Prickly Pear Creek Realignment Project Update

March 20, 2014

Presented By: METG and the PPC Design Team.

Meeting Goals

- ✓ Provide information and answer your questions
- ✓ Listen to your goals, priorities and concerns about site cleanup and redevelopment
- ✓ Create forum for an “idea exchange”
- ✓ Identify ways to improve communication
- ✓ Tonight's Focus on PPC

Tonight's Format

- ✓ Opening
- ✓ Technical Updates
  - Overview of PPC Realignment Project
  - Topics of Interest Noted by Community:
    - » Flooding
    - » Sedimentation
- ✓ Open Discussion

Custodial Trust – Private Trust with a Public Purpose

- ✓ Responsibilities specified in Settlement Agreement
  - Take ownership of former Asarco property
    - Implement cleanup
      - ➢ Required by Consent Decree
      - ➢ Report to EPA as Lead Agency
    - Transfer/sell properties
  - Responsible management of Trust funds
  - Beneficiaries US and State of Montana
- ✓ Finite trust funds restricted to cleanup, not for:
  - Property improvements
  - Restoration

QUESTIONS?

Smelter Site Orientation and Cleanup Objectives


Highway 12/East Helena
End of PPC Construction
Slag Pile
Prickly Pear Creek
Plant Site
Lower Lake
Smelter Dam
Upper Lake
Tito Park
South Plant Area

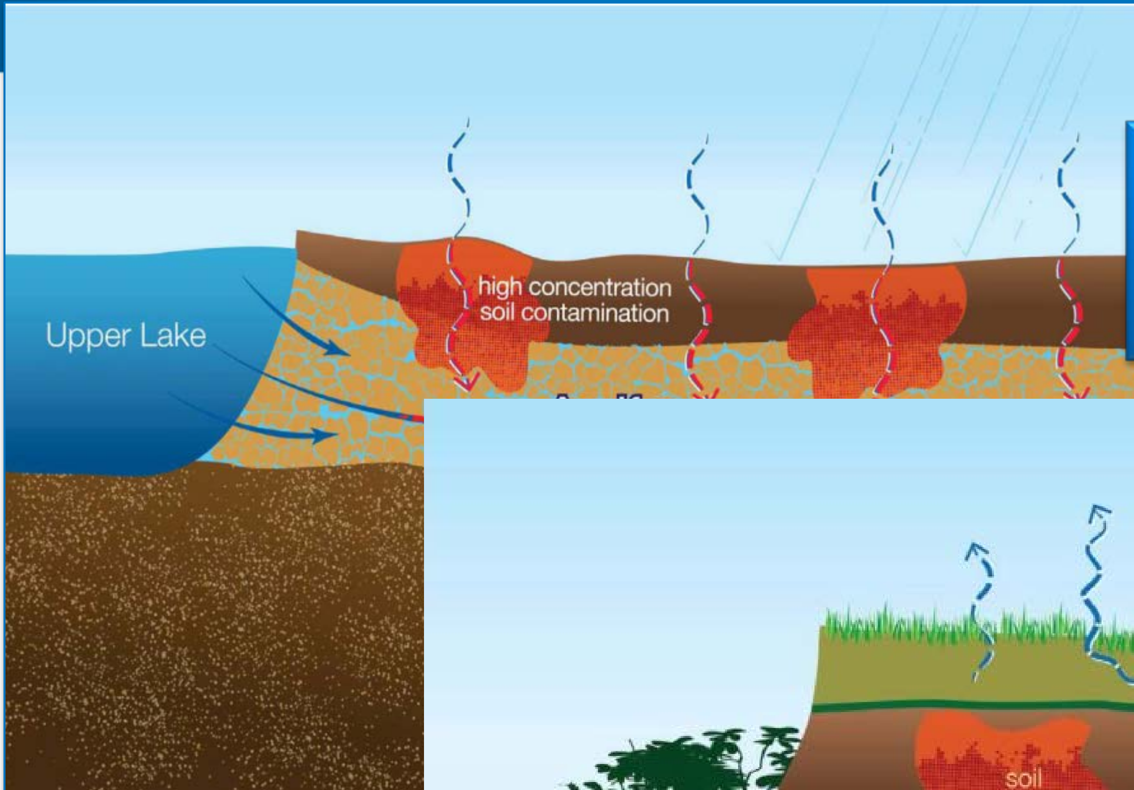
RCRA Corrective Action Cleanup

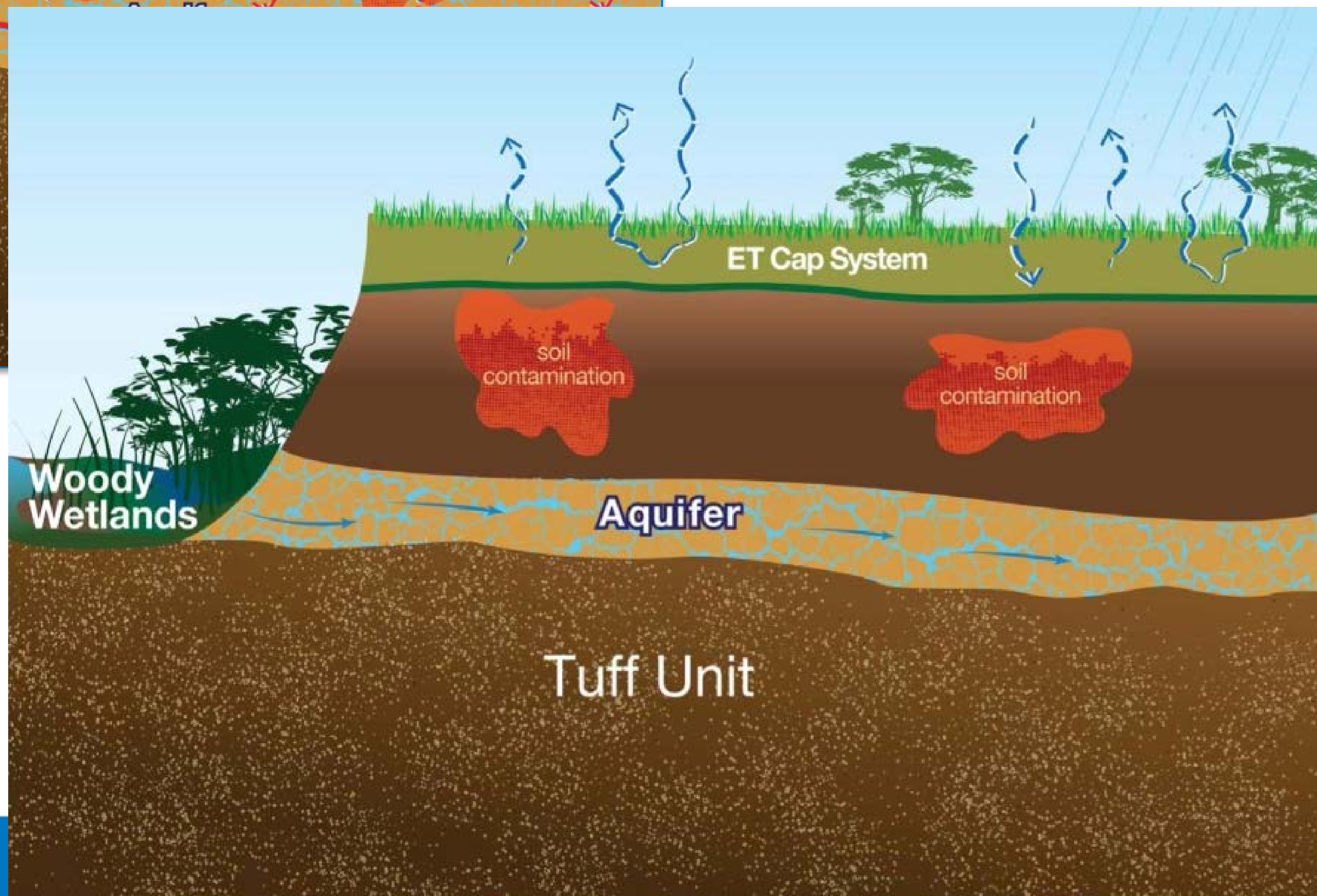
- ✓ Goal – Protection of human health and the environment
  - Control exposure to contaminants
  - Address groundwater contamination
- ✓ Steps
  - Investigation = RCRA Facility Investigation (RFI)
  - Remedy Evaluation = Corrective Measures Study (CMS) underway
  - Remedy Selection by EPA
  - Final Remedy Implementation
  - Interim Measures can be done at any time

How Does Prickly Pear Creek Realignment Fit into Cleanup?

- ✓ Key part of South Plant Hydraulic Control (SPHC)
  - Dewatering Upper and Lower Lakes
  - Lowers groundwater table without pumping
  - Reduces contact with contaminants in soils
- ✓ Added benefits:
  - Stop erosion of slag pile
  - Improved fish passage
  - Creates stable and functional stream corridor
- ✓ Implemented as IM
  - Earlier start for groundwater cleanup
  - Actual performance will be monitored

SPHC IM Concept Overview





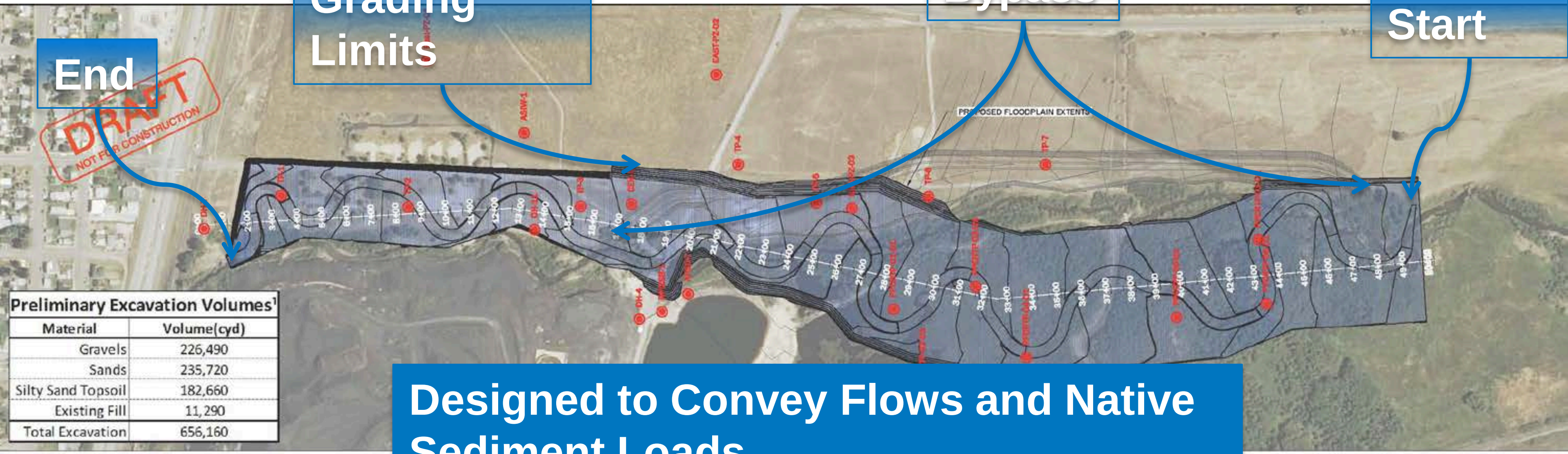
QUESTIONS?

PPC DESIGN UPDATE

Key Design Objectives

- ✓ Create a sustainable creek
  - ✓ Develop stable flow conditions and gradients;
  - ✓ Designing for low and high flows,
  - ✓ Adequate storage capacity and
  - ✓ <u>Natural processes</u>
- ✓ Groundwater elevations as low as possible to meet gradients and water interface with wetland areas.
- ✓ Design a stable stream channel and floodplain that meets all applicable permitting requirements

