Washington State Polyester Concrete Activity

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Bridge Deck Program Manager

Polyester Concrete Overlays

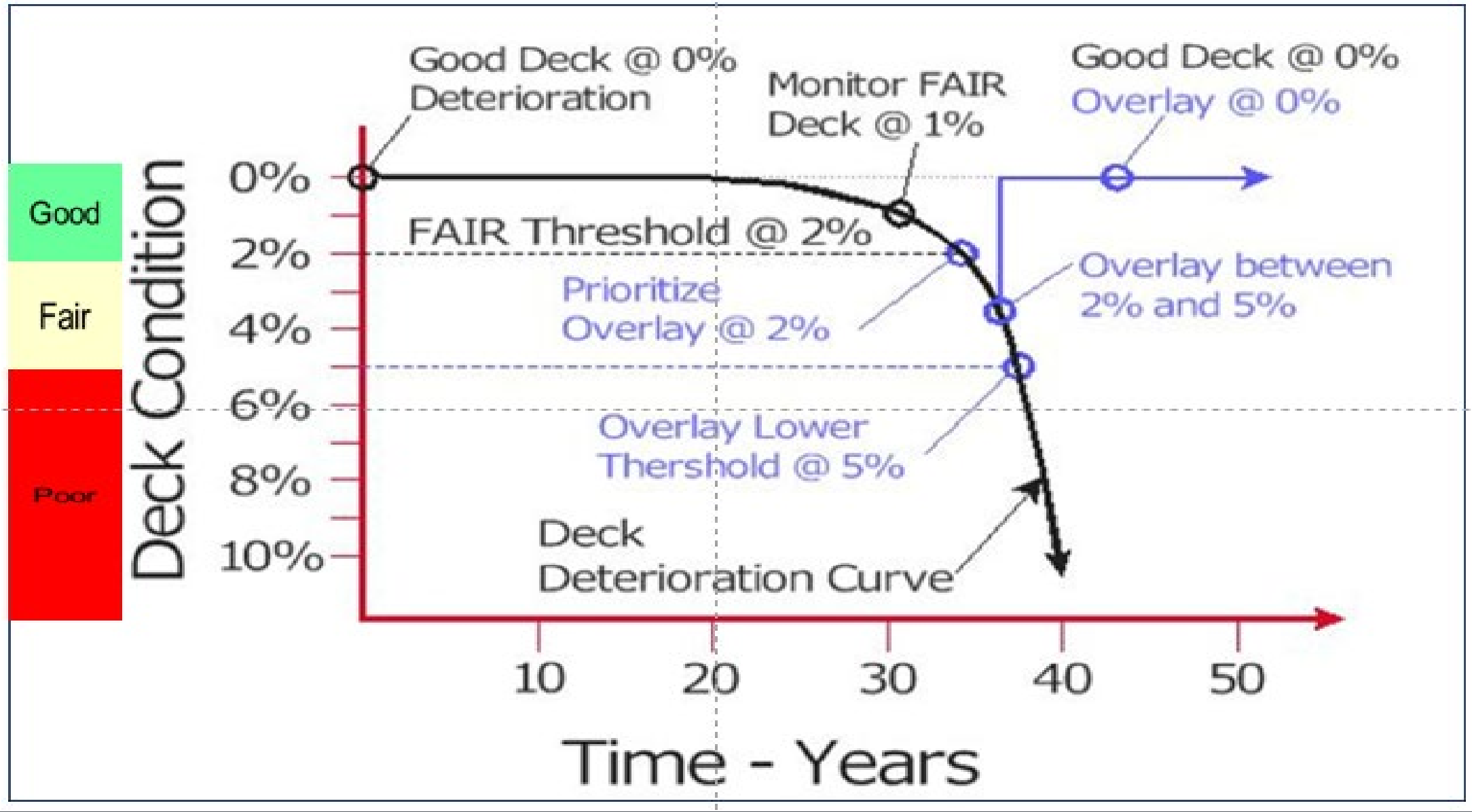
Polyester Concrete – Material Characteristics

	¾" Polyester	1.5" Mod Concrete
Compressive Strength, psi	6,000	7,000+
Flexural Strength, psi	1,500-2,000	0 - 500
Wear	3/8" / 25yrs	NA
Cure Time (3,000psi)	3-4 hr	42 hr
Chloride permeability	0	300 - 700

Polyester Concrete - Weather Restrictions

- Temperatures above 50 (> 60 preferred)
- Deck Temp less than 80 deg?
- Dry (no rain for 24 hours)
- Wind not a factor

Asset Management - Deck Deterioration Curve



Asset Management - Decks Beyond 2% Deterioration

Level of effort/expense for repairs is increased

High risk for full depth repairs

High risk for extended traffic closures

Full depth repairs require formwork

Asset Management - Selection Determination

WSDOT Bridge Asset Management Form - Bridges in "Poor" condition

Bridge Number: 0007141B 5 / 720W	Bridge Name: SAMISH RIVER	Milepost: 234.04	County: Skagit Region: Northwest
Year Built / YR Widened: 1963	Bridge Type: CS	Number of Main/Appr spans: 5 / 0	Overall Bridge Condition: Poor
Bridge Width (curb-curb): 33.5 ft.	Bridge Length: 187 ft.	Max Span: 48 ft.	
Average Daily Traffic: 22,561	Truck%: 14%	Number of Lanes: 2	NHS: YES
Vertical Clearance: NA	Detour Length (miles): 2	Deck Thickness: 18.5 in.	

