Carmel River Reroute & San Clemente Dam Removal Project

TRT Meeting No. 1

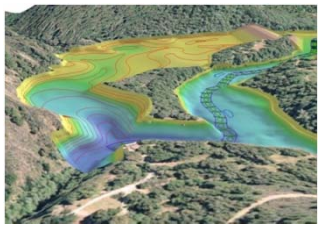
Concept Refinement & Design Criteria

April 6, 2011

URS

Technical Overview





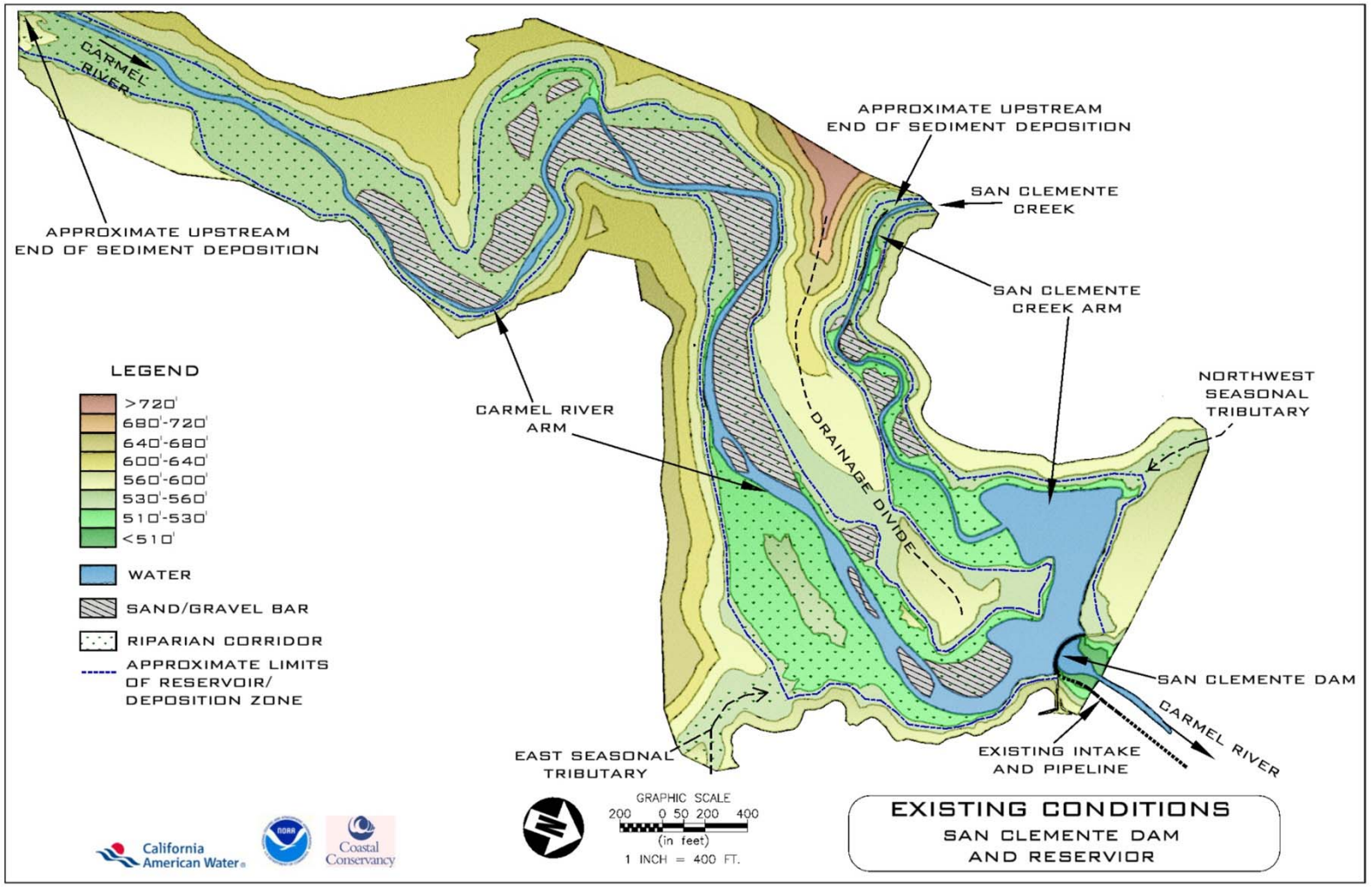
Technical Overview

Primary Project Goals

1. Provide long-term solution to dam seismic safety issue
2. Improve fish passage conditions and provide steelhead habitat to the extent feasible
3. Diminish potential for mobilization of sediment from the project to downstream reaches
4. Avoid exacerbating downstream flooding

