RESTORE THE SITE

Appendix G, Project Development Methodology
Alternatives Analyses

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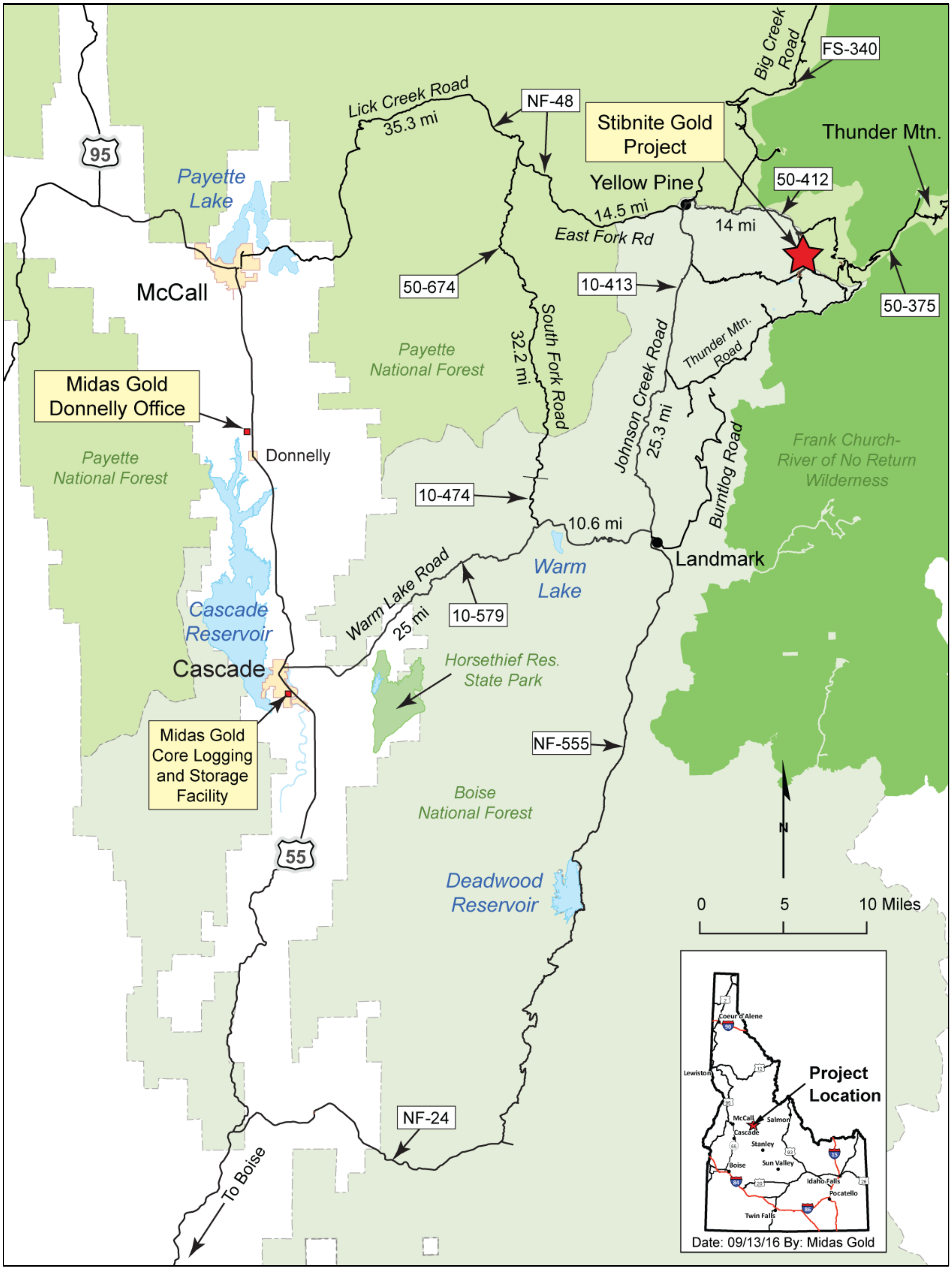
1 INTRODUCTION

