Cloverdale Bridge Replacement

Mike Johnson, Idaho Transportation Department, Bridge Section

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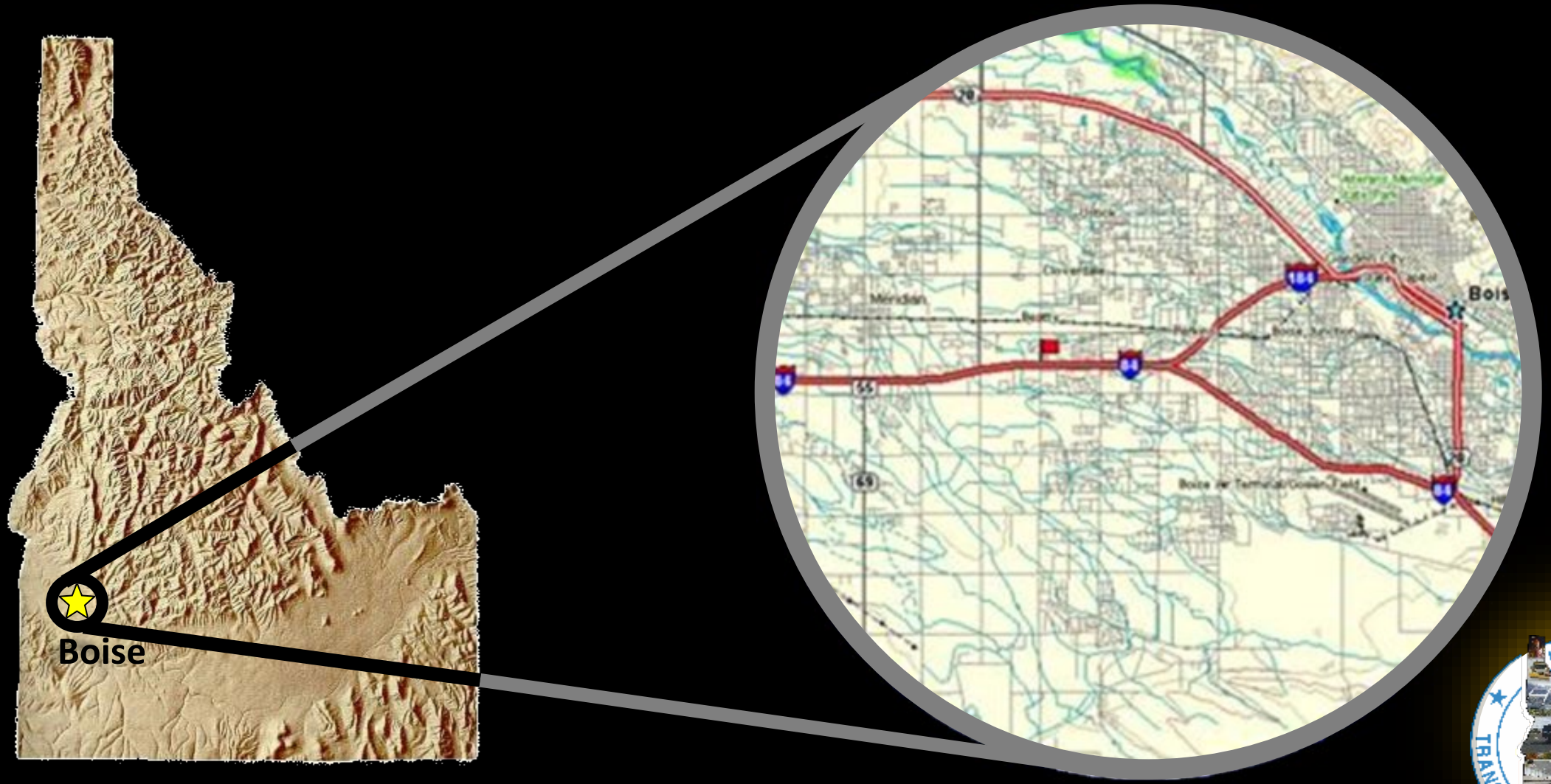
Cloverdale Bridge Replacement



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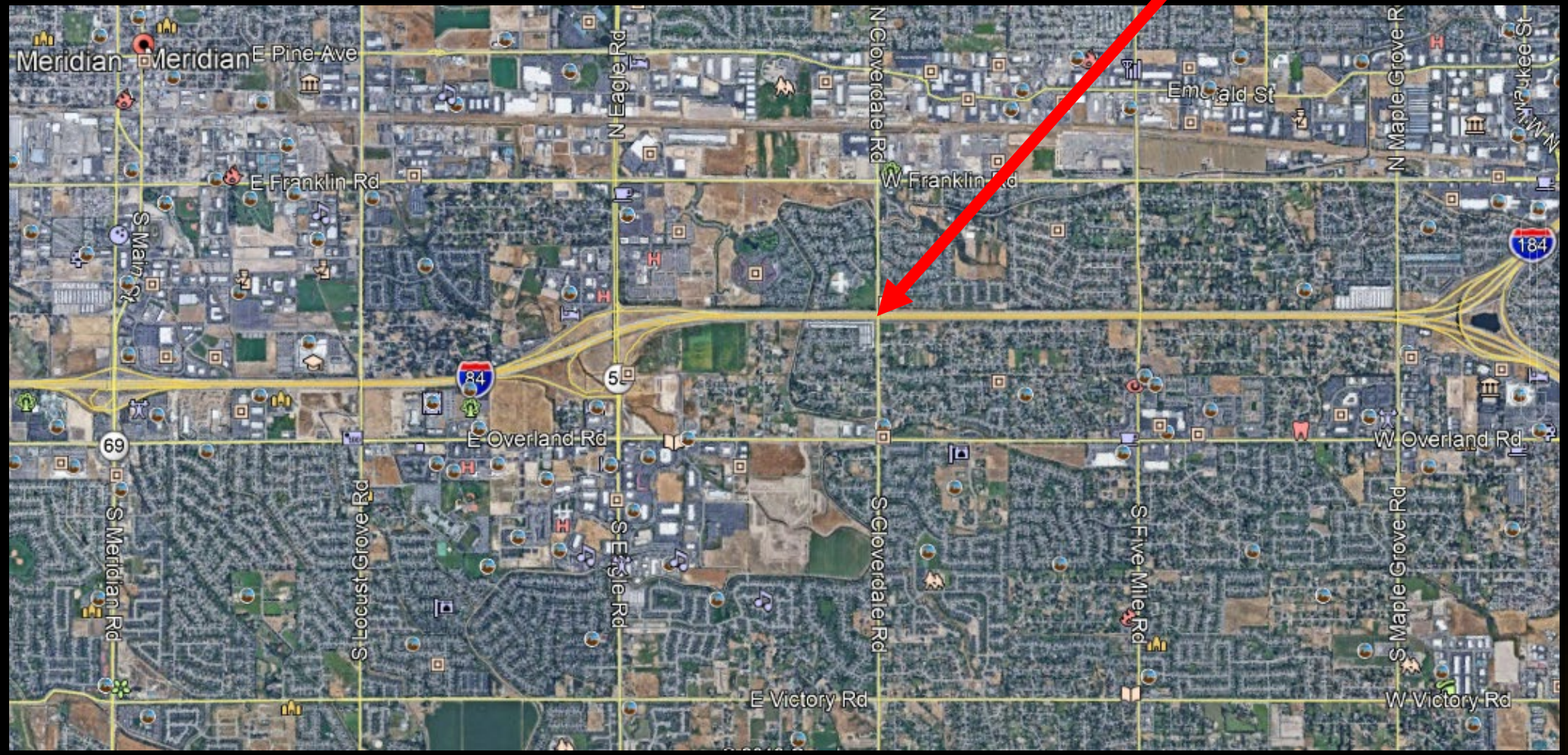
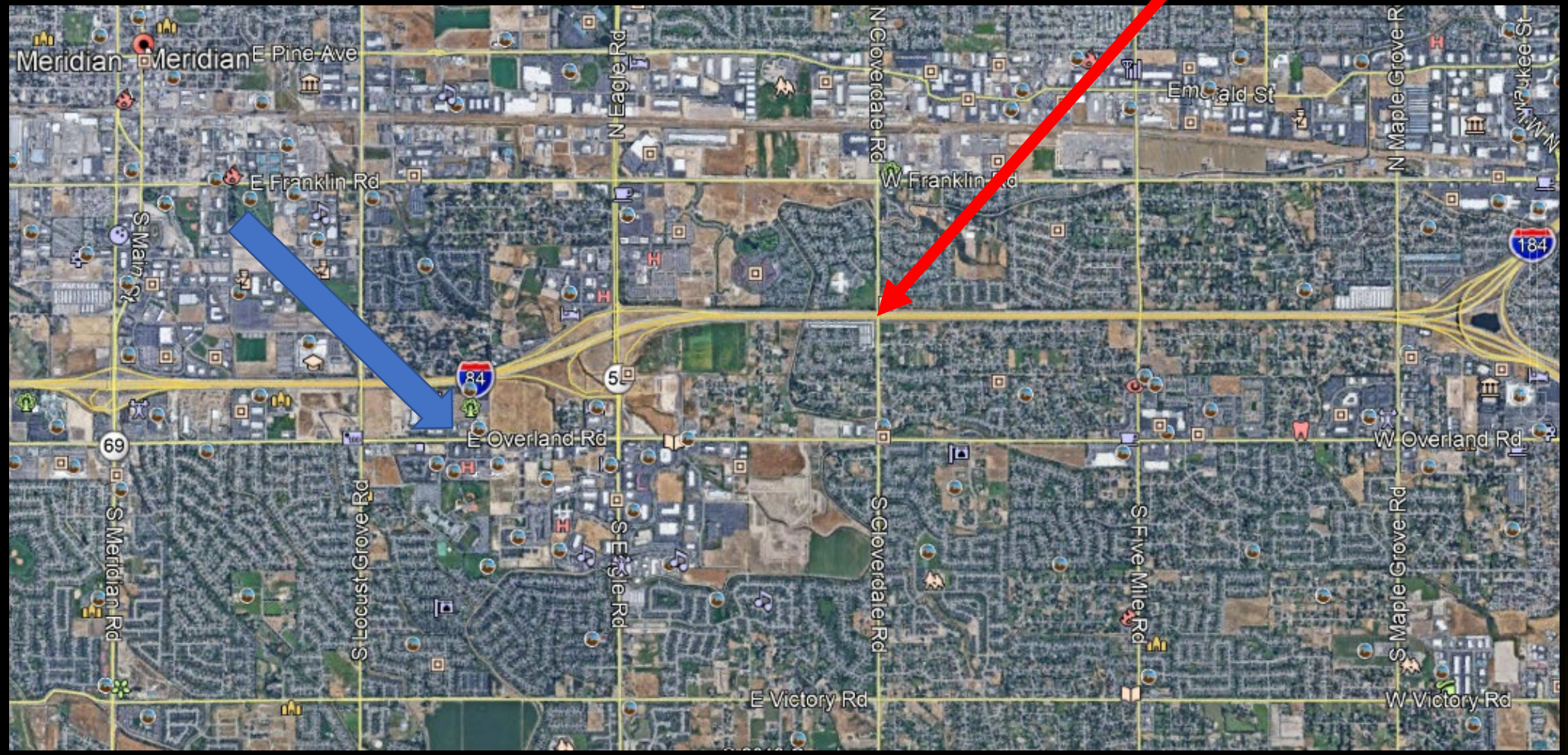
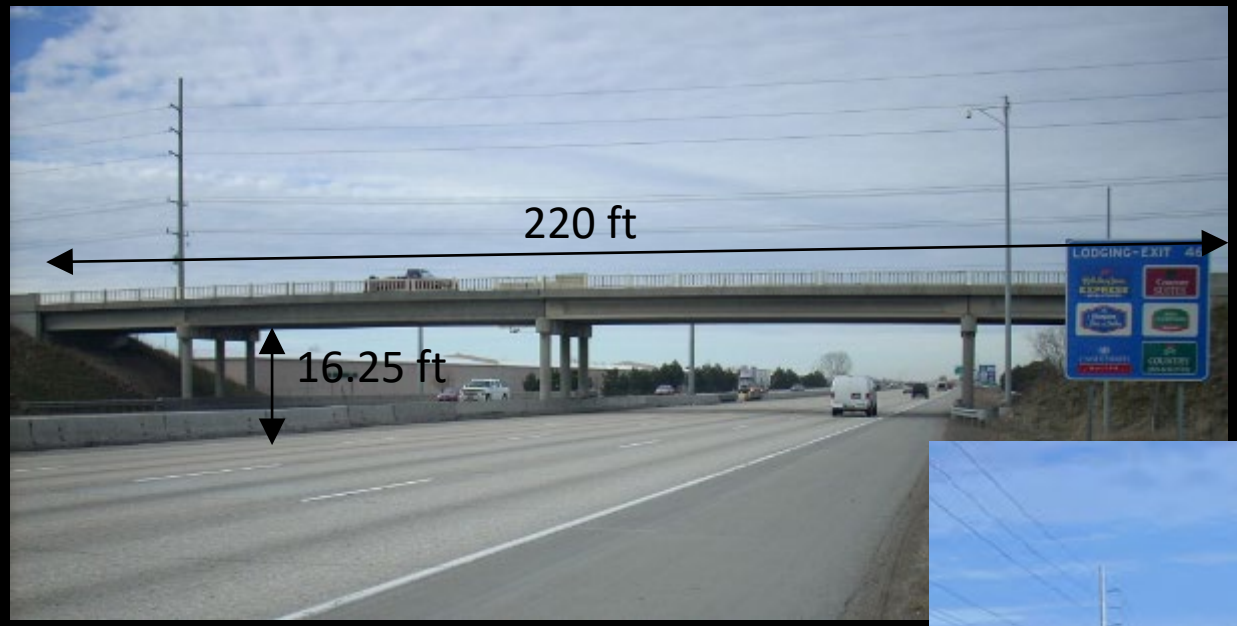
Site Overview



