State Route 37 Sears Point to Mare Island Improvement Project
Presenting to the San Francisco Bay Conservation Commission

Engineering Criteria Review Board
May 21, 2025

Introductions

Caltrans:

- Javier Mendivil, PM
- Michael Bergman, Bridge Design
- Lewis Shen, Bridge Design
- Olivier Mbatchou, Roadway Design
- John Moore, Geotech
- Peter Wei, Geotech
- Jinpeng Li, Hydraulics
- Skylar Nguyen, Env Planning
- David Weber, Biology

Metropolitan Transportation Commission

- Kevin Chen – Assistant Director
- Jeanette Weisman – SR 37 Corridor Program Manager

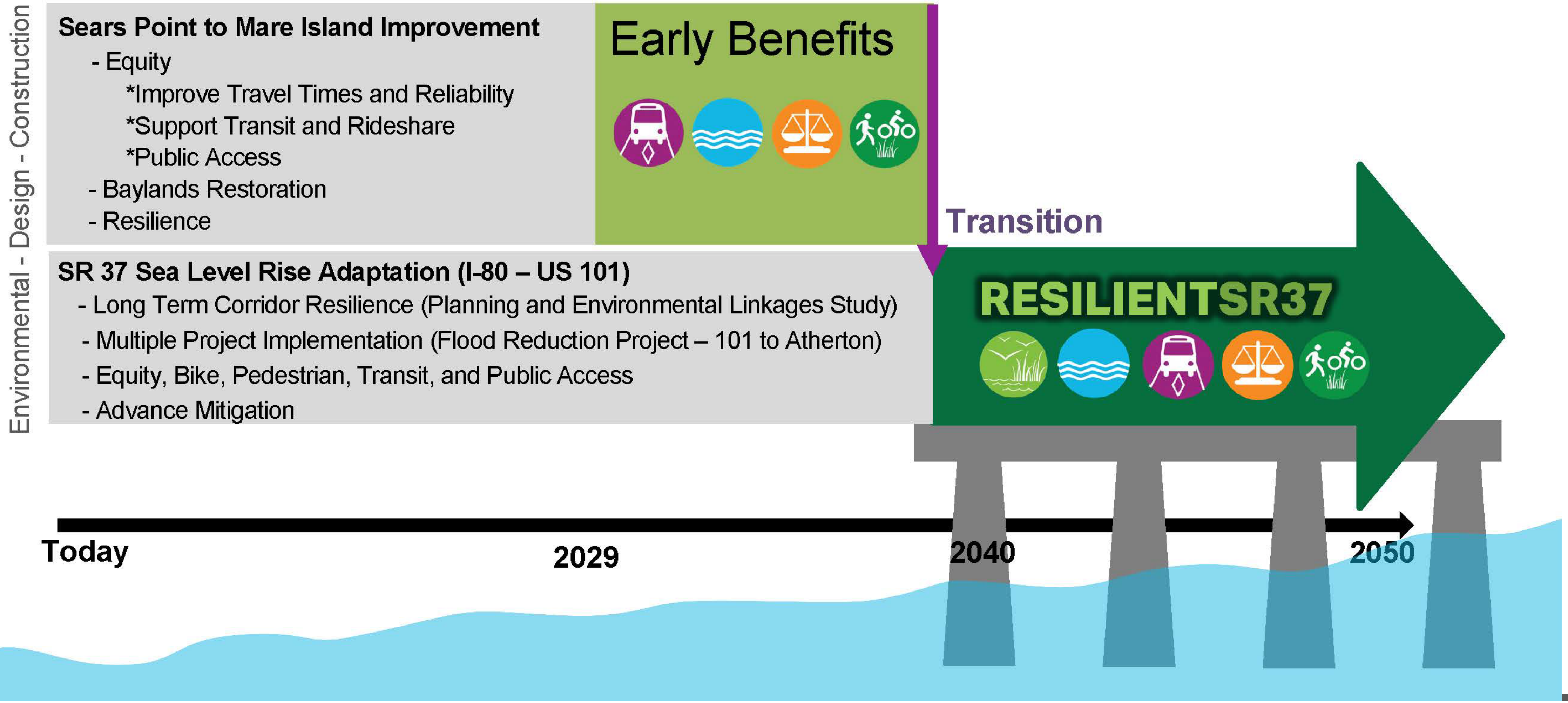
AECOM Consultant Team

- Gary Sjelin, Hydraulics
- Brad Mays, Drainage
- Dillon Lennebacker, Environmental
- Joy Villafranca, Project Engineering Manager

Presentation Overview

- Project Overview
- Purpose and Need
- Proposed Elements in BCDC Jurisdiction
- General Overview
- Technical Discussion

Phased Implementation



Environmental - Design - Construction

Sears Point to Mare Island Improvement
- Equity
  - *Improve Travel Times and Reliability
  - *Support Transit and Rideshare
  - *Public Access
- Baylands Restoration
- Resilience

Early Benefits

Transition

SR 37 Sea Level Rise Adaptation (I-80 – US 101)
- Long Term Corridor Resilience (Planning and Environmental Linkages Study)
- Multiple Project Implementation (Flood Reduction Project – 101 to Atherton)
- Equity, Bike, Pedestrian, Transit, and Public Access
- Advance Mitigation

RESILIENTSR37

Project Location, Purpose, and Need

Location:

- Sonoma County
  SR 37 (PM 2.6 to 4.9) and
  SR 121 (PM 0 to o.3)

Purpose:

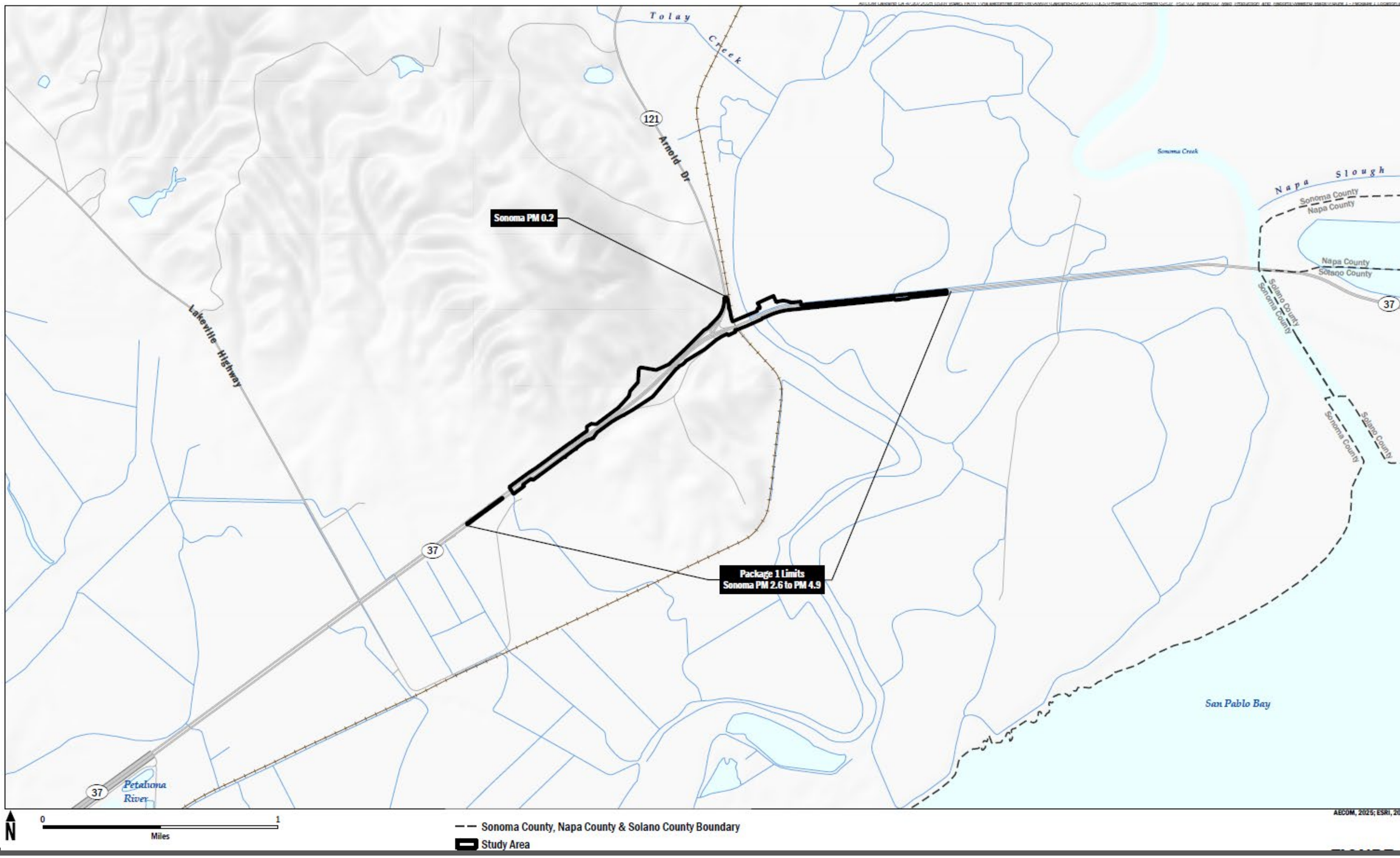
- Improve traffic flow

Need:

- Address recurring congestion

Minimization:

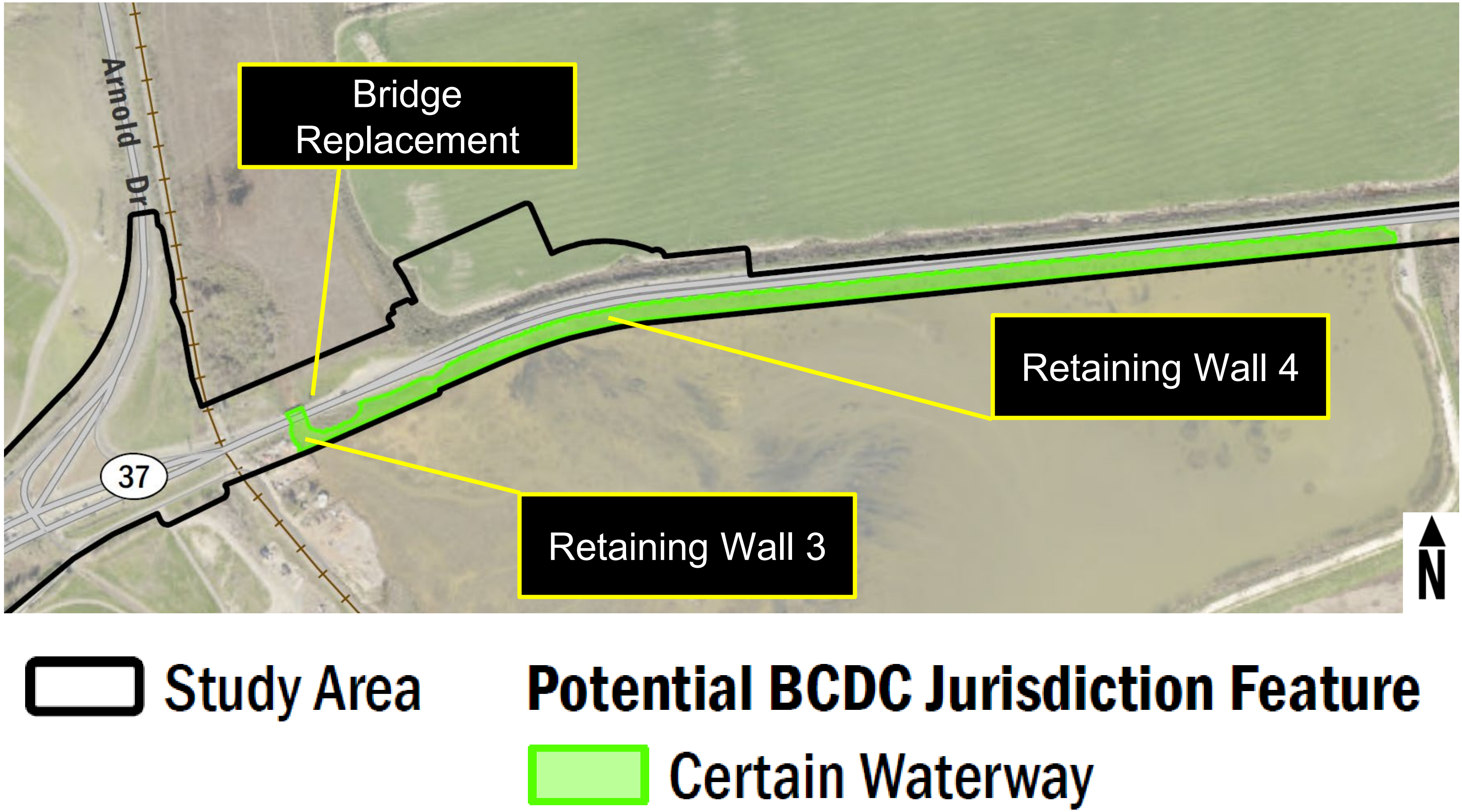
- Create waters/habitat
- Accommodate tidal prism



