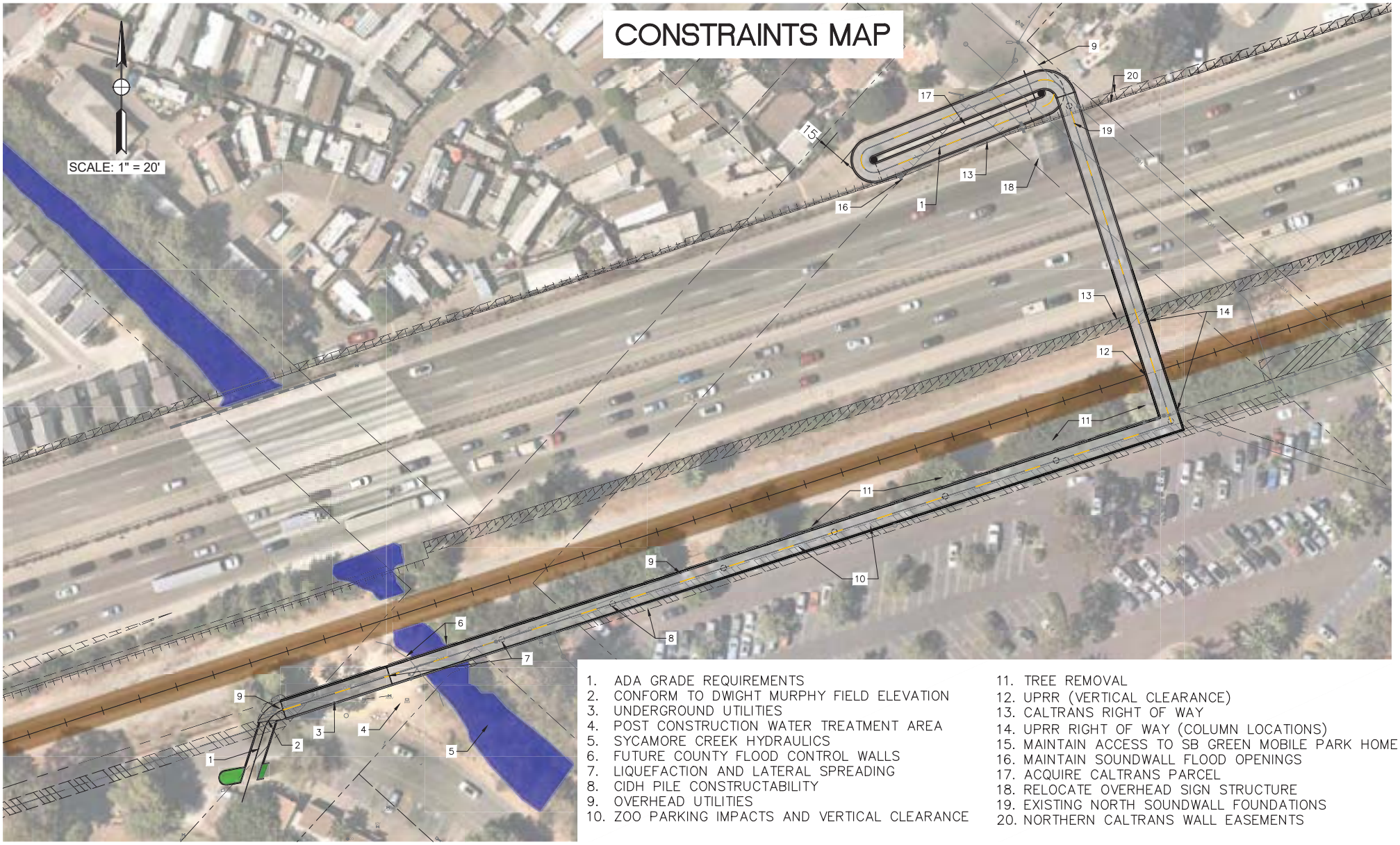
APPENDIX A

PROJECT CONSTRAINTS MAP

CONSTRAINTS MAP

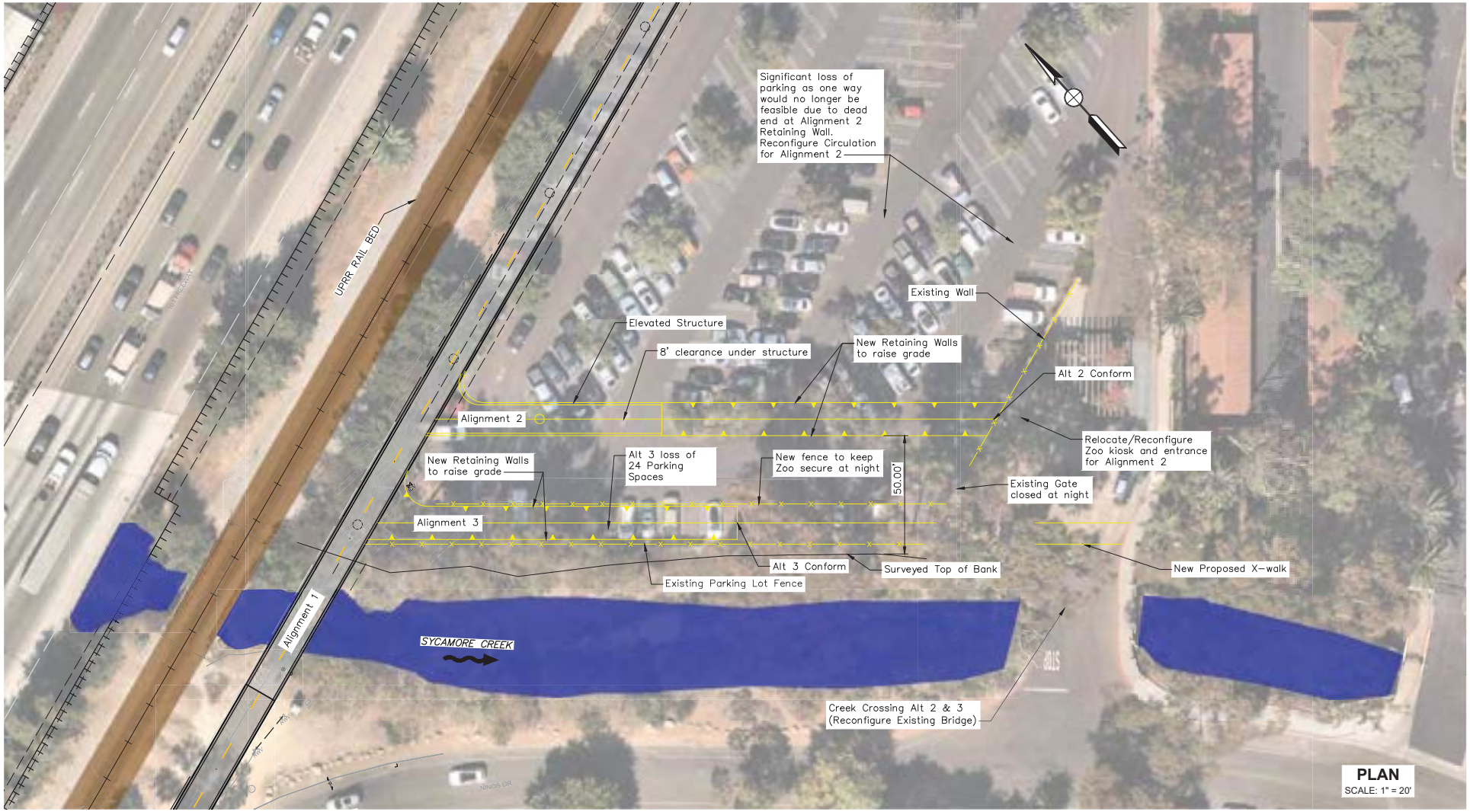


1. ADA GRADE REQUIREMENTS
2. CONFORM TO DWIGHT MURPHY FIELD ELEVATION
3. UNDERGROUND UTILITIES
4. POST CONSTRUCTION WATER TREATMENT AREA
5. SYCAMORE CREEK HYDRAULICS
6. FUTURE COUNTY FLOOD CONTROL WALLS
7. LIQUEFACTION AND LATERAL SPREADING
8. CIDH PILE CONSTRUCTABILITY
9. OVERHEAD UTILITIES
10. ZOO PARKING IMPACTS AND VERTICAL CLEARANCE
11. TREE REMOVAL
12. UPRR (VERTICAL CLEARANCE)
13. CALTRANS RIGHT OF WAY
14. UPRR RIGHT OF WAY (COLUMN LOCATIONS)
15. MAINTAIN ACCESS TO SB GREEN MOBILE PARK HOME
16. MAINTAIN SOUNDWALL FLOOD OPENINGS
17. ACQUIRE CALTRANS PARCEL
18. RELOCATE OVERHEAD SIGN STRUCTURE
19. EXISTING NORTH SOUNDWALL FOUNDATIONS
20. NORTHERN CALTRANS WALL EASEMENTS

consor

APPENDIX B

ALIGNMENT PLAN AND PROFILE



ALTERNATIVE ALIGNMENTS
CITY OF SANTA BARBARA

consor

FILE S:\Client\Santa Barbara City\22-3473 Lower Eastside Hwy 101 POC\500-Design\505 - CADD Files\Exhibit\22-3473ea-000_Exhibit.dwg

USERNAME Justus.horse DATE PLOTTED 7/12/2023 10:16:20 AM TIME PLOTTED 10:16:20 AM

EXISTING PARKING STALL LAYOUT MAP

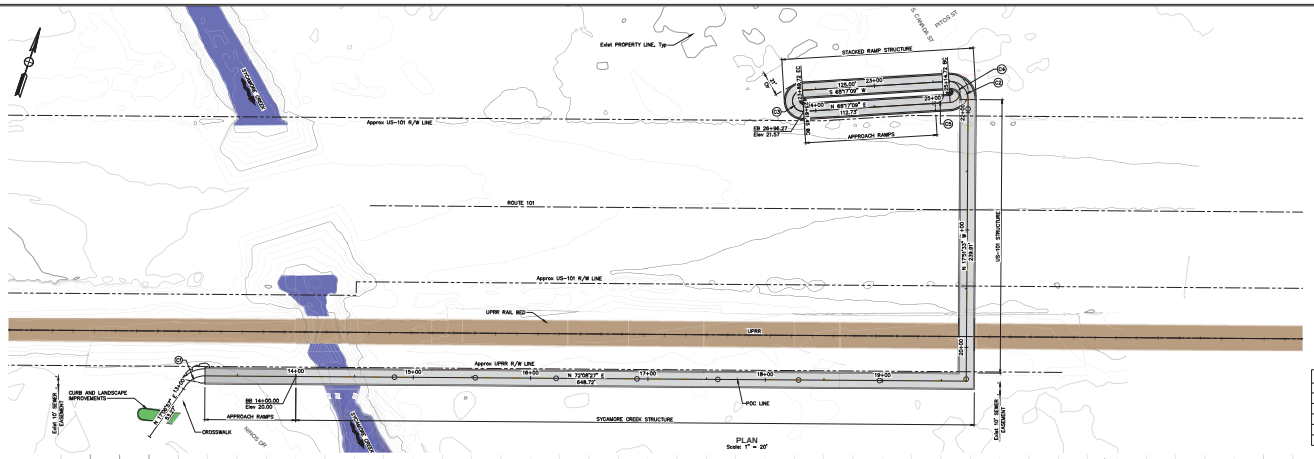
TOTAL EXISTING PARKING STALLS = 56

PROPOSED PARKING STALL LAYOUT MAP

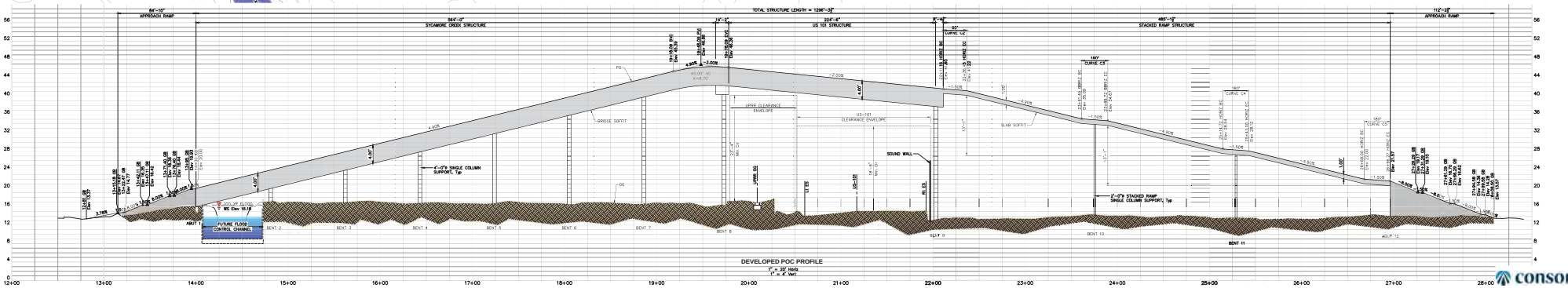
TOTAL PROPOSED PARKING STALLS = 51

consor

CANADA POC
CITY OF SANTA BARBARA
PRELIMINARY LAYOUT (SINGLE SPAN)
PLAN AND PROFILE

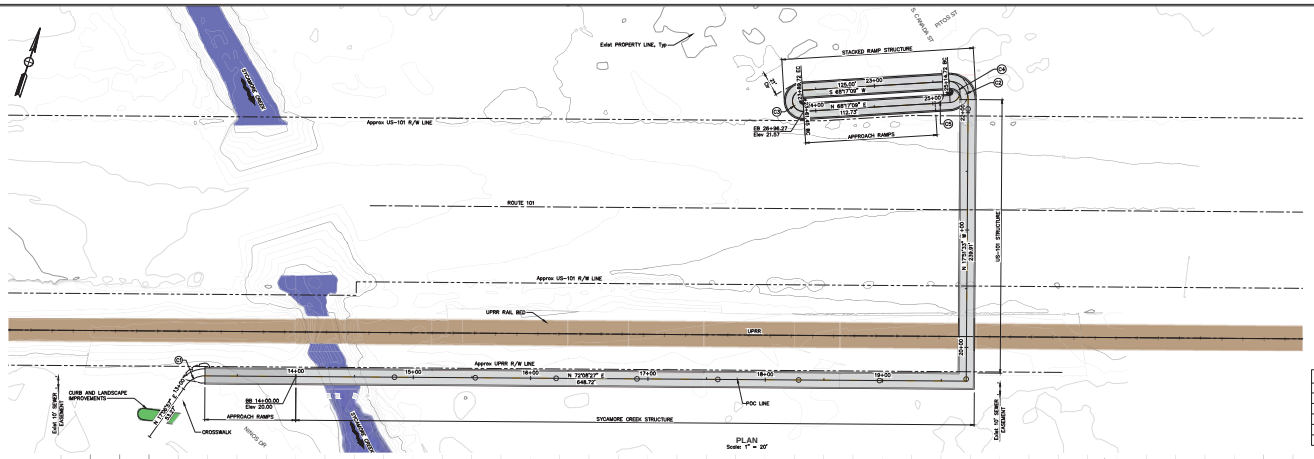


CURVE DATA				
NO.	R	Δ	T	L
C1	20.00'	55° 01' 35"	10.42'	19.21'
C2	15.50'	93° 27' 35"	16.47'	25.28'
C3	9.00'	180° 00' 00"	INFINITY'	28.27'
C4	9.00'	180° 00' 00"	INFINITY'	28.27'
C5	7.00'	90° 00' 00"	7.00'	11.00'

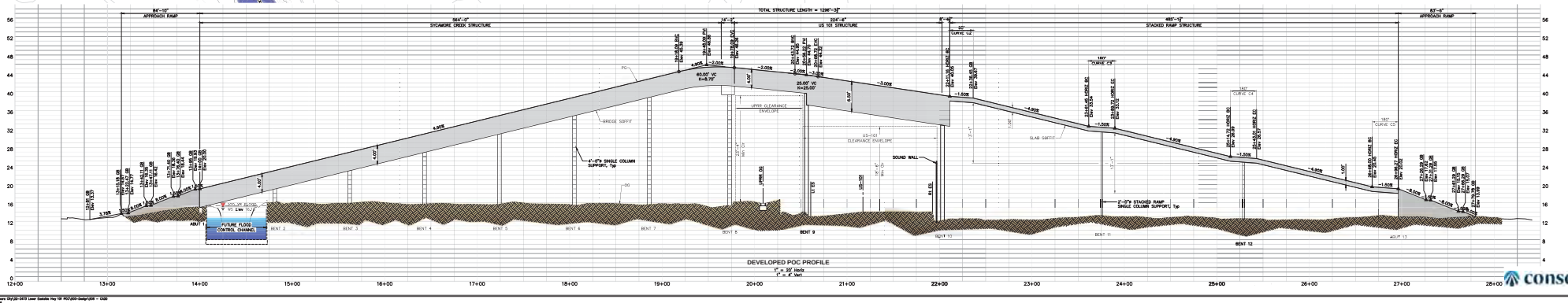


consor

CANADA POC
CITY OF SANTA BARBARA
PRELIMINARY LAYOUT (TWO-SPAN)
PLAN AND PROFILE

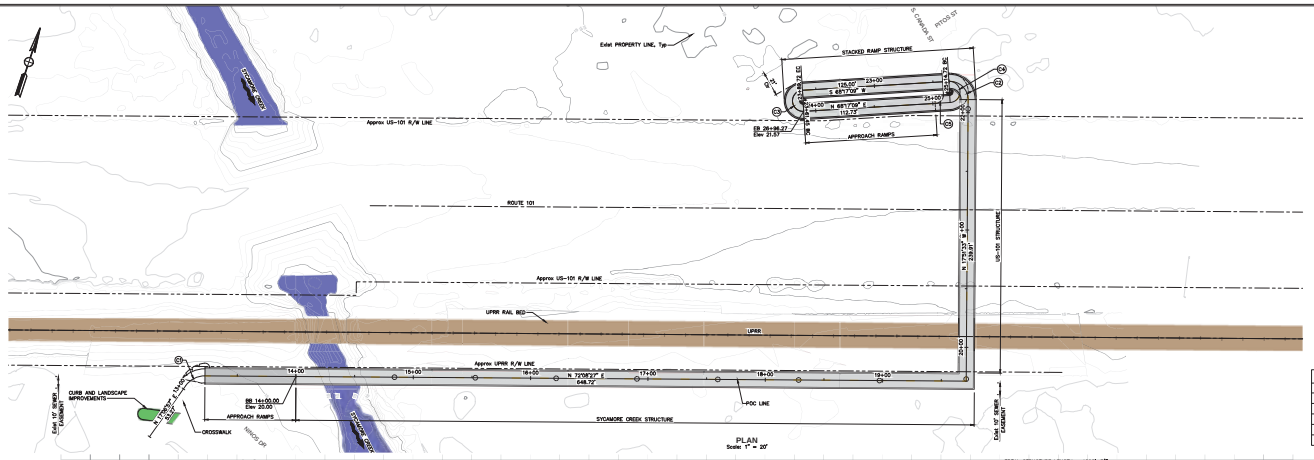


CURVE DATA				
NO.	R	Δ	T	L
C1	20.00'	55° 01' 30"	10.42'	19.21'
C2	15.50'	93° 27' 35"	16.47'	25.28'
C3	9.00'	180° 00' 00"	INFINITY'	28.27'
C4	9.00'	180° 00' 00"	INFINITY'	28.27'
C5	7.00'	90° 00' 00"	7.00'	11.00'

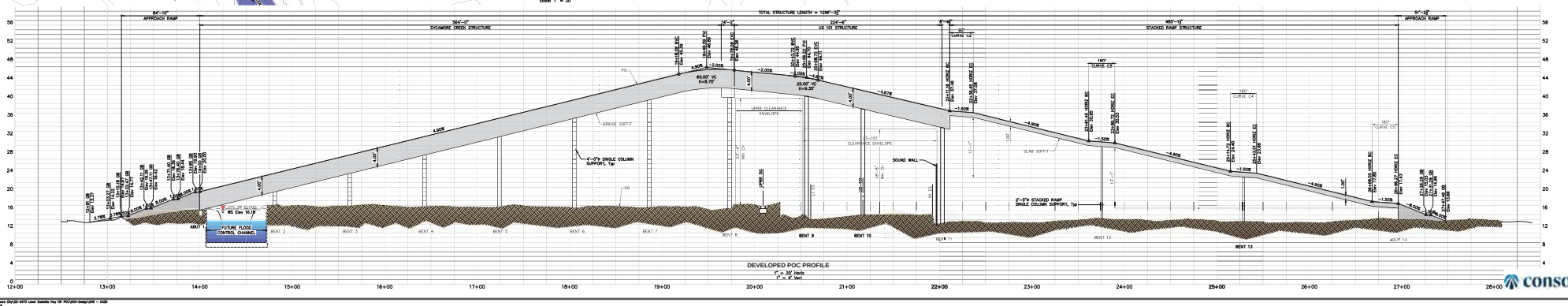


consor

CANADA POC
CITY OF SANTA BARBARA
PRELIMINARY LAYOUT (THREE-SPAN)
PLAN AND PROFILE



CURVE DATA				
NO.	R	Δ	T	L
C1	25.00'	155° 01' 30"	10.42'	19.21'
C2	15.50'	93° 27' 35"	16.47'	25.28'
C3	9.00'	180° 00' 00"	INFINITY'	28.27'
C4	9.00'	180° 00' 00"	INFINITY'	28.27'
C5	7.00'	90° 00' 00"	7.00'	11.00'



consor

APPENDIX C

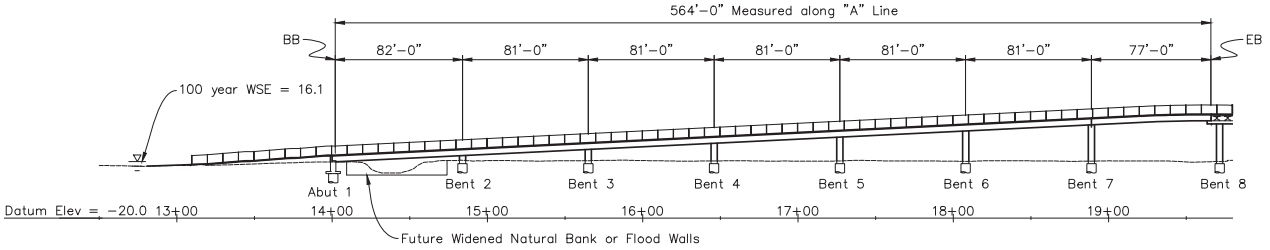
BRIDGE ADVANCE PLANNING STUDIES

PREPARED FOR THE CITY OF SANTA BARBARA – PUBLIC WORKS DEPARTMENT

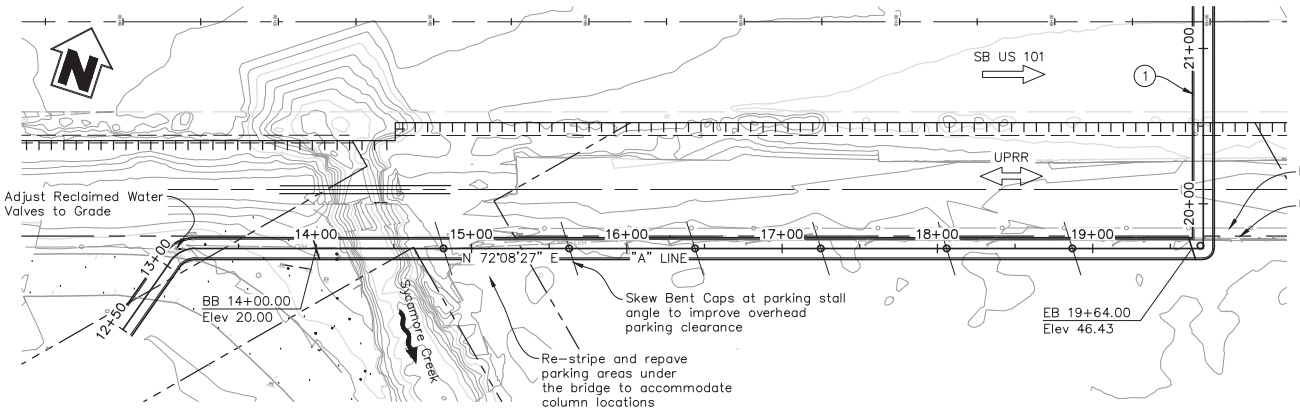
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT
5	SB	--	-- / --

consor

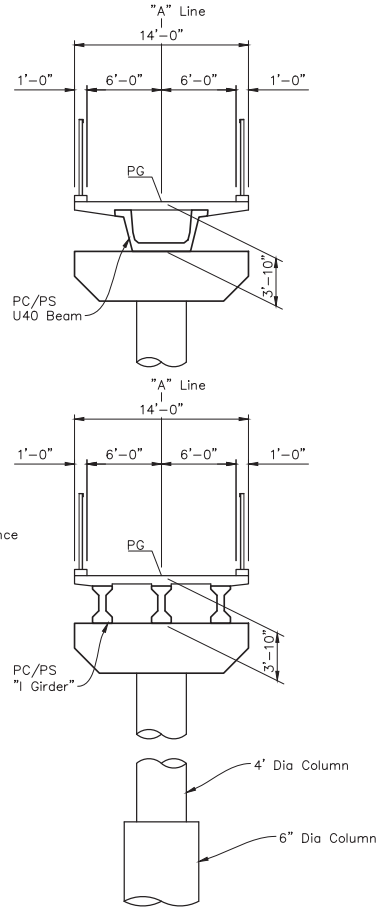
CITY OF SANTA BARBARA
DEPARTMENT OF PUBLIC WORKS
630 GARDEN ST, SANTA BARBARA, CA 93101
(805) 564-5377



ELEVATION
1" = 40'



PLAN
1" = 40'



TYPICAL SECTION ALTERNATIVES
1" = 5'

Notes:
1. US 101 Frame
2. Direction of Traffic

SYCAMORE CREEK FRAME

DESIGNED BY	G. Keating	DATE	1/23
DRAWN BY	A. Hanson	DATE	1/23
CHECKED BY	G. Young	DATE	1/23
APPROVED		DATE	

G. KEATING
PROJECT ENGINEER

PLANNING STUDY
CANADA STREET POC

BRIDGE NO. NEW	UNIT: --
SCALE: AS SHOWN	PROJECT NUMBER: 22-3473

DESIGN OVERSIGHT

SIGN OFF DATE

DESIGN DETAIL SHEET (ENGLISH) (REV.7/16/10)

FILE 22-3473-APS-1.dwg

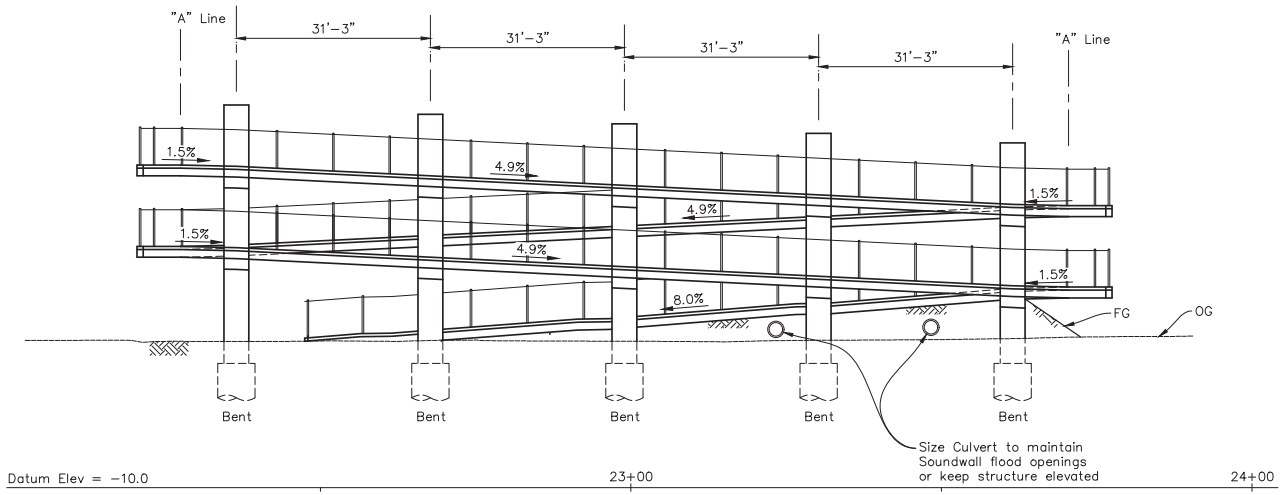
TIME PLOTTED 11:54:38 AM
DATE PLOTTED 9/8/2023 11:54:38 AM
USERNAME Greg.Young

PREPARED FOR THE CITY OF SANTA BARBARA – PUBLIC WORKS DEPARTMENT

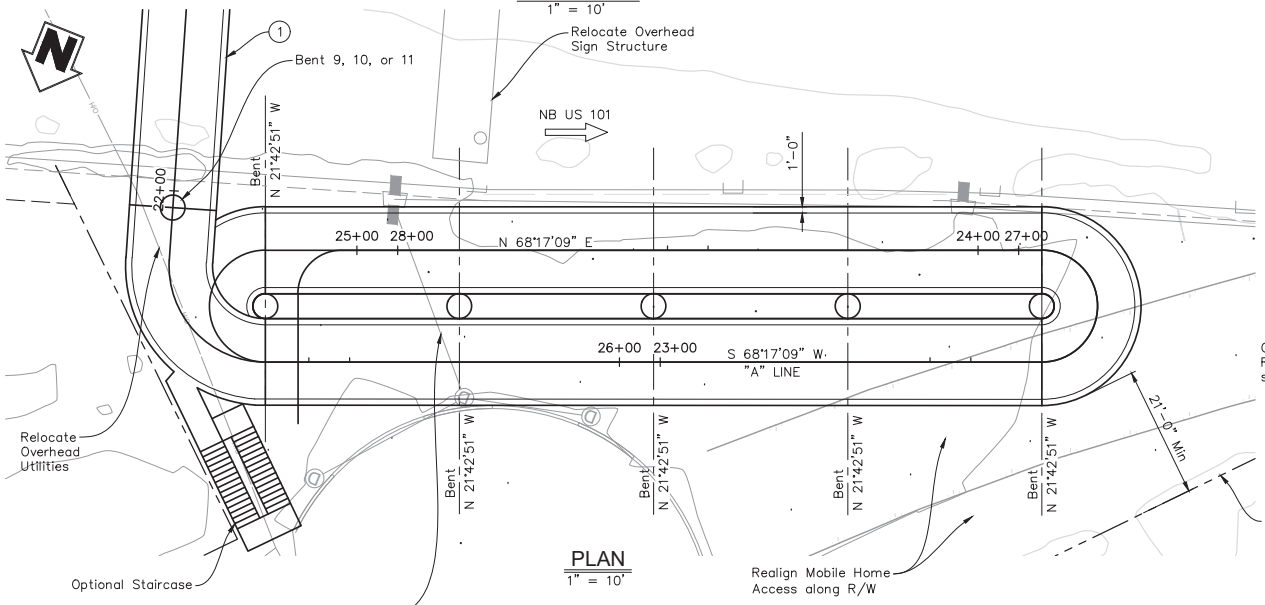
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT
5	SB	--	-- / --

consor

CITY OF SANTA BARBARA
DEPARTMENT OF PUBLIC WORKS
630 GARDEN ST, SANTA BARBARA, CA 93101
(805) 564-5377

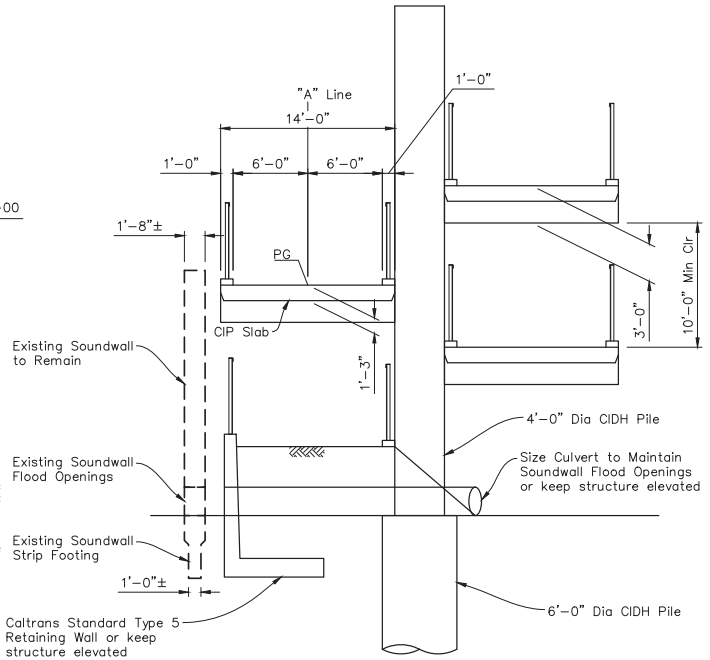


ELEVATION
1" = 10'



PLAN
1" = 10'

Notes:
1. (1) US 101 Frame
2. ⇨ Direction of Traffic



TYPICAL SECTION ALTERNATIVE
1" = 5'

STACKED RAMP FRAME

DESIGNED BY	G. Keating	DATE	9/23
DRAWN BY	A. Hanson	DATE	9/23
CHECKED BY	G. Young	DATE	9/23
APPROVED		DATE	

G. KEATING
PROJECT ENGINEER

PLANNING STUDY
CANADA STREET POC

BRIDGE NO. NEW	UNIT: --
SCALE: AS SHOWN	PROJECT NUMBER: 22-3473

DESIGN OVERSIGHT

SIGN OFF DATE

DESIGN DETAIL SHEET (ENGLISH) (REV.7/16/10)

FILE 22-3473-APS-1.dwg

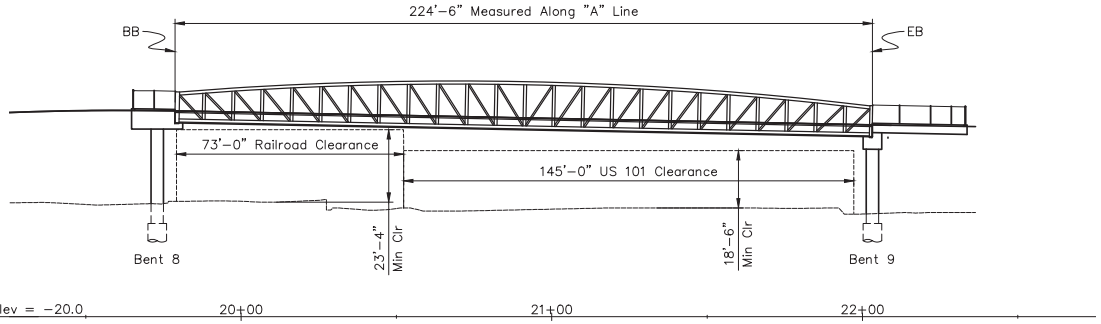
TIME PLOTTED 10:00:05 AM
DATE PLOTTED 9/8/2023 10:00:05 AM
USERNAME James.Hu

PREPARED FOR THE CITY OF SANTA BARBARA – PUBLIC WORKS DEPARTMENT

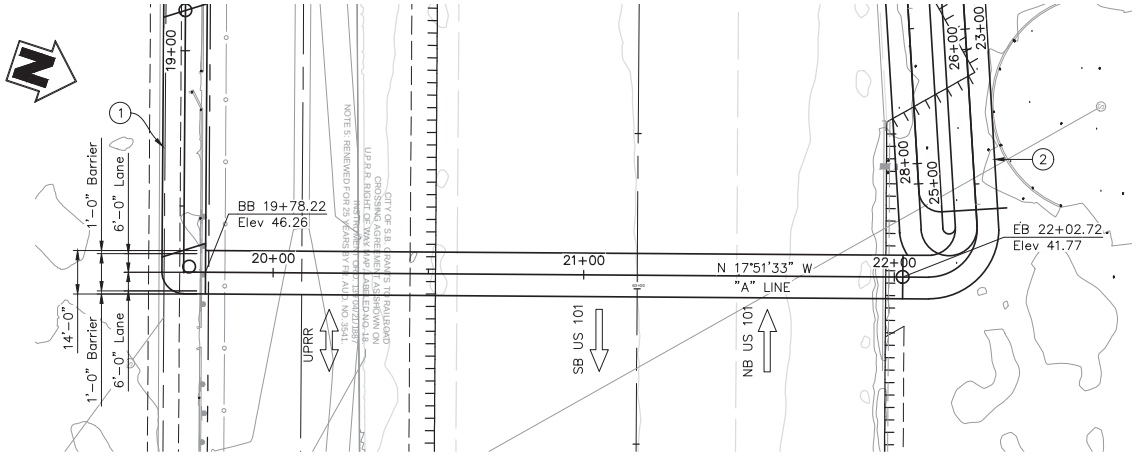
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT
5	SB	--	-- / --

consor

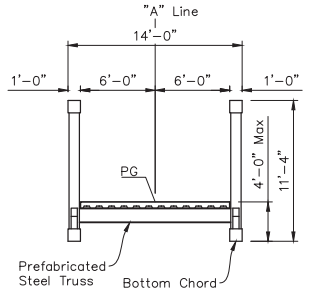
CITY OF SANTA BARBARA
DEPARTMENT OF PUBLIC WORKS
630 GARDEN ST, SANTA BARBARA, CA 93101
(805) 564-5377



ELEVATION
1" = 20'



PLAN
1" = 20'



TYPICAL SECTION ALTERNATIVE
1" = 5'

Notes:
(1) Sycamore Creek Frame
(2) Stacked Ramp Frame
⟸ Direction of Traffic

US 101 FRAME: ALT 1

DESIGNED BY G. Keating	DATE 1/23	G. KEATING PROJECT ENGINEER
DRAWN BY A. Hanson	DATE 1/23	
CHECKED BY G. Young	DATE 1/23	
APPROVED	DATE	

PLANNING STUDY
CANADA STREET POC

BRIDGE NO. NEW	UNIT: --
SCALE: AS SHOWN	PROJECT NUMBER: 22-3473

DESIGN OVERSIGHT
SIGN OFF DATE

DESIGN DETAIL SHEET (ENGLISH) (REV.7/16/10)

FILE 22-3473-APS-3.dwg

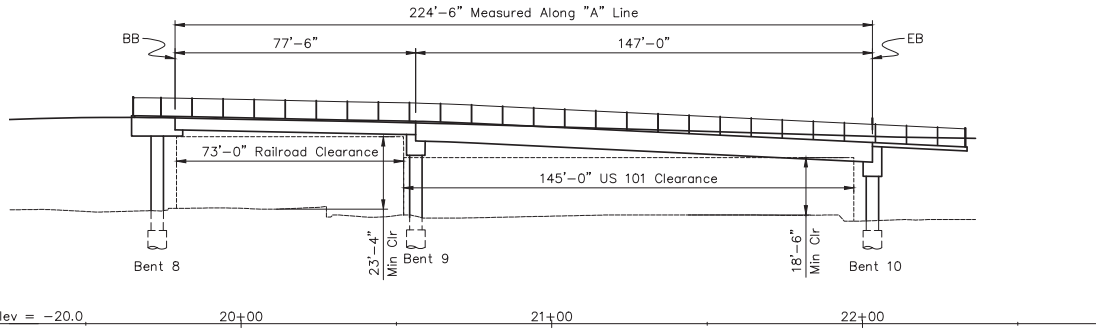
USERNAME Cyam.colegas DATE PLOTTED 12/30/2022 3:08:09 PM
TIME PLOTTED 3:08:09 PM

PREPARED FOR THE CITY OF SANTA BARBARA – PUBLIC WORKS DEPARTMENT

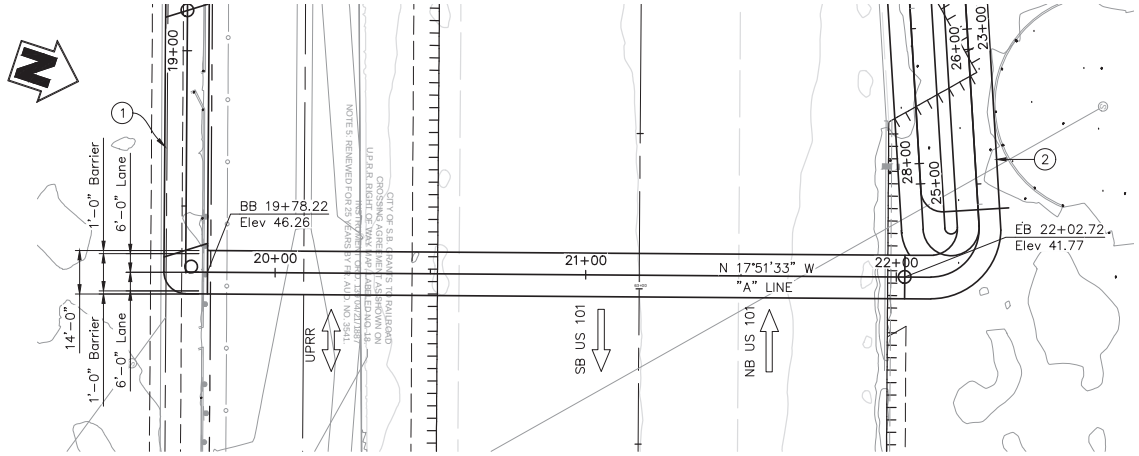
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT
5	SB	--	-- / --

consor

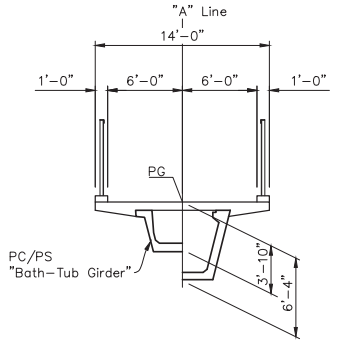
CITY OF SANTA BARBARA
DEPARTMENT OF PUBLIC WORKS
630 GARDEN ST, SANTA BARBARA, CA 93101
(805) 564-5377

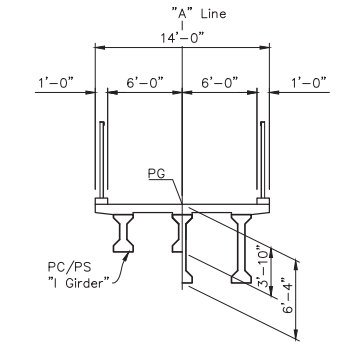


ELEVATION
1" = 20'



PLAN
1" = 20'





TYPICAL SECTION ALTERNATIVES
1" = 5'

Notes:
1. Sycamore Creek Frame
2. Stacked Ramp Frame
⇦ Direction of Traffic

US 101 FRAME: ALT 2

DESIGNED BY G. Keating	DATE 1/23	G. KEATING PROJECT ENGINEER
DRAWN BY A. Hanson	DATE 1/23	
CHECKED BY G. Young	DATE 1/23	
APPROVED	DATE	

PLANNING STUDY
CANADA STREET POC

BRIDGE NO. NEW	UNIT: --
SCALE: AS SHOWN	PROJECT NUMBER: 22-3473

DESIGN OVERSIGHT
SIGN OFF DATE

DESIGN DETAIL SHEET (ENGLISH) (REV.7/16/10)

FILE 22-3473-APS-3.dwg

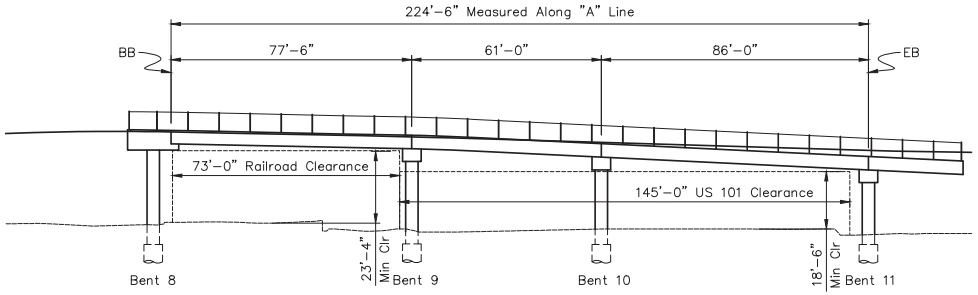
USERNAME Cyam.colgas DATE PLOTTED 12/30/2022 3:06:25 PM
TIME PLOTTED 3:06:25 PM

PREPARED FOR THE CITY OF SANTA BARBARA – PUBLIC WORKS DEPARTMENT

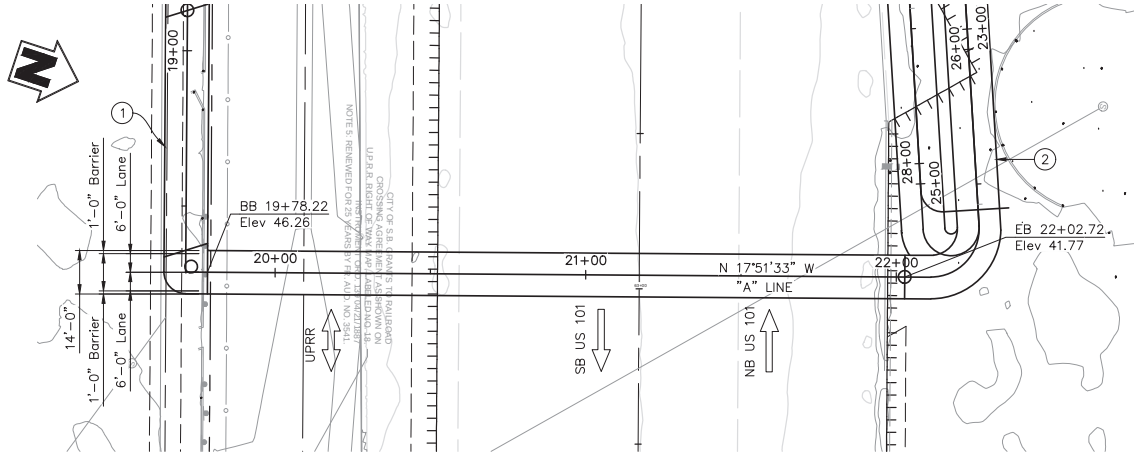
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT
5	SB	--	-- / --

consor

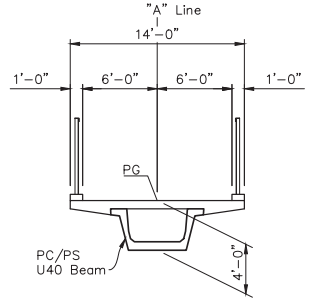
CITY OF SANTA BARBARA
DEPARTMENT OF PUBLIC WORKS
630 GARDEN ST, SANTA BARBARA, CA 93101
(805) 564-5377

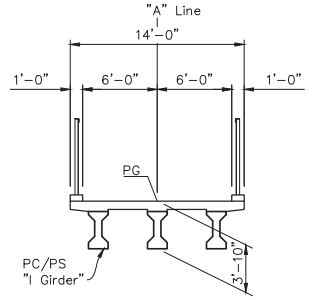


ELEVATION
1" = 20'



PLAN
1" = 20'





TYPICAL SECTION ALTERNATIVES
1" = 5'

Notes:
1. Sycamore Creek Frame
2. Stacked Ramp Frame
⟸ Direction of Traffic

US 101 FRAME: ALT 3

DESIGNED BY G. Keating	DATE 1/23	G. KEATING PROJECT ENGINEER
DRAWN BY A. Hanson	DATE 1/23	
CHECKED BY G. Young	DATE 1/23	
APPROVED	DATE	

PLANNING STUDY
CANADA STREET POC

BRIDGE NO. NEW	UNIT: --
SCALE: AS SHOWN	PROJECT NUMBER: 22-3473

DESIGN OVERSIGHT
SIGN OFF DATE

DESIGN DETAIL SHEET (ENGLISH) (REV.7/16/10)

FILE 22-3473-APS-3.dwg

USERNAME Cyam.colgas DATE PLOTTED 12/30/2022 3:04:32 PM
TIME PLOTTED 3:04:32 PM

APPENDIX D

CONSTRUCTION COST ESTIMATES

Project: Canada POC

Description: Quantities

Job No.:

By: Gavin K **Date: 1**/3/2022

Checked By: Gavin K

ALTERNATIVE COST COMPARISON*

Quantities			Quantity					Cost				
	Unit	Unit Price	Alt 1	Alt 2 (Girder)	Alt 2 (Box)	Alt 3 (Girder)	Alt 3 (Box)	Alt 1	Alt 2 (Girder)	Alt 2 (Box)	Alt 3 (Girder)	Alt 3 (Box)
CIDH Pile (72")	LF	$ 3,200	835	880	880	910	910	$ 2,672,000	$ 2,816,000	$ 2,816,000	$ 2,912,000	$ 2,912,000
Erect Truss	LS	$ 350,000	1					$ 350,000	$ -	$ -	$ -	$ -
Furnish Connector Truss**	LS	$ 1,250,000	1					$ 1,250,000	$ -	$ -	$ -	$ -
Furnish Precast PS Concrete Girder (80')	EA	$ 20,000	21	24		30		$ 420,000	$ 480,000	$ -	$ 600,000	$ -
Erect PC PS Concrete Girder (80')	EA	$ 20,000	21	24		30		$ 420,000	$ 480,000	$ -	$ 600,000	$ -
Furnish Precast PS Concrete Girder (150')	EA	$ 100,000		3				$ -	$ 300,000	$ -	$ -	$ -
Erect PC PS Concrete Girder (150')	EA	$ 80,000		3				$ -	$ 240,000	$ -	$ -	$ -
Furnish PC PS Concrete Bathtub Girder (80')	EA	$ 90,000			8		10	$ -	$ -	$ 720,000	$ -	$ 900,000
Erect PC PS Concrete Bathtub Girder (80')	EA	$ 50,000			8		10	$ -	$ -	$ 400,000	$ -	$ 500,000
Furnish PC PS Concrete Bathtub Girder (150')	EA	$ 250,000			1			$ -	$ -	$ 250,000	$ -	$ -
Erect PC PS Concrete Bathtub Girder (150')	EA	$ 200,000			1			$ -	$ -	$ 200,000	$ -	$ -
Structural Concrete, Bridge (Polymer Fiber)	CY	$ 3,000	668	712	729	712	729	$ 2,003,490	$ 2,137,192	$ 2,186,254	$ 2,137,192	$ 2,186,254
Structural Concrete, Bridge	CY	$ 4,000	245	264.0	264.0	288.5	288.5	$ 980,319	$ 1,055,967	$ 1,055,967	$ 1,153,956	$ 1,153,956
Joint Seal (MR 1.5")	LF	$ 200	48	60	60	48	48	$ 9,600	$ 12,000	$ 12,000	$ 9,600	$ 9,600
Bar Reinforcing Steel (Bridge)	LB	$ 2.00	524483	555423	559103	572793	576473	$ 1,048,966	$ 1,110,847	$ 1,118,206	$ 1,145,586	$ 1,152,945
Railroad Flagging	DAY	$ 1,400.00	2	22	22	22	22	$ 2,800	$ 30,800	$ 30,800	$ 30,800	$ 30,800
Traffic Control	DAY	$ 5,000.00	4	24	24	44	44	$ 20,000	$ 120,000	$ 120,000	$ 220,000	$ 220,000
Krail	LF	$ 30.00	0	160	160	480	480	$ -	$ 4,800	$ 4,800	$ 14,400	$ 14,400
Temporary alternative crash cushion	LF	$ 5,000.00	0	1	1	3	3	$ -	$ 5,000	$ 5,000	$ 15,000	$ 15,000
Decorative Hand Rail	LF	$ 600	2403	2853	2853	2853	2853	$ 1,441,800	$ 1,712,004	$ 1,712,004	$ 1,712,004	$ 1,712,004
Natina Finish for Truss	LS	$ 450,000	0	0	0	0	0	$ -	$ -	$ -	$ -	$ -
Paint Finish for Truss	LS	$ 90,000	0	0	0	0	0	$ -	$ -	$ -	$ -	$ -
							SUBTOTAL	$ 10,618,974	$ 10,504,610	$ 10,631,031	$ 10,550,538	$ 10,806,959

*Not all items included, cost comparison purposes only

**Add $350,000 for Keystone Upgrade

Add $90,000 for 2-Coat Paint Finish

Add $450,000 for Natina Finish

Consor

PROJECT REPORT 20% CONTINGENCY

Date 1/3/2023

Project Name Canada POC

Project. No.

