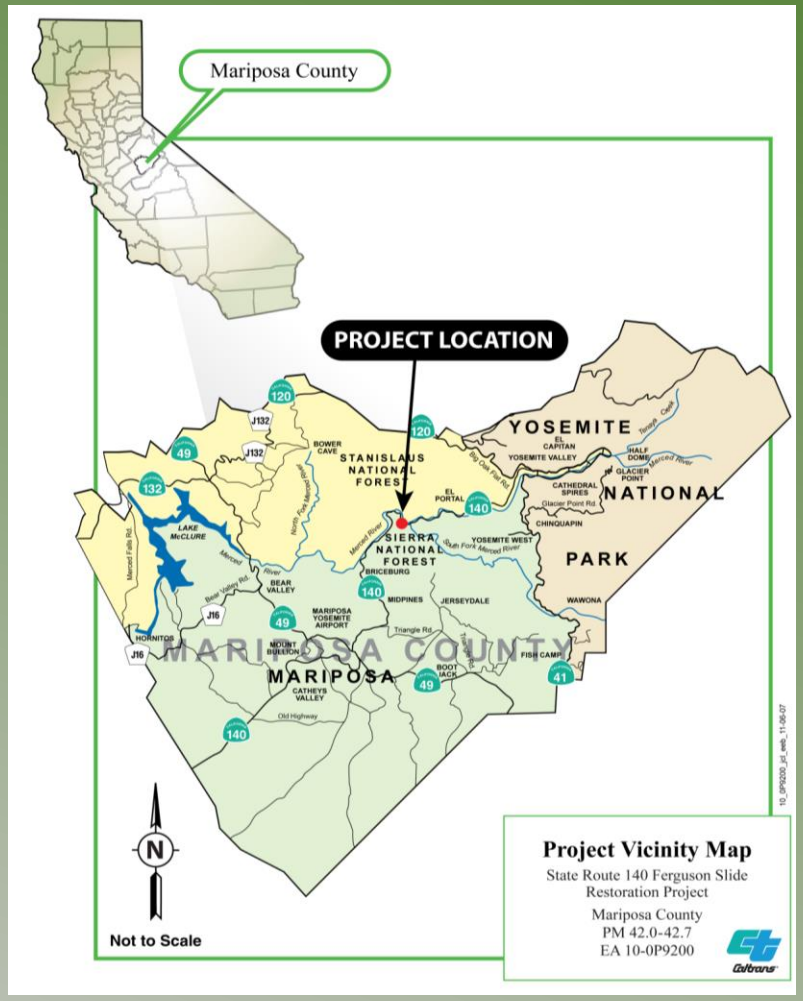
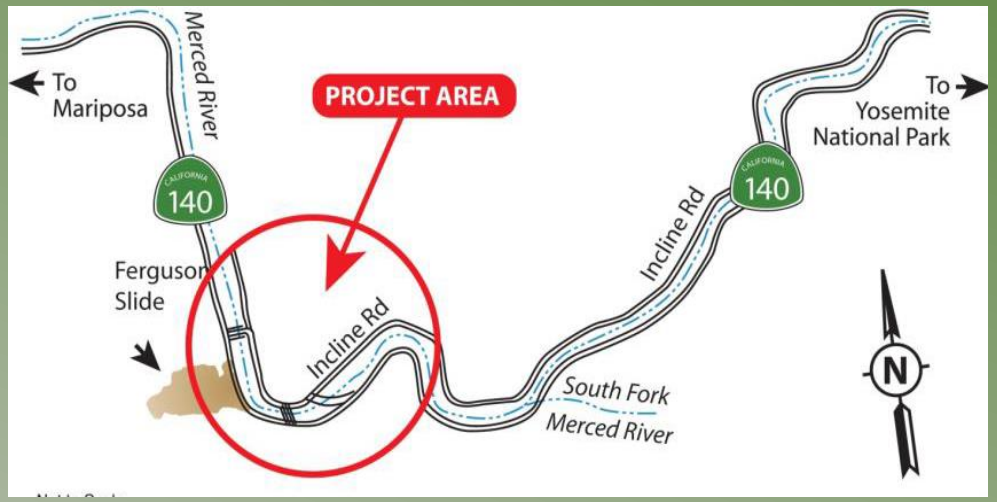
Photo: Across the Merced River looking at State Route 140 (2015 Talus Removal).