Project Components in BCDC

Project Elements

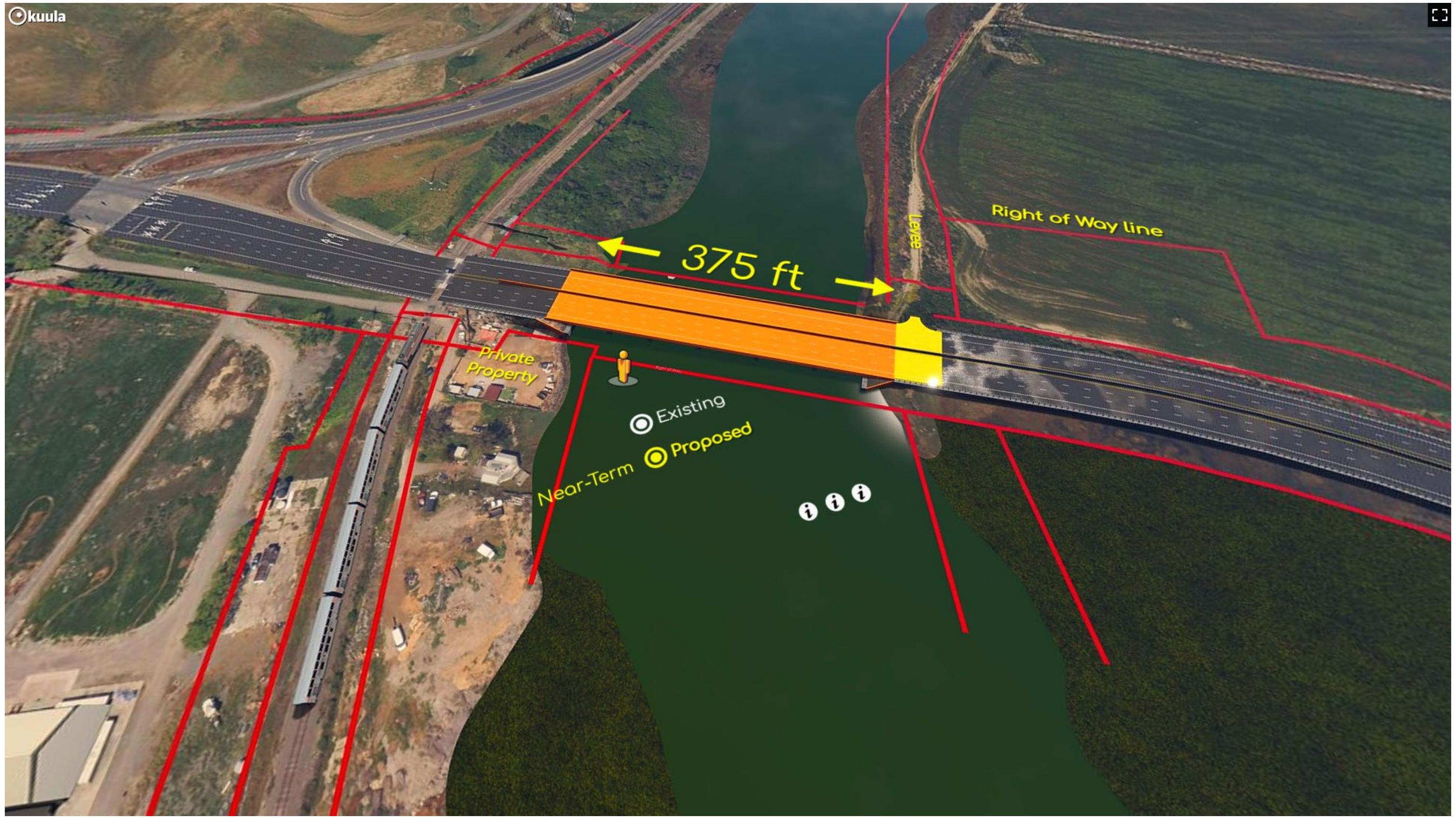
- Within BCDC Certain Waterway Jurisdiction
    - Tolay Creek Bridge Replacement
    - Retaining Walls 3 and 4
    - Fill Removal (creation of new waters from uplands)



Tolay Creek Bridge Replacement

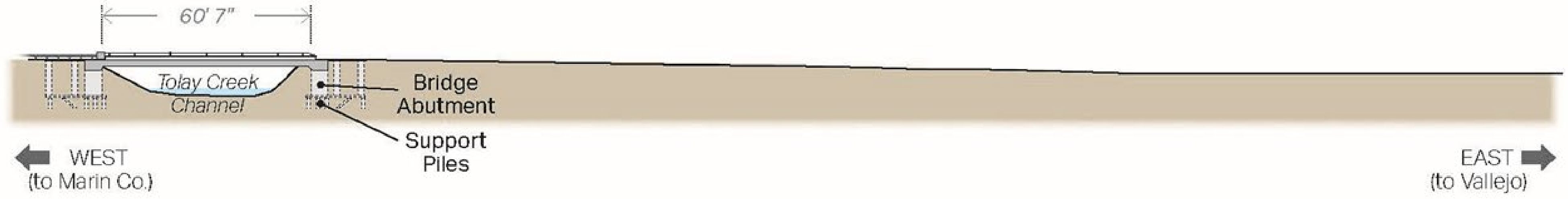
Existing

New Bridge



Tolay Creek Bridge - Replacement Configuration

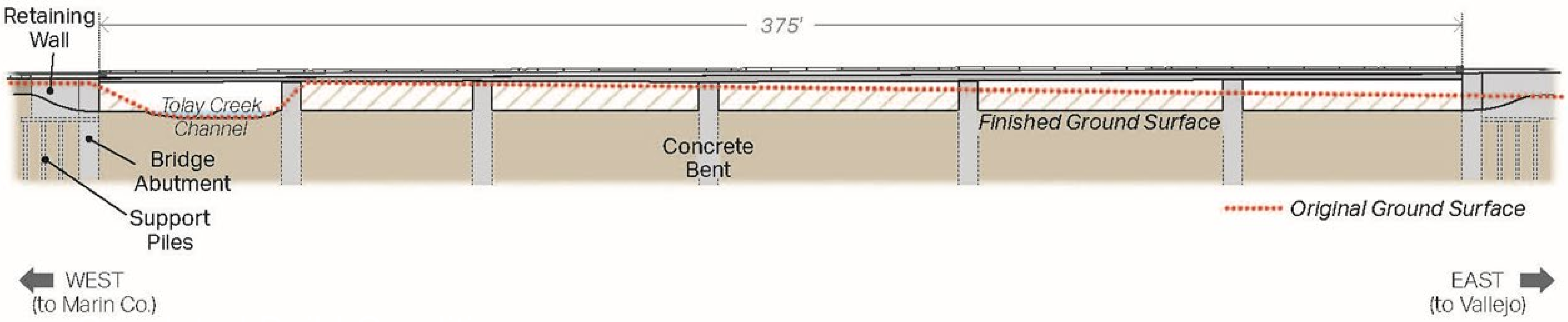
Existing Tolay Creek Bridge



<u>Existing Bridge:</u>

Single span, Br Length = 61ft

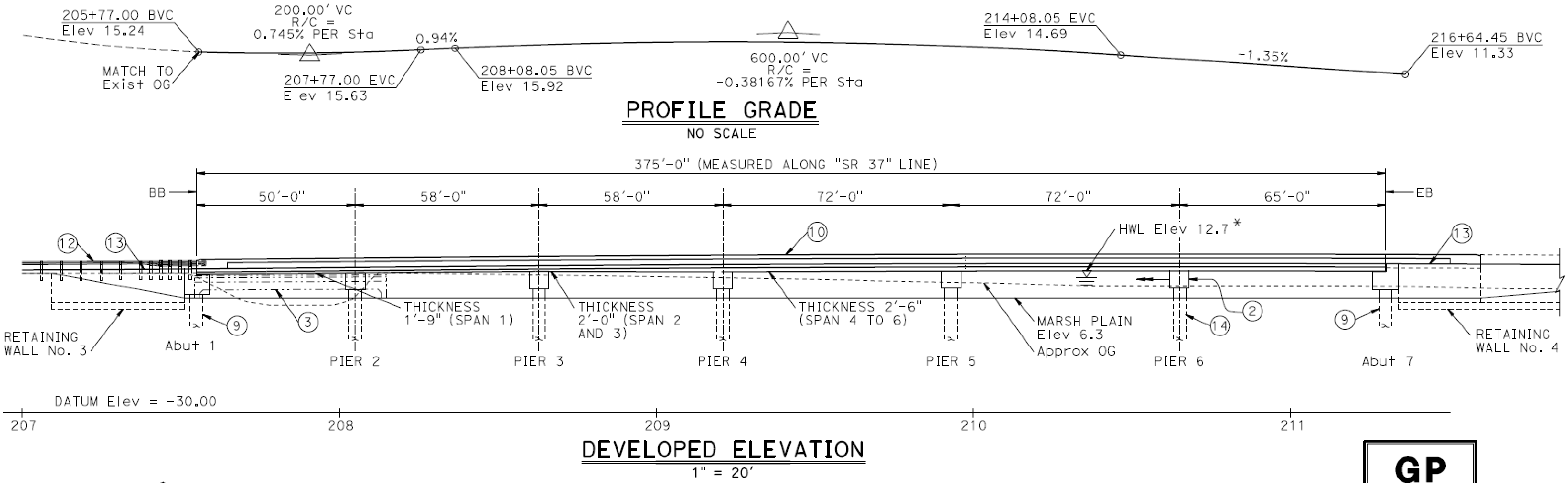
Proposed Bridge



<u>Proposed Bridge Replacement:</u>

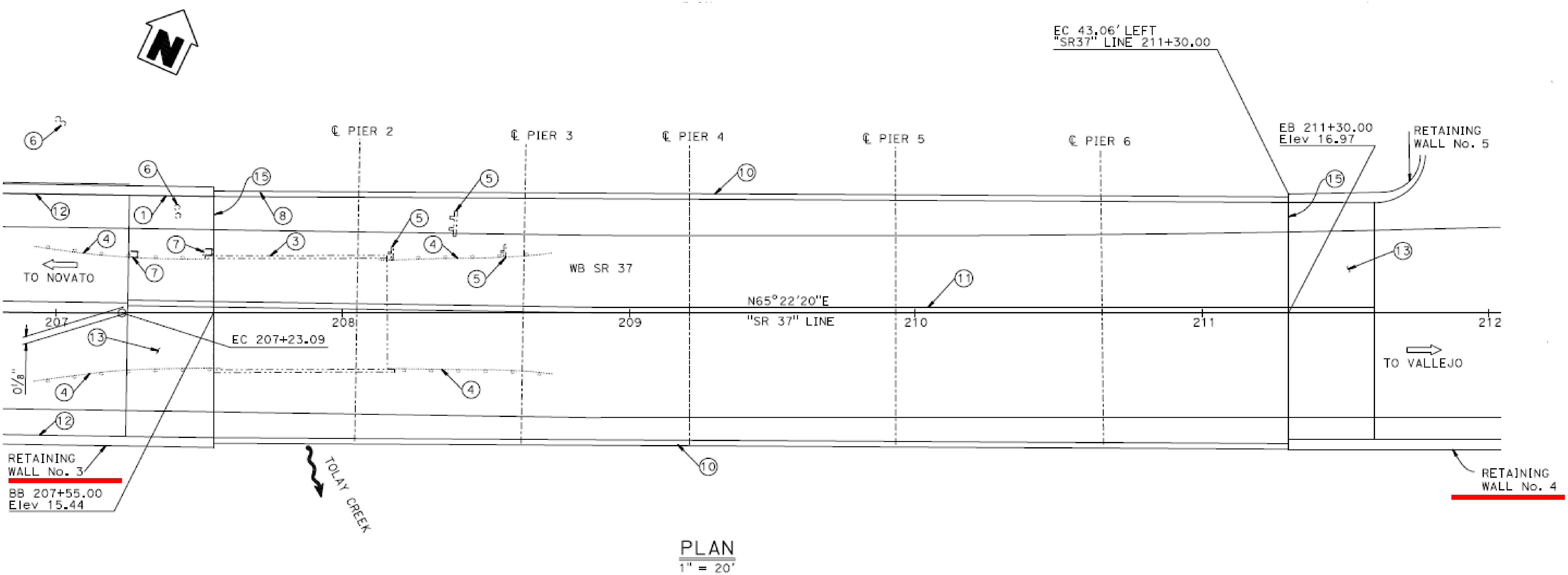
6 spans, Br Length = 375ft

Tolay Creek Bridge – Span Configuration

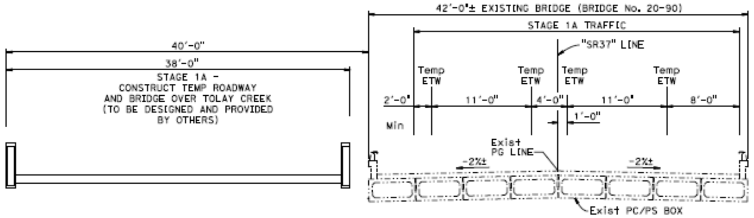


- Precast/prestressed voided slab w/ CIP deck continuous superstructure.
- Drop Bentcap on Pile Extensions. Additional bentcap width added to support the superstructure during fault rupture.

