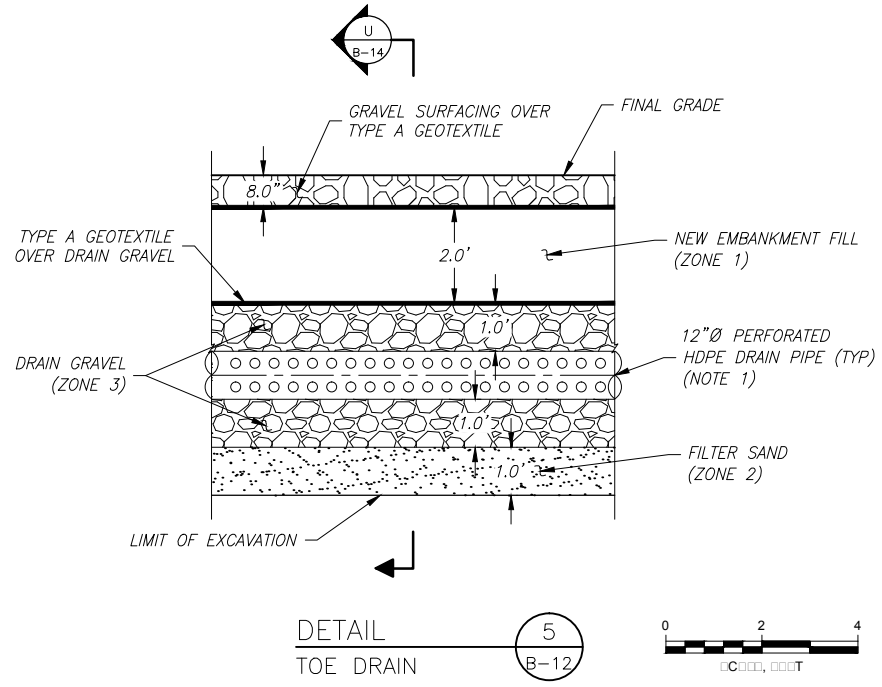


BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
TOE DRAIN
PLAN AND PROFILE
(2 OF 2)

P. EGGERS / J. HEITLAND
DESIGNED
P. EGGERS / J. HEITLAND
DRAWN
P. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

TOE DRAIN
PLAN AND PROFILE
(2 OF 2)

DESIGNED	P. EGGERS / J. HEITLAND
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

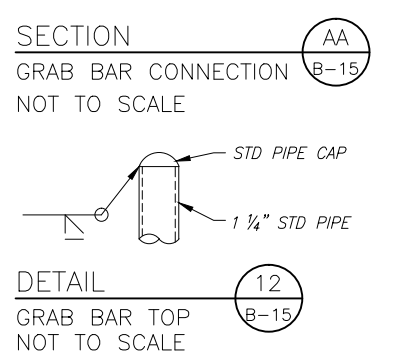
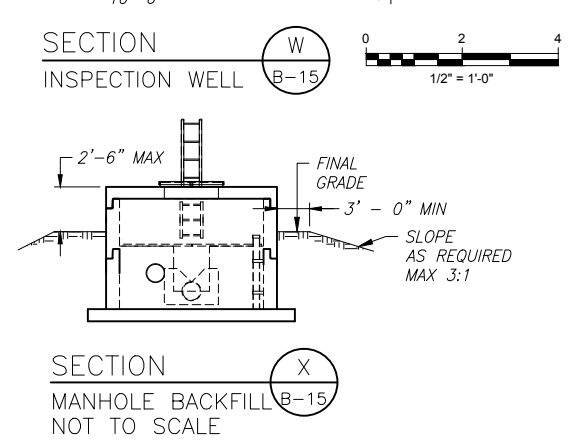
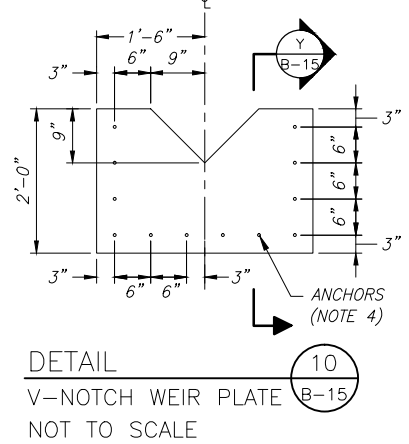
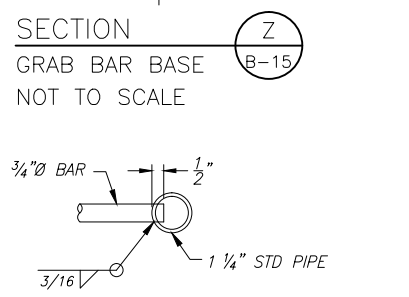
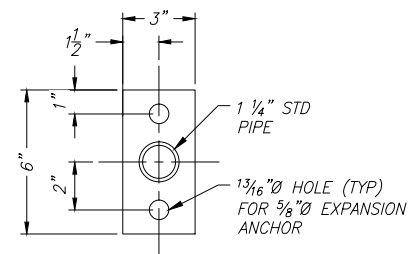
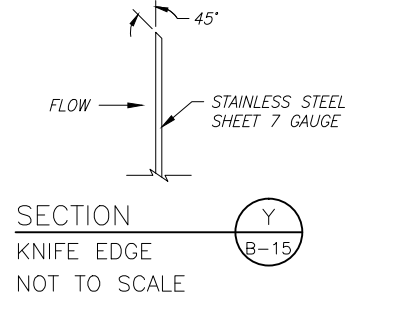
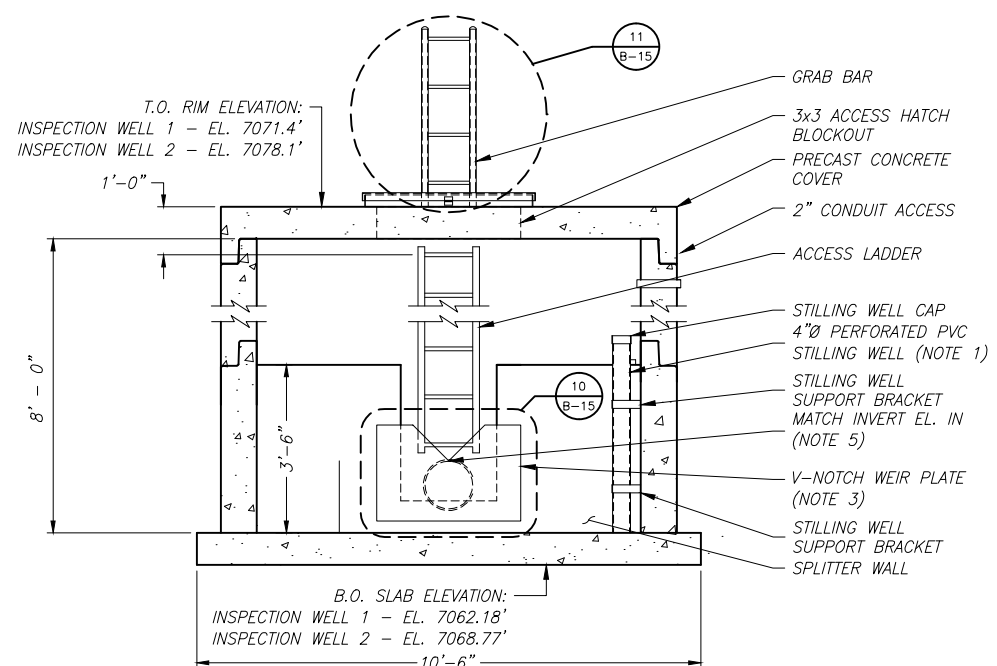
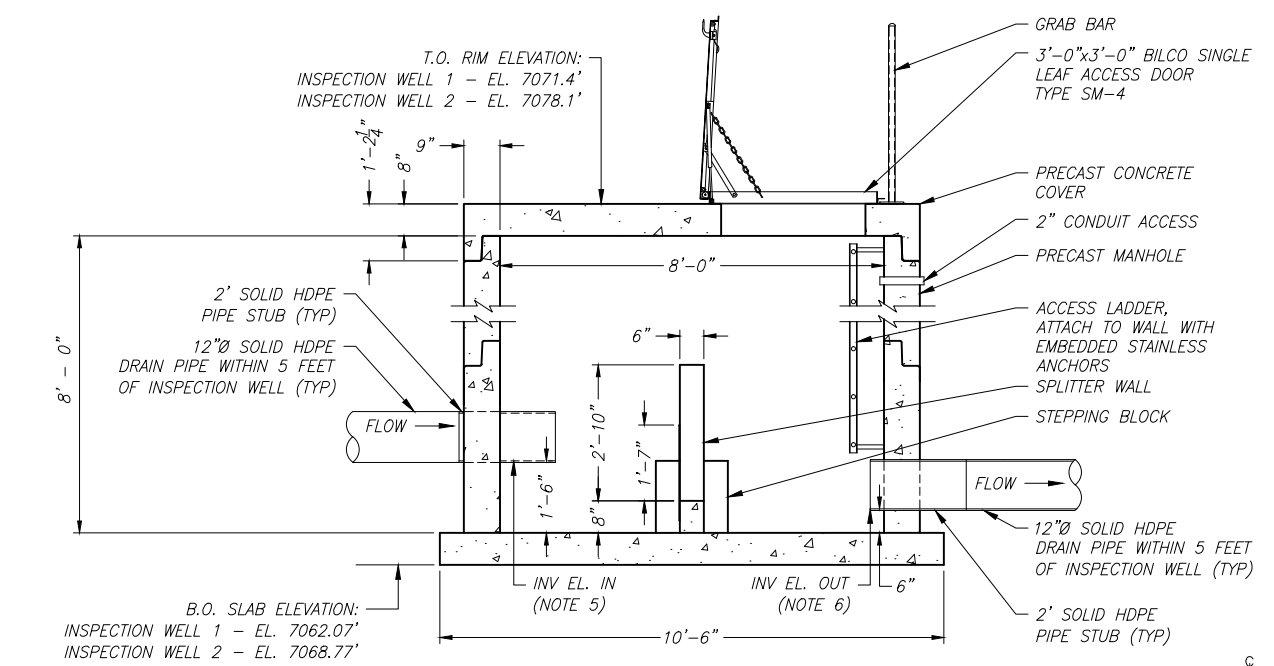
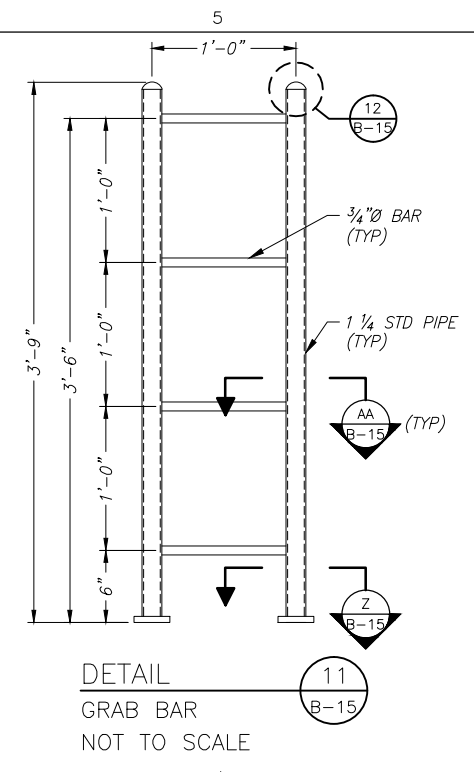
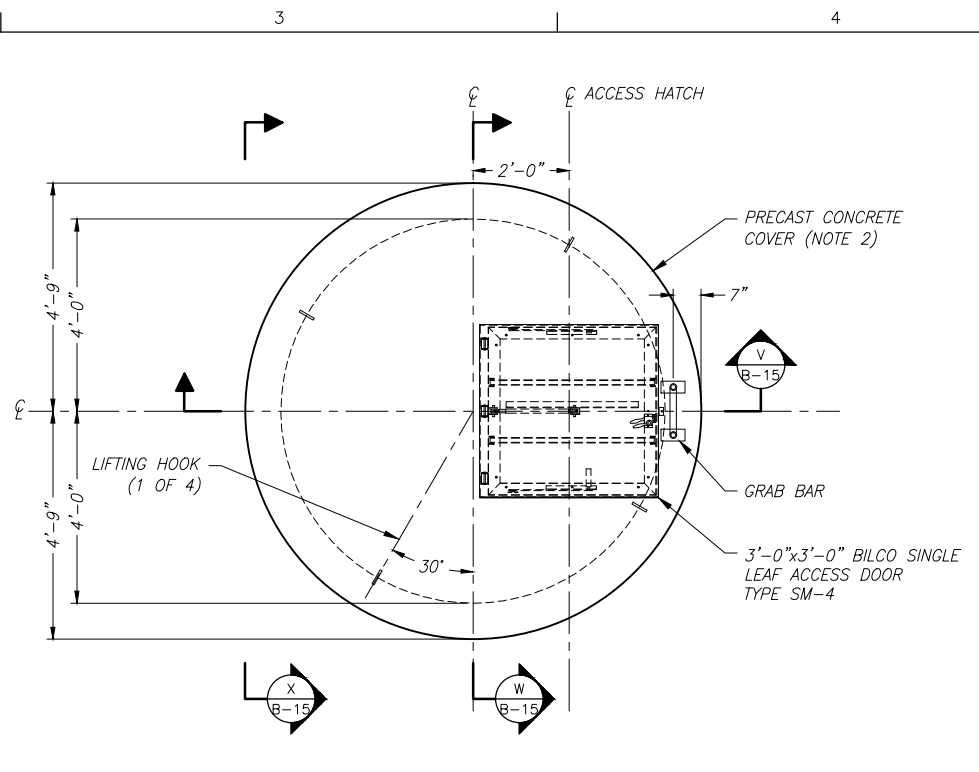
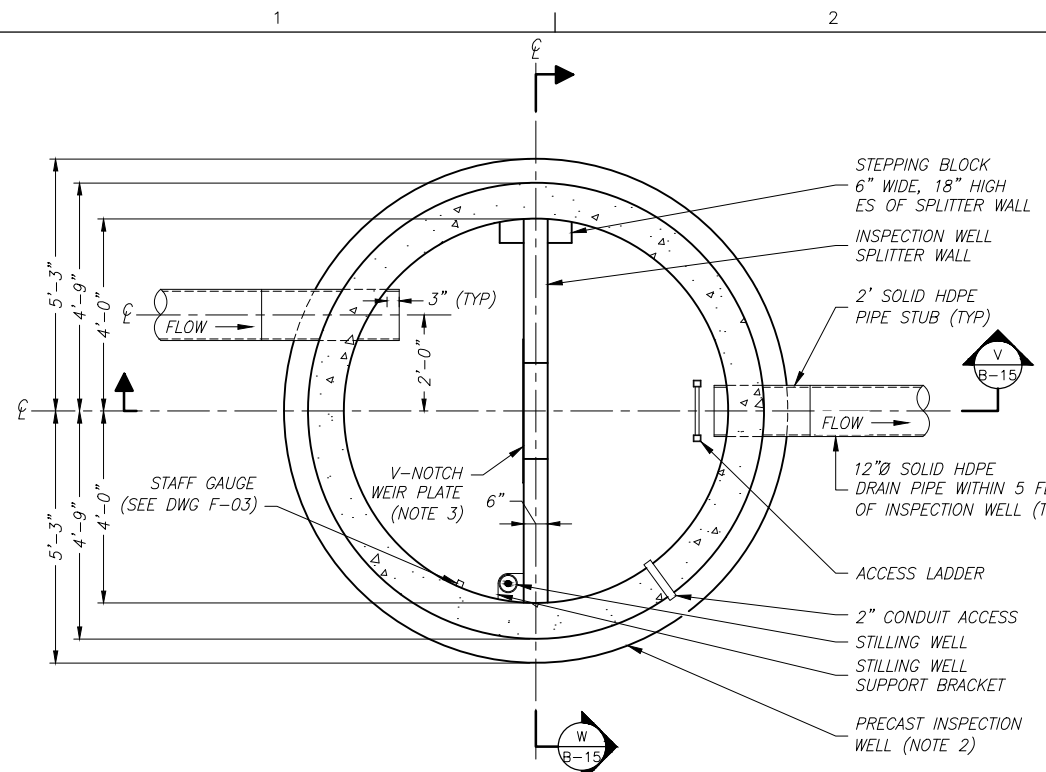


- NOTES**
1. DRAIN PIPE IS PERFORATED, DOUBLE-WALL CORRUGATED HDPE PIPE.
 2. CLEANOUT PIPING AND WYE DIAMETERS ARE THE SAME AS THE DRAIN PIPE DIAMETER UNLESS OTHERWISE NOTED.
 3. WYES ORIENTED 45° FROM VERTICAL.
 4. BOLLARDS SHOULD BE OFFSET TO THE EDGE OF THE DOWNSTREAM ACCESS ROAD AND PENETRATE 3.0 FEET BELOW FINAL GRADE.

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-14-TOE DRAIN DETAILS.DWG OCT 2015 KPRICE

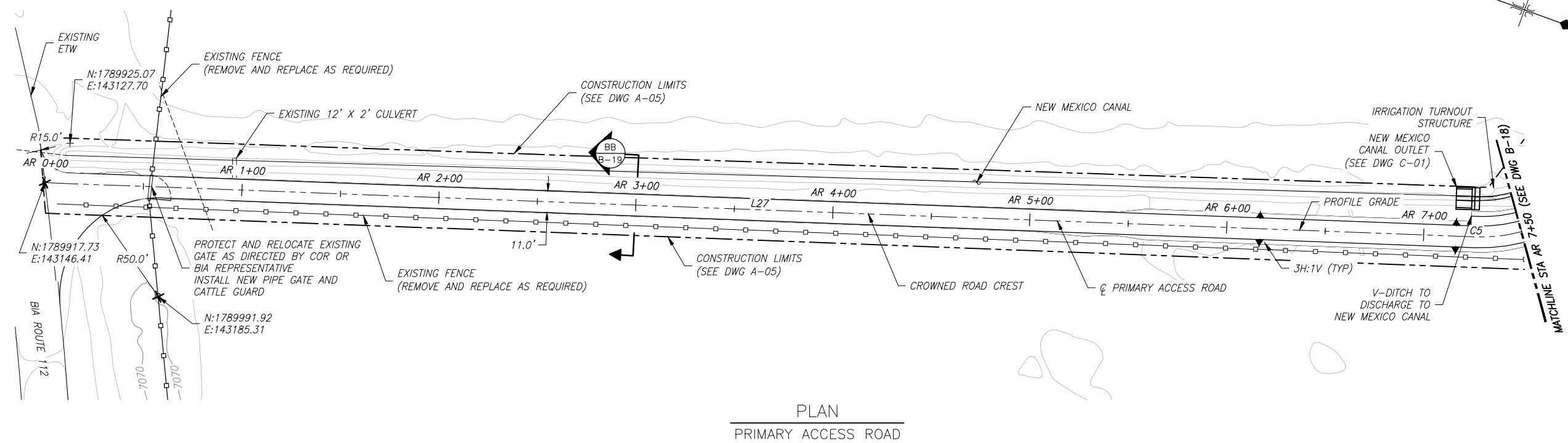
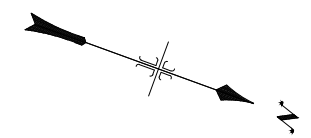
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-15-INSPECTION WELL DETAILS.DWG SEP 2015 RPRICE

DESIGNED	R. PRICE / J. HEITLAND
DRAWN	R. PRICE
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

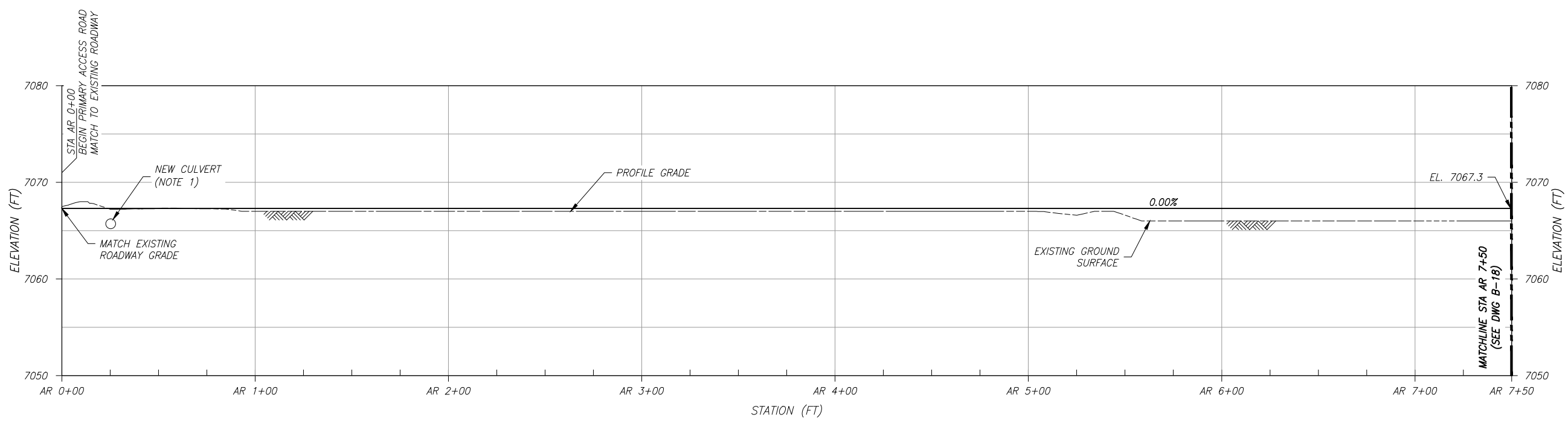


- NOTES**
- INSTALL ULTRASONIC WATER LEVEL SENSOR IN INSPECTION WELL #1 PER SPECIFICATIONS.
 - PRECAST MANHOLE AND COVER:
 A. DESIGN LIVE LOAD: 105 PSF
 - APPLY MASTIC BETWEEN WEIR PLATE AND CONCRETE WALL DIVIDER.
 - ANCHORS SHALL BE STAINLESS STEEL 3/8"Ø x 3" HILTI HIT-Z EPOXY ANCHOR AND SET WITH HILTI HIT-HY 200.
 - INVERT ELEVATION IN:
 INSPECTION WELL 1: 7064.24'
 INSPECTION WELL 2: 7070.94'
 - INVERT ELEVATION OUT:
 INSPECTION WELL 1: 7063.24'
 INSPECTION WELL 2: 7069.94'

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-16-PRIMARY ACCESS ROAD PLAN AND PROFILE (1 OF 2).DWG SEP 2015 RPRICE



PLAN
 PRIMARY ACCESS ROAD



PROFILE
 PRIMARY ACCESS ROAD

NOTE
 1. INSTALL 12"Ø HDPE CULVERTS AT CROSSINGS DESIGNATED BY THE COR OR BIA REPRESENTATIVE. 3 CULVERTS ASSUMED.

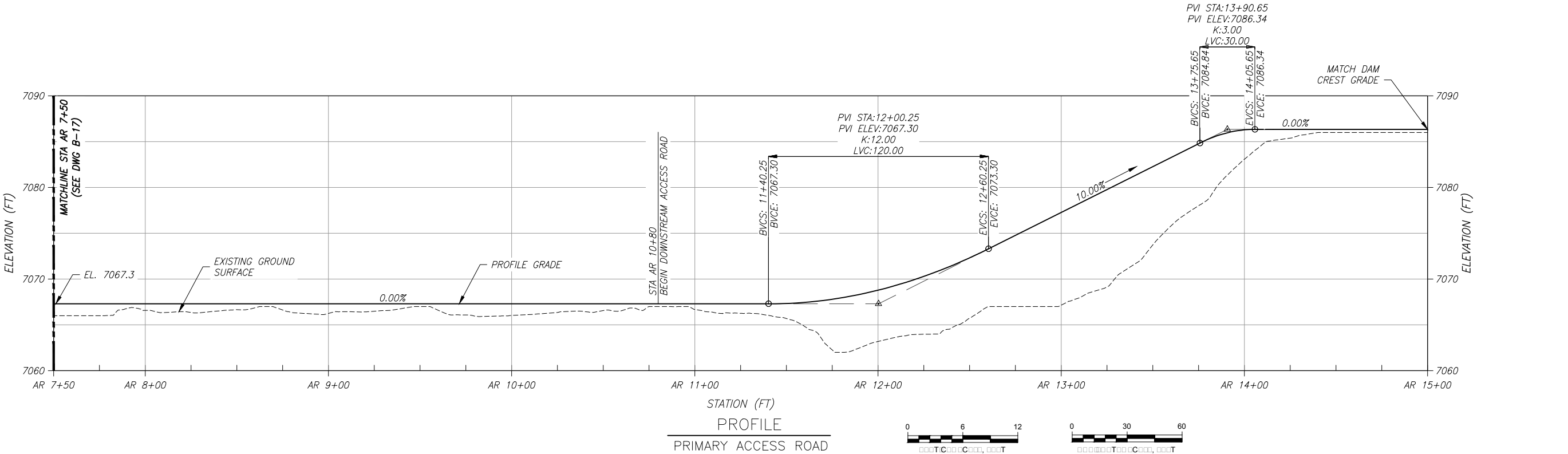
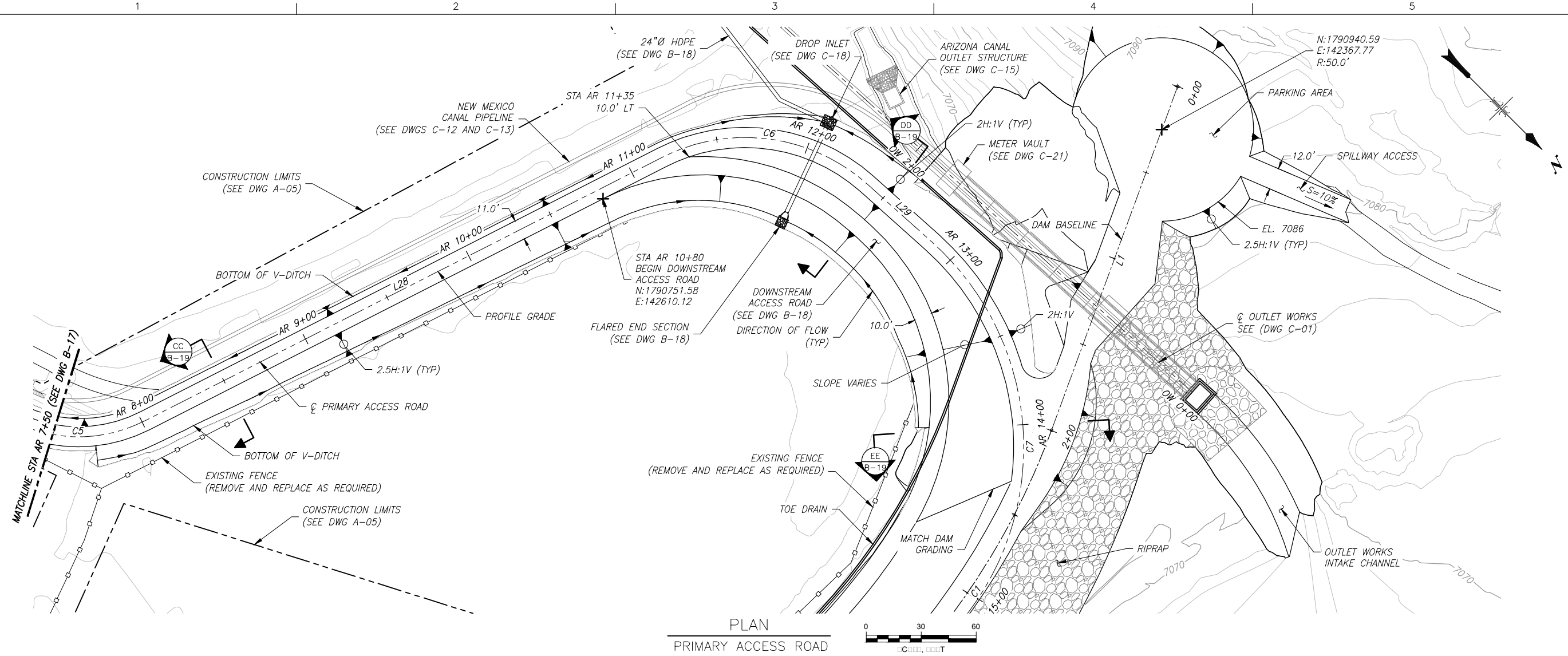
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 PRIMARY ACCESS ROAD
 PLAN AND PROFILE
 (1 OF 2)

P. EGGERS
 DESIGNED
 P. EGGERS
 DRAWN
 C. MASCHING
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

PRIMARY ACCESS ROAD
 PLAN AND PROFILE
 (1 OF 2)

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-17-PRIMARY ACCESS ROAD PLAN AND PROFILE (2 OF 2).DWG OCT 2015 JHEITLAND

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 PRIMARY ACCESS ROAD
 PLAN AND PROFILE
 (2 OF 2)

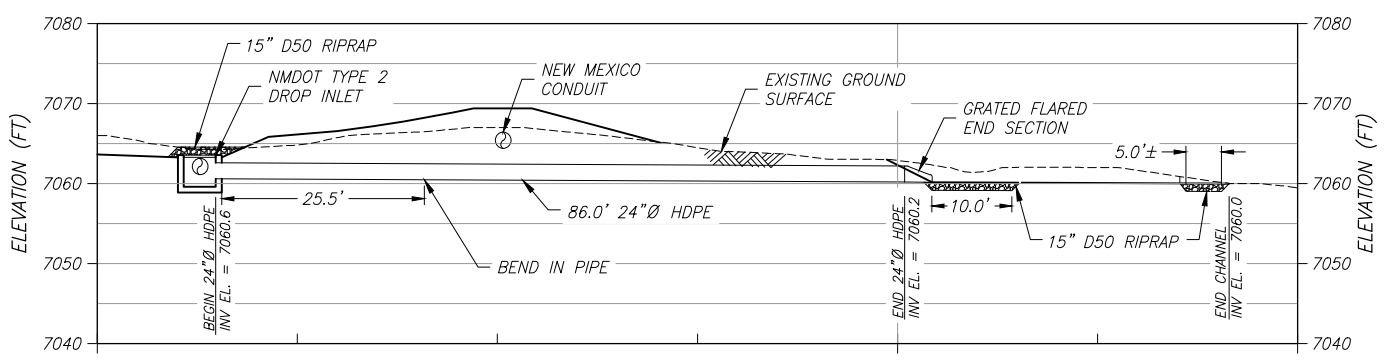
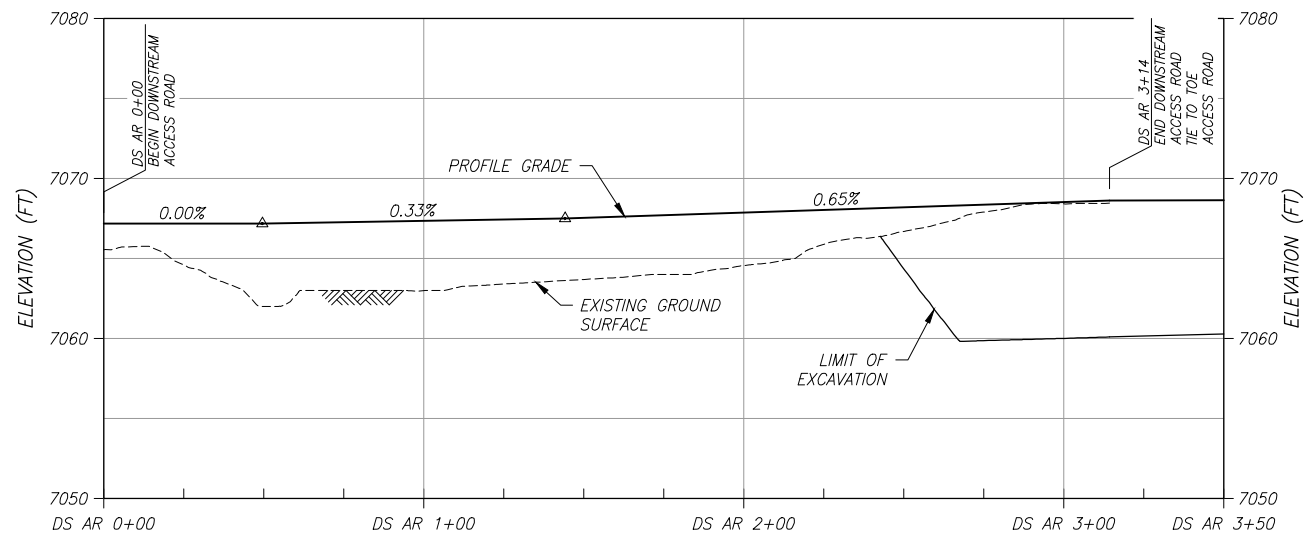
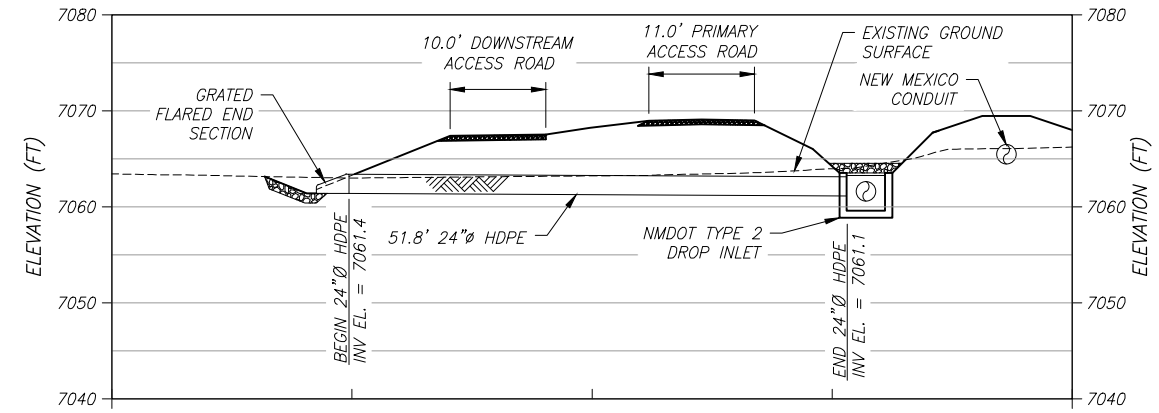
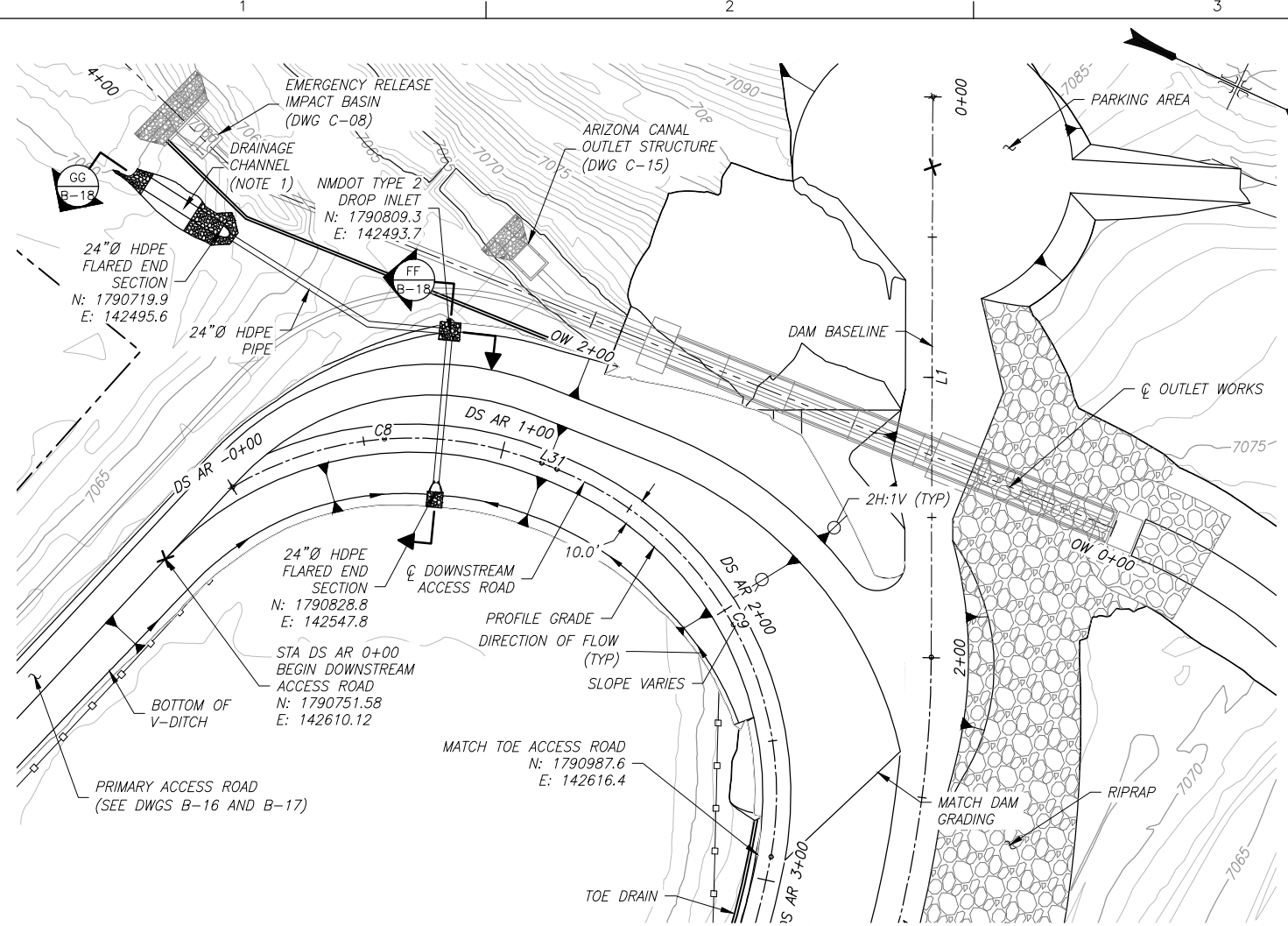


ISSUED FOR SOLICITATION

REV NO 0 OCTOBER 2, 2015

DESIGNED	P. EGGERS
DRAWN	C. MASCHING
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-18-DOWNSTREAM ACCESS ROAD PLAN, PROFILE, AND SECTIONS.DWG OCT 2015 JHETLAND



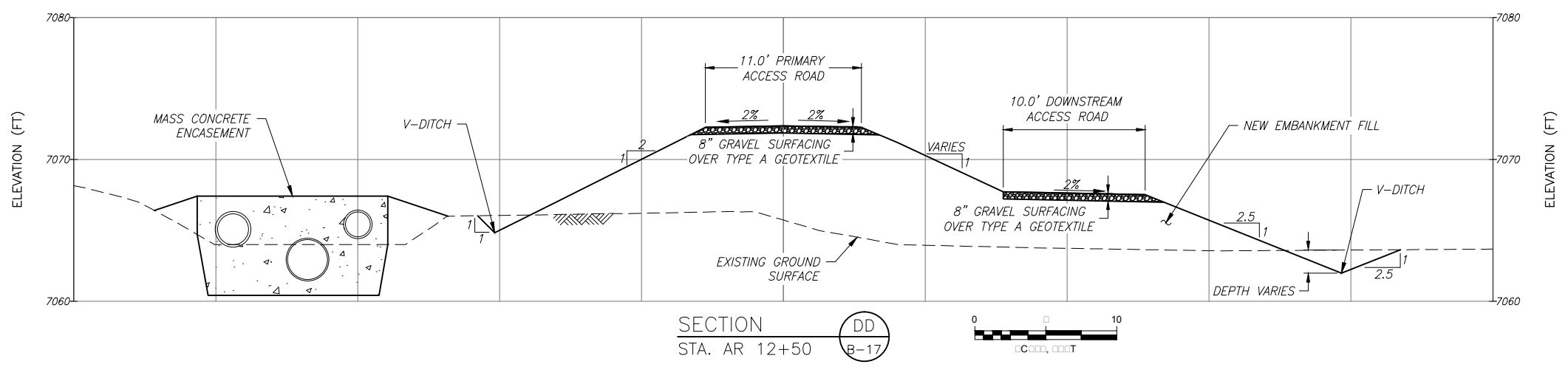
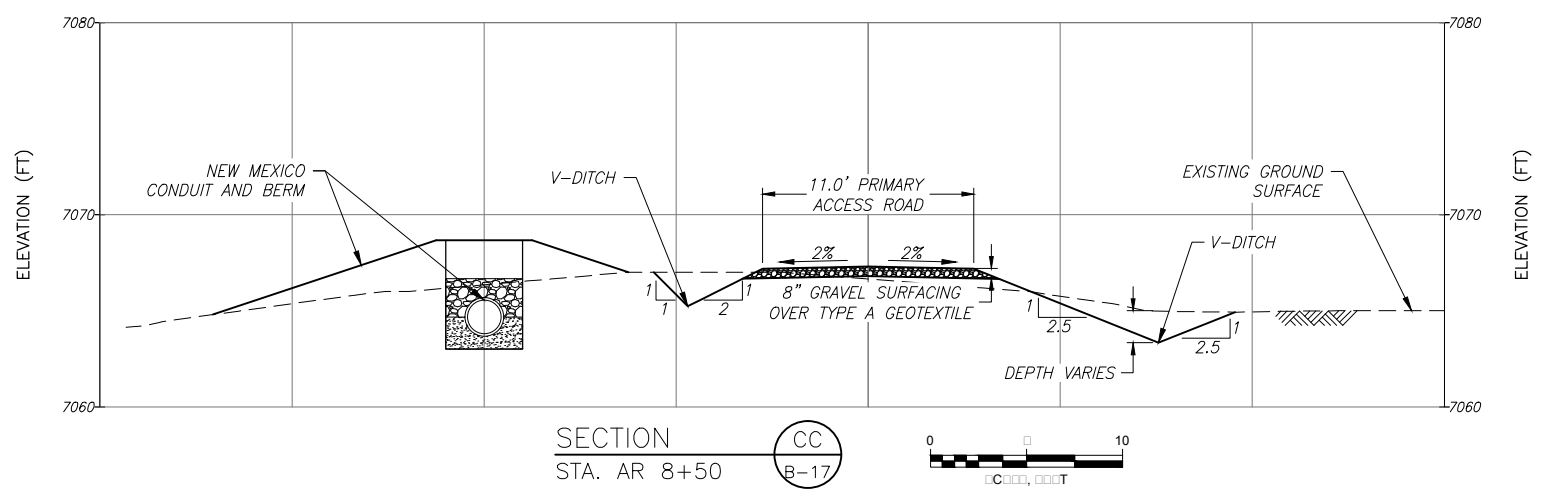
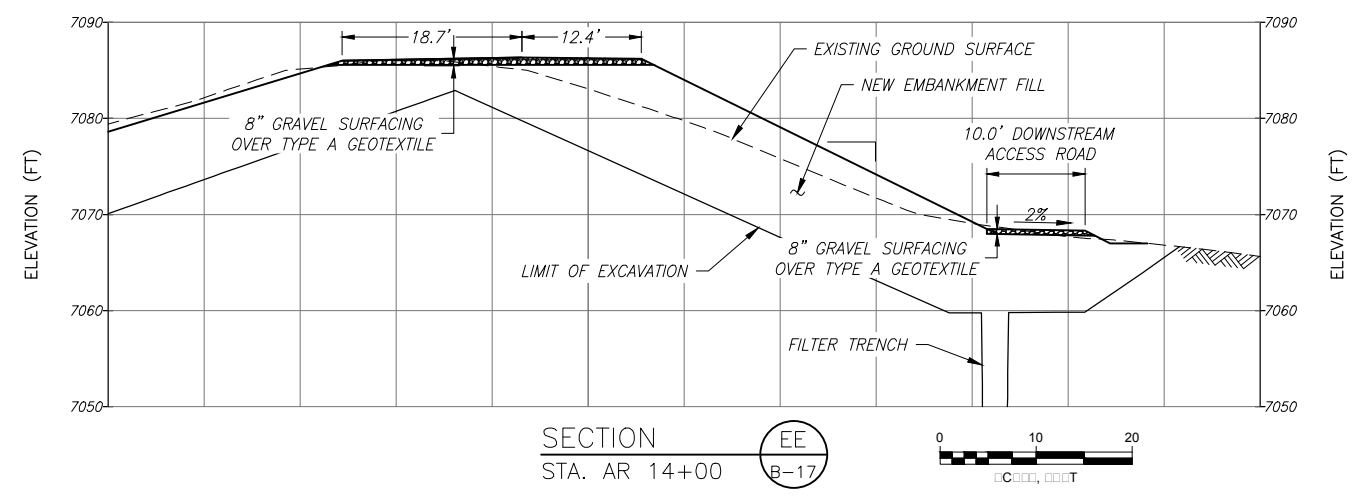
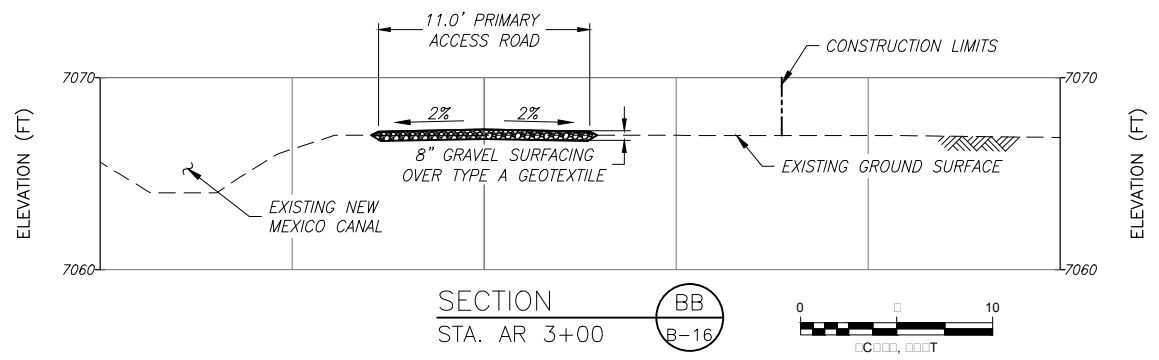
NOTE
 1. PROVIDE 5.0' FLAT BOTTOM WITH 3H:1V SIDE SLOPES.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 DOWNSTREAM ACCESS ROAD
 PLAN, PROFILE, AND SECTIONS

DESIGNED: P. EGGERS
 DRAWN: C. MASCHING
 CHECKED: C. MASCHING
 DESIGN APPROVAL: D. MILLER
 INDEPENDENT TECHNICAL REVIEW

DOWNSTREAM ACCESS ROAD
 PLAN, PROFILE, AND SECTIONS

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\B-19-ACCESS ROAD SECTIONS.DWG SEP 2015 RPR/ICE



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 ACCESS ROAD SECTIONS

REV NO	0	ISSUED FOR SOLICITATION
DATE	OCTOBER 2, 2015	
DESIGNED	P. EGGERS	
CHECKED	C. MASCHING	
DRAWN	C. MASCHING	
DESIGN APPROVAL	D. MILLER	
INDEPENDENT TECHNICAL REVIEW		

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-01-OUTLET WORKS GENERAL PLAN.DWG OCT 2015 KPRICE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

