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1060 White Rock Rd, Ste 200
Rancho Cordova, CA 95670

Project No. E23228.000P
27 June 2023

Attention: Mr. Dennis Haglan

Subject: **CITY OF PLACERVILLE CLAY STREET BRIDGE TESTING**
Clay Street north of Main Street, Placerville, CA
SUMMARY OF MATERIALS TESTING SERVICES

Dear Mr. Haglan:

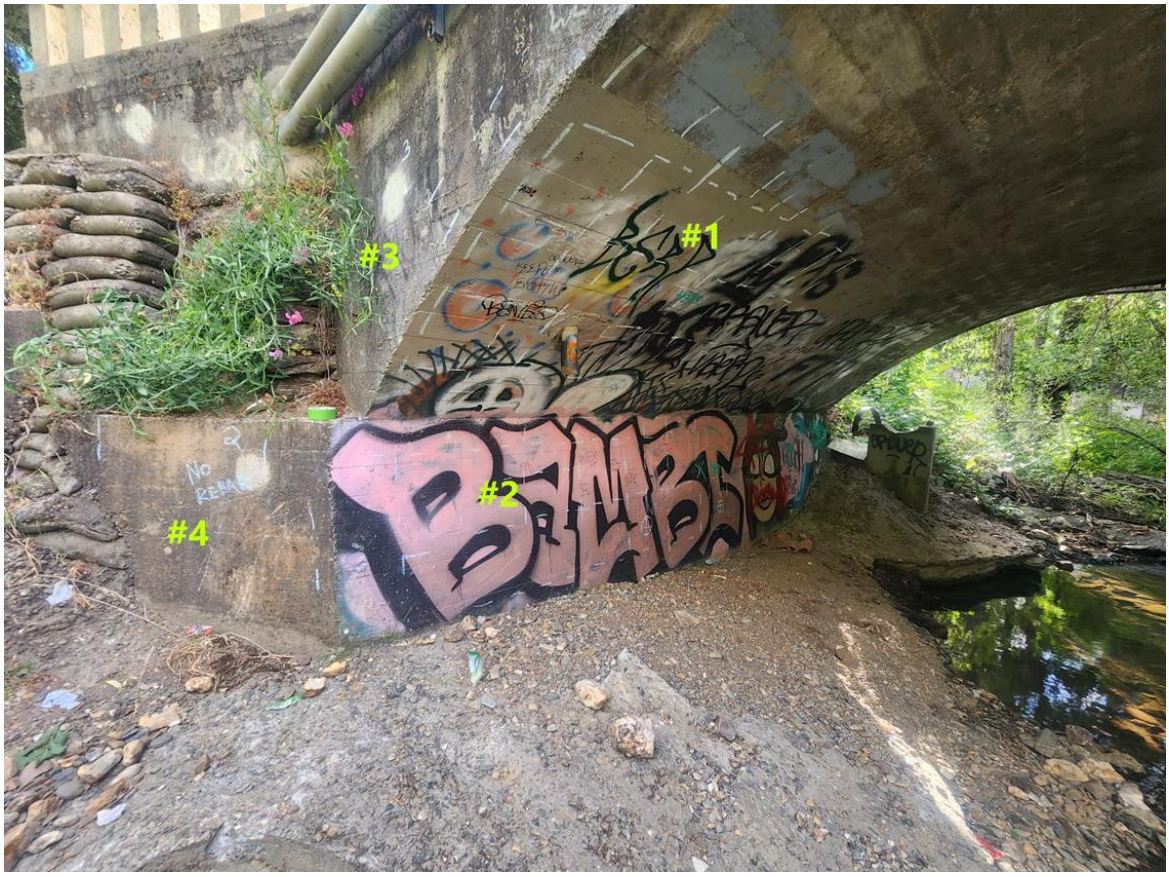
As requested, Youngdahl Consulting Group, Inc. has provided materials testing services from 16 June 2023 through 26 June 2023 for the above referenced project. We understand that material testing services for the subject Clay Street Bridge are complete. The structure for this project includes the Clay Street Bridge with abutment walls, retaining wall and sidewalk spanning over the top of the bridge.

Our scope of material testing services for the above reference project was comprised of the tasks listed below and are summarized in this report.

- Ground Penetrating Radar (GPR) Testing to verify reinforcement spacing and cover depth;
- Schmidt Hammer Testing in 8 locations;
- Core Drilling for compression at 2 locations;
- Core drilling sidewalk to verify material below;
- Visual observation of distressed areas.

Ground Penetrating Radar (GPR)
Ground penetrating radar (GPR) was used in 7 locations. The depth of investigation achieved during the survey varied depending on the specific conditions of the site. On average, the surveyed concrete achieved a depth of investigation of 12" thick; and on the retaining wall, 8" thick on abutment walls & arch with reinforcement coverage of 2” to 3.5”. However, note that the depth may vary due to variations in soil composition and other subsurface factors. The accuracy of the survey findings are subject to the limitations of the equipment used and the specific site conditions. Certain subsurface features may remain undetected or be inaccurately represented due to various factors such as depth, size, or material composition. The interpretation of the data collected relies on the expertise of the survey tech and may involve subjective analysis.