Ferguson Slide Area is on Route 140 about 10 miles from YNP Gate



- The only all weather route to Yosemite National Park, Route 140 serves the communities of Merced, Mariposa, Midpines, El Portal and over 1 million visitors annually to Yosemite National Park.

- Two temporary Acrow (modular steel) bridges have detoured one-way traffic control across the Merced River onto a USFS trail with portable traffic signals on both ends since 2006.



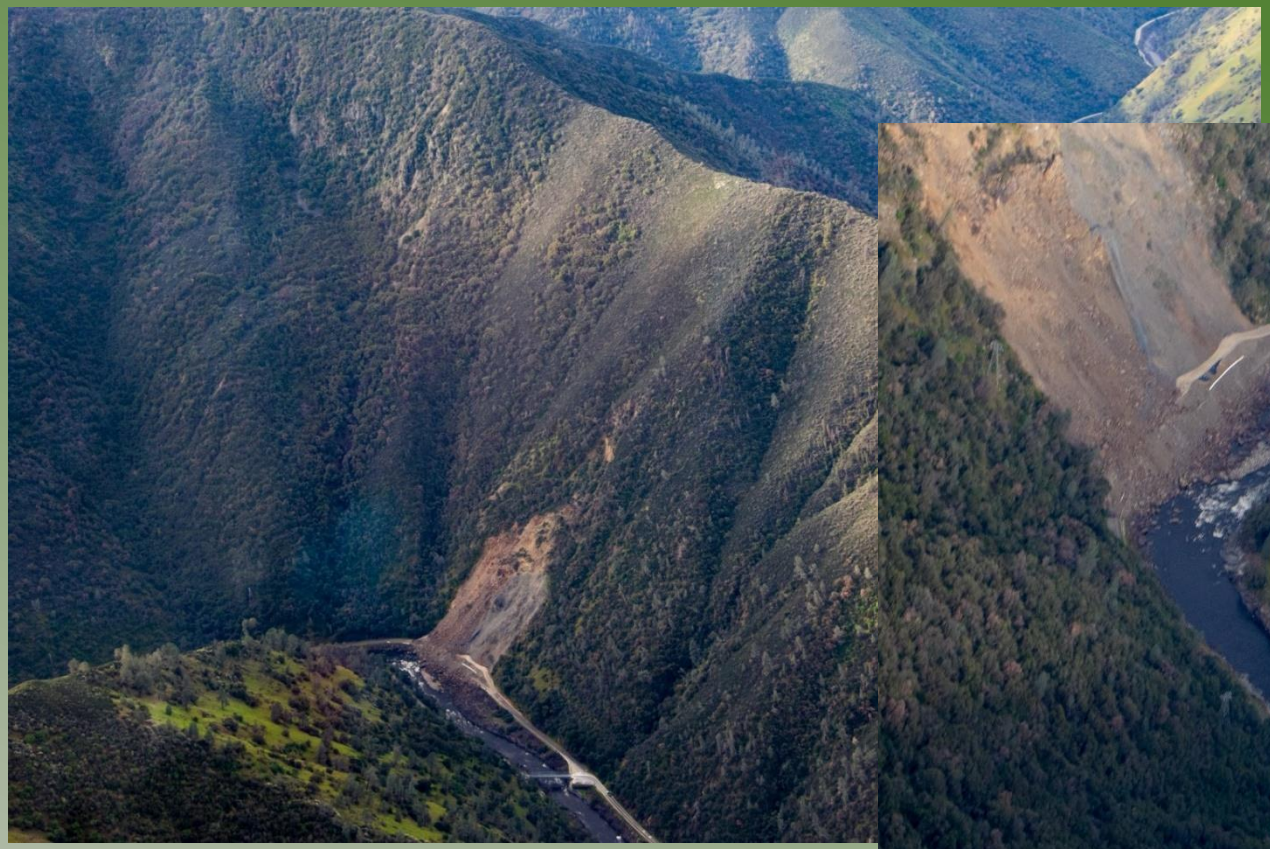


Photo: The site as it exists today.