Site Overview



Bridge History Prior to June 2018

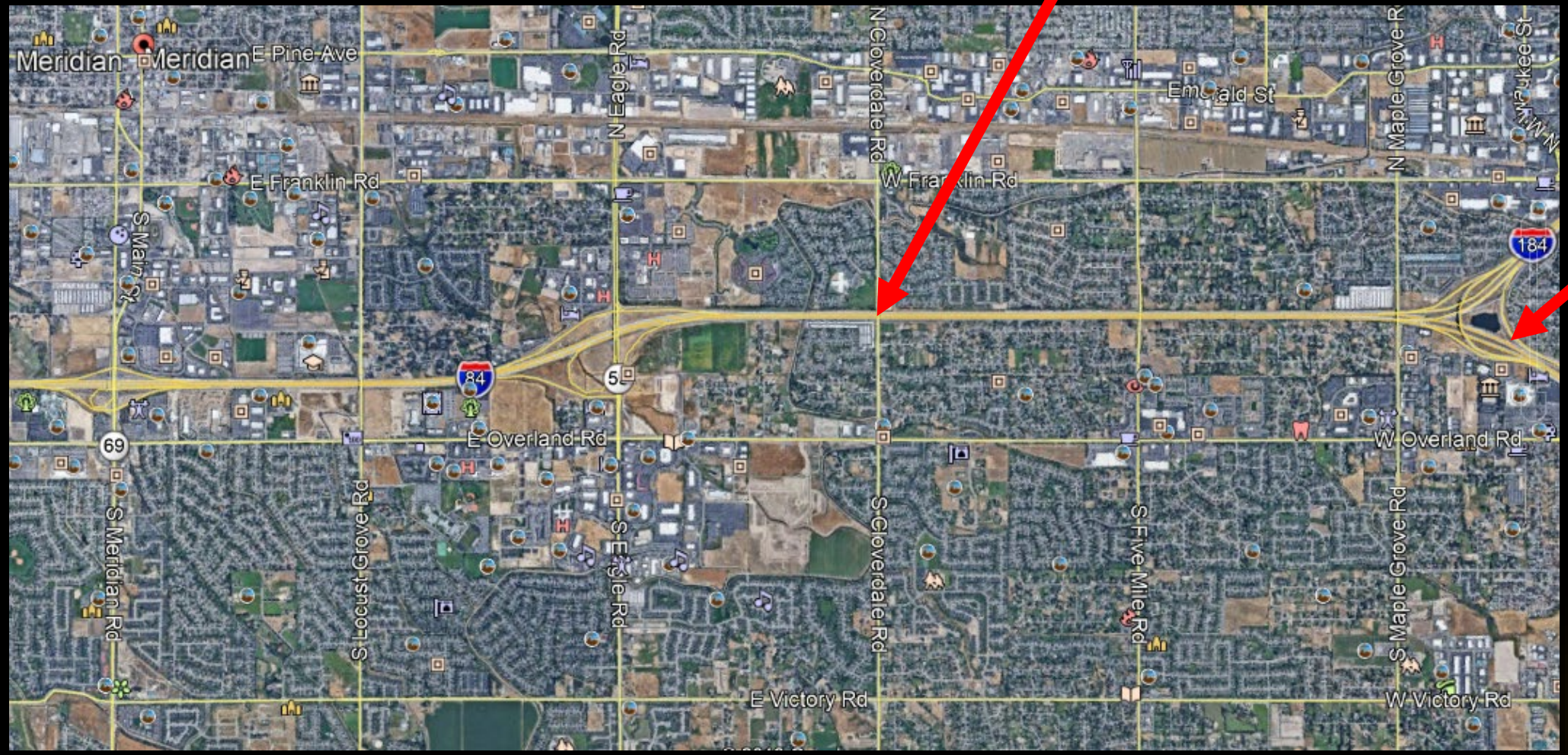


Overheight Load Damage - 2002

Overheight Load Damage - 2006

Overheight Load Damage - 2016

June 16, 2018



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June 16, 2018

https://www.ktvb.com

The Damage

Condition Assessment

Table 1: Physical Effects of Temperature on Concrete [8]

Temperature	Color Change	Changes in Physical Appearance and Benchmark Temperatures	Concrete Condition
0 to 550 °F (0 to 290 °C)	None	Unaffected	Unaffected
550 to 1100 °F (290 to 590 °C)	Pink to red	Surface crazing: 570 °F (300 °C); Deep cracking: 1020 °F (550 °C); Popouts over chert or quartz aggregate: 1070 °F (575 °C)	Sound but strength significantly reduced
1100 to 1740 °F (590 to 950 °C)	Whitish Grey	Spalling, exposing not more than 25% of reinforcing bar surface: 1470 °F (800 °C); Powdered, light colored, dehydrated paste: 1650 °F (575 °C)	Weak and friable
1740+ °F (950+ °C)	Buff	Extensive spalling	Weak and friable

Condition Assessment

Decision to Repair or Replace

Decision to Repair or Replace

Inspection and Repair of a Fire Damaged Prestressed Girder Bridge

RICHARD STODDARD, Washington State DOT, Olympia, WA

IBC-04-17

Section 1 **Incident Response**

DAMAGE INSPECTION REPORT 12/12/02

On December 11, 2002, at approximately 4:00 pm, a railroad tanker collision caused a fire under a prestressed girder bridge that consumed 30,000 gallons of methanol, (photo 1). This section of the bridge was a relatively new continuous three span frame constructed in 1997. The girders had a span length of 146 feet, a 28 day concrete strength of 7000 psi, and 0.5" diameter 270 ksi steel strands. The bridge deck and columns were constructed using 5000 psi concrete and 60 ksi mild steel. Confinement reinforcement in the columns was provided by tightly wound spiral cages.