Design Load: HS 20 Load Restricted Bridge? ☐

Pin Number: 100578B CPMS Ad Date 11/12/2019

Project Name I-5/SB Samish River - Bridge Deck Overlay

Bridge Inspection Information

Date Inspected: 5/23/2018

Superstr Code: 6 Deck Code: 4

Substr Code: 7 Scour: 8

Year "POOR"	Year "POOR" fixed	Year "POOR" Projected
2010		

Problem Conc Deck Deterioration

Cure Deck Repair and Overlay

Status Prioritized for Bridge Rehabilitation

Preservation Cost$: $1,500,000

Bridge Deck View

Bridge Profile View

This bridge is classified in "POOR" condition due to the NBI DECK CODE.

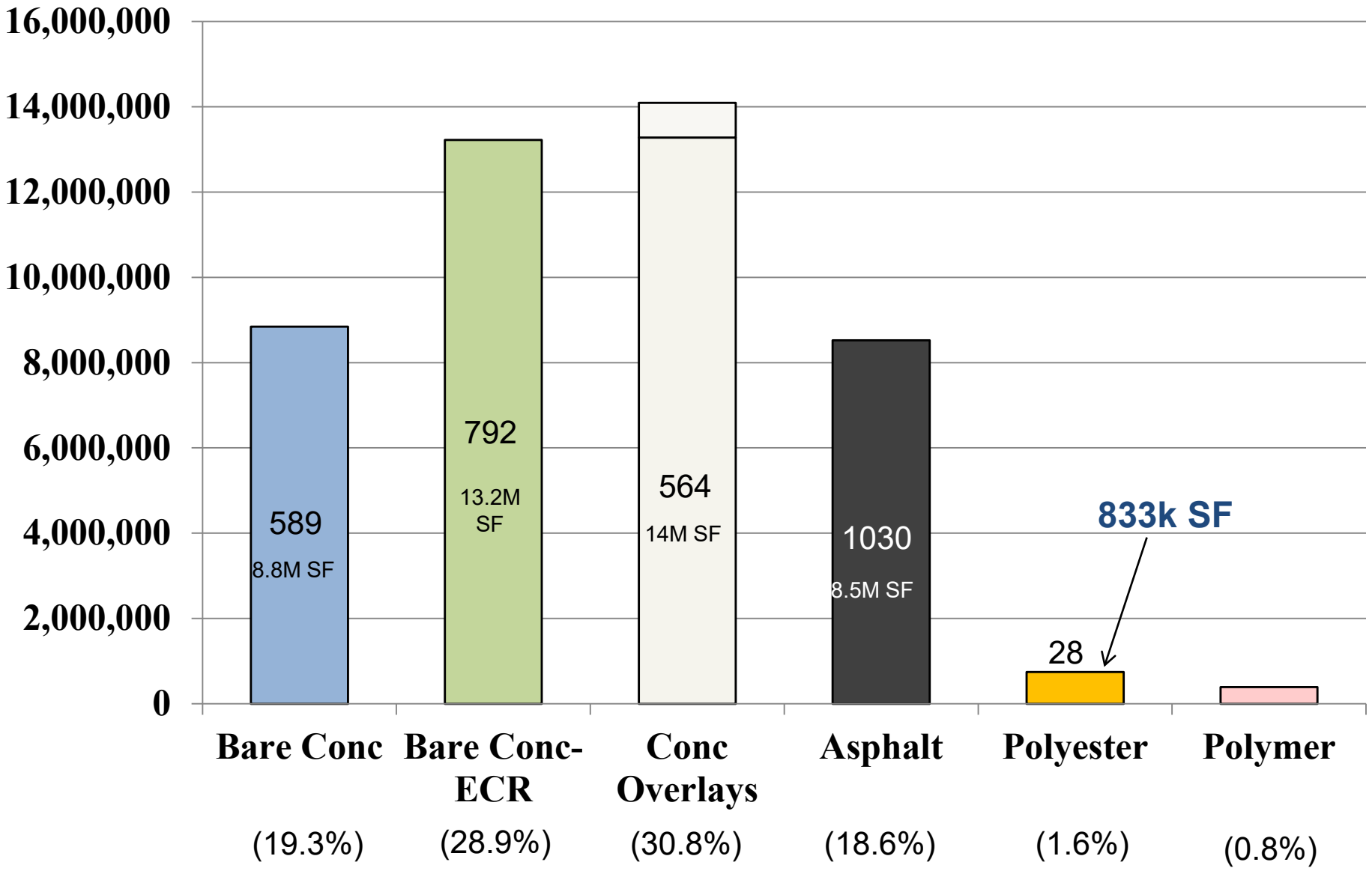
The 2014 bridge inspection noted 187 SF of deck patching (3.3%). The NBI deck code is a "4" based on the deck patching exceeding 2%.

