The Salt River Ecosystem Restoration Project
Phase 2 Design Update

Prepared for:

Humboldt County
Resource Conservation District
&
Salt River Watershed Council

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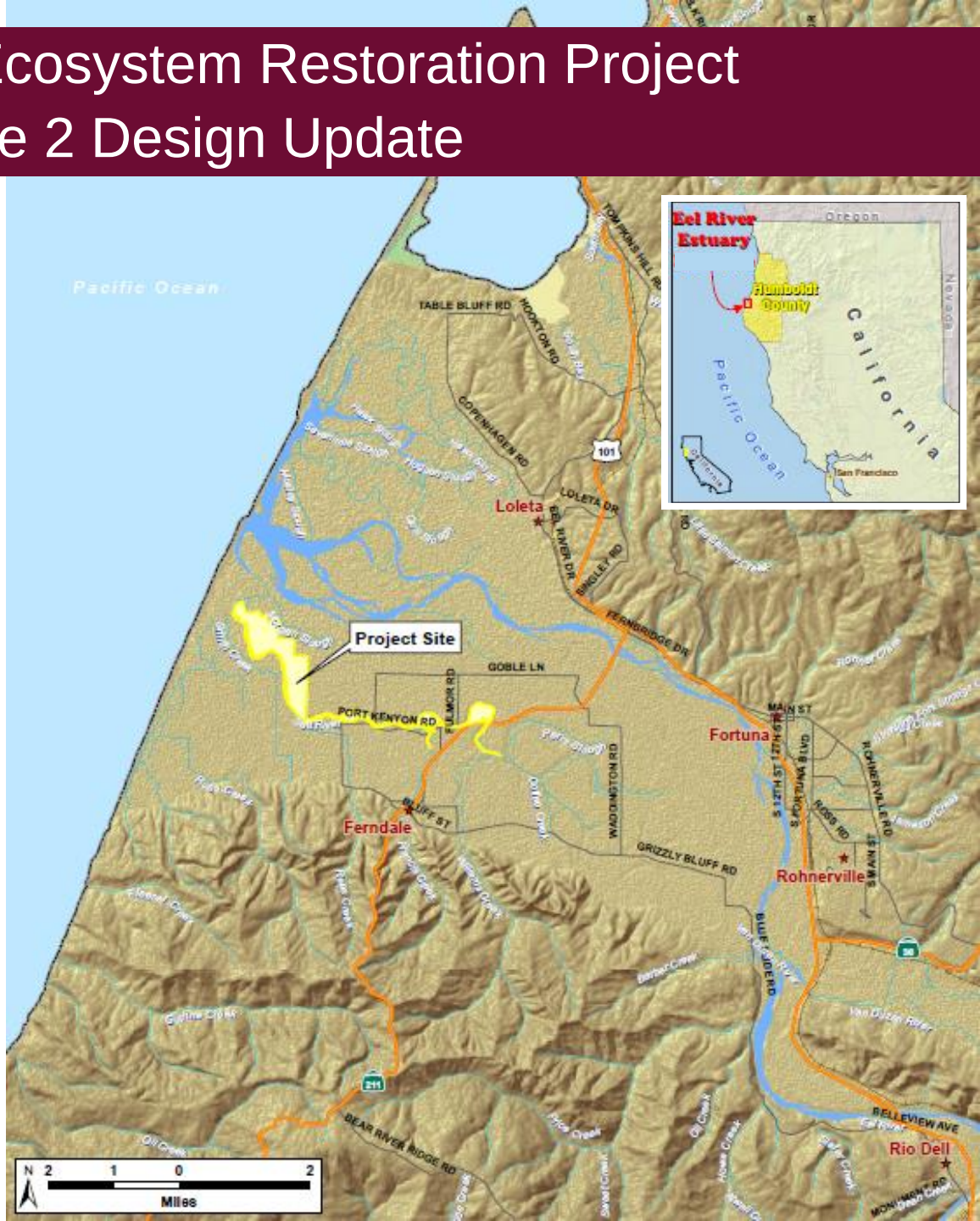
GHD

U.S. FISH & WILDLIFE SERVICE

Michael Love & Associates
Hydrologic Solutions



Acknowledgments

Salt River Watershed Council

KAMMAN HYDROLOGY
& ENGINEERING, INC

Northern Hydrology & Engineering

McBain & Trush

Presentation Overview

1. Project Overview
2. Phase 2 Design Goals/Objectives
3. Channel Design Development
   - Geomorphic Channel Grading
   - Instream Wood
   - Revegetation
4. Adaptive Management Plan (AMP)
5. Implementation Considerations
6. Q&A

Project Development
Watershed-Based and Ecosystem-Scale

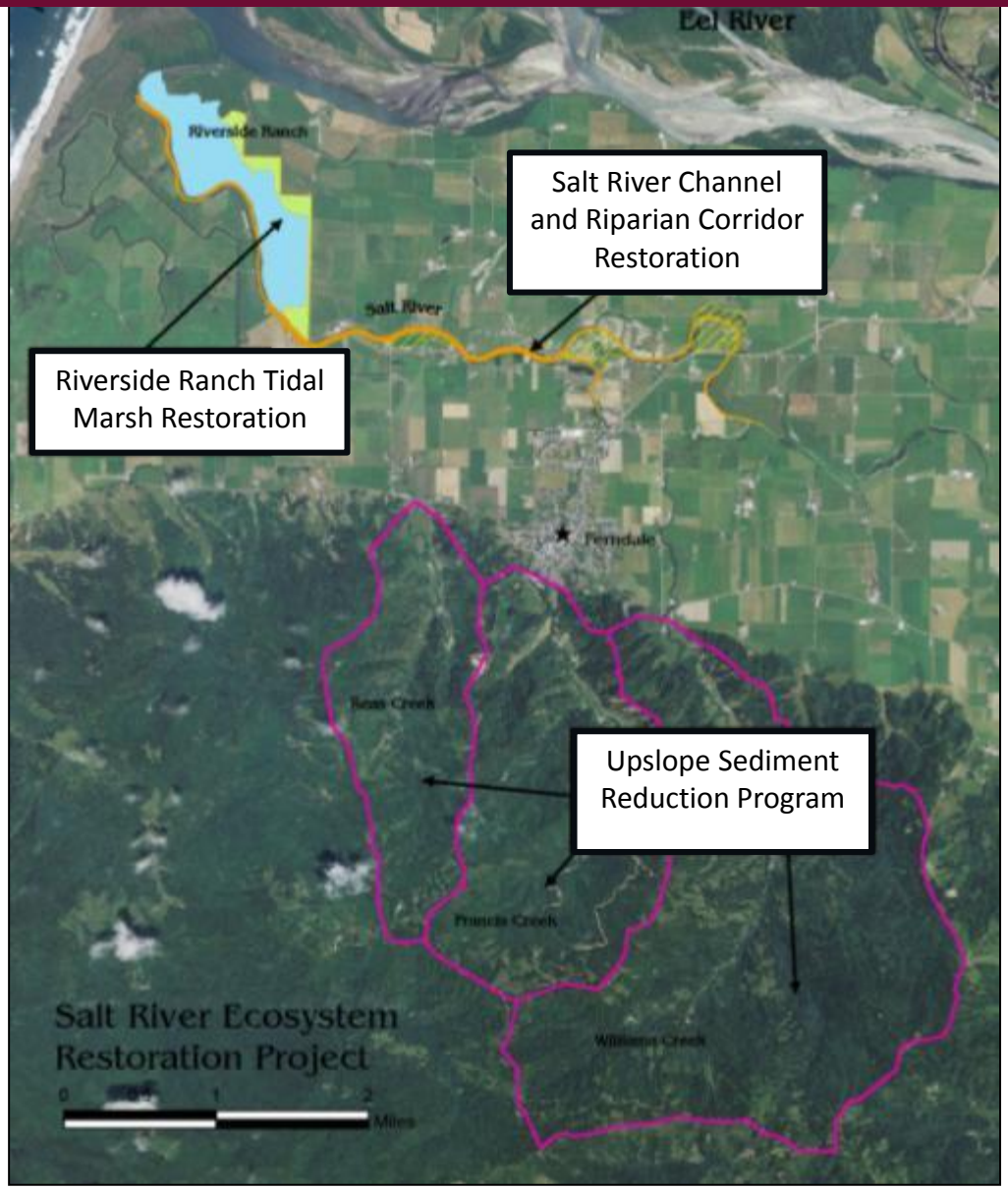
Primary Project Components

1. **Riverside Ranch Tidal Marsh Restoration**
   (Phase 1)