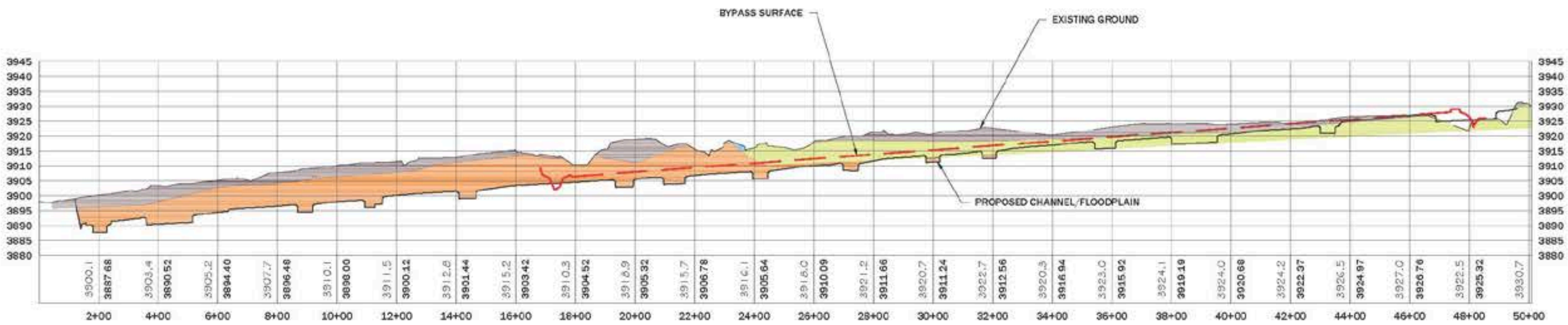
30% Design



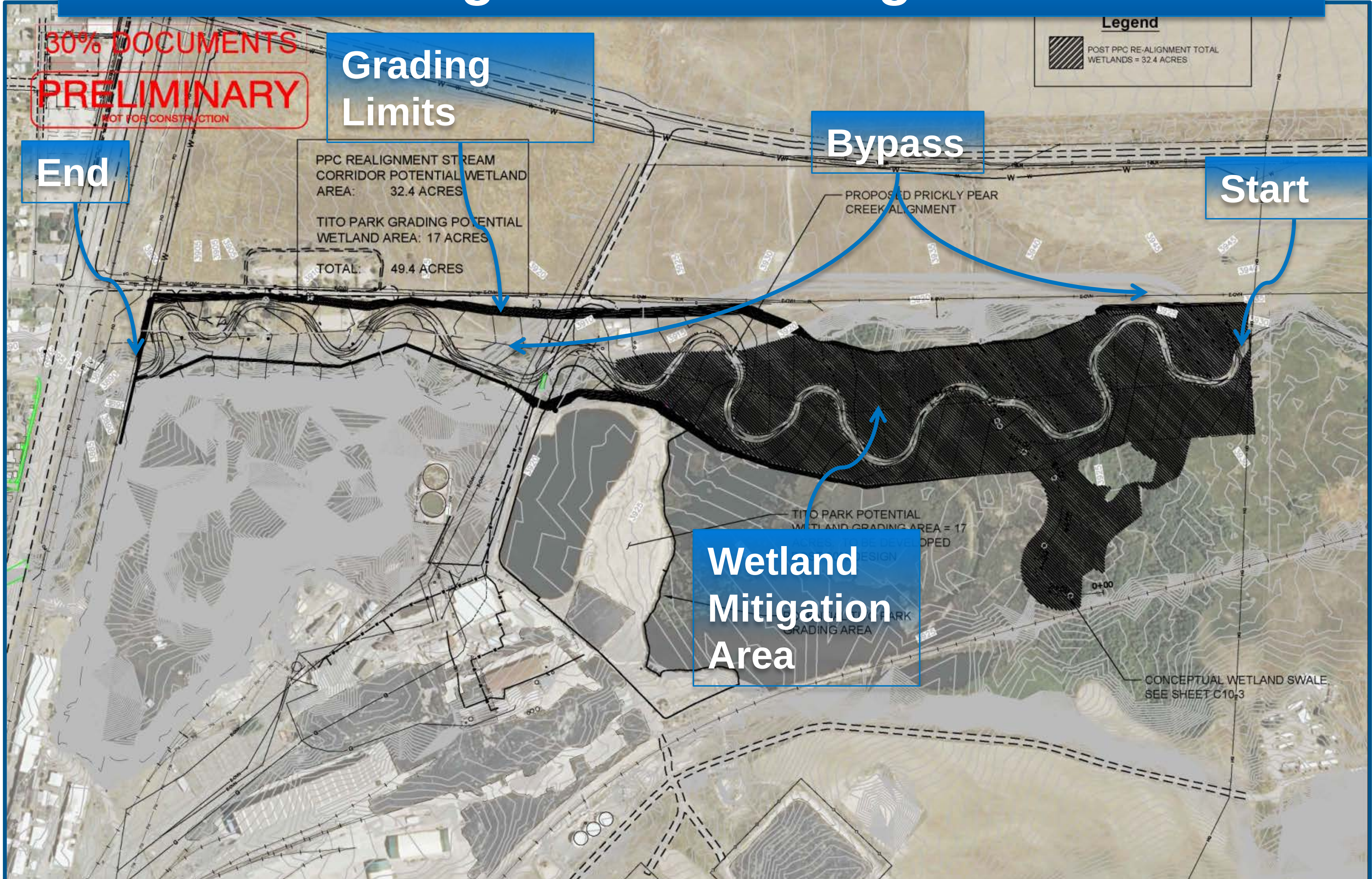
Preliminary Excavation Volumes[1]	
Material	Volume(cyd)
Gravels	226,490
Sands	235,720
Silty Sand Topsoil	182,660
Existing Fill	11,290
Total Excavation	656,160

NOTES:
1. VOLUMES ONLY INCLUDE CUT MATERIALS AND DO NOT TAKE INTO ACCOUNT FILL MATERIALS THAT MAY BE REQUIRED.

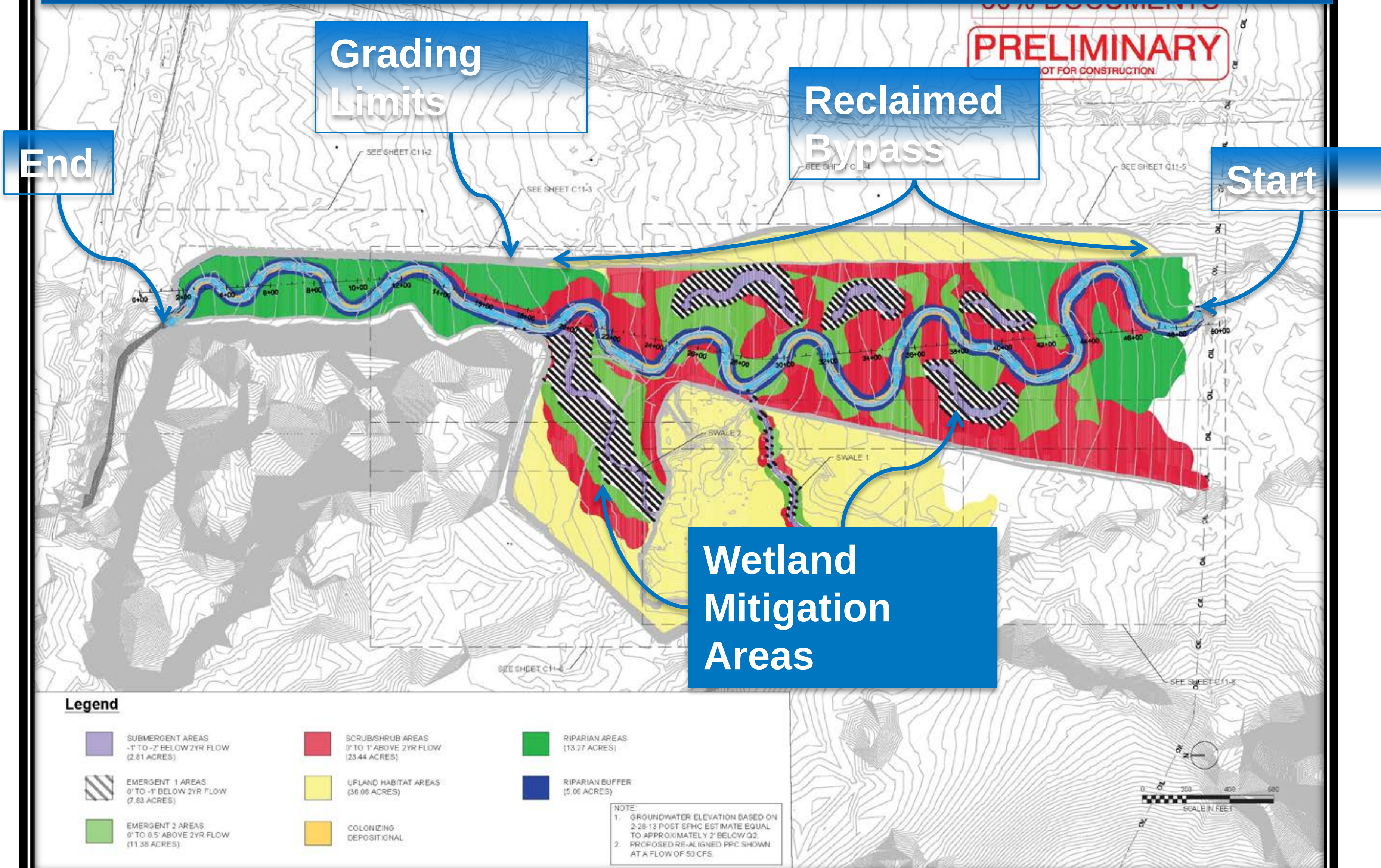
Designed to Convey Flows and Native Sediment Loads