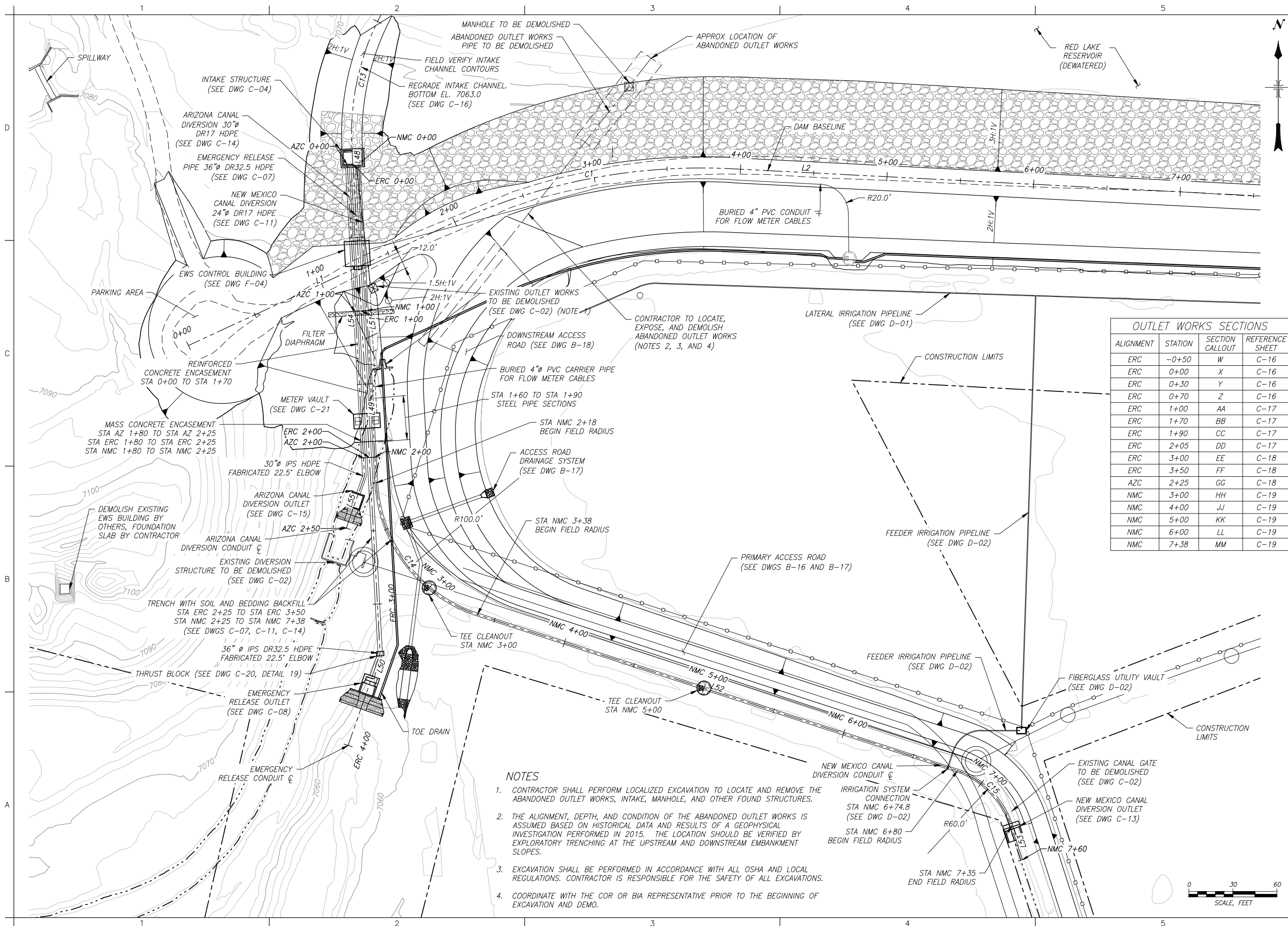
OUTLET WORKS
 GENERAL PLAN

REV NO 0
 OCTOBER 2, 2015
 ISSUED FOR SOLICITATION

K. PRICE
 DESIGNED
 K. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

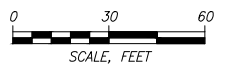
OUTLET WORKS
 GENERAL PLAN

Drawing C-01
 SHEET 36 OF 75

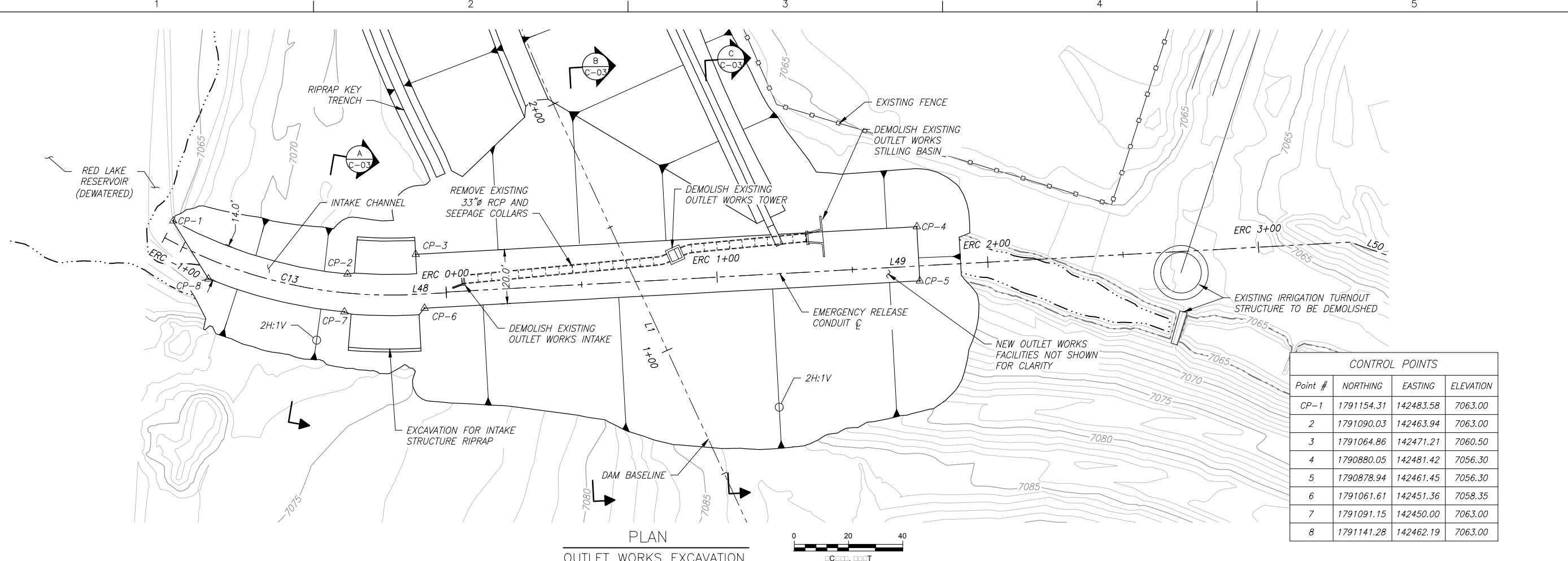


OUTLET WORKS SECTIONS			
ALIGNMENT	STATION	SECTION CALLOUT	REFERENCE SHEET
ERC	-0+50	W	C-16
ERC	0+00	X	C-16
ERC	0+30	Y	C-16
ERC	0+70	Z	C-16
ERC	1+00	AA	C-17
ERC	1+70	BB	C-17
ERC	1+90	CC	C-17
ERC	2+05	DD	C-17
ERC	3+00	EE	C-18
ERC	3+50	FF	C-18
AZC	2+25	GG	C-18
NMC	3+00	HH	C-19
NMC	4+00	JJ	C-19
NMC	5+00	KK	C-19
NMC	6+00	LL	C-19
NMC	7+38	MM	C-19

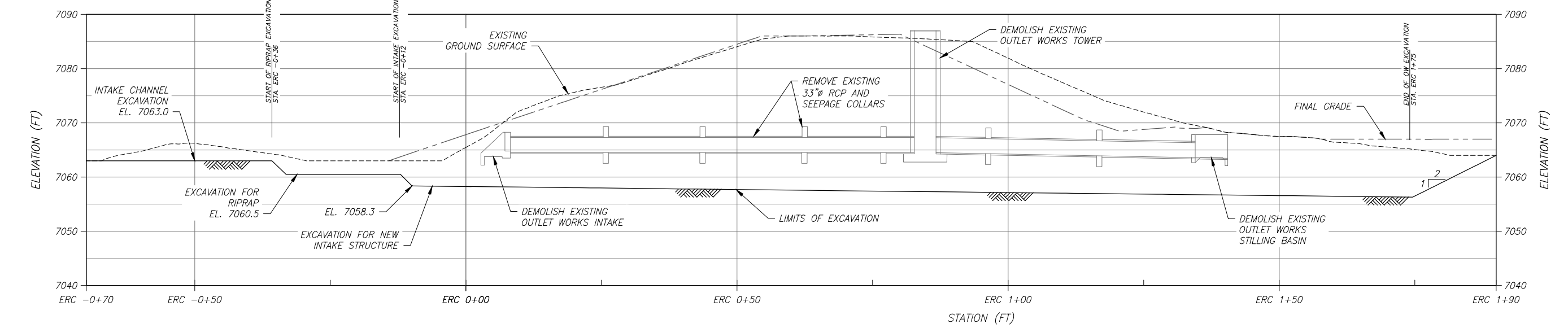
- NOTES**
- CONTRACTOR SHALL PERFORM LOCALIZED EXCAVATION TO LOCATE AND REMOVE THE ABANDONED OUTLET WORKS, INTAKE, MANHOLE, AND OTHER FOUND STRUCTURES.
 - THE ALIGNMENT, DEPTH, AND CONDITION OF THE ABANDONED OUTLET WORKS IS ASSUMED BASED ON HISTORICAL DATA AND RESULTS OF A GEOPHYSICAL INVESTIGATION PERFORMED IN 2015. THE LOCATION SHOULD BE VERIFIED BY EXPLORATORY TRENCHING AT THE UPSTREAM AND DOWNSTREAM EMBANKMENT SLOPES.
 - EXCAVATION SHALL BE PERFORMED IN ACCORDANCE WITH ALL OSHA AND LOCAL REGULATIONS. CONTRACTOR IS RESPONSIBLE FOR THE SAFETY OF ALL EXCAVATIONS.
 - COORDINATE WITH THE COR OR BIA REPRESENTATIVE PRIOR TO THE BEGINNING OF EXCAVATION AND DEMO.



P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-02-OUTLET WORKS EXCAVATION AND DEMOLITION PLAN AND PROFILE.DWG SEP 2015 RPRICE



CONTROL POINTS			
Point #	NORTHING	EASTING	ELEVATION
CP-1	1791154.31	142483.58	7063.00
2	1791090.03	142463.94	7063.00
3	1791064.86	142471.21	7060.50
4	1790880.05	142481.42	7056.30
5	1790878.94	142461.45	7056.30
6	1791061.61	142451.36	7058.35
7	1791091.15	142450.00	7063.00
8	1791141.28	142462.19	7063.00



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 OUTLET WORKS
 EXCAVATION AND DEMOLITION
 PLAN AND PROFILE

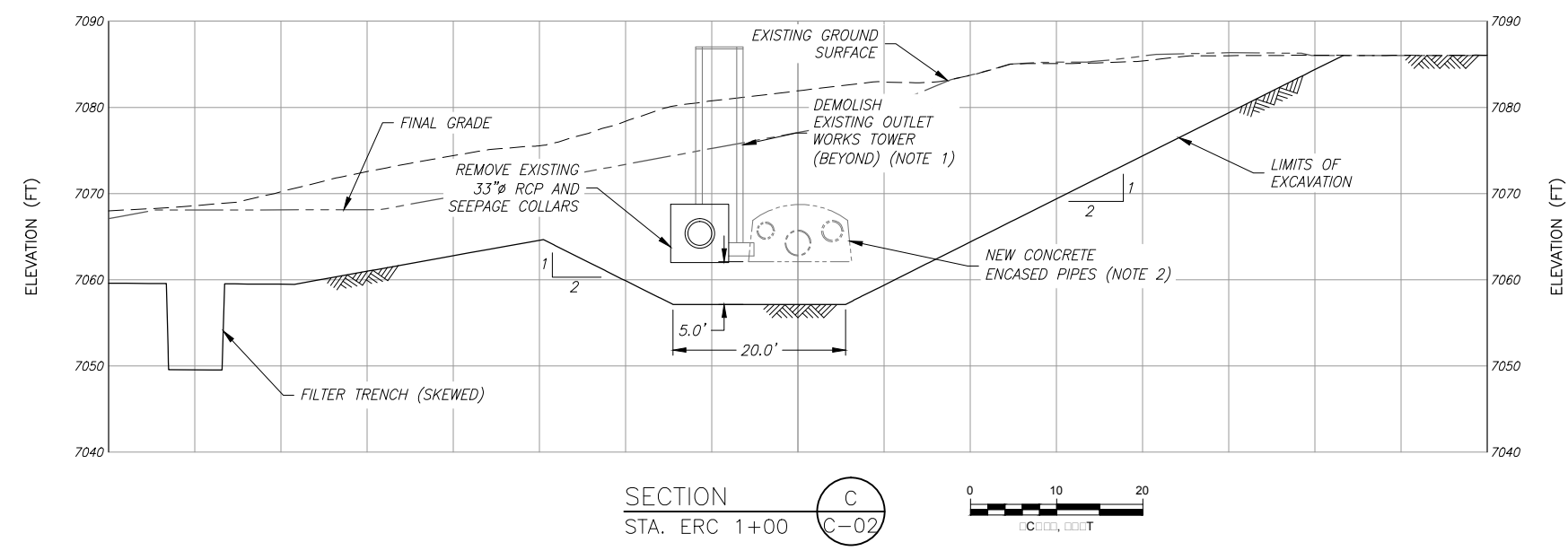
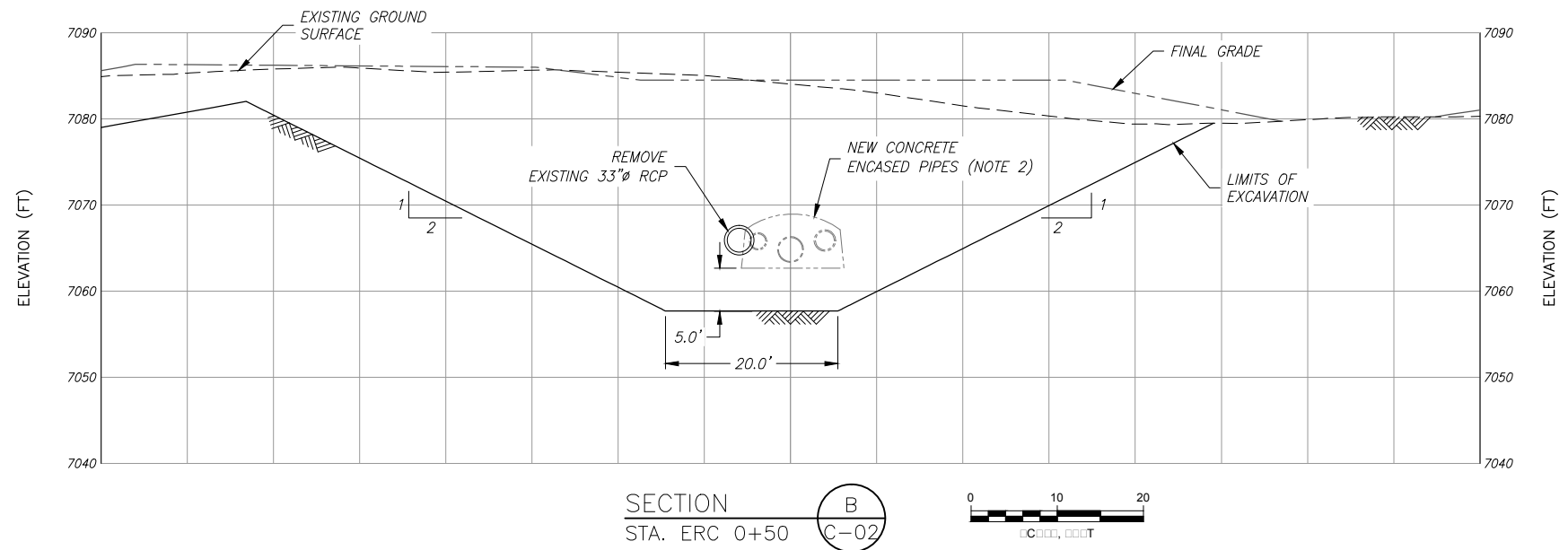
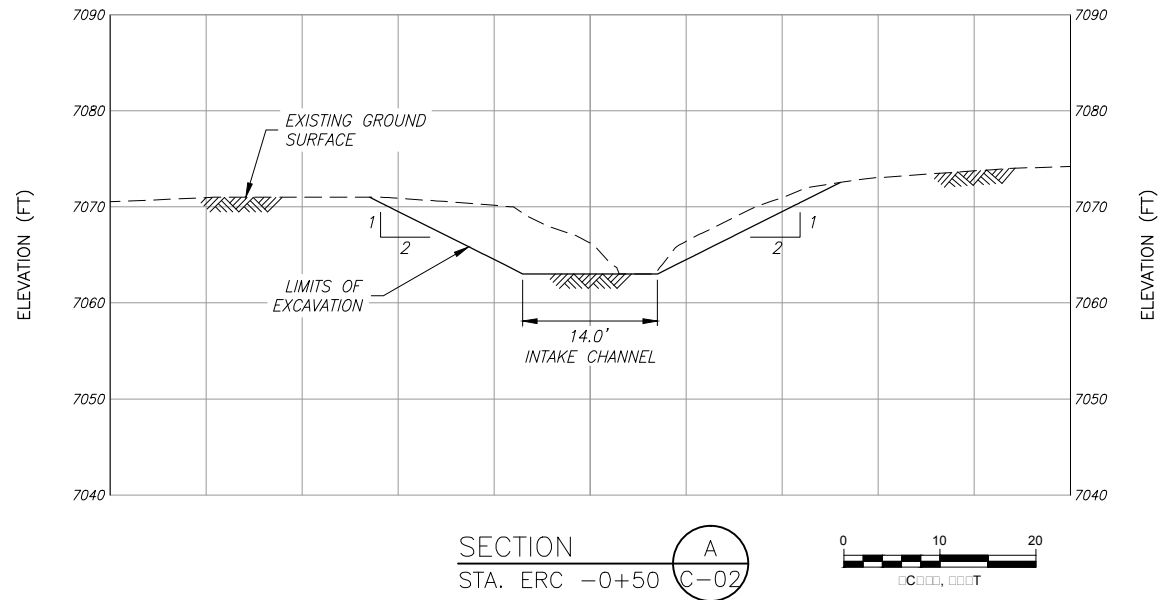
P. EGGERS
 DESIGNED
 S. MICKELL
 DRAWN
 K. PRICE
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

OUTLET WORKS
 EXCAVATION
 AND DEMOLITION
 PLAN AND PROFILE

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-03-OUTLET WORKS EXCAVATION AND DEMOLITION SECTIONS.DWG SEP 2015 RPRICE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 OUTLET WORKS
 EXCAVATION AND DEMOLITION
 SECTIONS

REV NO 0
 DATE OCTOBER 2, 2015
 ISSUED FOR SOLICITATION



- NOTES**
- PRESERVE DEMOLISHED OUTLET CONDUIT AND CONCRETE FOR FISH HABITAT STRUCTURE.
 - PLACE COMPACTED ZONE 1 FILL BENEATH CONCRETE ENCASEMENT.

DESIGNED	P. EGGERS
DRAWN	K. PRICE
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-05-INTAKE STRUCTURE STRUCTURAL DETAILS -1 UPDATED.DWG SEP 2015 JHETLAND

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

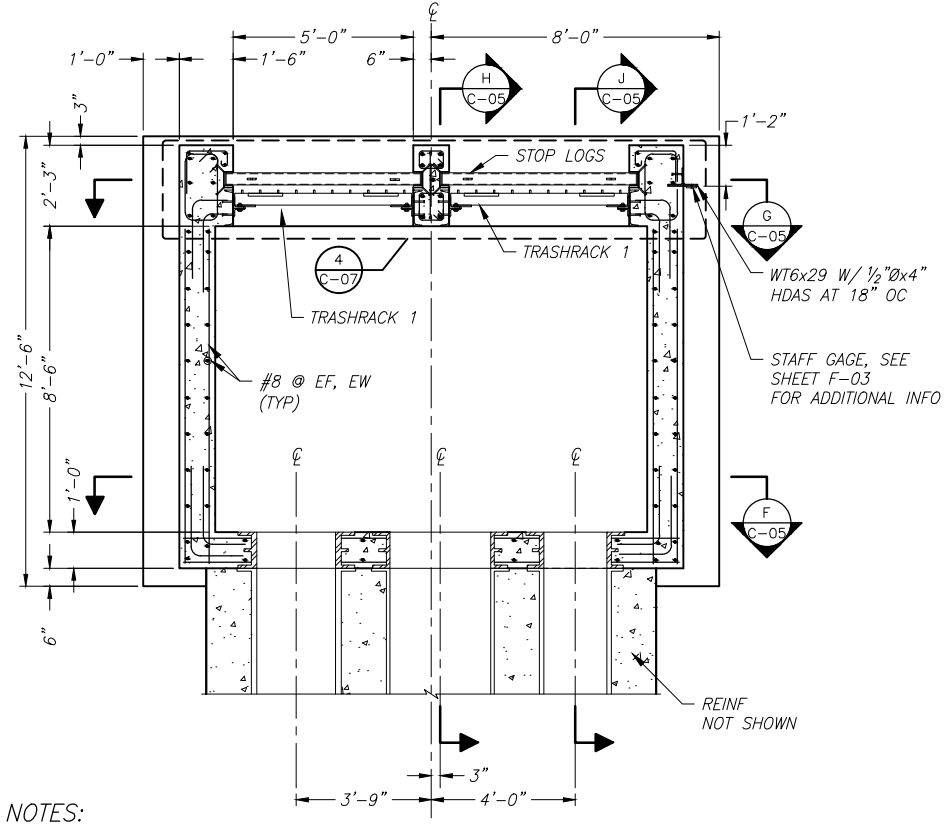
INTAKE STRUCTURE
STRUCTURAL DETAILS (1 OF 3)

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

M. KIMBLE / R. PRICE
DESIGNED
R. PRICE / M. KIMBLE
DRAWN
B. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW

INTAKE STRUCTURE
STRUCTURAL DETAILS
(1 OF 3)

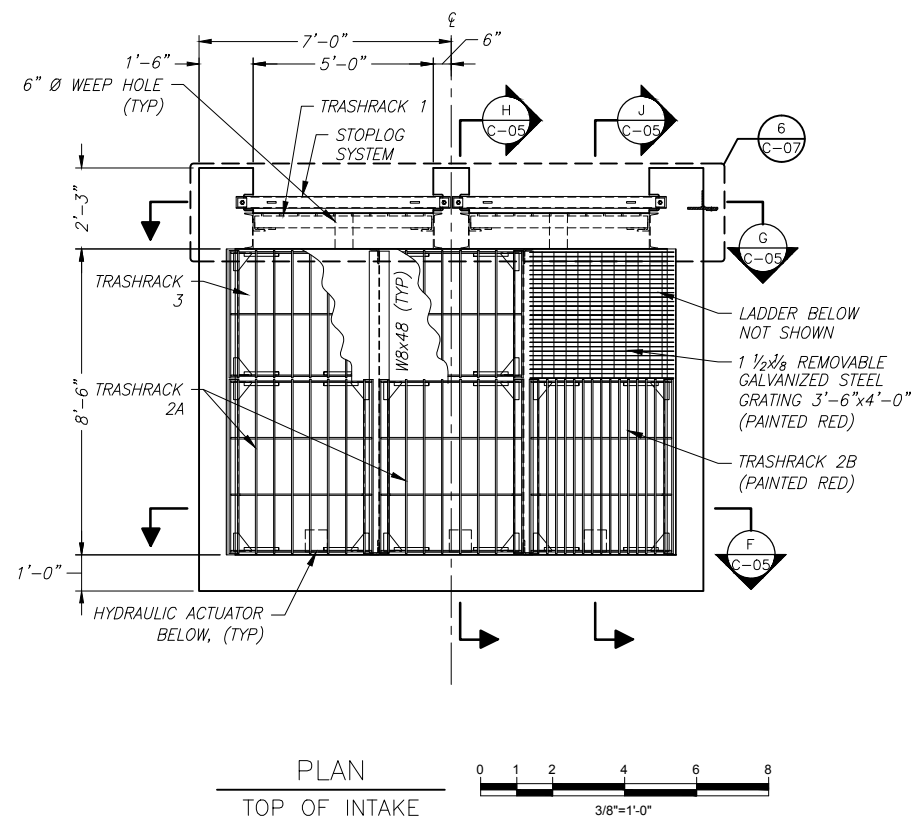
Drawing C-05
SHEET 40 OF 75



NOTES:
1. GATES NOT SHOWN FOR CLARITY

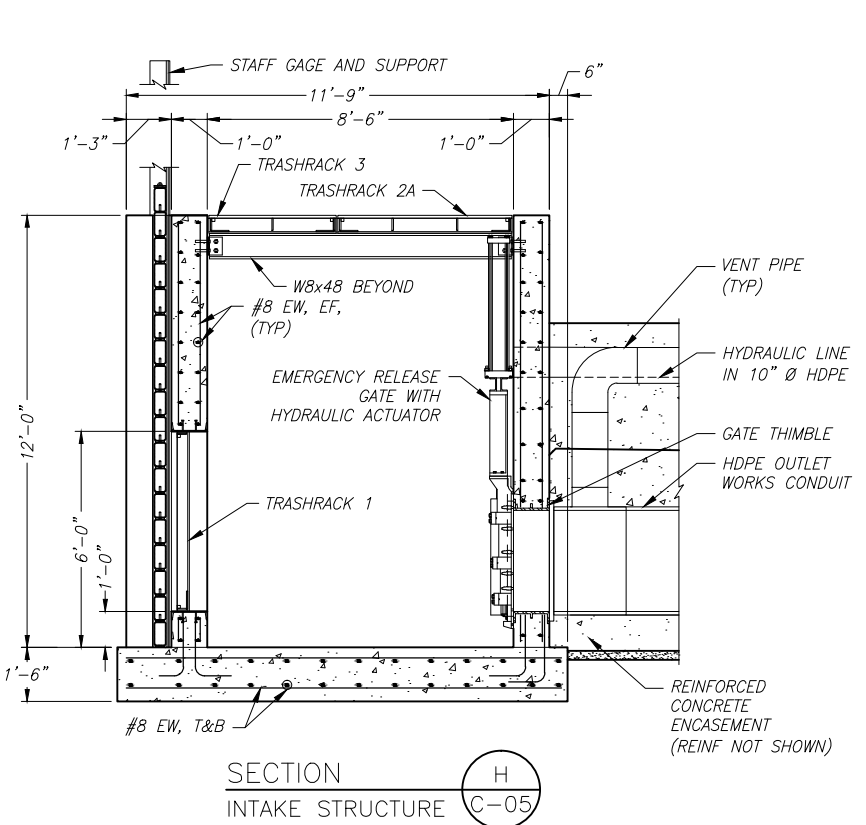
PLAN
BOTTOM OF INTAKE

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



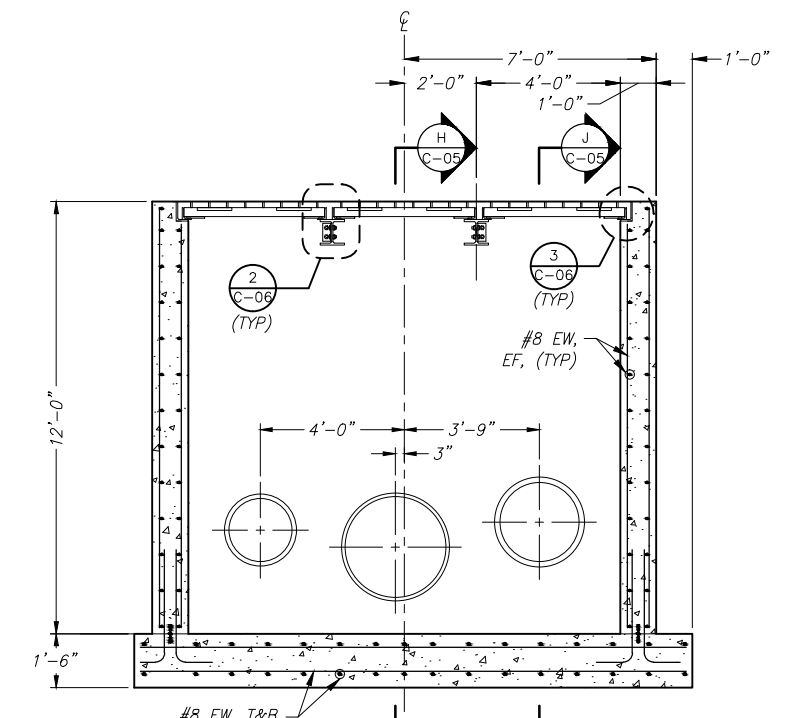
PLAN
TOP OF INTAKE

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



SECTION
INTAKE STRUCTURE (H)
C-05

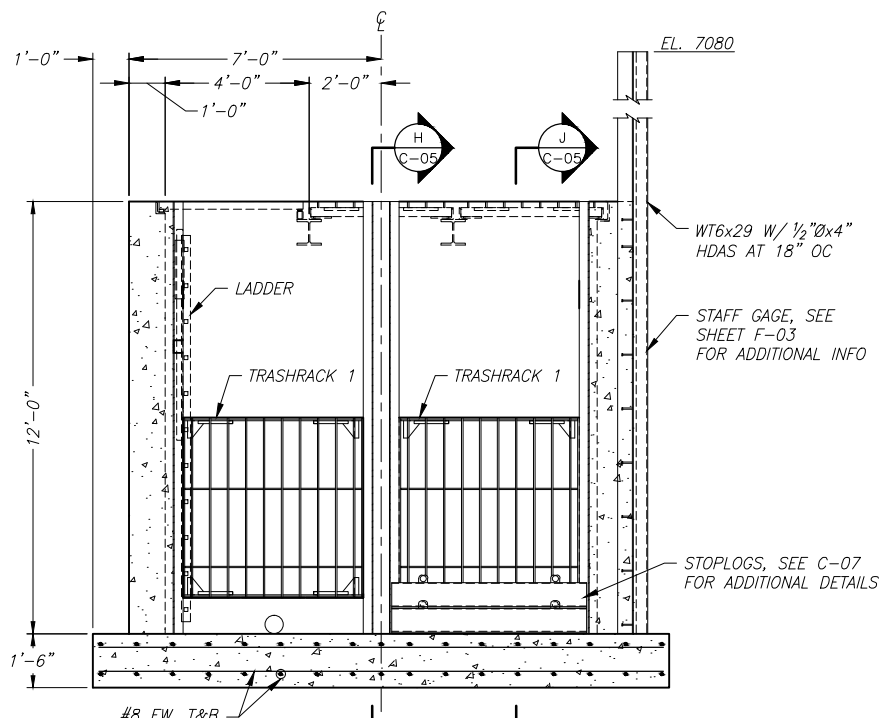
Scale: 3/8"=1'-0"



NOTES:
1. GATES NOT SHOWN FOR CLARITY

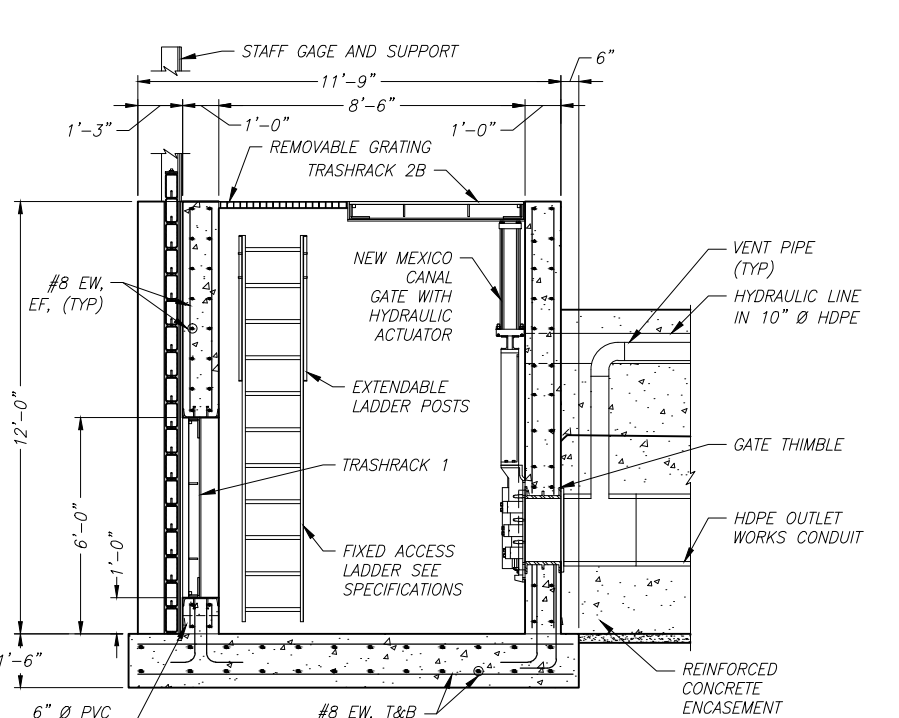
SECTION
INTAKE STRUCTURE (F)
C-05

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



SECTION
INTAKE STRUCTURE (G)
C-05

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

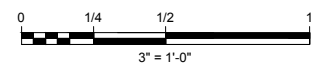
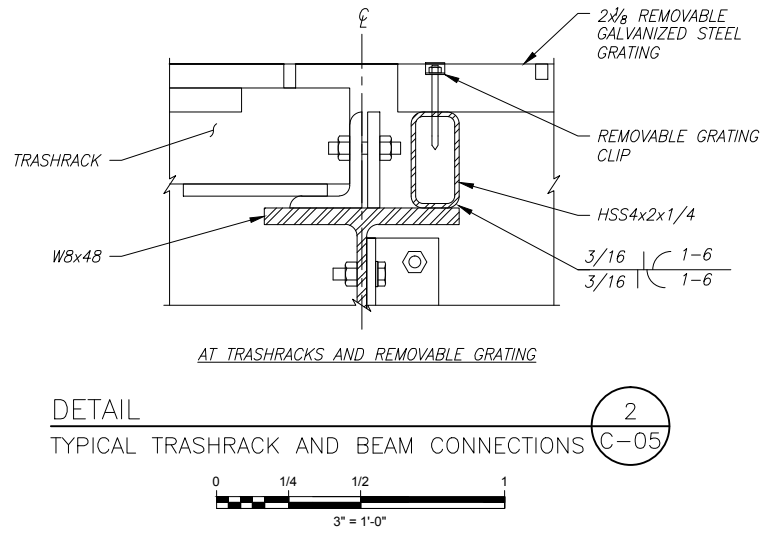
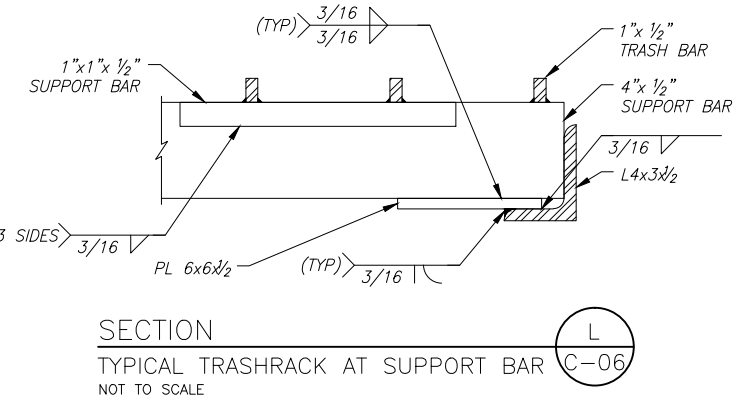
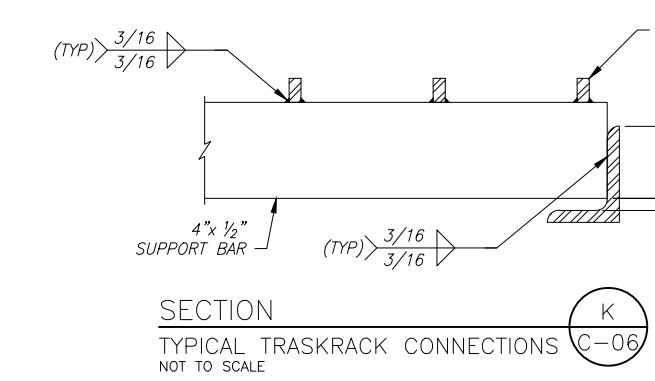
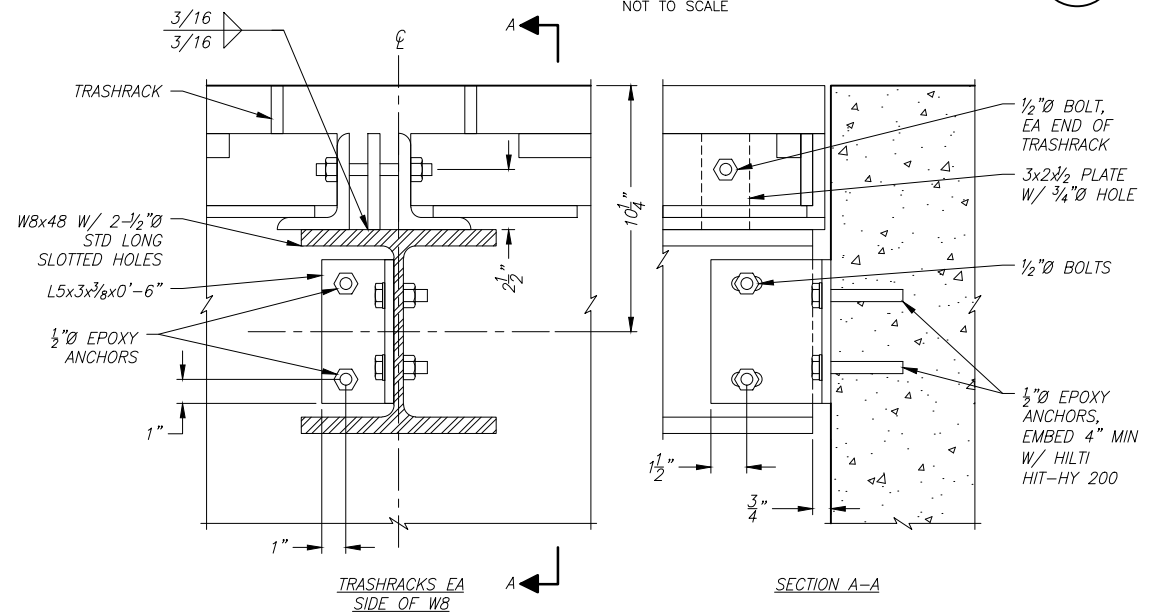
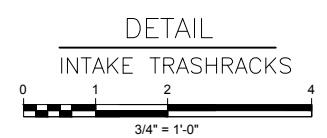
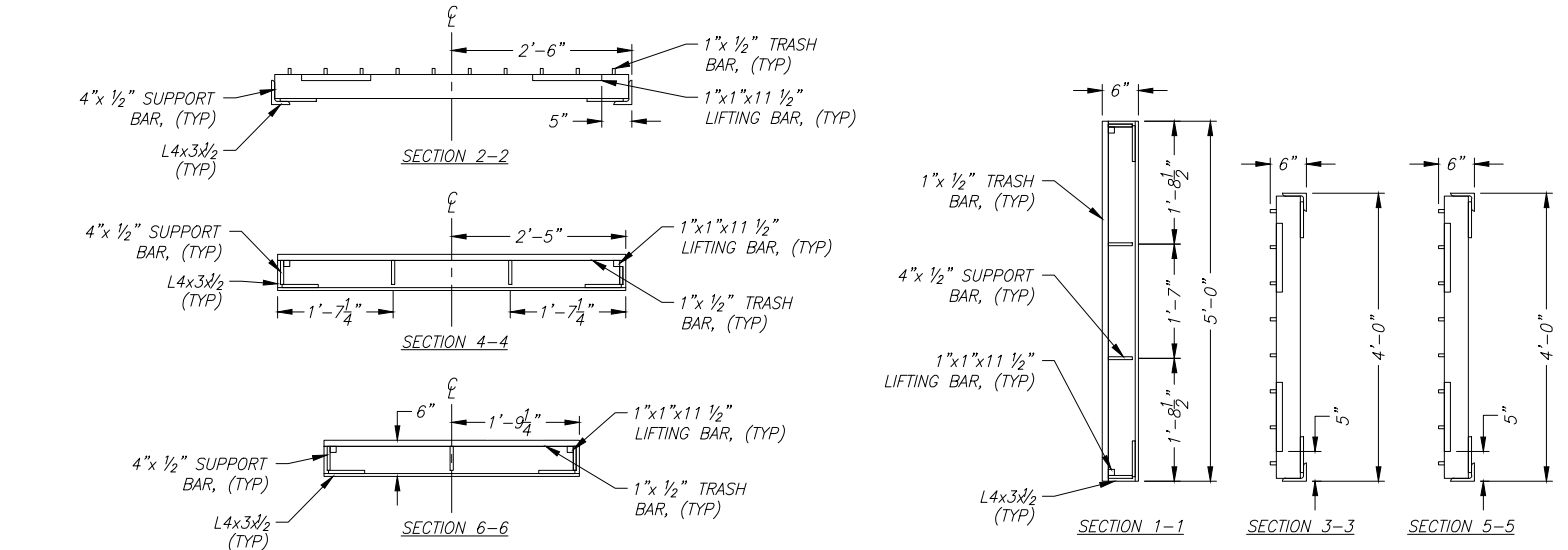
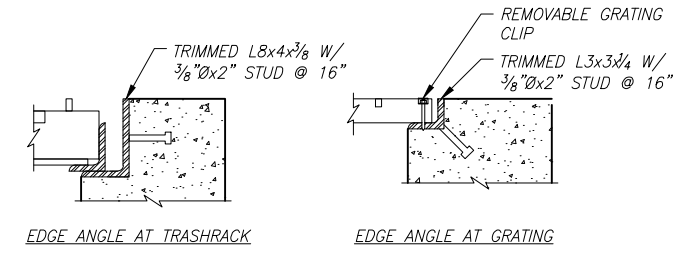
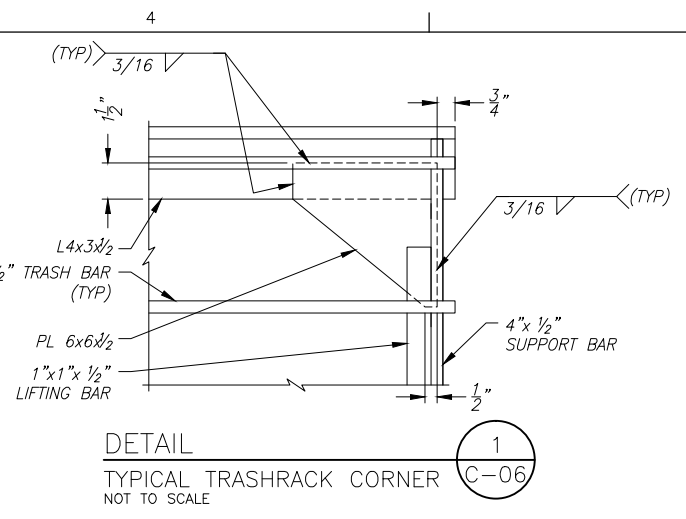
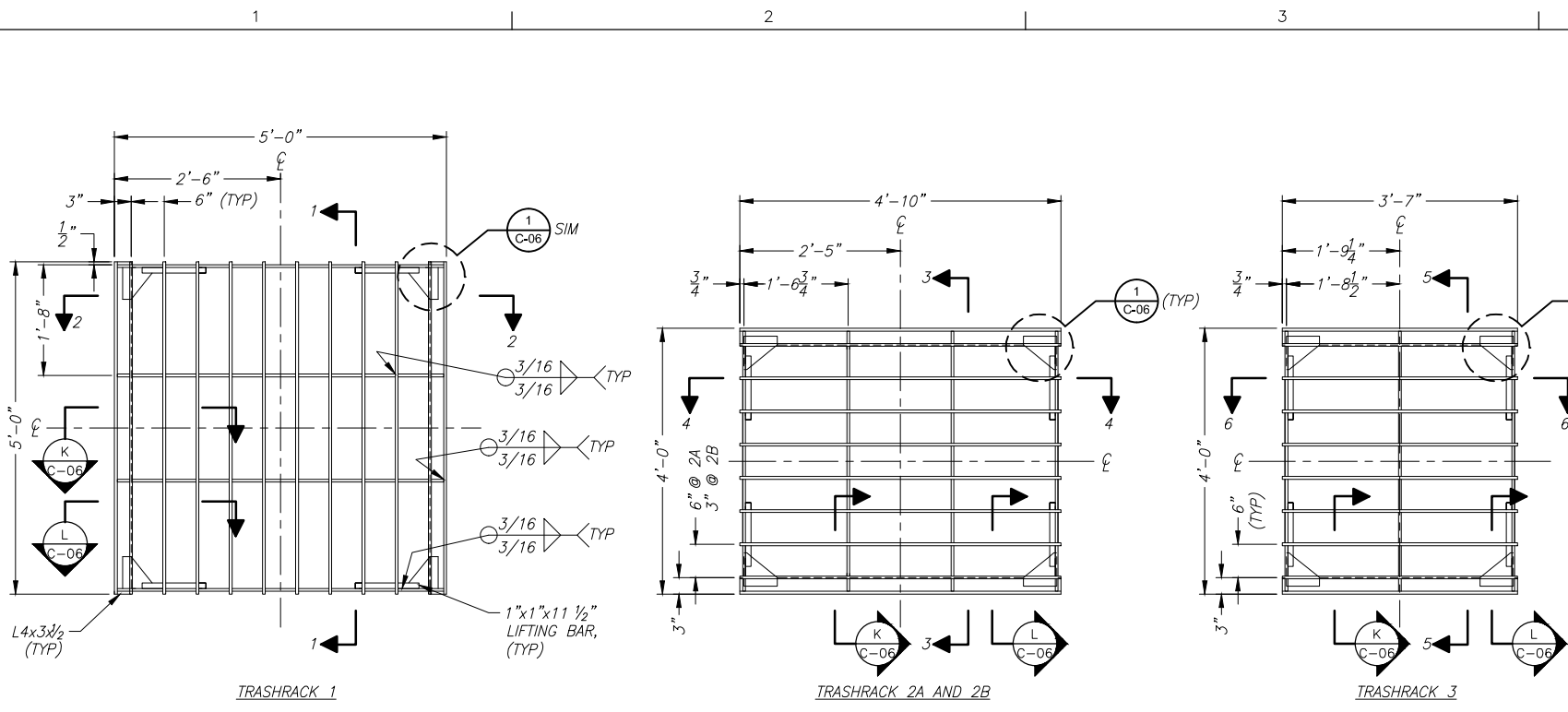


SECTION
INTAKE STRUCTURE (J)
C-05

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

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-06-OUTLET WORKS - INTAKE STRUCTURE - STRUCTURAL DETAILS - 2.DWG SEP 2015 JHETLAND

M. KIMBLE / R. PRICE
DESIGNED
R. PRICE
DRAWN
P. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW



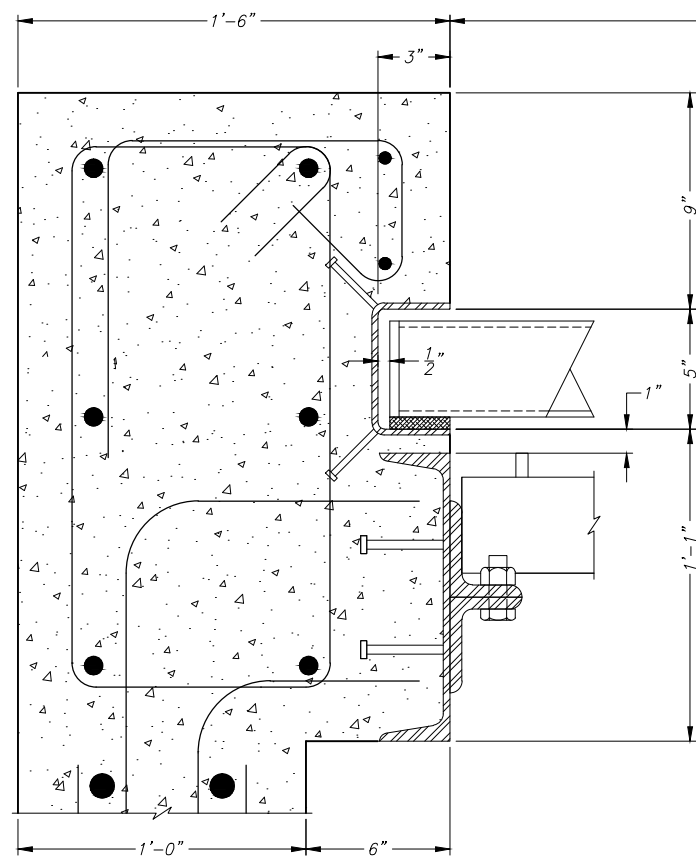
P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-07-OUTLET WORKS - INTAKE STRUCTURE - STRUCTURAL DETAILS - 3.DWG SEP 2015 JHETLAND

M. KIMBLE
 DESIGNED
 M. KIMBLE / R. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

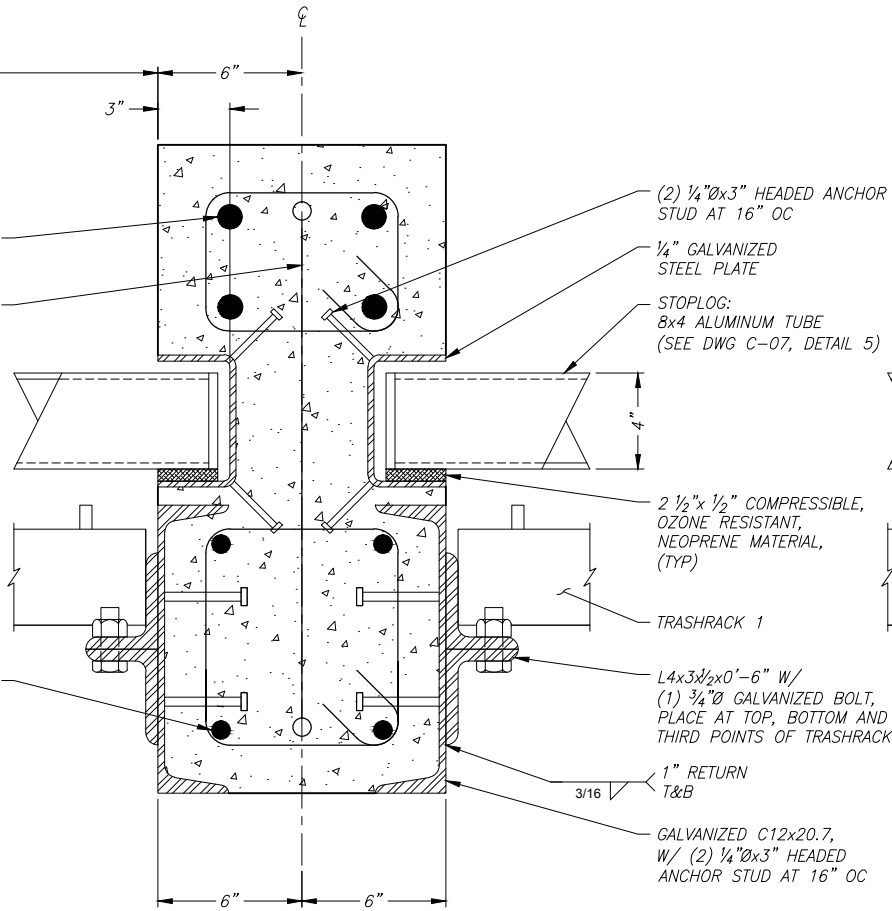
INTAKE STRUCTURE
 STRUCTURAL DETAILS
 (3 OF 3)