Bridge Name Single Span Steel Truss

Road Q's By

Bridge. No. New

Bridge Check Q's By

Item No.		Item Code	Item Description	Unit	Quantity	Unit Price	Total
1		070030	LEAD COMPLIANCE PLAN	LS	LUMP SUM	$ 5,000	$ 5,000
2		120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	$ 10,000	$ 10,000
3		120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	$ 20,000	$ 20,000
4		130100	JOB SITE MANAGEMENT	LS	LUMP SUM	$ 100,000	$ 100,000
5		130300	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	$ 3,000	$ 3,000
6		130310	RAIN EVENT ACTION PLAN	EA	25	$ 500	$ 12,500
7		130320	STORM WATER SAMPLING AND ANALYSIS DAY	EA	150	$ 400	$ 60,000
8		130330	STORM WATER ANNUAL REPORT	EA	2	$ 2,000	$ 4,000
9		130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	10	$ 250	$ 2,500
10		130640	TEMPORARY FIBER ROLL	LF	800	$ 3	$ 2,400
11		130710	TEMPORARY CONSTRUCTION ENTRANCE	EA	3	$ 5,000	$ 15,000
12		130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM	$ 25,000	$ 25,000
13		160110	TEMPORARY HIGH-VISIBILITY FENCE	LF	800	$ 8	$ 6,400
14		170103	CLEARING AND GRUBBING (LS)	LS	LUMP SUM	$ 50,000	$ 50,000
15		190101	ROADWAY EXCAVATION	CY	980	$ 140	$ 137,200
16		198010	IMPORTED BORROW (CY)	CY	255	$ 120	$ 30,600
17		210350	FIBER ROLLS	LF	800	$ 5	$ 4,000
18		210420	STRAW	SQFT	3000	$ 1	$ 1,500
19		260203	CLASS 2 AGGREGATE BASE (CY)	CY	655	$ 130	$ 85,150
20		390132	HOT MIX ASPHALT (TYPE A)	TON	660	$ 350	$ 231,000
21		568056	RELOCATE SIGN STRUCTURE	EA	1	$ 500,000	$ 500,000
22		600001	PUBLIC SAFETY PLAN	LS	LUMP SUM	$ 10,000	$ 10,000
23		665018	18" CORRUGATED STEEL PIPE (.109" THICK)	LF	50	$ 250	$ 12,500
24		723095	ROCK SLOPE PROTECTION (20 lb, CLASS I, METHOD B) (CY)	CY	200	$ 500	$ 100,000
25		731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	5	$ 1,500	$ 7,500
26		840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	25	$ 15	$ 375
27		840501	THERMOPLASTIC TRAFFIC STRIPE	LF	800	$ 2	$ 1,400
28		999994	BIOSWALE	LS	LUMP SUM	$ 25,000	$ 25,000
29		999995	RAILROAD FLAGGING	LS	LUMP SUM	$ 2,800	$ 2,800
30	F	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	10	$ 250	$ 2,500
31	F	193003	STRUCTURE BACKFILL (BRIDGE)	CY	10	$ 200	$ 2,000
32	F	477020	MECHANICALLY STABILIZED EMBANKMENT	SQFT	565	$ 100	$ 56,500
33		480300	TEMPORARY SUPPORT	LS	LUMP SUM	$ 50,000	$ 50,000
34		490611	72" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	835	$ 3,200	$ 2,672,000
35	F	510053	STRUCTURAL CONCRETE, BRIDGE	CY	245	$ 4,000	$ 980,000
36	F	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	10	$ 800	$ 8,000
37	F	510054	STRUCTURAL CONCRETE, BRIDGE (POLYMER FIBER)	CY	670	$ 3,400	$ 2,278,000
38		512207	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (80'-90')	EA	24	$ 20,000	$ 480,000
39		512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	24	$ 20,000	$ 480,000
40		519091	JOINT SEAL (MR 1 1/2")	LF	50	$ 200	$ 10,000
41	F	520102	BAR REINFORCING STEEL (BRIDGE)	LB	524485	$ 2	$ 1,048,970
42	F	750505	BRIDGE DECK DRAINAGE SYSTEM	LB	8000	$ 25	$ 200,000
43		833999	DECORATIVE HAND RAIL	LF	2405	$ 600	$ 1,443,000
44		870200	LIGHTING SYSTEM	LS	LUMP SUM	$ 400,000	$ 400,000
45		999992	FURNISH TRUSS BRIDGE	LS	LUMP SUM	$ 1,700,000	$ 1,700,000
46		999993	ERECT TRUSS BRIDGE	LS	LUMP SUM	$ 350,000	$ 350,000
47		999998	NATINA FINISH FOR TRUSS	LS	LUMP SUM	$ 450,000	$ 450,000
48		999990	MOBILIZATION	LS	LUMP SUM	$ 1,407,580	$ 1,407,580
						SUBTOTAL CONTRACT	$ 15,483,375
		SUPPLEMENTAL WORK					
49						$ -	
50						$ -	
51		066015	FEDERAL TRAINEE PROGRAM	LS	LUMP SUM	$ 800.00	$ 800
52						$ -	
						SUBTOTAL SUPPLEMENTAL WORK	$ 800
						SUBTOTAL	$ 15,484,175
						CONTINGENCIES 20.0%	$ 3,096,826
						TOTAL	**$ 18,581,000**

Lower Eastside Community Connectivity Active Transportation Plan Cost Estimate

Sheet Count	Civil Sheet
1	Title
2	Typical Cross Section
3	Layout 1 (north side)
4	Layout 2 (south side)
5	Profile & Super
6	Construction Details 1 (Contour Grading Xwalk South)
7	Construction Details 2 (Driveway/Sidewalk Details North)
8	Construction Details 3 (Misc. Details)
9	Construction Details 4 (Relocate US 101 Sign structure)
10	Temporary Creek Diversion
11	Erosion Control Plan
12	Utility Plan No. 1
13	Utility Plan No. 2
14	Drainage Layout
15	Drainage Details 1
16	Drainage Details 2
17	Construction Area Sign /Detour/Traffic Control Plan
18	Tree Removal Plan
19	Summary of Quantities

Lower Eastside Community Connectivity Active Transportation Plan Cost Estimate

Sheet Count	Structure Sheets
1	General Plan No. 1
2	General Plan No. 2
3	Index to Plans
4	General Notes
5	Structure Plan No. 1 (Sycamore Creek Frame)
6	Structure Plan No. 2 (US 101 Frame)
7	Structure Plan No. 3 (Stacked Ramp Structure)
8	Deck Contours No. 1
9	Deck Contours No. 2
10	Deck Contours No. 3
11	Foundation Plan
12	Abutment 1 Layout (Sycamore Creek Frame)
13	Abutment Details (Sycamore Creek Frame)
14	Bent Details No. 1 (Bent 2 through 7, US 101 Interior supports)
15	Bent Details No. 2 (Bent 2 through 7, US 101 Interior supports)
16	Bent Details No. 3 (Bent 2 through 7, US 101 Interior supports)
17	Bent Details No. 4 (Bent 2 through 7, US 101 Interior supports)
18	Bent Details No. 5 (Bent 8 Cap & Hinge Details)
19	Bent Details No. 6 (Bent 8 Cap & Hinge Details)
20	Bent Details No. 7 (US 101 North Bent Cap & Hinge Details)
21	Bent Details No. 8 (US 101 North Bent Cap & Hinge Details)
22	Bearing Details
23	Typical Section
24	Girder Layout No. 1
25	Girder Layout No. 2
26	PC/Pretensioned "I" or "U" Girder (Debonded Strands)
27	PC/Pretensioned "I" or "U" Girder (Miscellaneous Details)
28	Diaphragm Details No. 1
29	Diaphragm Details No. 2

consor

30 Additional Deck Slab Reinf No. 1
31 Additional Deck Slab Reinf No. 2
32 Ramp Bent Layout
33 Ramp Bent Details No. 1
34 Ramp Bent Details No. 2
35 Ramp Bent Details No. 3
36 Ramp Bent Details No. 4
37 Ramp Bent Details No. 5
38 Ramp Bent Details No. 6
39 Ramp Bent Details No. 7
40 Ramp Bent Details No. 8
41 Ramp Bent Details No. 9
42 Ramp Typical Section
43 Ramp Slab Details No. 1
44 Ramp Slab Details No. 2
45 Ramp Slab Details No. 3
46 Ramp Approach
47 Strip Joint Seal Assembly MR<4"
48 Joint Armor Protection Detail (ADA cover plate at joints)
49 Architectural Details No. 1
50 Architectural Details No. 2
51 Pedestrian Railing No. 1
52 Pedestrian Railing No. 2
53 Pedestrian Railing No. 3
54 Pedestrian Railing No. 4
55 Log of Test Boring No. 1
56 Log of Test Boring No. 2
57 Log or Test Boring No. 3

Lower Eastside Community Connectivity Active Transportation Plan Cost Estimate

Design Costs		
57 Bridge Sheets (+15% contingency) @ 100 hrs/sheet		6555 hours
19 Road Sheets (+ 15% contingency) @ 50 hrs/sheet		1092 hours
Project Mgmt 10%		765 hours
Total Prime Hours		8412
Average Rate/hr	$	185.00
Total Prime Consultant	$	1,556,165
Subs		
Environmental (EIR, Permits, NEPA Tech Studies)	$	391,000.00
Geotechnical (11 borings 50 to 150 feet, 8 CPT 100 to 150 feet)	$	362,000.00
Hydraulics (LHS and DHS)	$	125,000.00
Survey (Aerial Lidar, Ground Densification, Hydro Sections, and Plats and Legals)	$	61,500.00
Public Outreach (assumed)	$	40,000.00
City Design Mgmt Cost (10% assumed)	$	253,566.5
Total Design Phase Including City Time	$	2,789,231

Construction Cost		
Construction ($700/sqft bridge cost plus approach work)	$	15,500,000.00
Construction Engineering and City Mgmt Cost (15%)	$	2,325,000.00
Contingency (20%)	$	3,100,000.00
Total Construction Phase Including City Time	$	20,925,000.00

Total Escalated Project Cost		
Escalation 5%/year (assume design begins 2025, Construction begins 2030)	**$**	**32,518,703.47**

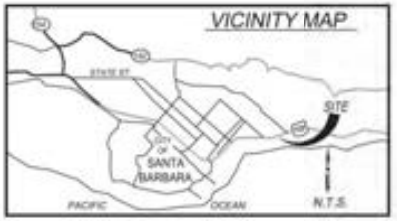
consor

APPENDIX E

TOPOGRAPHIC MAPPING

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES

SHEET LAYOUT AND SURVEY CONTROL



SURVEY NOTES

1. THIS SURVEY IS HORIZONTALLY CONSTRAINED TO THE "SANTA BARBARA CONTROL NETWORK" ACCORDING TO THE RECORD OF SURVEY MAP FILED IN BOOK 147 OF RECORDS OF SURVEYS, AT PAGES 70-74, IN THE COUNTY OF SANTA BARBARA, STATE OF CALIFORNIA WHICH IS REFERENCED TO THE CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), BASED ON THE HORIZONTAL DATUM NAD83 (1992) EPOCH 1991.35, ZONE 5, US SURVEY FEET AT STATION 0035 BEING A 2" IRON PIPE WITH 2.5" BRASS DISC STAMPED "SANTA BARBARA CONTROL NETWORK 1995 PLS 6167 STATION 25" INSIDE A STREET MONUMENT WELL NEAR THE INTERSECTION OF CABRILLO BLVD AND HANDS DRIVE AND HAVING THE PUBLISHED COORDINATES OF NORTHING 1,970,412.57, EASTING 6,266,772.08'.
2. ALL MEASUREMENTS LISTED, SHOWN AND REPRESENTED HEREON ARE BASED ON GRID DISTANCES OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 ZONE 5 PROJECTION. THE COMBINED SCALE FACTOR FOR THE PROJECT IS 0.999943493. THE COMBINED SCALE FACTOR WAS CALCULATED USING AN ELEVATION OF 17.04' FEET FOR PT. NO. 100 SHOWN HEREON. DIVIDE THE DISTANCES HEREON BY THE COMBINED SCALE FACTOR TO OBTAIN GROUND DISTANCES. ALL DISTANCES SHOWN ARE U.S. SURVEY FEET.
3. THE CONVERGENCE ANGLE IS: - 0° 57' 04" AT PT. NO. 100.
4. THE ORTHOMETRIC HEIGHTS (ELEVATIONS) ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). THIS SURVEY TIED TO THE POINT DESIGNATED AS STATION 606 ACCORDING TO THE RECORD OF SURVEY MAP FILED IN BOOK 147 OF RECORDS OF SURVEYS, AT PAGES 70-74, IN THE COUNTY OF SANTA BARBARA, STATE OF CALIFORNIA AND HAVING A PUBLISHED NAVD88 ELEVATION OF 14.08'.
5. THE SOUTHERN R/W OF THE UNION PACIFIC RAILROAD WAS LOCATED USING A TRIMBLE S310 SCANNING TOTAL STATION. MEASUREMENTS ALONG THE TOP CENTER OF THE SOUTHERN RAIL, SPANNING MORE THAN 150 FEET, WERE OBTAINED TO BEST FIT THE LINE BEARING N 72.08.44 E.
6. AERIAL IMAGE SHOWN HEREON BASED UPON PUBLICLY AVAILABLE AERIAL DATA AND IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
7. UNDERGROUND UTILITY LOCATIONS ARE PLOTTED BASED ON ABOVE GROUND PAINT MARKS BY OTHERS, ABOVE GROUND SURFACE STRUCTURES, ACTUAL LOCATION MAY DIFFER. ADDITIONAL UNDERGROUND UTILITY LINES MAY EXIST. FOR INFORMATION REGARDING UTILITY LOCATION, SIZE, DEPTH, CONDITION, AND CAPACITY CONTACT UTILITY OR MUNICIPAL/PUBLIC SERVICE FACILITY.
8. UNDERGROUND PIPE SIZES ARE BASED ON VISUAL OBSERVATIONS MADE FROM THE SURFACE AND ARE APPROXIMATE.

EASEMENT PLOTTING NOTES:

9. EASEMENTS AND TITLE EXCEPTIONS SHOWN HEREON ARE BASED ON THE FOLLOWING:
   - 9.1. AS NOTED HEREON, 10' SANITARY SEWER EASEMENT AS SHOWN ON THE MAP FILED IN BOOK 17, AT PAGE 397 OF RECORDS OF SURVEYS OF THE COUNTY OF SANTA BARBARA.
   - 9.2. PRELIMINARY TITLE REPORTS PROVIDED BY THE CITY OF SANTA BARBARA:
     - 9.2.A. FIRST AMERICAN TITLE COMPANY PRELIMINARY REPORT ORDER NUMBER 4301-6486CD, DATED JANUARY 04, 2021. THE FOLLOWING EXCEPTIONS ARE NOT SHOWN FOR THE FOLLOWING REASONS:
       - 9.2.A.1. EXCEPTION 4: A TELCOM EASEMENT TO PT&T PER 1282/553/307-308 IS NOT PLOTTABLE DUE TO AN AMBIGUOUS DESCRIPTION AND UNDETERMINED WIDTH BUT IS NOTED HEREON AS AN APPROXIMATE 5' OFFSET LINE PARALLEL WITH THE NORTHERLY LIPPER RIGHT OF WAY.
       - 9.2.A.2. EXCEPTION 5: A UTILITY EASEMENT WITHIN THE VACATED PORTION OF SAN BUENA VENTURA STREET PER 2596/280/282 IS OUTSIDE OF THE SURVEY LIMITS AND IS UNPLOTTABLE ACCORDING TO THE PRELIMINARY TITLE REPORT.
       - 9.2.A.3. EXCEPTION 10: AN EASEMENT FOR PUBLIC STREET PURPOSES OVER A PORTION OF HANDS DRIVE PER 2716/91/94 AS DEPICTED ON RM/9/76 IS NOT LOCATED WITHIN THE SURVEY LIMITS.
       - 9.2.A.4. EXCEPTION 11: AN EASEMENT FOR RECLAIMED WATER DISTRIBUTION LINE PER INSTRUMENT NO. 90-056512 IS NOT PLOTTABLE BUT IS NOTED HEREON AT THE SURVEYED LOCATION OF RECLAIMED WATER VALVES SHOWN ON THE EXHIBIT ATTACHED TO SAID INSTRUMENT.
       - 9.2.A.5. EXCEPTION 13: A 16.5 FOOT WIDE TELCOM EASEMENT TO AT&T FROM A COURT JUDGEMENT PER INSTRUMENT 2009-070745 AND IS NOT PLOTTABLE.
       - 9.2.A.6. PARCEL FIVE: IN THE LEGAL DESCRIPTION FOR PARCEL 5 (APN 017-363-005) INCLUDING BLOCK 367 THE EXCEPTION DESCRIBED IN 117/203/443 IS NOT PLOTTABLE BUT IS GRAPHICALLY REPRESENTED ON THE MISCELLANEOUS MAP RECORDED AS 2MM/4 AND IS NOT LOCATED WITHIN THE SURVEY LIMITS.
     - 9.2.C. STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTION, RIGHT OF WAY MAP, DISTRICT 06, SANTA BARBARA COUNTY, ROUTE 101, MAP OF POSTMILE 10.3A, SHEET 5 OF 7. CALTRANS ELECTRONIC PDF FILE 06010PM012MRK (86 PDF SUBSEQUENT INTERIOR CONFIGURATIONS OF THE VARIABLE WIDTH RIGHT OF WAY STRIPING BETWEEN THE STATE HIGHWAY AND THE UNION PACIFIC RAILROAD RIGHT OF WAY WAS NOT INCLUDED AS A PART OF THIS SURVEY.
       - 9.2.C.1.
     - 9.2.D. STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTION, RIGHT OF WAY MAP, DISTRICT 06, SANTA BARBARA COUNTY, ROUTE 10 MAP OF NOISE BARRIER WALL, POSTMILE 12.3, SHEET 3 OF 3. CALTRANS ELECTRONIC PDF FILE 06010PM012-1MK (86 PDF SUBSEQUENT INTERIOR CONFIGURATIONS OF THE VARIABLE WIDTH RIGHT OF WAY STRIPING BETWEEN THE STATE HIGHWAY AND THE UNION PACIFIC RAILROAD RIGHT OF WAY WAS NOT INCLUDED AS A PART OF THIS SURVEY.
       - 9.2.D.1.
     - 9.2.B. FIRST AMERICAN TITLE COMPANY PRELIMINARY REPORT ORDER NUMBER 4301-4998CD, DATED JANUARY 22, 2019. THE FOLLOWING EXCEPTION ARE NOT SHOWN FOR THE FOLLOWING REASONS:
       - 9.2.B.1. EXCEPTION 8: A TELCOM EASEMENT TO PT&T PER 1282/553/307-308 IS NOT PLOTTABLE DUE TO AN AMBIGUOUS DESCRIPTION AND UNDETERMINED WIDTH BUT IS NOTED HEREON AS AN APPROXIMATE 5' OFFSET LINE PARALLEL WITH THE NORTHERLY LIPPER RIGHT OF WAY.
       - 9.2.B.2. EXCEPTION 9: A UTILITY EASEMENT WITHIN THE VACATED PORTION OF SAN BUENA VENTURA STREET PER 2596/280/282 IS OUTSIDE OF THE SURVEY LIMITS AND IS UNPLOTTABLE ACCORDING TO THE PRELIMINARY TITLE REPORT.
       - 9.2.B.3. EXCEPTION 10: AN EASEMENT FOR PUBLIC STREET PURPOSES OVER A PORTION OF HANDS DRIVE PER 2716/91/94 AS DEPICTED ON RM/9/76 IS NOT LOCATED WITHIN THE SURVEY LIMITS.
       - 9.2.B.4. EXCEPTION 11: AN EASEMENT FOR RECLAIMED WATER DISTRIBUTION LINE PER INSTRUMENT NO. 90-056512 IS NOT PLOTTABLE BUT IS NOTED HEREON AT THE SURVEYED LOCATION OF RECLAIMED WATER VALVES SHOWN ON THE EXHIBIT ATTACHED TO SAID INSTRUMENT.
       - 9.2.B.5. EXCEPTION 13: A 16.5 FOOT WIDE TELCOM EASEMENT TO AT&T FROM A COURT JUDGEMENT PER INSTRUMENT 2009-070745 AND IS NOT PLOTTABLE.
       - 9.2.B.6. PARCEL FIVE: IN THE LEGAL DESCRIPTION FOR PARCEL 5 (APN 017-363-005) INCLUDING BLOCK 367 THE EXCEPTION DESCRIBED IN 117/203/443 IS NOT PLOTTABLE BUT IS GRAPHICALLY REPRESENTED ON THE MISCELLANEOUS MAP RECORDED AS 2MM/4 AND IS NOT LOCATED WITHIN THE SURVEY LIMITS.

BOUNDARY ESTABLISHMENT NOTE:

10. THE PROPERTY BOUNDARIES AND RIGHTS OF WAY SHOWN HEREON ARE CALCULATED FROM RECORD DATA AND BASED ON A PARTIAL FIELD SURVEY ONLY THAT IS INTENDED FOR PLANNING PURPOSES AND SUCH BOUNDARIES AND RIGHTS OF WAY SHOULD BE CONSIDERED APPROXIMATE ONLY. SUFFICIENT MONUMENTATION HAS BEEN LOCATED DURING THIS TOPOGRAPHIC SURVEY TO ALIGN THE SUBJECT PARCELS AND EASEMENTS AS CALCULATED FROM RECORD DATA IN THE CORRECT PROXIMITY, HOWEVER A MORE EXHAUSTIVE AND COMPLETE FIELD SURVEY AND INVESTIGATION WILL BE REQUIRED TO DETERMINE MORE ACTUAL LOCATIONS WHICH MAY VARY FROM WHAT IS SHOWN HEREON AND ARE NOT INCLUDED IN THE SCOPE OF THIS SURVEY.

SURVEYOR'S STATEMENT

THIS MAP REPRESENTS A SURVEY MADE BY ME AT THE REQUEST OF QUINCY ENGINEERING. THE FIELD SURVEY WAS PERFORMED JULY FIFTH THROUGH EIGHTH, TWO THOUSAND TWENTY-TWO.

DATE: 11/02/2022

CLAYTON L. BRADSHAW, LS 9298

FOUND MONUMENT COORDINATE TABLE

PT. NO.	NORTHING	EASTING	ELEV.	DESC.
28	1979412.51	6039772.04	14.7	FD 2" BRASS CAP PLS 6161 STA 28
100	1980106.86	6039232.70	16.7	FD NAIL & TAG CITY ENGR
109	1980052.85	6038183.43	17.3	FD NAIL & TAG RCE 7509
147	1979479.46	6040267.93	12.8	FD 1" IP PLASTIC CAP "CALIP 207"
151	1979757.12	6037148.19	21.9	FD NAIL & TAG CITY ENGR
152	1980150.18	6037026.89	24.4	FD CHISELED X AND HOLE
156	1980513.91	6037855.64	23.1	FD NAIL & TAG CITY ENGR
158	1979146.68	6039805.39	18.2	FD 1-1/2" DIAM. PIPE LS 5804 ACE

SURVEY CONTROL POINTS

PT. NO.	NORTHING	EASTING	ELEV.	DESC.
28	1979412.51	6039772.04	14.68	FD 2" BRASS CAP PLS 6161 STA 28
100	1979404.59	6039350.28	17.57	SET 5/ REBAR W/L
101	1979401.58	6038419.22	17.57	SET 0
110	1979374.24	6038225.75	15.71	SET COTTON SPIKE/L
127	1979957.97	6039650.39	15.33	SET 0

PROJECT NO. 1479-0002		
SURVEYED BY:	NDS	7/05-8/22
DRAFTED BY:	NDS	07/22/22
CHECKED BY:	CB	07/07/22

WALLACE GROUP®

SHEET 1
TOPOGRAPHIC MAPPING FOR PRELIMINARY PLANNING PURPOSES
FOR THE LOWER EASTSIDE COMMUNITY CONNECTIVITY PROJECT
PORTIONS OF BLOCKS 355, 363, 367 & 368
CITY OF SANTA BARBARA, CALIFORNIA

SHEET
1
1 OF 4 SHEETS

FILE NAME: 1479-0002-TOPO.DWG Plot Date: 11/2/2022

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

PROPERTY, RIGHT OF WAY AND EASEMENT ILLUSTRATION SHEET

LEGEND

- APPROXIMATE CITY STREET RIGHT OF WAY LINE
- APPROXIMATE CITY STREET SUPERCEDED RIGHT OF WAY LINE
- APPROXIMATE UPRR STREET RIGHT OF WAY LINE
- APPROXIMATE ACCESS CONTROL RIGHT OF WAY LINE
- APPROXIMATE PROPERTY LINE
- DRAINAGE/SOUNDWALL EASEMENT
- STRUCTURE EASEMENT
- APPROXIMATE LANDSCAPE AND DRAINAGE EASEMENT
- APPROXIMATE SOUND WALL EASEMENT (SEE NOTE)
- APPROXIMATE SEWER EASEMENT
- APPROXIMATE EASEMENT LINE AS DESCRIBED
- APPROXIMATE RIGHT OF WAY CONTROL LINE

N

SCALE
0 25 50 100
1 INCH = 50 FEET

WALLACE GROUP®
CIVIL AND TRANSPORTATION ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES

612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805.544.4011 F 805.544.4294
www.wallacegroup.us

SHEET 2
TOPOGRAPHIC MAPPING FOR PRELIMINARY PLANNING PURPOSES
FOR THE LOWER EASTSIDE COMMUNITY CONNECTIVITY PROJECT
PORTIONS OF BLOCKS 355, 363, 367 & 368
CITY OF SANTA BARBARA, CALIFORNIA

JOB #:	1479-0002
SURVEYOR(S):	NDS
DRAWN BY:	NDS
DATE:	11/02/2022

SHEET
2
OF 4 SHEETS

PROJECT NO. 1479-0002		
SURVEYED BY:	NDS	07/05-08/22
DRAFTED BY:	NDS	07/12/22
CHECKED BY:	CB	07/01/22

CAD OPERATOR: CLAYTONB DATE: August 29, 2022 LAYOUT NAME: SHEET 2

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

LEGEND

- APPROXIMATE RIGHT OF WAY LINE
- APPROXIMATE SUPERCEDED RIGHT OF WAY LINE
- APPROXIMATE ACCESS CONTROL RIGHT OF WAY LINE
- APPROXIMATE PROPERTY LINE
- APPROXIMATE EASEMENT LINE
- APPROXIMATE RIGHT OF WAY CONTROL LINE
- EDGE OF PAVEMENT
- CHAIN LINK FENCE
- STORM DRAIN LINE
- OVERHEAD UTILITY LINE
- LIGHT STANDARD
- STORM DRAIN MANHOLE
- SANITARY SEWER MANHOLE
- ELECTRICAL BOX
- WATER METER
- RECYCLED WATER VALVE
- IRRIGATION CONTROL VALVE
- WATER VALVE
- FIRE HYDRANT
- GUY WIRE
- JOINT UTILITY POLE
- POWER POLE
- POLE WITH LIGHT
- BOLLARD/SMALL POLE
- SANITARY SEWER CLEAN OUT
- SURVEY CONTROL POINT AND NUMBER
- FOUND MONUMENT AS DESCRIBED
- SANITARY SEWER PAINT MARK
- WATER PAINT MARK
- UNDERGROUND FIBER OPTIC PAINT MARK
- 20" PINE — TREE WITH DIAMETER NOTED
- STUMP
- WALL

ABBREVIATIONS

AC	ASPHALTIC CONCRETE
BLVD	BOULEVARD
BM	BENCHMARK
CLF	CHAIN LINK FENCE
CO	COUNTY
CONC	CONCRETE
CT	CAL TRANS
CYP	CYPRESS
DI	DRAINAGE INLET
DIA	DIAMETER
DR	DRIVE
ELE	ELECTRIC
ESMT	EASEMENT
EUC	EUCALYPTUS
FD	FOUND
FH	FIRE HYDRANT
IP	IRON PIPE
LT&T	LEAD, TACK AND TAG
MH	MANHOLE
MON	MONUMENT
N&T	NAIL AND TIN
OD	OUTSIDE DIAMETER
OR	OFFICIAL RECORDS
PIQ	PARCEL IN QUESTION
PP	POWER POLE
PT	POINT
RD	ROAD
R	RECORD
RR	RAILROAD
SD	STORM DRAIN
SS	SANITARY SEWER
ST	STREET
TOW	TOP OF WALL
UTL	UTILITY

SCALE
0 10 20 40
1 INCH = 20 FEET

N

WALLACE GROUP®
CIVIL AND TRANSPORTATION ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

SHEET 3
TOPOGRAPHIC MAPPING FOR PRELIMINARY PLANNING PURPOSES FOR THE LOWER EASTSIDE COMMUNITY CONNECTIVITY PROJECT
PORTIONS OF BLOCKS 355, 363, 367 & 368 CITY OF SANTA BARBARA, CALIFORNIA

PROJECT NO. 1479-0002		
SURVEYED BY:	NDS	07/05-08/22
DRAFTED BY:	NDS	07/12/22
CHECKED BY:	CB	07/01/22

JOB #:	1479-0002
SURVEYOR(S):	NDS
DRAWN BY:	NDS
DATE:	11/02/2022

SHEET 3
OF 4 SHEETS

FILE NAME: 1479-0002-TOPO.DWG Plot Date: 11/2/2022

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

LEGEND

- APPROXIMATE RIGHT OF WAY LINE
- APPROXIMATE SUPERCEDED RIGHT OF WAY LINE
- APPROXIMATE ACCESS CONTROL RIGHT OF WAY LINE
- APPROXIMATE PROPERTY LINE
- APPROXIMATE EASEMENT LINE
- APPROXIMATE RIGHT OF WAY CONTROL LINE
- EDGE OF PAVEMENT
- CHAIN LINK FENCE
- STORM DRAIN LINE
- OVERHEAD UTILITY LINE
- LIGHT STANDARD
- STORM DRAIN MANHOLE
- SANITARY SEWER MANHOLE
- ELECTRICAL BOX
- WATER METER
- RECYCLED WATER VALVE
- IRRIGATION CONTROL VALVE
- WATER VALVE
- FIRE HYDRANT
- GUY WIRE
- JOINT UTILITY POLE
- POWER POLE
- POLE WITH LIGHT
- BOLLARD/SMALL POLE
- SANITARY SEWER CLEAN OUT
- SURVEY CONTROL POINT AND NUMBER
- FOUND MONUMENT AS DESCRIBED
- SANITARY SEWER PAINT MARK
- WATER PAINT MARK
- UNDERGROUND FIBER OPTIC PAINT MARK
- 20" PINE — TREE WITH DIAMETER NOTED
- STUMP
- WALL

ABBREVIATIONS

AC	ASPHALTIC CONCRETE
BLVD	BOULEVARD
BM	BENCHMARK
CLF	CHAIN LINK FENCE
CO	COUNTY
CONC	CONCRETE
CT	CAL TRANS
CYP	CYPRESS
DI	DRAINAGE INLET
DIA	DIAMETER
DR	DRIVE
ELE	ELECTRIC
ESMT	EASEMENT
EUC	EUCALYPTUS
FD	FOUND
FH	FIRE HYDRANT
IP	IRON PIPE
LT&T	LEAD, TACK AND TAG
MH	MANHOLE
MON	MONUMENT
N&T	NAIL AND TIN
OD	OUTSIDE DIAMETER
OR	OFFICIAL RECORDS
PIQ	PARCEL IN QUESTION
PP	POWER POLE
PT	POINT
RD	ROAD
R	RECORD
RR	RAILROAD
SD	STORM DRAIN
SS	SANITARY SEWER
ST	STREET
TOW	TOP OF WALL
UTL	UTILITY

SCALE
0 10 20 40
1 INCH = 20 FEET

WALLACE GROUP®
CIVIL AND TRANSPORTATION ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES

612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

SHEET 4
TOPOGRAPHIC MAPPING FOR PRELIMINARY PLANNING PURPOSES FOR THE LOWER EASTSIDE COMMUNITY CONNECTIVITY PROJECT
PORTIONS OF BLOCKS 355, 363, 367 & 368 CITY OF SANTA BARBARA, CALIFORNIA

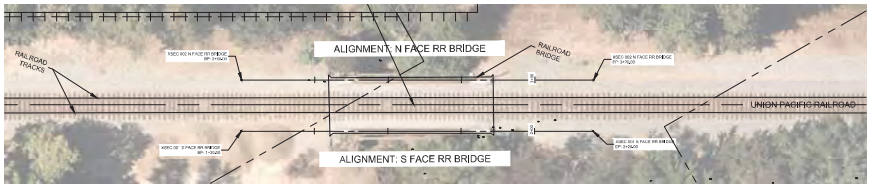
PROJECT NO. 1479-0002		
SURVEYED BY:	NDS	07/05-08/22
DRAFTED BY:	NDS	07/12/22
CHECKED BY:	CB	07/01/22

JOB #:	1479-0002
SURVEYOR(S):	NDS
DRAWN BY:	NDS
DATE:	11/02/2022

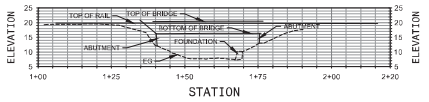
SHEET
4
3 OF 4 SHEETS

CAD OPERATOR: CLAYTONB DATE: August 29, 2022 LAYOUT NAME: SHEET 4

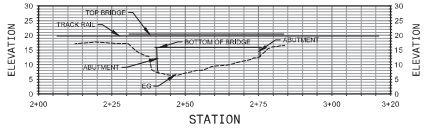
FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

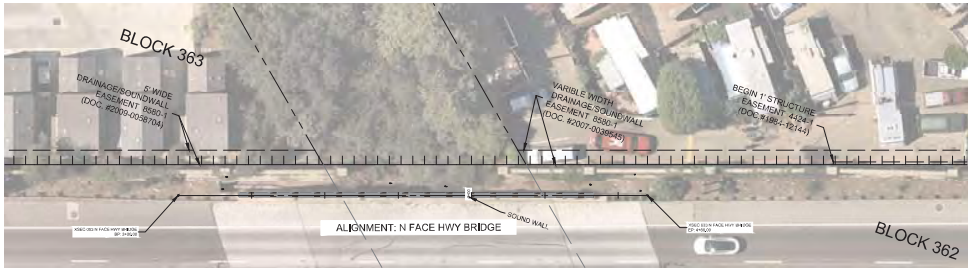


PROFILE OF XSEC 001 S FACE RR BRIDGE

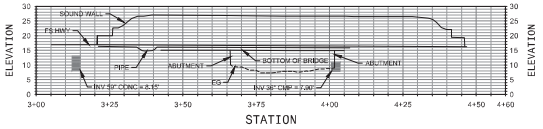


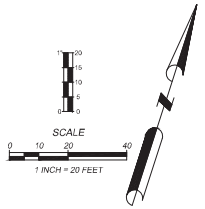
PROFILE OF XSEC 002 N FACE RR BRIDGE





PROFILE OF XSEC 003 N FACE HWY BRIDGE





PROJECT NO. 1479-0002		
SURVEYED BY:	NDS	07/05-08/22
DRAFTED BY:	NDS	07/12/22
CHECKED BY:	CB	07/01/22

WALLACE GROUP®
CIVIL AND TRANSPORTATION ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

SHEET 5
TOPOGRAPHIC MAPPING FOR PRELIMINARY PLANNING PURPOSES
FOR THE LOWER EASTSIDE COMMUNITY CONNECTIVITY PROJECT
PORTIONS OF BLOCKS 355, 363, 367 & 368
CITY OF SANTA BARBARA, CALIFORNIA

JOB #:	1479-0002
SURVEYOR(S):	NDS
DRAWN BY:	NDS
DATE:	11/02/2022

SHEET
5
4 OF 4 SHEETS

APPENDIX F

ENVIRONMENTAL STUDIES

SWCA
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

3426 Empresa Drive, Suite 100
San Luis Obispo, California 93401
Tel 805.543.7095 Fax 805.543.2367
www.swca.com

September 9, 2022

Greg Young
Quincy Engineering, Inc.
11017 Cobblerock Drive, Suite 100
Rancho Cordova, Ca 95670

Re: Biological Constraints Analysis for the Lower Eastside Pedestrian Bridge Project / SWCA Project No. 73506

SWCA Environmental Consultants (SWCA) prepared this Biological Constraints Analysis (BCA) at the request of the Quincy Engineering (Quincy) and the City of Santa Barbara (City) with the purpose of identifying potential constraints and environmental requirements associated with the Lower Eastside Pedestrian Bridge Project (project), shown in Figure 1. An evaluation of biological resources at the constraints level is intended to help establish the scope and cost estimates for future grant applications and help contribute to the engineering design and feasibility of the project. While multiple designs were initially considered by the engineering team, ultimately only one alternative was evaluated as part of this study, which is shown in Figure 2. Because the design is not final, the results of this report may also assist the team in evaluating potential biological impacts should there be future changes to the alignment or structure or provide supporting biological information for future environmental impact review or permitting tasks.

PROJECT DESCRIPTION

Within the Lower Eastside neighborhood, pedestrians and bicyclists would access the bridge structure near the intersection of Canada and Pintos streets which would provide connectivity over US 101 and UPRR from an approximate 225' clear span structure with optional supports within the median of US 101. On the south side of US 101, users would remain elevated as they travel parallel to the parcel boundary of the Santa Barbara Zoo and UPRR right-of-way for approximately 550 feet before crossing Sycamore Creek and conforming to the existing elevation at the Dwight Murphy Field where there would be a crosswalk on Ninos Drive. The elevated structure that runs parallel the zoo would be supported by 5 or 6 piers. Construction of the structure would result in the removal of all landscape trees along the border of the parking lot and non-native eucalyptus trees within Sycamore Creek that are within the alignment.

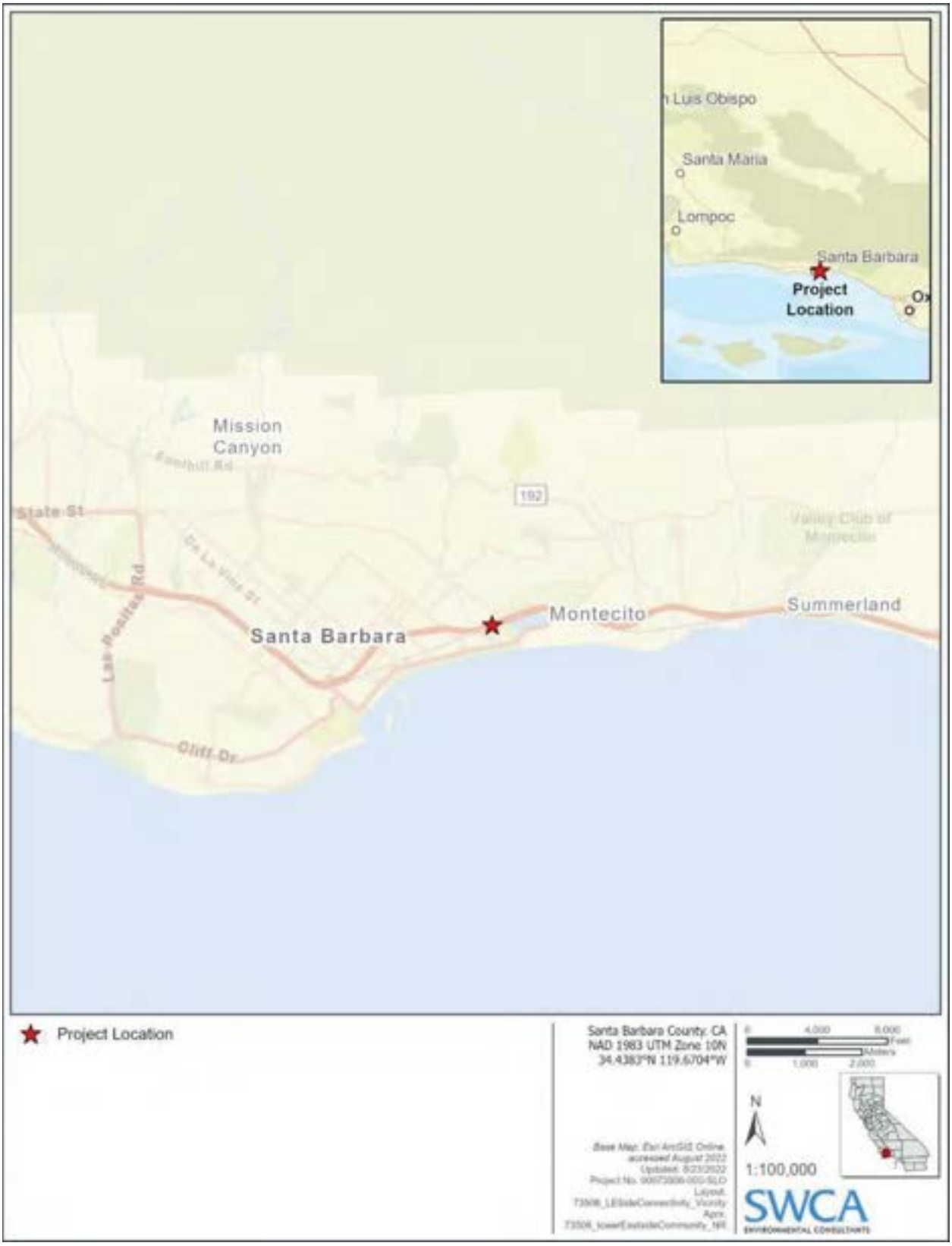


Figure 1. Project Vicinity

Figure 2. Project Location

METHODOLOGY

Prior to conducting a reconnaissance-level field surveys, SWCA Environmental Consultants (SWCA) performed a literature and database review to determine which sensitive species have been documented within the vicinity of the project. This included a 5-mile radius query of the California Natural Diversity Database (CNDDB), CNPS Electronic Inventory, and review of environmental documents that have been prepared for other projects in the general area. SWCA also obtained an unofficial species list from USFWS, which reaffirmed the CNDDB records and augmented the number of species for consideration. Refer to Attachment A.

The reconnaissance-level field survey was conducted on August 22, 2022, by SWCA Principal Natural Resources Team Lead, Jon Claxton. Mr. Claxton conducted a pedestrian survey of the alignment from public right-of-way, including the Santa Barbara Zoo parking lot. Due to safety constraints, Mr. Claxton did not enter the railroad right-of-way or the channel bed of Sycamore Creek due to resident homeless population. Mr. Claxton did characterize habitat and reviewed tree data from the top of bank. The channel was dry during the time of the survey. See Figure 3.

Existing tree data was collected by the survey team and location and species was verified by SWCA. Because all the landscape trees within the alignment will be removed, with no neighboring trees that would be affected, an analysis of projected damage of the crucial root zone was not necessary. See Figure 4.

No protocol-level surveys for wildlife were conducted as part of the survey, nor were any focused botanical surveys conducted. Regardless, it is very unlikely that any of the regional plant species of concern would occur within the project site due to the very urban and disturbed nature of the project area.

A formal aquatic resources delineation was not conducted; however, the boundaries of the state jurisdiction were mapped since the structure would cross over Sycamore Creek and result in the removal of some riparian vegetation. The pier structures are anticipated to be outside of the channel. No permanent impacts would occur below the Ordinary High-Water Mark.

ENVIRONMENTAL SETTING

Biological Study Area

For the purposes of this report, the Biological Study Area (BSA) included the alignment of the proposed project shown in Figure 2 and subsequent figures. The proposed project is located between the intersection of Canada and Pitos Streets in the Lower Eastside neighborhood and would provide a pedestrian and bicycle overcrossing over the U.S. Highway 101 (US 101) and Union Pacific Railroad (UPRR) to the vicinity of Dwight Murphy Field on the south side of US 101. The Santa Barbara Zoo is located along the southern boundary of the proposed project, while Sycamore Creek bisects the project site within the eastern portion of the site.

Due to the linear nature of the project and existing development in the area (railroad, parking lot, roadway), the survey area did not include a buffer surrounding the proposed project alignment. Equipment and materials for the project would be staged within existing developed areas (parking lots, streets) and would not have impacts beyond the existing conditions.

For the purposes of this report, it is anticipated that the entire extent of the BSA would be physically impacted by the construction activities of the proposed permanent structure.

Soil Conditions

Based on a review of the Web Soil Survey (USGS 2022), the native substrate within the project site is Camarillo fine sandy loam. This soil is poorly drained in areas of frequent flooding. Within the project site, this soil is covered by overburden primarily because of construction of the UPRR, U.S. 101, and Santa Barbara Zoo. The most intact native soils are located within Sycamore Creek, which are subject to flooding during storm events from upper reaches in the watershed and storm water drainage systems. Soils within the channel are comprised of sediments that have been transported from these upper watershed areas and localized runoff.

Hydrology

Sycamore Creek bisects the pedestrian and bicycle structure within the western portion of the project site. Sycamore Creek is one of four major watersheds within Santa Barbara, which originate on the south face of the Santa Ynez Mountains and convey urbanized stormwater runoff from the city. Within the project area, the hydrology of the creek is dry during most years and only flows during periods of rainfall. However, the channel may flow year around during periods of high rainfall events.

Habitat Connectivity

The California Essential Habitat Connectivity Project was queried for Essential Habitat Connectivity, which are the best available data describing important areas for maintaining connectivity between large blocks of land for wildlife corridor purposes (CDFW 2010). These important areas are referred to as Essential Connectivity Areas (ECA). ECAs are only intended to be a broad scale representation of areas that provide essential connectivity.

The BSA does not fall within an Essential Connectivity Area. It is expected that additional linkages will be identified as new data becomes available for various species. For the purposes of this analysis, it is reasonable to assume that the riparian corridor within the project site may be used by wildlife as movement corridors on a smaller scale. Sycamore Creek riparian corridor provides habitat for many anadromous and estuarine species including steelhead and tidewater goby. There are no known fish passage barriers located within the BSA based on a review of the CDFW Fish Passage database.

Figure 3. Habitat Map

Figure 4. Tree Survey

REGIONAL BIOLOGICAL RESOURCES OF CONCERN

Sensitive Habitats and Natural Communities of Concern

The portion of Sycamore Creek in the project area falls within designated critical habitat for the Southern California steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS). Sycamore Creek also provides habitat for the endangered tidewater goby (*Eucyclogobius newberryi*), but the creek is not considered to be critical habitat for this species. Lastly, this portion of Sycamore Creek is within the Coastal Zone and considered an Environmentally Sensitive Habitat Area (ESHA) under the Local Coastal Plan.

No wetland features appear to be present below OHWM within this segment of the creek. However, below the Ordinary High-Water Mark (OHWM), Sycamore Creek would be considered "waters of the U.S." and protected by the Clean Water Act. The entire channel from top of bank, or furthest extent of riparian habitat would be considered protected by California Fish and Game Code, as well as the Porter-Cologne Water Quality Act.

Plant Species of Concern

The USFWS, CNDDB, and CRPR species lists indicate 14 special-status plant taxa (federally listed, state listed, and/or CRPR List 1B, 2, or 4) as occurring within a 5-mile radius of the project site. An analysis of the range and habitat preferences was conducted to identify which special-status plant species have the potential to occur within the BSA. The analysis considered existing habitat, elevation, results of previous surveys conducted for other projects, and soils within the BSA. As a result, SWCA determined it is unlikely that the BSA supports suitable habitat for any of the 14 special-status plant species.

Wildlife of Concern

The USFWS, CNDDB species lists indicate 24 special-status wildlife taxa (federally listed and/or state listed) as occurring within a 5-mile radius of the project site (Refer to Attachment A). This list of species is considered regional; therefore, an analysis of the range and habitat preferences was conducted to identify which special-status wildlife species have the potential to occur within the BSA. This list is not intended to be inclusive of all nesting migratory species that may occur in the area, since numerous species of birds with potential for occurrence in the BSA that are protected by the MBTA and CFG Code Sections 3503 and 3503.5.

RESULTS: DISCUSSION OF IMPACTS AND RECOMMENDATIONS

Sensitive Habitat and Natural Communities of Concern

Based on the current alignment and proposed design, no permanent impacts would occur within the channel of Sycamore Creek. Abutments or piers required for spanning the structure over the creek would be placed outside of the riparian habitat to the furthest extent possible to avoid permanent impacts of riparian habitat, and to avoid impeding flow to the channel in a high flow event. However, placement of the structure over the channel would result in degradation of the habitat by the removal of non-native eucalyptus trees and understory. Any removal to the riparian channel, including removal of non-native eucalyptus trees would be considered an impact to state jurisdictional features, which are regulated by California Department of Fish, Wildlife and Regional Water Quality Control Board and California Coastal Commission. Final project plans would need to include a conceptual habitat mitigation and monitoring plan to be included in the permit packages to these affected agencies. No permanent impacts

would occur below the Ordinary High-Water Mark; therefore, no permanent impacts are anticipated to occur to federal jurisdictional features. There will likely be foot traffic in the channel during construction, but impacts would be temporary and not result in loss of vegetation. However, because this channel is federally designated as critical habitat by the National Marine Fisheries Services early coordination with this agency is recommended.

Plant Species of Concern

While no sensitive plant species are expected to occur within the BSA; it is recommended for the purposes of CEQA that a spring focused botanical survey be conducted to ensure the presence/absence determination of sensitive species. Should a focused sensitive botanical survey not be feasible prior to CEQA, appropriate mitigation measures should be included within the environmental document that provide specific measures to conduct a focused botanical survey at a later date and include specific measures to mitigation the impact should one be identified, that cannot be avoided.

Wildlife of Concern

It is anticipated that the required permits and approvals from CDFW and RWQCB would not allow for construction of the proposed project over Sycamore Creek during the rainy season (October 16 to May 31); however, should there be a significant rainy season which results in water being present within the channel during the months of June 1 to October 15, there is a potential for Southern California steelhead or tidewater goby to occur within the channel. While this is unlikely, the avoidance of any activity below the Ordinary High-Water Mark or along the banks of the channel would result in no effect to these aquatic species. Final project plans would have appropriate measures included to further reduce the potential for any inadvertent impacts from construction of the structure, piers, or abutments.

Nesting birds are anticipated within Sycamore Creek, and along the landscaped trees planted between the Santa Barbara Zoo and UPRR. The proposed project would remove vegetation along the alignment to construct the proposed project. It is recommended that the removal of this vegetation occur outside of the typical nesting season which is recognized as February 1 to September 1. Removal outside of the typical nesting season will reduce the probability of any nesting impacts. However, it is recommended that even tree removal outside of the nesting season should be surveyed by a qualified biologist prior to removal to ensure no late, or early, nesting activities are present.

Lastly, based on the reconnaissance-level survey, eucalyptus within the BSA do not provide sufficient density to provide overwintering habitat for monarch butterfly. This observation was further supported by the absence of any overwintering habitat documented by the Xerces Society, Map of Overwintering Sites (www.westernmonarchcount.org). Therefore, it is anticipated there would be no effect to this species.

DISCUSSION: ANTICIPATED DOCUMENTATION AND PERMITTING

Regarding anticipated documentation and permitting tasks going forward, it is expected that a separate standalone Biological Resources Assessment would be applicable. The report would support the future analysis within the Biological Resources section of the CEQA document and provide necessary information for state permitting with the California Department of Fish and Wildlife, Regional Water Quality Control Board and California Coastal Commission. Should federal funding be available to the project, or impacts affect the channel below the Ordinary High-Water Mark, it is also anticipated that the project may require a Biological Assessment to only address federal species and obtain federal approvals through Section 7 Endangered Species Consultation. If the federal funds are administered by Caltrans under NEPA delegation, it can also be expected that the Biological Resources Assessment may need to be

converted to a Natural Environment Study report, following the most recent guidance provided within the Standard Environmental Reference maintained by Caltrans.

Should you have any questions regarding this Memo, please contact me at (805) 543-7032 or jclaxton@swca.com.

Sincerely,

Jon Claxton, Principal Natural Resources Team Leader

Attachments

REFERENCES CITED

California Fish Passage Analysis Database (CalFish). 2022. California Fish Passage Analysis Database. Available at: http://www.calfish.org/ProgramsData/HabitatandBarriers/CaliforniaFishPassageAssessmentDatabase.aspx. Accessed September 2022.

California Native Plant Society (CNPS). 2022. California Native Plant Society online inventory of rare and endangered plants. Available at: http://www.rareplants.cnps.org. Accessed September 2022.

California Natural Diversity Data Base (CNDDB). 2022. Rarefind5 data output for Santa Barbara, California USGS 7.5-minute quadrangle. California Department of Fish and Wildlife. Sacramento, California.

Natural Resources Conservation Service (NRCS). 2022. Web Soil Survey Results. Available at: http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed September 2022.

United States Fish and Wildlife (USFWS). 2022. The Information, Planning, and Conservation (IPaC). Available at: https://ecos.fws.gov/ipac/. Accessed September 2022.

ATTACHMENT A

CNDDB and USFWS Database Output

CALIFORNIA NATURAL DIVERSITY DATABASE

Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database

Query Criteria: Quad IS (Santa Barbara (3411946))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Aniella pulchra Northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Atriplex coulteri Coulter's saltbush	PDCHE040E0	None	None	G3	S1S2	1B.2
Atriplex serenana var. davidsonii Davidson's saltscale	PDCHE041T1	None	None	G5T1	S1	1B.2
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G2	S1S2	
Calochortus fimbriatus late-flowered mariposa-lily	PMLIL0D1J2	None	None	G3	S3	1B.3
Calystegia sepium ssp. binghamiae Santa Barbara morning-glory	PDCON040E6	None	None	G5TXQ	SX	1A
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Coelus globosus globose dune beetle	IICOL4A010	None	None	G1G2	S1S2	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Cotumicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Danaus plexippus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	Candidate	None	G4T1T2	S2	
Delphinium umbraculorum umbrella larkspur	PDRAN0B1W0	None	None	G3	S3	1B.3
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	
Fritillaria ojaiensis Ojai fritillary	PMLIL0V0N0	None	None	G3	S3	1B.2
Horkelia cuneata var. puberula mesa horkelia	PDROS0W045	None	None	G4T1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S1	FP

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lonicera subspicata var. subspicata Santa Barbara honeysuckle	PDCPR030R3	None	None	G5T2?	S2?	1B.2
Monardella hypoleuca ssp. hypoleuca white-veined monardella	PDLAM18SA5	None	None	G4T3	S3	1B.3
Nasturtium gambelii Gambel's water cress	PDBRA270V0	Endangered	Threatened	G1	S1	1B.1
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Nyctinomops macrotis big free-tailed bat	AMACD04020	None	None	G5	S3	SSC
Oncorhynchus mykiss irideus pop. 10 steelhead - southern California DPS	AFCHA0209J	Endangered	Candidate Endangered	G5T1Q	S1	
Pelecanus occidentalis californicus California brown pelican	ABNFC01021	Delisted	Delisted	G4T3T4	S3	FP
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Quercus dumosa Nuttall's scrub oak	PDFAG050D0	None	None	G3	S3	1B.1
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Salvadora hexalepis virgultea coast patch-nosed snake	ARADB30033	None	None	G5T4	S2S3	SSC
Scrophularia atrata black-flowered figwort	PDSCR15010	None	None	G2?	S2?	1B.2
Sternula antillarum browni California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
Taricha torosa Coast Range newt	AAAAF02032	None	None	G4	S4	SSC
Thamnophis hammondii two-striped gartersnake	ARADB36160	None	None	G4	S3S4	SSC
Thelypteris puberula var. sonorensis Sonoran maiden fern	PPTHE05192	None	None	G5T3	S2	2B.2
Thermopsis macrophylla Santa Ynez false lupine	PDFAB3Z0E0	None	Rare	G1	S1	1B.3

Record Count: 36

UNITED STATES FISH AND WILDLIFE SERVICE IPAC

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Santa Barbara County, California

Local office

Ventura Fish And Wildlife Office

(805) 644-1766
(805) 644-3958
FWBVenturaSection7@FWS.Gov

2493 Portola Road, Suite B
Ventura, CA 93003-7726

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
California Condor Gymnogyps californianus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/8193	Endangered
California Least Tern Sterna antillarum browni Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Least Bell's Vireo Vireo bellii pusillus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5945	Endangered
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4467	Threatened
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	Endangered
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/8035	Threatened

Yellow-billed Cuckoo Coccyzus americanus	**Threatened**

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3911

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii Wherever found	**Threatened**

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/2891

Foothill Yellow-legged Frog Rana boylii	**Proposed Endangered**

No critical habitat has been designated for this species.

