

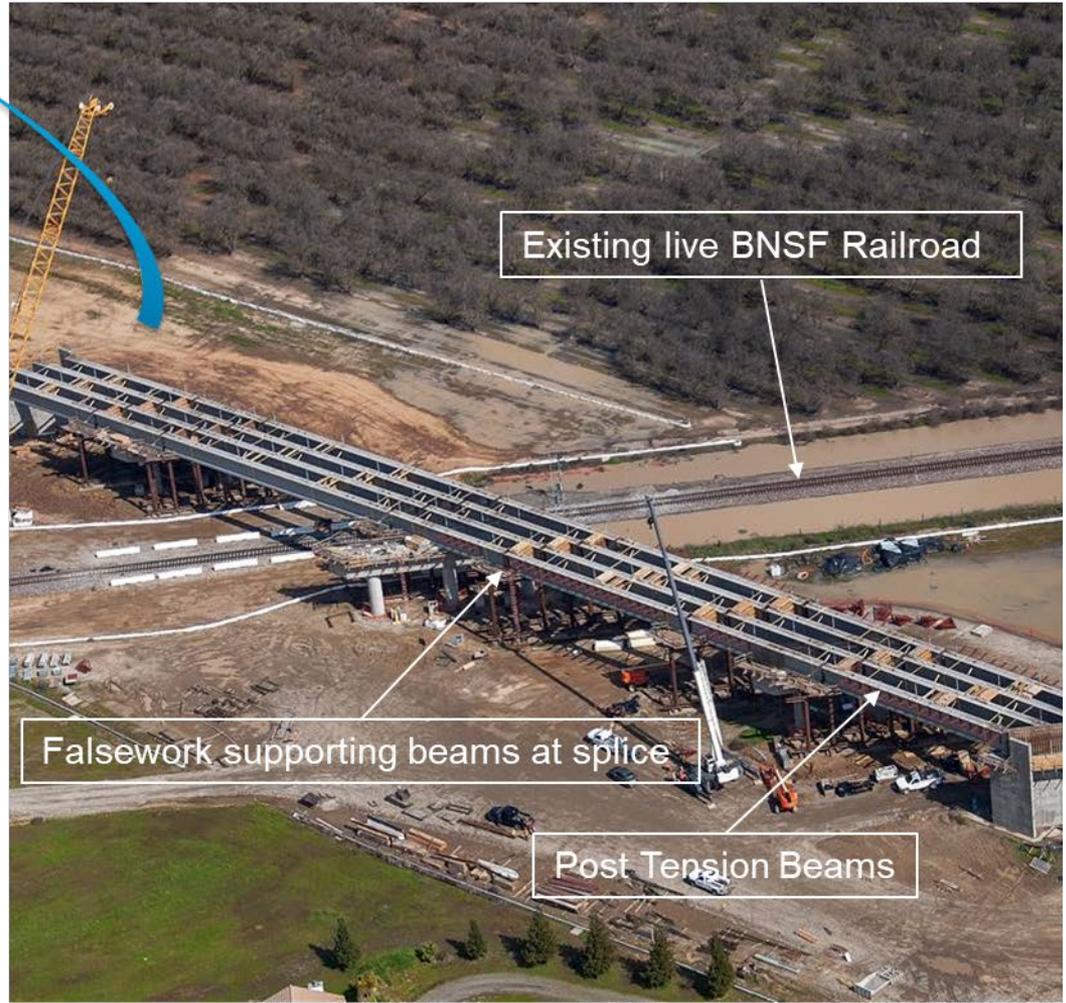
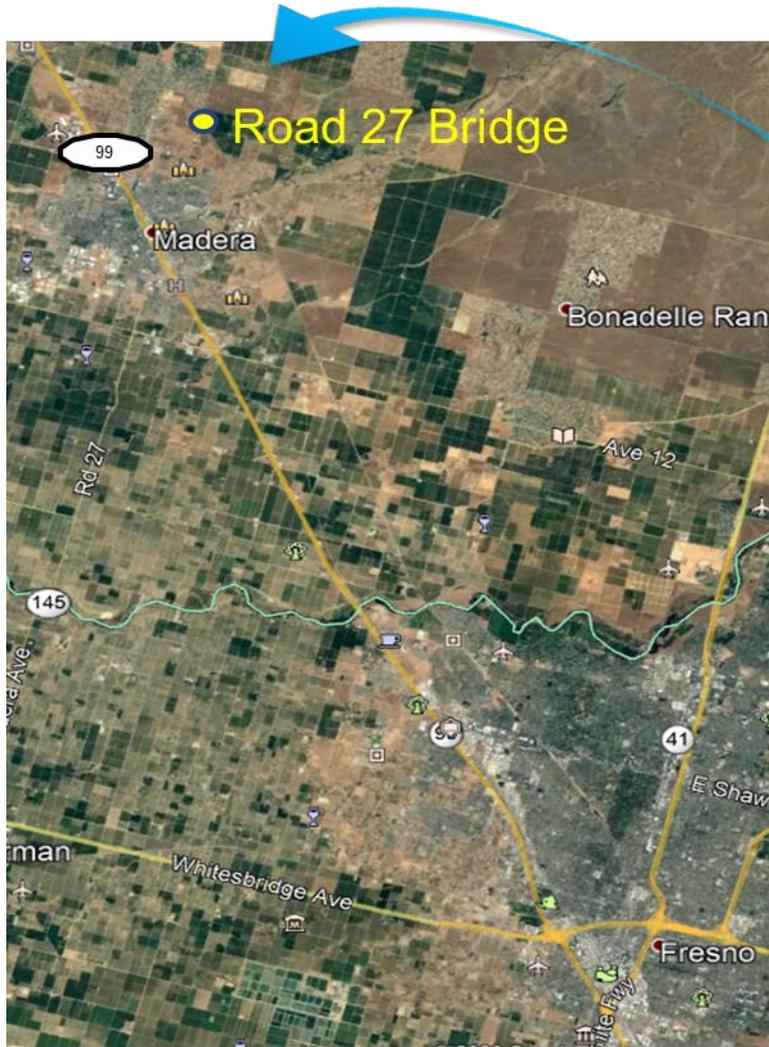
ROAD 27 BRIDGE CONSTRUCTION & REPAIR

