

Carpenter Snow Creek Mining District Superfund Site On-Site Waste Disposal Area Proposed Plan



Silver Dyke Glory Hole

Why The Proposed Plan?

A repository location needs to be selected before the Neihart remedial action can commence

- **2009 Town of Neihart Record of Decision (ROD) anticipated selecting repository during design**



Why The Proposed Plan?

Removal action planned in 2014 to address Silver Dyke Tailings

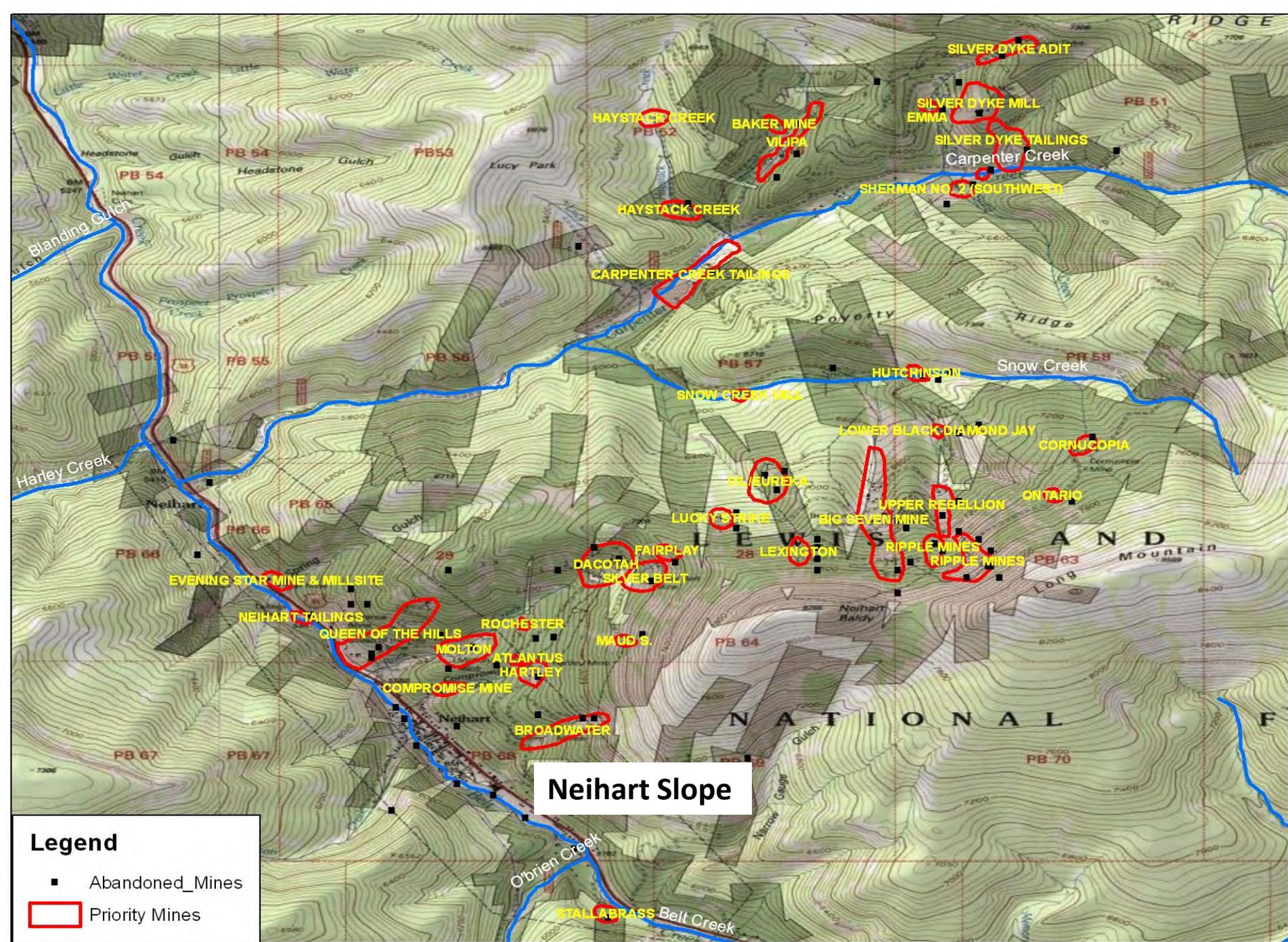
Best option is to excavate and place in the nearby Mckay Gulch Repository



Remnants of the breached dam

Site Overview

- Mining began in late 1800s on Neihart Slope
- Expanded into Snow Creek and Carpenter Creek in the 1900s
- Approximately 25 high priority mine sites identified during our investigations
 - Estimate 1.2 million cubic yards of mine waste