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi Wherever found	**Endangered**

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/57

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found	**Candidate**

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi Wherever found	**Threatened**

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/498

Flowering Plants

NAME	STATUS
Gambel's Watercress Rorippa gambellii Wherever found **No critical habitat has been designated for this species.** https://ecos.fws.gov/ecp/species/4201	**Endangered**
Marsh Sandwort Arenaria paludicola Wherever found **No critical habitat has been designated for this species.** https://ecos.fws.gov/ecp/species/2229	**Endangered**
Salt Marsh Bird's-beak Cordylanthus maritimus ssp. maritimus Wherever found **No critical habitat has been designated for this species.** https://ecos.fws.gov/ecp/species/6447	**Endangered**

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. **The Migratory Birds Treaty Act of 1918.**
2. **The Bald and Golden Eagle Protection Act of 1940.**

Additional information can be found using the following links:

- **Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species**

- Measures for avoiding and minimizing impacts to birds
  https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds
  https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird *Selasphorus sasin* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15

Black Oystercatcher Haematopus bachmani — **Breeds Apr 15 to Oct 31**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9591

Black Skimmer Rynchops niger — **Breeds May 20 to Sep 15**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5234

Black Tern Chlidonias niger — **Breeds May 15 to Aug 20**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3093

Black Turnstone Arenaria melanocephala — **Breeds elsewhere**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Bullock's Oriole Icterus bullockii — **Breeds Mar 21 to Jul 25**
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

California Thrasher Toxostoma redivivum — **Breeds Jan 1 to Jul 31**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — **Breeds Jun 1 to Aug 31**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — **Breeds May 20 to Jul 31**
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Lawrence's Goldfinch Carduelis lawrencei — **Breeds Mar 20 to Sep 20**
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Marbled Godwit Limosa fedoa This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Mountain Plover Charadrius montanus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3638	Breeds elsewhere
Nuttall's Woodpecker Picoides nuttallii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse Baeolophus inornatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Olive-sided Flycatcher Contopus cooperi This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Western Grebe aechmophorus occidentalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wrentit Chamaea fasciata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

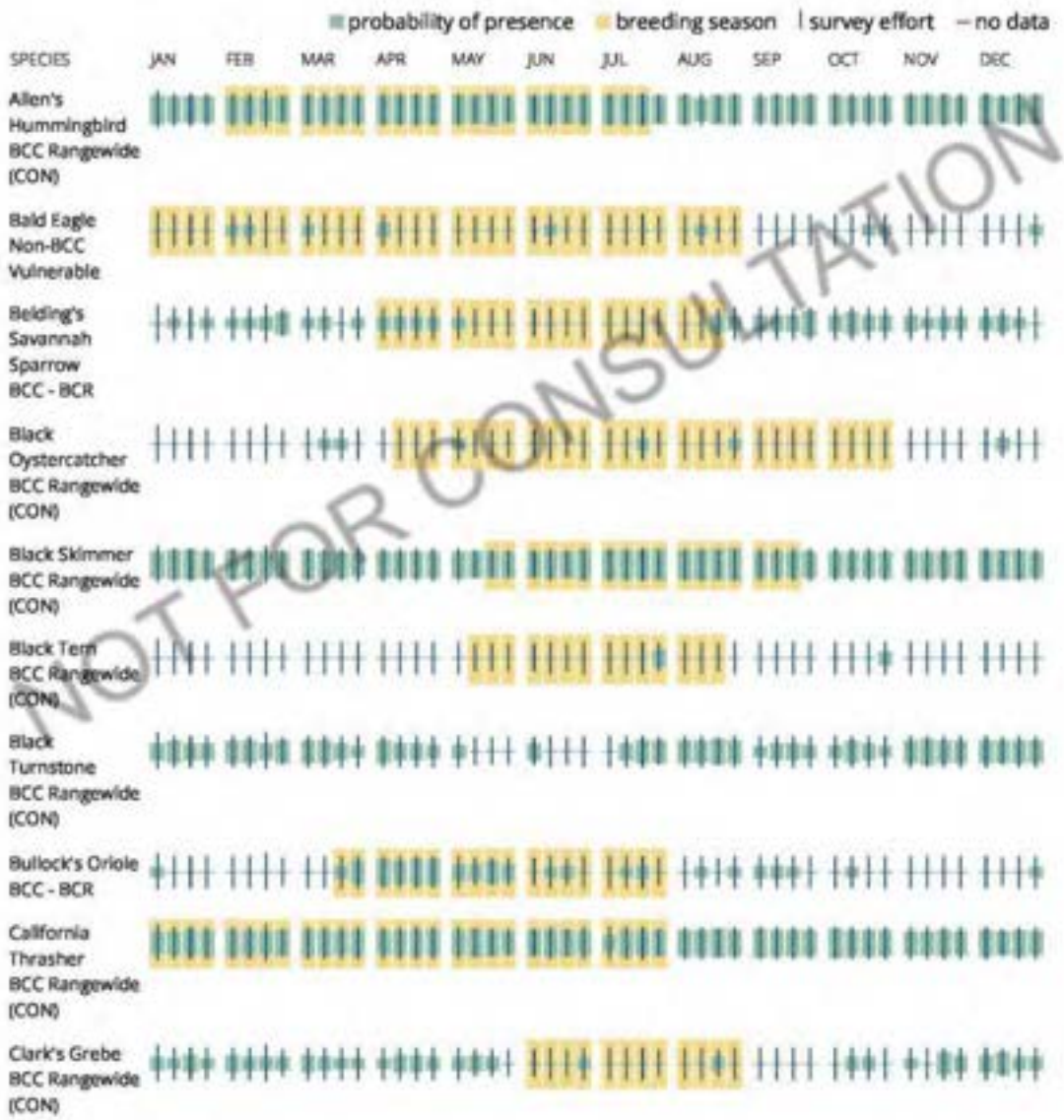
Survey Effort (|)

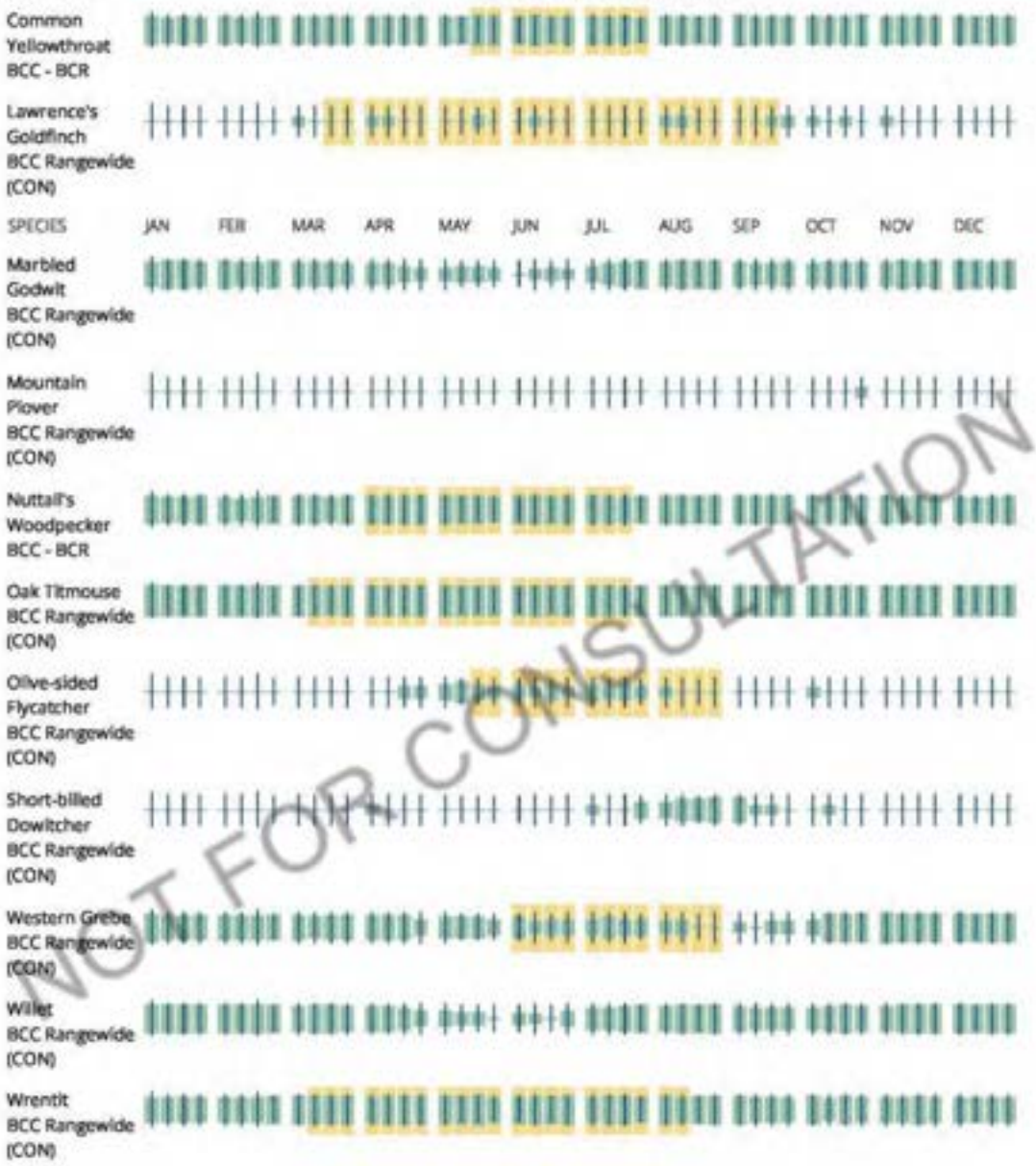
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

There are no known coastal barriers at this location.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

ATTACHMENT B

Site Photographs

Photo 1: View of alignment across Sycamore Creek between outhouse and eucalyptus tree in background.

Photo 2: View of eucalypus on eastern bank of Sycamore Creek, in corner of zoo parking lot.

Photo 3: Landscape planted trees on property boundary of zoo property and UPRR.

Photo 4: Photo of landscaped trees in western portion of parking lot. Location is approximate to crossing.

SWCA
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

3426 Empresa Drive, Suite 100
San Luis Obispo, California 93401
Tel 805.543.7095 Fax 805.543.2367
www.swca.com

TECHNICAL MEMORANDUM

To: Greg Young
Consor
11017 Cobblerock Drive, Suite 100
Rancho Cordova, Ca 95670

CC: Jon Claxton, Project Manager, SWCA Environmental Consultants

From: Leroy Laurie, Cultural Resources Team Lead

Date: November 3, 2022

Re: **Cultural Resources Review of the Lower Eastside Pedestrian Bridge Project / SWCA Project No. 73506**

SWCA Environmental Consultants (SWCA) prepared this cultural resources review at the request of the Quincy Engineering (Quincy) and the City of Santa Barbara (City) with the purpose of identifying potential constraints and environmental requirements associated with the Lower Eastside Pedestrian Bridge Project (project).

SWCA received the cultural resources records search results on August 29, 2022, from the Central Coast Information Center (CCIC) of the California Historical Resources Information System (CHRIS). The records search included all resource and prior study records within the project area. The records search revealed that 21 prior cultural resources studies overlap with the project area. These include archaeological (survey and Extended Phase I) and historic resource studies. Although none addressed the entirety of the proposed project area, the combined coverage of the 21 studies encompasses 100 percent of the project area.

The most recent studies included in the records search were associated with various projects at the Santa Barbara Zoological Gardens.

Because the project overlaps with a previously documented prehistoric and historic resource, as with prior projects in the immediate vicinity, additional cultural resources study will likely be required. If federal funds are acquired for the project, then the full suite of National Historic Preservation Act Section 106 cultural resources studies may be required for the project. These, along with tribal engagement and consultation, could include, but are not limited to:

- Historic Property Survey Report (HPSR): If the project is subject to Caltrans's Standard Environmental Review, the overarching HPSR may be required.

- Archaeological Survey Report (ASR) or Phase I Archaeological Survey Report

- Historic Resources Evaluation Report (HRER), if built environment resource may be directly or indirectly affected by the project.
- Extended Phase I Study, if the results of the ASR warrant further identification efforts.
- Phase II Evaluation or Phase III Data Recovery, if archaeological resources that are (or may be) significant cannot be avoided by the project.
- Finding of Effect, in the event that a significant resource is present.
- Environmentally Sensitive Area Action Plan, if resources requiring avoidance during construction are present.
- Memorandum of Understanding, as needed.

The scope, scale, and type of reporting will be dependent on the lead federal agency. Additional or supplemental studies and/or project conditions may be required as a result of the City's review of the project as it relates to their obligations under the California Environmental Quality Act.

EXHIBIT 6-A PRELIMINARY ENVIRONMENTAL STUDY (PES)

Federal Project No.: N/A *(Federal Program Prefix-Project No., Agreement No.)*

Final Design: _____ *(Expected Start Date)*

To: _____ *(District Local Assistance Engineer)*

_____ *(District)*

_____ *(Address)*

_____ *(Email Address)*

From: _____ *(Local Agency)*

_____ *(Project Manager's Name and Telephone No.)*

_____ *(Address)*

_____ *(Email Address)*

Is this Project "ON" the State Highway System? ☑ Yes ☐ No

IF YES, STOP HERE and contact the District Local Assistance Engineer regarding the completion of other environmental documentation.

Federal State Transportation Improvement Program (FSTIP)

_____ *(Currently Adopted Plan Date)* _____ *(Page No.___ attach to this form)*

https://dot.ca.gov/programs/financial-programming/office-of-federal-programming-data-management-ofpdm

Programming for FSTIP:

Preliminary Engineering		Right of Way		Construction	
_____ *(Fiscal Year)*	$ _____ *(Dollars)*	_____ *(Fiscal Year)*	$ _____ *(Dollars)*	_____ *(Fiscal Year)*	$ _____ *(Dollars)*

Project Description as Shown in RTP and FSTIP:
The project is not shown in the current FSTIP or the RTP

Detailed Project Description: *(Describe the following, as applicable: purpose and need, project location and limits, required right of way acquisition, proposed facilities, staging areas, disposal and borrow sites, construction activities, and construction access.)*

The Lower Eastside Pedestrian/Bicycle Bridge project will construct a new pedestrian/bicycle bridge to provide connectivity over US 101 and UPRR for the City of Santa Barbara's Lower Eastside neighborhood. The proposed bridge would be an approximate 225' clear span structure, with optional supports within the median of US 101. on the south side of US 101, users would remain on an elevated structure as they travel parallel to the parcel boundary of the Santa Barbara Zoo and UPRR right-of-way for approximately 500 feet before crossing Sycamore Creek and conforming to the existing elevation at Dwight Murphy Filed where there would be a crosswalk on Ninos Drive.

(Continue description on "Notes" sheet, last page of this Exhibit, if necessary)

Preliminary Design Information:
Does the project involve any of the following? Please check the appropriate boxes and delineate on an attached map, plan, or layout including any additional pertinent information.

Yes	No		Yes	No		Yes	No	
☐	☑	Widen existing roadway	☑	☐	Ground disturbance	☑	☐	Easements
☐	☑	Increase number of through lanes	☐	☑	Road cut/fill	☑	☐	Equipment staging
☐	☑	New alignment	☑	☐	Excavation: anticipated maximum depth _____	☐	☑	Temporary access road/detour
☐	☑	Capacity increasing—other (e.g., channelization)				☐	☑	Utility relocation
						☐	☑	Right of way acquisition (if yes, attach map with APN)
☐	☑	Realignment	☐	☑	Drainage/culverts			
☐	☑	Ramp or street closure	☑	☐	Flooding protection			
☑	☐	Bridge work	☑	☐	Stream channel work	☐	☑	Disposal/borrow sites
☑	☐	Vegetation removal	☑	☐	Pile driving	☐	☑	Part of larger adjacent project
☑	☐	Tree removal	☐	☑	Demolition	☑	☐	Railroad

Required Attachments:

☑ Regional map ☑ Project location map ☑ Project footprint map (existing/proposed right of way)

☐ Engineering drawings (existing and proposed cross sections), if available ☐ Borrow/disposal site location map, if applicable
(Note: all maps (except project location map and regional maps) should be consistent with the project description (minimum scale: 1" = 200').)

☑ GeoTracker Printout for Hazardous Materials (http://geotracker.waterboards.ca.gov/).

☐ Federal Threatened and Endangered Species List from USFWS (http://ecos.fws.gov/ipac/).

☐ Federal Threatened and Endangered Species List from NMFS (https://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html).

☐ Current Photos of Project Site ☐ FEMA map ☐ VIA Questionnaire

Examine the project for potential effects on the environment, direct or indirect and answer the following questions. The "construction area," as specified below, includes all areas of ground disturbance associated with the project, including staging and stockpiling areas and temporary access roads.

Each answer must be briefly documented on the "Notes" pages at the end of the PES Form.

A. Potential Environmental Effects	Yes	To Be Determined	No
General			
1. Will the project require future construction to fully utilize the design capabilities included in the proposed project?	☐	☐	☑
2. Will the project generate public controversy?	☐	☐	☑
Noise			
3. Is the project a Type I project as defined in 23 CFR 772.5(h); "construction on new location or the physical alteration of an existing highway, which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes"?	☐	☐	☑
4. Does the project have the potential for adverse construction-related noise impact (such as related to pile driving)?	☐	☑	☐
Air Quality			
5. Is the project in a NAAQS non-attainment or maintenance area?	☐	☐	☑
6. Is the project exempt from the requirement that a conformity determination be made? (If "Yes," state which conformity exemption per 40 CFR 93.126, or 40 CFR 93.128) (check one box below and identify the project type if applicable): ☐ 40 CFR 93.126 Project type: _____ ☐ 40 CRF 93.128	☐	☐	☐
7. Is the project exempt from regional conformity? (If "Yes," state which conformity exemption in 40 CFR 93.127, Table 3 applies):	☐	☐	☐
8. If project is not exempt from regional conformity, (If "No" on Question #7)			
Is project in a metropolitan non-attainment/maintenance area?	☐	☐	☐
Is project in an isolated rural non-attainment area?	☐	☐	☐
Is project in a CO, PM10 and/or PM2.5 non-attainment/maintenance area?	☐	☐	☐
Hazardous Materials/Hazardous Waste			
9. Is there potential for hazardous materials (including underground or aboveground tanks, etc.) or hazardous waste (including oil/water separators, waste oil, asbestos-containing material, lead-based paint, ADL, etc.) within or immediately adjacent to the construction area?	☐	☑	☐
Water Quality/Resources			
10. Does the project have the potential to impact water resources (rivers, streams, bays, inlets, lakes, drainage sloughs) within or immediately adjacent to the project area?	☐	☑	☐
11. Is the project within a designated sole-source aquifer?	☐	☐	☑

Coastal Zone			
12. Is the project within the State Coastal Zone, San Francisco Bay, or Suisun Marsh?	☑	☐	☐
Floodplain			
13. Is the construction area located within a regulatory floodway or within the base floodplain (100-year) elevation of a watercourse or lake?	☑	☐	☐
Wild and Scenic Rivers			
14. Is the project within or immediately adjacent to a Wild and Scenic River System?	☐	☐	☑
Biological Resources			
15. Is there a potential for federally listed threatened or endangered species, or their critical habitat or essential fish habitat to occur within or adjacent to the construction area?	☐	☑	☐
16. Does the project have the potential to directly or indirectly affect migratory birds, or their nests or eggs (such as vegetation removal, box culvert replacement/repair, bridge work, etc.)?	☑	☐	☐
17. Is there a potential for wetlands to occur within or adjacent to the construction area?	☑	☐	☐
18. Is there a potential for agricultural wetlands to occur within or adjacent to the construction area?	☐	☐	☑
19. Is there a potential for the introduction or spread of invasive plant species?	☐	☑	☐
Sections 4(f) and 6(f)			
20. Are there any historic sites or publicly owned public parks, recreation areas, wildlife or waterfowl refuges (Section 4[f]) within or immediately adjacent to the construction area?	☑	☐	☐
21. Does the project have the potential to affect properties acquired or improved with Land and Water Conservation Fund Act (Section 6[f]) funds?	☑	☐	☐
Visual Resources			
22. Does the project have the potential to affect any visual or scenic resources?	☑	☐	☐
Relocation Impacts			
23. Will the project require the relocation of residential or business properties?	☐	☐	☑
(If the answer to questions 23-32 is "yes," then Title VI Implementation and outreach may be triggered)			
Land Use, Community, and Farmland Impacts			
24. Will the project require any right of way, including partial or full takes? Consider construction easements and utility relocations.	☐	☑	☐
25. Is the project inconsistent with plans and goals adopted by the community?	☐	☐	☑
26. Does the project have the potential to divide or disrupt neighborhoods/communities?	☐	☐	☑
27. Does the project have the potential to disproportionately affect low-income and minority populations?	☐	☐	☑
28. Will the project require the relocation of public utilities?	☐	☑	☐
29. Will the project affect access to properties or roadways?	☐	☐	☑
30. Will the project involve changes in access control to the State Highway System (SHS)?	☐	☐	☑
31. Will the project involve the use of a temporary road, detour, or ramp closure?	☐	☐	☑
32. Will the project reduce available parking?	☐	☐	☑
33. Will the project construction encroach on state or federal lands?	☑	☐	☐
34. Will the project convert any farmland to a different use or impact any farmlands?	☐	☐	☑
Cultural Resources			
35. Is there National Register listed, or potentially eligible historic properties, or archaeological resources within or immediately adjacent to the construction area? *(Note: Caltrans PQS answers question #35)*	☐	☑	☐
36. Is the project adjacent to, or would it encroach on Tribal land?	☐	☐	☑

For Sections B, C, and D, check appropriate box to indicate required technical studies, coordination, permits, or approvals.

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
☐ **Traffic**		
Check one:		
☐ Traffic Study	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☐ Discussion in ED Only	☐ Caltrans	☐ Approval
☑ **Noise**		
Check as applicable:		
☐ Traffic Related		
☑ Construction Related		
Check one:		
☐ Noise Study Report	☐ Caltrans	☐ Approval
☐ NADR	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☑ Discussion in ED Only	☐ Caltrans	☐ Approval
☐ **Air Quality**		
Check as applicable:		
☐ Traffic Related		
☐ Construction Related		
Check one:		
☐ Air Quality Report	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☐ Discussion in ED Only	☐ Caltrans	☐ Approval
	☐ FHWA	☐ Conformity Finding (23 USC 327 CEs, EAs, EISs)
	☐ Caltrans	☐ Conformity Finding (23 USC 326 CEs)
	☐ Regional Agency	☐ PM10/PM2.5 Interagency Consultation
☐ **Hazardous Materials/ Hazardous Waste**		
Check as applicable:		
☐ Initial Site Assessment (Phase 1)	☐ Caltrans	☐ Approval
☐ Preliminary Site Assessment (Phase 2)	☐ Caltrans	☐ Approval
☐ Discussion in ED Only	☐ Caltrans	☐ Approval
	☐ Cal EPA DTSC	☐ Review Database
	☐ Local Agency	☐ Review Database
☑ **Water Quality/Resources**		
Check as applicable:		
☐ Water Quality Assess. Report	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☑ Discussion in ED Only	☐ Caltrans	☐ Approval
☐ **Sole-Source Aquifer (Districts 5, 6 and 11)**	☐ EPA (S.F. Regional Office)	☐ Approval of Analysis in ED
☑ **Coastal Zone**	☑ CCC	☐ Coastal Zone Consistency Determination

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
☑ **Floodplain**		
Check as applicable:		
☑ Location Hydraulic Study	☐ Caltrans	☐ Approval
☐ Floodplain Evaluation Report	☐ Caltrans	☐ Approval
☑ Summary Floodplain Encroachment Report	☐ Caltrans	☐ Approval
	☐ Caltrans	☐ Only Practicable Alternative Finding
	☐ FHWA	☐ Approves significant encroachments and concurs in Only Practicable Alternative Findings
☐ **Wild and Scenic Rivers**	☐ River Managing Agency	☐ Wild and Scenic Rivers Determination
☑ **Biological Resources**		
Check as applicable:		
☐ NES, Minimal Impact	☑ Caltrans	☑ Approval
☑ NES		
☐ BA	☐ Caltrans	☐ Approves for Consultation
	☐ USFWS ☐ NOAA Fisheries	☐ Section 7 Informal/Formal Consultation
☐ EFH Evaluation	☐ NOAA Fisheries	☐ MSA Consultation
☐ Bio-Acoustic Evaluation	☐ NOAA Fisheries	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☑ **Wetlands**		
Check as applicable:		
☑ WD and Assessment	☐ Caltrans	☐ Approval
	☑ ACOE	☑ Wetland Verification
	☐ NRCS	☐ Agricultural Wetland Verification
	☐ Caltrans	☐ Wetlands Only Practicable Alternative Finding
☑ **Invasive Plants**		
☑ Discussion in ED Only	☐ Caltrans	☐ Approval
☐ **Section 4(f)**		
Check as applicable:	☐ Caltrans	☐ Determine Temporary Occupancy
☐ De minimis	☐ Caltrans	☐ De minimis finding
☐ Programmatic 4(f) Evaluation Type: _____	☐ Caltrans	☐ Approval
☐ Individual 4(f) Evaluation	☐ Caltrans	☐ Approval
	☐ Agency with Jurisdiction ☐ SHPO ☐ DOI ☐ HUD ☐ USDA	

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/Approvals
☑ **Section 6(f)**	☑ Agency with Jurisdiction ☑ NPS	☑ Determines Consistency with Long-Term Management Plan
	☐ NPS	☐ Approves Conversion
☑ **Visual Resources**		
☐ Technical	☐ Caltrans	☐ Approval
☐ Memorandum 8	☐ Caltrans	☐ Approval
☑ Moderate VIA	☑ Caltrans	☑ Approval
☐ Advance/Complex VIA	☐ Caltrans	☐ Approval
☐ **Relocation Impacts**		
Check one:		
☐ Relocation Impact Memo	☐ Caltrans	☐ Approval
☐ Relocation Impact Study	☐ Caltrans	☐ Approval
☐ Relocation Impact Report	☐ Caltrans	☐ Approval
☐ **Land Use and Community Impacts**		
Check one:		
☐ CIA	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☐ Discussion in ED Only	☐ Caltrans	☐ Approval
☑ **Construction/Encroachment on State Lands**		
Check as applicable:		
☐ SLC Jurisdiction	☐ SLC	☐ SLC Lease
☑ Caltrans Jurisdiction	☑ Caltrans	☑ Encroachment Permit
☐ SP Jurisdiction	☐ SP	☐ Encroachment Permit
☐ **Construction/Encroachment on Federal Lands**	☐ Federal Agency with Jurisdiction	☐ Encroachment Permit
☐ **Construction/Encroachment On Indian Trust Lands**	☐ Bureau of Indian Affairs	☐ Right of Way Permit
☐ **Farmlands**		
Check one:		
☐ CIA	☐ Caltrans	☐ Approval
☐ Technical Memorandum	☐ Caltrans	☐ Approval
☐ Discussion in ED Only	☐ Caltrans	☐ Approval
Check as applicable:		
☐ Form AD 1006	☐ NRCS	☐ Approves Conversion
	☐ CDOC	☐ Approves Conversion
☐ Conversion to Non-Agri Use	☐ ACOE	

B. Required Technical Studies and Analyses	C. Coordination	D. Anticipated Actions/Permits/ Approvals
☐ **Cultural Resources** (**PQS completes this section**)	☐ Caltrans PQS	☐ Screened Undertaking
☐ APE Map	☐ Caltrans PQS and DLAE	☐ Approves APE Map
	☐ Local Preservation Groups and/or Native American Tribes	☐ Provides Comments Regarding Concerns with Project
☐ HPSR ☐ ASR ☐ HRER	☐ Caltrans	☐ Approves for Consultation
☐ Finding of Effect Report	☐ Caltrans	☐ Concurs on No Effect, No Adverse Effect with Standard Conditions
	☐ SHPO	☐ Letter of Concurrence on Eligibility, No Adverse Effect without Standard
☐ MOA	☐ Caltrans	☐ Approves MOA
	☐ SHPO	☐ Approves MOA
	☐ ACHP (if requested)	☐ Approves MOA
☑ **Permits** Copies of permits and a list of mitigation commitments are mandatory submittals following NEPA approval.	☑ ACOE	☑ Section 404 Nationwide Permit
	☐ ACOE	☐ Section 404 Individual Permit
	☐ Caltrans/ACOE/EPA ☐ USFWS ☐ NOAA Fisheries	☐ NEPA/404 Integration MOU
	☐ ACOE	☐ Rivers and Harbors Act Section 10 Permit
	☐ USCG	☐ USCG Bridge Permit
	☑ RWQCB	☑ Section 401 Water Quality Certification
	☑ CDFW	☑ Section 1602 Streambed Alteration Agreement
	☑ RWQCB	☑ NPDES Permit
	☑ CCC ☑ Local Agency	☑ Coastal Zone Permit
	☐ BCDC	☐ BCDC Permit

Notes: Additional studies may be required for other federal agencies.

ACHP = Advisory Council on Historic Preservation
ACOE = U.S. Army Corps of Engineers
ADL = Aerially Deposited Lead
APE = Area of Potential Effect
APN = Assessor Parcel Number
ASR = Archaeological Survey Report
BA = Biological Assessment
BCDC = Bay Conservation and Development Commission
BE = Biological Evaluation
BO = Biological Opinion
Cal EPA = California Environmental Protection Agency
CCC = California Coastal Commission
CDFW = California Department of Fish and Wildlife
CDOC = California Department of Conservation
CE = Categorical Exclusion
CIA = Community Impact Assessment
CWA = Clean Water Act
DLAE = District Local Assistance Engineer
DOI = U.S. Department of Interior
DTSC = Department of Toxic Substances Control
EA = Environmental Assessment
ED = Environmental Document
EFH = Essential Fish Habitat
EIS = Environmental Impact Statement
EPA = U.S. Environmental Protection Agency
FEMA = Federal Emergency Management Agency
FHWA = Federal Highway Administration
FONSI = Finding of No Significant Impacted
FTIP = Federal Transportation Improvement Program
HPSR = Historic Property Survey Report
HRER = Historical Resources Evaluation Report
HUD = U.S. Housing and Urban Development
MOA = Memorandum of Agreement
MSA = Magnuson-Stevens Fishery Conservation and Management Act
NEPA = National Environmental Policy Act
NADR = Noise Abatement Decision Report
NES = Natural Environment Study
NHPA = National Historic Preservation Act
NOAA = National Oceanic and Atmospheric Administration
NMFS National Marine Fisheries Service
NPDES = National Pollutant Discharge Elimination System
NPS = National Park Service
NRCS = Natural Resources Conservation Service
PM10 = Particulate Matter 10 Microns in Diameter or Less
PM2.5 = Particulate Matter 2.5 Microns in Diameter or Less
PMP = Project Management Plan
PQS = Professionally Qualified Staff
ROD = Record of Decision
RTIP = Regional Transportation Improvement Program
RTP = Regional Transportation Plan
RWQCB = Regional Water Quality Control Board
SER = Standard Environmental Reference
SEP = Senior Environmental Planner
SHPO = State Historic Preservation Officer
SLC = State Lands Commission
SP = State Parks
TIP = Transportation Improvement Program
USCG = U.S. Coast Guard
USDA = U.S. Department of Agriculture
USFWS = U.S. Fish and Wildlife Service
WD = Wetland Delineation

E. Preliminary Environmental Document Classification (NEPA)

Based on the evaluation of the project, the environmental document to be developed should be:

Check one:

- ☐ Environmental Impact Statement (*Note: Engagement with participating agencies in accordance with 23 USC 139 required)*
  - ☐ Compliance with 23 USC 139 regarding Participating Agencies required
- ☐ Complex Environmental Assessment
- ☐ Routine Environmental Assessment
- ☐ Categorical Exclusion without required technical studies.
- ☐ Categorical Exclusion with required technical studies

(if Categorical Exclusion is selected, check one of the following):

- ☐ Section 23 USC 326
  - ☐ 23 CFR 771 activity (c)(_____)
  - ☐ 23 CFR 771 activity (d) (_____)
  - ☐ Activity _____ listed in the Section 23 USC 326
- ☐ Section 23 USC 327

F. Public Availability and Public Hearing

Check as applicable:

- ☐ Not Required
- ☐ Notice of Availability of Environmental Document
- ☐ Public Meeting
- ☐ Notice of Opportunity for a Public Hearing
- ☐ Public Hearing Required

G. Signatures

Local Agency Staff and/or Consultant Signature

_____	_____	_____
(Signature of Preparer)	*(Date)*	*(Telephone No.)*

_____
(Name)

Local Agency Project Engineer Signature

This document was prepared under my supervision, according to the *Local Assistance Procedures Manual,* Exhibit 6-B, "Instructions for Completing the Preliminary Environmental Study Form."

_____	_____	_____
(Signature of Local Agency)	*(Date)*	*(Telephone No.)*

Caltrans District Professionally Qualified Staff (PQS) Signature

☐ Project does not meet definition of an "undertaking"; no further review is necessary under Section 106 ("No" Section A, #35).

☐ Project is limited to the type of activity listed in Attachment 2 of the Section 106 PA and based on the information provided in the PES Form, the project does not have the potential to affect historic properties ("No" Section A, #35).

☐ Project is limited to the type of activity listed in Attachment 2 of the Section 106 PA, but the following additional procedures or information is needed to determine the potential for effect ("To Be Determined" Section A, #35):

☐ Records Search ☐ _____ ☐ _____ ☐ _____

☐ Project meets the definition of an "undertaking"; all properties in the project area are exempt from evaluation per Attachment 4 of the Section 106 PA ("No" Section A, #35).

☐ The proposed undertaking is considered to have the potential to affect historic properties; further studies for 106 compliance are indicated in Sections B, C, and D of this PES Form ("Yes" Section A, #35).

_____ _____ _____
(Signature of Professionally Qualified Staff) *(Date)* *(Telephone No.)*

The following signatures are required for all CEs, routine and complex EAs, and EISs:

Caltrans District Senior Environmental Planner (or Designee) and DLAE Signatures

I have reviewed this Preliminary Environmental Study (PES) Form and determined that the submittal is complete and sufficient. I concur with the studies to be performed and the recommended NEPA Class of Action.

_____ _____ _____
(Signature of Senior Environmental Planner or Designee) *(Date)* *(Telephone No.)*

_____
(Name)

_____ _____ _____
(Signature of District Local Assistance Engineer or Designee) *(Date)* *(Telephone No.)*

_____
(Name)

☐ HQ DEA Environmental Coordinator concurrence _____. Email concurrence attached.
(*date*)

Preliminary Environmental Investigation
Notes to Support the Conclusions of the PES Form
(May Also Include Continuation of Detailed Project Description)

Brief Explanation of How Project Complies, or Will Comply with Applicable Federal Mandate (Part A):

1. The project will construct a new pedestrian/bicycle bridge structure over the existing US 101 and UPRR to connect Lower Eastside neighborhoods. No future construction would be required to fully utilize the proposed project.
2. The potential for public controversy is expected to be low. The project will improve pedestrian/bicycle access and connectivity within the existing Lower Eastside neighborhoods.
3. The proposedd project will construct a new pedestrian/bicycle bridge over US 101 and UPRR. No new highway lanes will be constructed.
4. The project may generate construction noise as construction equipment, such as pile drivers, may be necessary to construct the proposed bridge structure.
5. The project is located in Santa Barbara County, which does not have NAAQS non-attainment or maintenance status
6. Santa Barbara County is in NAAQS attainment. Regional conformity is not required.
7. Santa Barbara County is in NAAQS attainment. Regional conformity is not required.
8. Santa Barbara County is in NAAQS attainment. Regional conformity is not required.
9. A review of the Geo-Tracker database on 10/31/22 found no known hazardous material sites in the immediate project vicinity.
10. The proposed elevated pedestrian/bicycle bridge structure over US 101 and UPRR will also cross Sycamore Creek on an elevated bridge structure.
11. There are no sole source aquifers in Santa Barbara County. (http://www.epa.gov/region/9/water/groundwater/ssa.html)
12. The proposed pedestrian/bicycle bridge structure project lies within the boundaries of the California Coastal Zone and City of Santa Barbara Local Coastal Plan. A Coastal Development Permit is required. Federal Consistency will be required if there is a federal nexus (federal funds/permits/land)
13. The proposed elevated pedestrian bridge structure must cross Sycamore Creek. Ther is the potential to affect designated or base floodplains.
14. There are no designated Wild and Scenic Rivers in southern Santa Barbara County (http://www.rivers.gov/california.php)
15. Several USFWS/NMFS/CNDDB listed species have been recorded in the vicinity of Sycamore Creek. There is a low potential for project related impacts. These resources will be fully addressed in a Biological Resource Report (SWCA Biological Constraints Analysis 09/19/22)
16. Construction of the bridge structure will require removal of vegetation which may provide nesting and foraging habitat for migratory birds and raptors (SWCA Biological Constraints Analysis 09/19/22)
17. There is likely wetland habitat associated with Sycamore Creek. Wetland resources will be fully addressed in a Biological Resources Report (SWCA Biological Constraints Analysis 09/19/22).
18. There are no agricultural wetlands in the project area (SWCA Biological Constraints Analysis 09/19/22)
19. The project area has disturbed and native plant communities and likely supports non-native species that could be considered invasive. These resources will be addressed in a Biological Resource Report (SWCA Biological Constraints Analysis 09/19/22)

20. Dwight Murphy Field is a publicly owned recreational area and would qualify as a Section 4(f) resource if the project receives federal transportation funding or other approvals.

21. A Land and Water Conservation Funf (LWCF) grant was used for development of Dwight Murphy Field in 1985/86. If the project uses land from Dwight Murphy Field, Section 6(f) would apply.

22. The proposed project would require the removal of existing trees and the bridge structure would add an additional visual element to the area.The visual impacts will be evaluated in a Minor Visual Impact Report (VIA Checklist)

23. There are no residential/business relocation impacts associated with the Lower Eastside Pedestrian/Bicycle Bridge Project

24. Construction of the proposed bridge may require an Encroachment Permit for portions of the project located within US 101 right-of-way and Union Pacific approval for the UPRR crossing.

25. The proposed pedestrian/bicycle bridge project is consistent with community plans to improve connectivity within the Lower Eastside neighborhoods.

26. The proposed project has no potential to disrupt or divide neighborhoods or communities. The proposed project will improve connectivity within established Lower Eastside neighborhoods

27. The proposed project will have a beneficial effect on low-income or minority populations in the project area by improving pedestrian and bicycle connectivity within the Lower Eastside neighborhoods.

28. There may be public utilities in the project area that could be affected by the proposed project.

29. Construction of the project may require right-of-way easements from Caltrans (US 101) and Union Pacific (UPRR) but will not affect access or operation of these properties/roadways.

30. Construction of the project may require right-of-way easements from Caltrans (US 101) but will not change access control to the State Highway System.

31. The proposed project will not require temporary road detours or ramp closures

32. The proposed project will not affect existing parking

33. Construction of the project may require right-of-way an Encroachment Permit from Caltrans for portions of the structure located within US 101 right-of-way.

34. There are no farmlands in the project area

35. There are recorded historic and pre-historic resources in the project area. Additional Section 106 cultural resource studies will be required for the project (SWCA Cultural Constraints Analysis 10/3/22)

36. There are no tribal lands in the proposed project vicinity.

Continuation of Detailed Project Description:

The elevated structure that runs parallel to the zoo would be supported by 5 or 6 piers. Construction of the structure would result in the removal of all landscape trees along the border of an existing parking lot and non-native eucalyptus trees within Sycamore Creek that are within the pedestrian/bicycle path alignment.

Distribution 1) Original - DLAE, 2) Local Agency Project Manager, 3) DLA Environmental Coordinator
4) Senior Environmental Planner (or designee), 5) District PQS

APPENDIX G

HYDRAULIC MEMORANDUM

Hydraulic Memorandum

Date:	Thursday, October 27, 2022
Project:	Lower Eastside Community Connectivity Active Transportation Plan Project
To:	Greg Young – Quincy Engineering and the City of Santa Barbara
From:	Hannah Karlsson, Wana Chiu, and Han-Bin Liang – HDR|WRECO
Subject:	**Hydrologic and Hydraulic Feasibility Study Technical Memorandum**

1. Introduction

The City of Santa Barbara (City) is proposing the Lower Eastside Community Connectivity Active Transportation Plan Project (Project), which would construct a pedestrian and bicycle overcrossing to improve mobility between the Lower Eastside neighborhood and the Dwight Murphy Field. The Project area is located between the intersection of Canada and Pitos streets in the Lower Eastside neighborhood, crosses US Highway 101 (US 101) and the Union Pacific Railroad (UPRR) tracks to the vicinity of Dwight Murphy Field in the City of Santa Barbara, California. See Figure 1 for the Project location map, Figure 2 for the Project vicinity map, and Figure 3 for the Project aerial map.

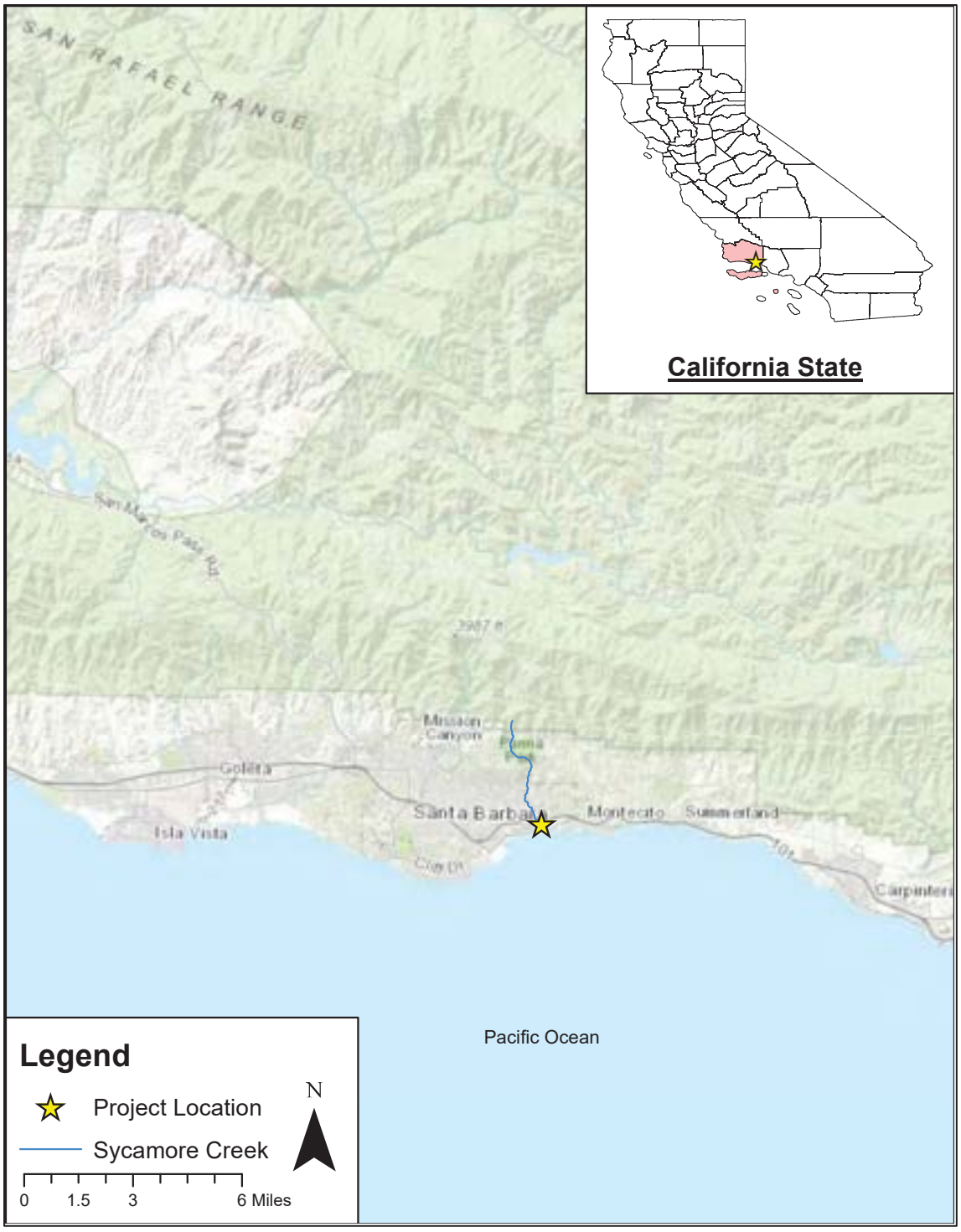
HDR|WRECO was tasked by the City to conduct a hydrologic and hydraulic feasibility study for the Project. The Project is located within the Sycamore Creek floodplain, south of the US 101 and the UPRR track crossings. The pedestrian overcrossing will cross over the Sycamore Creek channel on the western side of the approach near Dwight Murphy Field.

The purpose of this *Memorandum* is to provide a hydrologic and hydraulic analysis to evaluate the feasibility of constructing a pedestrian and bicycle overcrossing over the US 101 between the Lower Eastside neighborhood to the vicinity of Dwight Murphy Field.

Vertical and Horizontal Datum

The Project references the North American Datum of 1983 (NAD 83) State Plane California Zone V horizontal datum and the North America Vertical Datum of 1988 (NAVD 88).

Figure 1. Project Location Map



Source: United States Geological Survey (USGS)

Figure 2. Project Vicinity Map

Source: Quincy Engineering, Environmental Systems Research Institute (ESRI), 2022

Figure 3. Project Aerial Map

Source: Quincy Engineering and ESRI, 2022

Federal Emergency Management Agency Floodplain

The Project is located within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06083C1391J, Panel 1391 of 1835, effective from September 28, 2018 (FEMA, 2018a). The Project site is located in Special Flood Hazard Area (SFHA) Zone AE, which represents areas subject to flooding by the 100-year flood event determined by detailed methods where base flood elevations (BFE) are shown. At the Project site, the 100-year flood elevation is approximately 16.4 feet (ft) NAVD 88. The FIRM at Project location is shown in Figure 4.

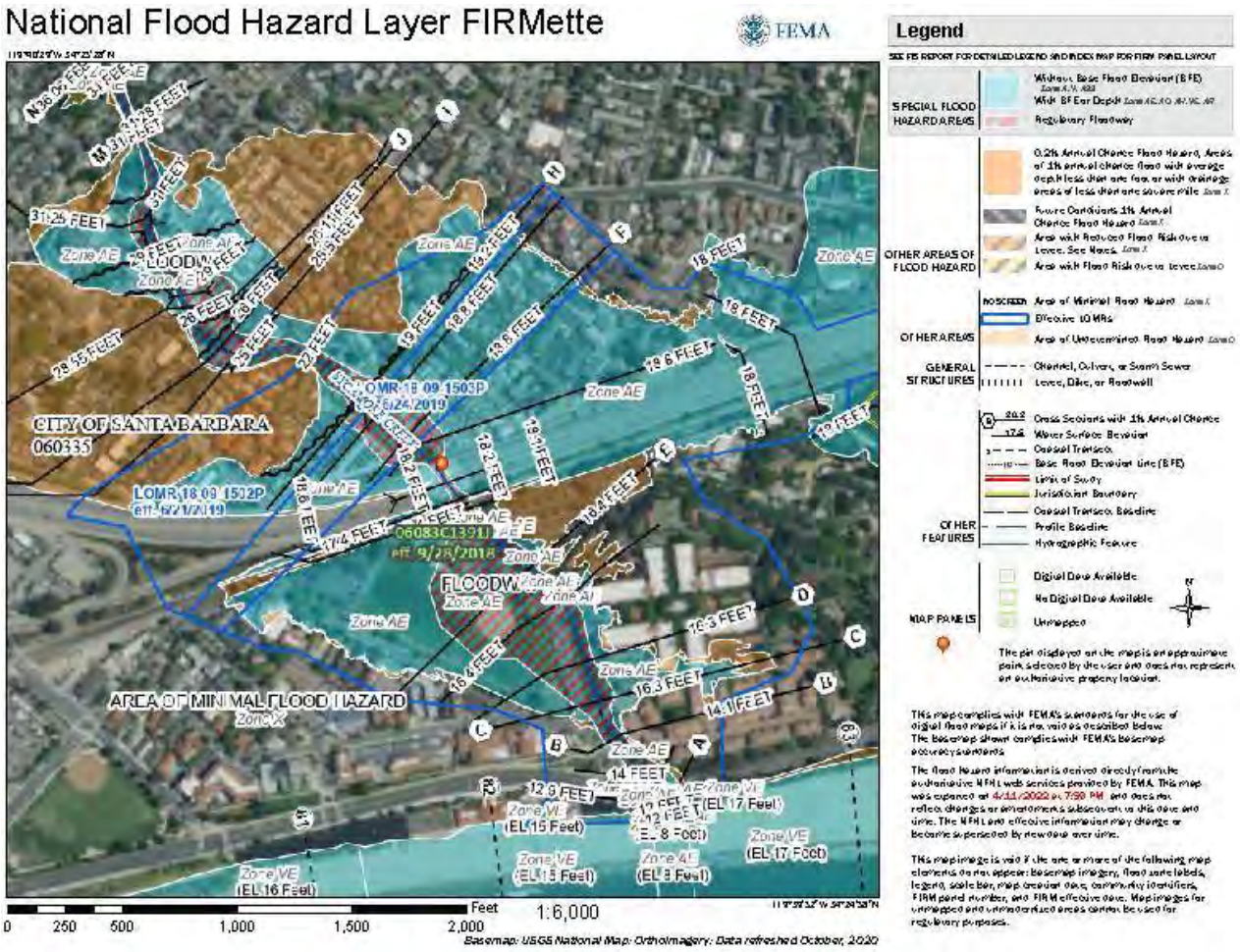
The Project site is also within a regulatory floodway. According to Title 44, Section 60.3(d)(3) of the Code of Federal Regulations (CFR), a community shall "prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge."

The US 101 UPRR track crossing and proposed overcrossing is bound by FEMA cross sections E and F, which have a base flood water surface elevation (WSE) of 18.1 and 18.8 ft, respectively, as listed in the Floodway Data table (FEMA, 2018b). No increase of any amount in the BFE is allowed in the floodway. In 2019, a Letter of Map Revision (LOMR) was developed for this floodplain area and the elevations were revised. Cross section E's BFE was revised to 16.4 ft and cross section F remained the same.

Geographic Location

Sycamore Creek originates from the Santa Ynez Mountains north of the City of Santa Barbara and flows south through the east side of the City of Santa Barbara and discharges into the Pacific Ocean. The watershed area is 3.65 square miles at the mouth of Sycamore Creek (FEMA, 2018b). The Project location is approximately 0.25 mile upstream of the outfall into the Pacific Ocean.

Figure 4. FEMA FIRMette at Project Location



Source: FEMA, 2018

Existing Structures

The proposed overcrossing is aligned on the south side of the US 101 and UPRR bridge crossing over Sycamore Creek. The US 101 bridge (Bridge No. 51 0332) was built in 2011. The US 101 bridge is a three-span continuous cast-in-place reinforced concrete slab. The center span (span 2) is currently the only span conveying flow. The two side spans (Span 1 and 3) are temporarily blocked off and will be opened when future channel improvements increase discharge through the channel. The current open span of the US 101 bridge is approximately 35.5-ft-wide with a minimum soffit elevation of 14.9 ft, based on the survey Quincy Engineering provided (2022). The existing span opening is only span 2. Span 1 and 3 on either side are blocked and will be used to accommodate hydraulic expansion during future flood protection projects.

The UPRR track is a separate bridge approximately 100 ft downstream (south) of the US 101 bridge. The UPRR bridge is a single-span with an opening width of 35 ft and a minimum soffit elevation of approximately 15.9 ft, based on survey provided by Quincy Engineering (2022).

Proposed Structures

The proposed pedestrian structure will cross over the Sycamore Creek channel approximately 44 ft downstream (south) of the UPRR track crossing. The structure will be 14-ft-wide and will have a clear-span over Sycamore Creek with an opening width of approximately 80 ft. The structure is proposed to conform to grade at the bend on Nino Drive approximately 140 ft west of the west bank of Sycamore Creek. The abutment of the structure will be on the west bank of Sycamore Creek and the structure deck will increase in elevation eastward. The proposed span length has been selected to accommodate future floodwall projects and the US 101 Span 1 and 3 hydraulic expansion.

Background Information and Previous Studies

The City has had several hydraulic studies conducted previously for Sycamore Creek and the surrounding area, which were provided and reviewed for this study. The Santa Barbara County Flood Control and Water Conservation District (SBFCWCD) prepared a *Flood Capacity Master Plan for Sycamore Creek* (Master Plan) (Penfield & Smith, 2003) to improve the conveyance of Sycamore Creek. This Master Plan is a guide for future projects along Sycamore Creek. The Master Plan established a feasible design capacity for Sycamore Creek near US 101 to be 3,000 cubic feet per second (cfs).

Since 2003, several public works projects within the lower reach of Sycamore Creek have been completed and more are underway. In 2010, the US 101 bridge was replaced to ultimately convey 3,000 cfs and was built to allow for future flow conveyance as future channel improvements are implemented. The *Sycamore Creek Project Study Report* (Bengal, 2018) was prepared for the SBFCWCD to evaluate the overall performance of the completed projects and the future improvements to the channel to meet the target conveyance.

In 2019, a LOMR was developed (Kasraie Consulting, 2018) for the floodplain area at the Project site. The LOMR information was used in the hydraulic analysis of this *Memorandum*.

Design Standards

FEMA Standards

FEMA standards are employed for design, construction, and regulation to reduce flood loss and to protect resources. Two types of standards are often employed: design criteria and performance standards.

A design criteria or specified standard dictates that a provision, practice, requirement, or limit be met; e.g., using the 1% flood and establishing floodway boundaries so as not to cause more than a 1-ft increase in flood stages.

A performance standard dictates that a goal is to be achieved, leaving it to the individual application as to how to achieve the goal; e.g., providing protection to the regulatory flood, keeping post-development stormwater runoff the same as pre-development, or maintaining the present quantity and quality of water in a wetland.

The 1% annual chance flood and floodplain have been adopted as a common design and regulatory standard in the United States. The National Floodplain Insurance Program (NFIP) adopted it in the early 1970s, and it was adopted as a standard for use by all federal agencies with the issuance of Executive Order 11988. States or local agencies are free to impose a more stringent standard within their jurisdiction.

Floodplain Regulations

FEMA defines a regulatory floodway as:

> the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations (FEMA, 2019a).

According to Title 44, Section 60.3(d)(3) of the Code of Federal Regulations (CFR), a community shall:

> prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge (FEMA, 2019b).

The community is responsible to review and maintain record of the documentation demonstrating that any permitted floodway encroachment meets NFIP requirements. A “no-rise certification” for floodways may be used to document the analyses.

Per Title 44, Section 60.3(d)(4) of the CFR, floodway encroachments that cause an increase may be permitted, provided the community first applies for a conditional FIRM and floodway revision (Conditional Letter of Map Revision, or CLOMR) and fulfills the requirements for such revisions as established under the provisions of Title 44 Section 65.12 of the CFR and receives the approval of the Floodplain Administrator (FEMA, 2019b).

Hydraulic Design Criteria

FHWA STANDARDS

Bridges must be designed per the *California American Association of State Highways and Transportation Officials Load and Resistance Factor Design Bridge Design Specifications (2017 Eighth Edition)* (AASHTO LRFD BDS) (Caltrans, 2019). AASHTO LRFD BDS Section 2.6.3 defers to state requirements for hydraulic studies.

From *Memo to Designers 16-1 Hydraulic Design for Structures over Waterways*, the proposed bridge soffit should provide adequate freeboard to pass anticipated drift for the 50-year design flood, or to pass the 100-year base flood without freeboard, whichever is greater (Caltrans, 2017).

CALTRANS STANDARDS

From Chapter 820 of the Caltrans' HDM, the criteria for the hydraulic design of bridges is that they be designed to pass the 2% probability of annual exceedance flow (50-year design discharge) with adequate freeboard to pass anticipated drift and debris (2020). Two (2) ft of freeboard is commonly used in bridge designs. Alternatively, the bridge can also be designed to pass the 1% probability of annual exceedance flow (100-year design discharge, or base flood). No freeboard is added to the base flood.

Design Considerations

SANTA BARBARA COUNTY STANDARDS

HDR|WRECO met with staff from the City, County of Santa Barbara, Kasraie Consulting, and Quincy Engineering on August 5, 2022 to discuss the Project's hydraulic goals, design limitations, and criteria. Below is a summary of the assumptions for the hydraulic conditions.

- Sycamore Creek conveyance at the Project site is controlled by the bridge opening of US 101 and the UPRR bridge. The entrance to the zoo culvert and Por La Mar Circle culvert crossings over Sycamore Creek have limited flood capacity and are controlling the existing hydraulics downstream of the Project site.
- The US 101 bridge, with the three spans open, has a total width is approximately 79.2 ft parallel to the proposed structure. The two piers and potential for debris accumulation reduced the conveyance at the US 101 bridge. The existing condition of the culvert only is conveying flow through the middle span with an opening of approximately 35.5 ft.
- The proposed structure width should be the same opening or wider and is required to have an equal or higher conveyance threshold than the surrounding structures to maintain the target discharge based on the Master Plan.

- The proposed structure will have a soffit elevation that is above the adjacent ground elevation and the US 101 soffit elevation to minimize the impact to the flow conveyance and floodplain.
- Flows over 2,000 cfs often escape the channel but then reenter at other locations.
- Future improvement studies assumed a 3,000 cfs flow which equate to around a 55-year storm.
- Standard freeboard for structures or conveying the 100-year flow was often not feasible.
- The County does consider “typical levels” of bulking in the flow but at this location the 3,000 cfs is all that is feasible whether it includes bulking or not. Bulking is also sometimes accommodated by increasing the debris width on bridge pier supports.
- The City project will need to consider future channel flood wall widening at Sycamore Creek. The proposed Bengal widths should be considered the minimum required, so any future project would at least need to accommodate that.

CALTRANS SEA LEVEL RISE GUIDELINES

Per Executive Order S-13-08 (November 14, 2008) all state agencies planning to construct projects in areas vulnerable to future sea level rise (SLR) must consider a range of sea-level projections for years 2050 and 2100, assess project vulnerability, and to the extent feasible, reduce expected risks and increase resiliency to SLR.

2. Hydrology

HDR|WRECO obtained flows from several sources to evaluate potential flow conditions at the Project site. The 100-year and 50-year design flows were obtained from the FEMA Flood Insurance Study (FIS). According to the FIS, the 100-year flow decreases downstream of US 101 due to overflow at US 101. The 2019 LOMR revised the flow downstream of US 101 at the location of the Project crossing and at the mouth of Sycamore Creek.

A bulked 100-year flow was obtained from the SBFCWCD South Coast Watershed Map (1975). The summary of the flows within the vicinity of the Project during the 50-year and 100-year design flows are listed in Table 1. The 100- and 50-year flows from the FEMA LOMR were used for the selected design flows in the hydraulic analysis. Additionally, the 3,000 cfs (approximately 55-year flow) design capacity from the Master Plan and the *Sycamore Creek Project Study Report* (Bengal, 2018) was evaluated for hydraulic analysis.

Table 1. Summary of 100- and 50-year Flows and Sources

Method/Source	Location	Design Flow (cubic ft per second [cfs])	
		100-year	50-year
SBCFCWCD South Coast Watershed Map	At US 101	4,700	--
FEMA (2018)	At mouth	3,306	2,942
FEMA LOMR (2019)	At mouth	1,975	1,826
FEMA LOMR (2019)	Upstream of US Highway 101	3,306	2,942

Source: FEMA, 2018

Sea-level Rise Consideration

The *State of California Sea-Level Rise Guidance, 2018 Update* (California Coastal Commission, 2018) was used to determine the scenario-based SLR projections of the Project site. The SLR projections for Santa Barbara, which is the closest location to the Project site that is included in the 2018 SLR Guidance, are provided in Table 2. The 2018 SLR Guidance uses the year 2000 as the baseline for the probabilistic projections and includes a low to high emission scenario leading up to 2150.