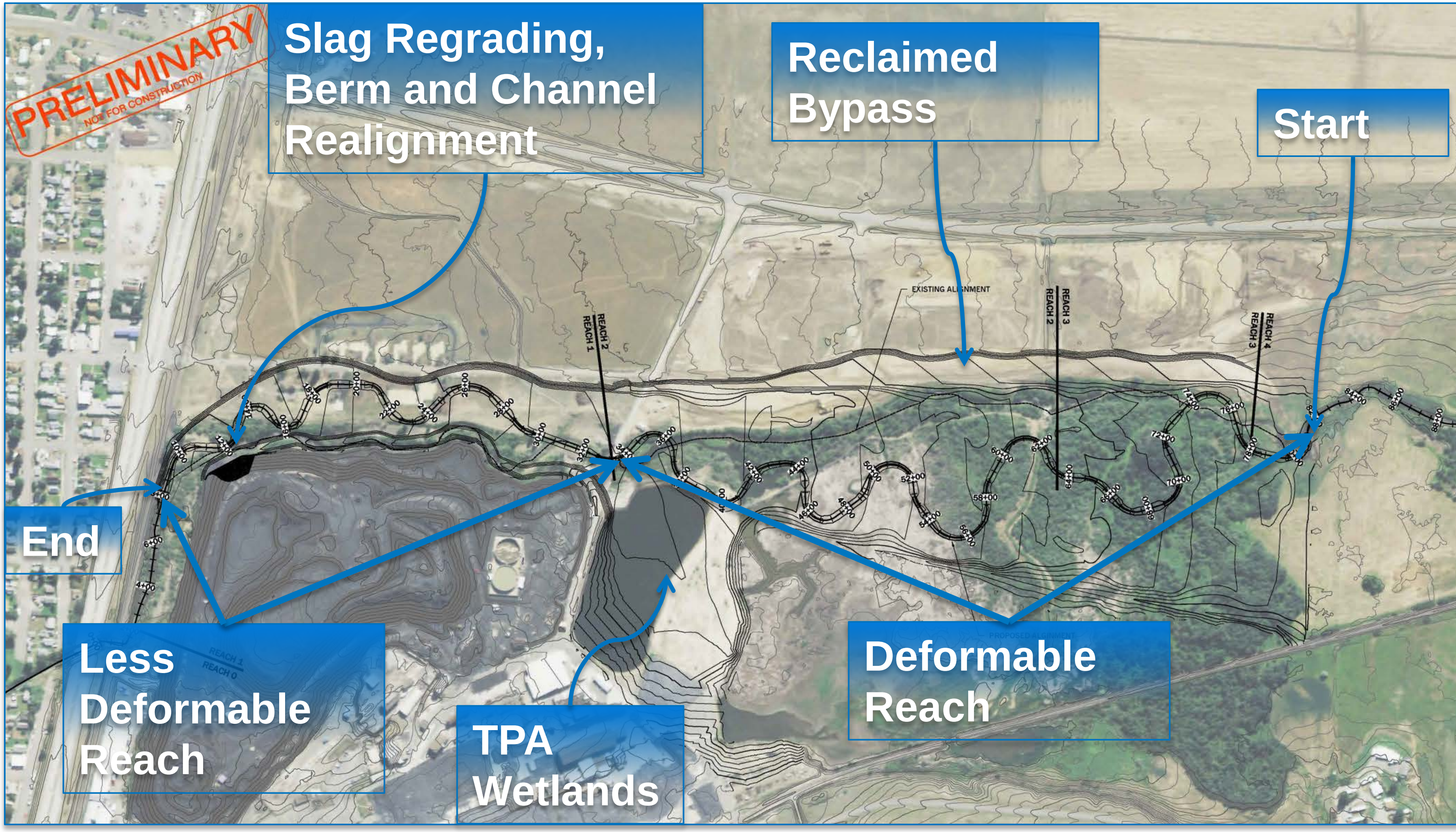
30% Design Wetland Mitigation Area



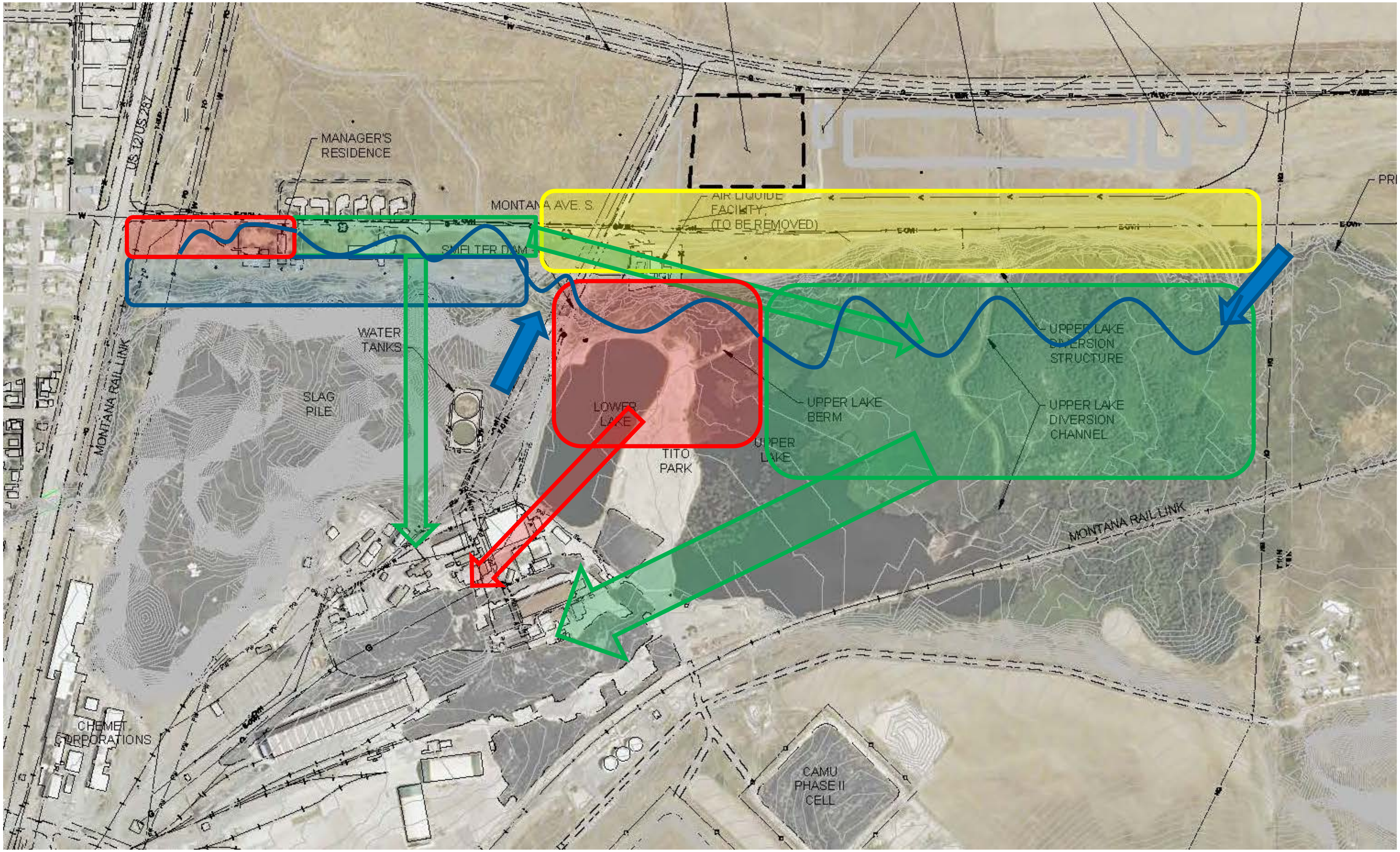
60% Design Stream/Wetland Mitigation Area



90 % Stream Reconstruction Reach

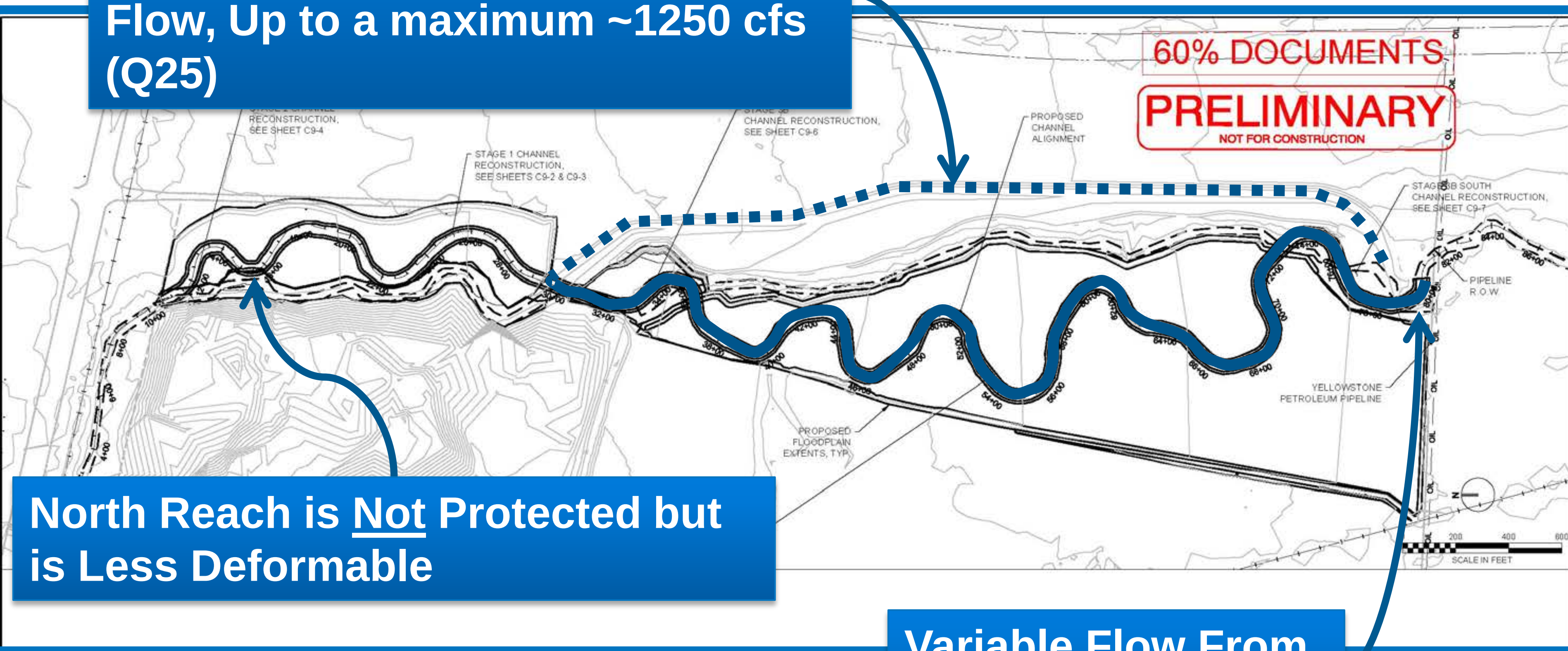


Construction Sequencing



INTERIM FLOODPLAIN CONDITION

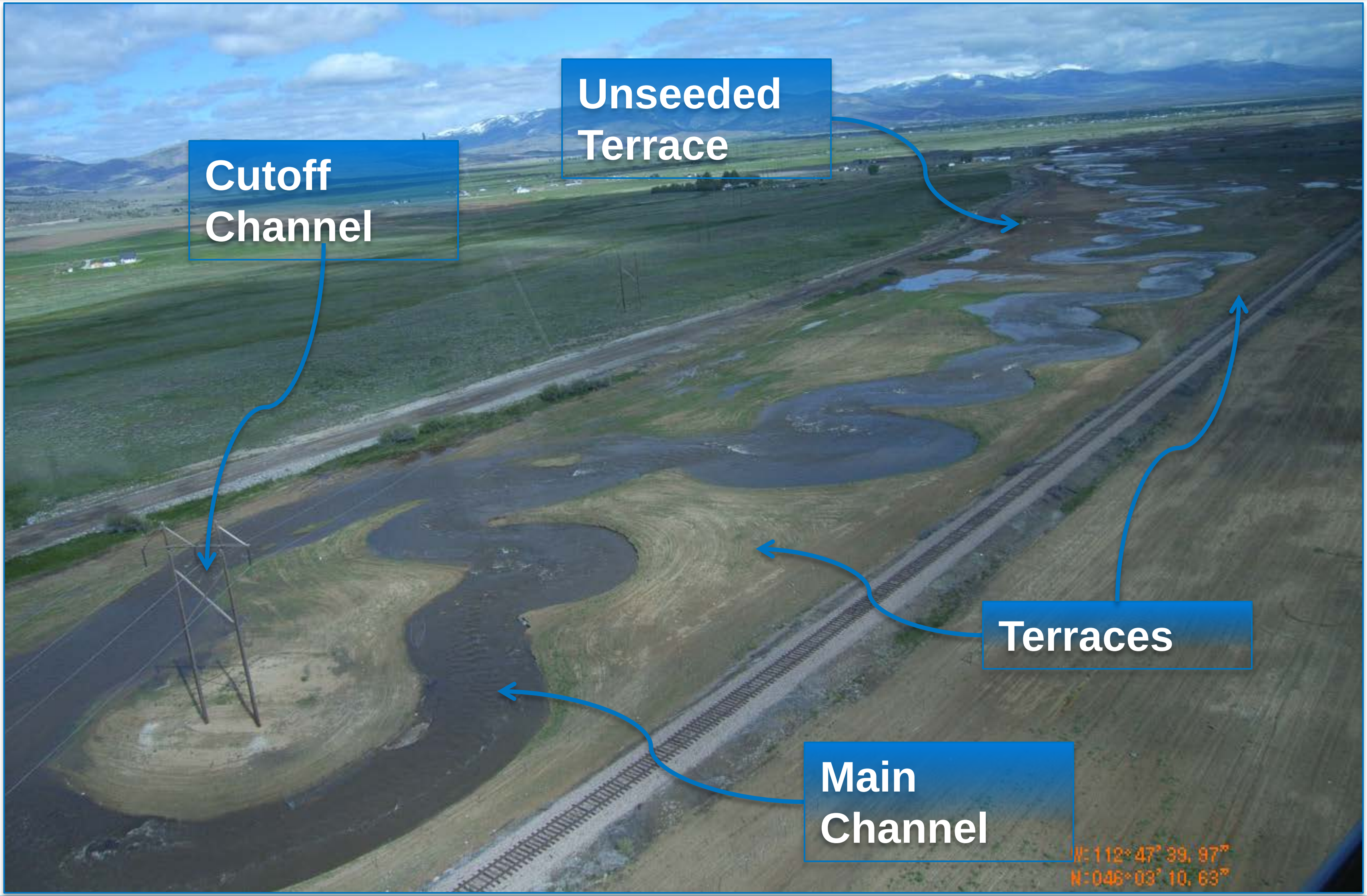
Bypass Receives Flows Greater than Specified Allowable Channel Flow, Up to a maximum ~1250 cfs (Q25)



North Reach is <u>Not</u> Protected but is Less Deformable

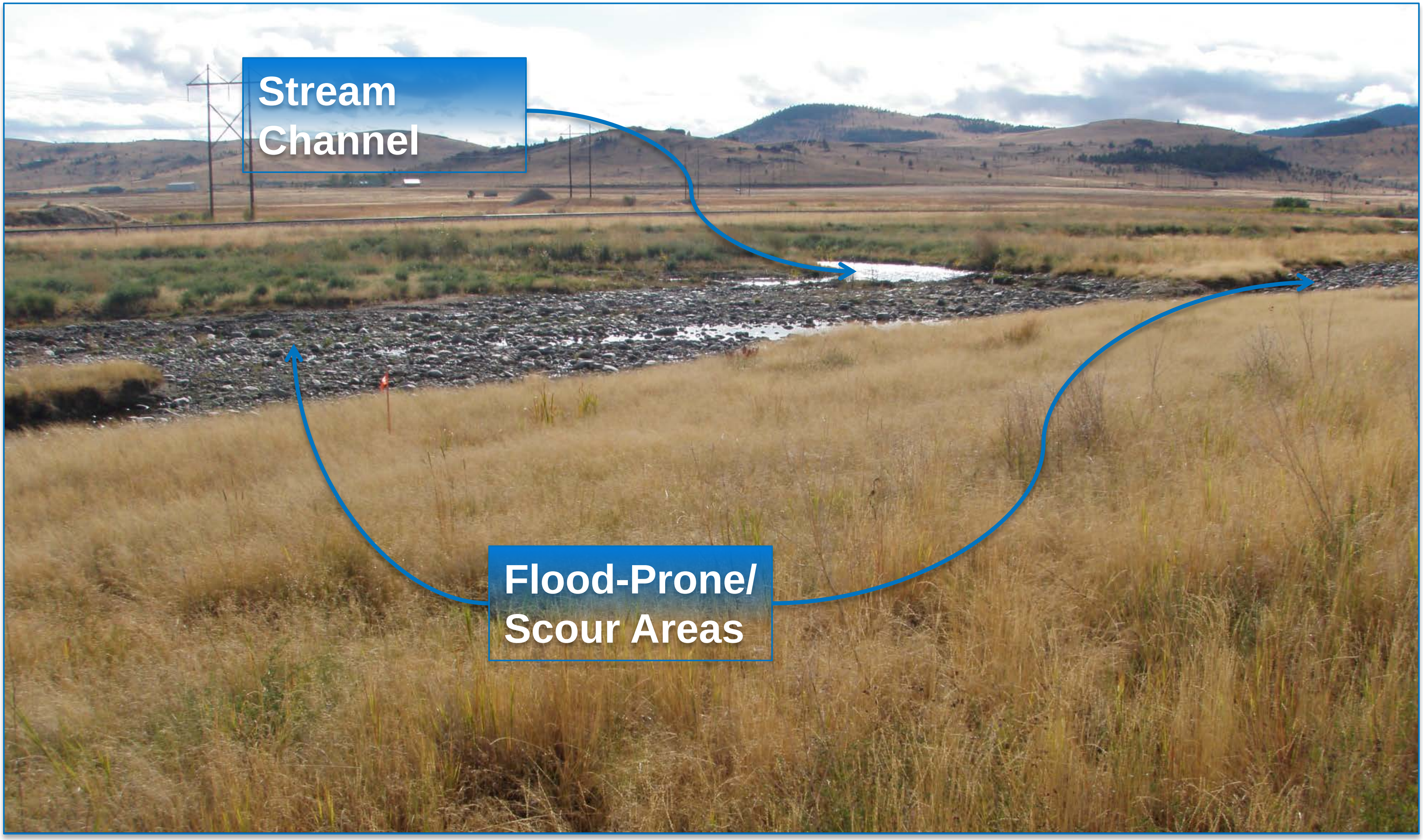
Variable Flow From Low to Bankfull +

2010 SILVER BOW CREEK AERIAL FLOOD PHOTO



SILVER BOW CREEK 2011 FLOOD PHOTO

SILVER BOW CREEK POST FLOOD PHOTO



SILVER BOW CREEK POST FLOOD PHOTO

WHY RETAIN THE BYPASS?

