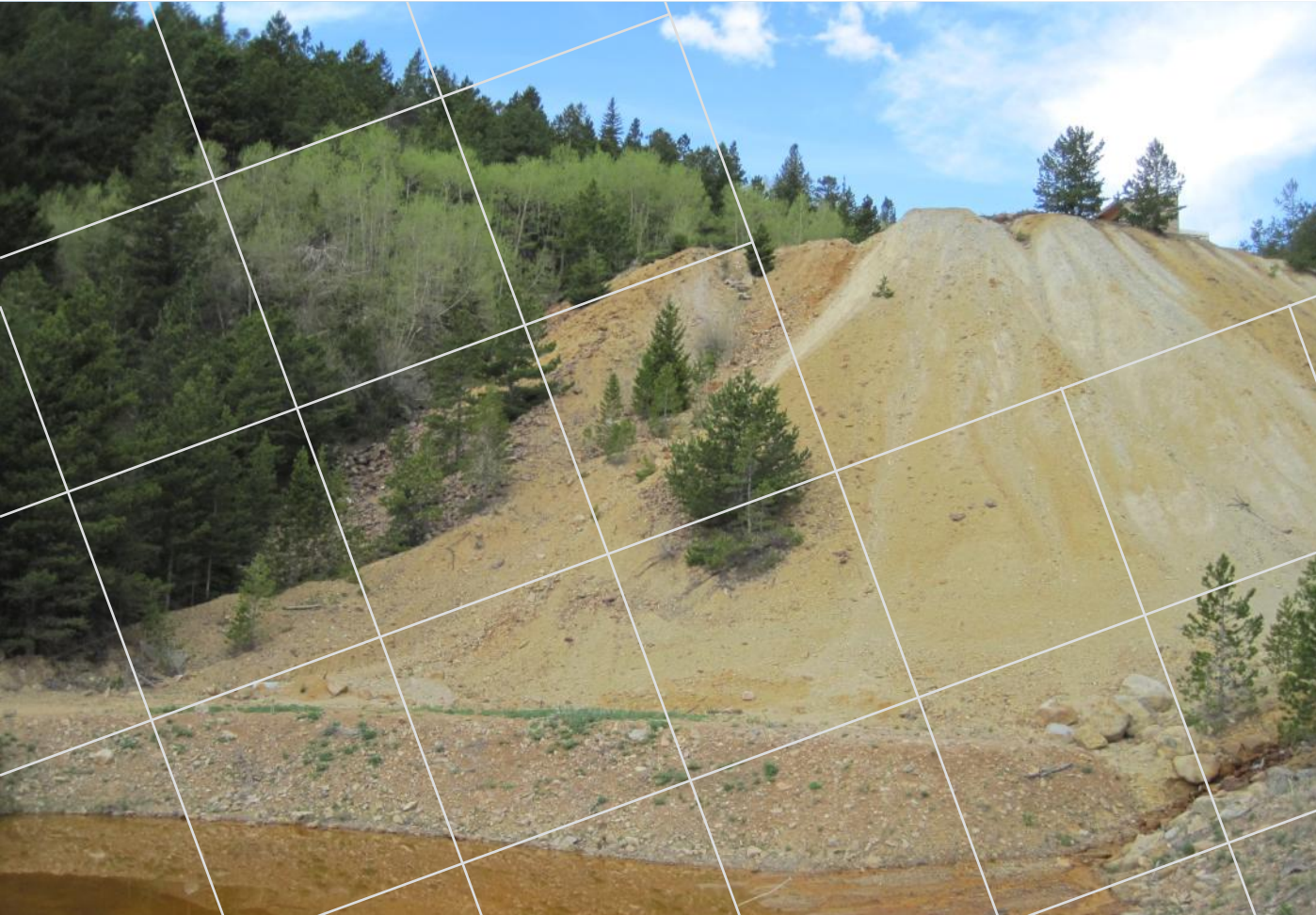


# SURFACE RECLAMATION OF THE CAPTAIN JACK MILL SUPERFUND SITE

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Todd Bragdon, CDM Smith  
Mary Boardman, CDPHE  
Joy Jenkins, U.S. EPA Region 8  
Chad Van Drie, CO Cleanup Corp.