Drawing C-07

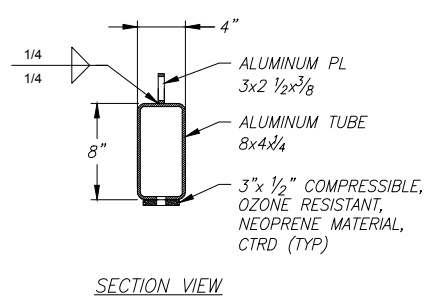
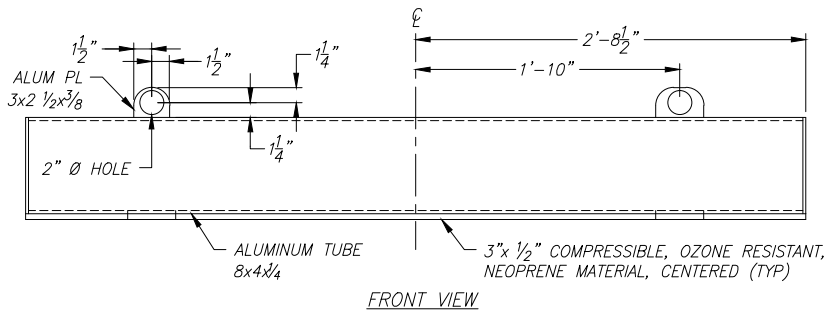
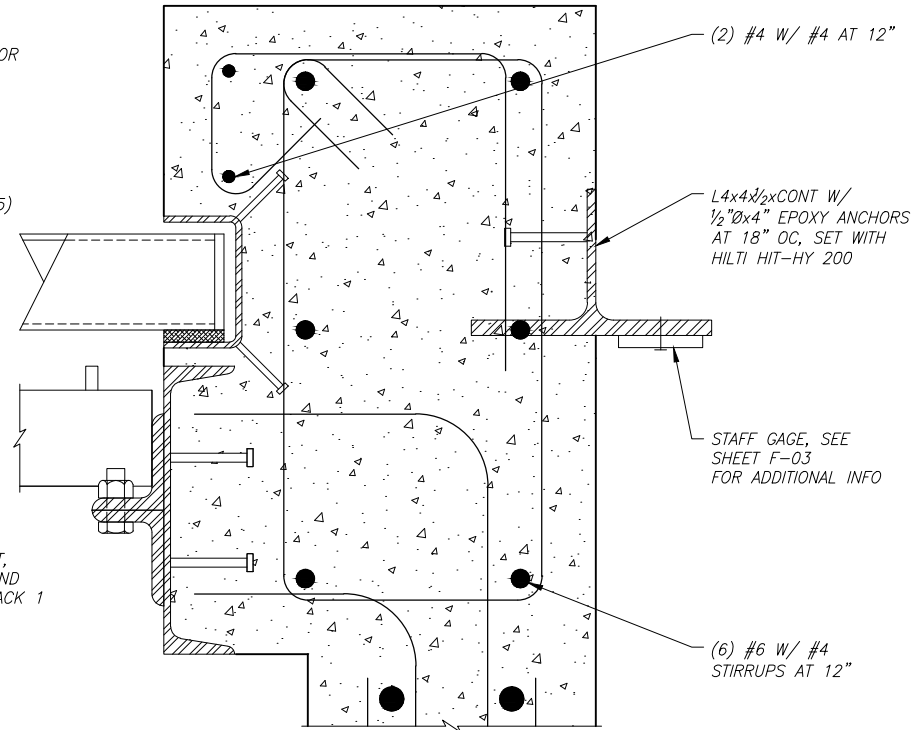
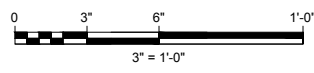
SHEET 42 OF 75



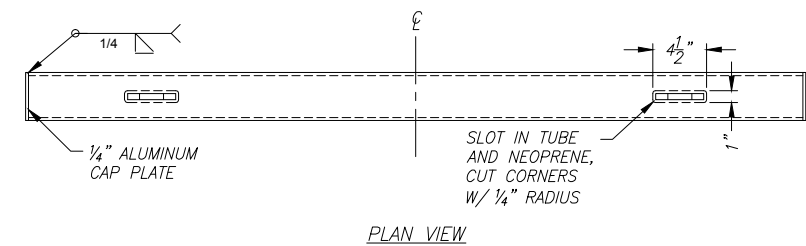
(4) #8 W/#4
 STIRRUPS AT 12"
 #6 W/HOOKS
 EA END AT 12"
 (4) #6 W/#4
 STIRRUPS AT 12"



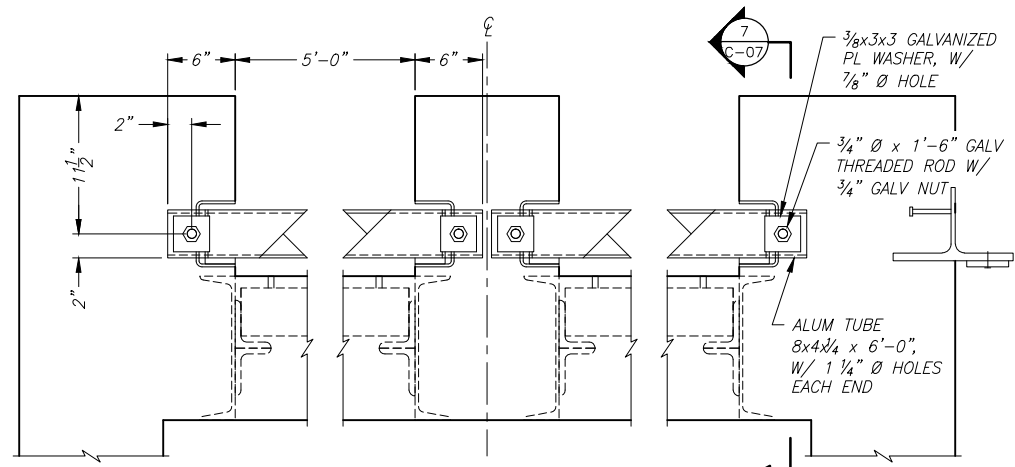
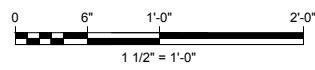
DETAIL 4
 STOPLOG SEATING C-05



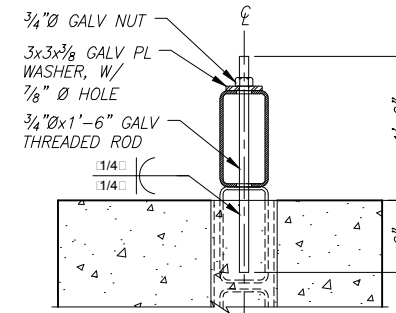
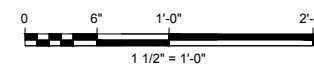
SECTION VIEW



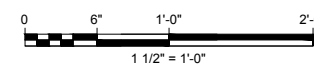
DETAIL 5
 STOPLOG AND LUGS C-07
 QUANTITY = 34 TOTAL



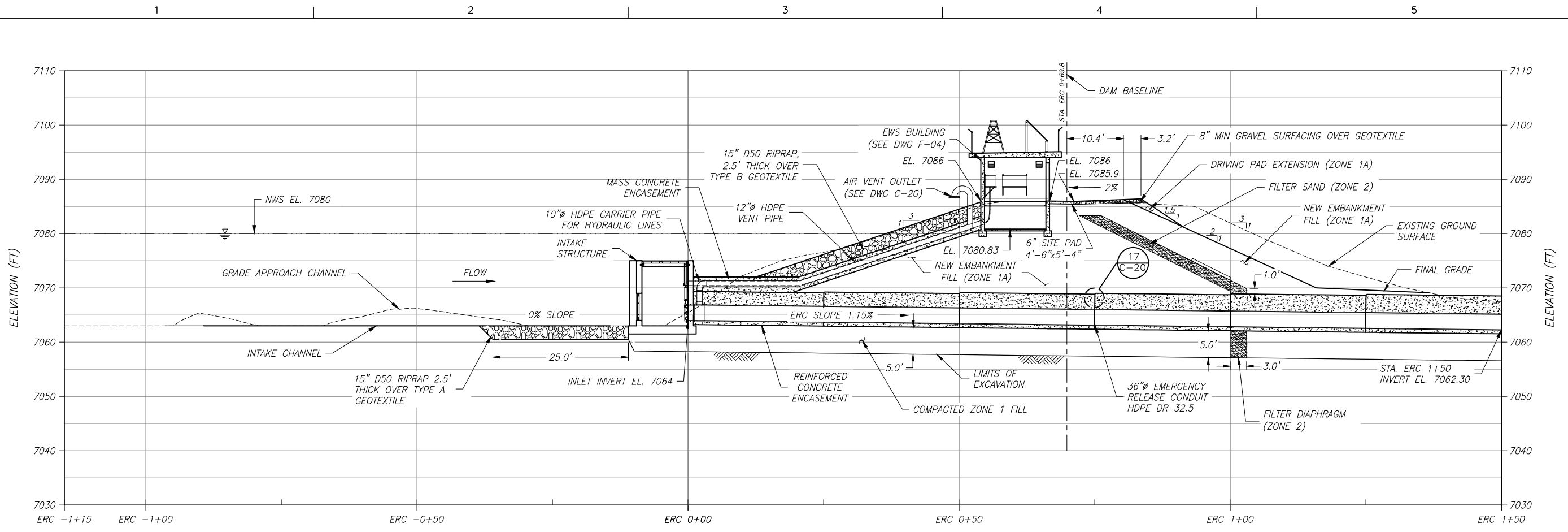
DETAIL 6
 STOPLOG ANCHORAGE C-07



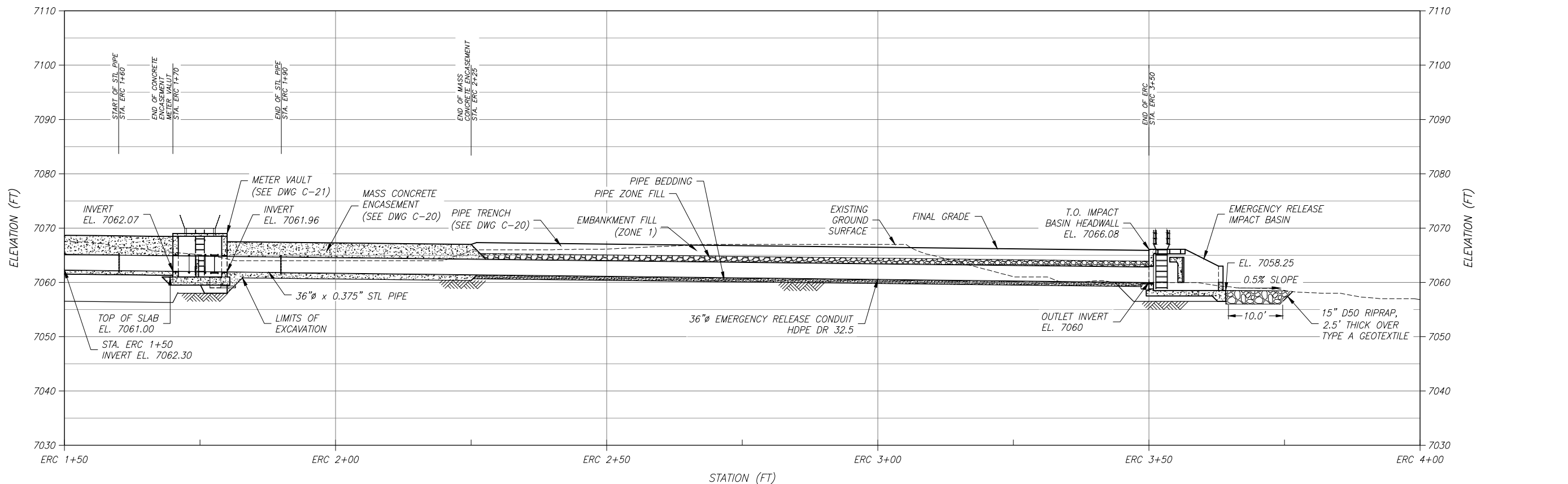
DETAIL 7
 STOPLOG ANCHORAGE C-07



DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

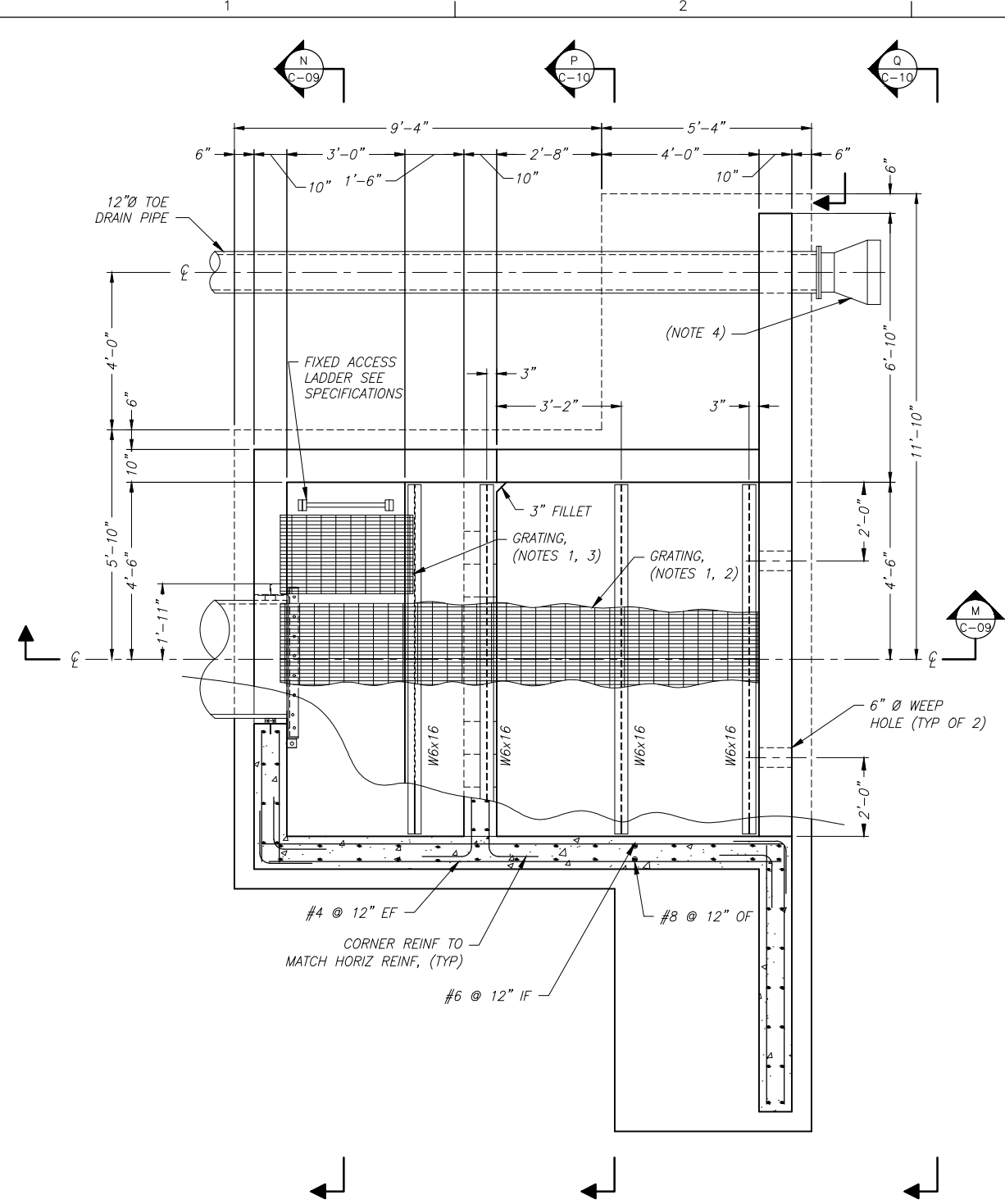


PROFILE
 INTAKE CHANNEL AND EMERGENCY RELEASE
 STA ERC -1+15 TO ERC 1+50



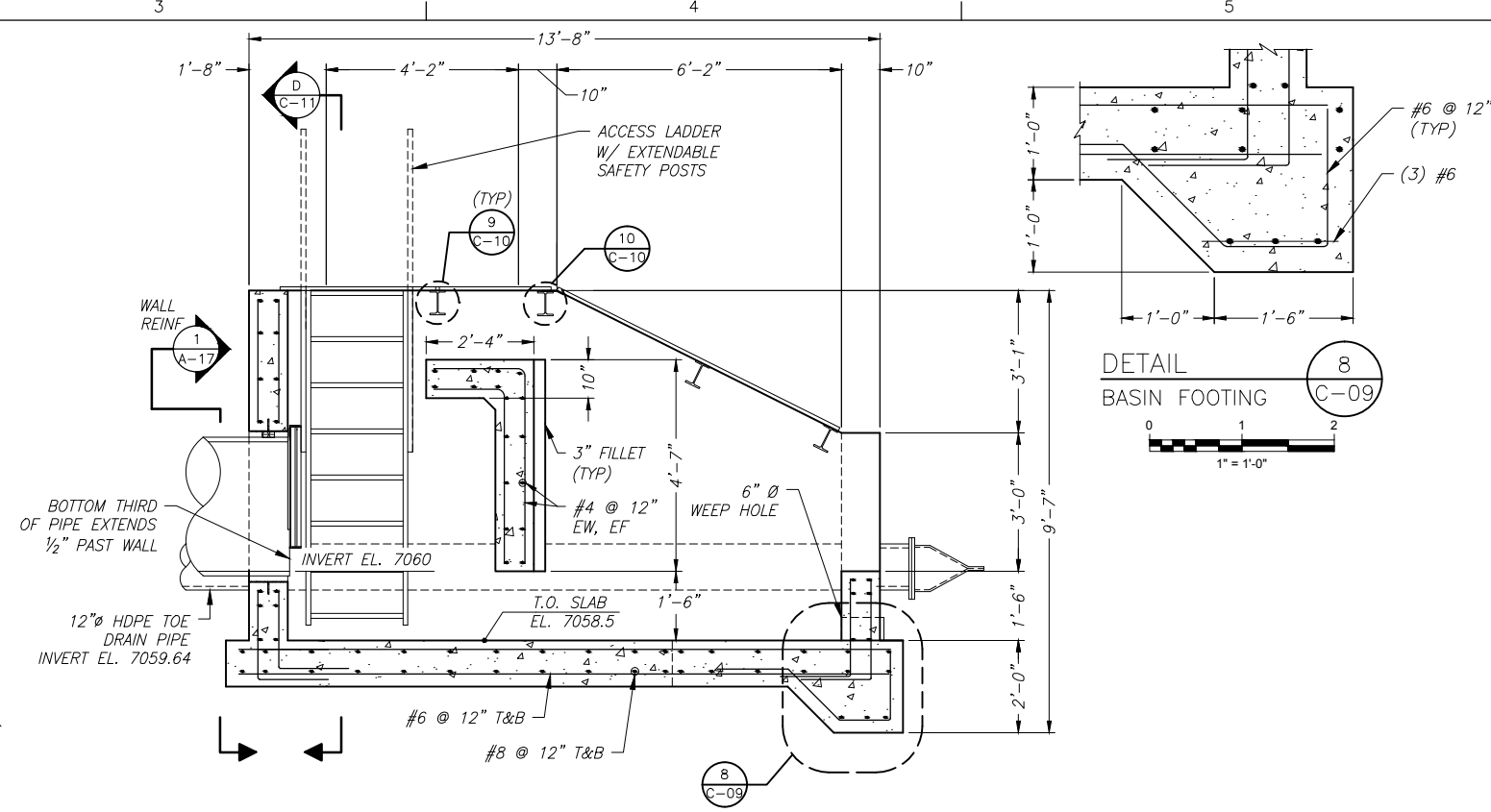
PROFILE
 INTAKE CHANNEL AND EMERGENCY RELEASE
 STA ERC 1+50 TO ERC 4+00

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-08-EMERGENCY RELEASE CONDUIT PROFILE.DWG OCT 2015 KPRICE

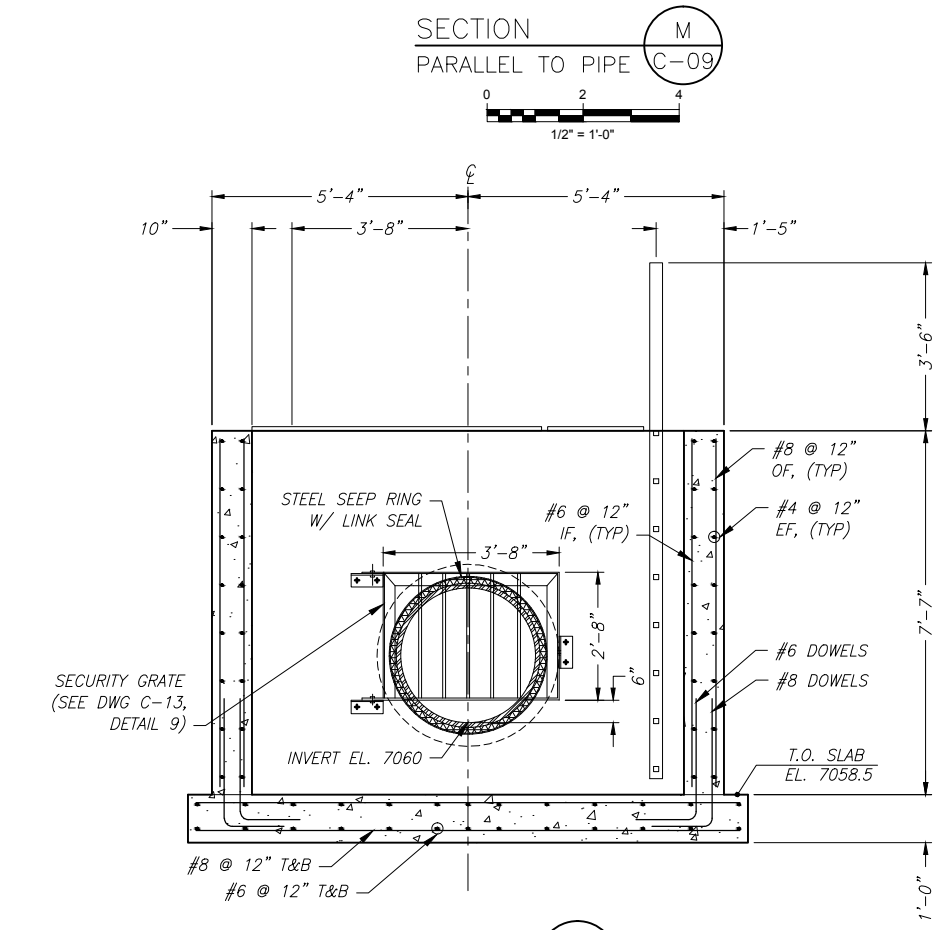


PLAN
 EMERGENCY RELEASE IMPACT BASIN
 0 2 4
 1/2" = 1'-0"

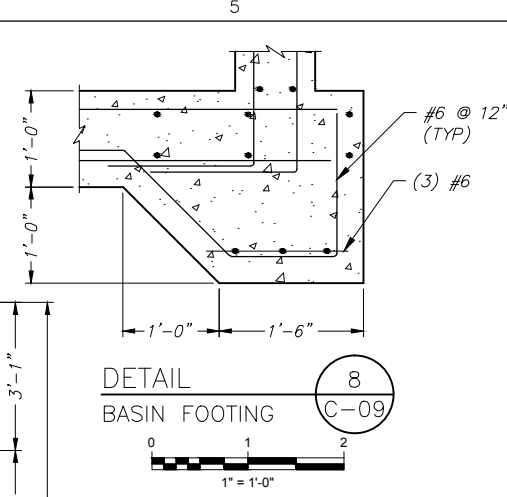
- NOTES**
1. GRATING SHALL BE McNICHOL'S HOT DIPPED GALVANIZED, 1x3/8 GW, SPACING 19-W-4, GRATING OR EQUAL.
 2. GRATING SHALL BE PERMANENTLY ATTACHED PER MFG RECOMMENDATIONS.
 3. GRATING SHALL BE REMOVABLE FOR LADDER ACCESS.
 4. CLA-VAL SERIES DBF DUCKBILL FLANGED STYLE CHECK VALVE: TYPE 12"-DBF-N.



SECTION
 PARALLEL TO PIPE
 M C-09
 0 2 4
 1/2" = 1'-0"

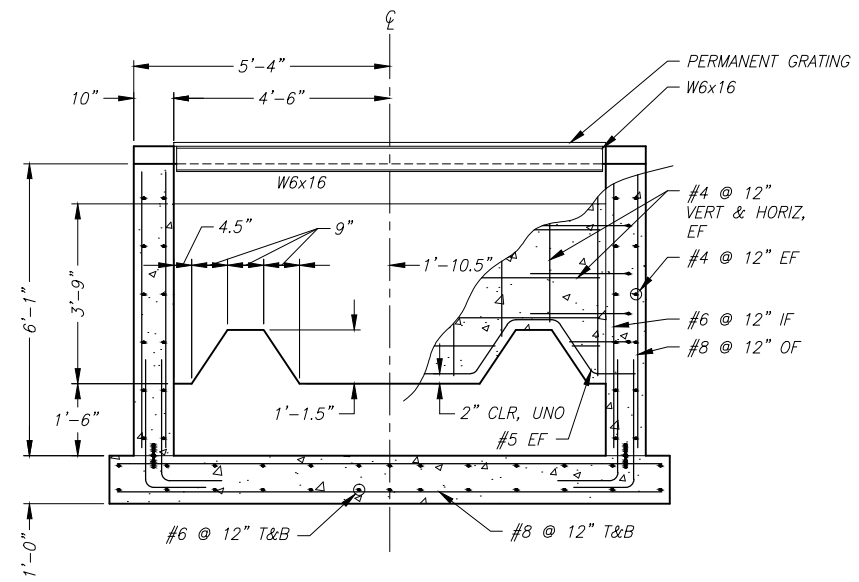


SECTION
 NORMAL TO PIPE
 N C-09
 0 2 4
 1/2" = 1'-0"

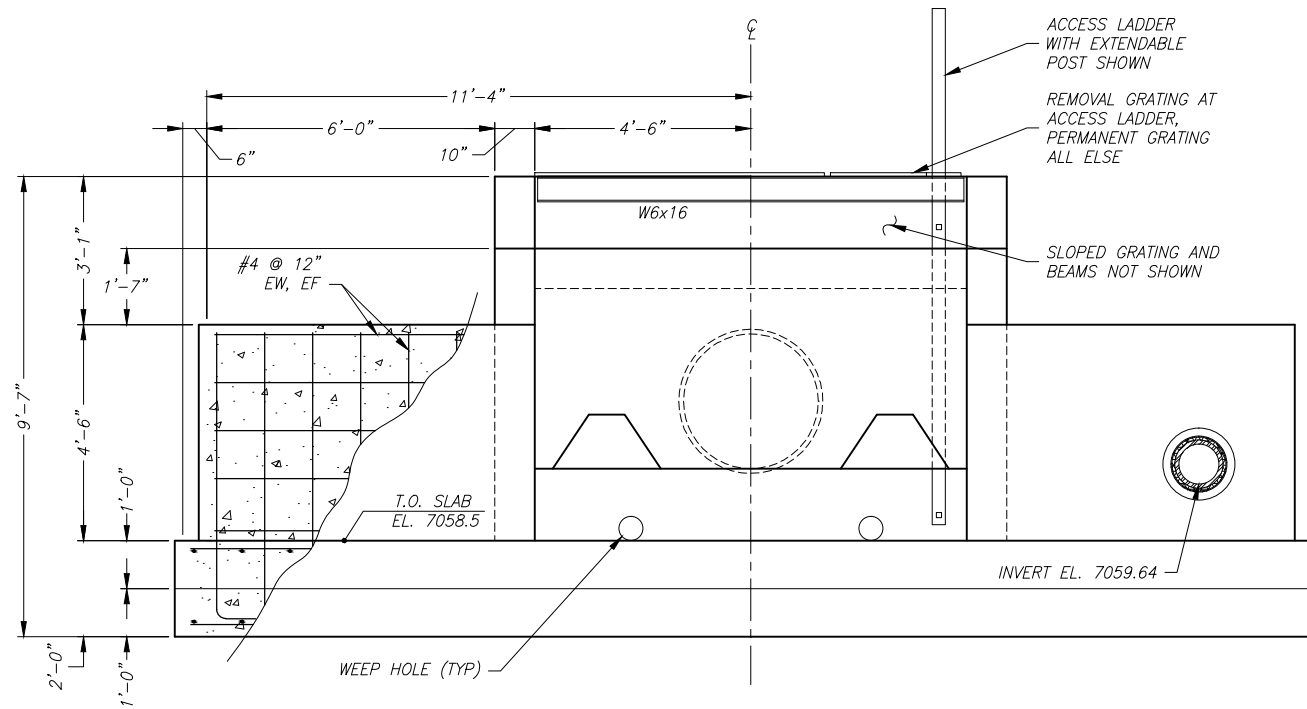
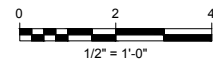


DETAIL
 BASIN FOOTING
 8 C-09
 0 1 2
 1" = 1'-0"

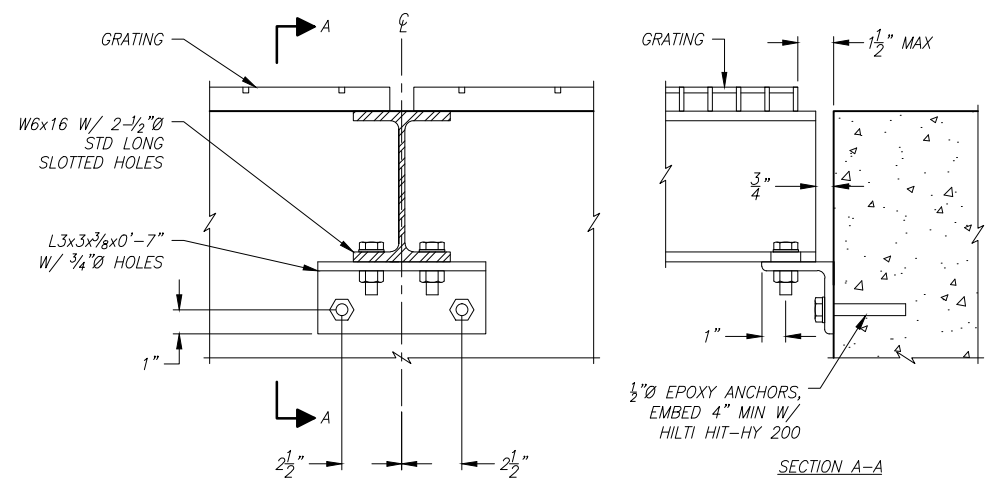
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-10-EMERGENCY RELEASE OUTLET STRUCTURAL DETAILS - 2.DWG SEP 2015 RPRICE



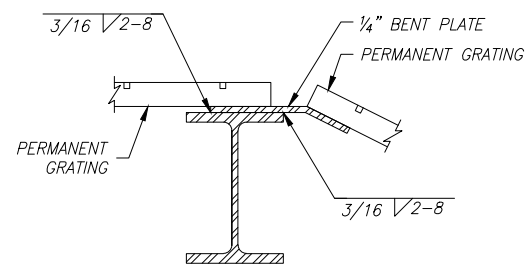
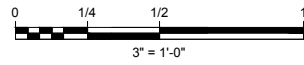
SECTION P
NORMAL TO PIPE C-09



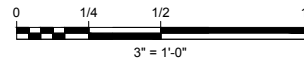
SECTION Q
NORMAL TO PIPE C-09



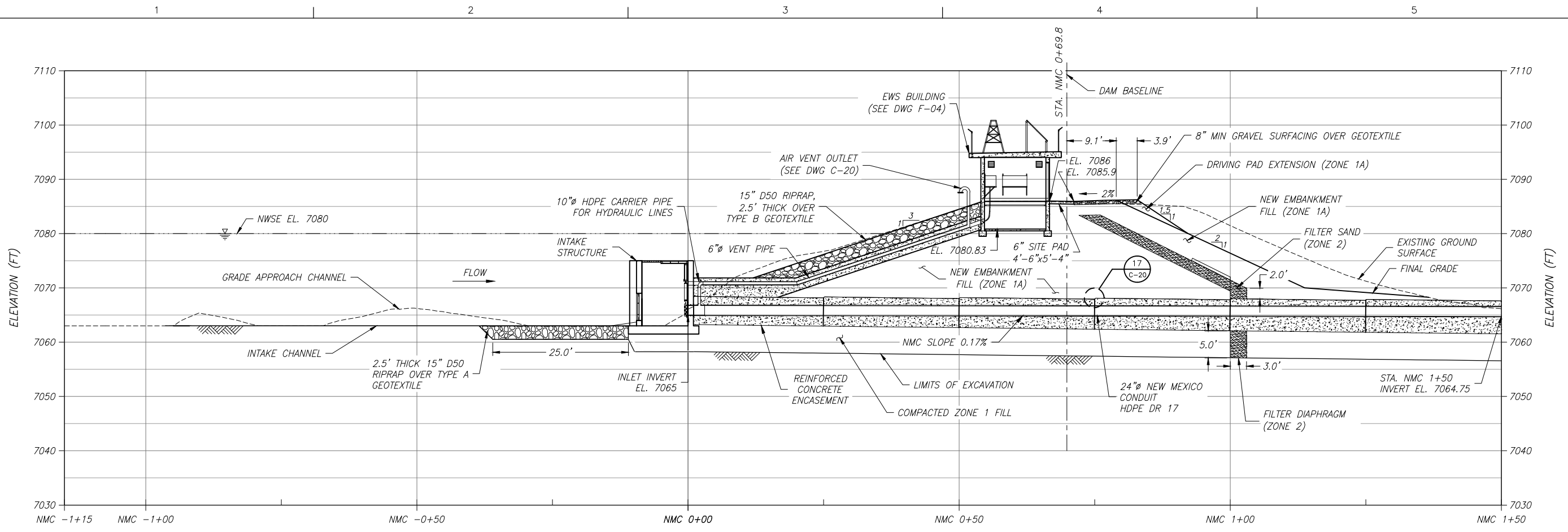
DETAIL 9
TYPICAL DRAIN C-09



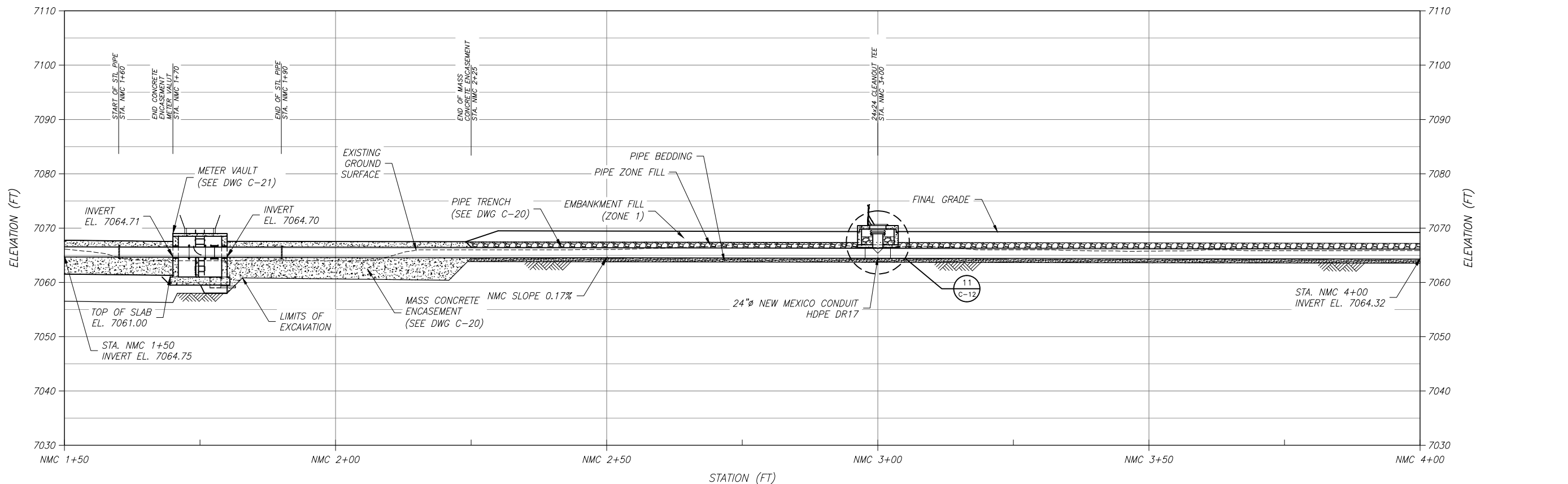
DETAIL 10
TYPICAL DRAIN C-09



DESIGNED	M. KIMBLE/R. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	



PROFILE
 INTAKE CHANNEL AND NEW MEXICO CANAL
 STA NMC -1+15 TO NMC 1+50



PROFILE
 INTAKE CHANNEL AND NEW MEXICO CANAL
 STA NMC 1+50 TO NMC 4+00

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 NEW MEXICO CANAL CONDUIT PROFILE
 (1 OF 2)

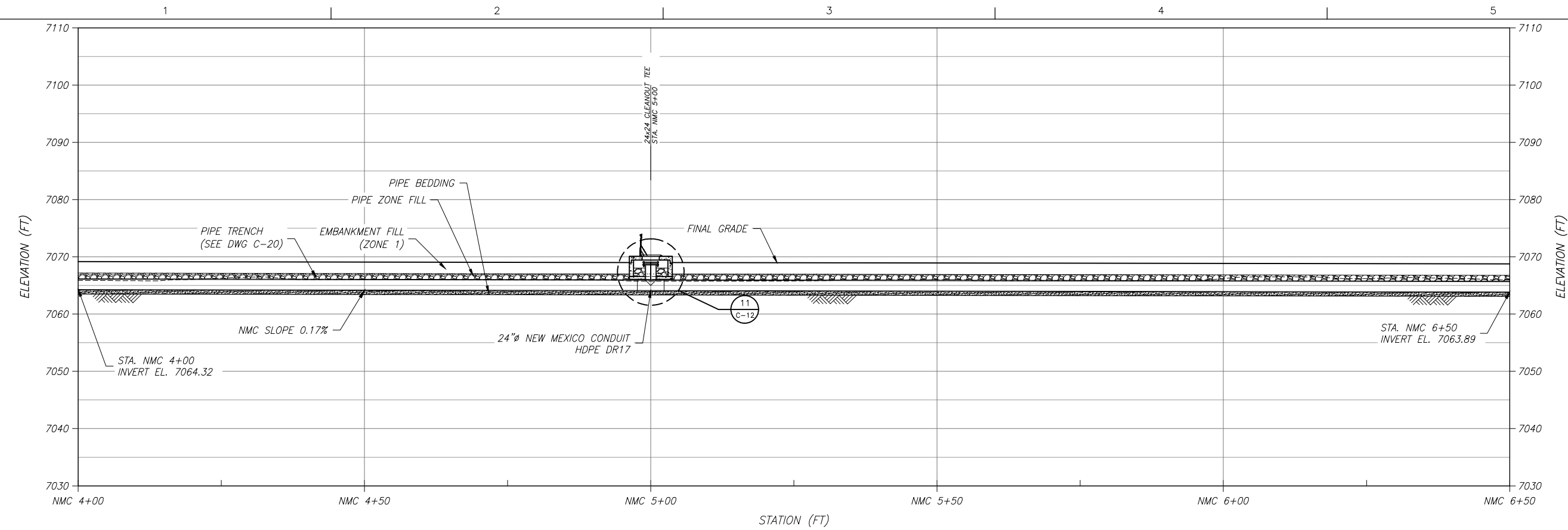
ISSUED FOR SOLICITATION
 OCTOBER 2, 2015

DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

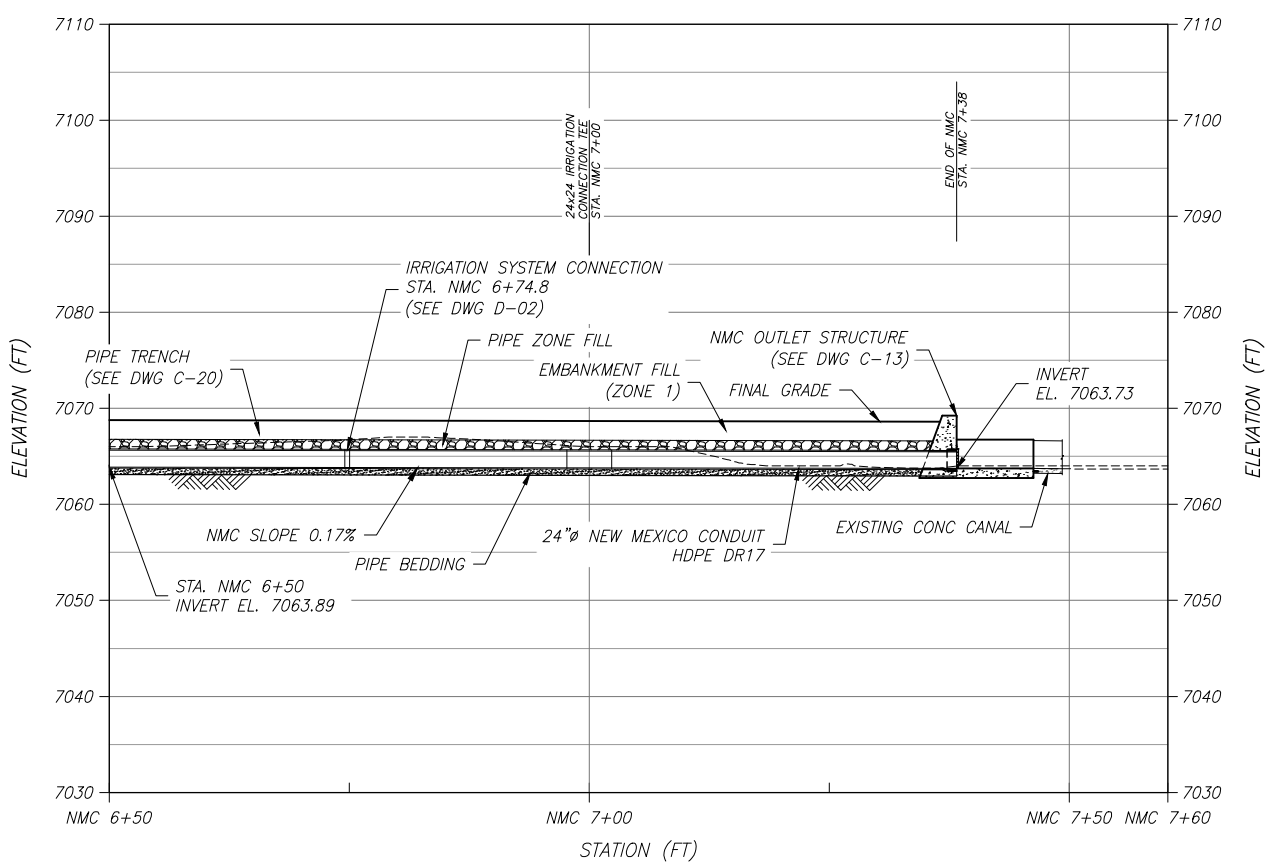
NEW MEXICO CANAL
 CONDUIT PROFILE
 (1 OF 2)

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-11 AND C-12 - NEW MEXICO CANAL CONDUIT PROFILES.DWG OCT 2015 KPRICE

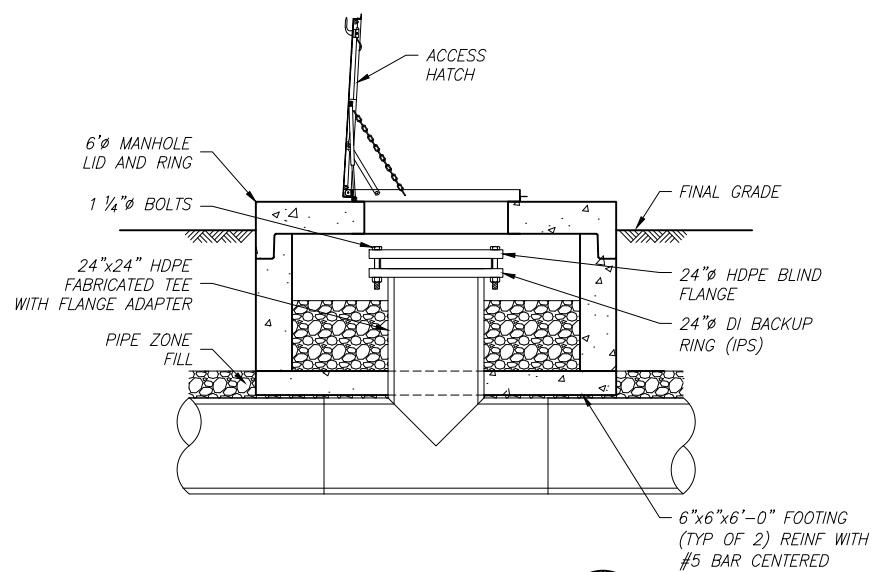
DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	



PROFILE
 INTAKE CHANNEL AND NEW MEXICO CANAL
 STA NMC 4+00 TO NMC 6+50



PROFILE
 INTAKE CHANNEL AND NEW MEXICO CANAL
 STA NMC 6+50 TO NMC 7+60



DETAIL
 CLEANOUT TEE

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-11 AND C-12- NEW MEXICO CANAL CONDUIT PROFILES.DWG OCT 2015 KPRICE

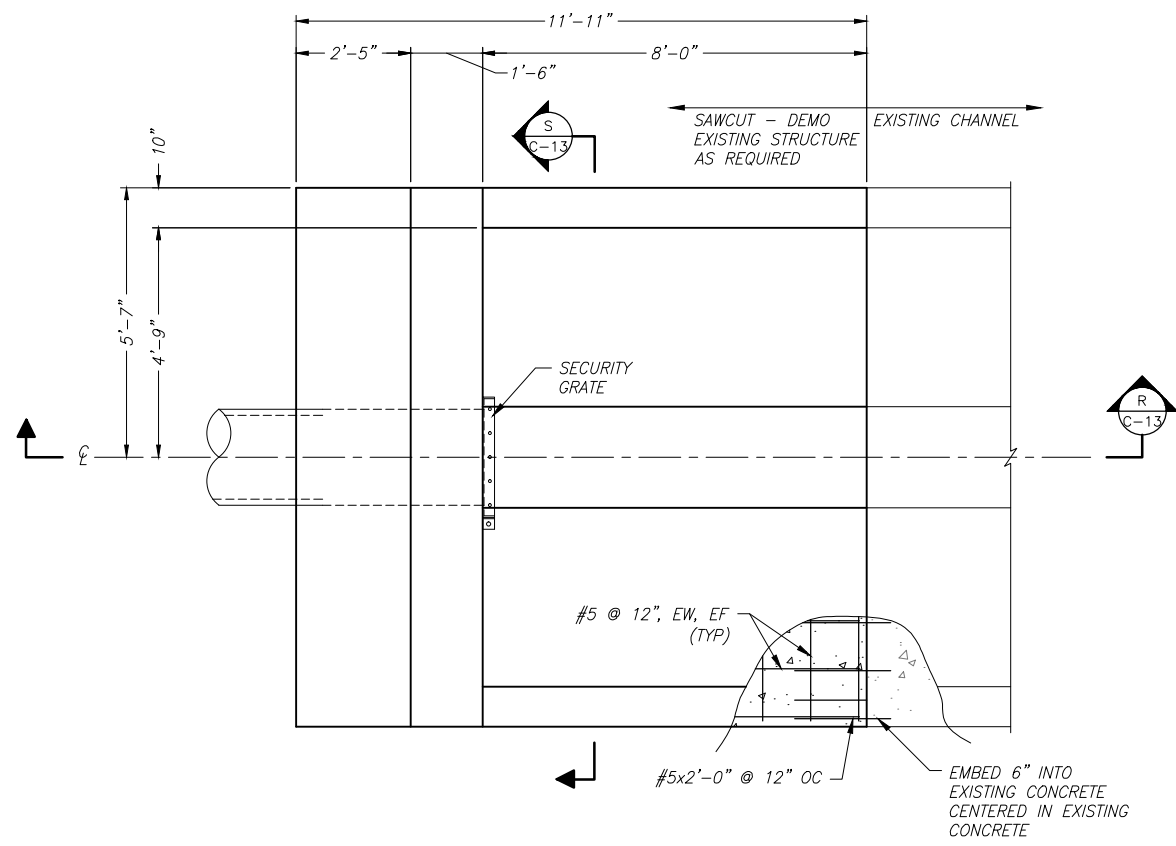
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-13 - OUTLET WORKS - NEW MEXICO CANAL OUTLET STRUCTURAL DETAILS.DWG SEP 2015 RPRICE