Photo 1. Puyallup River Bridge Railroad Tanker Fire

The fire engulfed Span 8 and maintained a high flame temperature for approximately one hour. The interstate freeway was immediately closed to traffic and remained closed pending an all night structural inspection.. The bridge displayed no unusual deflections or mis-alignments and was reopened to commuter traffic and legal weight trucks on the morning of December 12th. Over weight trucks were prohibited and routed to I-5.

JOINT TRANSPORTATION RESEARCH PROGRAM
INDIANA DEPARTMENT OF TRANSPORTATION AND PURDUE UNIVERSITY

Post-Fire Assessment of Prestressed Concrete Bridges in Indiana

Amit H. Varma, Jan Olek, Christopher S. Williams,
Tzu-Chun Tseng, Sijia Wang, Dan Huang, Tom Bradt

SPR-4221 • Report Number: FHWA/IN/JTRP-2021/05 • DOI: 10.5703/1288284317290

Required Collaboration of Several Agencies to Complete the Project so Quickly

- Date of Accident – June 16, 2018
- Decision to Replace and Move Forward – June 27, 2018
- Design Plans, Schedule, and Estimate Complete (PS&E) - October 1, 2018
- Construction Contract Awarded – November 5, 2018

I-84 Corridor Traffic

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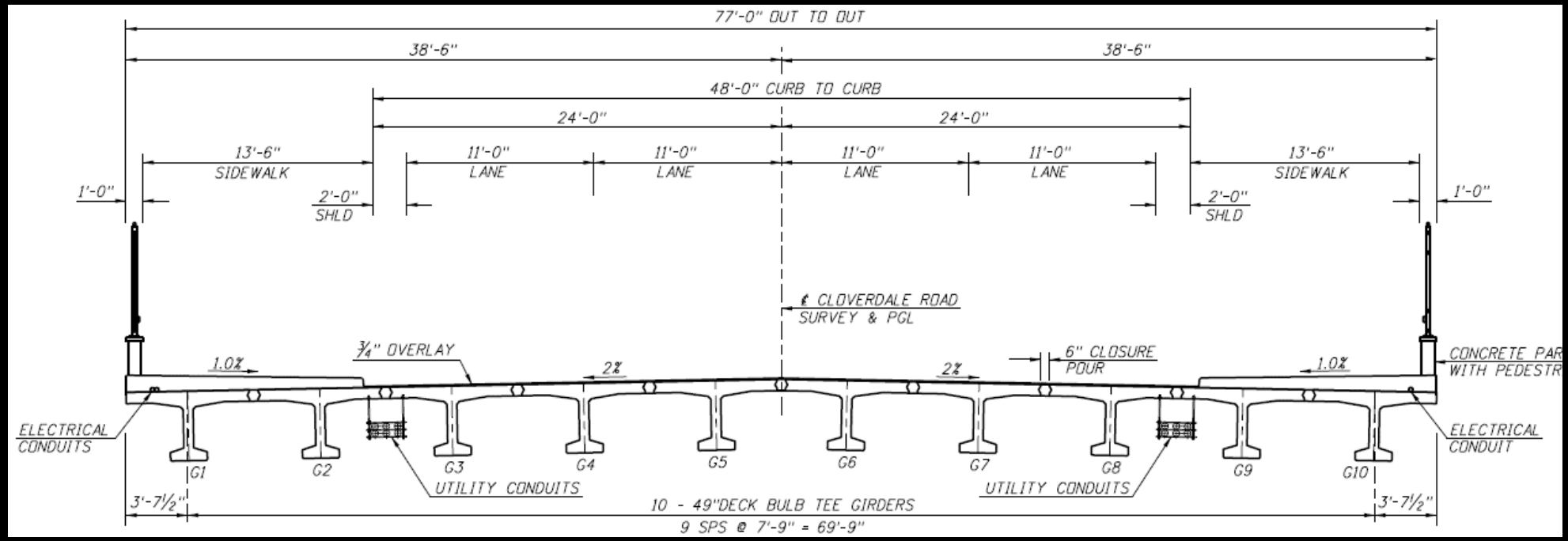
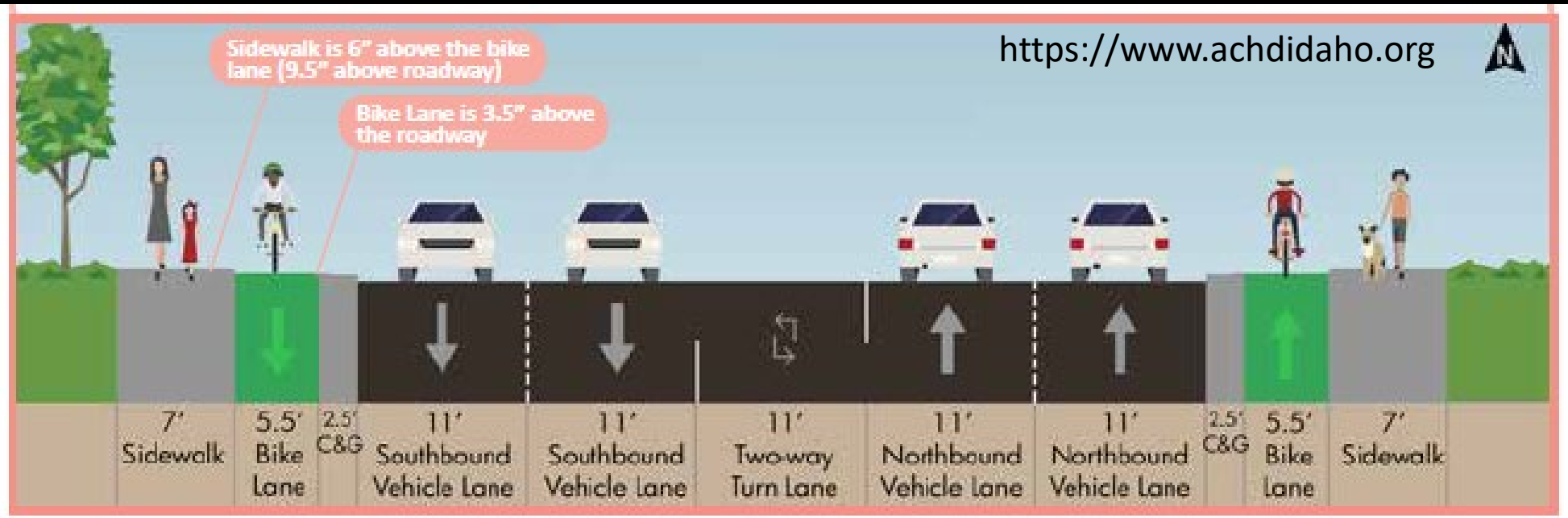
Cloverdale Corridor Plan

https://www.achdidaho.org

Franklin Rd.

