

**CONDITION REPORT  
FOR  
LAWSON VALLEY ROAD  
BRIDGE OVER LAWSON CREEK**



**PREPARED FOR  
THE COUNTY OF SAN DIEGO  
DEPARTMENT OF PUBLIC WORKS  
AL-S03-303-01**

April 2002

**PREPARED BY**  
**BOYLE**  
ENGINEERING CORPORATION

# CONDITION REPORT LAWSON VALLEY ROAD BRIDGE OVER LAWSON CREEK

---

**County of San Diego Department of Public Works**

Client Representative MOSEN FARADAY

**Boyle Engineering Corporation**

Project Manager BRUCE SCHMITH P.E.

Project Engineer ROBERT E. HAWTHORNE P.E.

AL-S03-303-01

April 2002



**BOYLE**

6400 Uptown Boulevard NE Suite 600E

Albuquerque, New Mexico

---

# EXECUTIVE SUMMARY

The Lawson Valley Road Bridge over Lawson Creek was originally built in 1948 and replaced in 1973. The bridge was recently inspected by the County of San Diego road maintenance crew and identified as having need for repairs. The crews identified an apparent rotation of the east side old abutment wall, cracking of the east side old abutment wall, a cracked old wing wall footing and eroded embankments at the four wing-walls. To abate their concerns the crew provided new timber bracing at the top of the old abutment wall and provided riprap along the banks of the wing walls. For reference, see the attached As Built Plans in Appendix 'A' and the photographs in Appendix 'B' located in the back of this report.

San Diego County engaged Boyle Engineering to review the bridge structure to evaluate the existing conditions and determine any additional modifications needed. There is concern that the roadway may need a reduced posting or at worst case, a closure.

The design and review tasks, required of Boyle Engineering, included collection and review of the existing drawings, field review of the bridge superstructure components, field investigation of the substructure components, a field inspection providing measurements needed to create 'As-Built' drawings of the structure, performing structural capacity analysis of the girders, cap beam, footings, and the new timber bracing, develop inventory and operating rating values of the existing bridge, and providing the findings of the analysis and proposed recommendations.

During the field review of the structure, it was determined the abutment cracking and rotations occurred at or before the time of the construction of the 1973 bridge structure. The crack in the old wing-wall footing was caused by the subsidence of the foundation soils of the 1973 bridge footing. The erosion of the riverbank soils along the wing walls has extended under the wing-walls reducing the support of the wing-walls and needs to be repaired.

In our analysis of the structure, the original old abutment wall design was reviewed and it was determined the old abutment was significantly overloaded. The overturning safety factor of the old abutment is 1.05 compared to the required 2.0 safety factor value. The addition of the new timber bracing greatly enhanced the performance of the old abutment structure. The new timber bracing changed the design concept of the wall from a cantilever structure to a fixed-pinned structure. The braced old abutment wall system is now adequate for the desired HS20 loading. The bridge structure has operated in an overloaded foundation state ever since the construction in 1973. The good performance of the bridge over the years is probably due to the light volume of traffic and the limited amount of truck traffic.

Our design analysis also included review of the 1973 footing design, the cap beam, and the girder design. Our calculations determined the controlling factor in the design of the bridge structure is the girder design, which allows a reasonable inventory rating of 23.3 Tons.