- ✓ Less risk during recovery
- ✓ Less robust bank treatments in south segment
- ✓ Potentially lower O&M requirements
- ✓ Allows better revegetation sequencing flexibility
- ✓ Reduced risk to downstream stakeholders
- ✓ Better overall path and timeframe to recovery

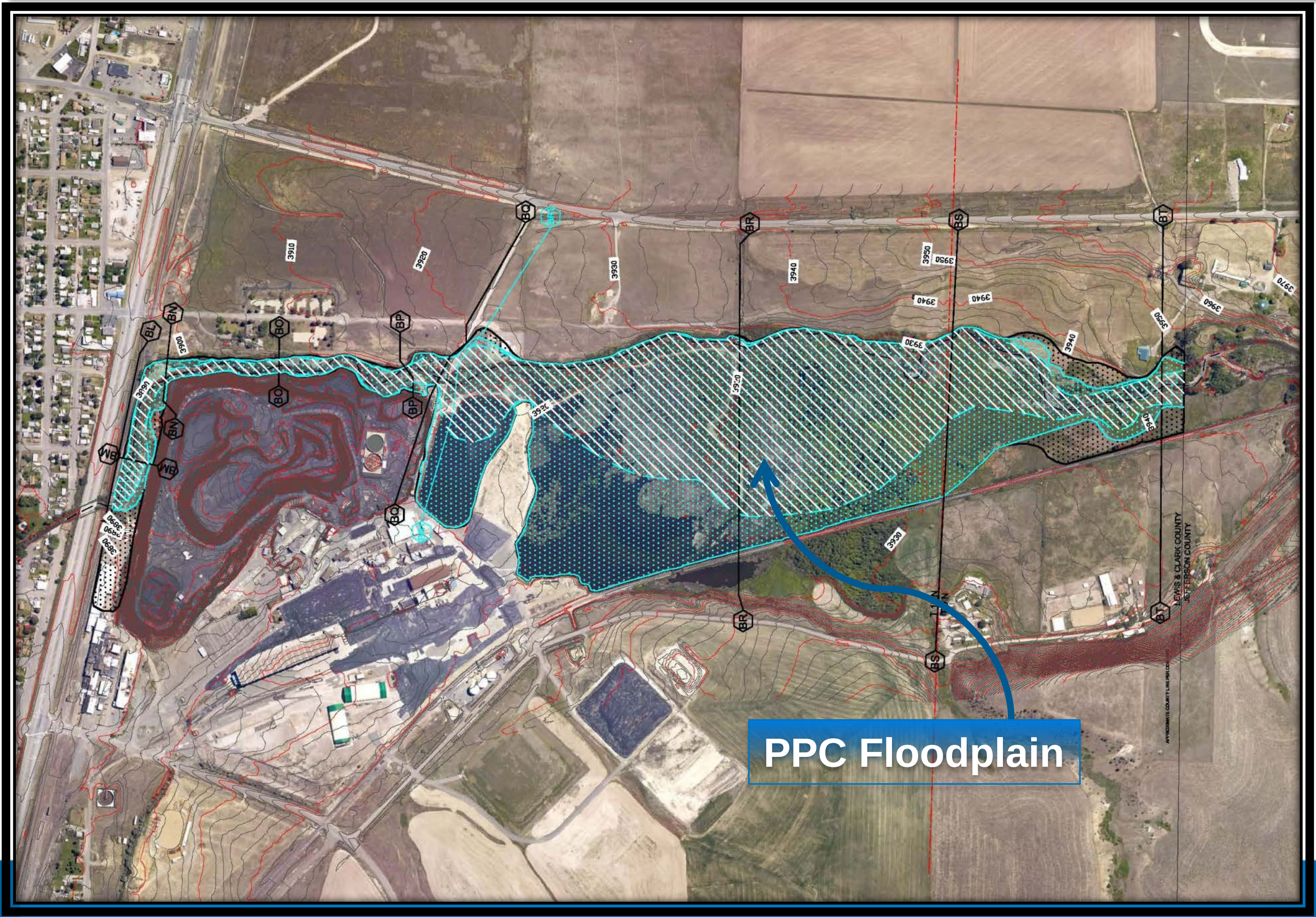
SIGNIFICANT PERMITS

- ✓ COE 404 Permit (Nationwide #38)
  - Wetlands Mitigation
  - Montana Stream Mitigation Procedure
  - Monitoring Requirements
  - Baseline Reports
- ✓ 310 Permit
- ✓ 318 Authorization (Short Term Turbidity)
- ✓ Floodplain Permit – Detailed CLOMR/LOMR Process
- ✓ General Stormwater Permit/SWPPP
- ✓ Water Rights

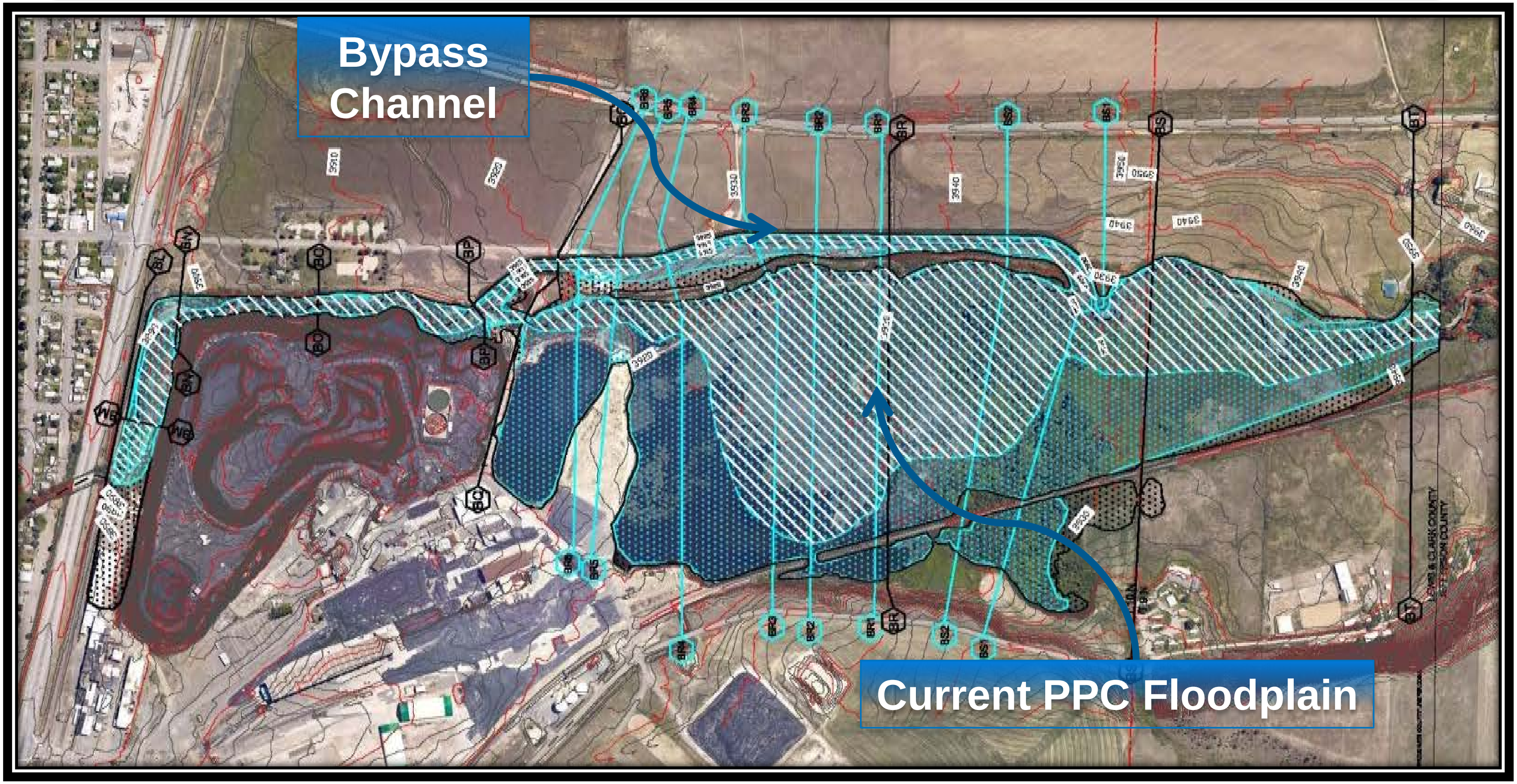
PERMITTING SUMMARY

Permit/License	Agency	Agency Processing Time	PPC Temporary Bypass	PPC Realignment
Section 404	USACOE	60 days	✓	☐
310 Permit	LCCD	60 days	✓	☐
POD (Water Right) (permanent diversion)	MDNRC	60 days	NR	☐
POD (Water Right) (temporary diversion)	MDNRC	120 days	✓	☐
318 Authorization	MDEQ	90 days	✓	☐
MPDES: General Permit (Construction)	MDEQ	30 days	✓	☐
Dam Safety Act: Downstream Hazard Determination	MDNRC	60 days	✓	✓
Dam Safety Act: Construction Permit	MDNRC	60 days	✓	✓
Floodplain Permit	COEH/Lewis and Clark County	60 days	✓	☐