This report summarizes the approach used by Midas Gold Idaho, Inc. (**Midas Gold** or **Company**) to evaluate alternatives for the Stibnite Gold Project (**Project**), a proposed gold, silver and antimony mining operation where such alternatives could have an environmental, social, community or economic impact. Midas Gold has employed this evaluation of alternatives in developing and submitting its proposed *Plan of Restoration and Operations* (**PRO** or **Plan**) for the Project to the U.S. Forest Service (**Forest Service**) for review by the Forest Service, other agencies, stakeholders and the general public, prior to a Forest Service approval decision. The proposed PRO and alternatives will remain subject to further evaluation under the National Environmental Policy Act (**NEPA**) and other authorities prior to a Forest Service approval decision.

The Project is located in Valley County in central Idaho, within the historical Stibnite Mining District (**District**), approximately 92 miles by air and 144 miles by road northeast of Boise, Idaho; 38 air miles east of McCall, Idaho; and 10 air miles east of Yellow Pine, Idaho (see Figure 1).

Midas Gold plans to develop and operate a modern surface mining and ore processing operation at the site in order to obtain a positive financial return and benefits from the Company's mineral rights and investment in the Project. The planned operation, as described in the PRO, will restore the site by addressing legacy impacts and supply extracted minerals for various uses, while providing broader environmental and socioeconomic benefits at the site and for the surrounding region.

Figure 1, General Location Map



2 PROJECT BACKGROUND

Midas Gold began exploration and study of the District in 2009 with the goal to determine if a viable mining and ore processing operation could be developed to produce gold, silver and antimony from the mineral resources[1] present at the site. Over the years, the Company has invested a total of US$131.5 million (to March 31, 2016) and hundreds of thousands of hours in the collection of extensive geologic, environmental, socioeconomic and engineering information for the site and surrounding areas. Midas Gold has used this information to assess the site, evaluate alternatives and determine the preferred options. Some of the nation's best exploration geologists, engineers, and environmental scientists have been involved in this process. Midas Gold has also sought input from the nearby communities, interested organizations and local, Idaho and federal officials. This effort provided valuable assistance to the site evaluation, alternative assessment and selection of preferred options.

Prior to Midas Gold's involvement, the District has experienced extensive past mining, milling and smelter activities, which left the area as a "brownfield" site[2]. The redevelopment of the historically mined lands, as proposed by the Company, provides the means and opportunity to clean up an existing brownfields site and reclaim previously impacted areas. In addition, it is evident that recent wildfires have been frequent and intense in the Project area, and Midas Gold has already undertaken (and will continue to undertake) reforestation efforts at the site to restore forest cover (which will help reduce sedimentation load), to refurbish stream channels, and improve wetland systems and fisheries habitat leading to a productive, self-sustaining ecosystem.

From the beginning of its involvement at the site, Midas Gold recognized that Project design must fully consider the area's environmental conditions and that restoration, closure and reclamation strategies would be an integral and essential component of planning. Therefore, the Company embarked on a major effort to collect and analyze environmental baseline and background information, in consultation and coordination with the public, interested organizations and the various federal, Idaho and local government regulatory agencies that are charged with mine oversight and environmental protection. Midas Gold and its consultants have collected (and continue to collect) information and data for air quality and climate, surface water and groundwater, geochemistry, geologic hazards (such as landslide risk), safety hazards (such as avalanche prone areas and abandoned mine openings), fisheries and wildlife (including any potential threatened and endangered species), cultural and historic resources, land use, soils, vegetation (including wetlands and riparian zones), recreation and socioeconomics.

As part of its planning efforts, Midas Gold retained the services of M3 Engineering & Technology Inc. (**M3**), a highly-respected and well-experienced engineering and construction management firm, to

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[1] Midas Gold declared mineral reserves on the Stibnite Gold Project through filing a NI 43-101 compliant technical report titled "Stibnite Gold Project Preliminary Feasibility Study" dated December, 2014. The analyses summarized herein precede that document; moreover, many of the alternatives described in this document do not form part of the project description described in the PFS, and it would be inappropriate to use the term "mineral reserves" when discussing the alternatives. Consequently, throughout this document, Midas Gold uses the term "mineral resources" to describe the mineralized zones at the Stibnite Gold Project. The mineral reserves from the PFS are included within the mineral resources discussed herein and are detailed in the PFS.