*June 6, 2013*

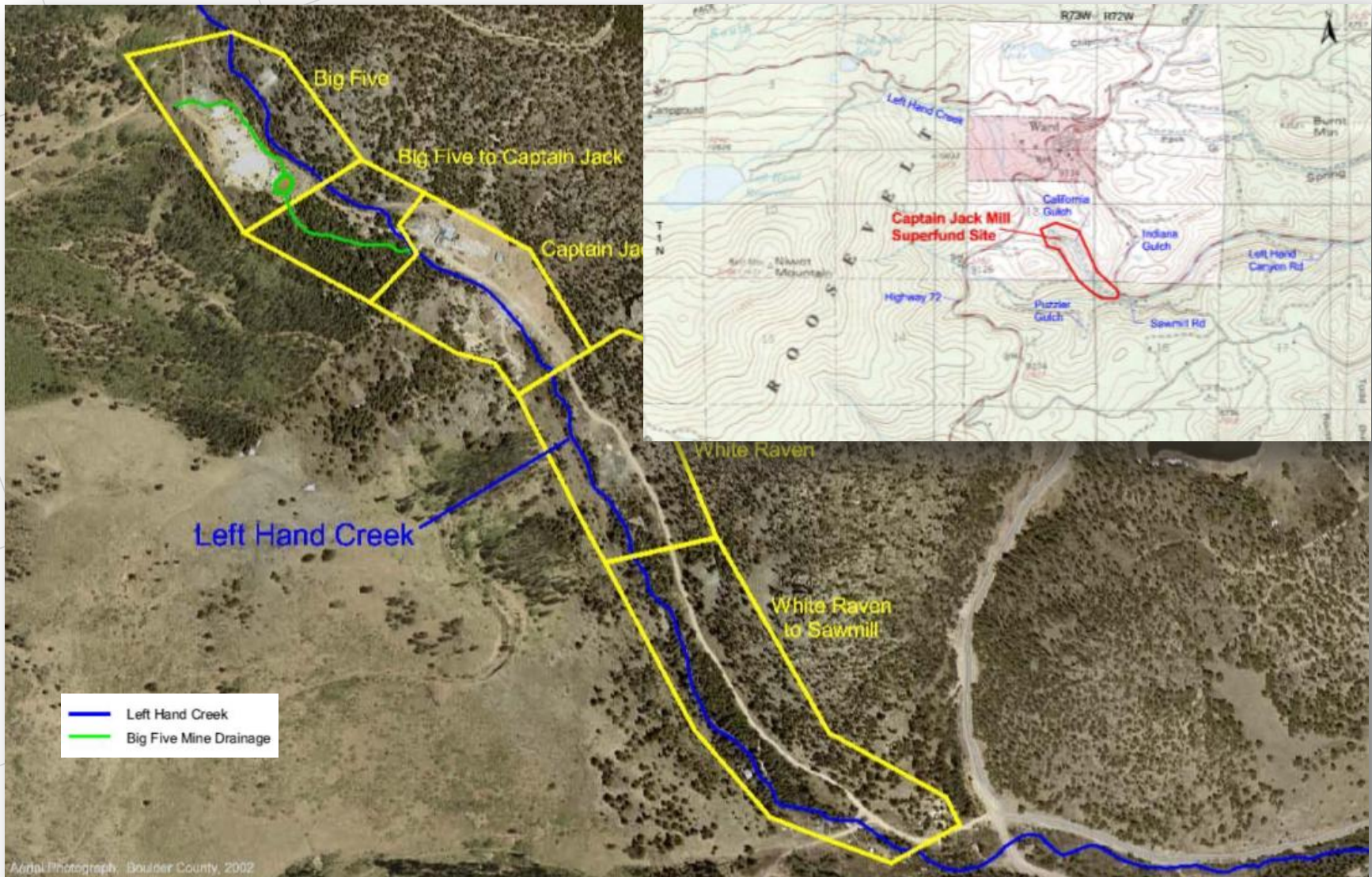


**CDM  
Smith**

# Introduction – Captain Jack Mill Superfund Site

- Remedial Design/Action (RD/RA)  
Project Team
  - CDM Smith; Engineering Design and Construction Administration
  - Colorado Department of Public Health and Environment;  
Lead Regulatory Agency
  - U.S. EPA Region 8;  
Supporting Regulatory Agency
  - Boulder County;  
Supporting Local Agency
  - Colorado Cleanup Corporation;  
Remedial Action Contractor
- Previous RI/FS & ROD
  - Nature & Extent of Contamination
  - Selected Remedy
- RD/RA Discussion Summary
  - Site Conditions
  - Design Approach
  - Construction Activities