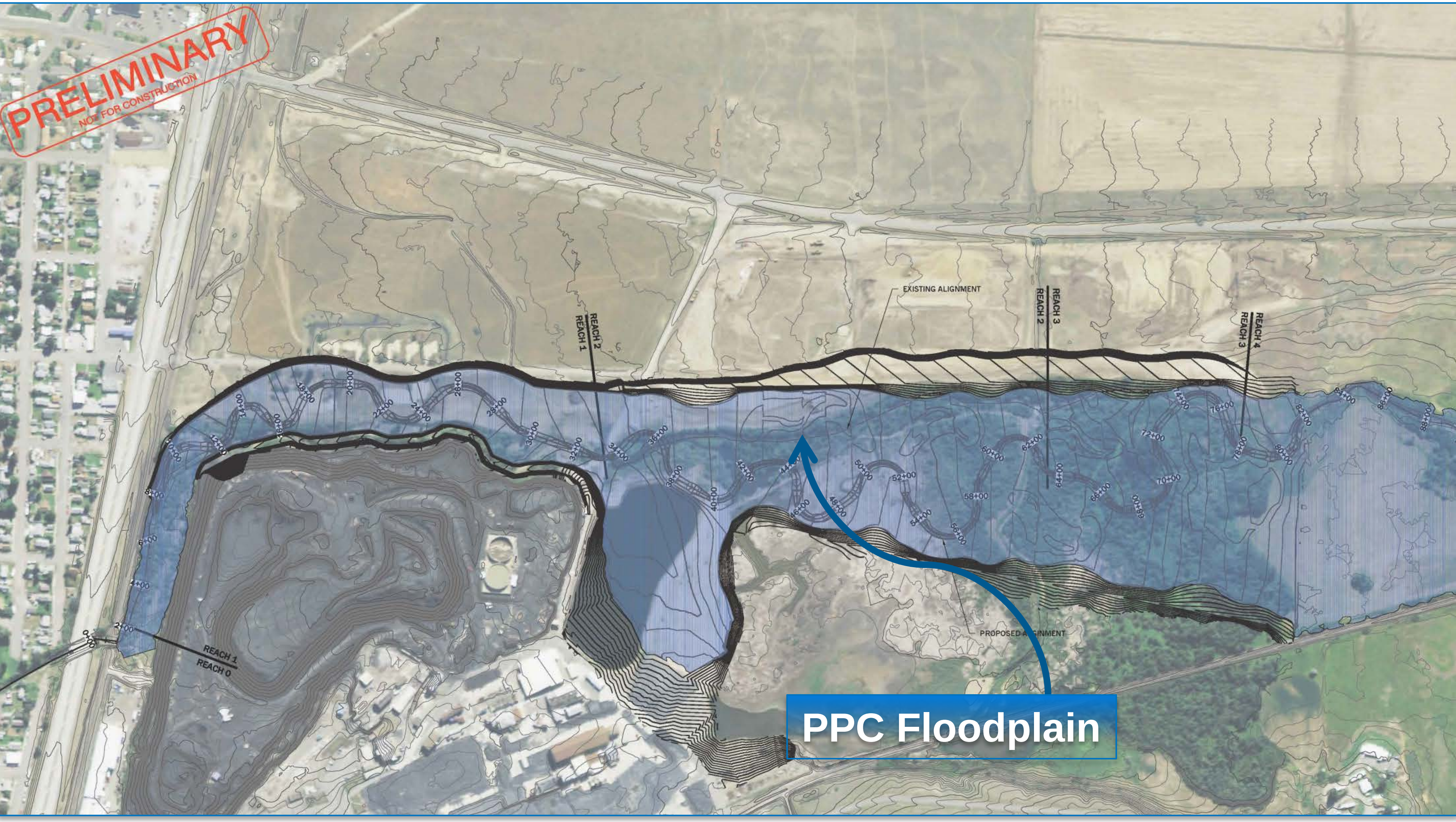
PRE - PROJECT FLOODPLAIN



CLOMR 1 (CURRENT) FLOODPLAIN

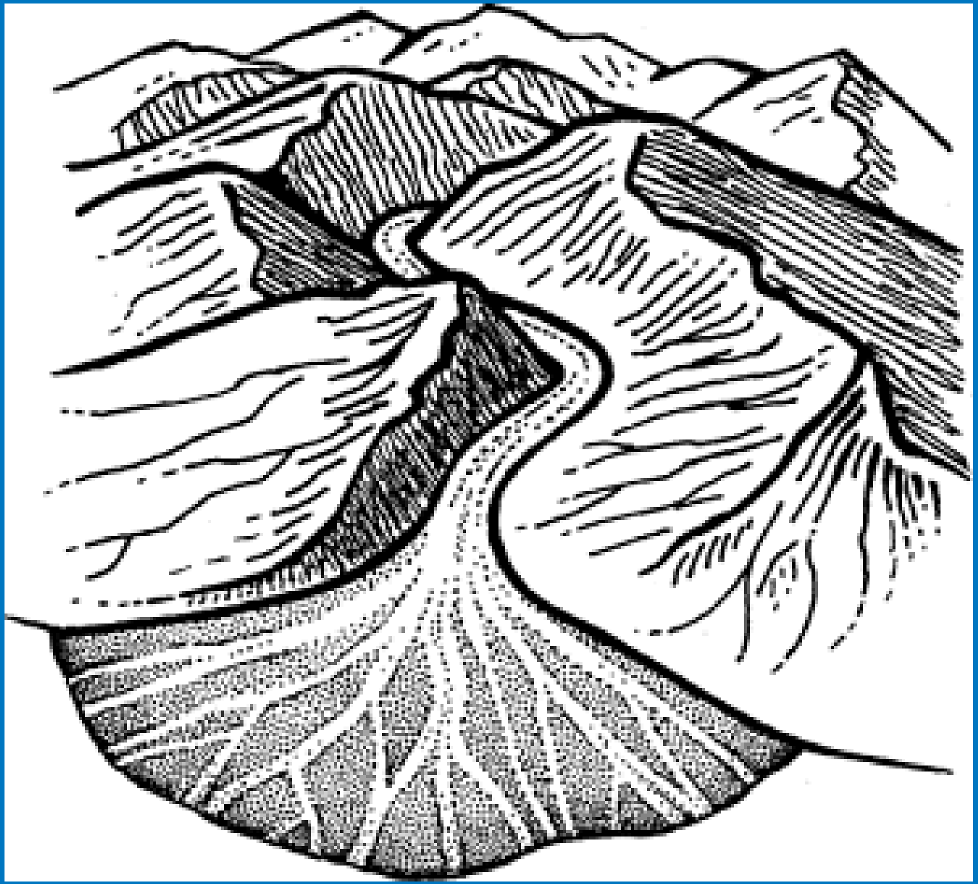


PROPOSED FINAL FLOODPLAIN AREA



QUESTIONS?

GEOMORPHIC SETTING



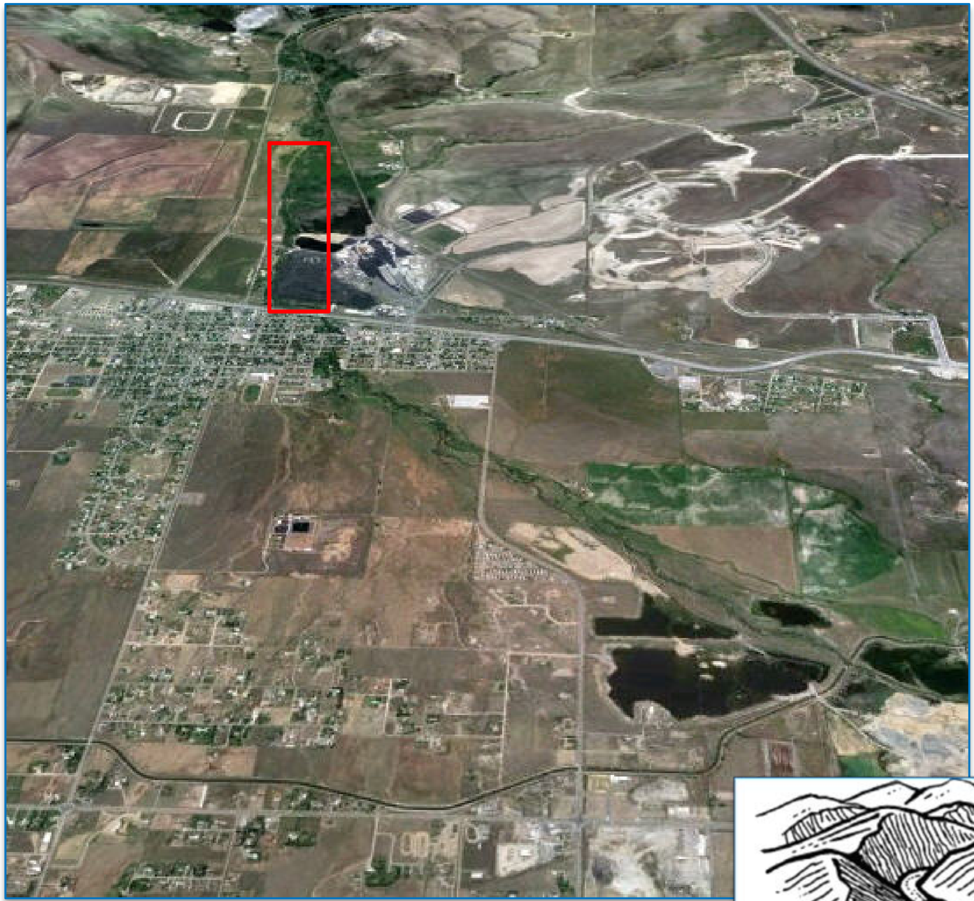
"The (Helena Valley) alluvium consists of broad, gently sloping alluvial fans formed by Prickly Pear and Tenmile Creeks…"

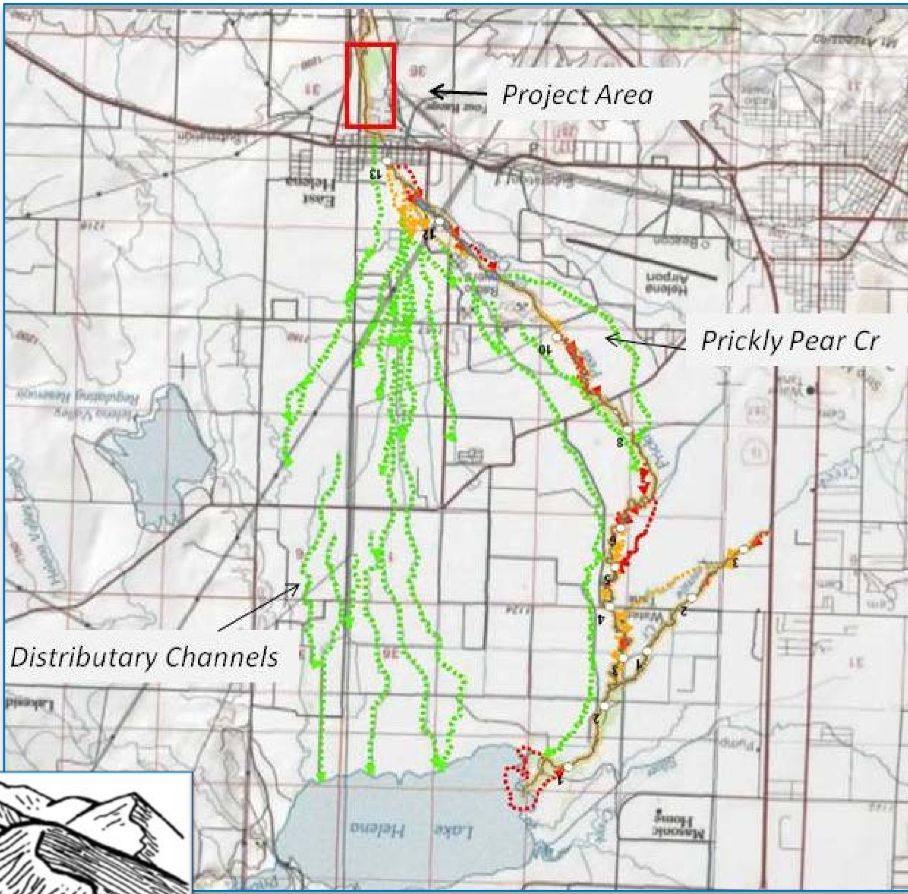
---Swenson, 1951

Geomorphology Discussion

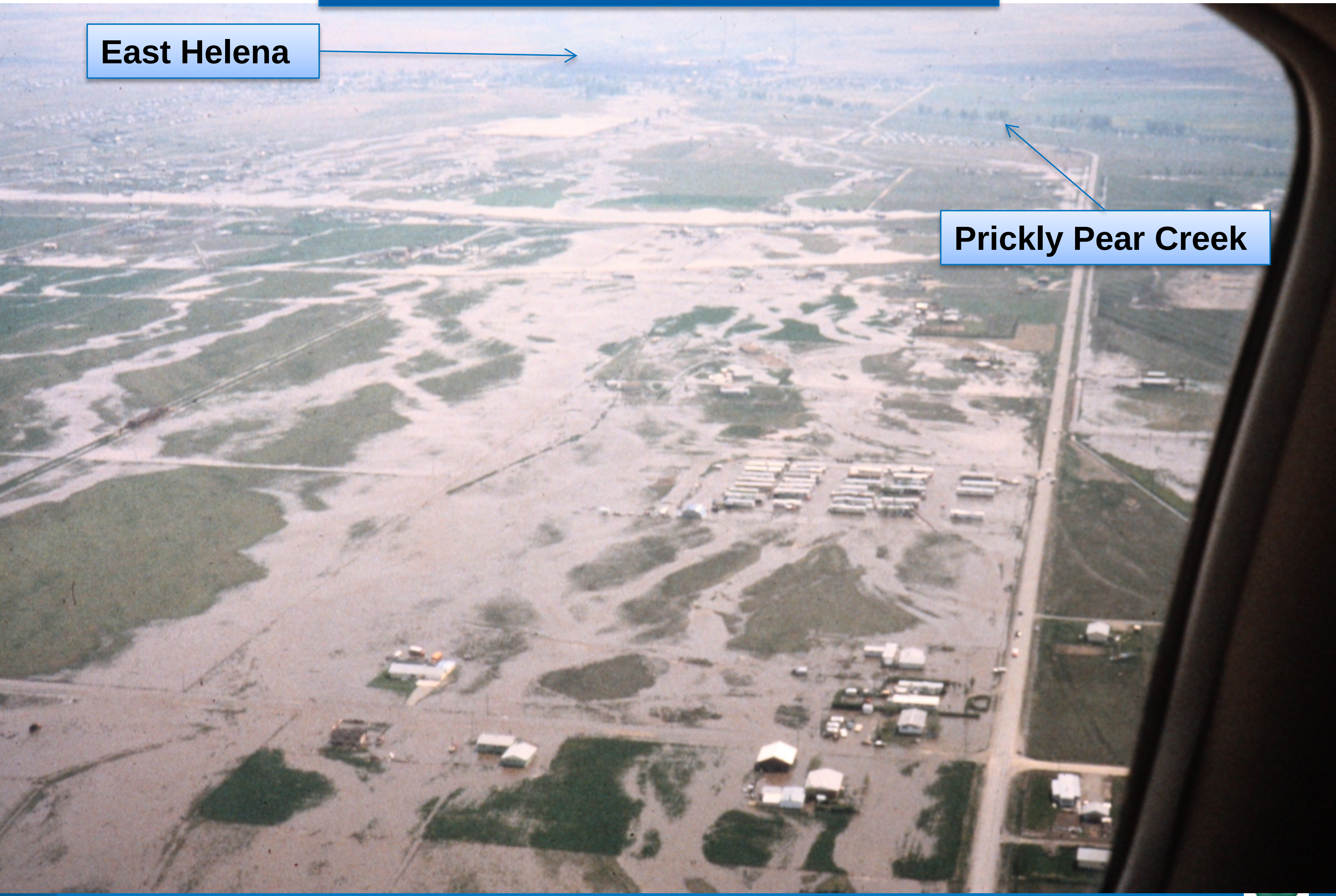
- ✓ General Setting
- ✓ Field Observations
- ✓ Sediment Sources
- ✓ Channel Form
- ✓ Project Implications