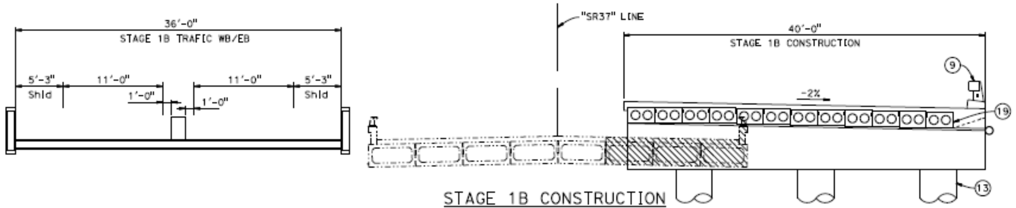
Tolay Creek Bridge – Plan View



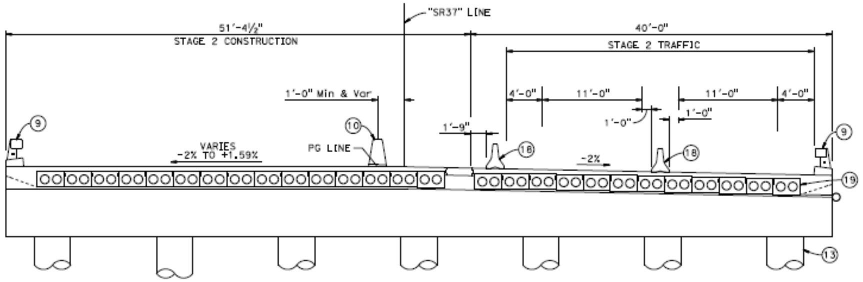
Tolay Creek Br – Typical Section/Stage Construction



STAGE 1A CONSTRUCTION
1" = 5'



STAGE 1B CONSTRUCTION
1" = 5'



STAGE 2 CONSTRUCTION
1" = 5'

Stage 1 Construction:

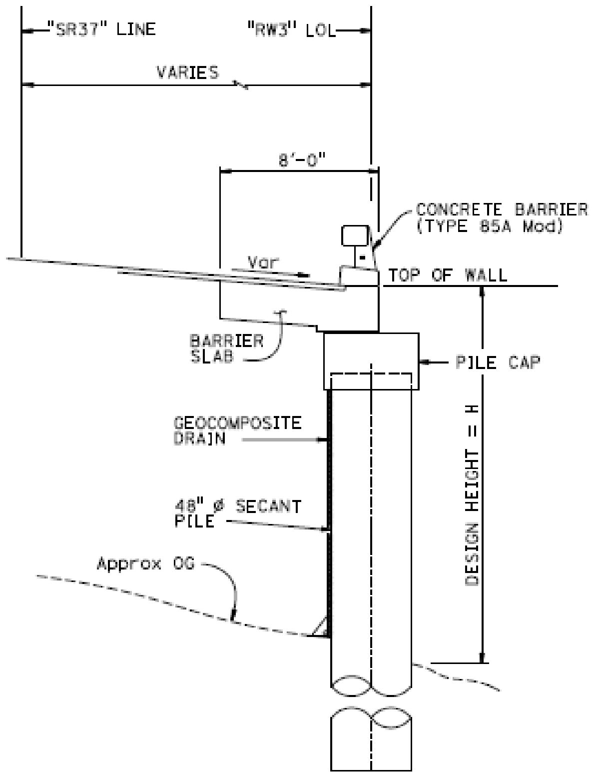
- Temp Traffic Detour with Temp Bridge over exist Tolay Crk
- Constructing partial new Tolay Crk Br to the South.

Stage 2 Construction:

- Traffic on newly constructed partial Tolay Crk Br to the south.
- Construct partial Tolay Crk Br to the North.

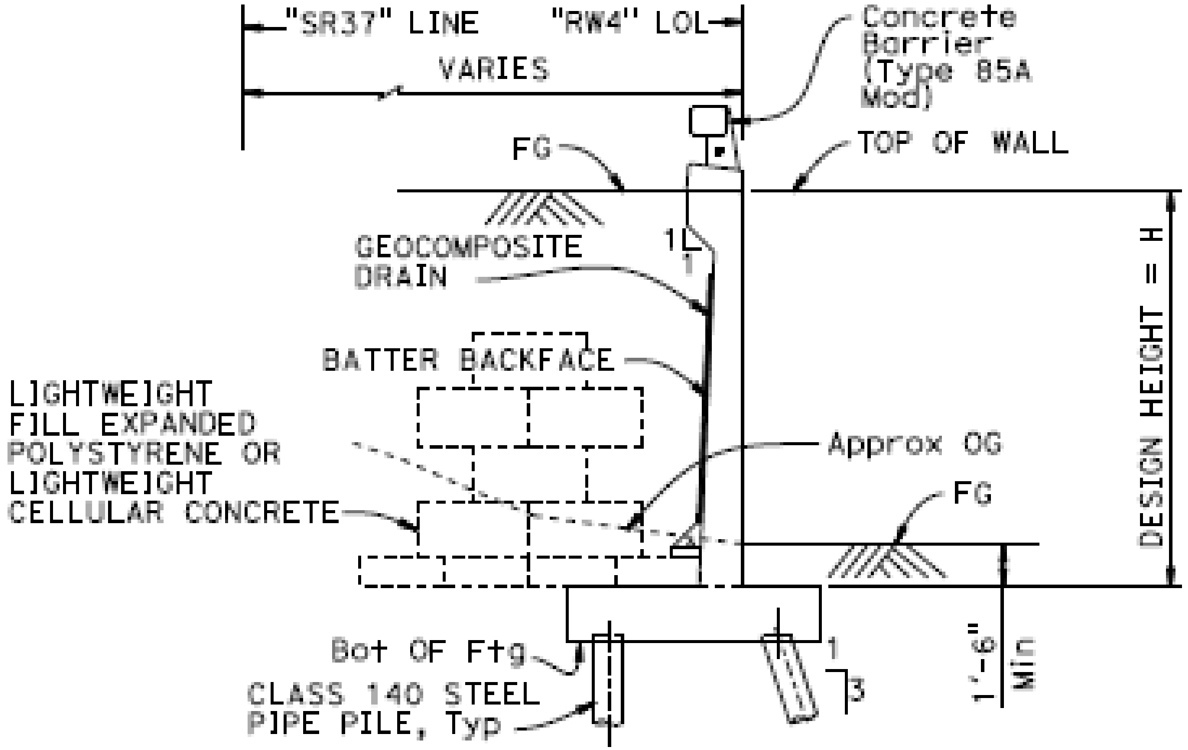
Retaining Walls – Typical Section

Retaining Wall 3



SECANT PILE WALL
TYPICAL SECTION
¼" = 1'-0"

Retaining Wall 4, 5



RETAINING WALL TYPE 1 (Mod)
TYPICAL SECTION
1" = 5'

DESIGN GENERAL NOTES

TOLAY CREEK BRIDGE

Design

- AASHTO LRFD Bridge Design Specs 2017, with CA Amendments updated June 2024
- Standard Plans and Specs, 2024 with Revised Standard Plans April 2025

Seismic Design

- Caltrans Seismic Design Criteria, Version 2.0, April 2019

Fault Rupture: (Static Offset)

- Horizontal Design Offset = 1.7 feet
- Vertical Design Offset = 0.9 feet

Dead Load

- Includes 1” Polyester overlay

Live Loading

- HL93 and permit design load

RETAINING WALLS 3, 4 & 5

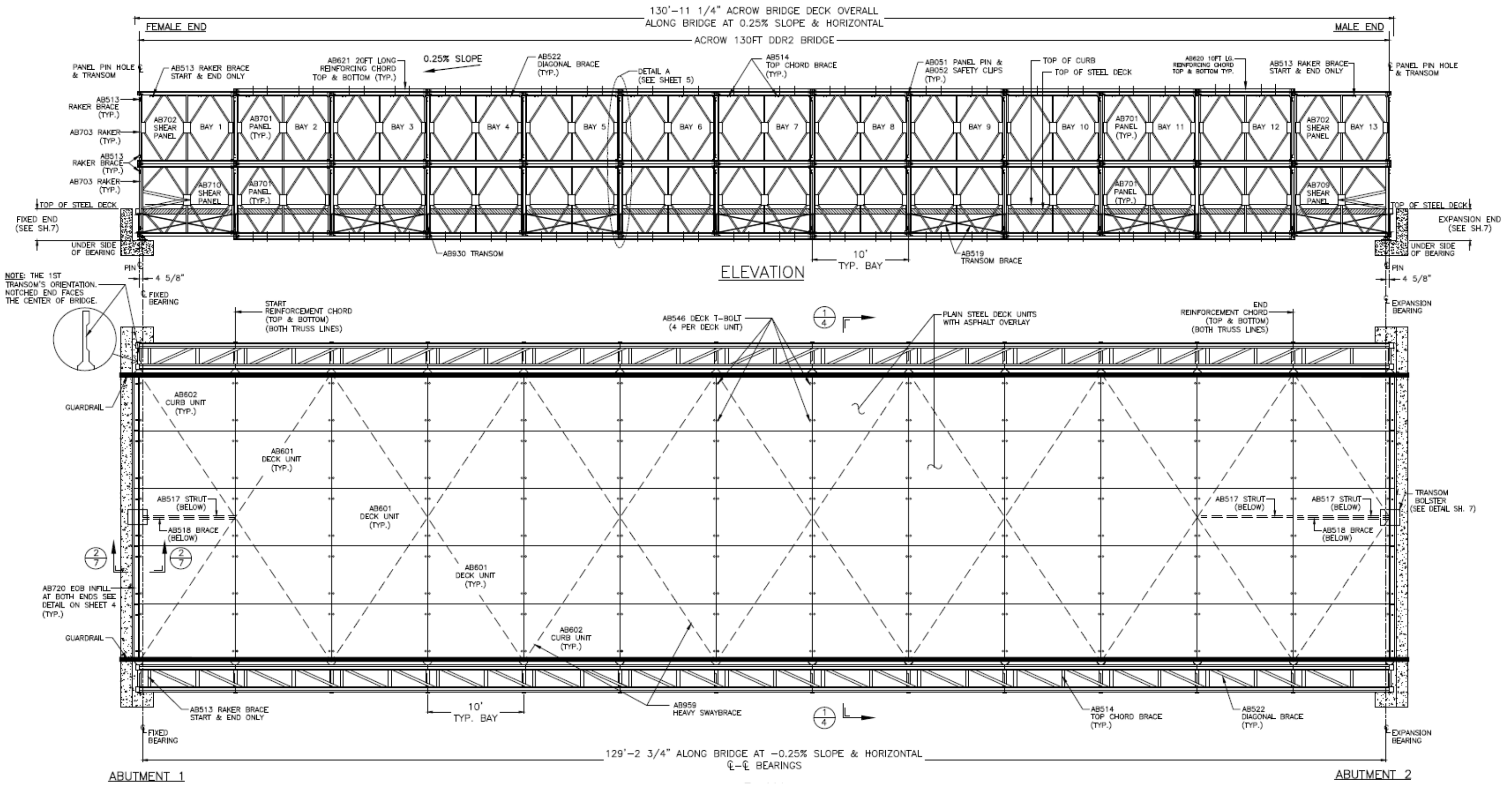
Design

- AASHTO LRFD Bridge Design Specs 2017, with CA Amendments updated June 2024
- Standard Plans and Specs, 2024 with Revised Standard Plans April 2025

Soil Parameters (Lightweight EPS block)

- $\Phi = 27^{o}$
- $\gamma = 35$ pcf
- Kn = 0.35
- Kv = 0
- Kα = 0.38

TEMPORARY BRIDGE STRUCTURE



Example of one type, Acrow Br Co. Temporary bridge type will be selected by the Construction Contractor

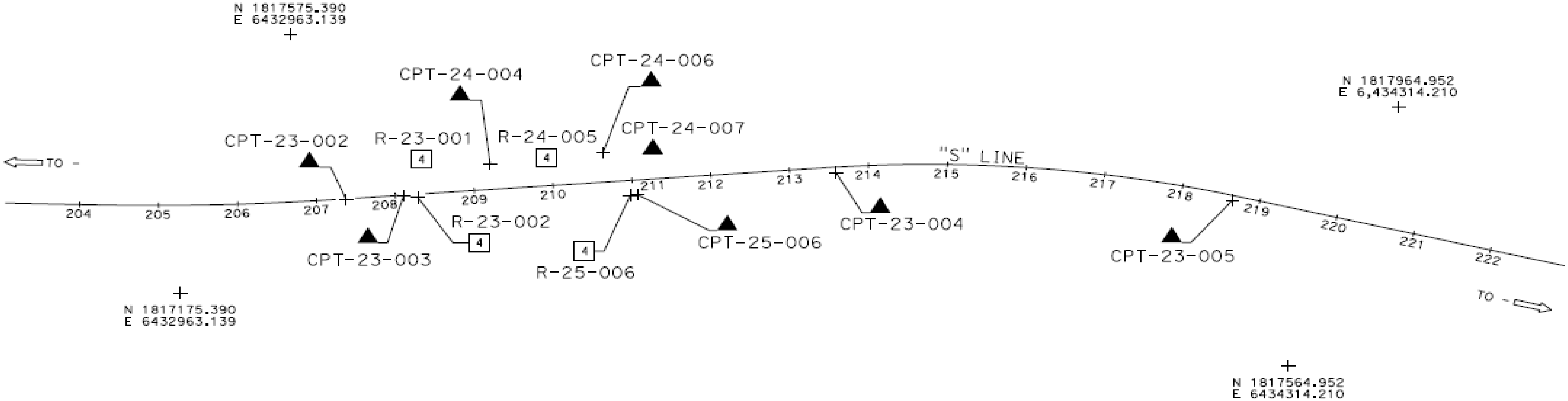
Tolay Creek Bridge – Geotechnical Investigation

Tolay Creek - Geotechnical Investigation

Field investigation from 2023 to 2025

- Four mud rotary wash soil borings up to 161.5 feet in depth
- Field testing included standard penetration testing (SPT) and pocket penetration testing (PP) during drilling
- Eight cone penetration testing (CPT) up to 119 feet in depth
- Three seismic measurements during CPT pushing
- A review of five As-built log of test borings (LOTB) drilled in 1973

Tolay Creek - Geotechnical Investigation



BENCHMARK

BM xxxx # Elev **xx.x**
xxxxxx
N xxxx
E xxxx
Vert: **NAV**Dxx
Horiz: **N**ADxx (xxxx)