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015

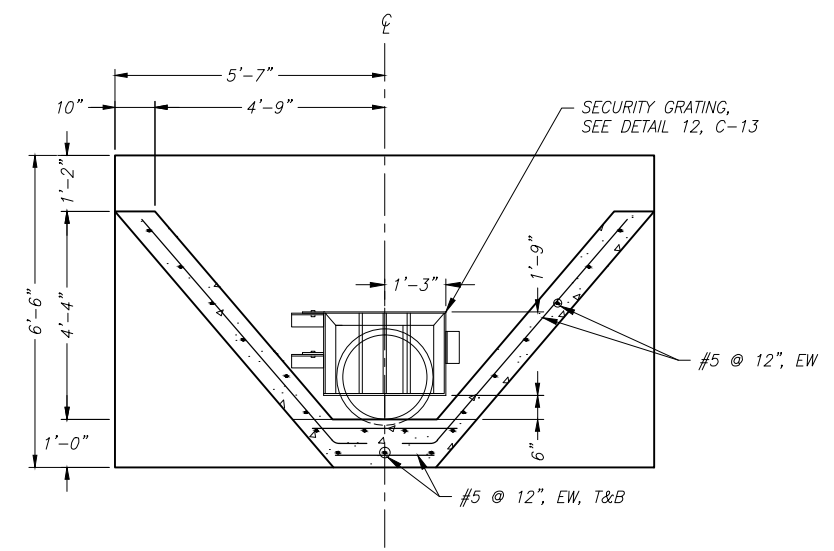
M. KIMBLE/R. PRICE
 DESIGNED
 M. KIMBLE/R. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

NEW MEXICO CANAL
 OUTLET STRUCTURAL
 DETAILS

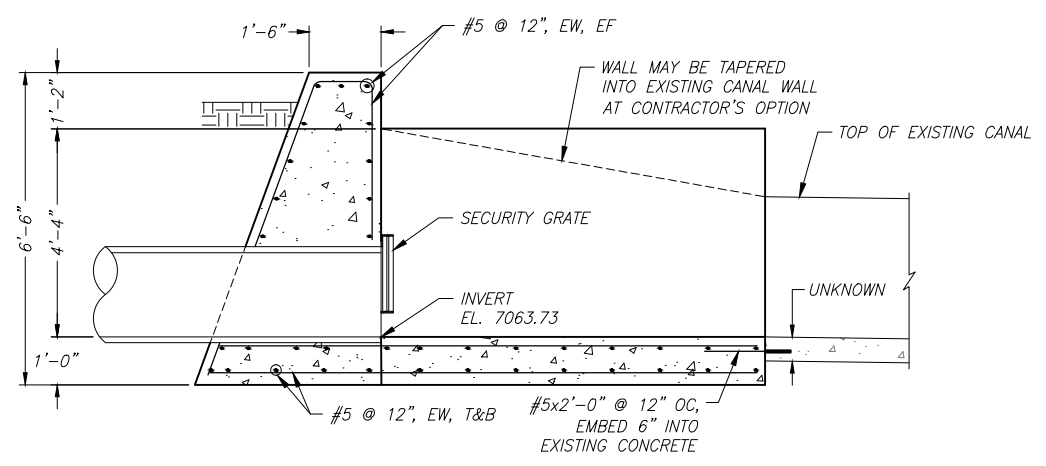
Drawing C-13
 SHEET 48 OF 75



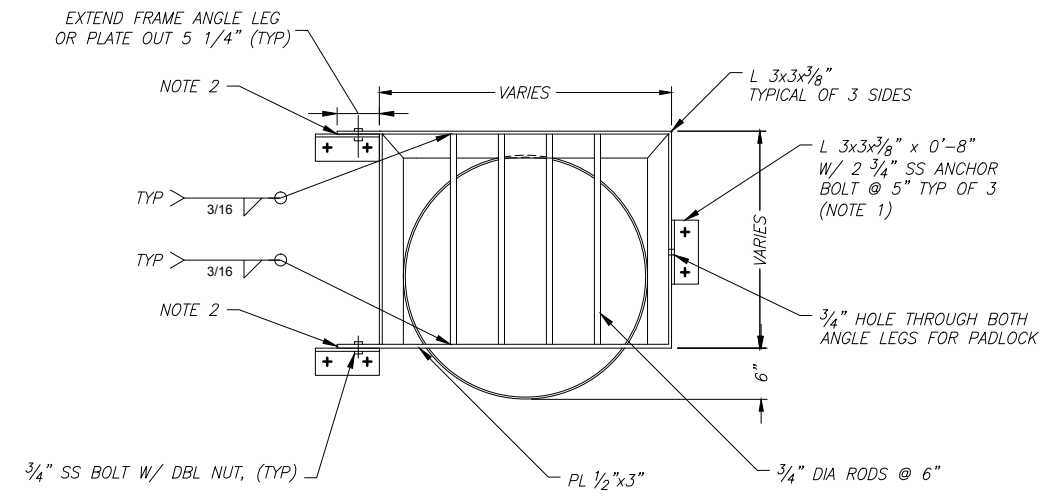
PLAN
 BOTTOM OF INTAKE
 0 2 4
 1/2" = 1'-0"



SECTION
 PERPENDICULAR TO PIPE C-13
 0 2 4
 1/2" = 1'-0"

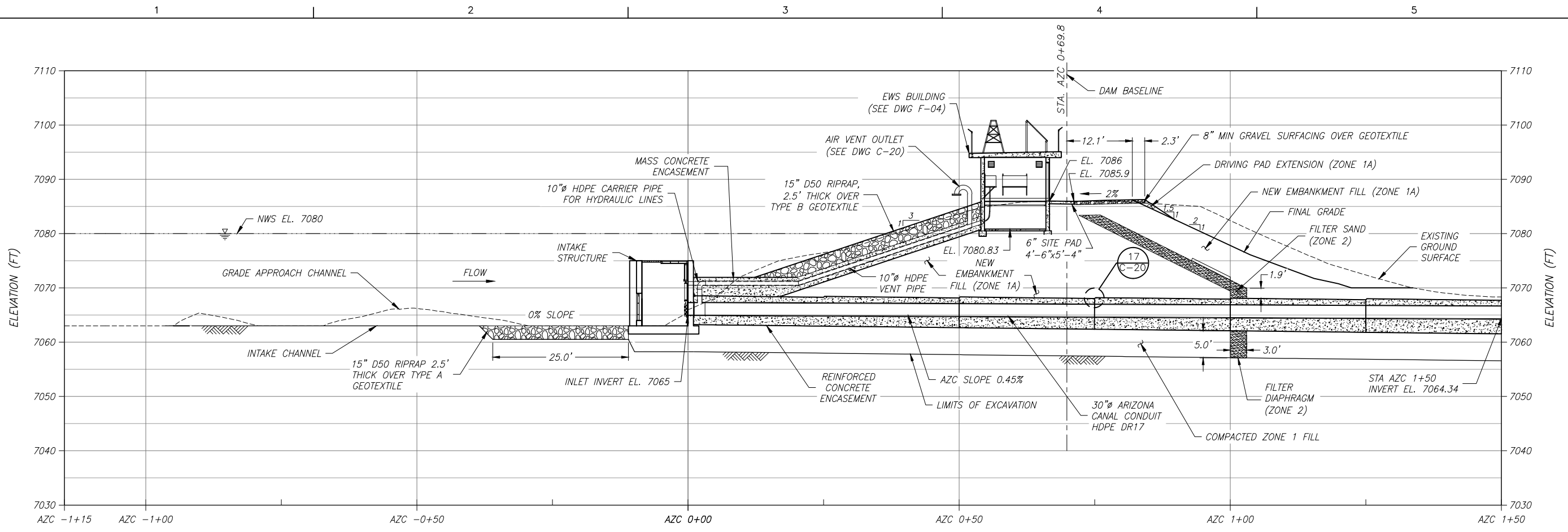


SECTION
 PARALLEL TO PIPE C-13
 0 2 4
 1/2" = 1'-0"

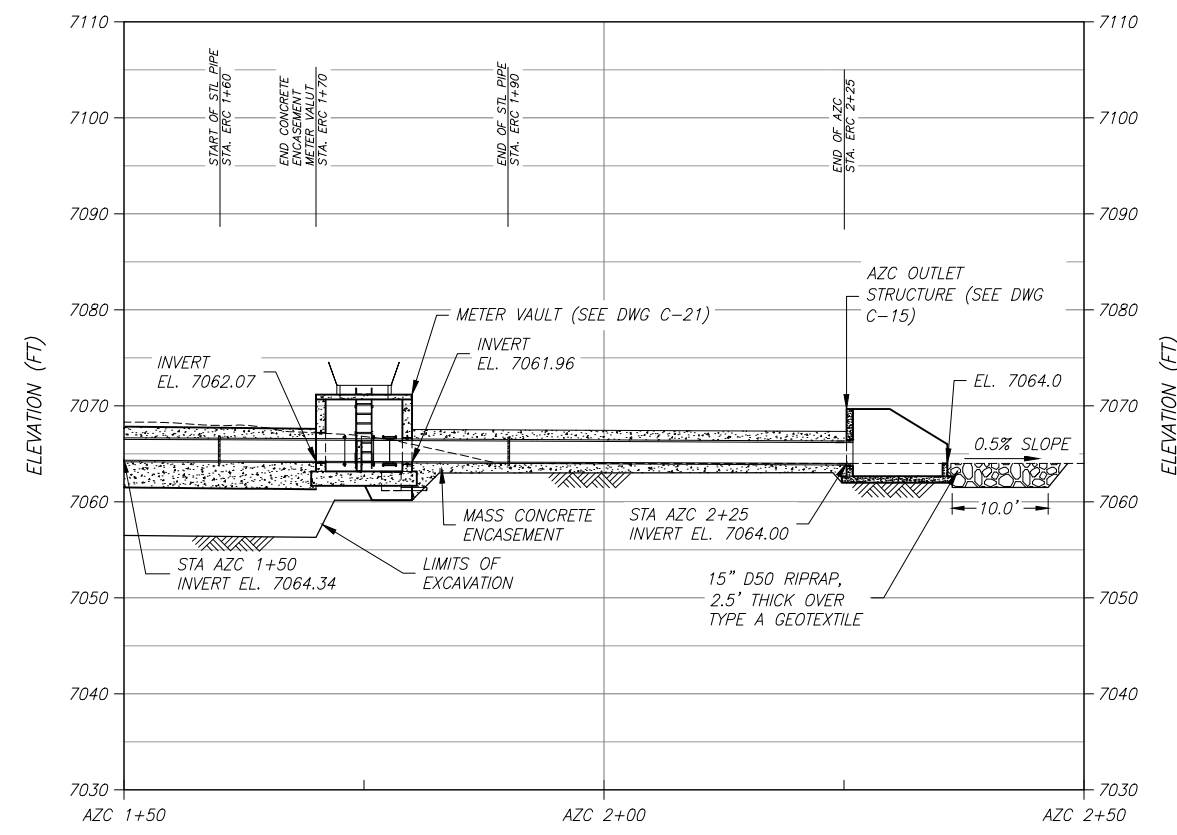
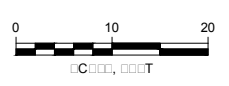


NOTES
 1. EPOXY GROUT A325 STUD BOLT ANCHORS A MINIMUM OF 6 INCHES INTO CONCRETE
 2. ROUND EDGE OF ANGLE TO ALLOW GRATE TO FULLY OPEN

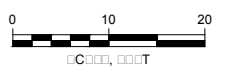
DETAIL
 TYPICAL SECURITY GRATE C-13
 0 1 2
 1" = 1'-0"



PROFILE
 INTAKE CHANNEL AND ARIZONA CANAL
 STA AZC -1+15 TO AZC 1+50



PROFILE
 INTAKE CHANNEL AND ARIZONA CANAL
 STA AZC 1+50 TO AZC 2+50



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 ARIZONA CANAL CONDUIT
 PROFILE

ISSUED FOR SOLICITATION
 OCTOBER 2, 2015
 0

DESIGNED
 K. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

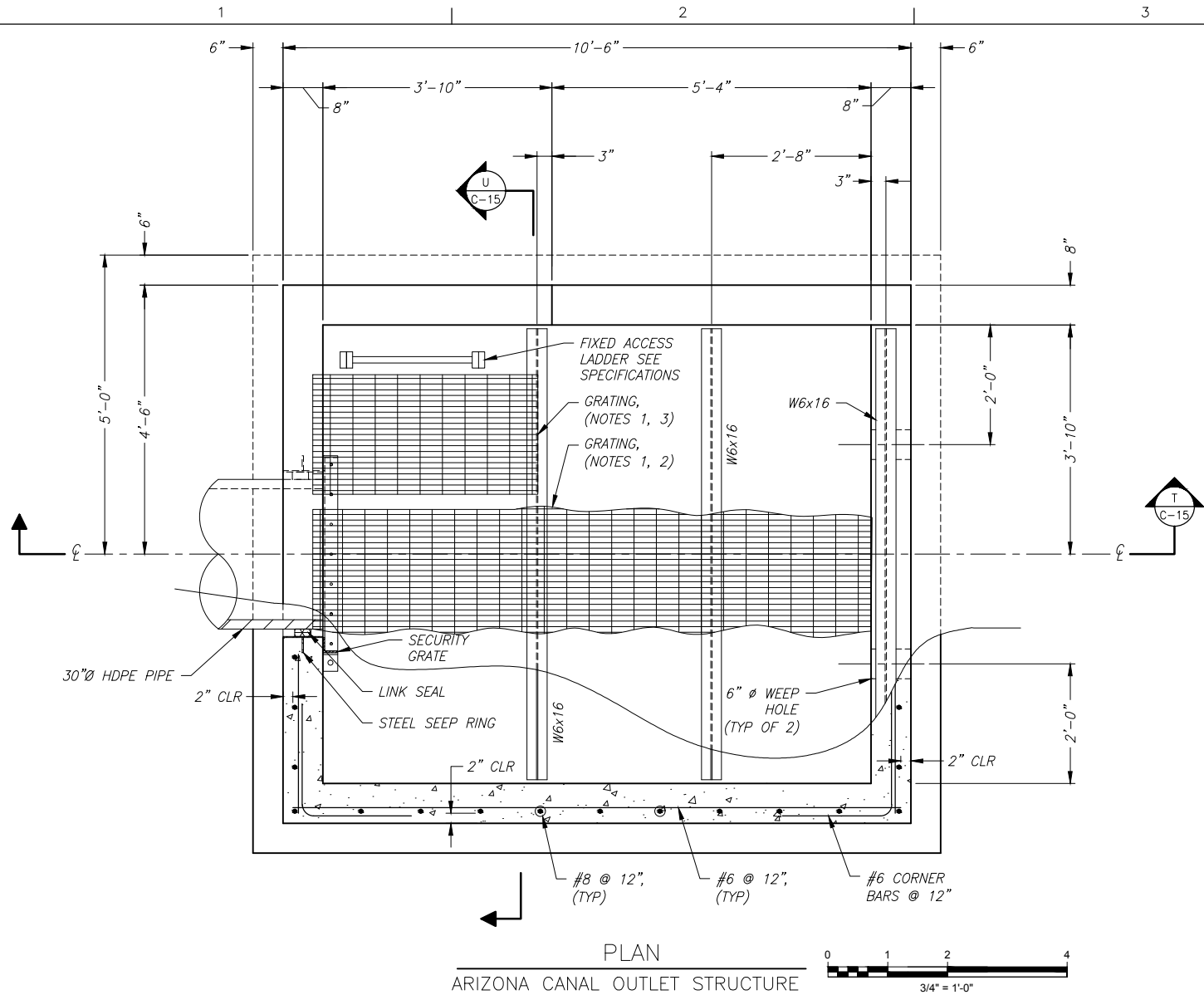
ARIZONA CANAL CONDUIT
 PROFILE

Drawing C-14

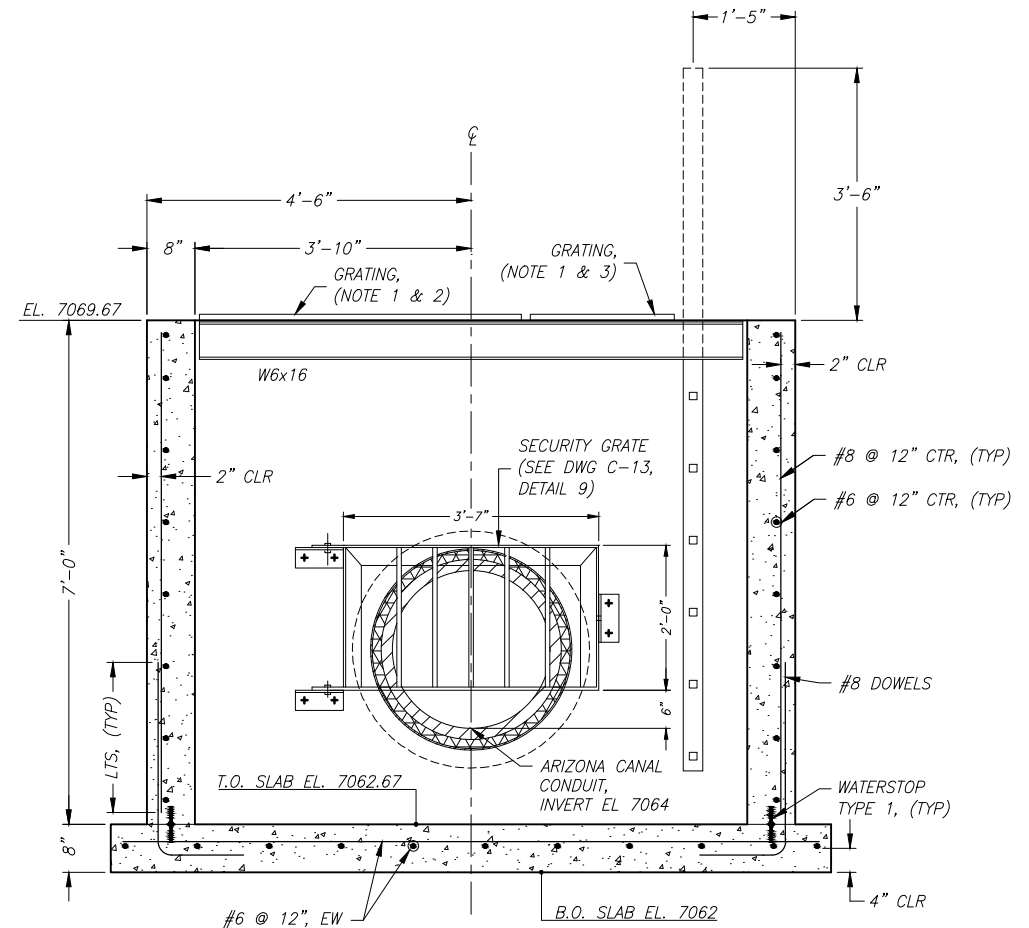
SHEET 49 OF 75

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-14-ARIZONA CANAL CONDUIT PROFILE.DWG OCT 2015 KPRICE

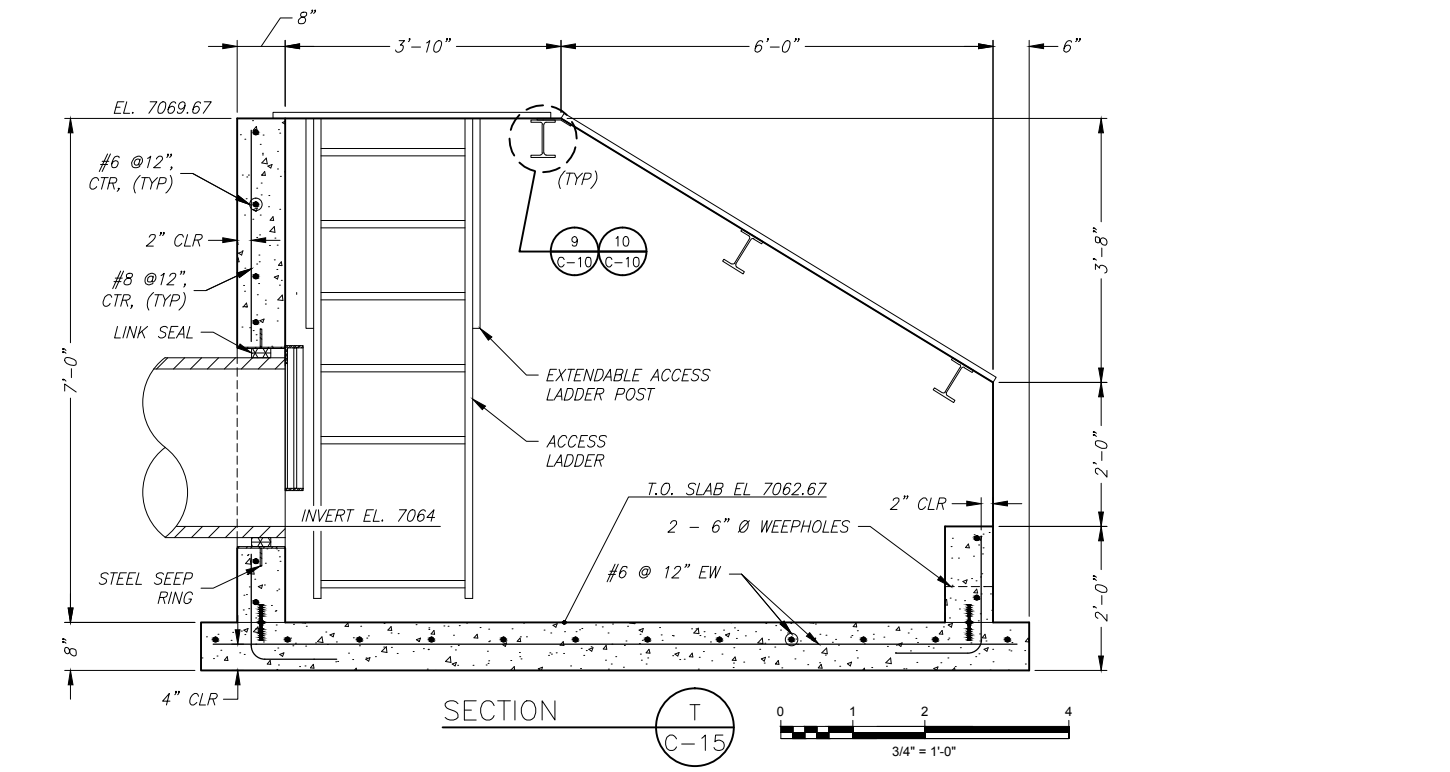
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-15-OUTLET WORKS - ARIZONA CANAL OUTLET STRUCTURAL DETAILS.DWG SEP 2015 RPRICE



PLAN
 ARIZONA CANAL OUTLET STRUCTURE
 0 1 2 4
 3/4" = 1'-0"



SECTION
 U
 C-15
 0 1 2 4
 3/4" = 1'-0"



SECTION
 T
 C-15
 0 1 2 4
 3/4" = 1'-0"

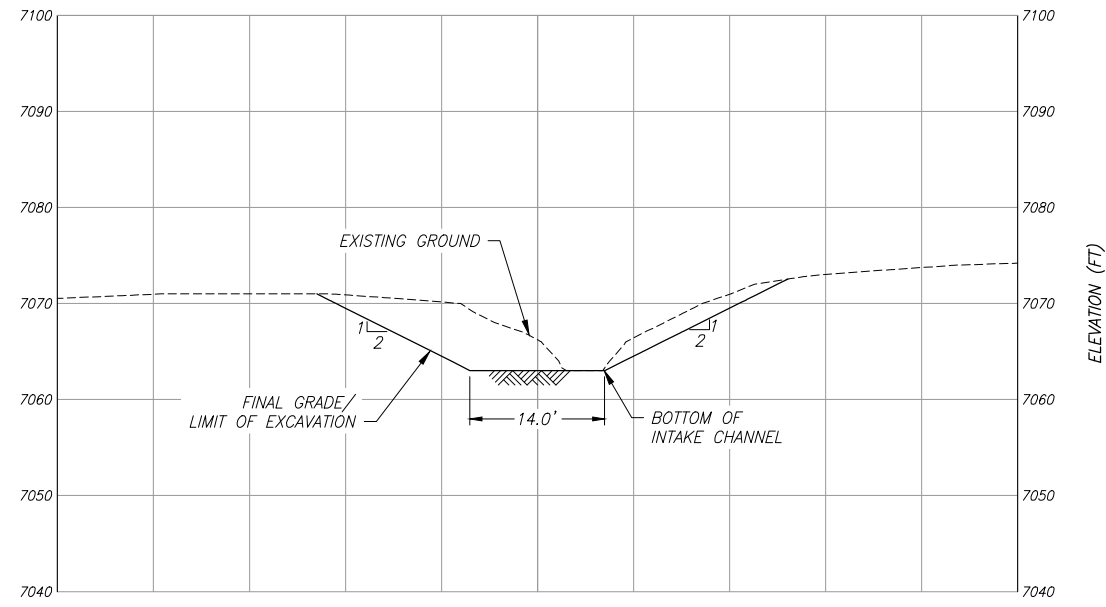
- NOTES**
1. GRATING SHALL BE McNICHOL'S HOT DIPPED GALVANIZED, $1 \times \frac{1}{16}$ GW, SPACING 19-W-4, GRATING OR EQUAL.
 2. GRATING SHALL BE PERMANENTLY ATTACHED PER MFG RECOMMENDATIONS.
 3. GRATING SHALL BE REMOVABLE FOR LADDER ACCESS.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 ARIZONA CANAL OUTLET STRUCTURAL DETAILS

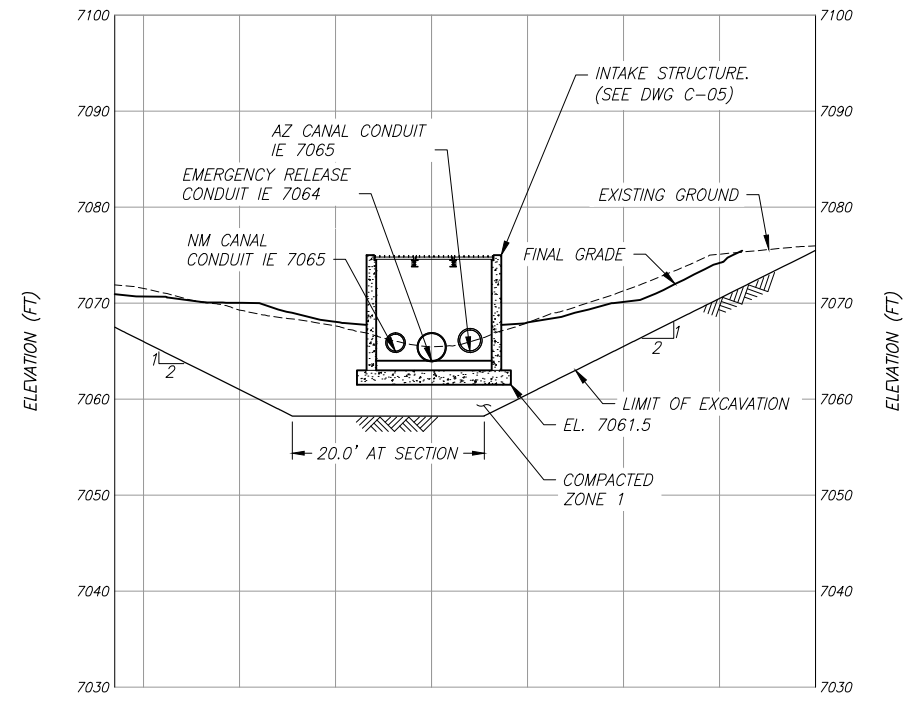
M. KIMBLE/R. PRICE
 DESIGNED
 M. KIMBLE/R. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

ARIZONA CANAL OUTLET
 STRUCTURAL DETAILS

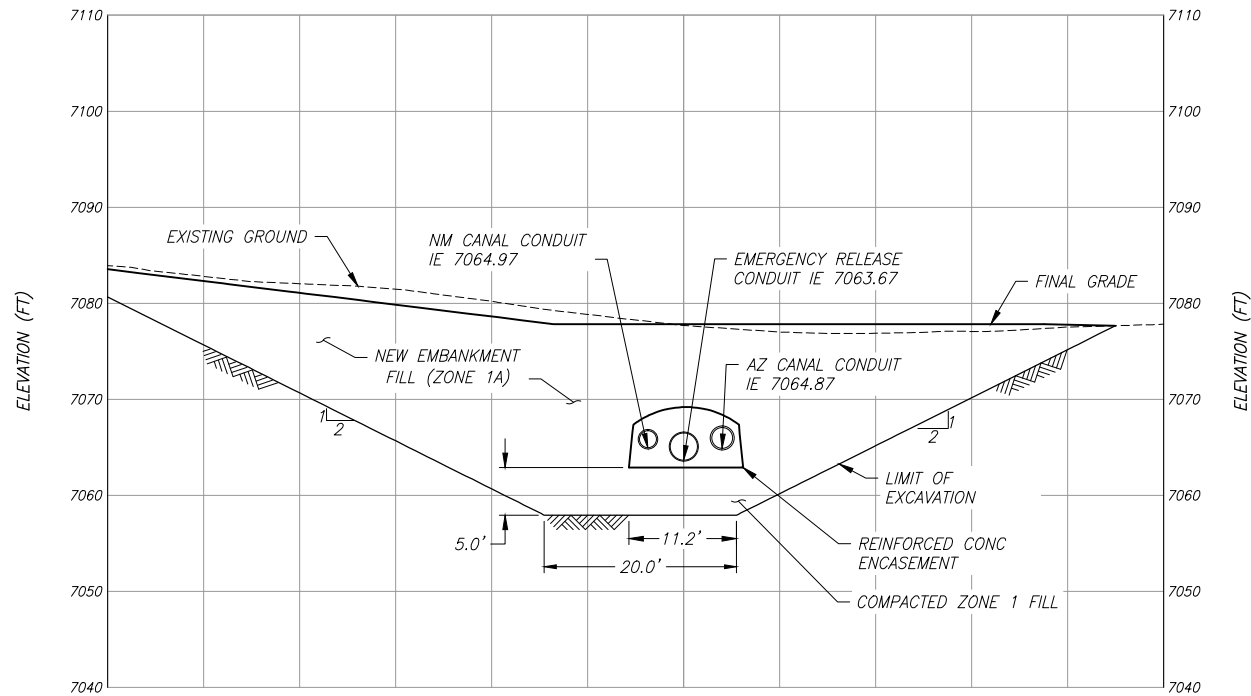
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-16,17,18,19-INTAKE CHANNEL AND CONDUIT SECTIONS.DWG OCT 2015 KPRICE



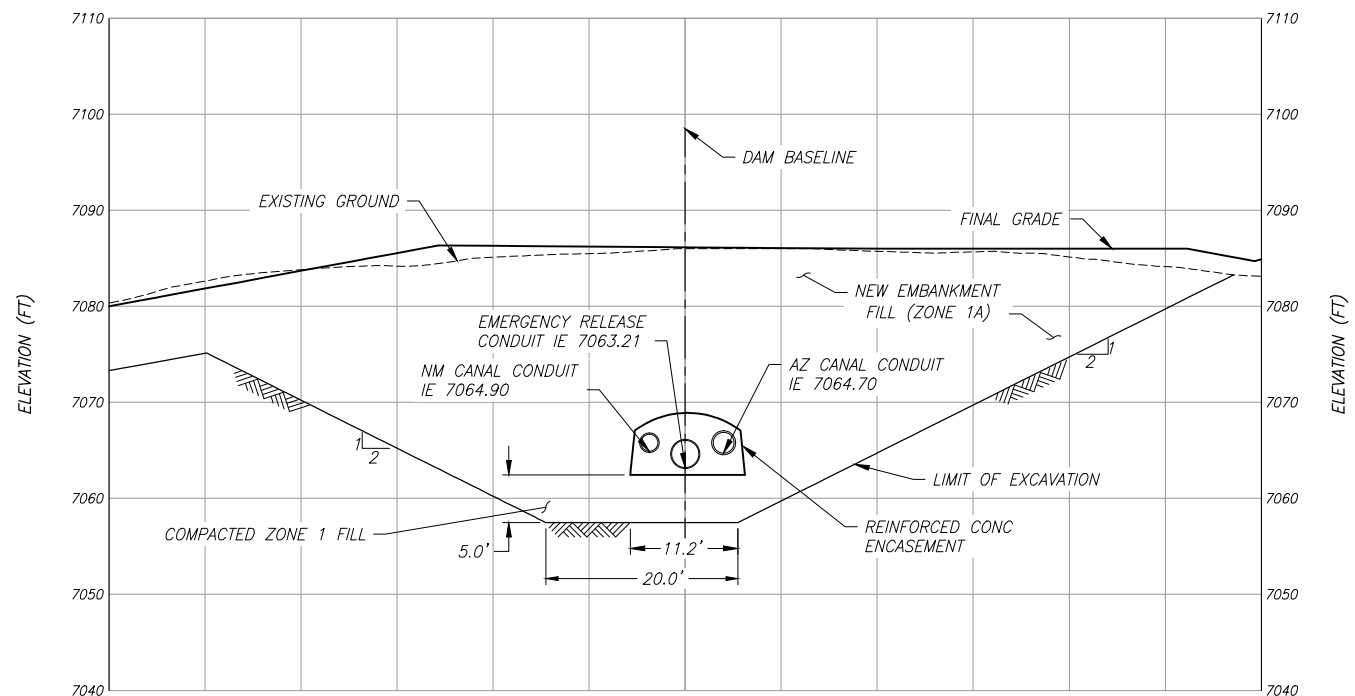
SECTION W
STA. ERC -0+50
C-01



SECTION X
STA. ERC 0+00
C-01



SECTION Y
STA. ERC 0+30
C-01



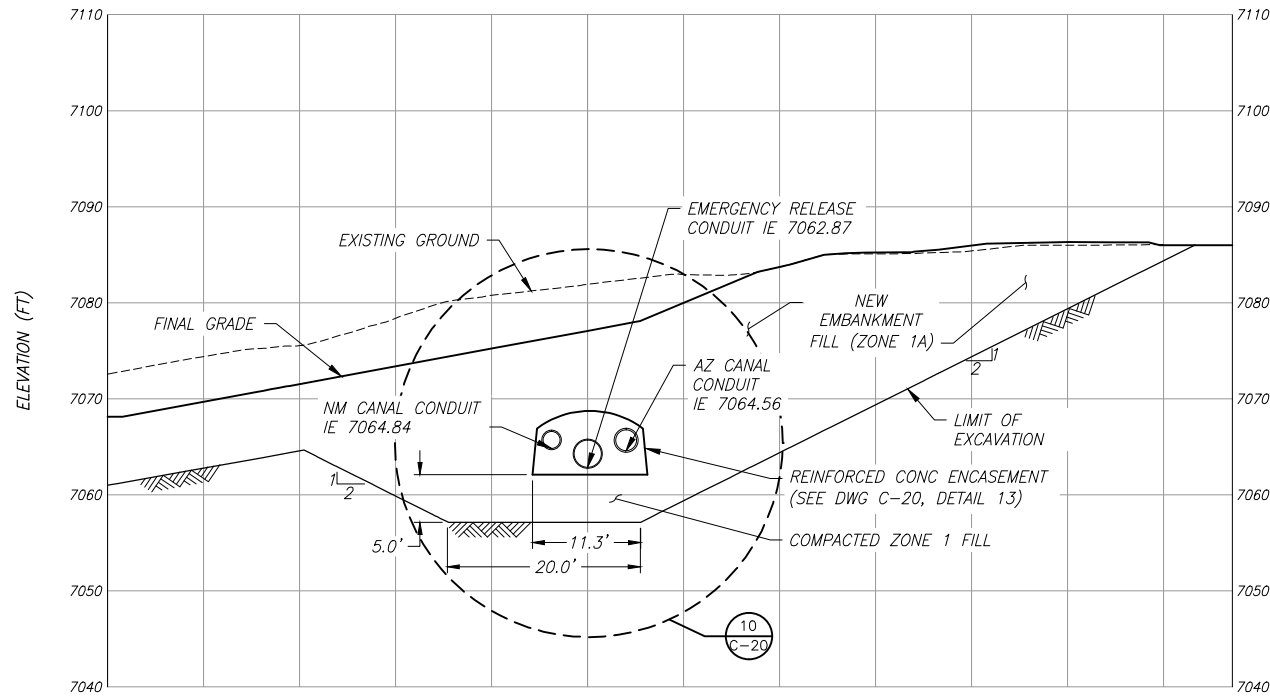
SECTION Z
STA. ERC 0+70
C-01

ISSUED FOR SOLICITATION
OCTOBER 2, 2015
0

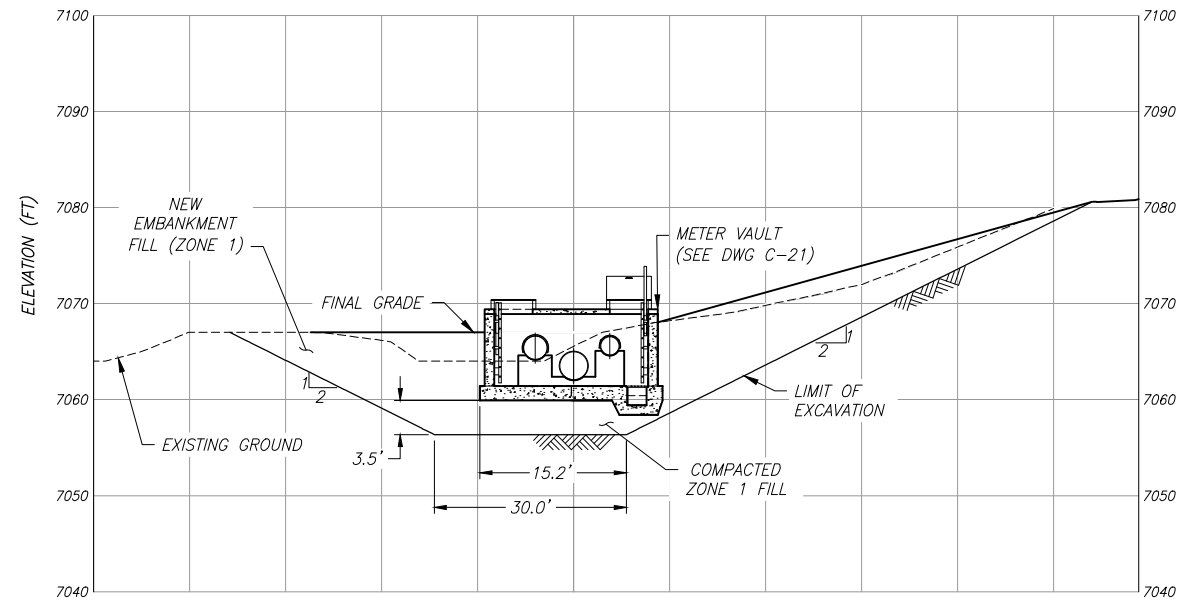
K. PRICE
DESIGNED
K. PRICE
DRAWN
P. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-16,17,18,19-INTAKE CHANNEL AND CONDUIT SECTIONS.DWG OCT 2015 KPRICE

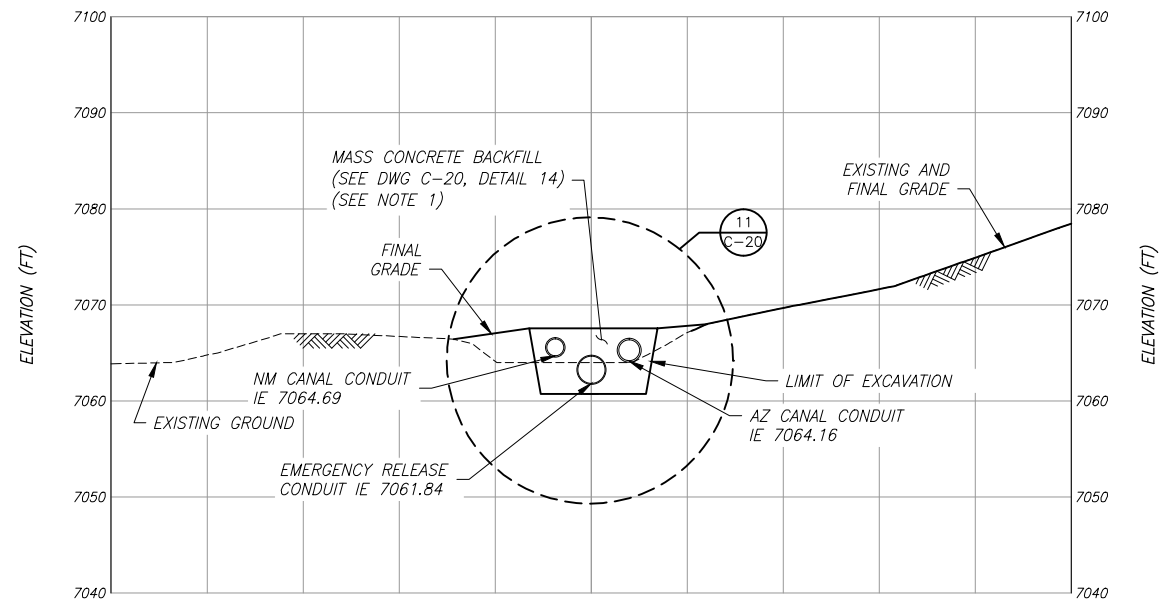
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INTAKE CHANNEL AND CONDUIT SECTIONS
 (2 OF 4)



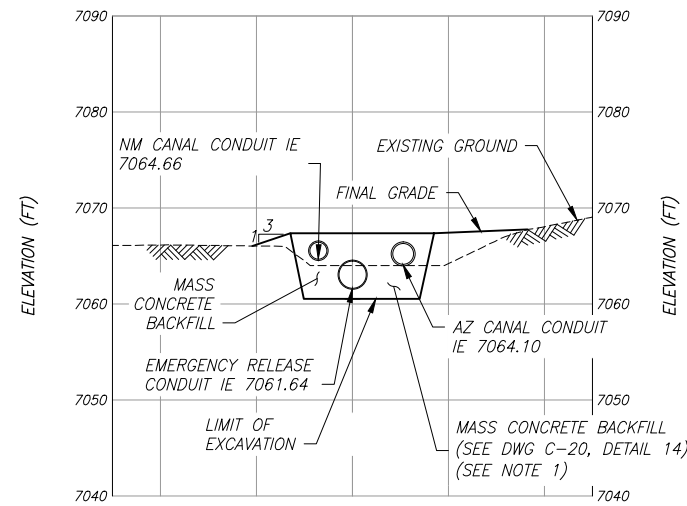
SECTION AA
 STA. ERC 1+00
 C-01



SECTION BB
 STA. ERC 1+70
 C-01



SECTION CC
 STA. ERC 1+90
 C-01



SECTION DD
 STA. ERC 2+05
 C-01

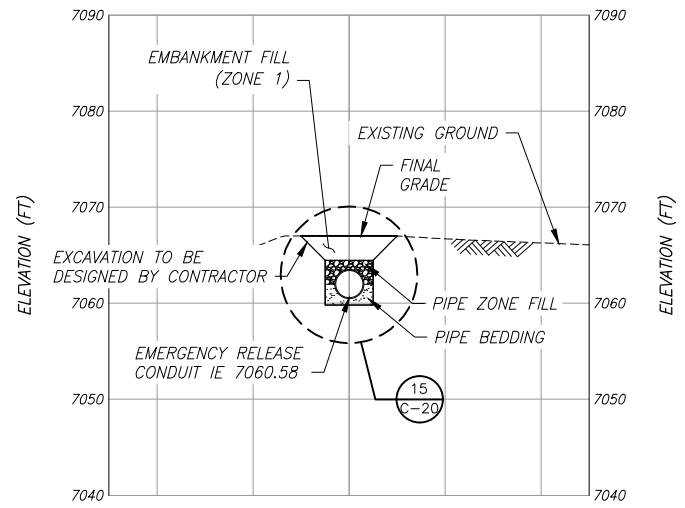
- NOTES**
 1. PLACE MASS CONCRETE BACKFILL TO SPRINGLINE OF NEW MEXICO CANAL CONDUIT.

DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

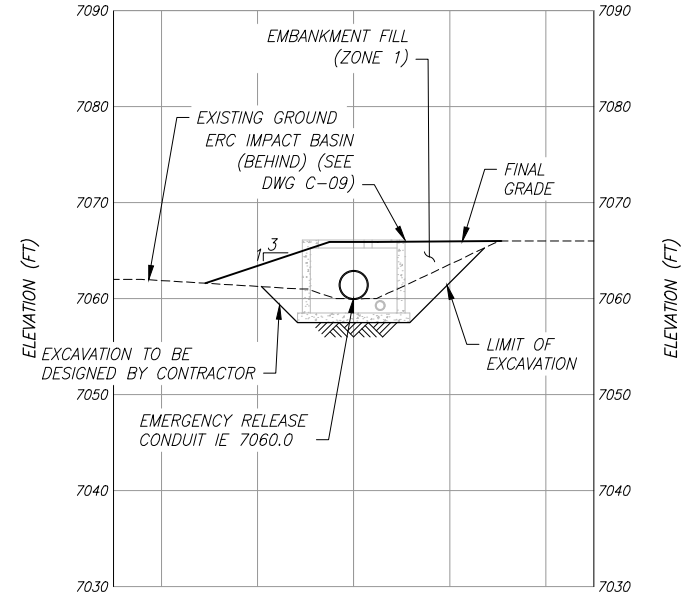
INTAKE CHANNEL AND CONDUIT SECTIONS
 (2 OF 4)

Drawing C-17

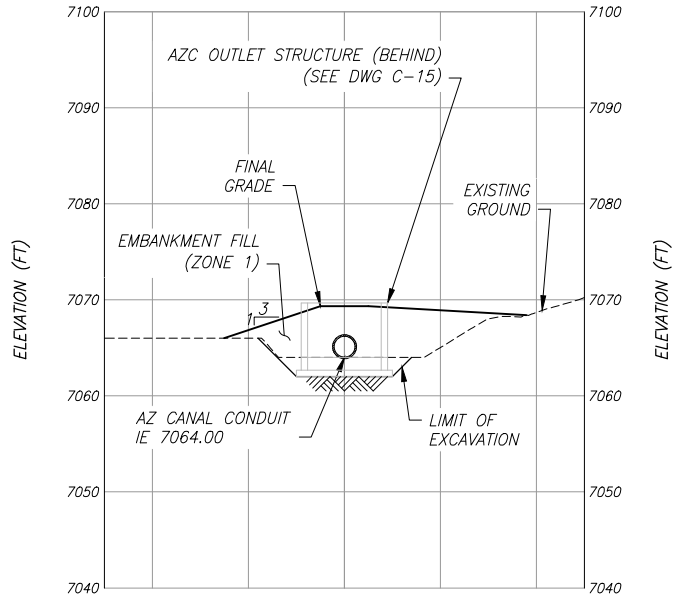
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-16,17,18,19-INTAKE CHANNEL AND CONDUIT SECTIONS.DWG OCT 2015 KPRICE



SECTION **EE**
 STA. ERC 3+00 **C-01**



SECTION **FF**
 STA. ERC 3+50 **C-01**



SECTION **GG**
 STA. AZC 2+25 **C-01**

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INTAKE CHANNEL AND CONDUIT SECTIONS
 (3 OF 4)

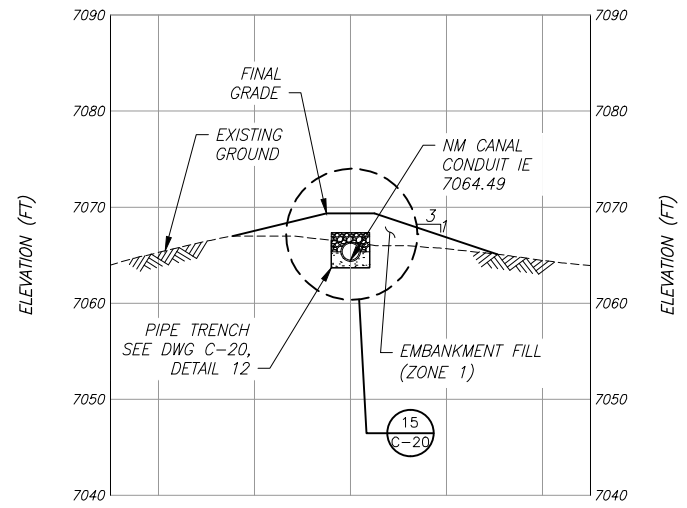
REV NO 0
 OCTOBER 2, 2015
 ISSUED FOR SOLICITATION

DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

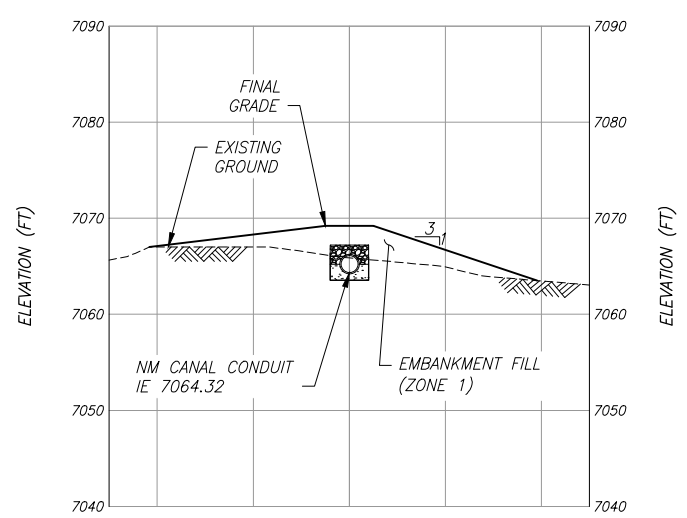
INTAKE CHANNEL AND CONDUIT SECTIONS
 (3 OF 4)

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-16,17,18,19-INTAKE CHANNEL AND CONDUIT SECTIONS.DWG OCT 2015 KPRICE

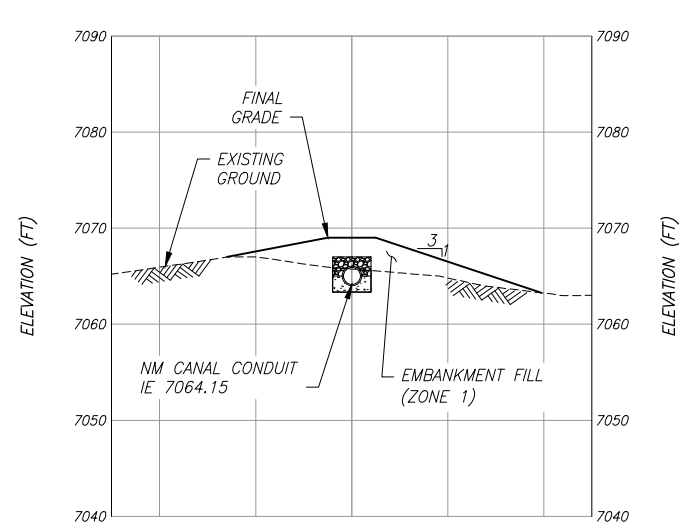
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INTAKE CHANNEL AND CONDUIT SECTIONS
 (4 OF 4)



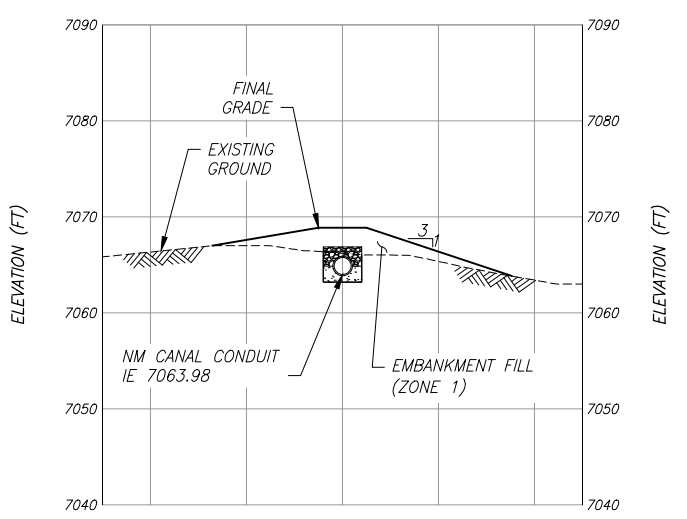
SECTION **HH**
 STA. NMC 3+00
 C-01



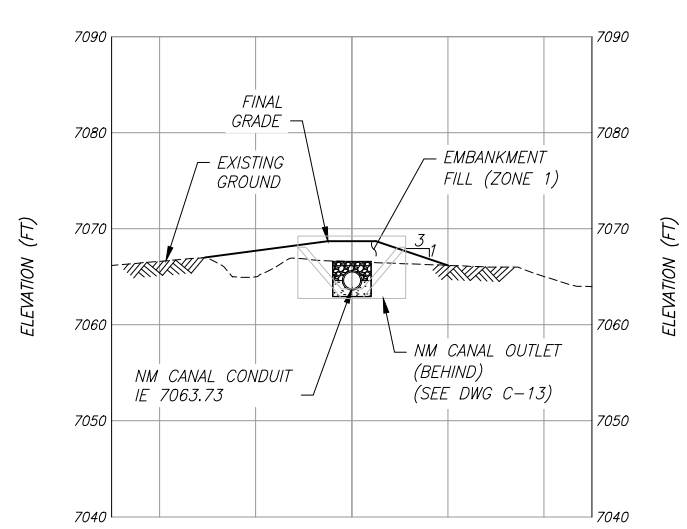
SECTION **JJ**
 STA. NMC 4+00
 C-01



SECTION **KK**
 STA. NMC 5+00
 C-01



SECTION **LL**
 STA. NMC 6+00
 C-01



SECTION **MM**
 STA. NMC 7+38
 C-01

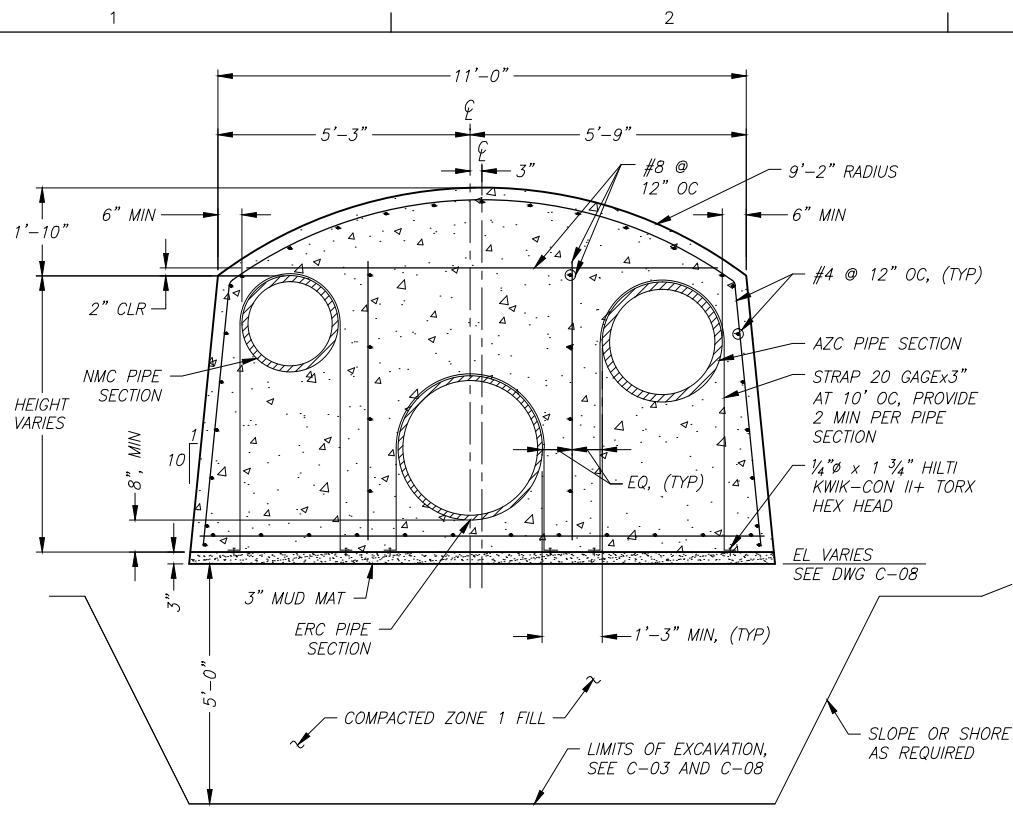
REV	NO	DATE	DESCRIPTION
0		OCTOBER 2, 2015	ISSUED FOR SOLICITATION

DESIGNED	K. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

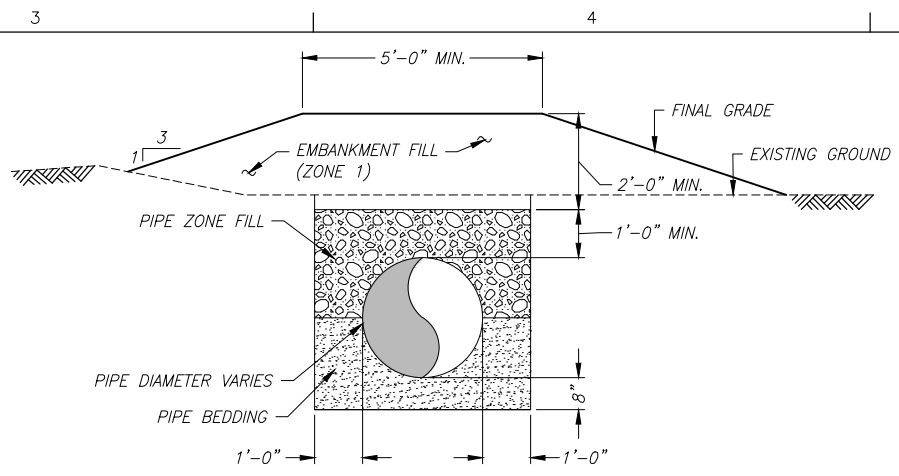
INTAKE CHANNEL AND CONDUIT SECTIONS
 (4 OF 4)

P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-20-OUTLET WORKS - MISCELLANEOUS DETAILS.DWG SEP 2015 KPRICE

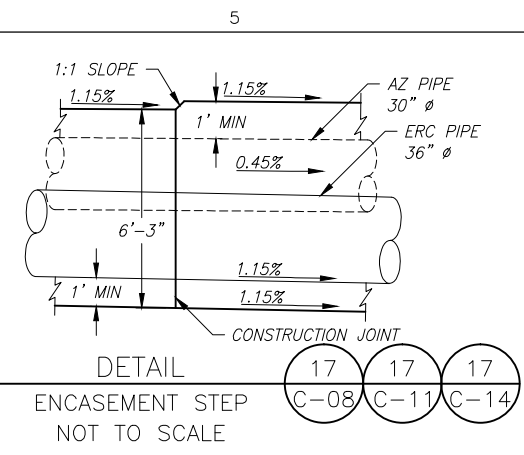
DESIGNED	M. KIMBLE/R. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	



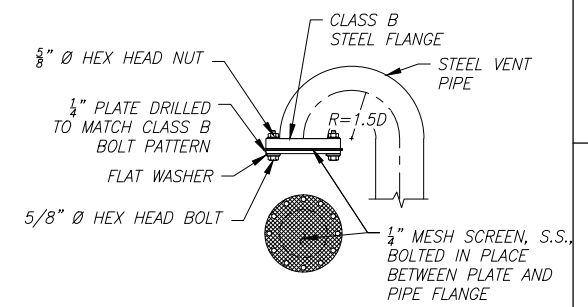
DETAIL 13
TYPICAL ENCASEMENT C-17
NOT TO SCALE



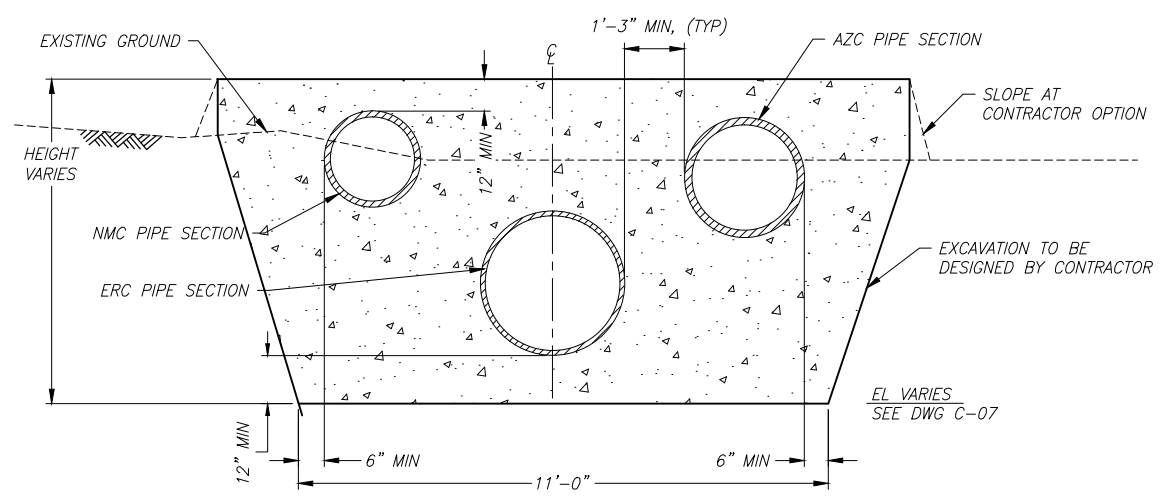
DETAIL 15
TYPICAL TRENCH FOR SINGLE PIPE C-09 C-18 C-19
NOT TO SCALE



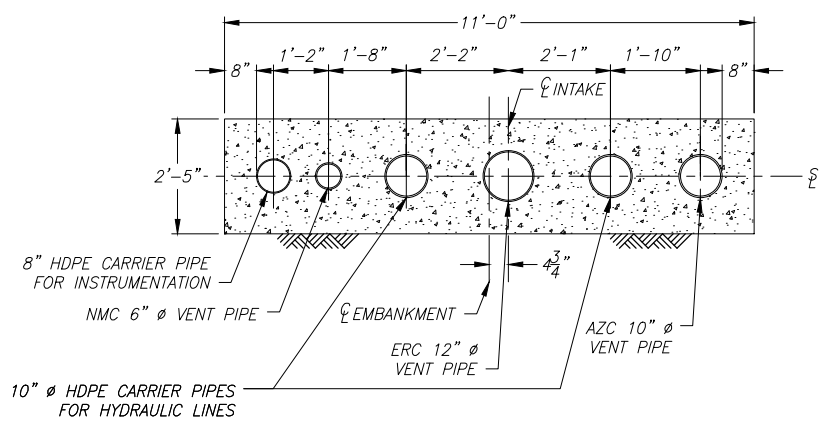
DETAIL 17
ENCASEMENT STEP C-08 C-11 C-14
NOT TO SCALE



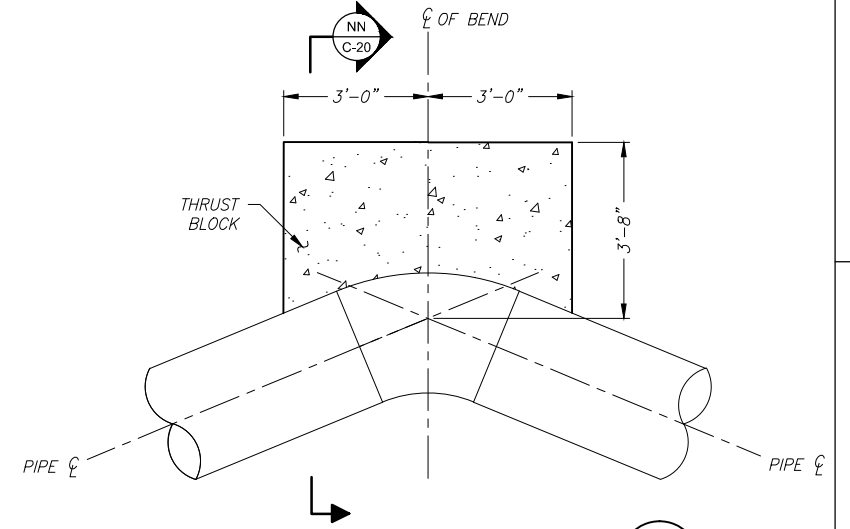
DETAIL 18
AIR VENT PIPE OUTLET C-08 C-11 C-14
NOT TO SCALE



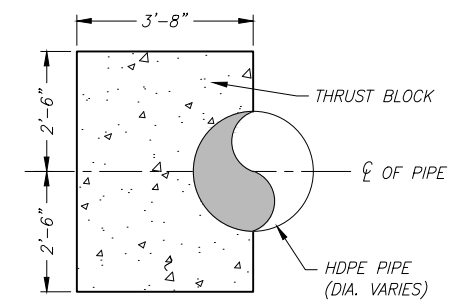
DETAIL 14
MASS CONCRETE ENCASEMENT FOR MULTIPLE PIPES C-17
NOT TO SCALE



DETAIL 16
CARRIER PIPE ENCASEMENT C-04
NOT TO SCALE



DETAIL 19
TYPICAL THRUST BLOCK C-01
NOT TO SCALE

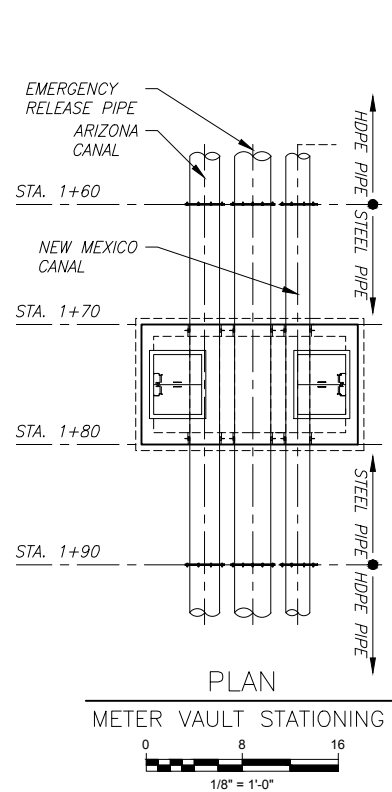
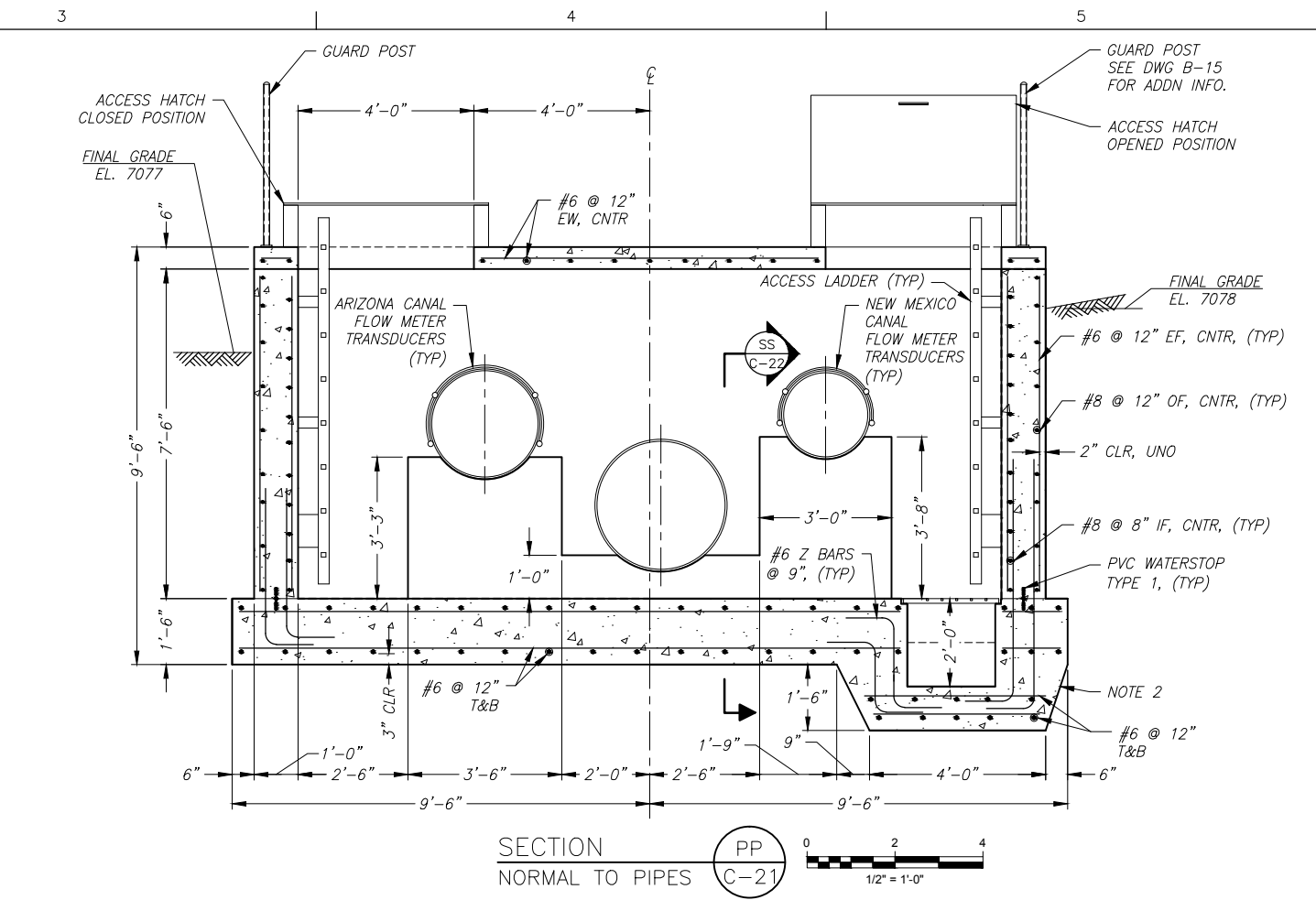
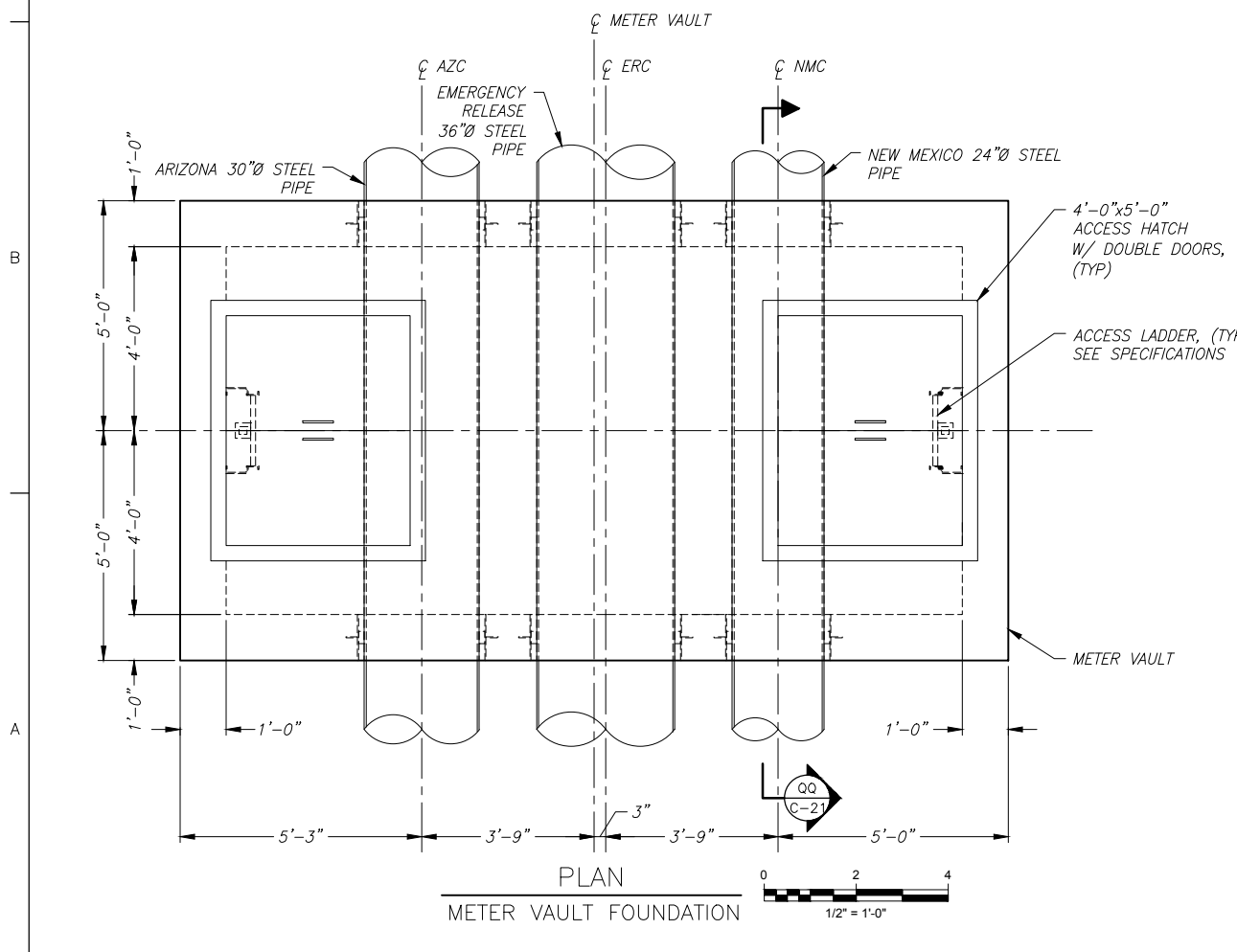
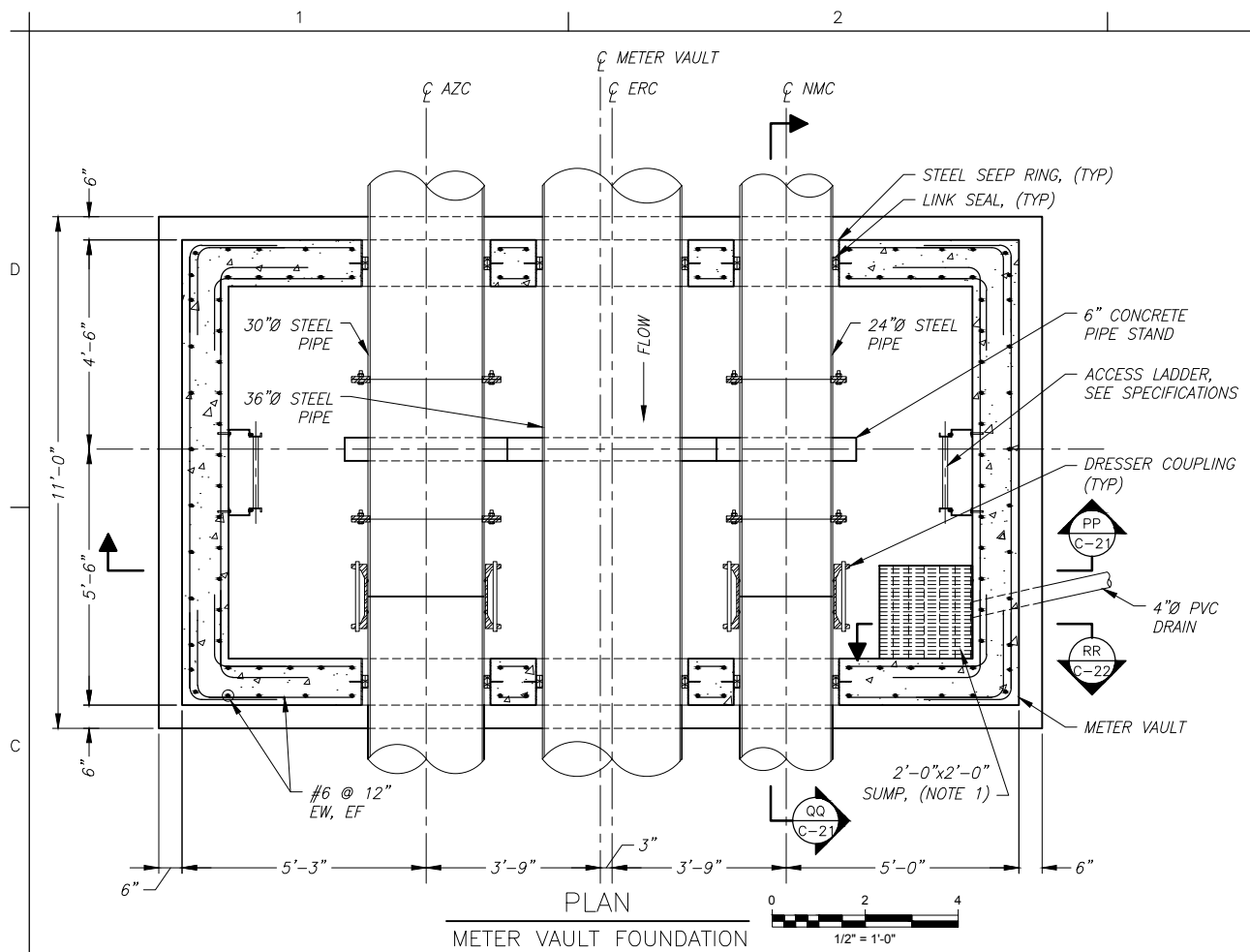


SECTION NN
TYPICAL THRUST BLOCK C-20
NOT TO SCALE

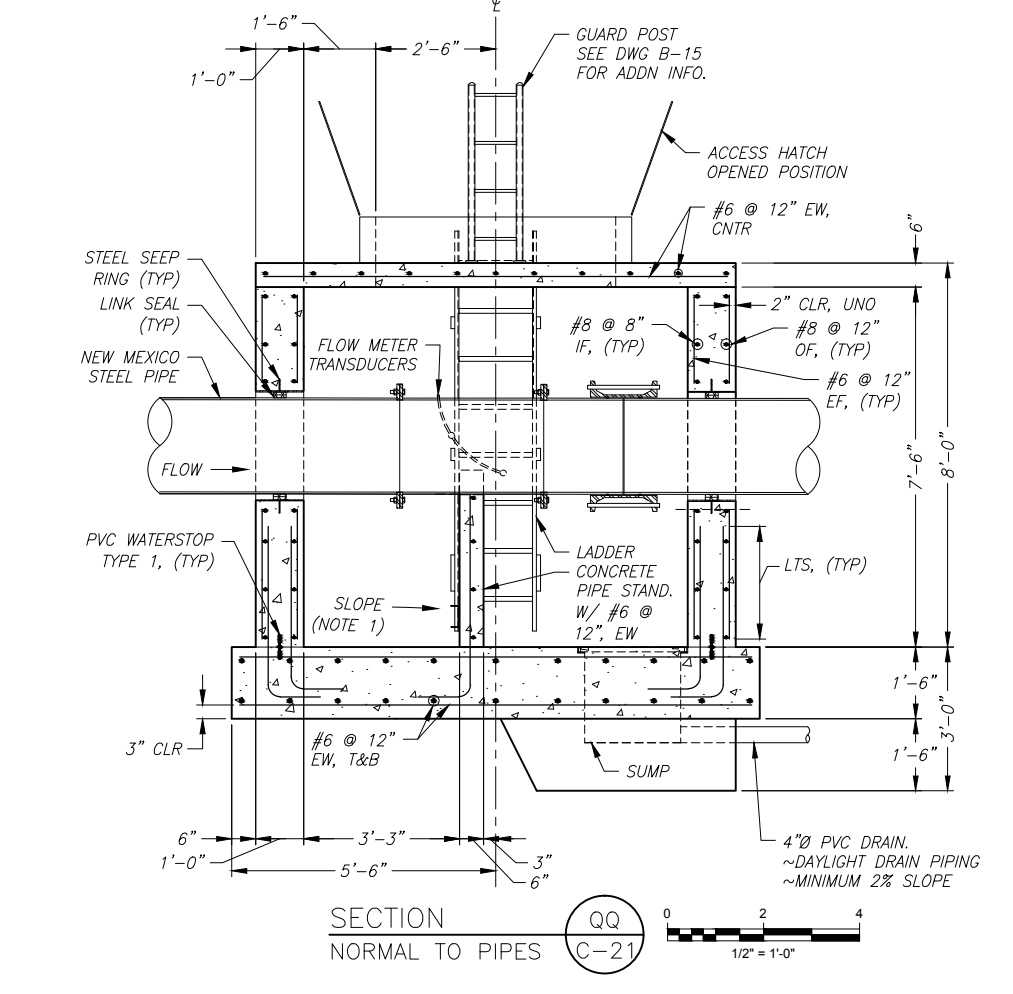
P:\1411470 - RED LAKE DAM (CIVIL)\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-21--METER VAULT - INTAKE STRUCTURE PLAN AND DETAILS.DWG SEP 2015 KPRICE

DESIGNED	M. KIMBLE/R. PRICE
DRAWN	B. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	

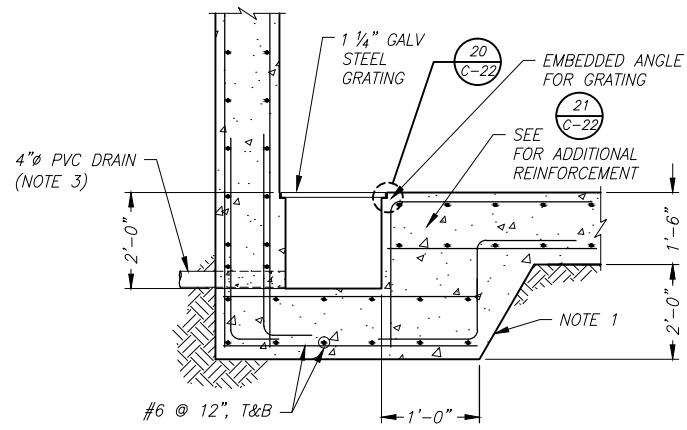
METER VAULT - INTAKE STRUCTURE PLAN AND DETAILS



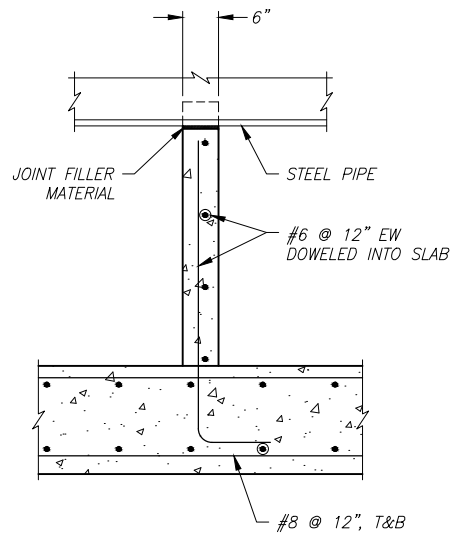
NOTES
 1. GRADE SLAB TO DRAIN TO SUMP.
 2. CONSTRUCT SLOPE AS NEAR TO VERTICAL AS POSSIBLE



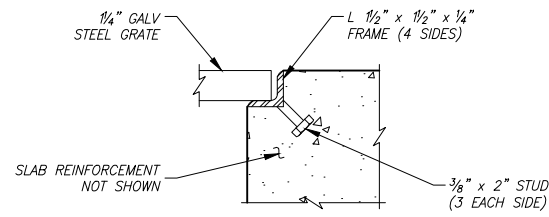
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\C-22-METER VAULT - INTAKE STRUCTURE STRUCTURAL DETAILS.DWG SEP 2015 KPRICE



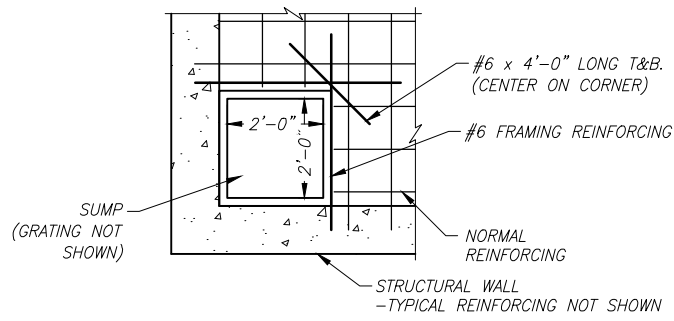
SECTION SUMP PIT (RR C-21)
 0 2 4
 1/2" = 1'-0"



SECTION TYPICAL PIPE SUPPORT (SS C-21)
 0 1 2 4
 3/4" = 1'-0"



DETAIL TYPICAL GRATING SEAT (C-22)
 NOT TO SCALE

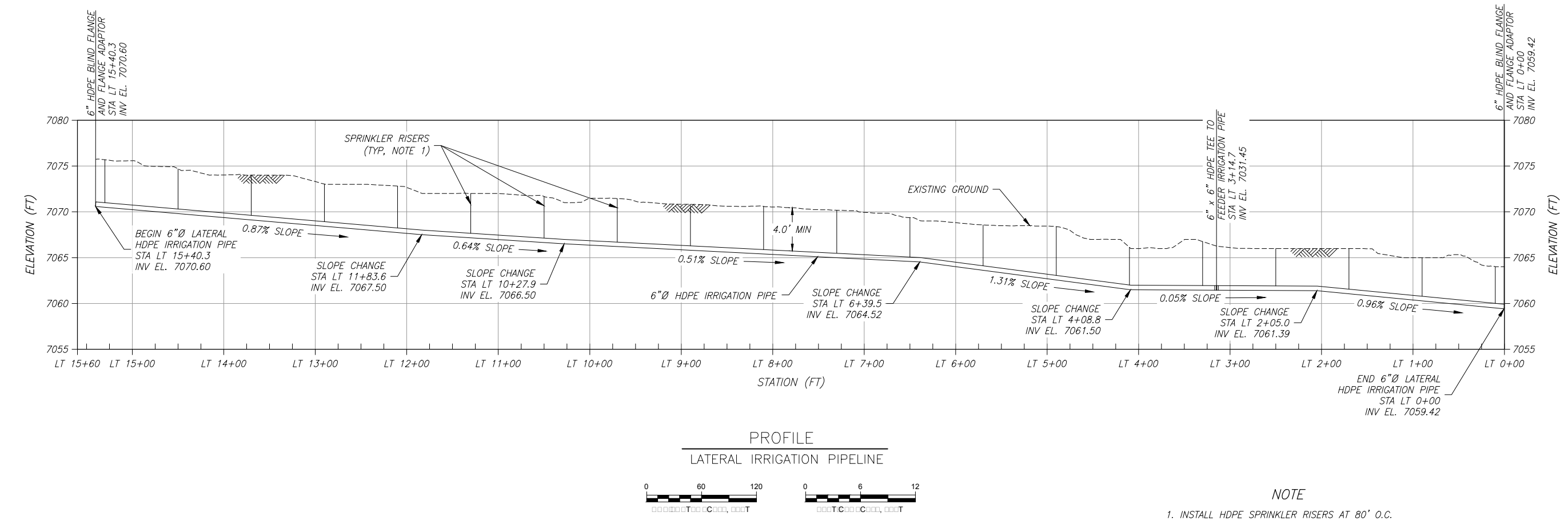
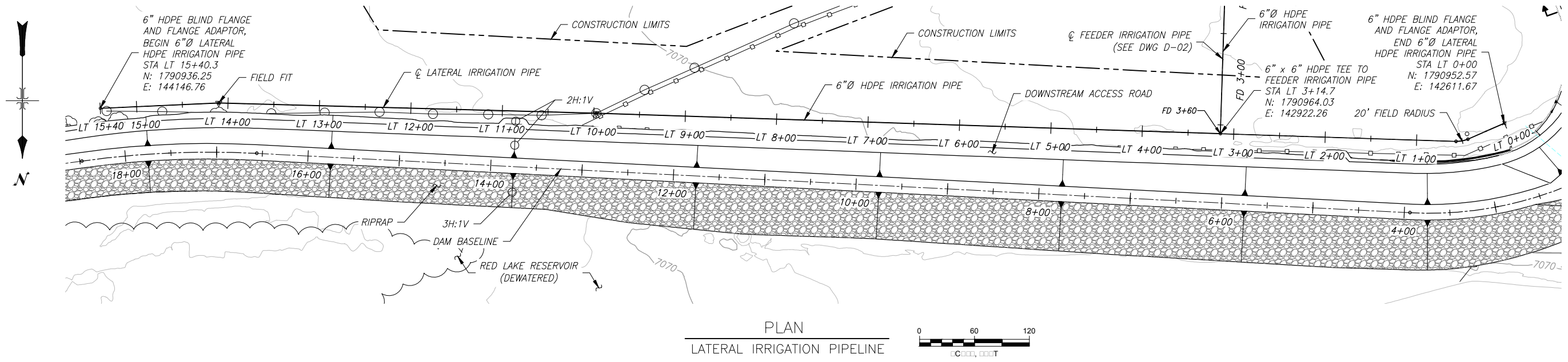


DETAIL ADDITIONAL REINFORCEMENT (C-22)
 0 2 4
 1/2" = 1'-0"

NOTES

1. CONSTRUCT SLOPE AS NEAR VERTICAL AS POSSIBLE.
2. GRADE SLAB TO DRAIN TO SUMP.
3. DAYLIGHT DRAIN PIPING MINIMUM 2% SLOPE.

DESIGNED	M. KIMBLE/R. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	T. SCHUTTER
INDEPENDENT TECHNICAL REVIEW	



NOTE
 1. INSTALL HDPE SPRINKLER RISERS AT 80' O.C. ALONG LATERAL IRRIGATION PIPE.

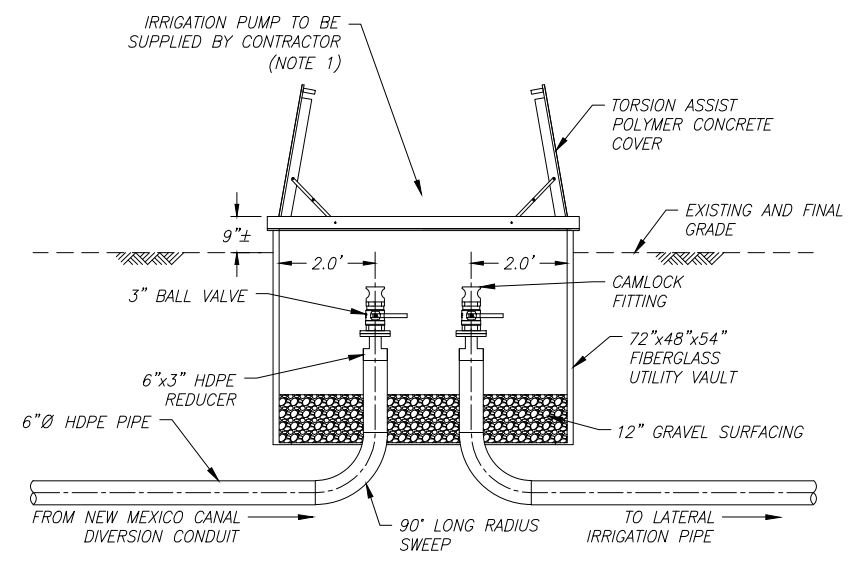
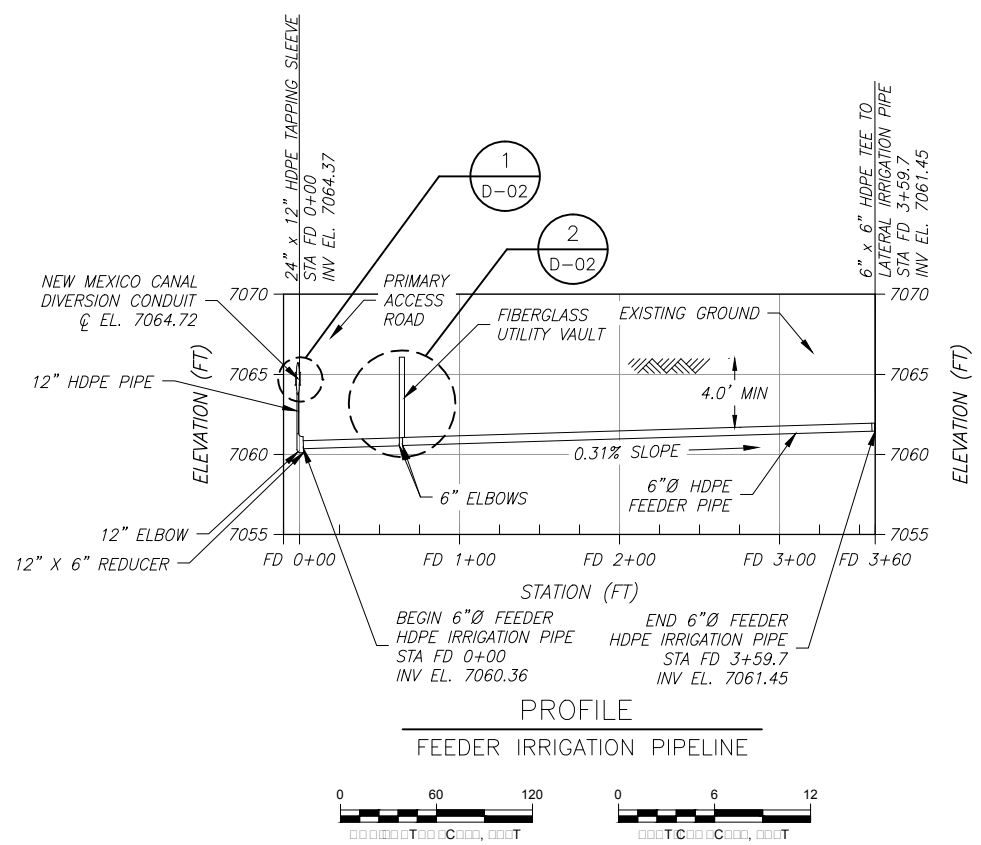
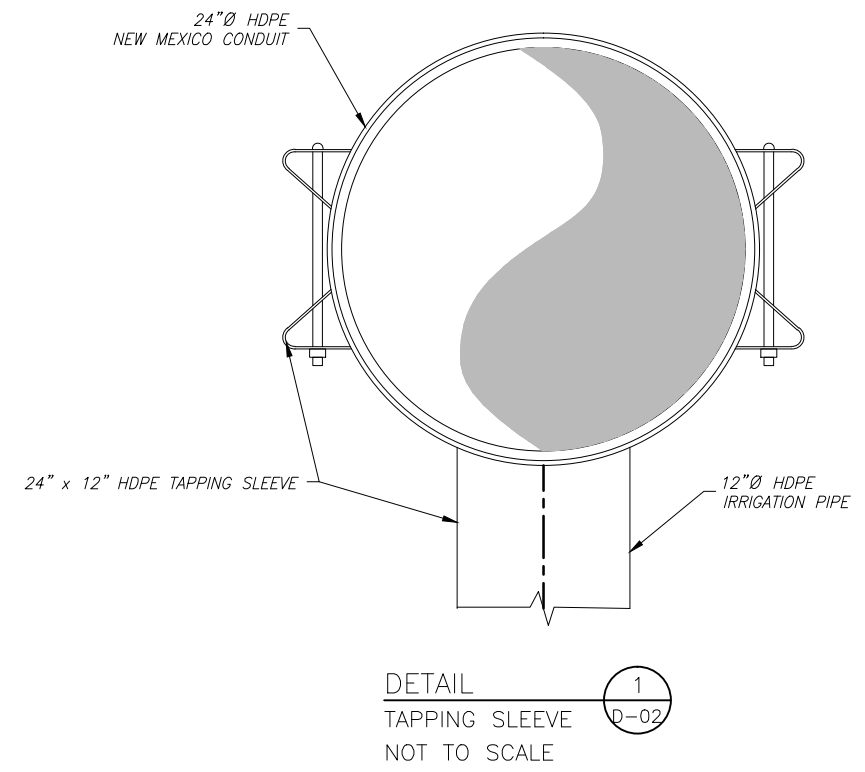
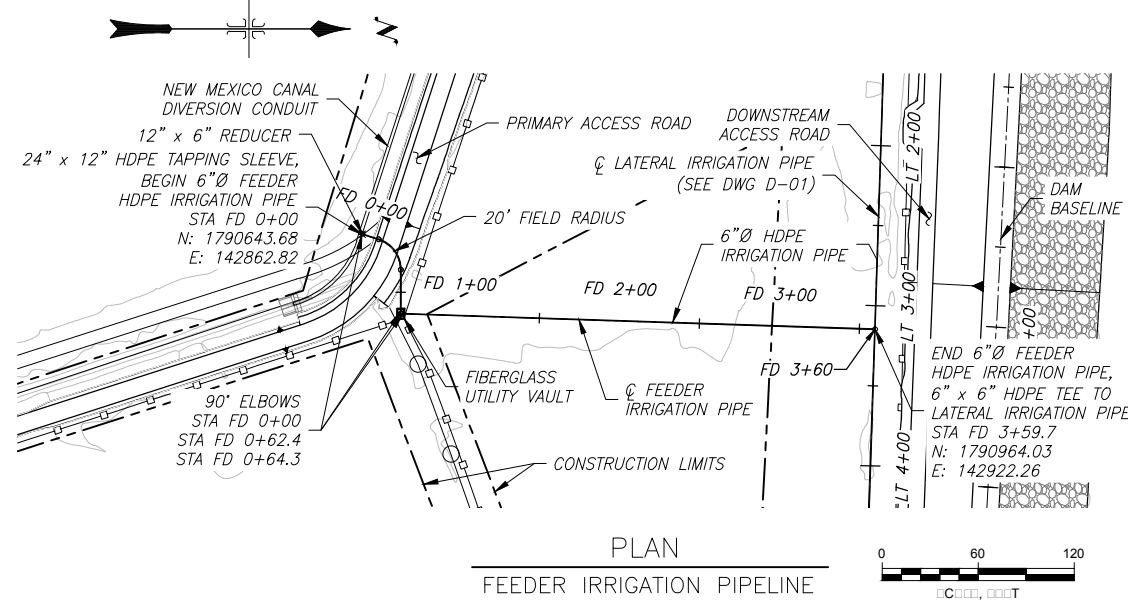
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\D-01-IRRIGATION PIPELINE PLAN AND PROFILE 1.DWG OCT 2015 JHEITLAND

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
 RED LAKE DAM MODIFICATIONS
 IRRIGATION PIPELINE
 PLAN AND PROFILE (1 OF 2)

DESIGNED: P. EGGERS
 DRAWN: J. HEITLAND
 CHECKED: C. MASCHING
 DESIGN APPROVAL: C. MASCHING
 INDEPENDENT TECHNICAL REVIEW: D. MILLER

IRRIGATION PIPELINE
 PLAN AND PROFILE
 (1 OF 2)

Drawing D-01
 SHEET 58 OF 75



NOTE
 1. CONTRACTOR TO PROVIDE PORTABLE DIESEL-POWERED SELF-PRIMING PUMP. GODWIN CD150M OR EQUIVALENT.