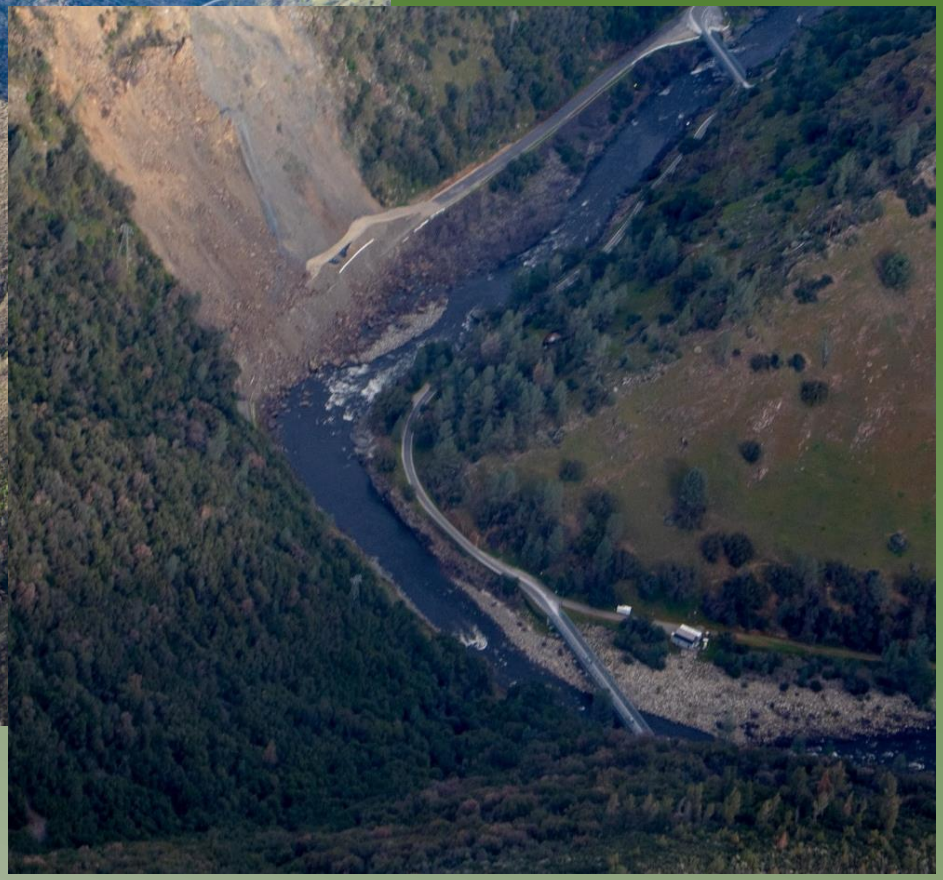


Photo: Traffic is detoured around to a one lane narrow path outside State property crossing the Wild and Scenic Merced River on temporary bridges.

PROJECT TIMELINE

Spring 1999
Minor rockfall event

Spring 2006
Major rockfall event

Summer 2006
Installed one-way temporary bridges (Upgraded 2008)

2006-2014
Developed Rock shed/Bridge/Tunnel Alternatives (Preferred Alternative cast-in-place rock shed)

Spring 2015
Phase I remove talus (30,000 CY removed)

Summer 2015
Ready for cast-in-place rock shed

November 2015
Major rockfall occurred between construction phases so geotechnical site review and rock shed constructability options review began

CMGC CONTRACT UNDERWAY

Slope Stability Analysis began to determine the safety and feasibility of continuing with the cast-in-place rock shed during the summer of 2016.

Photo: June 2015 Jobsite ready for Phase II construction of the cast-in-place rock shed.

Photo: Discovery in the morning after the November 2015 slide event taking down cable net drapery.

OBJECTIVES AFTER 2015 SLIDE EVENT

- Complete Geotechnical studies to determine characteristics of the slide.
- Complete Test anchor program to determine parameters for rock shed design.
- Evaluated other alternatives.
- Re-evaluated the Safety Plan.
- Evaluated different construction methodologies to minimize risks.
- Program project, complete Plans, Specifications, & Estimate, and award contract.

SLIDE CHARACTERISTICS

- This is an ancient slide.
- Slide main body 1.5 million CY.
- The toe is 200 feet above the road.
- Known records of previous slides have shown to daylight over State Route 140.