CHECK PRINT
by ________

DRAFT

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER X DATE

PLANS **APPROVAL** DATE

Haoli Wei
No. 2922
Exp. 09-30-2026

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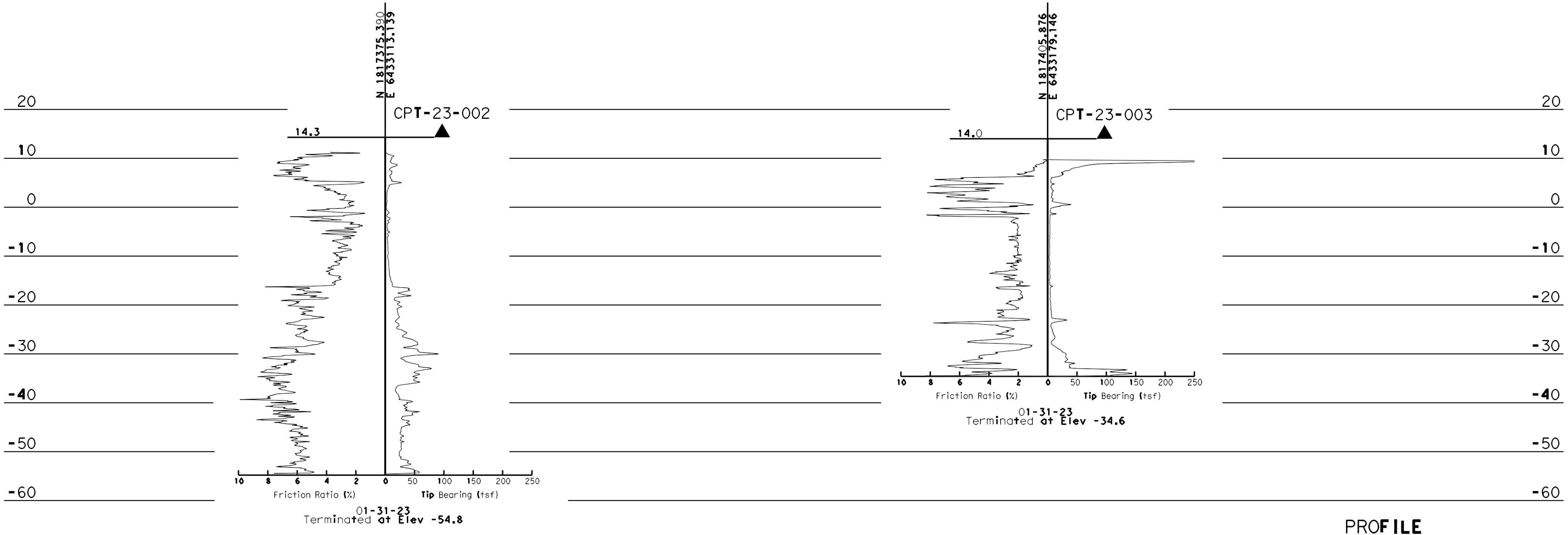

PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore
DRAWN BY: S. Yang
CHECKED BY: **X**
FIELD INVESTIGATION BY: **P.** Wei/C. **Mcmahon/M.** Farrell

STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)

LOG OF TEST BORINGS 1 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET (ENGLISH) (REVISION 6/5/2023)

DATE PLOTTED => 28-MAR-2025 TIME PLOTTED => 10:25
FILE => t.c.b. (replace)_lotb1of9.dgn USERNAME => s161293

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25
SHEET X OF X

BENCHMARK

BM xxxx # Elev xx.x
xxxxxx
N xxxx
E xxxx
Vert: NAVDxx
Horiz: NADxx (xxxx)

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by

DRAFT

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER

X
DATE

PLANS **APPROVAL** DATE

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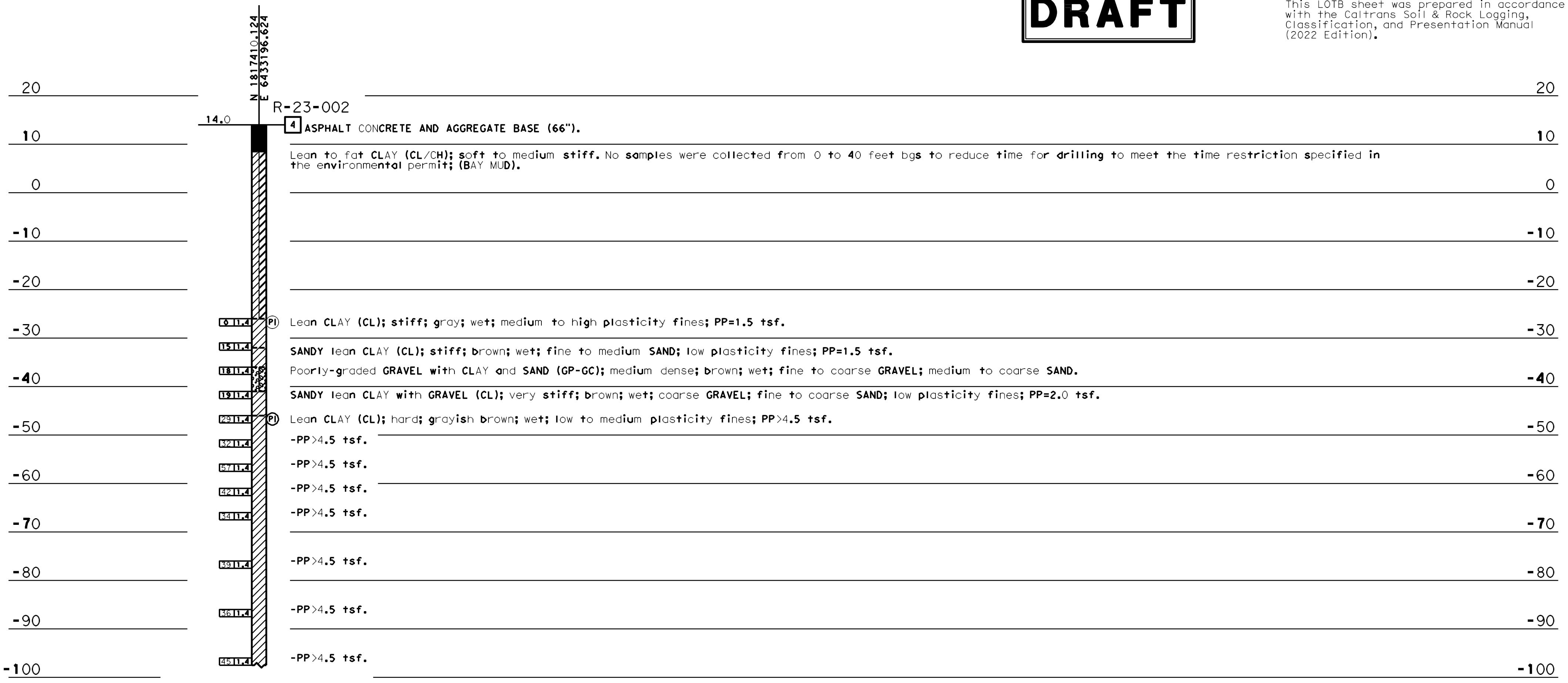

ASPHALT CONCRETE AND AGGREGATE BASE (66").

Lean to fat CLAY (CL/CH); soft to medium stiff. No samples were collected from 0 to 40 feet bgs to reduce time for drilling to meet the time restriction specified in the environmental permit; (BAY MUD).

Lean CLAY (CL); stiff; gray; wet; medium to high plasticity fines; PP=1.5 tsf.

SANDY lean CLAY (CL); stiff; brown; wet; fine to medium SAND; low plasticity fines; PP=1.5 tsf.

Poorly-graded GRAVEL with CLAY and SAND (GP-GC); medium dense; brown; wet; fine to coarse GRAVEL; medium to coarse SAND.

SANDY lean CLAY with GRAVEL (CL); very stiff; brown; wet; coarse GRAVEL; fine to coarse SAND; low plasticity fines; PP=2.0 tsf.

Lean CLAY (CL); hard; grayish brown; wet; low to medium plasticity fines; PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

-PP>4.5 tsf.

01-31-23
Terminated at Elev -97.5
ER_i = 81%

NOTE:

Groundwater was not encountered in boring R-23-002.

PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore
DRAWN BY: S. Yang
CHECKED BY: **X**
FIELD INVESTIGATION BY: **P.** Wei/**C. Mcmahon/M.** Farrell

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BRIDGE DESIGN
BRANCH **X**

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)
LOG OF TEST BORINGS 2 OF 9

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25
SHEET X OF X

BENCHMARK

BM xxxx # Elev xx.x
xxxxxx
N xxxx
E xxxx
Vert: NAVDxx
Horiz: NADxx (xxxx)

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER X DATE

PLANS **APPROVAL** DATE

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No. 2922
Exp. 09-30-2026

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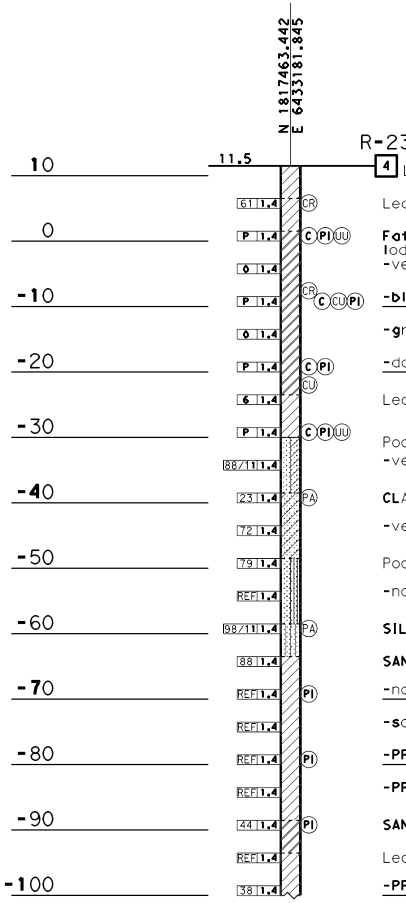

Lean CLAY (CL); stiff; variegated brown and grayish brown; moist; few fine SAND; mostly medium plasticity, medium toughness fines; trace organics; PP=1.25 tsf; (FILL).

Lean CLAY with SAND (CL); medium stiff; grayish brown; moist; few fine to coarse SAND; mostly low plasticity fines; PP=0.5 tsf; (FILL).

Fat CLAY (CH); medium stiff; bluish gray; moist; trace coarse, subrounded GRAVEL; mostly high plasticity fines; poor sample recovery (2.5" diameter gravel lodged in bottom of Shelby tube); PP=0.5 tsf; (BAY MUD).
-very soft; dark gray; wet; few fine SAND; PP=0.0 tsf.

-bluish gray; PP=0.0 tsf.

-greenish gray; shell fragments PP=0.0 tsf.

-dark bluish gray; PP=0.0 tsf.

Lean CLAY (CL); medium stiff; bluish gray; wet; trace fine SAND; mostly medium plasticity fines; PP=0.5 tsf; (BAY MUD).

Poorly-graded SAND with CLAY (SP-SC); dense; yellowish brown; wet; mostly fine to medium SAND; few low plasticity fines; moderate cementation.
-very dense.

CLAYEY SAND (SC); dense; yellowish brown; wet; mostly fine to medium SAND; trace nonplastic fines; weak cementation.

-very dense.

Poorly-graded SAND with SILT (SP-SM); very dense; yellowish brown; wet; mostly fine to coarse SAND; few nonplastic fines; moderate cementation.

-no sample recovery.

SILTY SAND (SM); very dense; yellowish brown; wet; mostly fine to coarse SAND; trace nonplastic fines; moderate cementation.

SANDY lean CLAY (CL); very stiff; grayish brown; wet; some fine to medium SAND; mostly medium plasticity, moderate toughness fines; PP=3.5 tsf.

-no sample recovery.

-some fine to coarse SAND; PP>4.5 tsf.

-PP>4.5 tsf.

-PP=4.0 tsf.

SANDY fat CLAY (CH); very stiff; light gray; wet; fine to medium SAND; mostly high plasticity fines; PP=3.5 tsf.

Lean CLAY (CL); hard; light gray; wet; few fine SAND; mostly medium plasticity, moderate toughness fines; PP>4.5 tsf.

-PP>4.5 tsf.

01-04-23
Terminated at Elev -100.0
ER_i = 81%

NOTE:

Groundwater was not measured in boring R-23-001 due to mud rotary drilling method.

PROFILE

Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: J. C. Moore
DRAWN BY: S. Yang
CHECKED BY: X
FIELD INVESTIGATION BY: P. Wei/C. Mcmahon/M. Farrell

STATE OF
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DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)

LOG OF TEST BORINGS 3 OF 9

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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25
SHEET X OF X

BENCHMARK

BM xxxx #   Elev **xx.x**
xxxxxx
N xxxx
E xxxx
Vert: **NAV**Dxx
Horiz: **N**ADxx (xxxx)

CHECK PRINT
by ________

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER   X DATE

PLANS **APPROVAL** DATE

Haoli Wei
No. 2922
Exp. 09-30-2026

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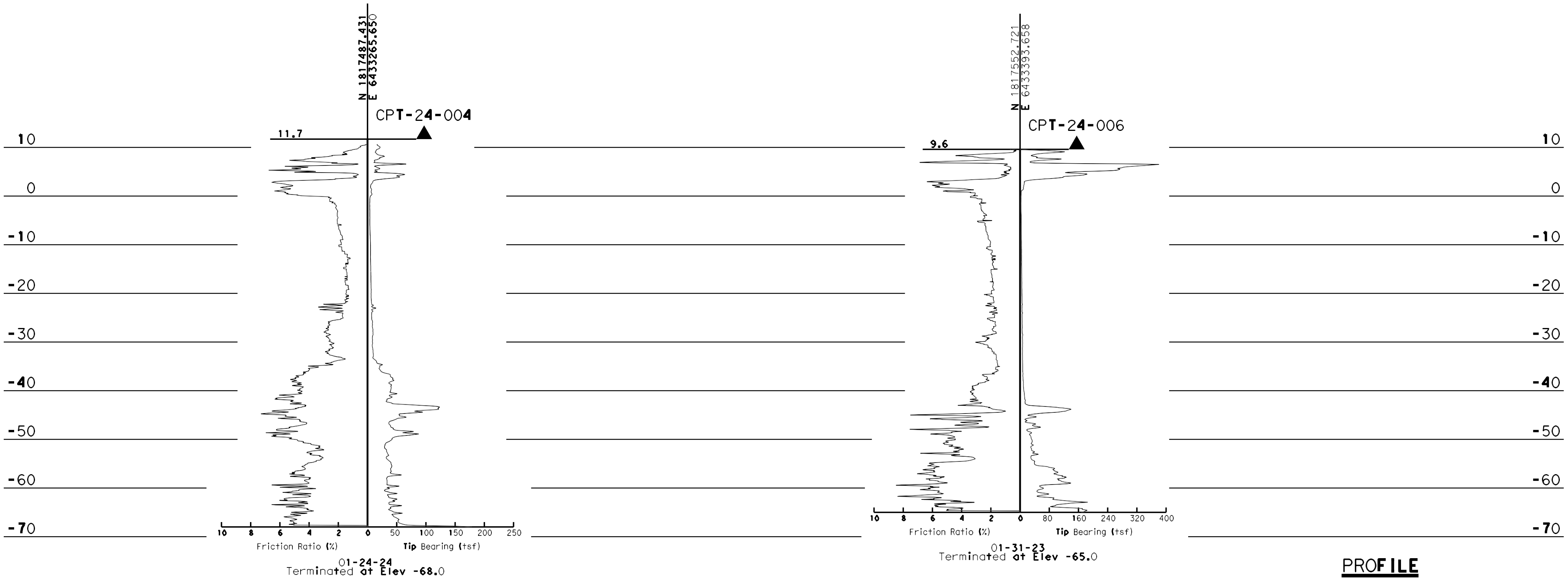

PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore

DRAWN BY: S. Yang

CHECKED BY: **X**

FIELD INVESTIGATION BY: **P.** Wei/C. **Mcmahon/M.** Farrell

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)

LOG OF TEST BORINGS 4 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET
(ENGLISH) (REVISION 6/5/2023)

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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1

COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25

SHEET X OF X

BENCHMARK

BM xxxx #   Elev xx.x
xxxxxx
N xxxx
E xxxx
Vert: NAVDxx
Horiz: NADxx (xxxx)

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by ________

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER   X DATE

PLANS APPROVAL DATE

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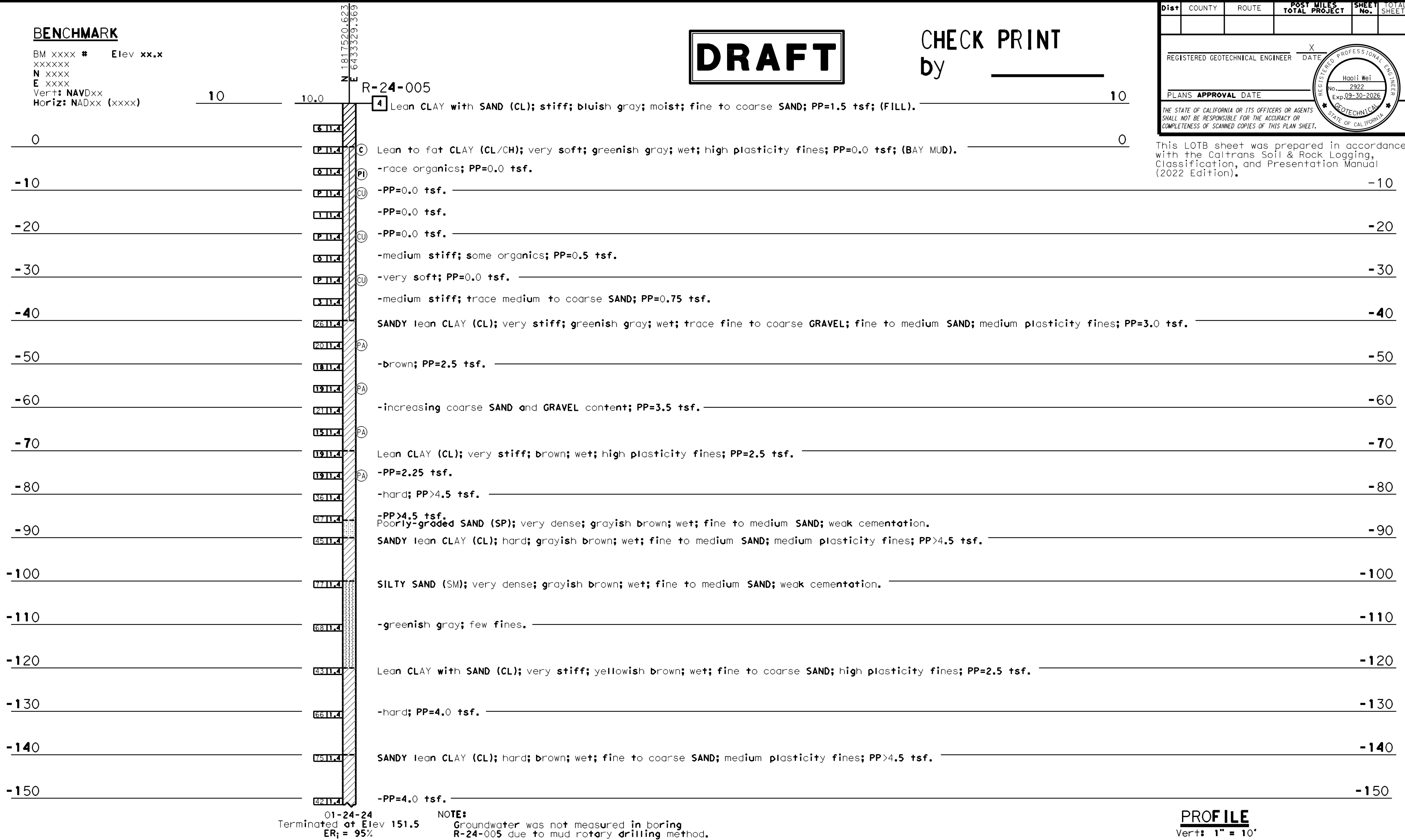

Lean CLAY with SAND (CL); stiff; bluish gray; moist; fine to coarse SAND; PP=1.5 tsf; (FILL).

Lean to fat CLAY (CL/CH); very soft; greenish gray; wet; high plasticity fines; PP=0.0 tsf; (BAY MUD).
-race organics; PP=0.0 tsf.
-PP=0.0 tsf.
-PP=0.0 tsf.
-PP=0.0 tsf.
-medium stiff; some organics; PP=0.5 tsf.
-very soft; PP=0.0 tsf.
-medium stiff; trace medium to coarse SAND; PP=0.75 tsf.

SANDY lean CLAY (CL); very stiff; greenish gray; wet; trace fine to coarse GRAVEL; fine to medium SAND; medium plasticity fines; PP=3.0 tsf.
-brown; PP=2.5 tsf.
-increasing coarse SAND and GRAVEL content; PP=3.5 tsf.

Lean CLAY (CL); very stiff; brown; wet; high plasticity fines; PP=2.5 tsf.
-PP=2.25 tsf.
-hard; PP>4.5 tsf.
-PP>4.5 tsf.

Poorly-graded SAND (SP); very dense; grayish brown; wet; fine to medium SAND; weak cementation.

SANDY lean CLAY (CL); hard; grayish brown; wet; fine to medium SAND; medium plasticity fines; PP>4.5 tsf.

SILTY SAND (SM); very dense; grayish brown; wet; fine to medium SAND; weak cementation.
-greenish gray; few fines.

Lean CLAY with SAND (CL); very stiff; yellowish brown; wet; fine to coarse SAND; high plasticity fines; PP=2.5 tsf.
-hard; PP=4.0 tsf.

SANDY lean CLAY (CL); hard; brown; wet; fine to coarse SAND; medium plasticity fines; PP>4.5 tsf.
-PP=4.0 tsf.

01-24-24
Terminated at Elev 151.5
ER_i = 95%

NOTE:
Groundwater was not measured in boring R-24-005 due to mud rotary drilling method.

PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: J. C. Moore
DRAWN BY: S. Yang
CHECKED BY: X
FIELD INVESTIGATION BY: P. Wei/C. Mcmahon/M. Farrell

STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)
LOG OF TEST BORINGS 5 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET
(ENGLISH) (REVISION 6/5/2023)

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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25
SHEET X OF X

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

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No. 2922
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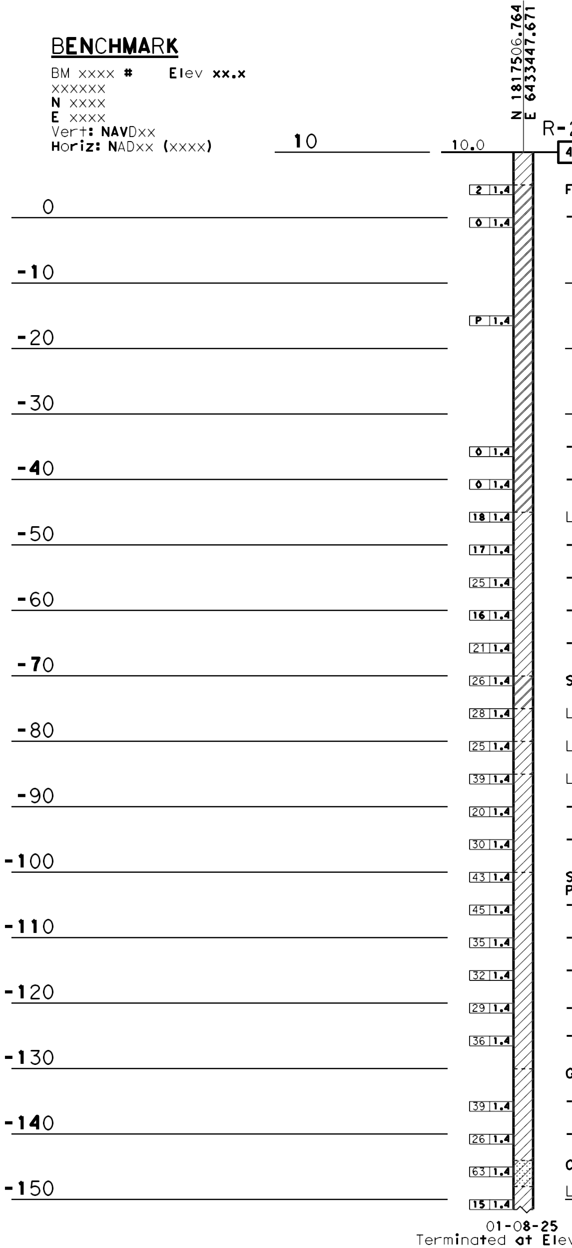
BM xxxx # Elev xx.x
xxxxxx
N xxxx
E xxxx
Vert: NAVDxx
Horiz: NADxx (xxxx)



Lean CLAY with GRAVEL (CL); greenish gray to black; moist; (FILL).

Fat CLAY (CH); stiff; greenish gray to dark gray; wet; high plasticity fines; PP=1.0 tsf; (BAY MUD).

-soft; PP=0.25 tsf.

-PP=0.25 tsf.

-very stiff; PP=2.0 tsf.

Lean CLAY with SAND (CL); very stiff; light brown with gray; wet; trace fine, subangular to subrounded GRAVEL; medium SAND; high plasticity fines; PP=3.0 tsf.

-PP=3.75 tsf.

-hard; PP>4.5 tsf.

-very stiff; bluish gray; some rootlets; PP=3.5 tsf.

-hard; trace pebbles and gravels; PP>4.5 tsf.

SANDY fat CLAY (CH); stiff; light grayish brown; wet; high plasticity fines; sample left in hole overnight; PP=1.5 tsf.

Lean CLAY with GRAVEL (CL); hard; pale brown; wet; angular GRAVEL; little medium SAND; high plasticity fines; PP>4.5 tsf.

Lean CLAY with SAND (CL); hard; light brown; wet; angular to subangular GRAVEL; coarse to fine SAND; high plasticity fines; PP>4.5 tsf.

Lean CLAY (CL); hard; light to olive brown; wet; trace fine SAND; high plasticity fines; some calcium carbonate nodules; PP>4.5 tsf.

-trace fine GRAVEL; few fine SAND; PP>4.5 tsf.

-light grayish brown; few fine GRAVEL; PP>4.5 tsf.

SANDY lean CLAY with GRAVEL (CL); hard; pale yellowish brown; wet; subangular to subrounded GRAVEL; medium to fine SAND; medium to high plasticity fines; PP>4.5 tsf.

-few GRAVEL; few medium to fine SAND; PP=4.25 tsf.

-PP>4.5 tsf.

-some calcium carbonate nodules; PP>4.5 tsf.

-very stiff; sample left in hole overnight; PP=3.0 tsf.

-hard; little medium to fine SAND; PP>4.5 tsf.

GRAVELLY lean CLAY with SAND (CL); hard; yellowish brown; wet; fine GRAVEL; coarse SAND; medium to high plasticity fines; PP=4.25 tsf.

-trace SAND; some calcium carbonate nodules; PP=4.25 tsf.

-some calcium carbonate nodules; PP=4.25 tsf.

CLAYEY SAND with GRAVEL (SC); very dense; light brown; wet; fine GRAVEL; coarse to fine SAND.

Lean CLAY (CL); very stiff; light brown; wet; trace fine SAND; medium plasticity fines; PP=3.25 tsf.

01-08-25
Terminated at Elev 151.5
ER_i = 95%

NOTE:
Groundwater was not measured in boring R-25-006 due to mud rotary drilling method.

