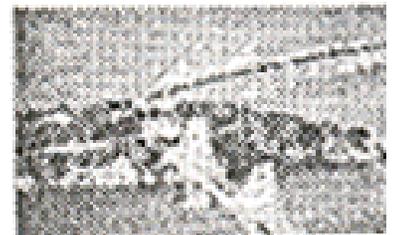




US Army Corps
of Engineers

SFOBB

WELCOME & INTRODUCTIONS



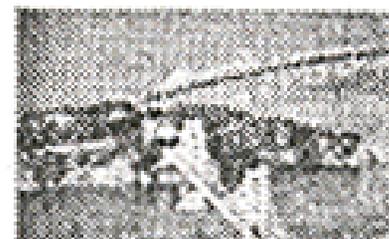


US Army Corps
of Engineers

Project Schedule

Start 27 June 2000
Complete 27 Oct 2000

27 Jun	City Kick Off Meeting
28 Jun	Caltrans Kick Off Meeting
25 Jul	Phase One Final Review Meeting
22 Sep	Phase Two Final Review Meeting Retrofit vs. Replacement
27 Oct	Phase Two Final Review Meeting Seismic Safety Current Replacement Alternative vs. Retrofit



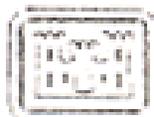


US Army Corps
of Engineers

SFOBB

RESULTS OF PHASE TWO FINAL REPORT

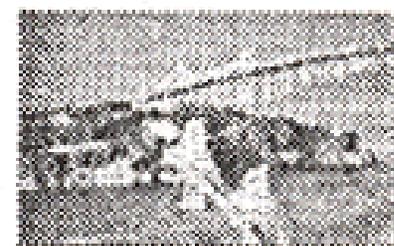




US Army Corps
of Engineers

Data Gap Update

Over 400 Documents Reviewed
75,000 + Pages!



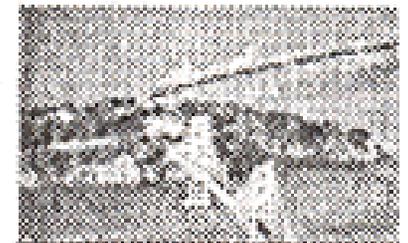


US Army Corps
of Engineers

Scope of Work

Key Questions:

- 1.
 - 1a.
 - 1b.
 - 1c.
 - 2.
-
- 3.
 - 4.
- September 22, 2000
- OCTOBER 27, 2000