1) North arch overhead verticals (Longitudinal) approx. 12" on center and horizontals (Transverse) approx. 18" on center.
2) Abutment wall below north arch 18" on center both ways
3) North arch face on west side of bridge 12" and 16" on center double mat verticals and Horizontals.
4) No rebar present on side of north abutment wing wall
5) Front of Center Abutment Verticals at 12" on center with Horizontals detected at 12" and 18" on center.
6) Side of center abutment verticals on 18" centerline and horizontals detected at 12" centerline.
7) Retaining wall SE corner of bridge 18" x 18" centerline both ways.
8) Sidewalk above was scanned and was found to have approx. 18"+ of some type of fill material. Appears to be bedrock (decomposed slate) with pieces of wood.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#2
#3
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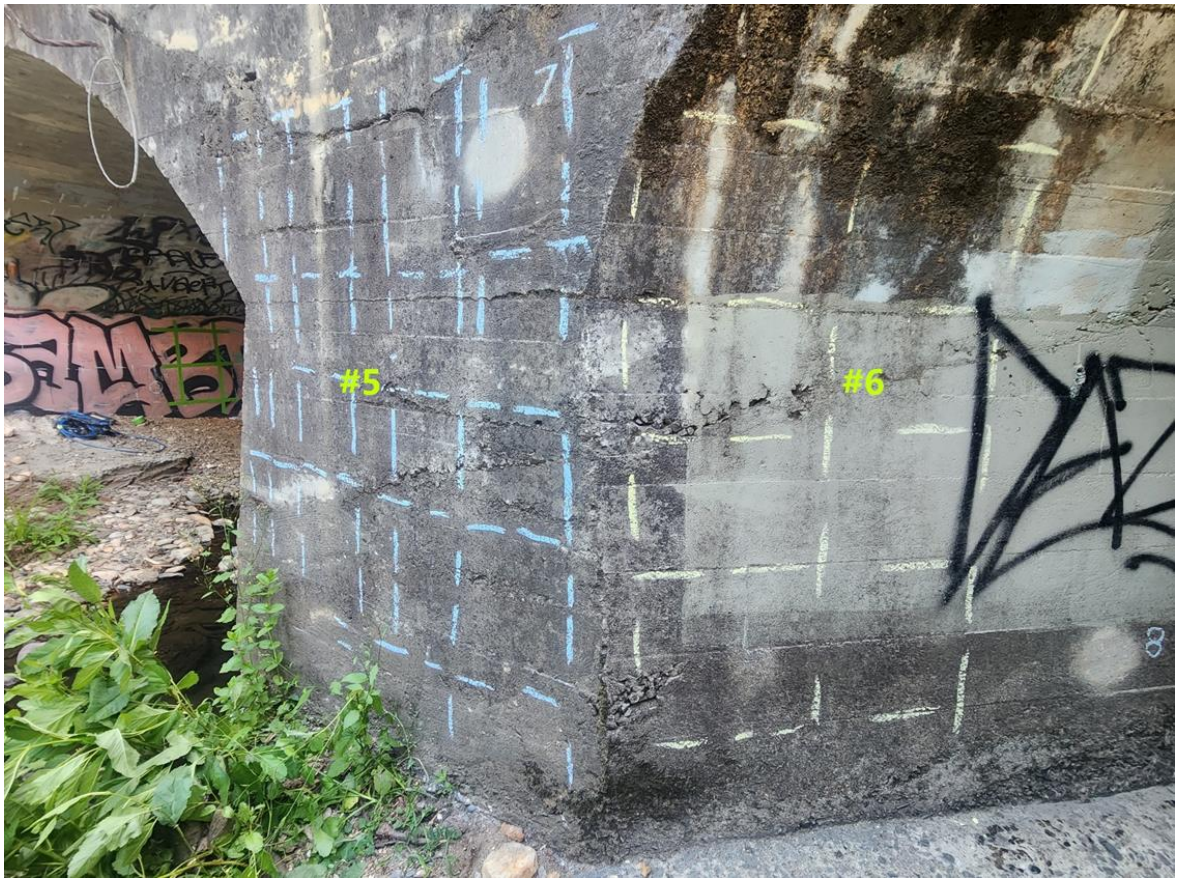
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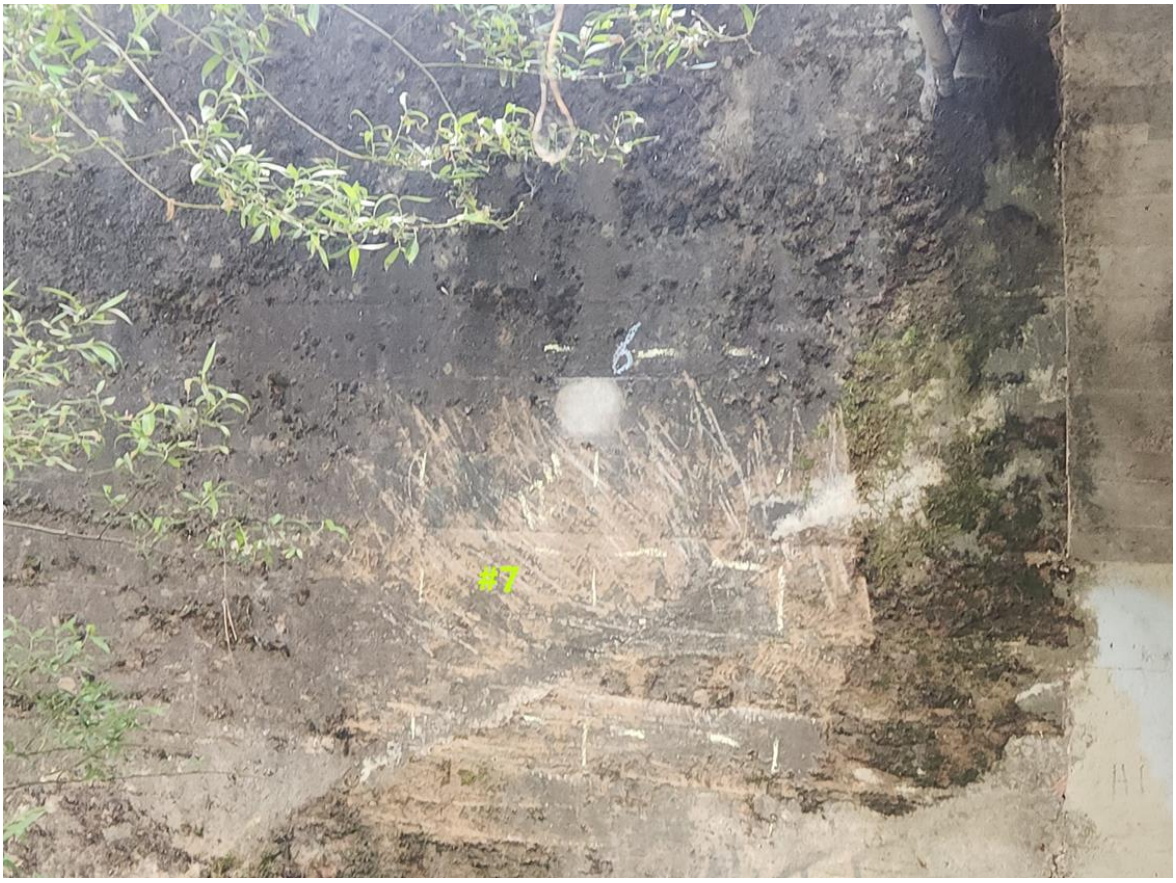
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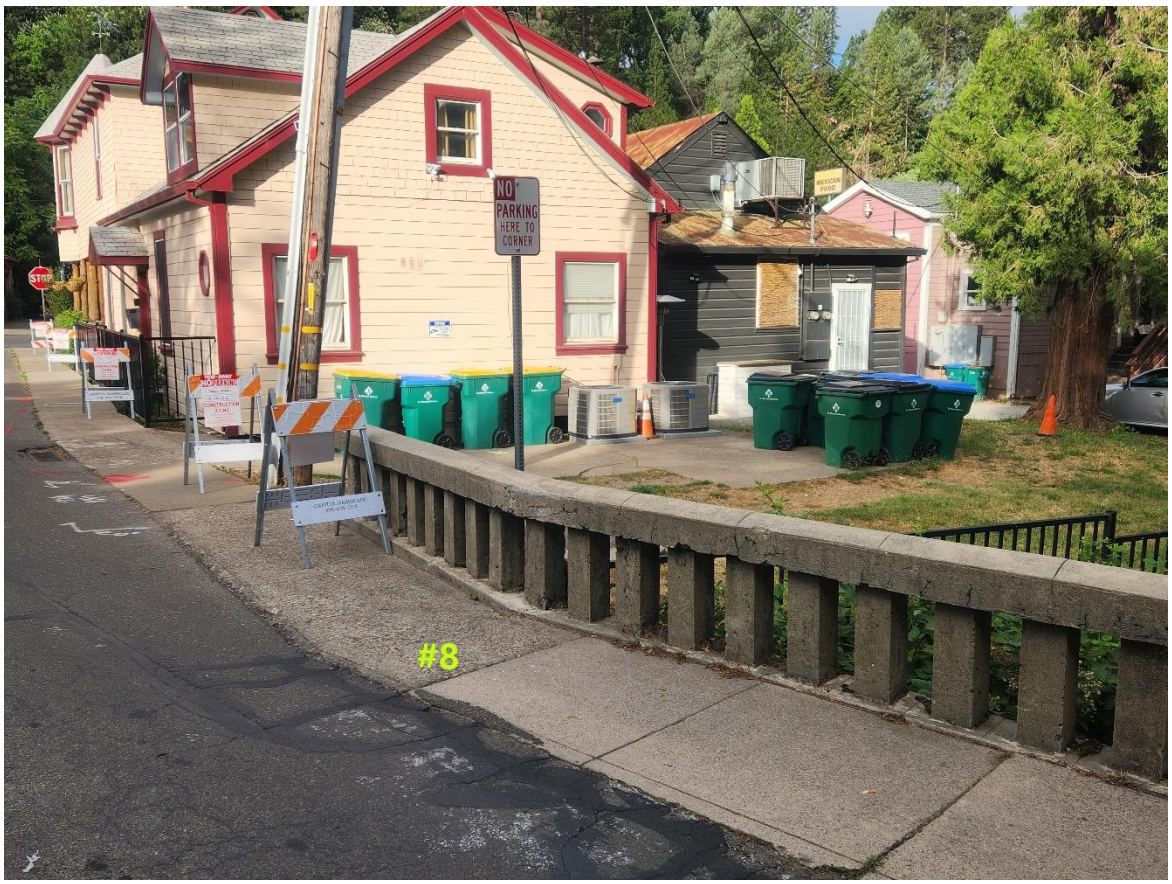
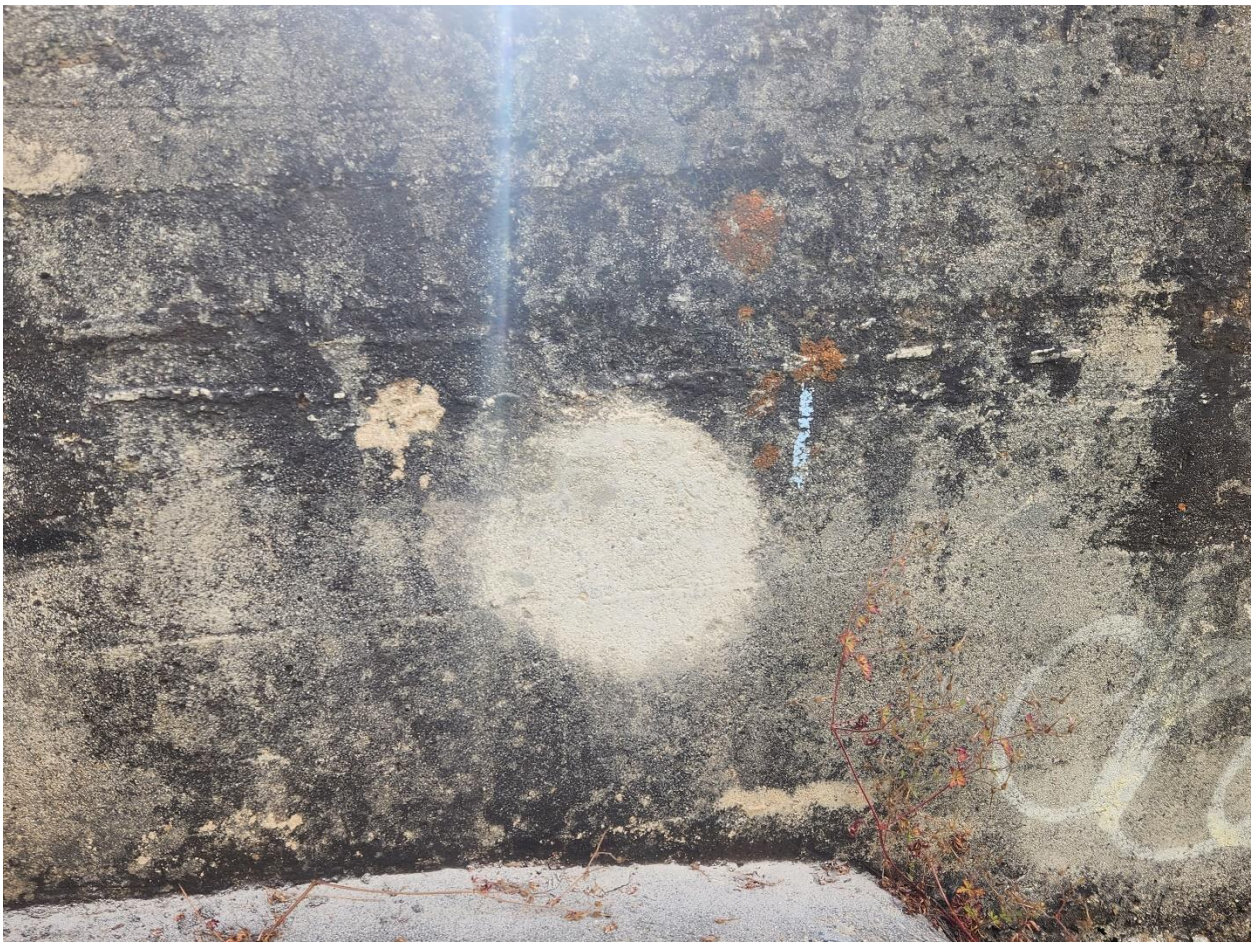