2. **Salt River Channel and Riparian Floodplain Corridor Restoration**
   (Phase 2)

3. **Upslope Sediment Reduction Program**

4. **Adaptive Management Plan –**
   Riverside Ranch, Channel and Riparian Floodplain, Sediment Maintenance and Management



Overall Project Goals

1. Rehabilitate the Salt River channel and adjacent riparian floodplain by increasing hydraulic conveyance and constructing habitat features that re-establish ecological processes beneficial to fish and other native species;

2. Restore historic estuarine habitat and tidal connectivity within the lower Salt River;

3. Improve water quality and drainage efficiency across the floodplain and implement long-term upslope sediment reduction;

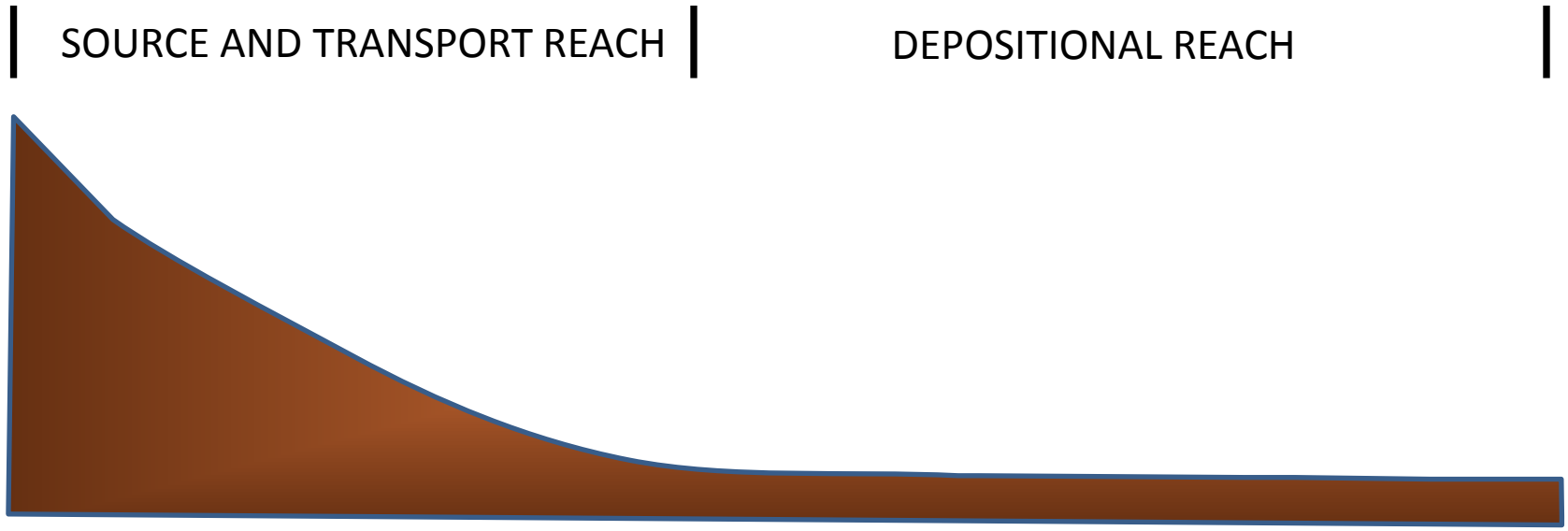
4. Manage excess sediment loads by maximizing fluvial and tidal channel sediment transport capacity and implementing sediment management areas;

5. Initiate a long-term corridor adaptive management process that maximizes ecological restoration success in a working landscape

