

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

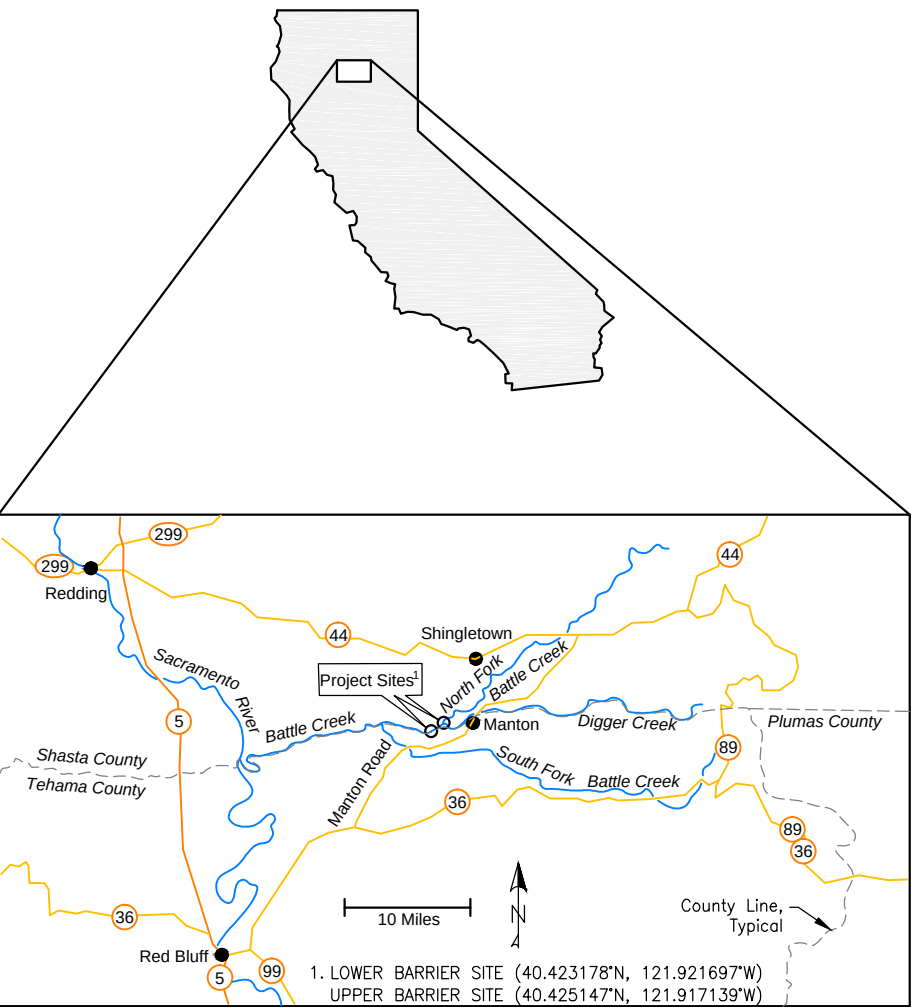
PLANS FOR CONSTRUCTION OF
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
LOWER AND UPPER BARRIER SITES

FEBRUARY 2017

FINAL SUBMITTAL

Prepared For:

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
AGREEMENT NUMBER: D1499019



PROJECT LOCATION MAP

APPROVALS

Michael Love and Associates, Inc.

Michael Love, P.E., Principal Engineer

Michael Love

P. Travis James, P.E., Project Engineer

P. Travis James



California Department of Fish and Wildlife

Approved by:

Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411
Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov



VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
PROJECT TITLE SHEET

DATE
FEBRUARY 2017
SUBMITTAL

DESIGN
FINAL

ML, pTJ

DRAWN
pTJ, NN

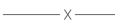
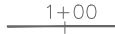
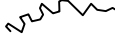
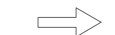
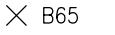
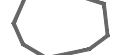
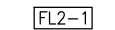
SHEET

1 of 27

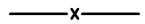
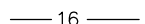
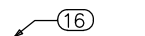
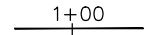
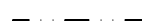
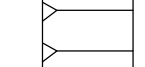
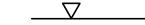
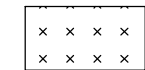
G-1

LEGEND AND SYMBOLS

EXISTING

	FENCE LINE
	EXISTING CONTOUR AND ELEVATION
	SPOT ELEVATION
	CHANNEL THALWEG OR DRAINAGE
	ALIGNMENT STATIONING (FEET)
	TREE DRIP LINE
	CONTROL POINT/TEMPORARY BENCH MARK
	FLOW DIRECTION
	STUMP
	TREE
	CULVERT
	SIDEWALK
	ROCK SLOPE PROTECTION (RSP)
	STORM DRAIN
	TOP OF BANK
	SIEVE (VOID UNDER BOULDERS)
	INDIVIDUAL BOULDER I.D.
	BOULDER COMPLEX
	FLOW LINE ID

NEW

	SURVEY CONTROL POINT
	LIMIT OF DISTURBANCE
	FENCE LINE
	CONTOUR AND ELEVATION
	SPOT ELEVATION
	STATIONING ALONG ALIGNMENT (FEET)
	CHANNEL THALWEG OR DRAINAGE
	TEMPORARY ISOLATION MEASURE
	SLOPE LINE
	RIPARIAN PLANTING AREA
	STAGING AREA
	LOG/LARGE WOOD STRUCTURE
	WATER SURFACE
	BOULDER OR BEDROCK REMOVAL OR MODIFICATION
	APPROXIMATE VEGETATION REMOVAL LIMITS

ABBREVIATIONS

AKA	ALSO KNOWN AS
APPROX, ~	APPROXIMATELY
BLDR	BOULDER
CA	CALIFORNIA
CGL	CHANNEL GRADE LINE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CO	CONTRACT OWNER
COR	CONTRACT OWNER REPRESENTATIVE
CP	SURVEY CONTROL POINT
CY	CUBIC YARDS
DIA	DIAMETER
DWG	DRAWING
EG	EXISTING GROUND
EL	ELEVATION
(E)	EXISTING
FG	FINISHED GROUND
'	FOOT OR FEET
HDPE	HIGH DENSITY POLYETHYLENE
HGL	HYDRAULIC GRADE LINE
"	INCH
I.D., ID	IDENTIFICATION
LBS	LOWER BARRIER SITE
LOD	LIMIT OF DISTURBANCE
MAX/MIN	MAXIMUM/MINIMUM
(N)	NEW
NF	NORTH FORK
NTS	NOT TO SCALE
OZ	OUNCE
O.C.	ON CENTER
RD	ROAD
SF	SOUTH FORK
STA	STATION
SY	SQUARE YARDS
TBM	TEMPORARY BENCHMARK
TOC	TOP OF CONCRETE
TYP	TYPICAL
UBS	UPPER BARRIER SITE
VEG	VEGETATION
W/	WITH
(1.5:1)	(HORIZONTAL:VERTICAL) SLOPE
%	PERCENT

	LOCATION AND ORIENTATION OF PHOTOGRAPH
	SECTION, DETAIL OR TYPICAL NAME (LETTER INDICATES SECTION, NUMBER INDICATES DETAIL OR TYPICAL)
	DWG NO. ON WHICH SECTION, TYPICAL, OR DETAIL APPEARS

NOTE: CONTACT ENGINEER FOR ABBREVIATIONS OR SYMBOLS NOT LISTED

GENERAL		
Sheet Number	DWG	Sheet Title
1	G-1	PROJECT TITLE SHEET
2	G-2	DRAWING LIST AND LEGEND
3	G-3	EXISTING COND., SHEET INDEX & ACCESS MAP

LOWER BARRIER SITE		
Sheet Number	DWG	Sheet Title
4	C-1	CONTRACTOR ACCESS & USE AREA OPTION 1
5	C-2	CONSTRUCTION ACCESS & SITE USE OPTION 2
6	C-3	EAGLE CANYON SECTION
7	C-4	HORIZONTAL AND VERTICAL CONTROL
8	C-5	WATER MANAGMENT PLAN & PROFILE
9	C-6	DEMO PLAN
10	C-7	DEMO PHOTOGRAPHS
11	C-8	DESIGN PLAN, PROFILE, DETAILS, & NOTES
12	C-9	SECTIONS, 1 OF 2
13	C-10	SECTIONS, 2 OF 2

UPPER BARRIER SITE		
Sheet Number	DWG	Sheet Title
14	C-11	ACCESS & USE AREA OPTION 1 PLAN
15	C-12	ACCESS & USE AREA OPTION 2 PLAN
16	C-13	ACCESS & USE AREA OPTIONS 1 & 2 SECTIONS
17	C-14	HORIZONTAL AND VERTICAL CONTROL
18	C-15	WATER MANAGEMENT, 1 OF 2
19	C-16	WATER MANAGEMENT, 2 OF 2
20	C-17	DEMO PLAN
21	C-18	DEMO PHOTOGRAPHS
22	C-19	CONCEPTUAL CHANNEL DESIGN PLAN & PROFILE
23	C-20	CHANNEL MODIFICATION NOTES
24	C-21	HYDRAULIC STRUCTURE TYPICALS
25	C-22	WEIR CONSTRUCTION PLAN & PHOTOS
26	C-23	CONCRETE WEIR SECTION & DETAIL

DETAILS		
Sheet Number	DWG	Sheet Title
27	C-24	PROJECT DETAILS AND TYPICALS

Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov



--	--	--	--	--

VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT

DRAWING LIST AND LEGEND

DATE
FEBRUARY 2017
SUBMITTAL
FINAL
DESIGN
ML, pTJ
DRAWN
pTJ, NN
SHEET

2 of 27

G-2



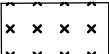
- NOTES:
1. PERMISSION REQUIRED TO ACCESS BARRIER SITES.
 2. ACCESS TO SOUTH RIM MUST FOLLOW PG&E'S ACCESS PROTOCOL, SEE SPECIFICATION 01 14 TO SITE USE
 3. KEEP ACCESS CLEAR FOR PG&E
 4. KEEP ACCESS CLEAR FOR LANDOWNERS

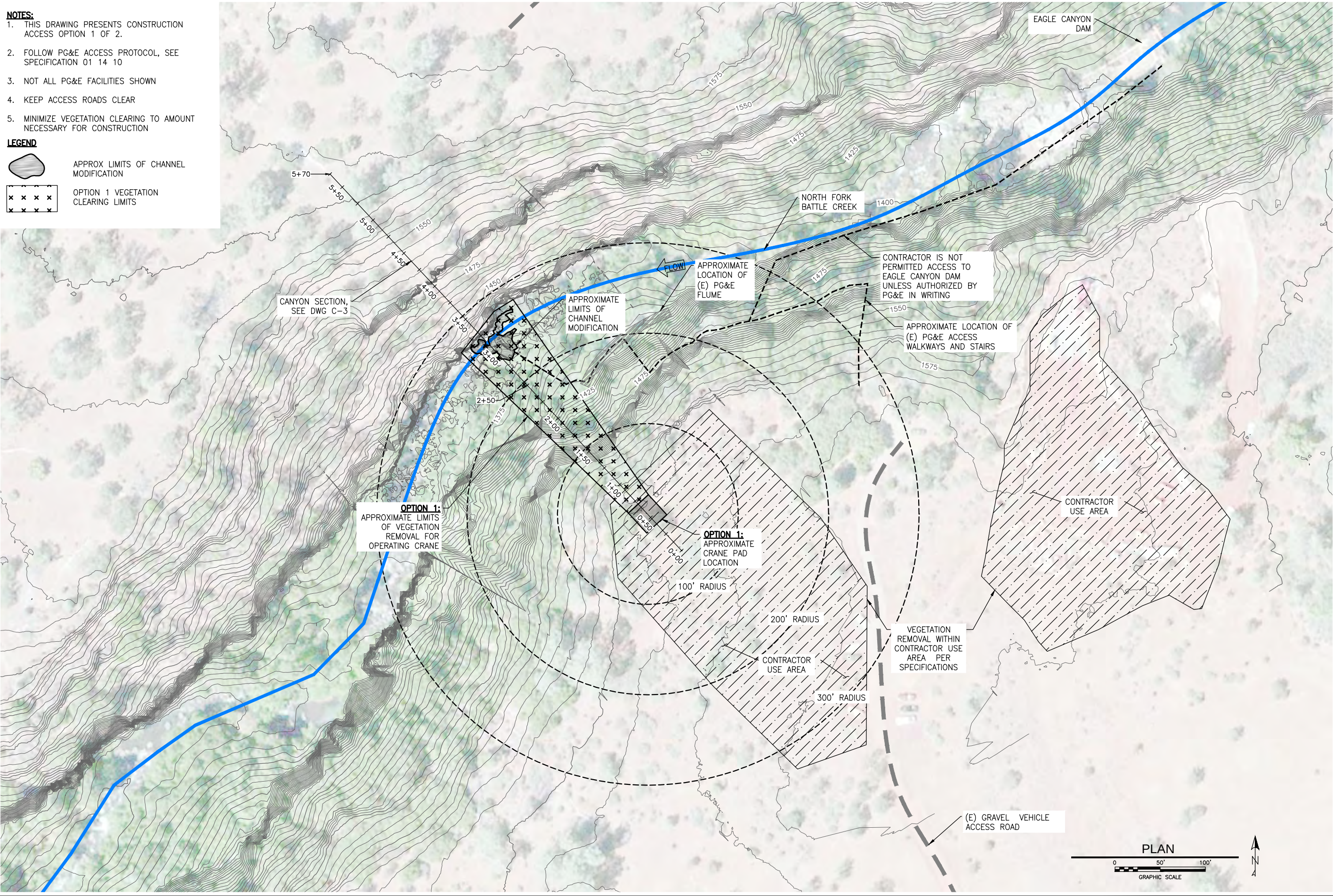
Michael Love & Associates, Inc. PO Box 4477 • Arcata, CA 95518 • (707) 822-2411 Department of Fish and Wildlife 1416 9th Street, 12th Floor Sacramento, CA 95814 http://www.dfg.ca.gov	
	
VERIFICATION SCALE THIS BAR IS ONE INCH LONG AT FULL SCALE	
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE NORTH FORK BATTLE CREEK EAGLE CANYON FISH PASSAGE IMPROVEMENT UPPER & LOWER BARRIER SITES EXISTING COND. SHEET INDEX & ACCESS MAP	
DATE FEBRUARY 2017 SUBMITTAL	
DESIGN FINAL	
DRAWN ML, pTJ	
SHEET pTJ, NN	
3 of 27	
G-3	

- NOTES:**
1. THIS DRAWING PRESENTS CONSTRUCTION ACCESS OPTION 1 OF 2.
 2. FOLLOW PG&E ACCESS PROTOCOL, SEE SPECIFICATION 01 14 10
 3. NOT ALL PG&E FACILITIES SHOWN
 4. KEEP ACCESS ROADS CLEAR
 5. MINIMIZE VEGETATION CLEARING TO AMOUNT NECESSARY FOR CONSTRUCTION

LEGEND

 APPROX LIMITS OF CHANNEL MODIFICATION

 OPTION 1 VEGETATION CLEARING LIMITS



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 825-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
<http://www.dfg.ca.gov>



VERIFY SCALE

THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT

**LOWER BARRIER SITE
CONTRACTOR ACCESS & USE AREA OPTION 1**

DATE
FEBRUARY 2017
SUBMITTAL

DESIGN
FINAL

ML, pTJ
DRAWN

pTJ, NN
SHEET

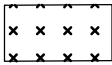
4 of 27

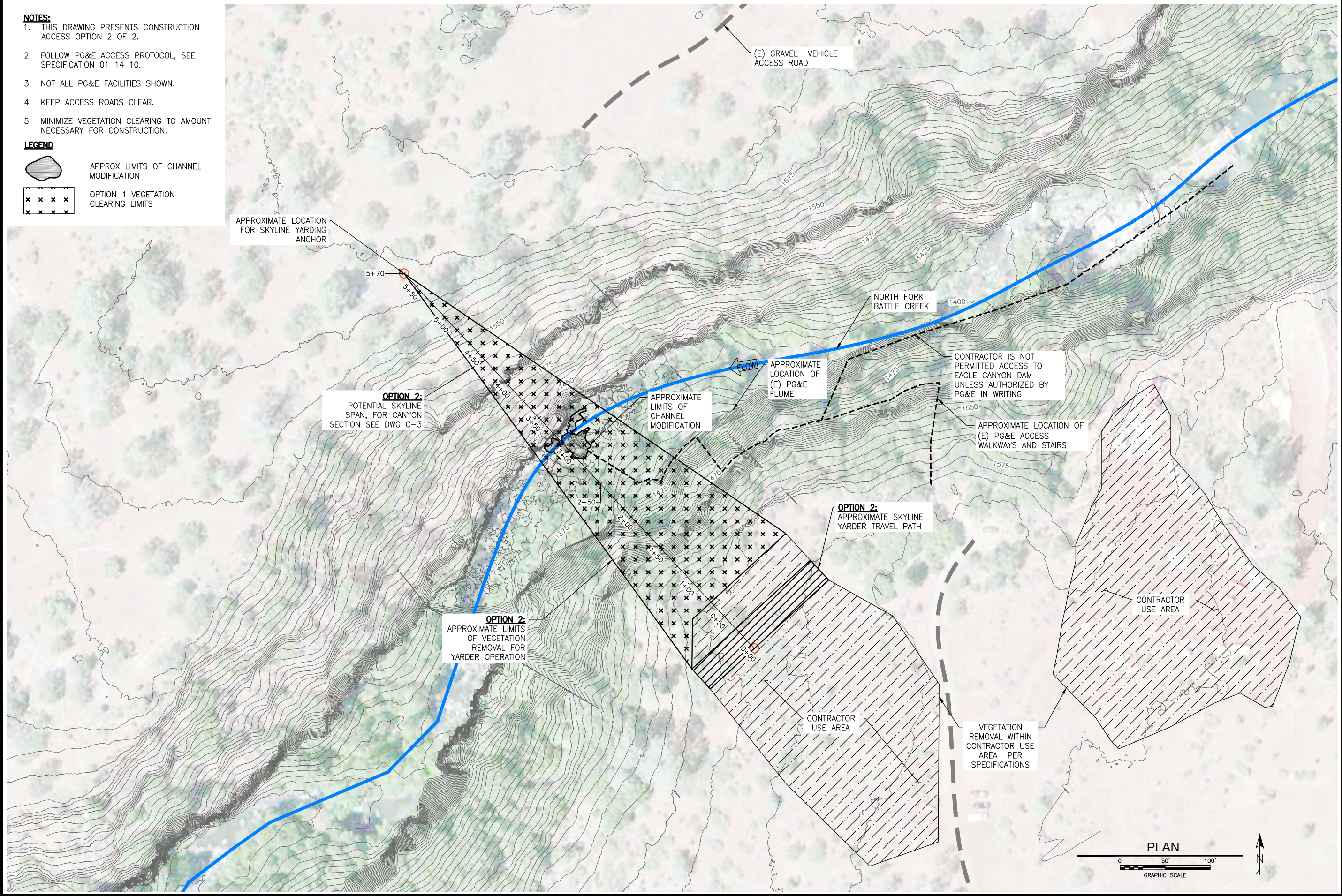
C-1

NOTES:

1. THIS DRAWING PRESENTS CONSTRUCTION ACCESS OPTION 2 OF 2.
2. FOLLOW PG&E ACCESS PROTOCOL, SEE SPECIFICATION 01 14 10.
3. NOT ALL PG&E FACILITIES SHOWN.
4. KEEP ACCESS ROADS CLEAR.
5. MINIMIZE VEGETATION CLEARING TO AMOUNT NECESSARY FOR CONSTRUCTION.