[2] A brownfield site is a former industrial or commercial site where future use is affected by real or perceived environmental contamination. An EPA definition of a "brownfield site" is found in Public Law 107-118 (H.R. 2869) – "Small Business Liability Relief and Brownfields Revitalization Act" signed into law on January 11, 2002.

coordinate with the Company's technical staff and third-party consultants and complete a detailed technical and financial assessment of development and operational options for a future mine. This work involved thorough technical, environmental and economic reviews of numerous alternatives such as legacy impact restoration, impact mitigation, mining locations and methods, milling techniques, tailings and development rock management and placement, water handling measures, site facility layouts, electric power supply, site access and transportation, and on-site housing for employees and contractors. The ultimate goal of this work was to develop mining and ore processing plans that yield a safe, technically feasible, and economically viable restoration program and mining operation that would be environmentally sound and socially responsible, and in compliance with applicable mining and environmental laws and regulations.

The efforts of M3, Midas Gold, and other specialized technical consultants were summarized in a *Prefeasibility Study* (**PFS**) *and NI 43-101 compliant technical report*, dated December 15, 2014. The PFS provides information about geology, mineralization, exploration potential, mineral resources, mineral reserves, mining method, process method, infrastructure, social and economic benefits, environmental protection, clean-up and repair of legacy impacts, reclamation and closure concepts, capital and operating costs, and an economic analysis for the Project. The PFS is available for review at www.midasgoldcorp.com/s/2014PFS.asp.

After the release of the PFS, Midas Gold continued to collect baseline information, evaluate alternatives and seek stakeholder input. The Company then used this information and input to further its analysis of the Project and began the preparation of this PRO to comply with the mining regulations of the U.S. Forest Service (36 CFR 228 Subpart A) and other state and federal agency laws and regulations. While the substantial majority of the ore to be mined is located on Midas Gold's private land, much of the planned infrastructure will be located on public lands overseen and managed by the Forest Service, so this agency will be responsible for the completion of an environmental impact statement (**EIS**) for the PRO in compliance with NEPA.

3 ALTERNATIVES & THE NATIONAL ENVIRONMENTAL POLICY ACT

The discussion of the environmental effects of a proposed action and reasonable alternatives is the focus of an EIS under NEPA.

The Council on Environmental Quality (**CEQ**) regulations (40 CFR 1502.14(a)) provide that an EIS "*rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that are eliminated from detailed study, briefly discuss the reasons for their having been eliminated"*. Further, CEQ regulations (again, in 40 CFR 1502.14) require that EIS documents include the evaluation of reasonable alternatives to the proposed action. CEQ describes reasonable alternatives as "*those that are practical or feasible from the technical and economic standpoint and using common sense"* (CEQ 40 FAQ 2a). Reasonable alternatives also must meet the Company's purpose and need for the Project.

While the NEPA regulations require consideration of a "no action" alternative, we note that the no action alternative will not conform to the Company's purpose and need for the Project. Further, the federal mining and National Forest laws and regulations[3] provide for locatable mineral exploration, development and extraction operations on National Forest and other federal lands open to locatable mineral entry. A no action alternative would prevent Midas Gold from benefiting from its valuable and valid mineral rights and would prevent Midas Gold from cleaning up and restoring an existing, widely impacted, brownfields site, thereby preventing the broader society from enjoying the benefits of a restored environment at the Project site. However, Midas Gold understands that the no action alternative, under NEPA, will serve as a baseline to facilitate the comparison of impacts between the proposed action and other alternatives that will be analyzed in detail in an EIS.