Table 2. SLR Projection (in feet) for Santa Barbara

		Probabilistic Projections (in feet) (based on Kopp et al. 2014)					H++ scenario (Sweet et al. 2017) *Single scenario
		MEDIAN	LIKELY RANGE		1-IN-20 CHANCE	1-IN-200 CHANCE	
		50% probability sea-level rise meets or exceeds...	66% probability sea-level rise is between...		5% probability sea-level rise meets or exceeds...	0.5% probability sea-level rise meets or exceeds...	
				Low Risk Aversion		Medium - High Risk Aversion	Extreme Risk Aversion
High emissions	2030	0.3	0.2 -	0.4	0.5	0.7	1.0
	2040	0.5	0.3 -	0.7	0.8	1.1	1.6
	2050	0.7	0.4 -	1.0	1.2	1.8	2.5
Low emissions	2060	0.7	0.4 -	1.0	1.4	2.2	
High emissions	2060	0.9	0.6 -	1.3	1.6	2.5	3.6
Low emissions	2070	0.9	0.5 -	1.3	1.7	2.8	
High emissions	2070	1.1	0.7 -	1.7	2.1	3.3	4.9
Low emissions	2080	1.0	0.5 -	1.5	2.0	3.6	
High emissions	2080	1.4	0.9 -	2.1	2.7	4.3	6.3
Low emissions	2090	1.1	0.6 -	1.8	2.4	4.4	
High emissions	2090	1.7	1.1 -	2.6	3.3	5.3	7.9
Low emissions	2100	1.2	0.6 -	2.0	2.9	5.3	
High emissions	2100	2.1	1.2 -	3.1	4.1	6.6	9.8
Low emissions	2110*	1.3	0.7 -	2.1	3.0	5.9	
High emissions	2110*	2.2	1.4 -	3.2	4.2	6.9	11.5
Low emissions	2120	1.4	0.7 -	2.4	3.5	7.0	
High emissions	2120	2.5	1.7 -	3.7	4.9	8.2	13.7
Low emissions	2130	1.5	0.8 -	2.6	3.9	8.0	
High emissions	2130	2.9	1.8 -	4.2	5.6	9.5	16.0
Low emissions	2140	1.6	0.8 -	2.9	4.4	9.1	
High emissions	2140	3.1	2.0 -	4.8	6.4	11.0	18.6
Low emissions	2150	1.8	0.7 -	3.2	5.0	10.5	
High emissions	2150	3.5	2.2 -	5.3	7.2	12.6	21.4

Source: OPC SLR Guidance, 2018

Depending on the service life of the Project and the construction date, a projected SLR should be considered. Assuming the design life is 75 years based on the *Highway Design Manual* (Caltrans, 2020) for the design life of a bridge and the estimated construction end date is 2025, the projected SLR year would be 2100. Based on the assumed Project design life and the medium-to-high-risk scenario with high emissions, a SLR projection of 6.6 ft in the year 2100 is estimated for the Project's SLR impact evaluations. Per conversations with the County of Santa Barbara on August 5, 2022, SLR is not considered in the current studies. Further evaluation of SLR impacts to the Sycamore Creek channel are recommended as needed.

3. Hydraulic Assessment

Model Source

The 2018 LOMR model for Lower Sycamore Creek was developed by Kasraie Consulting. This LOMR model was provided as a base model for the evaluation of this proposed Project. The 2018 LOMR model is a steady state one-dimensional model developed using the United States Army Corps of Engineers (USACE) Hydrologic Engineering Center's River Analysis System (HEC-RAS) modeling software, Version 4.1.0. Due to the lateral structures with gates used in this model, the analysis was required to be run in version 4.1.0.

The FEMA effective LOMR model extends upstream approximately 0.15 mile north of the Alameda Padre Serra crossing and downstream to the mouth of Sycamore Creek at the Pacific Ocean.

Model Input

Survey Data

Survey data was provided by Quincy Engineering (2022a). Survey within the channel was limited to three channel cross sections. The surveyed cross sections at the upstream face of US 101, upstream face and the downstream face of the UPRR tracks bridge were updated in the model geometry. In order to incorporate the proposed structure alignment, three cross sections were added. The geometry for the three cross sections was updated using the survey provided by Quincy Engineering and interpolated geometry from the adjacent cross sections in the LOMR cross sections in areas the Quincy Engineering survey did not extend.

Boundary Conditions

The model uses the boundary conditions (BC) provided in the LOMR effective model and the *Sycamore Creek Project Study Report* (Bengal Engineering, 2018) for the 55-year flow. The 50-, 55- and 100-year flows of 2,942 cfs, 3,000, and 3,306 cfs, respectively, were input into the upstream BC. The downstream BC for the 50- and 55-year flows was input as normal depth with a friction slope of 0.003 ft/ft. The downstream BC for the 100-year flow was input at a known water surface elevation of 12 ft.

Manning's Roughness Coefficients

Manning's roughness coefficients were used in the hydraulic model to estimate energy losses in the flow due to friction. A roughness coefficient of 0.035 was used to describe the channel, a roughness coefficient of 0.03 was used to describe open fields on the overbanks, and 0.06 was used to describe structures and heavily vegetated areas on the overbank areas. These values were selected based on the effective model inputs and were verified using aerial imagery and field photos.

Expansion and Contraction Coefficients

Expansion and contraction coefficients were used in the hydraulic model to represent energy losses in the channel. An expansion coefficient of 0.3 and a contraction coefficient of 0.1 were used to

represent the channel. These values represent a channel with gradual transitions between cross sections. An expansion coefficient of 0.5 to 0.7 and a contraction coefficient of 0.3 to 0.5 were used to represent the channel in the vicinity of the structures. These values represent the flow interference caused by the structures.

Proposed Alternatives

Three alternatives were provided by Quincy Engineering (2022). The preferred single span alternative was used for the hydraulic analysis (See Figure 5). All alternatives have similar approach profiles below the floodplain WSE. The proposed structure crossover will be approximately 14-ft-wide and span Sycamore Creek downstream on the UPRR track crossing. The west abutment face of the proposed structure will be approximately 12 ft west of the west bank of Sycamore Creek. The proposed structure profile will increase in elevation at an approximately 4.9% slope towards the east. The span over Sycamore Creek will be approximately 79.5-ft-long. The proposed structure will have eight 4-ft-diameter bridge supports on the east overbank of Sycamore Creek and the south side of the UPRR track and US 101. The structure will cross over the UPRR track and US 101 and ramp down to conform to the existing ground elevation near the intersection on Pitos Street and Canada Street. Approximately 100 ft of fill for the abutment on the north side of US 101 is proposed for the east ramp abutment. The fill was incorporated into the terrain at the cross section upstream of US 101 and the lateral structure with gates, which represents the sound wall along US 101.

Hydraulic Model Results

The results of the hydraulic modeling are discussed in this section. Depth, velocity, and WSE results for the 100-, 50-, and 55-year design flows for the existing and proposed conditions are shown in Attachment A and Attachment B, respectively.

Water Surface Elevation

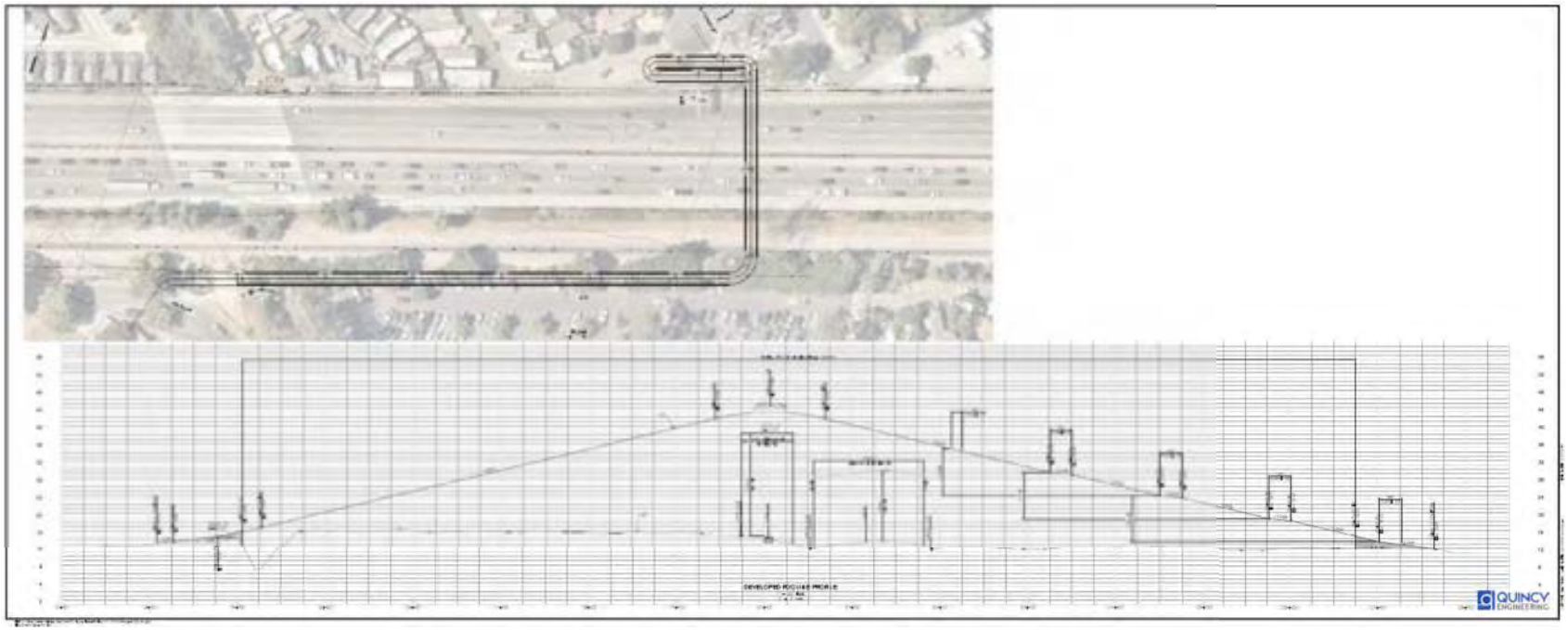
The 100-, 50-, and 55-year WSE results are shown in Table 3, Table 4, and Table 5, respectively. Based on the hydraulic model results, during the 100-year design flow, the change in WSE from existing to proposed condition show a WSE increase of 0.04 ft upstream of the proposed structure and a maximum decrease of 0.01 ft. During the 50-year design flow, the comparison of the existing to proposed results shows a WSE increase of 0.03 ft upstream of the proposed structure. The Master Plan target discharge of a 55-year flow shows no increase and a maximum decrease of 0.02 ft upstream of the proposed structure and 0.03 downstream of the proposed structure. Figure 6 shows the 100-year WSE profile for the existing and proposed conditions. The upstream face of the proposed structures is shown in Figure 7.

The increases in water surface elevations in the vicinities of the proposed structure may be minimized by implementing any or a combination of the following measures:

- Adjusting the opening of the proposed bridge structure
- Grading the main channel and/or overbanks areas (balance cut and fill)
- Adding ramps or culverts to convey the flow to the soundwall openings

These minimization measures will be further determined during the design phase of the Project when more survey and detailed design information is available.

Figure 5. Proposed Overcrossing Profile Plan



Source: Quincy Engineering, 2022b

Table 3. 100-Year Water Surface Elevation Results

River Station	*Description/Distance from Existing Bridge Centerline (feet)*	Water Surface Elevation (ft)		
		100-year		*Difference in WSE (ft)*
		Existing	*Proposed Single Span Alternative*	
1900	307 feet upstream of proposed structure	18.81	18.80	-0.01
1899.1	306 feet upstream of proposed structure	0.00	0.00	--
1851.133	258 feet upstream of proposed structure	18.63	18.63	0.00
1823.768	230 feet upstream of proposed structure	18.44	18.44	0.00
1726.932 USH101 BR U	Upstream face of US 101 Bridge	15.09	15.09	0.00
1726.932 USH101 BR D	Downstream face of US 101 Bridge	15.74	15.74	0.00
1659.316	66 feet upstream of proposed structure	17.28	17.29	0.01
1658.316	65 feet upstream of proposed structure	17.26	17.26	0.00
1633.359 Railroad BR U	Upstream face of UPRR Bridge	15.94	15.94	0.00
1633.359 Railroad BR D	Downstream face of UPRR Bridge	16.15	16.18	0.03
1612.363	19 feet upstream of proposed structure	16.15	16.18	0.03
1608	15 feet upstream of proposed structure	16.08	16.11	0.03
1604	11 feet upstream of proposed structure	16.07	16.11	0.04
1593.5 BR U	Upstream face of Proposed Bridge	--	16.07	--
1593.5 BR D	Downstream face of Proposed Bridge	--	16.34	--
1583	11 feet downstream of proposed structure	16.35	16.35	0.00
1500	94 feet downstream of proposed structure	16.37	16.37	0.00
1400	194 feet downstream of proposed structure	16.36	16.36	0.00
1302.082 E	292 feet downstream of proposed structure	16.36	16.37	0.01
1265.925 Zoo Ent	Zoo Entrance Culvert	0.00	0.00	--
1215.742	378 feet downstream of proposed structure	16.35	16.36	0.01

Table 4. 50-Year Water Surface Elevation Results

River Station	*Description/Distance from Existing Bridge Centerline (feet)*	Water Surface Elevation (ft)		
		50-year		*Difference in WSE (ft)*
		Existing	*Proposed Single Span Alternative*	
1900	307 feet upstream of proposed structure	18.31	18.31	0.00
1899.1	306 feet upstream of proposed structure	0.00	0.00	--
1851.133	258 feet upstream of proposed structure	18.12	18.12	0.00
1823.768	230 feet upstream of proposed structure	17.95	17.96	0.01
1726.932 USH101 BR U	Upstream face of US 101 Bridge	15.09	15.09	0.00
1726.932 USH101 BR D	Downstream face of US 101 Bridge	15.74	15.74	0.00
1659.316	66 feet upstream of proposed structure	16.98	16.98	0.00
1658.316	65 feet upstream of proposed structure	16.97	16.98	0.01
1633.359 Railroad BR U	Upstream face of UPRR Bridge	15.94	15.94	0.00
1633.359 Railroad BR D	Downstream face of UPRR Bridge	14.90	14.93	0.03
1612.363	19 feet upstream of proposed structure	14.90	14.93	0.03
1608	15 feet upstream of proposed structure	14.88	14.91	0.03
1604	11 feet upstream of proposed structure	14.86	14.89	0.03
1593.5 BR U	Upstream face of Proposed Bridge	--	14.87	--
1593.5 BR D	Downstream face of Proposed Bridge	--	15.11	--
1583	11 feet downstream of proposed structure	15.10	15.13	0.03
1500	94 feet downstream of proposed structure	15.16	15.18	0.02
1400	194 feet downstream of proposed structure	15.13	15.15	0.02
1302.082 E	292 feet downstream of proposed structure	15.13	15.15	0.02
1265.925 Zoo Ent	Zoo Entrance Culvert	0.00	0.00	--
1215.742	378 feet downstream of proposed structure	15.13	15.13	0.00

Table 5. 55-Year Water Surface Elevation Results

River Station	*Description/Distance from Existing Bridge Centerline (feet)*	Water Surface Elevation (ft)		
		55-year		*Difference in WSE (ft)*
		Existing	*Proposed Single Span Alternative*	
1900	307 feet upstream of proposed structure	18.38	18.37	-0.01
1899.1	306 feet upstream of proposed structure	0.00	0.00	--
1851.133	258 feet upstream of proposed structure	18.19	18.19	0.00
1823.768	230 feet upstream of proposed structure	18.02	18.02	0.00
1726.932 USH101 BR U	Upstream face of US 101 Bridge	15.09	15.09	0.00
1726.932 USH101 BR D	Downstream face of US 101 Bridge	15.74	15.74	0.00
1659.316	66 feet upstream of proposed structure	17.02	17.02	0.00
1658.316	65 feet upstream of proposed structure	17.01	17.01	0.00
1633.359 Railroad BR U	Upstream face of UPRR Bridge	15.94	15.94	0.00
1633.359 Railroad BR D	Downstream face of UPRR Bridge	14.99	14.98	-0.01
1612.363	19 feet upstream of proposed structure	14.99	14.98	-0.01
1608	15 feet upstream of proposed structure	14.97	14.96	-0.01
1604	11 feet upstream of proposed structure	14.96	14.94	-0.02
1593.5 BR U	Upstream face of Proposed Bridge	--	14.92	--
1593.5 BR D	Downstream face of Proposed Bridge	--	15.17	--
1583	11 feet downstream of proposed structure	15.21	15.19	-0.02
1500	94 feet downstream of proposed structure	15.26	15.24	-0.02
1400	194 feet downstream of proposed structure	15.24	15.21	-0.03
1302.082 E	292 feet downstream of proposed structure	15.24	15.21	-0.03
1265.925 Zoo Ent	Zoo Entrance Culvert	0.00	0.00	--
1215.742	378 feet downstream of proposed structure	15.22	15.21	-0.01

Figure 6. 100-year WSE Profile for the existing and proposed conditions.

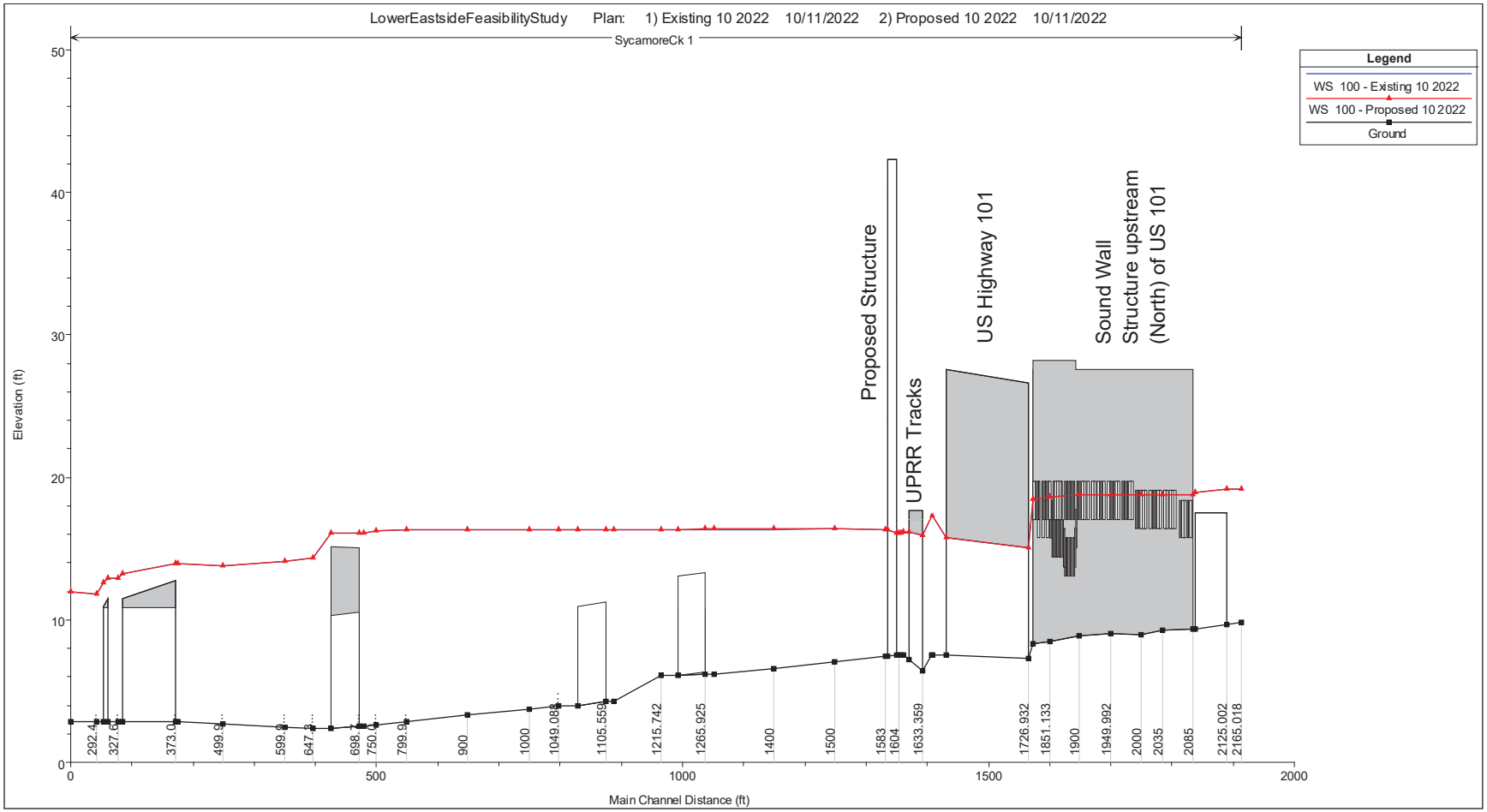
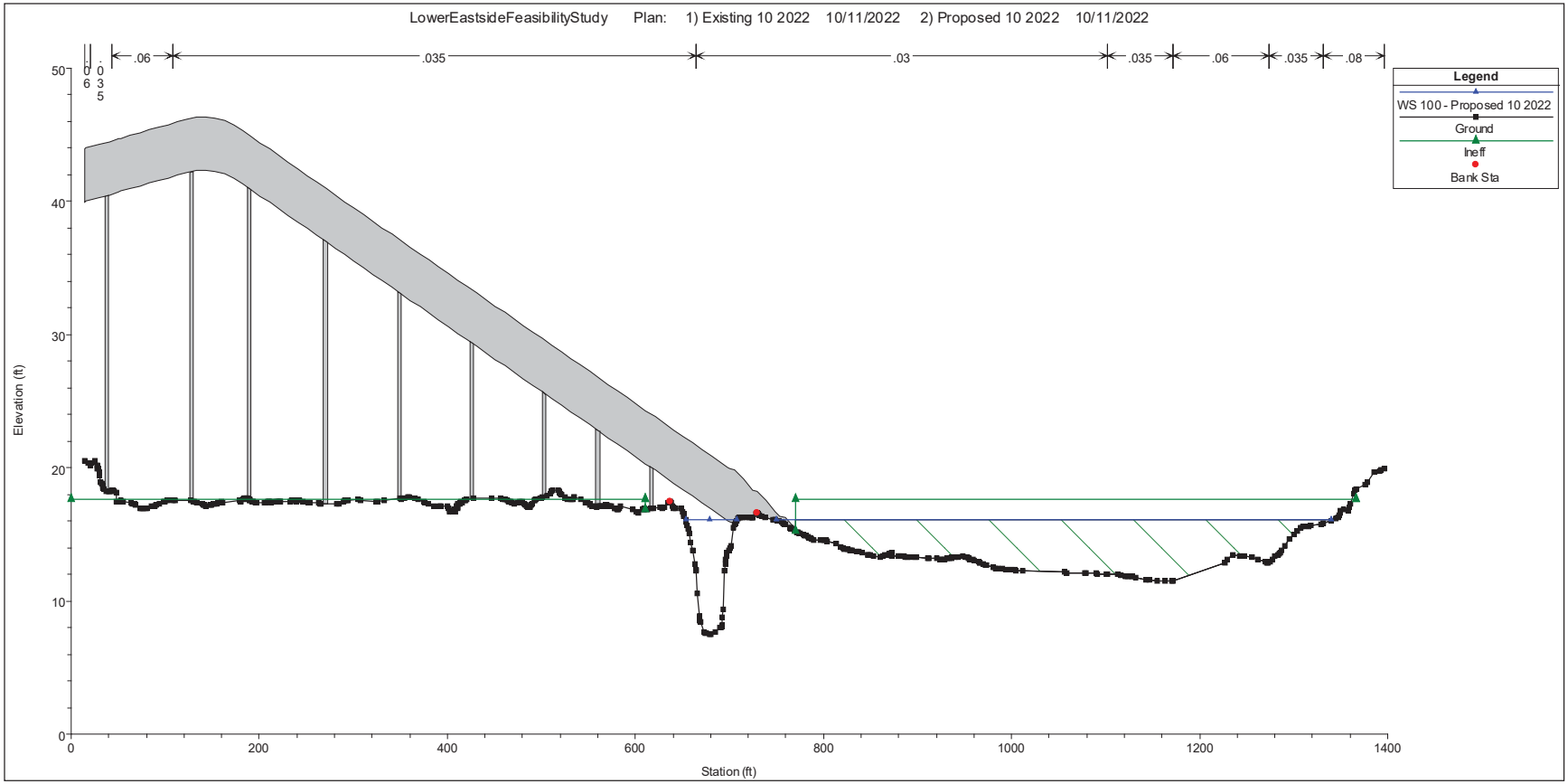


Figure 7. 100-year WSE at the upstream face of the Proposed Bridge and overcrossing structure.



Freeboard

The proposed structure has a minimum soffit elevation of approximately 16.0 ft. The minimum soffit elevation is at the west abutment. Based on the hydraulic results, the proposed structure has no freeboard during the 100-year flow, and approximately 0.1 ft of freeboard during the 50-year flow. Per the Federal Highway Administrator (FHWA) and Caltrans requirements, adequate freeboard is required for the 100-year flow and approximately 2 ft of freeboard for the 50-year flow to pass anticipated drift. The existing structures upstream, US 101, and the UPRR tracks bridges, currently do not have freeboard and will be controlling the flow upstream of the proposed structure. The proposed structure allows more flow conveyance than the adjacent UPRR structure and the future US 101 bridge after opening the 1 and 3 spans. Table 6 shows the existing WSE upstream of the bridges and Table 7 shows the proposed WSE at the existing and proposed structures. Table 8 shows the freeboard for the existing WSE conditions directly upstream of the existing structure and Project location. Table 9 shows the freeboard for the proposed WSE conditions.

Table 6. Existing WSE at the upstream side of existing bridge crossings and the proposed structure.

Locations	WSE (ft)		
	100-year	*50-year*	*55-year*
US 101 Bridge	18.4	18.0	18.0
UPRR Tracks Bridge	17.3	17.0	17.0
Existing Condition at Proposed structure	16.1	14.9	15.0

Table 7. Proposed WSE at the upstream side of the bridge crossings and proposed structure.

Locations	WSE (ft)		
	100-year	*50-year*	*55-year*
US 101 Bridge	18.4	18.0	18.0
UPRR Tracks Bridge	17.3	17.0	17.0
Proposed Structure	16.1	14.9	14.9

Table 8. Freeboard for existing conditions directly upstream of the existing structures and proposed Project.

Locations	Minimum Soffit Elevation (ft)	Freeboard (ft)		
		100-year	*50-year*	*55-year*
US 101 Bridge	15.0	-3.4	-3.0	-3.0
UPRR Tracks Bridge	15.9	-1.4	-1.1	-1.1

Note: Negative values indicate the bridge has no freeboard.

Table 9. Freeboard for Proposed WSE directly upstream of the existing structures and proposed Project.

Locations	Minimum Soffit Elevation (ft)	Freeboard (ft)		
		100-year	*50-year*	*55-year*
US 101 Existing Bridge	15.0	-3.4	-3.0	-3.0
UPRR Tracks Bridge	15.9	-2.3	-2.0	-2.0
Proposed Structure	16.0	-1.1	0.1	0.1

Note: Negative values indicate the bridge has no freeboard.

4. Conclusions

Based on the preliminary results of the hydraulics model, the proposed overcrossing structure will result in negligible impact to the floodplain WSE. Further analysis will be needed during the final design of this Project, and coordination with a floodplain administrator will be required to corroborate any potential floodplain impacts.

The proposed structure has a wider opening and will provide more freeboard that the surrounding structures at the UPRR track and the US 101 bridge. This proposed structure is not anticipated to reduce the target conveyance flow of 3,000 cfs in the channel. The proposed Project will be designed to convey the target discharge of 3,000 cfs and is anticipated to maintain the goals of the Master Plan for Sycamore Creek.

Final Design Recommendations

Recommendations and Limitations

Additional survey is recommended for the design of this Project. The survey extent was limited and did not extend the entire width of the floodplain. Three cross sections in the channel were updated to the current surface conditions. The additional cross sections were interpolated from the LOMR cross section geometry. The 0.04 ft increase is negligible based on the resolution of the elevation data used to update the feasibility model. Due to the limited accuracy of the topography, the model results cannot confirm any significant impact to the channel. During Project development, additional survey is recommended to be obtained and implemented into the hydraulic evaluation. The hydraulic model utilized a version 4.1.0 HEC-RAS model from the LOMR with several lateral structures and gates, which makes the model considerably sensitive and close coordination with the design and hydraulic team is recommended to address any hydraulic issues that may arise. In the design phase of this Project a 2-dimensional (2-D) model is recommended to determine accurate flow paths around the proposed structure. Figure 8 illustrates the cross sections and topographic land survey needed for updating the 1-dimensional (1-D) and developing a 2-D model.

Figure 8. Locations for additional survey requests.

Source: ESRI, 2022

Scope of Work

The following lists the items recommended for the hydraulic studies during the Project development and design phase:

- Project Management and Meetings
- Field Visit
- Location Hydraulic Study (LHS)
- Hydrologic and Hydraulic Analyses for LHS
- Bridge Design Hydraulic Study (BDHS)
- Hydrologic and Hydraulic Analyses for BDHS
- Scour and RSP Calculations

Below is a description of the recommended deliverables scoped for this Project.

The LHS would document the existing floodplains within the Project limits and discuss any potential impacts caused by improvements by the Project. The Project is located in SFHA Zone AE, which represents areas subject to flooding by the 100-year flood event determined by detailed methods where BFE are shown (see Figure 4). The Project site is also within a regulatory floodway, which prohibits any new construction in the regulatory floodway that results in an increase in flood levels during the base flood discharge. HDR|WRECO would perform hydrologic and hydraulic assessment/analyses of the existing condition and the proposed conditions for the Project. A 1-D model would be developed for the LHS to determine the floodplain impacts caused by the Project. coordination with local floodplain agencies would be required throughout the process.

Based on the Flood Capacity Master Plan for Sycamore Creek (Master Plan) (Penfield & Smith, 2003), the Sycamore Creek flood channel will ultimately be designed to accommodate a 55-year event (3,000 cfs). To accommodate future flood capacity the pedestrian and bicycle overcrossing is proposed to have a span wider than the ultimate span for US 101 and have a soffit above the 55-year flood elevations.

HDR|WRECO would assess impacts to floodplains within the Project limits and minimization or mitigation measures, as appropriate. The findings of the assessment and analyses would be summarized in the Floodplain Evaluation Report.

Due to the complexity of the floodplain at this Project location a 2-D model is recommended to be developed for the BDHS. The BDHS would document the results from the hydraulic and bridge scour analyses and recommendations for bridge scour countermeasures. The report would also include all of the detailed hydraulic model outputs.

5. References

California Coastal Commission.
2018 California Coastal Commission Sea Level Rise Guidance.

California Department of Transportation
2020 *Highway Design Manual*. Chapter 820 Section 821.3 Selection of Design Flood. Page 820-2. <Highway Design Manual (HDM) | Caltrans> (Last accessed: January 20, 2022).

California Department of Transportation
2019 *California Amendments to the AASHTO LRFD Bridge Design Specifications (2017 Eighth Edition).* <https://dot.ca.gov/programs/engineering-services/manuals/lrfd-ca-amendments-8th-edition> (Last accessed: January 20, 2022).

California Department of Transportation
2017 Memo to Designers 16-1 Hydraulic Design for Structures over Waterways. <https://dot.ca.gov/-/media/dot-media/programs/engineering/documents/memotodesigner/f0006651-mtd-16-1-final.pdf> (Last accessed: January 20, 2022).

Bengal Engineering
2018 Sycamore Creek Project Study Report.

Caltrans.
2022 Bridge Inspection Report. Facility Carried: US Highway 101. Bridge Number 51 0332. Structure Name: Sycamore Creek.

Federal Emergency Management Agency
2019a National Flood Hazard Layer for Santa Barbara County.

Federal Emergency Management Agency
2019b *Title 44 Section 60.3 "Flood plain management criteria for flood-prone areas,"* Code of Federal Regulations, U.S. Government Publishing Office.

Federal Emergency Management Agency
2019c Letter of Map Revision, Santa Barbara County, California and Incorporated Areas. Case Numbers 18-09-1503P-060335 and 18-09-1502P-060335, Published: 06/21/2019 & 06/24/2019

Federal Emergency Management Agency
2018a Flood Insurance Rate Map, Santa Barbara County, California and Incorporated Areas. Map Numbers 6083C1391J, Panel 1391 of 1835

Federal Emergency Management Agency
2018b Flood Insurance Study, Santa Barbara County, California and Incorporated Areas. Flood Insurance Study Numbers 06083CV001D and 06083CV002D.

Kasraie Consulting.
2018 Letter of Map Revision Lower Sycamore Creek

Penfield & Smith
2003 Flood Capacity Master Plan for Sycamore Creek. (Last accessed: August 24, 2022)

Santa Barbara County Flood and Water Conservation District
1975 South Coast Watershed Map

Quincy Engineering.
2022a Survey Topo. 22-3473jbb-TOPO Surface Data.dwg

Quincy Engineering.
2022b Proposed Structure Plan. 22-3473rea-000 Exhibit.pdf and Santa Barbara US-101 POC_Align.dwg

Attachment A: Existing HEC-RAS Results

HEC-RAS Plan: Existing 10 2022 River: SycamoreCk Reach: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2165.018 H	50	2916.69	9.80	18.75	16.78	19.40	0.003605	7.06	768.18	669.33	0.51
1	2165.018 H	100	3261.61	9.80	19.21	18.49	19.71	0.002975	6.57	1021.38	870.80	0.46
1	2165.018 H	55	2971.97	9.80	18.81	16.99	19.44	0.003543	7.03	799.77	684.89	0.50
1	2125.002 Punta Gorda		Bridge									
1	2085 G	50	2916.69	9.38	18.28	17.23	18.77	0.002451	6.36	799.64	713.71	0.48
1	2085 G	100	3261.61	9.38	18.79	17.69	19.16	0.001925	5.82	1080.62	933.60	0.43
1	2085 G	55	2971.97	9.38	18.35	17.36	18.82	0.002385	6.31	835.17	742.80	0.47
1	2084		Lat Struct									
1	2035	50	2899.19	9.27	18.26	16.73	18.49	0.001376	4.83	1290.99	942.68	0.36
1	2035	100	3222.61	9.27	18.78	17.10	18.94	0.000998	4.35	1756.67	1134.55	0.31
1	2035	55	2948.55	9.27	18.33	16.80	18.55	0.001325	4.77	1347.53	994.37	0.35
1	2000	50	2884.10	8.95	18.26	16.56	18.43	0.000937	4.34	1555.38	1035.28	0.30
1	2000	100	3194.78	8.95	18.77	16.78	18.90	0.000696	3.93	2029.29	1099.55	0.26
1	2000	55	2931.37	8.95	18.33	16.59	18.50	0.000900	4.28	1618.59	1039.57	0.29
1	1949.992 F	50	2867.02	9.00	18.29	16.06	18.36	0.000484	3.13	2073.54	1032.65	0.22
1	1949.992 F	100	3166.30	9.00	18.79	16.23	18.85	0.000370	2.88	2526.01	1042.08	0.19
1	1949.992 F	55	2913.64	9.00	18.36	16.09	18.43	0.000467	3.10	2136.00	1033.95	0.21
1	1900	50	2853.72	8.84	18.31	14.81	18.32	0.000118	1.54	4049.98	1277.52	0.11
1	1900	100	3144.56	8.84	18.81	14.91	18.82	0.000099	1.49	4593.06	1277.52	0.10
1	1900	55	2900.03	8.84	18.38	14.83	18.39	0.000115	1.54	4124.78	1277.52	0.11
1	1899.1		Lat Struct									
1	1851.133	50	1773.26	8.45	18.12		18.30	0.000633	3.50	635.65	158.84	0.25
1	1851.133	100	1907.83	8.45	18.63		18.79	0.000543	3.42	716.30	158.84	0.23
1	1851.133	55	1794.65	8.45	18.19		18.37	0.000621	3.50	646.68	158.84	0.25
1	1823.768	50	1753.77	8.34	17.95	13.01	18.25	0.000712	4.37	414.74	52.43	0.27
1	1823.768	100	1877.80	8.34	18.44	13.19	18.75	0.000675	4.42	440.28	52.43	0.26
1	1823.768	55	1774.33	8.34	18.02	13.04	18.32	0.000710	4.39	418.17	52.43	0.27
1	1726.932 USH101		Bridge									
1	1659.316	50	1753.77	7.53	16.98	13.00	17.24	0.000932	4.19	438.15	713.22	0.30

HEC-RAS Plan: Existing 10 2022 River: SycamoreCk Reach: 1 (Continued)

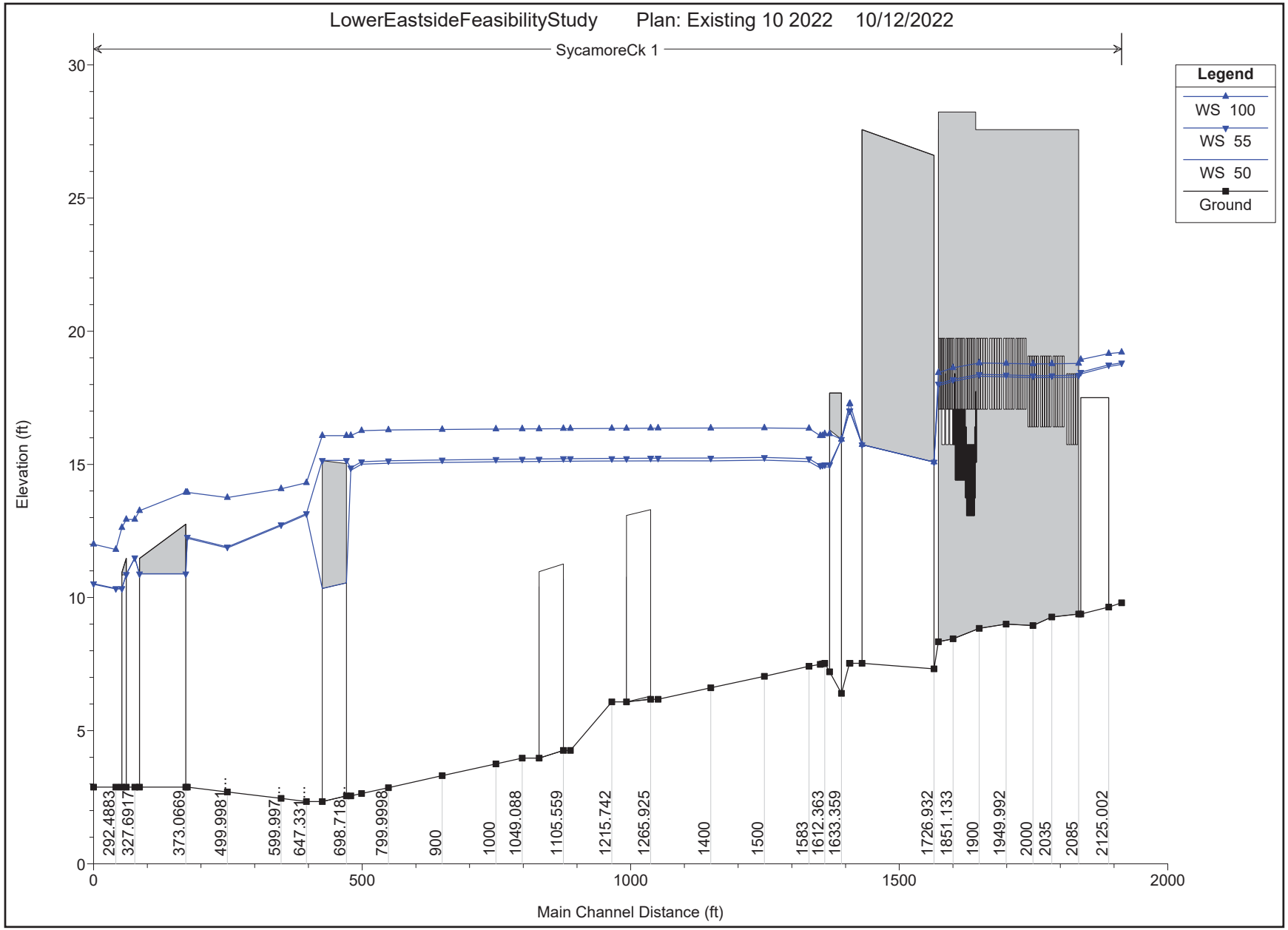
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1659.316	100	1877.80	7.53	17.28	13.27	17.56	0.000899	4.25	463.19	719.25	0.30
1	1659.316	55	1774.33	7.53	17.02	13.05	17.28	0.000934	4.21	441.22	714.03	0.30
1	1658.316	50	1763.25	7.53	16.97	13.03	17.24	0.000945	4.22	437.72	713.11	0.30
1	1658.316	100	1922.88	7.53	17.26	13.36	17.55	0.000954	4.37	461.51	718.87	0.30
1	1658.316	55	1785.43	7.53	17.01	13.07	17.28	0.000948	4.24	440.74	713.90	0.30
1	1633.359 Railroad		Bridge									
1	1612.363	50	1763.25	7.53	14.90	13.12	15.95	0.005372	8.22	214.49	44.46	0.66
1	1612.363	100	1922.88	7.53	16.15	13.46	16.91	0.003473	7.01	274.49	208.90	0.54
1	1612.363	55	1785.43	7.53	14.99	13.17	16.03	0.005240	8.17	218.61	44.92	0.65
1	1608	50	1763.25	7.51	14.88	13.13	15.91	0.005239	8.16	216.13	236.62	0.66
1	1608	100	1966.72	7.51	16.08	13.55	16.87	0.003638	7.18	274.10	542.33	0.56
1	1608	55	1785.43	7.51	14.97	13.18	15.99	0.005106	8.10	220.32	270.94	0.65
1	1604	50	1763.25	7.49	14.86	13.14	15.90	0.003466	8.16	216.20	563.19	0.66
1	1604	100	1966.72	7.49	16.07	13.57	16.85	0.002376	7.10	283.46	645.92	0.56
1	1604	55	1785.43	7.49	14.96	13.19	15.97	0.003376	8.10	220.44	567.68	0.65
1	1583	50	1763.25	7.42	15.10	13.20	15.53	0.002593	5.79	400.65	605.62	0.47
1	1583	100	1966.72	7.42	16.35	14.53	16.51	0.001086	3.79	663.33	717.30	0.31
1	1583	55	1785.43	7.42	15.21	13.25	15.60	0.002390	5.59	420.79	609.71	0.45
1	1500	50	1763.25	7.04	15.16	12.75	15.27	0.000751	3.19	722.35	642.69	0.26
1	1500	100	1966.72	7.04	16.37	14.09	16.42	0.000256	2.10	1108.77	687.77	0.16
1	1500	55	1785.43	7.04	15.26	12.81	15.36	0.000676	3.06	755.31	643.90	0.25
1	1400	50	1763.25	6.61	15.13	13.50	15.18	0.000334	2.22	1036.15	592.05	0.17
1	1400	100	1966.72	6.61	16.36	13.63	16.39	0.000120	1.48	1543.85	668.87	0.11
1	1400	55	1785.43	6.61	15.24	13.52	15.28	0.000302	2.13	1079.55	594.27	0.17
1	1302.082 E	50	1763.25	6.18	15.13	11.31	15.16	0.000129	1.66	1466.49	524.40	0.11
1	1302.082 E	100	1966.72	6.18	16.36	12.96	16.38	0.000054	1.18	2109.20	619.30	0.07
1	1302.082 E	55	1785.43	6.18	15.24	11.63	15.26	0.000119	1.60	1516.81	527.17	0.11
1	1265.925 Zoo Ent		Culvert									
1	1215.742	50	1763.25	6.61	15.13	12.52	15.15	0.000110	1.51	1473.99	416.96	0.10
1	1215.742	100	1966.72	6.61	16.35	12.62	16.36	0.000062	1.10	1999.59	487.80	0.08

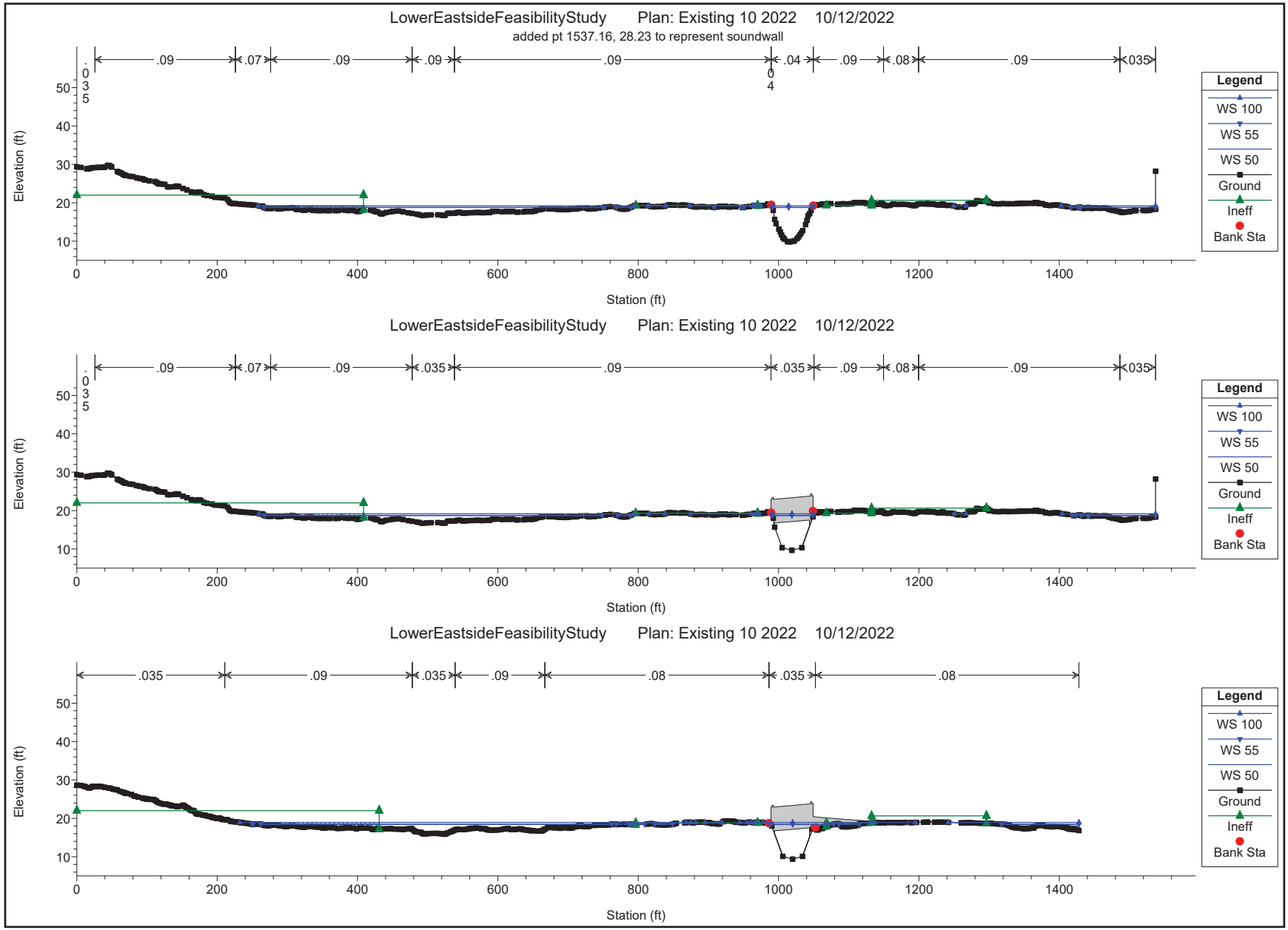
HEC-RAS Plan: Existing 10 2022 River: SycamoreCk Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1215.742	55	1785.43	6.61	15.22	12.53	15.24	0.000104	1.48	1513.65	418.05	0.10
1	1138.584	50	1763.25	5.26	15.12	9.74	15.14	0.000079	1.44	1605.96	406.04	0.09
1	1138.584	100	1966.72	5.26	16.35	10.06	16.36	0.000041	1.13	2191.48	628.70	0.07
1	1138.584	55	1785.43	5.26	15.22	9.78	15.24	0.000075	1.41	1645.34	420.24	0.09
1	1105.559 Por La Mar Cir N		Culvert									
1	1049.088	50	1763.25	5.41	15.10	9.87	15.13	0.000101	1.32	1465.02	374.57	0.09
1	1049.088	100	1966.72	5.41	16.33	10.18	16.35	0.000052	1.01	2013.96	485.30	0.07
1	1049.088	55	1785.43	5.41	15.20	9.90	15.22	0.000097	1.30	1500.22	385.56	0.09
1	1000	50	1763.25	5.43	15.10	12.04	15.12	0.000111	1.44	1368.90	338.48	0.10
1	1000	100	1966.72	5.43	16.33	12.15	16.34	0.000058	1.14	1888.70	486.75	0.07
1	1000	55	1785.43	5.43	15.19	12.05	15.21	0.000106	1.42	1400.44	346.94	0.10
1	900 D	50	1763.25	5.48	15.07	11.87	15.11	0.000155	1.60	1134.73	274.10	0.12
1	900 D	100	1966.72	5.48	16.31	11.98	16.34	0.000086	1.27	1535.94	433.85	0.09
1	900 D	55	1785.43	5.48	15.17	11.88	15.20	0.000149	1.57	1161.05	288.84	0.12
1	799.9998	50	1763.25	5.52	15.04	11.06	15.09	0.000172	1.61	993.23	232.01	0.12
1	799.9998	100	1966.72	5.52	16.29	11.20	16.33	0.000106	1.35	1293.85	538.61	0.10
1	799.9998	55	1785.43	5.52	15.14	11.08	15.19	0.000167	1.59	1011.95	236.26	0.12
1	750.0403 C	50	1763.25	5.54	15.01	10.19	15.08	0.000217	2.20	830.40	271.63	0.14
1	750.0403 C	100	1966.72	5.54	16.26	10.43	16.32	0.000159	1.95	1064.41	750.80	0.12
1	750.0403 C	55	1785.43	5.54	15.10	10.22	15.17	0.000212	2.19	843.58	303.99	0.14
1	729.7717	50	1763.25	5.55	14.77	10.19	15.05	0.000842	4.20	419.50	66.75	0.30
1	729.7717	100	1966.72	5.55	16.08	10.51	16.29	0.000544	3.78	561.67	273.49	0.24
1	729.7717	55	1785.43	5.55	14.87	10.23	15.14	0.000829	4.19	425.90	67.21	0.29
1	698.7187 Por La Mar Cir S		Culvert									
1	647.3312	50	1763.25	5.34	13.11	10.01	13.51	0.001471	5.08	346.96	63.41	0.38
1	647.3312	100	1966.72	5.34	14.31	10.29	14.64	0.000995	4.63	425.13	89.69	0.32
1	647.3312	55	1785.43	5.34	13.15	10.05	13.56	0.001476	5.10	349.80	63.65	0.38
1	599.9979	50	1763.25	5.46	12.69		13.34	0.003085	6.44	273.75	57.64	0.52
1	599.9979	100	1966.72	5.46	14.08		14.54	0.001865	5.44	364.80	76.54	0.41
1	599.9979	55	1785.43	5.46	12.74		13.39	0.003092	6.46	276.26	57.98	0.52

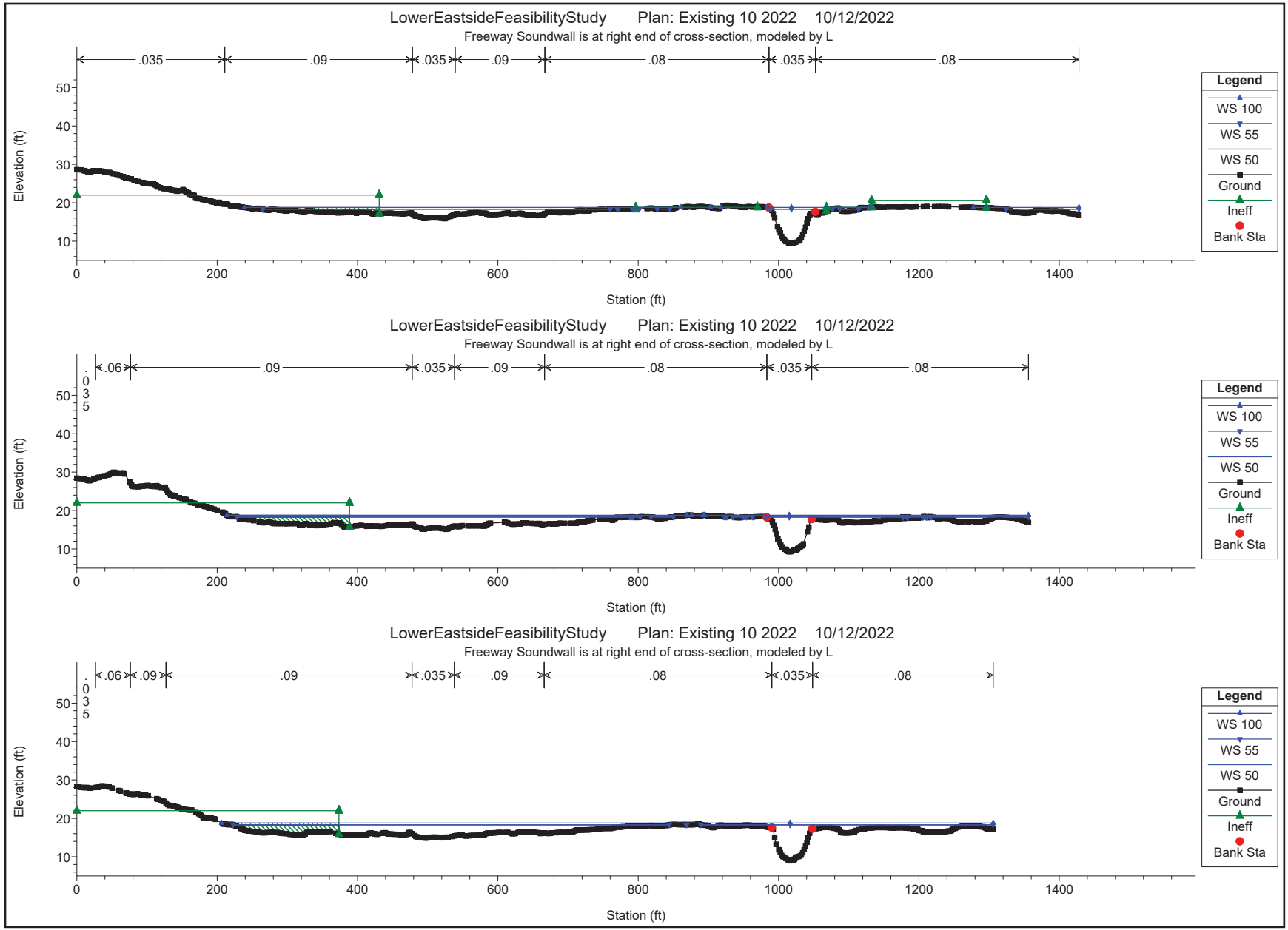
HEC-RAS Plan: Existing 10 2022 River: SycamoreCk Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	499.9981 B	50	1763.25	5.70	11.86	10.71	12.89	0.005838	8.14	216.71	51.95	0.70
1	499.9981 B	100	1966.72	5.70	13.75	11.04	14.32	0.002462	6.01	327.02	64.50	0.47
1	499.9981 B	55	1785.43	5.70	11.90	10.75	12.93	0.005832	8.16	218.91	52.25	0.70
1	425.6141	50	1763.25	5.88	12.22	9.05	12.49	0.001155	4.17	422.89	83.65	0.33
1	425.6141	100	1966.72	5.88	13.95	9.28	14.12	0.000544	3.40	592.36	118.47	0.23
1	425.6141	55	1785.43	5.88	12.27	9.08	12.54	0.001155	4.19	426.61	83.87	0.33
1	373.0669 Cabrillo		Bridge									
1	327.6917 A	50	1763.25	5.88	11.48	9.05	11.85	0.001779	4.91	359.46	77.38	0.40
1	327.6917 A	100	1966.72	5.88	12.93	9.28	13.18	0.000949	4.11	493.80	258.07	0.30
1	327.6917 A	55	1785.43	5.88	11.50	9.08	11.88	0.001801	4.94	361.06	78.94	0.40
1	305.2341 Pedestrian Bridg		Bridge									
1	292.4883	50	1763.25	5.88	10.32	9.22	11.23	0.005356	7.66	230.29	53.17	0.65
1	292.4883	100	1966.72	5.88	11.80	9.47	12.43	0.002714	6.35	309.79	81.12	0.47
1	292.4883	55	1785.43	5.88	10.34	9.25	11.26	0.005409	7.72	231.41	53.18	0.65
1	250.9678	50	1763.25	5.88	10.50	8.98	10.92	0.003003	5.23	337.19	119.99	0.50
1	250.9678	100	1966.72	5.88	12.00	9.22	12.25	0.001110	3.98	494.50	243.92	0.33
1	250.9678	55	1785.43	5.88	10.52	9.00	10.95	0.003002	5.25	339.91	121.38	0.50