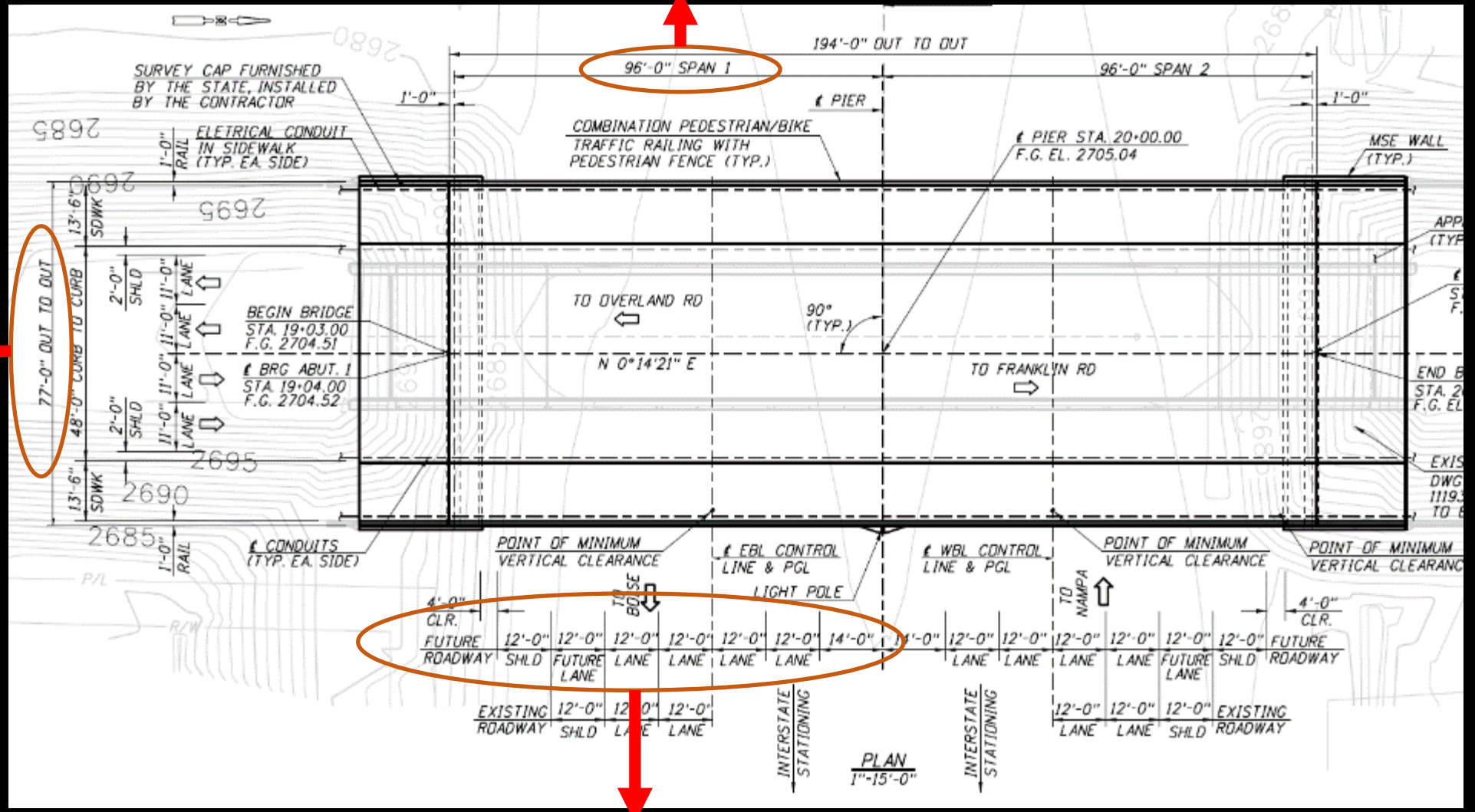

77'-0" OUT TO OUT
38'-6"
38'-6"
48'-0" CURB TO CURB
24'-0"
24'-0"
13'-6" SIDEWALK
11'-0" LANE
11'-0" LANE
11'-0" LANE
11'-0" LANE
13'-6" SIDEWALK
1'-0"
2'-0" SHLD
2'-0" SHLD
1'-0"
℄ CLOVERDALE ROAD SURVEY & PGL
¾" OVERLAY
1.0%
2%
2%
6" CLOSURE POUR
1.0%
CONCRETE PAR WITH PEDESTR
ELECTRICAL CONDUITS
ELECTRICAL CONDUIT
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
UTILITY CONDUITS
UTILITY CONDUITS
3'-7½"
10 - 49"DECK BULB TEE GIRDERS
9 SPS @ 7'-9" = 69'-9"
3'-7½"

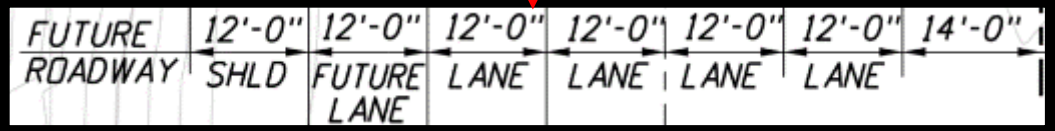

Sidewalk is 6" above the bike lane (9.5" above roadway)
Bike Lane is 3.5" above the roadway
https://www.achdidaho.org
7' Sidewalk
5.5' Bike Lane
2.5' C&G
11' Southbound Vehicle Lane
11' Southbound Vehicle Lane
11' Two-way Turn Lane
11' Northbound Vehicle Lane
11' Northbound Vehicle Lane
2.5' C&G
5.5' Bike Lane
7' Sidewalk