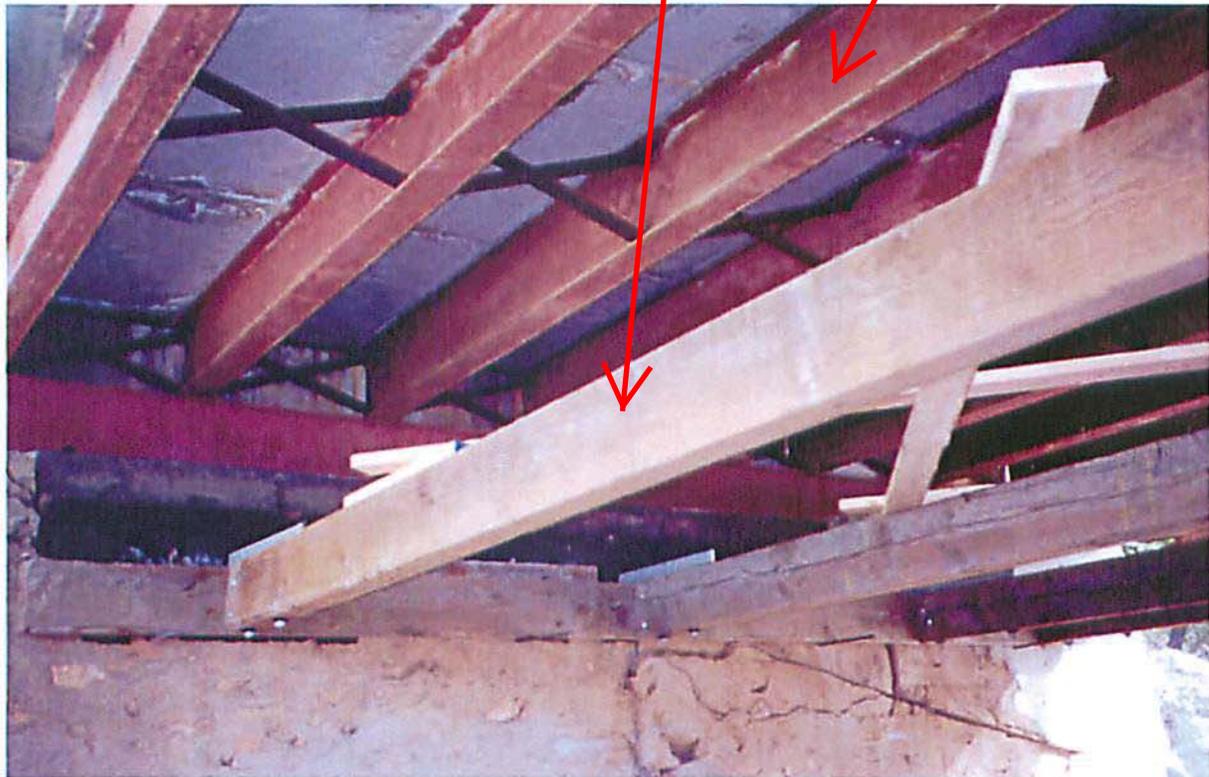
**S-1: Roadway Looking West**



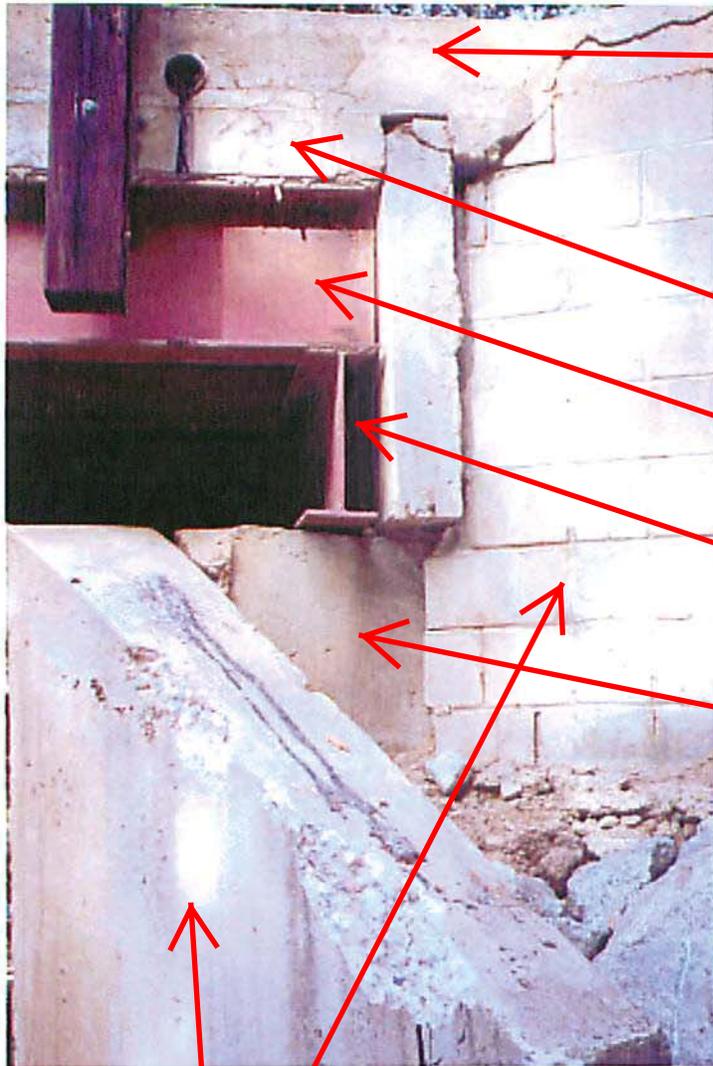
**S-2: South Elevation of Bridge**



**S-3: North Elevation of Bridge**



**S-4: Steel Bridge Girders and Timber Bracing**



**S-5: Southeast Wing Wall and New Foundation**

This is just a 'curb' sticking up

Existing 7" thick concrete roadway decking

Decking is supported by steel girders running lengthwise

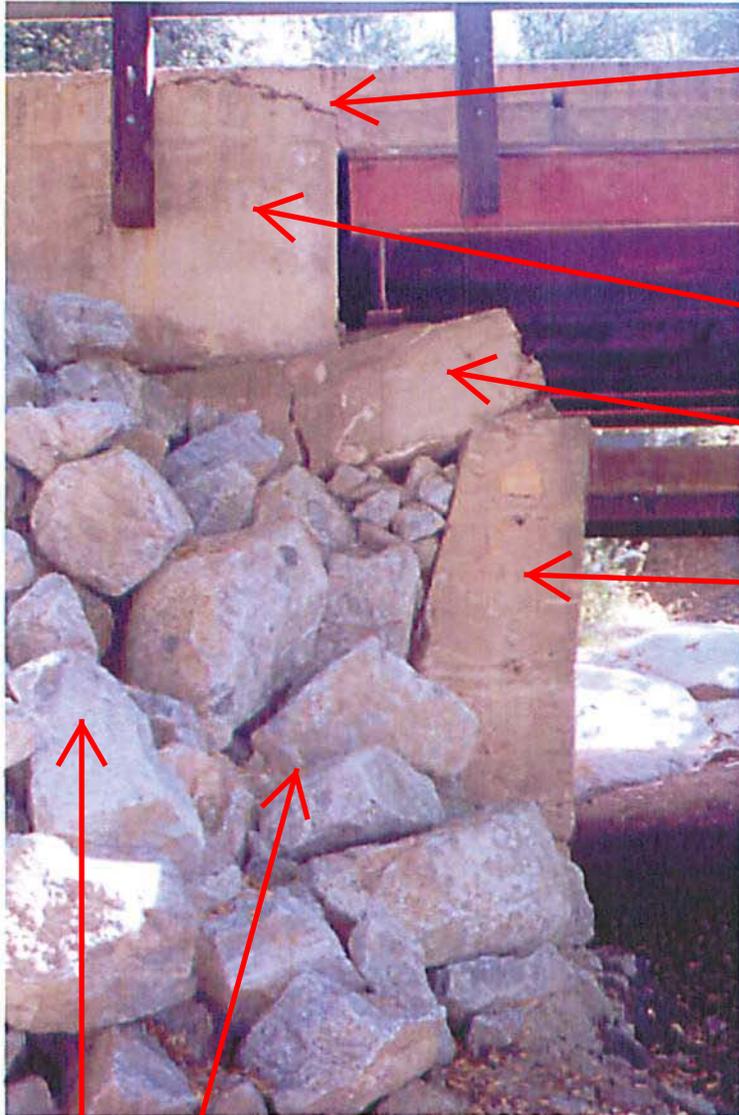