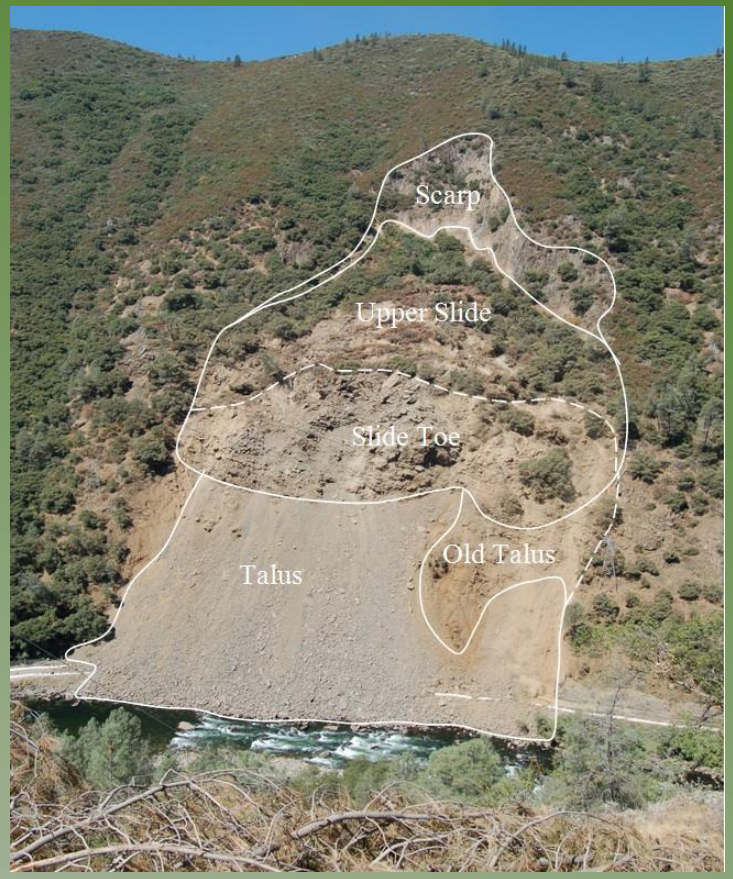


Photo: Taken after the 2006 slide.

SITE GEOLOGY

- In 2016, 4 diamond core holes up to 250 foot depths were drilled to characterize the slide.

- 84,000 CY of talus remains to be removed.
  - 30,000 CY remainder from 2015 slide event.
  - 42,000 CY 2006 talus.
  - 12,000 CY for trim blasting.