PROFILE

Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore
DRAWN BY: S. Yang
CHECKED BY: X
FIELD INVESTIGATION BY: **P.** Wei/**C. Mcmahon/M.** Farrell

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)
LOG OF TEST BORINGS 6 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET (ENGLISH) (REVISION 6/5/2023)

DATE PLOTTED => 28-MAR-2025 TIME PLOTTED => 10:25
FILE => t.c.b. (replace)_lotb6of9.dgn USERNAME => s161293

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25
SHEET X OF X

BENCHMARK

BM xxxx # Elev **xx.x**
xxxxxx
N xxxx
E xxxx
Vert: **NAV**Dxx
Horiz: **N**ADxx (xxxx)

DRAFT

CHECK PRINT
by ____________

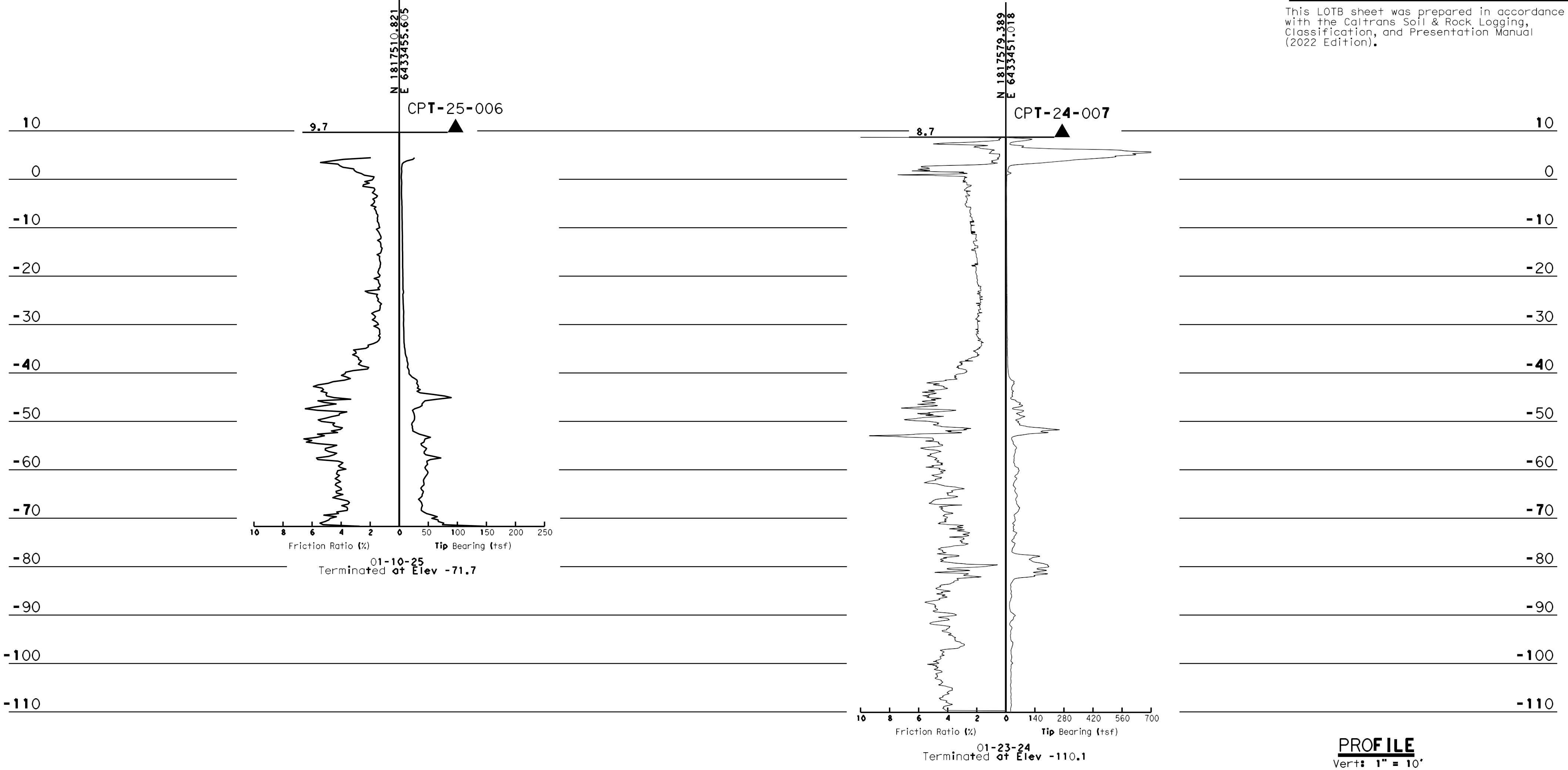
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

X
REGISTERED GEOTECHNICAL ENGINEER DATE

PLANS **APPROVAL** DATE

REGISTERED PROFESSIONAL ENGINEER
Haoli Wei
No. 2922
Exp. 09-30-2026
GEOTECHNICAL
STATE OF CALIFORNIA

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2022 Edition).



PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore

DRAWN BY: S. Yang

CHECKED BY: **X**

FIELD INVESTIGATION BY: **P.** Wei/**C. Mcmahon/M.** Farrell

STATE OF
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)
LOG OF TEST BORINGS 7 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET
(ENGLISH) (REVISION 6/5/2023)

DATE PLOTTED => 28-MAR-2025 TIME PLOTTED => 10:25
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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3-10-25

SHEET X OF X

BENCHMARK
BM xxxx # Elev xx.x
xxxxxx
N xxxx
E xxxx
Vert: NAVDxx
Horiz: NADxx (xxxx)

CHECK PRINT
by ________

DRAFT

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED GEOTECHNICAL ENGINEER   X
DATE

PLANS **APPROVAL** DATE

Haoli Wei
No. 2922
Exp. 09-30-2026

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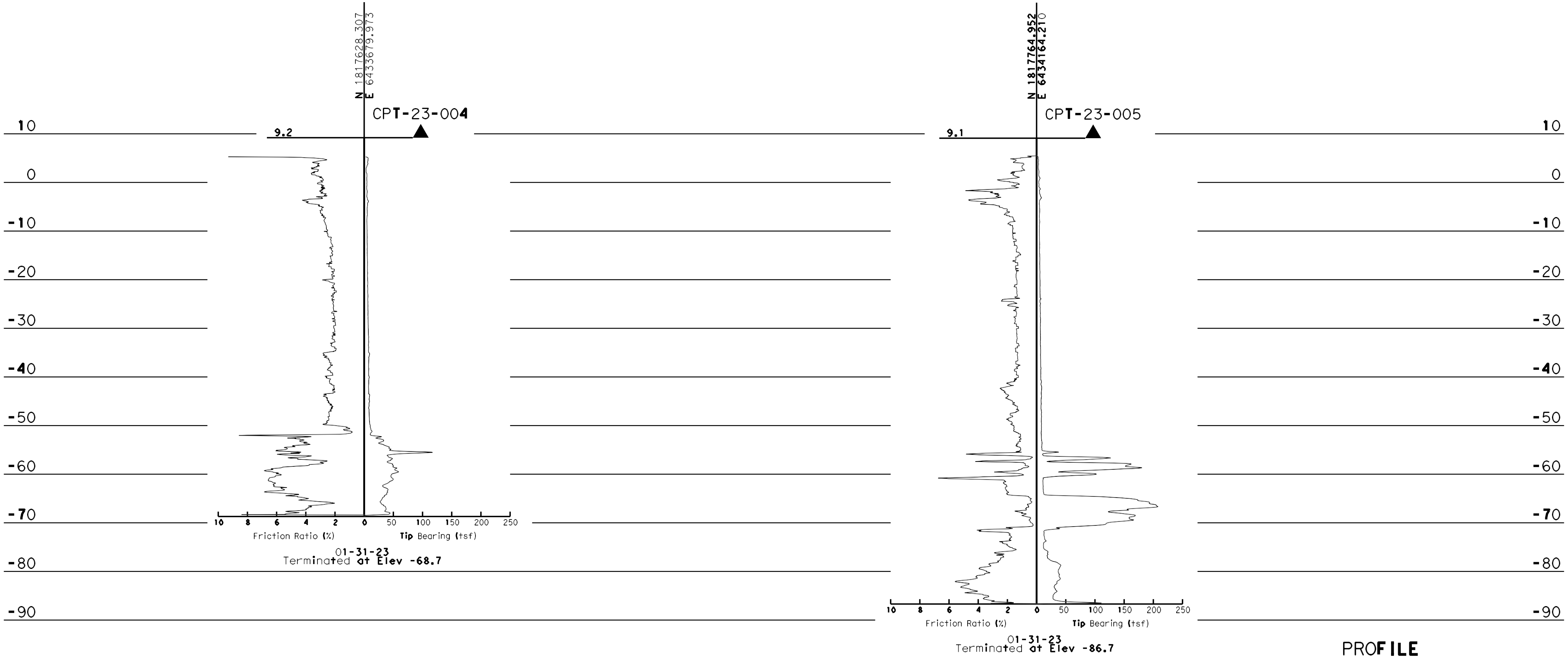

PROFILE
Vert: 1" = 10'

GEOTECHNICAL SERVICES

FUNCTIONAL SUPERVISOR: **J. C.** Moore
DRAWN BY: S. Yang
CHECKED BY: **X**
FIELD INVESTIGATION BY: **P.** Wei/C. **Mcmahon/M.** Farrell

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
BRIDGE DESIGN
BRANCH X

BRIDGE No. 20-0090
POST MILE 4.04

TOLAY CREEK BRIDGE (REPLACE)
LOG OF TEST BORINGS 8 OF 9

OGS CIVIL LOG OF TEST BORINGS SHEET
(ENGLISH) (REVISION 6/5/2023)

DATE PLOTTED => 28-MAR-2025 TIME PLOTTED => 10:25
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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3650
PROJECT NUMBER & PHASE: 0419000255-1
COUNTY/ROUTE/ZONE: Son/37/2
CONTRACT No.: 04-1Q7614

DISREGARD PRINTS BEARING EARLIER REVISION DATES

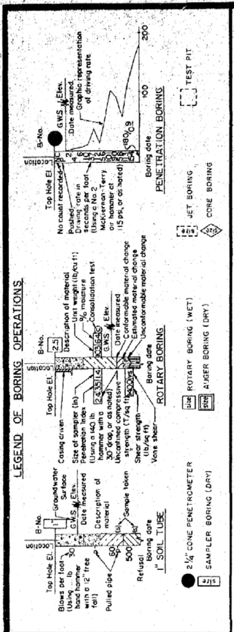
REVISION DATES 3-10-25
SHEET X OF X

DRAFT

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SON	37			

CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED



LEGEND OF EARTH MATERIALS

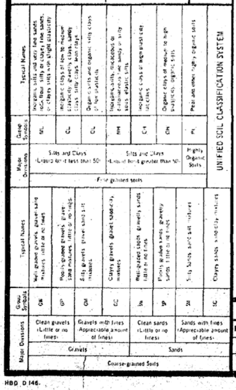
- ▨ GRAVEL
- ▨ SAND
- ▨ SILT
- ▨ CLAY
- ▨ SANDY CLAY or CLAYEY SAND
- ▨ SANDY SILT or SILTY SAND
- ▨ SILTY CLAY or CLAYEY SILT
- ▨ PEAT and/or ORGANIC MATTER
- ▨ FILL MATERIAL
- ▨ IGNEOUS ROCK
- ▨ SEDIMENTARY ROCK
- ▨ METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test ASTM Designation D 1586-67

Penetration Index (Blows / Ft.)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.



BM "R-1" - PAINTED USC&GS BM

chisled "□" in PCC bose telephone booth (NW corner) 97' Rt Rte 37 "Rt LOL" 236+25
ELEV. 11.87

DIVISION OF ENGINEERING SERVICES - GEOTECHNICAL SERVICES

As-Built Log of Test Borings sheet is considered an informational document only. As such, the State of California registration seal with signature, license number and registration certificate expiration date confirm that this is a true and accurate copy of the original document. It does not attest to the accuracy or validity of the information contained in the original document. This drawing is available and presented only for the convenience of any bidder, contractor or other interested party.

DIST.	COUNTY	ROUTE	POST MILE-TOTAL PROJECT	Sheet No.	Total Sheets
04	Son	37			

REGISTERED PROFESSIONAL GEOLOGIST

X
DATE

Haoli Wei
No. 2922
Exp 09-30-2026

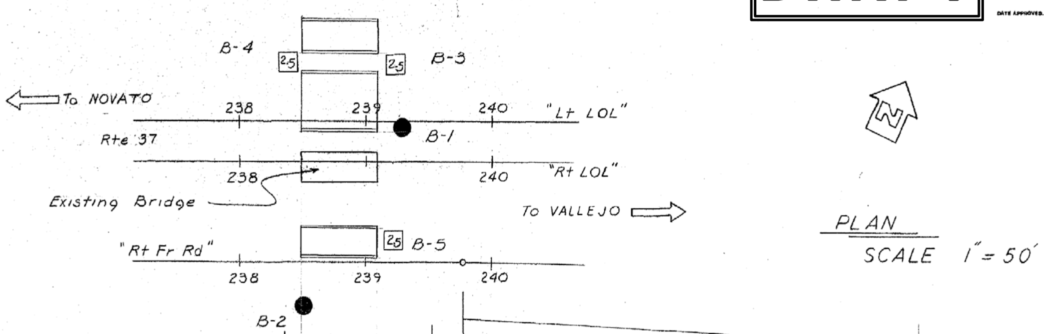
TOLAY CREEK BRIDGE (REPLACE)