LEGEND

-  APPROX LIMITS OF CHANNEL MODIFICATION
-  OPTION 1 VEGETATION CLEARING LIMITS



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
<http://www.dfg.ca.gov>



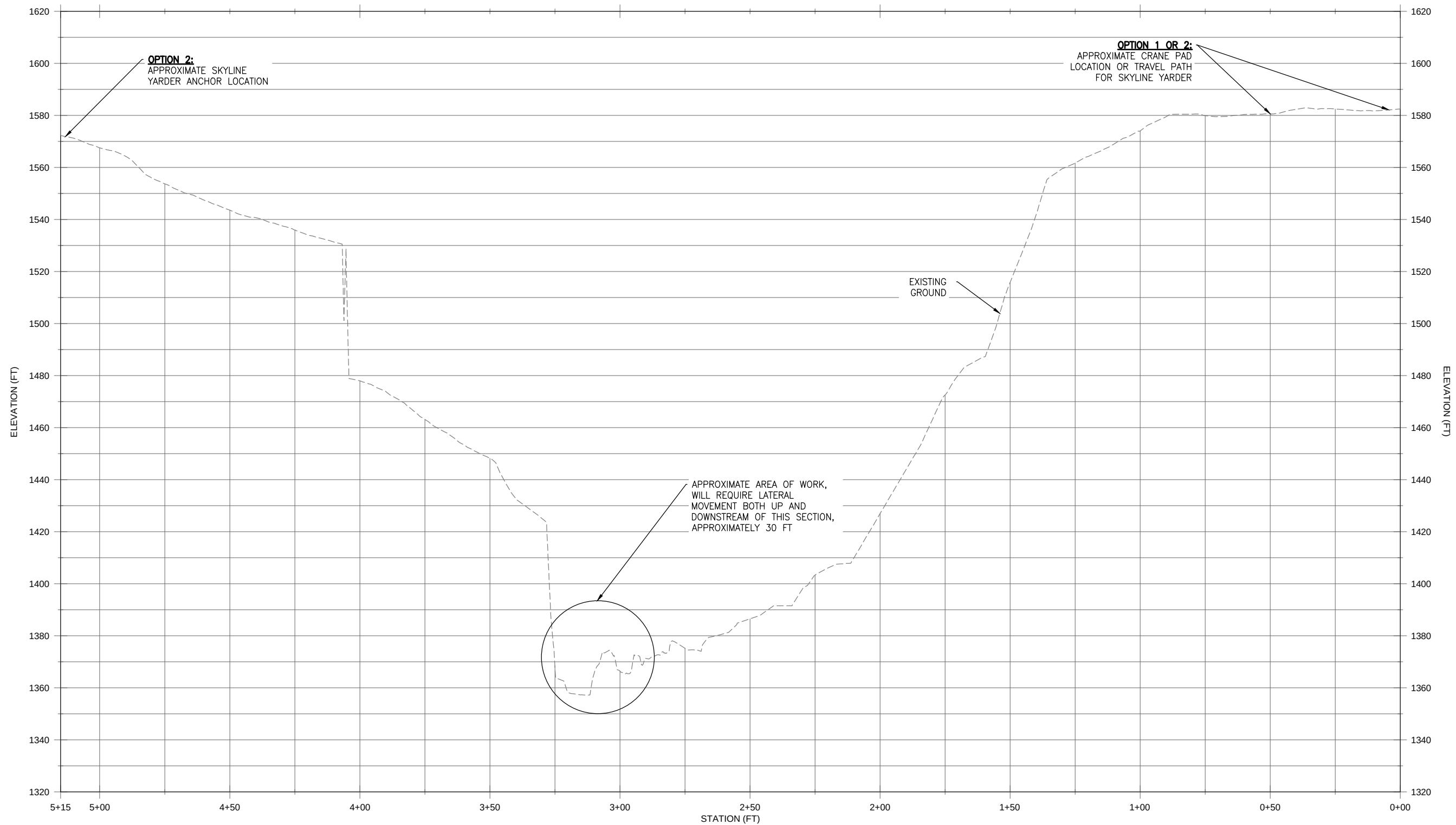
VERIFICATION SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

VERIFICATION SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

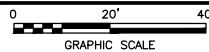
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
LOWER BARRIER SITE
CONSTRUCTION ACCESS & SITE USE OPTION 2

DATE
FEBRUARY 2017
SUBMITTAL
FINAL
DESIGN
ML, pTJ
DRAWN
pTJ, NN
SHEET

5 of 27
C-2

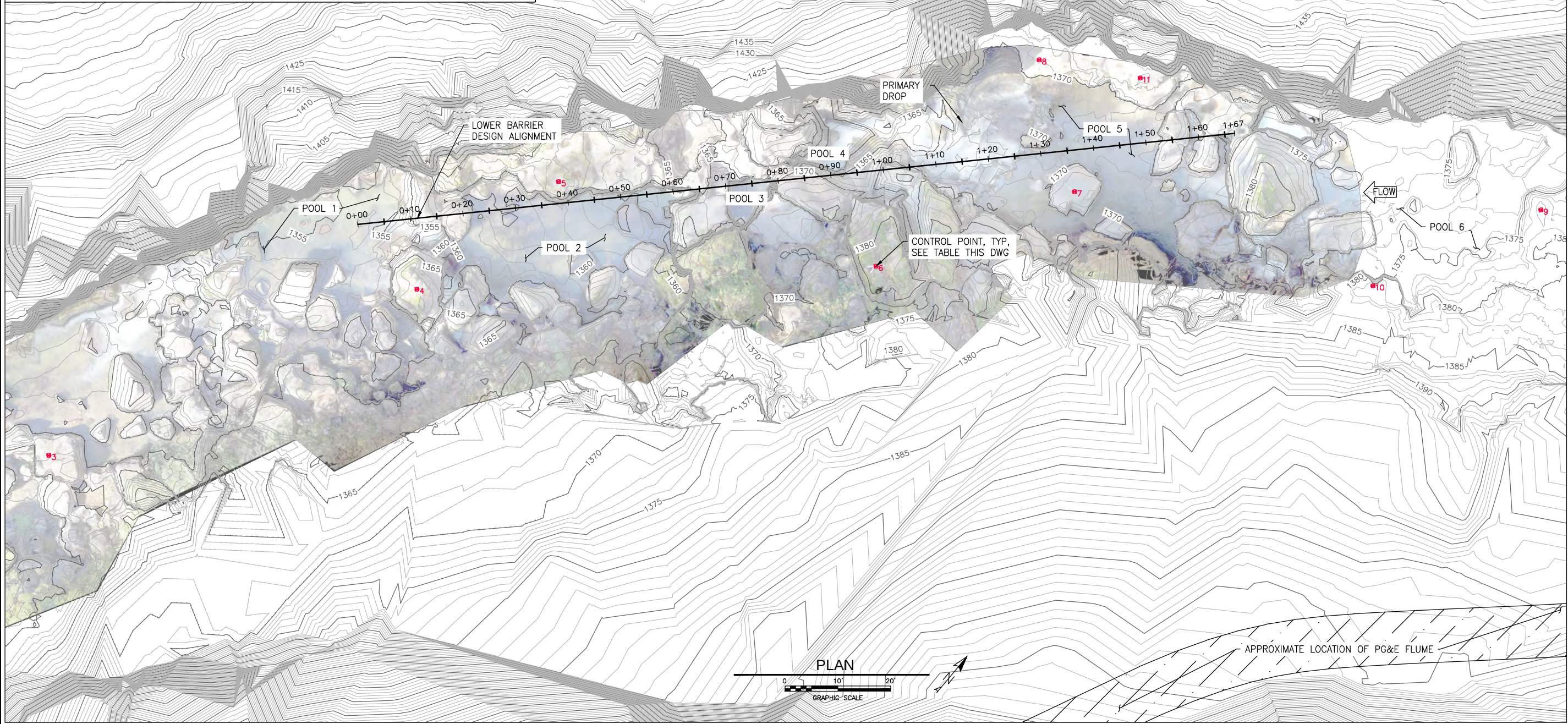


CANYON SECTION (LOOKING UPSTREAM)



Michael Love & Associates, Inc. PO Box 4477 • Arcata, CA 95518 • (707) 822-2411		Department of Fish and Wildlife 1416 9th Street, 12th Floor Sacramento, CA 95814 http://www.dfg.ca.gov	
			
			
VERIFY SCALE THIS BAR IS ONE INCH LONG AT FULL SCALE			
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE NORTH FORK BATTLE CREEK EAGLE CANYON FISH PASSAGE IMPROVEMENT		LOWER BARRIER SITE EAGLE CANYON SECTION	
DATE FEBRUARY 2017 SUBMITTAL			
DESIGN FINAL			
DRAWN ML, pTJ			
SHEET pTJ, NN			
6 of 27			
C-3			

CONTROL POINTS				
POINT #	ELEVATION (FT)	NORTHING (FT)	EASTING (FT)	DESCRIPTION
1	1352.13	2037262.41	6583398.87	CP1 MAG NAIL IN ROCK WITH SHINER
2	1355.32	2037300.30	6583359.09	CP2 MAG NAIL IN ROCK WITH SHINER
3	1357.74	2037322.97	6583401.49	CP3 MAG NAIL IN ROCK WITH SHINER
4	1367.74	2037391.89	6583434.60	CP4 MAG NAIL IN ROCK WITH SHINER
5	1368.28	2037424.74	6583442.01	CP5 MAG NAIL IN ROCK WITH SHINER
6	1381.29	2037451.14	6583498.32	CP6 MAG NAIL IN ROCK WITH SHINER
7	1372.29	2037486.13	6583518.01	CP7 MAG NAIL IN ROCK WITH SHINER
8	1371.13	2037500.94	6583496.84	CP8 MAG NAIL IN ROCK WITH SHINER
9	1379.10	2037540.30	6583587.82	CP9 MAG NAIL IN ROCK WITH SHINER
10	1381.20	2037508.87	6583572.72	CP10 MAG NAIL IN ROCK WITH SHINER
11	1374.06	2037510.61	6583513.67	CP11 MAG NAIL IN ROCK WITH SHINER
100	1590.94	2037606.48	6584265.20	DWR ALUM. DISC STAMPED "EC"
200	1581.59	2037878.69	6584073.43	DWR ALUM. DISC STAMPED "EC1"



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. LOVE
No. 71681
CIVIL
STATE OF CALIFORNIA

VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT

LOWER BARRIER SITE
HORIZONTAL AND VERTICAL CONTROL

DATE
FEBRUARY 2017
SUBMITTAL

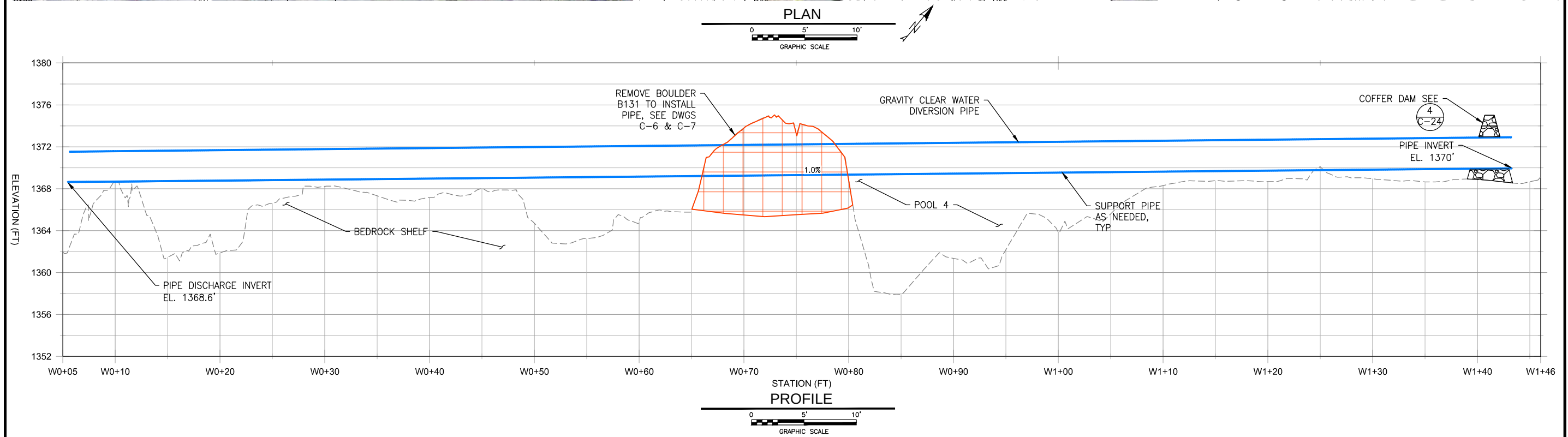
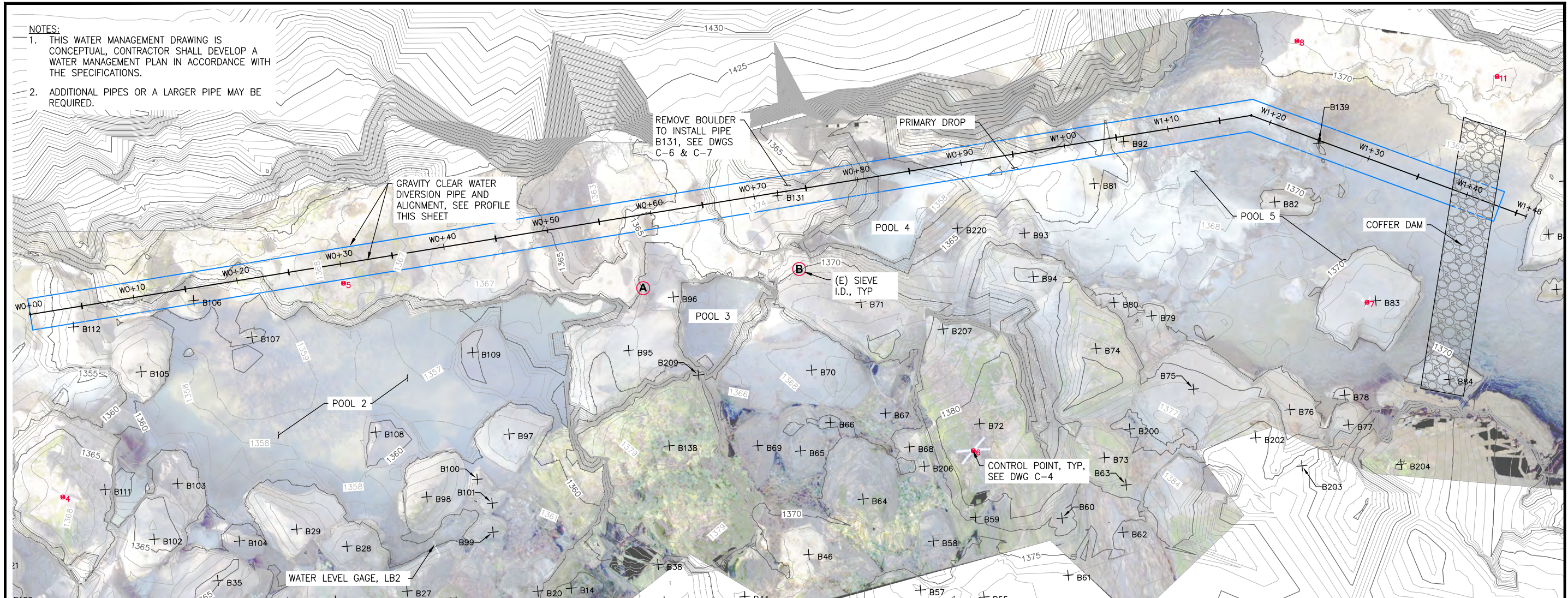
FINAL
DESIGN
ML, pTJ

DRAWN
pTJ, NN

SHEET
7 of 27

C-4

2/27/2017 7:45:12 PM Q:\Eagle_Canyon\05_CAD\Sheets\7_FinalDesign_LB_Horiz&Vert-Control.dwg



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 825-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. LOVE
No. 71681
CIVIL
STATE OF CALIFORNIA

VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT

LOWER BARRIER SITE
WATER MANAGEMENT PLAN & PROFILE

DATE
FEBRUARY 2017
SUBMITTAL

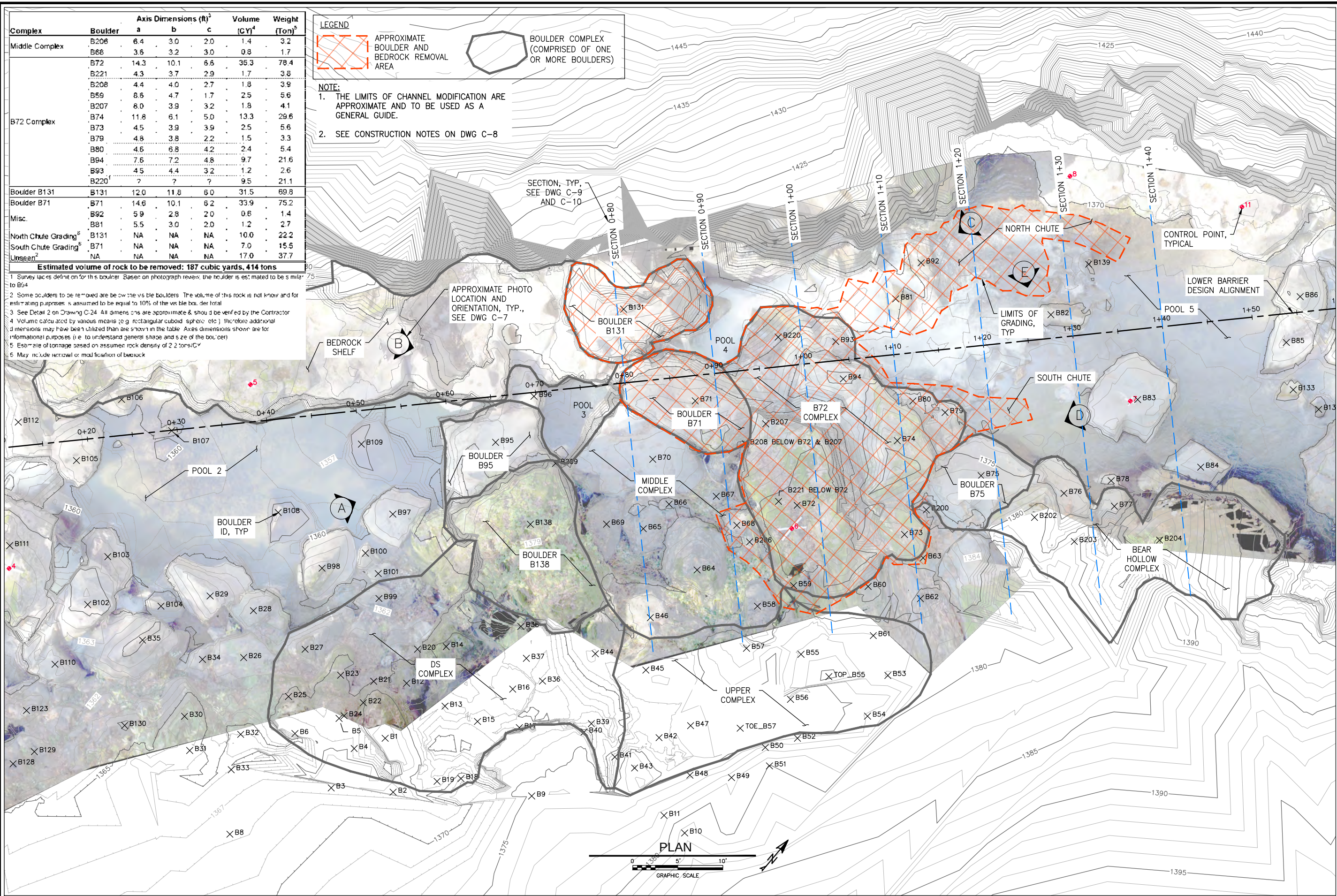
FINAL
DESIGN

ML, pTJ
DRAWN

pTJ, NN
SHEET

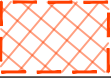
8 of 27

C-5

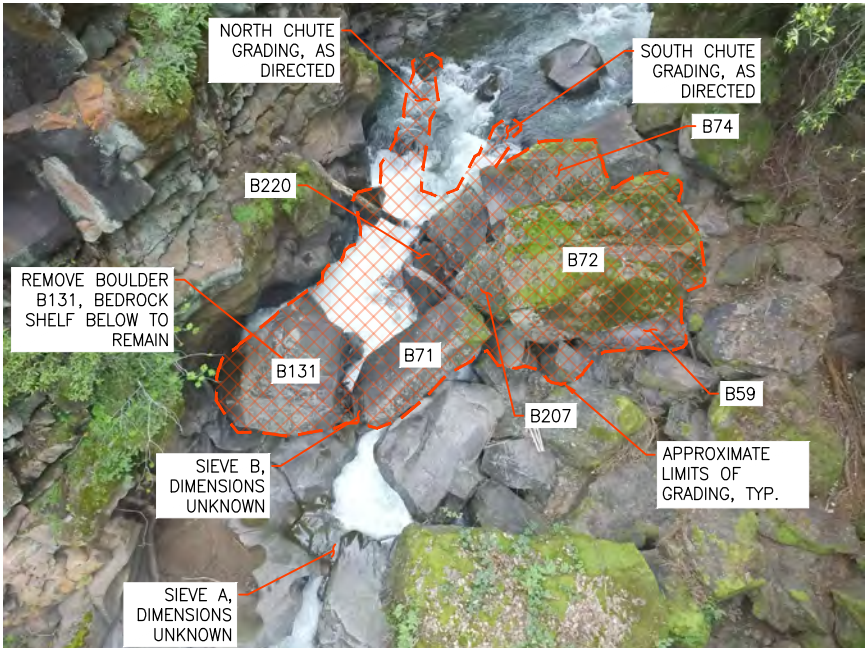


- NOTE:
1. THE LIMITS OF CHANNEL MODIFICATION ARE APPROXIMATE AND TO BE USED AS A GENERAL GUIDE.
 2. SEE DRAWING C-6 FOR LOCATION WHERE PHOTOGRAPH TAKEN

