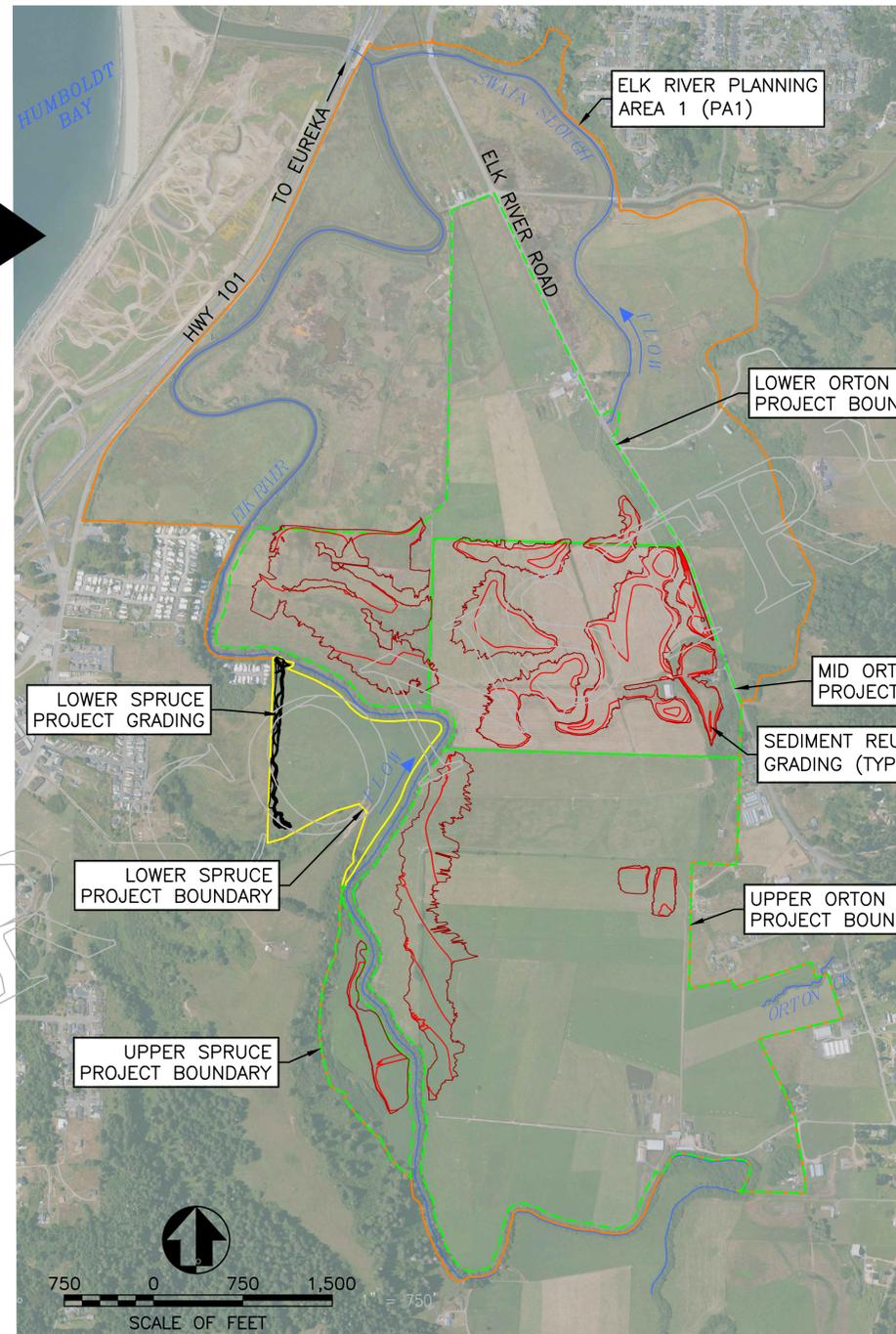


ELK RIVER PLANNING AREA 1 65% DESIGN: LOWER SPRUCE PERMIT SET HUMBOLDT COUNTY, CALIFORNIA



SHEET INDEX

CIVIL SHEETS		
1	G1	COVER
2	G2	EXISTING CONDITIONS
3	G3	CONTRACTOR USE AREA & ACCESS
4	C1C	COLOR SITE OVERVIEW
5	C2	PROFILE
6	C3	SECTIONS
7	C4	ISOPACH
8	C5C	COLOR SITE OVERVIEW: SEDIMENT REUSE
9	C6	SECTIONS: SEDIMENT REUSE
10	C7	ISOPACH: SEDIMENT REUSE
11	C8	DETAILS

Plotted: 10/14/2025 4:23 PM - By: LICENSED USER - R17.1 - File: G1-COVER-LOWER-SPRUCE-65PER-PERMIT

NOT FOR CONSTRUCTION

10/15/2025
THESE PLANS WERE PREPARED UNDER THE SUPERVISION OF JEFFREY K. ANDERSON P.E. LICENSE # 50713

ELK PA-1 65% DESIGN: PERMIT SET



Northern Hydrology & Engineering

- Engineering
- Hydrology
- Geomorphology
- Water Resources

PO BOX 2515, MCKINLEYVILLE, CA 95519 (707) 839-2195

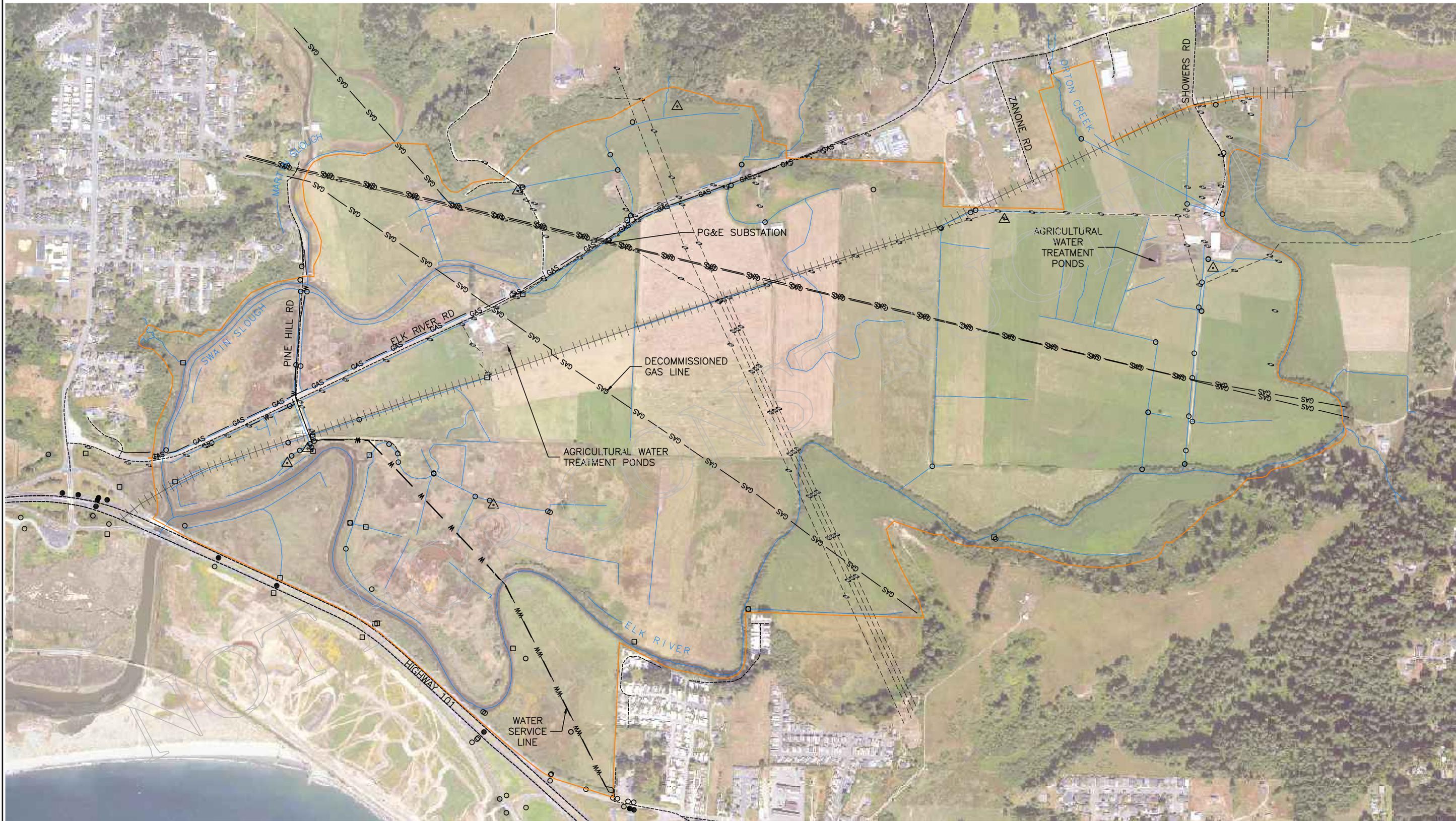
DESIGNED:
NHE
BD
TECH. REVIEW:
DATE:
10/15/2025