LOG OF TEST BORINGS 9 OF 9

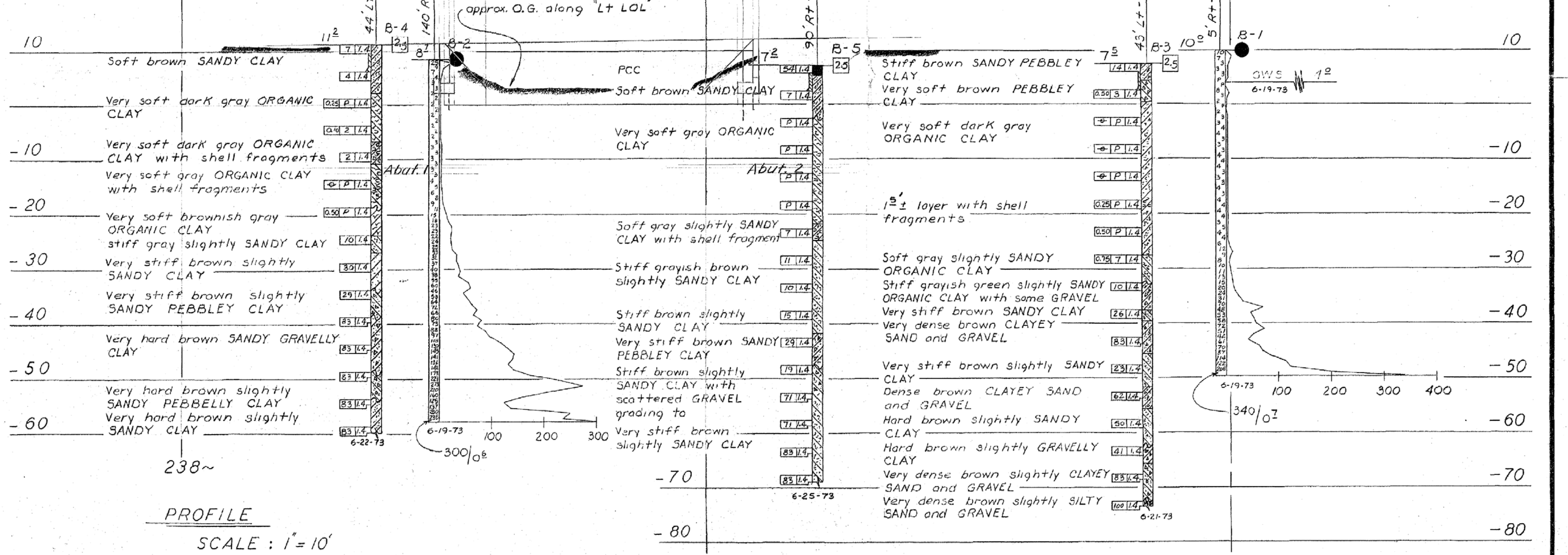
		CONTRACT No.	BRIDGE No.
UNIT:	3650		
PROJ. No. & PHASE:	0419000255-1	04-1Q7614	20-0090

AS-BUILT VERT DATUM: NGVD29 CONVERSION: NAVD88=NGVD29+2.66' | Sheet | of

NOTE: A COPY OF THIS LOG OF TEST BORINGS IS AVAILABLE AT OFFICE OF STRUCTURE MAINTENANCE AND INVESTIGATIONS, SACRAMENTO, CALIFORNIA



PLAN
SCALE 1" = 50'



PROFILE
SCALE : 1" = 10'

Note : Plan & Profile of structure obtained from "General Plan" dated 11-12-73

ENGINEERING GEOLOGY SECTION			
FIELD STUDY	By R. FOX	6-25-73	Approval Recommended By
DRAWN	By DERANIA	7-1-73	ENGINEERING GEOLOGIST
CHECKED	By R. Fox	7-6-73	CERTIFIED ENGINEERING GEOLOGIST NUMBER

State of
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BRIDGE DEPARTMENT
DESIGN SECTION
PROJECT ENGINEER

BRIDGE NO. 20-90 L,R
POST MILE 14.0

TOLAY CREEK BRIDGE
LOG OF TEST BORINGS

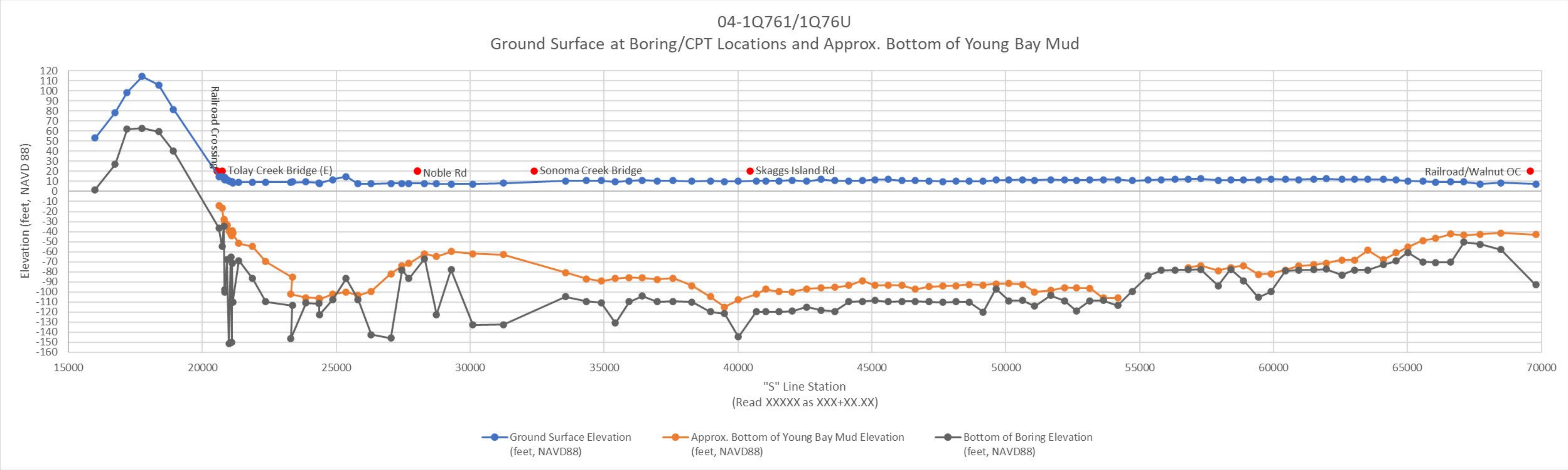
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04204
WO 103921

Disregard prints bearing earlier revision dates →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

Tolay Creek - Geotechnical Investigation



Tolay Creek - Geotechnical Investigation

Laboratory Testing included:

- Moisture content
- Particle gradation
- Atterberg limits
- Unconfined compression
- Consolidation
- Consolidated undrained triaxial
- Corrosion

Tolay Creek - Geotechnical Investigation

Subsurface conditions

- Fill thickness including AC/AB sections from 3 to 10 feet
- Very soft to soft clayey soils (young bay mud) from 34 to 60 feet in thickness
- Young bay mud thickness increases from west to east
- Stiff to hard clayey soils with a few layers of medium dense to very dense sand (consolidated bay mud) below young bay mud up to maximum depths drilled

Tolay Creek Bridge – Hydraulics

- Hydraulic study and report were prepared for the bridge
- HEC-RAS was used to develop a 2D model of the bridge
- HEC-RAS 2D hydrodynamic model was run for 12 scenarios developed from criteria in the Caltrans Highway Design Manual

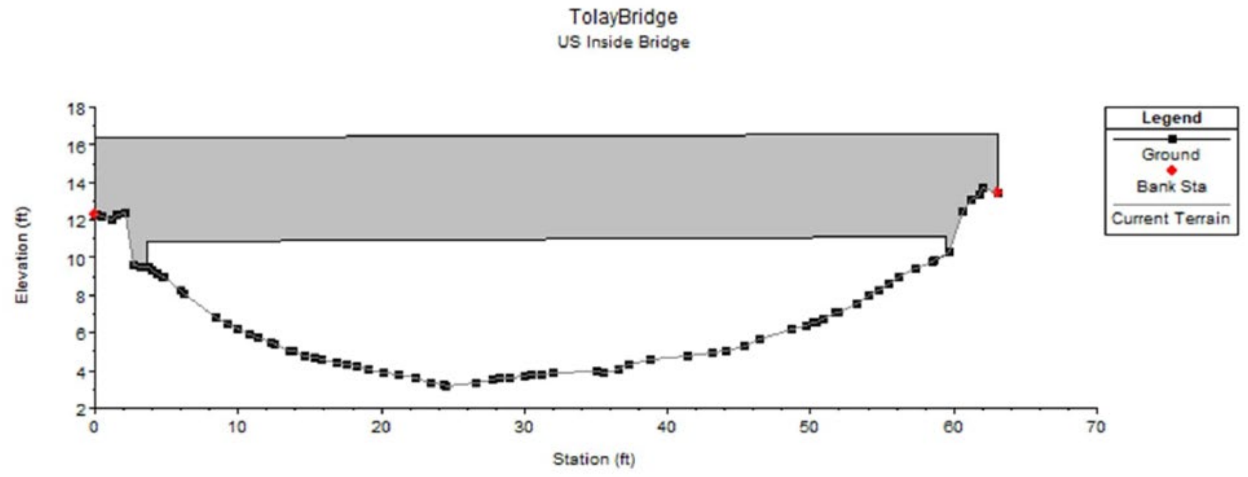


Figure 29. Tolay Creek Bridge (Existing Condition, Looking Downstream)

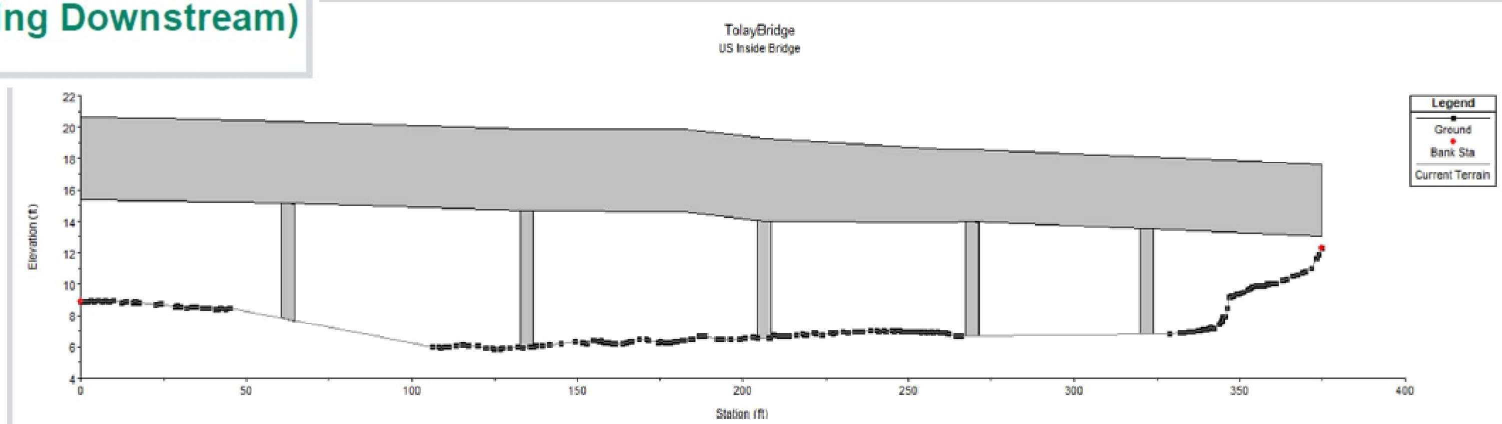


Figure 30. Tolay Creek Bridge (Proposed Condition, Looking Downstream)

Sea Level Rise Considerations

Current OPC Guidance (2024)

- 0.8 to 1.3 Feet of SLR by 2050

Project Assumptions

- 9.9 feet 100-year maximum water surface elevation
- 1 foot wave crest
- 0.7 Feet of SLR by 2046
- 1 foot of freeboard
- Minimum Soffit elevation 12.6 feet

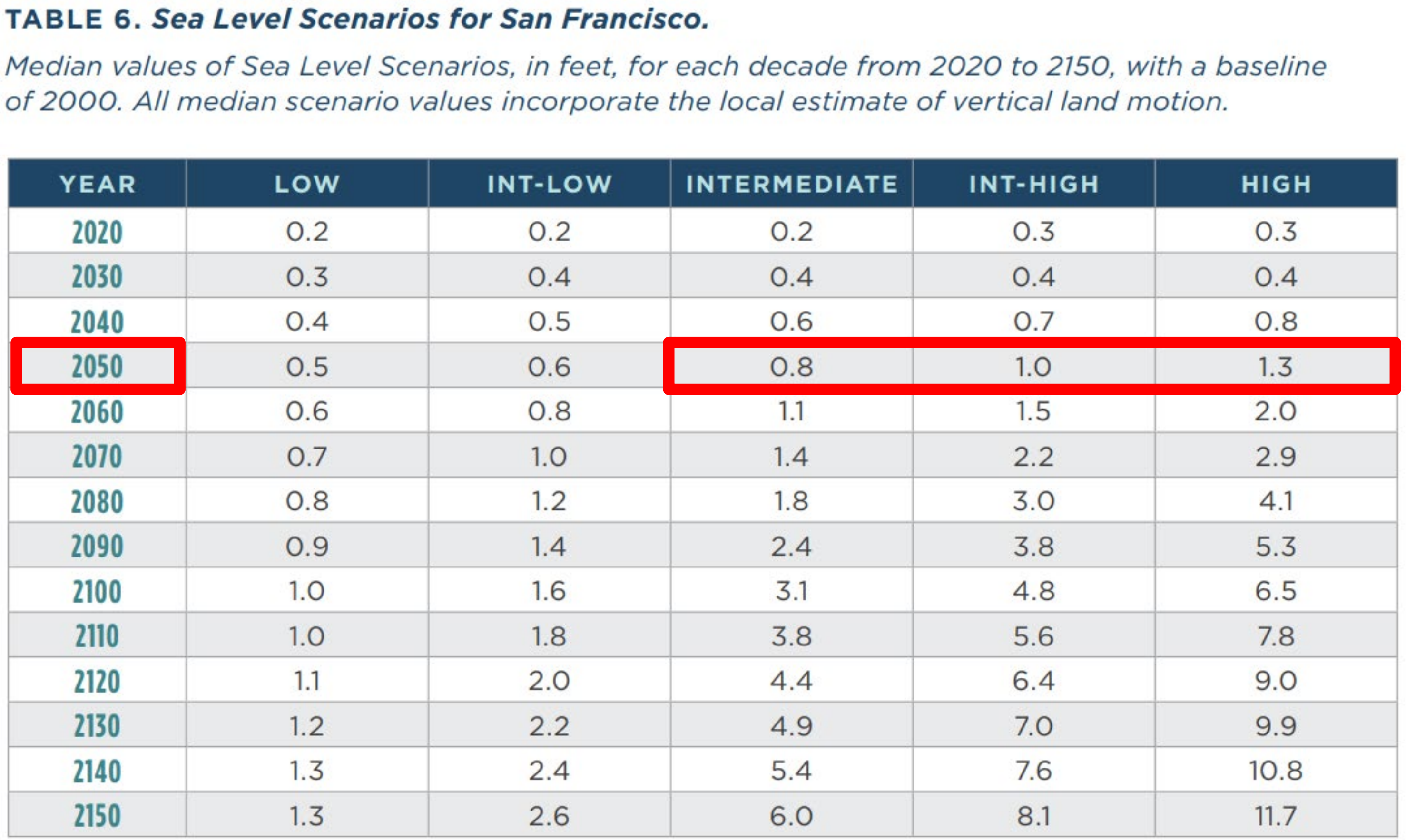


TABLE 6. ***Sea Level Scenarios for San Francisco.***

Median values of Sea Level Scenarios, in feet, for each decade from 2020 to 2150, with a baseline of 2000. All median scenario values incorporate the local estimate of vertical land motion.