# Site Location & Layout



# Site Conditions - Big Five Mine Dump



Erosion (Head-cutting), Stormwater & Adit Discharge (Infiltration), Direct Exposure

# Site Conditions - Black Jack Adit & Captain Jack Mill



Former Mill & Tailings Ponds & Adit, Direct Exposure, Boulder County Borrow Area

# Site Conditions - Residential Property & Philadelphia Mine



Erosion, Direct Exposure

# Site Conditions – White Raven Mine



Erosion, Direct Exposure

# Pre-Design Investigation

- Additional Data Collection to Support Design
  - Geotechnical properties of mine waste
  - Geotechnical/agronomic properties for borrow material characteristics and volumes
  - Additional mine feature assessment (Cornucopia and Philadelphia Mines)
  - Additional structural/features assessment including culverts, Mill building, debris volume, ACM, and septic system
  - Additional cultural resource assessment

Team Subcontractors: Geocal Inc., Advanced Terra Testing, Pinyon Env. Engineering, SWCA Env. Consultants, CSU Soils Laboratory



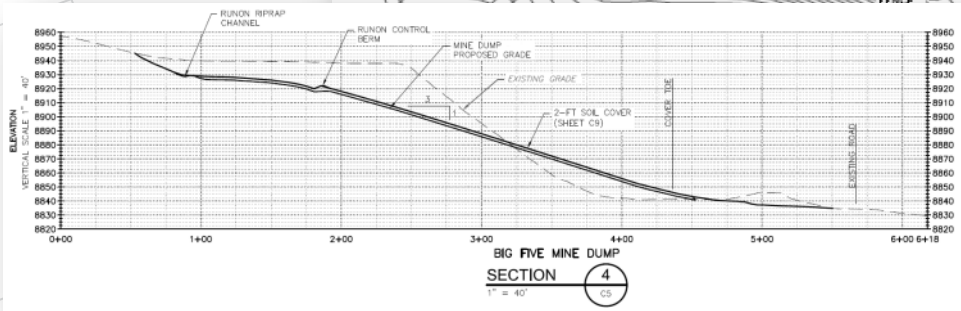
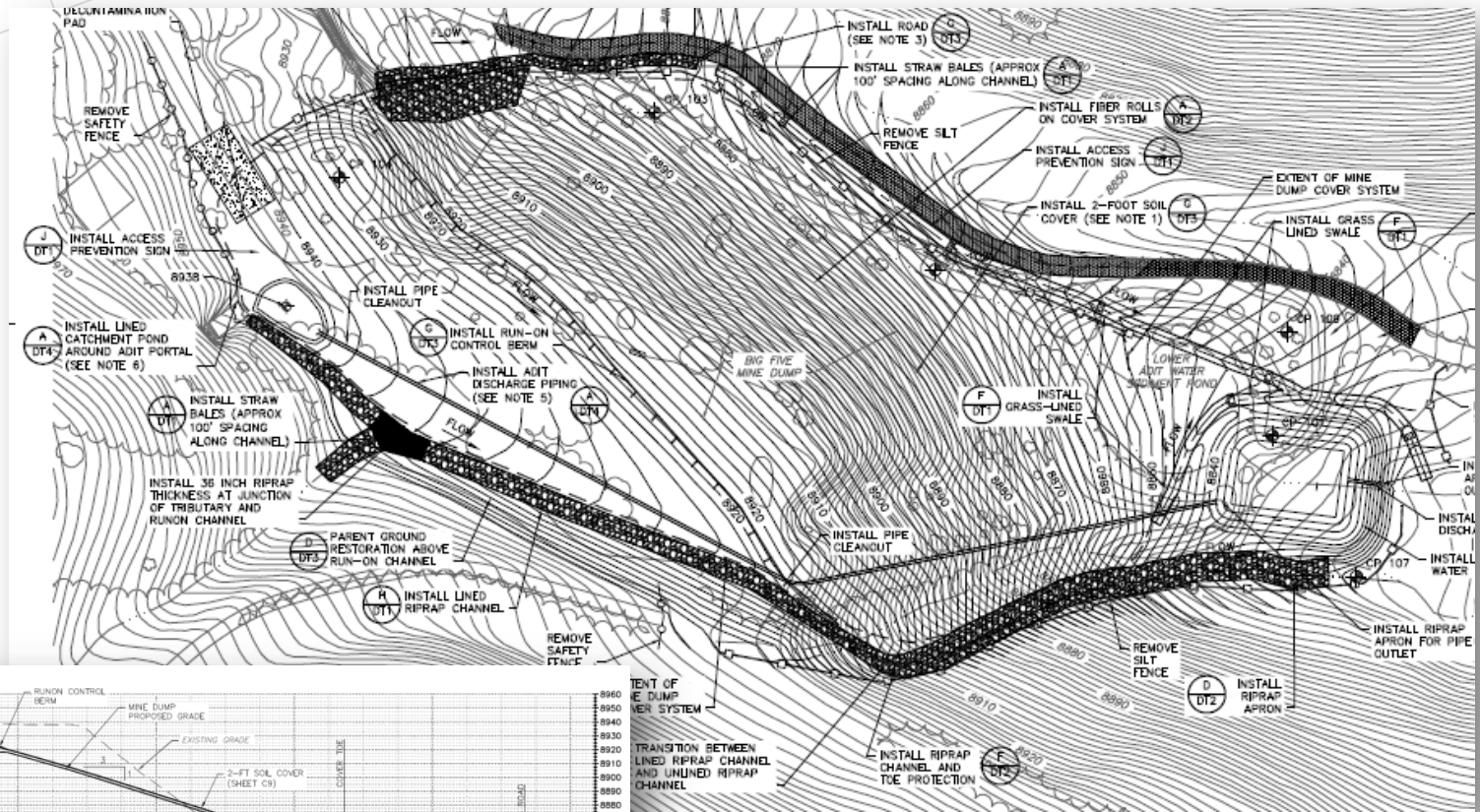
# Remedial Action Overview