SUB SHEET NO.
G1

TITLE OF SHEET
**COVER
LOWER SPRUCE
PROJECT**
HUMBOLDT COUNTY, CA

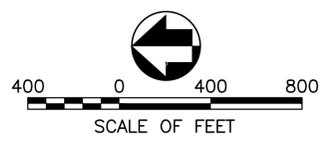
SHEET
1
OF
11

Plotted: 10/13/2025 2:19 PM - By: LICENSED USER - R17.1 - File: G2-EXISTING-CONDITIONS



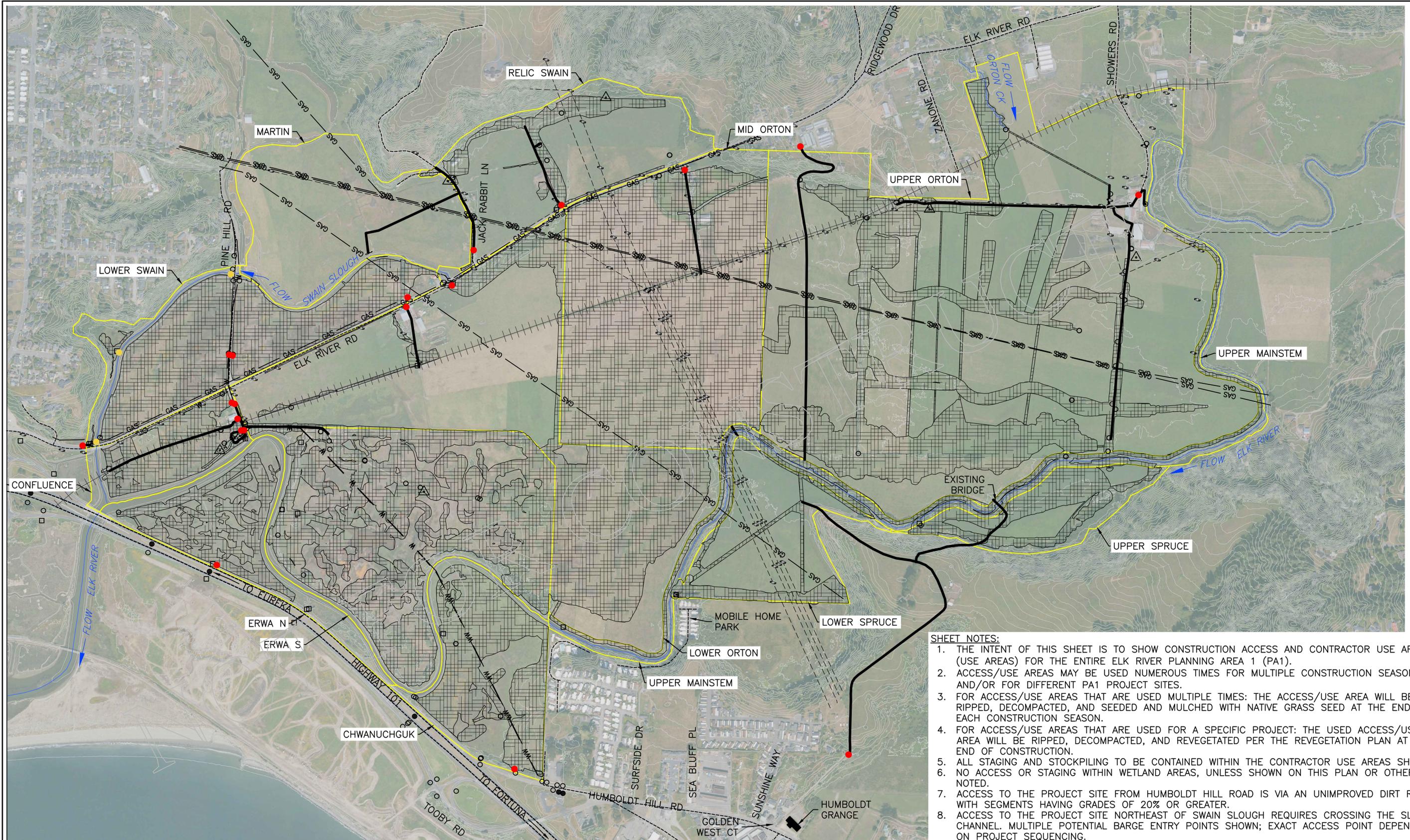
- | | | | | | |
|--|--------------------|--|-----------------------|--|---------------|
| | PLANNING AREA 1 | | OVERHEAD UTILITY LINE | | CULVERT |
| | HIGHWAY | | WATER LINE | | DROP INLET |
| | MAIN ROAD | | RIVER CENTERLINE | | TIDE GATE |
| | ABANDONED RAILROAD | | STREAMS | | ARTESIAN WELL |
| | GAS | | DRAINAGE CHANNEL | | UTILITY POLE |

SHEET NOTES:
 1) ALL INFRASTRUCTURE LOCATIONS ARE APPROXIMATE.



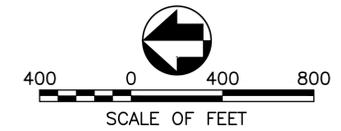
ELK PA1 65% DESIGN: PERMIT SET		TITLE OF SHEET		SHEET
DESIGNED: NHE CV, JRP	SUB SHEET NO. G2	EXISTING CONDITIONS OVERVIEW PLANNING AREA 1		2 OF
TECH. REVIEW: JRP, BSP, JKA	DATE: 10/13/2025	HUMBOLDT COUNTY, CA		11

Plotted: 10/13/2025 2:30 PM - By: LICENSED USER - R17.1 - File: G3-CONTRACTOR USE-&-ACCESS-65PER-PERMIT



- SHEET NOTES:**
1. THE INTENT OF THIS SHEET IS TO SHOW CONSTRUCTION ACCESS AND CONTRACTOR USE AREAS (USE AREAS) FOR THE ENTIRE ELK RIVER PLANNING AREA 1 (PA1).
 2. ACCESS/USE AREAS MAY BE USED NUMEROUS TIMES FOR MULTIPLE CONSTRUCTION SEASONS AND/OR FOR DIFFERENT PA1 PROJECT SITES.
 3. FOR ACCESS/USE AREAS THAT ARE USED MULTIPLE TIMES: THE ACCESS/USE AREA WILL BE RIPPED, DECOMPACTED, AND SEEDED AND MULCHED WITH NATIVE GRASS SEED AT THE END OF EACH CONSTRUCTION SEASON.
 4. FOR ACCESS/USE AREAS THAT ARE USED FOR A SPECIFIC PROJECT: THE USED ACCESS/USE AREA WILL BE RIPPED, DECOMPACTED, AND REVEGETATED PER THE REVEGETATION PLAN AT THE END OF CONSTRUCTION.
 5. ALL STAGING AND STOCKPILING TO BE CONTAINED WITHIN THE CONTRACTOR USE AREAS SHOWN.
 6. NO ACCESS OR STAGING WITHIN WETLAND AREAS, UNLESS SHOWN ON THIS PLAN OR OTHERWISE NOTED.
 7. ACCESS TO THE PROJECT SITE FROM HUMBOLDT HILL ROAD IS VIA AN UNIMPROVED DIRT ROAD WITH SEGMENTS HAVING GRADES OF 20% OR GREATER.
 8. ACCESS TO THE PROJECT SITE NORTHEAST OF SWAIN SLOUGH REQUIRES CROSSING THE SLOUGH CHANNEL. MULTIPLE POTENTIAL BARGE ENTRY POINTS SHOWN; EXACT ACCESS POINT DEPENDENT ON PROJECT SEQUENCING.