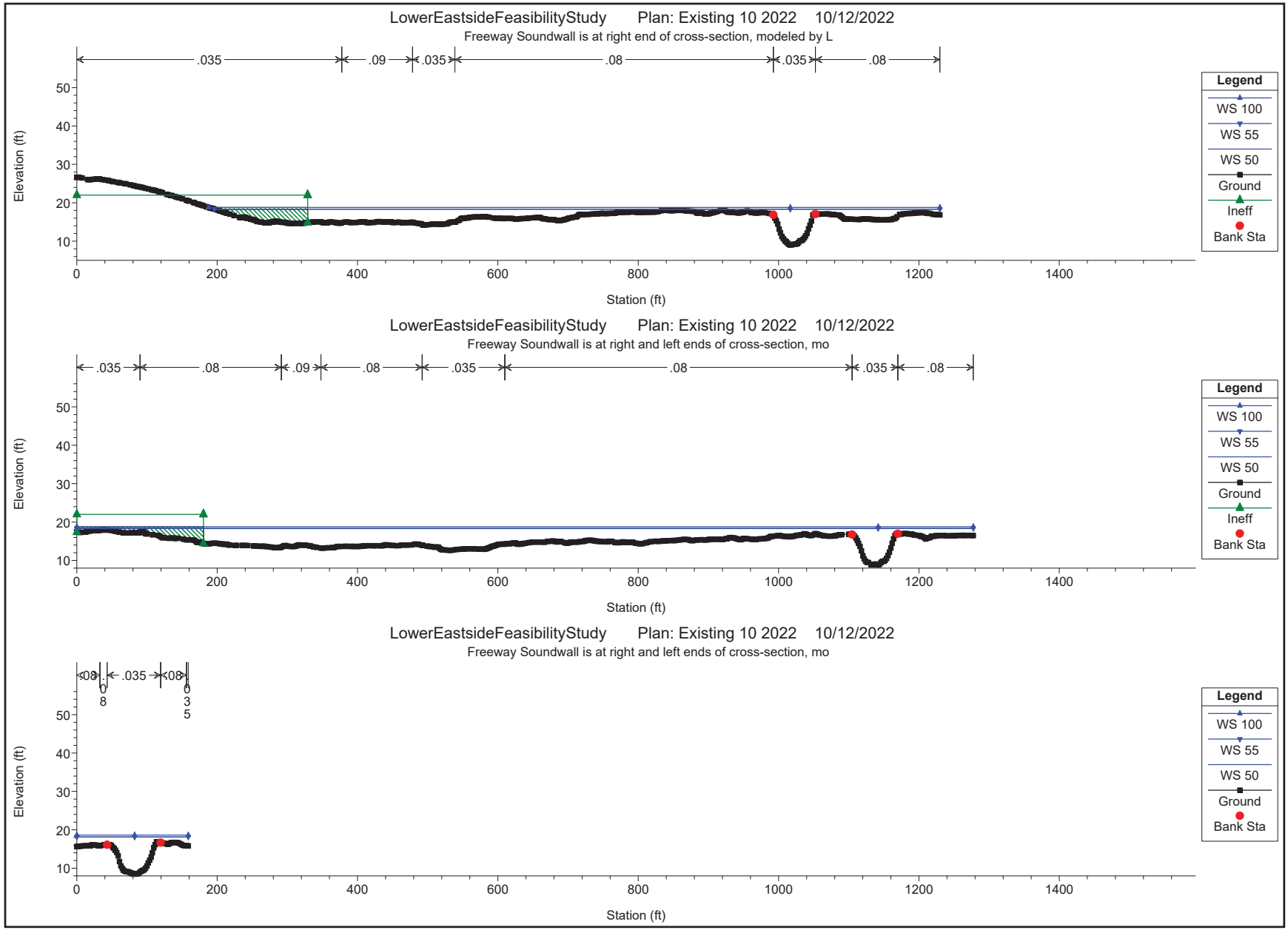

LowerEastsideFeasibilityStudy Plan: Existing 10 2022 10/12/2022
SycamoreCk 1
Legend
WS 100
WS 55
WS 50
Ground
Elevation (ft)
Main Channel Distance (ft)
0
5
10
15
20
25
30
0
500
1000
1500
2000
292.4883
327.6917
373.0669
499.9981
599.997
647.33
698.718
799.9998
900
1000
1049.088
1105.559
1215.742
1265.925
1400
1500
1583
1612.363
1633.359
1726.932
1851.133
1900
1949.992
2000
2035
2085
2125.002



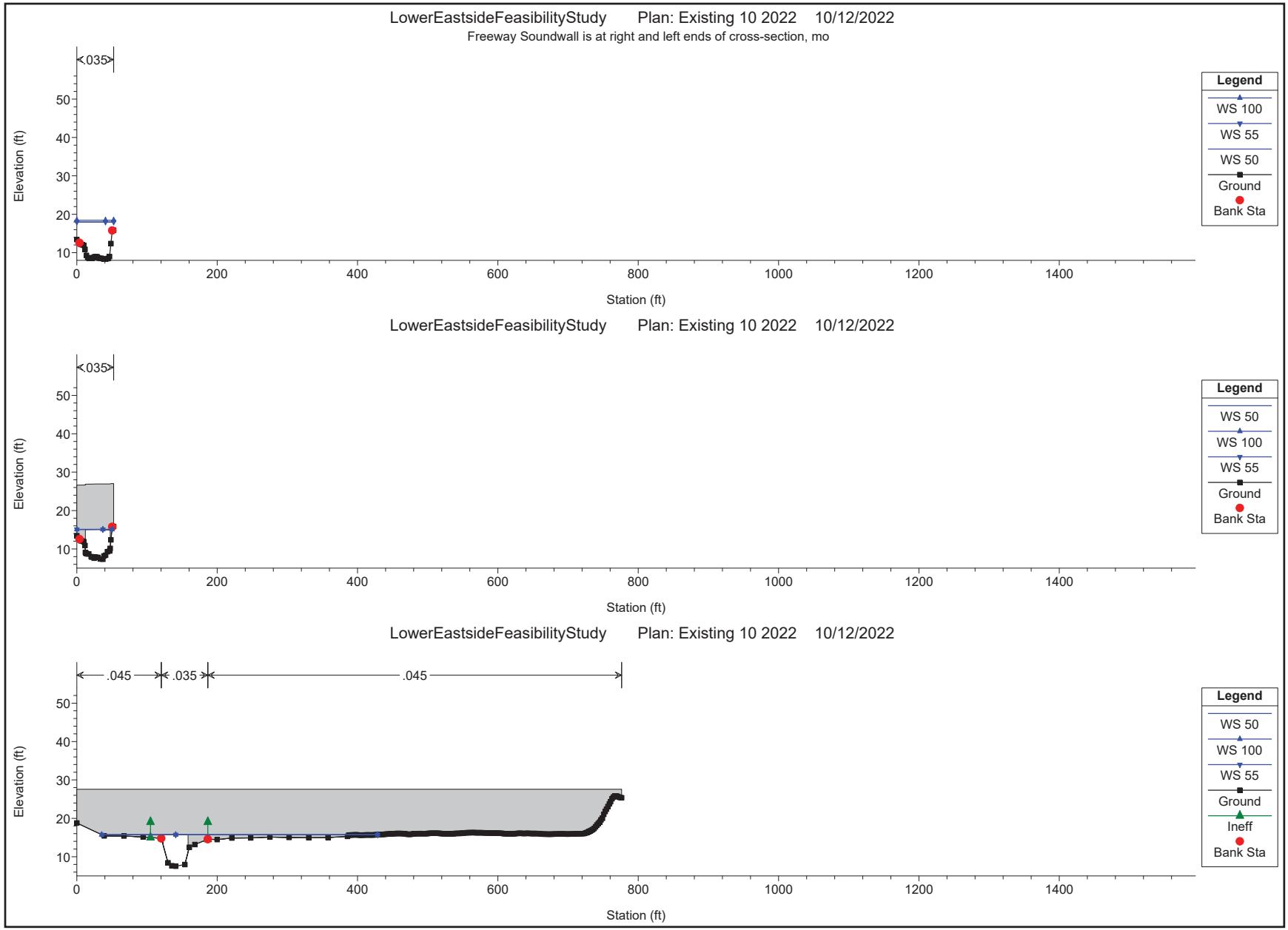
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



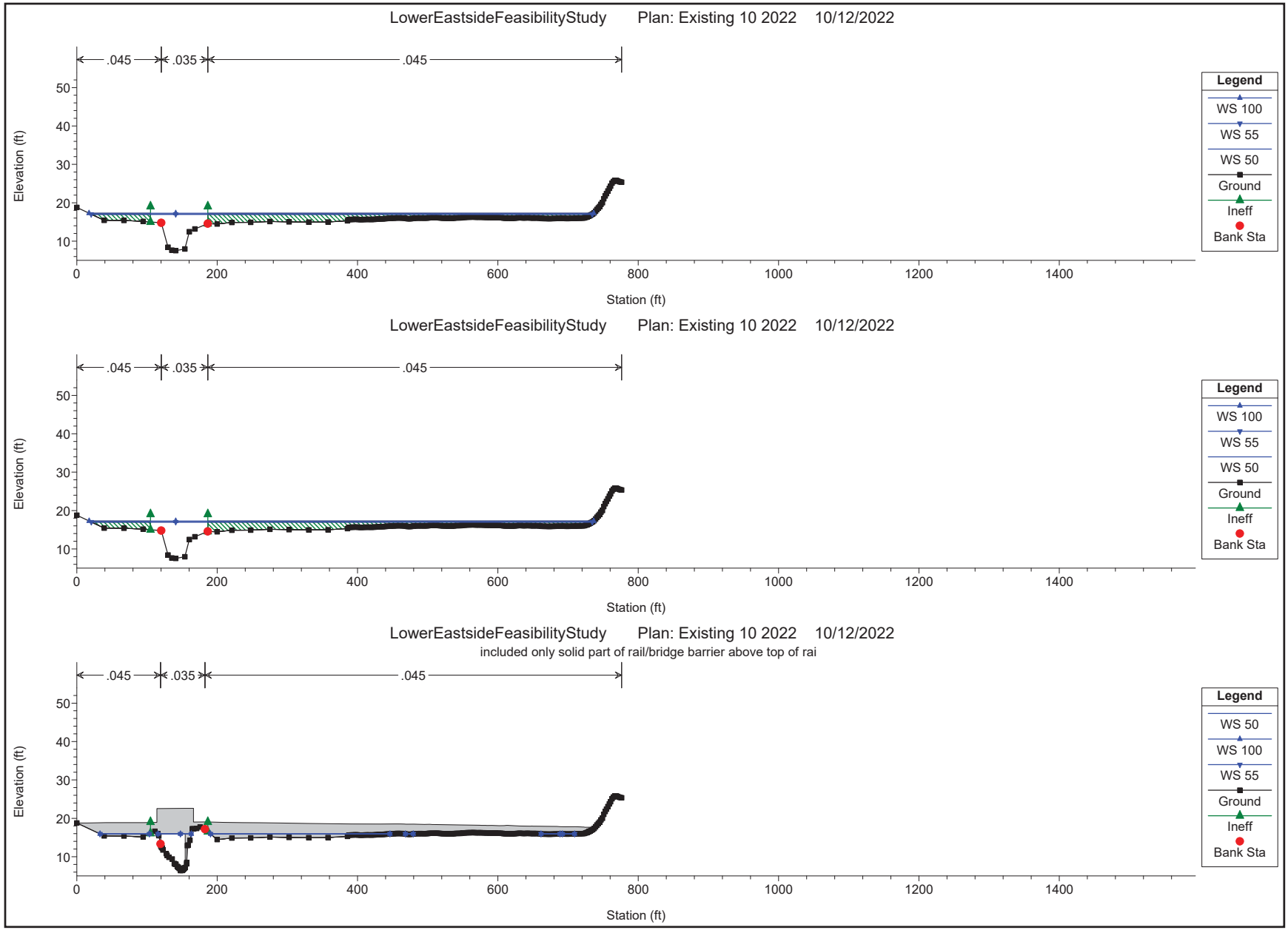
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



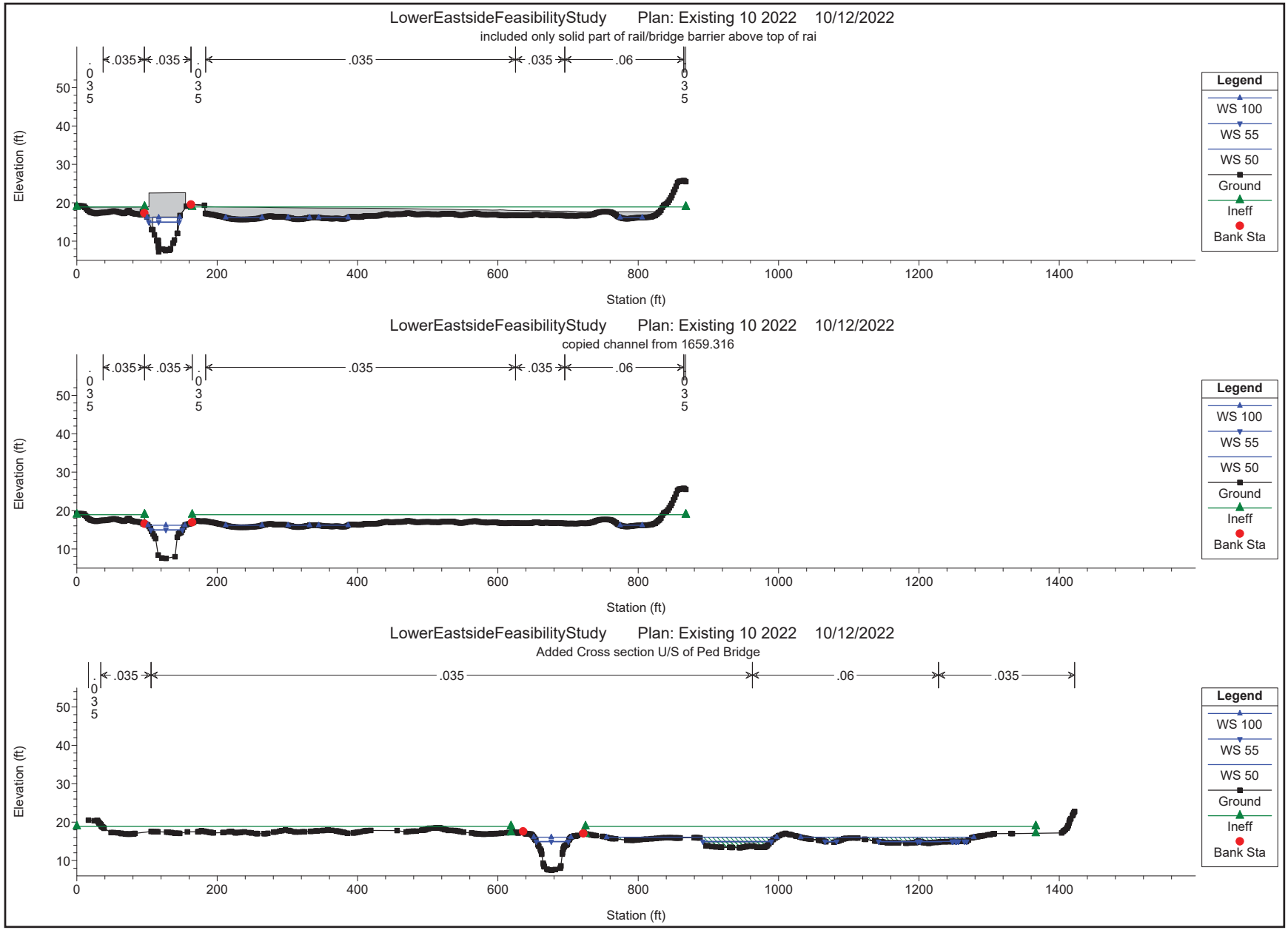
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



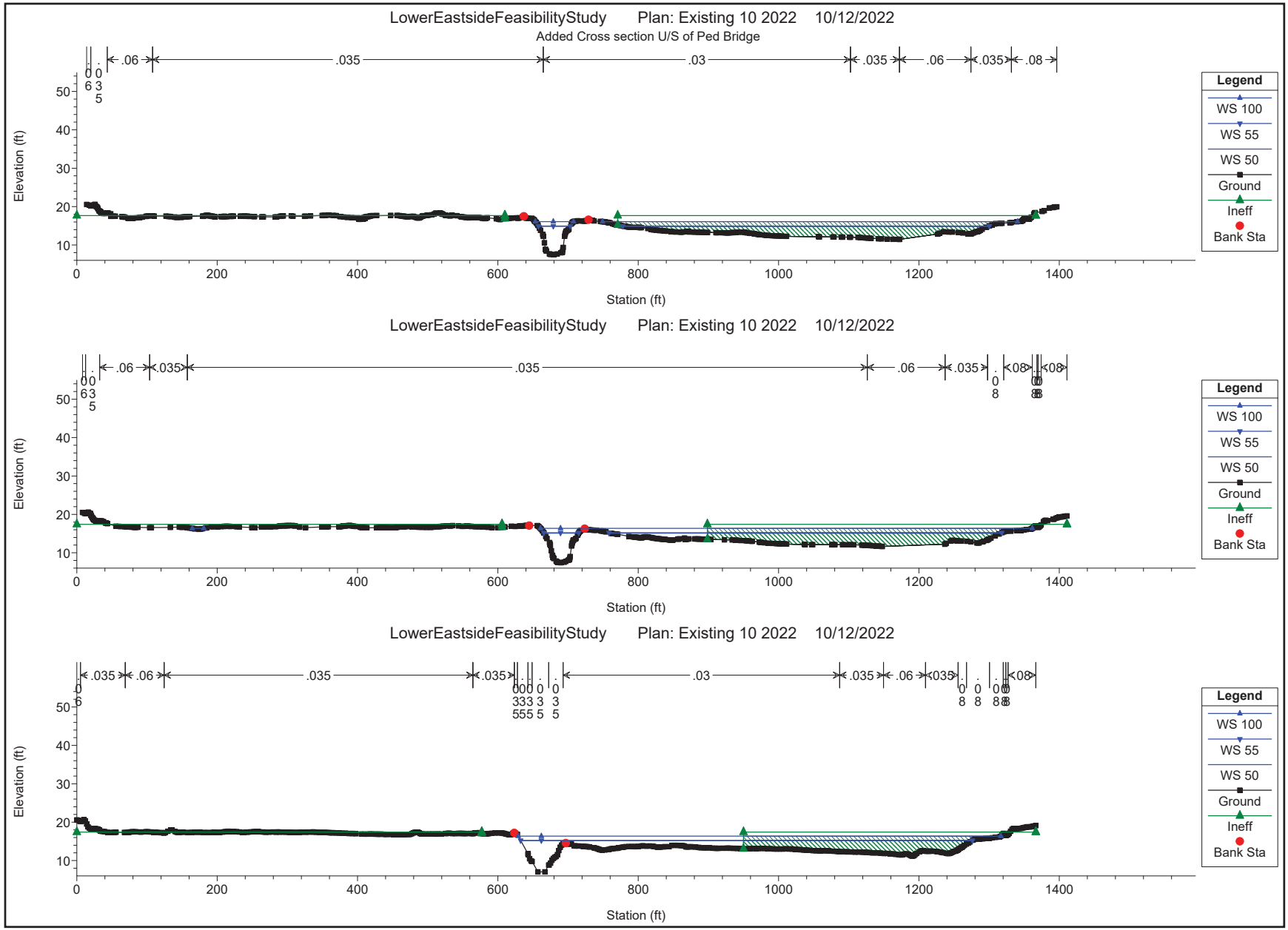
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



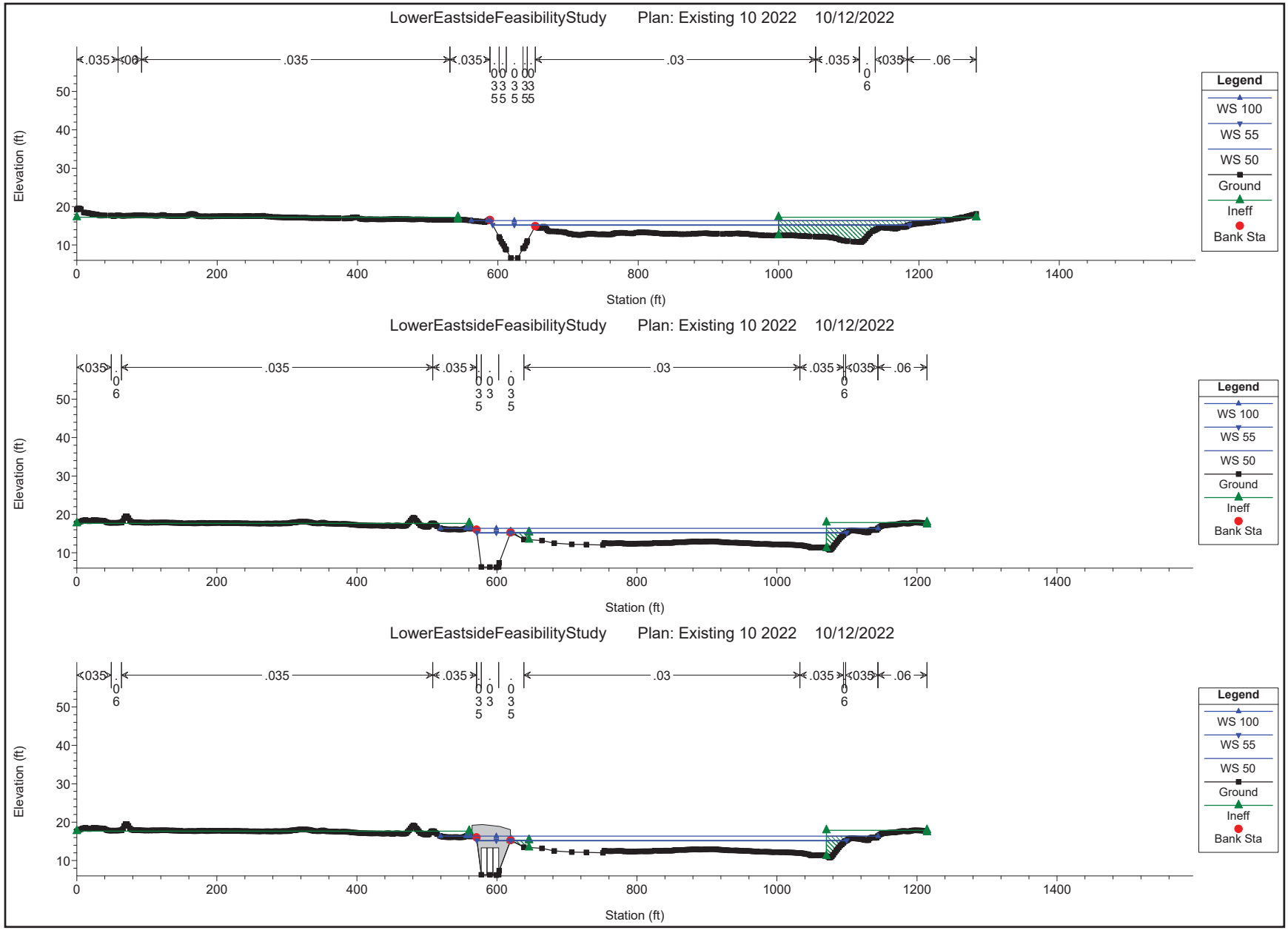
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



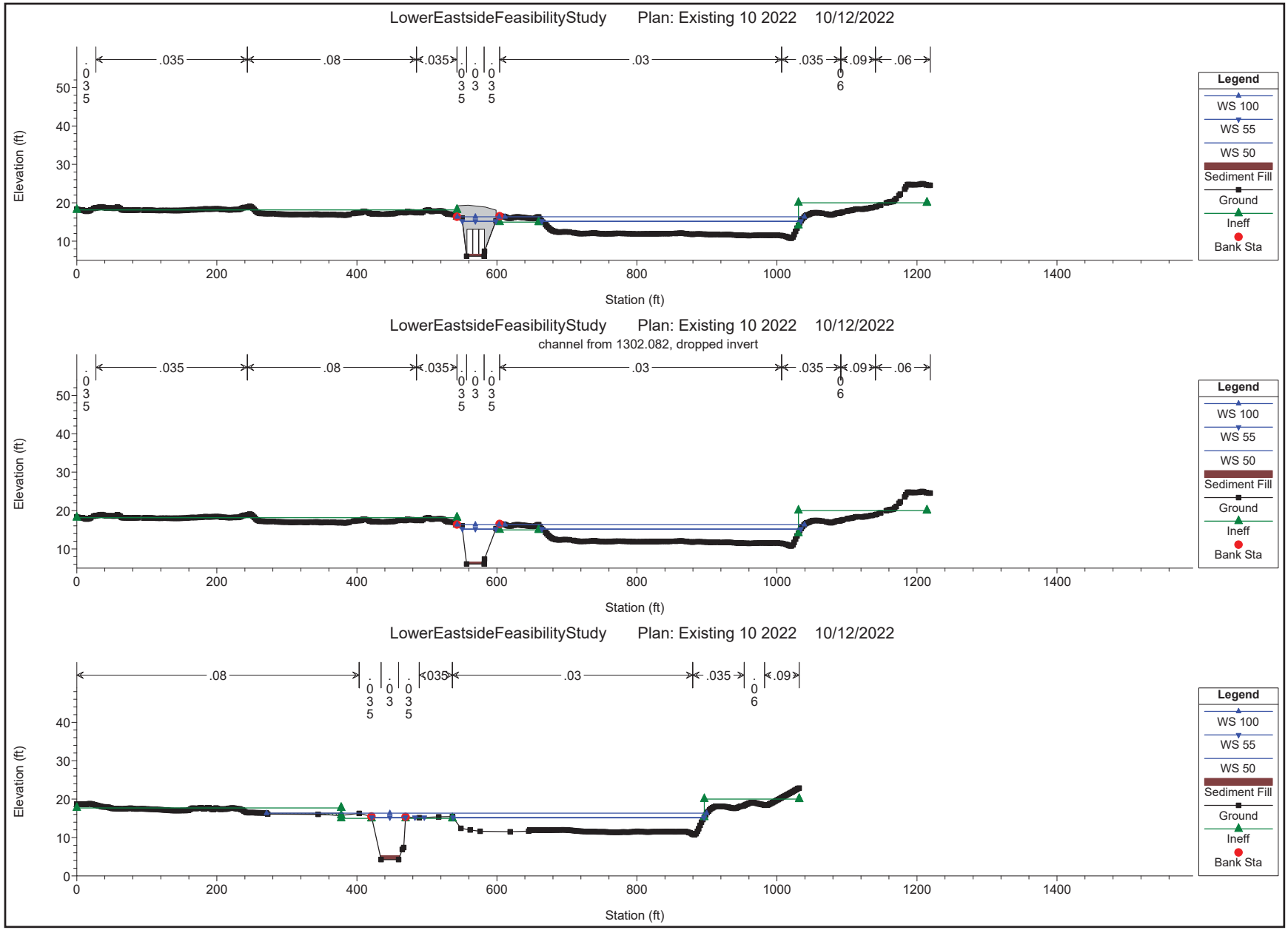
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



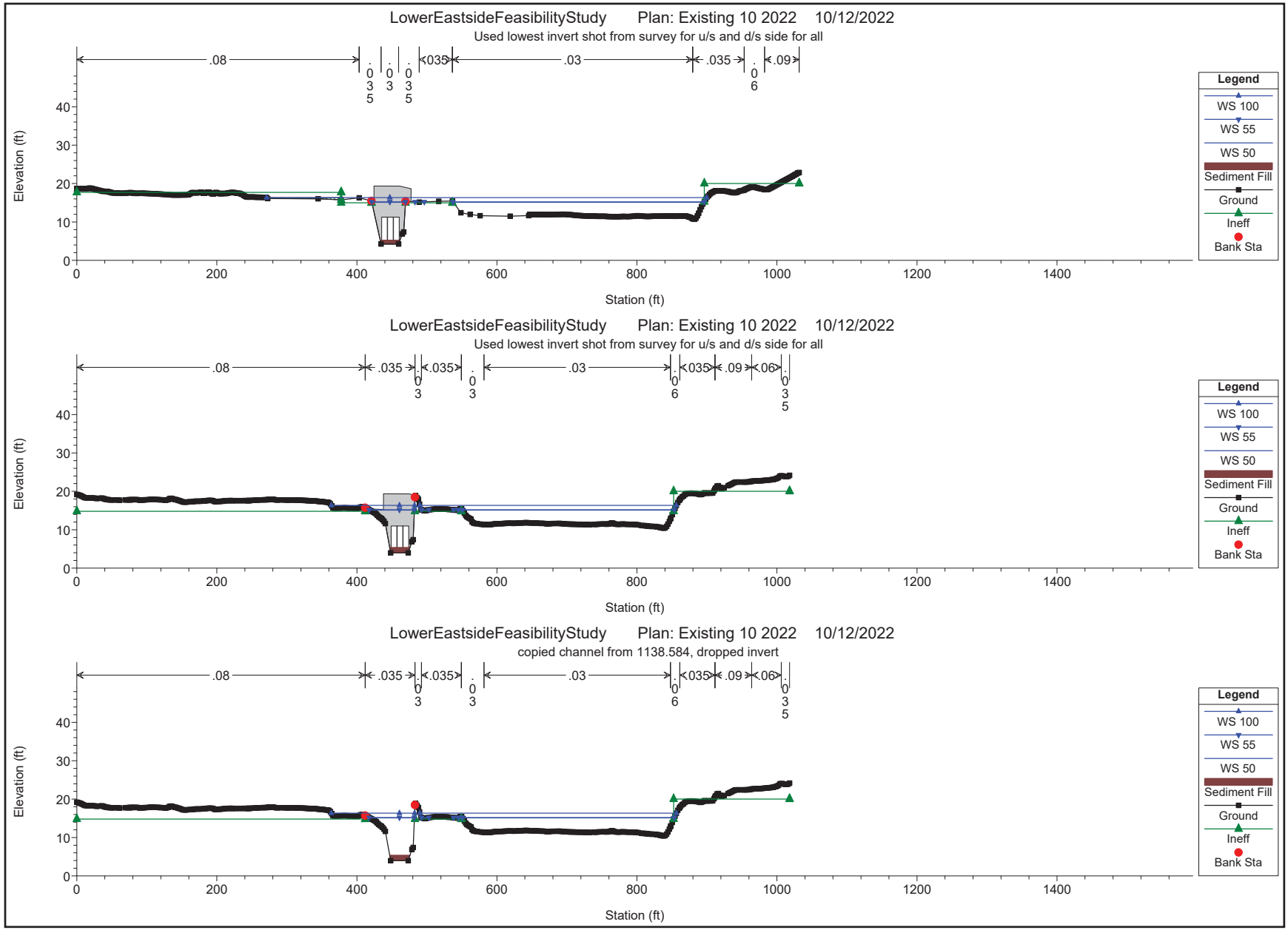
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



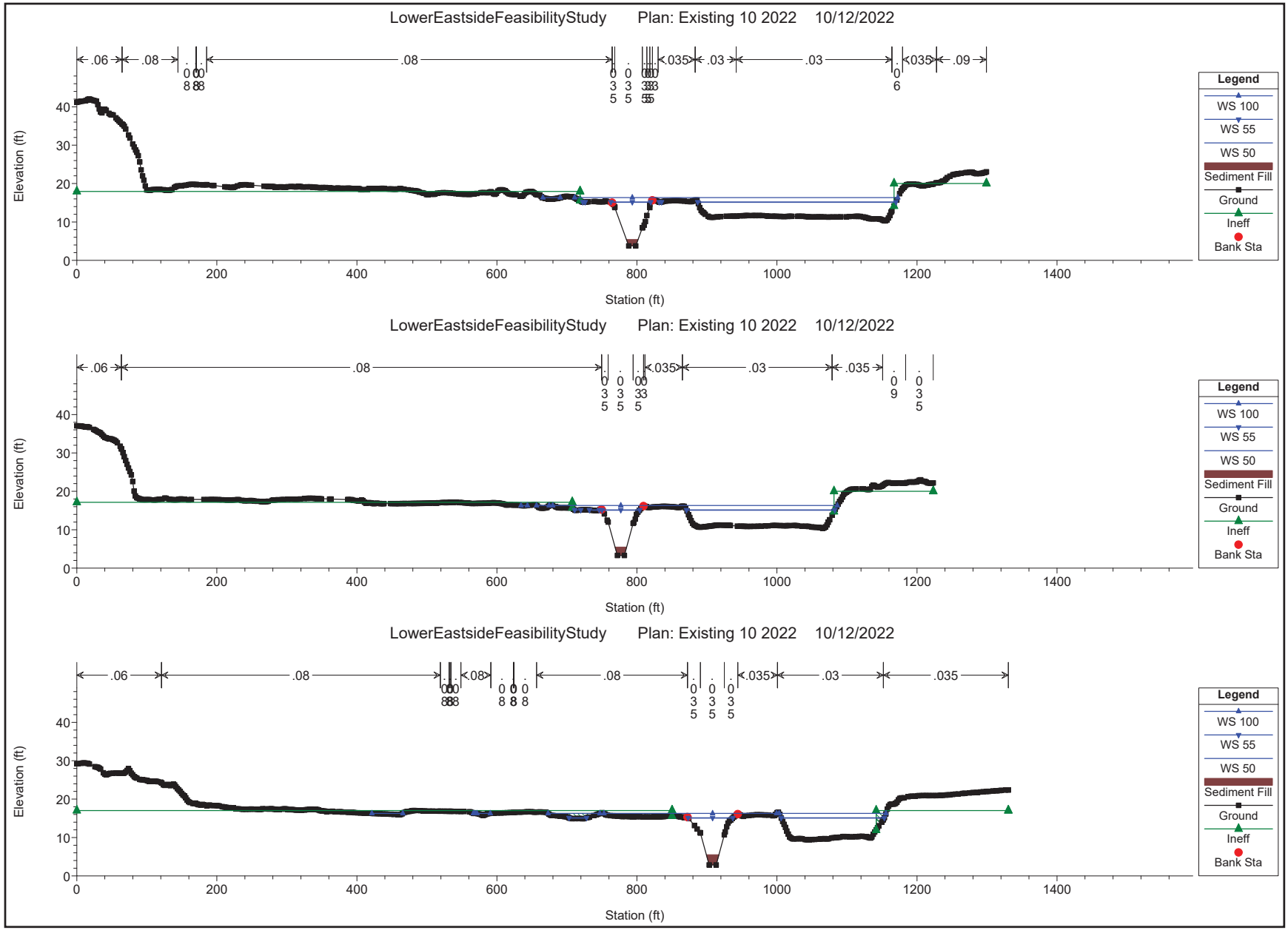
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



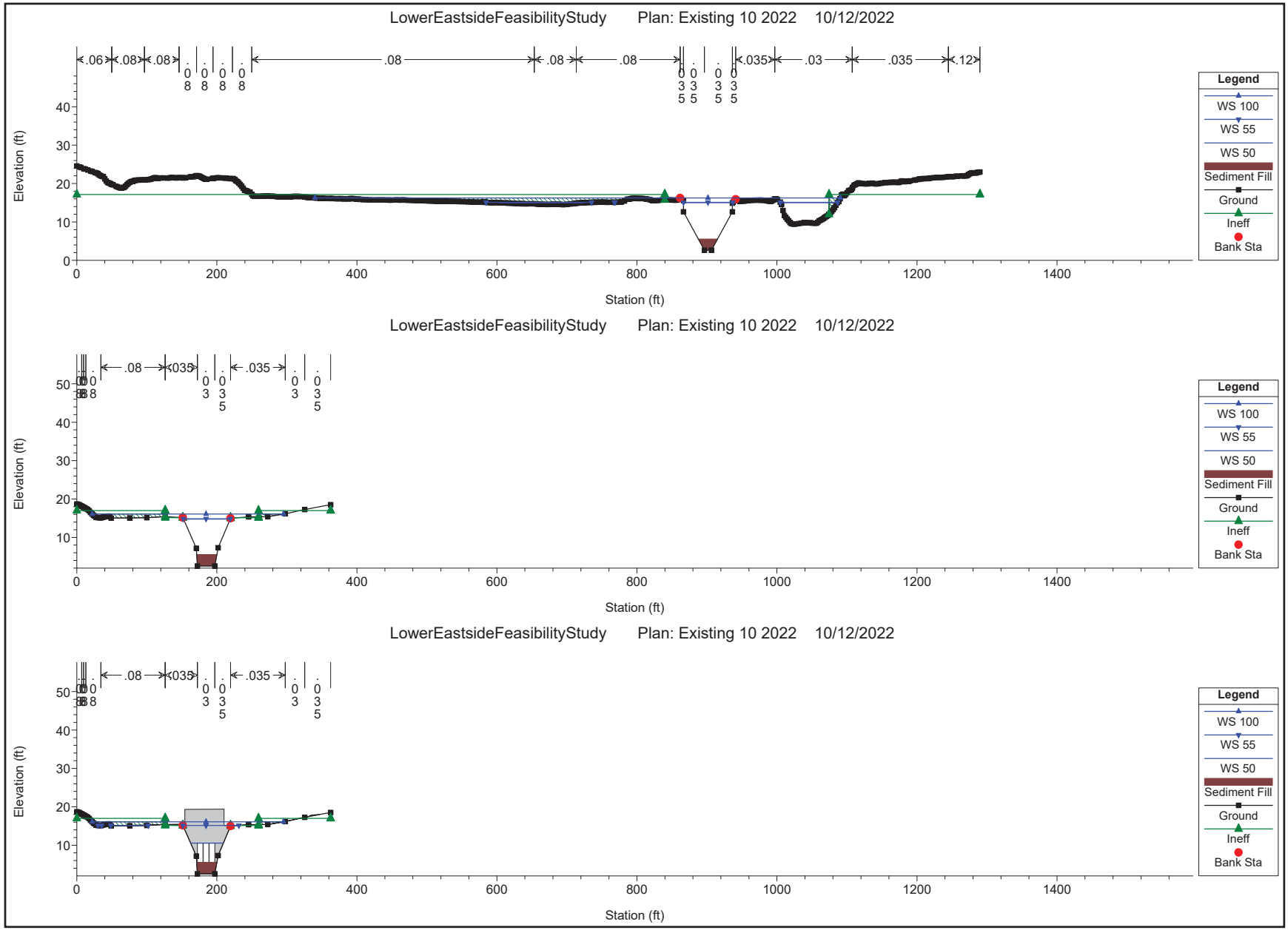
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



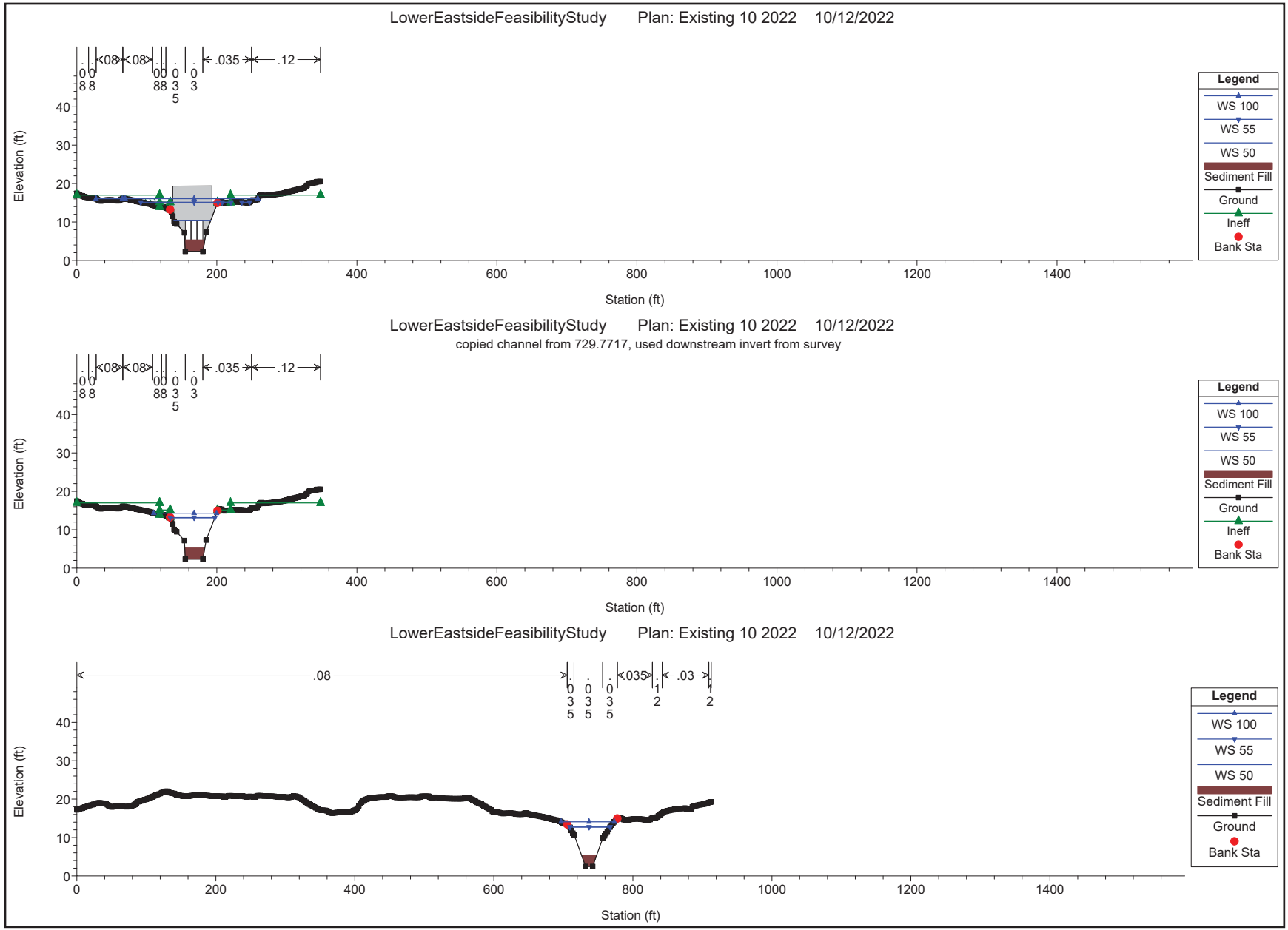
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



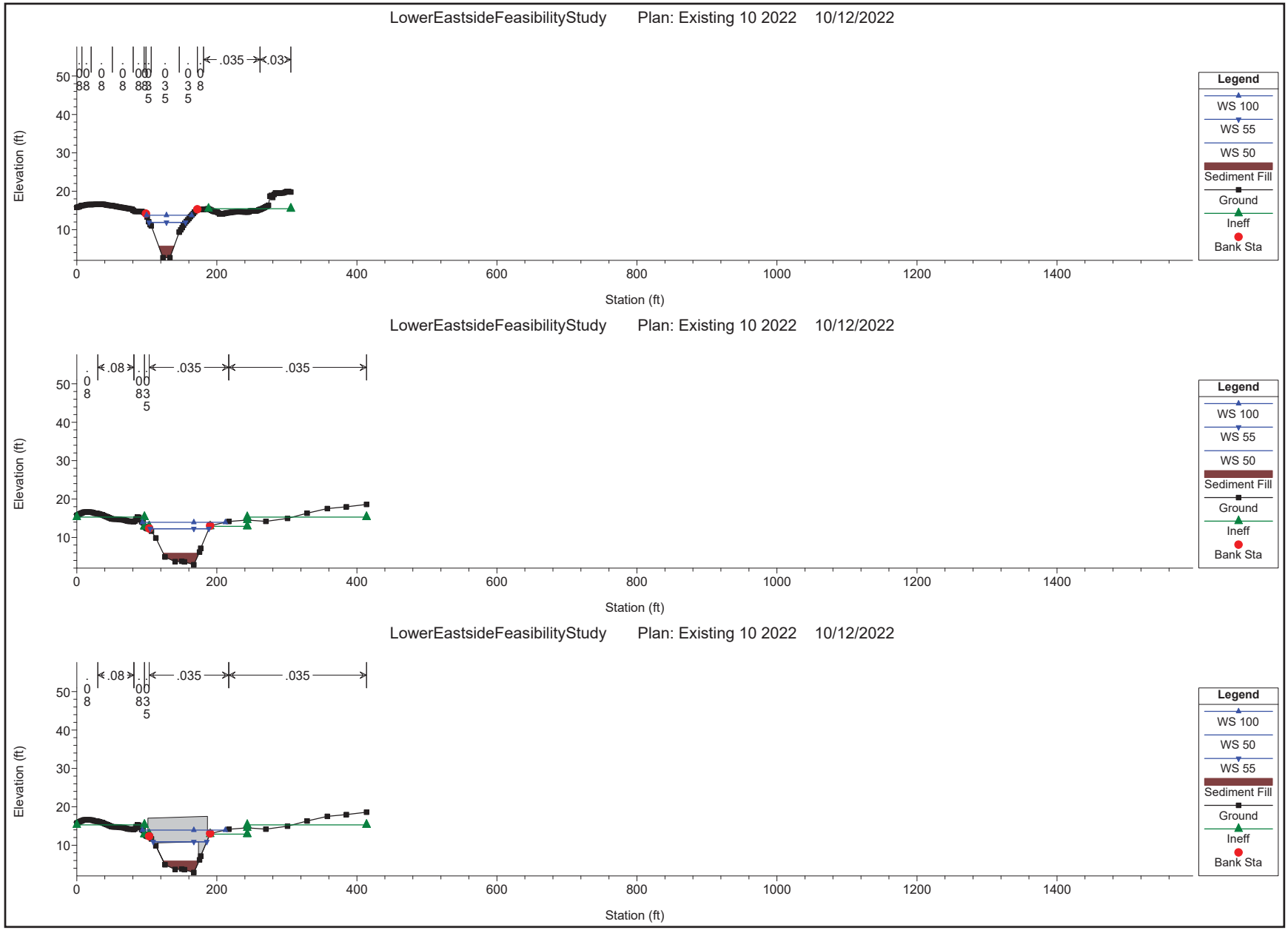
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



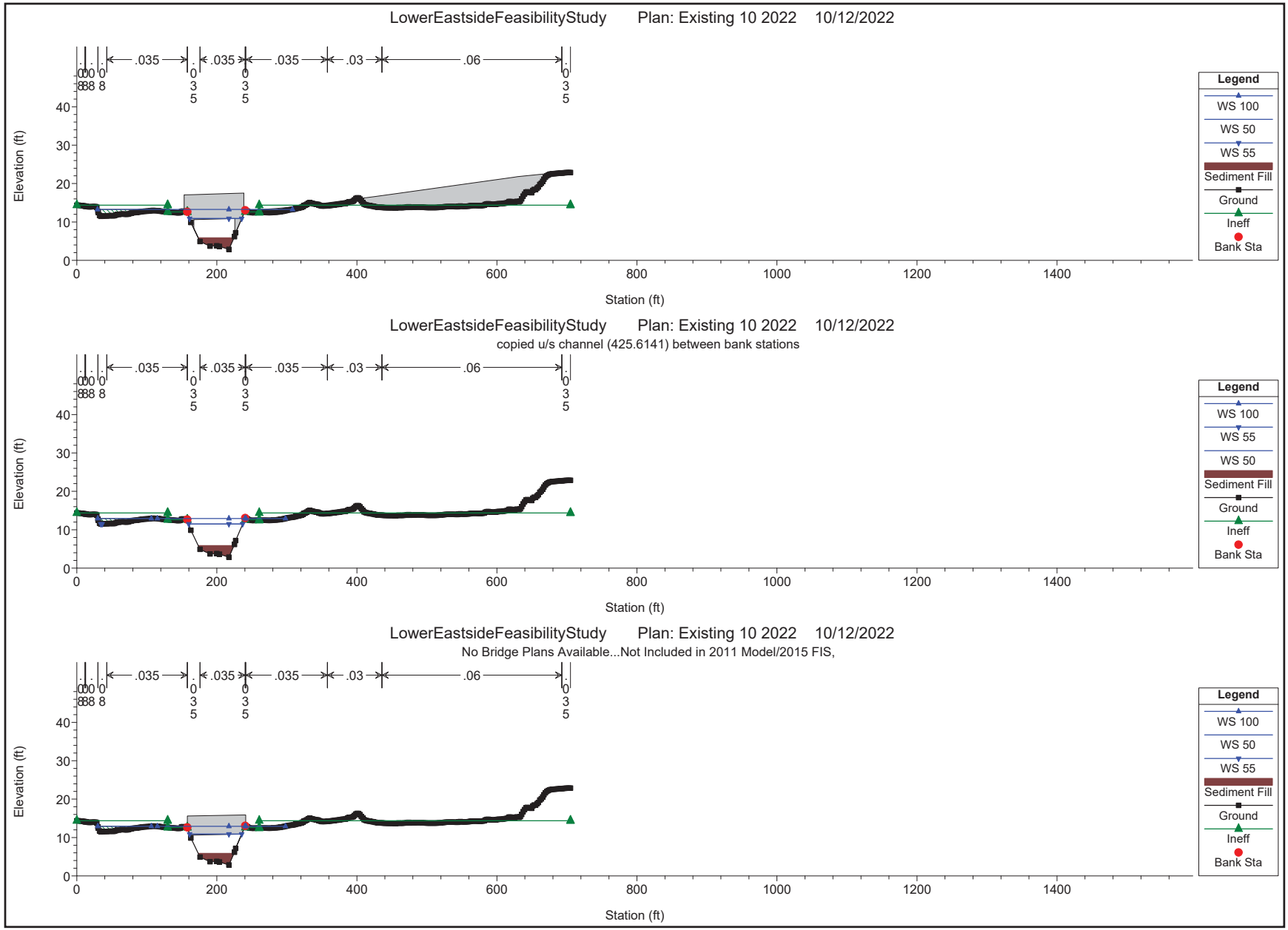
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



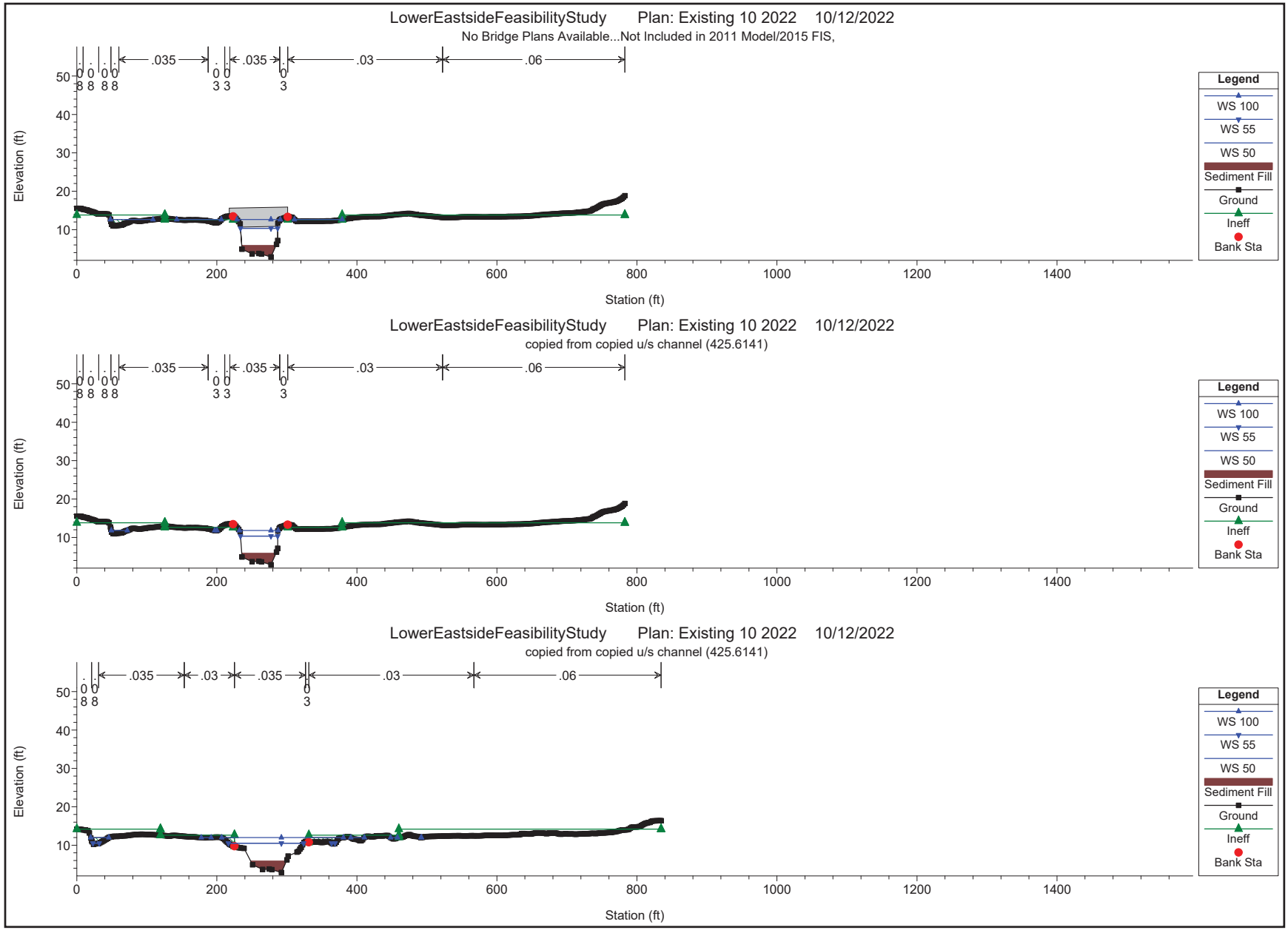
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft

Attachment B: Proposed HEC-RAS Results

HEC-RAS Plan: Proposed 10 2022 River: SycamoreCk Reach: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2165.018 H	50	2916.70	9.80	18.76	16.78	19.40	0.003577	7.04	772.62	671.27	0.50
1	2165.018 H	100	3261.63	9.80	19.21	18.49	19.71	0.002958	6.56	1025.02	873.16	0.46
1	2165.018 H	55	2971.94	9.80	18.82	17.00	19.44	0.003526	7.01	802.51	686.68	0.50
1	2125.002 Punta Gorda		Bridge									
1	2085 G	50	2916.70	9.38	18.29	17.23	18.78	0.002425	6.33	805.94	720.09	0.47
1	2085 G	100	3261.63	9.38	18.80	17.69	19.17	0.001907	5.80	1085.83	937.11	0.42
1	2085 G	55	2971.94	9.38	18.36	17.36	18.83	0.002365	6.29	839.80	745.93	0.47
1	2084		Lat Struct									
1	2035	50	2895.98	9.27	18.27	16.73	18.50	0.001355	4.80	1301.16	949.29	0.35
1	2035	100	3222.89	9.27	18.78	17.10	18.95	0.000989	4.34	1765.42	1136.21	0.31
1	2035	55	2949.56	9.27	18.34	16.81	18.56	0.001313	4.76	1355.11	1002.42	0.35
1	2000	50	2880.30	8.95	18.27	16.46	18.44	0.000922	4.31	1567.14	1035.89	0.30
1	2000	100	3195.03	8.95	18.78	16.78	18.91	0.000690	3.92	2037.76	1099.63	0.26
1	2000	55	2932.33	8.95	18.34	16.59	18.50	0.000892	4.27	1626.64	1041.25	0.29
1	1949.992 F	50	2863.61	9.00	18.30	16.06	18.37	0.000477	3.11	2084.89	1032.89	0.22
1	1949.992 F	100	3166.27	9.00	18.80	16.23	18.86	0.000367	2.87	2534.62	1042.25	0.19
1	1949.992 F	55	2914.04	9.00	18.37	16.08	18.44	0.000463	3.09	2143.87	1034.08	0.21
1	1900	50	2850.87	8.84	18.31	15.24	18.33	0.000208	2.05	3708.65	1241.83	0.14
1	1900	100	3144.39	8.84	18.80	15.38	18.82	0.000173	1.96	4237.25	1252.03	0.13
1	1900	55	2900.08	8.84	18.37	15.26	18.40	0.000204	2.05	3777.47	1243.29	0.14
1	1899.1		Lat Struct									
1	1851.133	50	1772.66	8.45	18.12		18.30	0.000631	3.50	636.26	158.84	0.25
1	1851.133	100	1909.01	8.45	18.63		18.80	0.000543	3.42	716.68	158.84	0.23
1	1851.133	55	1794.57	8.45	18.19		18.37	0.000621	3.50	646.67	158.84	0.25
1	1823.768	50	1753.51	8.34	17.96	13.01	18.26	0.000711	4.37	414.94	52.43	0.27
1	1823.768	100	1878.92	8.34	18.44	13.19	18.75	0.000675	4.42	440.40	52.43	0.26
1	1823.768	55	1774.04	8.34	18.02	13.04	18.32	0.000710	4.39	418.18	52.43	0.27
1	1726.932 USH101		Bridge									
1	1659.316	50	1753.51	7.53	16.98	13.01	17.25	0.000930	4.19	438.46	713.30	0.30

HEC-RAS Plan: Proposed 10 2022 River: SycamoreCk Reach: 1 (Continued)

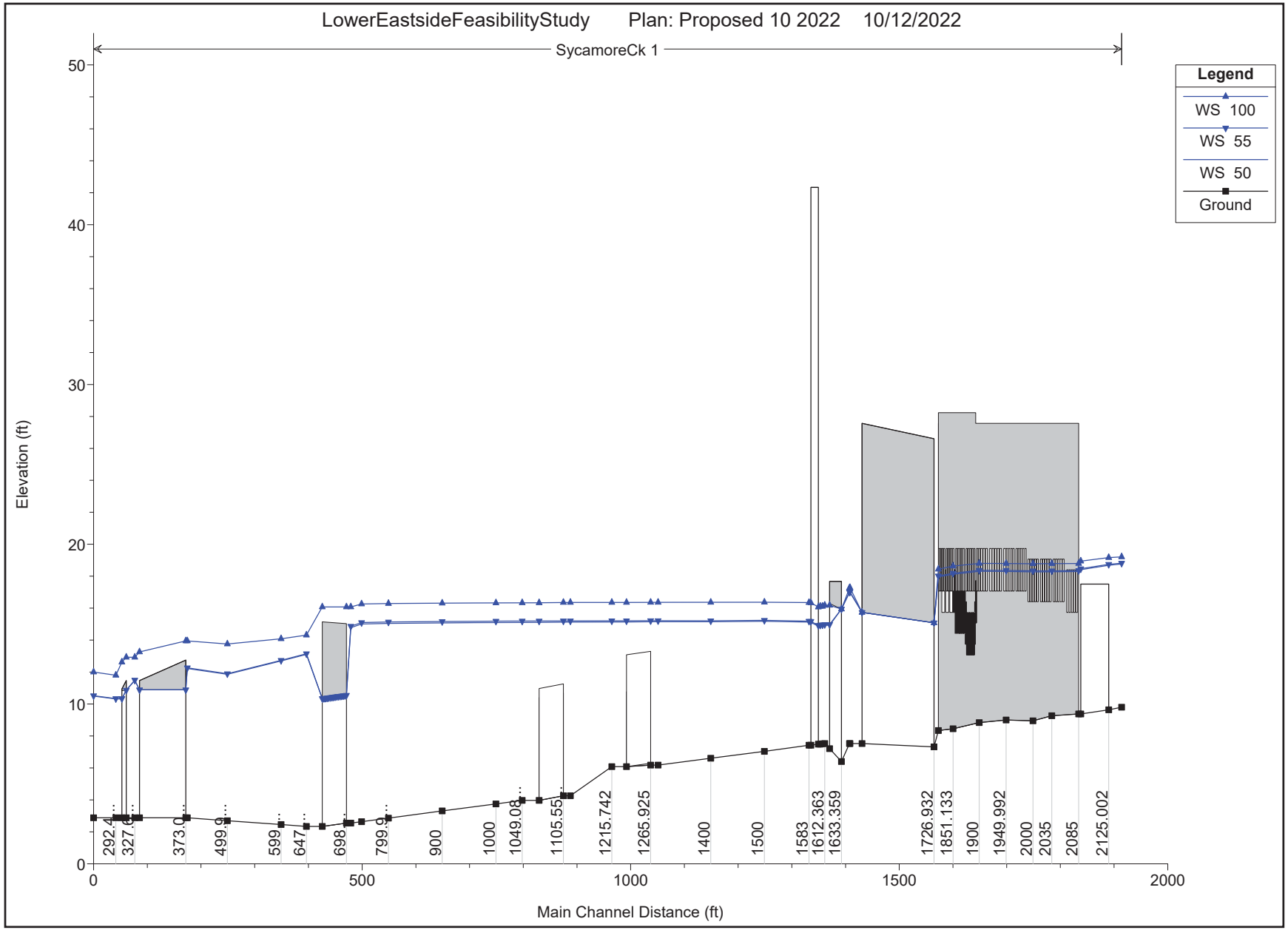
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1659.316	100	1878.92	7.53	17.29	13.28	17.56	0.000900	4.25	463.25	719.26	0.30
1	1659.316	55	1774.04	7.53	17.02	13.05	17.28	0.000933	4.21	441.25	714.03	0.30
1	1658.316	50	1763.77	7.53	16.98	13.03	17.25	0.000944	4.21	438.00	713.18	0.30
1	1658.316	100	1923.95	7.53	17.26	13.37	17.55	0.000954	4.37	461.57	718.88	0.30
1	1658.316	55	1785.07	7.53	17.01	13.07	17.28	0.000948	4.24	440.77	713.91	0.30
1	1633.359 Railroad		Bridge									
1	1612.363	50	1763.77	7.53	14.93	13.11	15.96	0.005297	8.18	215.69	44.59	0.66
1	1612.363	100	1923.95	7.53	16.18	13.46	16.93	0.003425	6.96	276.36	222.96	0.54
1	1612.363	55	1785.07	7.53	14.98	13.16	16.02	0.005275	8.19	218.01	44.86	0.65
1	1608	50	1763.77	7.51	14.91	13.13	15.93	0.005164	8.11	217.35	245.19	0.65
1	1608	100	1967.46	7.51	16.11	13.56	16.90	0.003591	7.12	276.14	546.58	0.55
1	1608	55	1785.07	7.51	14.96	13.17	15.98	0.005142	8.12	219.71	264.96	0.65
1	1604	50	1763.77	7.49	14.89	13.15	15.91	0.003416	8.11	217.44	564.34	0.65
1	1604	100	1967.46	7.49	16.11	13.57	16.88	0.002350	7.05	286.49	651.04	0.55
1	1604	55	1785.07	7.49	14.94	13.19	15.97	0.003400	8.12	219.82	566.92	0.65
1	1593.5		Bridge									
1	1583	50	1763.77	7.42	15.13	14.08	15.54	0.002541	5.74	404.52	606.40	0.46
1	1583	100	1967.46	7.42	16.35	14.53	16.52	0.001083	3.79	664.22	717.52	0.31
1	1583	55	1785.07	7.42	15.19	14.08	15.59	0.002445	5.65	416.38	608.81	0.45
1	1500	50	1763.77	7.04	15.18	12.76	15.29	0.000733	3.16	728.64	642.93	0.26
1	1500	100	1967.46	7.04	16.37	14.09	16.42	0.000255	2.10	1109.96	687.80	0.16
1	1500	55	1785.07	7.04	15.24	12.82	15.34	0.000695	3.10	748.23	643.65	0.25
1	1400	50	1763.77	6.61	15.15	13.50	15.20	0.000326	2.19	1044.50	592.40	0.17
1	1400	100	1967.46	6.61	16.36	13.63	16.39	0.000119	1.48	1545.47	669.15	0.11
1	1400	55	1785.07	6.61	15.21	13.52	15.26	0.000310	2.15	1070.20	593.63	0.17
1	1302.082 E	50	1763.77	6.18	15.15	11.31	15.18	0.000127	1.64	1476.17	524.88	0.11
1	1302.082 E	100	1967.46	6.18	16.37	12.96	16.38	0.000054	1.18	2111.09	619.44	0.07
1	1302.082 E	55	1785.07	6.18	15.21	11.63	15.24	0.000122	1.62	1505.96	526.54	0.11
1	1265.925 Zoo Ent		Culvert									

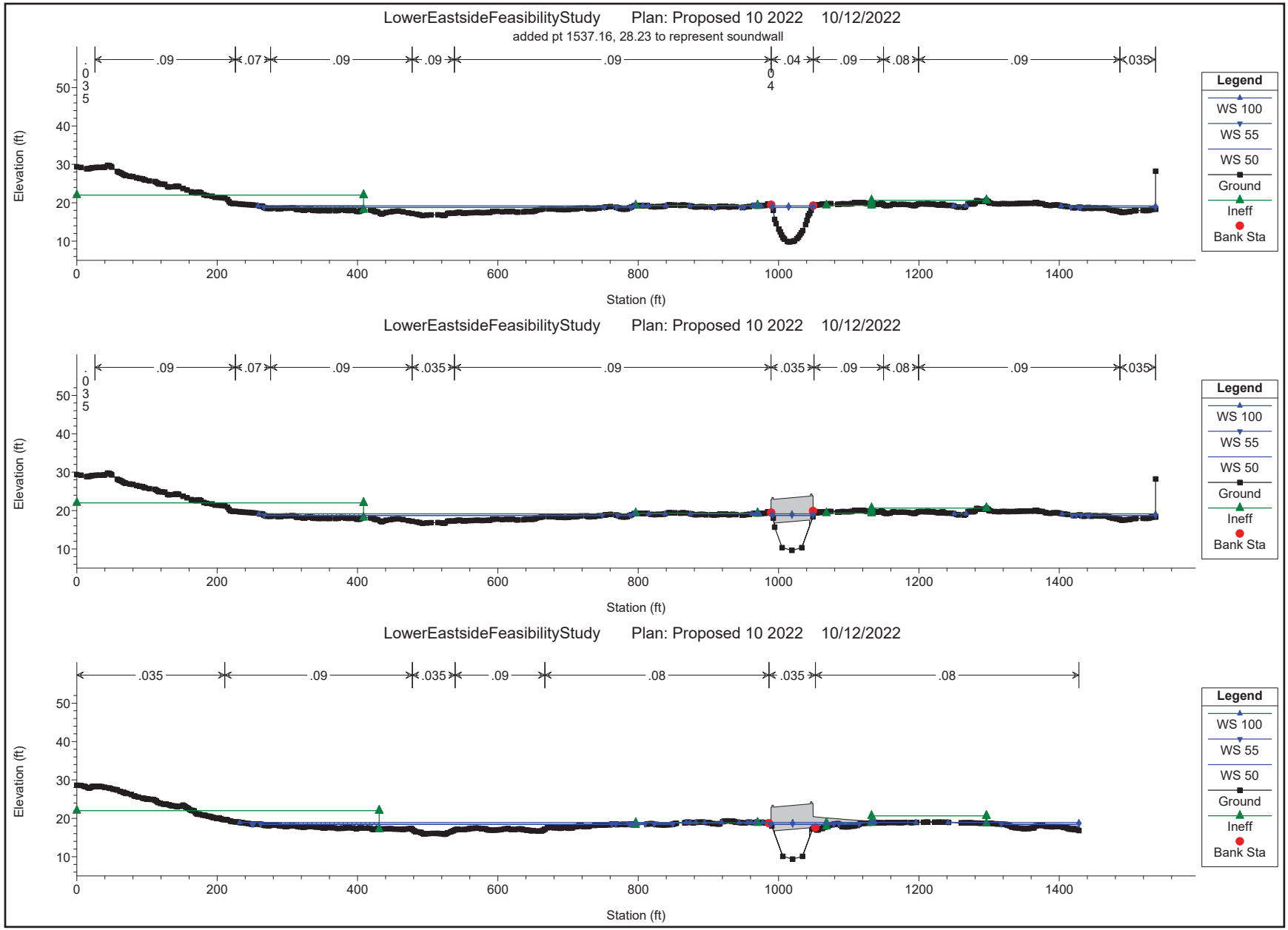
HEC-RAS Plan: Proposed 10 2022 River: SycamoreCk Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1215.742	50	1763.77	6.61	15.13	12.52	15.16	0.000110	1.51	1477.48	417.06	0.10
1	1215.742	100	1967.46	6.61	16.36	12.62	16.37	0.000062	1.10	2004.47	488.31	0.08
1	1215.742	55	1785.07	6.61	15.21	12.53	15.23	0.000105	1.48	1508.40	417.91	0.10
1	1138.584	50	1763.77	5.26	15.13	9.74	15.15	0.000078	1.44	1609.39	406.12	0.09
1	1138.584	100	1967.46	5.26	16.36	10.06	16.37	0.000040	1.12	2196.75	628.81	0.06
1	1138.584	55	1785.07	5.26	15.21	9.78	15.23	0.000076	1.42	1640.02	417.21	0.09
1	1105.559 Por La Mar Cir N		Culvert									
1	1049.088	50	1763.77	5.41	15.11	9.87	15.13	0.000101	1.32	1465.83	374.77	0.09
1	1049.088	100	1967.46	5.41	16.33	10.18	16.35	0.000052	1.01	2014.86	485.31	0.07
1	1049.088	55	1785.07	5.41	15.19	9.90	15.22	0.000097	1.30	1499.67	385.35	0.09
1	1000	50	1763.77	5.43	15.10	12.04	15.12	0.000111	1.44	1369.62	338.51	0.10
1	1000	100	1967.46	5.43	16.33	12.15	16.35	0.000058	1.14	1889.54	486.85	0.07
1	1000	55	1785.07	5.43	15.19	12.05	15.21	0.000106	1.42	1399.95	346.80	0.10
1	900 D	50	1763.77	5.48	15.07	11.87	15.11	0.000155	1.60	1135.32	274.56	0.12
1	900 D	100	1967.46	5.48	16.31	11.98	16.34	0.000086	1.27	1536.65	434.10	0.09
1	900 D	55	1785.07	5.48	15.16	11.89	15.20	0.000149	1.57	1160.64	288.66	0.12
1	799.9998	50	1763.77	5.52	15.04	11.06	15.09	0.000172	1.61	993.67	232.11	0.12
1	799.9998	100	1967.46	5.52	16.29	11.20	16.33	0.000106	1.35	1294.39	539.12	0.10
1	799.9998	55	1785.07	5.52	15.13	11.07	15.18	0.000167	1.59	1011.67	236.20	0.12
1	750.0403 C	50	1763.77	5.54	15.01	10.19	15.08	0.000217	2.20	830.70	271.85	0.14
1	750.0403 C	100	1967.46	5.54	16.26	10.43	16.32	0.000159	1.95	1064.85	750.99	0.12
1	750.0403 C	55	1785.07	5.54	15.10	10.22	15.17	0.000212	2.19	843.37	303.38	0.14
1	729.7717	50	1763.77	5.55	14.78	10.19	15.05	0.000842	4.20	419.65	66.77	0.30
1	729.7717	100	1967.46	5.55	16.08	10.51	16.30	0.000544	3.78	561.92	273.56	0.24
1	729.7717	55	1785.07	5.55	14.87	10.23	15.14	0.000829	4.19	425.81	67.20	0.29
1	698.7187 Por La Mar Cir S		Culvert									
1	647.3312	50	1763.77	5.34	13.11	10.01	13.51	0.001471	5.08	347.03	63.42	0.38
1	647.3312	100	1967.46	5.34	14.31	10.29	14.64	0.000995	4.63	425.23	89.72	0.32
1	647.3312	55	1785.07	5.34	13.15	10.05	13.56	0.001476	5.10	349.76	63.64	0.38
1	599.9979	50	1763.77	5.46	12.69		13.34	0.003085	6.44	273.81	57.65	0.52

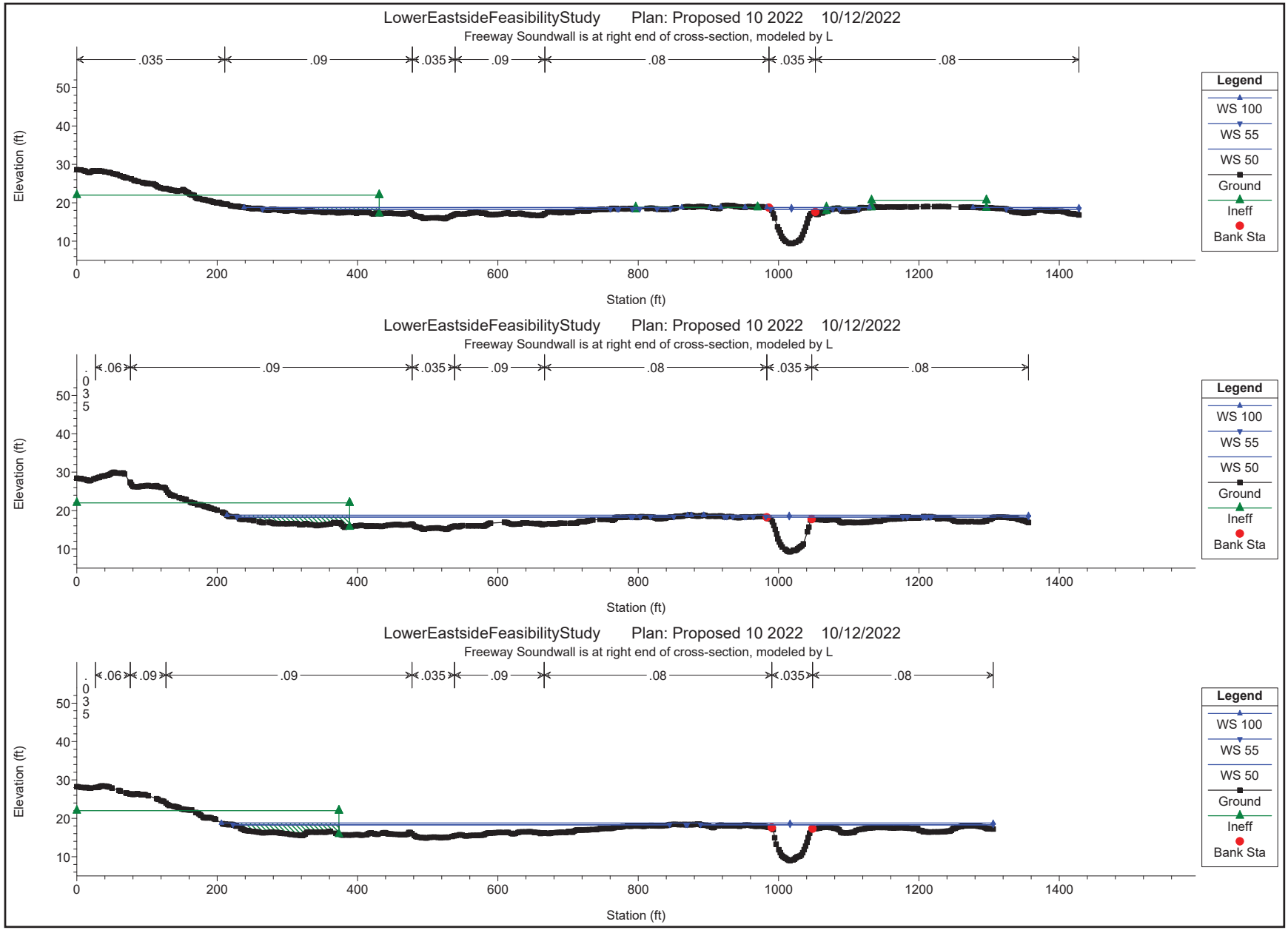
HEC-RAS Plan: Proposed 10 2022 River: SycamoreCk Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	599.9979	100	1967.46	5.46	14.08		14.54	0.001865	5.44	364.91	76.56	0.41
1	599.9979	55	1785.07	5.46	12.74		13.38	0.003092	6.46	276.22	57.97	0.52
1	499.9981 B	50	1763.77	5.70	11.86	10.72	12.89	0.005838	8.14	216.76	51.96	0.70
1	499.9981 B	100	1967.46	5.70	13.76	11.04	14.32	0.002462	6.01	327.13	64.51	0.47
1	499.9981 B	55	1785.07	5.70	11.90	10.75	12.93	0.005832	8.16	218.88	52.25	0.70
1	425.6141	50	1763.77	5.88	12.22	9.05	12.49	0.001155	4.17	422.97	83.65	0.33
1	425.6141	100	1967.46	5.88	13.95	9.29	14.12	0.000544	3.40	592.54	118.52	0.23
1	425.6141	55	1785.07	5.88	12.27	9.08	12.54	0.001155	4.18	426.55	83.86	0.33
1	373.0669 Cabrillo		Bridge									
1	327.6917 A	50	1763.77	5.88	11.48	9.05	11.85	0.001780	4.91	359.50	77.41	0.40
1	327.6917 A	100	1967.46	5.88	12.93	9.28	13.18	0.000949	4.11	493.90	258.18	0.30
1	327.6917 A	55	1785.07	5.88	11.50	9.08	11.88	0.001800	4.94	361.03	78.91	0.40
1	305.2341 Pedestrian Bridg		Bridge									
1	292.4883	50	1763.77	5.88	10.32	9.22	11.23	0.005357	7.66	230.32	53.17	0.65
1	292.4883	100	1967.46	5.88	11.80	9.47	12.43	0.002716	6.35	309.78	81.11	0.47
1	292.4883	55	1785.07	5.88	10.34	9.24	11.26	0.005408	7.71	231.39	53.17	0.65
1	250.9678	50	1763.77	5.88	10.50	8.98	10.92	0.003003	5.23	337.25	120.03	0.50
1	250.9678	100	1967.46	5.88	12.00	9.22	12.25	0.001110	3.98	494.50	243.92	0.33
1	250.9678	55	1785.07	5.88	10.52	9.00	10.95	0.003002	5.25	339.86	121.37	0.50

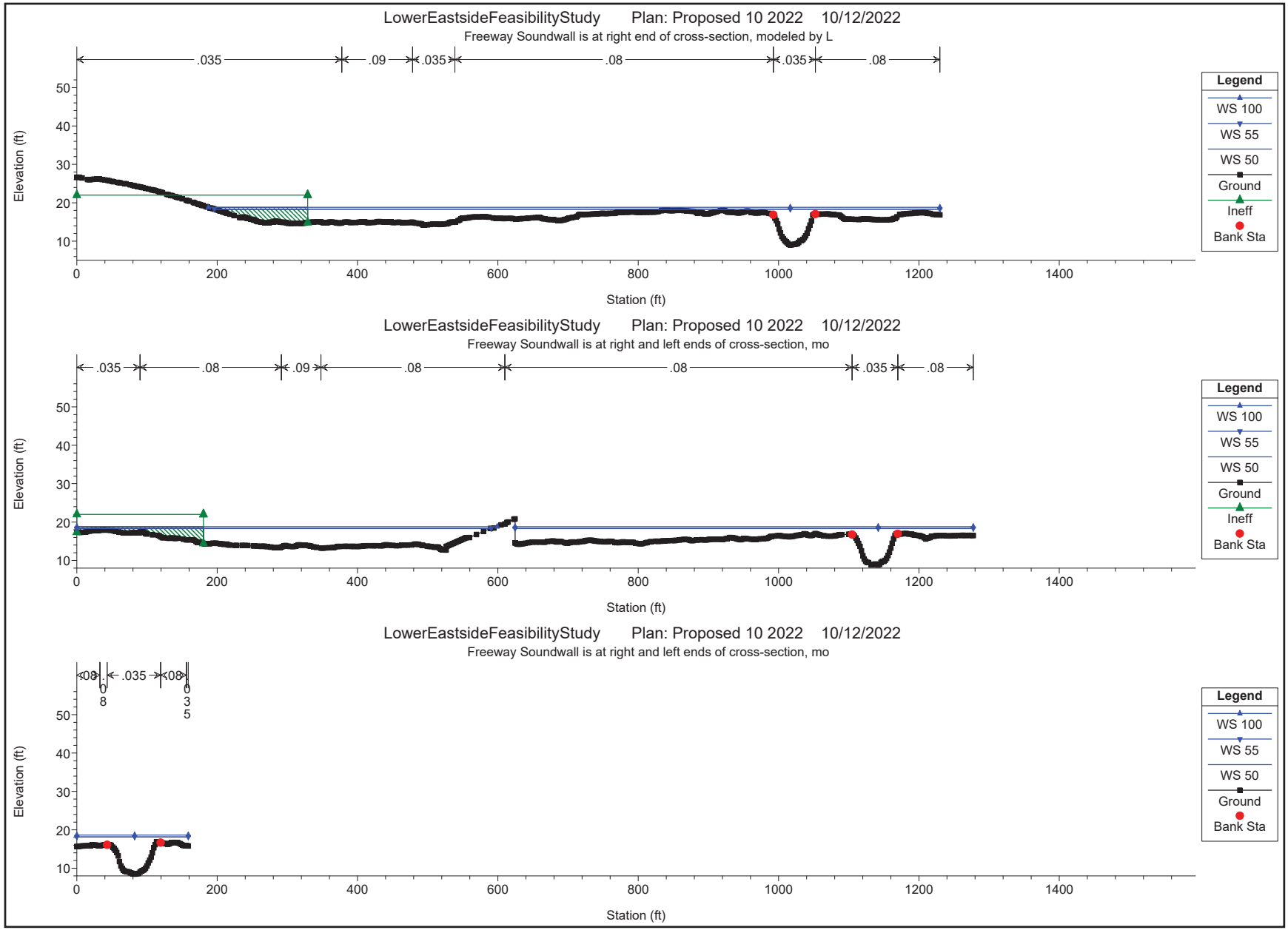

LowerEastsideFeasibilityStudy Plan: Proposed 10 2022 10/12/2022
SycamoreCk 1
Legend
WS 100
WS 55
WS 50
Ground
Elevation (ft)
Main Channel Distance (ft)
0
10
20
30
40
50
0
500
1000
1500
2000
292.4...
327.6...
373.0...
499.9...
599...
647...
698...
799.9...
900
1000
1049.08...
1105.55...
1215.742
1265.925
1400
1500
1583
1612.363
1633.359
1726.932
1851.133
1900
1949.992
2000
2035
2085
2125.002



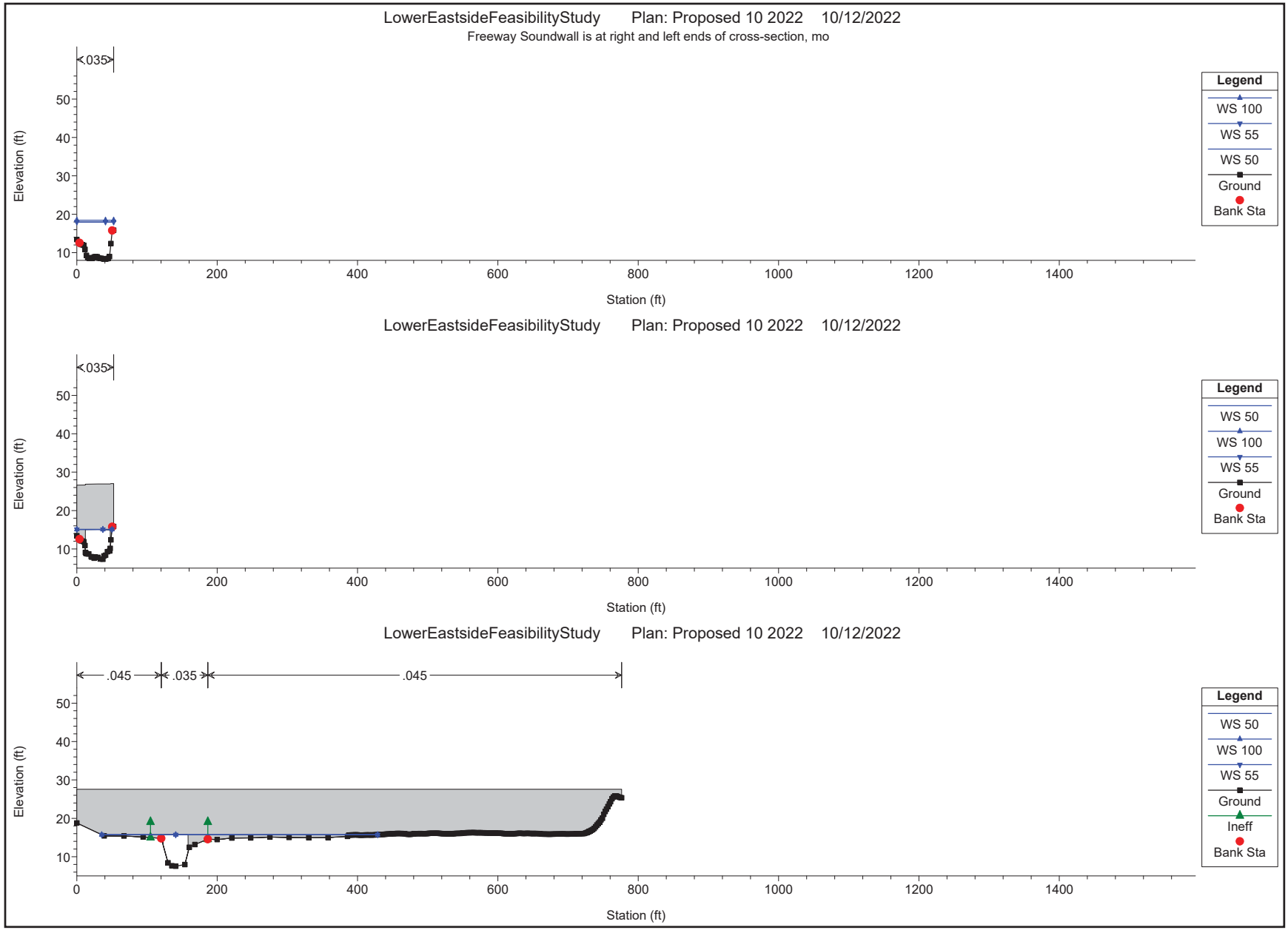
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



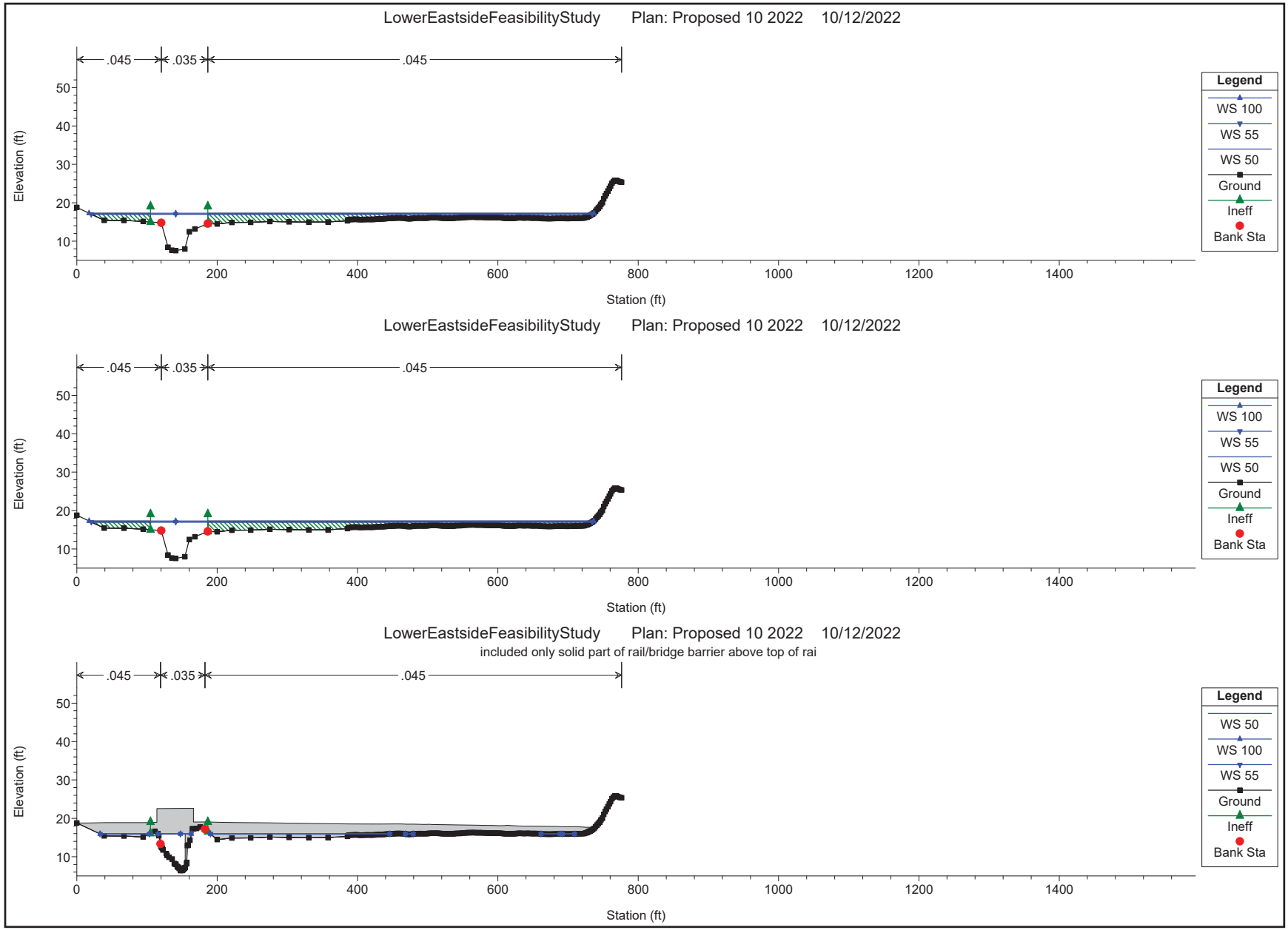
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



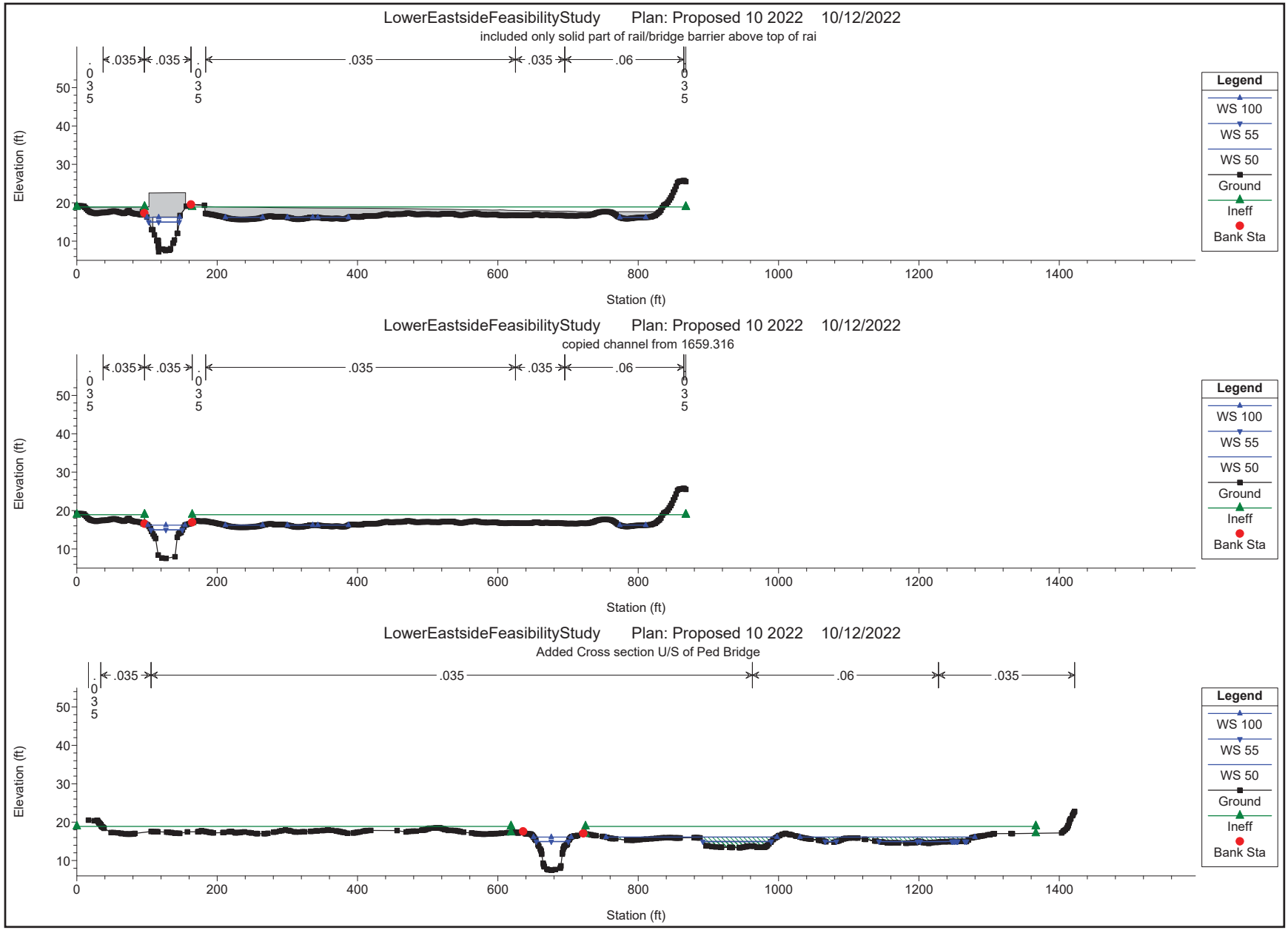
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



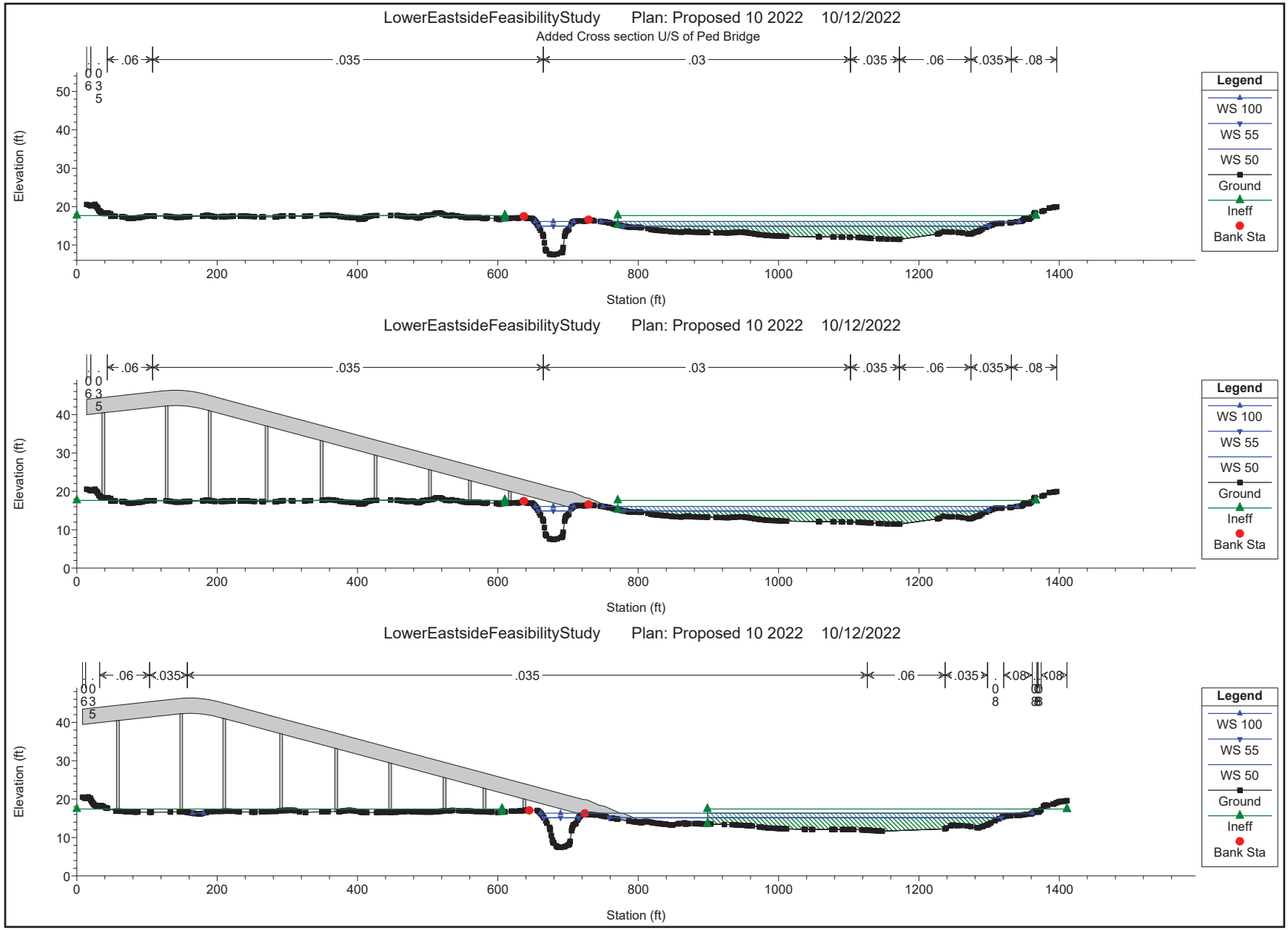
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



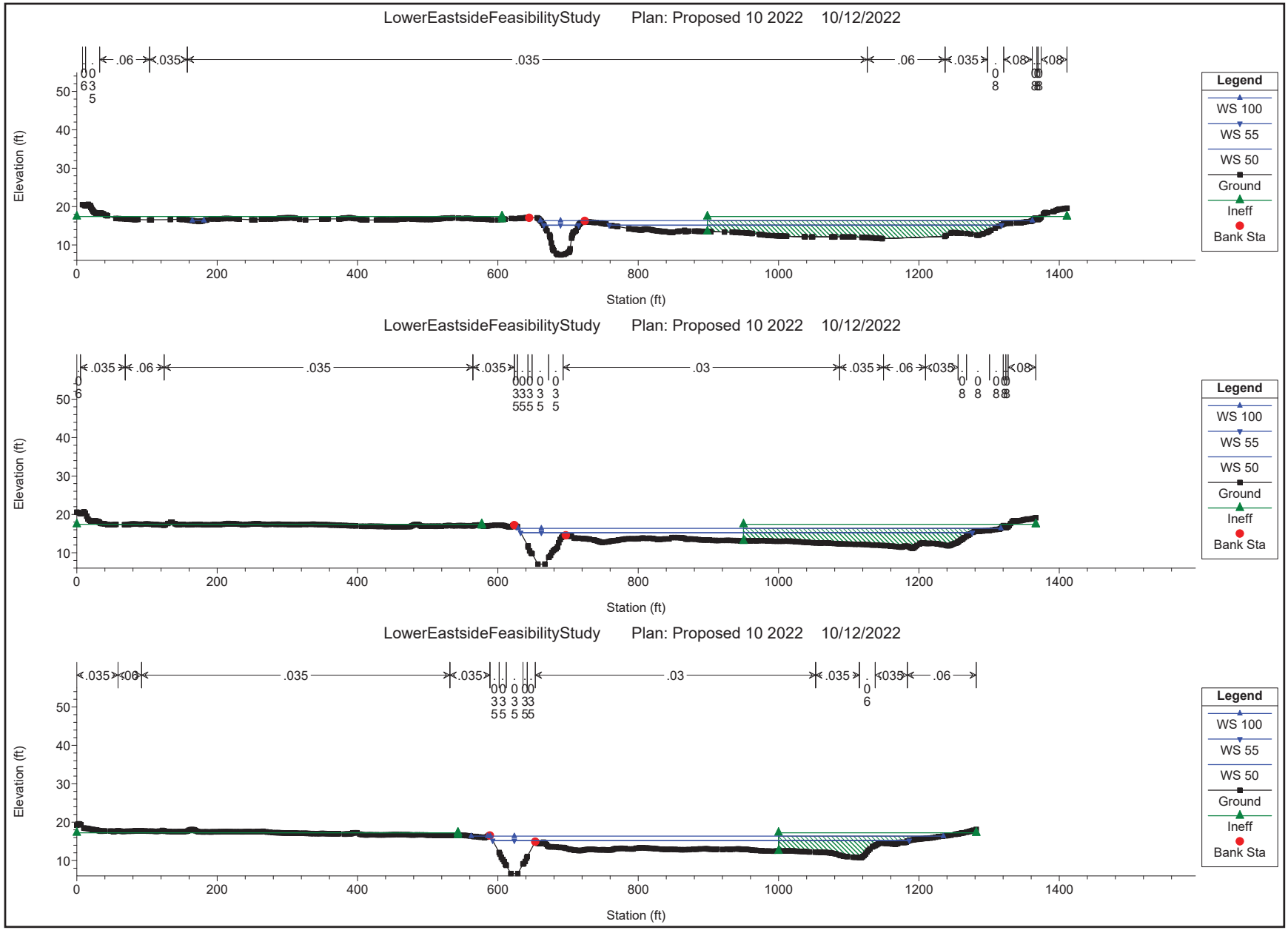
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



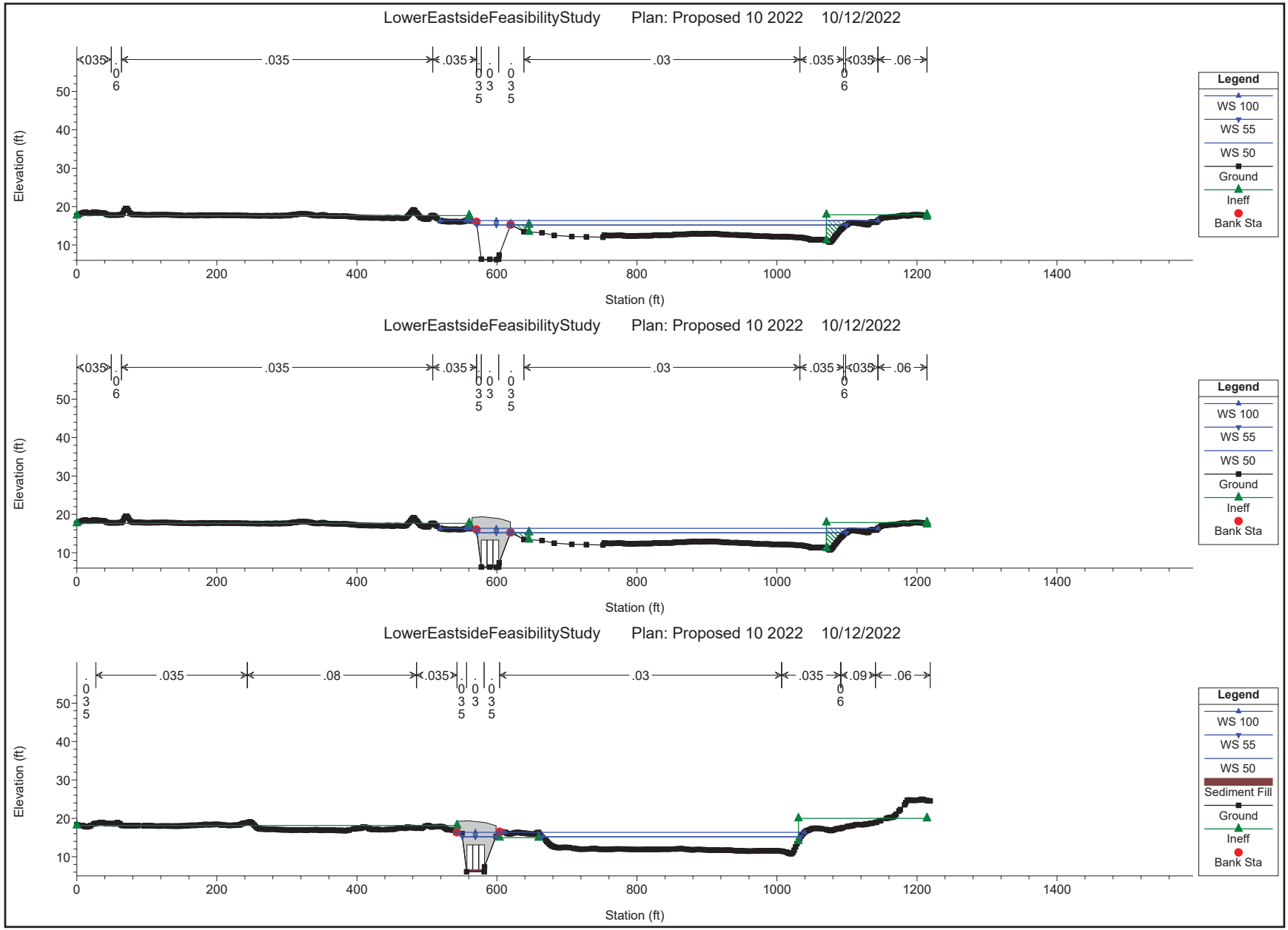
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



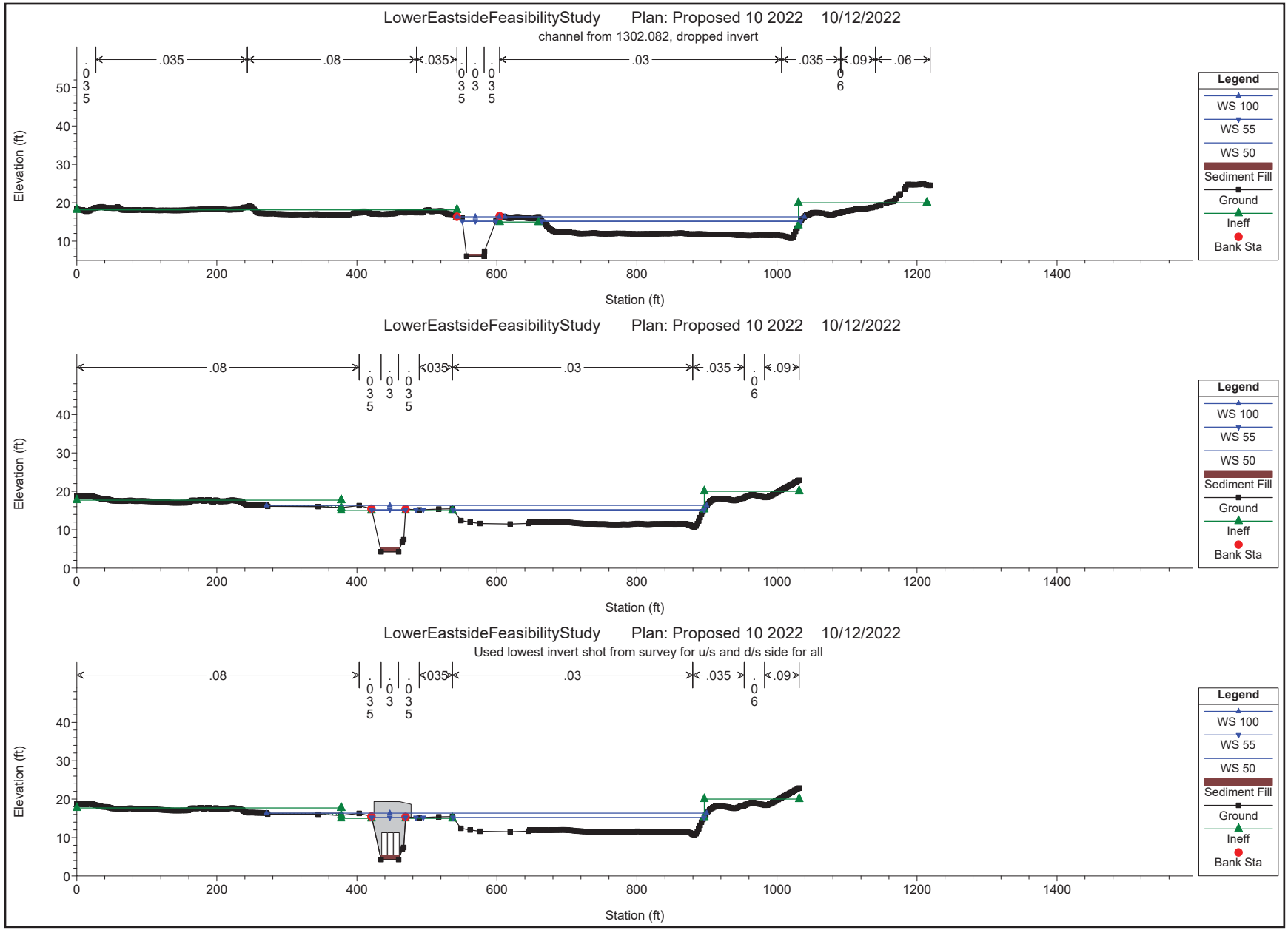
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



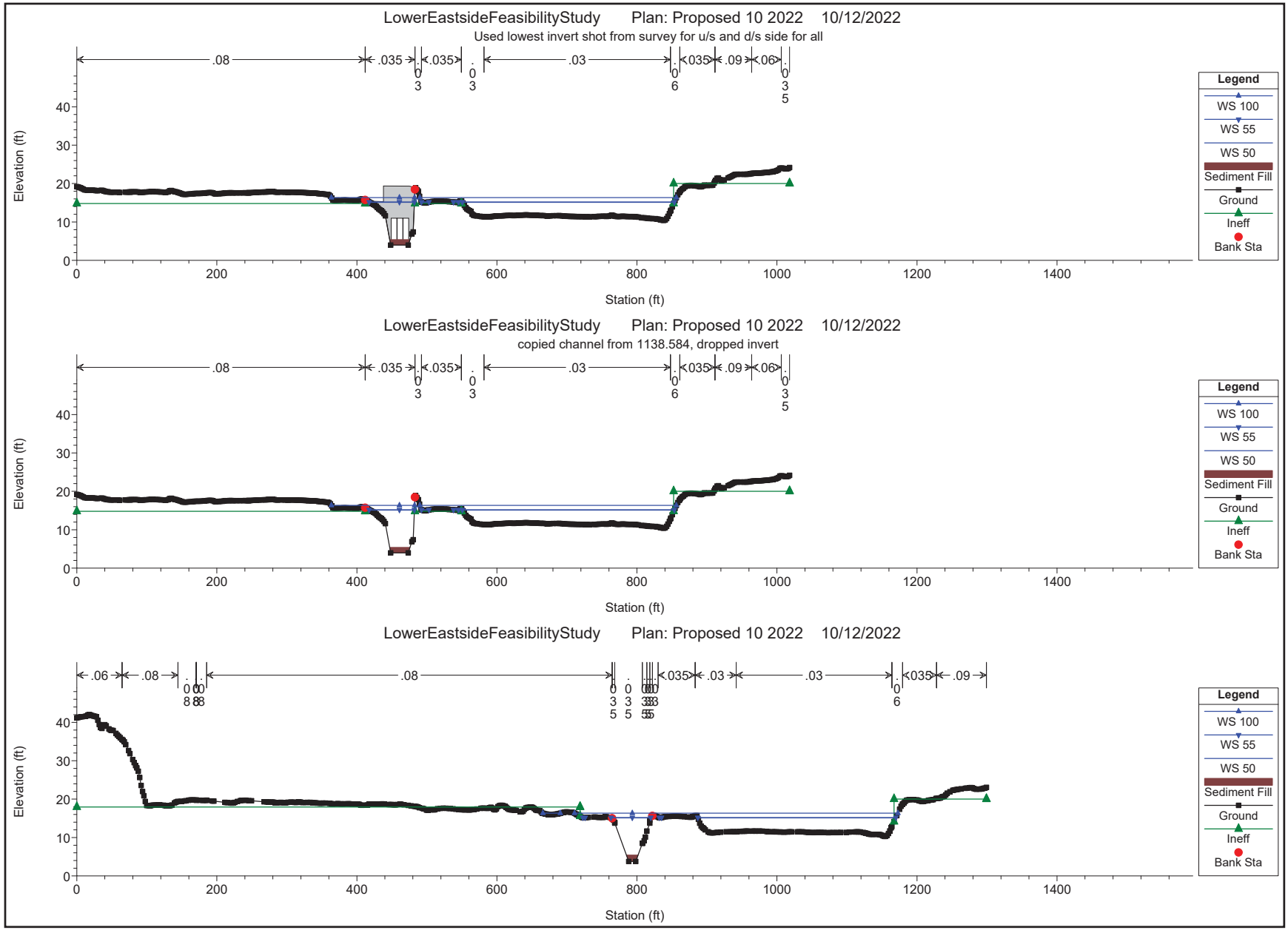
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