- Remedial Action Objectives
  - Reduce Exposure to Metals in Soil (Arsenic, Lead, and Thallium)
  - Reduce Metals Loading to Groundwater from Surface Sources
  - Reduce Instream Surface Water Metals Concentrations
  - Remedial Goal: Lead in Soil < 380 to 860 mg/kg (Area Specific)
- Selected Remedy (2008 Record of Decision)
  - Adit Water Diversion
  - Removal of Mine Waste from Various Site Sources and Consolidate and Cover Mine Waste at the Captain Jack Repository
  - Regrade and Cover Mine Waste at Big Five Mine Dump

# Remedial Action Overview

- Additional Reclamation Components
  - Structure demolition
  - Extend Black Jack Portal
  - Sedimentation basins for adit water diversion system
  - Run-on and runoff controls at repositories
  - Cover systems - 12” subsoil and 12” growth media
  - Restoration of excavated and disturbed areas
    - 4-6” growth media, seeding, erosion controls
    - Parent ground reclamation
    - Willow and tree plantings
  - Residential property septic system replacement
  - Culvert replacement

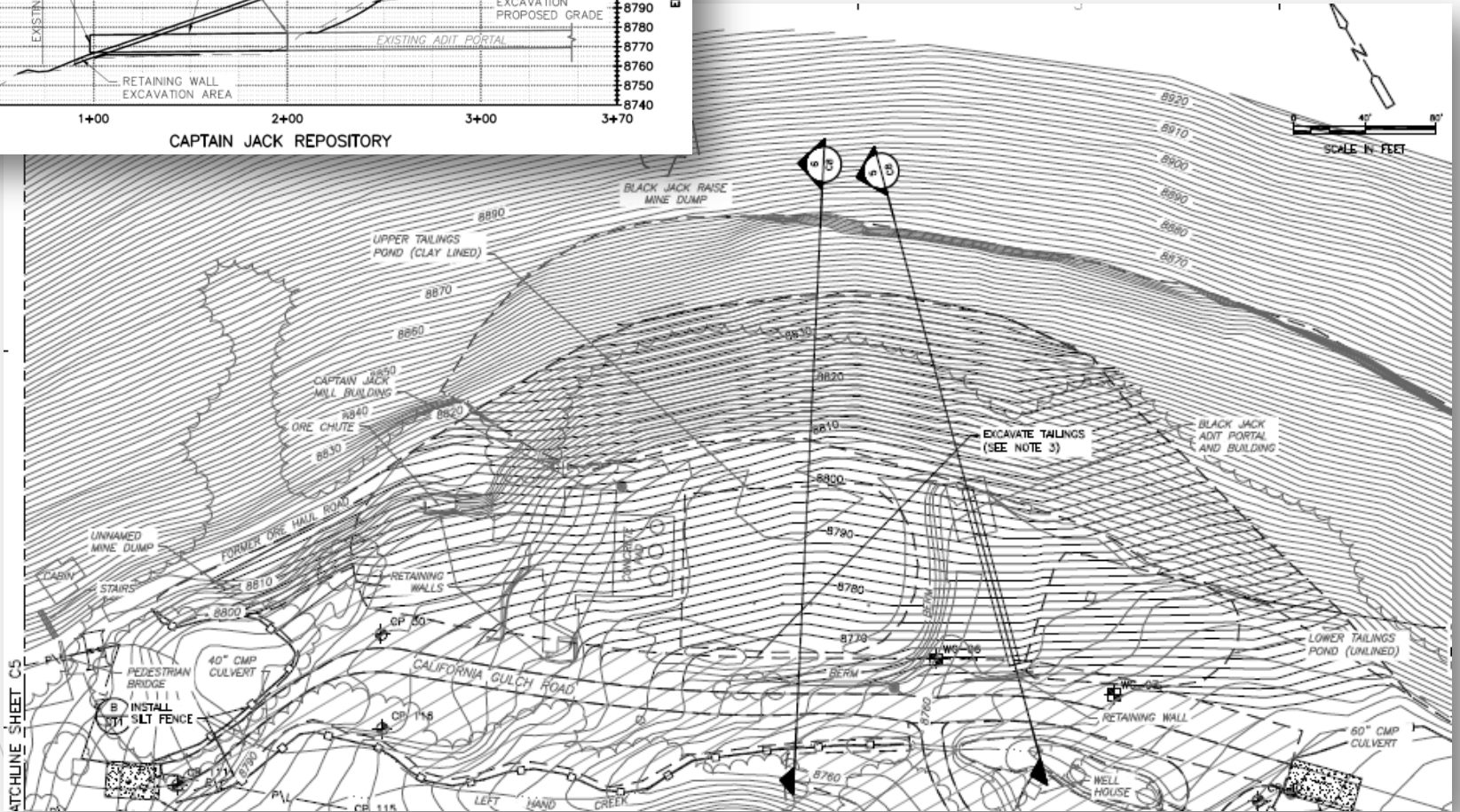
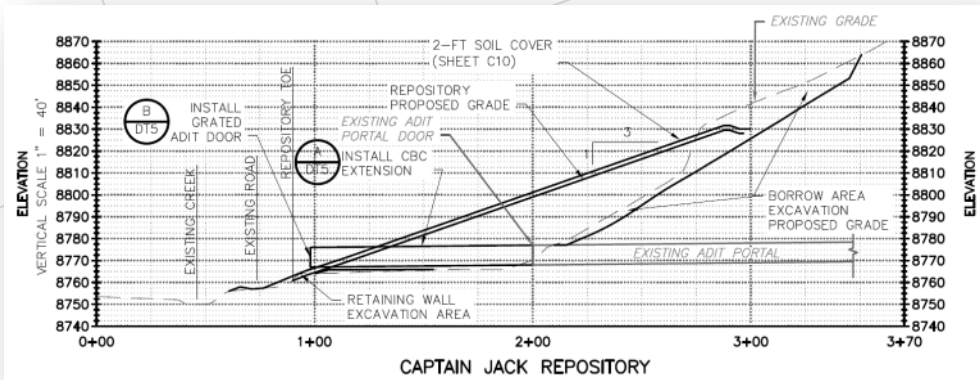
# Design Approach - Big Five Mine Dump