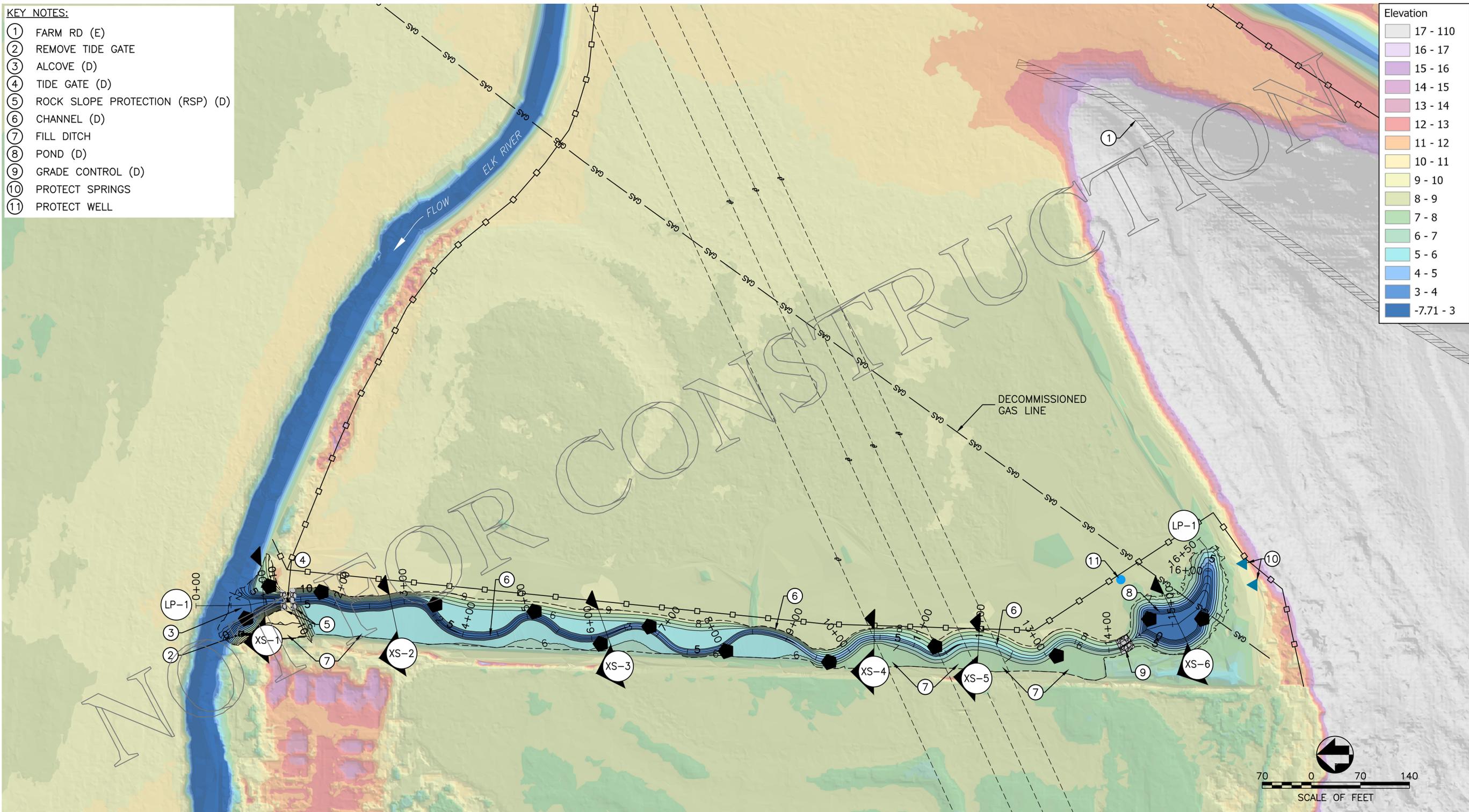
— — — — —	EXISTING CONTOUR (5-FT INTERVAL)	○	CULVERT (E)
— GAS —	GASLINE (E)	⊕	DROP INLET
— — — — —	OVERHEAD UTILITY LINE (E)	△	ARTESIAN WELL
— + + + —	ABANDONED RAILROAD	●	ACCESS POINT (E)
— w —	WATER LINE	●	ACCESS POINT: POTENTIAL BARGE ENTRY LOCATION (SEE NOTE #8)
— — — — —	HIGHWAY	—	ACCESS ROAD (E)
— — — — —	MAIN ROAD	▨	CONTRACTOR USE AREA
○	UTILITY POLE (E)		
□	TIDE GATE (E)		



ELK PA1 65% DESIGN: PERMIT SET		TITLE OF SHEET		SHEET
DESIGNED: NHE	SUB SHEET NO. G3	CONTRACTOR USE AREAS & ACCESS PLANNING AREA 1		3
BD				OF
TECH. REVIEW:				11
DATE: 10/13/2025		HUMBOLDT COUNTY, CA		

Plotted: 10/13/2025 1:56 PM - By: LICENSED USER - R17.1 - File: C-SHEETS-LOWER-SPRUCE-65PER-PERMIT

- KEY NOTES:**
- ① FARM RD (E)
 - ② REMOVE TIDE GATE
 - ③ ALCOVE (D)
 - ④ TIDE GATE (D)
 - ⑤ ROCK SLOPE PROTECTION (RSP) (D)
 - ⑥ CHANNEL (D)
 - ⑦ FILL DITCH
 - ⑧ POND (D)
 - ⑨ GRADE CONTROL (D)
 - ⑩ PROTECT SPRINGS
 - ⑪ PROTECT WELL