The original concrete slab thickness is 18.5 inches with 1.5 inches of concrete cover over the top mat of deck reinforcing.

A future bridge deck rehabilitiation project will shotblast 1/2 inch from the existing slab, perform deck repair and apply a 3/4" polyester overlay.

Polyester Concrete Overlays

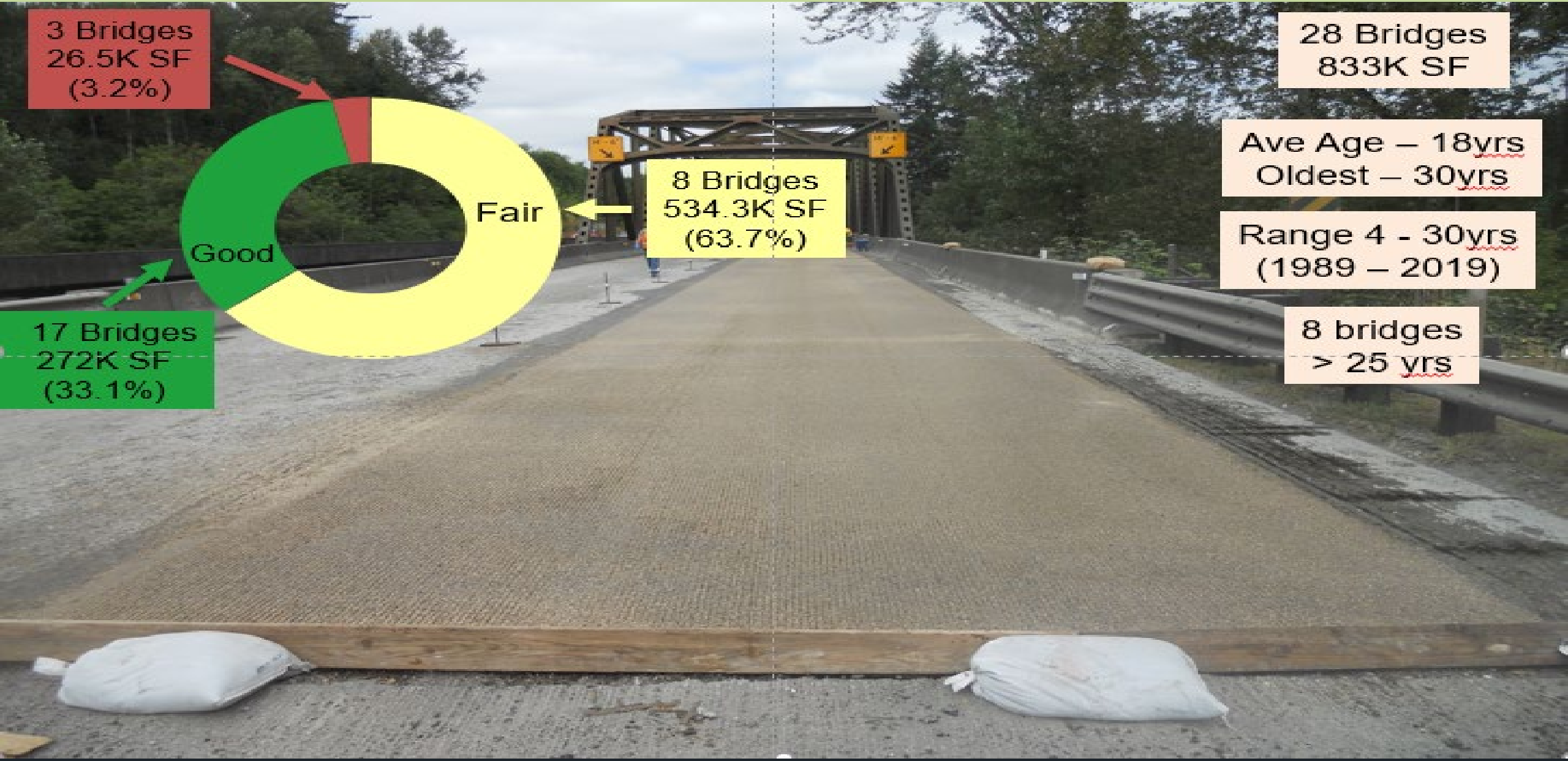
Washington State's Concrete Bridge Deck Program



Cost of Bridge Deck Options

Epoxy Rebar -	$1/SF
ACP w/membr -	$20/SF
Conc Overlay -	$80/SF
Polyester Overlay -	**$120/SF**
Replace Deck -	$300/SF
Replace Bridge -	$1000/SF