NO PARKING HERE TO CORNER
STOP
#8

Schmidt Hammer Testing

Schmidt hammer testing of the Clay Street Bridge was performed 10 times in 9 locations. Each location was ground with abrasive stone prior to testing. Core samples were taken at location 4, 5, and 9 to correlate rebound values with compressive strength of cores. Note that more cores may be necessary for better correlation with Schmidt Hammer tests.

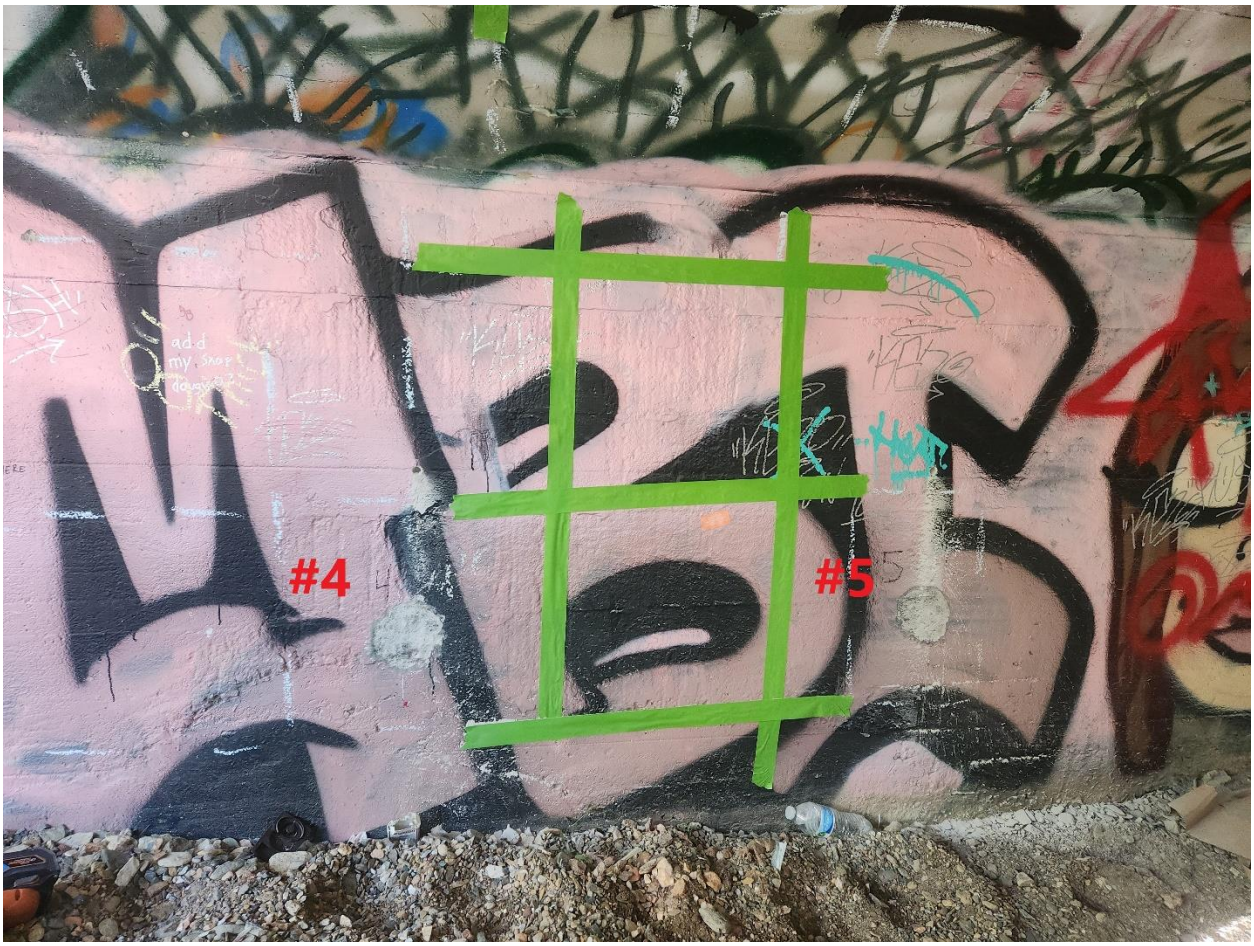
#1 Wing wall at north west corner of bridge ---------- Average of 45
#2 Wing wall below north arch at north west corner of bridge ----- Average of 40
#3 Above arch north west corner of bridge ---------- Average of 34
#4 Abutment Wall north side of bridge at **core location** ---------- Average of 38 **(5,350 PSI)**
#5 Abutment Wall north side of bridge at **core location** ---------- Average of 33 **(2,750 PSI)**
#6 Retaining wall connected to south east corner of bridge ------- Average of 31
#7 West end of wall between bridge arches ---------- Average of 40
#8 South side of wall between bridge arches ---------- Average of 42
#9 Sidewalk adjacent to core----------Average of 41 **(5,600 PSI)**