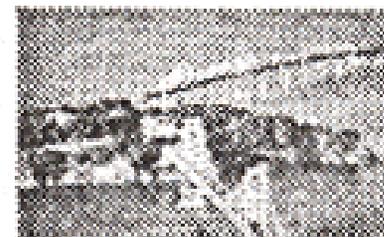


US Army Corps
of Engineers

Today's Presentation

Questions 3 & 4

Recommended Actions

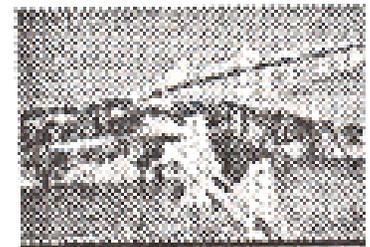




Question 3

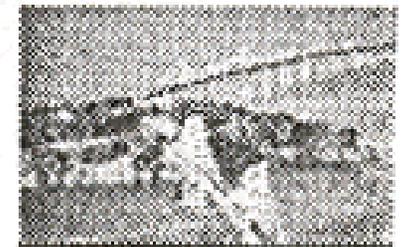
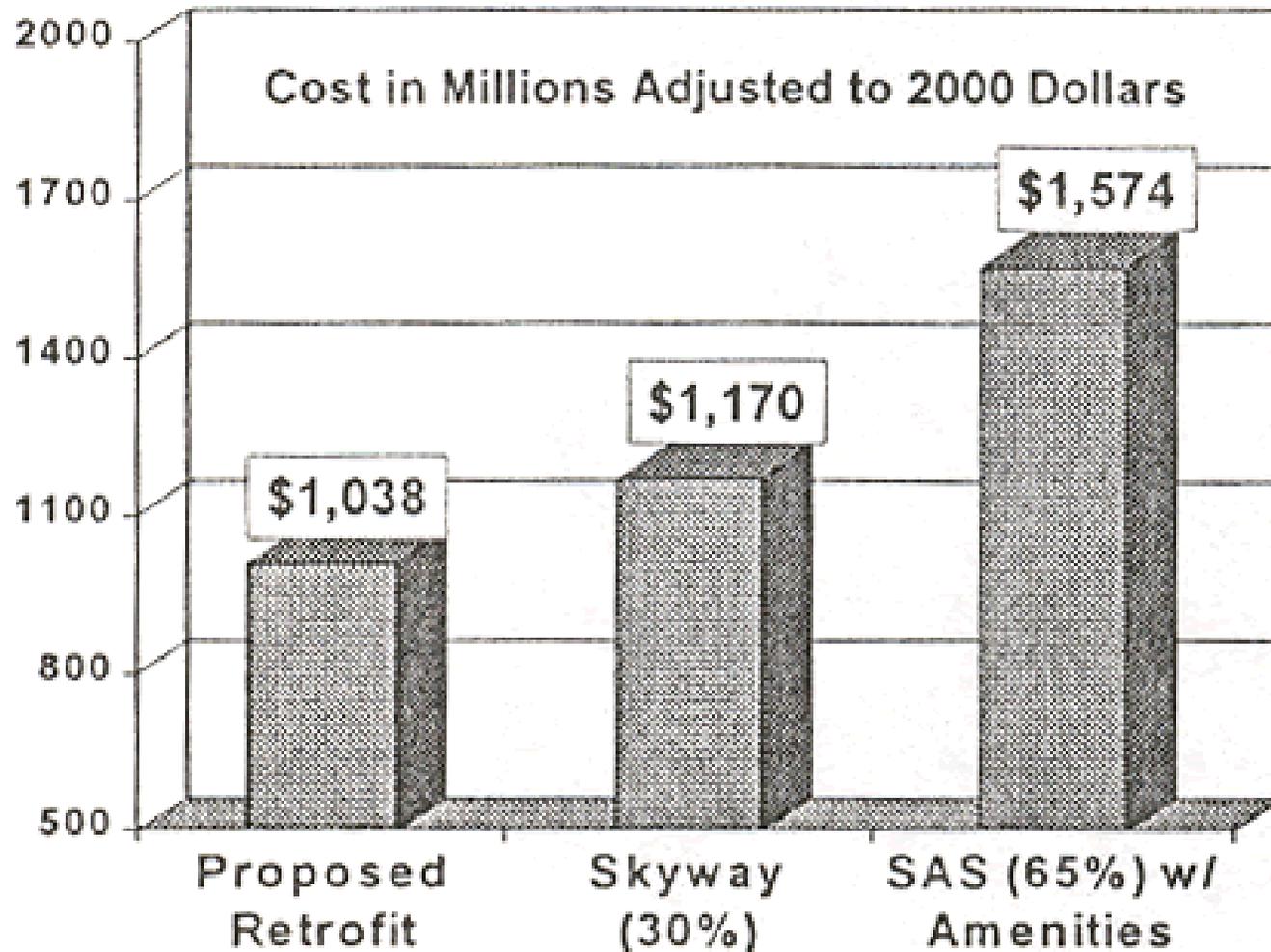
How does the currently proposed replacement alternative compare to various retrofit alternatives in terms of...