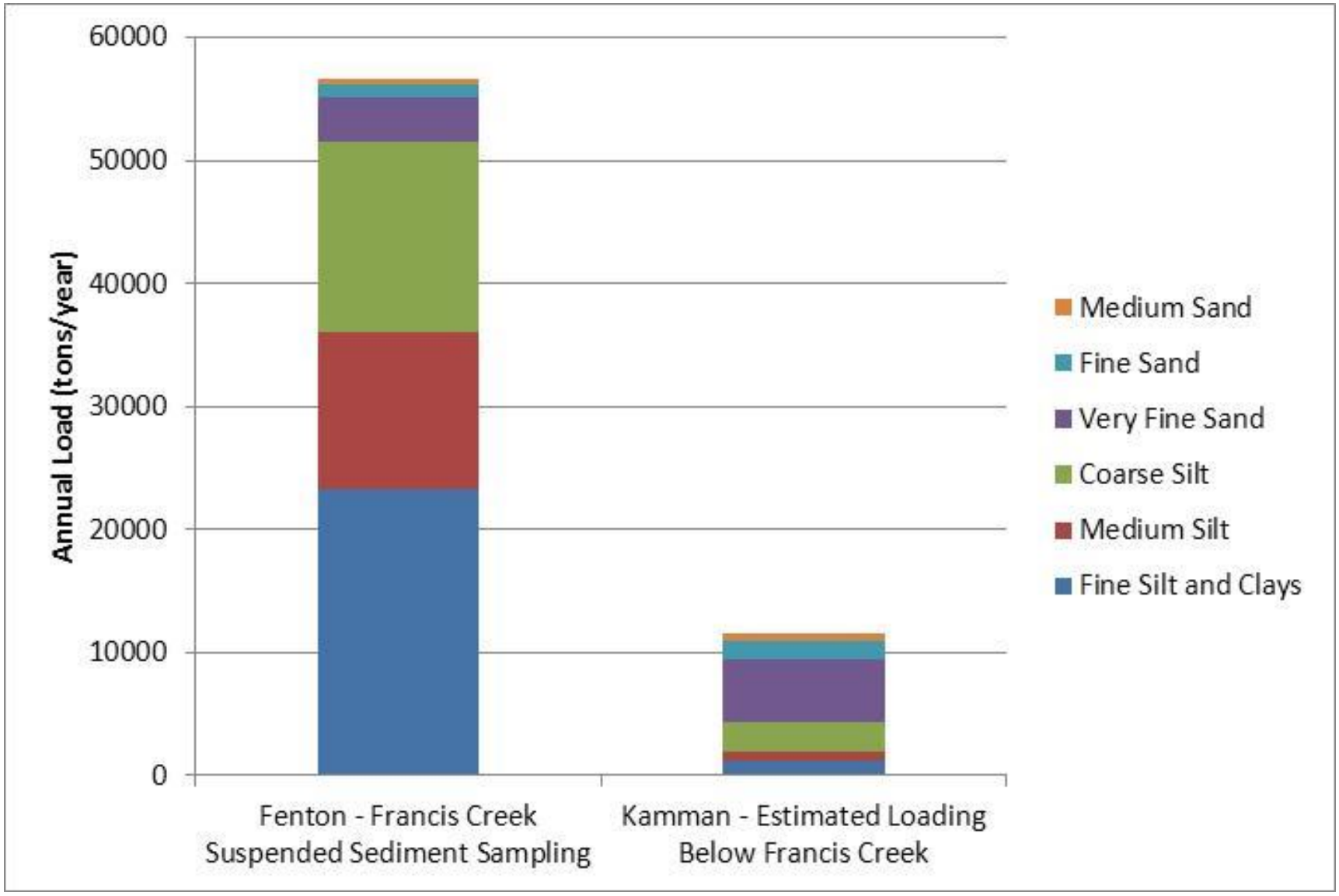
Geomorphic Channel Design Rational

Geomorphic Channel Design Rational

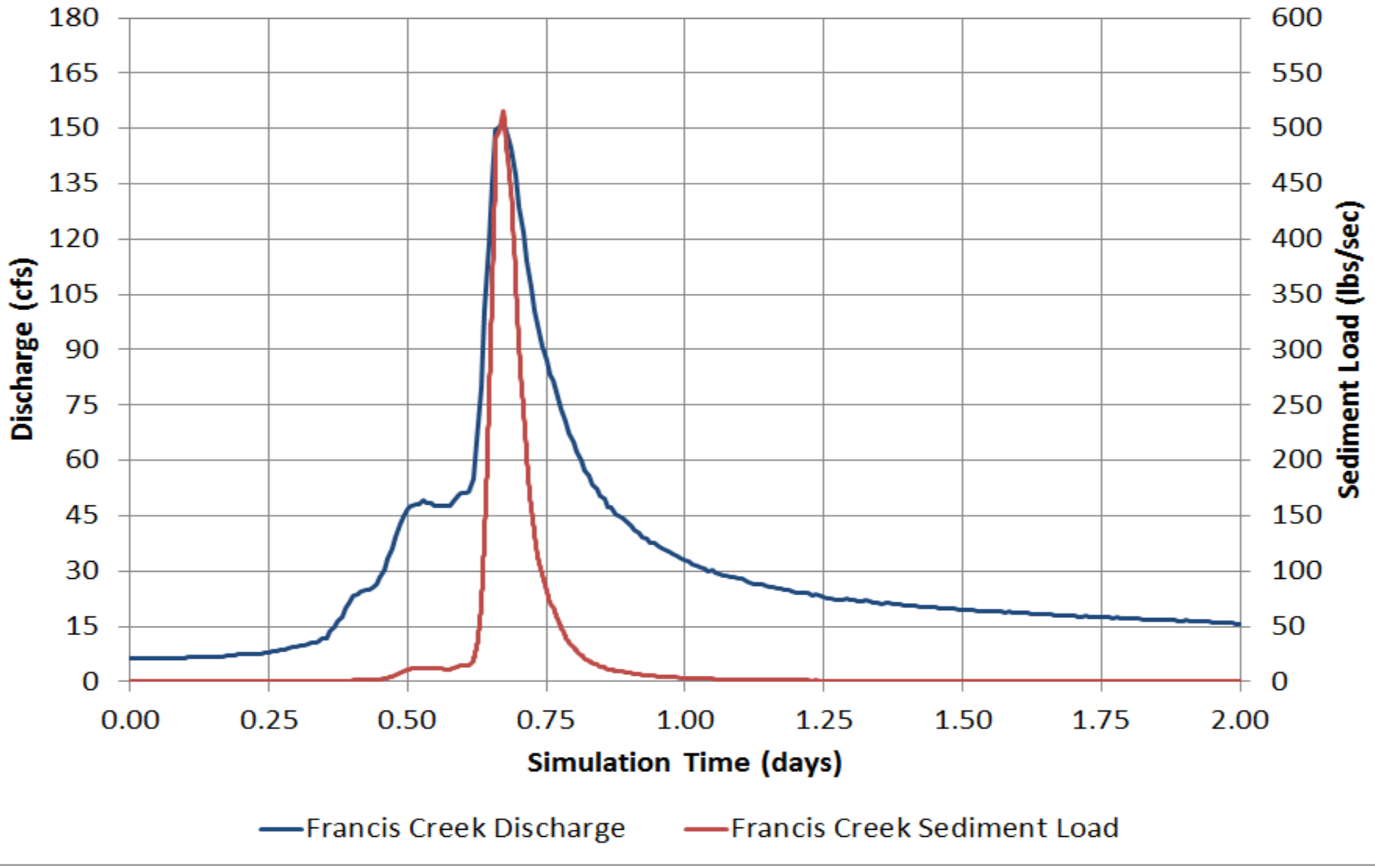
- Transport hyperloads of sediment through low-slope channel