Core Drilling for Compressive Strength

Three 4" diameter core samples were taken from north abutment wall and one from the sidewalk for compressive strength and to correlate with Schmidt Hammer testing results performed at same location. GPR was used on 6/19/23 to locate reinforcement and to make sure cores are taken without going through reinforcement. The core drill was only used to a depth of 7" inches in the abutment wall in order to not drill all the way through the wall. After samples were taken holes in wall were filled with Sakrete High-Strength Concrete Mix.

#4 Compressive Strength of core 5,350 PSI
#5 Compressive Strength of core 2,750 PSI **(Large rock in core may have affected the strength.)**
#9 Compressive Strength of core 5,600 PSI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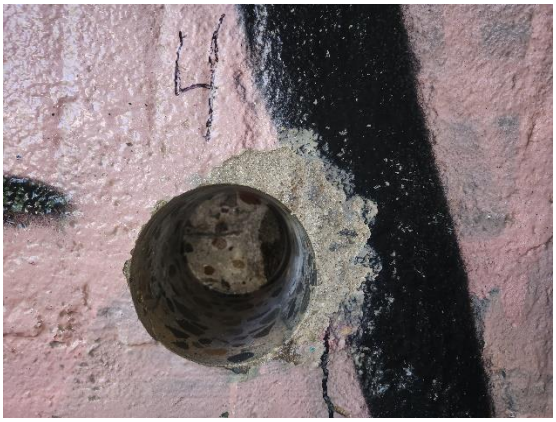
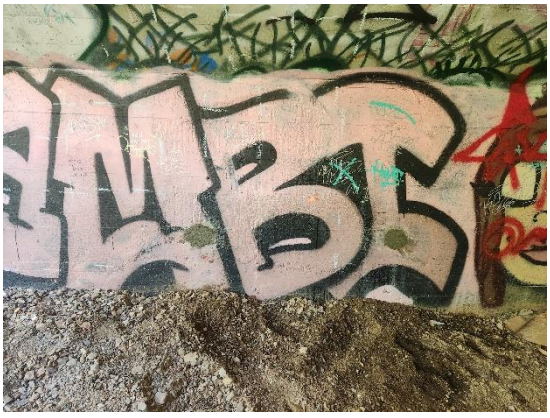
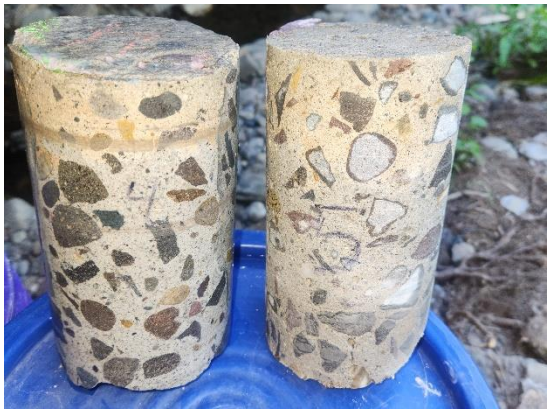