Legend

- Abandoned_Mines
- Priority Mines

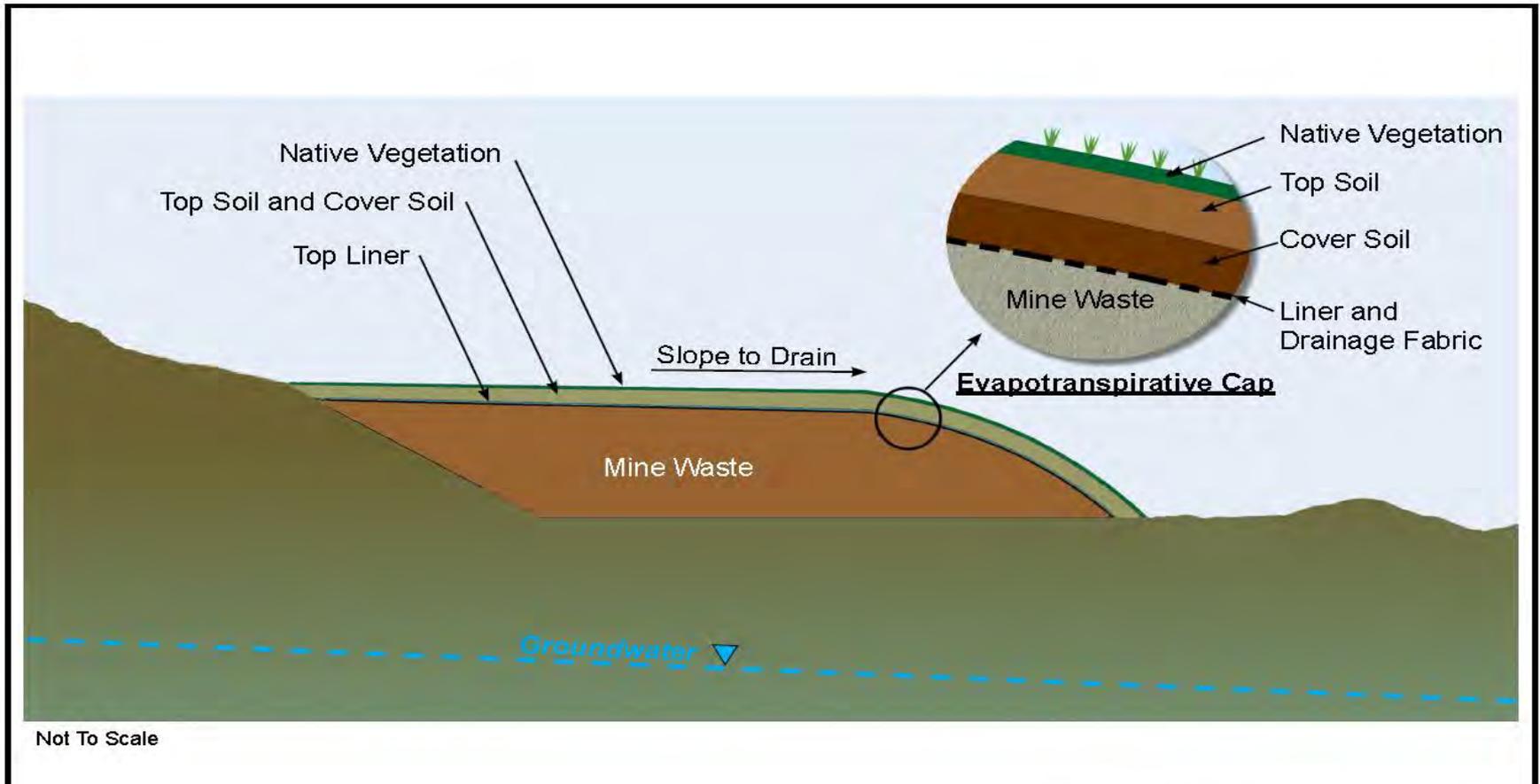
Neihart Slope

Map labels include: Blanding Gulch, Harley Creek, O'Brien Creek, Stallabrass Belt Creek, Neihart, Lucy Park, Poverty Ridge, Snow Creek, and Mountain Ridge. Mine labels include: Silver Dyke Adit, Silver Dyke Mill Emma, Silver Dyke Tailings Carpenter Creek, Sherman No. 2 (Southwest), Haystack Creek, Baker Mine Vilipa, Haystack Creek, Carpenter Creek Tailings, Snow Creek Mill, Hutchinson, Lower Black Diamond Jay, Cornucopia, Ontario, Upper Rebellion, Big Seven Mine, Ripple Mines, Ripple Mines, Deurela, Luckys Strike, Lexington, Fairplay, Silver Belt, Evening Star Mine & Millsite, Neihart Tailings, Queen of the Hills, Rochester, Maud S., Molton, Atlantis Hartley, Compromise Mine, Broadwater, and Stallabrass Belt Creek.