Divert Adit Discharge, Regrade 3H:1V (16,000 CY), Install Soil Cover

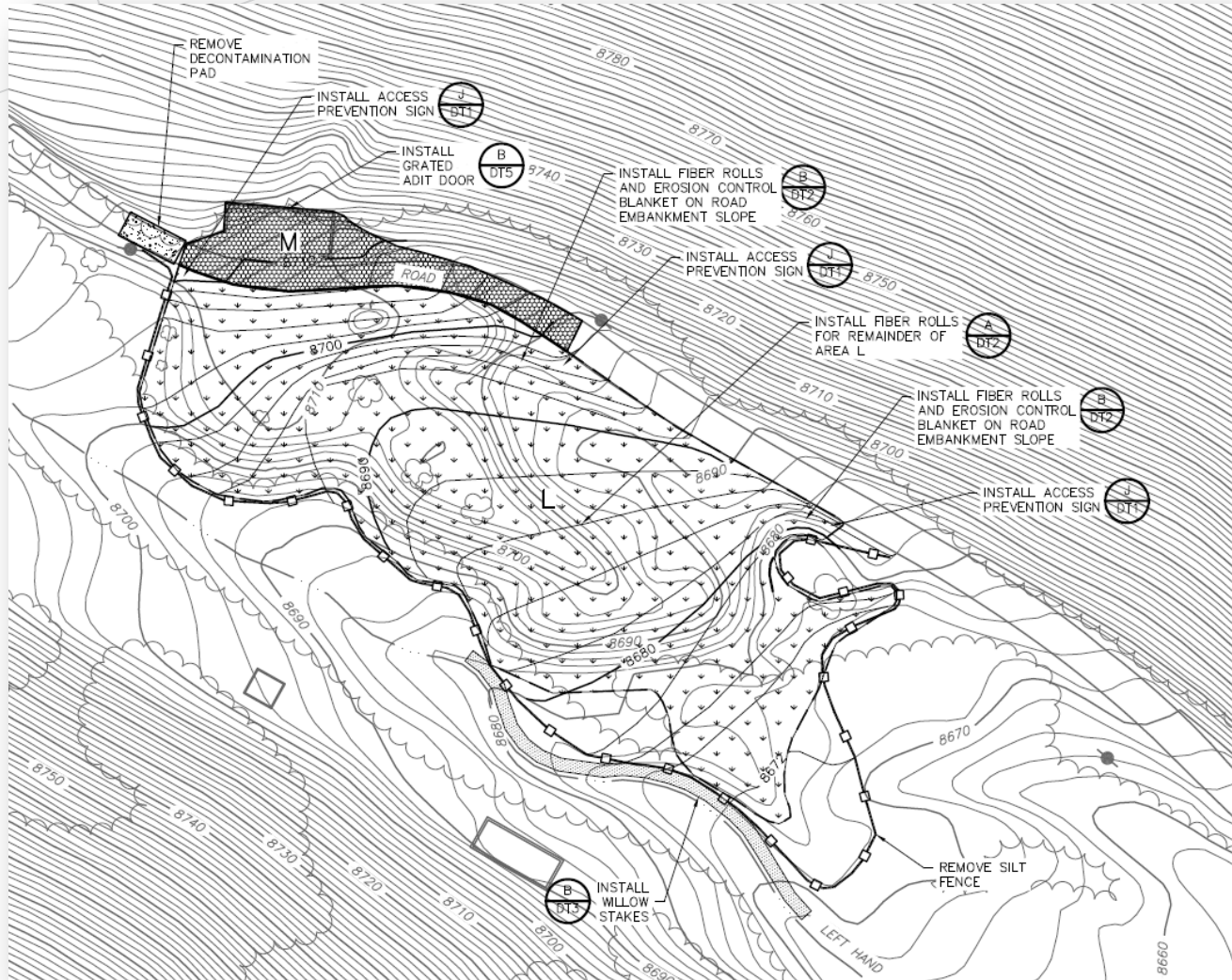
# Design - Black Jack Adit & Captain Jack Mill