Polyester Concrete - History Summary



Polyester Overlays from 1989 to 1999

SR-18 Holder Creek Bridge

- **Built: 1961**
- **Polyester applied: 1989**
- **ADT: 9722**

SR-18 Holder Creek Bridge

- **Deck condition after 10 years.**
- **Under contract for rehab.**

Polyester Overlays since 2000

14 Bridges = 504,168 SF

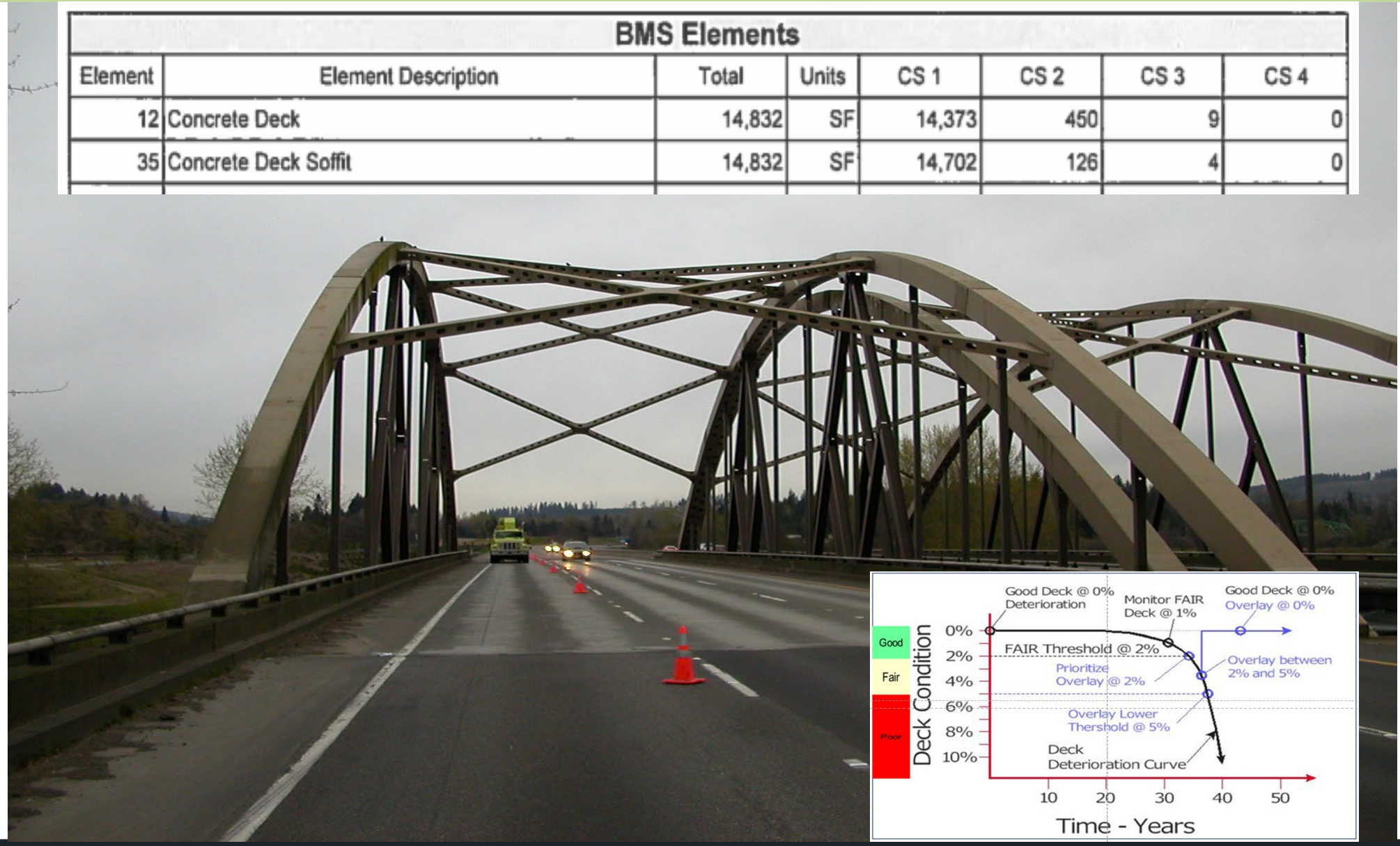