- ...a) cost**
- ...b) seismic reliability, including the ability to meet lifeline criteria?**





a) Replace vs. Retrofit Comparison of Costs

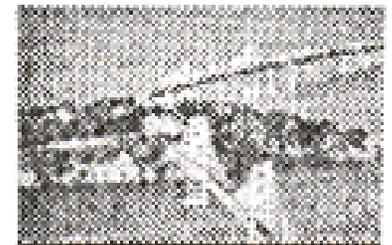




b) Replace vs. Retrofit Comparison – Seismic Reliability and Lifeline Criteria

Seismic Reliability

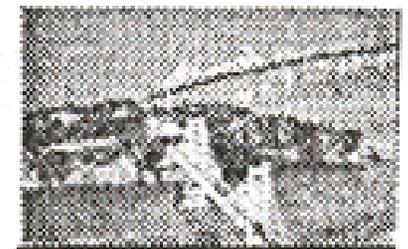
- Reliability studies are not included in the data reviewed
- Quantitative Reliability Analysis (Outside Scope of Work)





Question 4

Is the currently proposed replacement alternative seismically safe? How will this replacement alternative perform in a maximum credible earthquake? Does this alternative meet lifeline criteria? To what extent and how quickly could it accommodate passenger vehicles?





Is the proposed replacement seismically safe?

SAB and EDAP have approved the seismic performance criteria

Engineering Criteria

Conformance of Design to Engineering Criteria

Predictability

Earthquake Event

Actual

Performance During Earthquake

Seismic Safety

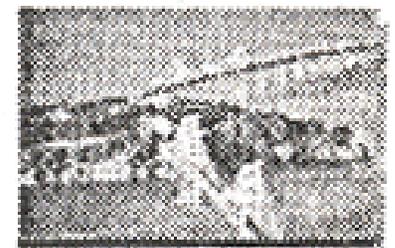
Seismic Safety – A function of performance based on predictability of engineering criteria applied





Is the proposed replacement seismically safe?

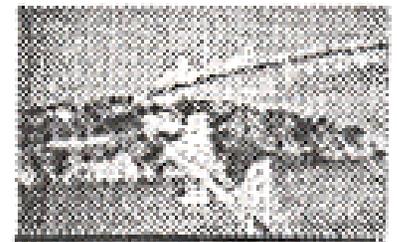
- SAS design in progress and not complete
- Design work cannot be verified
- Review shows that the design is moving along a path to meet seismic performance criteria established by SAB and EDAP

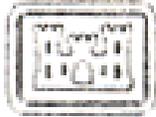




Is the proposed replacement seismically safe?

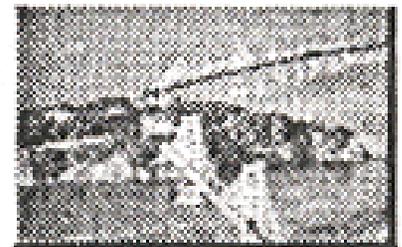
- Seismic safety is being addressed as Caltrans' design team works towards meeting the seismic performance criteria established by design authorities including the Seismic Advisory Board (SAB) and the Engineering and Design Advisory Panel (EDAP)





