How We Reduced Permanent Impacts to Waters of the United States by Over 78%

Case Study on the I-15 La Mesa/Nisqualli Interchange Project, Victorville, California

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Project Partners:

US Army Corps of Engineers · California Regional Water Quality Control Board · California Department of Fish and Game · Caltrans

Background

- The full-service interchange at La Mesa and Nisqualli Roads and Interstate 15 is a vital future component of the City of Victorville's infrastructure system
  - A two-span overcrossing structure
  - Three through lanes in each direction
  - Additional turn lanes at the proposed freeway ramp connections
  - Intersections with two realigned frontage roads
- Project implementation would result in impacts to Oro Grande Wash, a tributary to the Mojave River and Waters of the United States
  - United States Army Corps of Engineers Individual Permit required as permanent impacts to Oro Grande Wash would exceed 0.5 acres
- The Lahontan Regional Water Quality Control Board expressed concerns about impacts to water quality and hydrology, including channelization and habitat conversion downstream
- Parsons Brinckerhoff provided regulatory services and worked with the City and agencies to address and alleviate regulatory agency concerns

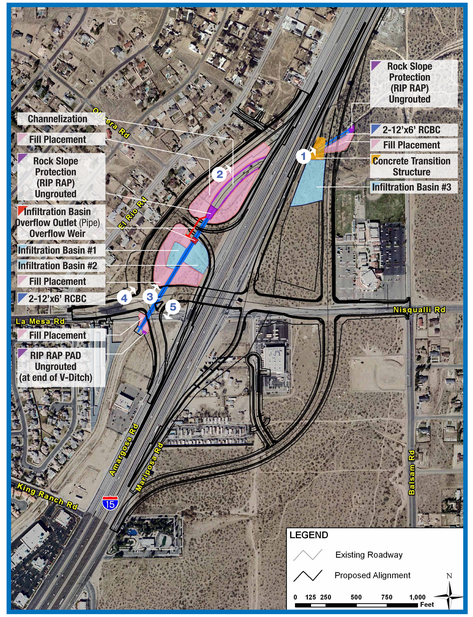
Approach

- Traditional transportation infrastructure engineering design
  - Focuses on the structures and materials needed to complete the project utilizing the most conservative standards to maintain safety
  - A typical engineering solution would convey water from Point A to Point B along a linear path
- To address environmental concerns from the Lahontan Regional Water Quality Control Board, the design team had to "think outside the box"
  - Collaboration between the engineers and environmental staff resulted in a design that will allow flow in a linear fashion during high-flow conditions while a low-flow water diversion would maintain the original meander of the Wash
  - The natural streambed will be utilized instead of a hard culvert, infiltration rates were also increased, vital in this dry environment
- Design changes included participation of all appropriate agencies – federal and state resource agencies, including the California Department of Transportation – on email communication, phone teleconferences, and in-person meetings
  - Fostered information sharing by all agencies
  - Ensured that decisions from one agency would be known by others and not conflict with future decisions of other agencies
  - One regulatory agency complimented the design team on this approach, since limited coordination on previous projects resulted in mitigation requirement conflicts between agencies

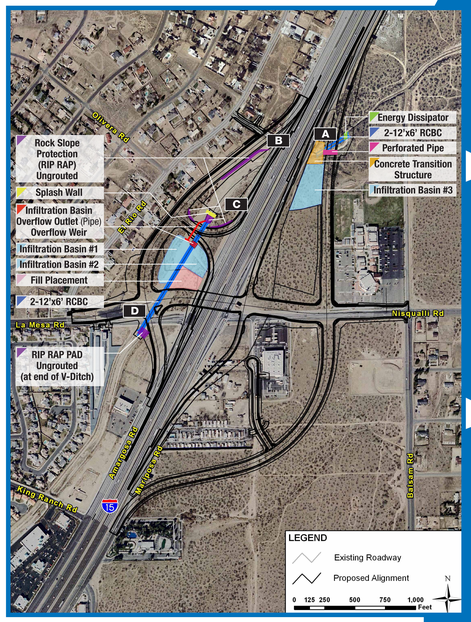
"The Corps of Engineers, CDFG, RWQCB, and the project proponents: Caltrans, the City of Victorville, and their consultants, worked collaboratively to reach a mutually agreeable solution that both minimized impacts to waters of the U.S. and provided vital transportation improvements for the area. As a result of this collaborative effort, the design team incorporated flow reduction design measures that successfully minimized impacts to waters of the U.S. while providing much needed transportation improvements. To offset unavoidable impacts to waters of the U.S., the City and Caltrans also provided compensatory mitigation that contributes an overall benefit to the Mojave River watershed."