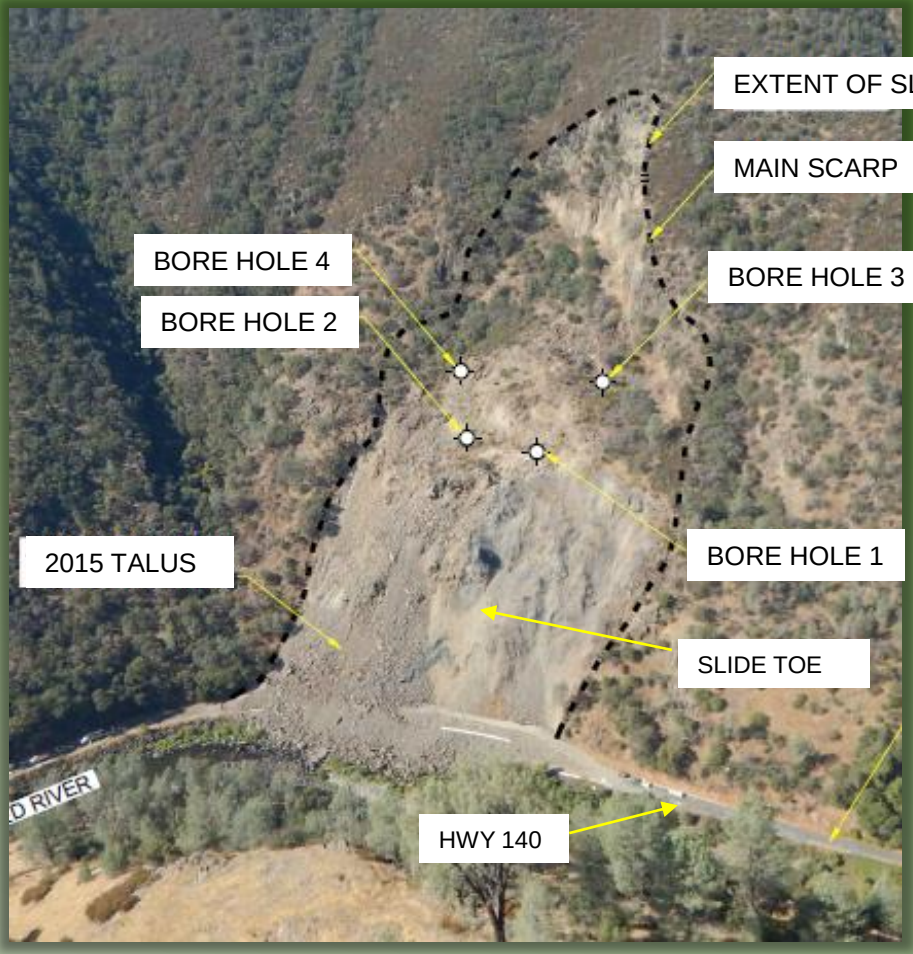


Photo: Extent of rock slide illustrating head scarp, toe, mass, talus of slide and bore hole locations.

SLIDE CROSS SECTION

Photo: 2016 Core Samples

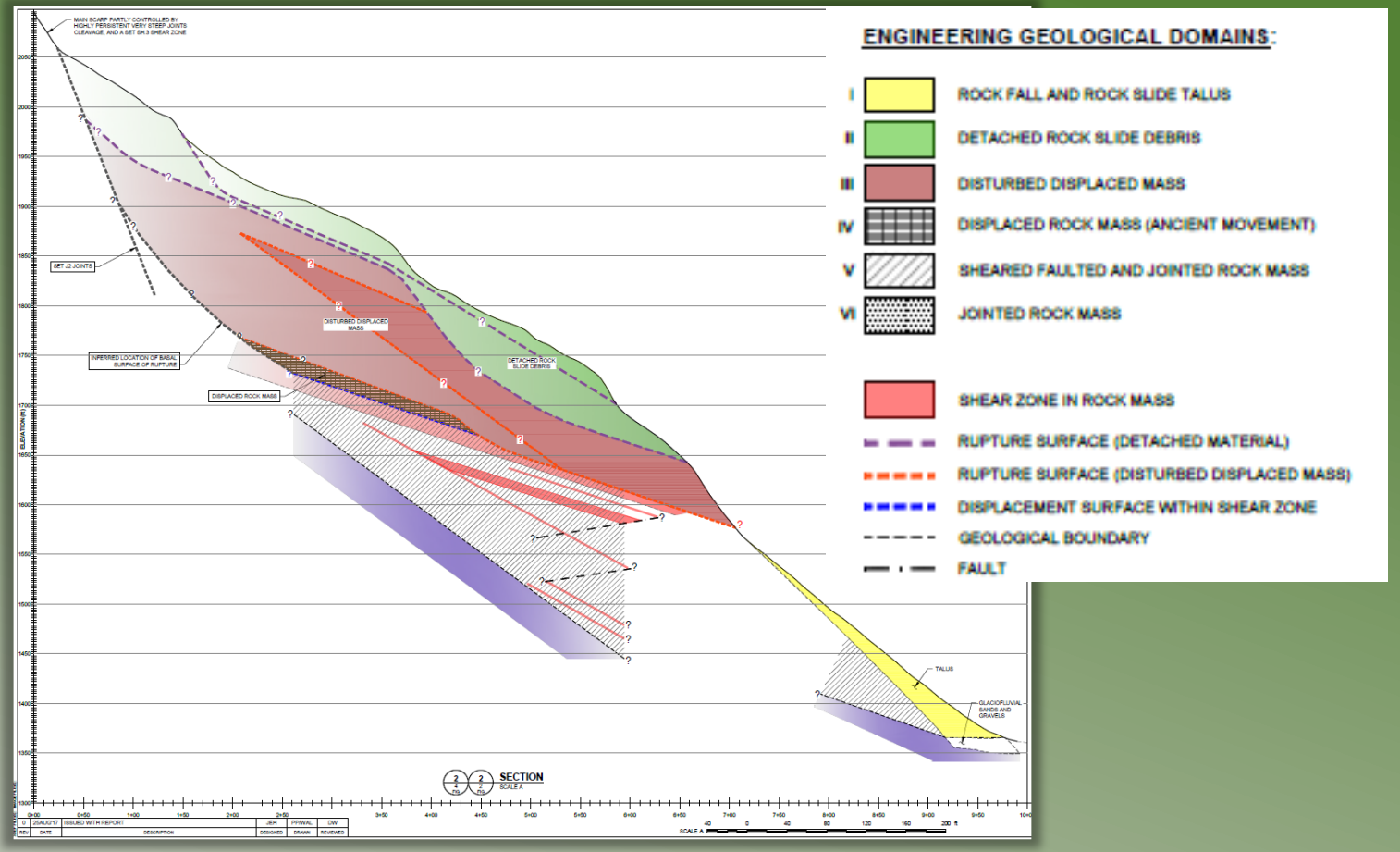


Diagram: Slide Cross Section from 2016 Willie Norrish Geotechnical Report

CMGC CONTRACT UNDERWAY

Three key construction risks with the cast-in-place rock shed:

1. Worker Safety
2. Construction Schedule
3. Partially Completed Structure

To address these risks, the Segmentally Launched Rock shed (SLR) was developed.