Joe Hedges, CHSRA
Ghassan Ariqat, TPZP
John Corven, Corven Engineering, Inc.

September 9, 2020

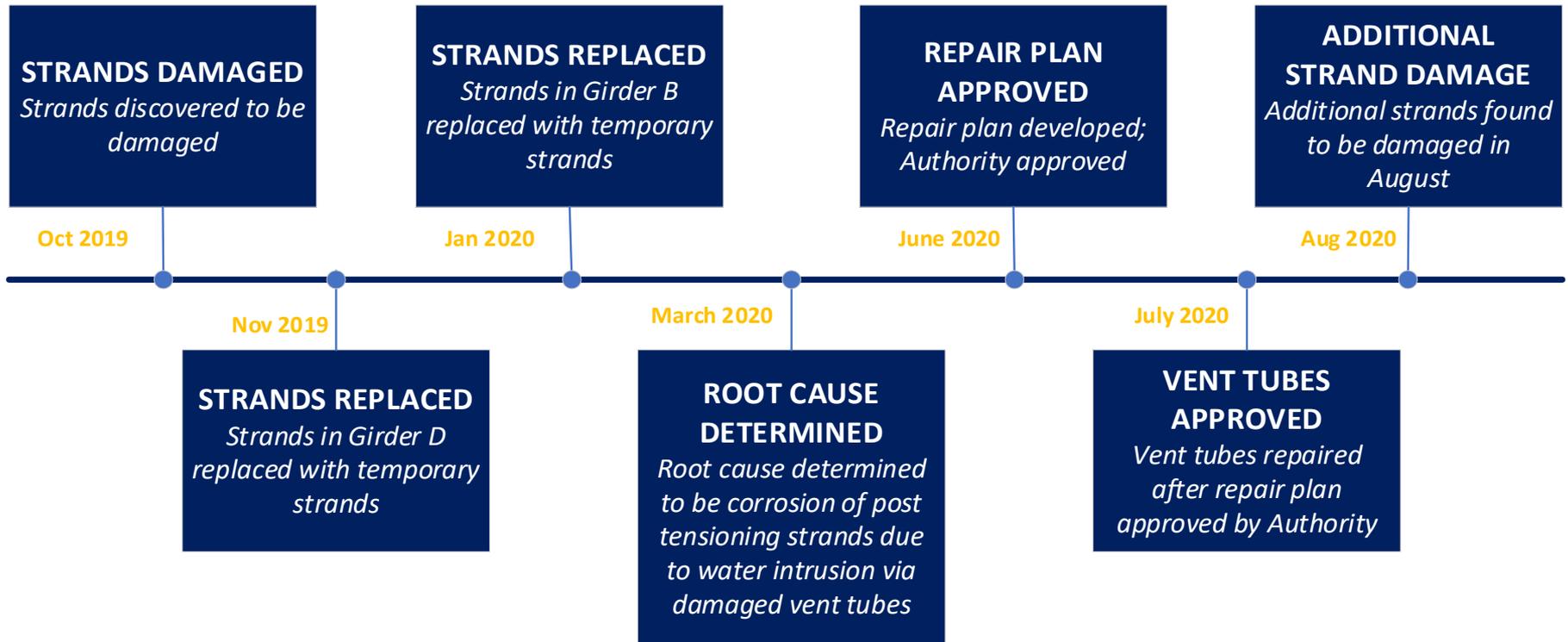


LOCATION OF ROAD 27 OVERCROSSING



TIMELINE

- Construction began October 2016
- Delays include issues with third party agreements and precast girder post-tension strands