96'-0" SPAN 1

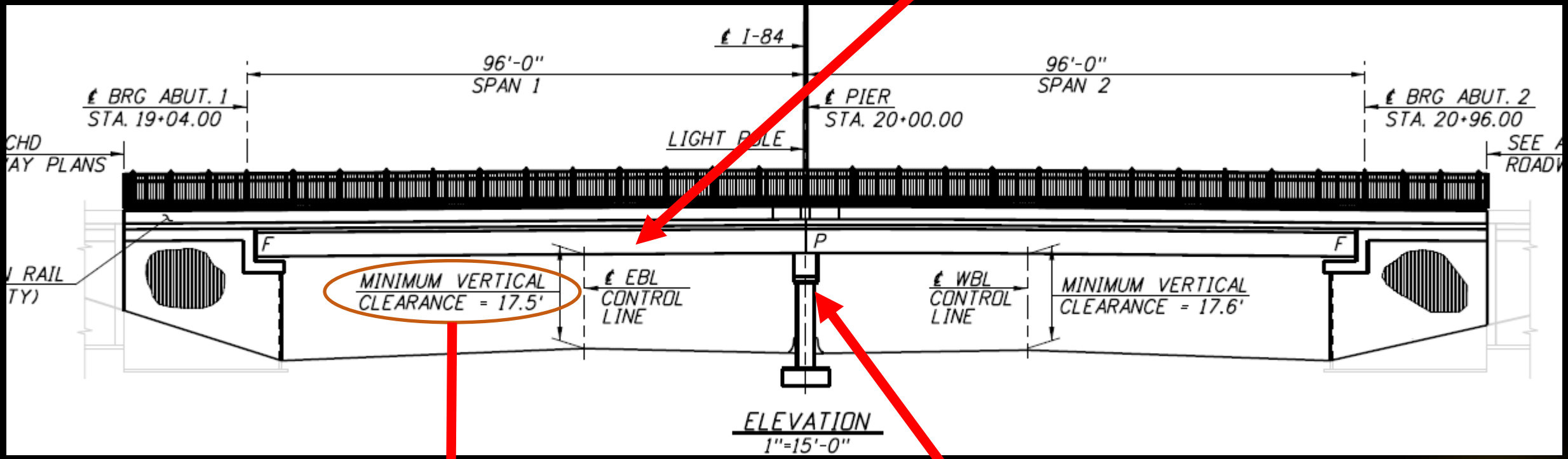
96'-0" SPAN 2

77'-0" OUT TO OUT



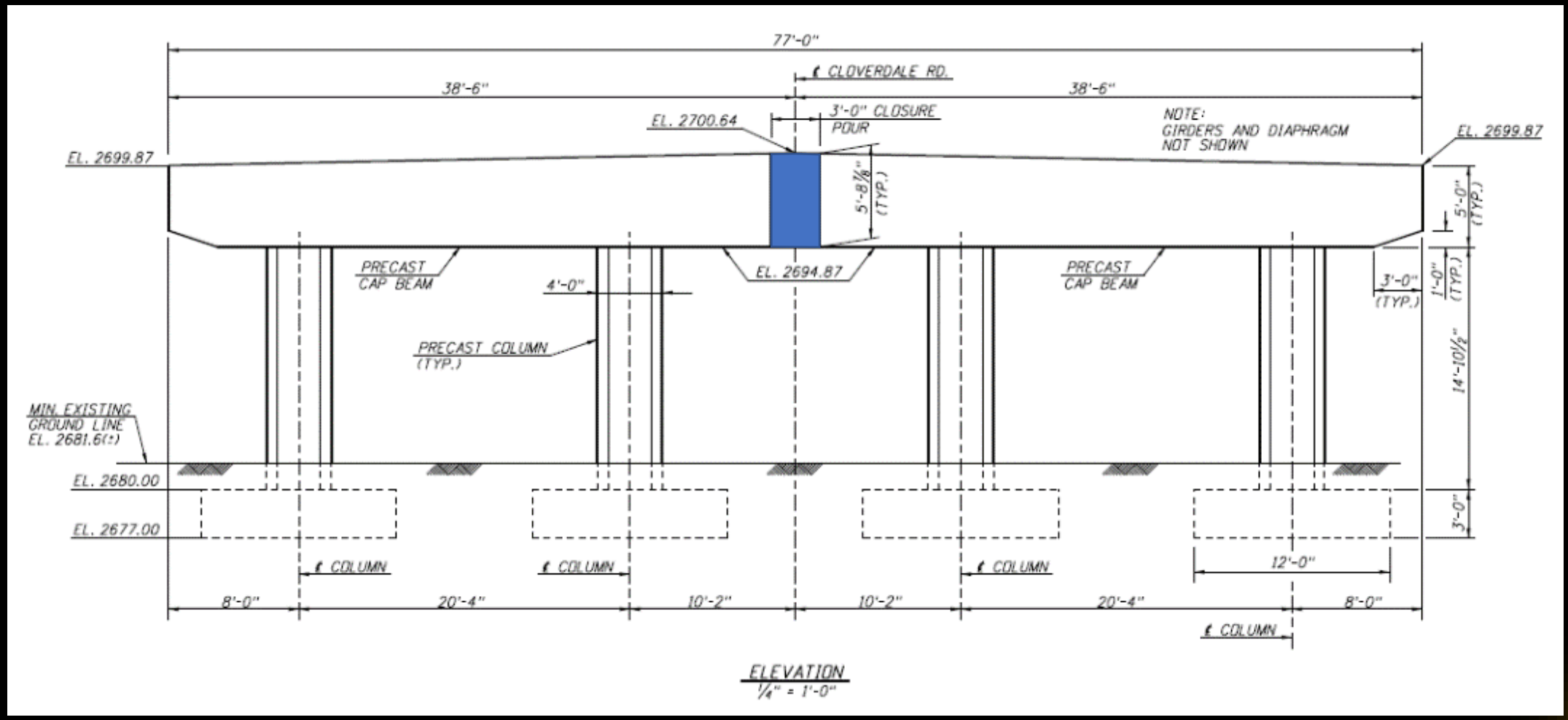


Precast Deck Bulb-Tee

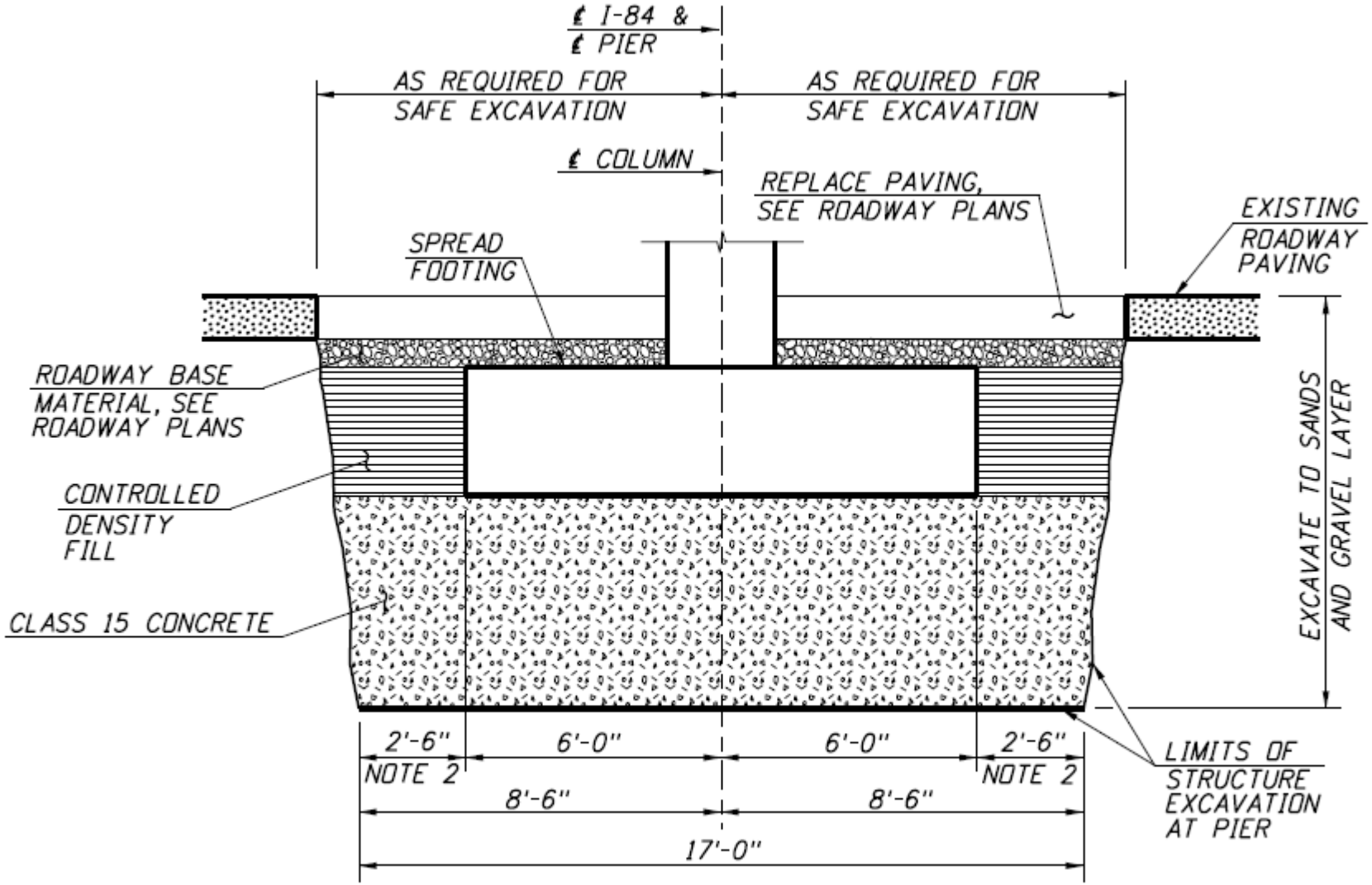


MINIMUM VERTICAL
CLEARANCE = 17.5'

Precast Columns /
Cap Beam

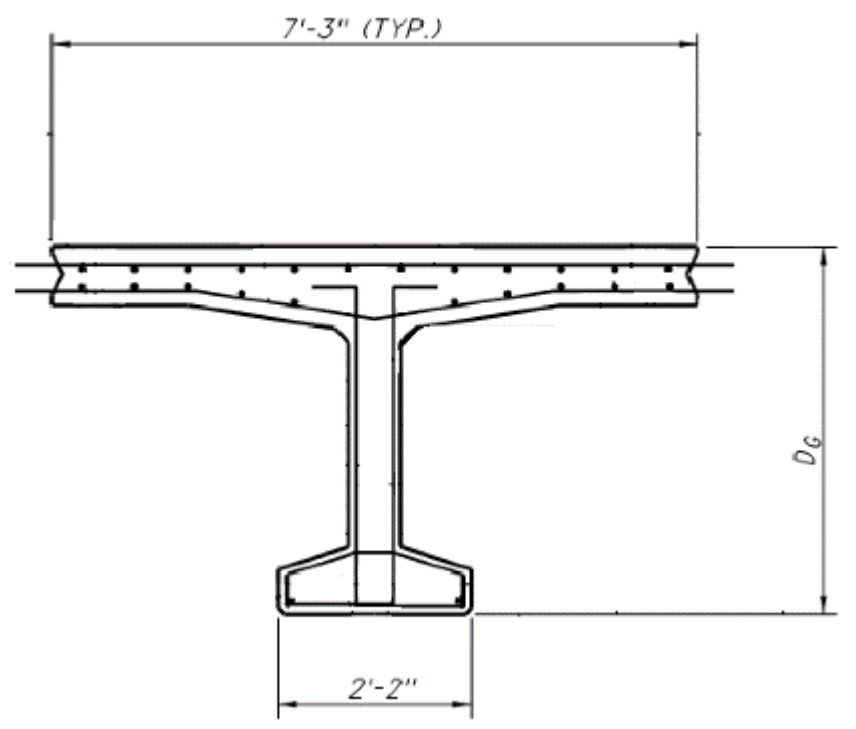


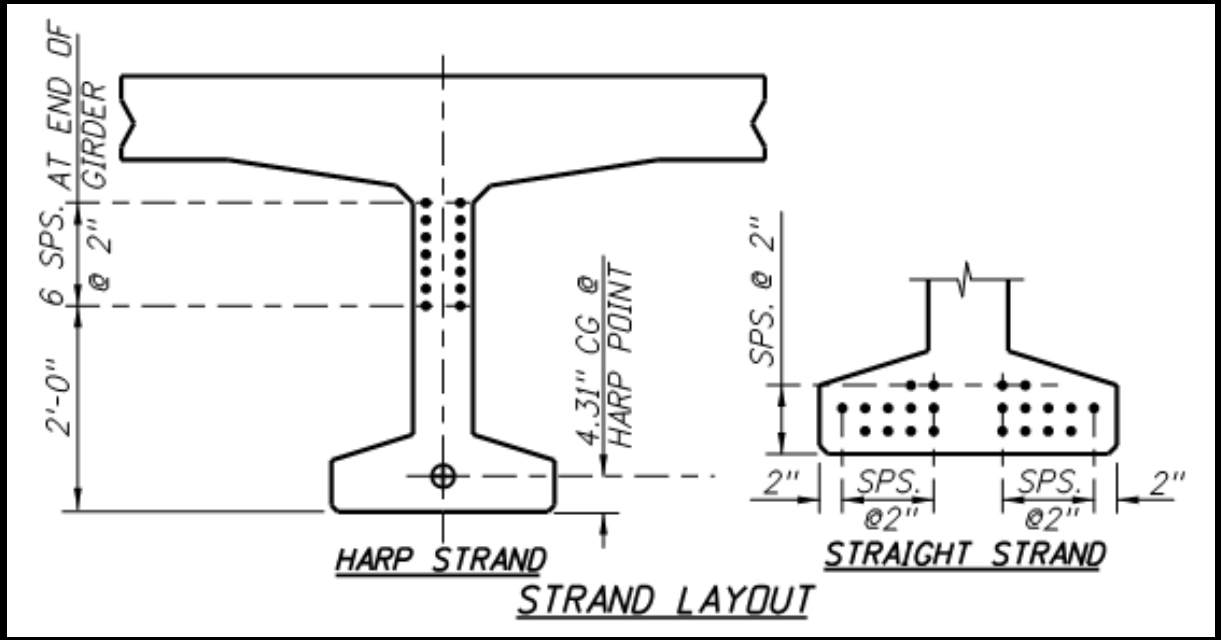
ELEVATION
1/4" = 1'-0"