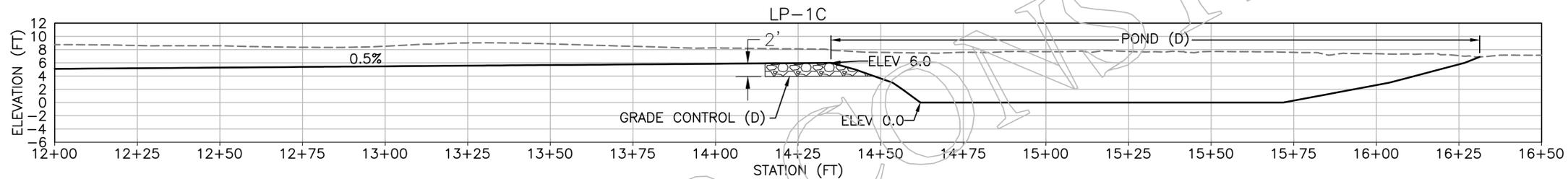
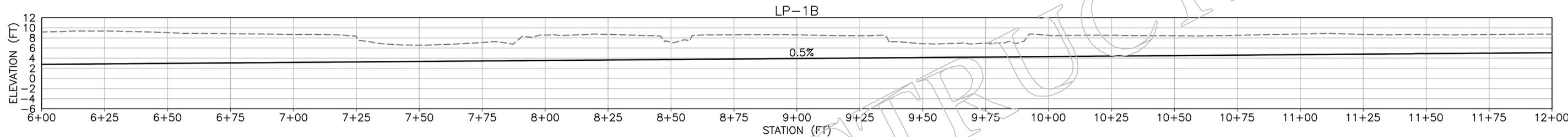
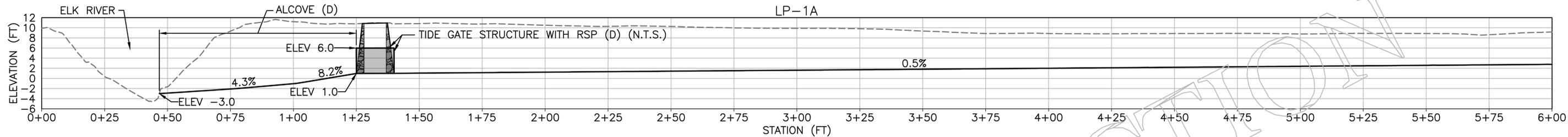
- SHEET NOTES:**
1. (XS-1) REFERS TO CROSS-SECTION LOCATION; SEE CROSS SECTION SHEET.
 2. (LP-1) REFERS TO LONG-PROFILE LOCATION; SEE LONG PROFILE SHEET.
 3. TIE FENCE (D) INTO FENCE (E). FENCE (E) NOT SHOWN. GATES (D) NOT SHOWN; LOCATIONS TO BE COORDINATED WITH LANDOWNER BEFORE CONSTRUCTION.
 4. SEDIMENT REUSE LOCATIONS NOT SHOWN ON THIS SHEET; REFER TO SEDIMENT REUSE OVERVIEW SHEETS C5C-C7.

- GAS — GASLINE (E)
- - - OVERHEAD UTILITY LINE (E)
- UTILITY POLE (E)
- TIDE GATE (E)
- CULVERT (E)
- SPRING (E) (APPROXIMATE LOCATION)
- GROUNDWATER MONITORING SITE (E)
- DESIGN CONTOUR (1-FEET INTERVAL)
- - - DESIGN CONTOUR (5-FEET INTERVAL)
- - - GRADING BOUNDARY
- - - FENCE (D)
- ◆ WOOD STRUCTURE (D)



ELK PA1 65% DESIGN: PERMIT SET		
DESIGNED: NHE	SUB SHEET NO. C1C	TITLE OF SHEET COLOR SITE OVERVIEW LOWER SPRUCE PROJECT
BD	TECH. REVIEW:	HUMBOLDT COUNTY, CA
DATE: 10/13/2025		SHEET 4 OF 11

Plotted: 10/9/2025 8:27 AM - By: LICENSED USER - R17.1 - File: C-SHEETS-LOWER-SPRUCE-65PER-PERMIT



--- EXISTING GRADE PROFILE
 — DESIGN GRADE PROFILE

NOT FOR

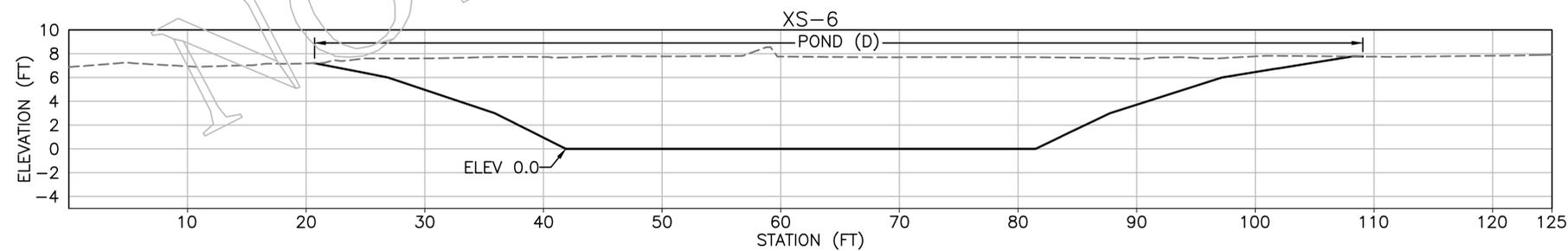
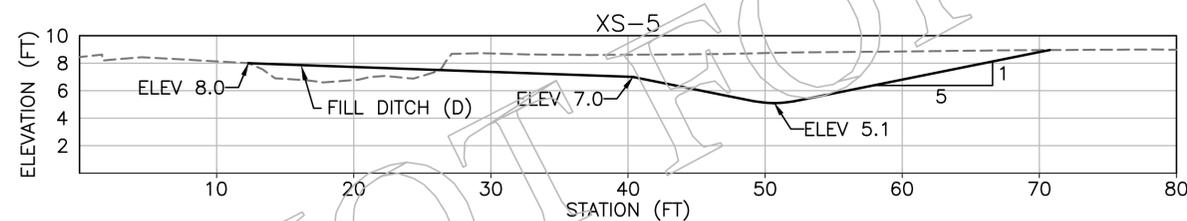
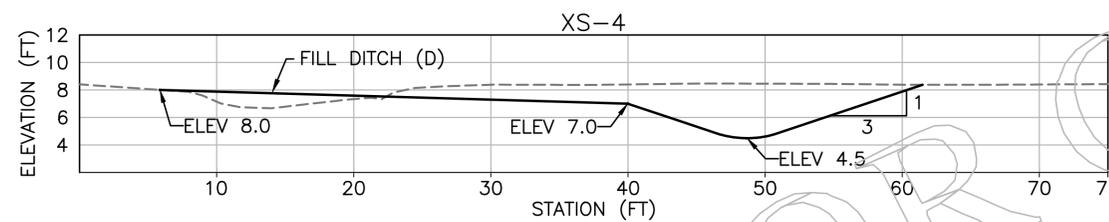
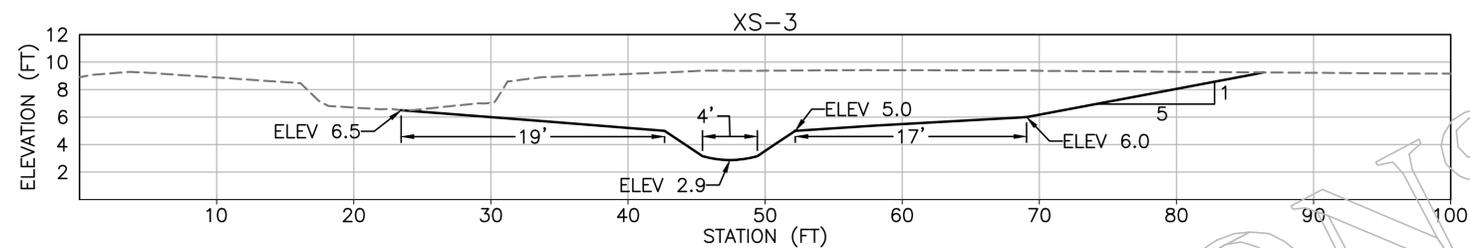
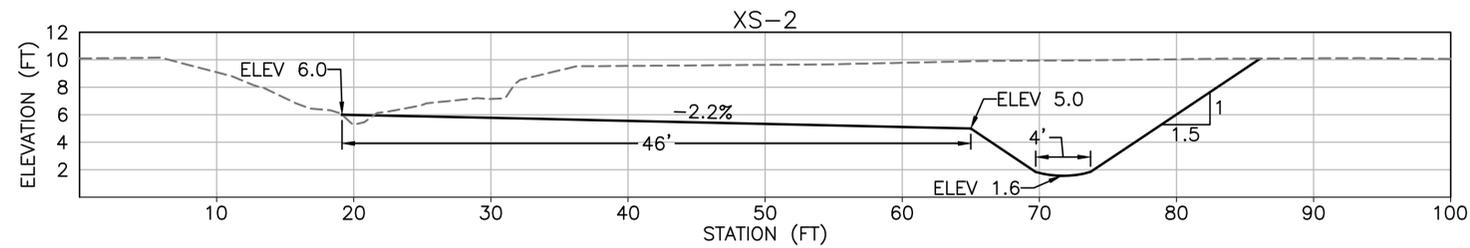
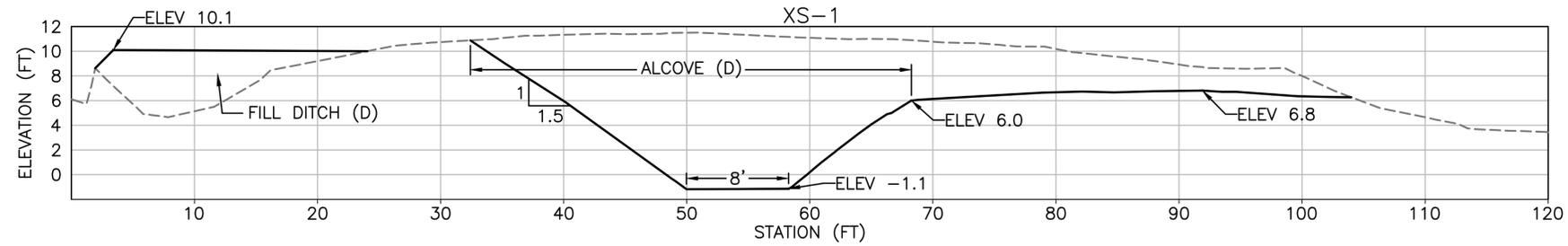
SHEET NOTES:

1. SEE SITE OVERVIEW SHEET FOR PROFILE ALIGNMENT LOCATION.
2. VERTICAL EXAGGERATION OF 2 FOR ALL PROFILE VIEWS ON THIS SHEET.
3. THIS SHEET SHOWS EXISTING AND DESIGN GRADES, AND APPROXIMATE LOCATION OF DESIGN ELEMENTS.
4. DESIGN MHHW ~5.5 FT.



ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C2	TITLE OF SHEET PROFILE LOWER SPRUCE PROJECT	SHEET 5
TECH. REVIEW: BD			OF 11
DATE: 10/08/2025		HUMBOLDT COUNTY, CA	

Plotted: 10/9/2025 8:29 AM - By: LICENSED USER - R17.1 - File: C-SHEETS-LOWER-SPRUCE-65PER-PERMIT



--- EXISTING GRADE PROFILE
 ——— DESIGN GRADE PROFILE

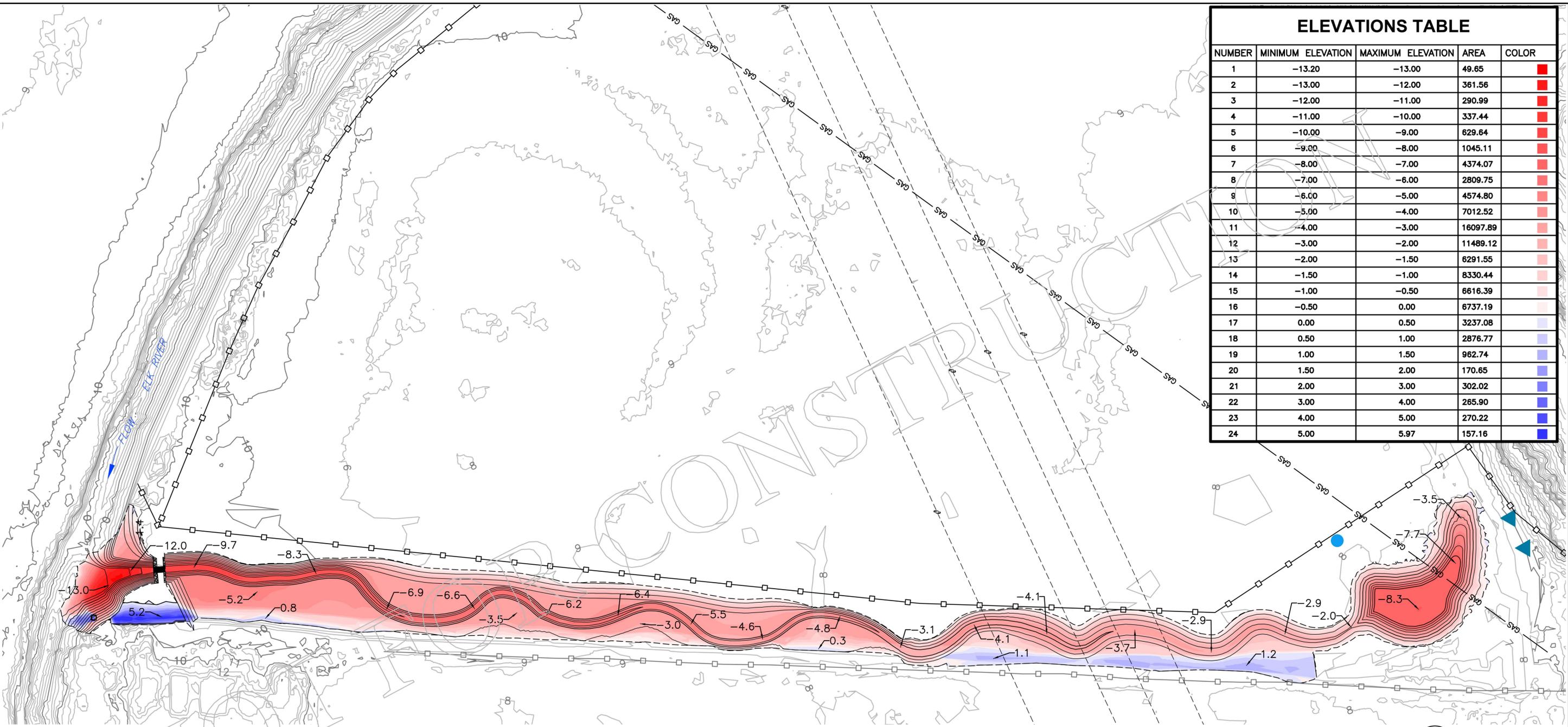
- SHEET NOTES:**
1. SEE SITE OVERVIEW SHEET FOR CROSS-SECTION LOCATIONS.
 2. NO VERTICAL EXAGGERATION FOR ALL SECTION VIEWS ON THIS SHEET.
 3. THIS SHEET SHOWS EXISTING AND DESIGN GRADES, AND APPROXIMATE LOCATION OF DESIGN ELEMENTS.
 4. DESIGN MHHW ~5.5 FT.



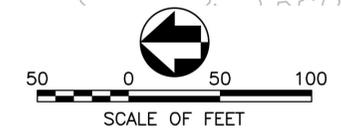
ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C3	TITLE OF SHEET SECTIONS LOWER SPRUCE PROJECT	SHEET 6
TECH. REVIEW: BD			OF 11
DATE: 10/08/2025		HUMBOLDT COUNTY, CA	

Plotted: 10/9/2025 8:47 AM - By: LICENSED USER - R17.1 - File: ISOPACH-LOWER-SPRUCE-65PER-PERMIT

ELEVATIONS TABLE				
NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	AREA	COLOR
1	-13.20	-13.00	49.65	Red
2	-13.00	-12.00	361.56	Red
3	-12.00	-11.00	290.99	Red
4	-11.00	-10.00	337.44	Red
5	-10.00	-9.00	629.64	Red
6	-9.00	-8.00	1045.11	Red
7	-8.00	-7.00	4374.07	Red
8	-7.00	-6.00	2809.75	Red
9	-6.00	-5.00	4574.80	Red
10	-5.00	-4.00	7012.52	Red
11	-4.00	-3.00	16097.89	Red
12	-3.00	-2.00	11489.12	Red
13	-2.00	-1.50	6291.55	Red
14	-1.50	-1.00	8330.44	Red
15	-1.00	-0.50	6616.39	Red
16	-0.50	0.00	6737.19	Red
17	0.00	0.50	3237.08	Light Blue
18	0.50	1.00	2876.77	Light Blue
19	1.00	1.50	962.74	Light Blue
20	1.50	2.00	170.85	Light Blue
21	2.00	3.00	302.02	Light Blue
22	3.00	4.00	265.90	Light Blue
23	4.00	5.00	270.22	Light Blue
24	5.00	5.97	157.16	Light Blue