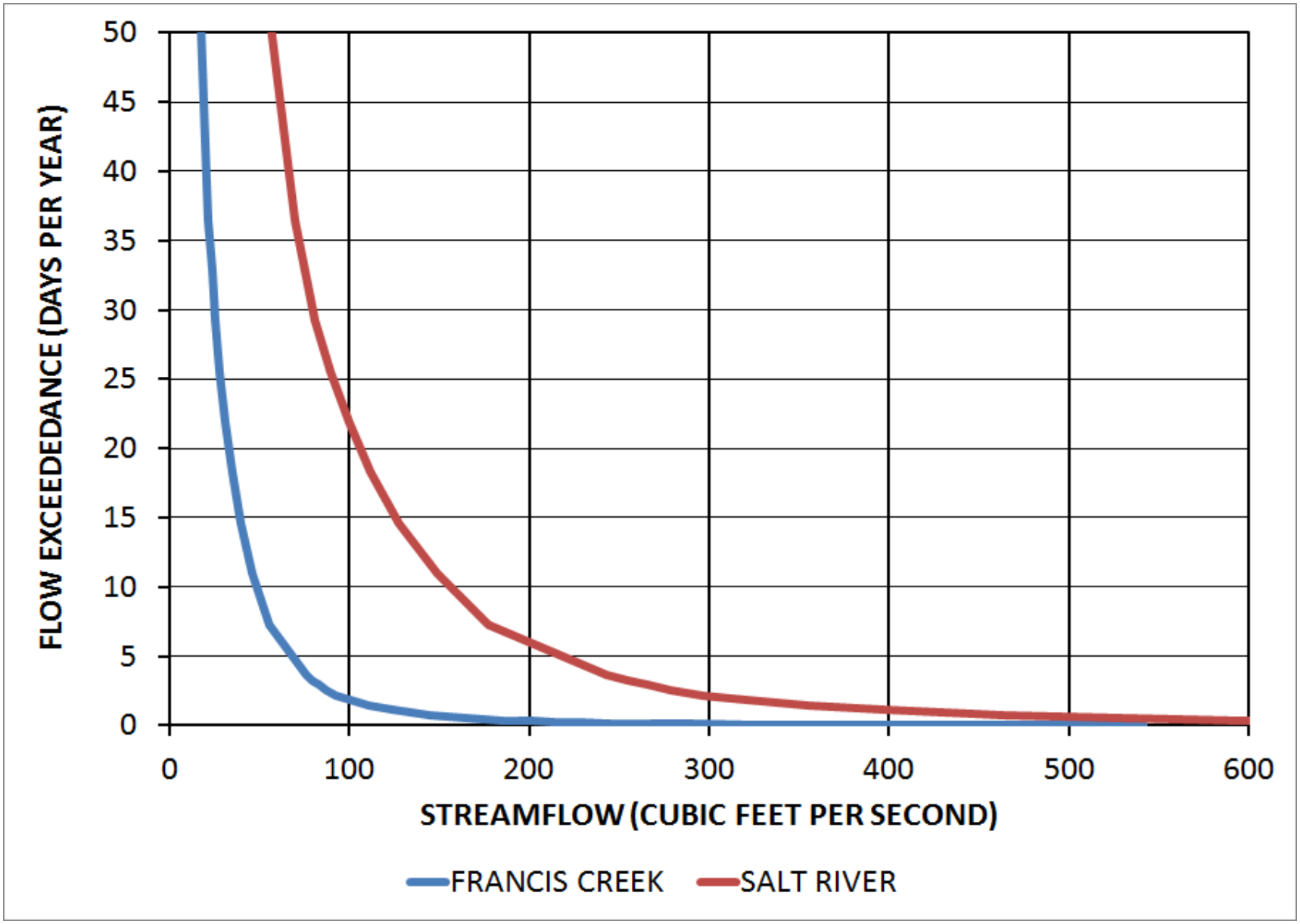
Sediment Supply and Deposition Rates



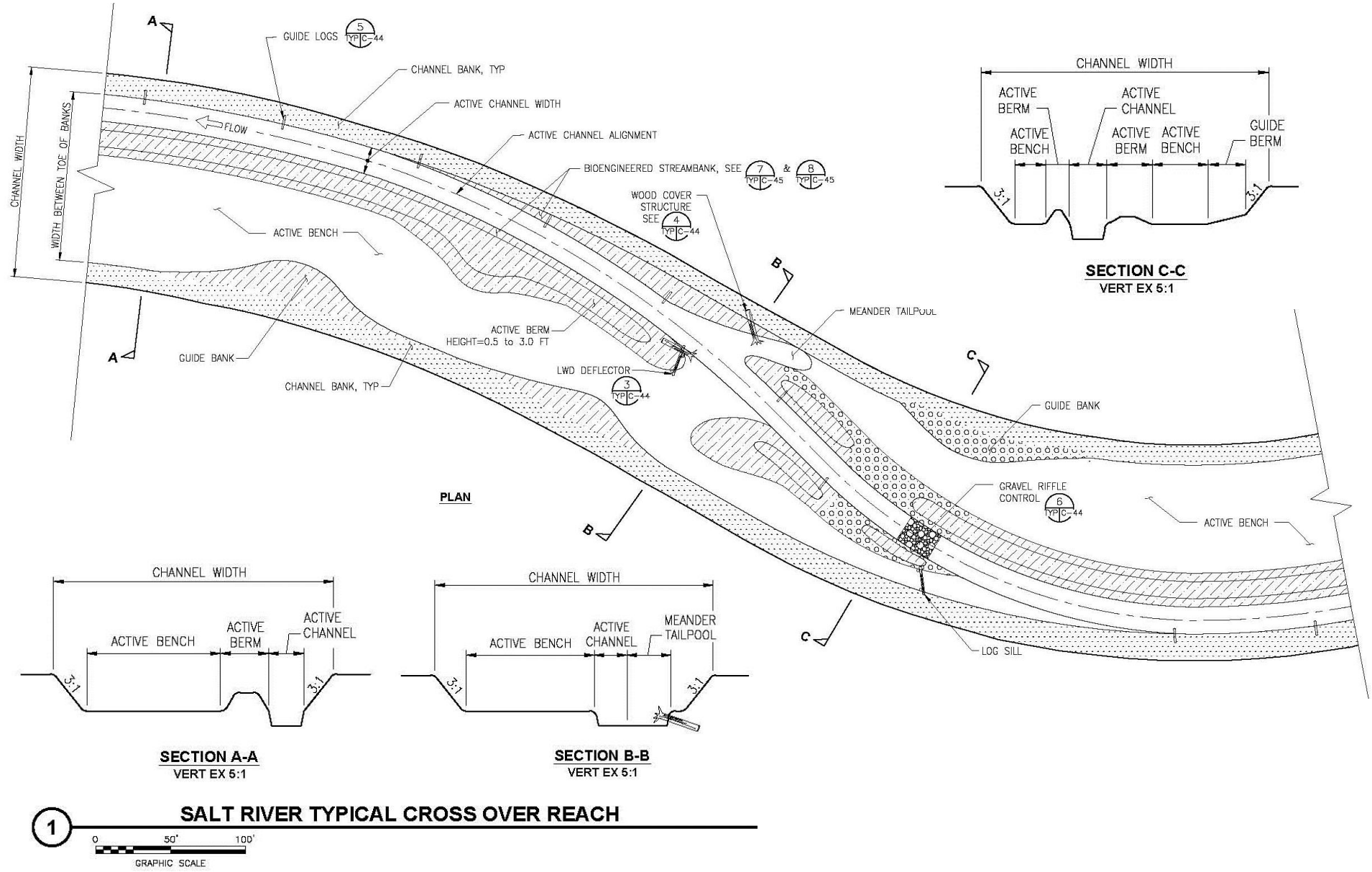
Most Sediment Comes with High Discharge



High Flow Events Occur Only a Few Days a Year



Phase 2: Salt River Channel and Riparian Floodplain Corridor Geomorphic and 2-D Hydraulic Modeling Design Approach