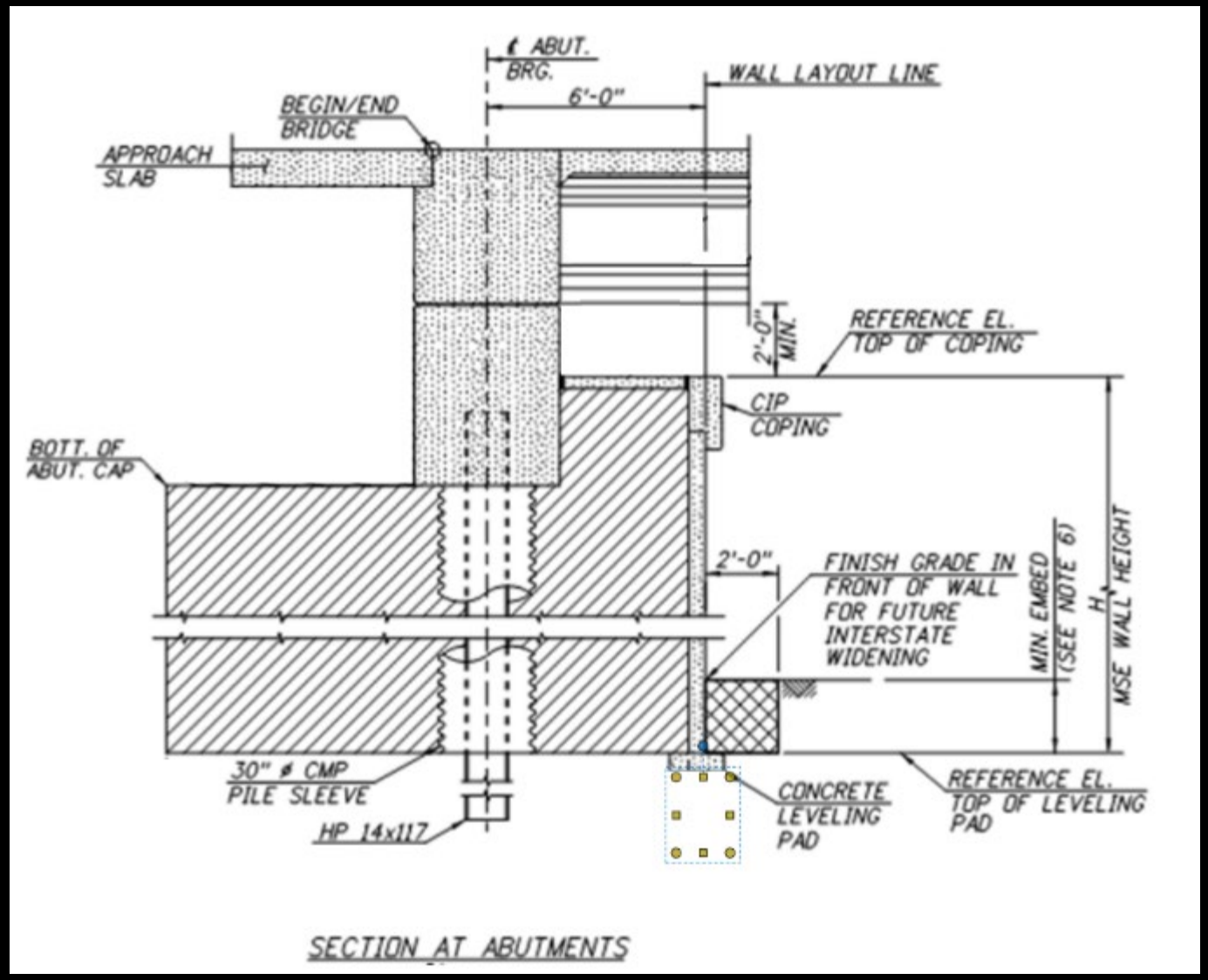
FOOTING EXCAVATION DETAIL

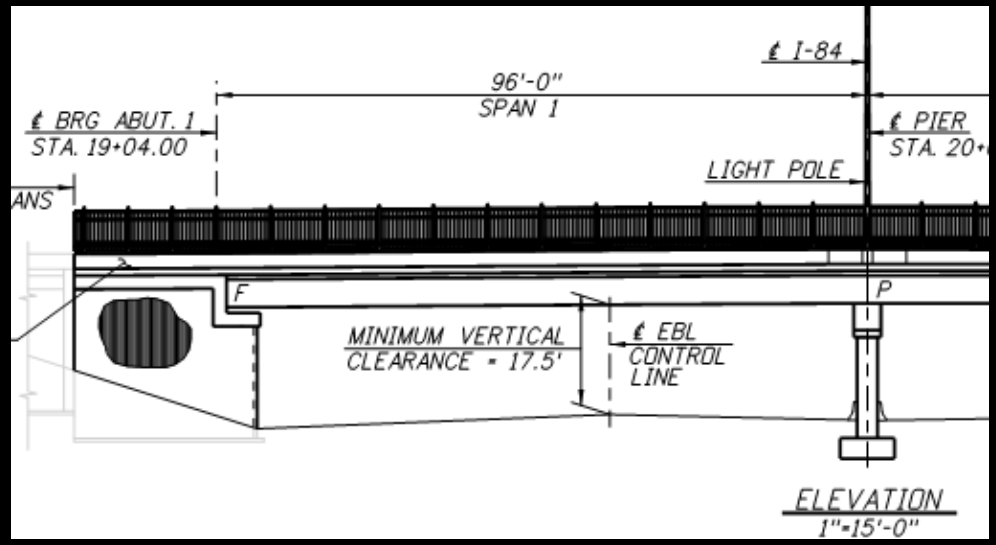
3/8" - 1'-0"





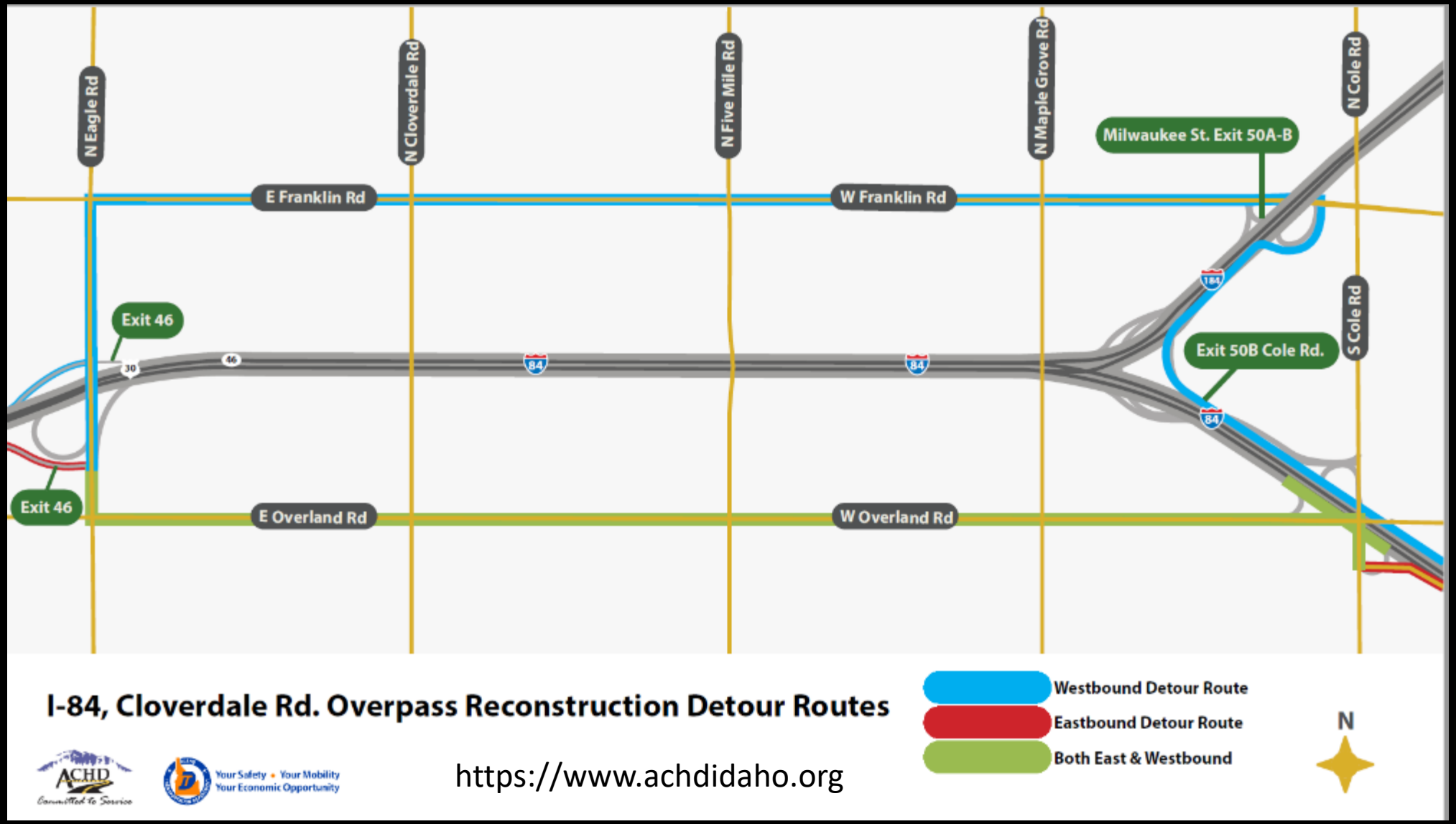
PRESTRESS FORCE ~ KIPS		CONCRETE STRENGTH ~ PSI			
FINAL AFTER LOSSES	INITIAL BEFORE LOSSES	AT RELEASE f'ci	AT 28 DAYS f'c	Ⓐ	Ⓑ
1205	1582	7000	8000	96'-3"	94'-11"
1205	1582	7000	8000	96'-3"	94'-11"


℄ ABUT.
BRG.
6'-0"
WALL LAYOUT LINE
BEGIN/END
BRIDGE
APPROACH
SLAB
2'-0"
MIN.
REFERENCE EL.
TOP OF COPING
CIP
COPING
BOTT. OF
ABUT. CAP
2'-0"
FINISH GRADE IN
FRONT OF WALL
FOR FUTURE
INTERSTATE
WIDENING
MIN. EMBED
(SEE NOTE 6)
H
MSE WALL HEIGHT
30" ø CMP
PILE SLEEVE
HP 14x117
CONCRETE
LEVELING
PAD
REFERENCE EL.
TOP OF LEVELING
PAD
SECTION AT ABUTMENTS


℄ I-84
96'-0"
SPAN 1
℄ BRG ABUT. 1
STA. 19+04.00
℄ PIER
STA. 20+
LIGHT POLE
ANS
F
P
MINIMUM VERTICAL
CLEARANCE = 17.5'
℄ EBL
CONTROL
LINE
ELEVATION
1"=15'-0"