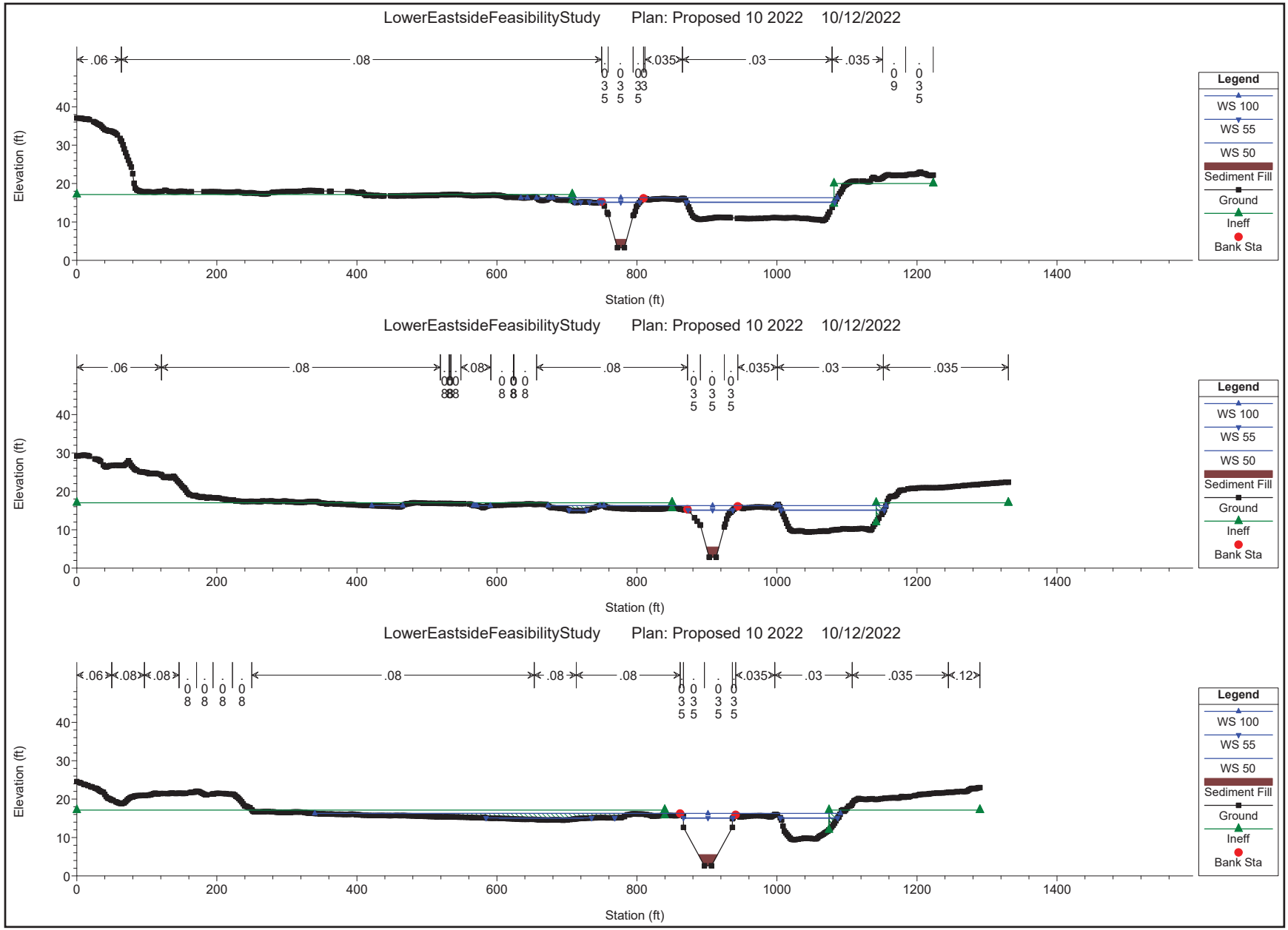
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



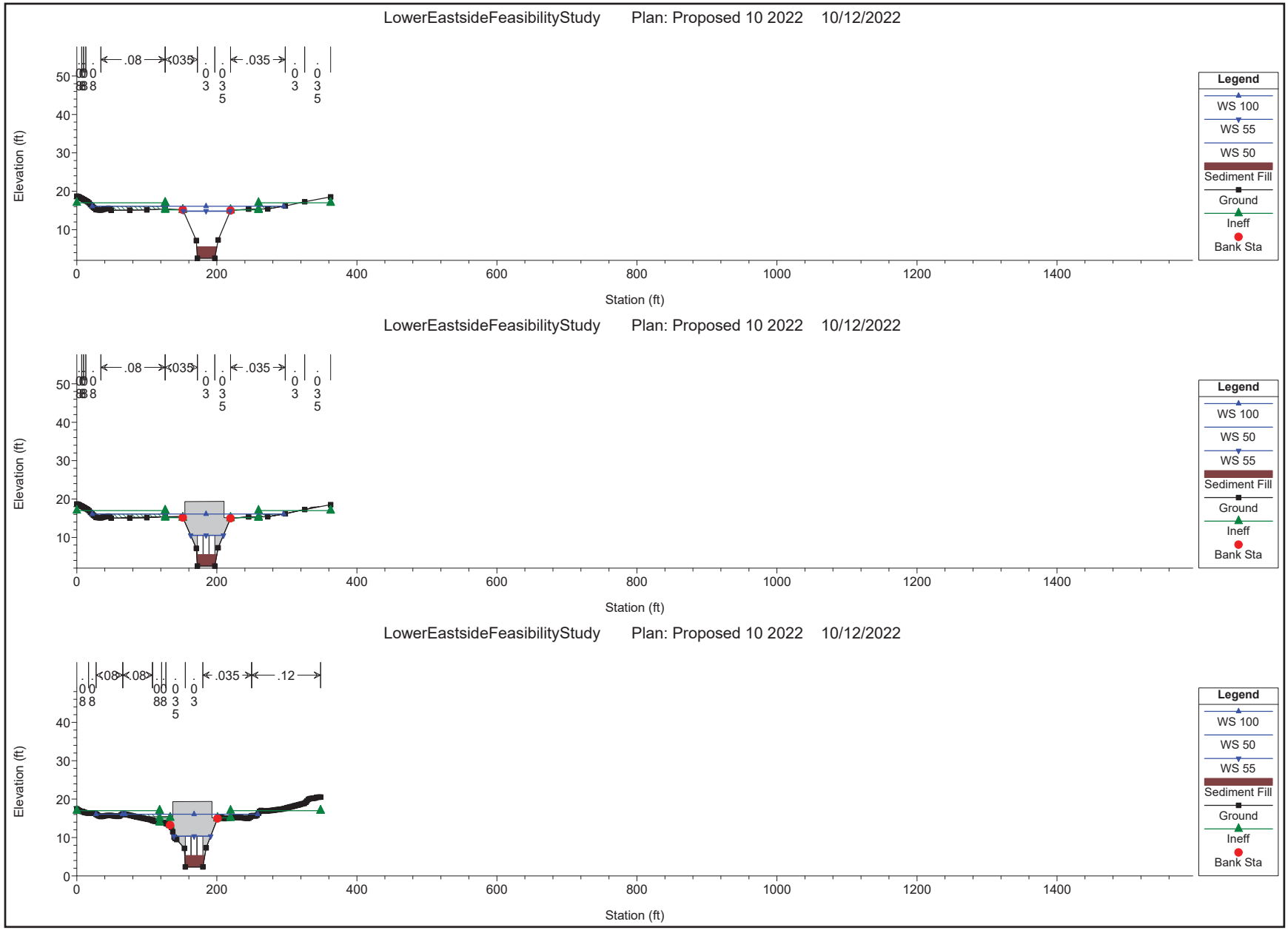
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



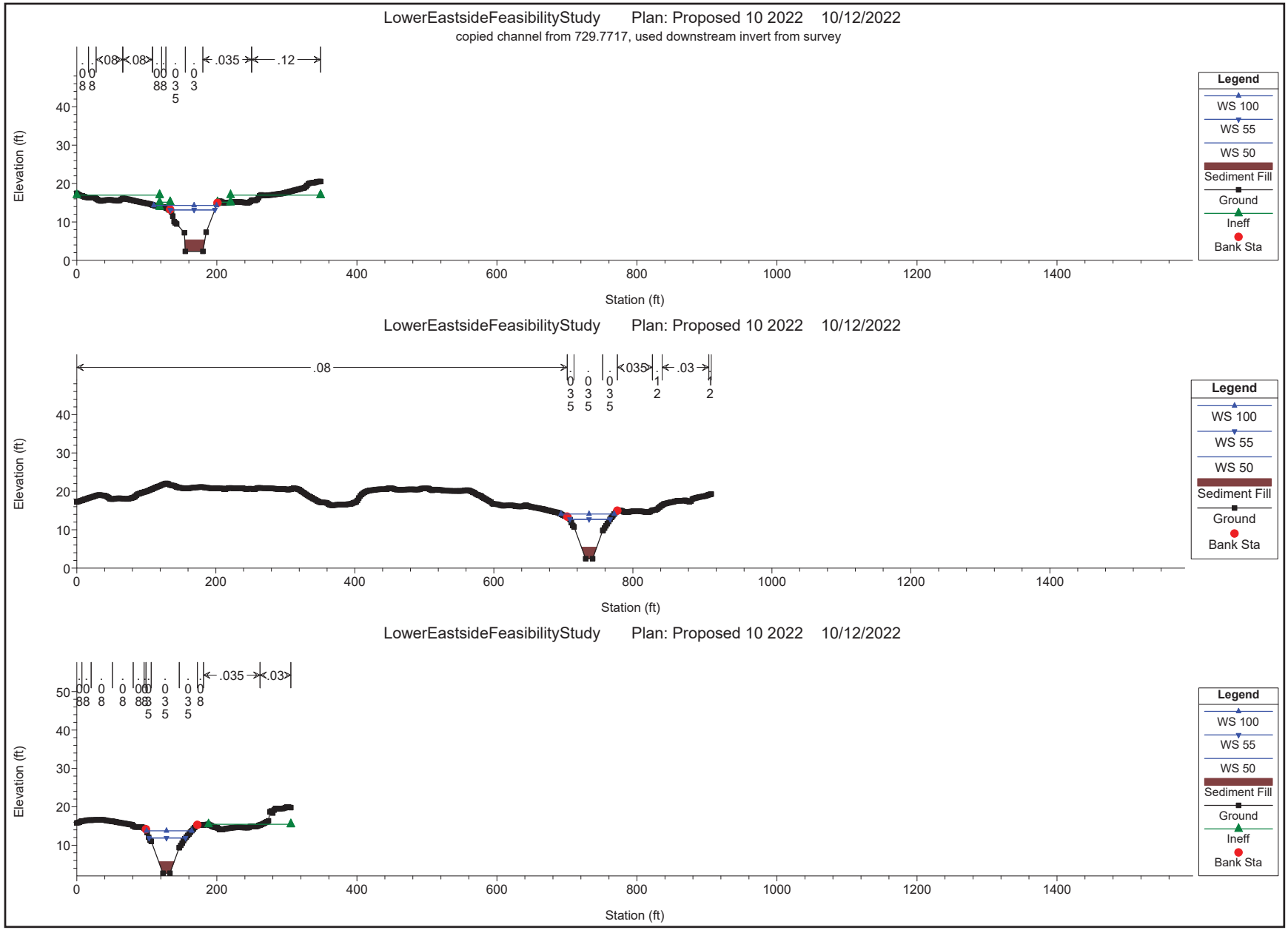
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



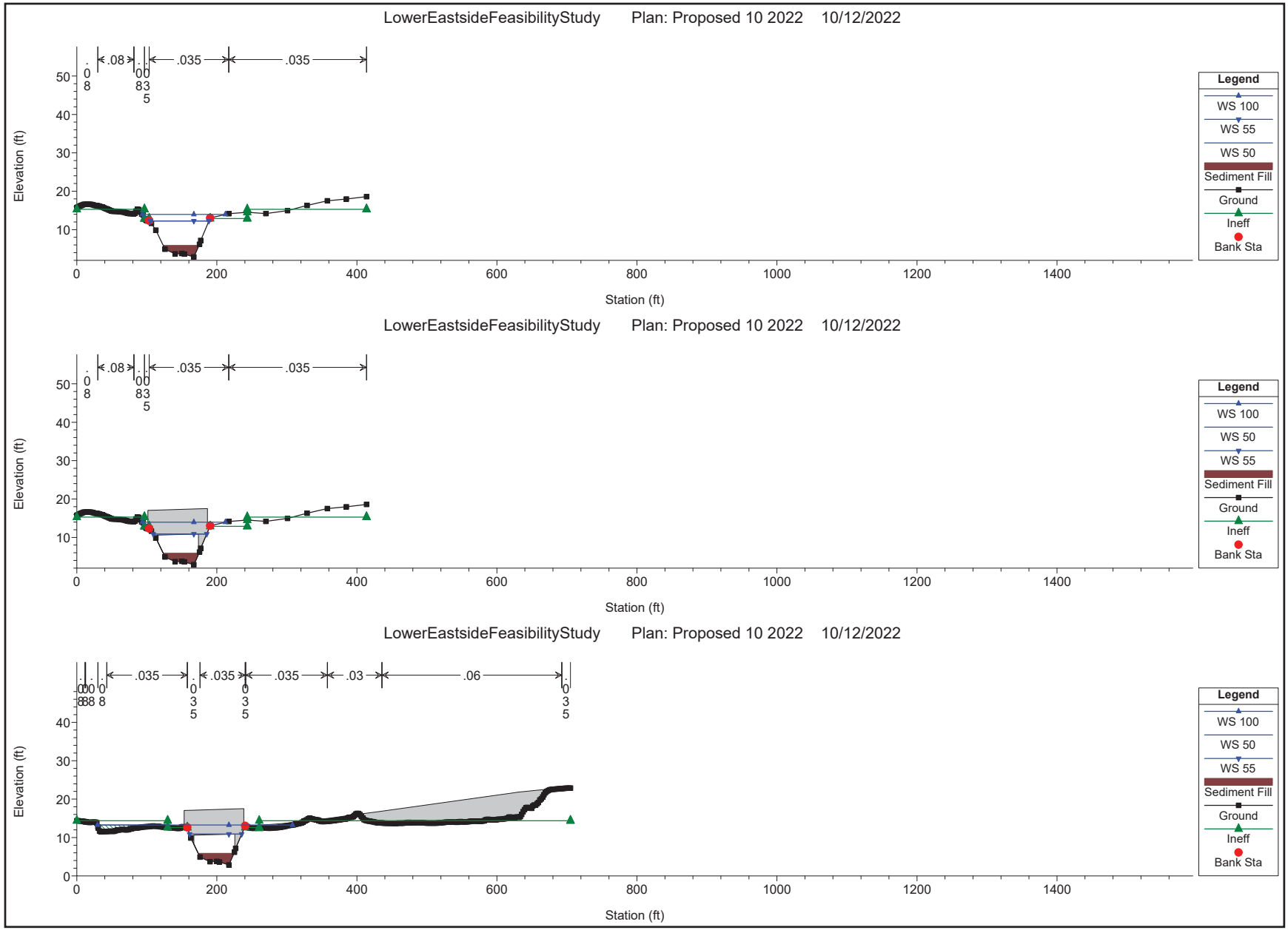
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



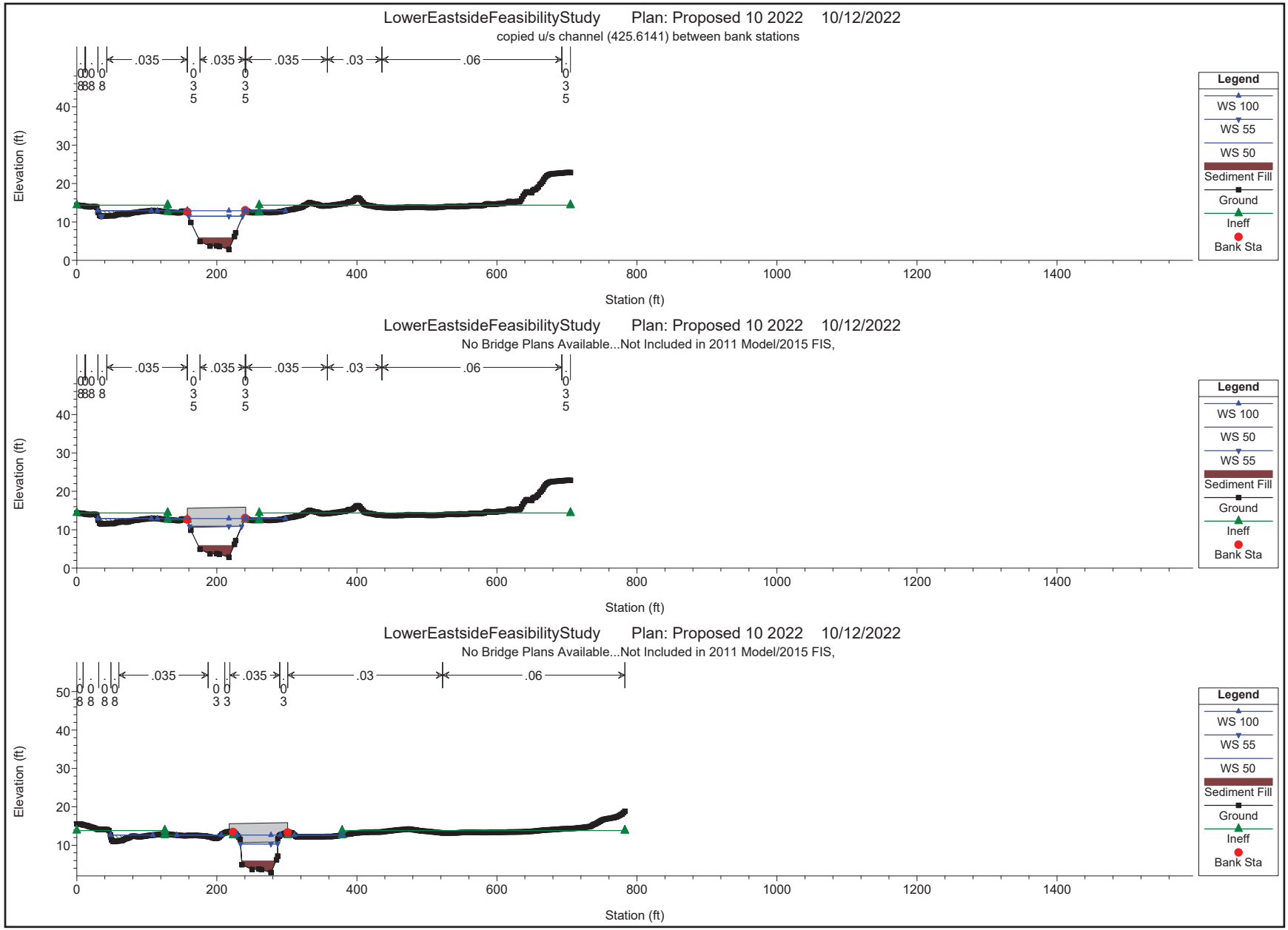
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



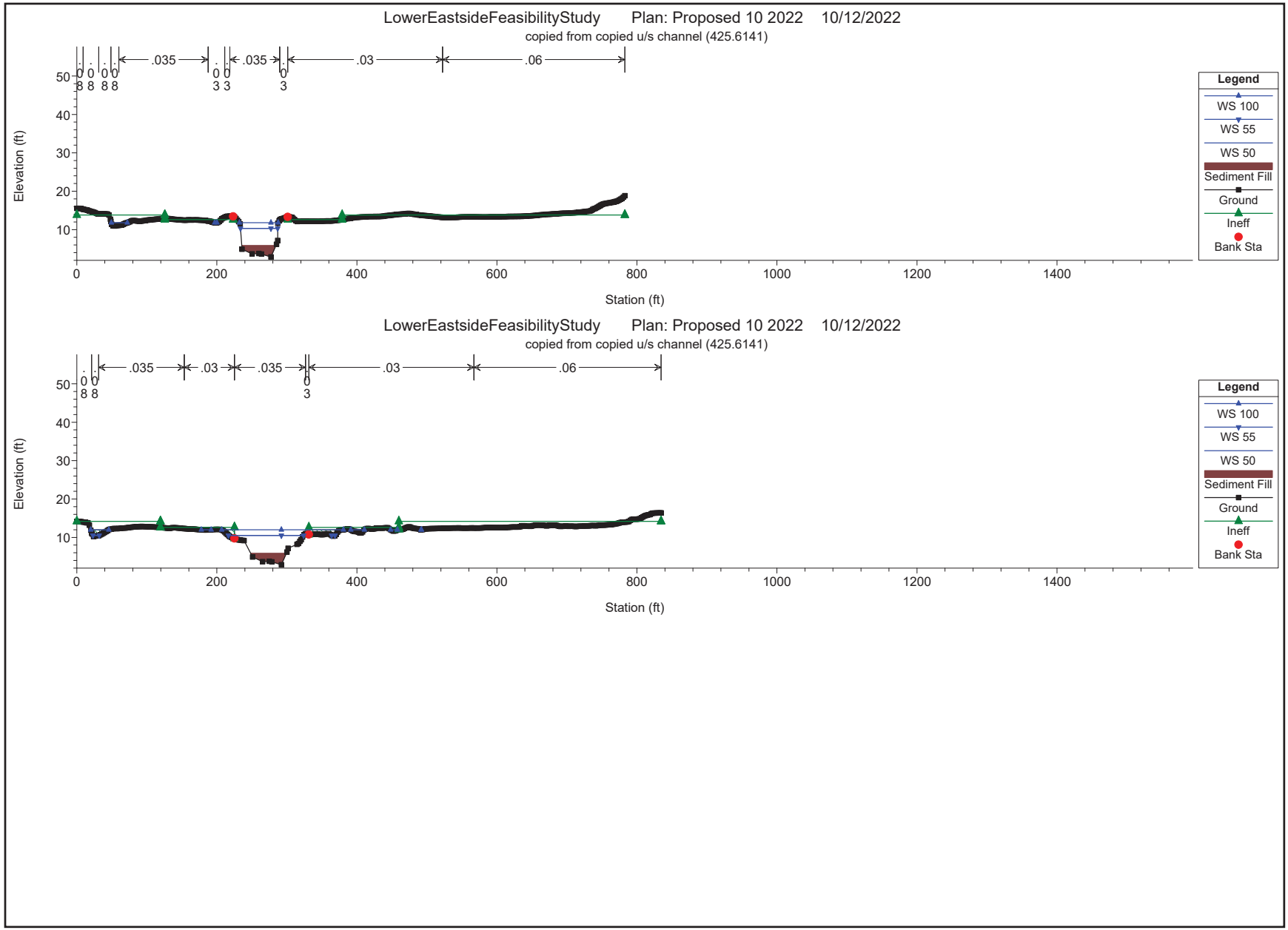
1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft



1 in Horiz. = 203 ft 1 in Vert. = 37 ft

APPENDIX H

PRELIMINARY GEOTECHNICAL REPORT

Structure Preliminary Geotechnical Report

Lower Eastside Community Connectivity Active Transportation Plan

Santa Barbara, California

Yeh Project No.: 222-181

October 14, 2022

Prepared for:

Quincy Engineering, Inc.
11017 Cobblerock Drive, Suite 100
Rancho Cordova, California 95670
Attn: Mr. Greg Young, P.E.

Prepared by:

Yeh and Associates, Inc.
56 E. Main Street, Suite 104
Ventura, California 93001
Phone: 805-481-9590 ext. 271

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

56 E. Main Street, Suite 104
Ventura, CA 93001
(805) 481-9590, ext. 271
www.yeh-eng.com

Structure Preliminary Geotechnical Report

Lower Eastside Community Connectivity Active Transportation Plan

Santa Barbara, California

Yeh Project No.: 222-181

October 14, 2022

Prepared by:

Jamie L. Cravens, P.E.
Project Engineer

Loree A. Berry, P.E.
Senior Project Manager

Reviewed By:

Jonathan D. Blanchard, P.E., G.E.
Principal Geotechnical Engineer

Copies: Dacé Morgan, P.E. (Quincy)

Table of Contents

List of Figures

List of Tables

List of Plates

List of Appendices

1. INTRODUCTION

Yeh was retained by Quincy Engineering, Inc. (Quincy) to provide preliminary geotechnical recommendations as input to the preliminary design of a pedestrian overcrossing at the US-101 Freeway, Union Pacific Railroad (UPRR), and Sycamore Creek as part of the Lower Eastside Community Connectivity Active Transportation Plan. This report was prepared in accordance with our agreement for professional services with Quincy executed on June 8, 2022, and in general accordance with Caltrans guidelines for a Structure Preliminary Geotechnical Report in affect at the time this report was prepared, dated January 2021. The purpose of this report is to provide preliminary geotechnical considerations and recommendations regarding the design of the overcrossing foundations and suitable foundation alternatives, seismic hazards, scour, and construction. Preliminary alignment and design information for the project was provided by Quincy (2022). The preliminary characterization of the subsurface conditions is based on previous explorations for the existing Sycamore Creek Bridge and soundwall structures for US-101 (Caltrans 1944, Caltrans 2005[a], Caltrans 2005b). Yeh is also providing services to Quincy to review public databases and reports that are readily available to identify sites near the project that have documented soil or groundwater contamination. A summary of that research will be provided under separate cover.

Figure 1: Project Location

2. PROJECT DESCRIPTION

The location of the project is shown in Figure 1. The project consists of the design of improvements to provide pedestrian access between the communities on the Lower Eastside of Santa Barbara to waterfront areas south of the freeway that are separated by the US-101 freeway and Union Pacific Railroad (UPRR) corridors. The project mainly consists of providing a new pedestrian pathway from

the intersection of Canada and Pitos Streets on the north side of US-101, continuing south over US-101 and the UPRR corridors on to the Santa Barbara Zoo property, continuing west through the parking lot at the Zoo, and over Sycamore Creek to Dwight Murphy Field. The Canada Pedestrian Overcrossing (POC) will be approximately 1,400 feet long (Quincy 2022). We understand from Quincy that the pedestrian overcrossing will consist of three individual frames. This report refers to the frames as: 1) Stacked Ramp Structure (at Canada and Pitos Streets); 2) US-101 Structure (crossing over the US-101 and UPRR corridors); and 3) Sycamore Creek Structure (parallel to US-101 and UPRR and extending west from the Zoo to Sycamore Creek). Ramp structures are anticipated to consist of either cast-in-place or precast concrete and the overcrossing structure may consist of either precast concrete or a steel truss.

2.1 Existing Facility

The proposed project is located near mile post 12.0 on US-101, approximately 600 feet southwest of the Salinas Street on-ramp (see Figure 1). Figure 2 shows a photo of the proposed crossing location (Google 2022) looking east. The Santa Barbara Zoo and Dwight Murphy Field border the site to the south, and residential properties and the Santa Barbara Sunrise RV Park border the site to the north. Within the project limits, Caltrans soundwalls No. 1 and 2 border US-101 to the north and the Union Pacific Railroad (UPRR) borders US-101 to the south. Sycamore Creek runs south along the western extents of the project and crosses under US-101 at the existing Sycamore Creek Bridge.

Figure 2: View of Proposed Crossing from Southbound US-101 Looking East (Google Maps 2022)

US-101 right-of-way through the project site is approximately 138 feet wide (Quincy 2022) and consists of 6 approximately 12-foot-wide travel lanes (3 northbound lanes and 3 southbound lanes) with 8- to 10-foot-wide paved shoulders. The UPRR right-of-way through the project site is approximately 76 feet wide and consists of a single track.

3. GEOTECHNICAL EXPLORATION

Explorations performed for previous studies at the project site were reviewed for the purposes of this report. Field exploration at the project site consisted of previous explorations performed by Caltrans for the design of the existing Sycamore Creek Bridge, replacement of the Sycamore Creek Bridge, and design of the existing Soundwalls No. 1 and No. 2 that run along the northbound lane of US-101. Plate 1 presents the locations of the field exploration programs at the project site. Logs of the explorations are presented in Appendix A. A description of the field exploration programs at the project site are described below.

3.1 PREVIOUS STUDIES

Previous explorations pertinent to the project site are included in Appendix A. Pertinent previous field exploration data at the project site included:

- A boring ("Test Hole #1") performed by Caltrans in 1944 as input for the design of the original Sycamore Creek Bridge for US-101 (Caltrans 1944). The boring was performed to a depth of approximately 43.5 feet below the ground surface (to approximately elevation -36 feet).
- Four auger borings (B21-04, B24-04, B29-04, and B34-04) performed by Caltrans in 2004 for Soundwalls No. 1 and 2 for the US-101 widening between kilometer post mile 17.4 to 20.6 (approximately post mile 10.8 to 12.8, Caltrans 2005b). The borings were performed at intervals along the Soundwall No. 1 and 2 locations to depths of approximately 24.5 to 26 feet below the ground surface (approximately elevation -9.8 to -12.4 feet).
- Four mud rotary borings (B1-04, B2-04, B13-04, and B18-04) performed by Caltrans in 2005 for the replacement of Sycamore Creek Bridge (Caltrans 2005a). The borings were performed at approximately each corner of the existing bridge prior to its construction to depths of approximately 82.5 to 90 feet below the ground surface (approximately elevation -65.8 to -73.1 feet).

3.2 LABORATORY TESTING PROGRAM

Available laboratory test data from the previous studies discussed in the previous section of this report are presented in Appendix B. Laboratory testing for corrosion was performed on ten of the samples recovered from the borings from the Caltrans (2005) Sycamore Creek Bridge Replacement project. Additional laboratory test results for the previous studies are not available.

4. GEOTECHNICAL CONDITIONS

4.1 GEOLOGY

The project site is located within the Transverse Ranges geomorphic province, which extends from the Los Angeles Basin westward to Point Arguello. Within the province, the project site lies within an alluvial plain bordered by the Santa Ynez Mountains to the north and the Pacific Ocean to the south. The province is characterized by east-west trending mountain ranges that are oblique to the general

north-northwest structural trend of California mountain ranges. The Transvers Ranges province is composed of Cenozoic- to Mesozoic-age sedimentary, volcanic, igneous, and metamorphic rocks.

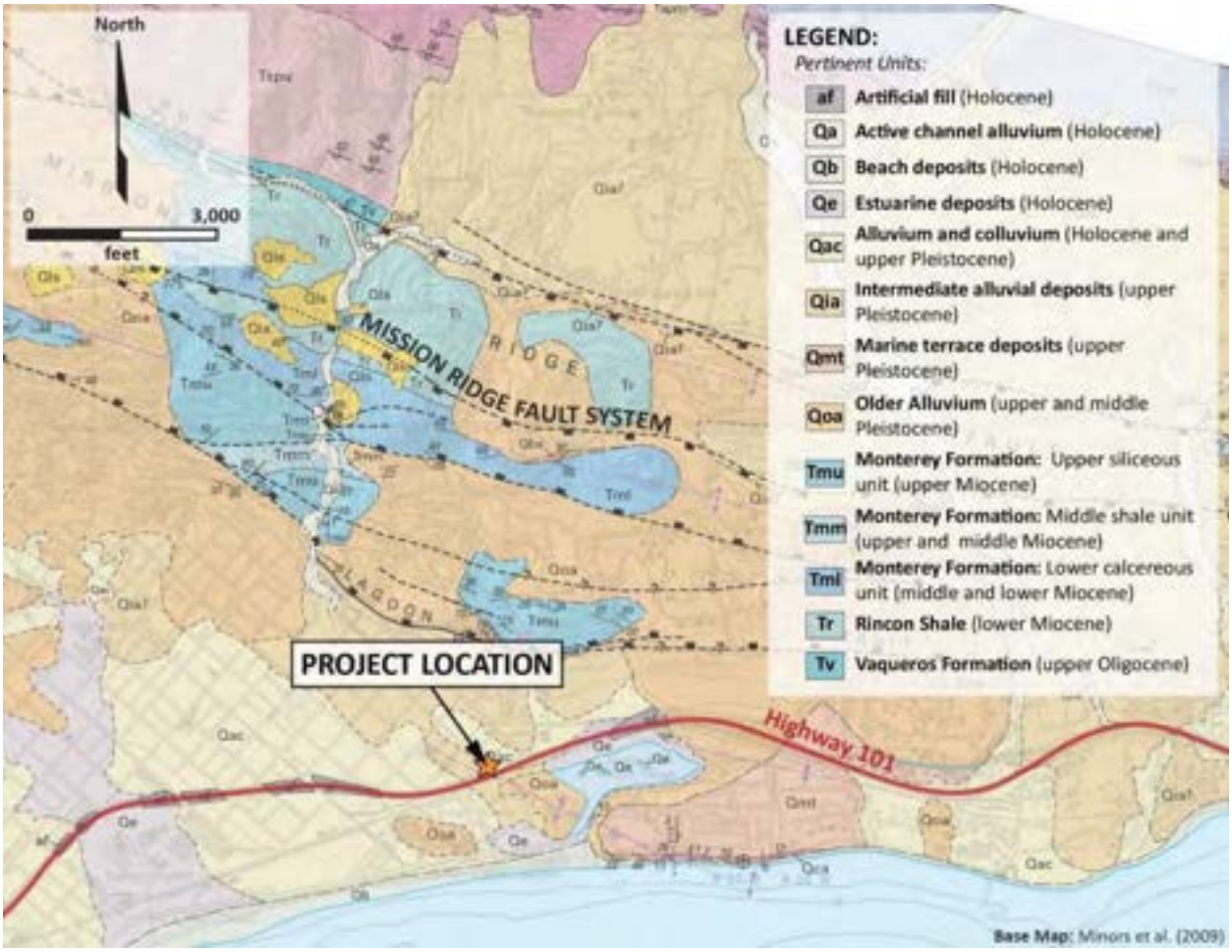


Figure 3: Geologic Map (Minor et al. 2009)

The regional geology as mapped by Minor et al. (2009) is shown on Figure 3. Minor et al. map the surface geology at the site as Quaternary-age alluvium (Qia, Qac, and Qoa). Geologic structure in the region is generally characterized by a series of east to west trending faults and folds. The closest Quaternary-age fault to the site is the Mission Ridge Fault System, which is mapped by USGS (2022) approximately 0.4 miles northeast of the project site (and shown on Figure 3). Other Quaternary-age faults include the Mesa Fault, Lavigia Fault Zone, Red Mountain Fault Zone, Ortega Hill Fault, and Santa Ynez Fault Zone mapped 1.5 miles southwest of the site, 2.5 miles southwest of the site, 2.7 miles southeast of the site, 3.4 miles east of the site, and 5.5 miles northeast of the site, respectively. Unnamed anticlines and synclines are mapped by Minor et al. 100 feet southwest of the site and 0.3-mile northeast of the site. Unnamed anticlines are also mapped by Minor et al. within the Mission Ridge Fault System northeast of the site.

4.2 Surface Conditions

Topography in the site vicinity includes grades of 0- to 3-percent (CalTopo 2022). Sycamore Creek runs south through the project site before its confluence with the Pacific Ocean on East Beach approximately 0.3-miles southeast of US-101. Existing structures in the site vicinity that could impact the project include US-101 and its associated signage, the Union Pacific Railroad (UPRR), and Soundwall No. 2 along US-101. Existing overhead and underground utilities and vegetation are present along the north and south sides of US-101.

4.3 Subsurface Conditions

The following description of the subsurface conditions is based on the previous 1944, 2004, and 2005 field exploration programs conducted by Caltrans in the vicinity of the project site. The subsurface conditions generally appear to consist of units of alluvium and colluvium (Qac), intermediate alluvial deposits (Qia), and older alluvium (Qoa). The approximate locations of the previous borings that have been referenced for the project are shown on Plate 1 and are described as follows.

Alluvium and Colluvium (Qac). The alluvium and colluvium unit was encountered in borings B21-04 and B24-04 (drilled on the northbound side of US101 for Soundwalls No. 1 and 2 and east of the proposed overcrossing) from the ground surface to the maximum depth of those borings, approximately 24.5 to 26 feet below the ground surface (to approximately elevation -9.8 to -10.5 feet). The unit generally consisted of loose to medium dense sand with varying amounts of silt and clay (SW-SM, SP, SP-SM, SM, SC) with alternating lenses and layers up to 6 feet thick of very soft to very stiff sandy lean clay (CL) and soft to very stiff sandy silt (ML).

Intermediate Alluvial Deposits (Qia). Intermediate alluvial deposits were encountered in Test Hole #1, and borings B29-04 and B34-04 (for the previous Sycamore Creek Bridge and Soundwall No. 2 and west of the proposed overcrossing) from the ground surface to the maximum depths explored, approximately 25.5 to 43.5 feet below the ground surface (to approximately elevation -10.6 to -36 feet). The unit was also encountered in borings B1-04, B2-04, B13-04, and B18-04 (for the replacement of Sycamore Creek Bridge west of the proposed overcrossing) from the ground surface to depths of approximately 39.5 to 46 feet below the ground surface (to approximately elevation -22.2 to -29.3 feet). The intermediate alluvial deposits generally consisted of very loose to medium dense sand with varying amounts of silt, clay, and gravel (SW, SP, SM, SC, SC) with interbedded up to 5-foot-thick layers of stiff to hard lean to fat clay with varying amounts of sand (CL, CH) and soft silt with varying amounts of sand (MH, ML). Older alluvium (Qoa) was encountered below the intermediate alluvial deposits in borings B1-04, B2-04, B13-04, and B18-04.

Older Alluvium (Qoa). Older alluvium was encountered below the intermediate alluvial deposits in borings B1-04, B2-04, B13-04, and B18-04 (for the replacement of Sycamore Creek Bridge west of the

proposed overcrossing). The unit was encountered to the maximum depths explored, approximately 82.5 to 90 feet below the ground surface (to approximately elevation -65.8 to -73.1 feet). The older alluvium generally consisted of medium dense to very dense sand with varying amounts of silt, clay, and gravel (SP, SW, SP-SM, SM, SC) with interbedded up to 13-foot-thick layers of hard lean to fat clay with varying amounts of sand (CH, CL). Slight cementation was noted at various depths in borings B1-04 and B18-04 within the older alluvium.

4.4 GROUNDWATER

A summary of the groundwater levels encountered in each of the previous studies is presented in Table 1. Groundwater levels and soil moisture conditions will vary seasonally and in association with changes in precipitation, runoff, irrigation, pumping, and other factors. Based on the FEMA (2022) Flood Map for the project site, the vicinity is within a "Zone AE" special flood management area with a base flood elevation of approximately 18 feet.

Table 1: Summary of Groundwater Data

Boring ID	Location	Ground Surface Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Date Measured
Test Hole #1	Sycamore Creek Bridge, NB side of Highway 101	7.5	1.5	6.0	8/1944
B1-04	Sycamore Creek Bridge, SE corner of bridge	16.7	6.5 10.0	10.2 6.7	5/4/2004 5/25/2004
B2-04	Sycamore Creek Bridge, SW corner of bridge	17.3	--	--	5/3/2004
B13-04	Sycamore Creek Bridge, NE corner of bridge	16.9	(Wet sample at 70 feet, no groundwater noted)	--	5/11/2004
B18-04	Sycamore Creek Bridge, NW corner of bridge	17.3	--	--	5/12/2004
B21-04	Soundwall No. 1, W side	16.2	8.0	8.2	5/11/2004
B24-04	Soundwall No. 2, near Canada Street	14.0	13.0	1.0	5/12/2004
B29-04	Soundwall No. 2, W of Sycamore Creek Bridge	14.9	9.0	5.9	5/13/2004
B34-04	Soundwall No. 2, between Canada Street and Sycamore Creek Bridge	13.6	6.3	7.3	5/18/2004

5. AS-BUILT DATA

Available as-built data considered in this study included the final foundation report (Caltrans 2004) and pile driving records (Caltrans 2008) for the replacement of Sycamore Creek Bridge as well as the as-built plans (Caltrans 2005b) for Soundwalls No. 1 and No. 2 along the northbound side of US-101. Sycamore Creek Bridge is supported on 18-inch diameter by ½-inch wall thickness (PP457x12.70) Cast-in-Steel-Shell (CISS) piles embedded to approximately elevation -28 feet and designed with nominal compressional resistances of approximately 280 kips. The wing walls for the Sycamore Creek

Bridge are supported on standard Class 400 driven piles embedded to approximately elevation -24.5 feet and designed with nominal compressional resistances of approximately 180 kips. Soundwall No. 1 is supported by both Class 400 driven piles embedded to approximately elevation -4 feet as well as trench footing foundations embedded to an unknown depth "D". Soundwall No. 2 is supported by trench footing foundations embedded approximately 6.5 feet below the ground surface. Design foundation capacities for Soundwalls No. 1 and No. 2 as well as additional as-built information for US-101, UPRR, or the Sycamore Creek Bridge were not available.

6. Scour Data

Preliminary scour data for the proposed Sycamore Creek crossing is not available. The final *Foundation Report* will include scour data for the project. The existing Sycamore Creek Bridge for US-101 was designed for a scour elevation of approximately 2.3 feet.

7. Corrosion Evaluation

Nine soil samples and one water sample were taken for corrosion testing from the Caltrans (2005a) borings for the Sycamore Creek Bridge Replacement. Results for pH, resistivity, soluble sulfate content, and soluble chloride content were reported for the samples tested. A copy of those corrosion test results is presented in Appendix B and summarized in Table 2 below.

Caltrans (2019a) *Amendments* states that "a site is considered to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 1,500 ppm or greater, or the pH is 5.5 or less." The soil samples tested are not considered corrosive based on Caltrans test methods and standards (Caltrans 2021).

Table 2: Soil Corrosion Test Summary

Boring ID	Elevation (feet)	Minimum Resistivity (Ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)	Corrosive Status
B1-04 #1	16.7 to 10.2	2,000	8.08	--	--	No
B1-04 #7	-3.3 to -4.8	1,200	7.41	--	--	No
B1-04 #11	-10.8 to -14.8	3,300	7.62	--	--	No
B1-04 #17	-26.3 to -29.8	3,100	7.46	--	--	No
B1-04 #21	-36.3 to -39.8	970	7.28	16	27	No
B1-04 #26	-51.3 to -54.3	3,200	7.53	--	--	No
B13-04 "A"	9.6 to 6.0	3,100	7.40	--	--	No
B13-04 "E"	-10.5 to -14.0	2,300	6.59	--	--	No

Boring ID	Elevation (feet)	Minimum Resistivity (Ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)	Corrosive Status
B13-04 "I"	-30.5 to -32.1	2,600	6.78	--	--	No
B1-04 (Well Water Sample)	10.1	300	7.30	87	204	No

8. SEISMIC INFORMATION

8.1 GROUND MOTION HAZARD

Figure 4 presents the preliminary design response spectrum for the site estimated using Caltrans (2022) *ARS Online* (accessed July 26, 2022) and guidelines set forth in Appendix B of the Caltrans *Seismic Design Criteria* (Caltrans 2019b). The SDC defines the design earthquake as corresponding to an event having a 5-percent probability of exceedance in 50 years (975-year return period). The site coordinates were estimated as 34.4208 degrees latitude and -119.6679 degrees longitude.

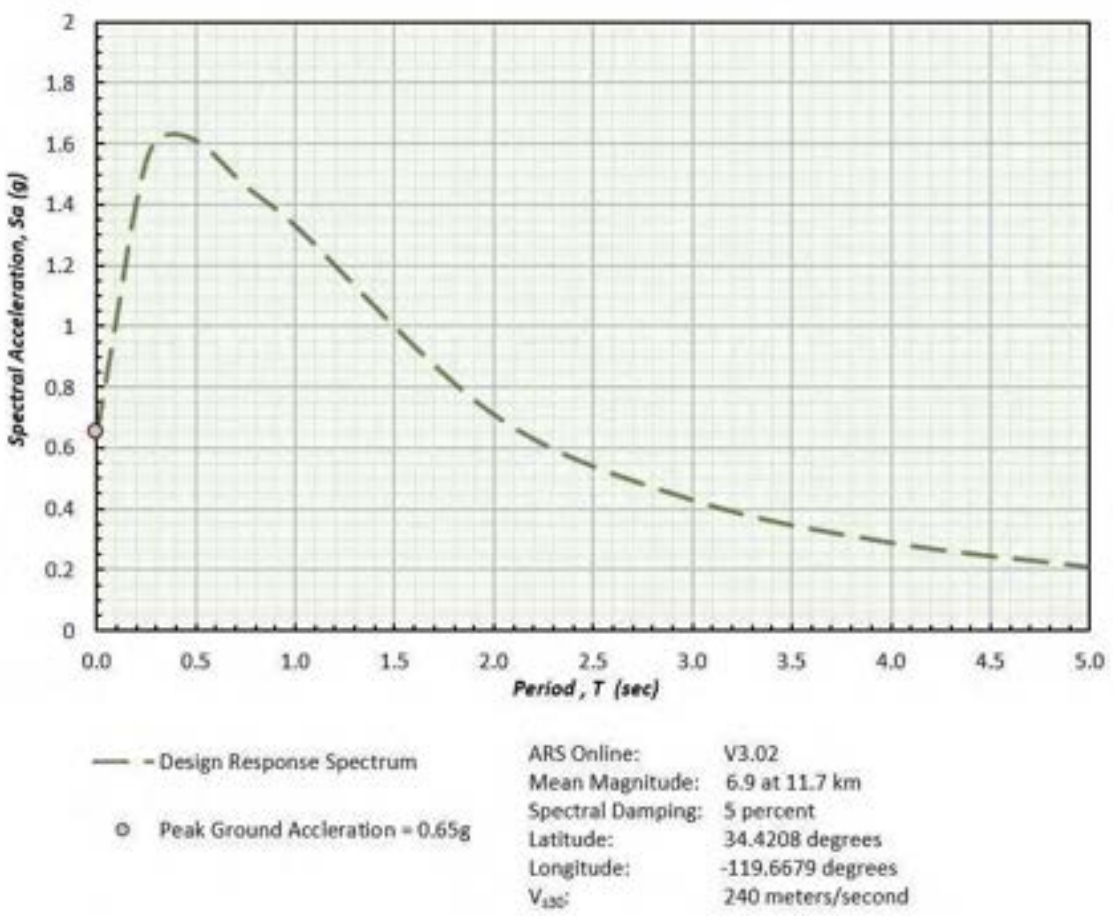


Figure 4: Preliminary ARS Curve (obtained 7/26/22, subject to database changes)

Subsurface data from the 2004 Caltrans borings for the Sycamore Creek Bridge Replacement and design of Soundwalls No. 1 and 2 along US-101 was used to estimate an average shear wave velocity

of 780 feet per second (240 meters per second) for the upper 100 feet of the soil and rock at the site, corresponding to Site Class D defined in Appendix B of the *Seismic Design Criteria*. The design earthquake is estimated to have a mean magnitude of 6.9, a mean site to source distance of approximately 7.3 miles (11.7 kilometers), and results in a peak ground acceleration of approximately 0.65g at the project site. The alluvium (Qac and Qia) is classified as S2 soil based on Section 6.1 of the *Seismic Design Criteria*. The older alluvium (Qoa) is classified as S1 soil.

8.2 Other Seismic Hazards

8.2.1 Surface Fault Rupture

The project site is not within an Alquist-Priolo Earthquake Fault Zone. No known active or potentially active faults are mapped through the site. Therefore, no special design considerations are needed to address fault rupture.

8.2.2 Liquefaction Potential

Liquefaction is the loss of soil strength due to an increase in soil porewater pressure resulting from seismic ground shaking. Liquefaction typically occurs in loose to medium dense granular soil that is below the water table. The extent and severity of liquefaction is dependent upon the intensity and duration of the strong ground motion. Evaluation of liquefaction potential is needed to assess the impact of adverse subsurface conditions on structures during earthquakes. These include increased lateral loads on piles and abutments due to lateral spreading along slopes and negative skin friction on piles due to settlement. The site is mapped as being underlain by units of alluvium consistent with the subsurface conditions encountered in the previous Caltrans borings. The liquefaction potential of the alluvium was preliminarily evaluated using the previous boring data and NCEER (Youd and Idriss 2001) guidelines in consideration of Caltrans (2020) guidelines for evaluating liquefaction. Selected units of alluvium encountered in the previous boring are considered liquefiable for the design earthquake based on the preliminary analyses. A summary of soil layers that were preliminarily estimated to be liquefiable are presented in Table 3. Special recommendations are needed for design to address liquefaction or seismic related hazards for such structures or improvements.

Table 3: Preliminary Liquefaction Potential

Location or Boring ID	USCS	Ground Surface Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Estimated Factor of Safety (CSR/CSR_{req})	Potential Liquefiable Layer Depths (feet)	Potential Liquefiable Layer Elevations (feet)
B1-04	SC, SM, SP SC	16.7	6.5 10.0	10.2 6.7	0.20 to 0.93 0.69	6.5 to 46 71 to 73.5	10.2 to -29.3 -54.3 to -56.8
B2-04	SM, SC SP SP	17.3	--	--	0.66 to 0.68 0.85 0.76	13 to 22.5 32 to 36 49 to 49.5	4.3 to -5.2 -14.7 to -18.7 -31.7 to -32.2
B13-04	SM	16.9	(Wet sample at 70 feet, no groundwater noted)	--	0.54 to 0.91	25.5 to 35.5	-8.6 to -18.6
B18-04	SM	17.3	--	--	0.86	36 to 41	-18.7 to -23.7
B21-04	SP-SM SP-SM, SW-SM	16.2	8.0	8.2	0.46 to 0.68 0.17 to 0.63	5 to 8 8 to 24	11.2 to 8.2 8.2 to -7.8
B24-04	SP	14.0	13.0	1.0	0.38	19.5 to 24.5	-5.5 to -10.5
B29-04	SM SP, SC	14.9	9.0	5.9	0.5 to 0.63 0.63 to 0.83	2.5 to 9 9 to 15 25.5 to 26	12.4 to 5.9 5.9 to -0.1 -10.6 to -11.1
B34-04	SM, SC SW-SC	13.6	6.3	7.3	0.34 to 0.56 0.64	2.5 to 7.5 14.5 to 19.5	11.1 to 6.1 -0.9 to -5.9

Note: Values in table show potentially liquefiable layers if those layers are below the groundwater table. Groundwater was not recorded in all reviewed borings.

Potentially liquefiable soil will likely be encountered below the proposed pedestrian overcrossing and should be further evaluated and addressed as part of a subsequent design-level field exploration program and reporting for the project. The Caltrans *Seismic Design Criteria* specifies that liquefiable soils are classified as Site Class F and require site-specific seismic analyses. The field exploration program for the new overcrossing should include Cone Penetration Testing to help characterize the subsurface conditions and liquefaction potential below the site.

8.2.3 Effects of Liquefaction

Potentially liquefiable soil conditions should be considered in subsequent geotechnical exploration and analysis for the project based on our preliminary analyses and should be considered in the design of the overcrossing foundations. Estimation of the liquefaction potential and effects of liquefaction (such as seismic settlement, seismically induced downdrag, and lateral spreading) should be considered within the scope of the *Foundation Report* prepared for design.

8.2.4 Seismic Slope Stability

The project will likely not involve high embankments or steep slopes that would be considered vulnerable to slope instability or lateral spreading. Seismic slope stability analysis should be performed for applicable slopes that are part of the proposed design as part of the final *Foundation Report.*

8.2.5 TSUNAMI RISK

Tsunamis are long-period sea waves formed during seismic events or submarine landslides. Tsunamis behave like a tidal surge that can result in run-ups, or bores, extending up streams, rivers, and creeks and inundating coastal areas. The site is located approximately elevation 12 to 17 feet above sea level and 0.3-miles north of the shoreline of the Pacific Ocean. Sycamore Creek runs through the project site and west of the proposed overcrossing. Potential tsunami hazards were considered for the project in accordance with Caltrans Memo to Designers (Caltrans 2010). Tsunami loading can be estimated by the AASHTO *Guide Specifications for Bridges Subjected to Tsunami Effects* (AASHTO 2022). The estimated limits of tsunami inundation for a 1,000-year return event are shown on the Natural Hazards Risk and Resiliency Research Center Tsunami Inundation Portal (NHR3 2022) and presented on Figure 5 relative to the project site.

Figure 5: NHR3 (2022) Tsunami Hazard Map

9. PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

9.1 PRELIMINARY FOUNDATION CONSIDERATIONS

Foundation alternatives for proposed crossing includes spread footings, driven piles, cast-in-steel-shell (CISS) piles, and cast-in-drilled-hole (CIDH) piles. Considerations for each alternative are presented below. The following are key geotechnical considerations that will influence the foundation design and selection of the foundation type selection for the new pedestrian overcrossing:

- Relatively shallow groundwater and alluvium composed of interbedded layers of loose to medium dense sand and very soft to stiff silt and clay were encountered in the previous Caltrans (1944, 2005) borings drilled near the project site. The alluvium was underlain by older alluvium units at depths of approximately 40 to 46 feet below the highway that were composed of interbedded layers of medium dense to very dense sand and hard clay.
- Sand layers within the alluvium that were encountered in the previous borings were potentially liquefiable under the design earthquake based on preliminary analyses. Additional exploration and analyses are needed to characterize the liquefaction potential and provide specific recommendations that will be needed for design to address liquefaction, seismic settlement, loss of foundation support, or seismic related hazards for the proposed structure and associated foundations.
- Shallow foundations will be vulnerable to liquefaction and static and seismic settlement within the younger alluvium. The older alluvium had a low potential for liquefaction and is the likely bearing material for deep foundation alternatives considered in this report.
- The subsurface soil is not considered corrosive based on testing for previous studies.
- The proposed structure will cross Sycamore Creek. Scour may need to be considered for design of the foundations for the proposed crossing.
- The construction footprint and final layout for the proposed crossing foundations is constrained spatially between the Santa Barbara Zoo parking lot to the south, Union Pacific Railroad (UPRR), US-101, and the residential neighborhood to the north. Considerations for spatial constraint will be needed for both construction and final layout of the proposed structure and foundations.
- Existing overhead lines and utilities were observed on the north and south sides of US-101 during Yeh's 2022 site visit. Underground utilities are also likely present within the area on the northern side of US-101 within the residential neighborhood, as well as underground reclaimed water lines on the south side of US-101. Locations of any existing utilities at the site should be considered relative to overcrossing construction, foundation drilling, or pile driving. The utilities may need to be taken out of service or relocated to allow for staging and construction of the overcrossing and foundations. Existing vegetation is also present within the Santa Barbara Zoo parking lot on the south side of US-101. This vegetation will likely need to be removed to allow for pile driving or foundation excavation.
- Soil and groundwater in the project vicinity may be potentially contaminated based on previous Yeh project experience in the area and experience working near railroad corridors.

Selection of foundation alternatives should consider the need to test and dispose of soil and drilling cuttings and the potential for contamination.

9.1.1 SPREAD FOOTINGS

Spread footings would likely bear within 5 to 8 feet of existing site grades in soft clay or loose sand within the upper units of the alluvium (Qac, Qia). Groundwater was encountered at about 6 to 13 feet below the ground surface. Design of spread footings should consider bearing resistance, initial and post-construction settlement of soft clay, potential scour along Sycamore Creek, the potential for liquefaction of the alluvium to compromise support of shallow foundations, and spatial constraints for excavation and construction of the footings. Benefits of the use of spread footings as a foundation alternative would include:

- Potential reduced cost of construction compared to other foundation methods if footings can be constructed in the dry without excessive shoring, ground modification or dewatering, and
- Spread footings are a conventional foundation type (no specialty contractors needed).