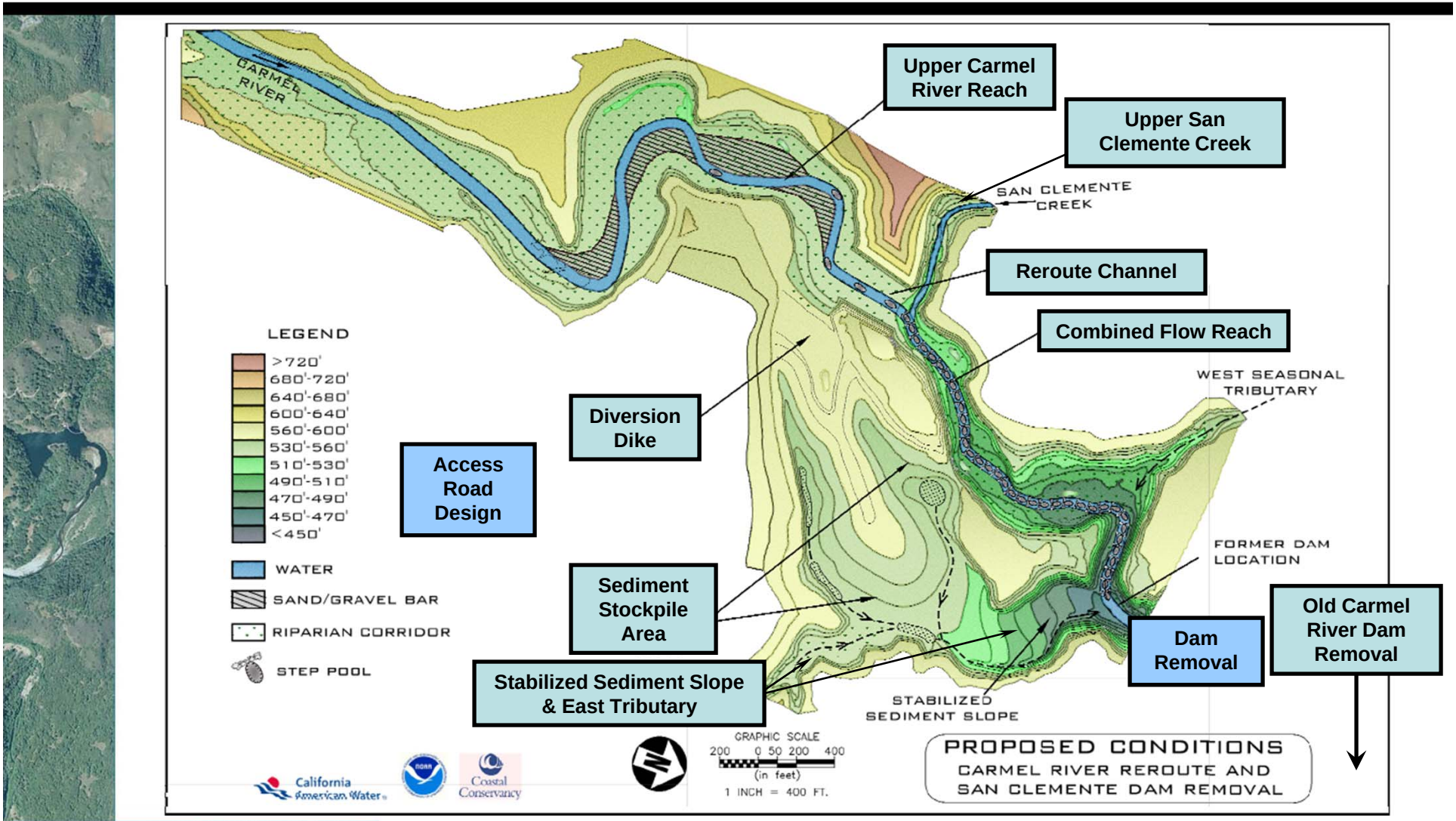
Technical Overview

Existing Site Conditions



Technical Overview

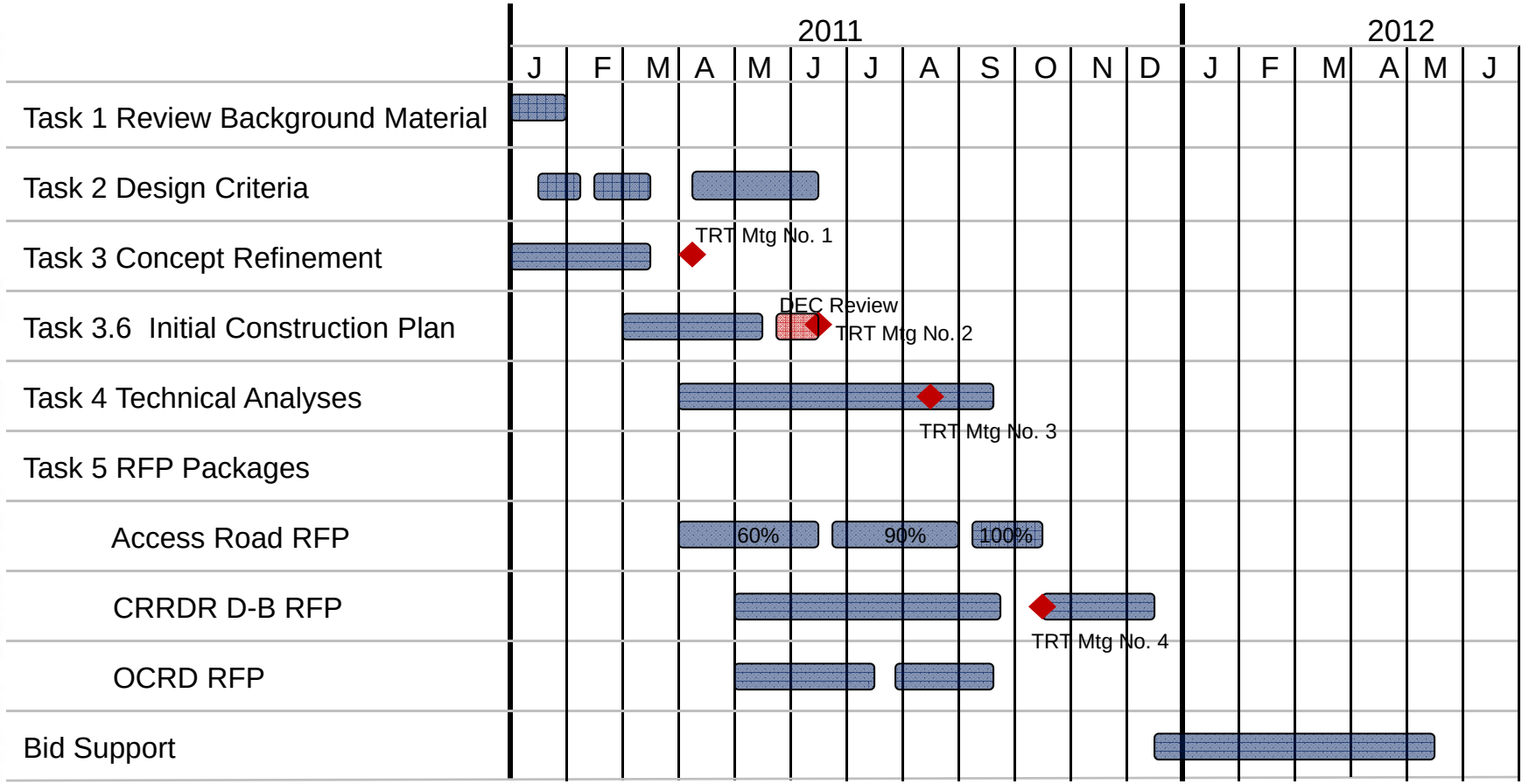
Proposed Conditions



PROJECT DESIGN AND ENGINEERING

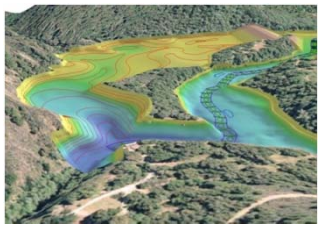
Technical Overview

Schedule Summary