Bridge Demolition – December 3, 2018

Detour Routes



IDAHO TRANSPORTATION DEPARTMENT

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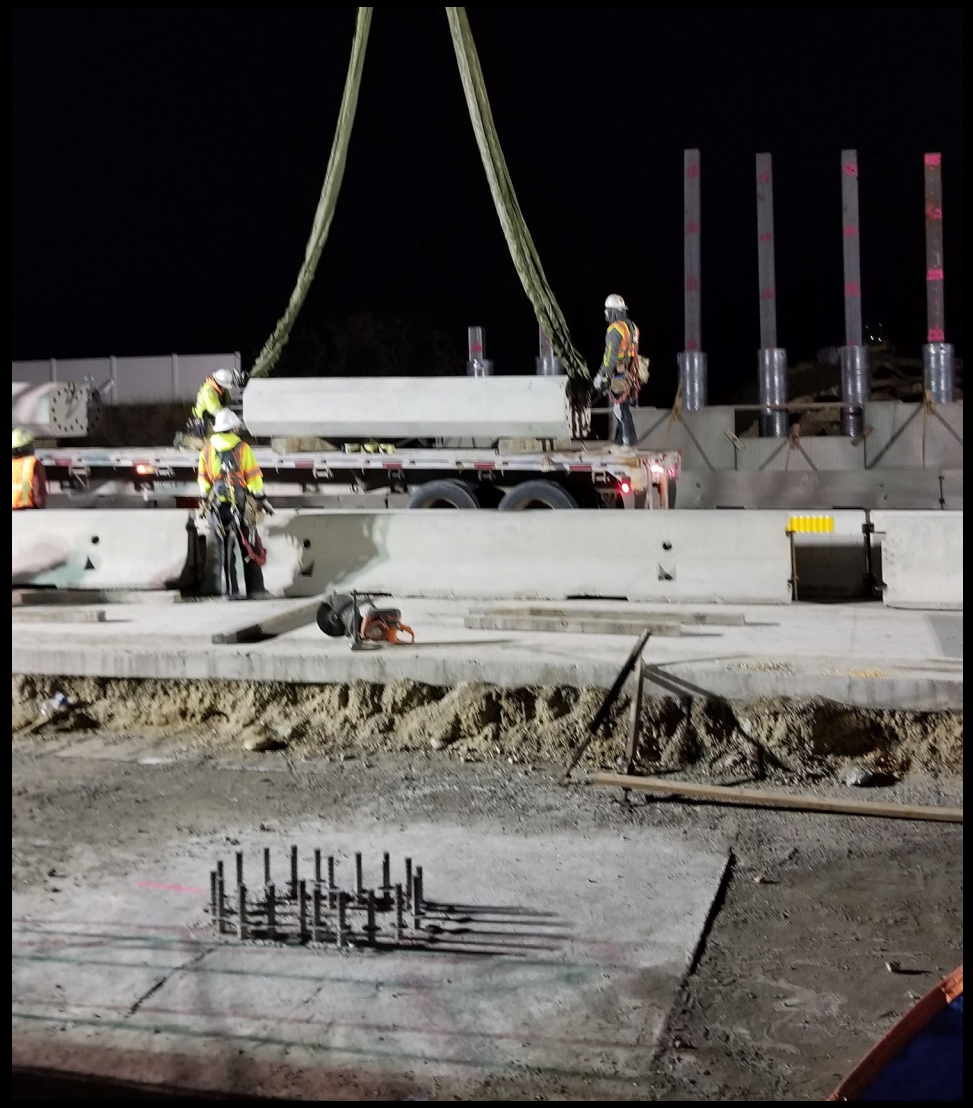
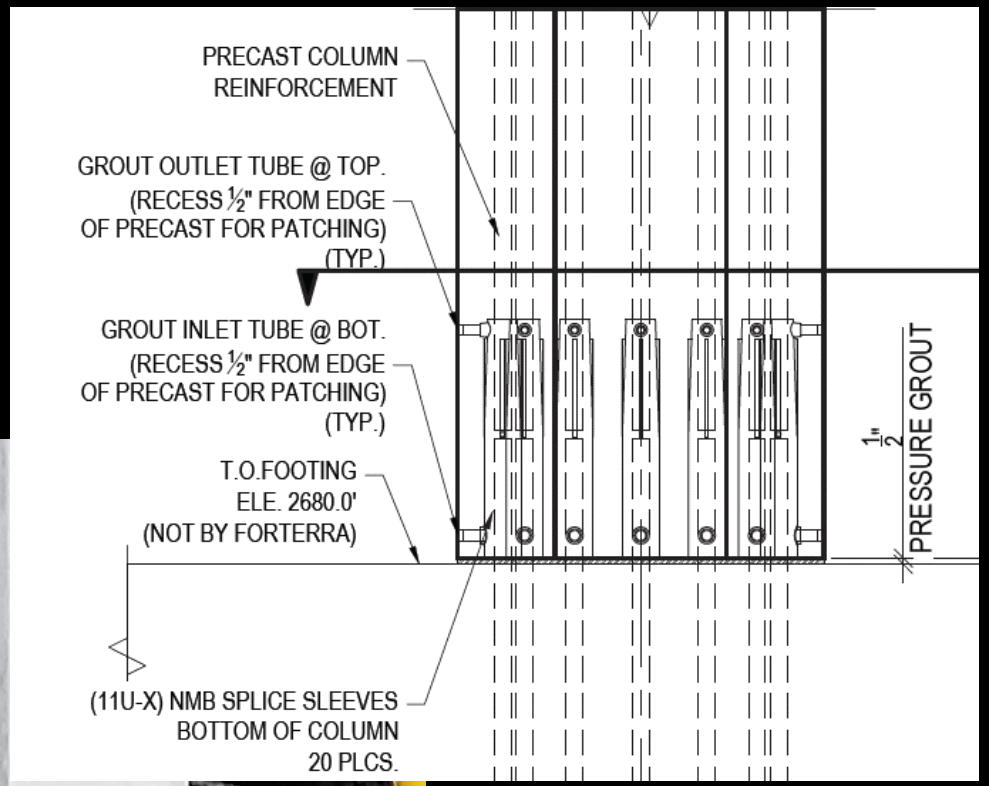
Pile Driving Challenges