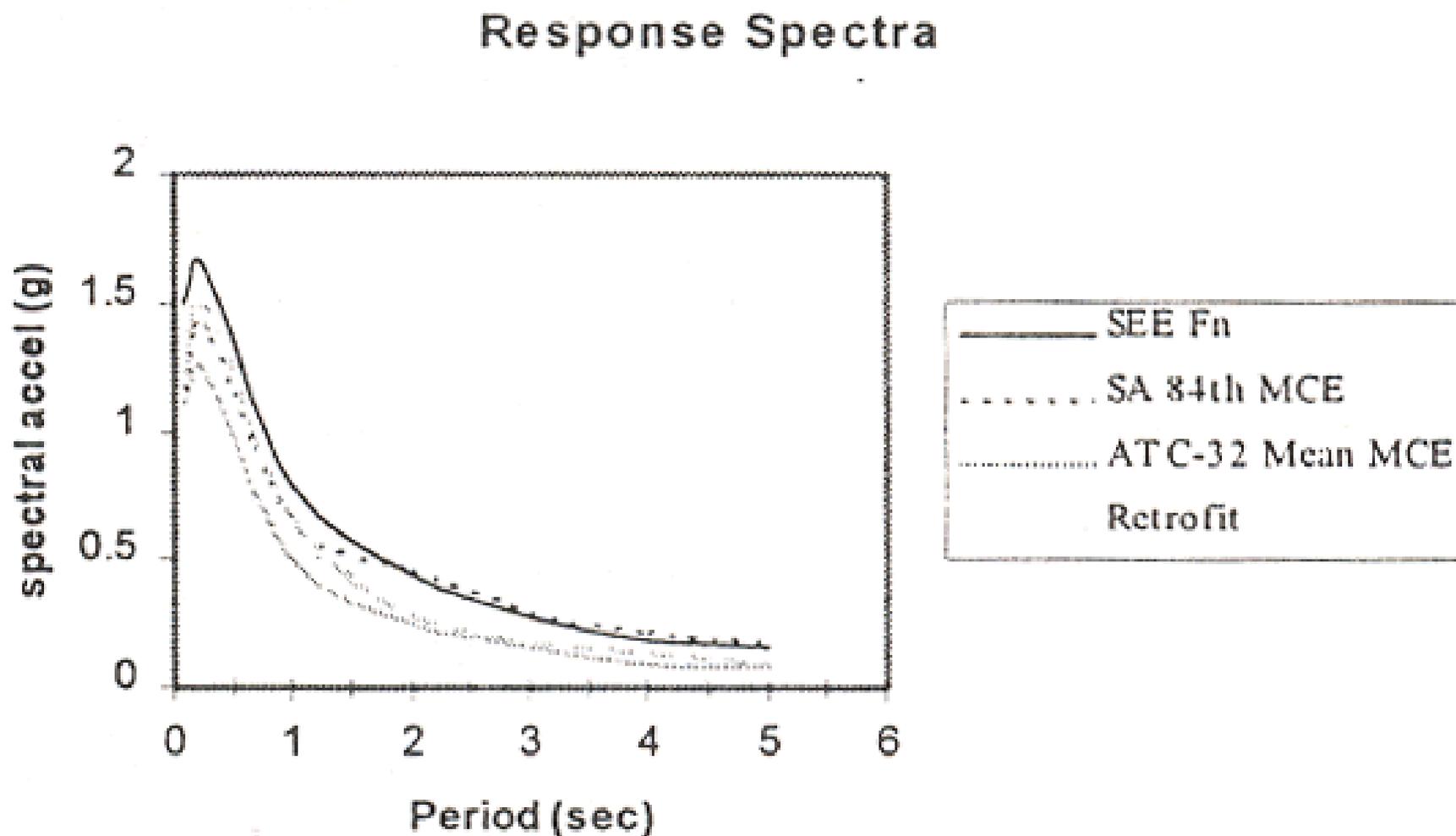
How will it perform in a MCE?

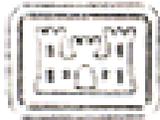
- Unknown
- The performance of the replacement bridge during a Maximum Credible Earthquake (MCE) cannot be determined. The bridge has not been evaluated or designed for a MCE event, which is larger than the SEE event





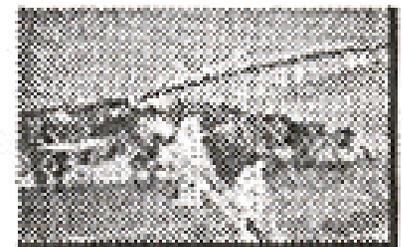
How will it perform in a MCE?

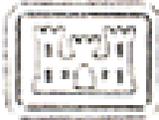




Does it meet lifeline criteria?