Revised Design Concepts

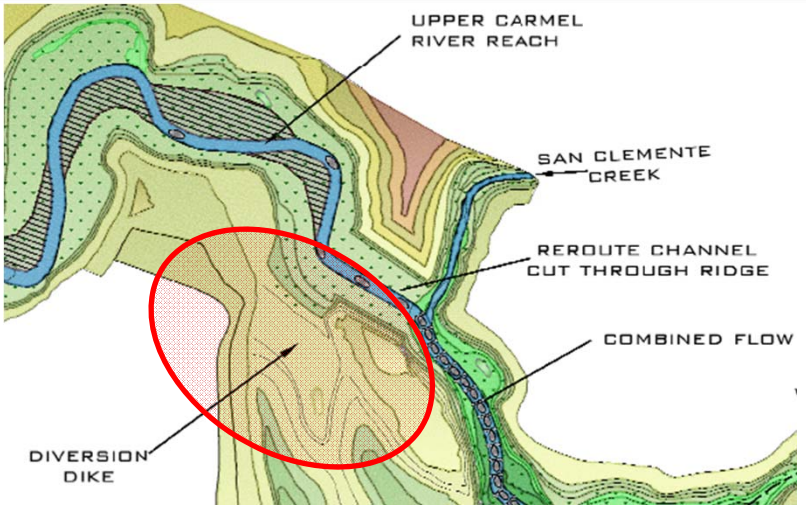




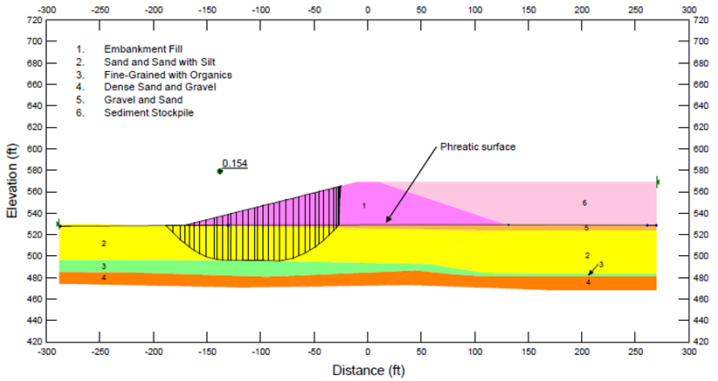
Revised Design Concepts

Diversion Dike

1. Primary Objectives
   a) Redirect flow to Reroute Channel
   b) Maximize habitat
   c) Terrestrial wildlife migration and visual continuity