A no action alternative would avoid the environmental impacts associated with the Project, but would also forego the associated environmental, social, and economic benefits associated with the Project. Particularly, were the Project not permitted to proceed; in order to restore the site to standards similar to those discussed in the PRO; government agencies would need to relocate millions of tons of development rock and spent ore and construct standalone repositories for storage of legacy tailings, contaminated soils, development rock, and spent heap leach ore. Such efforts would not be able to take advantage of more suitable (larger scale) equipment available to conduct the aforementioned activities, and would require the construction of all other associated infrastructure, such as offices, maintenance facilities and housing. In order to undertake such activities, these agencies would have to utilize third party contractors to purchase or lease vehicles and heavy equipment and provide mobilization to and from the Project site. In addition, if conducted on a standalone basis, such restoration work would require the transportation of equipment, people, supplies and fuel along the existing roads, which currently parallel Johnson Creek and the EFSFSR salmon-bearing rivers.

Further, without the integrated redevelopment of the Project and access to the ore processing facility (as that planned by Midas Gold), none of the metals currently contained in the legacy tailings would be removed from such tailings and would remain on site as a potential future risk.

It is highly unlikely that the restoration of the site on a standalone basis would be funded by taxpayers, the State of Idaho or any federal agency, such as the Forest Service, the Environmental Protection Agency (**EPA**), or the NOAA National Marine Fisheries Service. Nor should it be, given that the mining

[3] See 30 U.S.C. 21-54 (codified sections of federal mining laws); 16 USC 478, 551 (National Forest establishment and administration); 36 CFR 228A (Forest Service locatable mineral surface use regulations).

and ore processing facility planned by Midas Gold will incorporate this work into the activities of the proposed Project, at no cost to taxpayers.

The Project presents an opportunity to clean up an existing, widely impacted, brownfield site, and to create nearly 1,000 new jobs in Idaho while generating significant taxes and other benefits to the local, state and federal economies. Key considerations for the Project include:

- From the beginning, the Project has been designed for what will remain after closure, a net benefit to the local environment. The restoration, closure and reclamation work for the Project will protect the environment by incorporating stable and secure features that will be the foundation for restoring a long-term naturally sustainable ecosystem.
- The Project design is based on the cleanup and repair of extensive historical mining-related impacts, with much of the cleanup and repair work occurring as advanced compensation in the early stages of the Project's construction and operation.
- The Project is designed to create ongoing positive local and regional financial and social benefits through employment, business opportunities and taxation.
- The footprint for the Project facilities will be tightly confined, and preferentially located on areas previously impacted and disturbed. Approximately 1,700 acres will be physically disturbed at the site, with nearly half of this represented by areas that have been previously impacted and disturbed by historical mining and its related activities.
- Salmon and other fishery enhancements are integral to the Project design. Removal of artificial barriers and reconstruction of natural habitat along the EFSFSR and Meadow Creek will recreate the connectivity that will allow salmon and other fish migration into the upper reaches of the watershed for the first time since 1938. The durability of this advanced mitigation measure will be backed by long-term financial and adaptive management commitments made by Midas Gold as part of the overall development scheme.
- All aspects of the Project are designed to improve upon existing conditions, with the extensive costs related to brownfield remediation and reclamation of legacy impacts funded by an economically feasible Project.

4 ALTERNATIVE ASSESSMENT PROCESS

The assessment of alternatives for a mining project EIS is an iterative process. It involves an understanding of engineering, mine operations, site-specific environmental conditions, reclamation techniques, regulatory requirements, and economics. From the Company's perspective, the technical, environmental and regulatory aspects of the assessment should be openly and succinctly summarized so that regulatory and land management agencies, interested organizations, concerned individuals and elected officials gain insight into the alternatives assessment process, and have confidence that the process is transparent and fair, as well as that the Project is properly sited and engineered.

Midas Gold has considered and screened many alternatives, starting with the method of mining and ending with the closure and reclamation of the site. The goal of this detailed screening process was to assemble a rational, workable, safe, environmentally sound and economically feasible plan for the Project, one that will result in a positive EIS and be acceptable to the Forest Service, other agencies and welcomed by the public. The Company understands that the eventual key to the Forest Service review and screening of other potential reasonable alternatives will be the consideration of the Project's purpose and need, the feasibility (including economic and technical factors) of any alternative, and potential environmental impacts balanced with mitigation and compensatory environmental enhancements.