On-Site Repository Investigations

- Town of Neihart (OU1) Remedial Investigation/Feasibility Study began in 2004
 - cursory repository investigation conducted
- OU1 Record of Decision issued in 2009
 - Specified on-site disposal but did not identify a location
- Field investigations of potential repository locations began in 2011

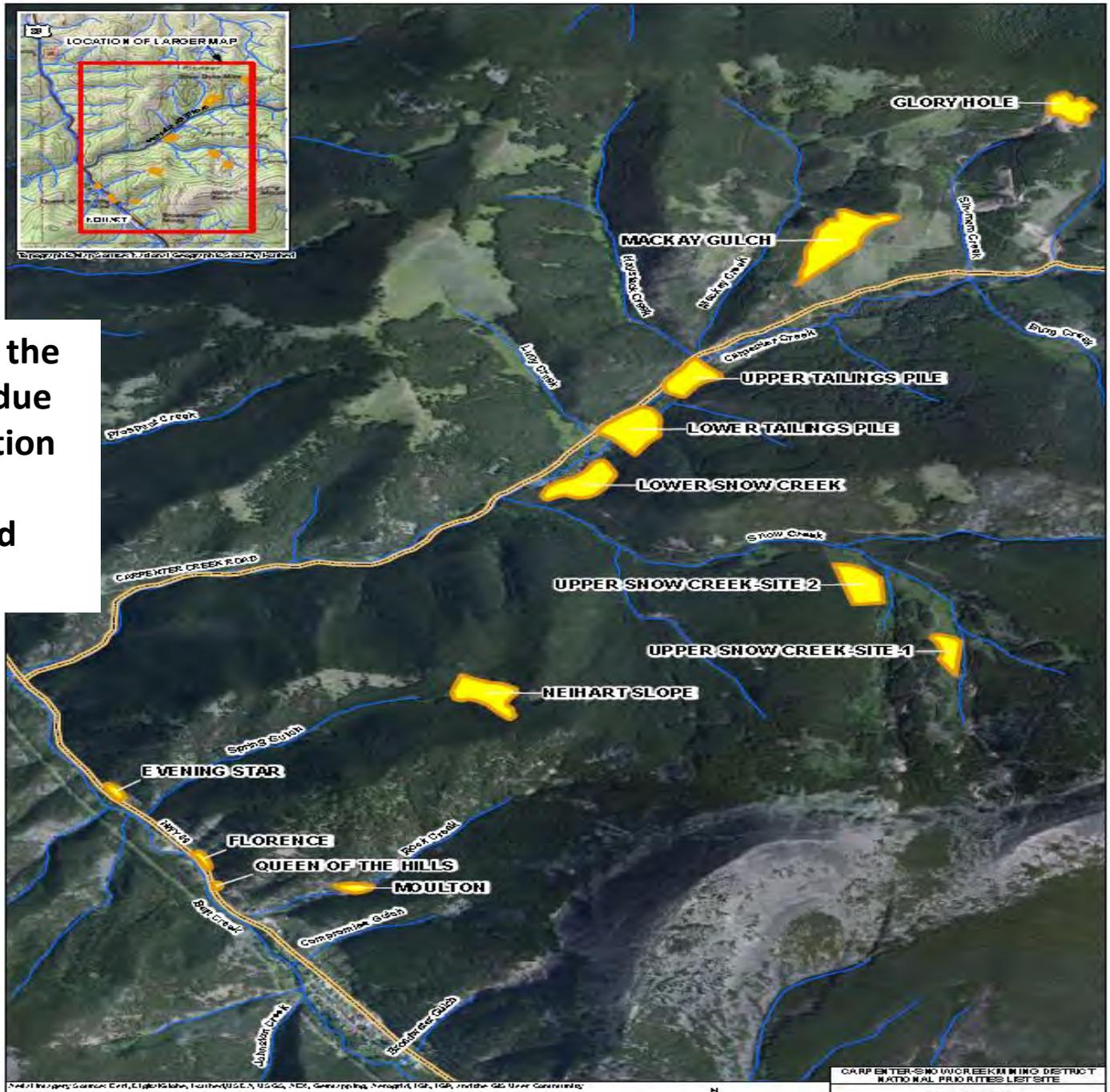
Conceptual Site Model



- Access (including ownership)
- Slope
- Capacity
- Availability of cover and top soil
- Separation between mine waste and groundwater