Polyester Overlays – Next Up

SB I-5 Toutle River Bridge – Deck Rehab

- **Bridge Built – 1969**
- **ADT – 22,511**

Deck – Looking North

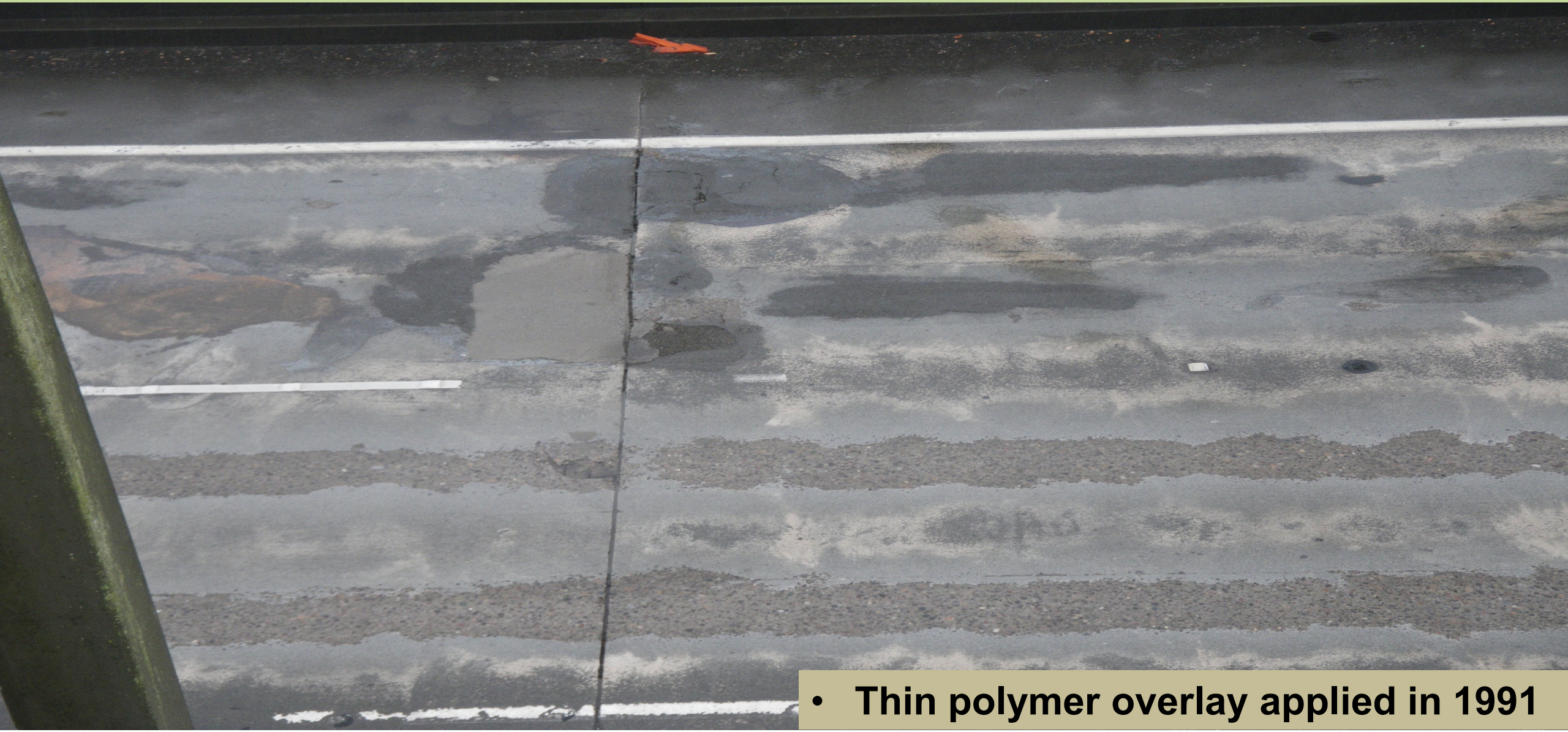
BMS Elements							
Element	Element Description	Total	Units	CS 1	CS 2	CS 3	CS 4
12	Concrete Deck	14,832	SF	14,373	450	9	0
35	Concrete Deck Soffit	14,832	SF	14,702	126	4	0