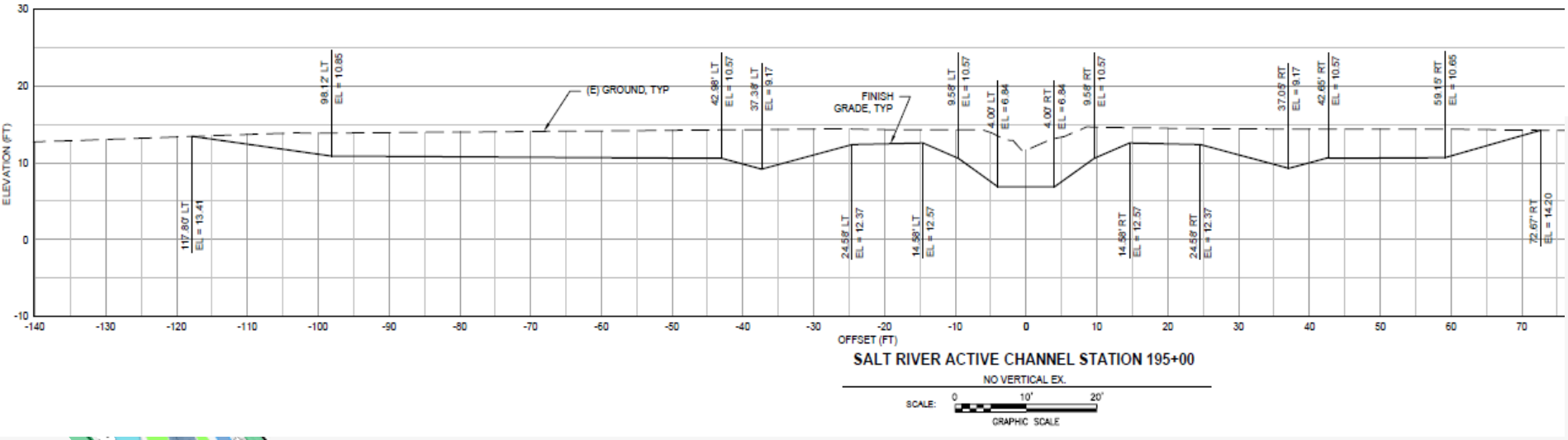


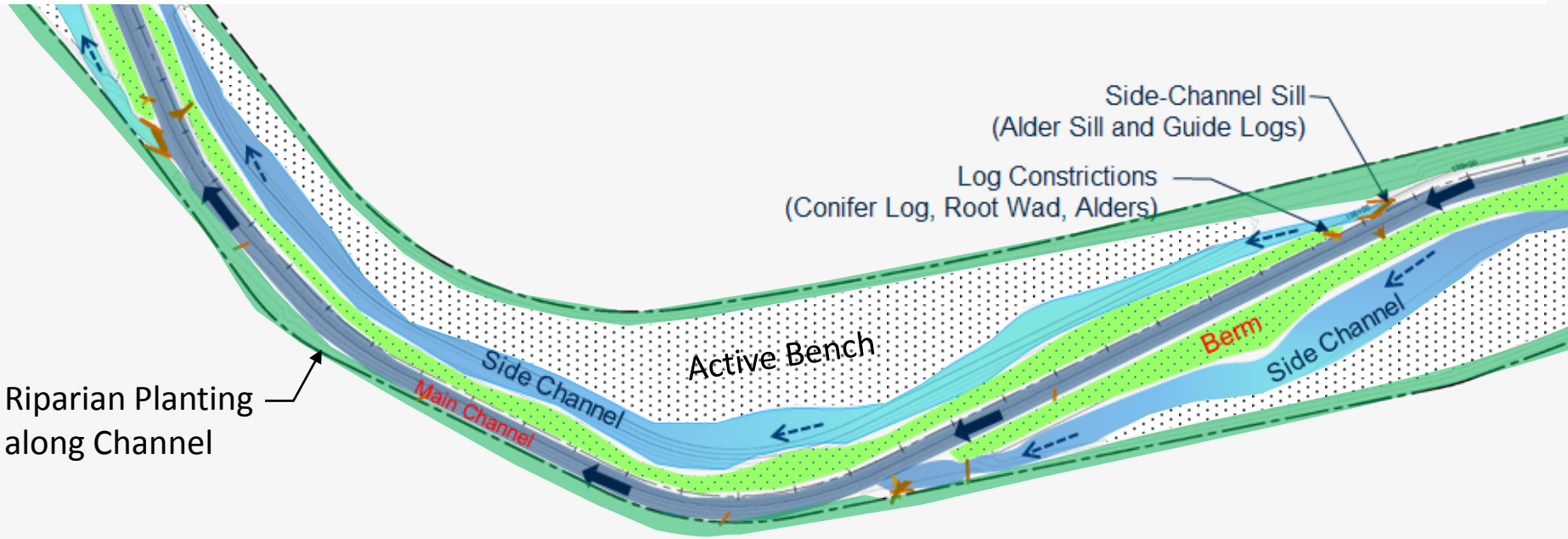
1 SALT RIVER TYPICAL CROSS OVER REACH

0 50' 100'

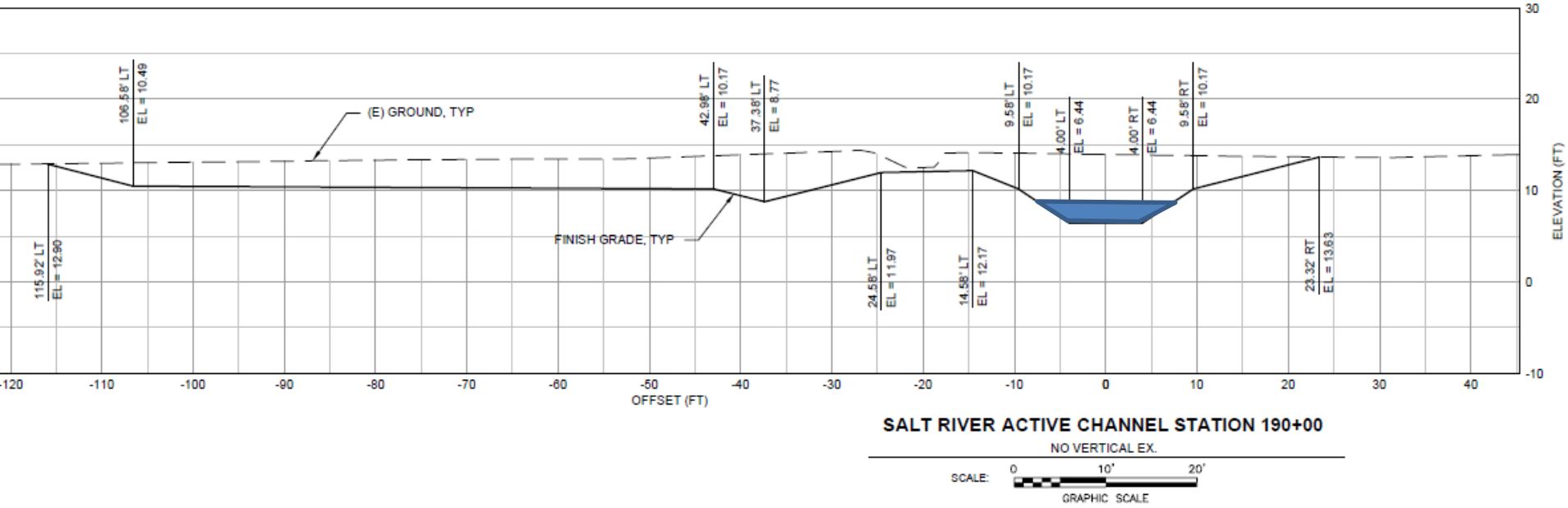
GRAPHIC SCALE

Channel Cross-section Design





Channel Cross-section Design



SALT RIVER ACTIVE CHANNEL STATION 190+00

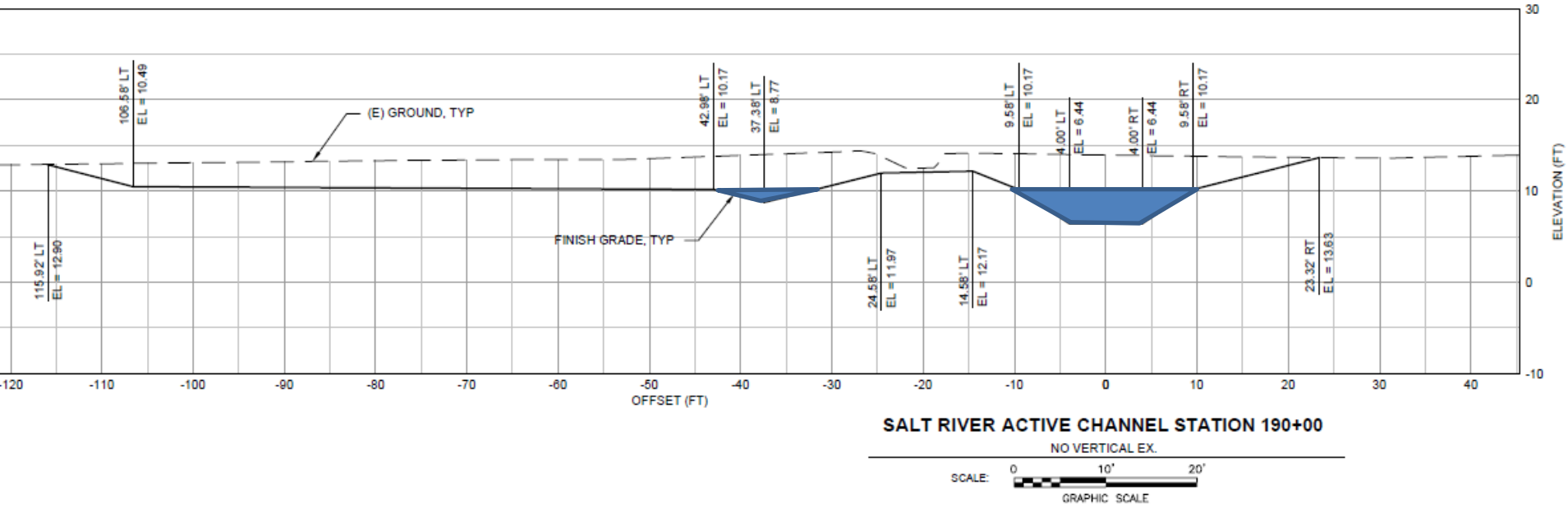
NO VERTICAL EX.