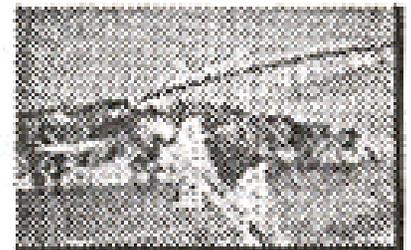
- The replacement bridge does not meet lifeline criteria as defined in the Scope of Work, but is being designed to conform to a unique Design Criteria, including the Safety Evaluation Earthquake (SEE) performance criteria





Does it meet lifeline criteria?

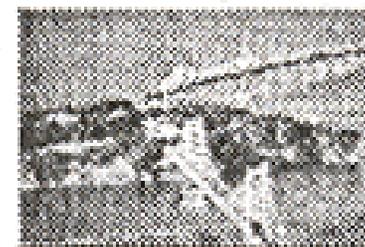
- The replacement bridge does not meet lifeline criteria as defined in the Scope of Work, but is being designed to conform to a unique Design Criteria, including the Safety Evaluation Earthquake (SEE) performance criteria

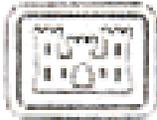




How long for traffic to resume?

- Data provided no information to indicate how quickly passenger vehicles can be accommodated
- Design goal - return to full service almost immediately after an earthquake
- “full service almost immediately” after an earthquake is not defined

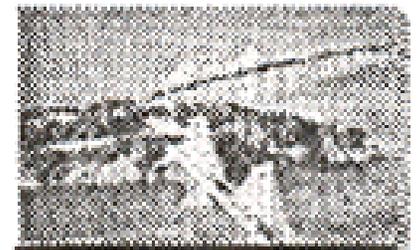




How long for traffic to resume?

Post-earthquake scenario

- steel plates to be placed at damaged deck joints within hours to allow for traffic at reduced speeds
- Construction activities to replace deck joints would begin within 3 months



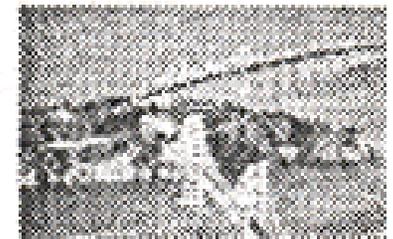


US Army Corps
of Engineers

Today's Presentation

Questions 3 & 4

Recommended Actions



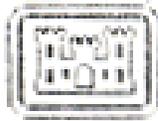


Recommended Actions

As indicated in the Scope of Work, actions needed to answer the Questions should be identified.

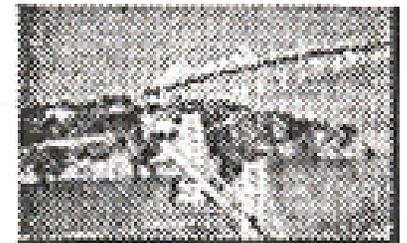
In response, the following actions should be considered to further answer, or refine answers for Questions 3 and 4





Recommended Action 1

Design Calculations should be completed for a comprehensive document. This document should be complete with references, narratives, discussions, and conclusions. The intent is to provide a ready reference for the bridge owner. Future engineers will be able to rapidly determine the designer's intent to facilitate the work for repairs, modifications, etc.

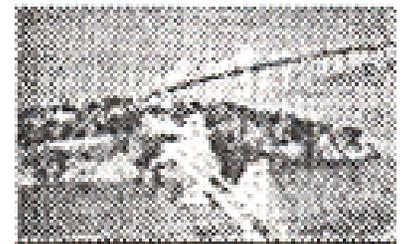




US Army Corps
of Engineers

Recommended Action 2

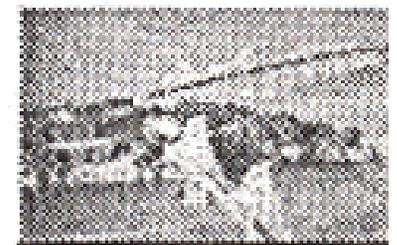
An independent check of the design should be completed