- EXISTING CONTOUR (1-FT INTERVAL)
- EXISTING CONTOUR (5-FT INTERVAL)
- DESIGN CONTOUR (1-FT INTERVAL)
- DESIGN CONTOUR (5-FT INTERVAL)
- - - GRADING BOUNDARY
- FENCELINE (E)
- FENCELINE (D)
- GAS — GASLINE (E)
- - - OVERHEAD UTILITY LINE (E)
- UTILITY POLE (E)
- TIDE GATE (E)
- CULVERT (E)
- ▲ EXISTING SPRING
- GROUNDWATER MONITORING SITE



SHEET NOTES:

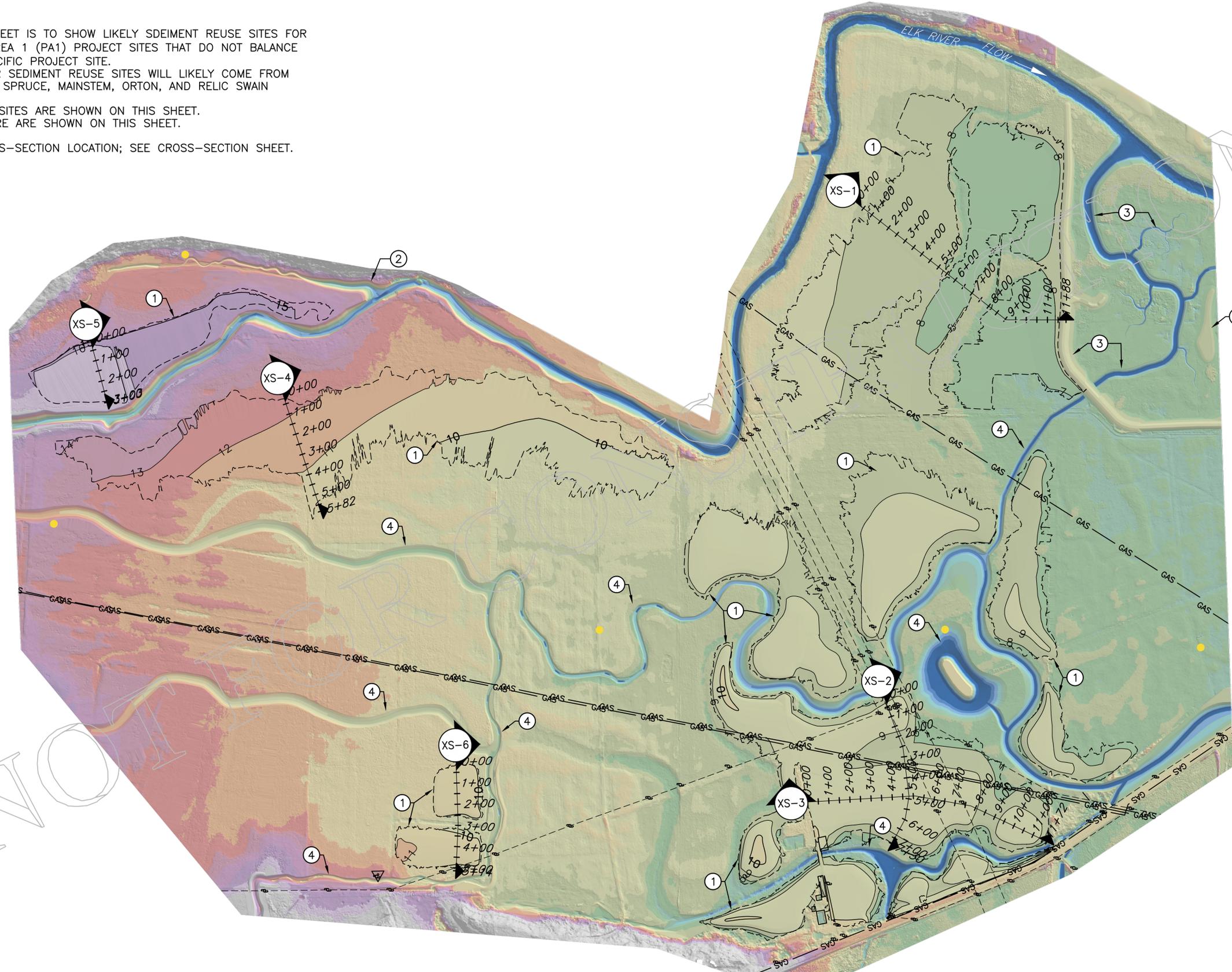
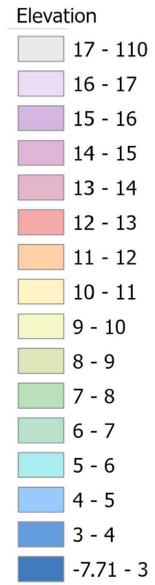
1. THE INTENT OF THIS DRAWING IS TO SHOW FINISHED GRADE CUT/FILL DEPTHS RELATIVE TO EXISTING GRADE (EG).
2. ISOPACH LABELS REPRESENT CUT/FILL DEPTHS IN FEET (RELATIVE TO EG).
3. SEE SHEETS C1C-C3 FOR ADDITIONAL GRADING DETAILS.



ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C4	TITLE OF SHEET ISOPACH LOWER SPRUCE PROJECT	SHEET 7
TECH. REVIEW: BD		HUMBOLDT COUNTY, CA	OF 11
DATE: 10/08/2025			

SHEET NOTES:

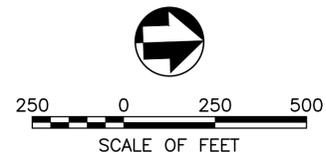
1. THE INTENT OF THIS SHEET IS TO SHOW LIKELY SDEIMENT REUSE SITES FOR ELK RIVER PLANNING AREA 1 (PA1) PROJECT SITES THAT DO NOT BALANCE CUT/FILL WITHIN A SPECIFIC PROJECT SITE.
2. SEDIMENT SOURCES FOR SEDIMENT REUSE SITES WILL LIKELY COME FROM LOWER SPRUCE, UPPER SPRUCE, MAINSTEM, ORTON, AND RELIC SWAIN PROJECT SITES.
3. NOT ALL PA1 PROJECT SITES ARE SHOWN ON THIS SHEET.
4. NOT ALL INFRASTRUCTURE ARE SHOWN ON THIS SHEET.
5. (XS-1) REFERS TO CROSS-SECTION LOCATION; SEE CROSS-SECTION SHEET.



- KEY NOTES:**
- ① SEDIMENT REUSE (D)
 - ② UPPER SPRUCE PROJECT (D)
 - ③ ERWA-S PROJECT (D)
 - ④ ORTON CREEK PROJECT (D)

- DESIGN CONTOUR (1-FIT INTERVAL)
- - - - DESIGN CONTOUR (5-FIT INTERVAL)
- - - - GRADING BOUNDARY
- GAS — GAS LINE
- - - - UTILITY LINE