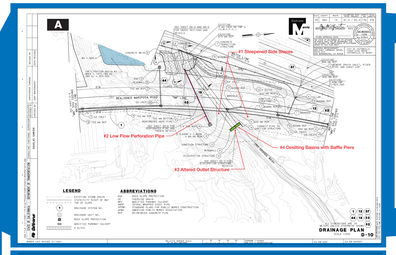
Veronica Chan, Project Manager
U.S. Army Corps of Engineers
Los Angeles District Regulatory Division

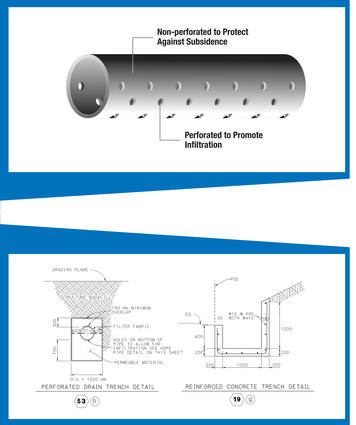
Original Design

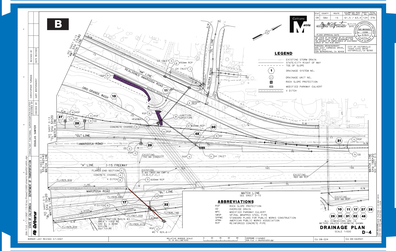


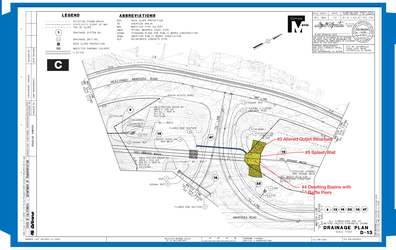
Revised Design

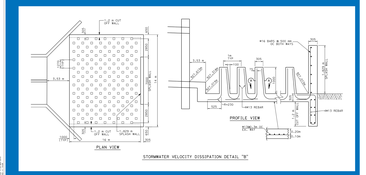


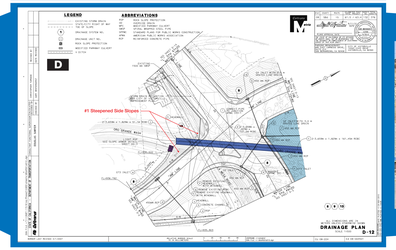












Results/Outcomes

The permanent impacts to non-federal Waters of the United States decreased from 3.85 acres to 0.84 acres (over 78% decrease) by modifying the original design as follows:

1. Steepen the side slopes to reduce the length of the drainage systems and minimize fill
2. Increase infiltration opportunities and preserve the historical flow path by adding a low-flow perforated pipe in an abandoned portion of the Oro Grande Wash
3. Alter outlet structures to reduce the footprint necessary to decrease flow velocities
4. Incorporate stilling basins equipped with baffle piers to replace rip rap that was proposed as the original energy dissipation structure
5. Incorporate a splash wall to split the flow into separate flow lines while further reducing flow velocities and increasing infiltration

Implications

One of the purposes of the Clean Water Act is to avoid impacts to regulated areas. By incorporating some creative "out of the box" engineering solutions, which had minimal cost implications, we were able to produce a significant reduction in the impacts to jurisdictional areas. With mitigation tied to the "permanent impact acreage", this reduction also resulted in a significant decrease in the acreages and costs associated with mitigation and construction.

"The teamwork of Caltrans and its project partners resulted in a project that substantially reduced impacts to Waters of the U.S., thus complying with [Clean Water Act Section] 404(b)(1) guidelines, while still meeting purpose and need."

Scott Quinnell, Biologist
Caltrans District 8

"It has been a pleasure working on the Nisqualli Interchange project. Through the collaboration of the City of Victorville, Caltrans, Parsons Brinckerhoff, Regional Water Quality Control Board, Army Corps of Engineers and the Department of Fish and Game, the project design was revamped in such a manner as to simultaneously maintain the integrity and utility of the infrastructure, but also made material changes germane to the localized biological resources."

Eric Weiss, Environmental Scientist
California Department of Fish and Game
Inland Desert Region 6

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