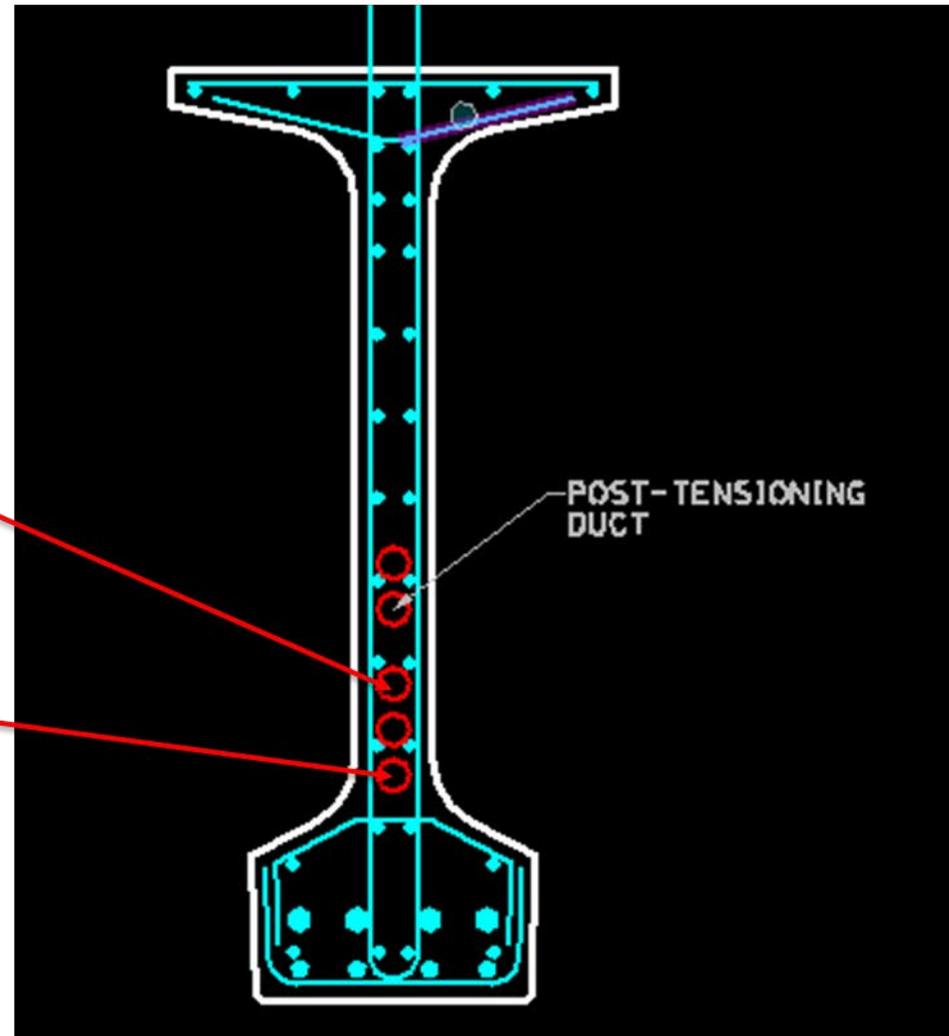