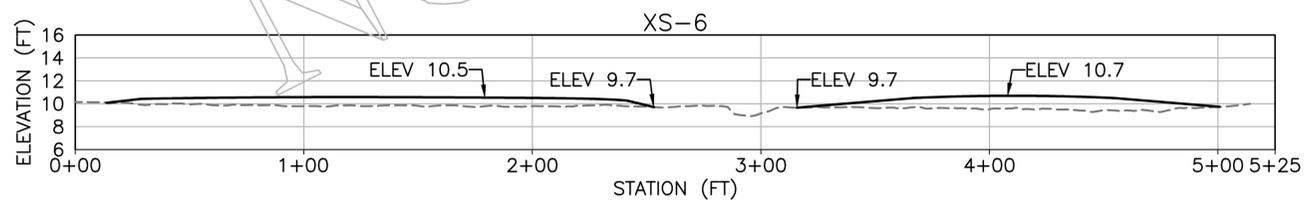
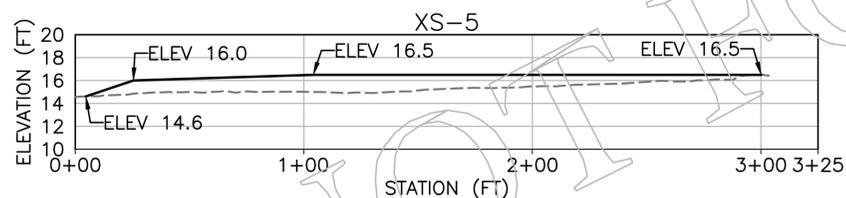
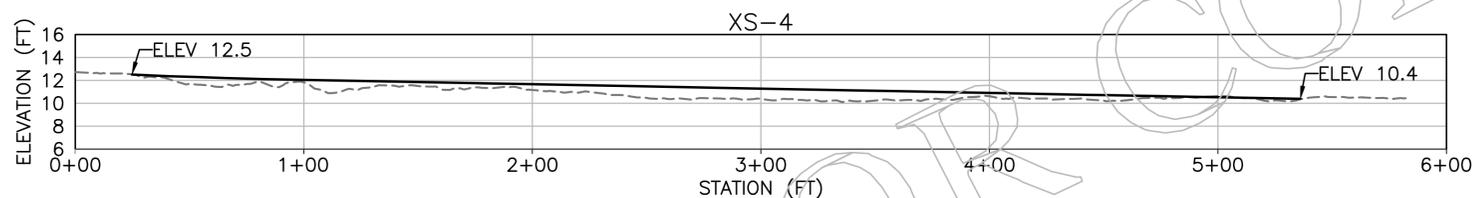
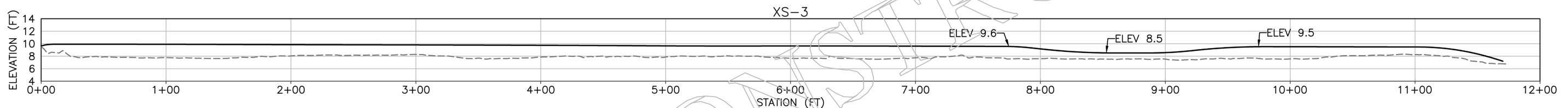
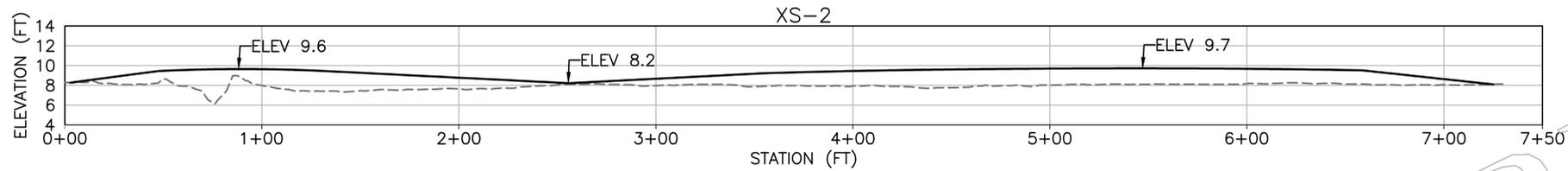
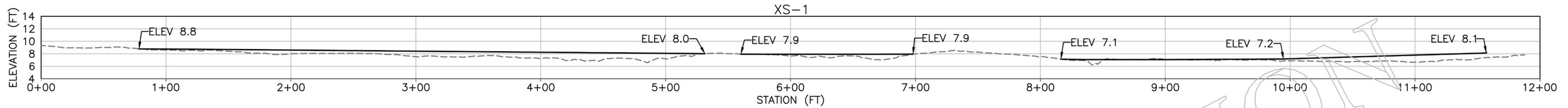
- ▲ ARTESIAN WELL (E)
- UTILITY POLE (E)
- GROUNDWATER MONITORING SITE (E)



ELK PA1 65% DESIGN: PERMIT SET		
DESIGNED: NHE CADD	SUB SHEET NO. C5C	TITLE OF SHEET COLOR SITE OVERVIEW SEDIMENT REUSE PLANNING AREA 1
TECH. REVIEW:	DATE: 10/08/2025	SHEET 8 OF 11
HUMBOLDT COUNTY, CA		

Plotted: 10/9/2025 9:04 AM - By: LICENSED USER - R17.1 - File: 11-SEDIMENT-REUSE-PRELIM-65%-DRAFT-PERMIT-C-SHEETS

Plotted: 10/9/2025 9:05 AM - By: LICENSED USER - R17.1 - File: 11--SEDIMENT--REUSE--PRELIM--65%--DRAFT--PERMIT--C--SHEETS



SHEET NOTES:

- SEE SITE OVERVIEW SHEET FOR CROSS-SECTION ALIGNMENT LOCATION.
- VERTICAL EXAGGERATION OF 5 FOR ALL CROSS-SECTION VIEWS ON THIS SHEET.
- THIS SHEET SHOWS EXISTING AND DESIGN GRADES.

--- EXISTING GRADE PROFILE
 ——— DESIGN GRADE PROFILE



ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C6	TITLE OF SHEET SECTIONS SEDIMENT REUSE PLANNING AREA 1	SHEET 9
TECH. REVIEW: TC			OF 11
DATE: 10/08/2025		HUMBOLDT COUNTY, CA	

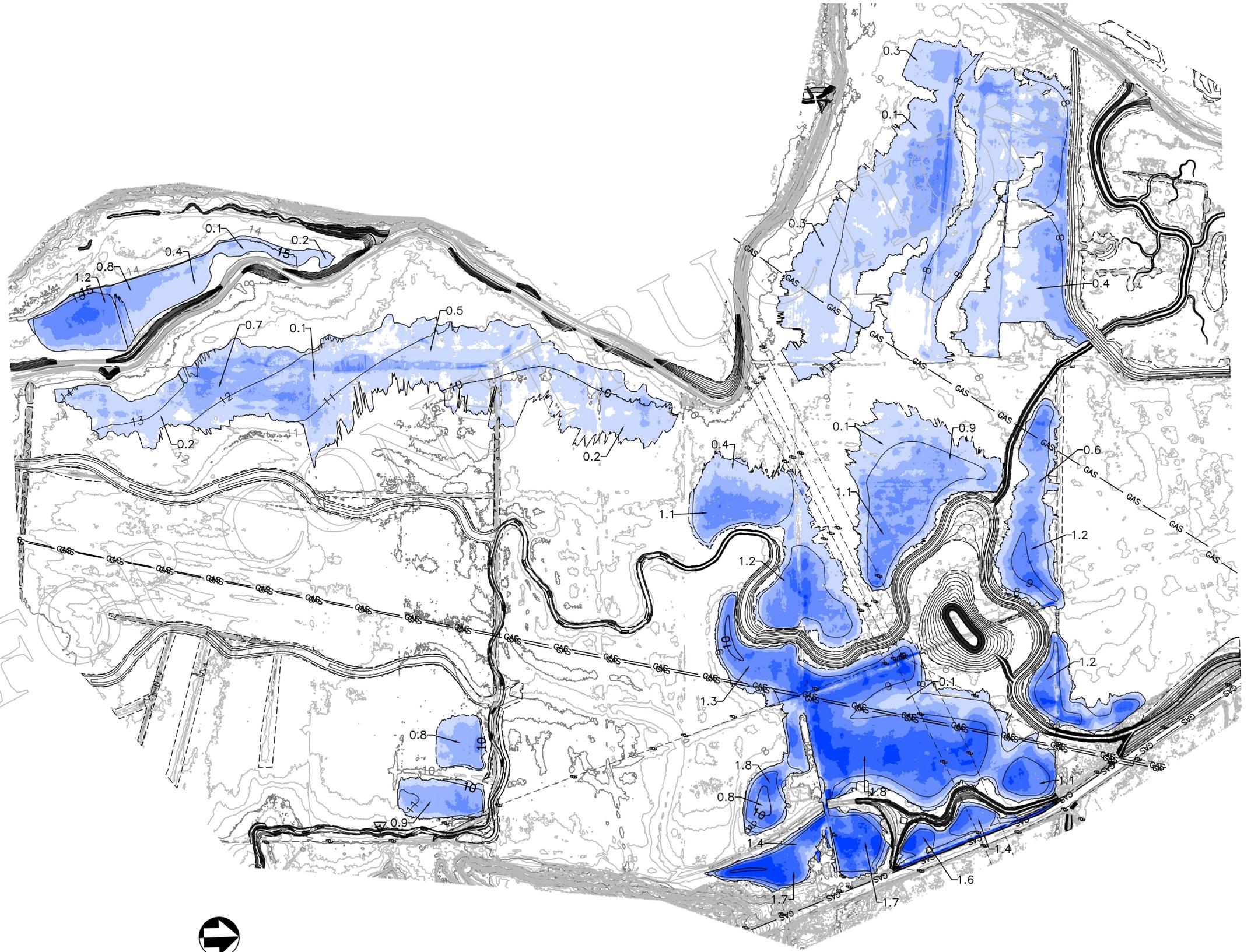
Plotted: 10/16/2025 10:19 AM - By: LICENSED USER - R17.1 - File: 11-SEDIMENT-REUSE-PRELIM-65%-DRAFT-PERMIT-ISOPACH