SCALE: 0 10' 20'

GRAPHIC SCALE

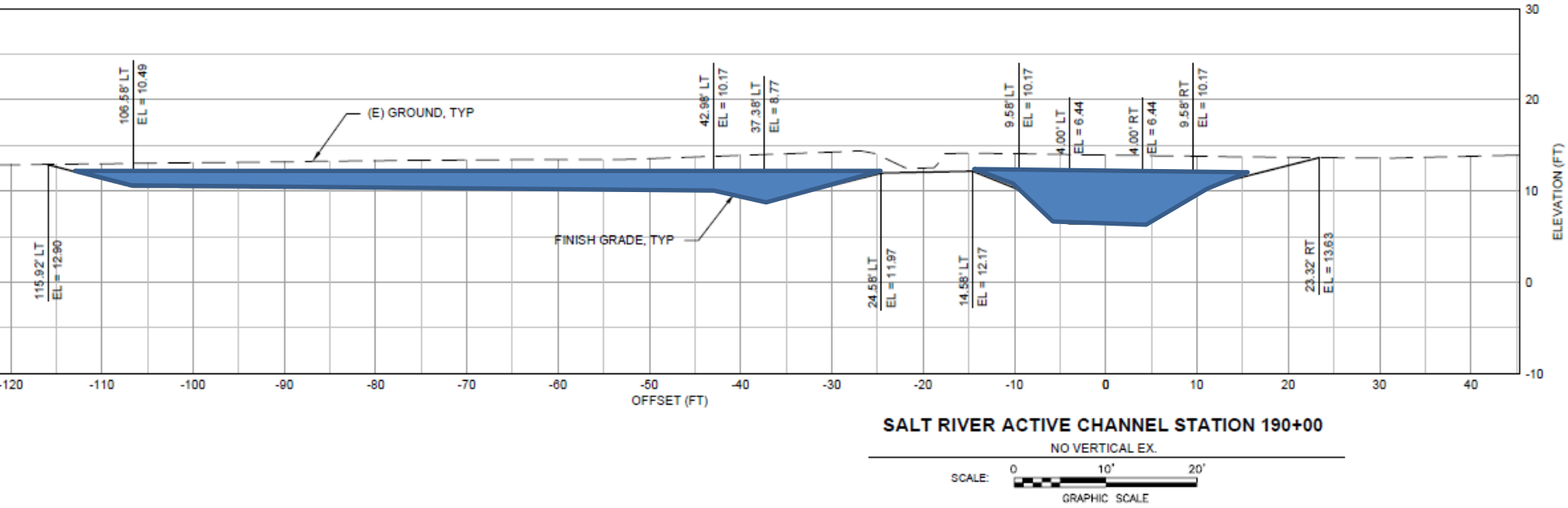
Effective Discharge: 86 cfs
Exceeded 27 days/year

Channel Cross-section Design



Full Active Channel
Discharge: 138 cfs
Exceeded 13 days/year

Channel Cross-section Design



SALT RIVER ACTIVE CHANNEL STATION 190+00

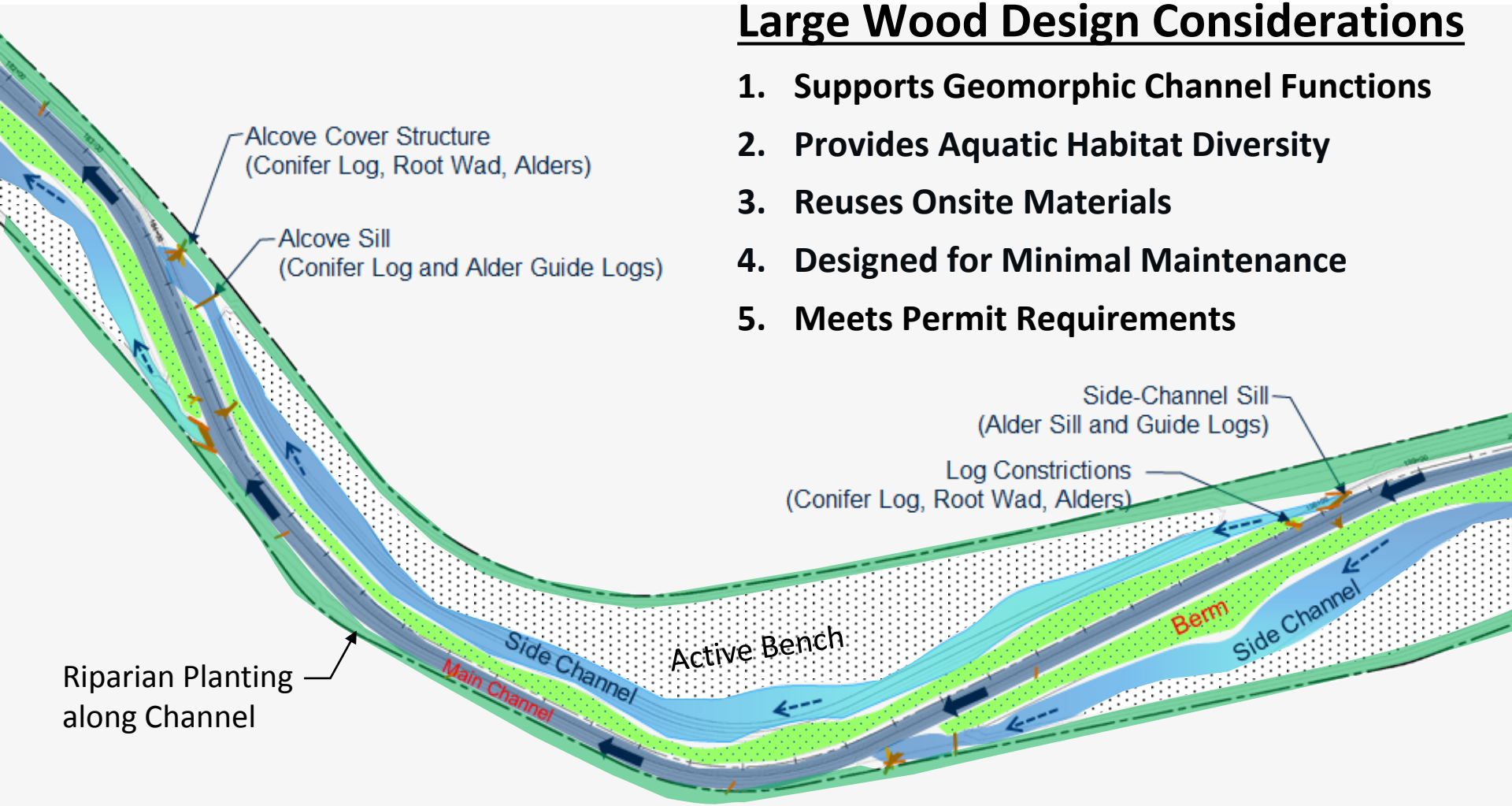
NO VERTICAL EX.