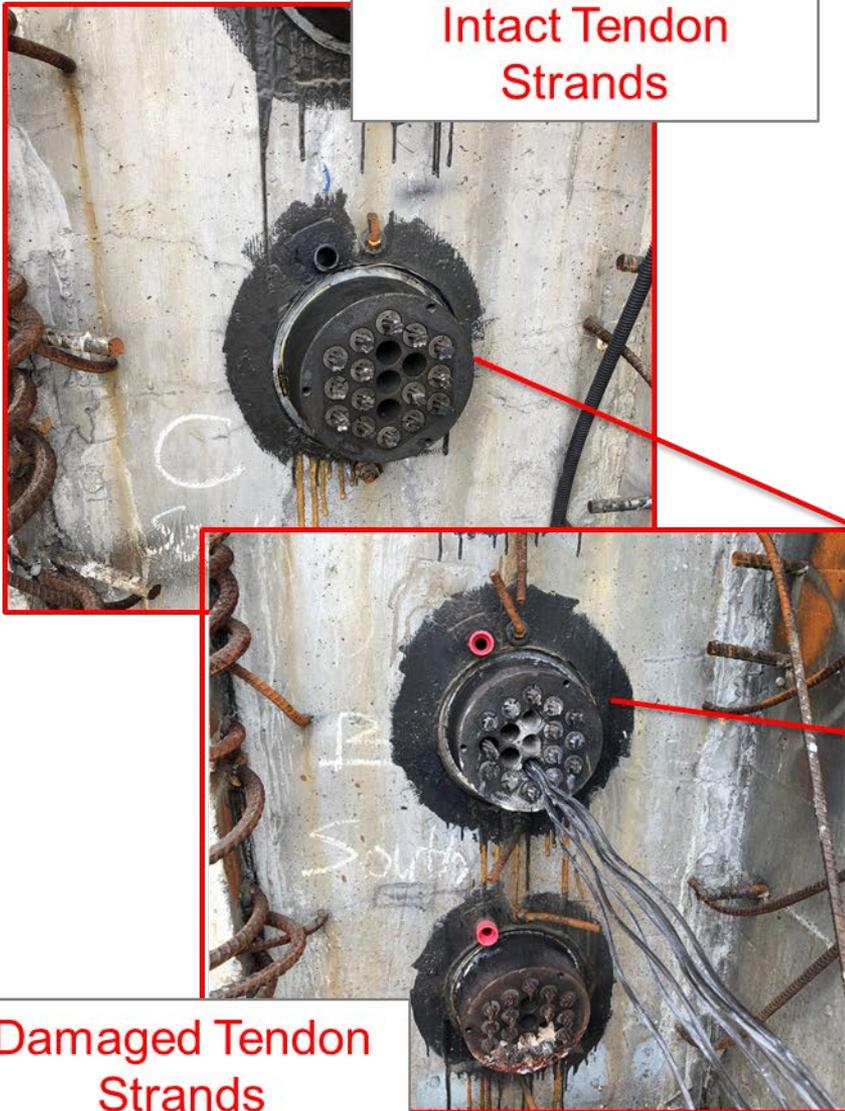