2. Key Criteria
   a) Design Earthquake – MCE
   b) Design Flood – PMF
   c) Seepage – max. exit gradient of 0.5



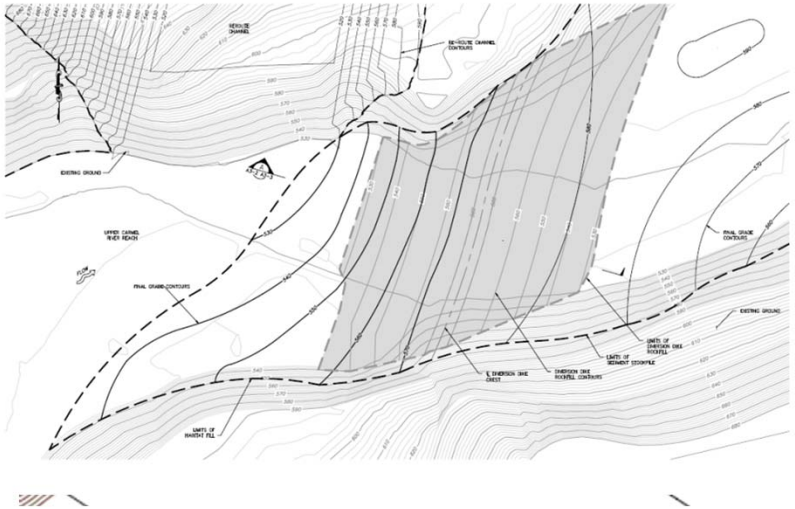
3. Analyses for Refined Concept
   a) Liquifaction potential assessment
   b) Stability analysis & stabilization alternatives analysis
   c) Settlement & seepage analyses

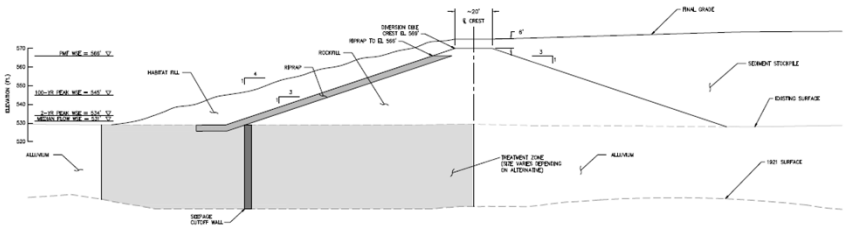
Revised Design Concepts

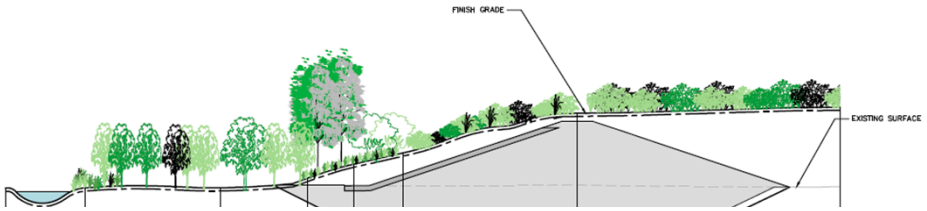
Diversion Dike

4. Primary Refinements
   a) Top of dike ℄ alignment
   b) Height reduction
   c) Foundation stabilization
   d) Habitat fill

5. Upcoming Technical Analyses
   a) Updated hydrologic analysis
   b) Updated response spectra and associated ground motions
   c) Seepage analyses
   d) Static stability analysis
   e) Seismic deformation analysis