The Slope Stability Report prepared by Wyllie & Norrish (August 2017) and an Internal VA study (October 2017), **determined that the SLR is safely constructible.**

Photo: Summer 2016 instrument installation.

SEGMENTALLY LAUNCHED ROCK SHED

Structure Purpose

- Mitigates the Three Key Construction Risks
- Protects the Road from the Talus Pile
- Does Not Prevent the Slide from Moving

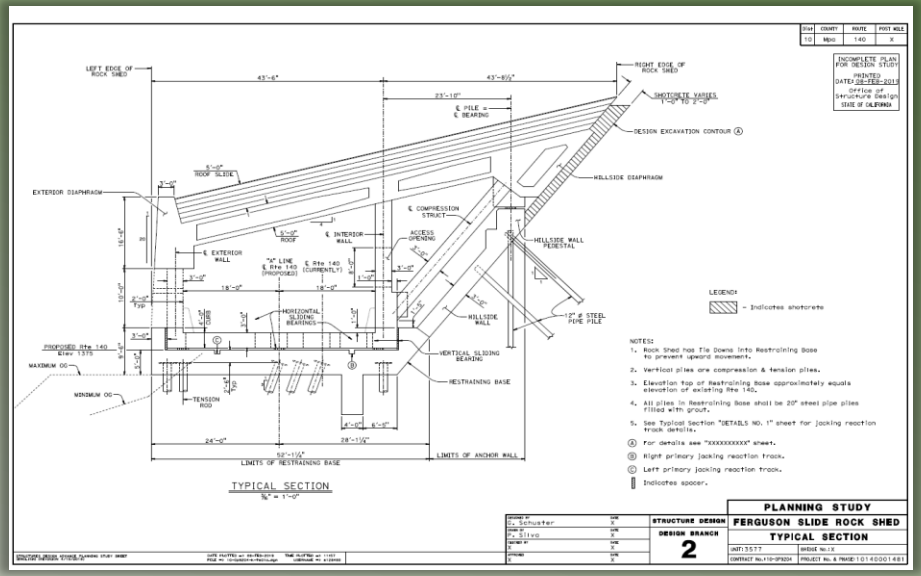


Diagram: Current Typical Section

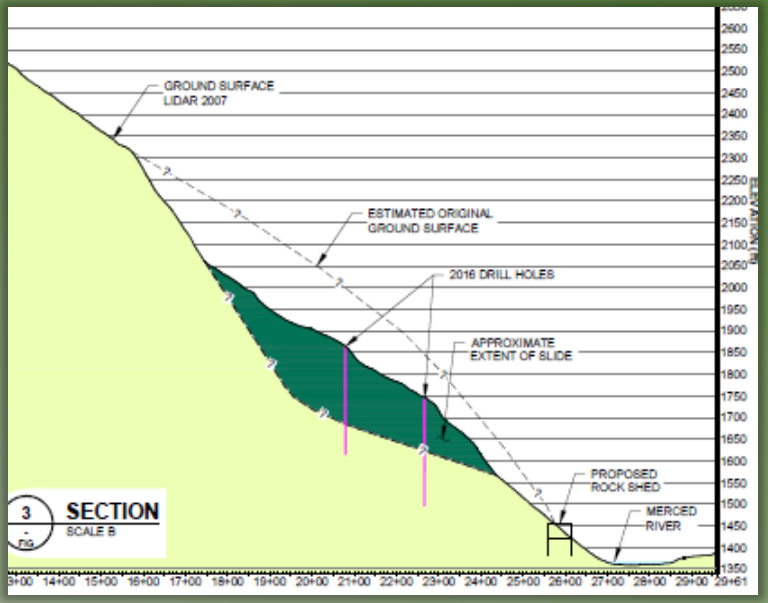


Diagram: Wyllie & Norrish Cross Section

SLR SHED CONSTRUCTION ANIMATION

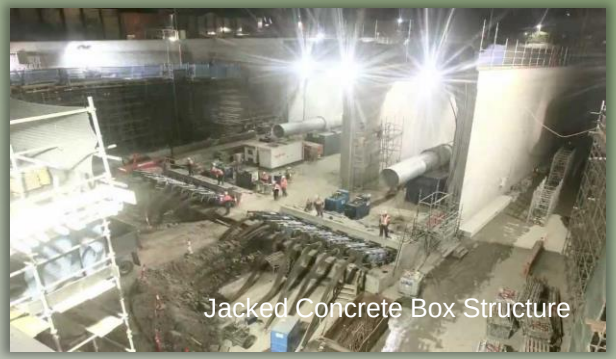
- Animation: https://youtu.be/KQ3hGZtIpiQ

SEGMENTALLY LAUNCHED ROCK SHED

CONSTRUCTION TECHNIQUES TO REDUCE WORKER EXPOSURE:

- Remote controlled equipment
- Work shield for segmental foundation construction
- Precast shed segments out side rock fall zone, launch into place