YEAR	LOW	INT-LOW	INTERMEDIATE	INT-HIGH	HIGH
2020	0.2	0.2	0.2	0.3	0.3
2030	0.3	0.4	0.4	0.4	0.4
2040	0.4	0.5	0.6	0.7	0.8
2050	0.5	0.6	0.8	1.0	1.3
2060	0.6	0.8	1.1	1.5	2.0
2070	0.7	1.0	1.4	2.2	2.9
2080	0.8	1.2	1.8	3.0	4.1
2090	0.9	1.4	2.4	3.8	5.3
2100	1.0	1.6	3.1	4.8	6.5
2110	1.0	1.8	3.8	5.6	7.8
2120	1.1	2.0	4.4	6.4	9.0
2130	1.2	2.2	4.9	7.0	9.9
2140	1.3	2.4	5.4	7.6	10.8
2150	1.3	2.6	6.0	8.1	11.7

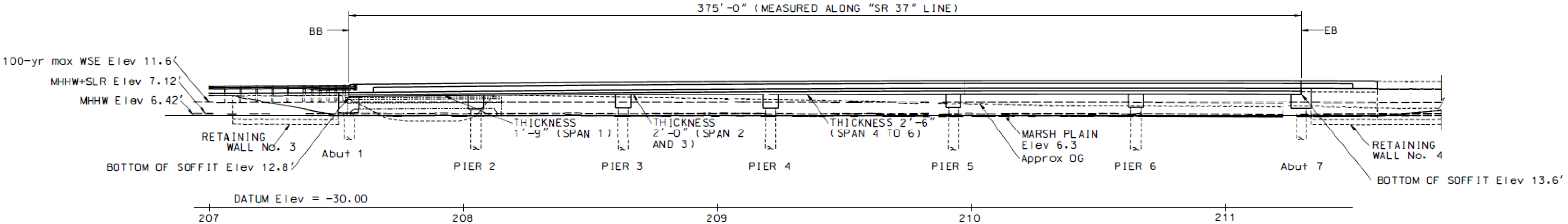
Tolay Creek Bridge – Design Criteria/Model Assumptions

Table 7. Future Condition Model Scenarios

Scenario	Event Frequency	Precipitation Frequency	Tide at Peak Flow
9	100-Year	100-Year	MSL (3.70 Ft + 2.00 Ft Surge + 0.70 Ft SLR)
10	100-Year	50-Year	MHHW (6.42 Ft + 2.00 Ft Surge + 0.70 Ft SLR)
11	100-Year	No Precipitation	EHW (7.12 Ft + 2.00 Ft Surge + 0.70 Ft SLR)
12	50-Year	50-Year	MSL (3.70 Ft + 2.00 Ft Surge + 0.70 Ft SLR)

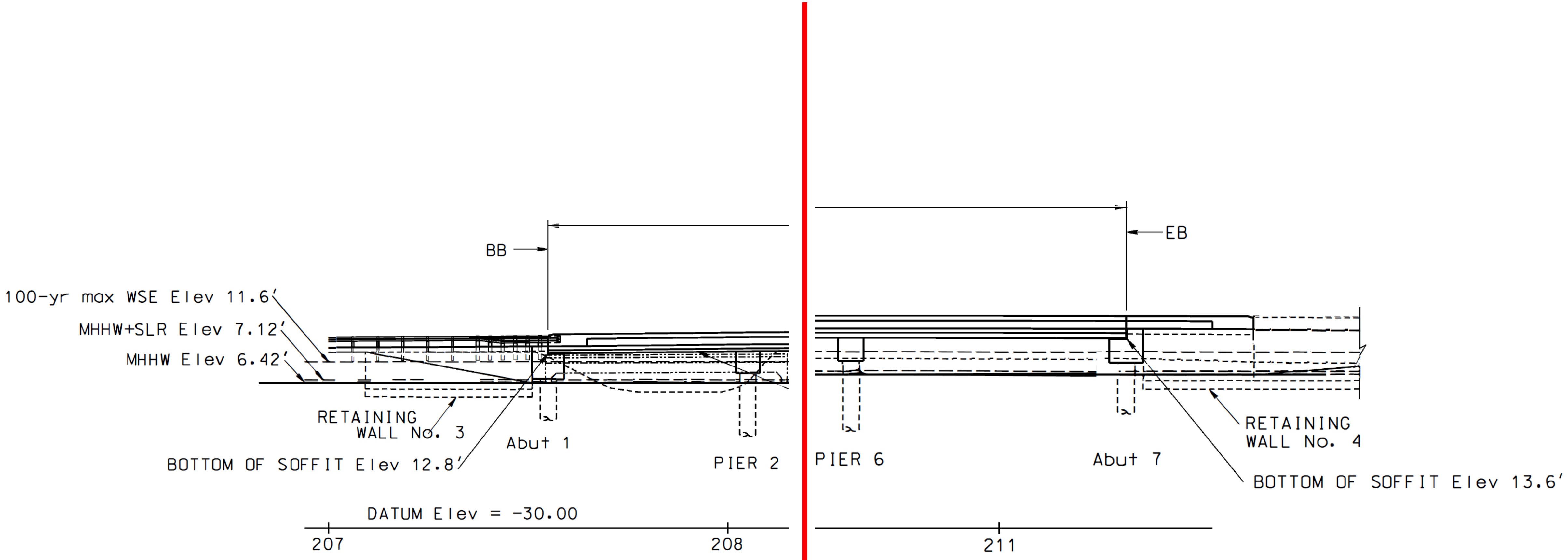
- The table outlines the most conservative modeling scenarios for the SR-37 Tolay Creek Bridge, incorporating a planning horizon of 2046 with a sea level rise (SLR) of 0.7 feet based on the 2024 California guidance.
- Scenarios include a range of precipitation frequencies combined with tidal conditions adjusted for surge and SLR.
- Tidal levels at peak flow are set at Mean Sea Level (MSL), Mean Higher High Water (MHHW), and Extreme High Water (EHW), each with a 2-foot surge and 0.7-foot SLR added.
- These assumptions reflect a conservative approach to account for future climate impacts and tidal influences on the hydraulic design of the proposed bridge.

SLR Considerations



DEVELOPED ELEVATION

SCALE: NONE


BB
100-yr max WSE Elev 11.6'
MHHW+SLR Elev 7.12'
MHHW Elev 6.42'
RETAINING WALL No. 3
Abut 1
BOTTOM OF SOFFIT Elev 12.8'
PIER 2
DATUM Elev = -30.00
207
208
EB
PIER 6
Abut 7
RETAINING WALL No. 4
BOTTOM OF SOFFIT Elev 13.6'
211

Results

Part 3 – Issues and Applications in Coastal Highway Design HEC-25 3rd ed.

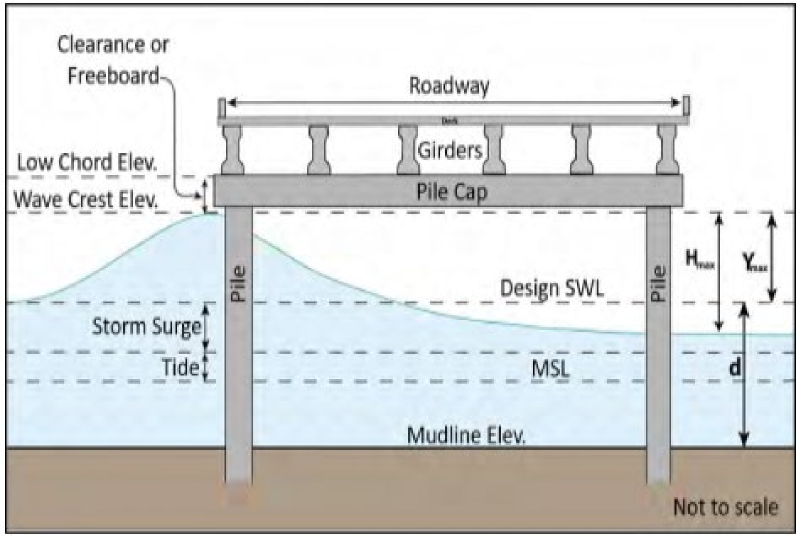


Figure 11.16. Definition sketch of wave parameters and water levels for determining elevation of bridge deck for clearance from wave crests

Part 3 – Issues and Applications in Coastal Highway Design HEC-25 3rd ed.

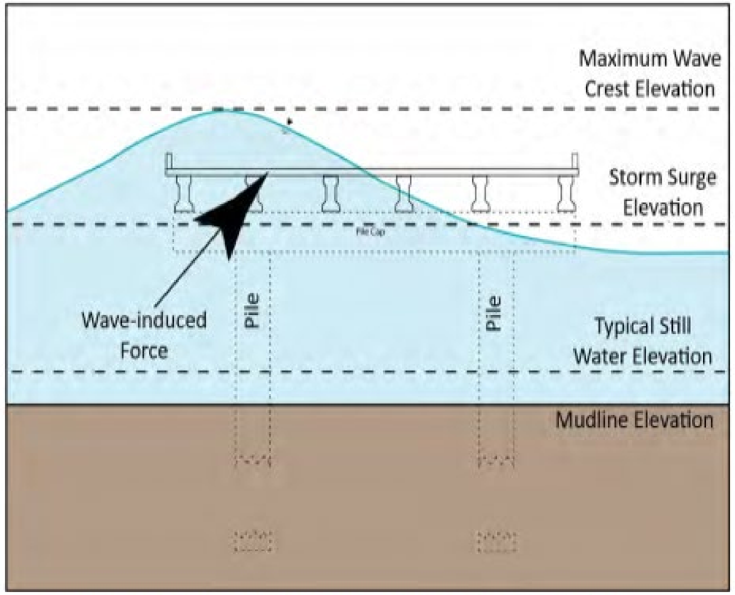


Figure 11.11. Schematic of resultant wave-induced load, with both uplift and lateral components, on a bridge deck

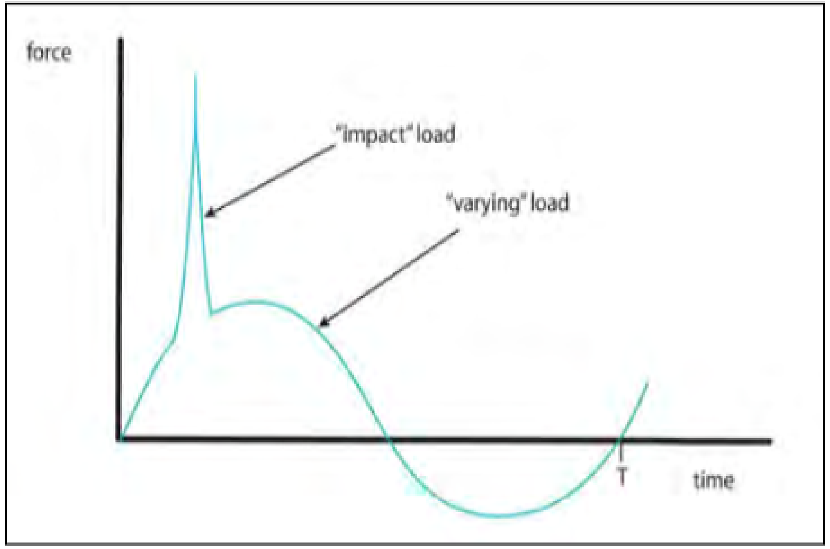


Figure 11.12. Schematic of typical time-history of wave loads on rigid structures

Results

Table 10. Future Condition Scenario Results

Scenario	Event Frequency (Years)	East Branch Maximum Discharge (cfs)	Tolay Bridge Maximum Discharge (cfs)	Maximum Water Surface (feet, NAVD 88)	Maximum Velocity (feet per second)
9	100	-19/+371	-136/+530	+8.95	1.2
10	100	-6/+289	-140/+408	+8.97	1.0
11	100	-21/+28	-332/+49	+9.45	0.7
12	50	-19/+286	-135/+422	+8.73	1.1

- The most conservative result is from Scenario 11, occurring during an extreme high water tide cycle.
- Maximum discharge through the Tolay Creek Bridge -332 cfs (upstream) and +49 cfs (downstream) in Scenario 11, reflecting significant tidal influence.
- The maximum velocity of 1.2 feet per second is observed in Scenario 9, aligning with a 100-year precipitation event and MSL tide conditions with surge and SLR.
- These results suggest lower flow rates and velocities compared to previous studies, attributed to reduced SLR assumptions (0.7 ft vs. 1.7 ft) and storage effects in the upstream marsh.
- The recommended minimum soffit elevation of +12.60 feet (NAVD 88) accounts for the +9.90 ft EHW, 1 ft wave crest, 0.7 ft SLR, and 1 ft freeboard, ensuring safety against future conditions.

Thank you!