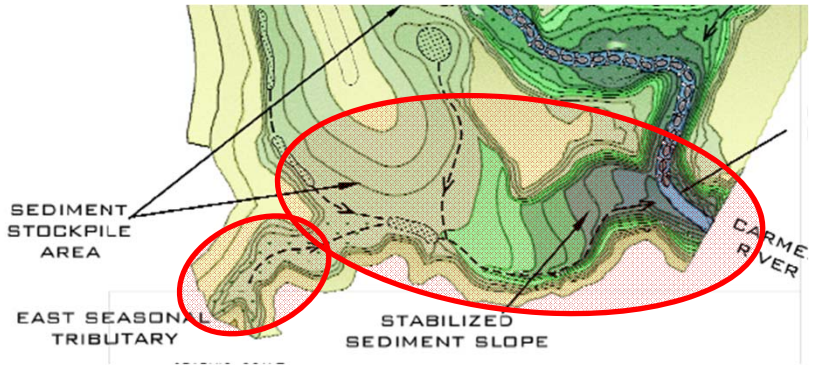




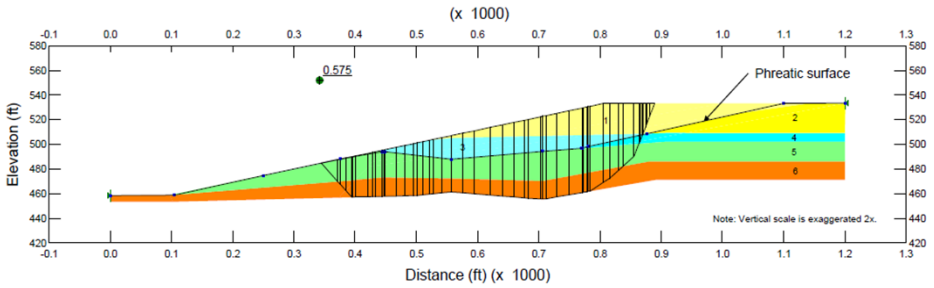
Revised Design Concepts

Stabilized Sediment Slope

1. Primary Objectives
   a) Retain accumulated sediments
   b) Dispose & stabilize excavation/ demolition materials
   c) Convey E. Tributary drainage
   d) Maximum habitat



2. Key Criteria
   a) Design Earthquake – MCE
   b) Design Flood – PMF



3. Analyses for Refined Concept
   a) Liquifaction potential assessment
   b) Stability analysis & stabilization alternatives analysis
   c) Simplified seismic deformation analyses

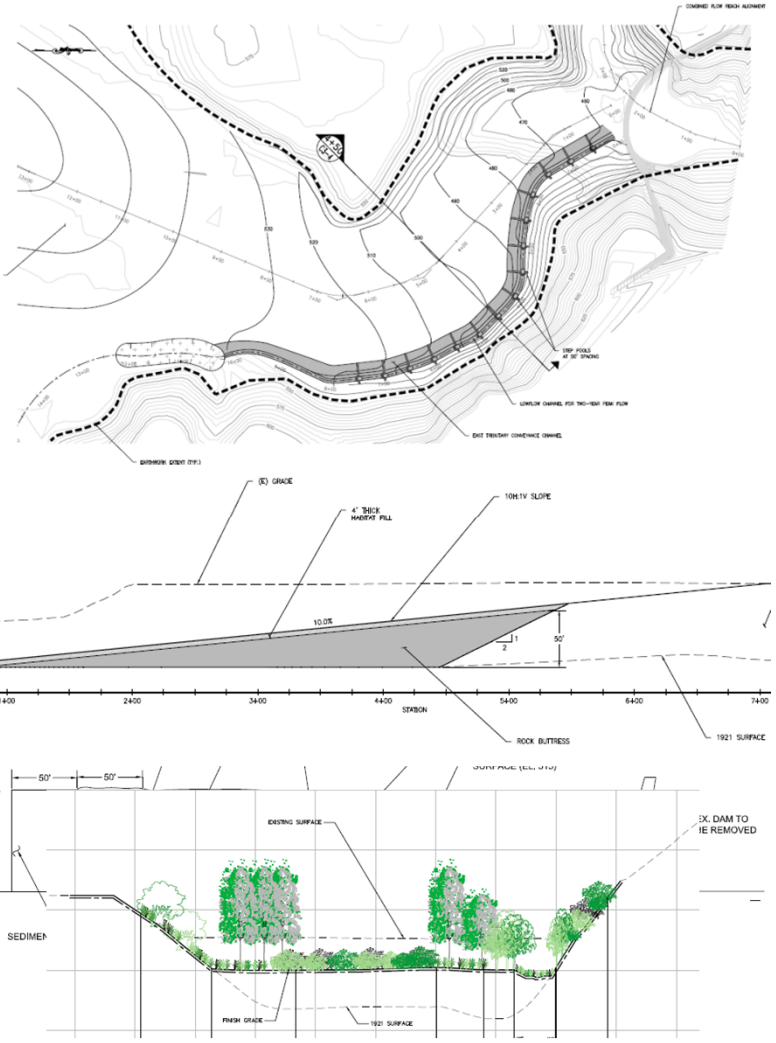
Revised Design Concepts

Stabilized Sediment Slope

4. Primary Refinements
   a) Replaced soil cement columns with reduced slope and lower rock buttress
   b) Replaced center geogrid with side channel with controlled drops

5. Upcoming Technical Analyses
   a) Updated hydrologic and hydraulic analysis (East Tributary)
   b) Updated response spectra and associated ground motions
   c) Static stability analysis
   d) Seismic deformation analysis