North Joint

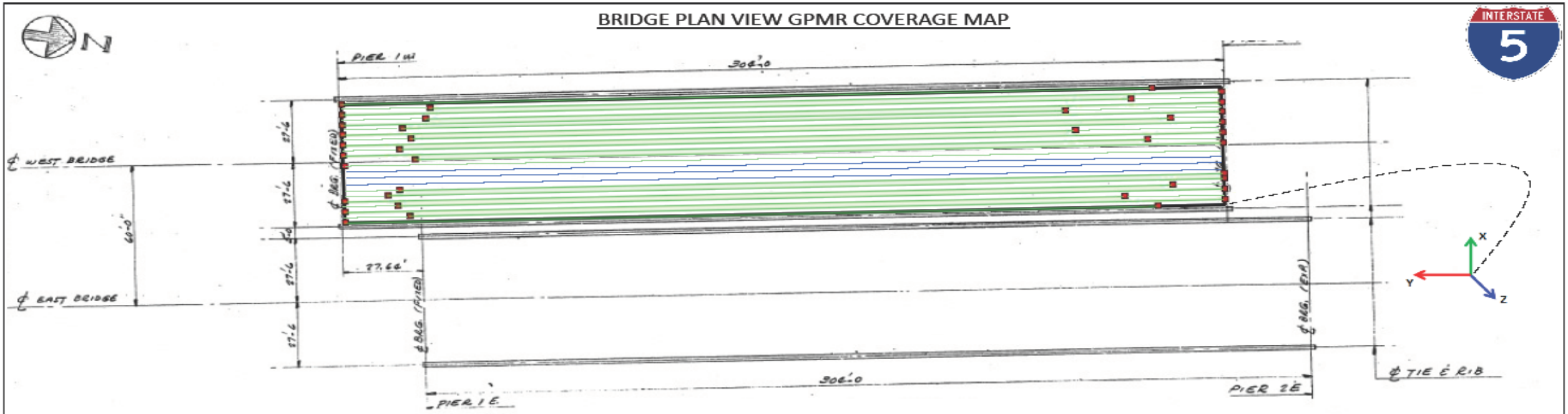
South Joint

Deck View



- **Thin polymer overlay applied in 1991**

BRIDGE PLAN VIEW GPMR COVERAGE MAP



GPMR DECK SCAN NOTES

- SCAN COLLECTION DATE 10/25/18
- CONTROL UNIT SIR30 HIGH SPEED MULTI CHANNEL RADAR
- ANTENNA ARRAY (3 EACH) 3000 MHZ WIDEBAND HIGH FREQUENCY TRANSDUCERS
- 3D GPMR IMAGE SIZE X= 304.00' Y= 48.00' Z= 12.00"
- DATA PROFILES 2.0' ON CENTER
- (X, Y, Z) ORIGIN IN NE CORNER OF DATA SET/ DECK
- © INDICATES COVER THICKNESS FIELD MEASUREMENT
- BLUE LINES INDICATE DATA GAP BETWEEN MIDDLE & WEST LANES
- GREEN LINES INDICATE PROFILE POSITION

GPR DATA
GROUND PENETRATING RADAR EXPERTS

GENERAL NOTES: ALL DIMENSIONS ARE ROUNDED TO THE NEAREST 1/16". ALL DIMENSIONS ARE IN FEET AND INCHES EXCEPT AS NOTED.	REVISED:	GPR Data Inc.—Portland, OR	Cowlitz County WA
	REVISED:	Don Spahr—WASHDOT	Castle Rock (vicinity)
WWW.GPRDATA.COM	REVISED:	I5 SB Toutle River Bridge	GPR DATA JOB#:
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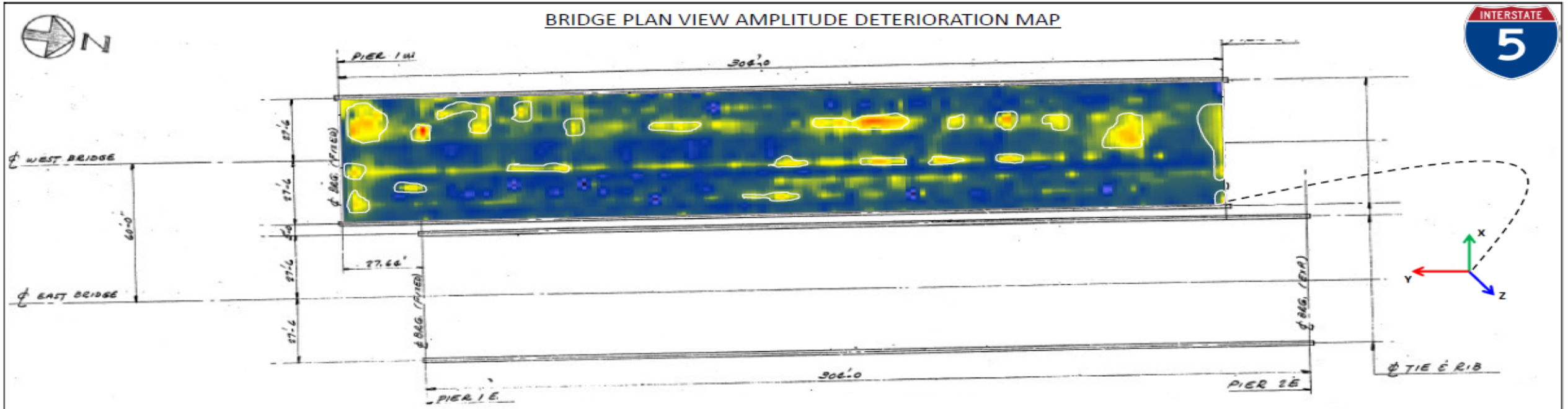
Washington State Department of Transportation	DRAWN BY:	GPMR Concrete Deck Testing	SHEET 001A
	CHECKED BY:		DATE: 11/18/18