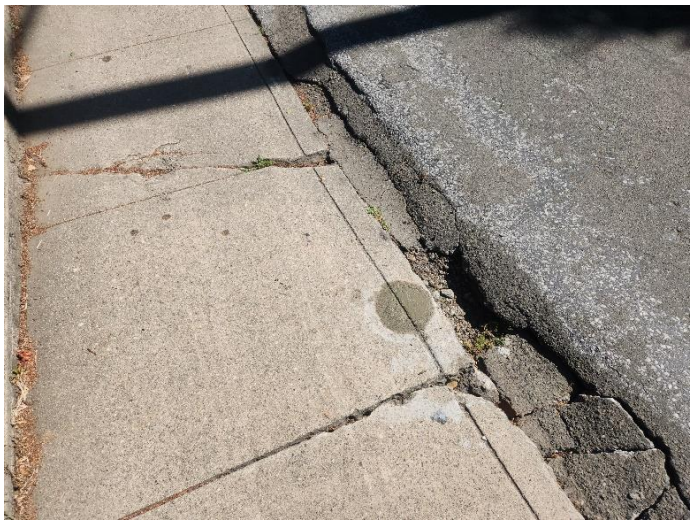


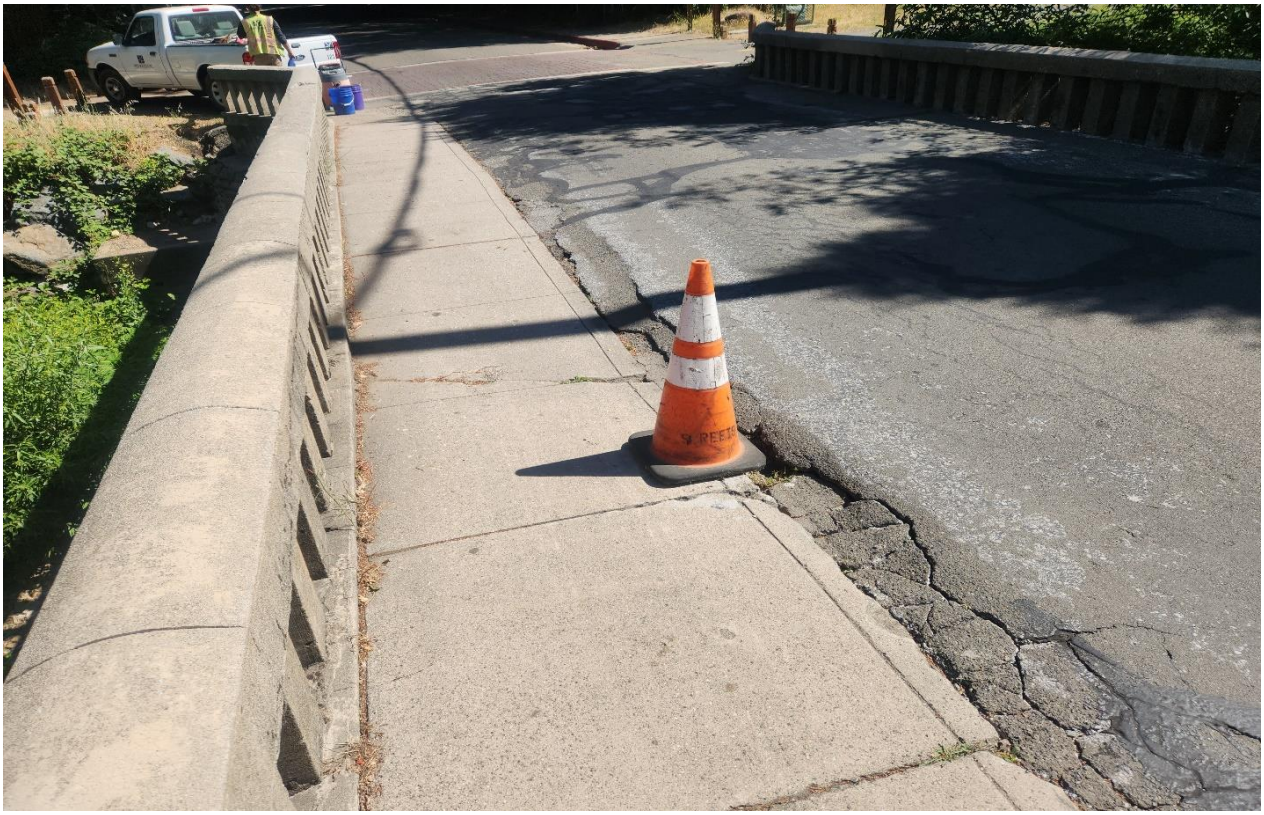


Core Drilling of Sidewalk to Verify Fill Material

One 4" diameter core was taken from section of sidewalk above in order to observe material below (Compressive strength was also tested). Core was taken where there is a large amount of settlement and concrete was cracked. Material below sidewalk was observed to be moist and appears to be decomposed slate with pieces of wood (Material was easily obtained with hand auger and did not appear to be well compacted). Hole in sidewalk was filled with Sakrete High-Strength Concrete Mix and Orange cone placed over wet concrete.