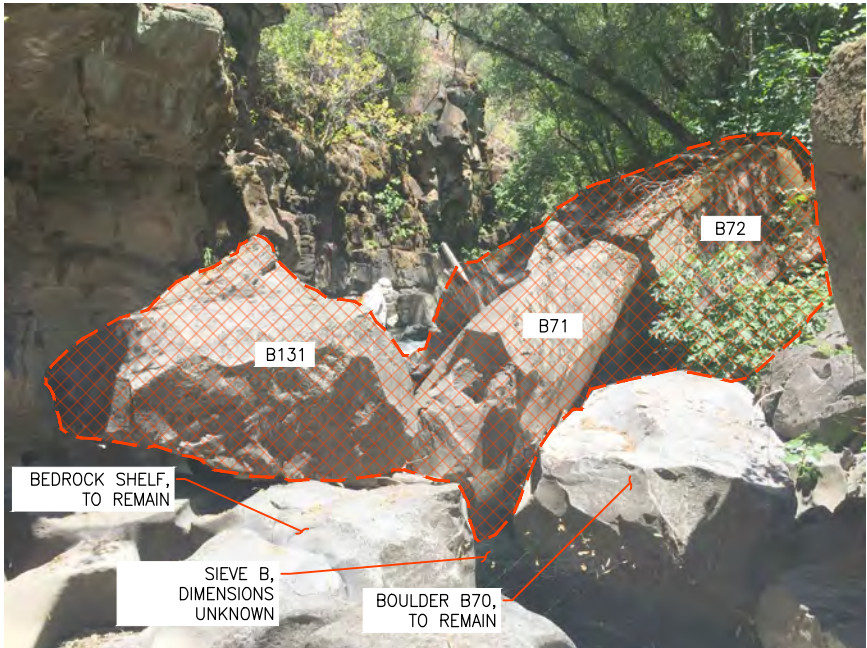
LEGEND



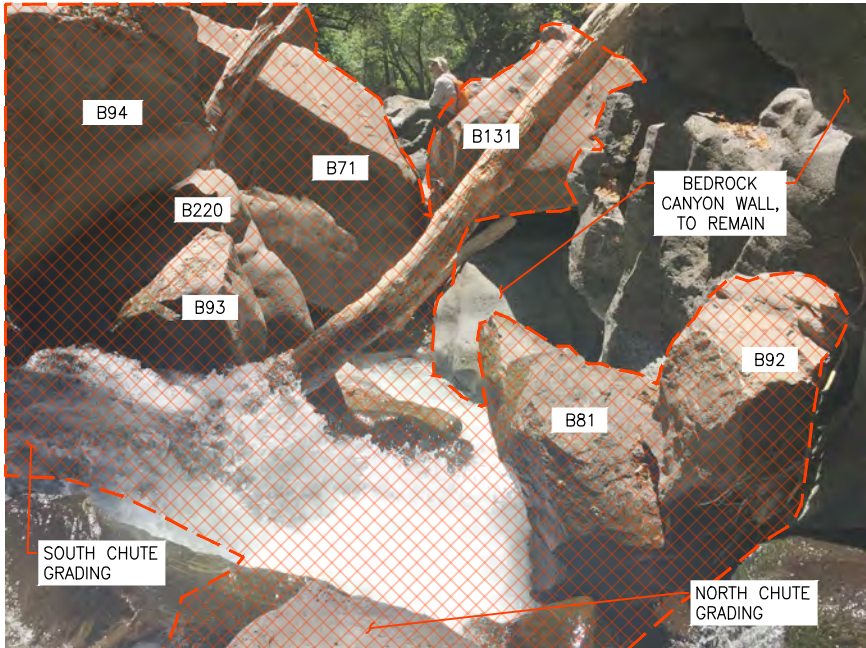
APPROXIMATE LIMITS OF CHANNEL MODIFICATION



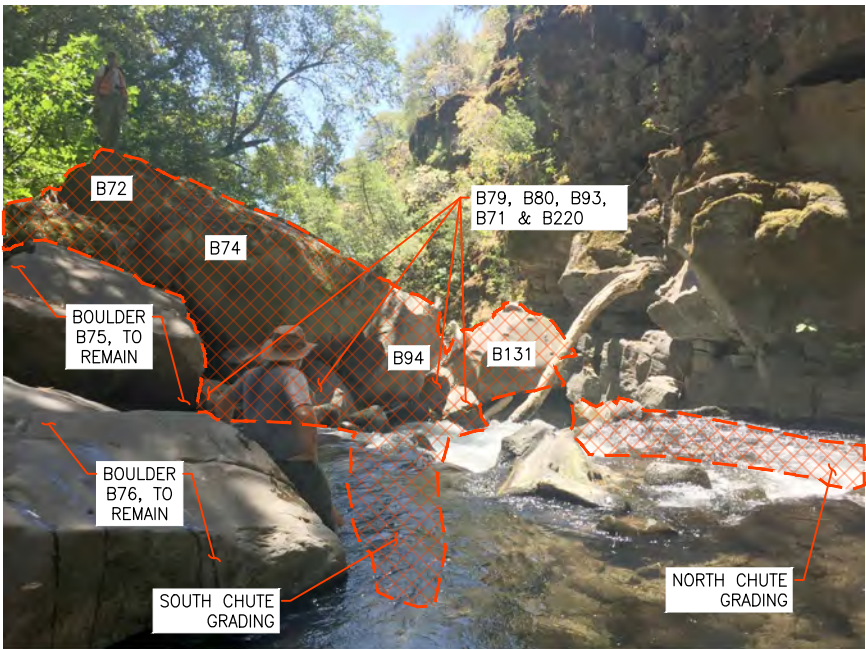
PHOTOGRAPH A
AERIAL, LOOKING UPSTREAM



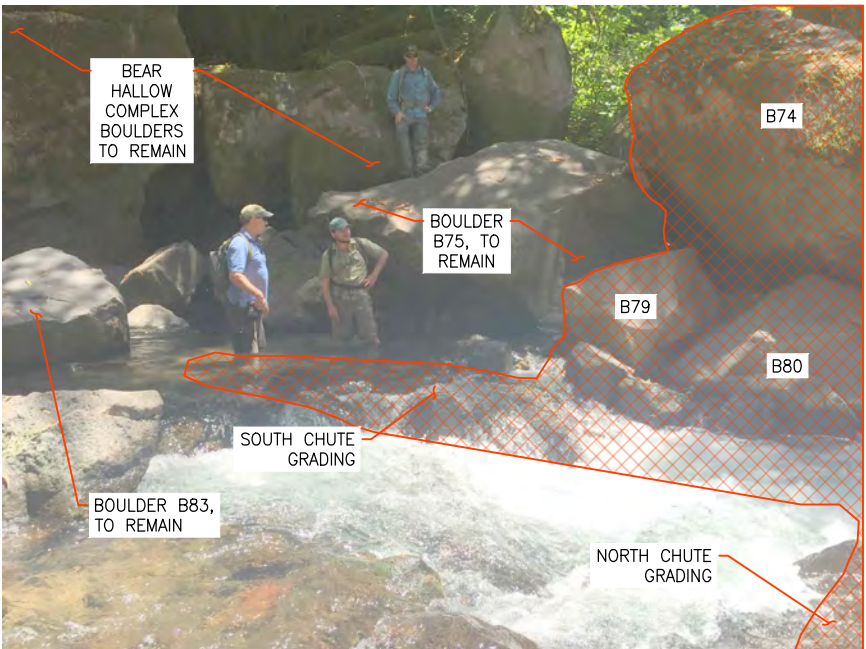
PHOTOGRAPH B
LOOKING UPSTREAM



PHOTOGRAPH C
LOOKING DOWNSTREAM

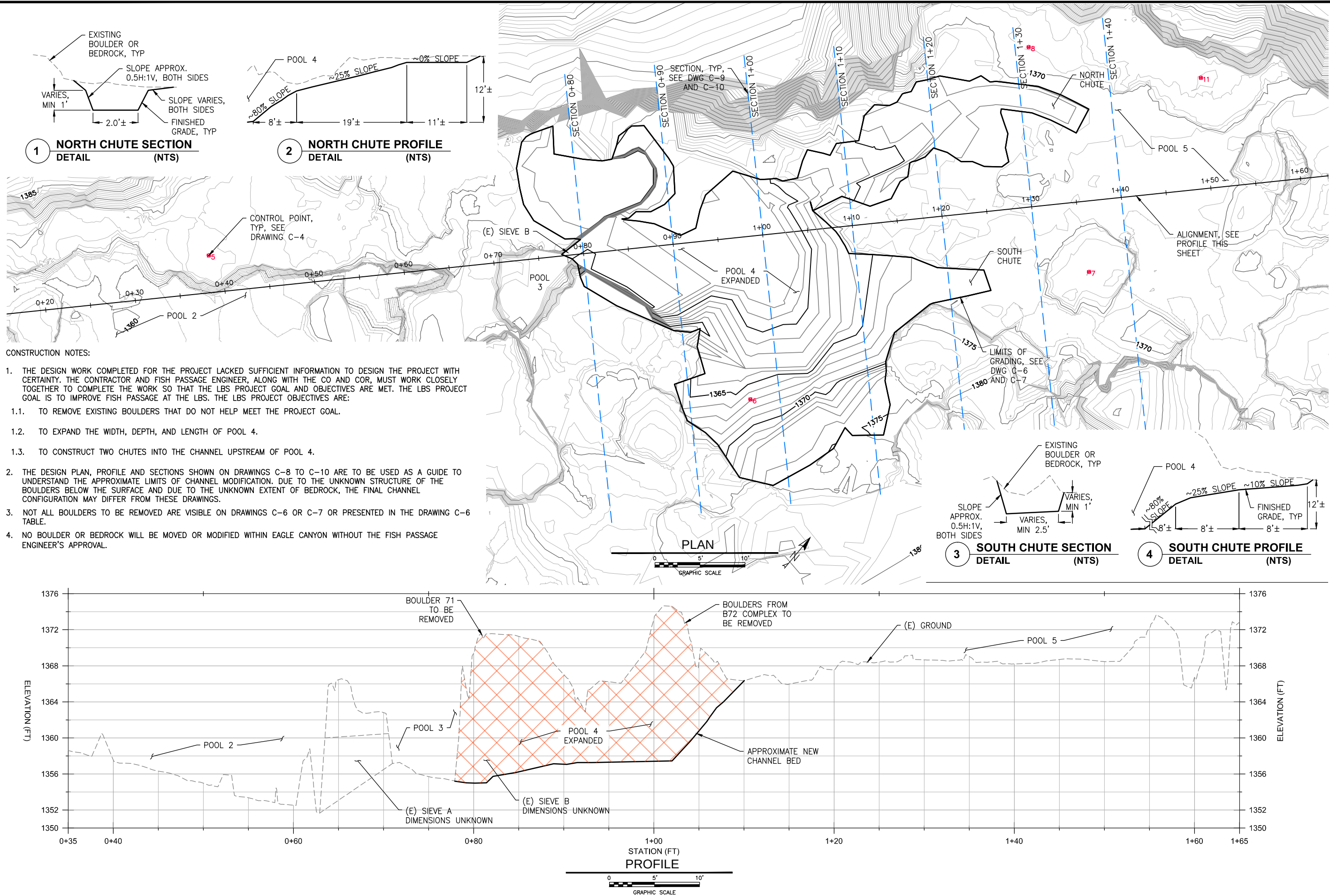


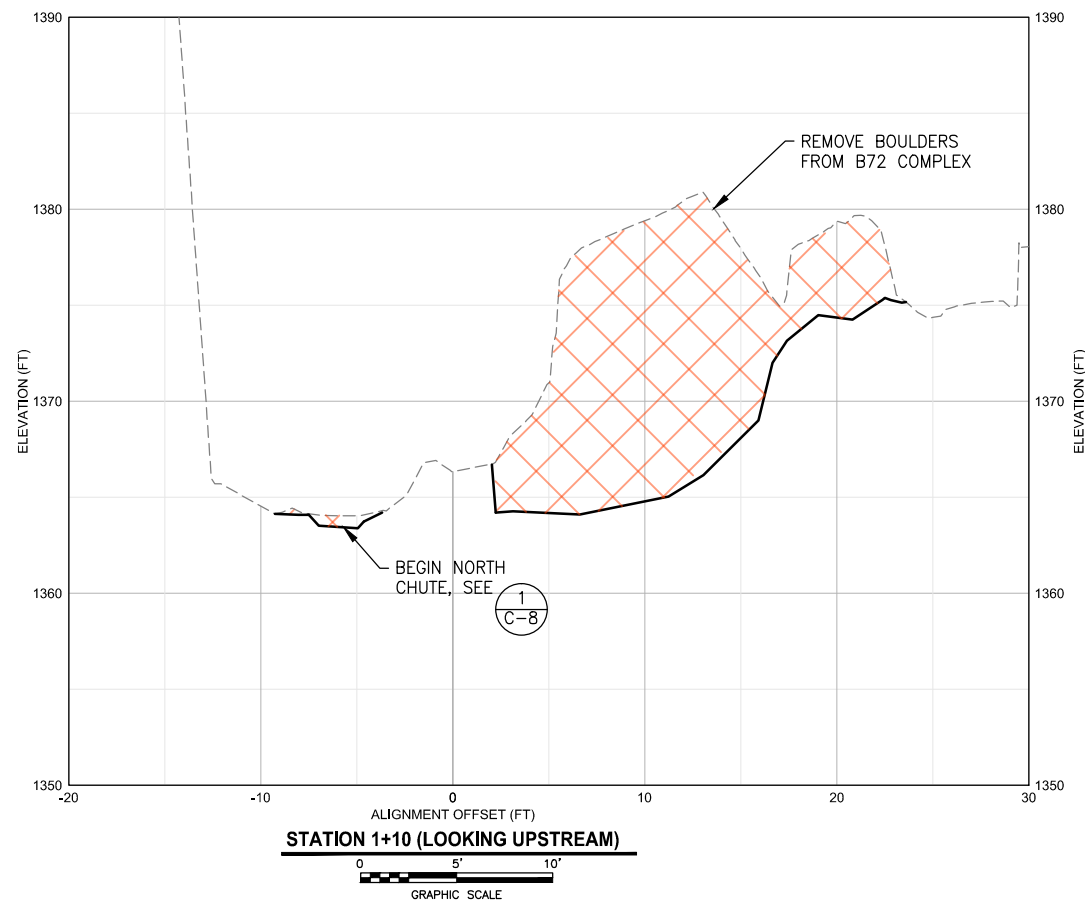
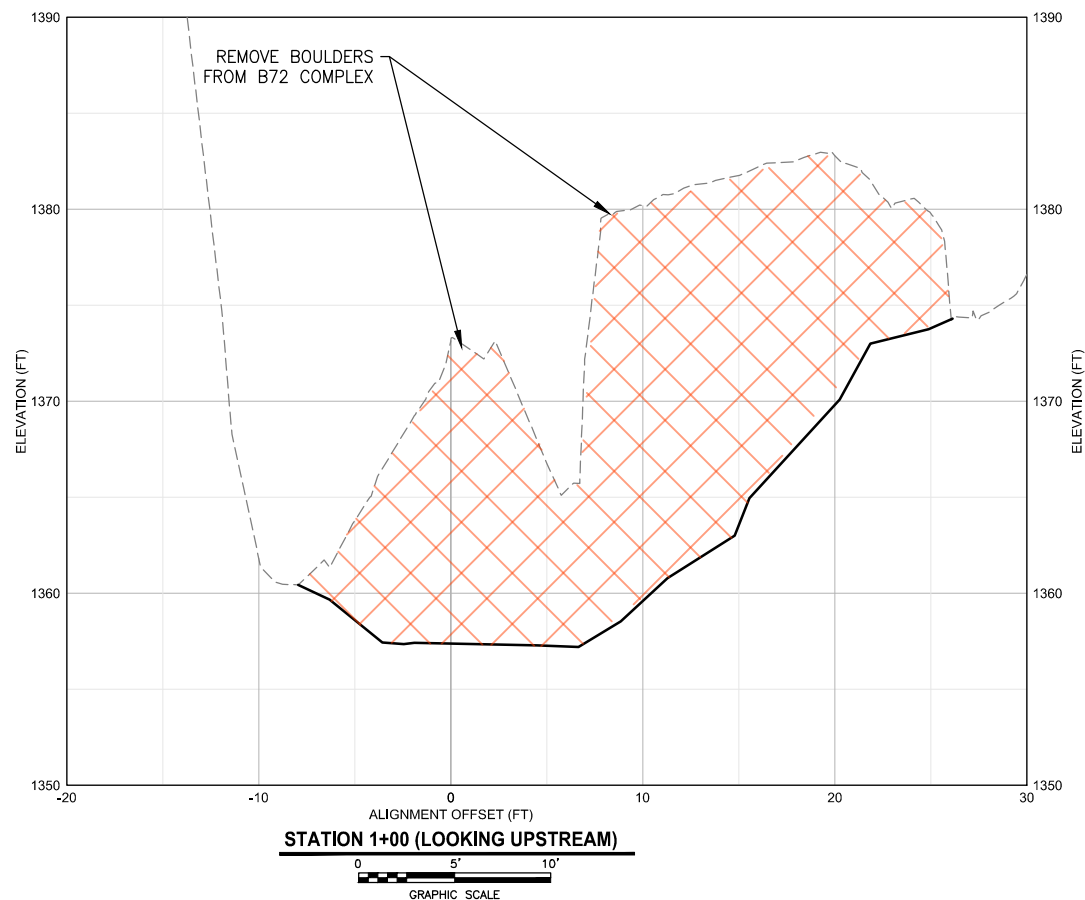
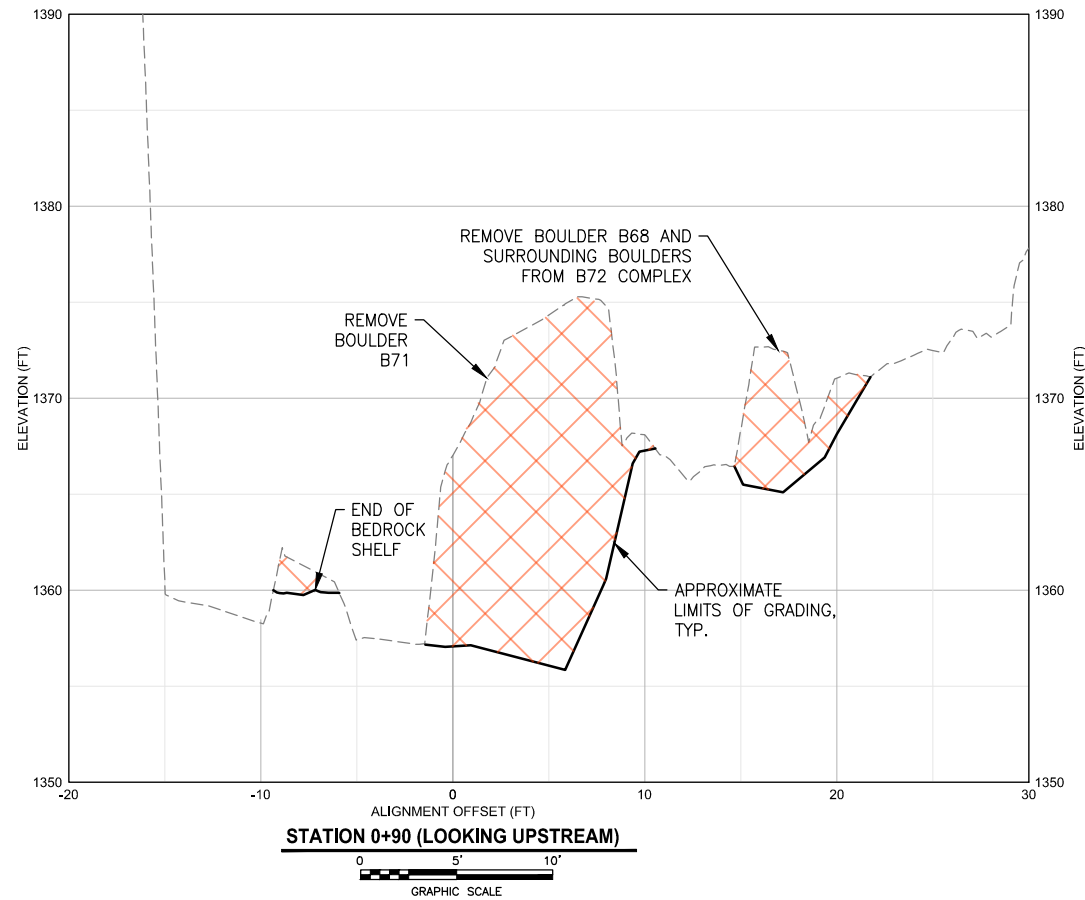
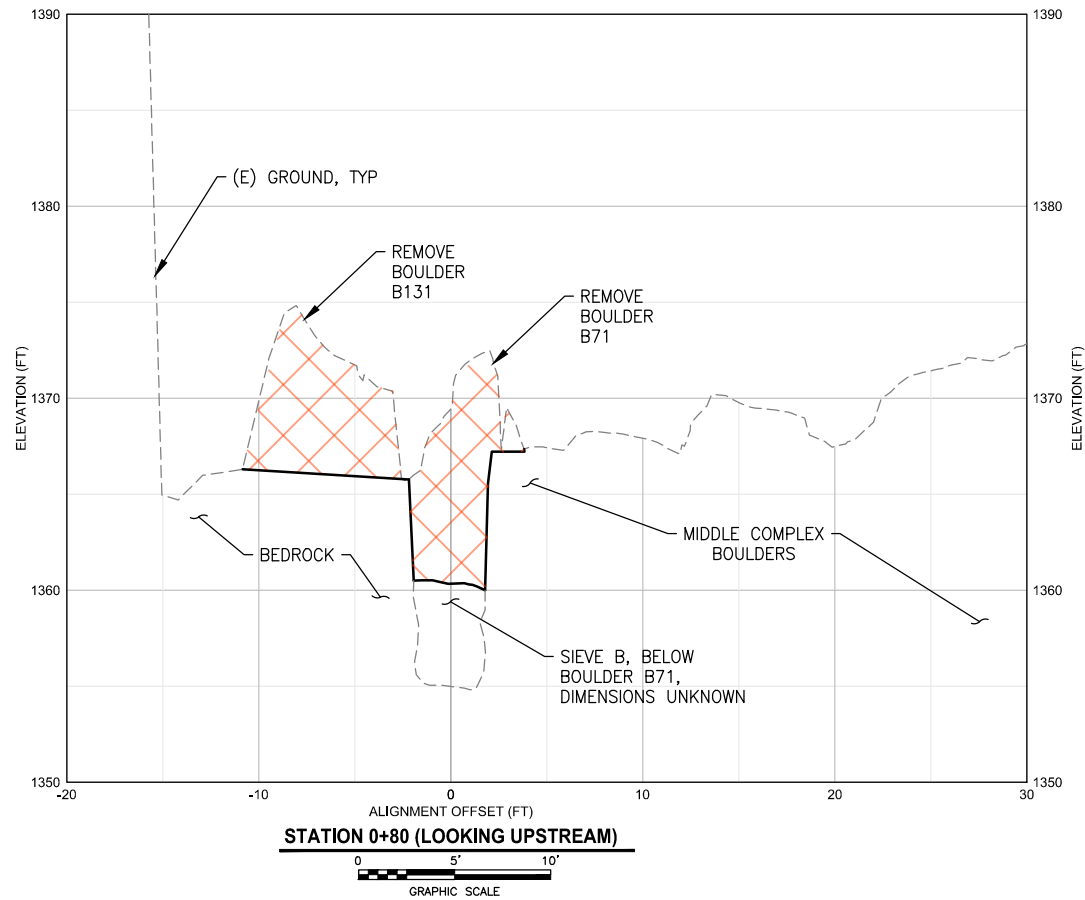
PHOTOGRAPH D
LOOKING DOWNSTREAM