POST TENSIONING

Video Goes Here

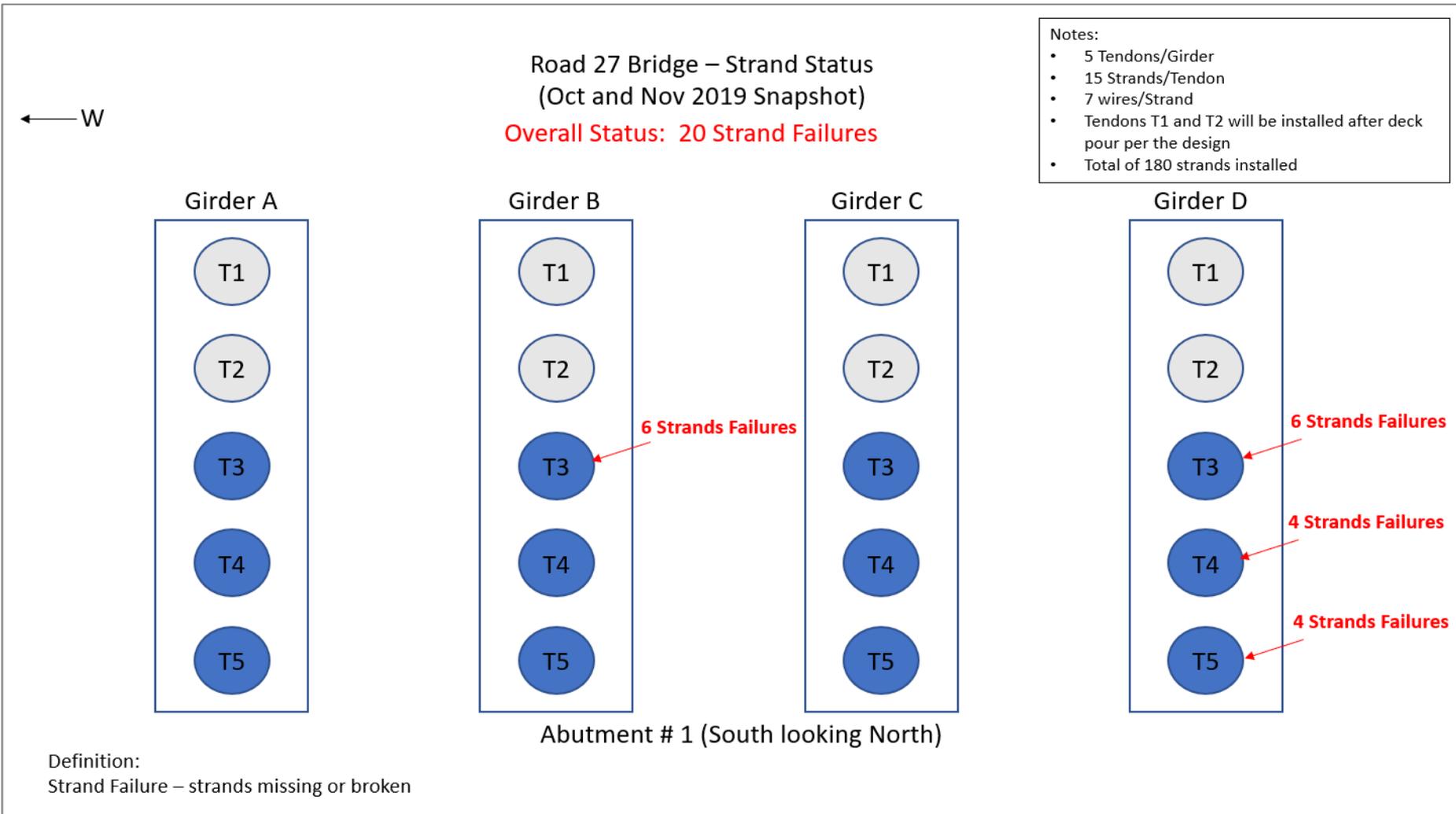


GIRDER SECTION & POST TENSION DUCTS



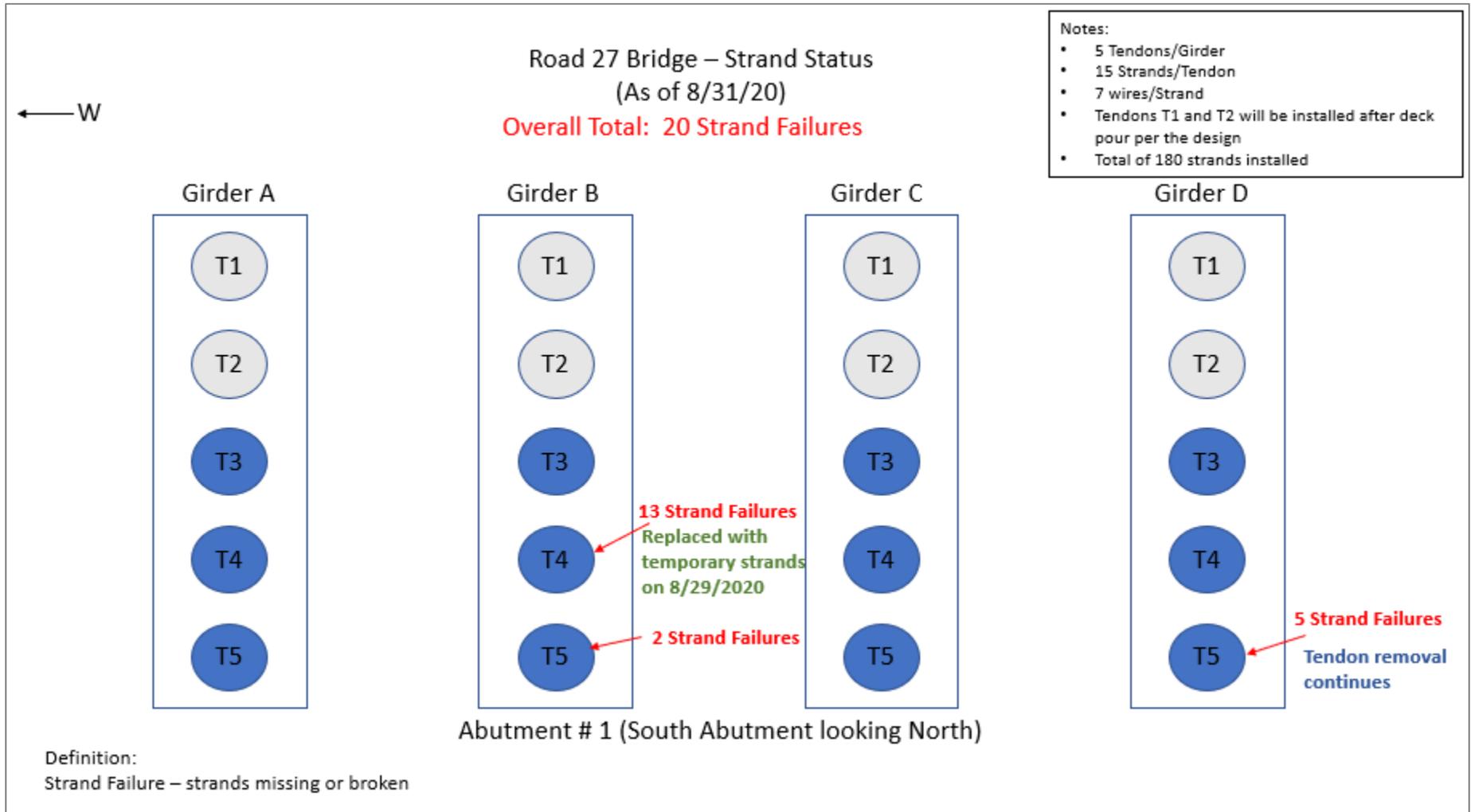
INITIAL STRAND FAILURES

Replaced November & January 2020



ADDITIONAL STRAND FAILURES - AUGUST

Investigation Underway



ROOT CAUSE OF STRAND FAILURE

- **Root Cause**

- » Water made its way into the post-tensioning ducts through broken vent tubes, which led to the corrosion of the affected strands.