Core compressive strength 5,600 PSI

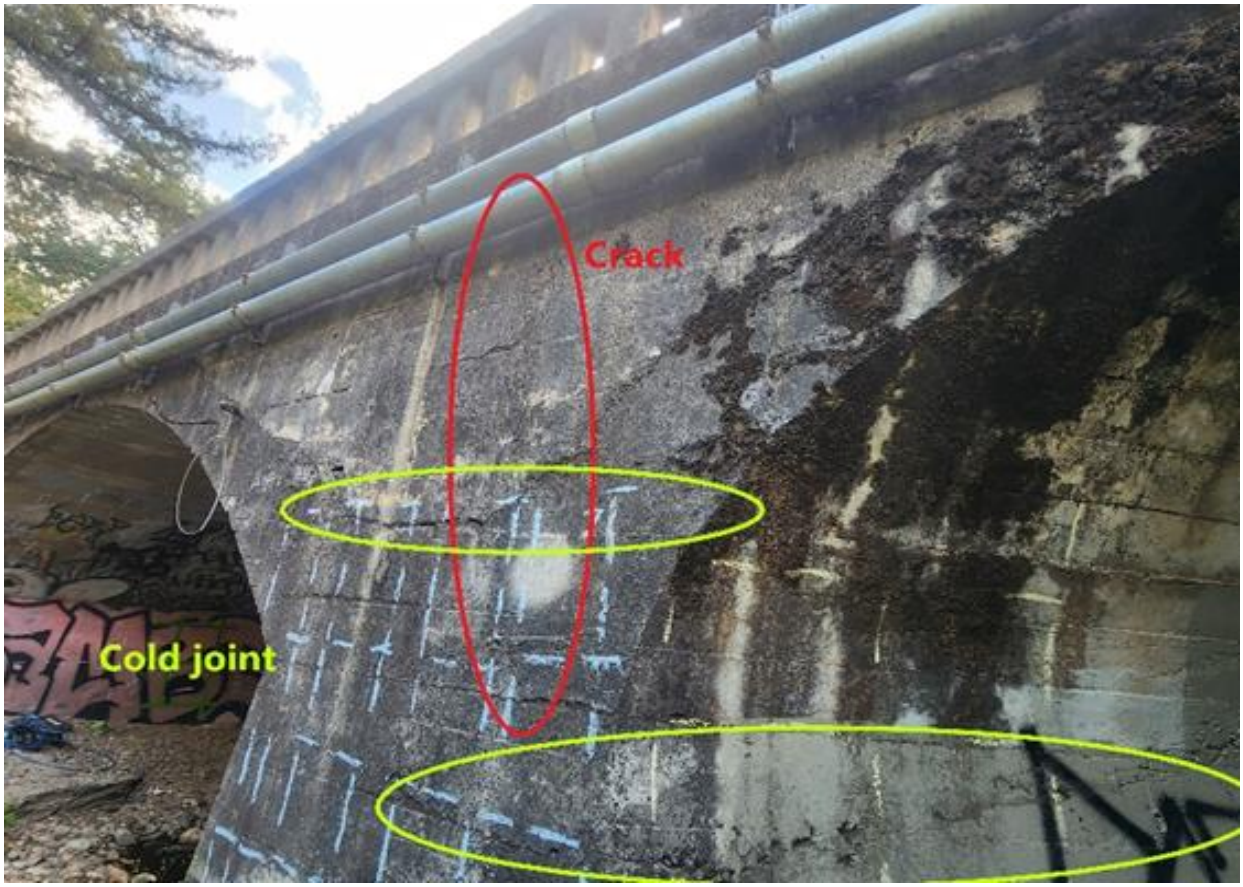


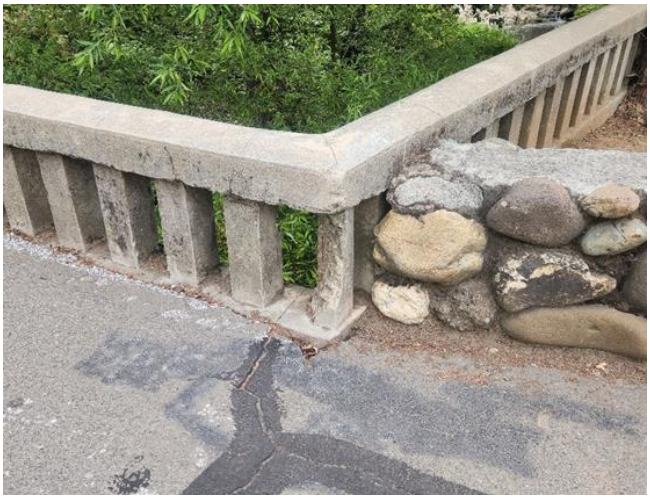


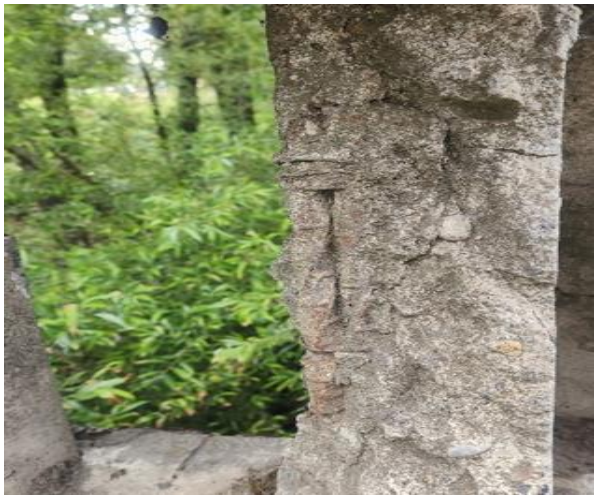
Visual Observation of distressed areas

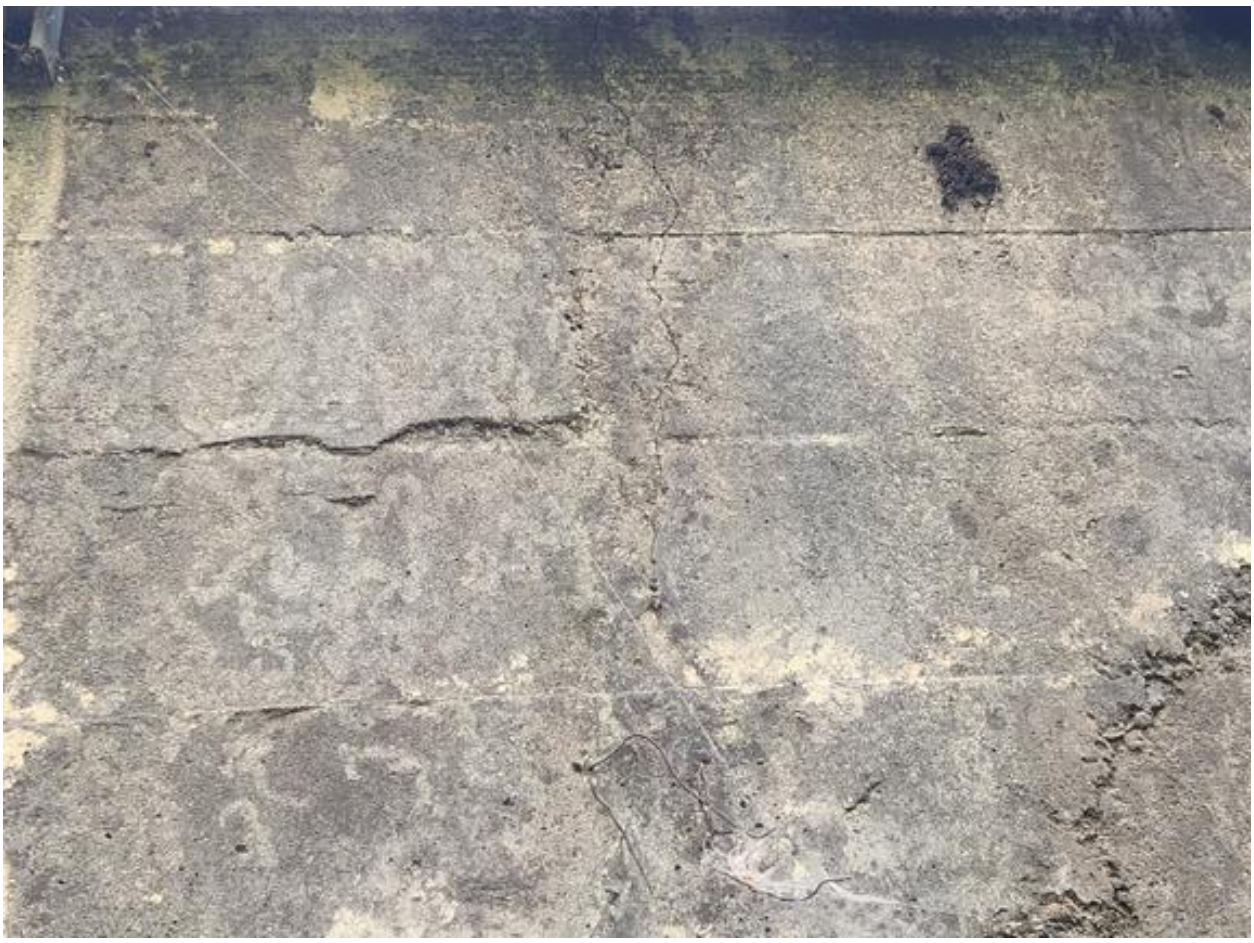
While on site areas of distress were observed and documented.