Like every mining project, the Stibnite Gold Project has major activities or facilities, which are known as "components". Together, these components form the Project. The components are interrelated, but not necessary mutually dependent. For example, extracting the mineral ore from the ground itself is a major component, but the method of extraction does not necessarily dictate the type of ore processing that will occur at the site. The components of tailings[4] and development rock[5] management and placement are interrelated with ore extraction only to the extent that such placement must not interfere with the planned ore extraction and the possible future mineral resources that could be mined. In addition, there are Project components separate from ore extraction and processing, and tailings and development rock storage, such as site access and the electric power supply, that will be needed for Project construction, operations and closure.

Every component generally has alternatives, which mainly involve location or design methods. For the purpose of this alternatives assessment, Midas Gold started with a set of Project and design criteria that form a realistic framework, then developed a range of possible alternatives for each component and assessed the alternatives relative to their projected performance in areas such as: safety, environmental, community, regulatory, technical risk, and economics. The goal of the alternatives screening was to eliminate an alternative that does not meet the Company's purpose and need for the Project, is clearly not feasible or economic, or has substantial (or risk of substantial) negative safety or environmental impacts.

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[4] Tailings are the finely ground rock and water remaining after the metal and mineral values have been extracted from the ore through milling and other metallurgical processes. At the Project, the values to be removed are gold, silver and antimony. Often, the term "tailings" is mistakenly used interchangeably with development rock (or waste rock, as termed by many miners), but tailings and development rock are separate and distinct items. See footnote below.

[5] Development rock is non-mineralized or uneconomic mineralized material excavated during mining to access ore material.

Midas Gold and its consultants completed many trade-off studies (or alternative assessments) to reach the preferred design presented in the PRO. This document presents a summary of a subset of the alternative assessments that have been completed. The alternative assessments summarized in this report were particularly instrumental in defining the Stibnite Gold Project and therefore warrant being highlighted early in the permitting process (see Section 8). Those excluded from this report are primarily related to operational aspects that have little impact on the Project footprint (such as the type of crusher used in the ore processing facility).

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5 MIDAS GOLD'S CORE VALUES & DESIGN PRINCIPLES

The foundation of Midas Gold's approach to the Project is its core values, which are detailed in the PRO and summarized below for ease of reference. From these core values, a set of design principles were developed to provide guidance to Company personnel and consultants and align their thinking with these core values.

5.1 MIDAS GOLD CORE VALUES

Midas Gold considers the health and safety of people, the protection of the environment and the sustainability of our activities to be the core values that drive all aspects of our thinking. This foundation of core values is reflected in our commitments to safety, environmental responsibility, community, accountability, integrity and transparency that are set out in our policies below:

- **Safety** – The health and safety of our employees, contractors and the public is of the utmost importance.
- **Environmental Responsibility** – We go above and beyond what is required; we find practical solutions to manage growth while protecting and enhancing the natural environment.
- **Community Involvement** – As a proud part of the community, we actively strive to serve the community's needs to collectively enhance prosperity and well-being.
- **Transparency** – We fulfill our commitments in an open and transparent manner. We aim to be accurate, consistent and straightforward in all information delivered to our stakeholders.
- **Accountability** – As part of our governance, we ensure that accountability guides all of our actions, decisions, conduct and reporting.
- **Integrity & Performance** – We hold ourselves to high moral standards and strive to fulfill our commitments in an effective and sustainable manner.