Steel girders are resting on 'cap beams' at each end of bridge

The cap beams rest on a concrete foundation at each end of bridge

These are called 'wing walls' in bridge terminology

**S-6: East Side New Foundation at Top of Old Abutment**





Big cracks not good

**S-7: Northeast Wing Wall and Old Abutment**

'Wing wall' settling (sinking)

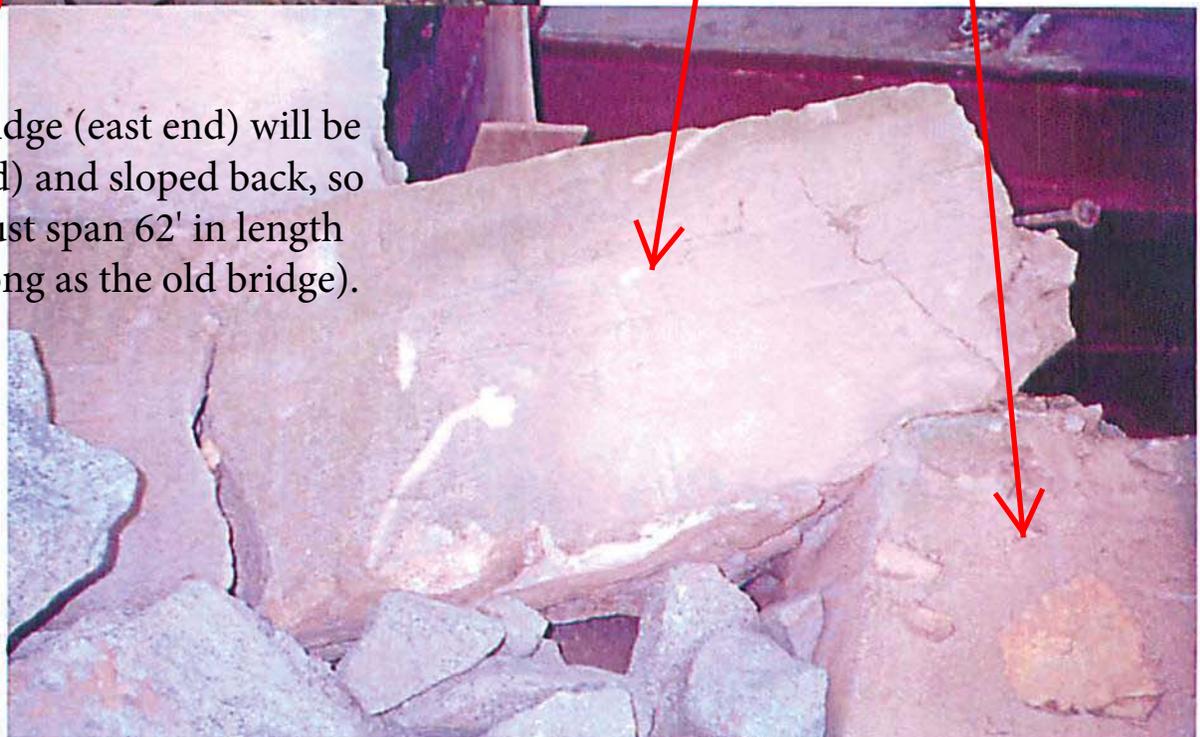
Concrete footing sitting at a dangerous angle. This holds up the bridge!