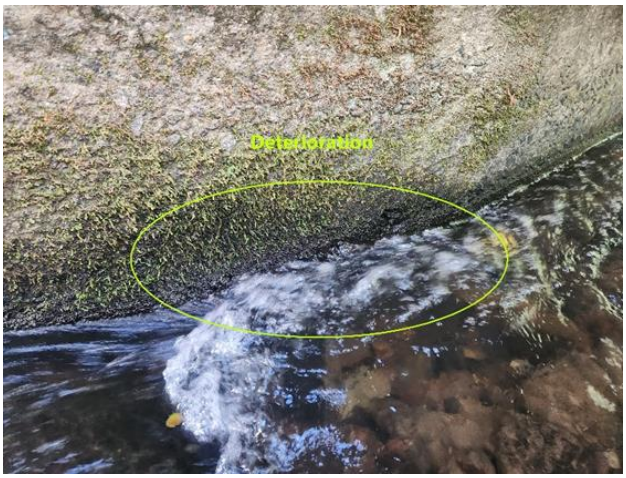
1) Crack on west side of center abutment
2) Cold Joint made during original concrete placement
3) Deterioration of concrete due to water flow and debris. South east corner of bridge (Transition of retaining wall and abutment) and north west corner of center abutment.
4) Chipping of concrete: Most likely due to being forcibly hit South east corner post of guard rail exposing reinforcement. Other posts have chipping throughout guard rails both sides of bridge
5) Sidewalk and asphalt depressions: Most likely due to deterioration and washing out of fill material below.

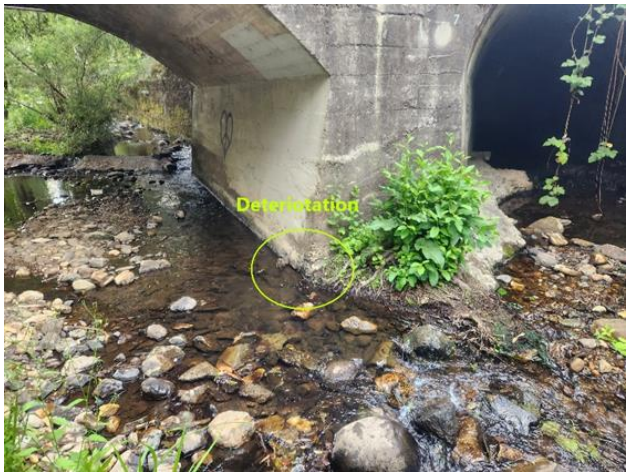












We trust that this letter provides you with the needed information. If you have any questions or require additional information, please do not hesitate to call.

Very Truly Yours,
Youngdahl Consulting Group, Inc.

Michael R. Kelley
Construction Inspection Manager

John Youngdahl, P.E
Principal Engineer

Attachments: Compressive Strength Summary Report

Concrete Core Compressive Strength Test Report, ASTM C42

Core Number	4	5	6			
Core Location	Wall under north side of north arch	Wall under north side of north arch	Sidewalk			
Age, days	Concrete placed in 1926					
Diameter, in	3.99	3.99	3.99			
Cross-Sectional Area, in^2	12.50	12.50	12.50			
As Received Length, in	6.3	6.0	4.5			
Before Capping Length, in	6.2	5.8	4.1			
After Capping Length, in	6.2	5.8	4.1			
Calculated Density, pcf	140	136	150			
Ultimate Load, lb	69,720	36,240	79,540			
Compressive Strength, psi*	5,350	2,750	5,600			
Type of Fracture**	3	2	3			

*Compressive strengths have been corrected to reflect a length to diameter ratio of 2:1
**1 = Cone, 2 = Cone & Split, 3 = Columnar, 4 = Shear, 5 = End (1-Sided), 6 = End (2-Sided)

Notes: Specimens were sealed in an airtight container for five days prior to testing, in accordance with ASTM C42, to allow them to come to a moisture equilibrium.

Jeffry Cannon, Laboratory Manager

Concrete Supplier:	Unknown	Mix Design No.:	Unknown
Direction of Load at Time of Test:	Vertical	Max Aggregate Size, in:	1 1/2 (visual estimate)
Moisture Content at Time of Test:	Equilibrium	Date Cored:	6/20/2023
Date of End Preparation:	6/20/2023	Date Tested:	6/26/2023

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Project: **City of Placerville, Clay Street Bridge Testing**

Project No.: **E23228.000P**

Figure

Reviewed By: JLC

Date: 6/26/2023