6. Challenge: Design earthquake for buttress design



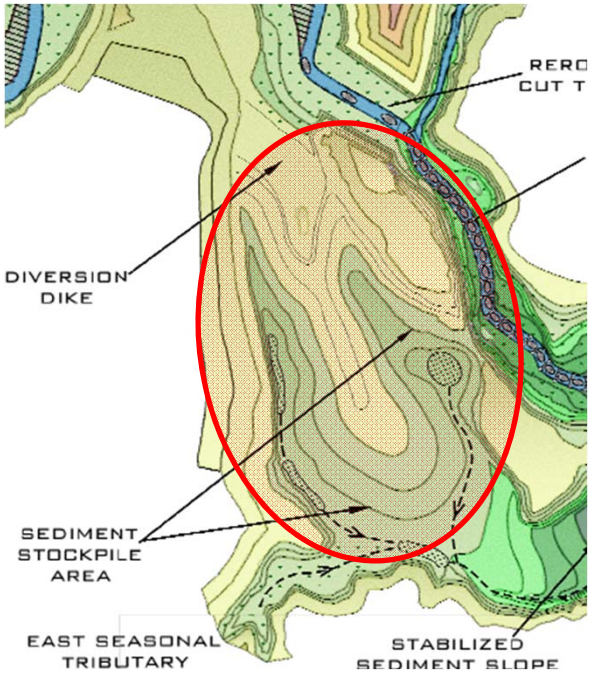
Revised Design Concepts

Sediment Stockpile

1. Primary Objectives
   a) Retain accumulated sediments
   b) Dispose & stabilize excavation/ demolition materials
   c) Maximum habitat
   d) Terrestrial wildlife migration and visual continuity