General Setting: Alluvial Fan

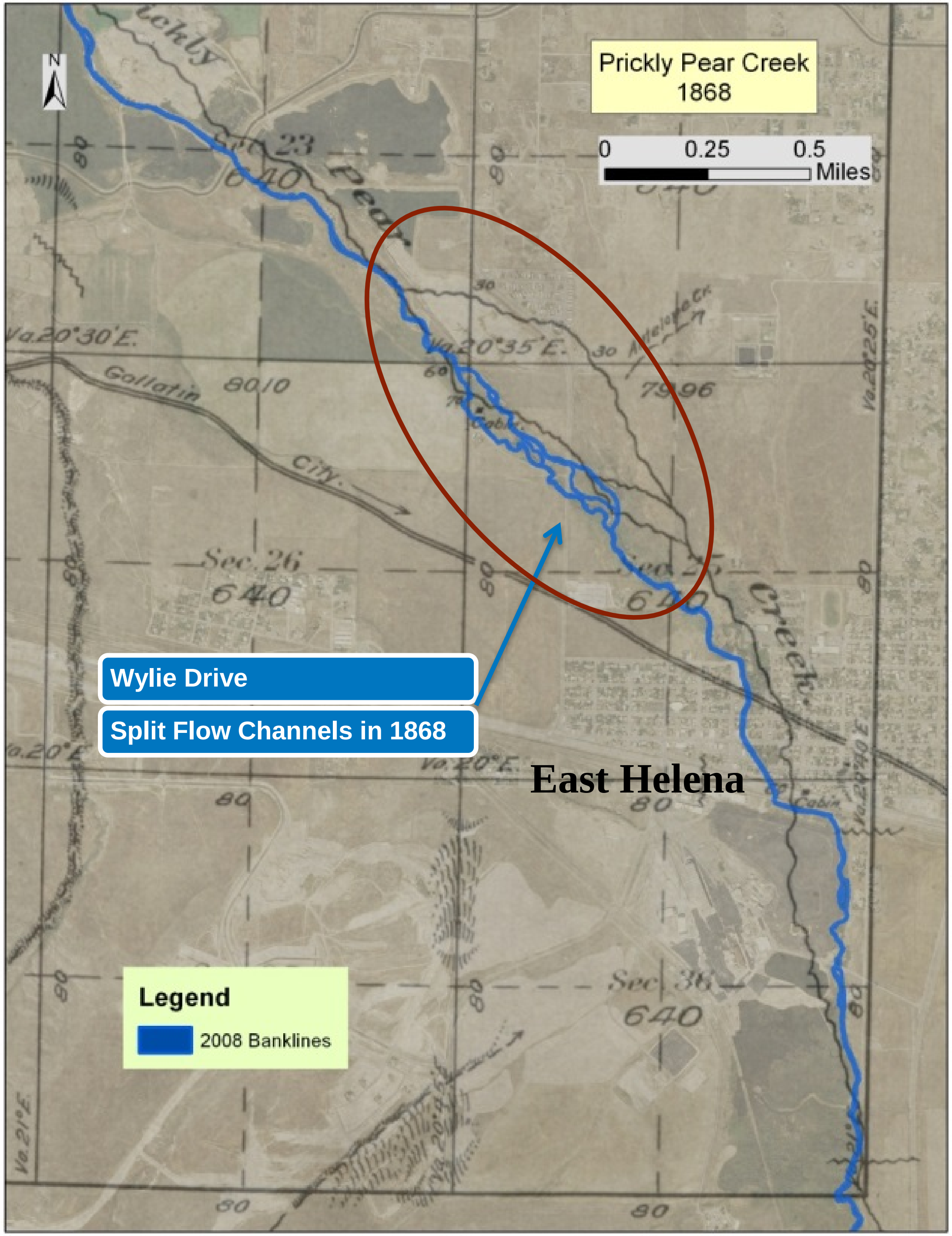




Prickly Pear Creek During the 1981 flood

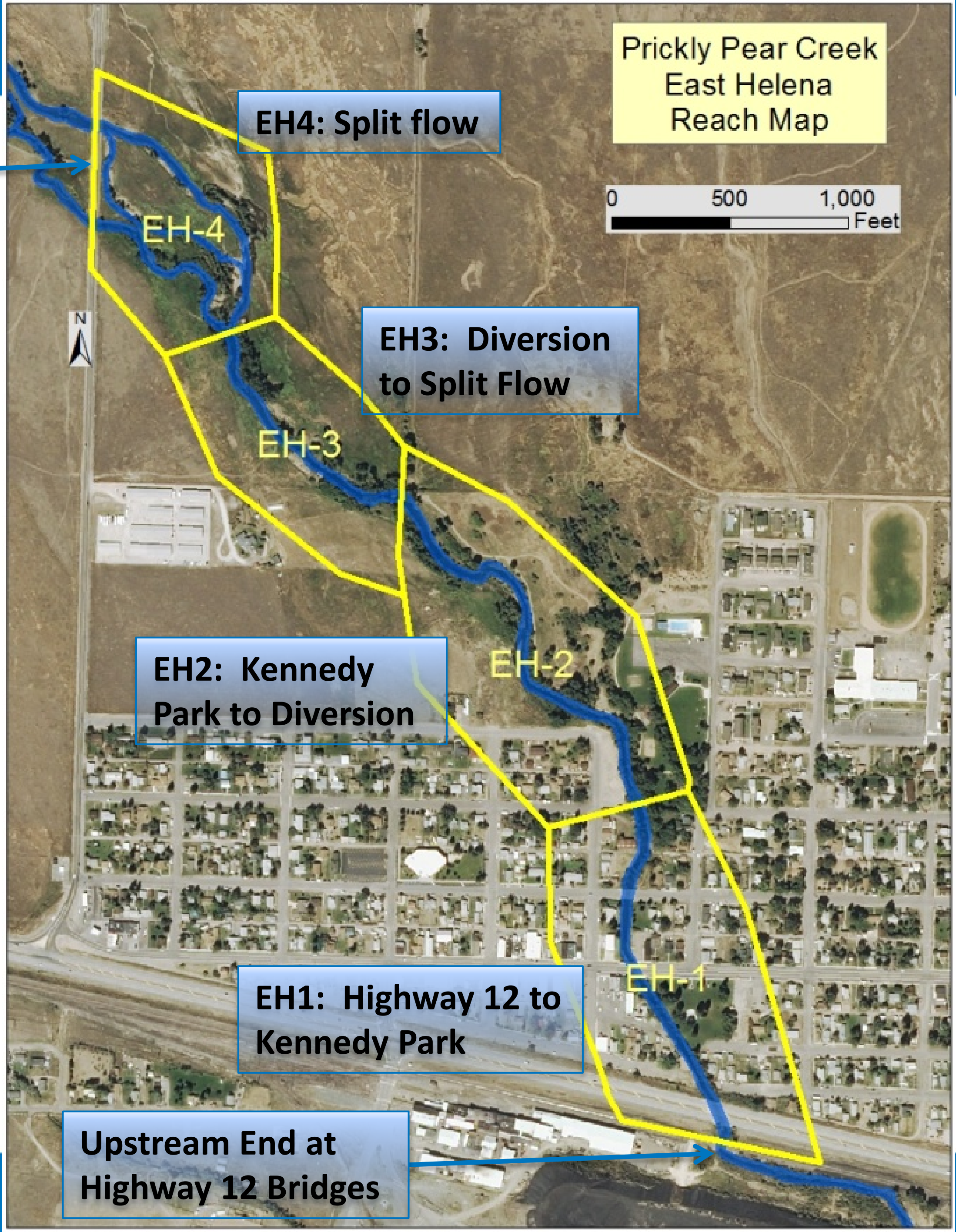


1868 Split Flow



East Helena Reaches

Downstream End at Wylie Drive Bridges



EH4: Split flow

EH3: Diversion to Split Flow

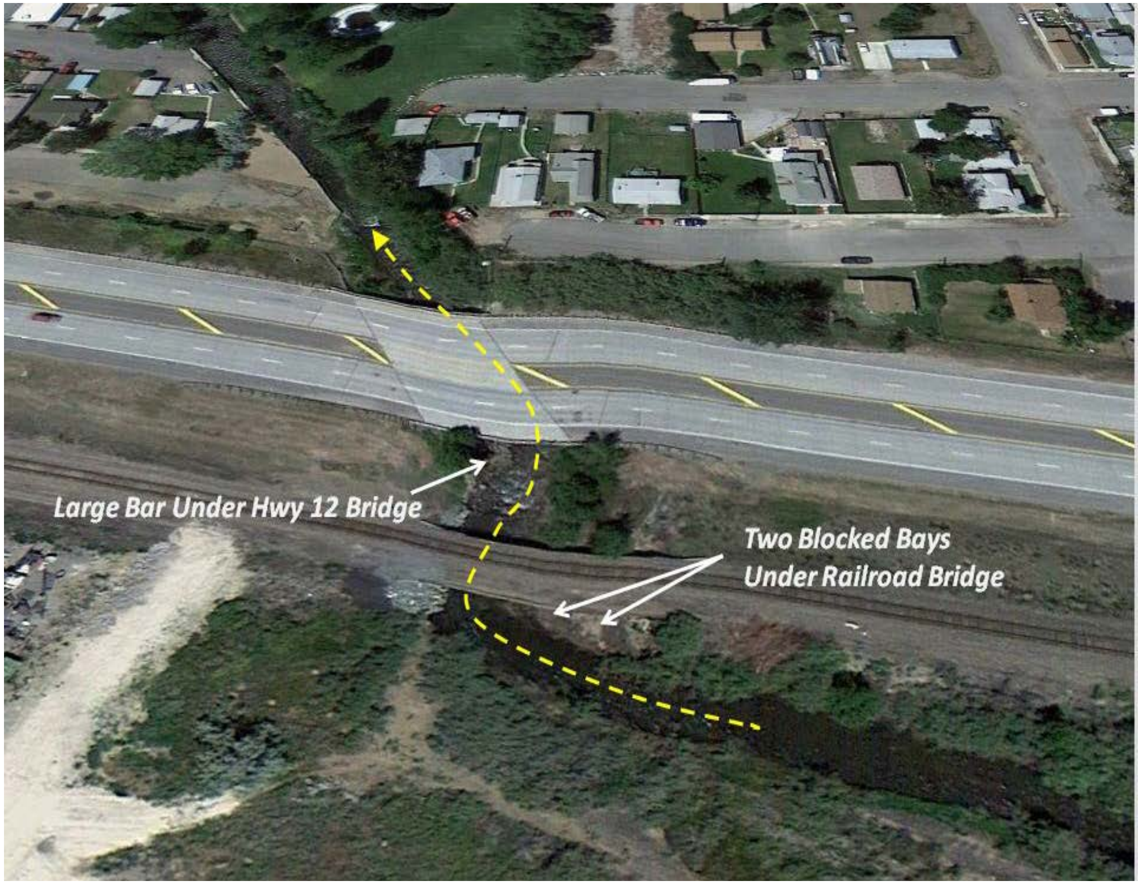
EH2: Kennedy Park to Diversion

EH1: Highway 12 to Kennedy Park

Upstream End at Highway 12 Bridges

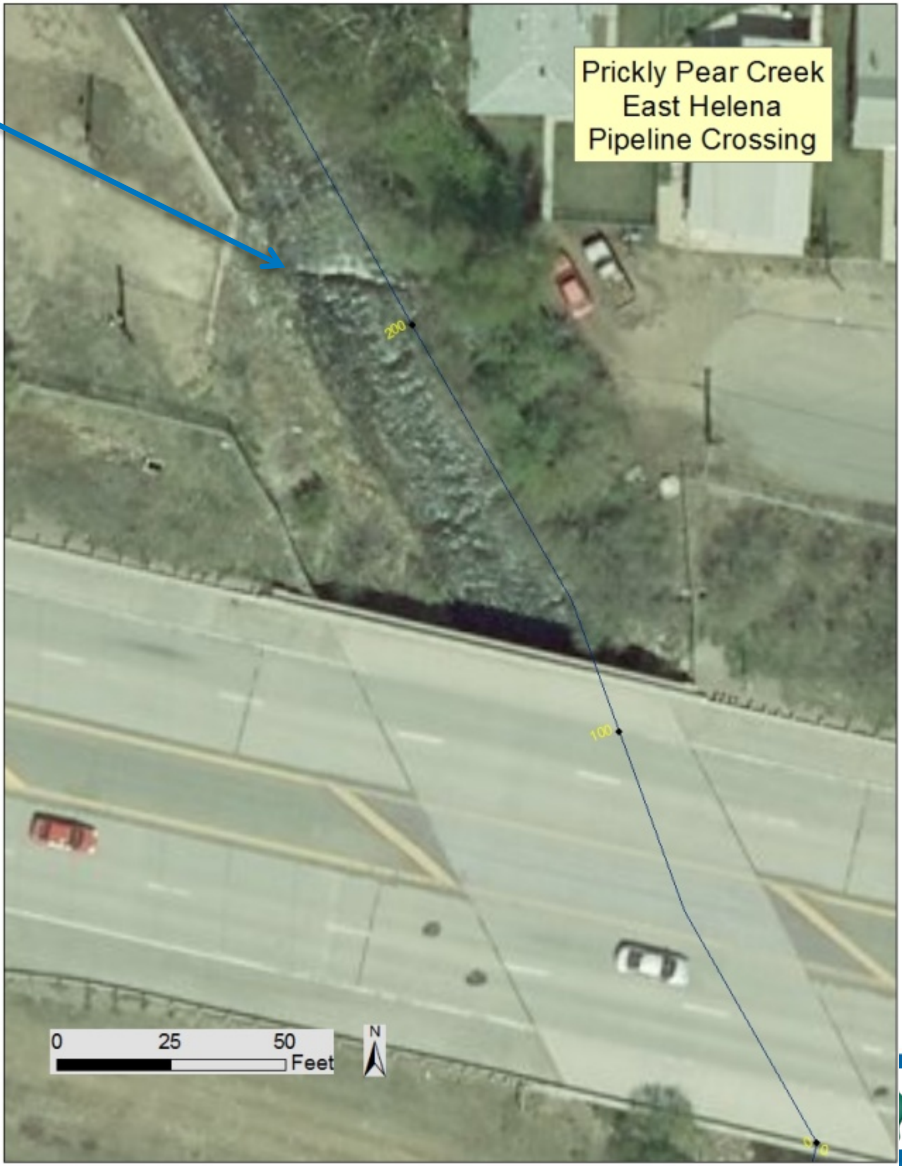
EH1 Geomorphology: East Helena

Highway 12 Bridge Deposition



EH1 Geomorphology: East Helena

Pipeline Crossing ~200 ft. below Hwy 12



EH1 Geomorphology: East Helena

Berms and Dense Vegetation Along Base of Concrete Walls

EH1 Geomorphology: East Helena

Main Street Bridge Deposition