Self Driving Equipment

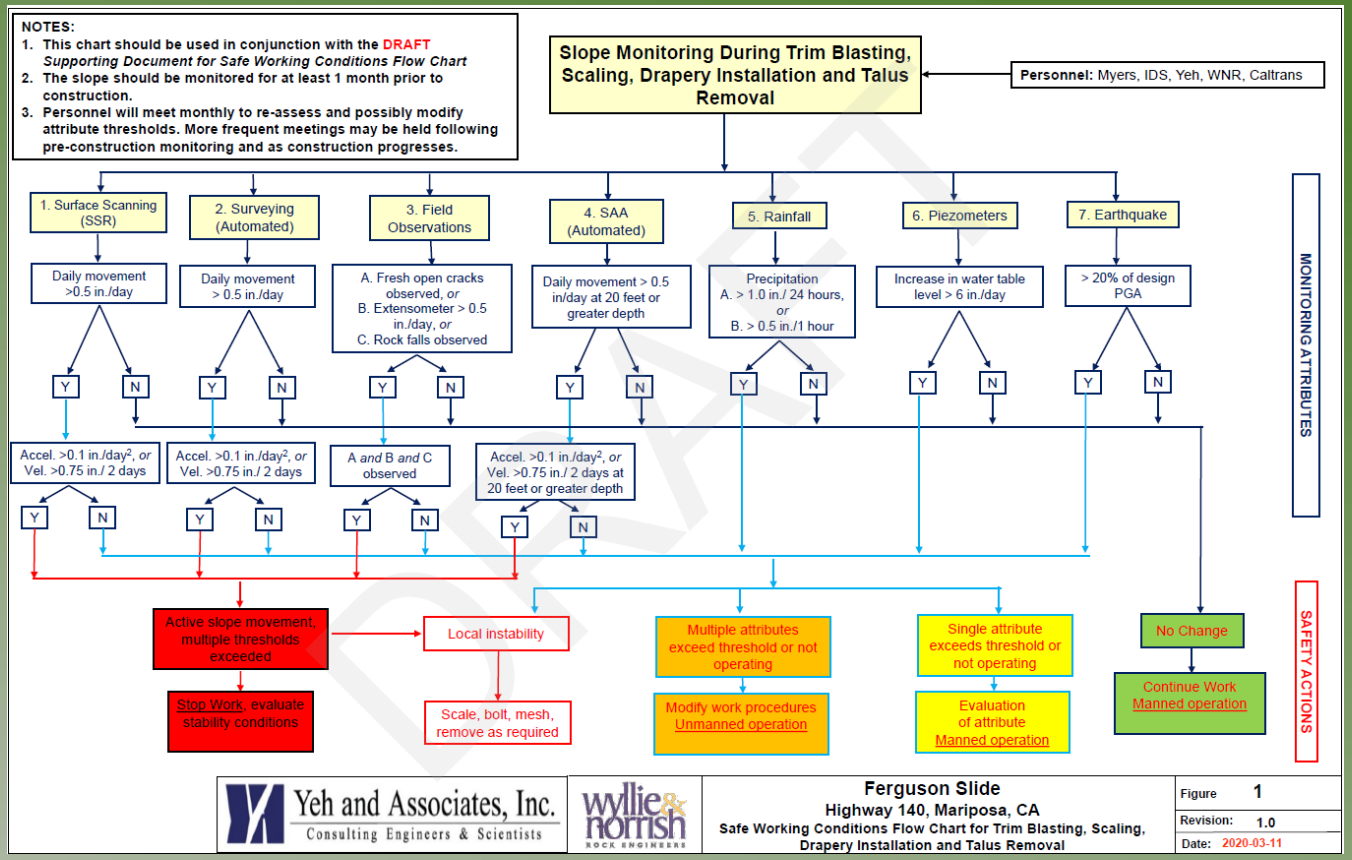

Jacked Concrete Box Structure


Remote Controlled Equipment

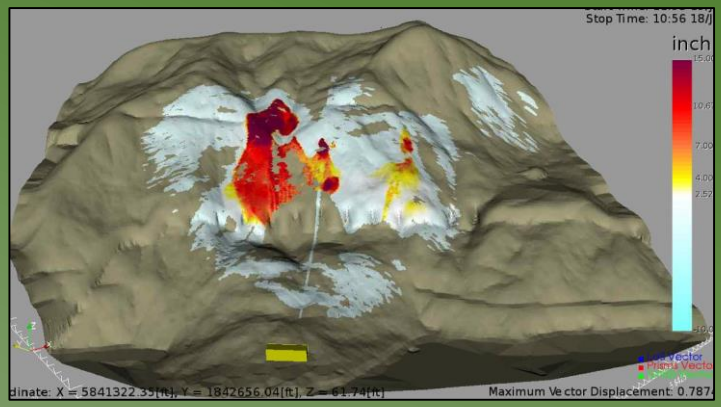

Jacked Concrete Box Structure

SAFETY PLAN

- A risk management strategy has been developed.
- To provide guidelines on actions that should be taken to modify/stop construction.
- Plan consists of multiple monitoring systems to provide redundancy.



MONITORING SYSTEM



Slope Stability Radar (SSR):

- Capable in all weather conditions
- Accurate
- Reliable and current slope data due to scan and processing speed
  - Radar scans less than every 2 minutes
  - Data is processed in 15 seconds
- 24/7 real time monitoring

MONITORING SYSTEM

Automated Total Station:

- Minimal human exposure
- Real time data with exceedance alarms
- 24/7 real time monitoring
- Readings can be done remotely
- Uses infrared technology
- Typical total stations can take readings up to 4,900 feet away
- 54 reflector monuments located on upper slide surface

MONITORING SYSTEM

Shape Accel Array (SAA):

- Chain of rigid segments connected by flexible joints. Designed to resist twist but allows segments to twist.
- Used for subsurface monitoring to measure movement or vibration
- Can be installed in boreholes
- Initial readings establish a baseline. Subsequent measurements are taken frequently to compare to the baseline.

COMPLETED ROCK SHED

COMPLETED ROCK SHED

COMPLETED ROCK SHED

COMPLETED ROCK SHED