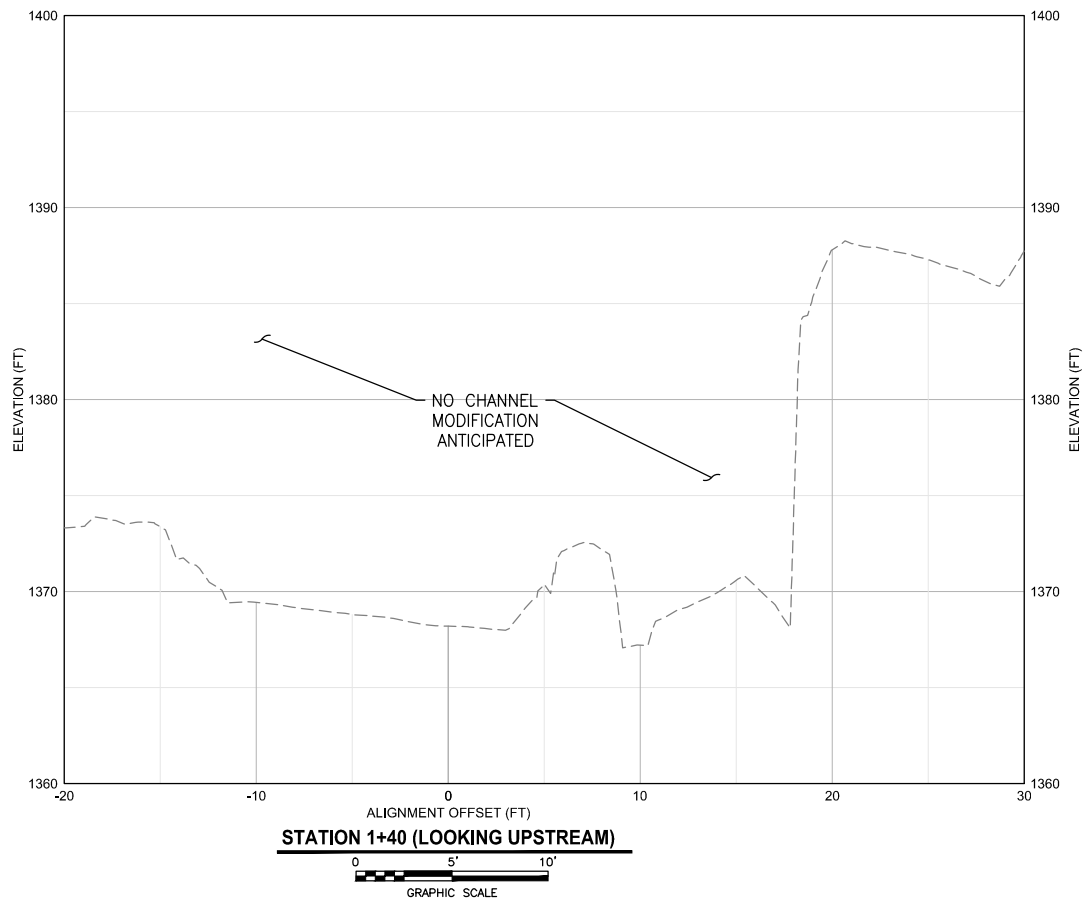
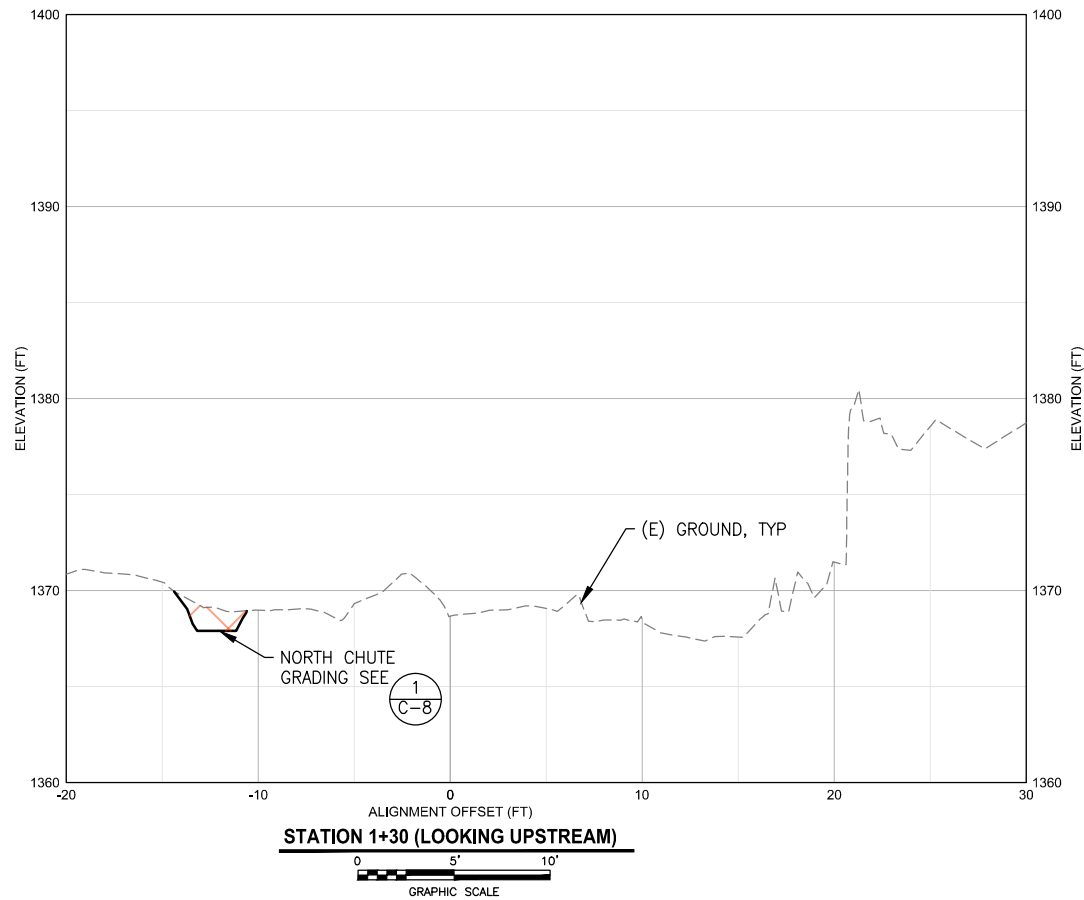
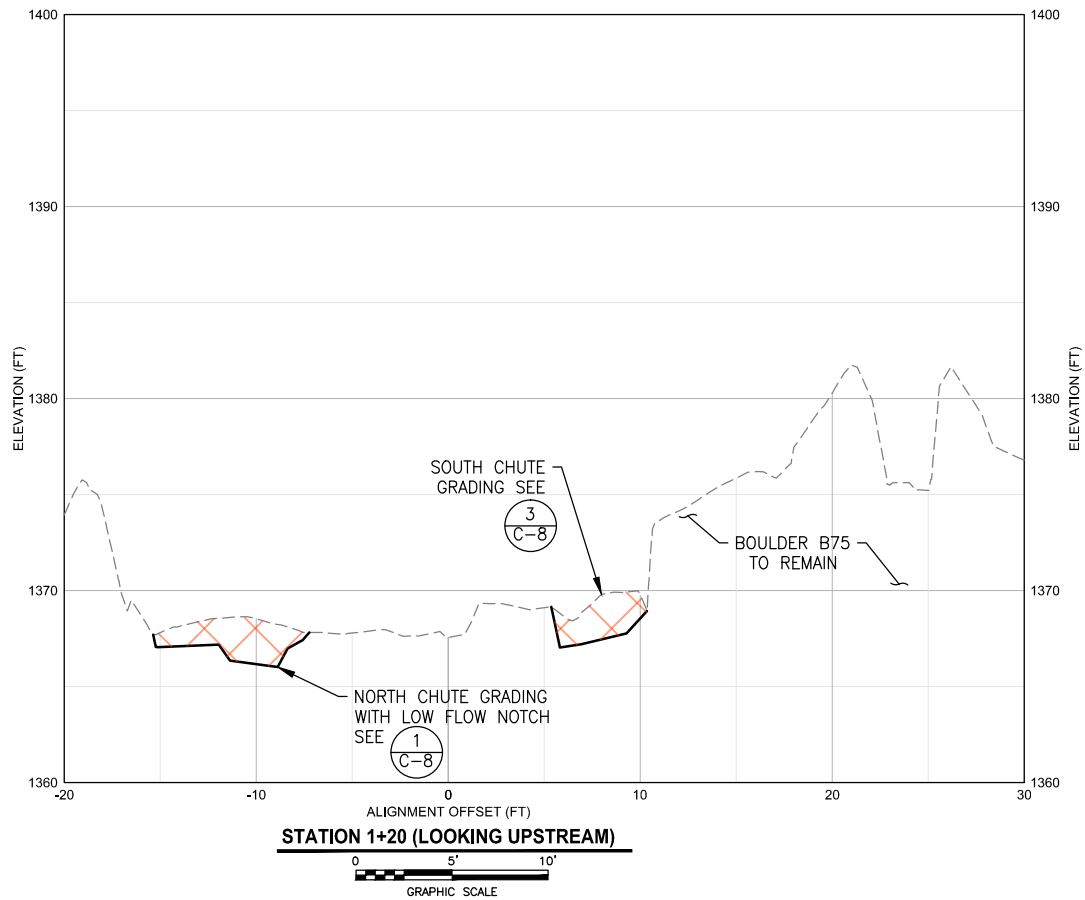


PHOTOGRAPH E
LOOKING TO SOUTH BANK

Michael Love & Associates, Inc. PO Box 4477 • Arcata, CA 95518 • (707) 822-2411		Department of Fish and Wildlife 1416 9th Street, 12th Floor Sacramento, CA 95814 http://www.dfg.ca.gov	
			
VERIFIED SCALE THIS BAR IS ONE INCH LONG AT FULL SCALE		CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE NORTH FORK BATTLE CREEK EAGLE CANYON FISH PASSAGE IMPROVEMENT LOWER BARRIER SITE DEMO PHOTOGRAPHS	
DATE FEBRUARY 2017 SUBMITTAL		FINAL DESIGN	
ML, pTJ		DRAWN	
pTJ, NN		SHEET	
10 of 27		C-7	







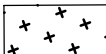
Michael Love & Associates, Inc. PO Box 4477 • Arcata, CA 95518 • (707) 822-2411		Department of Fish and Wildlife 1416 9th Street, 12th Floor Sacramento, CA 95814 http://www.dfg.ca.gov	
			
VERIFY SCALE		THIS BAR IS ONE INCH LONG AT FULL SCALE	
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE NORTH FORK BATTLE CREEK EAGLE CANYON FISH PASSAGE IMPROVEMENT LOWER BARRIER SITE SECTIONS, 2 OF 2			
DATE FEBRUARY 2017 SUBMITTAL			
DESIGN FINAL			
DRAWN ML, pTJ			
SHEET pTJ, NN			
13 of 27			
C-10			

- NOTES:**
1. THIS DRAWING PRESENTS CONSTRUCTION ACCESS OPTION 1 OF 2.
 2. KEEP ACCESS ROADS CLEAR.
 3. MINIMIZE VEGETATION CLEARING TO AMOUNT NECESSARY FOR CONSTRUCTION.
 4. SELECTED OPTION MUST BE CAPABLE OF PLACING BOULDERS WITHIN A 1-FT TOLERANCE.

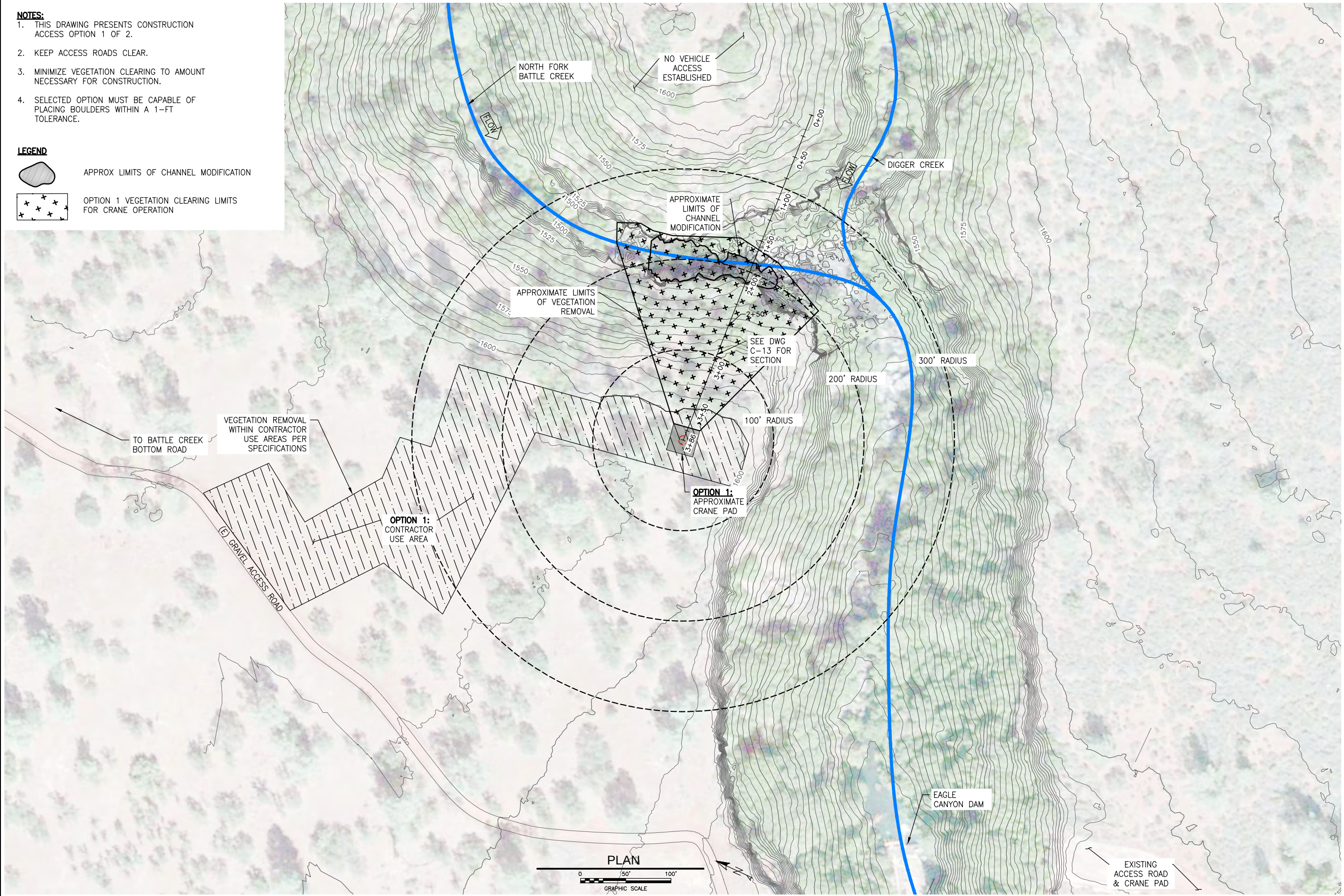
LEGEND



APPROX LIMITS OF CHANNEL MODIFICATION



OPTION 1 VEGETATION CLEARING LIMITS FOR CRANE OPERATION



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
<http://www.dfg.ca.gov>

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. LOVE
No. 71681
CIVIL
STATE OF CALIFORNIA

VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
UPPER BARRIER SITE
ACCESS & USE AREA OPTION 1 PLAN

DATE
FEBRUARY 2017
SUBMITTAL

FINAL
DESIGN

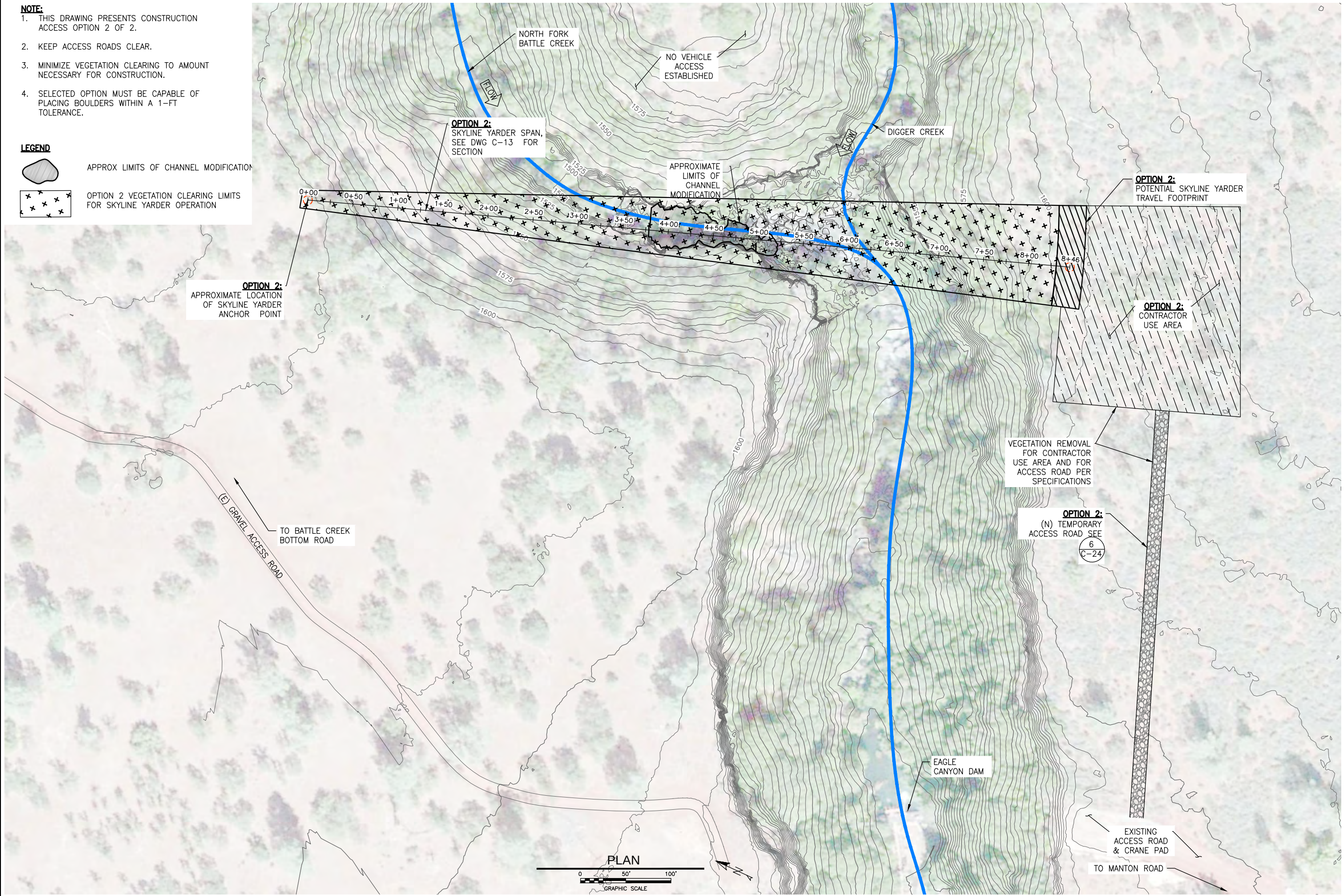
ML, pTJ
DRAWN

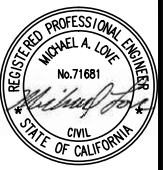
pTJ, NN
SHEET

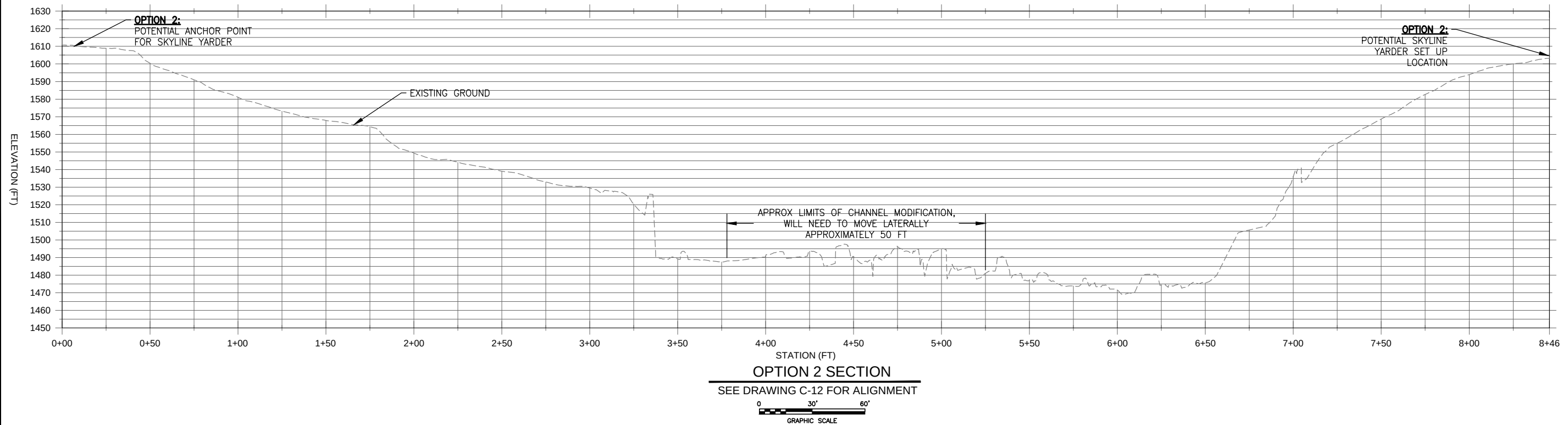
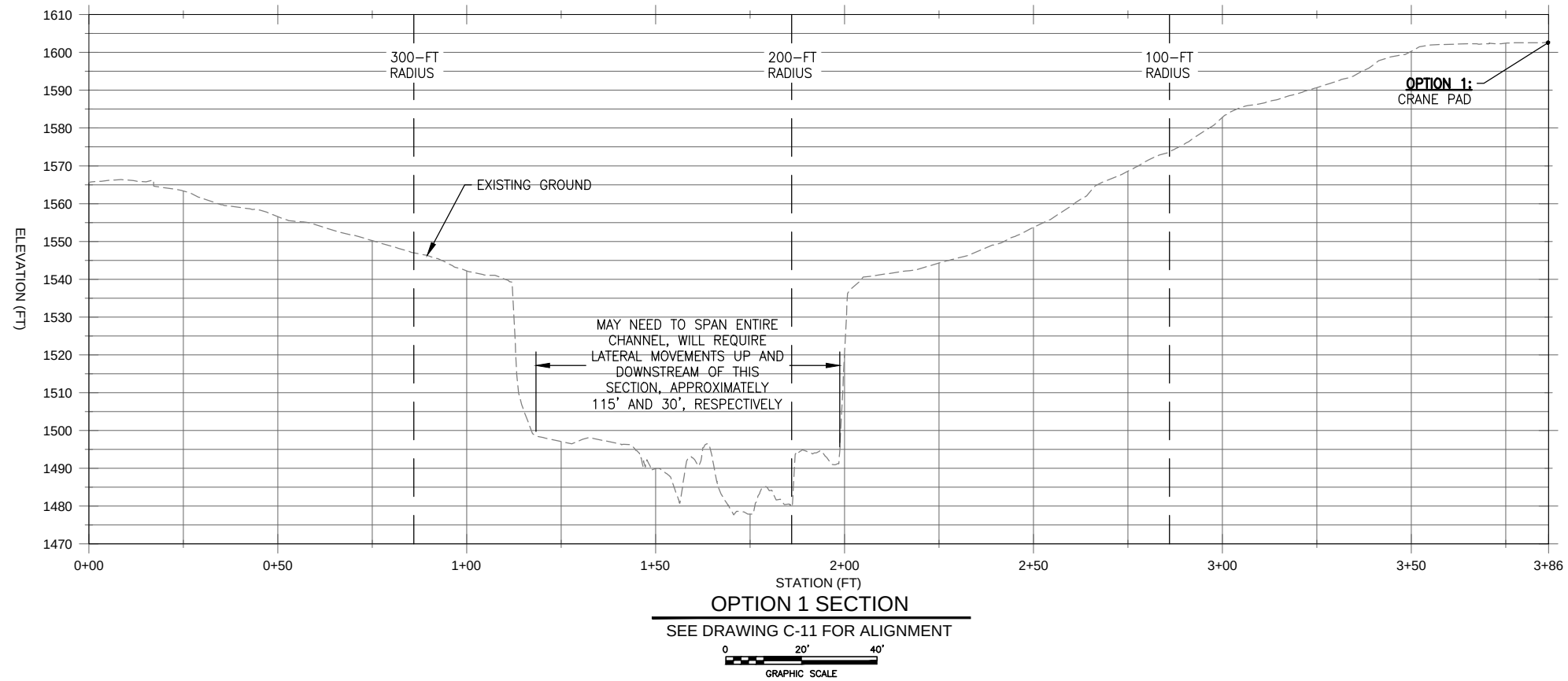
14 of 27

C-11

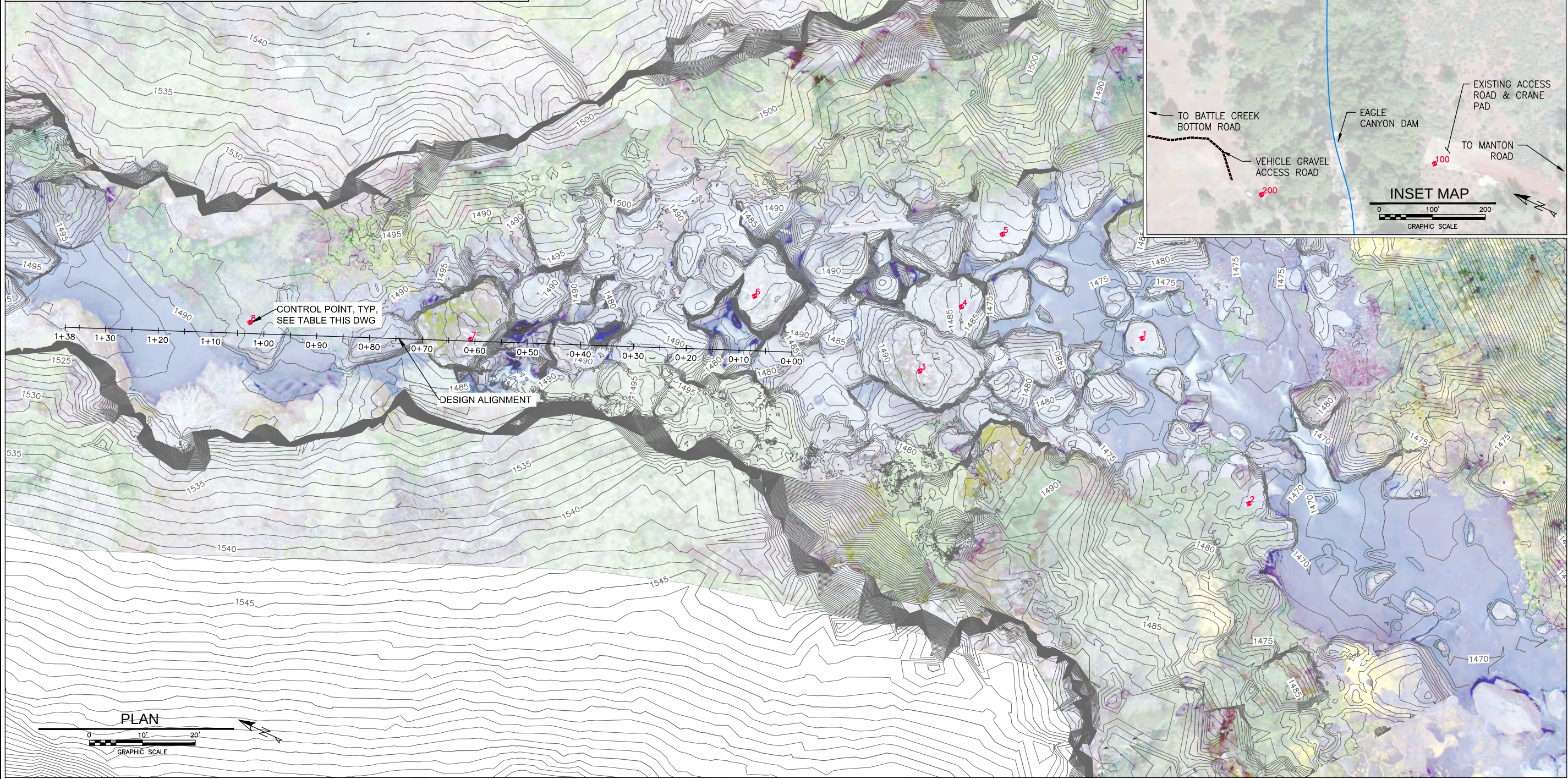
- NOTE:**
1. THIS DRAWING PRESENTS CONSTRUCTION ACCESS OPTION 2 OF 2.
 2. KEEP ACCESS ROADS CLEAR.
 3. MINIMIZE VEGETATION CLEARING TO AMOUNT NECESSARY FOR CONSTRUCTION.
 4. SELECTED OPTION MUST BE CAPABLE OF PLACING BOULDERS WITHIN A 1-FT TOLERANCE.
- LEGEND**
-  APPROX LIMITS OF CHANNEL MODIFICATION
-  OPTION 2 VEGETATION CLEARING LIMITS FOR SKYLINE YARDER OPERATION



Michael Love & Associates, Inc. PO Box 4477 • Arcata, CA 95518 • (707) 825-2411	Department of Fish and Wildlife 1416 9th Street, 12th Floor Sacramento, CA 95814 http://www.dfg.ca.gov
	
VERIFY SCALE THIS BAR IS ONE INCH LONG AT FULL SCALE	
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE NORTH FORK BATTLE CREEK EAGLE CANYON FISH PASSAGE IMPROVEMENT UPPER BARRIER SITE ACCESS & USE AREA OPTION 2 PLAN	
DATE FEBRUARY 2017 SUBMITTAL	
DESIGN FINAL	
DRAWN ML, pTJ	
SHEET pTJ, NN	
15 of 27	
C-12	



CONTROL POINTS				
POINT #	ELEVATION (FT)	NORTHING (FT)	EASTING (FT)	DESCRIPTION
1	1476.77	2038142.95	6584769.42	CP1 MAG NAIL WITH SHINER IN ROCK
2	1478.26	2038111.41	6584749.60	CP2 MAG NAIL WITH SHINER IN ROCK
3	1492.08	2038178.49	6584746.00	CP3 MAG NAIL WITH SHINER IN ROCK
4	1486.08	2038176.49	6584760.36	CP4 MAG NAIL WITH SHINER IN ROCK
5	1481.20	2038175.25	6584776.07	CP5 MAG NAIL WITH SHINER IN ROCK
6	1496.70	2038212.83	6584745.67	CP6 MAG NAIL WITH SHINER IN ROCK
7	1498.48	2038258.12	6584715.52	CP7 MAG NAIL WITH SHINER IN ROCK
8	1492.28	2038297.30	6584700.76	CP8 MAG NAIL WITH SHINER IN ROCK
100	1590.94	2037606.48	6584265.20	DWR ALUM. DISC STAMPED "EC"
200	1581.59	2037878.69	6584073.43	DWR ALUM. DISC STAMPED "EC1"



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. LOVE
No. 71681
CIVIL
STATE OF CALIFORNIA

VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT

UPPER BARRIER SITE
HORIZONTAL AND VERTICAL CONTROL

DATE
FEBRUARY 2017
SUBMITTAL

DESIGN
FINAL

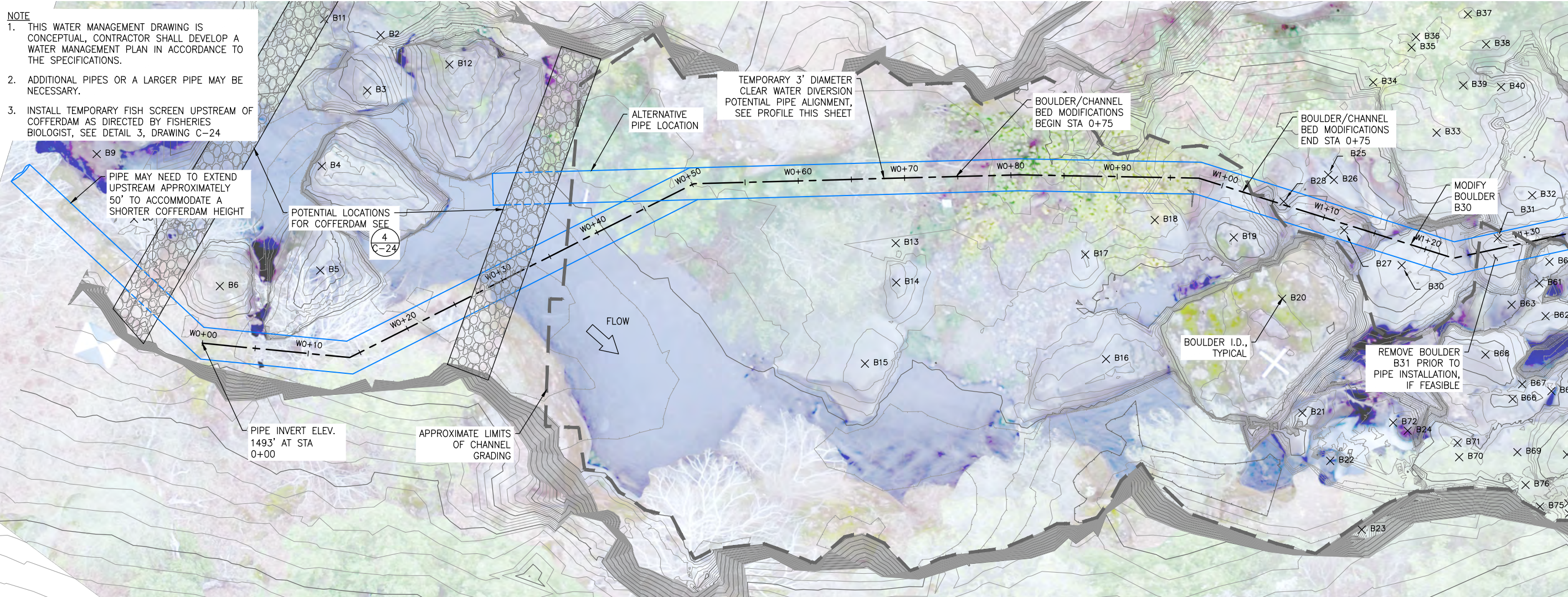
DRAWN
ML, pTJ

SHEET
pTJ, NN

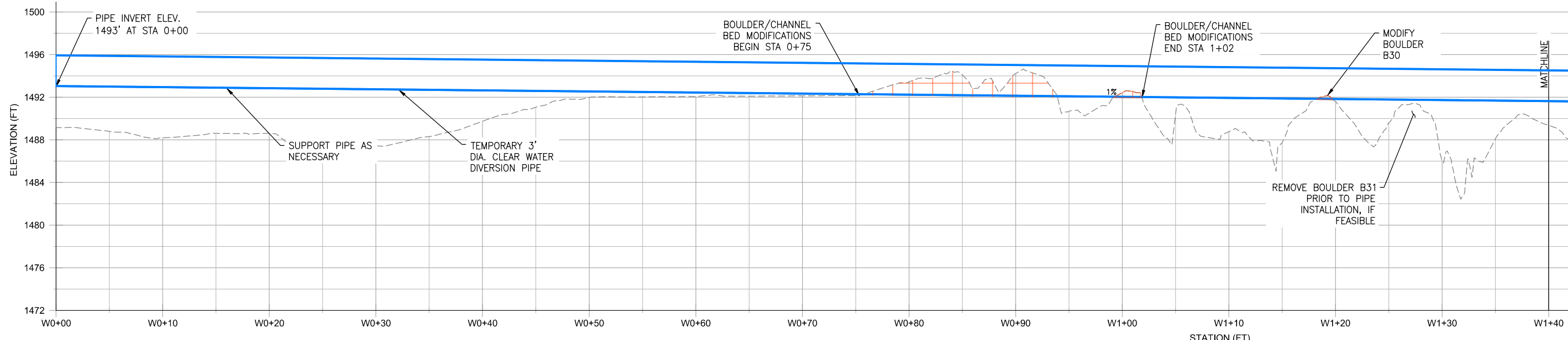
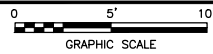
17 of 27

C-14

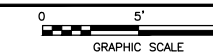
- NOTE
1. THIS WATER MANAGEMENT DRAWING IS CONCEPTUAL, CONTRACTOR SHALL DEVELOP A WATER MANAGEMENT PLAN IN ACCORDANCE TO THE SPECIFICATIONS.
 2. ADDITIONAL PIPES OR A LARGER PIPE MAY BE NECESSARY.
 3. INSTALL TEMPORARY FISH SCREEN UPSTREAM OF COFFERDAM AS DIRECTED BY FISHERIES BIOLOGIST, SEE DETAIL 3, DRAWING C-24



CONCEPTUAL TEMPORARY PIPE PLAN



CONCEPTUAL TEMPORARY PIPE PROFILE



Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 825-2411
Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov

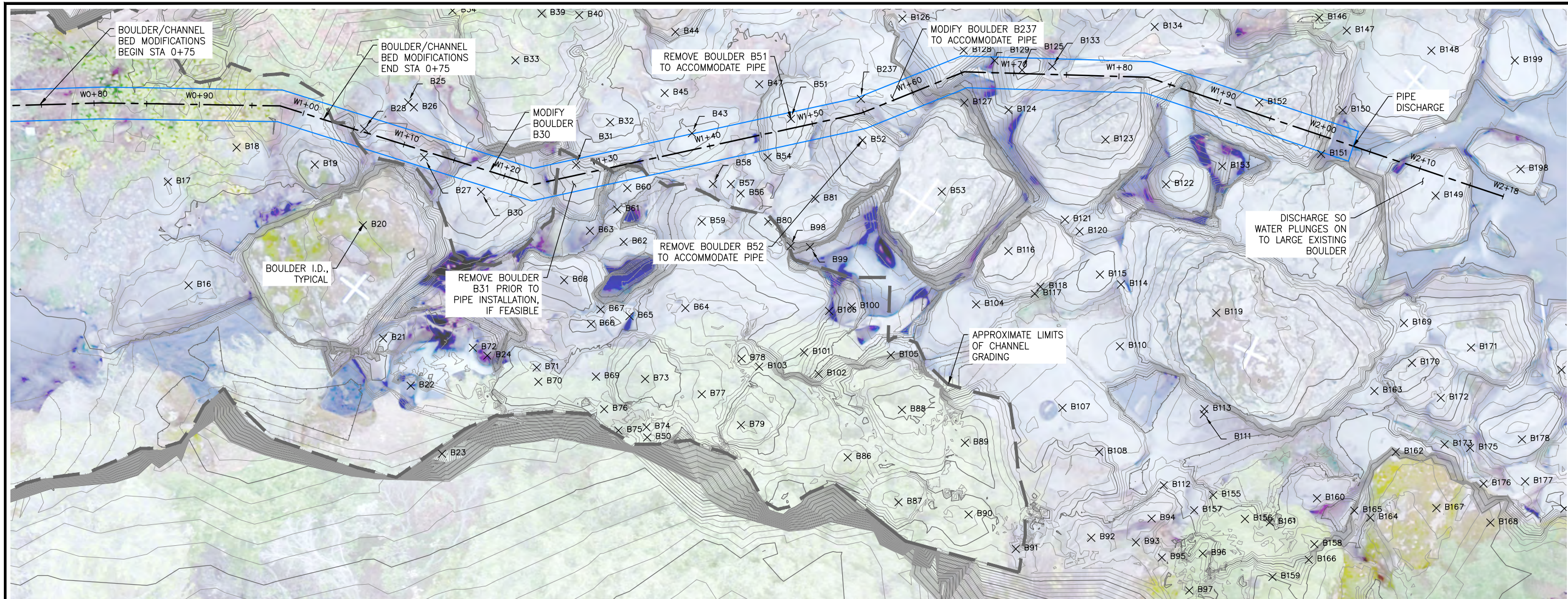


VERIFY SCALE
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

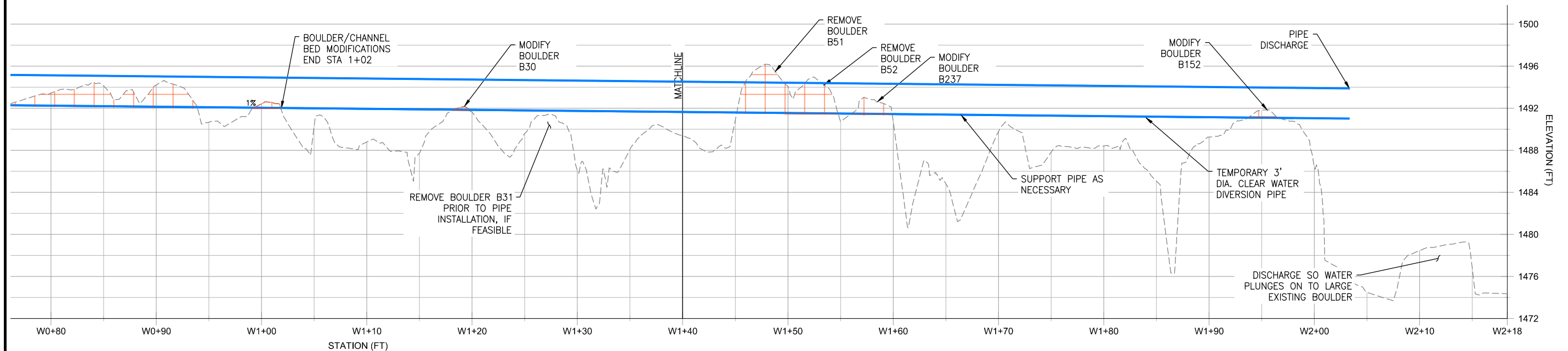
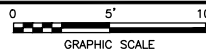
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
UPPER BARRIER SITE
WATER MANAGEMENT, 1 OF 2

DATE
FEBRUARY 2017
SUBMITTAL
FINAL
DESIGN
ML, pTJ
DRAWN
pTJ, NN
SHEET

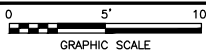
18 of 27
C-15



CONCEPTUAL TEMPORARY PIPE PLAN



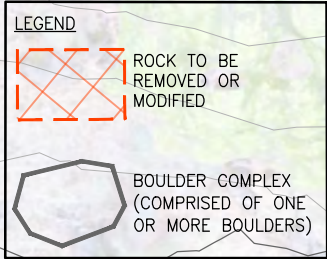
CONCEPTUAL TEMPORARY PIPE PROFILE



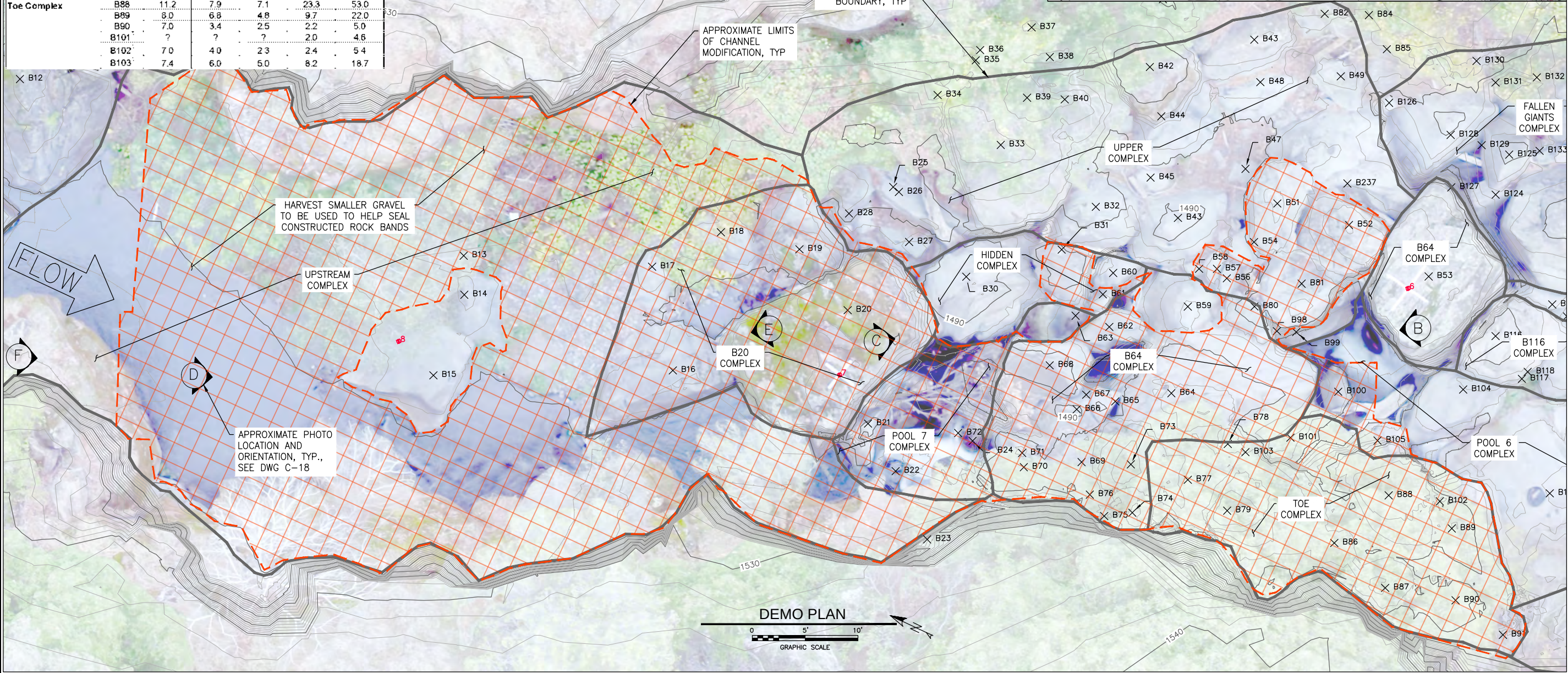
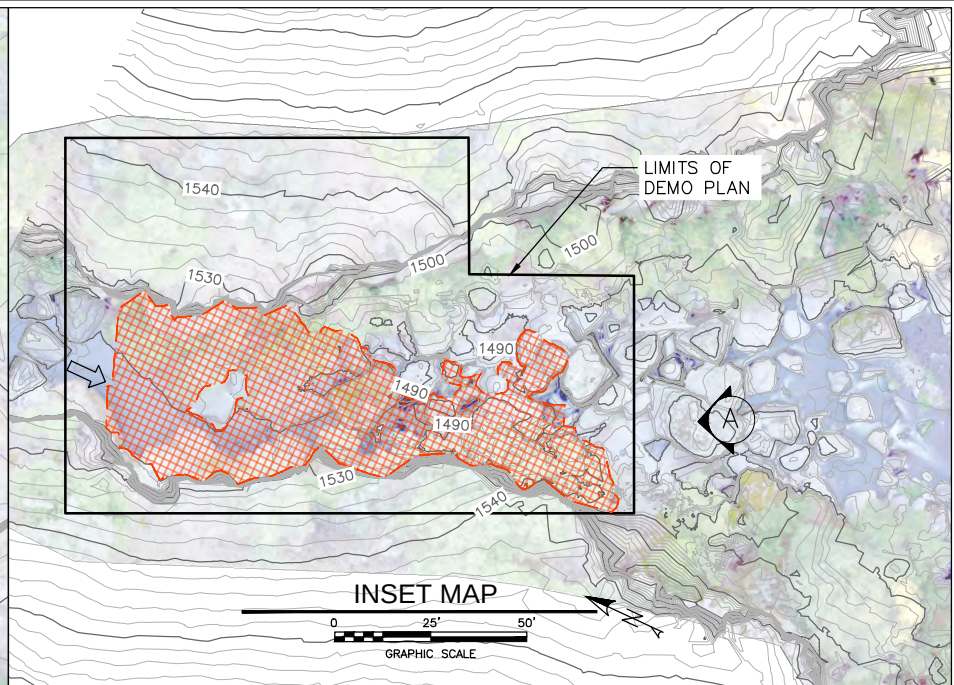
Complex	Boulder	Axis Dimensions (ft) ⁴			Volume (CY) ⁵	Weight (Ton) ⁶
		a	b	c		
B20 Complex	B16 ¹	13.6	7.0	8.0	22.1	50.3
	B17 ¹	3.4	3.0	3.0	1.1	2.6
	B18 ¹	4.2	4.0	4.0	2.5	5.7
	B19	6.2	5.9	3.7	5.0	11.4
	B20	15.9	11.0	9.1	51.4	117.1
Pool 7 Complex	B21 ^{1,2}	8.7	5.5	3.7	5.0	11.5
	B22 ^{1,2}	5.5	4.3	4.1	1.9	4.4
	B24 ¹	2.8	2.5	2.3	0.4	1.0
	B72 ¹	5.4	5.2	2.3	2.4	5.4
	B61	2.1	2.0	1.0	0.1	0.2
Toe Complex	B62	3.0	3.9	3.5	1.5	3.4
	B64	14.4	8.8	5.4	25.3	57.7
	B65	3.0	2.7	2.7	0.4	0.9
	B66 ¹	6.0	2.6	2.3	1.7	3.8
	B67 ¹	6.0	4.3	2.4	2.3	5.2
	B68	9.0	6.0	7.0	14.0	31.9
	B69	5.7	3.2	2.4	1.6	3.7
	B70	5.2	4.2	2.1	1.7	3.9
	B71	4.1	3.6	2.0	1.1	2.5
	B73	5.6	4.9	3.8	3.9	8.8
	B74	2.0	1.5	1.0	0.1	0.3
	B75	2.0	1.5	0.8	0.1	0.2
	B76	2.1	2.1	1.9	0.3	0.7
	B80	4.3	3.2	2.4	1.2	2.8
	B77	6.6	5.6	5.0	6.8	15.6
	B78	6.2	2.5	2.5	1.4	3.3
	B79	12.0	8.3	6.0	11.1	25.2
	B86	3.7	3.2	2.1	0.5	1.2
	B87	5.5	4.3	3.8	3.3	7.6
	B88	11.2	7.9	7.1	23.3	53.0
	B89	8.0	6.8	4.8	9.7	22.0
	B90	7.0	3.4	2.5	2.2	5.0
	B101	?	?	?	2.0	4.6
	B102	7.0	4.0	2.3	2.4	5.4
	B103	7.4	6.0	5.0	8.2	18.7

Complex	Boulder	Axis Dimensions (ft) ⁴			Volume (CY) ⁵	Weight (Ton) ⁶
		a	b	c		
Pool 6 Complex	B100 ¹	4.0	3.0	3.0	1.3	3.0
	B105	5.5	5.2	4.1	2.6	5.9
Upper Complex	B51	6.1	3.8	5.1	4.4	10.0
	B52	5.7	5.6	5.3	3.3	7.5
	B56	2.4	1.8	1.6	0.3	0.6
	B57 ¹	2.0	2.1	2.0	0.3	0.7
	B58	2.0	2.1	2.0	0.3	0.7
Upstream Complex	NA	NA	NA	NA	453	1031
Grading	NA	NA	NA	NA	18	40
Unseen ³	NA	NA	NA	NA	18	40
Estimated volume of rock to be removed or modified: 716 cubic yards, 1630 tons						

- Some of boulder dimensions are not visible (e.g. below other boulders, under water) and are estimated.
- May be bedrock.
- Some boulders to be removed/moved/modified are located below the visible boulders, primarily beneath the Toe Complex boulders. The volume of this rock is not known and for estimating purposes is assumed to be 25% of the Toe Complex boulder subtotal.
- See Detail 2 on Drawing C-24. All dimensions are approximate & should be verified by the Contractor.
- Volume calculated by various means (e.g. rectangular, conical, sphere, etc.) therefore additional dimensions may have been utilized than are shown. Axes dimensions shown are for informational purposes (e.g. to understand general shape and size of the boulder).
- Weight based on assumed rock density of 2.3 tons/CY.



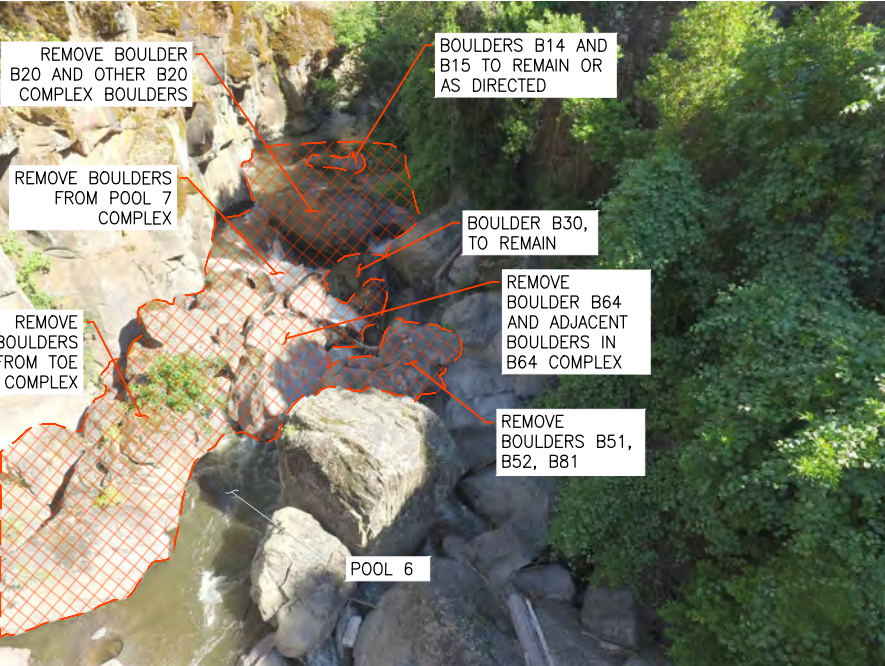
- NOTE:
- THE LIMITS OF CHANNEL MODIFICATION ARE APPROXIMATE AND TO BE USED AS A GENERAL GUIDE.
 - SEE CONSTRUCTION NOTES ON DWG C-20



- NOTE:
1. THE LIMITS OF CHANNEL MODIFICATION ARE APPROXIMATE AND TO BE USED AS A GENERAL GUIDE.
 2. SEE DRAWING C-17 FOR LOCATION AND ORIENTATION OF PHOTOGRAPH.
 3. SEE NOTES ON DWG C-21

LEGEND

APPROXIMATE LIMITS OF CHANNEL MODIFICATION



PHOTOGRAPH A
LOOKING UPSTREAM



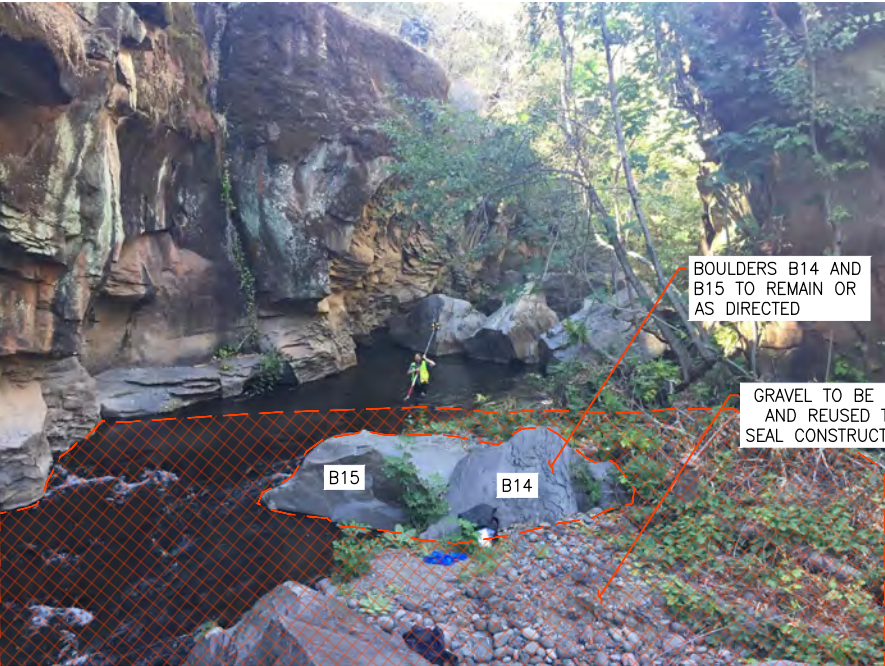
PHOTOGRAPH B
LOOKING UPSTREAM



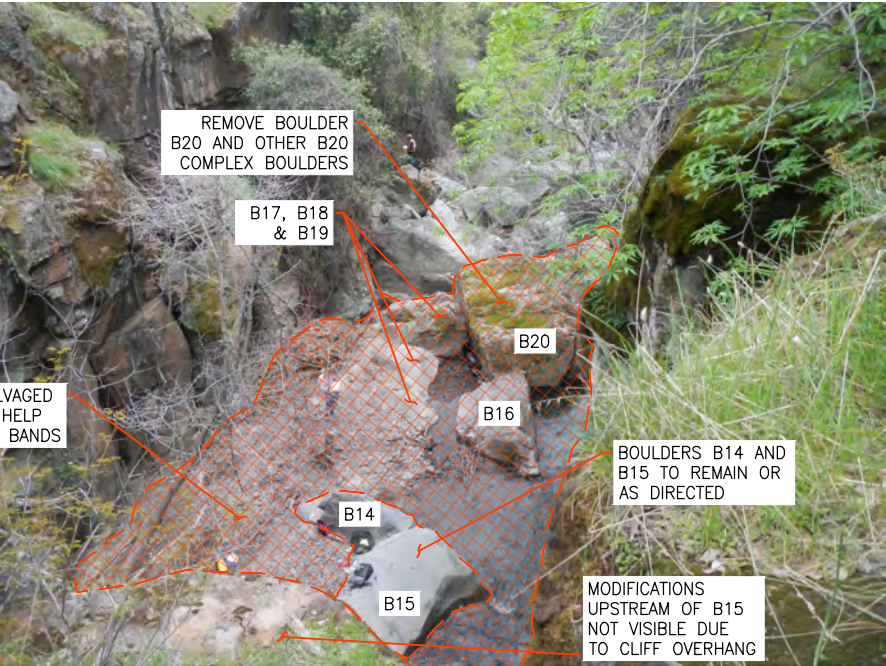
PHOTOGRAPH C
LOOKING DOWNSTREAM



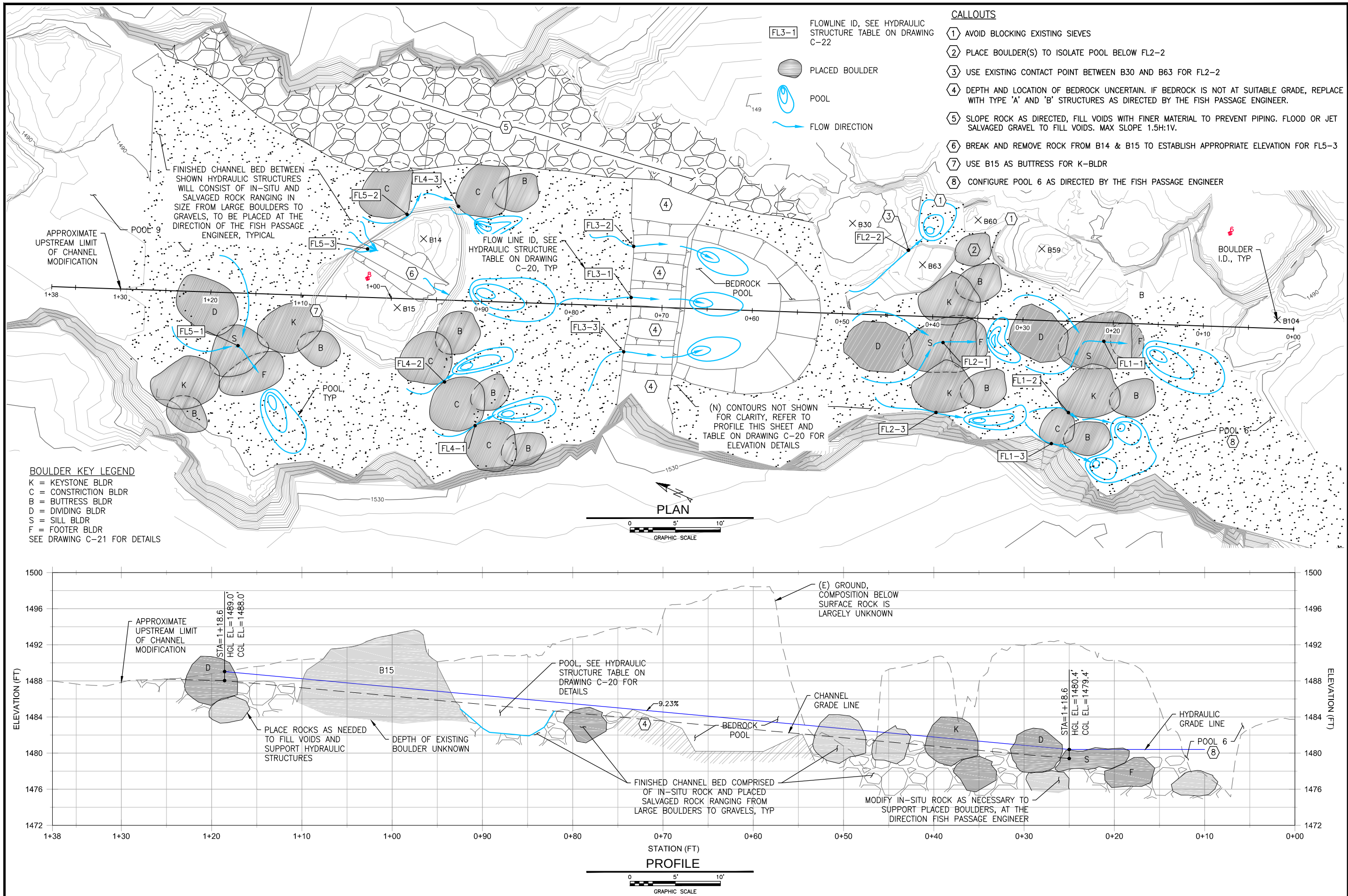
PHOTOGRAPH D
LOOKING DOWNSTREAM



PHOTOGRAPH E
LOOKING UPSTREAM



PHOTOGRAPH F
LOOKING DOWNSTREAM



CONSTRUCTION NOTES:

1. REFER TO SPECIFICATION 31 05 16.
2. THE DESIGN WORK COMPLETED FOR THE PROJECT, ALTHOUGH THOROUGH, LACKED SUFFICIENT INFORMATION TO DESIGN THE PROJECT WITH CERTAINTY. THE CONTRACTOR AND FISH PASSAGE ENGINEER, ALONG WITH THE CO AND COR, MUST WORK CLOSELY TOGETHER TO COMPLETE THE WORK SO THAT THE UBS PROJECT GOAL AND OBJECTIVES ARE MET. THE UBS PROJECT GOAL IS TO IMPROVE FISH PASSAGE AT THE UBS. THE UBS PROJECT OBJECTIVES ARE:

2.1. TO REMOVE EXISTING BOULDERS TO SUPPORT CHANNEL RECONSTRUCTION.

2.2. TO RECONSTRUCT THE CHANNEL USING EXISTING MATERIAL TO CREATE MULTIPLE DROPS OVER BOULDERS AND BEDROCK WITH ADEQUATE POOLS BELOW EACH DROP.

2.3. TO CONSTRUCT EACH HYDRAULIC STRUCTURE PER THE DESIGN ELEVATIONS WITHIN THE ALLOWED TOLERANCES.

2.4. TO CONSTRUCT EACH HYDRAULIC STRUCTURE SO THAT EACH BOULDER PLACED RESTS AGAINST ADJACENT BOULDERS OR BEDROCK TO COUNTERACT GRAVITATIONAL AND HYDRAULIC FORCES.
3. THE CONCEPTUAL DESIGN DRAWING (DRAWING C–19) IS TO BE USED AS A GUIDE TO AID IN THE CONSTRUCTION OF THE CHANNEL. DUE TO THE UNKNOWN STRUCTURE OF THE BOULDERS AND BEDROCK BELOW THE SURFACE AND DUE TO THE UNKNOWN SHAPE AND SIZE OF THE EXISTING BOULDERS AFTER THEY HAVE BEEN MODIFIED, THE FINISHED CHANNEL MAY DIFFER FROM THE CONCEPTUAL DRAWING.
4. NOT ALL BOULDERS TO BE REMOVED, MOVED, OR MODIFIED ARE VISIBLE ON DRAWINGS C–17 OR C–18 OR PRESENTED IN THE DRAWING C–17 TABLE.
5. NO BOULDER OR BEDROCK WILL BE MOVED OR MODIFIED WITHIN EAGLE CANYON WITHOUT THE FISH PASSAGE ENGINEER’S APPROVAL.
6. THE CONTRACTOR SHALL AVOID DISTURBING THE EXISTING CHANNEL BELOW THE CHANNEL GRADE LINE. USE EXISTING IN–SITU BOULDERS AND OTHER ROCK FOR THE FINISHED CHANNEL AS MUCH AS PRACTICAL.
7. WHERE OVER EXCAVATION OCCURS THE CONTRACTOR MUST, AFTER PLACING LARGER ROCK, MUST FILL VOIDS AND SEAL THE FINISHED CHANNEL TO PREVENT WATER FROM GOING SUBSURFACE.
8. BOULDERS MAY REQUIRE MODIFICATION TO MOVE. MODIFICATION WILL BE CONDUCTED SO THAT THE RESULTING BOULDER FRAGMENTS REMAIN AS LARGE AS POSSIBLE WHILE STILL ALLOWING THE FRAGMENT TO BE MOVED AS NECESSARY, UNLESS OTHERWISE APPROVED BY THE FISH PASSAGE ENGINEER.
9. ALTHOUGH BEDROCK IS SHOWN ON DRAWING C–19, BEDROCK MAY NOT BE ENCOUNTERED.
10. THE CONTRACTOR MAY NEED TO MOVE BOULDERS TO A TEMPORARY STAGING LOCATION WHILE PREPARING THE SUBGRADE FOR THE FINAL BOULDER PLACEMENT IN THE CONSTRUCTED CHANNEL.
11. COLLECT AND STOCKPILE GRAVELS AND OTHER SMALLER ROCKS FOR USE IN RECONSTRUCTING THE CHANNEL.
12. SEPERATE STOCKPILED ROCK MATERIAL BY SIZE, THE EXTENT PRACTICAL.
13. EACH BOULDER WITHIN A HYDRAULIC STRUCTURE WILL BE IN CONTACT WITH ADJACENT BOULDERS WITH AT LEAST THREE (3) POINTS OF CONTACT.
14. EACH BOULDER WITHIN A HYDRAULIC STRUCTURE WILL BE PLACED SO THAT IT IS STABLE AND RESISTANT TO FORCES ACTING ON IT IN A DOWNSTREAM DIRECTION.
15. EACH HYDRAULIC STRUCTURE MUST BE BACKFILLED WITH NATIVE MATERIALS TO FILL VOIDS AND HYDRAULICALLY SEAL THE STRUCTURE, SO THAT WATER POOLS UPSTREAM OF THE STRUCTURE. THE FISH PASSAGE ENGINEER WILL REQUIRE THE CONTRACTOR TO SHOW THAT THE STRUCTURE IS SEALED BY ADDING WATER.
16. EACH HYDRAULIC STRUCTURE WILL BE CONSTRUCTED, WITHIN THE PERMITTED TOLERANCES, TO THE RELATIVE ELEVATIONS SHOWN IN THE HYDRAULIC STRUCTURE LAYOUT TABLE, THIS SHEET.
17. AVOID DISTURBING A HYDRAULIC STRUCTURE ONCE IT HAS BEEN INSTALLED.
18. THE FISH PASSAGE ENGINEER RESERVES THE RIGHT TO MODIFY THE HYDRAULIC STRUCTURE TABLE AT ANY TIME.
19. THE CONTRACTOR NEEDS TO PROVIDE MEANS TO ACCURATELY PLACE BOULDERS AT ANY LOCATION WITHIN THE PROJECT’S CHANNEL MODIFICATION AREA.
20. THE CONTRACTOR NEEDS TO PROVIDE MEANS TO ROTATE A BOULDER WHILE SUSPENDED SO A BOULDER MAY BE PLACED IN AN APPROPRIATE ORIENTATION.
21. POOLS SHALL BE CONSTRUCTED INTO THE CHANNEL BED DOWNSTREAM OF EACH FLOW LINE.
22. ADDITIONAL POOLS MAY BE CREATED BASED ON FIELD CONDITIONS.
23. THE CONTRACTOR MAY NEED TO REPOSITION BOULDERS AFTER PLACEMENT.
24. THE CONTRACTOR MAY NEED TO MODIFY EXISTING IN–SITU BOULDERS.
25. PORTIONS OF IN–SITU BOULDERS MAY NEED TO BE REMOVED TO MEET FINISHED GRADE, CREATE SUITABLE SUBGRADE FOR PLACEMENT OF BOULDERS IN HYDRAULIC STRUCTURES OR TO CREATE DESIRED FLOWLINES.
26. THE SURFACE OF THE FINISHED CHANNEL BED SHALL BE ROUGH WITH SOME BOULDERS PROTRUDING ABOVE THE CHANNEL GRADE LINE.

UPPER BARRIER HYDRAULIC STRUCTURE LAYOUT TABLE			
FLOWLINE (FL) ID	ROCK STRUCTURE TYPE	FLOWLINE DESCRIPTION	POOL BOTTOM DOWNSTREAM OF FLOWLINE
HYDRAULIC STRUCTURE 1			
FL1-1	TYPE 'B'	EL 1480.3+/-0.5 FT	MIN 3 FT LOWER THAN FL1-1
FL1-2	TYPE 'A'	1 FT+/-0.5 FT ABOVE FL1-1	MIN 3 FT LOWER THAN FL1-1
FL1-3	TYPE 'A' AGAINST CANYON WALL	1 FT+/-0.5 FT ABOVE FL1-2	MIN 3 FT LOWER THAN FL1-1
HYDRAULIC STRUCTURE 2			
FL2-1	TYPE B	SET BASED ON HYDRAULIC GRADELINE+/-0.5 FT	MIN 3 FT LOWER THAN FL1-1
FL2-2	EXISTING FL, TO REMAIN UNCHANGED	CONTACT BETWEEN B30 AND B36 AT APPROX EL 1483.5 FT	EXISTING POOL TO REMAIN
FL2-3	TYPE 'A' AGAINST CANYON WALL	1 FT+/-0.5 FT ABOVE FL2-2	MIN 3 FT LOWER THAN FL1-3
HYDRAULIC STRUCTURE 3			
FL3-1	TYPE 'C'	SET BASED ON HYDRAULIC GRADELINE+/-0.5 FT, BUT NO GREATER THAN 2.5 FT ABOVE FL2-1	MIN 3 FT LOWER THAN FL2-1
FL3-2	BEDROCK CONDITIONS PERMITTING	1 FT+/-0.5 FT ABOVE FL3-1	MIN 3 FT LOWER THAN FL2-2
FL3-3		1 FT+/-0.5 FT ABOVE FL3-2	MIN 3 FT LOWER THAN FL2-3
HYDRAULIC STRUCTURE 4			
FL4-1	TYPE 'A'	SET BASED ON HYDRAULIC GRADELINE+/-0.5 FT	MIN 3 FT LOWER THAN FL3-1
FL4-2	TYPE 'A'	1 FT+/-0.5 FT ABOVE FL4-1	MIN 3 FT LOWER THAN FL3-1
FL4-3	TYPE 'A'	1 FT+/-0.5 FT ABOVE FL4-2	MIN 3 FT LOWER THAN FL3-3
HYDRAULIC STRUCTURE 5			
FL5-1	TYPE 'A'	SET BASED ON HYDRAULIC GRADELINE+/-0.5 FT	MIN 3 FT LOWER THAN FL4-1
FL5-2	TYPE 'B' (USE IN-SITU BOULDERS AS FEASIBLE)	1 FT+/-0.5 FT ABOVE FL1-1.	MIN 2 FT LOWER THAN FL4-3
FL5-3	TYPE 'B'	1 FT+/-0.5 FT ABOVE FL1-2. DEFINED AT CONTACT BETWEEN B14 AND B15	MIN 2 FT LOWER THAN FL3-3

Michael Love & Associates, Inc.
PO Box 4477 • Arcata, CA 95518 • (707) 822-2411

Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
http://www.dfg.ca.gov



VERIFIED SCALE
|
THIS BAR IS
ONE INCH LONG
AT FULL SCALE

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH FORK BATTLE CREEK
EAGLE CANYON FISH PASSAGE IMPROVEMENT
UPPER BARRIER SITE
CHANNEL MODIFICATION NOTES

DATE
FEBRUARY 2017
SUBMITTAL

FINAL
DESIGN

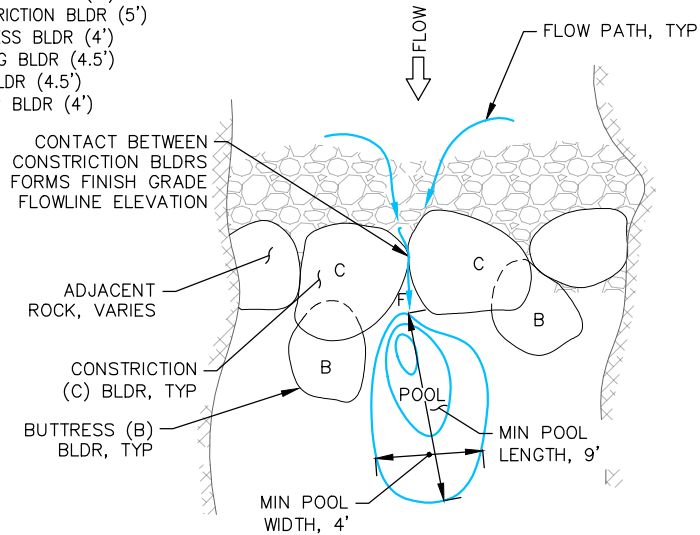
ML, pTJ
DRAWN

pTJ, NN
SHEET

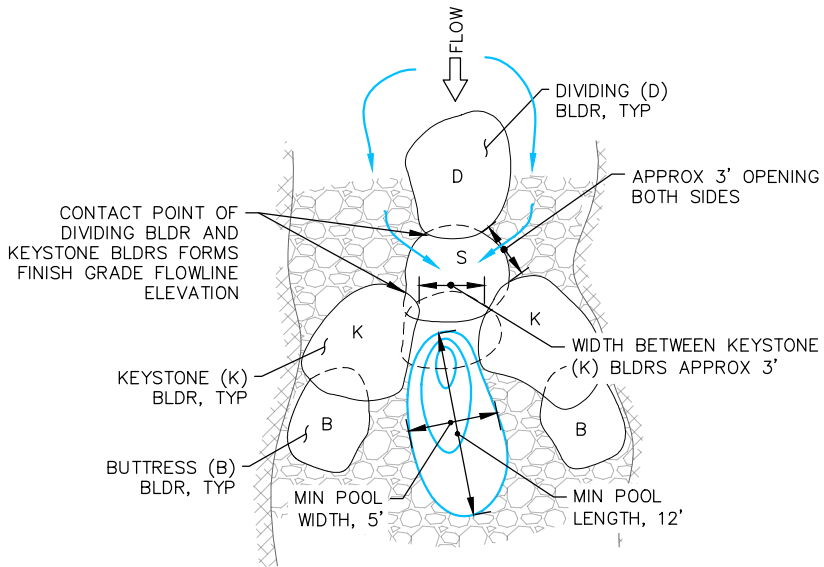
23 of 27

C-20

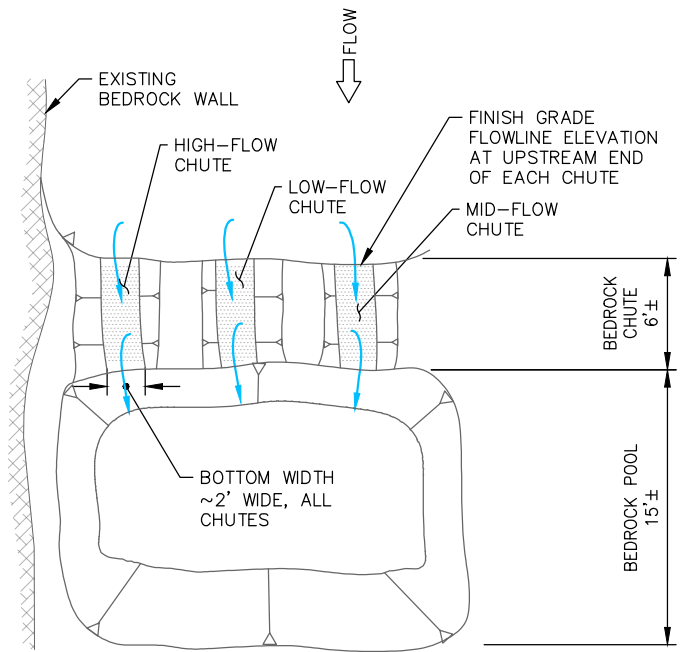
BOULDER KEY LEGEND
(MIN BLD R B-AXIS, SEE
DETAIL 2, DWG C-24)
K = KEYSTONE BLD R (5')
C = CONSTRICTION BLD R (5')
B = BUTTRESS BLD R (4')
D = DIVIDING BLD R (4.5')
S = SILL BLD R (4.5')
F = FOOTER BLD R (4')



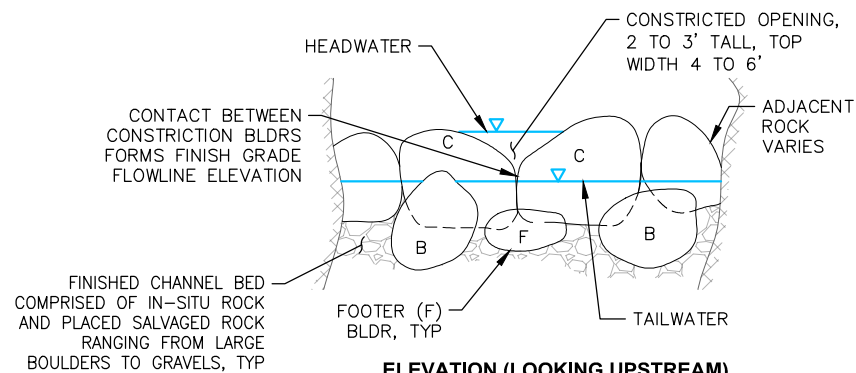
PLAN



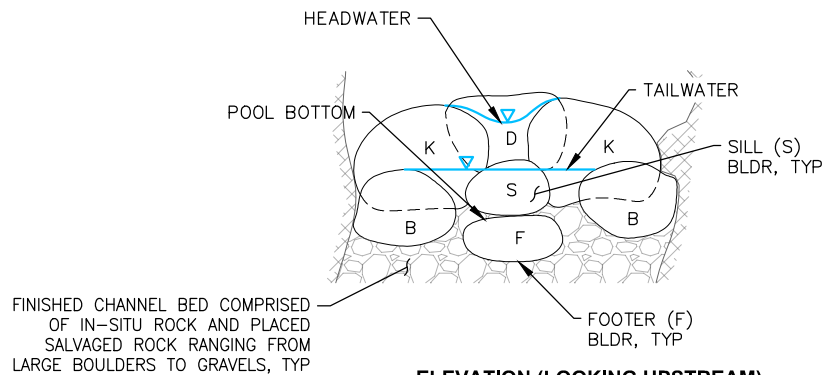
PLAN



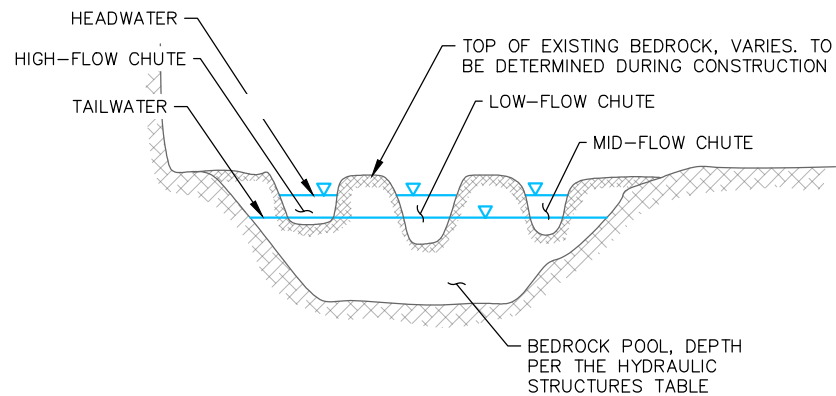
PLAN



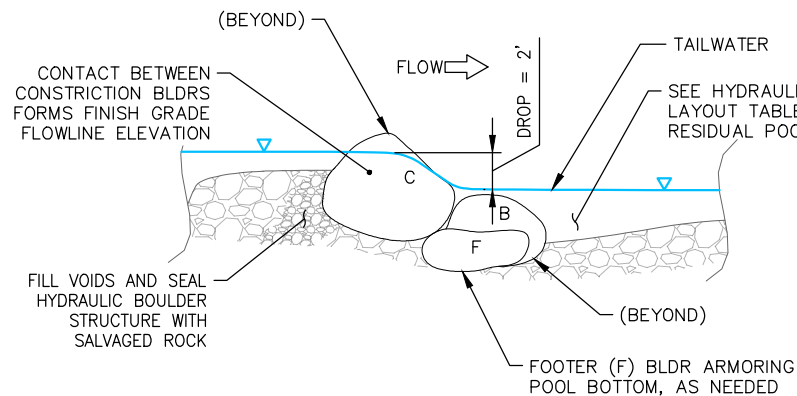
ELEVATION (LOOKING UPSTREAM)