2. Key Criteria
   a) Ecological considerations
   b) Material balance
   c) Design Flood – 100 year

3. Analyses for Refined Concept
   a) Habitat assessment

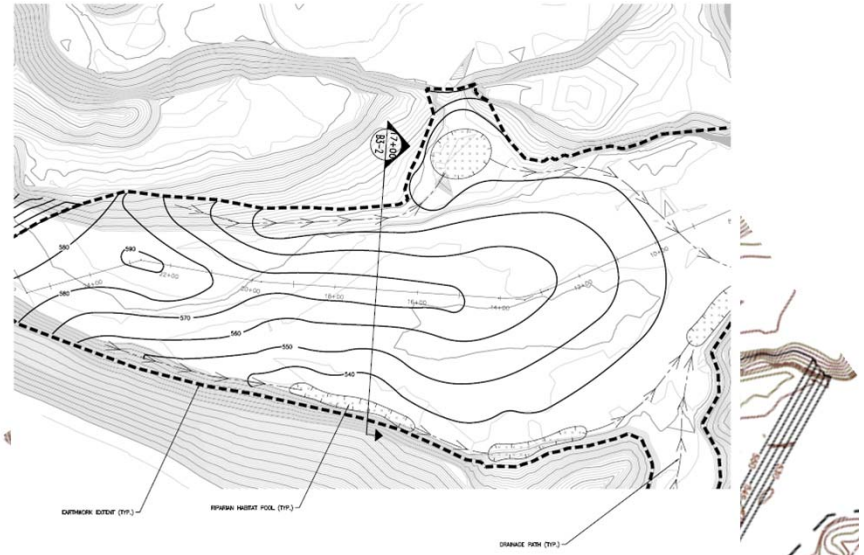


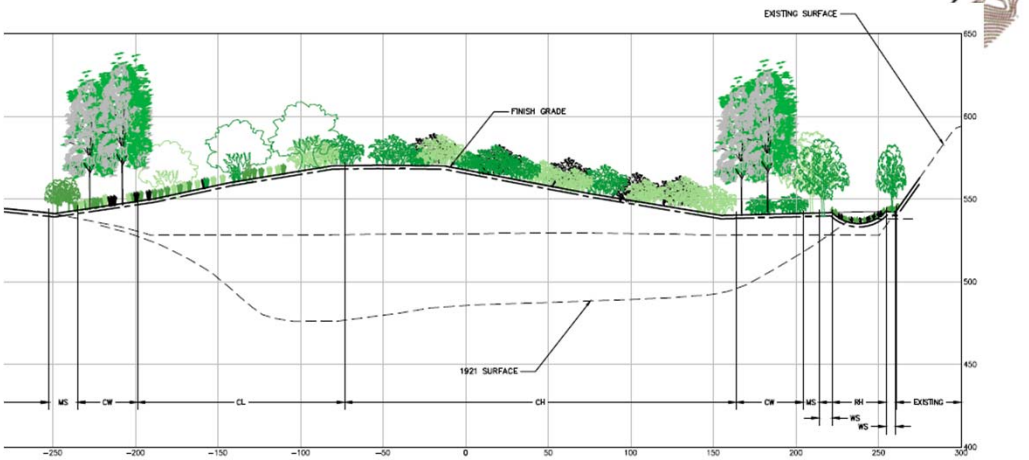
Revised Design Concepts

Sediment Stockpile

4. Primary Refinements
   a) Replaced flat plateau with variable topography and habitat

5. Upcoming Technical Analyses
   a) Hydraulic assessment
   b) Refined habitat assessment



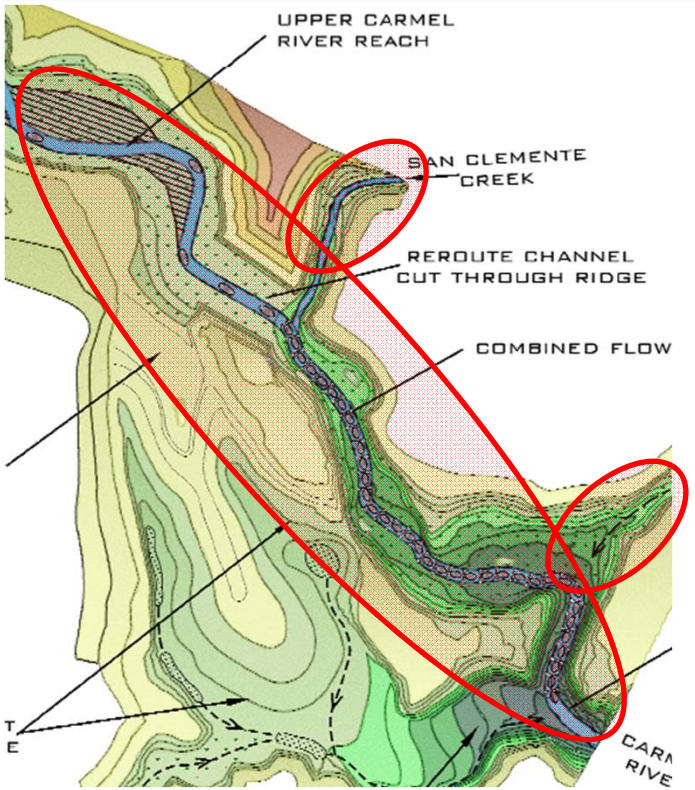


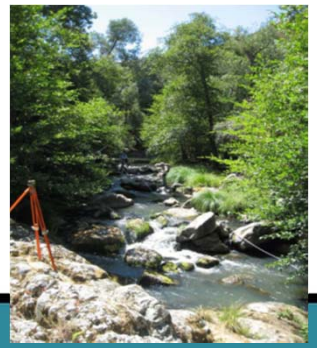
Revised Design Concepts

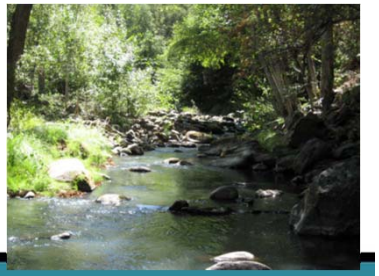
Channel Reconstruction

1. Primary Objectives
   a) Convey combined flow through reach; avoid backwater effects
   b) Meet fish passage criteria (US & DS)
   c) Strive for sediment transport balance
   d) Support dense riparian and aquatic habitat and CRLF habitat to the extent feasible
   e) Emulate natural variability to the extent feasible

2. Key Criteria
   a) Sediment transport balance / long-term equilibrium slope for channel viability
   b) Fish passage criteria
   c) Ecological considerations