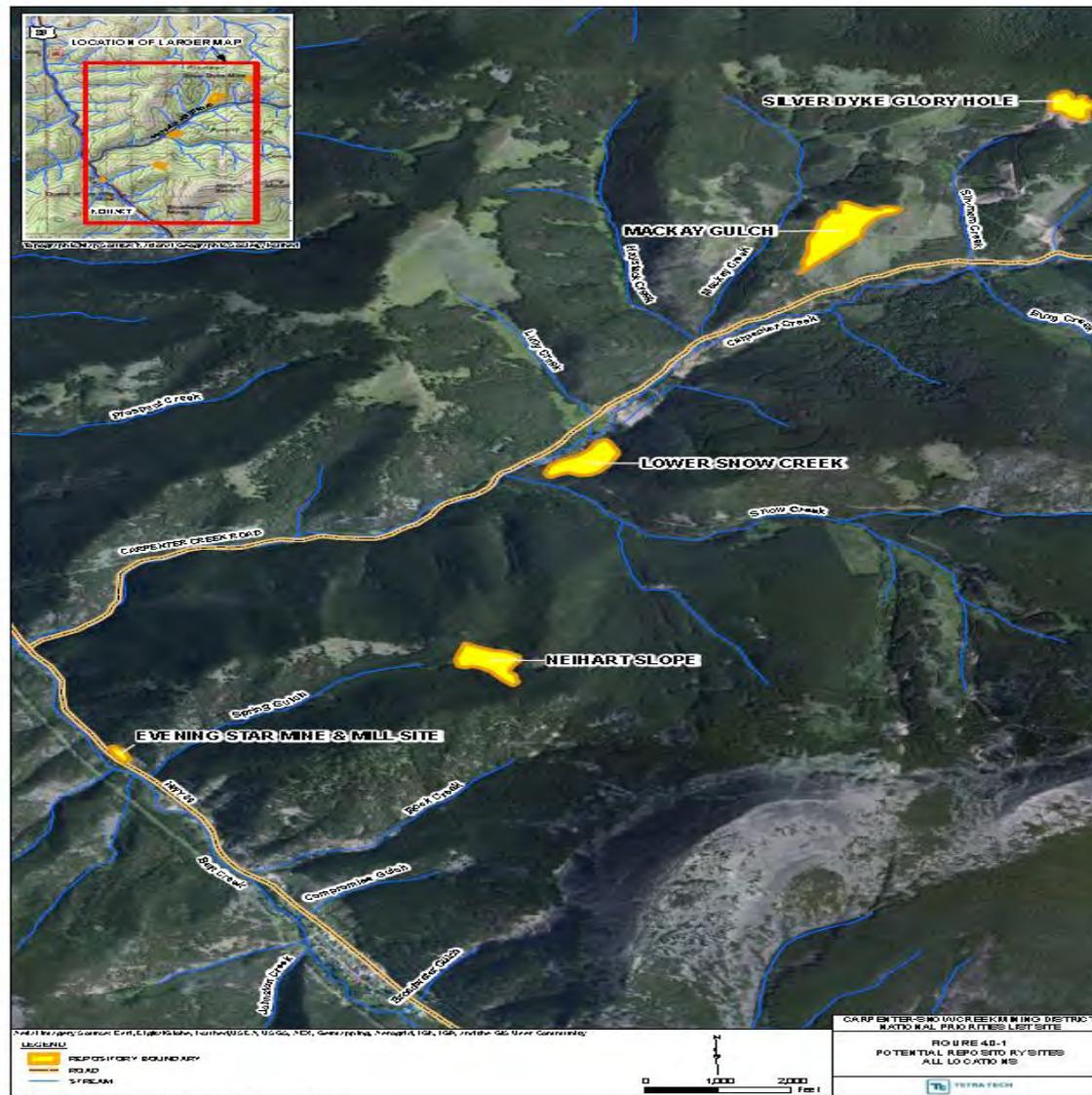
CARPENTER-SNOW CREEK MINING DISTRICT
NATIONAL PRIORITIES LIST SITE

FIGURE 1.3-2
Conceptual Model of a Repository



Several screened out in the remedial investigation due to size limitations, location to mine waste, and proximity to surface and groundwater

On-Site Locations Carried Forward to the Feasibility Study



Preliminary Remedial Action Objectives

- Prevent exposure of humans and the environment to the removed mine waste placed in the repository;
- Prevent the migration of mine waste contamination out of the repository through erosion and leaching; and
- Site repository locations in practical places where access and proximity issues can be addressed readily.

Mine Waste Disposal Alternatives

- No action
- No further action with monitoring
- Off-site disposal to Great Falls landfill

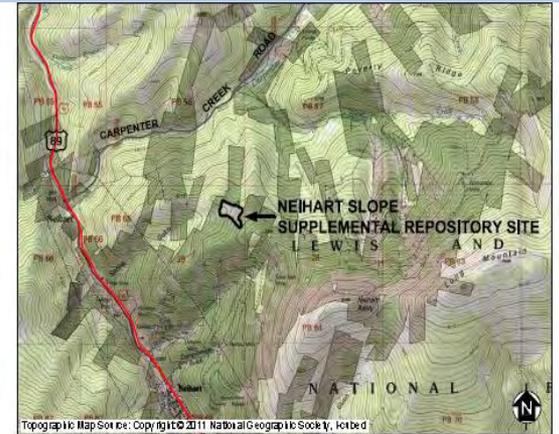
Evaluation Criteria Analysis

Repository Location	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short Term Effectiveness	Implementability	Cost
Alternative 1 - No Action	Not protective of human health or the environment.	Does not comply with ARARs	Is not effective at preventing exposure to mine waste.	Does not reduce toxicity, mobility or volume.	Is not effective at preventing exposure to mine waste.	Readily implemented.	No cost
Alternative 2 - No Further Action with Monitoring	Not protective of human health or the environment.	Does not comply with ARARs	Is not effective at preventing exposure to mine waste.	Does not reduce toxicity, mobility or volume.	Is not effective at preventing exposure to mine waste.	Readily implemented.	Low
Alternative 3 - Off-Site Disposal	High degree of protection.	Complies with ARARs	Effective. Eliminates human and environmental exposure to mine waste permanently .	Eliminates mobility to air, surface soil, surface water, and groundwater by consolidation and confinement in a repository.	Very Effective. Eliminates human and environmental exposure to mine waste permanently as long as repository is maintained.	Readily implemented if permitted facility has capacity to accept 1.2 million cubic yards.	\$90 M