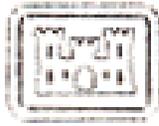




Recommended Action 3

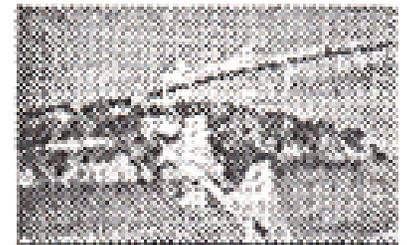
The bridge should be evaluated for a design that addresses the San Andreas MCE ground motions. These ground motions appear to be more forceful than the SEE ground motions in the period range significant to the bridge.





Recommended Action 4

The possible effects of permanent ground movements on the bridge response should be addressed. These movements are associated with accumulation of seismically induced strains in the soils surrounding and/or beneath the pile foundations





US Army Corps
of Engineers

Recommended Action 5

The stability of the rock slope at Pier 1 should be reviewed to confirm that it is seismically stable and consistent with the Fugro-Earth Mechanics, Inc.'s recommendations

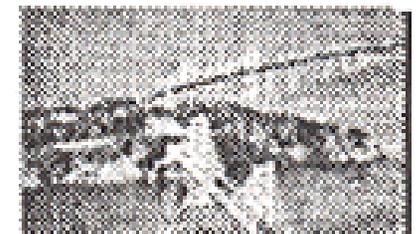


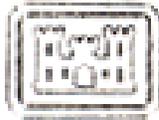


US Army Corps
of Engineers

Recommended Action 6

A feasibility evaluation should be performed comparing the performance of vertical and battered piles in order to check whether the installation costs and complexities of battered piles are justified

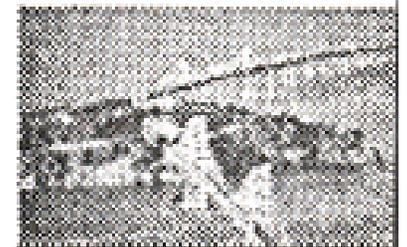




US Army Corps
of Engineers

Recommended Action 7

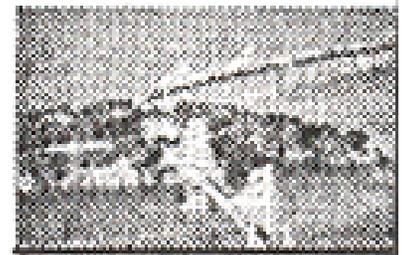
The currently estimated permanent pile settlements during an earthquake should be checked during the iterative design process





Recommended Action 8

Consideration should be given to performing a cyclic pile load test to check the assumed soil degradation rates

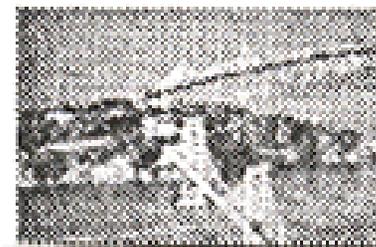




US Army Corps
of Engineers

Recommended Action 9

Movement at joints should be evaluated and prototype joints should be laboratory tested with loading that would simulate the MCE displacement demands

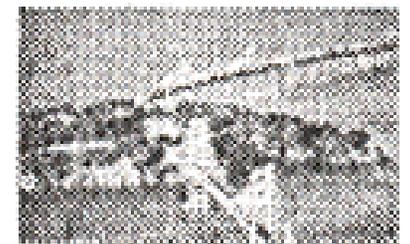




US Army Corps
of Engineers

Recommended Action 8

Consideration should be given to performing a cyclic pile load test to check the assumed soil degradation rates





US Army Corps
of Engineers

SFOBB

QUESTIONS?





US Army Corps
of Engineers

SFOBB

Supplemental Questions

Appendix 9