Abutment wall tipping dangerously. Could lead to total collapse.

Closeup of dangerous footing and abutment wall

**S-8: Old Northeast Wing Wall Footing With Crack**

This end of the bridge (east end) will be dug out (excavated) and sloped back, so the new bridge must span 62' in length (almost twice as long as the old bridge).





**S-9: Southwest Wing Walls**

Apparently the west end looks okay...

These are both 'wing walls' technically. The lower one is just the wing wall for the stream culvert.

This is the abutment wall that's tipping dangerously

**S-10: Elevation of East Old Abutment Wall**



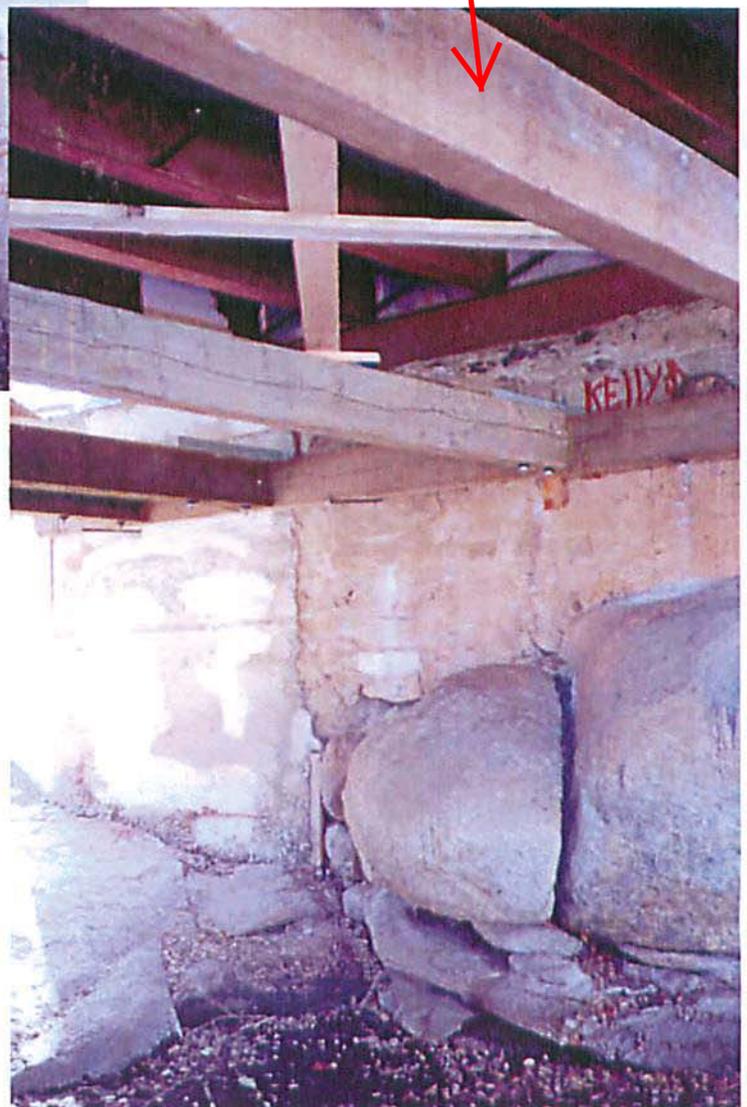


**S-11: Elevation of East Old Abutment Wall**

The 'leaning' abutment wall



Again, this is the temporary wood bracing that was added to prevent collapse



**S-12: Elevation of West Old Abutment Wall**