ELEVATIONS TABLE

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	AREA	COLOR
1	0.00	0.50	1925095.51	Lightest Blue
2	0.50	1.00	1099749.27	Light Blue
3	1.00	1.50	643635.49	Medium Light Blue
4	1.50	2.00	315314.04	Medium Blue
5	2.00	3.00	83904.31	Dark Blue
6	3.00	6.00	3716.82	Very Dark Blue

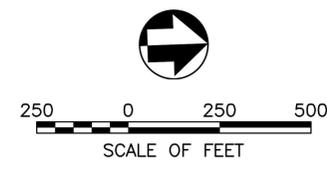
SHEET NOTES:

- 1) THE INTENT OF THIS DRAWING IS TO SHOW FINISHED GRADE SEDIMENT REUSE DEPTHS RELATIVE TO EXISTING GRADE (EG).
- 2) ISOPACH LABELS REPRESENT DEPTHS IN FEET (RELATIVE TO EG).
- 3) SEE SHEET C5C-C6 FOR ADDITIONAL SEDIMENT REUSE GRADING DETAILS.



NOT FOR CONSTRUCTION

- EXISTING CONTOUR (1-FT INTERVAL)
- EXISTING CONTOUR (5-FT INTERVAL)
- DESIGN CONTOUR (1-FT INTERVAL)
- DESIGN CONTOUR (5-FT INTERVAL)
- GRADING BOUNDARY
- GAS LINE
- UTILITY LINE
- ARTESIAN WELL (E)
- UTILITY POLE (E)



ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C7	TITLE OF SHEET ISOPACH SEDIMENT REUSE PLANNING AREA 1	SHEET 10
TC	TECH. REVIEW:	HUMBOLDT COUNTY, CA	OF 11
DATE: 10/15/2025			



DETAIL 1: LWS INSTALLATION AND INTEGRATION ALONG STREAM BANK. PHOTO OF LWS INSTALLED AT PRAIRIE CREEK, HUMBOLDT COUNTY.



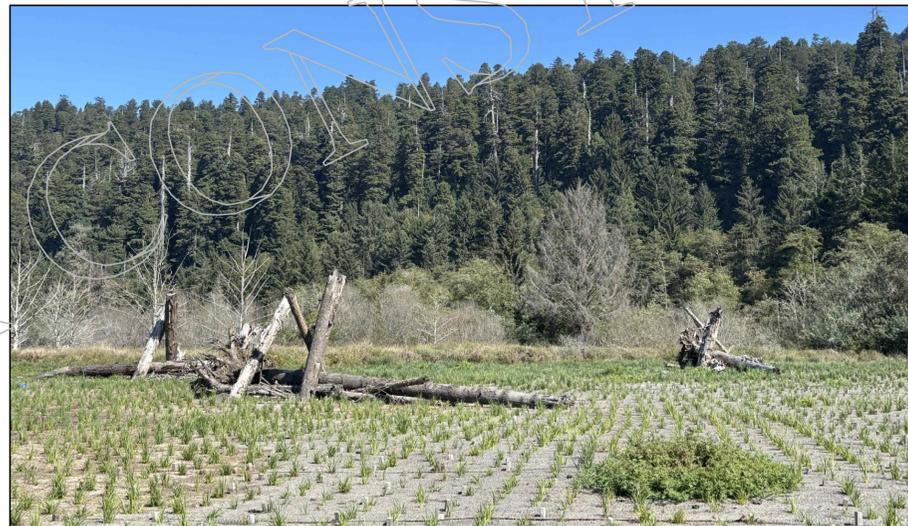
DETAIL 3: LWS INSTALLATION WITHIN FLOODPLAIN. PHOTO OF LWS INSTALLED AT PRAIRIE CREEK, HUMBOLDT COUNTY.



DETAIL 5: SIDE HINGED TIDE GATE WITH ADJUSTABLE OPENING (TOP PHOTO). SIDE HINGED TIDE GATE WITH ADJUSTABLE OPENING DURING OUTFLOW CONDITIONS ON EBB TIDE (BOTTOM PHOTO). SIDE HINGED TIDE GATE CLOSES DURING FLOOD TIDE, BUT ADJUSTABLE OPENING ALLOWS A MUTED (REDUCED) VOLUME OF WATER TO FLOW UPSTREAM. SIDE HINGED TIDE GATE WITH OPENING TO REPLACE THE EXISTING TOP HINGED TIDE GATE DRAINING INTO ELK RIVER THROUGH LEVEE. TOP AND BOTTOM PHOTO OF SIDE HINGED TIDE GATE WITH ADJUSTABLE OPENING INSTALLED AT GANNON SLOUGH, HUMBOLDT COUNTY.



DETAIL 2: LWS INSTALLATION AND INTEGRATION ALONG STREAM BANK. PHOTO OF LWS INSTALLED AT PRAIRIE CREEK, HUMBOLDT COUNTY.



DETAIL 4: LWS INSTALLATION WITHIN FLOODPLAIN. PHOTO OF LWS INSTALLED AT PRAIRIE CREEK, HUMBOLDT COUNTY.

SHEET NOTES:

1. THE INTENT OF THIS SHEET IS TO SHOW GENERAL EXAMPLES OF THE TYPES OF LARGE WOOD STRUCTURES TO BE INSTALLED.
2. THIS SHEET SHOWS APPROXIMATE LARGE WOOD STRUCTURE CONFIGURATIONS AND INSTALLATION TECHNIQUES USING LOG PILES AS PINNING LOG ANCHORS. ACTUAL LOG STRUCTURES WILL VARY DEPENDING ON VARIABLE FIELD CONDITIONS, LOG VARIABILITY, AND OTHER UNFORESEEN CONDITIONS.
3. THIS SHEET SHOWS GENERAL TIDE GATE STRUCTURE TYPES AND FUNCTIONALITY. ACTUAL TIDE GATE SHAPE, SUCH AS ROUND OR RECTANGULAR, MAY VARY.

Plotted: 10/14/2025 9:10 PM - By: LICENSED USER - R17.1 - File: CX-DETAILS-65PER-PERMIT



ELK PA1 65% DESIGN: PERMIT SET			
DESIGNED: NHE	SUB SHEET NO. C8	TITLE OF SHEET DETAILS	SHEET 11
TECH. REVIEW: BD			OF 11
DATE: 10/15/2025		HUMBOLDT COUNTY, CA	