ELEVATION (LOOKING UPSTREAM)



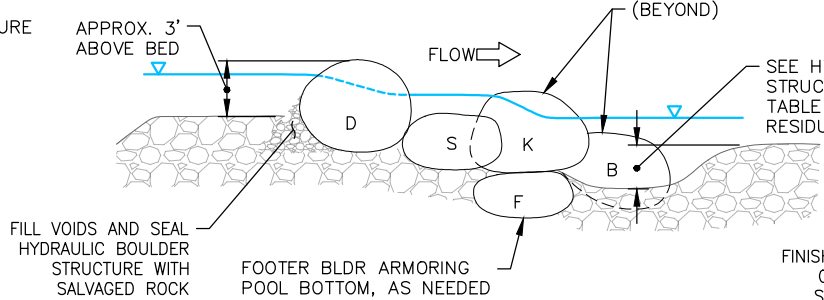
ELEVATION (LOOKING UPSTREAM)



CENTERLINE PROFILE

1

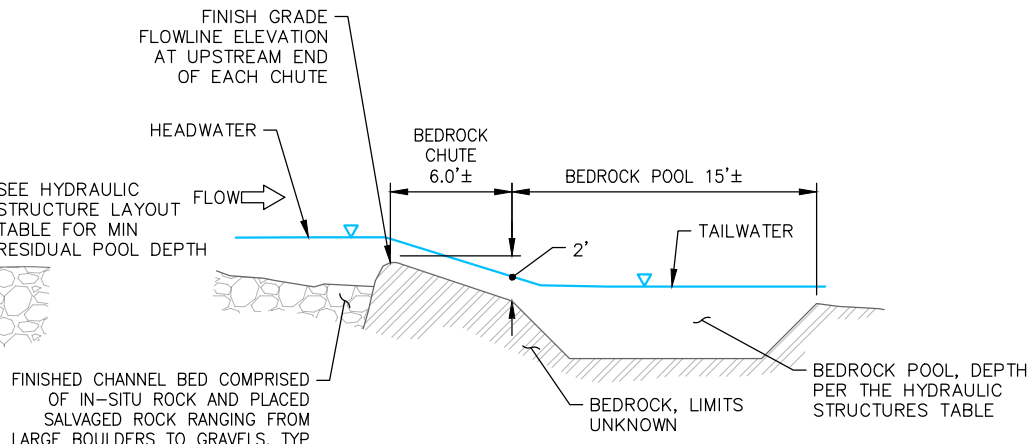
TYPE 'A' HYDRAULIC STRUCTURE
BOULDER CONSTRICTION
TYPICAL (NTS)



CENTERLINE PROFILE

2

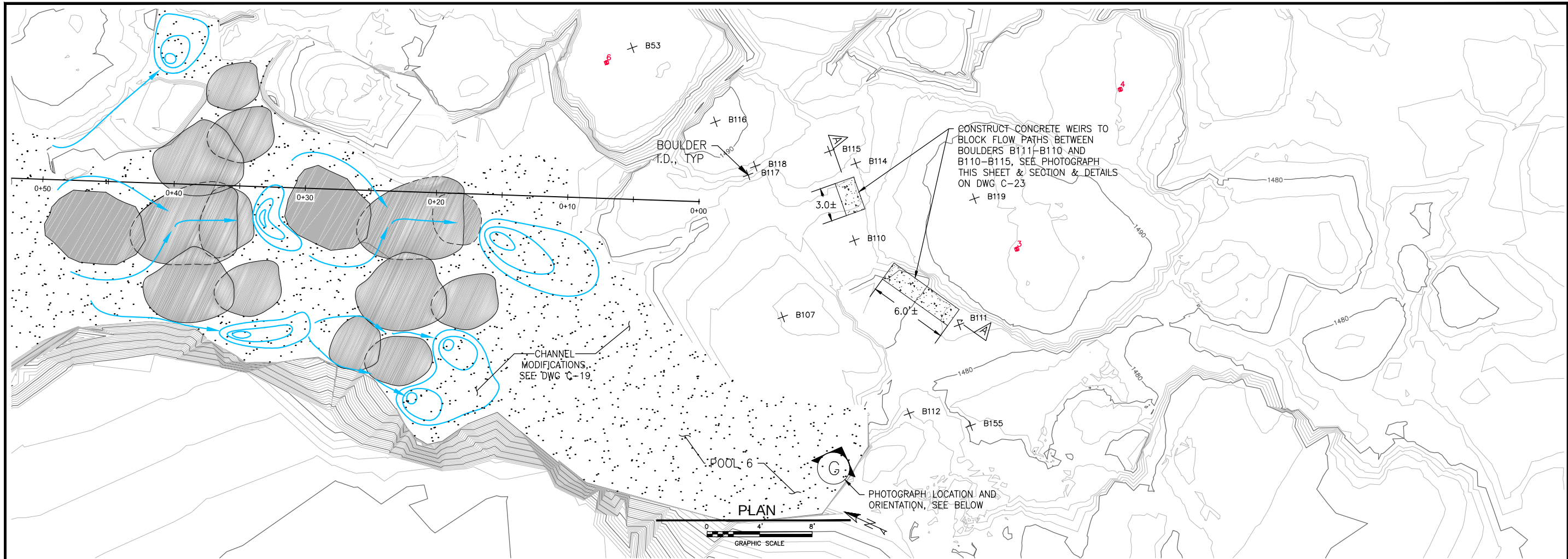
TYPE 'B' HYDRAULIC STRUCTURE
BOULDER DOUBLE SLOT
TYPICAL (NTS)



CHUTE PROFILE

3

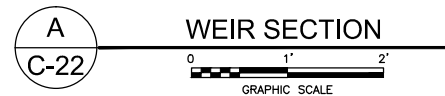
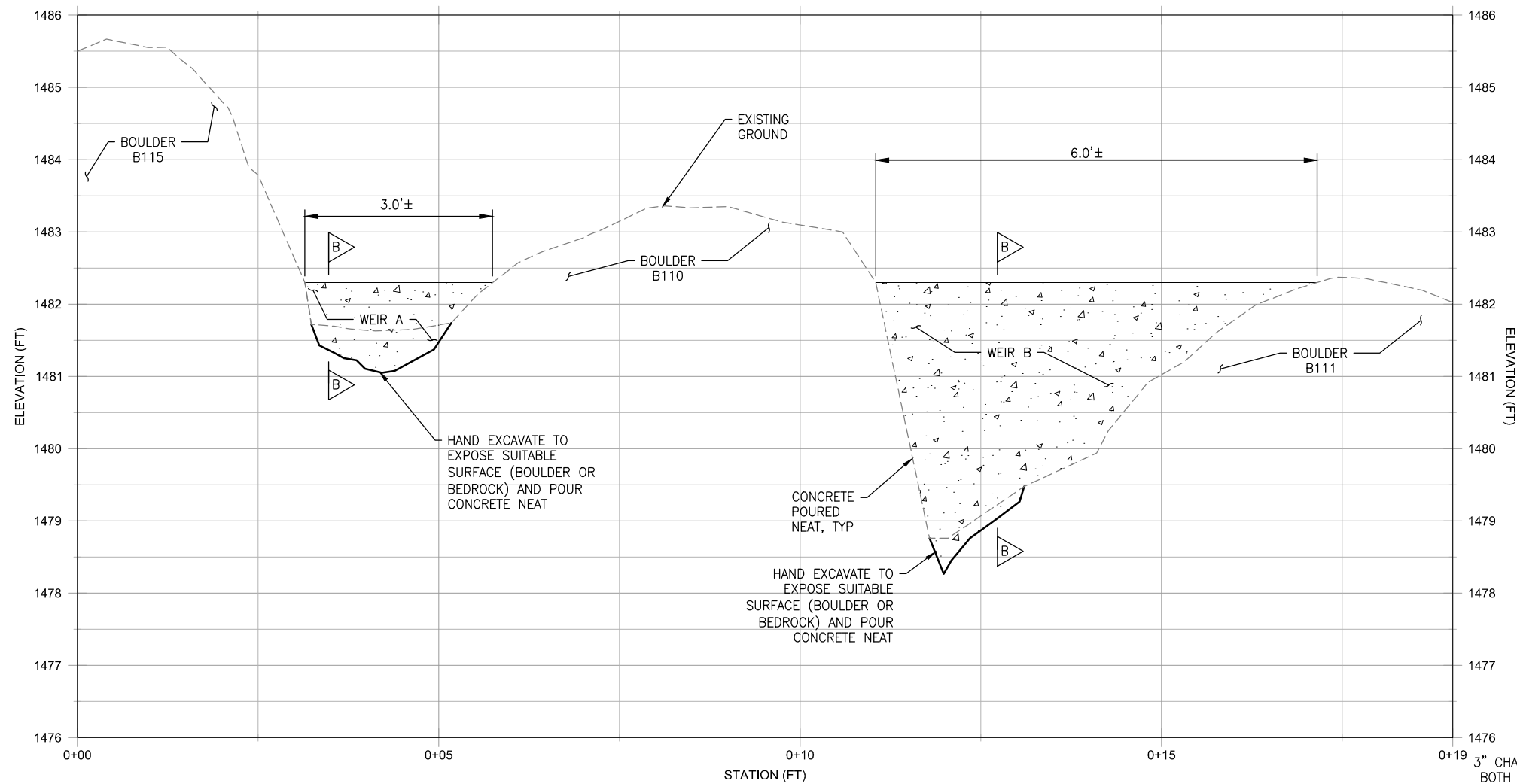
TYPE 'C' HYDRAULIC STRUCTURE
BEDROCK CHUTES AND POOLS
TYPICAL (NTS)



PHOTOGRAPH G EXISTING CONDITIONS
NOT TO SCALE

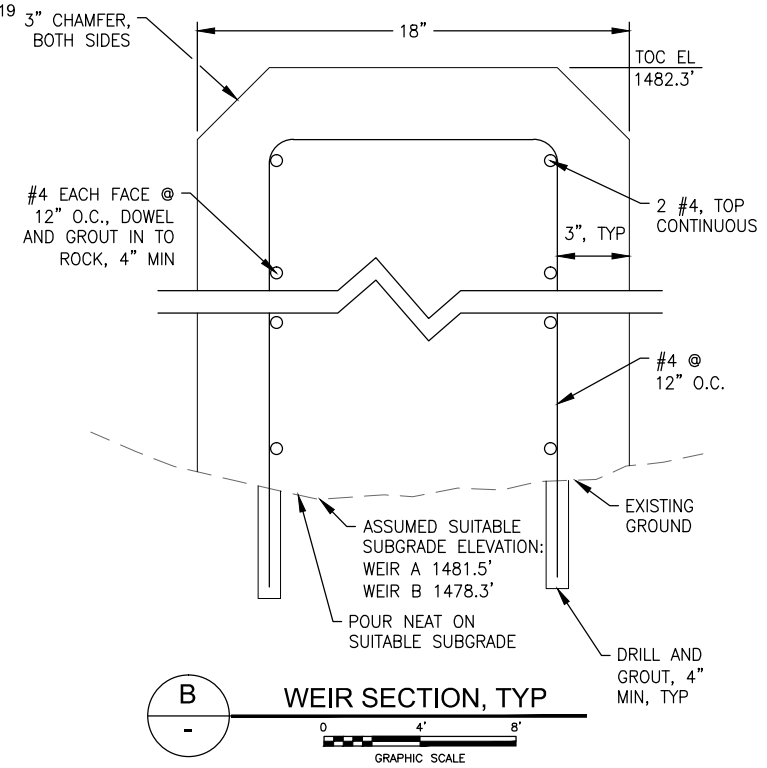


PHOTOGRAPH G EXISTING CONDITIONS WITH (N) WEIR
NOT TO SCALE



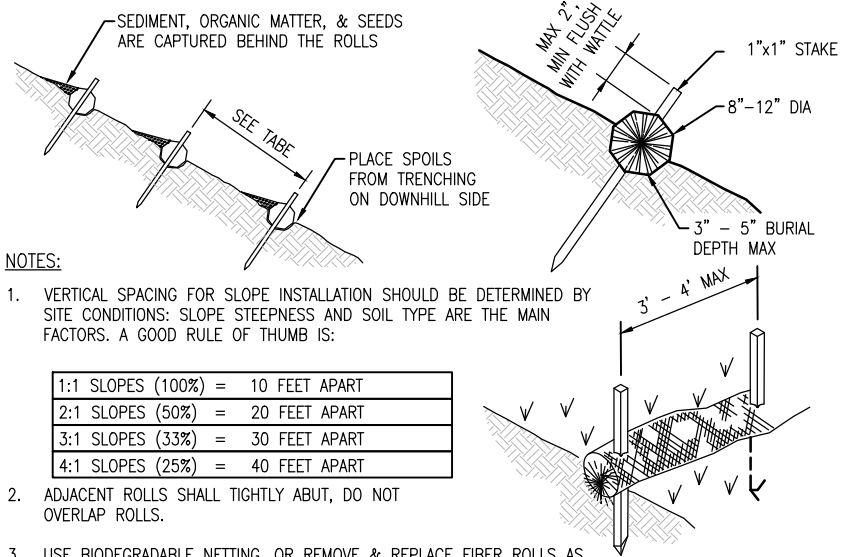
PHOTOGRAPH G EXISTING CONDITIONS

NOT TO SCALE



PHOTOGRAPH G EXISTING CONDITIONS WITH (N) WEIR

NOT TO SCALE



NOTES:

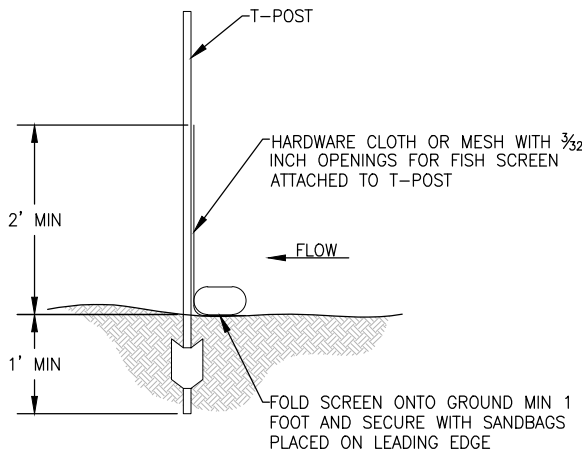
1. VERTICAL SPACING FOR SLOPE INSTALLATION SHOULD BE DETERMINED BY SITE CONDITIONS: SLOPE STEEPNESS AND SOIL TYPE ARE THE MAIN FACTORS. A GOOD RULE OF THUMB IS:

1:1 SLOPES (100%)	= 10 FEET APART
2:1 SLOPES (50%)	= 20 FEET APART
3:1 SLOPES (33%)	= 30 FEET APART
4:1 SLOPES (25%)	= 40 FEET APART
2. ADJACENT ROLLS SHALL TIGHTLY ABUT, DO NOT OVERLAP ROLLS.
3. USE BIODEGRADABLE NETTING, OR REMOVE & REPLACE FIBER ROLLS AS SOON AS STRAW FILLING BEGINS TO DEGRADE
4. REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS FOR TYPE 2 INSTALLATION USING ROPE AND STAKES
5. WHEN CALLED FOR IN DRAWINGS, STRAW WATTLE IS TO BE SECURELY ATTACHED TO BASE OF TEMPORARY SECURITY FENCING OR STAKED JUST INSIDE SECURITY FENCING AT SPACING CALLED FOR IN SKETCH ABOVE. STRAW WATTLE IS TO BE PLACED ON INSIDE OF FENCE TO MINIMIZE PUBLIC TAMPERING.

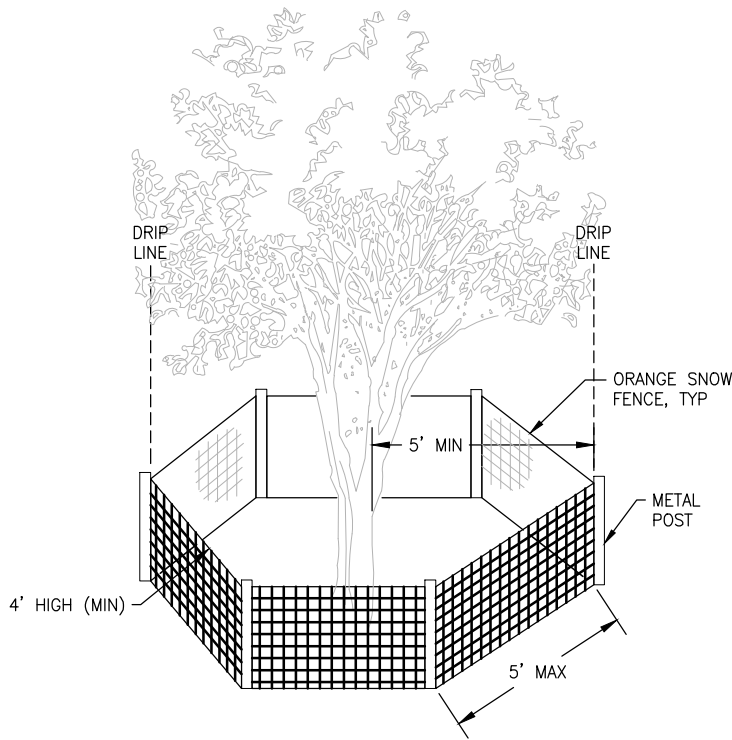
1 STRAW WATTLE
DETAIL, NTS

ROCK MEASUREMENT
A LONG AXIS
B INTERMEDIATE AXIS
C SHORT AXIS

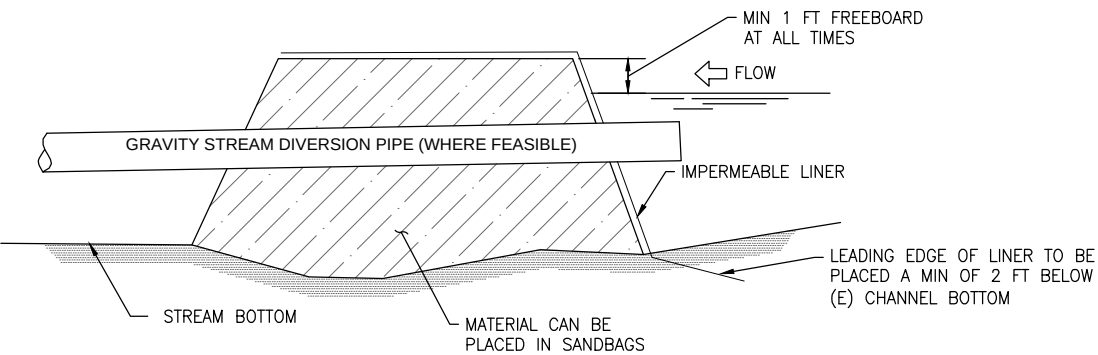
2 BOULDER AXIS
DETAIL, NTS



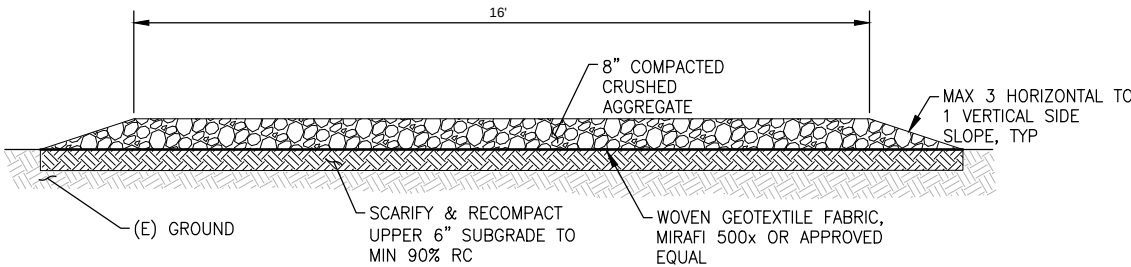
3 TEMPORARY FISH SCREEN
NTS



5 TEMPORARY VEGETATION FENCING
NTS



4 TEMPORARY COFFERDAM
TYPICAL PROFILE (NTS)



6 GRAVEL ACCESS ROAD SECTION
NTS