Constraints and considerations that could adversely impact the cost and feasibility of supporting the proposed overcrossing on spread footings foundations include:

- Long term settlement and consolidation within clay layers that would require pre-loading, settlement waiting periods, or ground modification to support the anticipated foundation loads;
- Ground modification may be needed to resist scour, liquefaction, settlement, lateral spreading or strengthen the alluvium to provide adequate support for spread footings;
- Dewatering, shoring, and subgrade stabilization would be needed if footings are to be constructed below groundwater;
- May involve soil disposal for the excavated material that may encounter contaminated soil or groundwater conditions.
- Shoring with adequate lateral support systems may be needed to avoid potential impacts to the US-101 and UPRR rights-of-way and avoid settlement of existing facilities and utilities that may be present along the railroad lines; and
- Spread footings may need a footprint larger than the pile cap for deep foundation to accommodate higher loading, if anticipated.

The design and construction of spread footing foundation seems relatively complex and with risks for unanticipated costs associated with the compressibility and liquefaction potential of the foundation support soil, shallow groundwater, spatial constraints along the UPRR right of way, and performance to seismic hazards or scour compared to deep foundations. Spread footing are not recommended for design of the overcrossing foundations based on the preliminary analyses and review of previous geotechnical data.

9.1.2 DRIVEN PILES

Driven piles would typically consist of Caltrans standard plan steel pipe or square precast concrete piles or nonstandard H-piles. Driven Class 400 concrete piles were used for the support of Soundwall No. 1 east of the project site as well as the wing walls for the Sycamore Creek Bridge. Driven piles would likely need to develop end and frictional resistance within the older alluvium and below approximately el. -25 feet to provide suitable support for the new overcrossing.

Benefits of the use of driven piles as a foundation alternative would include:

- Driven piles extending below groundwater with a pile cap above the groundwater level may have less construction challenges than drilled methods below the groundwater table;
- Driven piles would not require slurry or cutting disposal;
- Steel pipe piles or H-piles can be cut or spliced to accommodate variations in pile length in relation to variable subsurface conditions encountered during pile driving;
- Concrete piles can be constructed long and cut off to accommodate refusal above the tip elevation if needed but would generate cut-off pieces that would need to be disposed of;
- Closed-end pipes or full displacement concrete piles would likely develop end bearing resistance relatively quickly with the older alluvium and at shallower depths than CIDH piles designed for friction alone and advanced deeper within the wet ground; and
- Driven piles can be designed to provide resistance to scour and liquefaction.

Constraints of the use of driven piles as a foundation alternative would include:

- Pile driving will generate noise. Pre-construction surveys of nearby residences, distress surveys, and noise and vibration monitoring may be needed for pile driving;
- Pile driving in close proximity to Sycamore Creek may not be permitted for environmental reasons, or could require special permit conditions such as the use of buffer trenches or curtains to attenuate noise and vibrations from pile driving from adversely impacting aquatic species in the creek;
- Driving could be delayed if splicing of steel piles is needed because of requirements for inspection and testing of field welds;
- A group of driven piles will likely be needed to support structure loads above the standard pile capacity or to provide a structural connection between the foundation and superstructure. Pile cap excavation and construction for the driven piles would need to include shoring and dewatering to control groundwater and provide lateral support to excavations within the younger alluvium; and
- Pile caps for driven piles could require a larger final design footprint compared to large-diameter CIDH pile connected directly to the structural column.

Driven piles are considered suitable foundation support for the proposed overcrossing. The piles would need to be driven into the older alluvium and consider additional down drag and potential lateral forces associated with settlement and liquefaction.

Preliminary factored nominal axial resistance versus embedment depth into the alluvium are provided on Figure 6 for Caltrans (2018) Standard Plan 200 pipe piles (Alternative "W") for both open-ended and close-ended conditions. Factored nominal axial resistances provided on Figure 6 were estimated according to the latest Caltrans (2019) amendments to the AASHTO (2017) *LRFD Bridge Design Specifications* for the Strength Limit State (resistance factor of 0.7) and Extreme Limit State (resistance factor of 1.0) and do not include the effects of scour, loading due to seismically induced downdrag, or preliminary lateral resistance. The provided preliminary factored nominal axial resistances neglect resistance contribution from potentially liquefiable layers. Yeh should be contacted if pile sizes or types other than those provided on Figure 6 are needed for preliminary design.

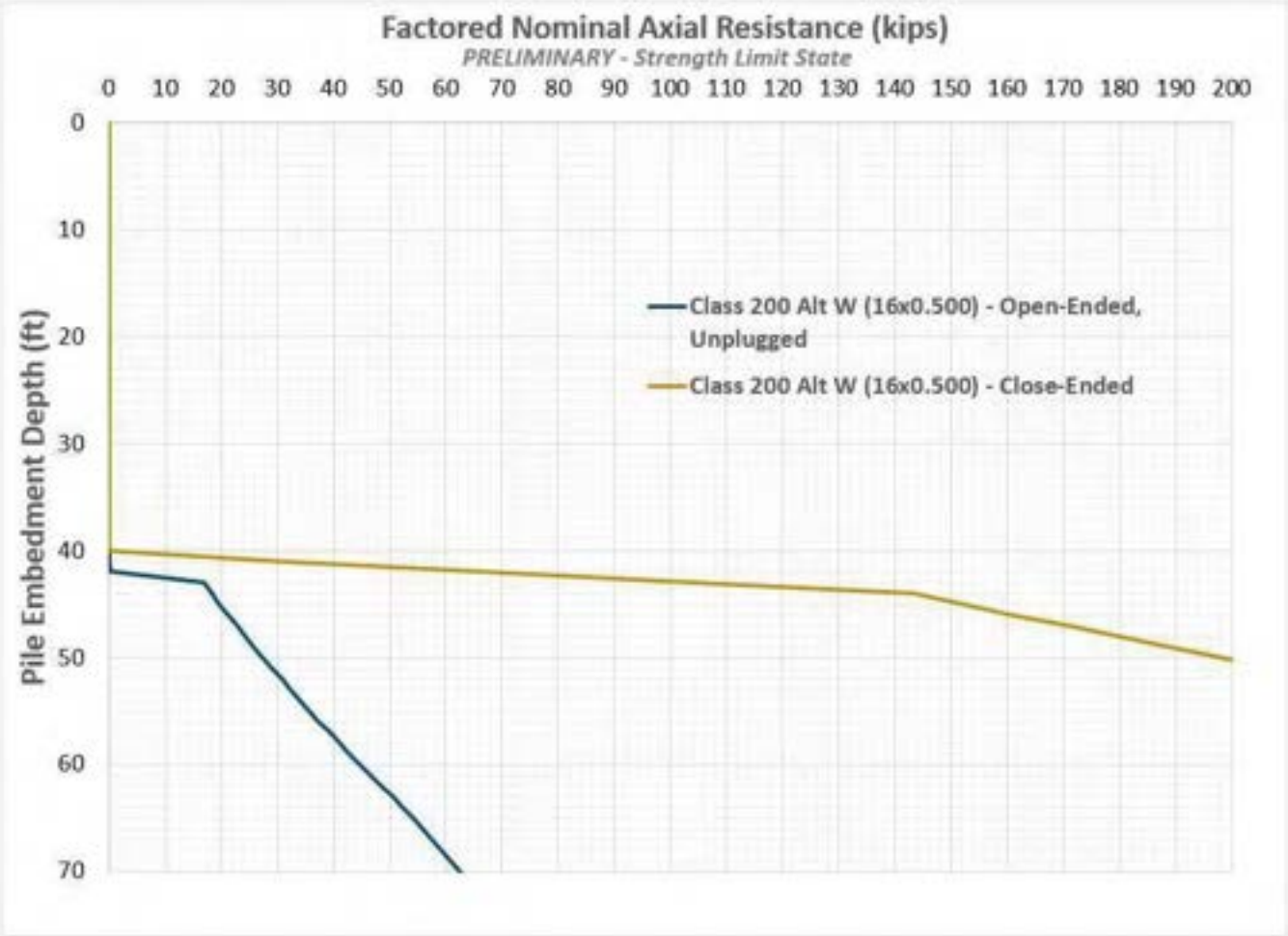


Figure 6: Preliminary Factored Nominal Axial Resistance Versus Depth for Driven Piles - Strength Limit State

9.1.3 CAST-IN-STEEL-SHELL (CISS) PILES

CISS piles typically consist of driving a steel pipe pile into the ground and casting reinforced concrete into the head of the pile to form a structural connection to the superstructure. The concrete can be placed in a closed-end pile, or by removing a portion of the soil plug within an open-end pipe pile to

allow for concrete placement. CISS piles would likely need to develop end and frictional resistance within the older alluvium and below approximately el. -25 feet to provide suitable support for the new overcrossing.

Benefits of the use of CISS piles as a foundation alternative would include:

- Larger diameter CISS piles can be specified that help develop resistance at shallower depths compared to driven piles.
- CISS piles are commonly used to resist lateral loads for relatively large structures and may be preferred over standard steel pipe piles if a larger lateral resistance is needed to satisfy special structural considerations or loading conditions; and
- CISS piles can be designed to provide resistance to scour and liquefaction-related effects.

Constraints of the use of CISS piles as a foundation alternative would include:

- CISS installation would involve soil disposal for the soil plug that may encounter potentially contaminated soil or groundwater conditions.
- Pile driving will generate noise. Pre-construction surveys of nearby residences, distress surveys, and noise and vibration monitoring may be needed for pile driving.
- Pile driving in close proximity to Sycamore Creek may not be permitted for environmental reasons or could require special permit conditions such as the use of buffer trenches or curtains to attenuate noise and vibrations from pile driving from adversely impacting aquatic species in the creek.
- Driving could be delayed if splicing of steel piles is needed because of requirements for inspection and testing of field welds; and
- A group of driven piles will likely be needed to support structure loads above the standard pile capacity or to provide a structural connection between the foundation and superstructure.

CISS piles are considered suitable for support of the proposed overcrossing structure. CISS piles bearing near elevation -28 feet (approximately 33 feet below the ground surface) were used to support the Sycamore Canyon Bridge with nominal design capacities up to 280 kips. These piles appear embedded within the younger alluvium (Qia) unit. The younger alluvium may be potentially liquefiable based on preliminary analyses, and is not the recommended bearing material for CISS, if used. The piles would need to be driven into the older alluvium and consider additional down drag and potential lateral forces associated with seismic settlement and liquefaction.

9.1.4 Cast-in-Drilled-Hole (CIDH) Piles

Cast-in-drilled-hole (CIDH) piles typically consist of a reinforced concrete pile cast in a drilled hole. CIDH piles would likely need to develop frictional resistance within the older alluvium and below approximately el. -25 feet to provide suitable support for the new overcrossing. Loose, wet alluvium encountered in the previous borings at the project site would require wet-method (slurry displacement) CIDH pile construction and/or temporary casing. Drill rigs used to construct CIDH piles

can be equipped with temporary casings and other tooling to help advance the hole through loose soil and groundwater. Pile contractors are typically experienced in drilling in loose or caving soil or below groundwater.

Benefits of the use of CIDH piles as a foundation alternative would include:

- CIDH piles can be designed to larger diameters (compared to standard piles) to provide additional axial or lateral resistance or help to reduce the total number of piles needed;
- A single CIDH pile can be designed with a structural connection to the bridge column without the need for a pile cap (and associated excavation);
- CIDH pile installation typically also does not have the noticeable vibrations or noise associated with pile driving;
- CIDH piles can be designed to develop higher capacities in hard or dense bearing material where a smaller-, standard-size driven pile may have a limited capacity and meet refusal near the surface of the bearing material; and
- CIDH piles can be designed to provide resistance to scour and liquefaction-related effects.

Constraints of the use of CIDH piles as a foundation alternative would include:

- Post-construction inspection and non-destructive testing of CIDH piles constructed in the wet is required by the Standard Specifications. Anomalies are often identified that require delays, review of the design loads, and possible mitigation or pile replacements to address anomalies;
- Tanks for slurry and spoils associated with wet-method CIDH pile construction can require a larger construction footprint compared to driven piles; and
- CIDH pile construction would involve cutting and slurry disposal that may encountered potentially contaminated soil or groundwater conditions.

CIDH piles are considered suitable for support of the proposed overcrossing structure. Preliminary factored nominal axial resistance versus embedment depth into the alluvium are provided on Figure 8 for various CIDH pile diameters requested by Quincy. Factored nominal axial resistances provided on Figure 7 were estimated according to the latest Caltrans (2019) amendments to the AASHTO (2017)

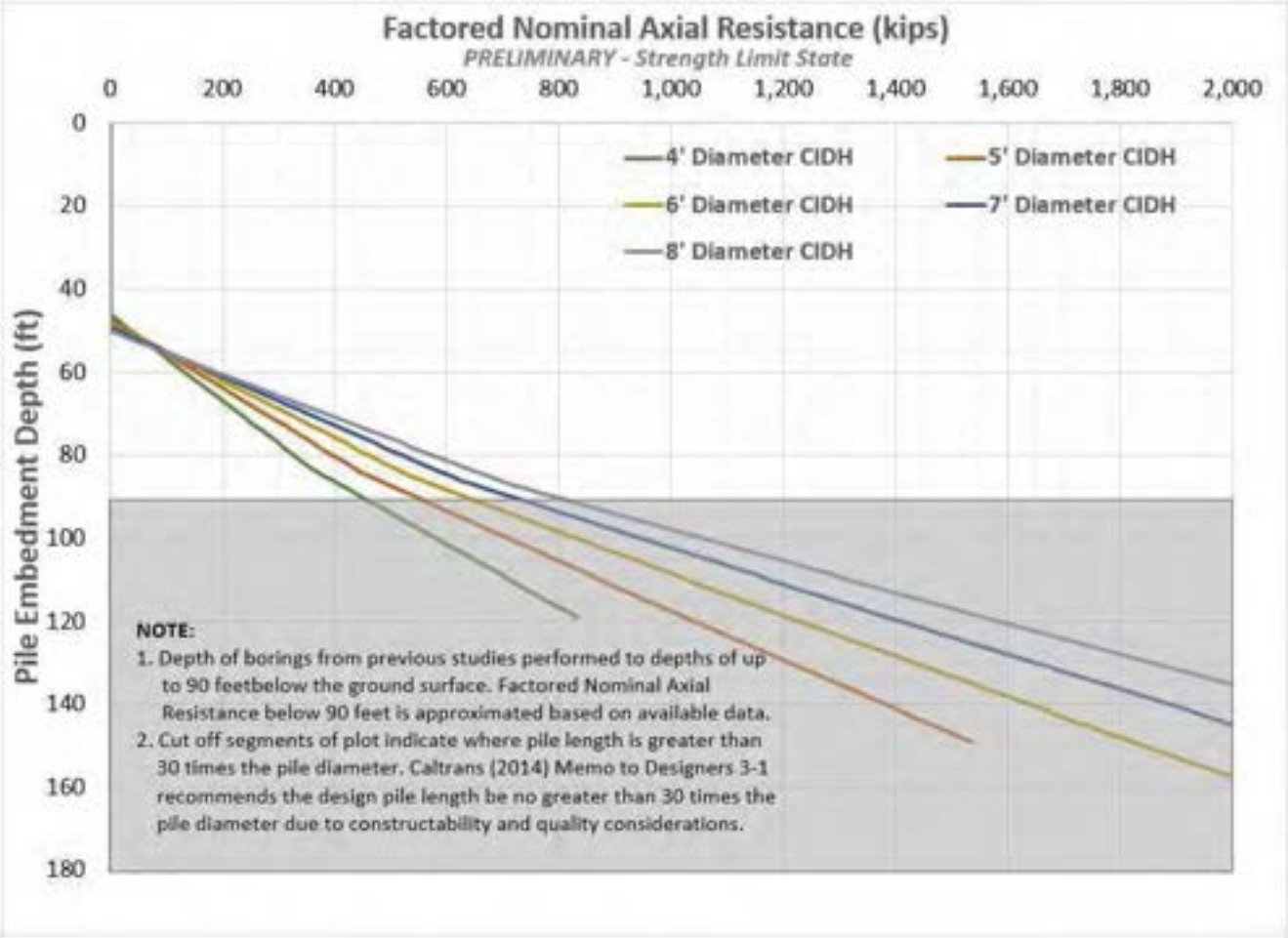


Figure 7: Preliminary Factored Nominal Axial Resistance Versus Depth for CIDH Piles – Strength Limit State

LRFD Bridge Design Specifications for the Strength Limit State (resistance factor of 0.7) and does not include the effects of scour, seismically induced downdrag, or preliminary lateral resistance. Yeh should be contacted if pile sizes or loading other than those provided on Figure 7 are needed for preliminary design.

9.1.5 PREFERRED PILE FOR DESIGN

The proposed overcrossing should be supported on deep foundations bearing in dense older alluvium based on subsurface conditions encountered in previous borings drilled for adjacent structures. Similar to the foundation support for the Sycamore Creek Bridge on Highway 101, driven piles are considered most suitable for support of the overcrossing structure based on the subsurface conditions encountered in previous studies in the site vicinity and would help to avoid potential foundation problems associated with shallow groundwater, caving soil conditions, and foundation support. CIDH piles are also considered suitable for support of the overcrossing structure; however, CIDH piles may encounter more constructability challenges relative to the project site compared to driven piles (as described above). Preliminary axial resistance versus embedment depth for various piles are provided in the previous sections to be used with preliminary design. Final design pile tip elevations will be recommended in the *Foundation Report* based on additional field exploration and test results, load demands, the estimated scour depth, estimated seismically induced downdrag or loads, and foundation analysis to evaluate the lateral resistance of piles relatively to axial and lateral load demands.

10. RECOMMENDED SCOPE OF WORK FOR FINAL DESIGN

Additional field exploration and testing at or near project support locations should be performed as input to the final *Foundation Report* for the project. Cone Penetration Test (CPT) soundings and drilled borings are recommended to characterize the foundation support soils relative to foundation capacity, liquefaction, and compressibility. Samples collected from the borings will be laboratory tested for classification, strength, and compressibility and compared to interpreted data collected from the CPT soundings. Geotechnical recommendations should be provided in the final *Foundation Report* based off the additional field exploration and testing performed relative to foundation support of the overcrossing structure, seismic and scour considerations at the site, any anticipated retaining wall structures, as well as site grading and earthwork. Table 4 provides a summary of proposed exploration and considerations for alternative overcrossing geometries provided by Quincy (2022).

Table 4: Summary of Future Exploration by Frame Structure

Frame ID	No. of Supports	Location	No. Proposed Explorations x Depth	Access and ROW Considerations
Sycamore Creek Structure* (Sta. 12+50 to 19+78)	7	Parallel to US-101 and UPRR and extending west from the Zoo to Sycamore Creek	4 Borings x 50-150 feet 3 CPTs x 100-150 feet	All explorations on Zoo or City property south of UPRR corridor, use of park and zoo driveways and parking lot, day work
US-101 Structure A – clear span alternative (Sta. 19+78 to 22+02)	2	Crossing US-101 and UPRR corridors	2 boring x 100-150 feet 2 CPTs x 150 feet	All explorations on Zoo or City property outside Caltrans and UPRR corridors, use of park and zoo driveways and parking lot, day work

Frame ID	No. of Supports	Location	No. Proposed Explorations x Depth	Access and ROW Considerations
US-101 Structure B – two span alternative (Sta. 19+78 to 22+02)	3	Crossing US-101 and UPRR corridors	3 borings x 100 feet 3 CPTs x 150 feet	Two borings and two CPTs on Zoo or City property outside Caltrans and UPRR corridors One boring+CPT inside Caltrans right of way along existing SB shoulder of US-101. Caltrans lane closure required, night work likely
US-101 Structure C* - three span alternative (Sta. 19+78 to 22+02)	4	Crossing US-101 and UPRR corridors	4 borings x 100-150 feet 3 CPT x 150 feet	Two borings and two CPTs on Zoo or City property outside Caltrans and UPRR corridors Two borings and one CPT inside Caltrans right of way along existing SB shoulder and in center median of US-101. Caltrans lane closures required, night work likely
Stacked Ramp Structure* (~Sta. 22+02 to 26+00)	5	Intersection of Canada and Pitos Streets on north side of US-101	3 borings x 50-100 feet 2 CPT x 100-150 feet	All explorations on City property, day work
***Total No of Borings and CPT Soundings assuming Sycamore Creek Structure, US-101 Alternative C, and Stacked Ramp support locations shown on Quincy (2022)**			**11 borings x 50-150 feet 8 CPT x 100-150 feet**	**Zoo and City property outside of UPRR corridor, Caltrans right of way along existing SB shoulder and between existing SB travel lanes of US-101. City and Caltrans lane closures required; day and night work**

11. General Conditions

Yeh prepared this report for Quincy Engineering and their authorized agents only. It is not intended to address issues or conditions pertinent to other parties, projects or for other uses. This report is for preliminary planning purposes only and is not intended for use in final design or construction. The results of this study are preliminary and subject to change pending the results of our design-level geotechnical evaluation. No services have been performed to evaluate environmental impacts or the presence of hazardous or toxic materials.

12. References

American Association of State Highway and Transportation Officials (AASHTO 2022), *AASHTO Guide Specifications for Bridges Subject to Tsunami Effects*, issued January 2022.

American Association of State Highway and Transportation Officials (AASHTO 2017), *AASHTO LRFD Bridge Design Specifications, 8th Edition*, issued 2017.

California Department of Transportation (Caltrans 2022), ARS Online, Version 3.02, Online Web Tool, https://arsonline.dot.ca.gov/, accessed July 26, 2022.

California Department of Transportation (Caltrans 2021), *Corrosion Guidelines, Version 3.2,* Division of Engineering Services, Structure Design, issued May 2021.

California Department of Transportation (Caltrans 2020). *Caltrans Geotechnical Module, Liquefaction Evaluation*, issued January 2020.

California Department of Transportation (Caltrans 2019b), Seismic Design Criteria, Version 2.0 (with interim revisions), Division of Engineering Services, Structures Design, issued April 2019.

California Department of Transportation (Caltrans 2019a), *California Amendments to the AASHTO LRFD Bridge Design Specifications*, Eighth Edition, Sacramento, California, issued April 2019.

California Department of Transportation (Caltrans 2018), *Standard Plans*, issued 2018 with April 2022 revisions.

Caltrans Department of Transportation (Caltrans 2014), *Memo to Designers 3-1, Deep Foundations*, dated June 2014.

California Department of Transportation (Caltrans 2010), Memo to Designers 20-13, Tsunami Hazard Guidelines, dated January 2010.

California Department of Transportation (Caltrans 2008), Pile Driving Records for the Sycamore Creek Bridge Replacement, Bridge No. 51-0332, EA 05-447804.

California Department of Transportation (Caltrans 2005b), US-101 Widening, Kilometer Post Mile 17.4 to 20.6, Sheets 17 through 27, 30 through 32, 613 through 652, dated 2005.

California Department of Transportation (Caltrans 2005a), Sycamore Creek Br (Replace), Log of Test Borings, Bridge No. 51-0332, dated March 17, 2005.

California Department of Transportation (Caltrans 2004), *Final Structure Foundation Report*, EA 05-447801, Sycamore Creek Bridge (Replace), Bridge No. 51-0157, dated October 1, 2004.

California Department of Transportation (Caltrans 1944), *Sycamore Creek Test Hole, File No. 10-5-238, Drawing No. P.1706-1, Bridge No. 51-157*, dated August 1944.

CalTopo (CalTopo 2022), Online Topography Tool, accessed August 3, 2022, https://caltopo.com/map.html#ll=34.42081,-119.66787&z=17&b=mbh

Federal Emergency Management Agency (FEMA 2022), FEMA Flood Map Service Center, Map No. 06083C1391J, effective September 28, 2018, accessed September 6, 2022.

Google Maps (Google 2022), street view, accessed September 6, 2022.

Minor, S.A., Kellogg, K.S, Stanley, R.G, Gurrola, L.D, Keller, E.A., and Brandt, T.R. (Minor et al. 2009), *Geologic Map of the Santa Barbara Coastal Plain Area, Santa Barbara County, California*, scale 1:25,000.

Natural Hazards Risk and Resiliency Research Center (NHR3 2022) Web Portal, ec2-35-167-122-9.us-west-2.compute.amazonaws.com, accessed October 5, 2022.

Quincy Engineering, Inc. (Quincy 2022), *Planning Study, Canada Street POC*, dated October 5, 2022.

United State Geological Survey (USGS 2022), Quaternary Fault and Fold Database of the United States, https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf, accessed August 3, 2022.

Youd, T. L. and Idriss, I.M. (Youd and Idriss 2001), *Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*, Co-chairs Youd, T.L. and Idriss, I.M., Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 127, No. 10, pp. 817-833.

LEGEND:

- Existing Boring (2004)
- Existing Well (2004)
- Existing Boring (1944)
- USGS Survey Benchmark (R28-1920)
- Existing Boring (Soundwall #1)
- Sound Wall Locations
- Union Pacific Railroad
- Base Image (Google Earth, 2022)
- Existing Exploration Locations (CaltransMetric Sheet L-6 and L-7, 2005).
- Overlain Image Pedestrian Bridge design (Quincy Engineering)

North

0 100

feet

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

EXISTINIG FIELD EXPLORATIONS

PROJECT NAME: Lower East Side Pedestrian Community Connector Santa Barbara CA

PLATE 1

PROJECT NUMBER: 222-181

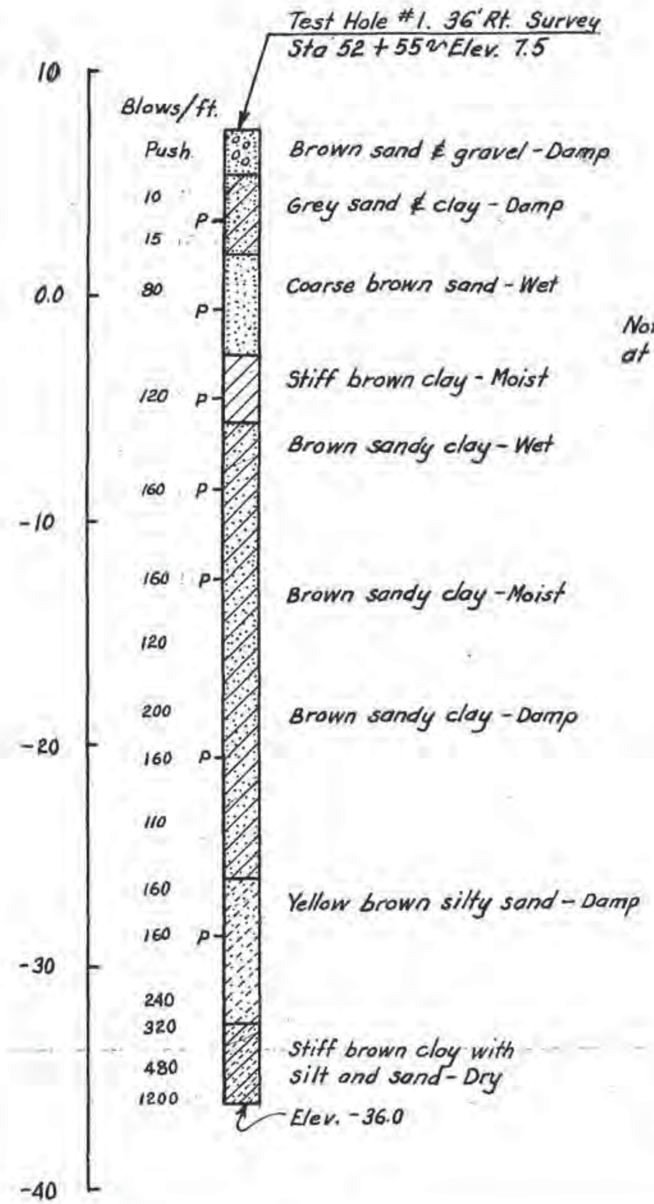
REVISION DATE: 9/12/2022

APPENDIX A - PREVIOUS STUDIES - BORING LOGS

Dist.	County	Route	Section
V	S.B.	2	S.B.

Bridge Engineer ______ License 1414

Date Approved ______



Note: Found ground water at Elev. 6º, Aug. '44.

U.S.G.S. B.M. R-28-1920
South abutment, hwy. side of R.R. bridge - 92' Lt.
Sta 51 + 85 ~ Elev. 16.09

Surveyed Aug. '44
By S. S. Pavitt

Drawn by O.M.U. Date 8-44
Checked by ______
Approved ______

SYCAMORE CREEK	
TEST HOLE	
SCALE: 1" = 6'	FILE NO. LD-5-238
BRIDGE NO. 51-157	DRWG. NO. P-1706-1

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
BRIDGE DEPARTMENT

FORM BD-94. EST. 1944

51-0332 518

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
05	SB	101	pm 12.27		

Caltrans Metric

3-17-05
REGISTERED CIVIL ENGINEER

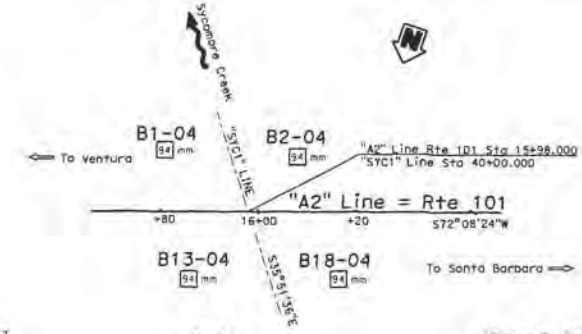
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-05 — CIVIL — STATE OF CALIFORNIA

BENCH MARK

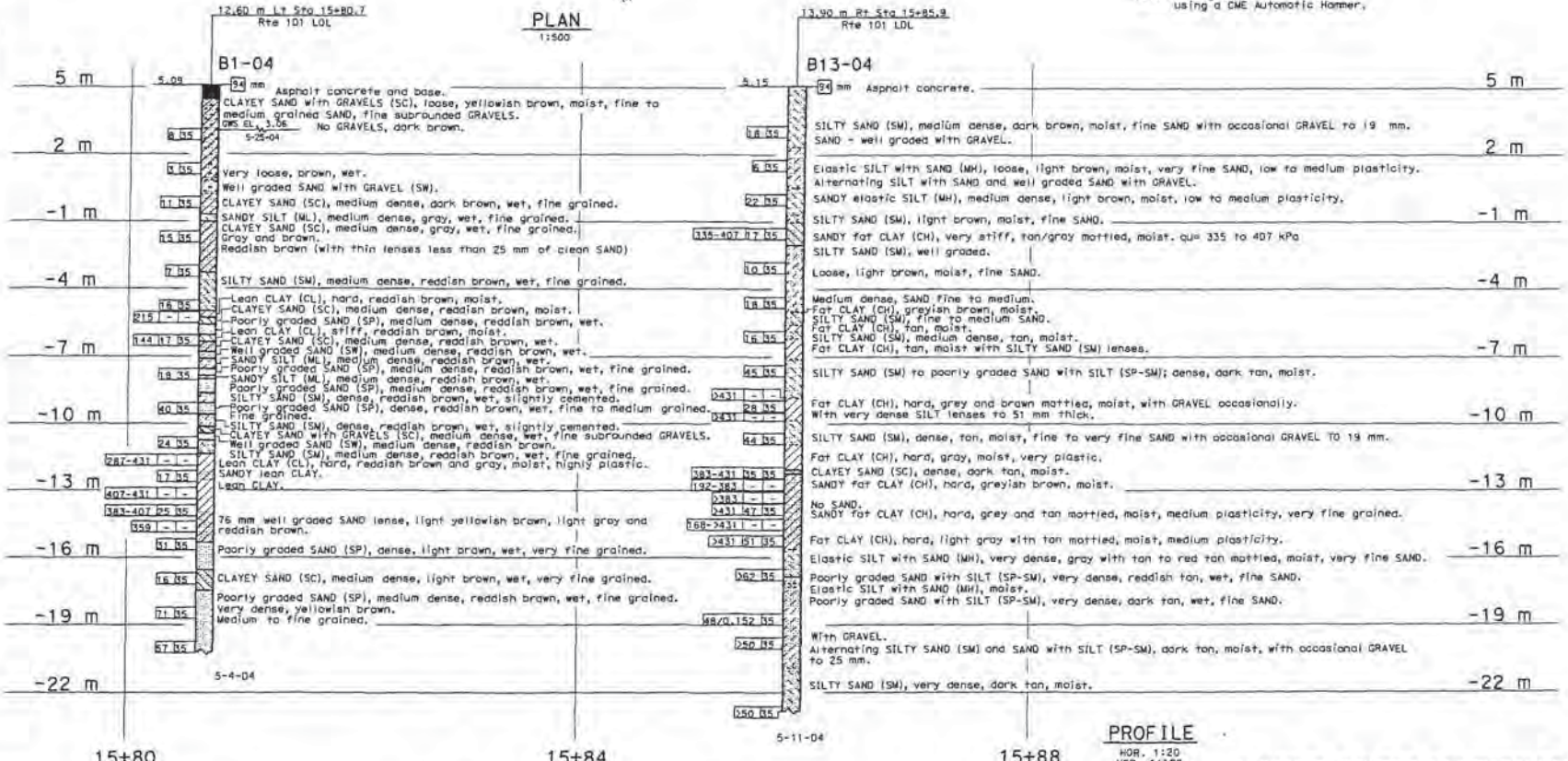
SB101 pm12.30 = NAVD88 4.962 m
SB101 pm12.19 = NAVD88 3.726 m



PLAN

1:500

Note: Boring B1-04 was conducted using a CME Automatic Hammer.



PROFILE

HOR. 1:20
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS According to the Standard Penetration Test

Note: Classification of earth materials as shown on this plan is based upon field inspection and is not to be construed to imply anticipated uniformity.

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	FIELD INVESTIGATION BY:	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 51-0332	SYCAMORE CREEK BR (REPLACE)
DRAWN BY F. Nguyen 9/04		S. von Schwind, W. Hoon			KILOMETER POST 19.8	LOG OF TEST BORINGS 1 OF 2
CHECKED BY S. von Schwind				CU 05 EA 447801		

DOS CIVIL LOG OF TEST BORINGS SHEET (METRIC) REV. 4/04

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

DISREGARD PRINTS BEARING EARLIER REVISION DATES

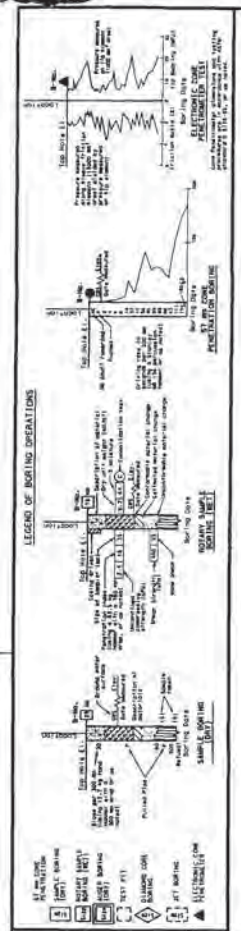
REVISION DATES (PRELIMINARY STAGE ONLY)

DATE 3-17-05

SHEET OF

FILE = s:\sycamore\of2.dgn

TIME PLOTTED => 07:48d 7/05



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
05	SB	101			

Caltrans Metric

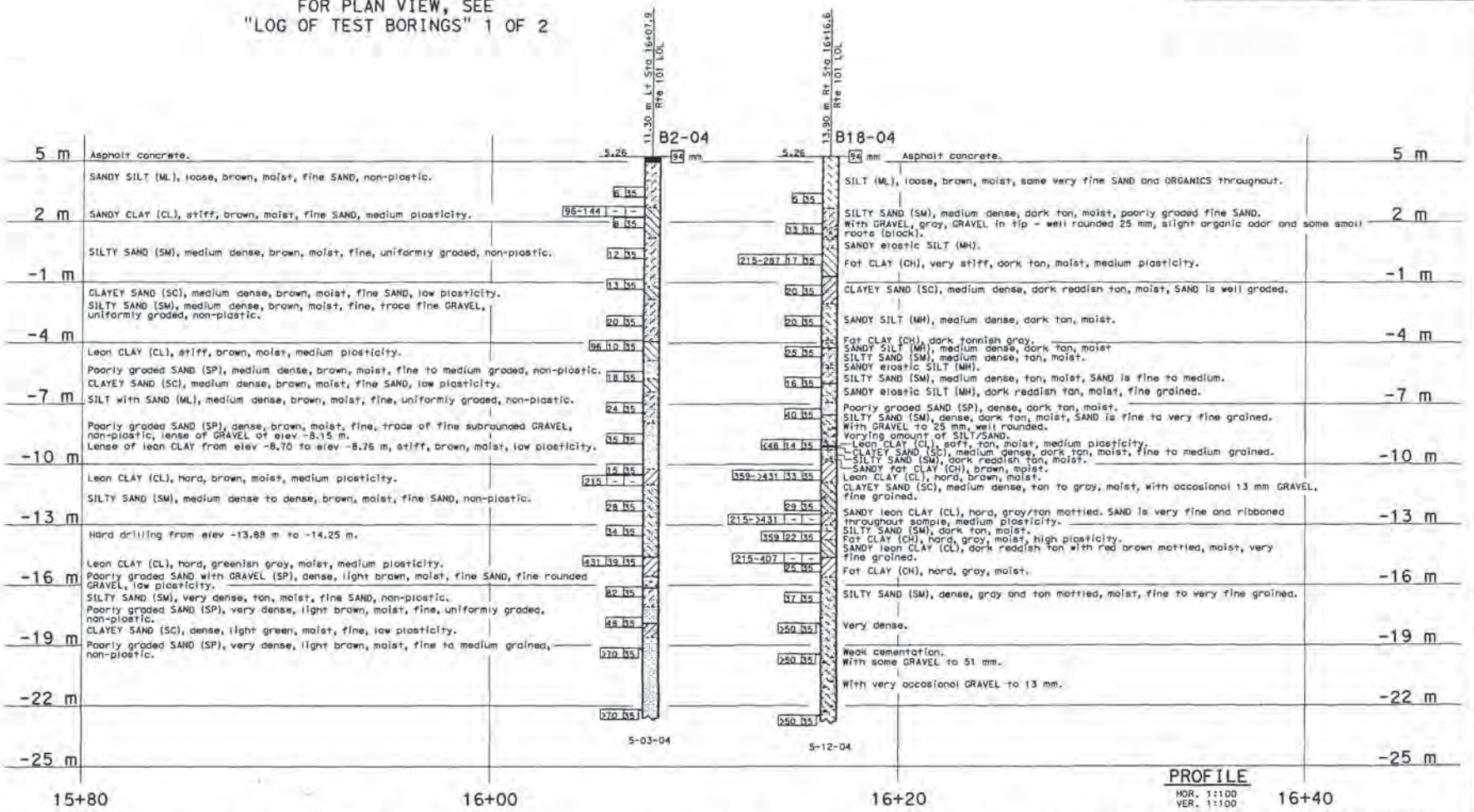
REGISTERED CIVIL ENGINEER — 3-17-05

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-05 — CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS" 1 OF 2



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS According to the Standard Penetration Test

	Granular		Cohesive	
SPT (Blows/ft)	Density		Consistency	
0-4	Very Loose	0-2	Very Soft	
5-10	Loose	3-4	Soft	
11-30	Medium Dense	5-8	Firm	
31-50	Dense	9-15	Stiff	
>50	Very Dense	16-30	Very stiff	
		>30	Hard	

NOTE: Classification of earth materials as shown on this sheet is based upon visual inspection and is not to be construed to apply to specific samples.

ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY: F. Nguyen 9/04	
CHECKED BY: S. von Schwind	

FIELD INVESTIGATION BY: S. von Schwind, W. Hoon, D. Appelbaum

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO. 51-0332
KILOMETER POST 19.8

SYCAMORE CREEK BR (REPLACE)
LOG OF TEST BORINGS 2 OF 2

CU 05
EA 447801

FILE = s:\sycamore2of2.dgn

DGN: CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 4/04)

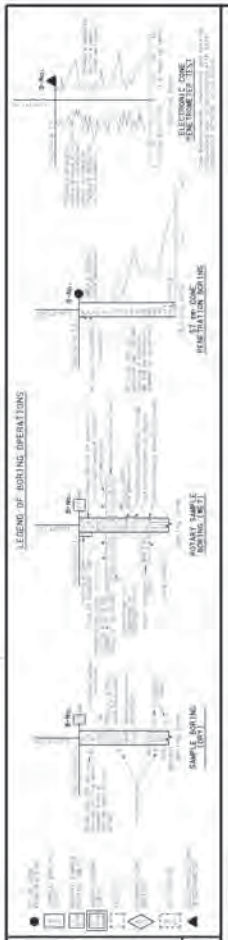
ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

									SHEET	OF
7-1-05	3-17-05									

USERNAME = s\wtong DATE PLOTTED = 07-APR-2005 TIME PLOTTED = 11:32



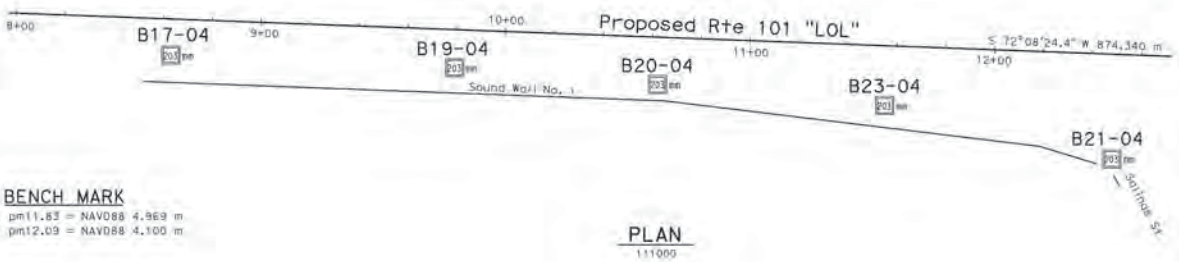
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SB	101	17.4/20.6	628	652

REGISTERED CIVIL ENGINEER 3-25-05

9-17-07
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-09 — CIVIL — STATE OF CALIFORNIA



BENCH MARK

SB101 pm11.83 = NAVD88 4.969 m
SB101 pm12.09 = NAVD88 4.100 m

PLAN

1:1000

Note:
1) Soils described as wet are saturated and below the groundwater table.
2) Borings B17-04, B19-04, B20-04, B21-04 and B23-04 were conducted using a CME automatic Hammer.

PROFILE

HOR. 1:500
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY: F. Nguyen 9/04	
CHECKED BY: S. von Schwind	

FIELD INVESTIGATION BY: S. von Schwind

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.

KILOMETER POST 17.4/20.6

SOUND WALL NO. 1

LOG OF TEST BORINGS 1 of 2

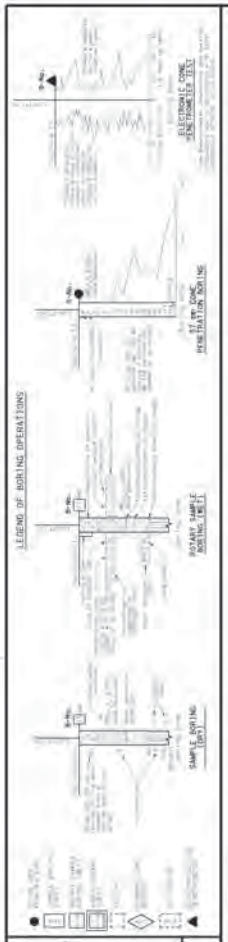
CU 05
EA 447801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

SHEET 8 OF 9

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

DOS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 4/04)



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SB	101	17.4/20.6	629	652

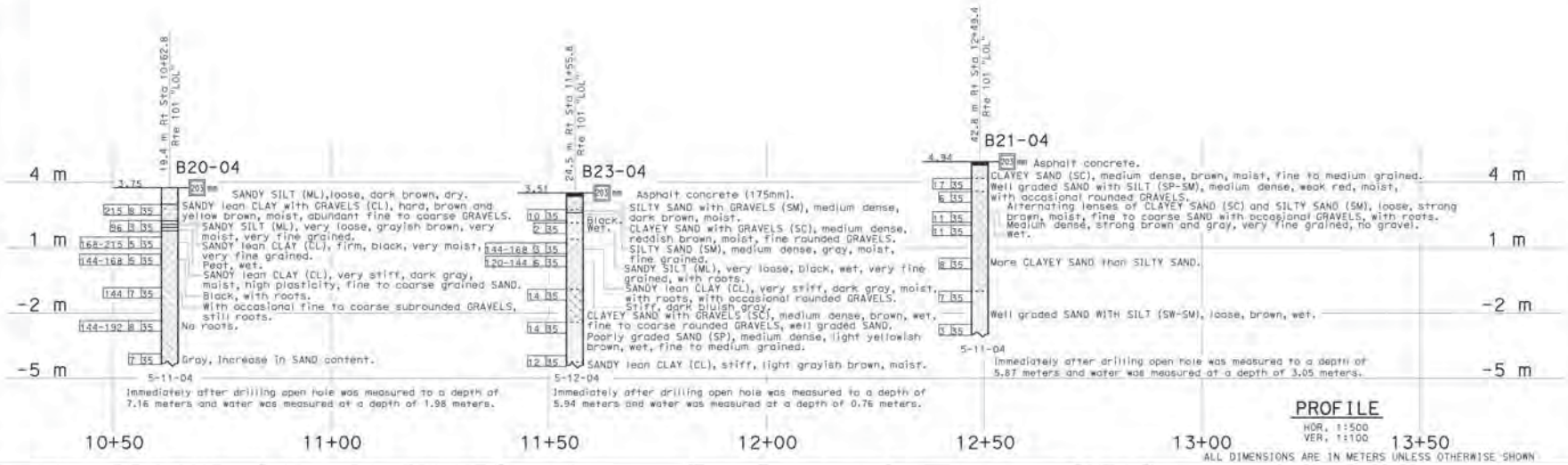
REGISTERED CIVIL ENGINEER 3-25-05

9-17-07
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-08 — CIVIL — STATE OF CALIFORNIA

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS" 1 OF 2



PROFILE
HOR. 1:500
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ENGINEERING SERVICES	GEOTECHNICAL SERVICES
DRAWN BY: F. Nguyen 9/04	
CHECKED BY: S. von Schwind	

FIELD INVESTIGATION BY: S. von Schwind

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 6

BRIDGE NO.
KILOMETER POST 14.7/20

SOUND WALL NO. 1
LOG OF TEST BORINGS 2 of 2

CU 05
EA 447801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

SHEET 9 OF 9

OBS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 4/04)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

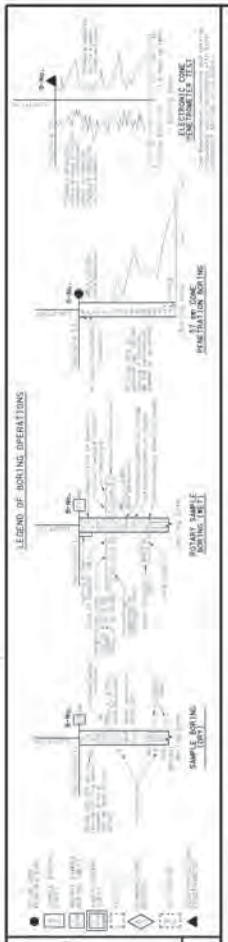
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SB	101	17.4/20.6	638	652

REGISTERED CIVIL ENGINEER 6-22-05

9-17-07
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-05 — CIVIL — STATE OF CALIFORNIA



LEGEND OF BORING OPERATIONS

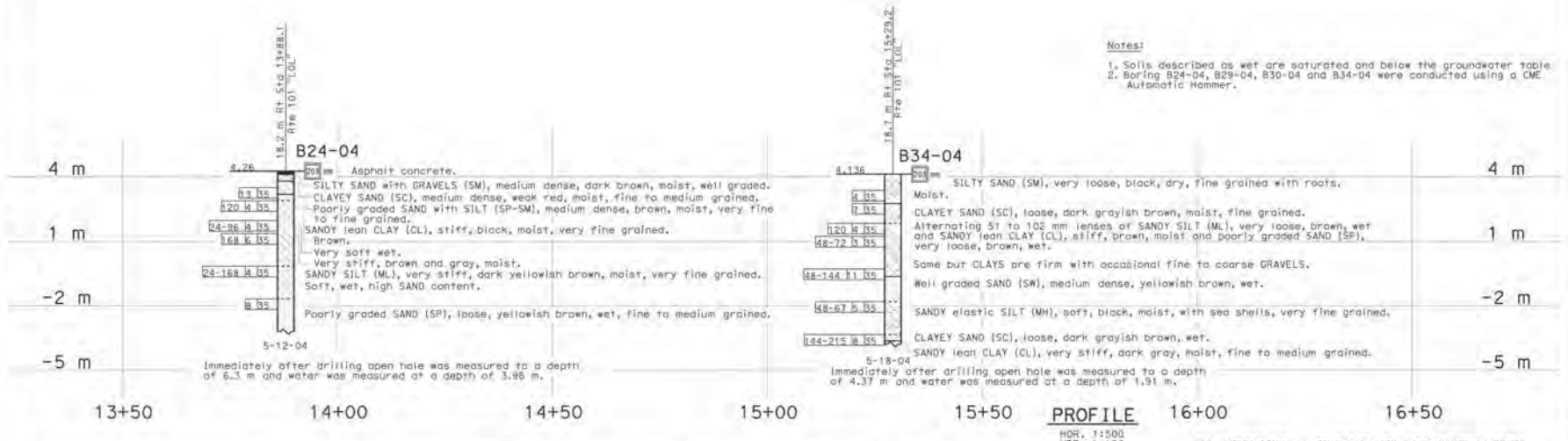
LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

BENCH MARK

Sb 101 pm 12.09 Elev. 4.100 m
Sb 101 pm 12.19 Elev. 3.726 m

PLAN
1:1000



PROFILE
HOR. 1:500
VER. 1:100

Notes:
1. Soils described as wet are saturated and below the groundwater table
2. Boring B24-04, B29-04, B30-04 and B34-04 were conducted using a CME Automatic Hammer.

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ENGINEERING SERVICES					
DRAWN BY	W. Tang 09/04	S. von Schwind	CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO.
CHECKED BY	S. von Schwind				KILOMETER POST

SOUND WALL NO. 2

LOG OF TEST BORINGS 1 OF 2

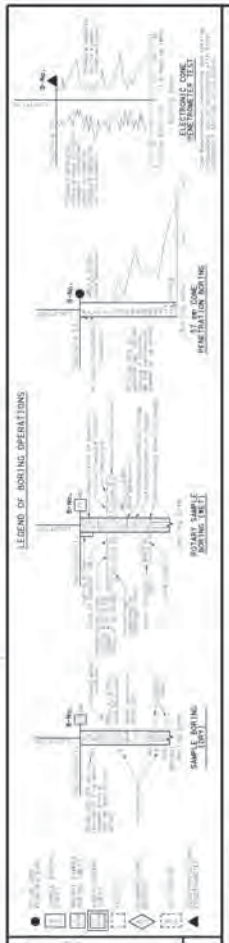
DOS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 05
EA 447801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PROJECTOR STAGE ONLY)										SHEET	TOTAL
										9	10



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SB	101	17.4/20.6	639	652

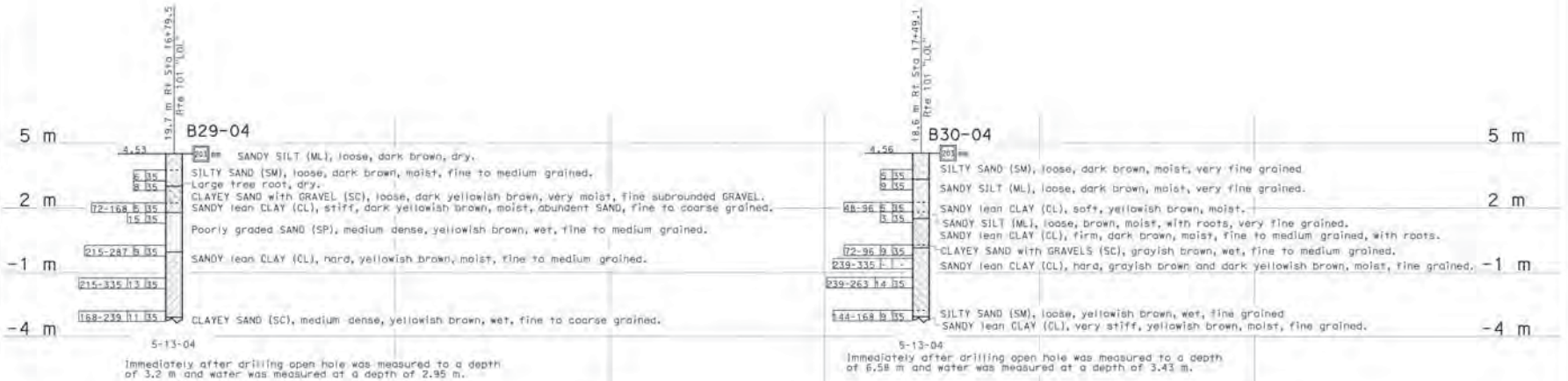
REGISTERED CIVIL ENGINEER — 6-22-05

9-17-07
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Sara von Schwind — No. C050789 — Exp. 9-30-05 — CIVIL — STATE OF CALIFORNIA

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS" 1 OF 2



PROFILE
HOR. 1:200
VER. 1:100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

ENGINEERING SERVICES					
DRAWN BY	W. Tang 09/04	S. von Schwind	CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. / KILOMETER POST
CHECKED BY	S. von Schwind				SOUND WALL NO. 2
					LOG OF TEST BORINGS 2 OF 2

DOS CIVIL LOG OF TEST BORINGS SHEET (METRIC) (REV. 3/02)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 05
EA 447801

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PROJECT ENGINEER)

DATE										SHEET	OF
										10	10

APPENDIX B - PREVIOUS STUDIES - RESULTS OF LABORATORY TESTING

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion Technology Branch
Report Date: 9/20/2004
Reported By: Lopez, Rudy

CORROSION TEST SUMMARY REPORT - Soil/Water

Bridge Name: **SYCAMORE CREEK**
Bridge Number: **51-0157**
EA No.: **05-447801**
Dist/Co/Rte/PM or KP: **05 / SB / 101 / 12.31 PM**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity[1] (ohm-cm)	pH[2]	Chloride Content[3] (ppm)	Sulfate Content[4] (ppm)
C677828	SB-101-11.6	SOIL	0-6.5 FT /BORING B1-04, SAMPLE 1	2000	8.08		
C677829	SB-101-11.6	SOIL	20-21.5 FT/BORING B1-04, SAMPLE 7	1200	7.41		
C677830	SB-101-11.6	SOIL	27.5-31.5 FT /BORING B1-04, SAMPLE 11	3300	7.62		
C677831	SB-101-11.6	SOIL	53-56.5 FT /BORING B1-04, SAMPLE 21	970	7.28	16	27
C677832	SB-101-11.6	SOIL	43-46.5 FT /BORING B1-04, SAMPLE 17	3100	7.46		
C677833	SB-101-11.6	SOIL	68-71 FT /BORING B1-04, SAMPLE 26	3200	7.53		
C677834	SB-101-11.6	SOIL	7.3-10.9 FT /BORING B13-04, SAMPLE A	3100	7.40		
C677835	SB-101-11.6	SOIL	27.4-30.9 FT /BORING B13-04, SAMPLE E	2300	6.59		
C677836	SB-101-11.6	SOIL	47.4-49 FT /BORING B13-04, SAMPLE I	2600	6.78		
C677787	SYCAMORE	WATER	2 METERS / BORING B1-04	300	7.3	87	204

☒ This site is not corrosive to foundation elements (see note below for MSE wall backfill)

☐ This site is corrosive (if checked).

Note: For MSE wall structure backfill material, minimum resisitivity must be 1500 ohm-cm or greater, pH must be between 5.5 and 10.0, chloride content must not be greater than 500 ppm, and sulfate content must not be greater than 2000 ppm.

[1,2]CTM 643, [3]CTM 422, [4]CTM 417

APPENDIX I

RENDERINGS


Laguna St
Garden St
Downtown
1/2
Milpas St
1/2 MILE


Preferred Alternative Grades Less than 5%


Short Ramp Alternative Grades up to 8.3%