5.2 DESIGN PRINCIPLES

In order to align the Project design with Midas Gold's core values, the following design principles were provided to the consultants that developed the alternative assessments for the Project:

- Protect worker and public health and safety;
- Consider closure and reclamation from the outset;
- Minimize disturbance by maintaining as compact an operation as practicable;
- Locate facilities, to the extent practicable, on areas impacted by past mining activities, and on flat ground to avoid extensive earthmoving and reduce environmental footprint;
- Avoid locating facilities (especially structures or buildings in which people live or work) in areas of geological hazards or areas prone to avalanches;
- Reuse and/or reprocess already mined materials, where possible, to reduce the environmental footprint of the Project;
- Design and construct facilities to minimize impacts on aquatic and terrestrial wildlife, improve and enhance habitat across the Project site, and protect anadromous and local aquatic populations;

- Minimize or avoid, where practicable, direct disturbance to environmentally sensitive resources, such as jurisdictional Waters of the U.S. (**Waters of the U.S.**), leaving a buffer where appropriate;
- Minimize or avoid, where practicable, disturbance in designated Idaho Roadless areas;
- Comply with applicable legal and regulatory standards; and,
- Create or provide opportunities for the Company to clean up an existing brownfields site, reclaim historically impacted areas, replant forest cover, restore stream channels, wetlands and fisheries, and create a sustainable ecosystem.

Along with new mining and ore processing in the District, Midas Gold plans to clean up legacy disturbances that have occurred in this area over the past century. Midas Gold is resolved that the Project design will include plans to:

- Restore historically impacted areas within the Project footprint;
- Recover and re-mill legacy gold-silver-antimony tailings;
- Re-use legacy development rock (often referred to as "waste rock") and spent ore;
- Recover the remaining portions of previously mined gold-silver-antimony deposits; and,
- Commence and substantially advance legacy impact clean up and reclamation work early in the Project life.

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6 PROJECT DESIGN CRITERIA

In addition to providing our technical team with design principles based on Midas Gold's core values, additional project-specific design criteria were defined by Midas Gold to constrain alternatives that can be considered viable in the assessment processes. Some design criteria are obvious, as they are regulatory-driven requirements; some criteria are consistent with industry norms that represent best management or design practices; and, some design criteria are Project-specific that relate to the purpose and need for the Project.

Based on comprehensive engineering and financial analysis set forth in the PFS, to align the Project with Midas Gold's core values and design principles, and to meet the Company's purpose and need for the Project, Midas Gold specified that all alternatives considered in this assessment must meet the following general design criteria:

- **Safety & Health:** The alternatives must be protective of worker and public health and safety, and all Midas Gold facilities, including offsite facilities, will comply with appropriate safety and health regulatory requirements.
- **Community:** The Project must be designed and operated to produce a positive outcome for the communities in Valley County.
- **Environmental:** The Project must be designed and operated to be protective of the environment and improve environmental conditions at the site that have been degraded due to legacy features and conditions, including fish and wildlife habitat impacts, legacy water quality impacts, stream and wetland impacts, vegetative resource impacts and un-reclaimed legacy ground disturbance.
- **Fish Passage:** The Project development plan must include the ability for fish to migrate upstream from the current blockage in the East Fork of the South Fork of the Salmon River (**EFSFSR**).
- **Legal:** Alternatives considered must comply with federal, state and local regulatory requirements.
- **Wilderness:** The Frank Church River of No Return Wilderness has already been designated as an exclusion area, and alternatives that encroach on it will not be considered.
- **Tailings Management:** The Stibnite Gold Project TSF will be a lined facility that will meet or exceed the requirements of the Idaho Department of Environmental Quality (**IDEQ**). TSF design alternatives that do not include a low-permeability liner system, and potential TSF sites that do not allow for this design feature, will not be considered by Midas Gold.
- **International Cyanide Management Institute (ICMI):** All Midas Gold onsite and offsite facilities, and contractor equipment and materials handling facilities, will be designed and operated to meet the ICMI Cyanide Management Code.
- **Access:** The Project design must ensure that the general public and private landowners can access public and private land outside the Project area (Monumental Summit and beyond) and provide for year round recreation access. Alternatives that block access to Monumental Summit will not be considered by Midas Gold.
- **Gold Concentrate Management:** The Project ore processing plant will generate gold-rich sulfide (**pyrite**) concentrate enriched with silver. Midas Gold and its design team have completed extensive metallurgical testwork, engineering and cost estimating to confirm the

feasibility of building and operating appropriate onsite ore processing circuits to refine the gold concentrate into gold and silver rich doré bars. Midas Gold has also identified two offsite ore processing plants in the U.S. (owned and operated by two separate companies) that have the technical capability of refining the gold concentrate that are also within economic trucking distance to the Stibnite Gold Project; however, neither company is willing to sign the required life-of-mine contract to process the concentrate, which is essential to allow funding of development of the Project. Consequently, Project alternatives that do not include onsite refining of the gold concentrate do not meet Midas Gold's purpose and need and will not be considered viable.