BRIDGE PLAN VIEW AMPLITUDE DETERIORATION MAP



AMPLITUDE (AMP) REBAR LEVEL DETERIORATION INCREASING

-2000AMP 1000AMP 4000AMP 7000AMP 10000AMP 13000AMP 16000AMP

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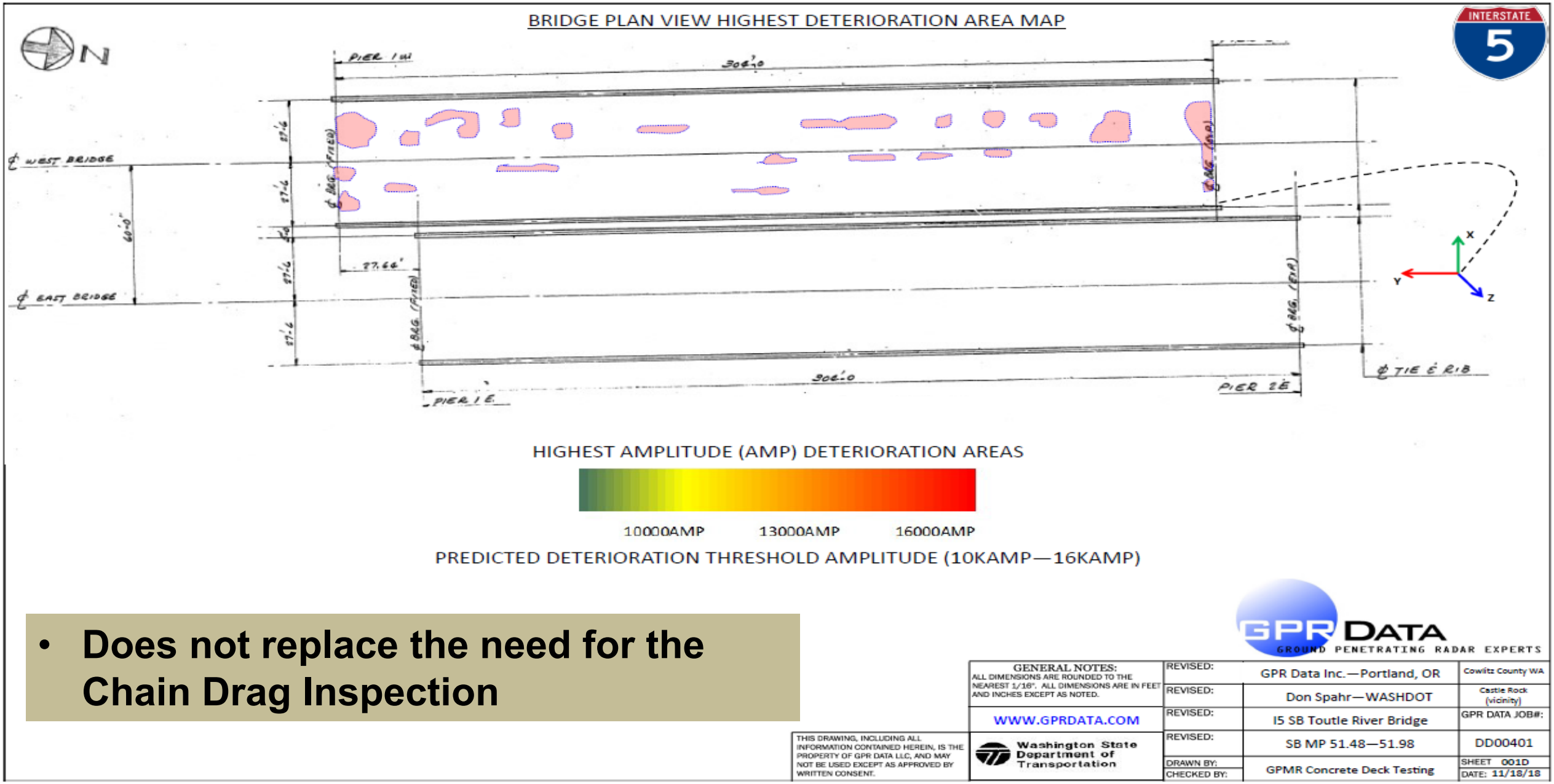