DETAIL 2
 UTILITY VAULT
 NOT TO SCALE

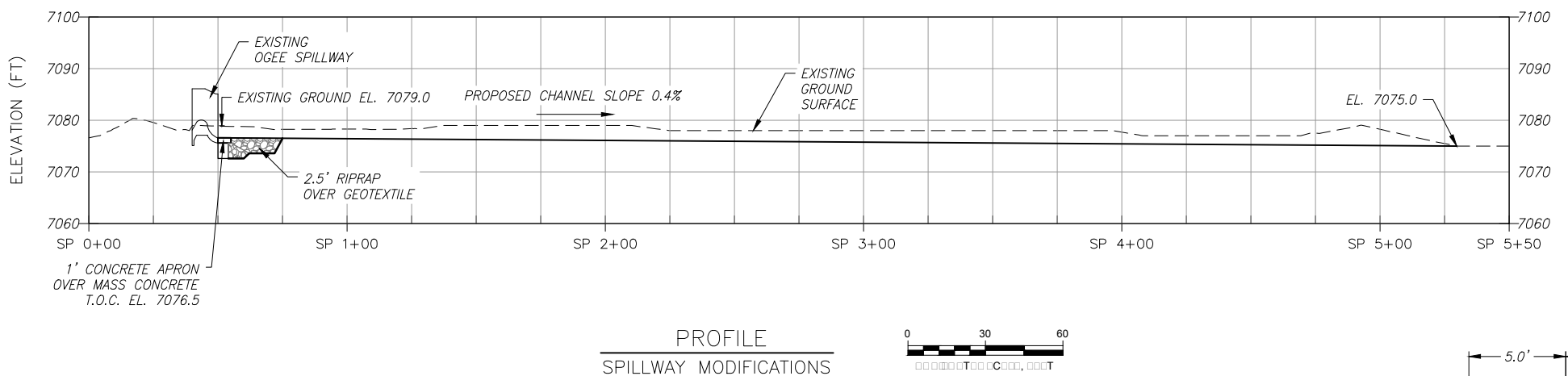
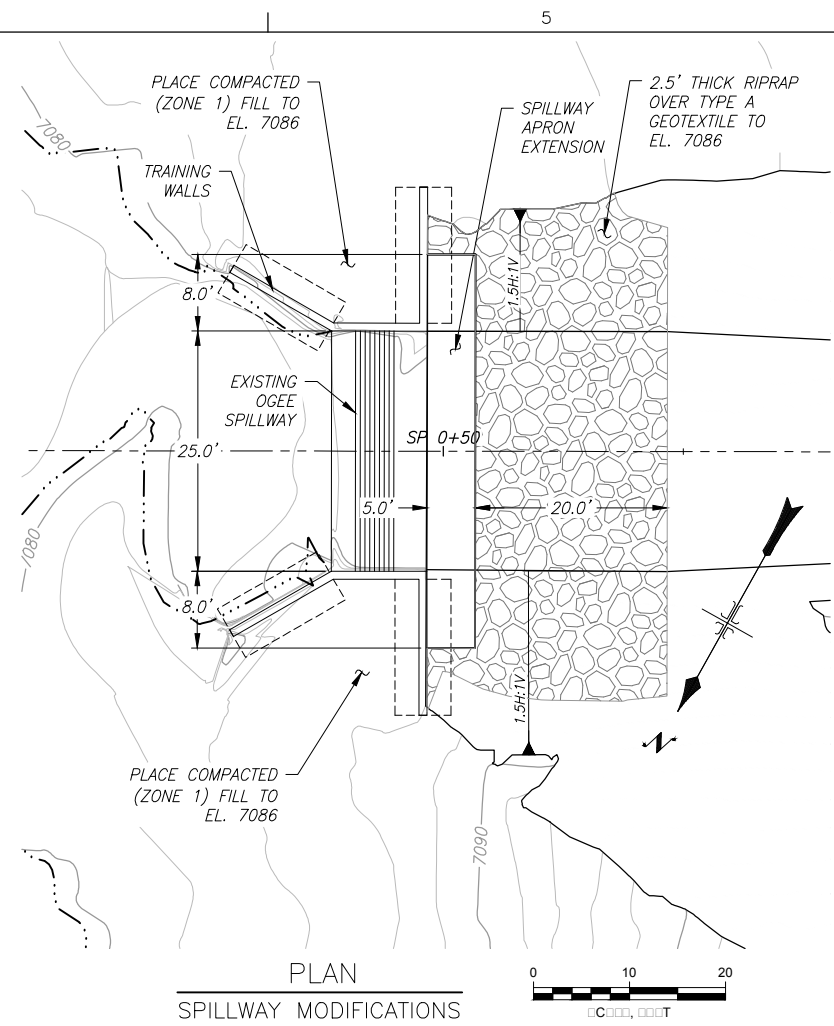
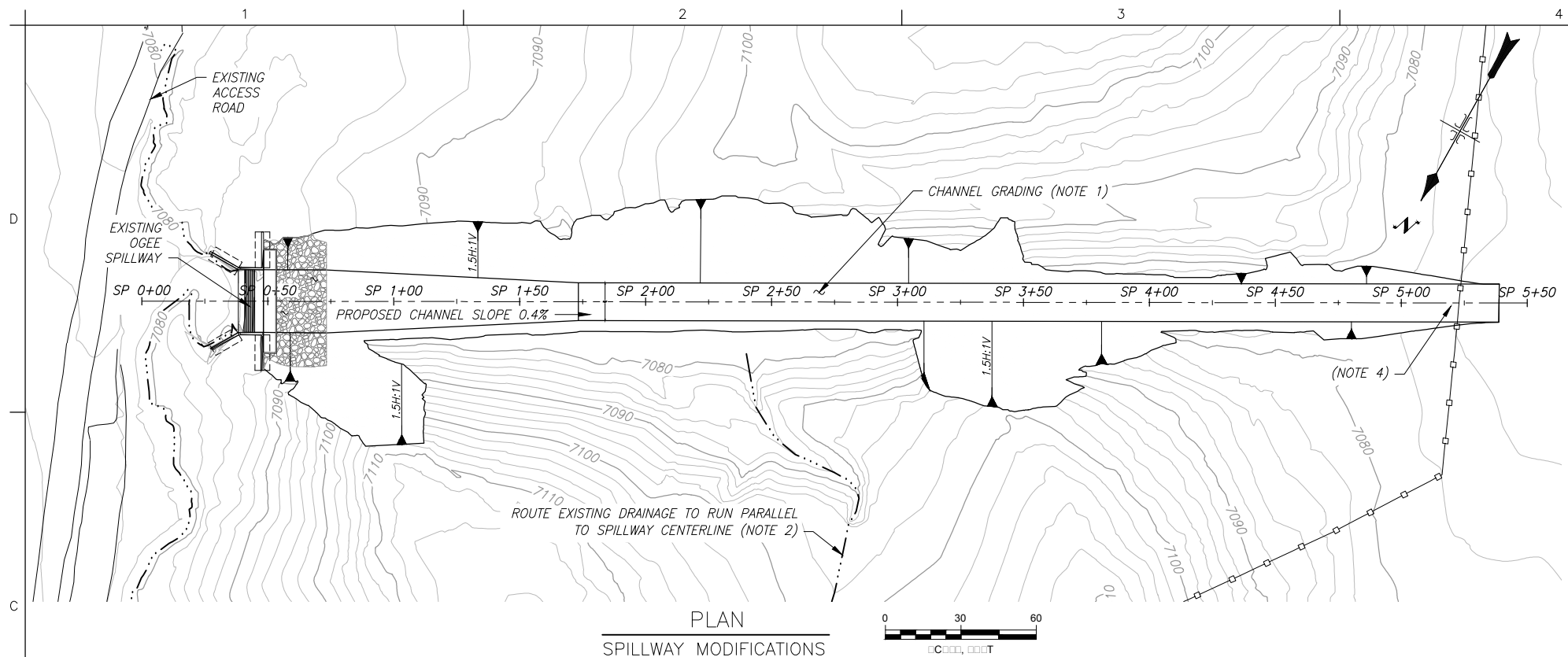
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 IRRIGATION PIPELINE
 PLAN AND PROFILE (2 OF 2)
 AND DETAILS

P. EGGERS
 DESIGNED
 J. HEITLAND
 DRAWN
 C. MASCHING
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

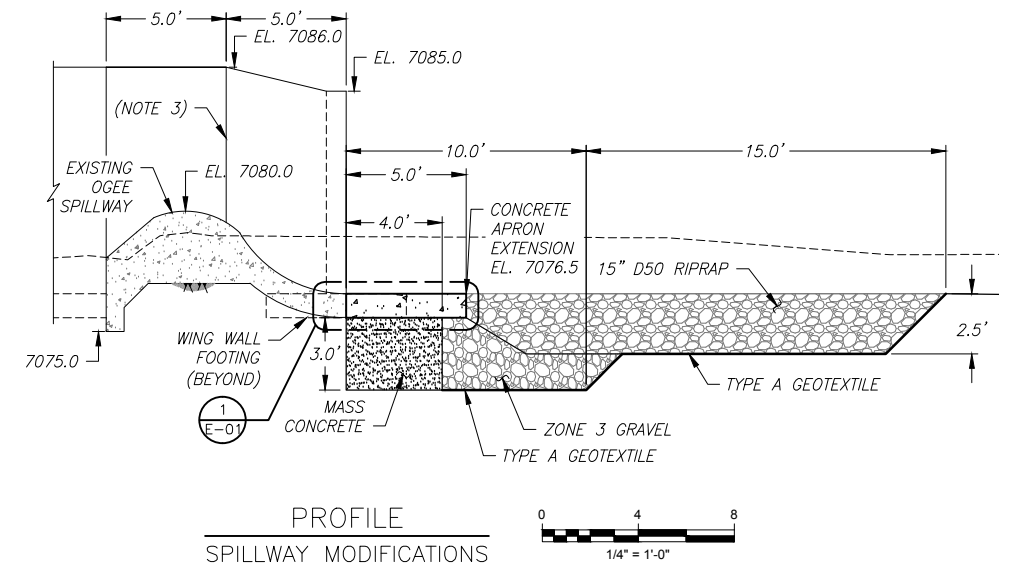
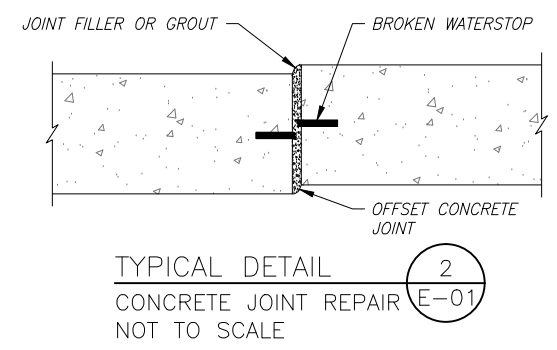
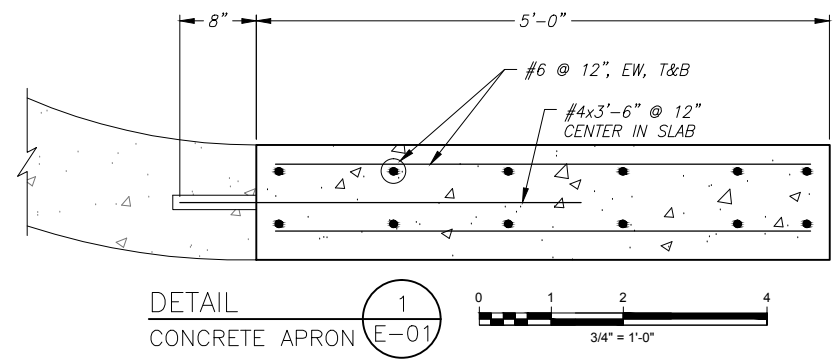
IRRIGATION PIPELINE
 PLAN AND PROFILE
 (2 OF 2) AND DETAILS

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\D-02-IRRIGATION PIPELINE PLAN AND PROFILE 2 AND DETAILS.DWG OCT 2015 JHEITLAND

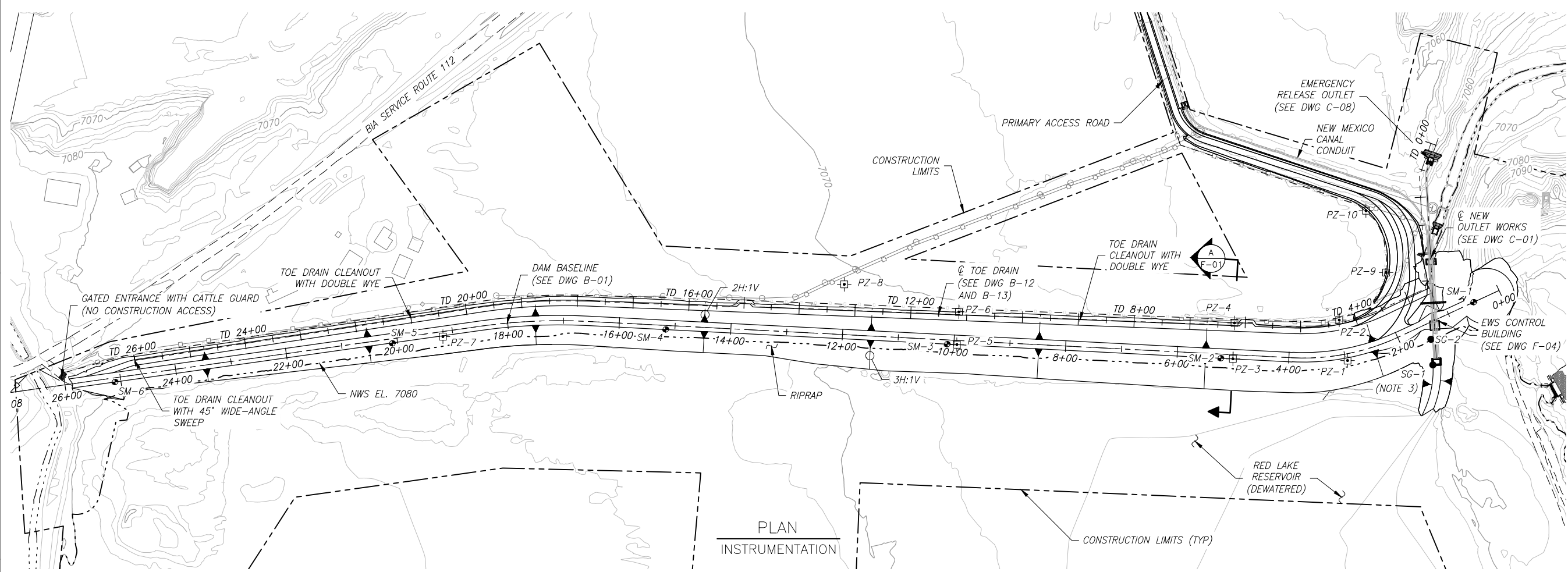
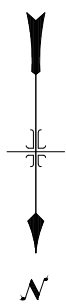
DESIGNED	R. PRICE / K. PRICE
DRAWN	R. PRICE / K. PRICE
CHECKED	P. EDGERS
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER



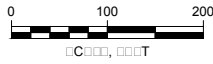
- NOTES**
1. PERFORM ALL EXCAVATIONS IN ACCORDANCE WITH OSHA AND LOCAL REGULATIONS. CONTRACTOR IS RESPONSIBLE FOR THE SAFETY OF ALL EXCAVATIONS.
 2. CONTRACTOR TO DESIGN SPILLWAY CHANNEL GRADING TO ALLOW EXISTING DRAINAGE TO DISCHARGE INTO CHANNEL NEAR STA. SP 2+50.
 3. CLEAN OPEN WALL JOINTS, THEN INJECT JOINT FILLER UNTIL FLUSH WITH TOP OF WALL. SEE SPECIFICATIONS FOR JOINT FILLER INFORMATION. SEE DETAIL 2/E-01 FOR ADDITIONAL INFORMATION.
 4. CONTRACTOR TO GRADE SPILLWAY CHANNEL TO TRANSITION TO THE EXISTING DRAINAGE NEAR STA. SP 5+25.



P:\1411470 - RED LAKE DAM (CIVIL) PRODUCTION DRAWINGS\WORKING DRAWINGS\E-01-SPILLWAY PLAN, PROFILE, AND SECTIONS.DWG OCT 2015 KPRICE



PLAN
INSTRUMENTATION

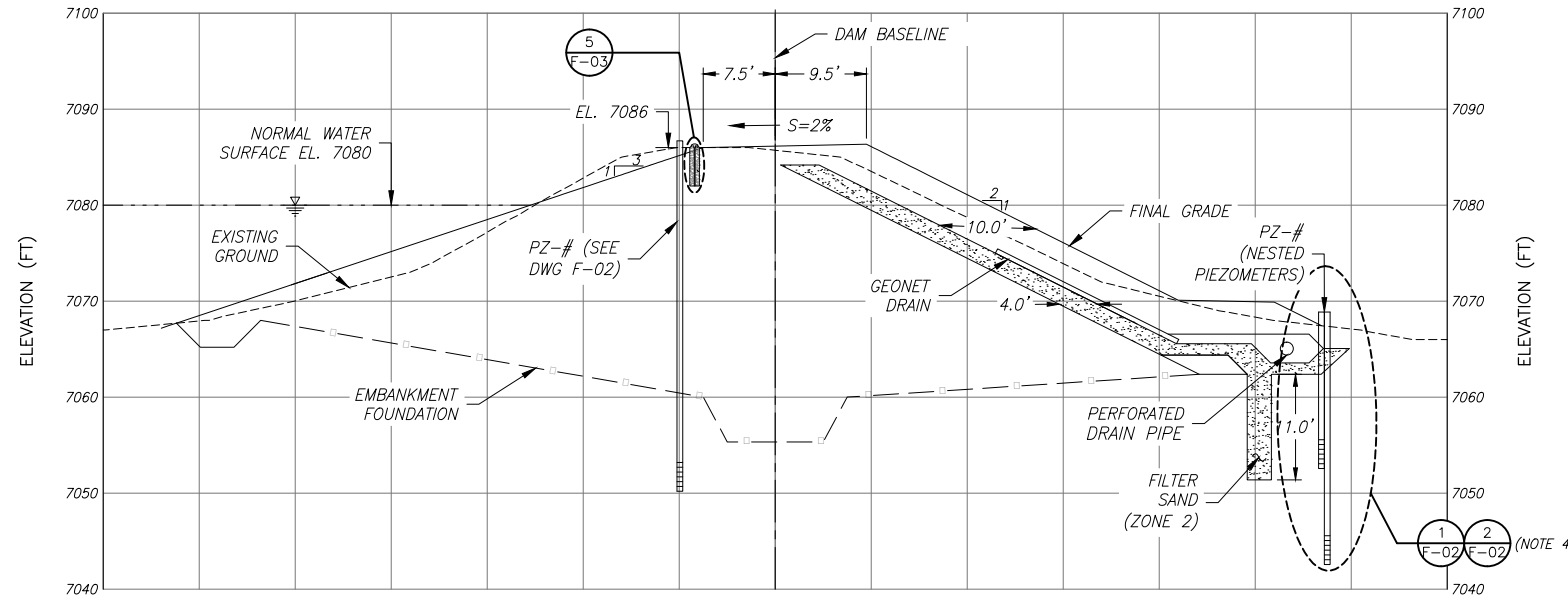


LEGEND

- ⊕ NEW PIEZOMETER
- NEW SURVEY MONUMENT
- NEW STAFF GAUGE

NOTES

1. SIX (6) SURVEY MONUMENTS SPACED APPROXIMATELY 500 FEET APART ON DAM CREST.
2. MANHOLES SPACED APPROXIMATELY 1000 FEET APART AND EQUIPPED WITH FLOW MEASURING WEIRS.
3. SEE DWGS C-05 AND C-07 FOR INTAKE STRUCTURE MOUNTED STAFF GAUGE DETAILS AND DETAILS 3 AND 4/F-02 AND 6/F-03 FOR EMBANKMENT STAFF GAUGE DETAILS.
4. SEE TABLE ON F-02 FOR PIEZOMETER DEPTHS AND TYPE.



TYPICAL SECTION
INSTRUMENTATION



INSTRUMENTATION POINTS			
Point #	Description	Northing	Easting
45	PZ-1	1791055.59	142616.25
46	PZ-2	1790983.18	142631.09
42	PZ-3	1791052.56	142821.43
48	PZ-4	1790988.23	142818.57
49	PZ-5	1791027.08	143315.52
62	PZ-6	1790968.51	143311.82
50	PZ-7	1791012.74	144235.26
51	PZ-8	1790919.26	143517.04
3	PZ-9	1790898.01	142547.14
5	PZ-10	1790787.37	142583.31
6	SG-1	1791063.43	142463.53
7	SG-2	1791017.56	142467.06
55	SM-1	1790951.10	142390.45
57	SM-2	1791051.45	142843.10
58	SM-3	1791026.20	143332.72
59	SM-4	1791000.00	143836.57
60	SM-5	1791024.80	144325.69
61	SM-6	1791093.99	144822.08

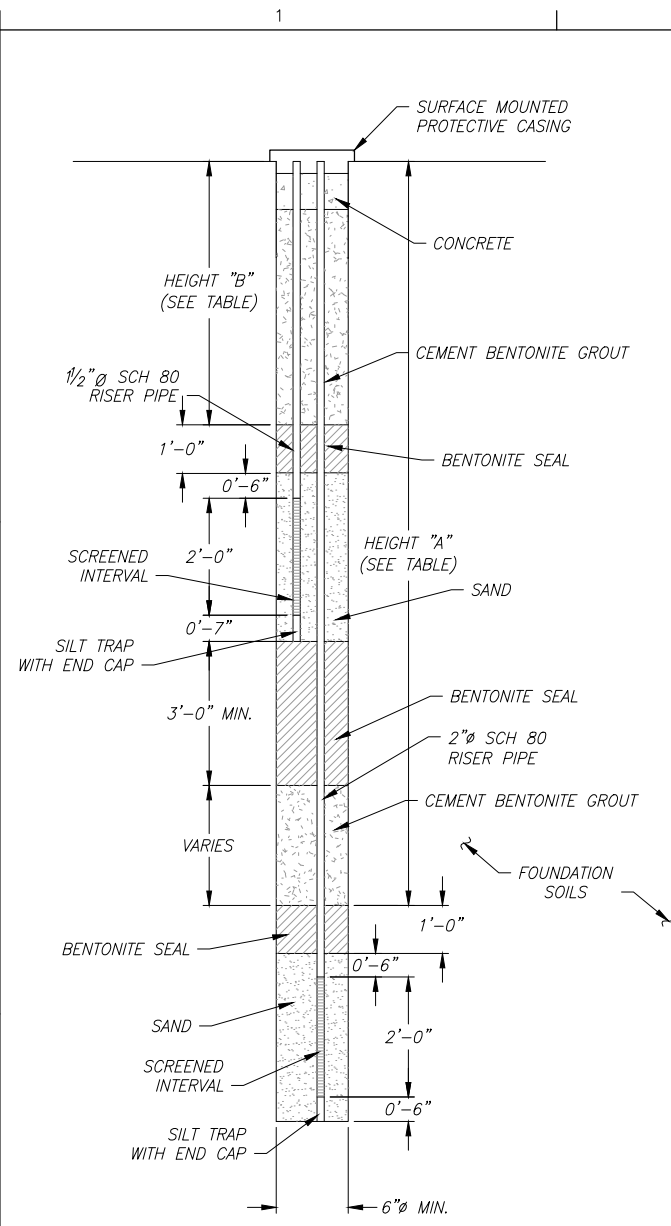
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INSTRUMENTATION PLAN
 AND TYPICAL SECTION

DESIGNED: A. LOCKMAN
 DRAWN: S. MICKELL
 CHECKED: P. EGGERS
 DESIGN APPROVAL: C. MASCHING
 INDEPENDENT TECHNICAL REVIEW: D. MILLER

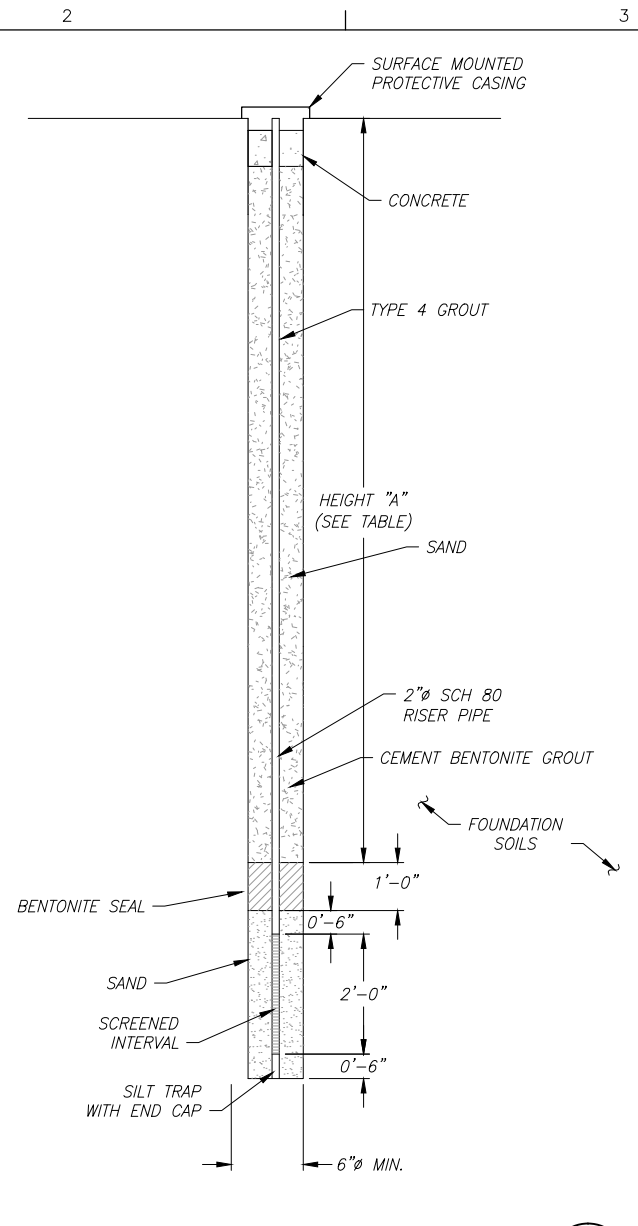
INSTRUMENTATION PLAN
AND TYPICAL SECTION

Drawing F-01

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-01-INSTRUMENTATION PLAN AND TYPICAL SECTION.DWG RPRICE OCT 2015



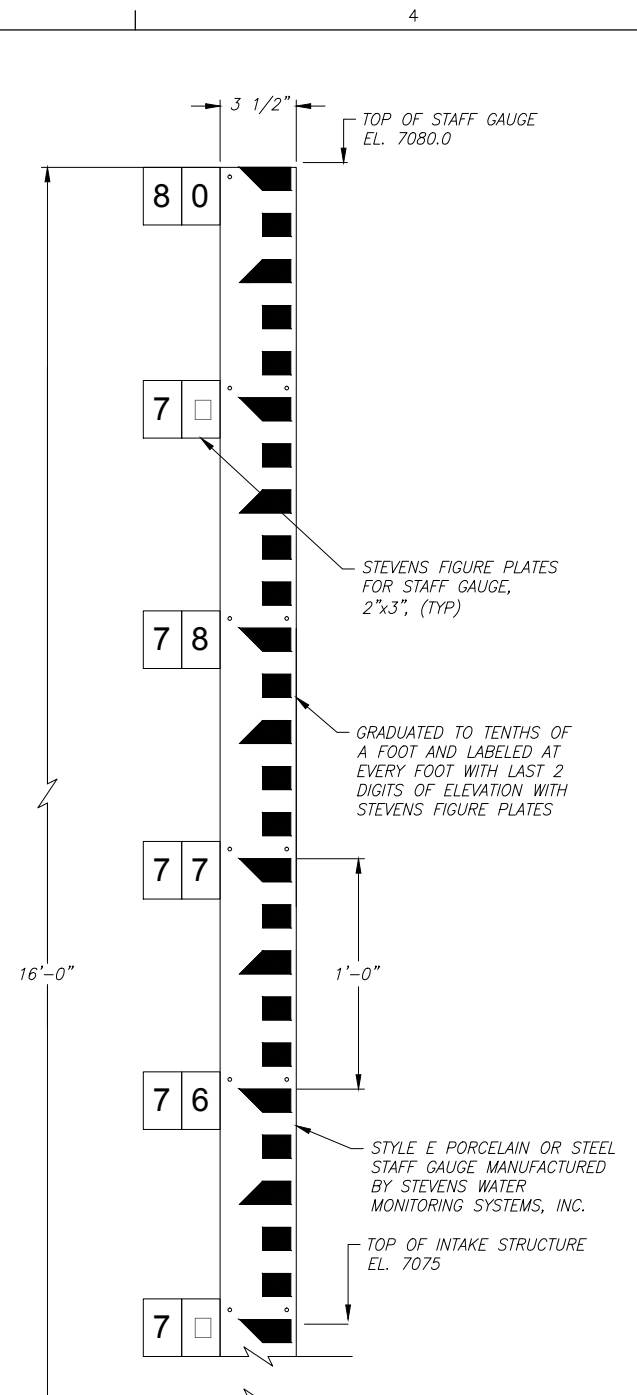
DETAIL 1
 TYPICAL DOUBLE LEVEL PIEZOMETER F-01
 NOT TO SCALE



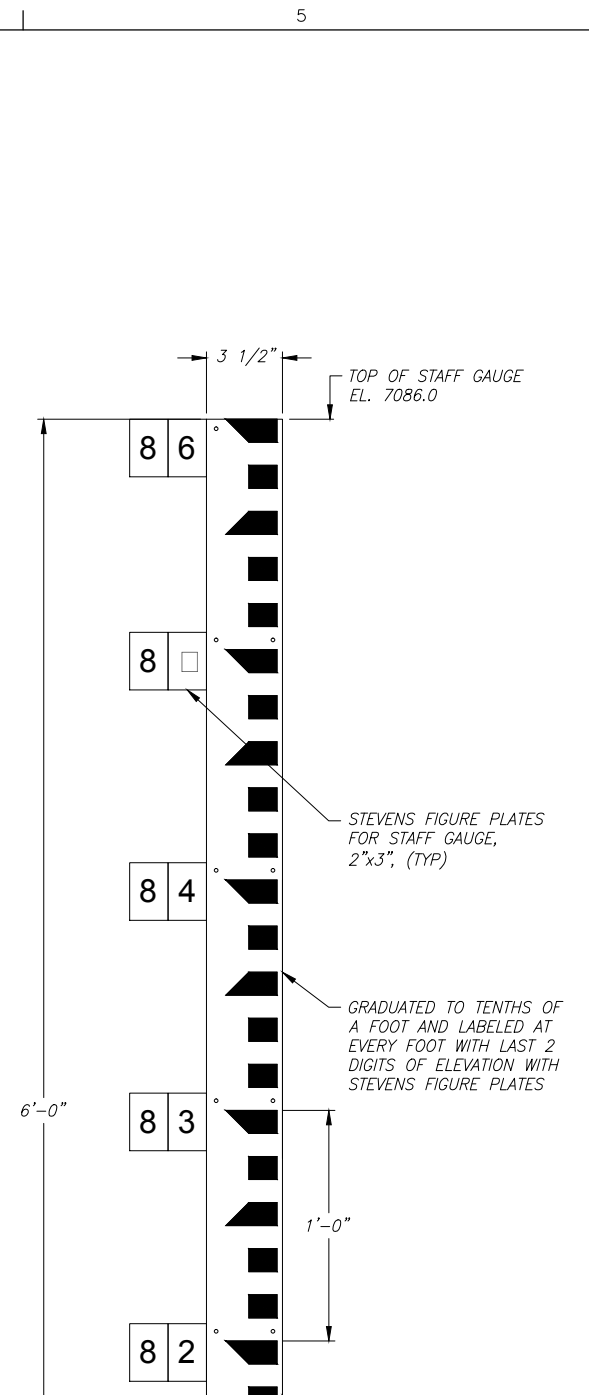
DETAIL 2
 TYPICAL SINGLE LEVEL PIEZOMETER F-01
 NOT TO SCALE

PIEZOMETERS			
BOREHOLE ID	SINGLE/DOUBLE	SCREEN INTERVAL (FEET BELOW GROUND SURFACE)	
		A	B
PZ-1	SINGLE	30-32	N/A
PZ-2	DOUBLE	18-20	10-12
PZ-3	SINGLE	30-32	N/A
PZ-4	DOUBLE	18-20	10-12
PZ-5	SINGLE	30-32	N/A
PZ-6	DOUBLE	18-20	10-12
PZ-7	SINGLE	15-17	N/A
PZ-8	SINGLE	10-12	N/A
PZ-9	SINGLE	10-12	N/A
PZ-10	SINGLE	10-12	N/A

1. ACTUAL DEPTHS MAY CHANGE BASED ON OBSERVATIONS DURING DRILLING.



DETAIL 3
 STAFF GAUGE MOUNTED ON INTAKE F-01
 NOT TO SCALE



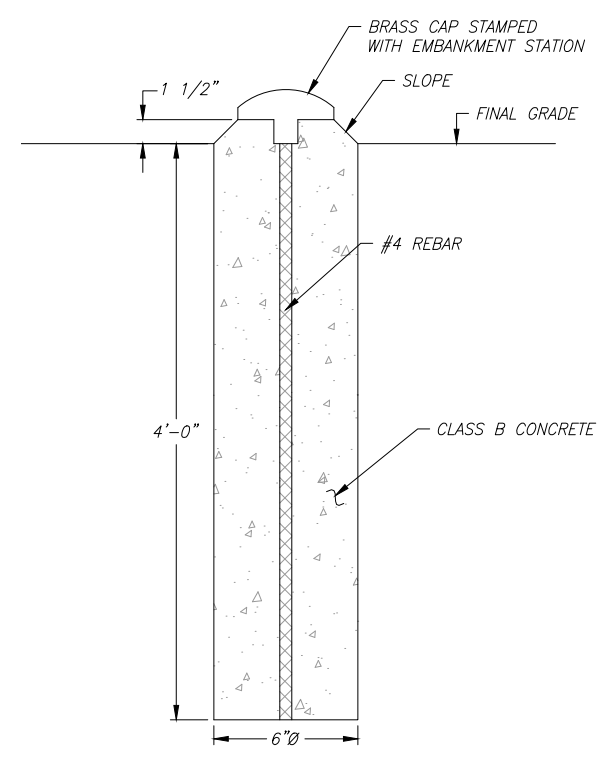
DETAIL 4
 STAFF GAUGE ON EMBANKMENT F-01
 NOT TO SCALE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INSTRUMENTATION DETAILS
 (1 OF 2)

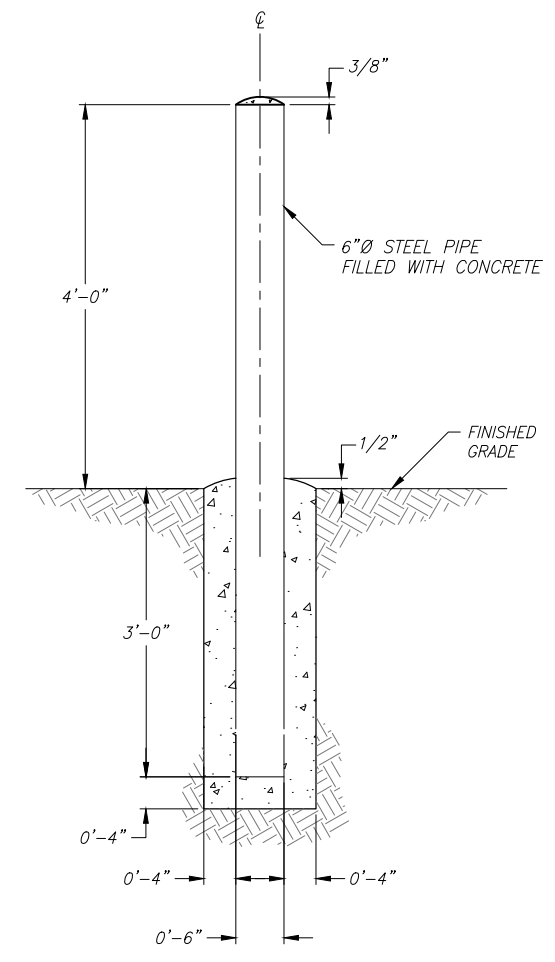
K. PRICE
 DESIGNED
 K. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

INSTRUMENTATION DETAILS
 (1 OF 2)

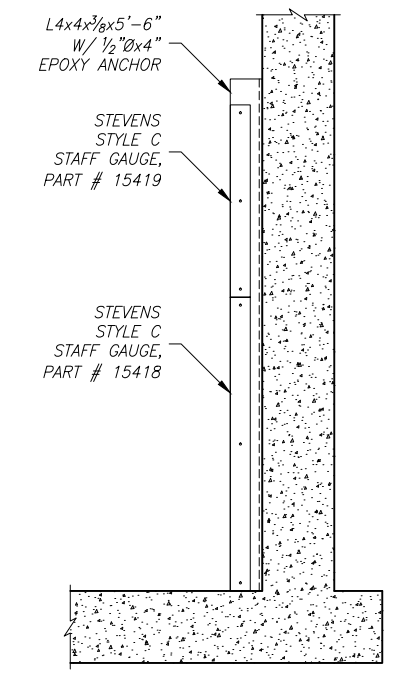
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-02-INSTRUMENTATION DETAILS (1 OF 2).DWG RPRICE OCT 2015



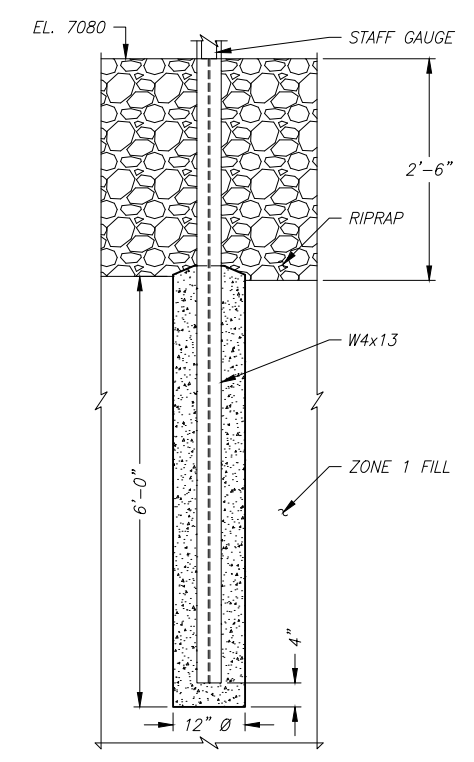
DETAIL 5
 SETTLEMENT MONITORING POINT
 NOT TO SCALE
 F-01



DETAIL 7
 TYPICAL BOLLARD
 NOT TO SCALE
 B-14



DETAIL 8
 INSPECTION WELL STAFF GAUGE
 NOT TO SCALE
 B-15



DETAIL 6
 EMBANKMENT STAFF GAUGE MOUNT
 NOT TO SCALE
 F-01

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 INSTRUMENTATION DETAILS
 (2 OF 2)

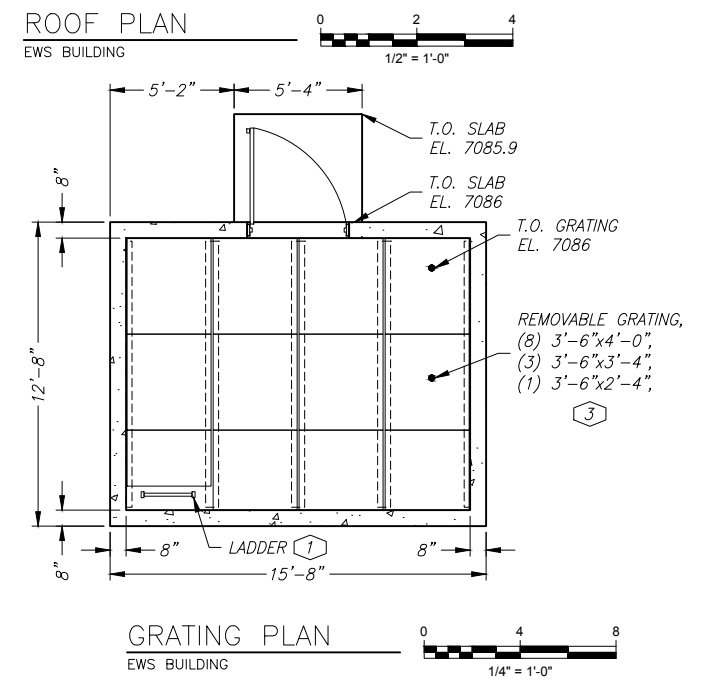
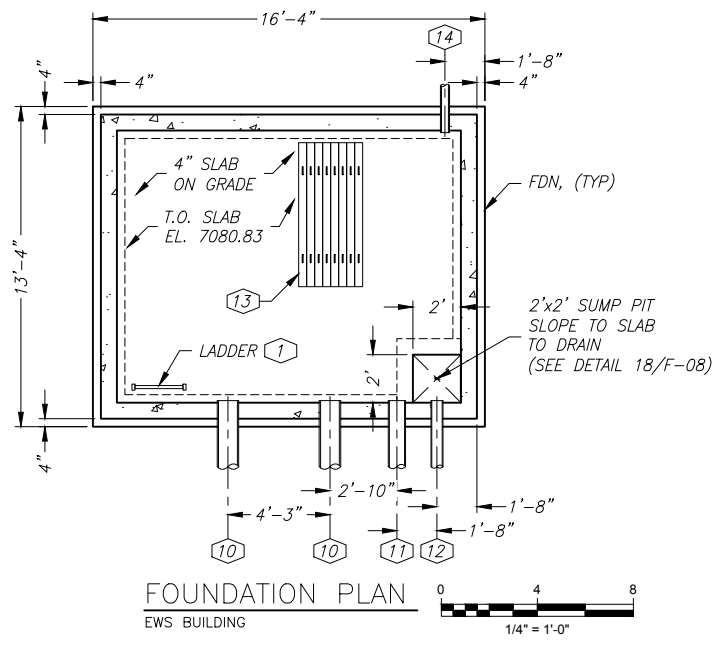
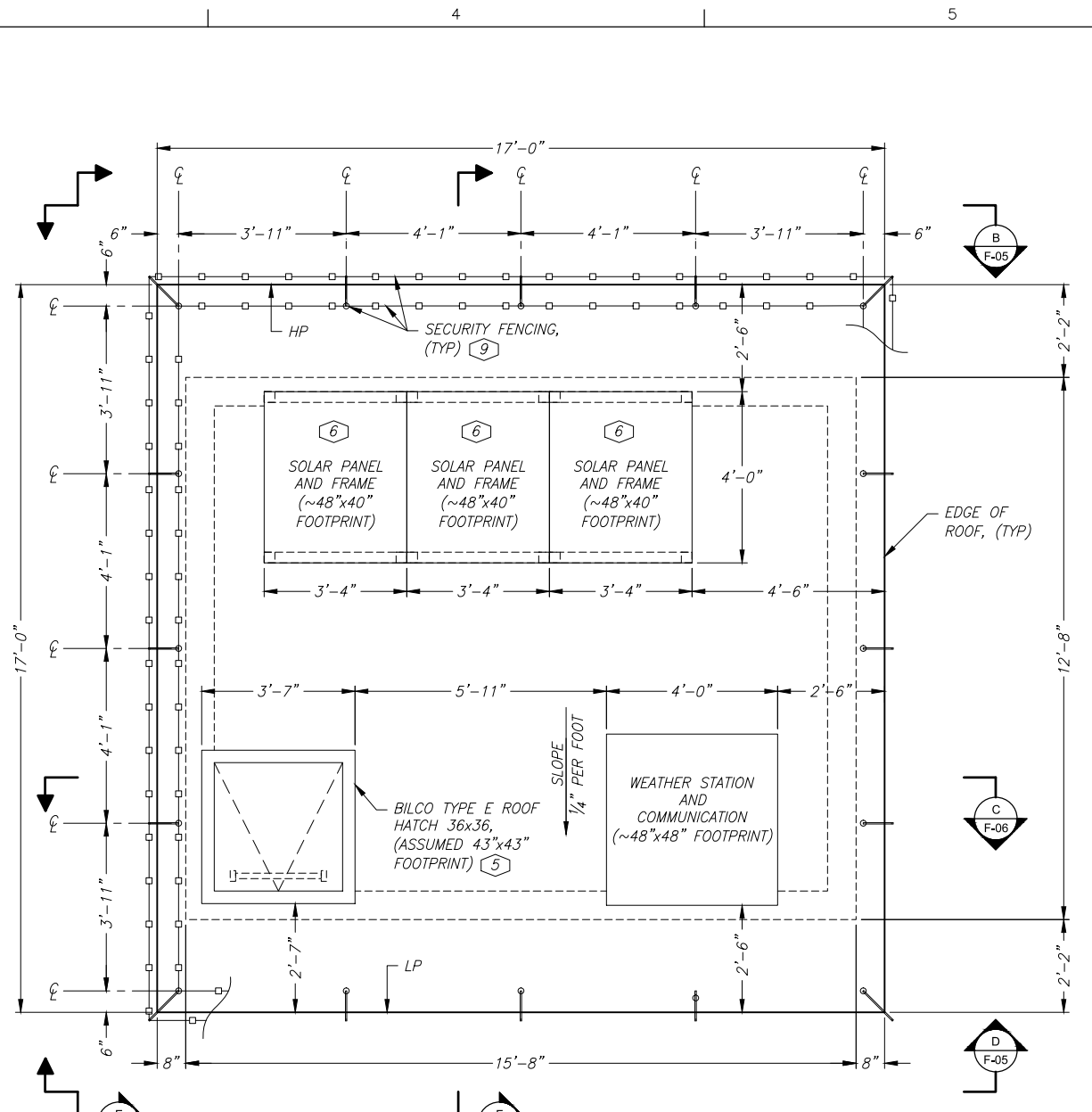
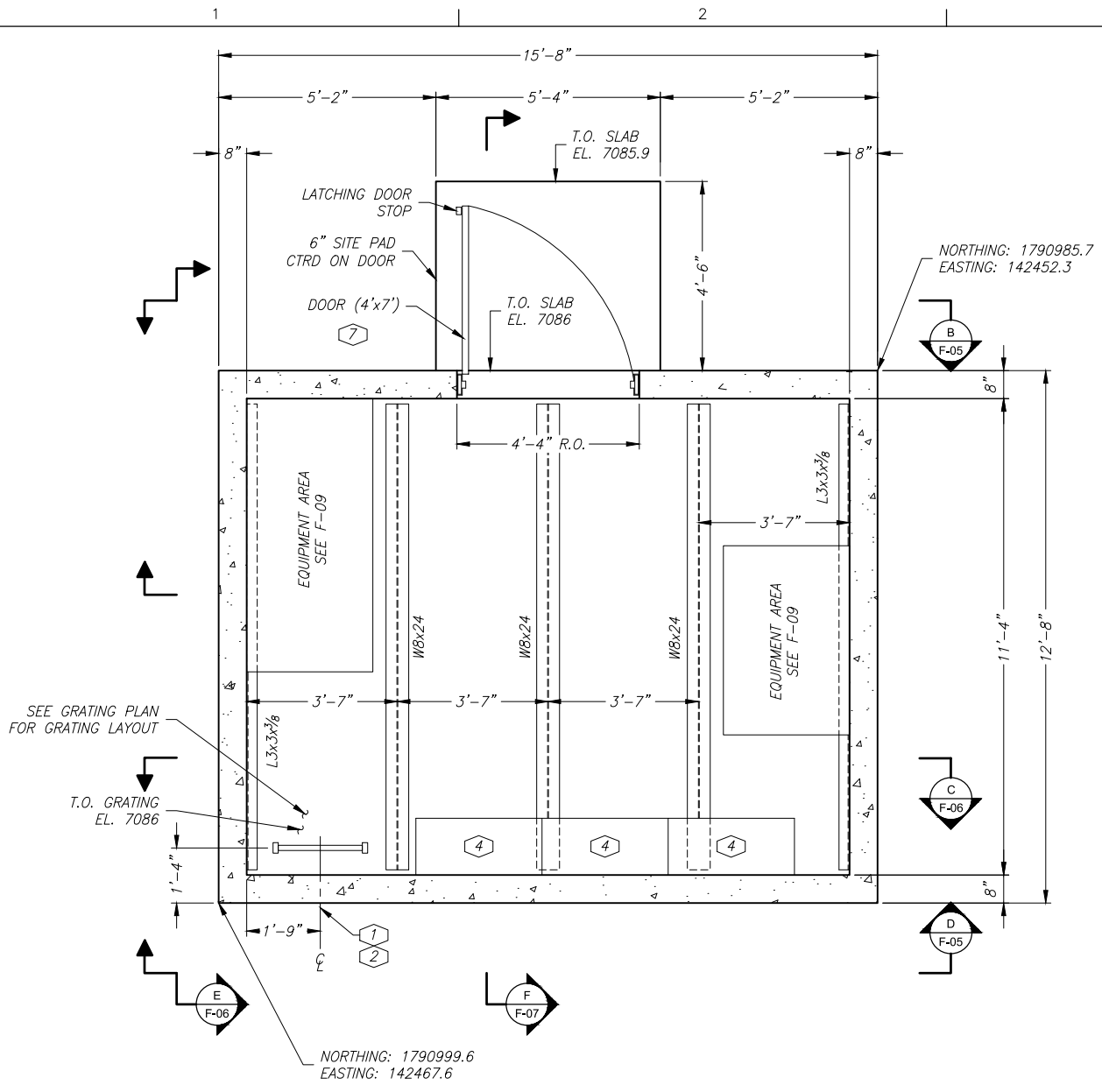
REV NO 0
 OCTOBER 2, 2015
 ISSUED FOR SOLICITATION