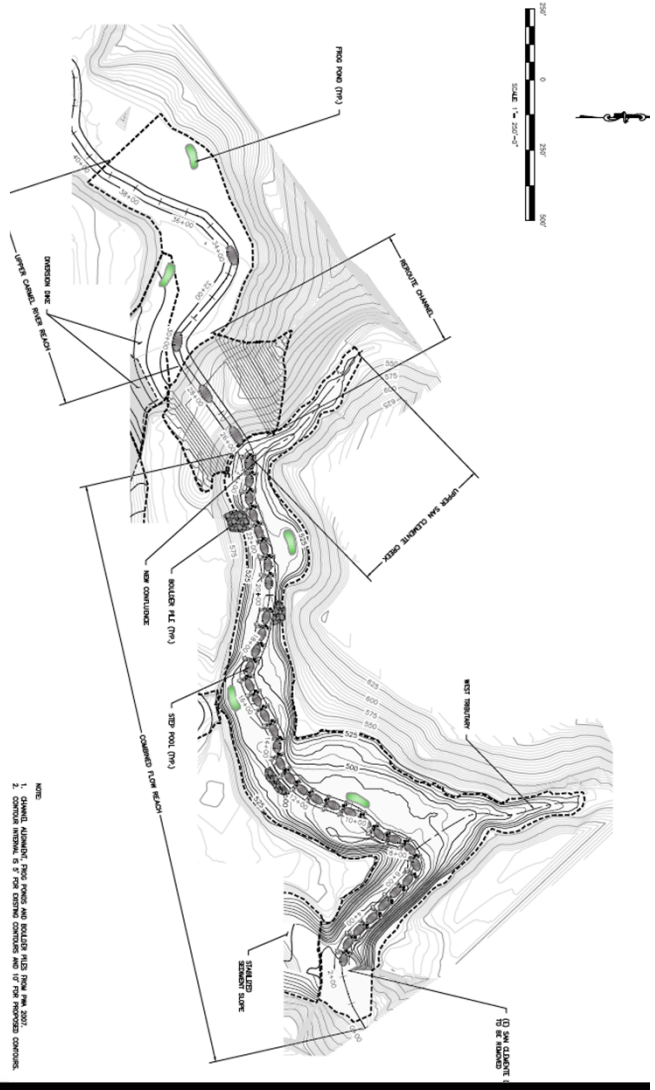
Revised Design Concepts

Channel Reconstruction

3. Primary Refinements
   a) Reroute Channel & US slope reduced
   b) US and DS improvement boundary extended
   c) Improvements extended up San Clemente Creek and East Tributary

4. Upcoming Technical Analyses
   a) Updated hydrologic analysis
   b) Hydraulic, geomorphic and sediment transport analysis
   c) Fish passage assessment

5. Challenges
   a) Incorporation of slope and unit morphology variability
   b) Approach to Upper Carmel River Reach
   c) Role/desired intensity for LWD
   d) Approach for stabilization of valley slopes



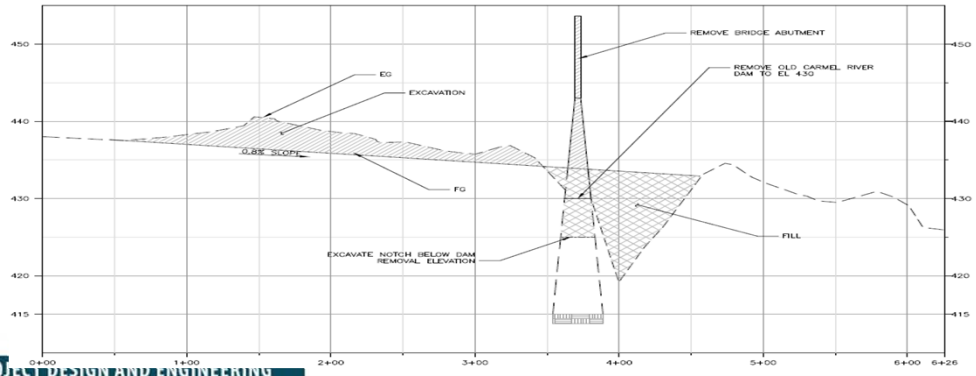
PROJECT DESIGN AND ENGINEERING

Revised Design Concepts

Old Carmel River Dam Removal

1. Primary Objectives
   a) Remove bridge and associated dam structure
   b) Meet fish passage criteria
   c) Manage sediment

2. Key Criteria
   a) Sediment transport balance / long-term equilibrium slope
   b) Ecological considerations



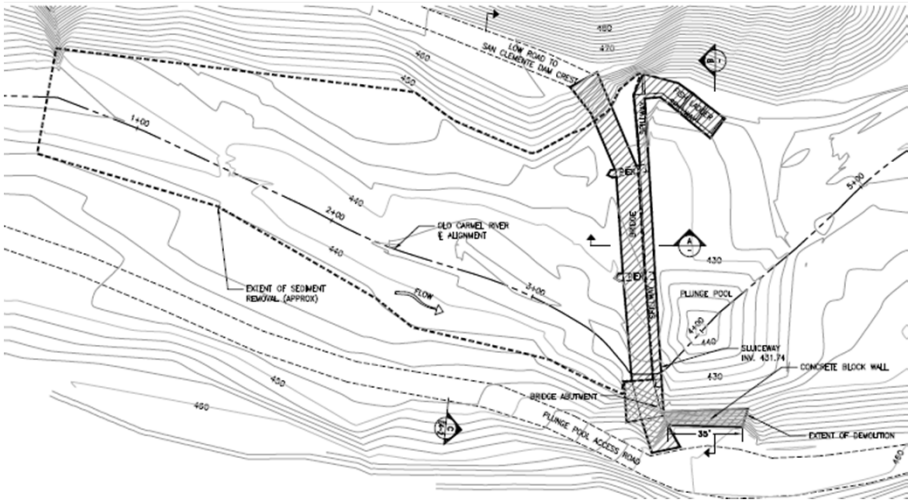
Revised Design Concepts

Old Carmel River Dam Removal

3. Primary Refinements
   a) Full removal of dam and associated sediment

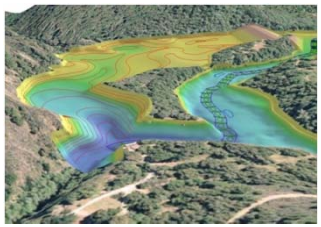
4. Upcoming Technical Analyses
   a) Updated hydrologic analysis
   b) Hydraulic and sediment transport modeling
   c) Fish passage assessment

5. Challenges
   a) Approach to sediment removal and restoration
   b) Approach to valley slope stability



Design Criteria Discussion





Wrap-Up