EH1 Geomorphology: East Helena

East Riggs Street Bridge Deposition

EH2 Geomorphology: Kennedy Park to Diversion

Storage

Beaver

Slag

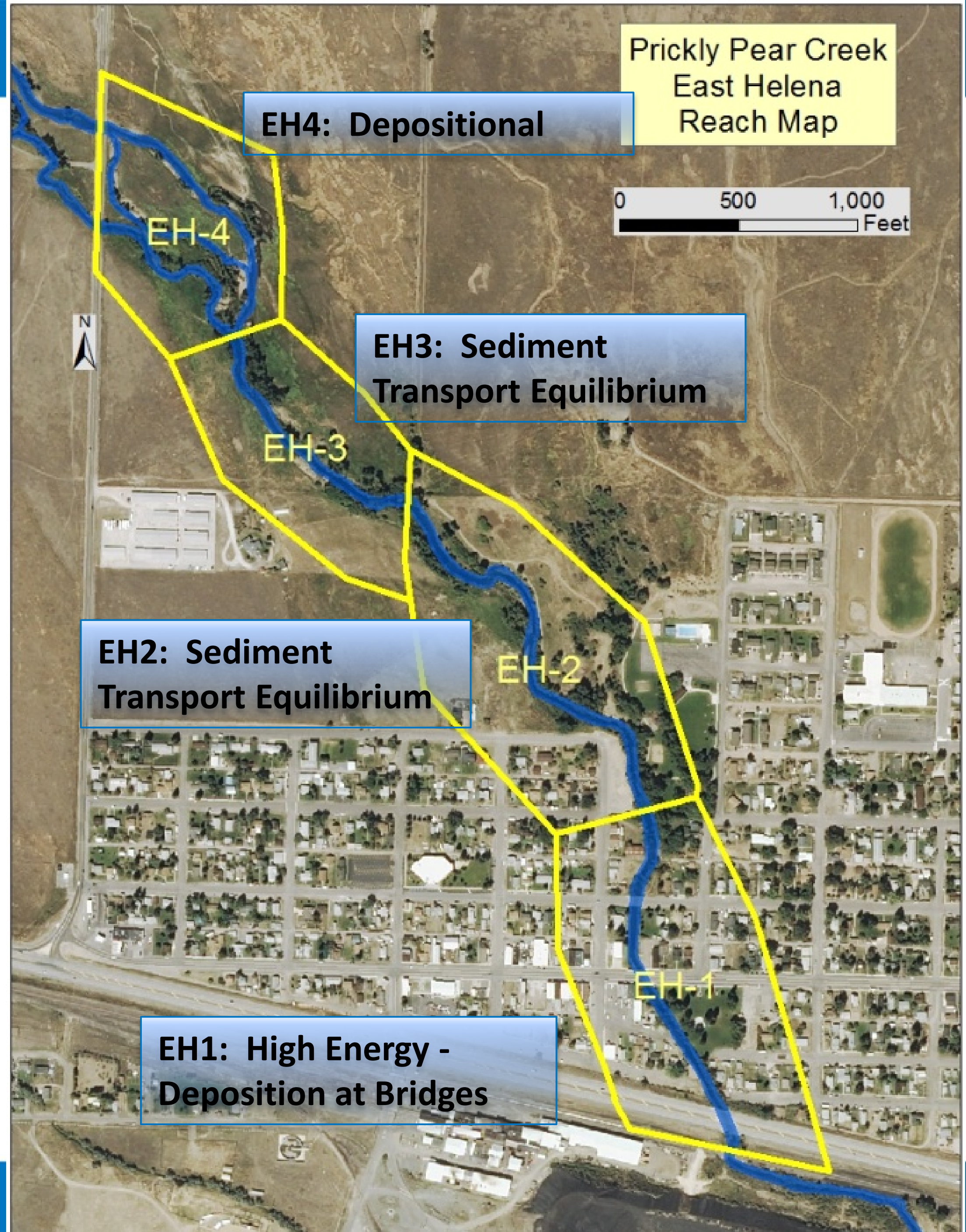
EH3 Geomorphology: Diversion to Split Flow

Deep Channel - Good Transport Capacity

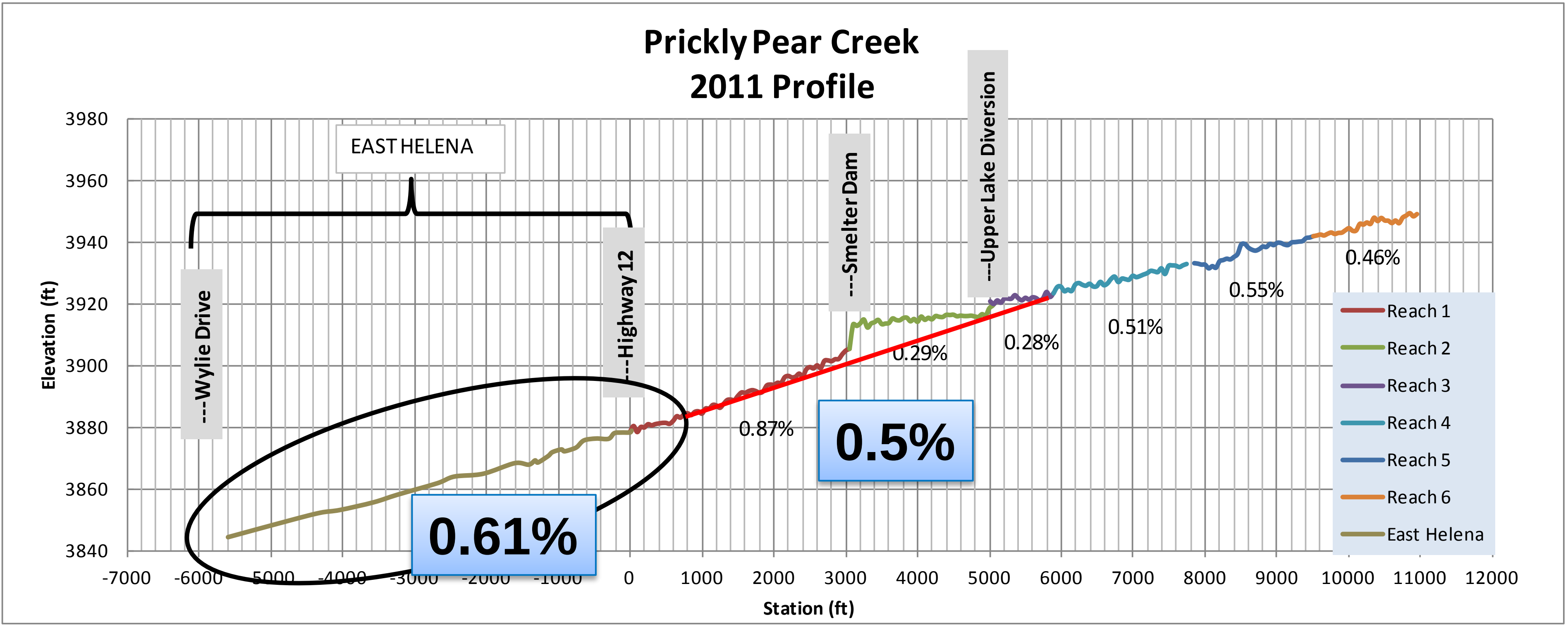
EH4 Geomorphology: ~1,000 ft Upstream of Wylie Drive ("EH4")

- **Multiple Channels**
- **Aggradation**
- **Channel Maintenance**

East Helena Reach Summary



Geomorphology: Channel Slope ~0.61%

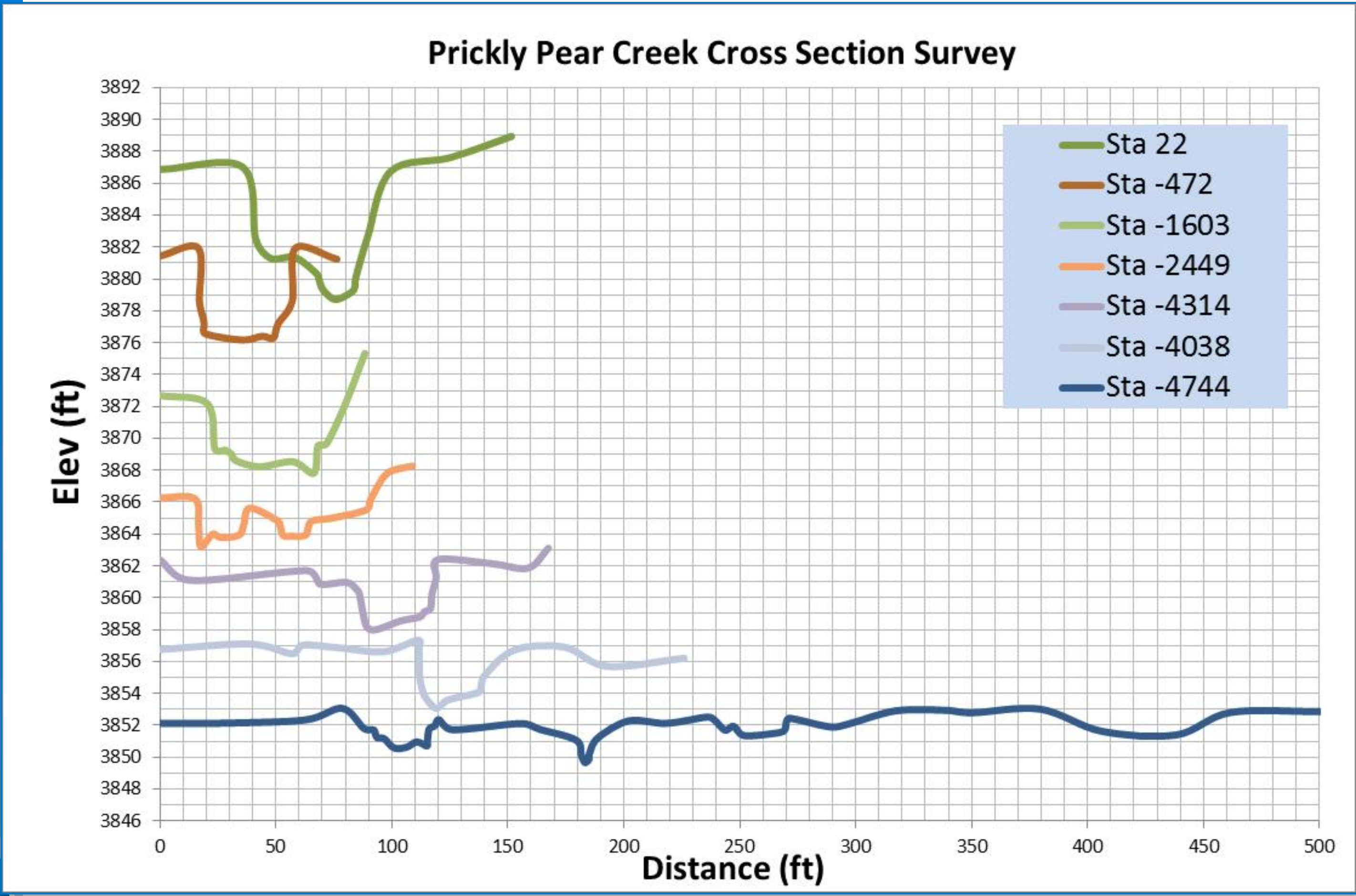


Increasing Width to Depth Ratio Up- to Downstream

Highway 12 Through East Helena

North of Town

Depositional/Split Flow



Sediment Sources: Boulder Batholith

Slag Pile Erosion into the Channel


“ East Bench”