K. PRICE
 DESIGNED
 K. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 T. SCHUTTER
 INDEPENDENT TECHNICAL REVIEW

INSTRUMENTATION DETAILS
 (2 OF 2)

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-03-INSTRUMENTATION DETAILS (2 OF 2).DWG RPRICE OCT 2015

DESIGNED	R. PRICE
DRAWN	R. PRICE
CHECKED	P. EGGERS
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER



- KEYNOTES**
- ACCESS LADDER TO ROOF HATCH AND BELOW GRATING. SEE SPECIFICATION 05 50 00.
 - ACCESS LADDER ADJUSTABLE EXTENSION. SEE SPECIFICATION 05 50 00.
 - CONTROL BUILDING FLOOR CONSISTING OF 1 1/4" x 3/16" REMOVABLE ALUMINUM GRATING. WEIGHT OF EACH REMOVABLE SECTION SHALL NOT EXCEED 50 POUNDS. EACH PANEL TO BE FASTENED TO SUPPORT BEAM OR INSTALLED WITH STOP PLATES ON BEAM TO PREVENT SLIDING IN ALL DIRECTIONS. PROVIDE STRAP REINFORCED BLOCKOUTS FOR LADDER. SEE SPECIFICATION 05 50 00.
 - HYDRAULIC POWER UNIT (HPU). MOUNT 32" ABOVE GRATING. SEE SPECIFICATION 35 23 15.
 - ROOF ACCESS HATCH, SEE SPECIFICATION 07 72 33.
 - SOLAR PANEL, SEE SPECIFICATION 48 14 00.
 - BALLISTIC RESISTANT ACCESS DOOR, SEE DETAIL 11 ON DWG F-07 AND SPECIFICATION 08 30 00.
 - BALLISTIC RESISTANT FIXED LOUVER, SEE DETAIL 9 ON DWG F-07 AND SPECIFICATION 23 37 01
 - ROOF ACCESS PERIMETER SECURITY FENCING, SEE DETAIL 21 ON DWG F-09 SPECIFICATION 32 31 10.
 - CENTERLINE OF 10"Ø HDPE CARRIER PIPES FOR HYDRAULIC LINES.
 - CENTERLINE OF 8"Ø HDPE CARRIER PIPES FOR HYDRAULIC LINES.
 - CENTERLINE OF 6"Ø PVC PIPE TO DRAIN TO RESERVOIR.
 - STOP LOG STORAGE BELOW GRATING (3'x4'x6')
 - CENTERLINE OF 4"Ø PVC PIPE TO VAULT
 - HYDRAULIC ACCUMULATOR

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-04-EARLY WARNING SYSTEM BUILDING PLANS.DWG OCT 2015 RPRICE

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-05-EARLY WARNING SYSTEM BUILDING ELEVATIONS.DWG OCT 2015 RPRICE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

EARLY WARNING SYSTEM
 BUILDING ELEVATIONS

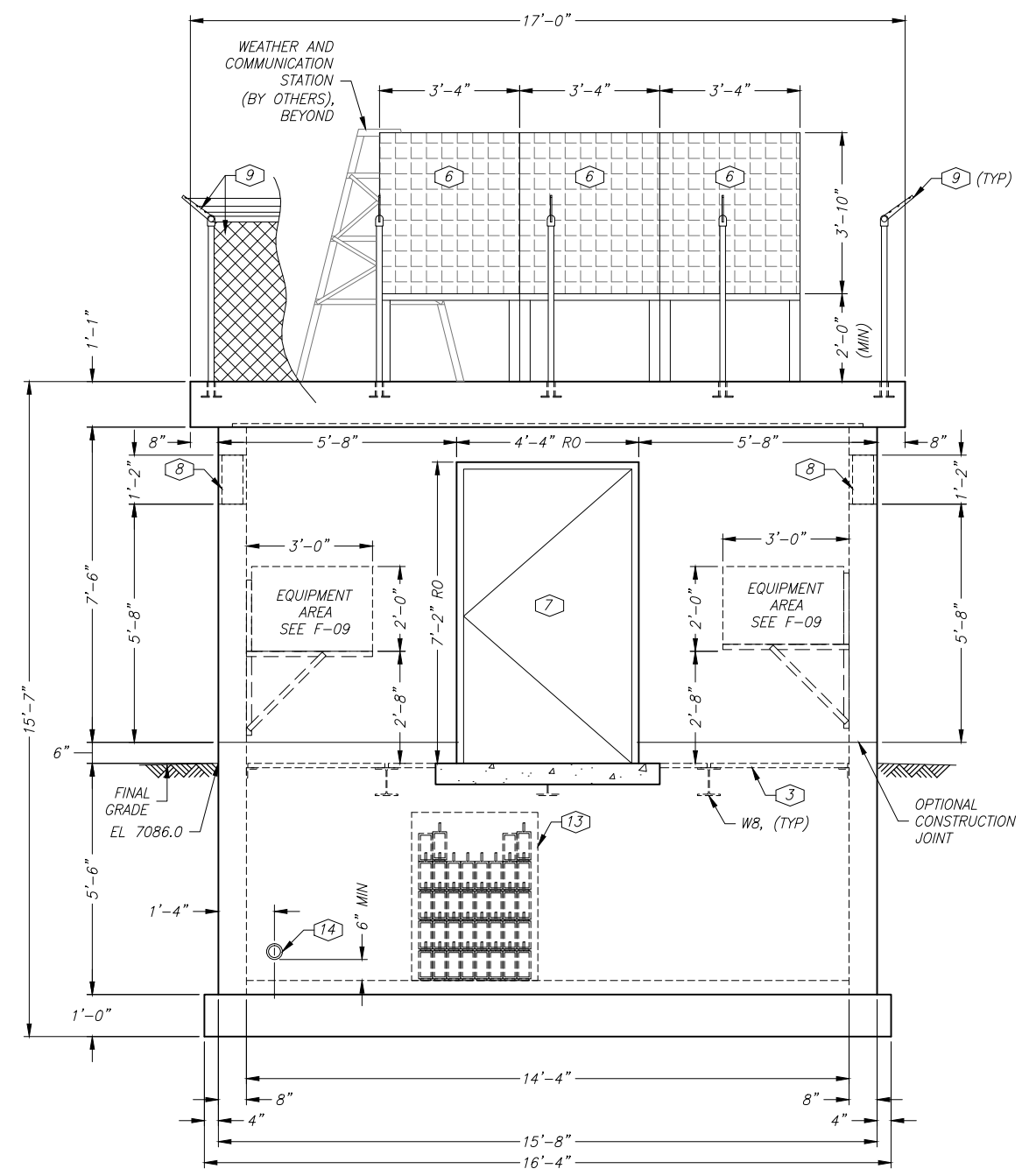
ISSUED FOR SOLICITATION
 OCTOBER 2, 2015
 0

DESIGNED	R. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

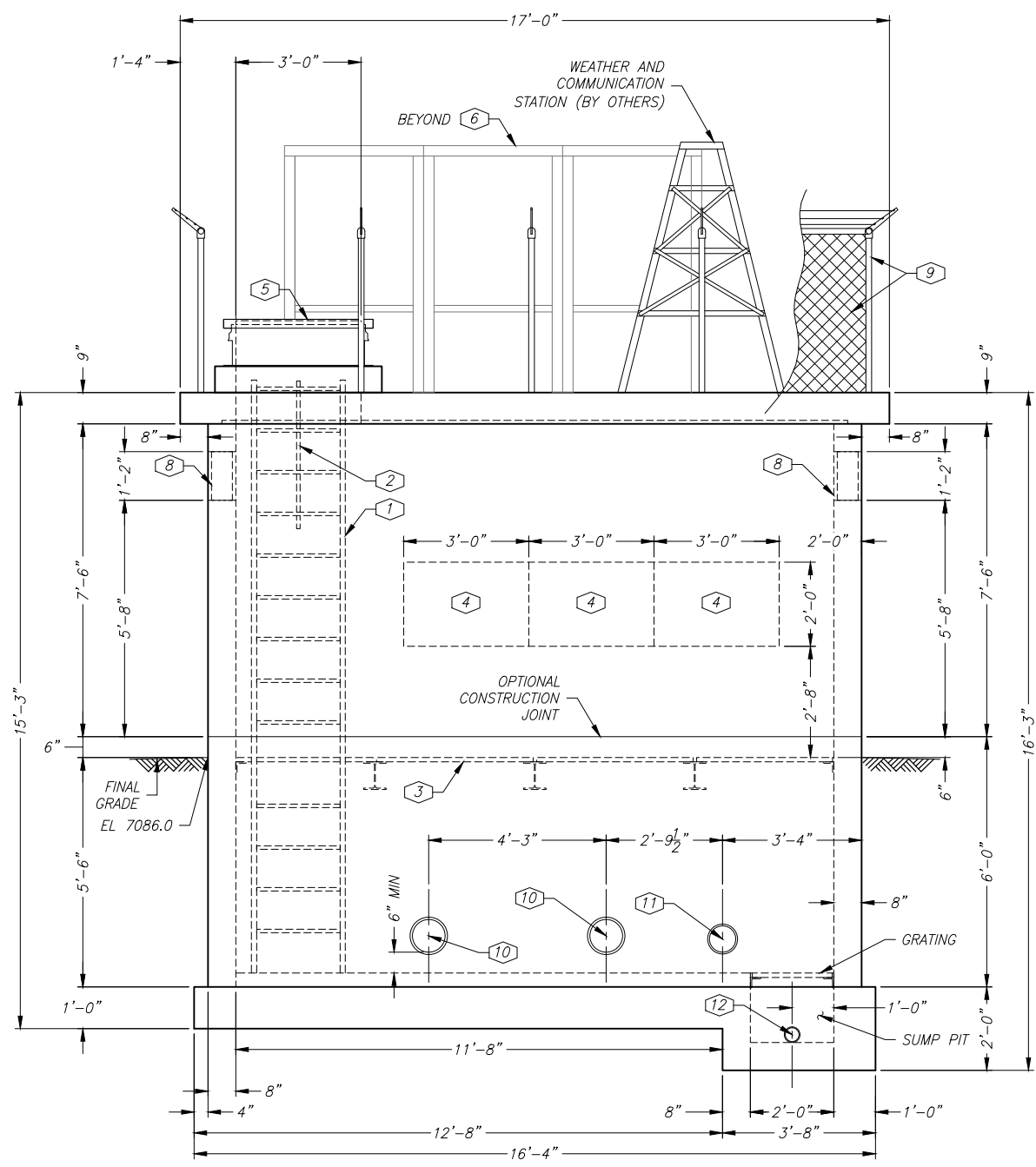
EARLY WARNING SYSTEM
 BUILDING ELEVATIONS

Drawing F-05

SHEET 65 OF 75



ELEVATION SOUTH FACE
 B
 F-04
 0 2 4
 1/2" = 1'-0"



ELEVATION NORTH FACE
 D
 F-04
 0 2 4
 1/2" = 1'-0"

KEYNOTES
 SEE DRAWING F-04.

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-06-EARLY WARNING SYSTEM BUILDING SECTIONS.DWG OCT 2015 RPRICE

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

EARLY WARNING SYSTEM
BUILDING SECTIONS

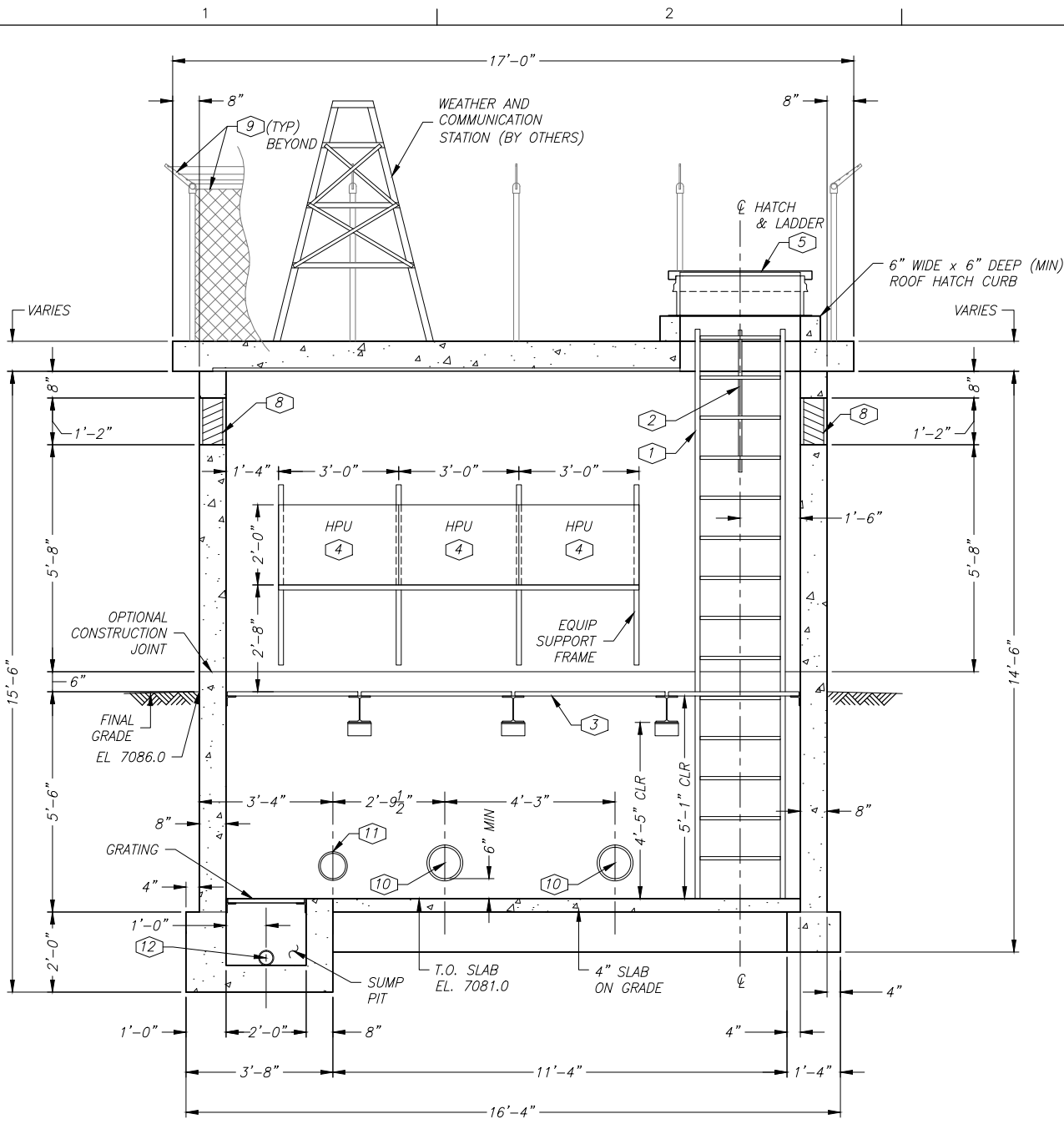
ISSUED FOR SOLICITATION
OCTOBER 2, 2015

R. PRICE
DESIGNED
R. PRICE
DRAWN
P. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

EARLY WARNING SYSTEM
BUILDING SECTIONS

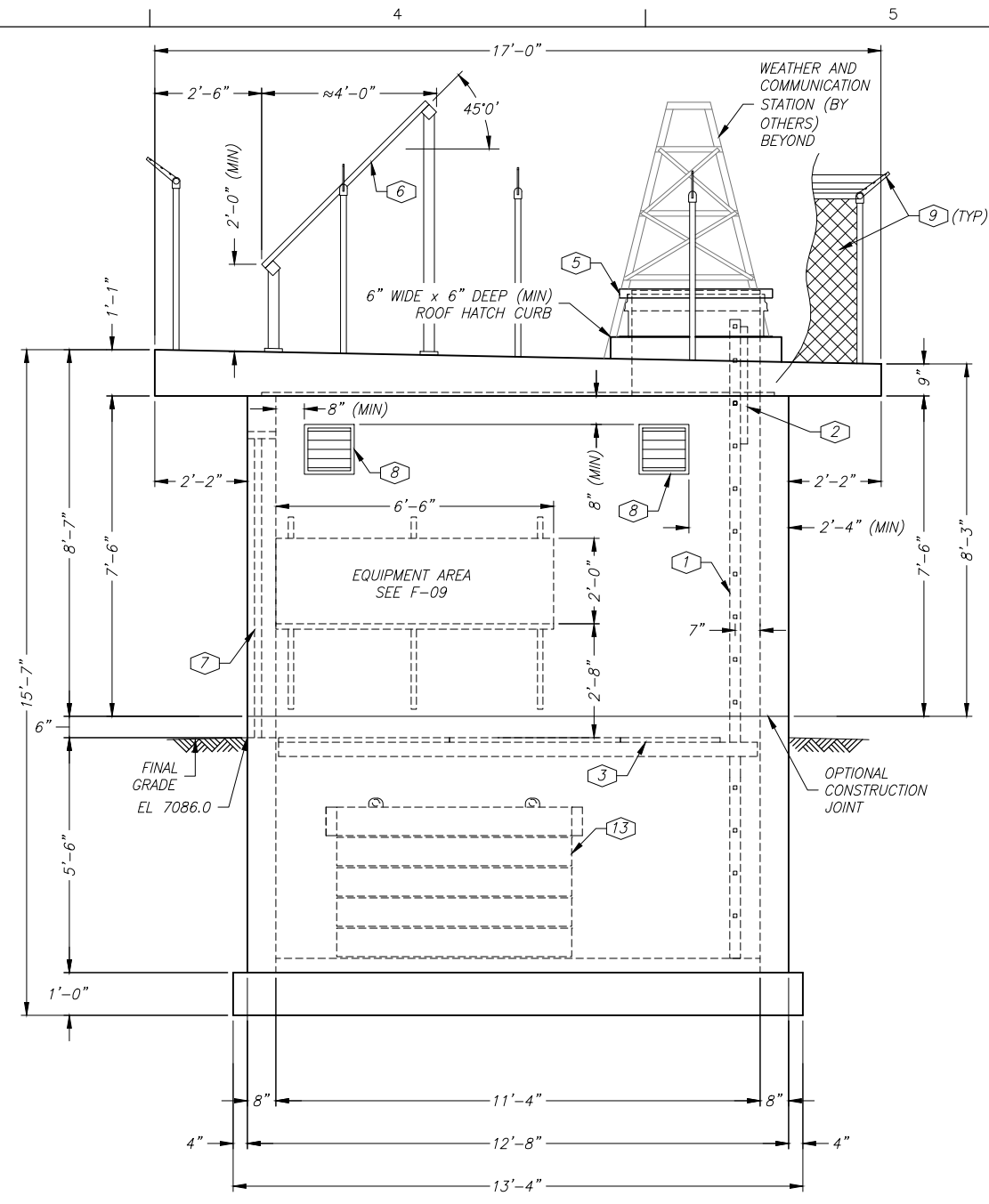
Drawing F-06

SHEET 66 OF 75



SECTION PERPENDICULAR TO CONDUITS **F-04**
0 2 4
1/2" = 1'-0"

KEYNOTES
SEE DRAWING F-04.

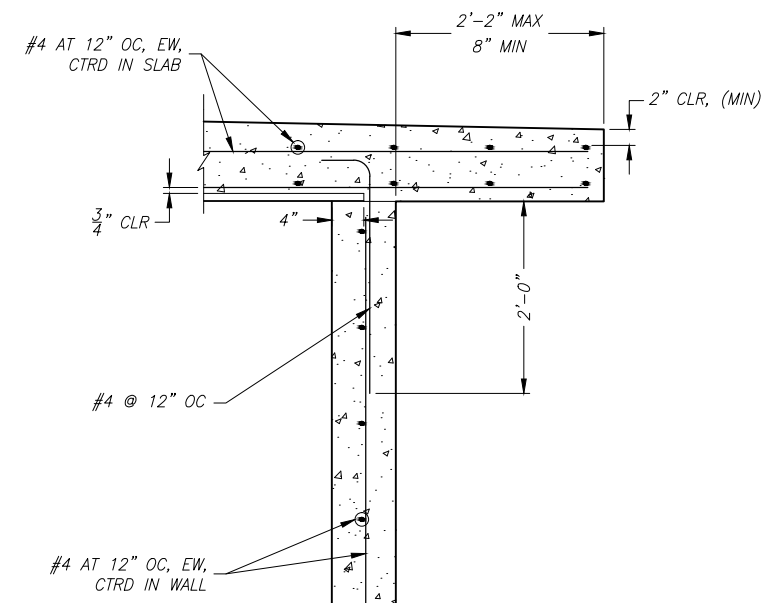


ELEVATION EAST FACE **F-04**
0 2 4
1/2" = 1'-0"

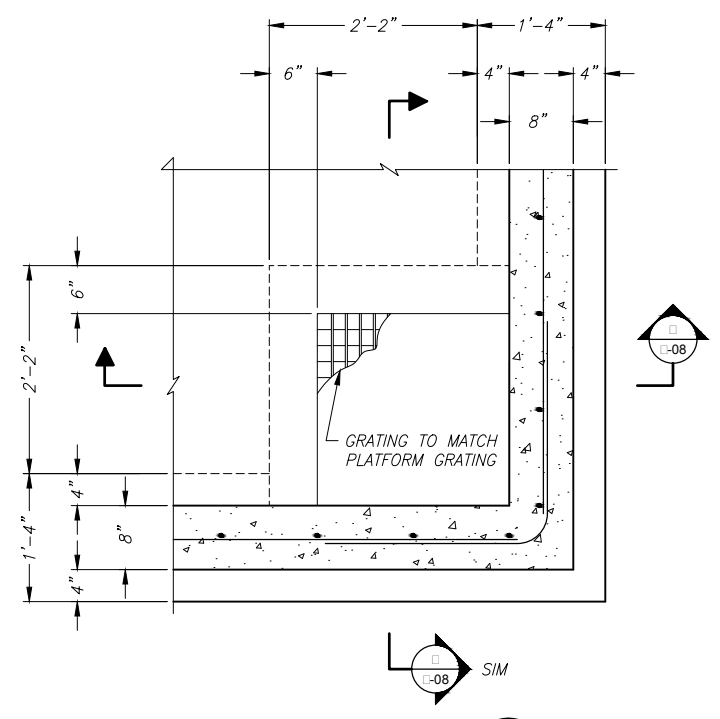
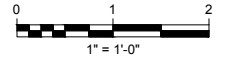
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-08-EARLY WARNING SYSTEM BUILDING STRUCTURAL DETAILS.DWG RPRICE OCT 2015

REV NO 0
 OCTOBER 2, 2015
 ISSUED FOR SOLICITATION

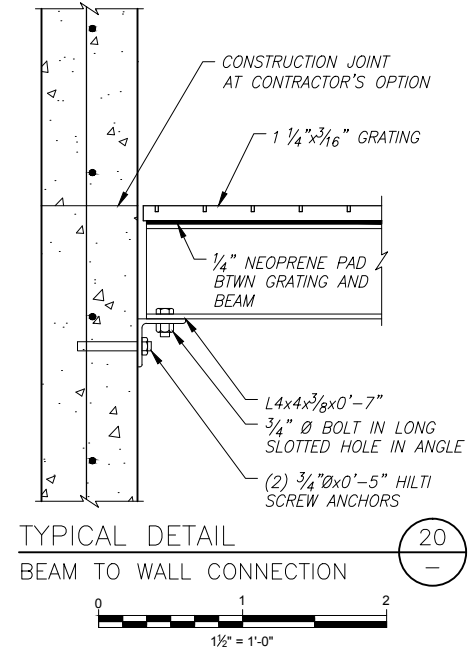
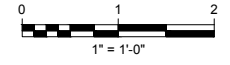
R. PRICE
 DESIGNED
 R. PRICE
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW



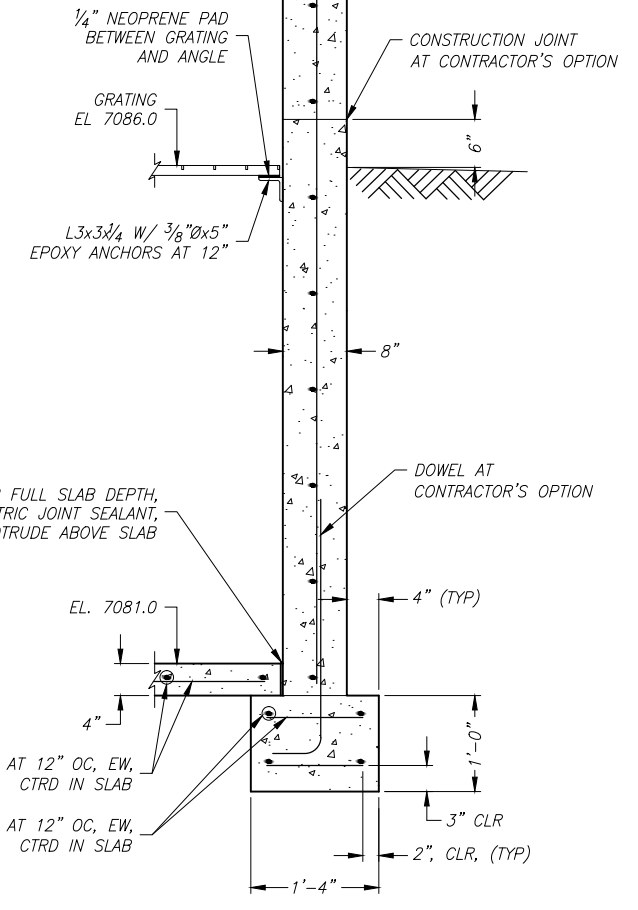
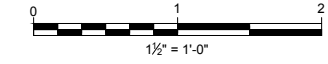
SECTION
 TYPICAL REINFORCEMENT
 G



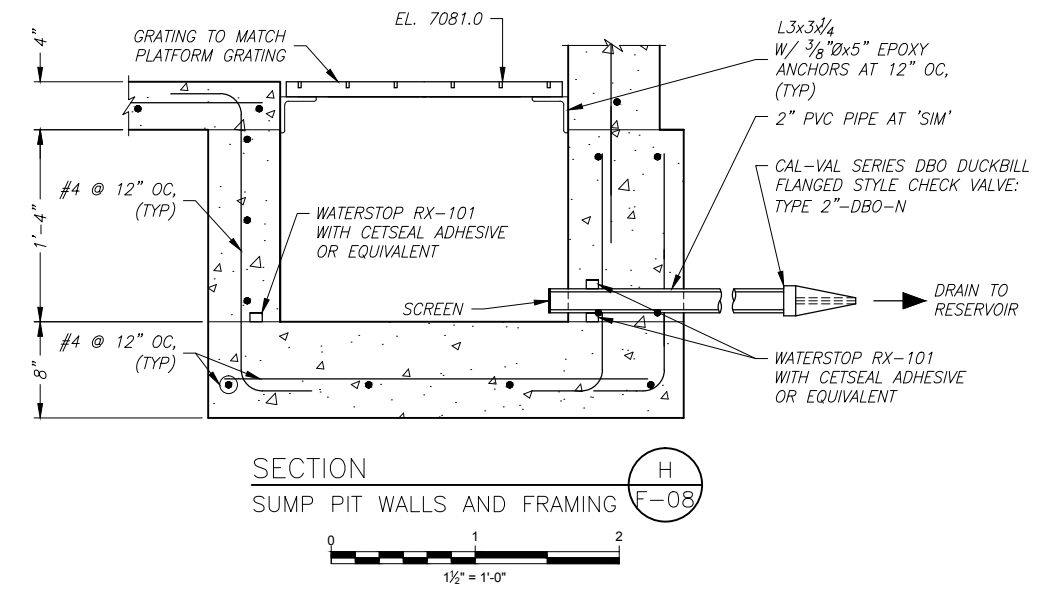
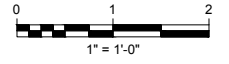
DETAIL
 SUMP PIT LAYOUT
 18
 F-04



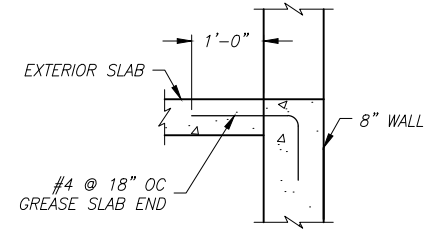
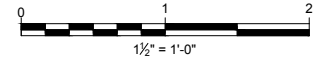
TYPICAL DETAIL
 BEAM TO WALL CONNECTION
 20



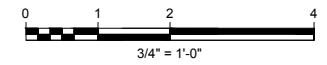
SECTION
 TYPICAL REINFORCEMENT
 G



SECTION
 SUMP PIT WALLS AND FRAMING
 H
 F-08

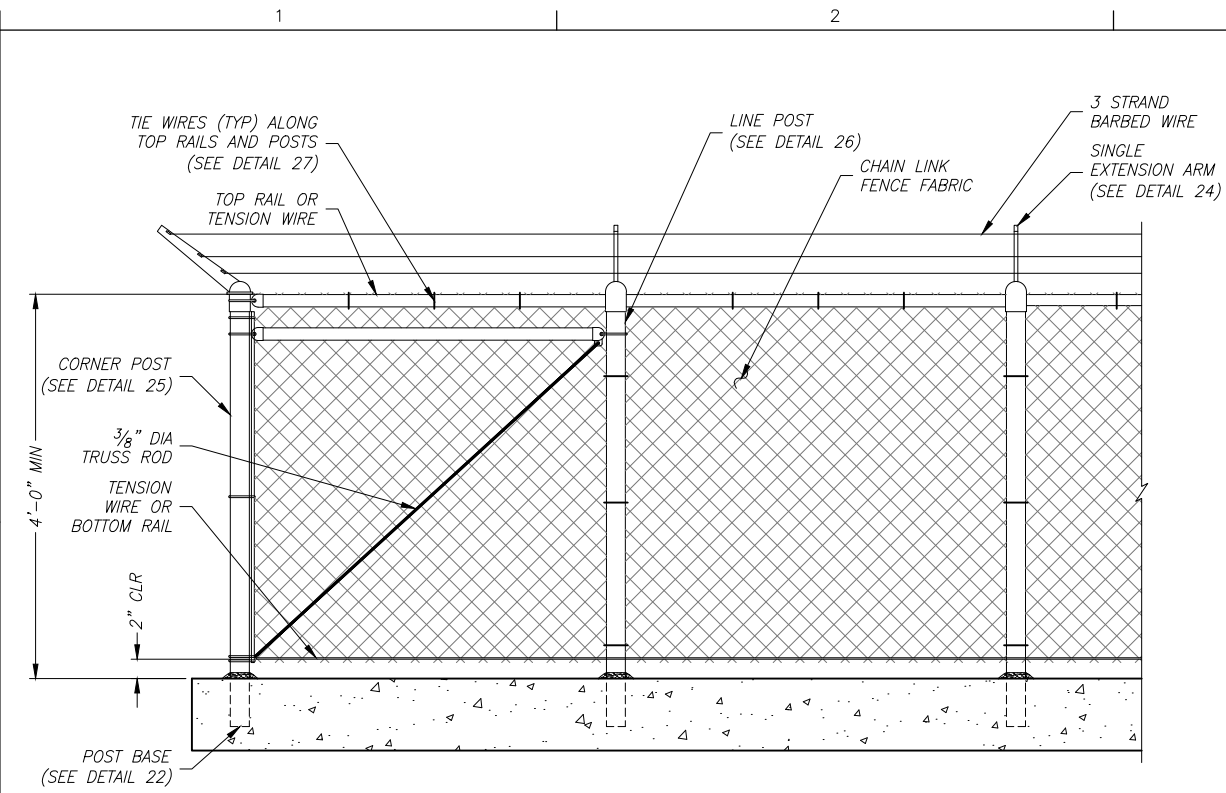


TYPICAL DETAIL
 CONCRETE WALL TO SITE SLAB
 19

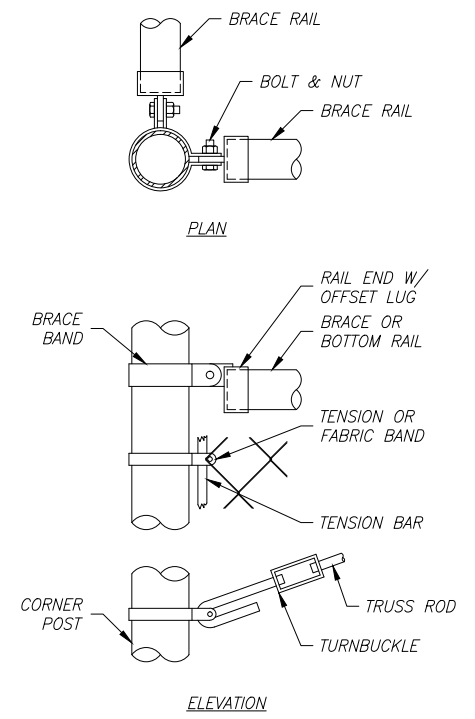


DESIGNED	R. PRICE
DRAWN	P. EGGERS
CHECKED	C. MASCHING
DESIGN APPROVAL	D. MILLER
INDEPENDENT TECHNICAL REVIEW	

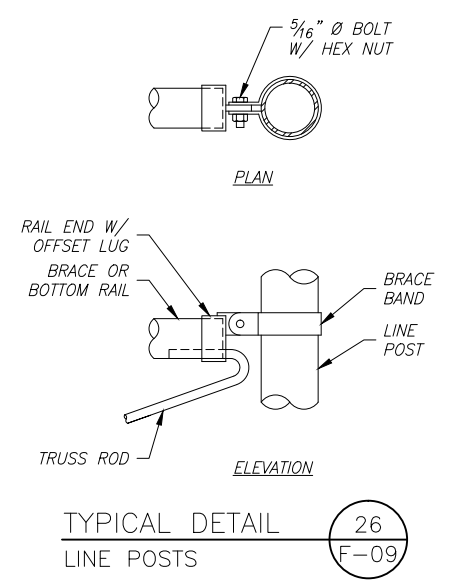
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-09-EARLY WARNING SYSTEM BUILDING SECURITY FENCING.DWG SEP 2015 MKIMBLE



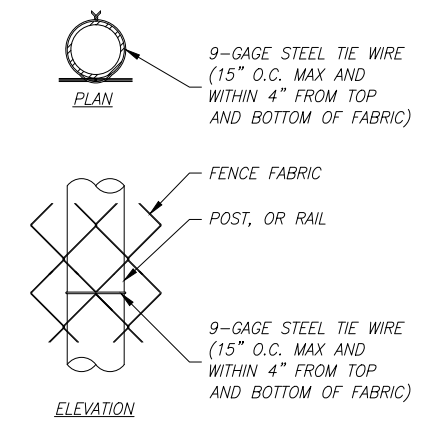
TYPICAL DETAIL 21
 FENCE AND CORNER PANEL ELEVATION (F-04, F-05, F-06, F-07)



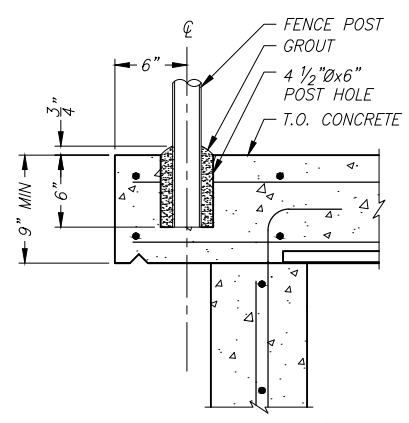
TYPICAL DETAIL 25
 CORNER POSTS (F-09)



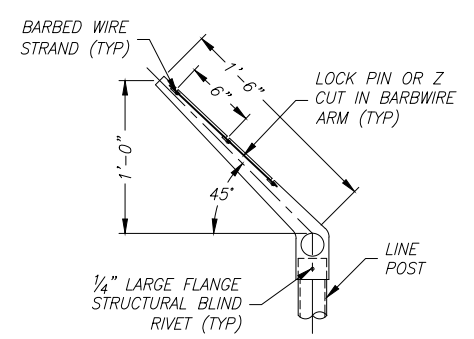
TYPICAL DETAIL 26
 LINE POSTS (F-09)



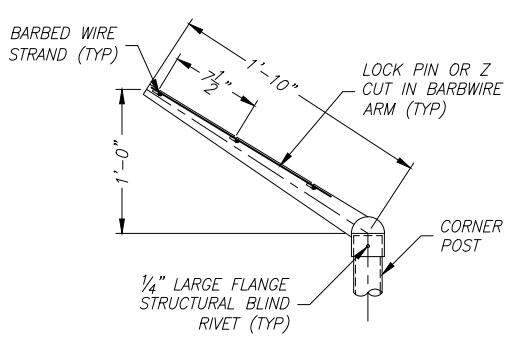
TYPICAL DETAIL 27
 TIE WIRES (F-09)



TYPICAL DETAIL 22
 POST BASE (F-09)



TYPICAL DETAIL 24
 SINGLE EXTENSION ARM DETAILS (F-09)

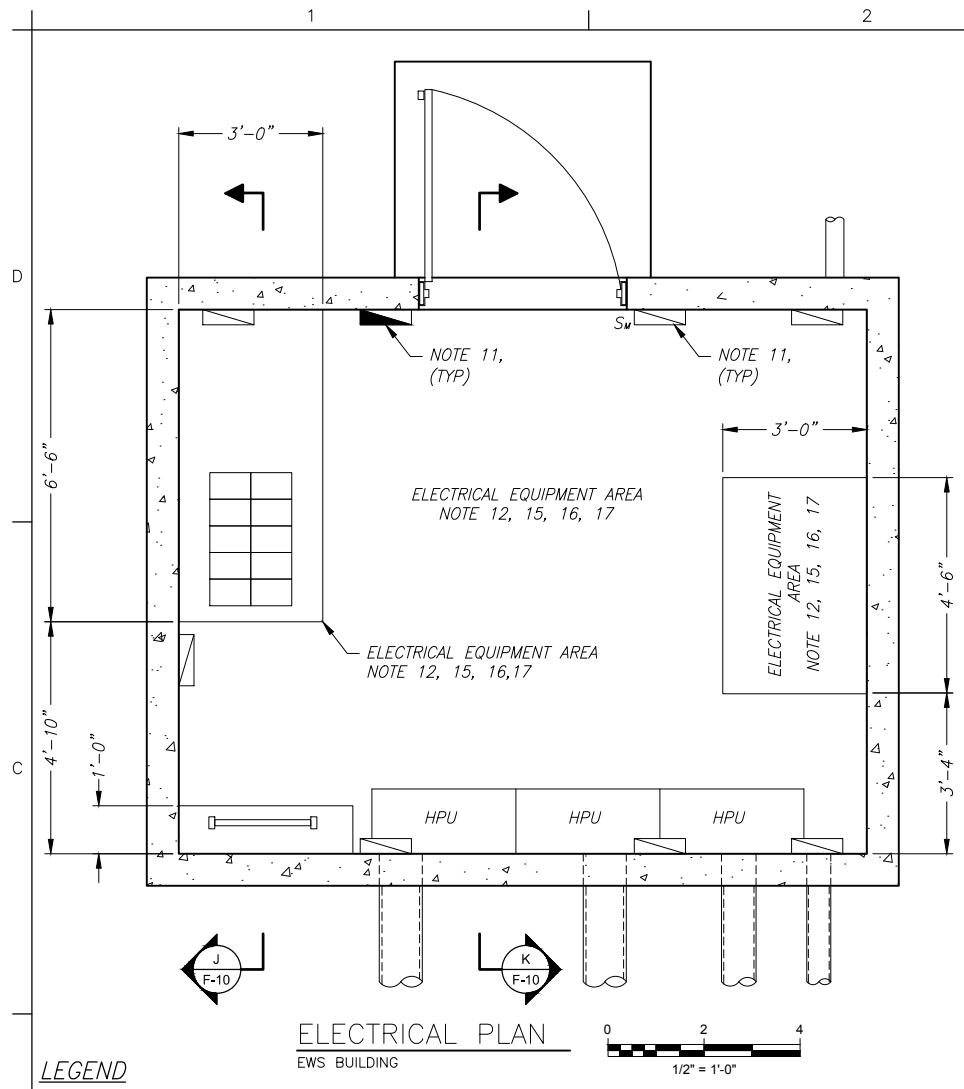


CHAIN LINK FENCING NOTES

- FABRIC:** THE STANDARD FENCE FABRIC SHALL BE 6-GAUGE VINYL, ZINC OR ALUMINUM-COATED STEEL WIRE CHAIN LINK WITH MESH OPENINGS NOT LARGER THAN TWO INCHES PER SIDE AND A TWISTED AND BARBED SELVAGE AT TOP AND BOTTOM.
- FABRIC TIES:** ONLY 12-GAUGE STEEL TIES SHALL BE USED. COATING OR PLATING WILL BE ELECTROLYTICALLY COMPATIBLE WITH THE FENCE FABRIC TO INHIBIT CORROSION.
- REINFORCEMENT:** TENSION WIRES SHALL BE INSTALLED AND INTERWOVEN (OR AFFIXED WITH FABRIC TIES) ALONG TOP & BOTTOM OF THE FENCE FOR STABILIZATION OF THE FENCE FABRIC.
- FENCE HEIGHT:** CHAIN LINK FABRIC SHALL BE 4' HIGH WITH AN ADDITIONAL 1' IN HEIGHT COMPOSED OF 3 STRANDS OF BARBED WIRE AS REQUIRED. THE TOTAL FENCE HEIGHT SHALL BE 5'.
- GROUND CLEARANCE:** BOTTOM OF THE FENCE FABRIC SHALL BE WITHIN TWO INCHES OF FIRM SOIL.
- TOP GUARDS:** A TOP GUARD IS AN OVERHANG OF BARBED WIRED ALONG THE TOP OF A FENCE, FACING OUTWARD (AWAY FROM PROTECTED SIDE) AND UPWARD AT APPROX. 45 ANGLE. TOP GUARD SUPPORTING ARMS WILL BE PERMANENTLY AFFIXED TO THE TOP OF THE FENCE POSTS TO INCREASE THE OVERALL HEIGHT OF THE FENCE AT LEAST 1 FOOT. THREE STRANDS OF 12-GAUGE BARBED WIRE, EQUALLY SPACED, SHALL BE INSTALLED ON THE SUPPORTING ARMS.
- FENCE POSTS:** SHALL BE A GALVANIZED ASTM F1083 2 3/8" diameter (MINIMUM) ROUND PIPE. FENCE POST SPACING SHALL NOT BE GREATER THAN THAT SHOWN ON F-01.

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-10-EARLY WARNING SYSTEM ELECTRICAL EQUIPMENT LAYOUT.DWG OCT 2015 RPRICE

R. PRICE
 DESIGNED
 N. JORGENSEN
 DRAWN
 P. EGGERS
 CHECKED
 C. MASCHING
 DESIGN APPROVAL
 D. MILLER
 INDEPENDENT TECHNICAL REVIEW

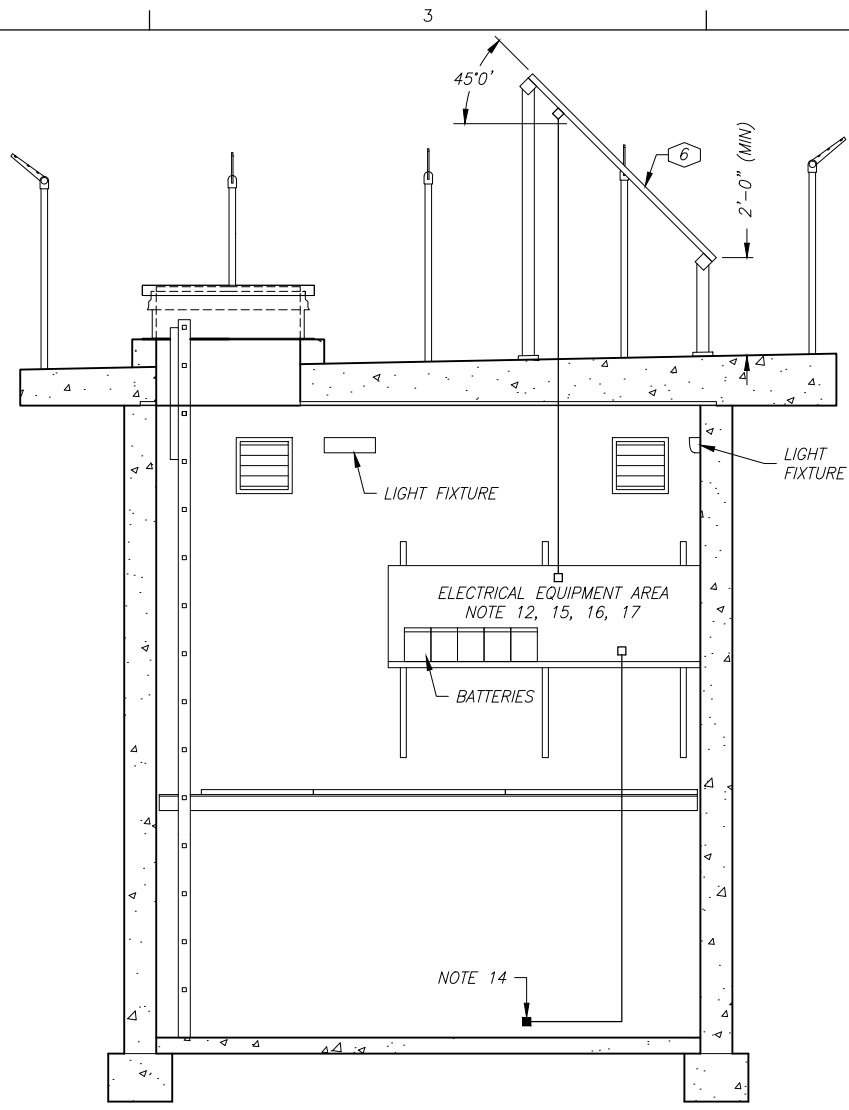


LEGEND

- TYPE 'A' FIXTURE, SURFACE MOUNTED
- EMERGENCY/LOW BATTERY LIGHT. TYPE 'A' FIXTURE, SURFACE MOUNTED.
- Sv 24VDC LIGHT SWITCH. 'M' DENOTES MANUAL-ON, MANUAL-OFF.