- An Aesthetic Design Advisory Committee (ADAC) was formed to evaluate and provide feedback regarding the rock shed design in 2014.

- The ADAC consisted of community groups, Native American tribes, and various agencies.

- It was the consensus of the ADAC that the aesthetics of the rock shed preserve the visual components of the railroad heritage in the area and blend in with the surrounding natural features.

CONSTRUCTION CMGC CONTRACT REVISED TIMELINE AND ESTIMATE

TIMELINE

- Talus Removal
  - Ready to List (RTL) June 2020
  - Begin Construction Summer 2020

- Rock Shed
  - Design – 1 year
  - Secure Permits – 1 year
  - Ready to List (RTL) Winter 2021
  - Begin Construction Spring 2022 with Potential to Begin 2021 Early Work Package

COST

- 2020/2021 – $238M (Capital & Support)*

** Depending on Risk Management and CMGC negotiations.*

CONSTRUCTION CMGC CONTRACT REVISED TIMELINE AND ESTIMATE

- **Least risk alternative**
  - ✓ Least external dependency
  - ✓ Predictable project delivery schedule

- Fastest open to restore the route
- Lowest project cost with escalation consideration
- Best alternative for the public and local economy to permanently restore the route to a full facility
  - ✓Consistent with the message presented to the public and local community.

- **Consistent with our Mission, Vision and Goals**
  - ✓ Innovative

QUESTIONS AND ANSWERS

Any Questions?

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