- **Does not replace the need for the Chain Drag Inspection**

Verify the Clearcover Prior to Surface Removal

- **Damaged reinforcing from milling**

NB I-5 Seattle Viaduct – Deck Rehab

NB I-5 Seattle Viaduct

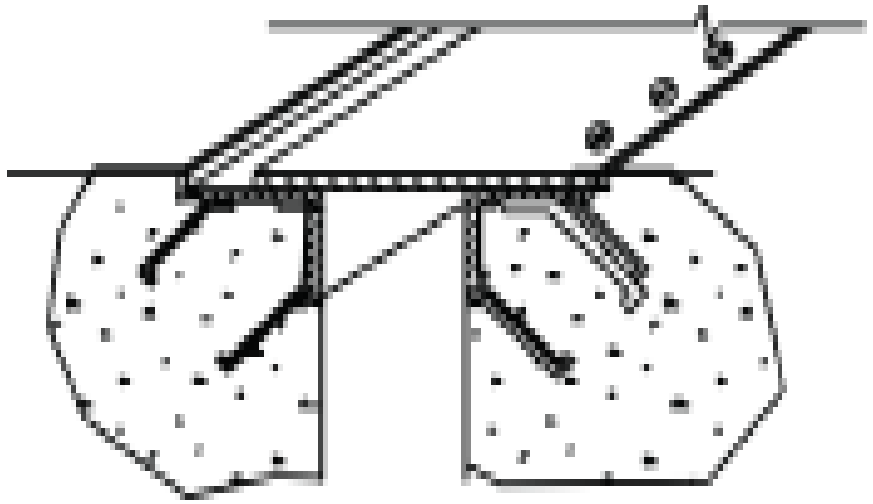
BMS Elements							
Element	Element Description	Total	Units	CS 1	CS 2	CS 3	CS 4
804	Polyester Concrete Overlay	383,043	SF	382,743	0	300	0

Bridge Built – 1966
Length – 5762’
ADT – 90,000
Polyester applied – 2007

NB I-5 Seattle Viaduct – Original Joint Detail

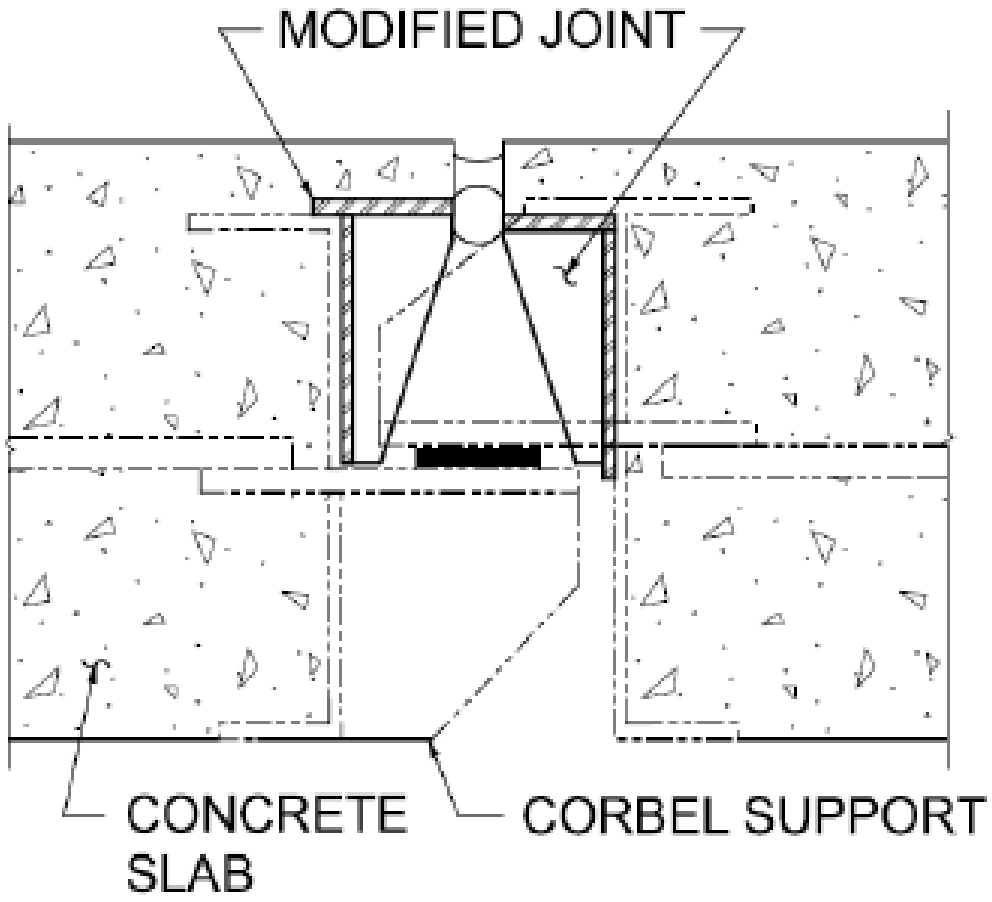
408	Steel Sliding Plate	Units – LF

This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.



> 1,800 LF of sliding plate joints

NB I-5 Seattle Viaduct – Modified Joint Detail



Modified Joint - Surface Condition

SB I-5 Seattle Viaduct – Next Up

SB Deck resurfacing/joint replacement programmed for 2020/21.

Program - Periodic Resurfacing of Polyester Overlays

- **Programming for resurfacing is a consideration after approx. 10 yrs. of service life.**
- **¾” thickness limits multiple resurfacing passes.**

Periodic Resurfacing of Polyester Overlays

- **New SR-99 Tunnel Surfacing.**

Periodic Resurfacing of Polyester Overlays

- **New SR-99 Tunnel Surfacing.**

Questions?