On-Site Disposal

- Neihart Slope, Lower Carpenter Creek and Evening Star Mine and Mill Repositories screened out

Neihart Slope Repository Location



NEIHART SLOPE SUPPLEMENTAL REPOSITORY SITE LOCATOR MAP

LEGEND

- EXISTING GRADE MAJOR CONTOUR - 20 FOOT INTERVAL
- EXISTING GRADE MINOR CONTOUR - 5 FOOT INTERVAL
- REPOSITORY SITE - EXTENT OF SURVEYED AREA
- REPOSITORY SITE - EXTENT OF PROPOSED FILL AREA



0 50 100 150 200
Feet

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NATIONAL PRIORITIES LIST SITE

FIGURE 42
NEIHART SLOPE
SUPPLEMENTAL REPOSITORY
EXISTING TOPOGRAPHY

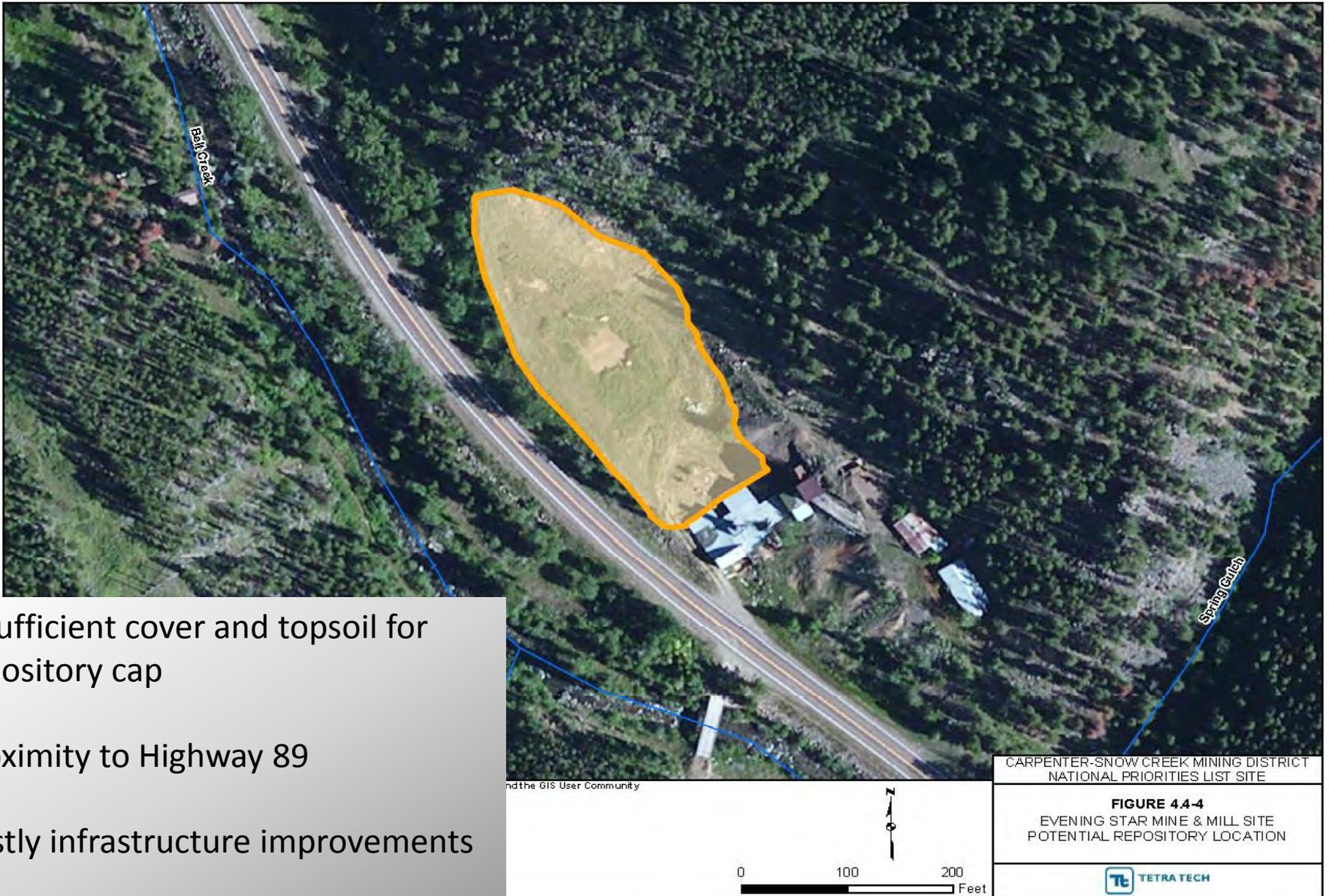


Multiple landowners

Costly infrastructure improvements
to access location

92,000 cubic yard capacity

Evening Star Mine and Mill Repository



Insufficient cover and topsoil for repository cap

Proximity to Highway 89

Costly infrastructure improvements

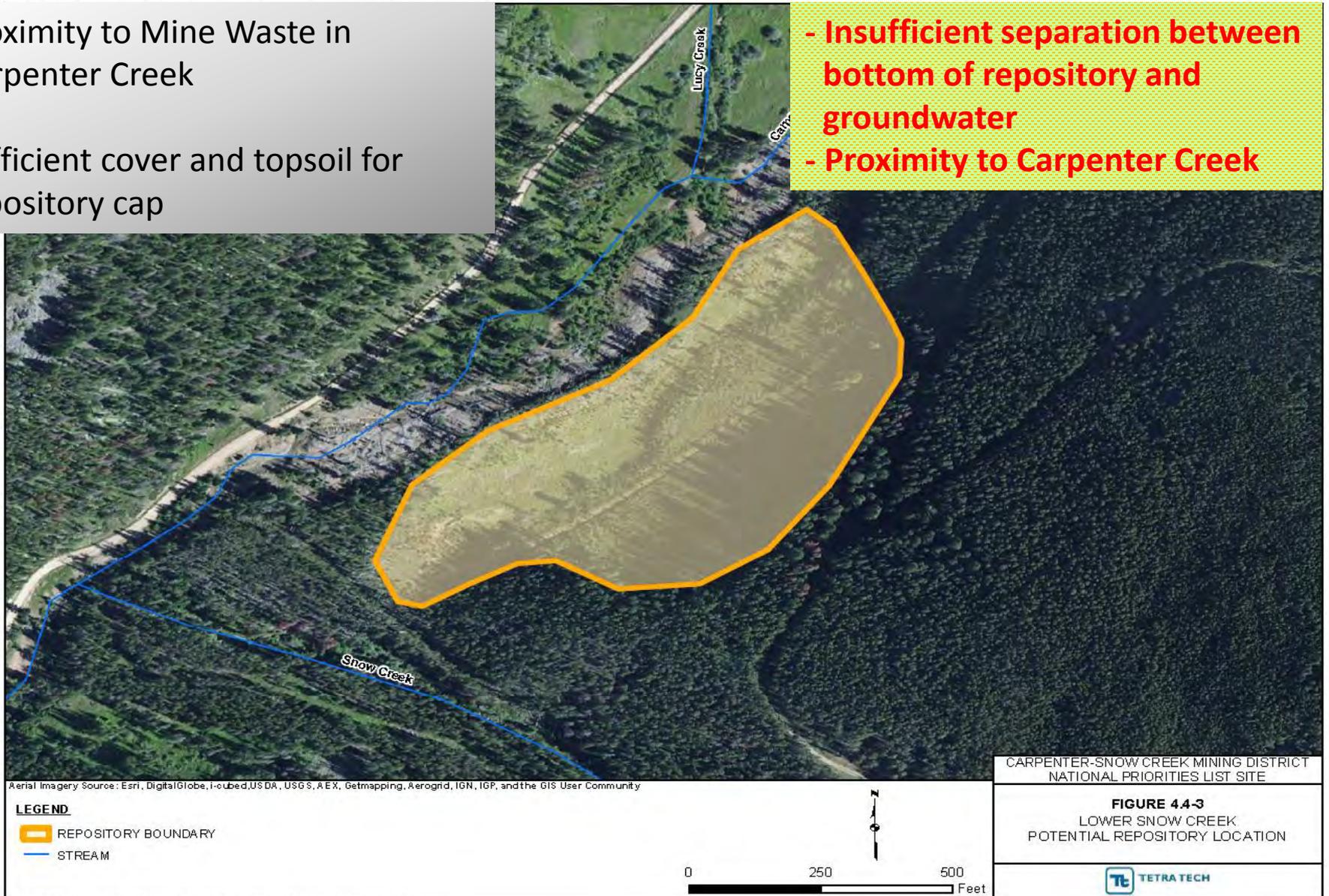
51,000 cubic yard capacity

Lower Snow Creek Repository

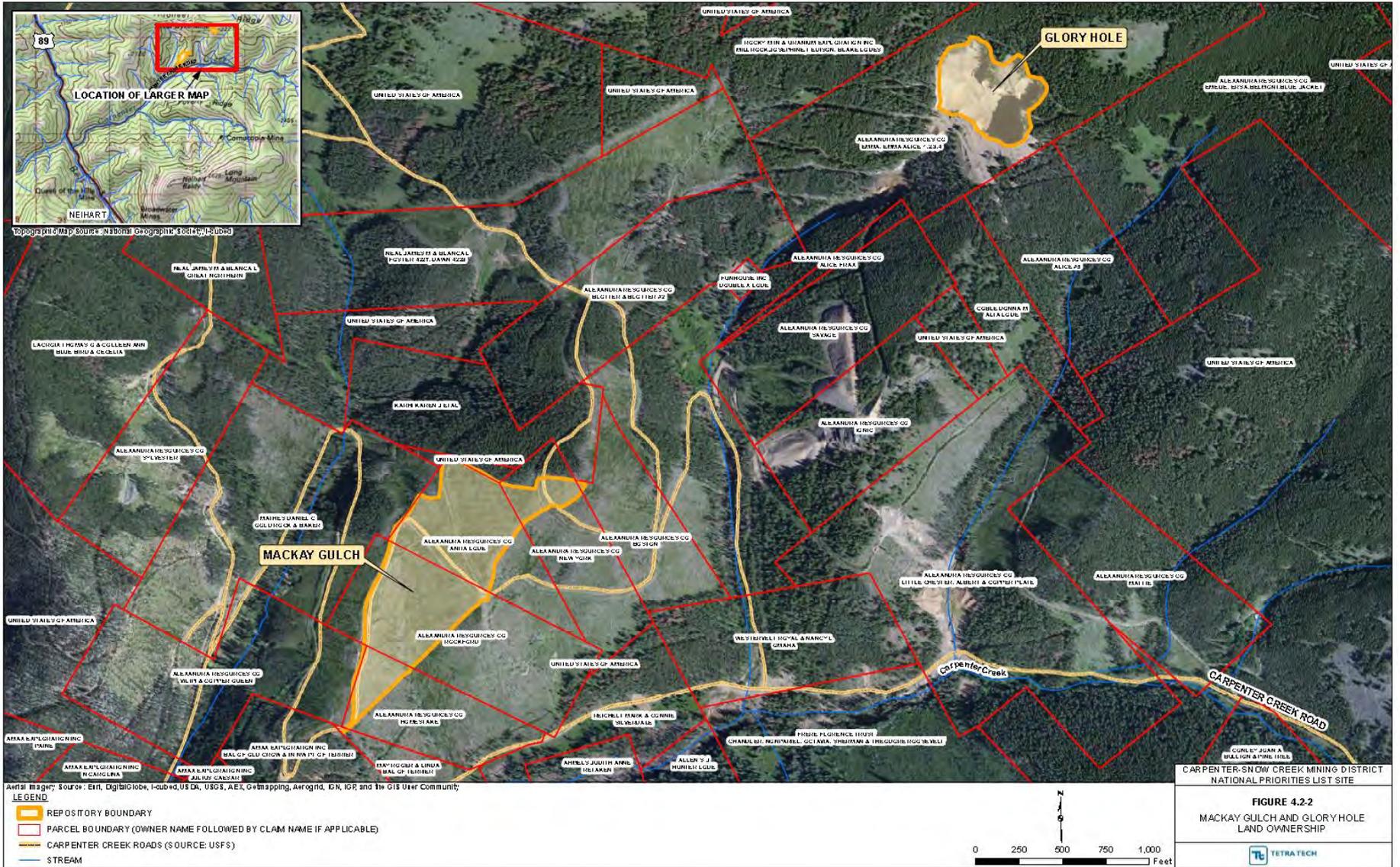
Proximity to Mine Waste in
Carpenter Creek

Sufficient cover and topsoil for
repository cap