- Power Lines
- Gas Line

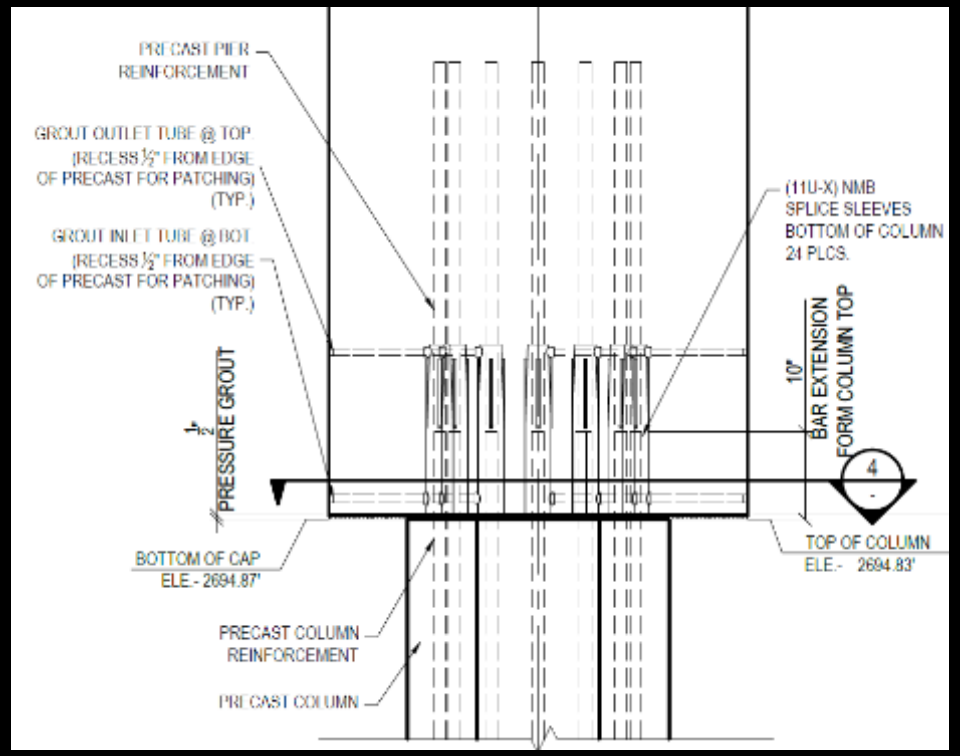
Column Delivery

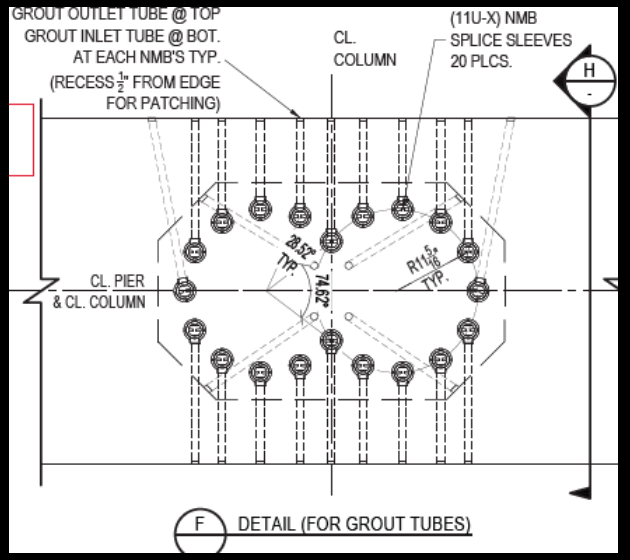


Column Delivery



Pier Cap Delivery

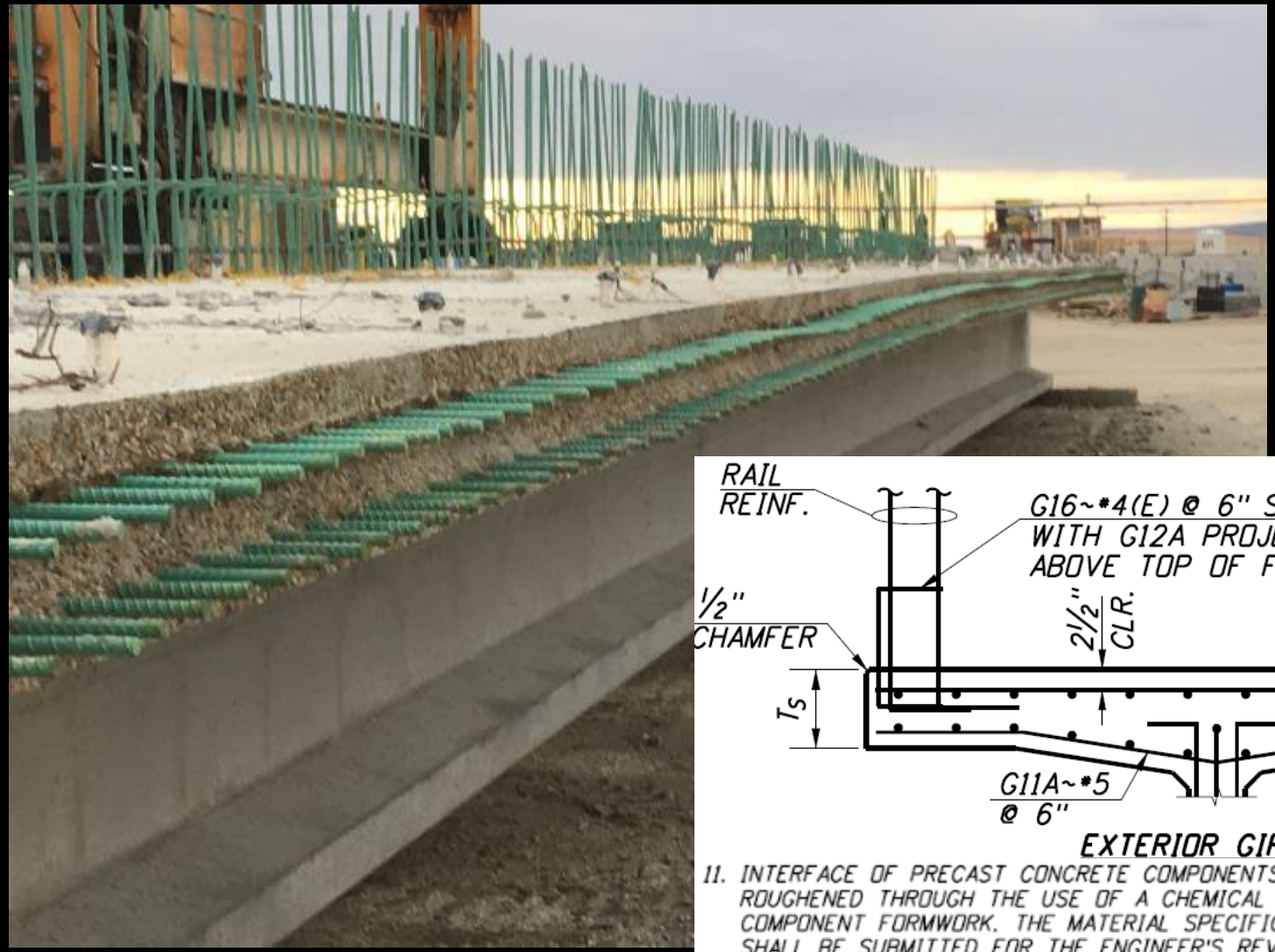


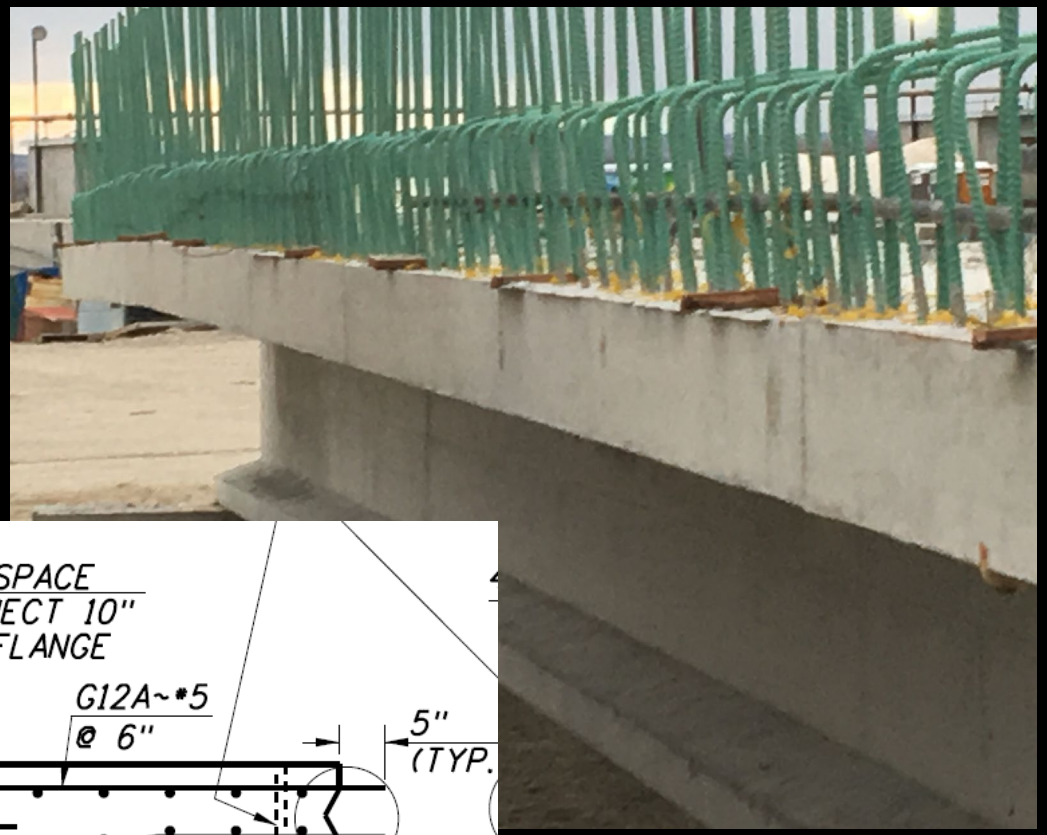


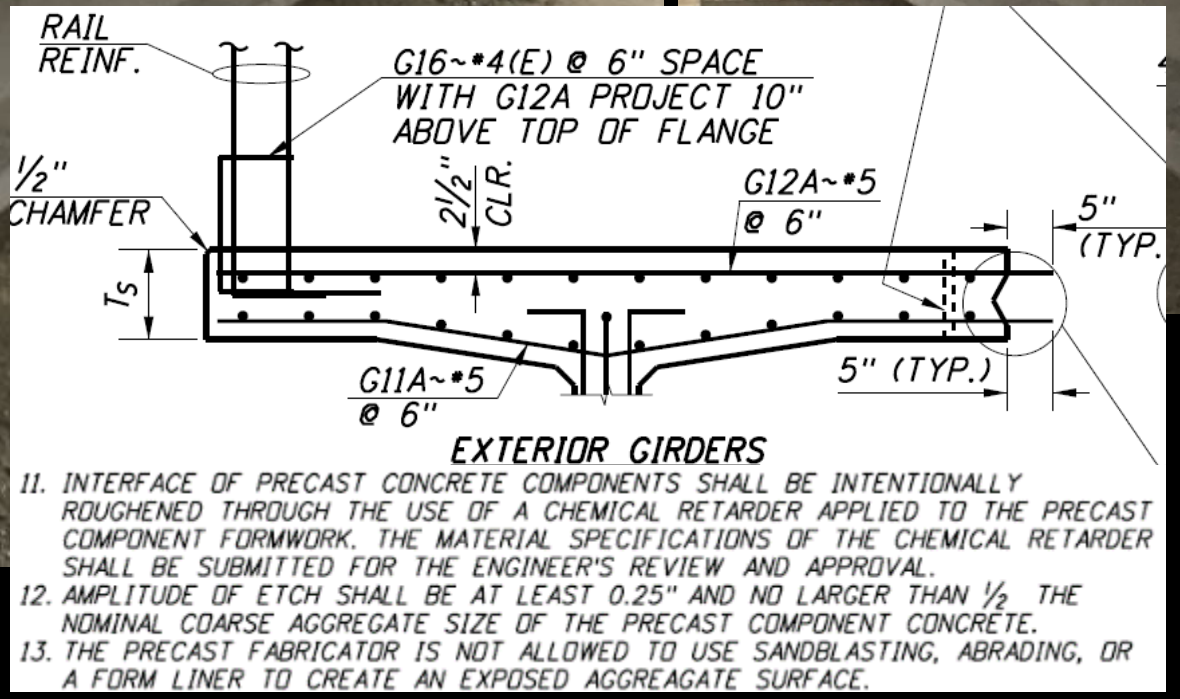
New Precast Pier Column Detail

Pier Cap Closure Pour

Girders at Forterra







EXTERIOR GIRDERS

11. INTERFACE OF PRECAST CONCRETE COMPONENTS SHALL BE INTENTIONALLY ROUGHENED THROUGH THE USE OF A CHEMICAL RETARDER APPLIED TO THE PRECAST COMPONENT FORMWORK. THE MATERIAL SPECIFICATIONS OF THE CHEMICAL RETARDER SHALL BE SUBMITTED FOR THE ENGINEER'S REVIEW AND APPROVAL.
12. AMPLITUDE OF ETCH SHALL BE AT LEAST 0.25" AND NO LARGER THAN 1/2 THE NOMINAL COARSE AGGREGATE SIZE OF THE PRECAST COMPONENT CONCRETE.
13. THE PRECAST FABRICATOR IS NOT ALLOWED TO USE SANDBLASTING, ABRADING, OR A FORM LINER TO CREATE AN EXPOSED AGGREAGATE SURFACE.

Girder Delivery

Girder Delivery

Girder Equalization

Girder Equalization

UHPC Girder Connection

PPC Overlay

Interstate Traffic Fully Open – July 2, 2019

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Construction Continues on Local Road– July 2019

Project Substantially Complete – August 23, 2019

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