- **Weiss, Janney, Elstner Associates, Inc. (WJE) Post-Tension Strand Fracture Investigation Report:**

- » Long term presence of moisture in the ducts after the tendons were stressed



Corroded Strands



VENT TUBES ON DECK



- Connected to the Tendon Ducts
- Support the grouting of the tendons in the ducts by allowing air to escape as the duct is injected with grout.
- Are the likely access for water entrance that facilitated the corrosion of the post tensioning strands



BRIDGE STATUS

- All girders are fully supported on falsework
- Falsework has been certified by Contractor's Engineer as installed and functioning properly
- Structure has been certified by Engineer of Record to be safe
- Authority, Independent Site Engineer and TPZP are making daily inspections of Girders, Tendons and Falsework
- Engineer of Record has confirmed that once the construction of the bridge is complete it will meet its design capacity
- Independent Consultant and Authority concur with this view



PATH FORWARD

- **Replace newly discovered damaged strands – complete August 30, 2020**
- **BNSF approve Completion Plan – September 2020**
- **Implement Bridge Completion plan (requires relaxation of BNSF Moratorium)**
 - » Root cause analysis complete Sep 11
 - » Root cause agreed with BNSF Sept 21
 - » Begin to replace ALL strands in tendons 3-5 of all girders by Sep 29
 - » Deck placement by Oct 08
 - » Place strands in tendons 1 & 2 by Oct 24
 - » Pressure test and grout all tendon ducts by Oct 27
- **BNSF Moratorium start postponed from October 1 to November 14, running through December 31, 2020**
- **Finish utilities**
- **Place embankment**
- **Finish roadway**
- **Open Road – Summer 2021**



AUTHORITY DIRECTIVES

- Daily strand checks
- Remove recent broken strands and replace. Performing further analysis to verify root cause
- Test to identify/verify possible source of water intrusion
- Full-time on-site superintendent and quality inspector assigned during all repair work
- Additional independent expert analysis of additional damaged strands



CORVEN ENGINEERING, INC

Independent Consultant to the Authority

Complex Post-Tensioned Bridges – Design, Construct, Assess, Maintain
John Corven, PE – Nationally recognized for work with FHWA and State DOT's to develop PT bridge durability.

Role

- Hired by WSP (4/1/2020) for 3rd Party Review of post-tensioning issues on the Road 27 bridge.

Scope

- Reviewed Road 27 Bridge design plans, post-tensioning specifications, and chronology of events.
- Reviewed TPZP draft Road 27 Bridge Superstructure Completion Plan.
- Participated in TPZP and BNSF meetings to refine the TPZP May 2020 Road 27 Superstructure Completion Plan
- Continues to provide advice and recommendations to the Authority as requested.



COMPLETION PLAN

- **Completion Plan developed by TPZP**
- **Authority and BNSF review of additional root-cause analysis**
- **Authority and BNSF review/approval of Completion Plan**
- **TPZP implement Completion Plan**



QUALITY TEAM IMPROVEMENTS

- **Provided explicit guidance to TPZP and Project Construction Management (PCM), Wong+Harris, on standards for quality review and structures**
- **Enhanced PCM Quality Team**
- **Reassigned State Principal Engineer to lead Construction Quality Team**
- **Added PCM quality inspectors to Construction Package 1 Team**
- **Partnering with Caltrans to add quality control engineers. Will provide additional expertise and assistance with quality reviews**



AUTHORITY COMMITMENT

- Committed to continue working with the local community throughout this process.
- Met with supervisors and notified residents of causes of delay.
- **Safety for the public and BNSF freight lines remains the top priority.**



ROAD 27 CONSTRUCTION & REPAIR

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