- Insufficient separation between
bottom of repository and
groundwater
- Proximity to Carpenter Creek



On-Site Locations Carried Forward



Evaluation Criteria Analysis

Repository Location	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short Term Effectiveness	Implementability	Cost
Alternative 4 - Mackay Gulch Repository	High degree of protection. Remote, dry area. No groundwater observed above bedrock.	Complies with ARARs	Effective. Eliminates human and environmental exposure to mine waste permanently as long as repository is maintained.	Eliminates mobility to air, surface soil, surface water, and groundwater by consolidation and confinement in a repository.	Very effective. Eliminates human and environmental exposure to mine waste permanently as long as repository is maintained.	Readily implemented. Existing site access needs minor improvements. Site access and development estimated at <1 month.	\$ 20 M
Alternative 5 - Silver Dyke Glory Hole Repository	Medium to high protection. Leachate may drain with pre-existing adit drainage. Eliminates large mine hazard.	Complies with ARARs	Effective. Eliminates human and environmental exposure to mine waste permanently as long as repository is maintained.	Eliminates mobility to air and surface soil by consolidation and confinement in a repository. May reduce adit drainage. Must be filled to positive drainage over a short term to prevent ponding.	Very effective if filled to positive drainage in 1-2 years. Eliminates human and environmental exposure to mine waste permanently as long as repository is maintained.	Implementable. Requires haul road construction and extensive repository site development. Site access and development estimated at 1-2 years. Glory Hole will need to be addressed anyway to mitigate adit drainage. Adit drainage will need to be addressed in the future to meet ARARs.	\$17 M

Mackay Gulch Repository

- Slope grade less than 4:1
- Contains 180,000 cys of cover and top soil
- Adequate separation to gw
- Easy access
- One property owner
- Minimal preparation



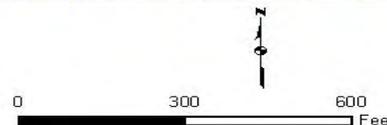
- Infrastructure improvement
- 675,000 cubic yard capacity



Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, USDA, USGS, AeroGRID, IGN, IGF, and the GIS User Community