Regrade Tailings Pond, Extend Portal, Consolidate Mine Waste (46,000 cy), Borrow Source, Install Soil Cover





# Design – White Raven Mine



Remove Mine Waste (12,000 cy), Restore Property

# Remedial Action – Big Five Mine Dump



Excavation and regrading mine waste, 2 ft soil cover

# Remedial Action – Big Five Mine Dump



Run-on control; adit drainage ponds and discharge piping



# Remedial Action – Big Five Mine Dump



Access and runoff controls

# Remedial Action – Big Five Mine Dump



Runon controls  
and  
cornucopia  
mine  
reclamation

# Remedial Action – Captain Jack Area



Portal extension and lime amendment

# Remedial Action – Captain Jack Area



Mill demolition, mine waste consolidation,  
borrow material preparation

# Remedial Action – Captain Jack Area



Mine waste  
consolidation  
and 2-ft soil  
cover

# Remedial Action – Captain Jack Area



Run-on controls

# Remedial Action – Captain Jack Area



Runoff controls

# Remedial Action – Captain Jack Area



Erosion controls  
and seeding



# Remedial Action – Residential Property



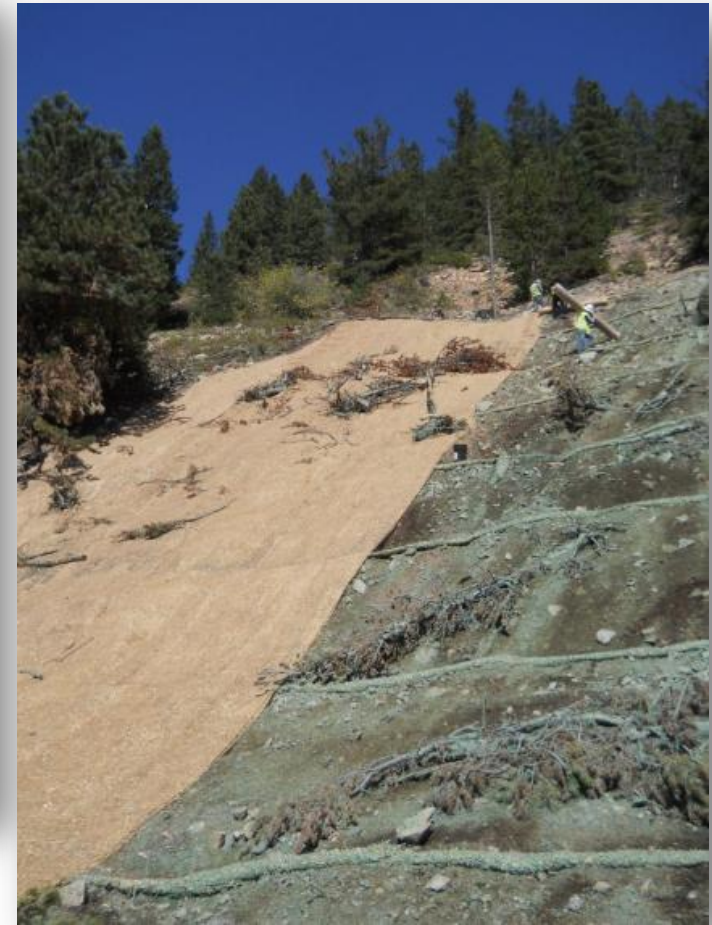
Mine waste removal, culvert replacement, septic system replacement

# Remedial Action –Philadelphia Mine Dump



Mine waste excavation, parent ground amendment, slash placement

# Remedial Action –Philadelphia Mine Dump



Erosion control and seeding

# Remedial Action – Residential Property & Philadelphia



Property Restoration – Growth media placement, seeding, erosion controls, sod, tree planting, willow stakes

# Remedial Action – White Raven Mine



Mine waste removal; adit portal structural restoration and gate



# Remedial Action – White Raven Mine

Restoration – Fill and rock placement, erosion controls, seeding



# Questions