128
90
64
16
22.6
32
45
4
5.7
8
11.3

Impact of 2011 Flooding

2011 Deposition Near Kleffner Ranch

Under Bridge

Sediment Transport Modeling

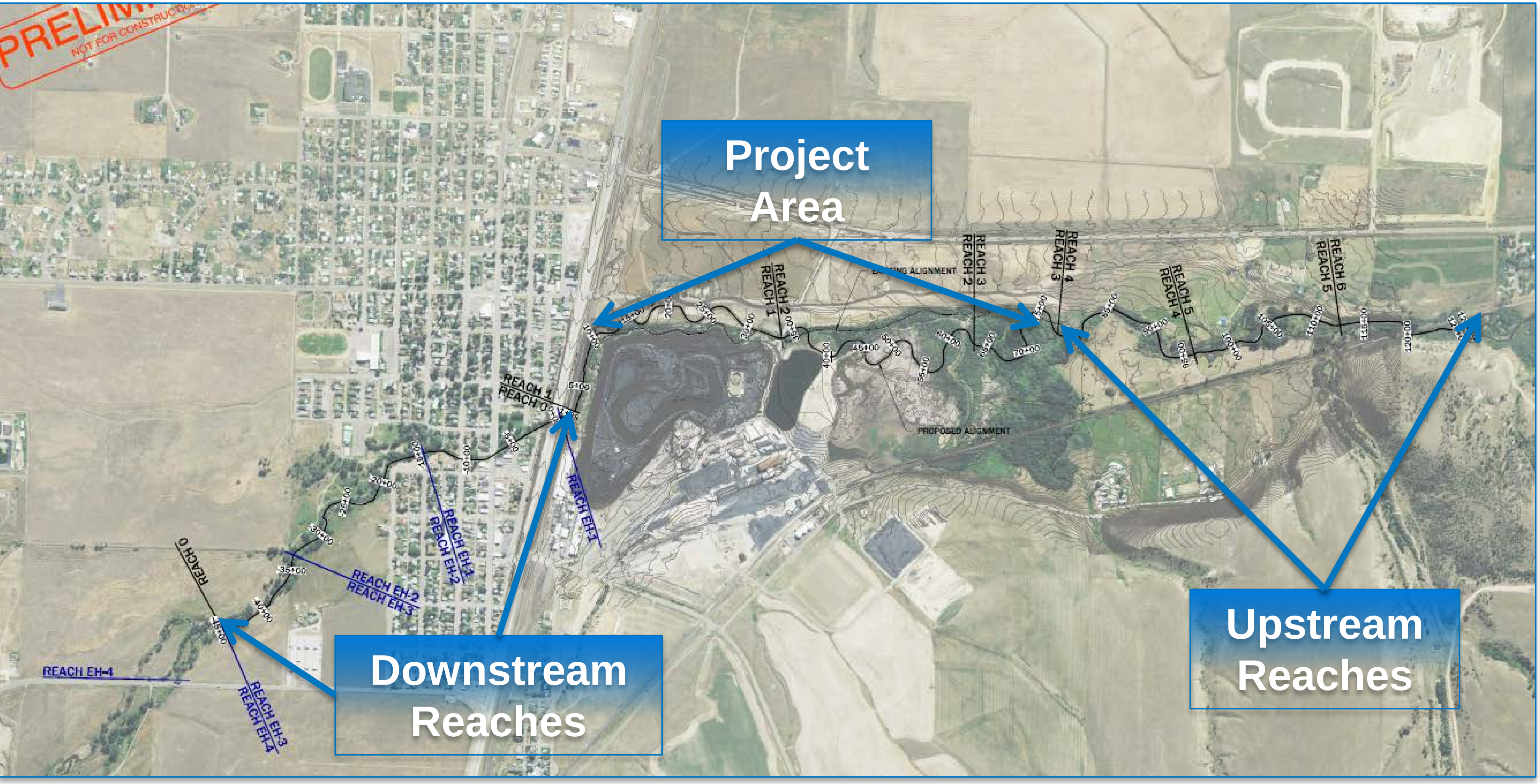
- ✓ No Direct Measurements of PPC Sediment Transport Through the Project or East Helena Reaches
- ✓ Sediment Continuity Analysis Conducted to Estimate the Aggradation/Degradation Potential of the PPC Channel
  - Uses Hydraulic Energy Calculations and Empirical Sediment Transport Functions to Estimate the Sediment Transport Capacity of PPC
- ✓ Can be Used to Provide a Relative Measure of How Much Capacity a Stream Reach Has to Transport Sediment
- ✓ The Analysis was Completed Upstream, Through and Below the PPC Reconstruction Reach

Sediment Transport Models

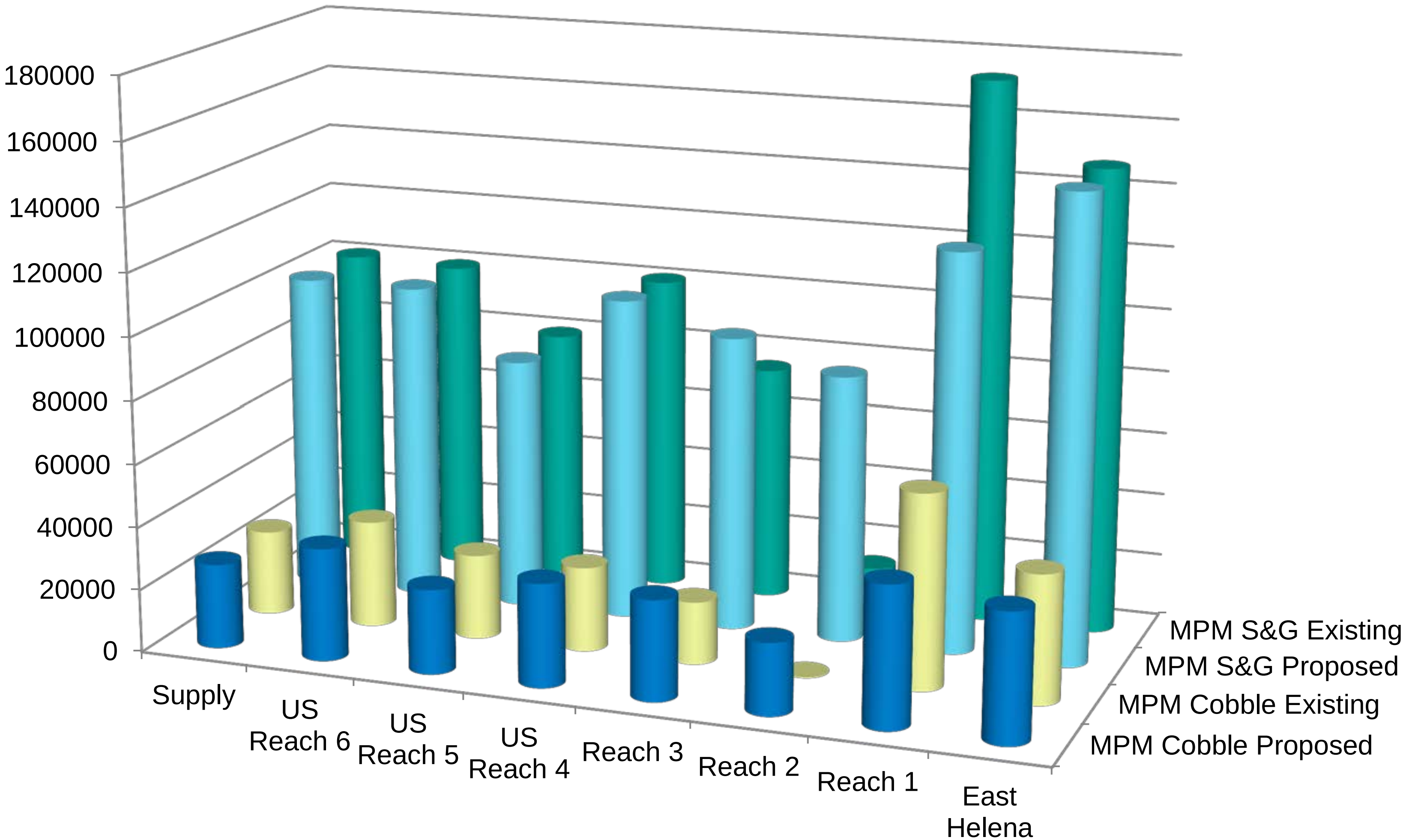
- ✓ Two Sediment Transport Functions Were Used:
  - o Meyer-Peter and Mueller (MPM) - Representative of Coarse Gravel Material
  - ❖ Yang - Representative of Sand and Fine Gravel

- ✓ Two Representative Sediment Material Gradations Were Used:
  - o Coarse Gravel and Cobble
  - ❖ Sand and Fine Gravel

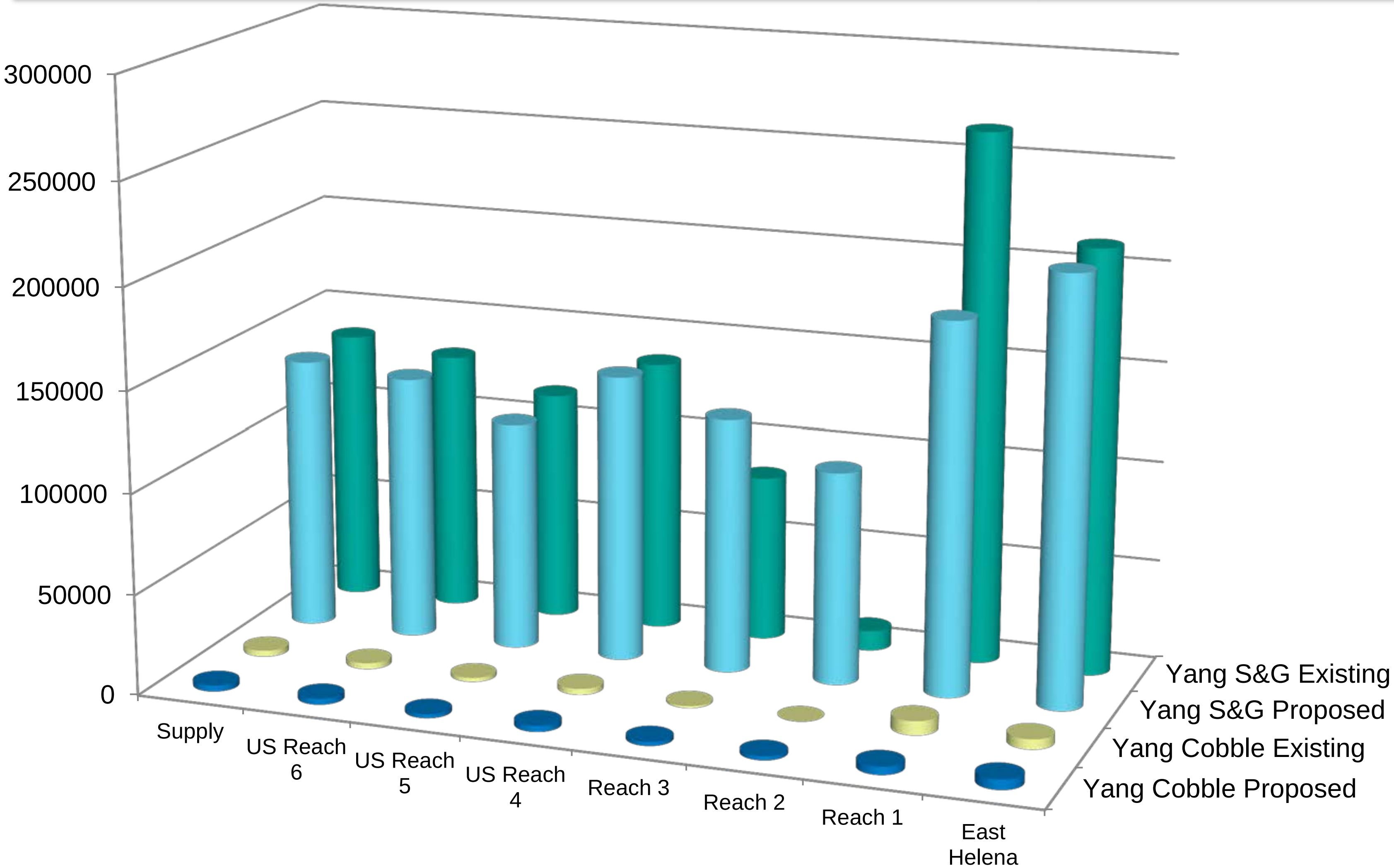
Sediment Transport Modeling Area



Sediment Transport Modeling Results



Sediment Transport Modeling Results



Project Implications: Sediment Delivery

- Timing of Sediment Delivery
  - ✓ In Sync With Hydrograph (Removal of Dam Effects)

- Magnitude of Supply/Changes to Supply
  - ✓ Removal of Upper Lake Sediment Trap
  - ✓ Removal of Smelter Dam Storage
  - ✓ Recovery of Native Load Through Smelter Reach
  - ✓ Removal of Slag Material Inputs from Smelter Site
  - ✓ Removal of East Bench Material Inputs from Smelter Site

- Type of Material
  - ✓ Return to Native Sediments

Project Implications: Sediment Transport

- Through East Helena:
  - ✓ Reductions in Supply From Trust Reach
  - ✓ Sediment Delivery Better Aligned to Flows
  - ✓ East Helena Reach has Sufficient Capacity
  - ✓ Continued Localized Erosion/Deposition at Bridges – Not related to upstream activities
  - ✓ Continued Beaver Management Necessary

- Downstream of Kennedy Park:
  - ✓ Still Prone to Sediment Deposition During Floods
  - ✓ Still Prone to Beaver Influences
  - ✓ Wylie Drive area Prone to Continued Deposition/Instability
  - ✓ Has Always Been a Split Flow/Depositional Area

→ **Continued O&M Necessary**

Other Project Benefits

- ✓ Fish Passage
- ✓ Create more natural, varied, and functional stream channel, floodplain and wetland complex
- ✓ Removal of Smelter Dam – Improves Safety
- ✓ Potential to Establish A Community Asset
- ✓ Mitigate Risks from Slag Pile

QUESTIONS?