LEGEND

-  REPOSITORY BOUNDARY
-  STREAM



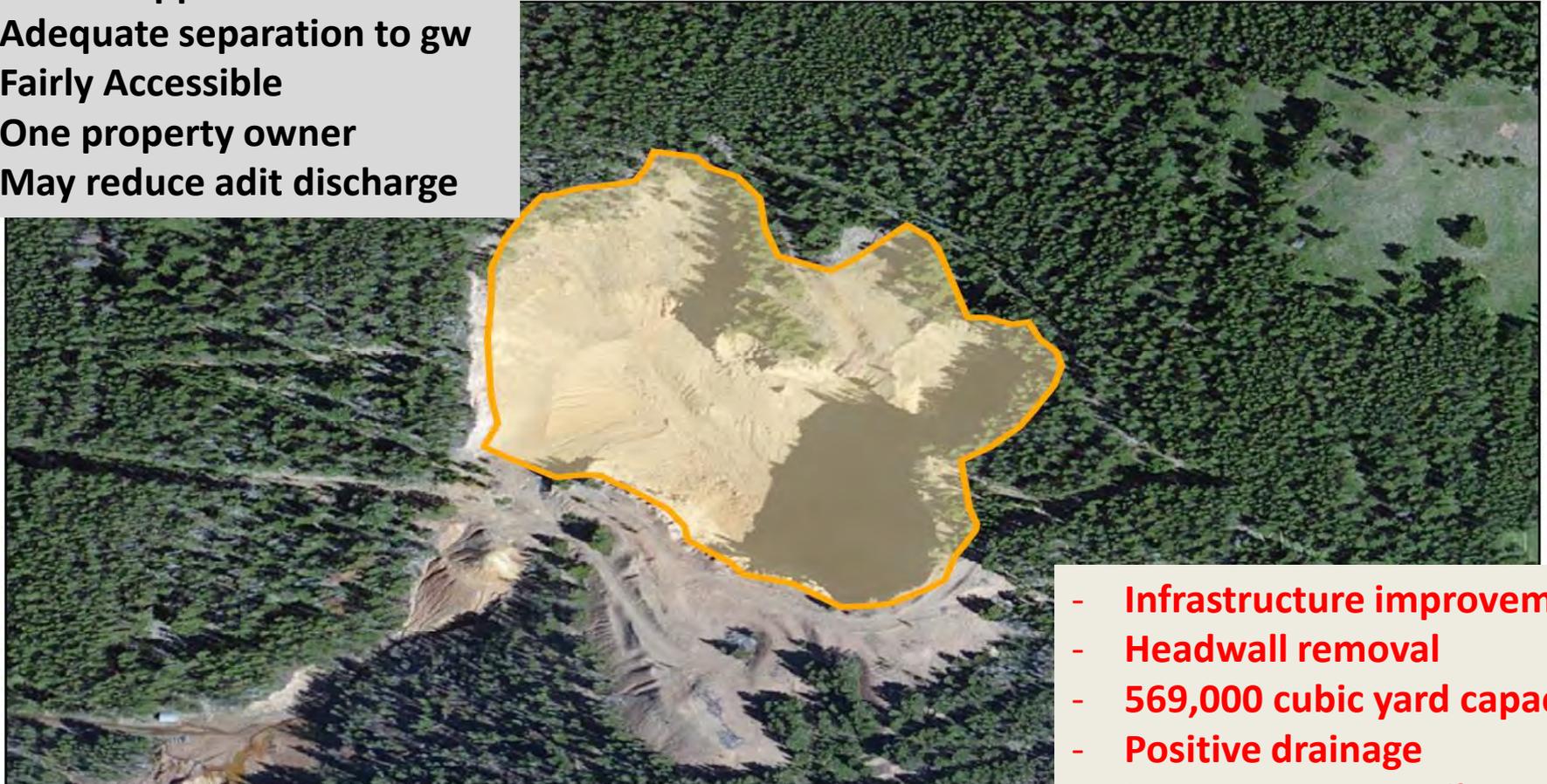
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NATIONAL PRIORITIES LIST SITE

FIGURE 4.4-1
MACKAY GULCH
POTENTIAL REPOSITORY LOCATION



Silver Dyke Glory Hole Repository

- Public support
- Adequate separation to gw
- Fairly Accessible
- One property owner
- May reduce adit discharge



- Infrastructure improvement
- Headwall removal
- 569,000 cubic yard capacity
- Positive drainage
- No cover or top soil
- Adit discharge

Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, USDA, USGS, AeroGRID, IGN, IGP, and the GIS User Community

LEGEND

 REPOSITORY BOUNDARY

0 200 Feet



Preferred Alternatives

No repository location has been screened out from future consideration

- Mackay Gulch and Silver Dyke Glory Hole have been selected as repositories for on-site disposal
 - Rationale is that both sites will be required for the estimated 1.2 million cubic yards of mine waste
- Mackay Gulch will be developed first to meet deadlines for Silver Dyke Tailings Removal Action and OU1 Remedial Action

Questions or Comments