SCALE: 0 10' 20'

GRAPHIC SCALE

Berm Overtopping
Discharge: 400 cfs
Exceeded 1 day/year

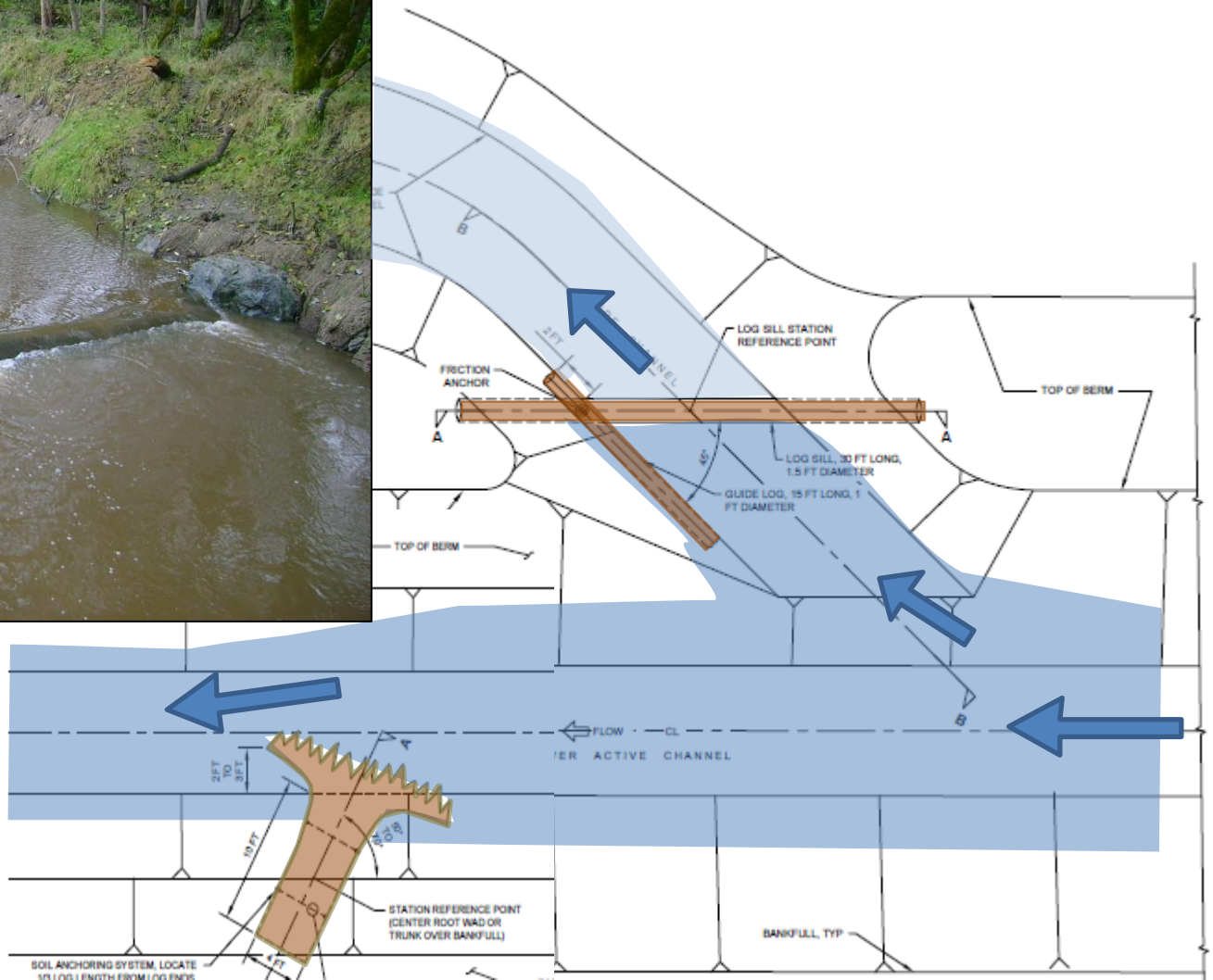
Large Wood Used to Create Geomorphic Features



Large Wood Design Considerations

1. **Supports Geomorphic Channel Functions**
2. **Provides Aquatic Habitat Diversity**
3. **Reuses Onsite Materials**
4. **Designed for Minimal Maintenance**
5. **Meets Permit Requirements**

Log Sill Structures (Side Channel Inlet)