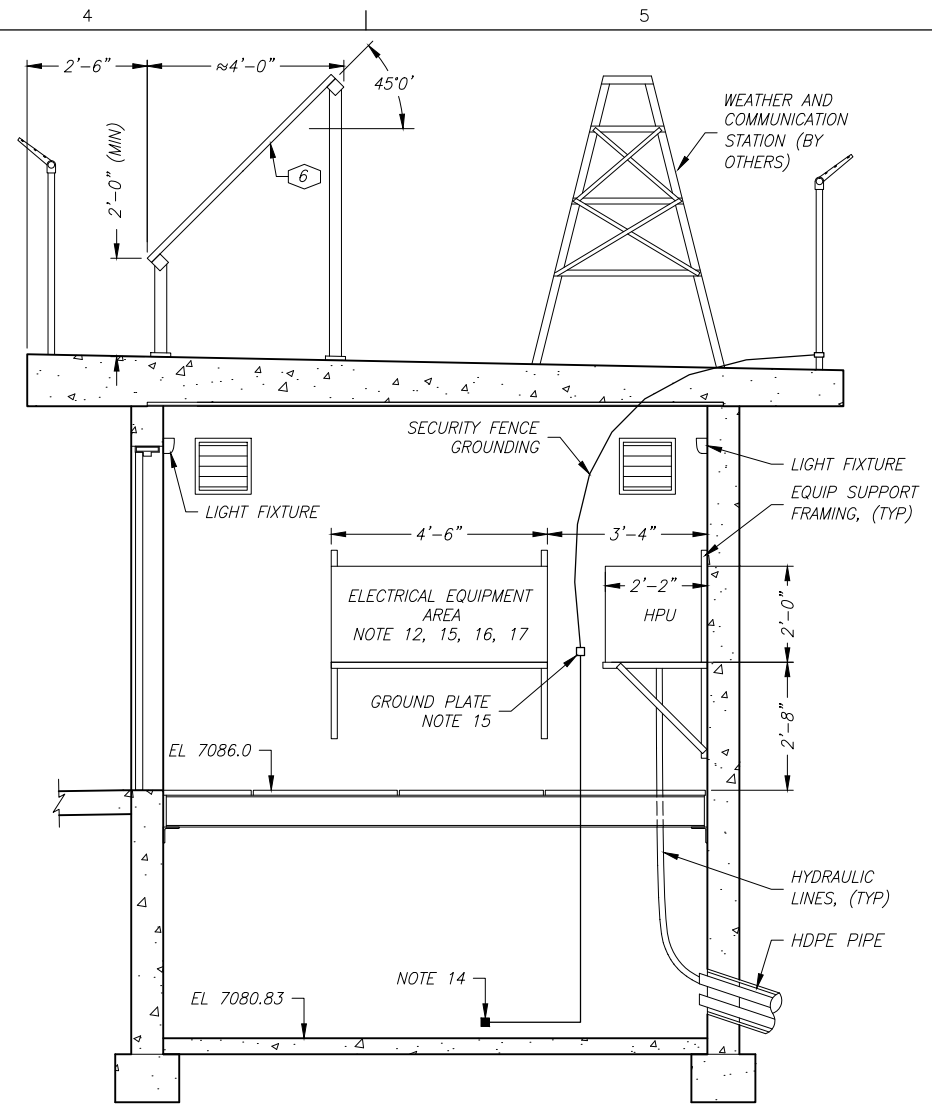
ELECTRICAL PLAN
 EWS BUILDING

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



SECTION
 ELECTRICAL SECTION J-F-10

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



SECTION
 ELECTRICAL SECTION K-F-10

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

NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT NFPA 70: NATIONAL ELECTRIC CODE (NEC).
2. ALL EQUIPMENT & EMBEDDED CONDUIT LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS PRIOR TO BEGINNING OF CONSTRUCTION.
3. ALL EXPOSED CONDUIT SHALL BE 1/2" GALVANIZED RIGID METAL CONDUIT (RMC) UNLESS OTHERWISE NOTED.
4. ALL EMBEDDED CONDUIT SHALL BE 1/2" SCHEDULE 40 PVC UNLESS OTHERWISE NOTED.
5. CONDUCTORS SHALL HAVE THWN INSULATION AND SIZED PER SPECIFICATIONS UNLESS NOTED OTHERWISE.
6. CONTRACTOR TO DETERMINE ROUTING OF ALL CONDUIT.
7. SEE LEGEND FOR SYMBOL DESIGNATION. CB## DENOTES WHICH CIRCUIT BREAKER SUPPLIES POWER FROM DC CONTROL ENCLOSURE.
8. ALL REQUIRED GROUNDING SHALL BE CONNECTED TO THE GROUND PLATE. (PHOTOVOLTAIC SYSTEM, ROOF FENCING, METAL INVERTER, AC ENCLOSED CIRCUIT BREAKER (ECBAC), GROUNDING ELECTRODE CONDUCTOR (#2 COPPER CONDUCTOR, SEE NOTE 15)).
9. REFER TO DRAWING F-10 FOR SCHEMATIC DIAGRAM.
10. PROVIDE 24VDC LIGHT SWITCH AT 48" ABOVE METAL GRATING AND SUPPLY SWITCH FROM CIRCUIT BREAKER CBX. SWITCH SHALL CONTROL RELAY SLX.
11. PROVIDE LIGHTING FIXTURES SURFACE MOUNTED AT LOCATIONS SHOWN AND SUPPLIED FROM EMBEDDED CONDUIT. CONDUIT STUB-OUT LOCATIONS SHALL BE BASED ON LIGHT FIXTURE CONNECTION POINT. EMERGENCY FIXTURE WILL BE SUPPLIED FROM CIRCUIT BREAKER CBX, CIRCUIT BREAKER CBXX SHALL SUPPLY FOUR (4) FIXTURES, AND CIRCUIT BREAKER CBXX SHALL SUPPLY THREE (3) FIXTURES. ALL FIXTURES SHALL BE CONTROLLED BY RELAY SLX.
12. CONTRACTOR TO DETERMINE LAYOUT OF ELECTRICAL EQUIPMENT WITHIN THE DEFINED AREA. ELECTRICAL EQUIPMENT CONSISTS OF BATTERY ENCLOSURE, PHOTOVOLTAIC (PV) SWITCHED COMBINER, CHARGE CONTROLLER, DC CONTROL MAIN BREAKER, DC CONTROL ENCLOSURE, FLOW METER RECEIVER, AND TWO (2) ENCLOSED CIRCUIT BREAKERS (ECB). BATTERY ENCLOSURE MUST BE LOCATED NEXT TO PV SERVICE ENTRANCE. MOUNTING HEIGHT SHALL BE BETWEEN 18"-72".
13. PROVIDE AND EMBED GROUNDING PLATE AT 24" ABOVE METAL GRATING IN CONCRETE WALL. GROUND PLATE SHALL BE COPPER AND CONSIST OF 4 HOLES.
14. PROVIDE AND CAD WELD #2 BARE COPPER STRANDED GROUNDING ELECTRODE CONDUCTOR TO LOWEST ELEVATION EMBEDDED STEEL REBAR. REBAR MUST BE A MINIMUM OF 16' IN LENGTH OR CONDUCTOR MUST BE CAD WELDED TO MULTIPLE SEGMENTS OF REBAR TO MAKE UP A MINIMUM OF 16' REBAR. EMBED CONDUCTOR IN CONCRETE AND CONNECT TO GROUND PLATE.
15. PROVIDE 2-#3 CONDUCTORS INSIDE 1" RMC TO CONNECT THE DC CONTROL PANEL TO ENCLOSED CIRCUIT BREAKER FOR DC SIDE OF THE INVERTER (ECBDC), AND ECBDC TO THE AC/DC INVERTER.
16. PROVIDE 1/0 CONDUCTORS INSIDE 2" RMC TO CONNECT THE BATTERY ENCLOSURE TO THE DC CONTROL MAIN BREAKER, AND FORM THE DC CONTROL MAIN BREAKER TO THE DC CONTROL PANEL.
17. DC CONTROL ENCLOSURE SHALL CONTAIN DEVICES AS SHOWN ON DRAWING F-10 AND HAVE LOCAL OPERATING CONTROLS AS SHOWN ON DRAWING F-11.
18. PROVIDE #16 MINIMUM CONDUCTORS INSIDE 1/2" CONDUIT TO SUPPLY POWER TO ALL BALL VALVES, FLOW METERS, & FLOW METERS. FINAL CONNECTIONS SHALL BE MADE WITH LIQUID TIGHT FLEXIBLE CONDUIT.

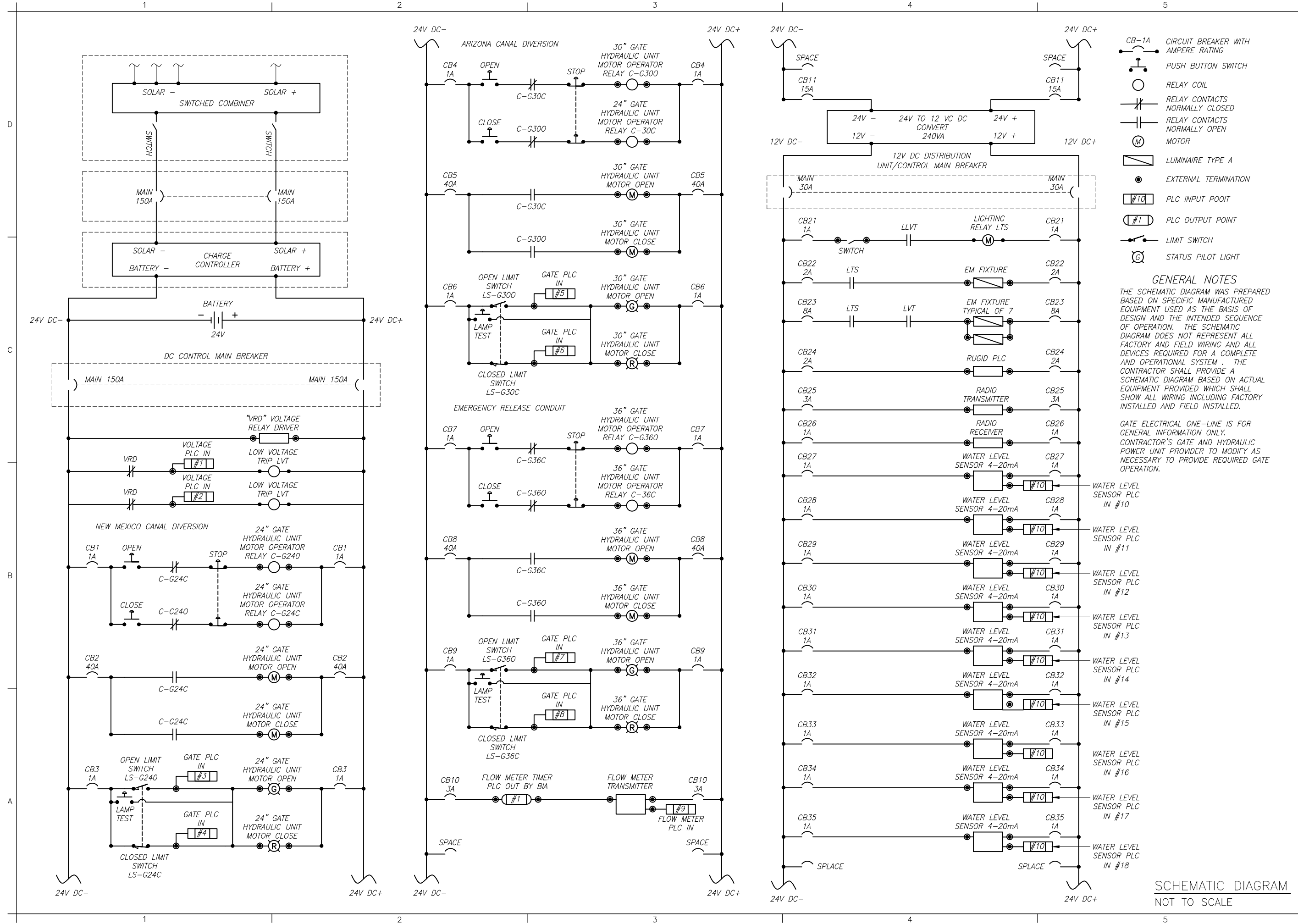
Red Lake EWS Power Requirements:

Specification Section	Equipment/Device	Normal Operations								
		Equip Voltage	Equip Load Watts	Equip Load Amps	# units	Total Watts	Total Amps	Duration / Day, (hours)	Watt-hours /day	Amp-hours /day
Provided By BIA	Rugid PLC	-	-	-	-	9.84	0.82	-	236	19.68
	Base Unit	12	1.68	0.14	1	1.68	0.14	24	40.3	3.36
	Relay Boards	12	3.36	0.28	1	3.36	0.28	24	80.6	6.72
	Loop supply	12	3.36	0.28	1	3.36	0.28	24	80.6	6.72
	Displays	12	1.44	0.12	1	1.44	0.12	24	34.6	2.88
Provided By BIA	Radio	-	-	-	-	25.20	2.10	-	604.8	50.40
	Receiver	12	1.20	0.10	1	1.20	0.10	24	28.8	2.40
	Transmitter	12	24.00	2.00	1	24.00	2.00	24.0	576.0	48.00
	Sensors	-	-	-	-	37.164	1.64	-	163.9	8.99
31-09-12	4-20 mA Water Level Sensors	12	0.24	0.02	9	2.16	0.18	24	51.8	4.32
31-09-12	3010 Sonic Flow Transmitter **	24	35.00	1.46	1	35.00	1.46	3.2	112.0	4.67
26-51-10	Lighting	-	-	-	-	76.80	6.40	-	307.20	25.60
	Thinlite LED16ZCP - 12 dVc	12	9.60	0.80	8	76.80	6.40	4	307.2	25.60
35-23-15	New Mexico Canal 24" Sluice Gate *	24	600	25.00	1	600.00	25.00	0.044	26.7	1.11
35-23-15	Arizona Canal 30" Sluice Gate *	24	600	25.00	1	600.00	25.00	0.089	53.3	2.22
35-23-15	Emergency Release 36" Sluice Gate *	24	600	25.00	1	600.00	25.00	0.161	96.7	4.03

*** Gate System Operation Notes**
 24" Orbinox Stainless Steel Fabricated Gate - 2-1/2" x 24" Cylinder, Opening & Closing Time 35-40 Seconds - Assume 2 full Open-Close Cycles per Day
 30" Orbinox Stainless Steel Fabricated Gate - 3-1/4" x 30" Cylinder, Opening & Closing Time 70-80 Seconds - Assume 2 full Open-Close Cycles per Day
 36" Orbinox Stainless Steel Fabricated Gate - 4" x 36" Cylinder, Opening & Closing Time 135-145 Seconds - Assume 2 full Open-Close Cycles per Day

**** Sonic Flow Operation Notes**
 Sonic Flow Transmitter will be limited to transmitting 2 minutes out of every 15 minute period by BIA (8 minutes/hour x 24 hours/day = 192 minutes ==>

P:\1411470 - RED LAKE DAM\PRODUCTION DRAWINGS\WORKING DRAWINGS\F-11-EARLY WARNING SYSTEM SCHEMATIC DIAGRAM.DWG OCT 2015 JHETLAND



BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

EARLY WARNING SYSTEM
ELECTRICAL INSTALLATION SCHEMATIC DIAGRAM

ISSUED FOR SOLICITATION
OCTOBER 2, 2015

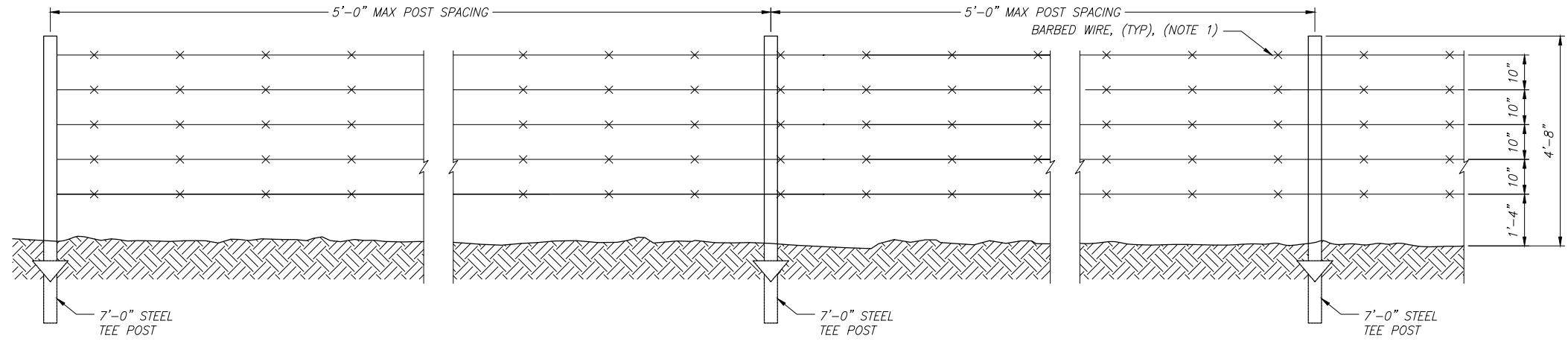
R. PRICE
DESIGNED
N. JORGENSEN
DRAWN
P. EGGERS
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

EARLY WARNING SYSTEM
ELECTRICAL INSTALLATION
SCHEMATIC DIAGRAM

Drawing F-11
SHEET 71 OF 75

SCHEMATIC DIAGRAM
NOT TO SCALE

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\G-01-STOCK FENCING BARBED WIRE FENCES STEEL POSTS.DWG RPRICE SEP 2015



TYPICAL DETAIL
5 WIRE BARBED WIRE
NOTE TO SCALE

FENCING NOTES

- 1. 1/2 GA TWISTED GALVANIZED BARBED WIRE WITH 14 GA BARBS.

BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS

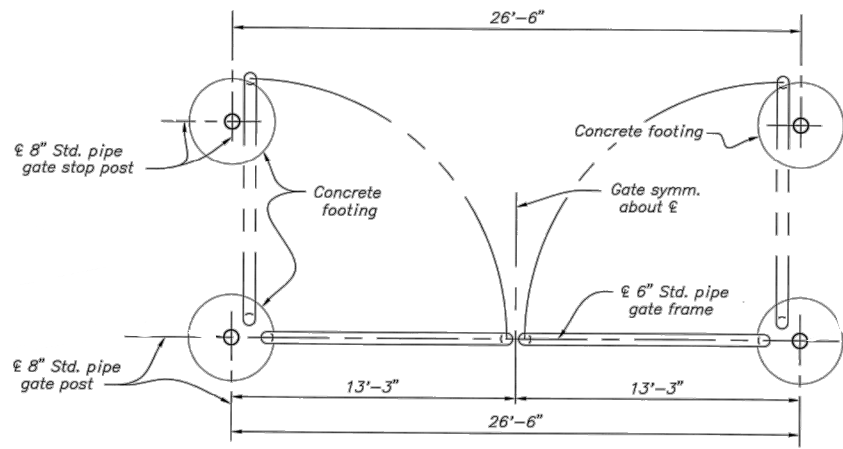
STOCK FENCING BARBED WIRE

P. EGGERS
DESIGNED
S. MICKELL
DRAWN
K. PRICE
CHECKED
C. MASCHING
DESIGN APPROVAL
D. MILLER
INDEPENDENT TECHNICAL REVIEW

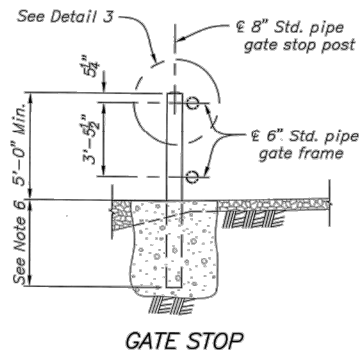
STOCK FENCING BARBED WIRE

Drawing G-01

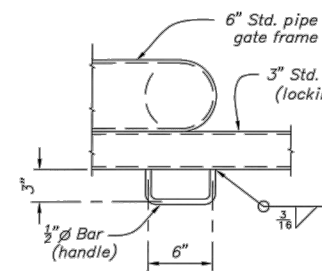
REV NO 0
OCTOBER 2, 2015
ISSUED FOR SOLICITATION



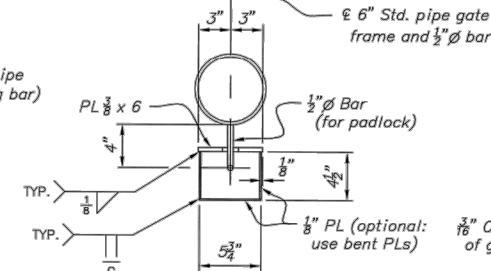
PLAN - SECURITY GATE



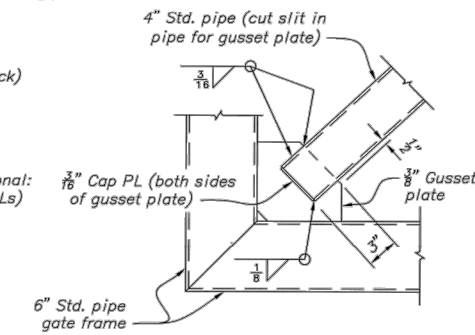
GATE STOP



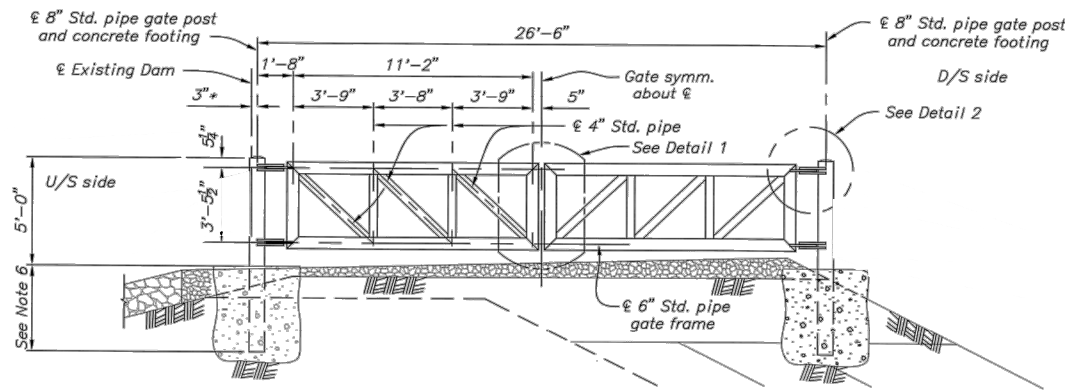
VIEW B-B



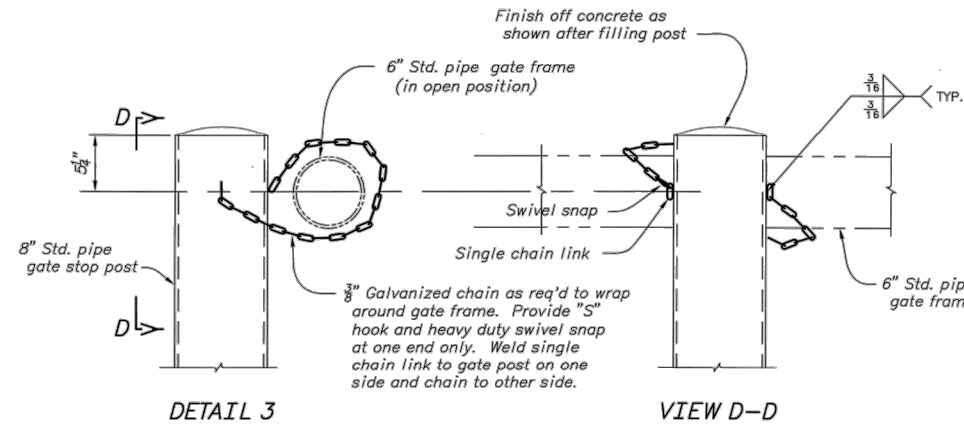
SECTION C-C



DETAIL 3
(OPTIONAL PIPE JOINT)



ELEVATION - SECURITY GATE

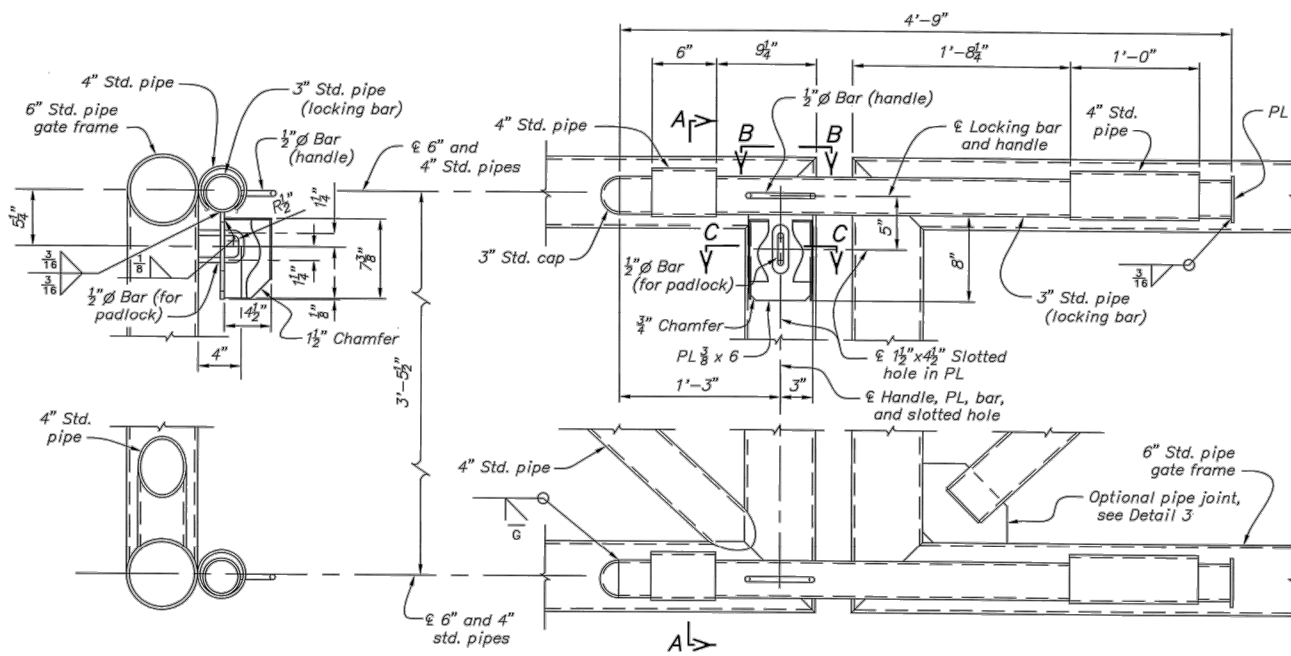


DETAIL 3

VIEW D-D

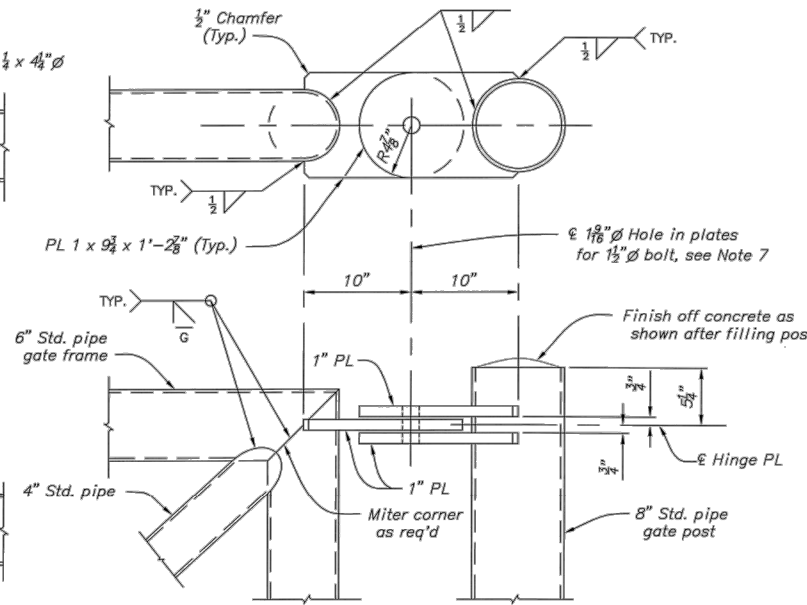
SURVEY NOTES

1. INSTALL GATE POSTS AND GATE STOPS PLUMB AND ENSURE EACH GATE LEAF OPERATES IN AN APPROVED MANNER.
2. DO NOT HANG GATE LEAVES TO POSTS UNTIL CONCRETE HAS CURED AT LEAST 7 DAYS.
3. GALVANIZE ALL FERROUS METALWORK AFTER FABRICATION. PROVIDE VENT HOLES IN PIPE AS REQUIRED FOR GALVANIZING.
4. GRIND ALL OUTSIDE WELDS, SHARP EDGES AND CORNERS SMOOTH BEFORE GALVANIZING.
5. AFTER THE GATE IS INSTALLED, ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIR IN ACCORDANCE WITH SPECIFICATIONS.
6. WHEN POST IS INSTALLED IN SOIL OR FRACTURED ROCK, POST ANCHOR SHALL BE 4'-0" DIAMETER MINIMUM CONCRETE FOOTING WITH POST SET AT 4'-0" MINIMUM DEPTH. WHEN POST IS INSTALLED IN SOLID ROCK, POST ANCHOR SHALL BE 1'-0" DIAMETER MINIMUM CONCRETE FOOTING WITH POST SET AT 3'-0" MINIMUM DEPTH.
7. USE A 3/25 HEX HD BOLT WITH HEX NUT AND STD WASHERS. ALSO PLACE STD WASHERS BETWEEN HINGE PLATES. WELD NUT TO BOLT AFTER NUT HAS BEEN ADJUSTED TO ELIMINATE EXCESS PLAY IN HINGE JOINT.
8. * DENOTES APPROXIMATE DIMENSION OR STATION TO BE FIELD VERIFIED.



SECTION A-A

DETAIL 1



DETAIL 2

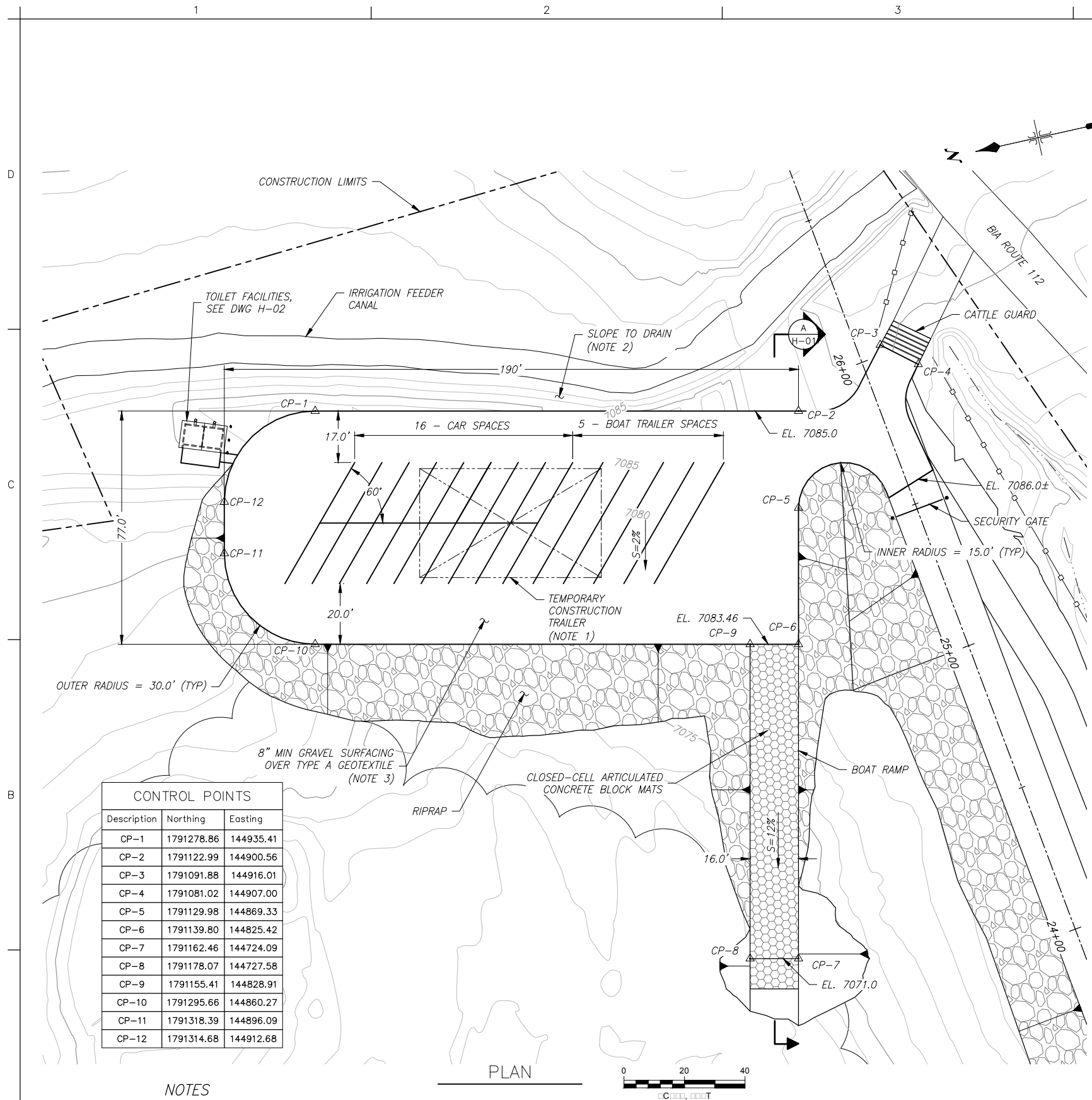
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
 RED LAKE DAM MODIFICATIONS

GATE DETAILS

DESIGNED	P. EGGERS
DRAWN	S. MICKELL
CHECKED	K. PRICE
DESIGN APPROVAL	C. MASCHING
INDEPENDENT TECHNICAL REVIEW	D. MILLER

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\G-02-GATE DETAILS.DWG SEP 2015 RPRICE

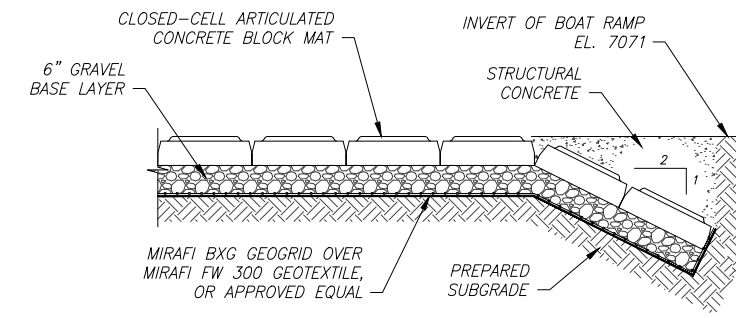
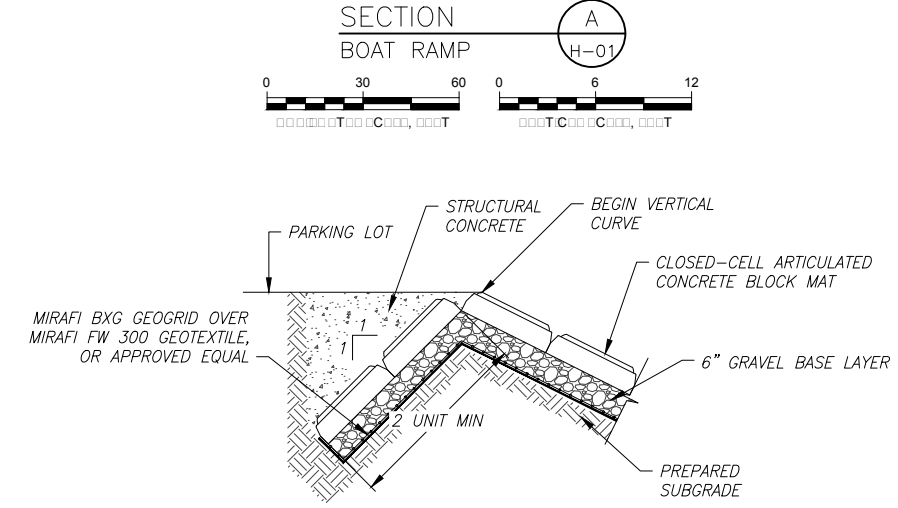
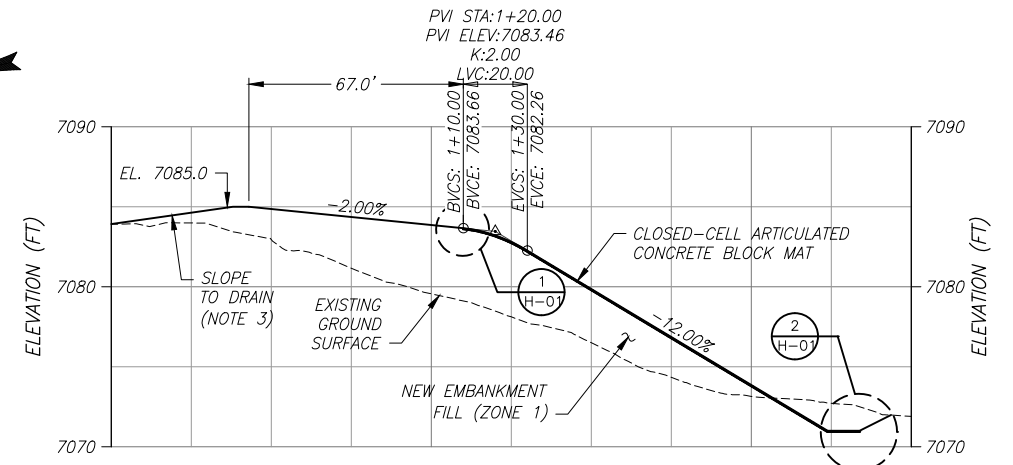
P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\H-01-PARKING AREA AND BOAT RAMP.DWG RPRICE OCT 2015



CONTROL POINTS		
Description	Northing	Easting
CP-1	1791278.86	144935.41
CP-2	1791122.99	144900.56
CP-3	1791091.88	144916.01
CP-4	1791081.02	144907.00
CP-5	1791129.98	144869.33
CP-6	1791139.80	144825.42
CP-7	1791162.46	144724.09
CP-8	1791178.07	144727.58
CP-9	1791155.41	144828.91
CP-10	1791295.66	144860.27
CP-11	1791318.39	144896.09
CP-12	1791314.68	144912.68

NOTES

- RELOCATE TEMPORARY CONSTRUCTION TRAILER TO DESIGNATED AREA PER SPECIFICATION SECTION 01 51 00 - TEMPORARY FACILITIES AT END OF CONSTRUCTION.
- SLOPE DOWNSTREAM SIDE OF PARKING LOT TO DRAIN TO FEEDER CANAL AS NECESSARY.
- SEE DWG B-11, DETAIL 4 TYPICAL DETAIL OF GRAVEL SURFACING AND RIPRAP INTERFACE. PARKING LOT WILL HAVE SIMILAR CONDITION TO DAM CREST.



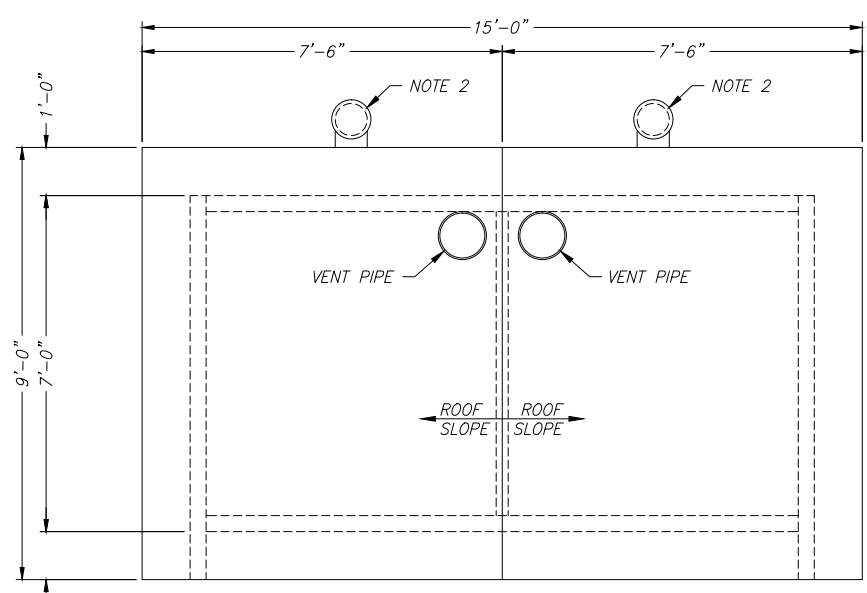
BUREAU OF INDIAN AFFAIRS - SAFETY OF DAMS PROGRAM
RED LAKE DAM MODIFICATIONS
 PARKING AREA AND BOAT RAMP
 PLAN, SECTION, AND DETAILS

J. HEITLAND
 DESIGNED
 J. HEITLAND
 DRAWN
 P. EGGERS
 CHECKED
 DESIGN APPROVAL
 INDEPENDENT TECHNICAL REVIEW

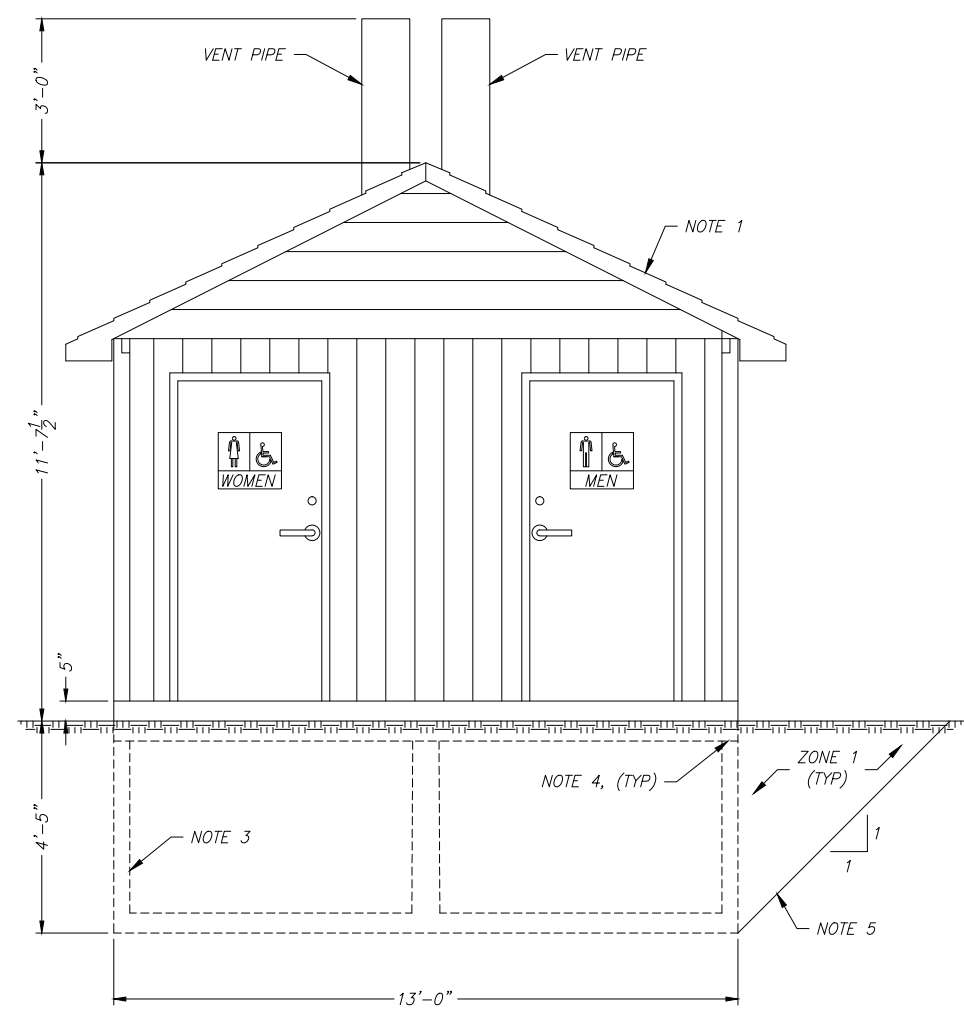
PARKING AREA AND BOAT RAMP
 PLAN, SECTION, AND DETAILS

P:\1411470 - RED LAKE DAM\CIVIL\PRODUCTION DRAWINGS\WORKING DRAWINGS\H-02-PARKING AREA TOILET FACILITIES.DWG OCT 2015 RPRICE

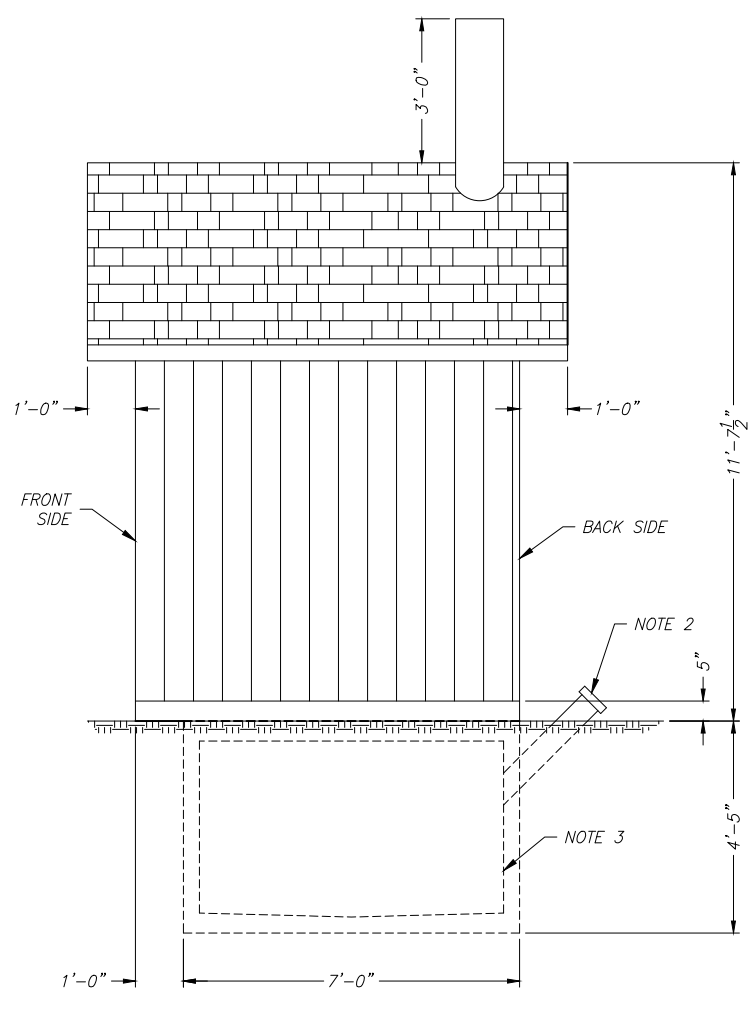
DESIGNED	R. PRICE
DRAWN	P. EGGERS
CHECKED	
DESIGN APPROVAL	
INDEPENDENT TECHNICAL REVIEW	



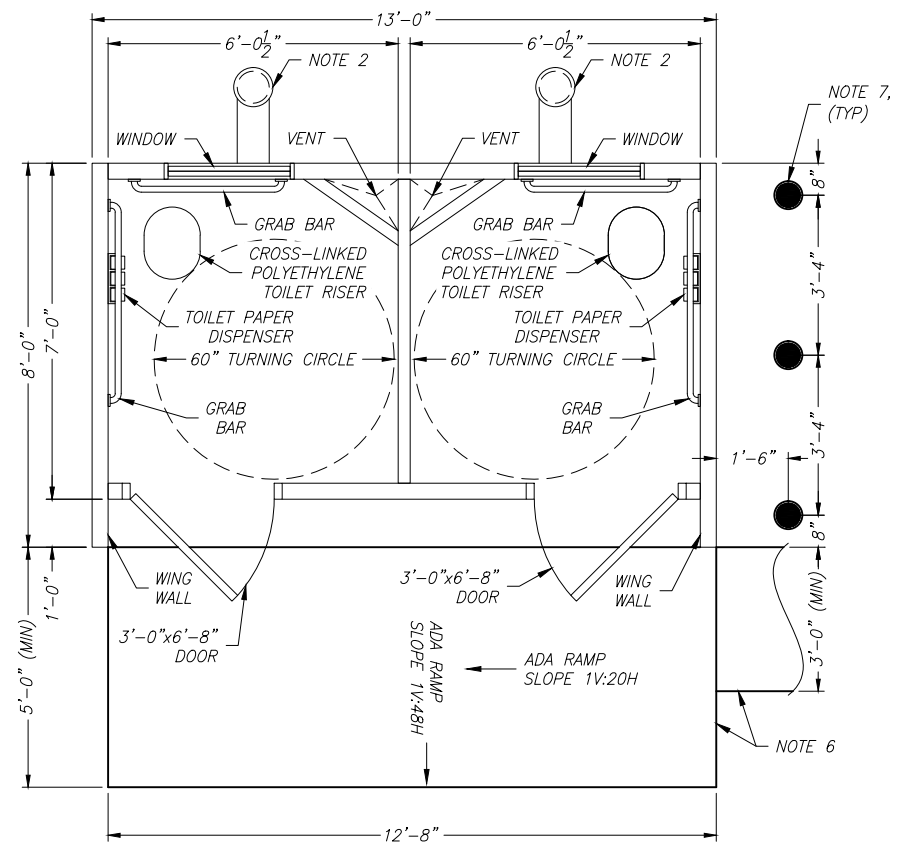
ROOF PLAN
 DOUBLE UNIT TOILET
 3/4" = 1'-0"



ELEVATION
 FRONT
 1/2" = 1'-0"



ELEVATION
 SIDE
 1/2" = 1'-0"



FLOOR PLAN
 DOUBLE UNIT TOILET
 3/4" = 1'-0"

- NOTES**
- CONTRACTOR TO CONSTRUCT OUTDOOR TOILET FACILITIES PER SPECIFICATION SECTION 13 34 13 - VAULT TOILETS AND MAINTAIN THROUGHOUT CONSTRUCTION. TOILET FACILITIES TO REMAIN ONSITE AFTER COMPLETION OF THE PROJECT.
 - 8"Ø PVC CLEANOUT WITH CAP AND LOCKS. OWNER TO PROVIDE PADLOCKS.
 - TANK SHALL BE LINED WITH ONE PIECE MOLDED PLASTIC TANK LINER THAT IS 0.20 INCHES THICK.
 - 3/4" SPECTIC TAPE SHALL BE PROVIDED AT ALL CONCRETE JOINTS.
 - EXCAVATIONS SHALL MEET ALL OSHA SAFETY CRITERIA.
 - ENTRANCE RAMP SHALL BE 4" THICK MINIMUM AND MEET ALL APPLICABLE ADA REQUIREMENTS.
 - PROTECT BUILDING WITH BOLLARDS.