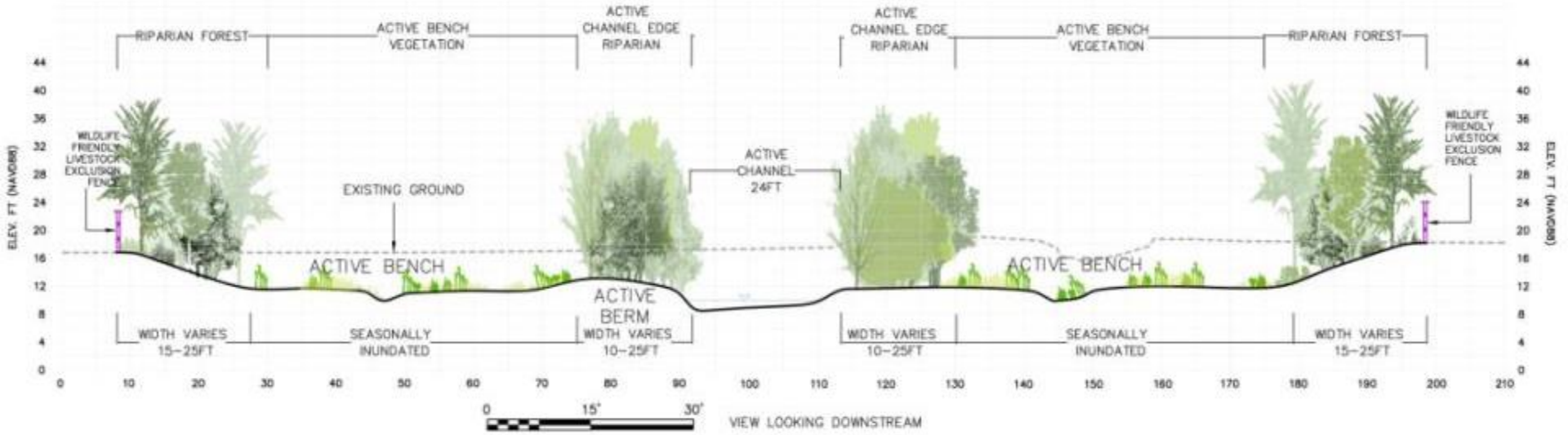


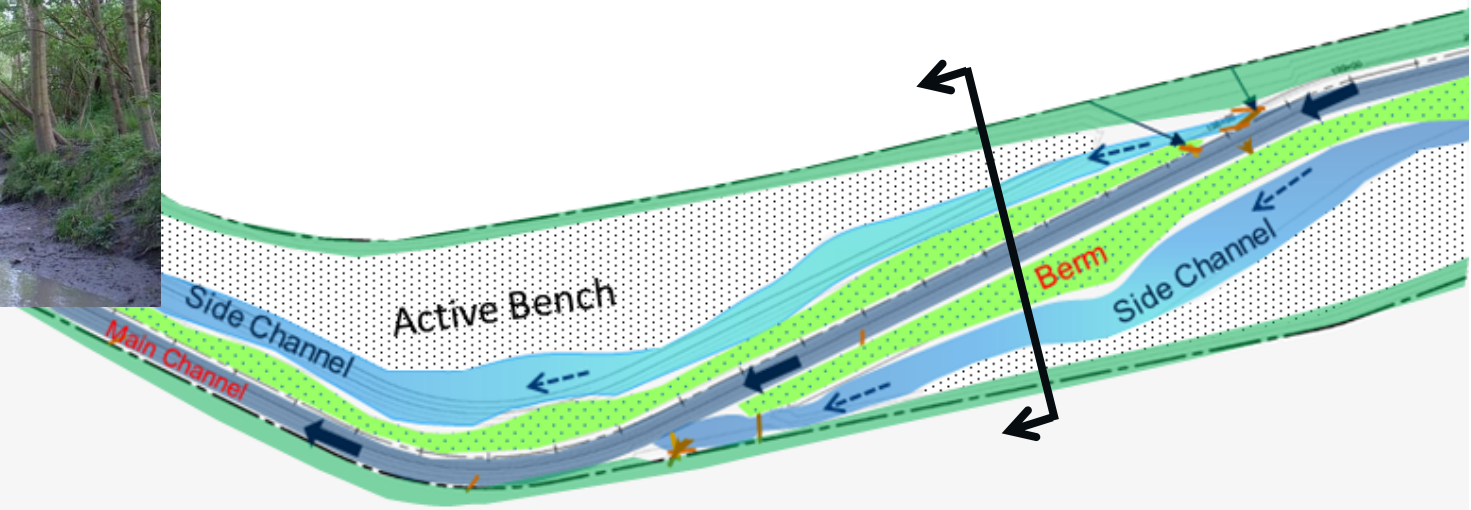
Revegetation Design Approach

Revegetation Considerations

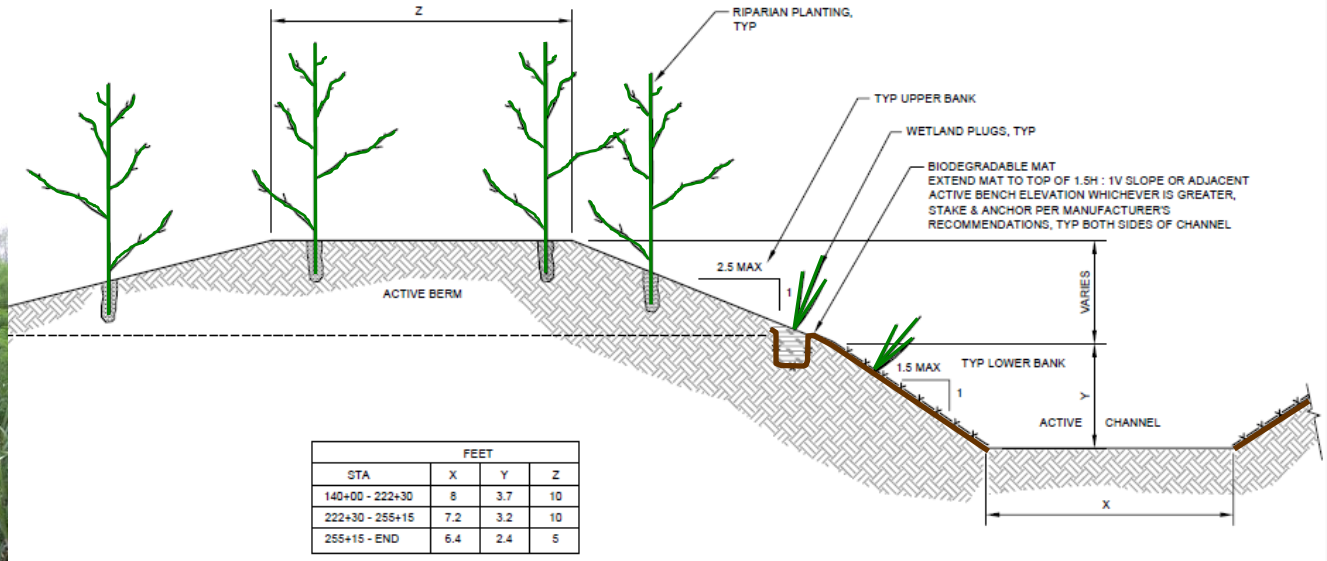
1. Compatible with geomorphic design and adjoining land uses
2. Short Term Erosion Control/SWPPP Compliance
3. Long Term Succession to Suppress Invasive Species
4. Permit Requirements (Planting Area and Species)
5. Freshwater and Brackish Habitats

Revegetation Design Approach





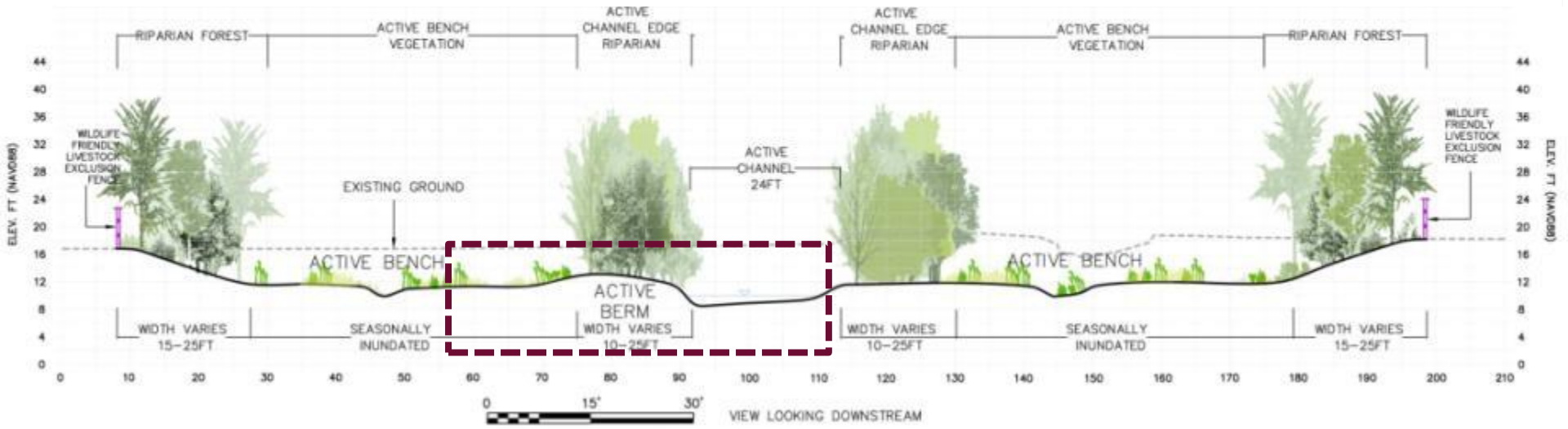
Revegetation Design Approach



FEET			
STA	X	Y	Z
140+00 - 222+30	8	3.7	10
222+30 - 255+15	7.2	3.2	10
255+15 - END	6.4	2.4	5

7 SALT RIVER ACTIVE CHANNEL BANK TYPICAL CROSS-SECTION

NTS



Adaptive Management Plan (AMP)
Long-term Monitoring and Management Program

- One of the Four Project Components
- Monitoring and management structure
- Identify monitoring components, triggering mechanisms and potential actions
- Relates project performance to goals & objectives
- Includes Roles for all Stakeholders
  - Watershed Council
  - HCRCD
  - Landowners
  - Regulatory Group
  - Funders
  - Technical Advisory
- Included in 10-year Permits
- Basis to Pursue Long-term Funding Opportunities

Adaptive Management Plan (AMP)
Long-term Monitoring and Management Program

The Structure

Decision Making / Funding Acquisition

PROJECT MANAGEMENT TEAM
- HCRCD
- State Coastal Conservancy
- Watershed Council
- CDFG
- NRCS

Project Management / Coordination

MONITORING PROGRAM COORDINATOR
- HCRCD / Watershed Council (Year 0 - Year 5)
- Watershed Council / HCRCD (Year 5 - Year 10+; as needed)

MONITORING GROUP
- consultants
- staff
- students
- professors
- volunteers

Advisory

TECHNICAL ADVISORY WORK GROUP
- outside reviewers
- independent experts / scientists

REGULATORY WORK GROUP
- CDFG
- NCRWQCB
- USFWS
- County of Humbolt
- Air Quality Board
- State Lands Commission
- Calif. Coastal Commission
- USACE
- NMFS

STAKEHOLDER WORK GROUP
- landowners
- merchants
- politicians
- interested parties
- local citizens

The Process