- **Antimony Concentrate Management:** The Project ore processing plant will generate antimony-rich sulfide (**stibnite**) concentrate enriched with silver. Midas Gold and its design team have completed extensive metallurgical testwork, engineering and cost estimating to establish the feasibility of building and operating appropriate ore processing circuits to refine the antimony concentrate into a salable antimony product; however, since antimony is only present in approximately 14% of the Project ore, the capital cost of the antimony refinery relative to the utilization of the plant renders the circuit uneconomic based on the current, known antimony mineral reserves. However, Midas Gold has identified a number of antimony refineries that are capable of and willing to contract for refining the antimony concentrate to produce antimony metal or other products within economic transport distance. Consequently, Project alternatives that include onsite refining of the antimony concentrate do not meet Midas Gold's purpose and need and will not be considered viable.
- **Best Practices:** All alternatives considered should meet or exceed industry best management and design practices.
- **Project Economics:** The overall Project defined through the PFS and the preferred alternatives selected should yield a minimum after tax internal rate of return of approximately 20%; projects with lower rates of return are unlikely to obtain the financing necessary to develop and therefore would not meet Midas Gold's purpose and need.

Alternatives considered in this assessment must therefore meet these criteria so that Midas Gold can conduct continuous operations in an economically viable manner, while maintaining a safe, environmentally sound, and technically feasible Project that benefits the local communities and complies with regulatory requirements.

7 OTHER SAFETY, ENVIRONMENTAL & TECHNICAL CONSIDERATIONS

To guide the alternative analysis process, Midas Gold established a list of other safety, environmentally and technically driven considerations to assist in establishing the preferred alternatives. The objective of these considerations was to establish facility locations that would promote worker safety and avoid injuries and fatalities, protect the environment and avoid substantial adverse environmental impacts, and consider economic viability and avoid negative economic consequences. The following considerations were used to set regional boundaries and parameters for the selection of Project facilities location and design:

- Placement, to the extent practicable, of operations and facilities on areas of previous disturbance;
- Exclusion of Project facilities that might directly and physically disturb Sugar Creek;
- Avoidance of areas with geologic hazards for placement of ore processing, maintenance, administrative, housing and other facilities where personnel safety might be endangered;
- Avoidance of areas with potential avalanche hazards for placement of ore processing, maintenance, administrative, housing and other facilities where personnel safety might be endangered;
- Avoidance of areas with steep slopes (these are typically tied to areas of geologic and avalanche hazards);
- Avoidance, to the extent practicable, of jurisdictional wetlands and other Waters of the U.S., as determined by the U.S. Army Corps of Engineers (**USACE**);
- Placement, to the extent practicable, of operations and facilities on areas of private (patented) lands owned or controlled by Midas Gold in an effort to minimize disturbance to public lands administered by the Forest Service; and,
- Avoidance of remote areas where facilities would require excessive haulage, pumping or complex infrastructure.

Details of these considerations are discussed in the following subsections.

7.1 AREAS OF PAST DISTURBANCE

The District has experienced extensive past mining, heap leaching, milling and smelter activities over the past century that resulted in extensive placement of development rock and tailings, and required the development of numerous on site facilities including multiple town sites, two hydro facilities, multiple haul roads, etc. Midas Gold recognizes that redevelopment of the previously mined lands provides a unique opportunity to clean up existing disturbed sites and reclaim previously impacted areas. To the extent practicable, Midas Gold will locate facilities on areas disturbed by past mining activities in order to reduce incremental impacts, and address the existing legacy impacts in those disturbed areas before any new facilities are developed in those areas (see Figure 2).

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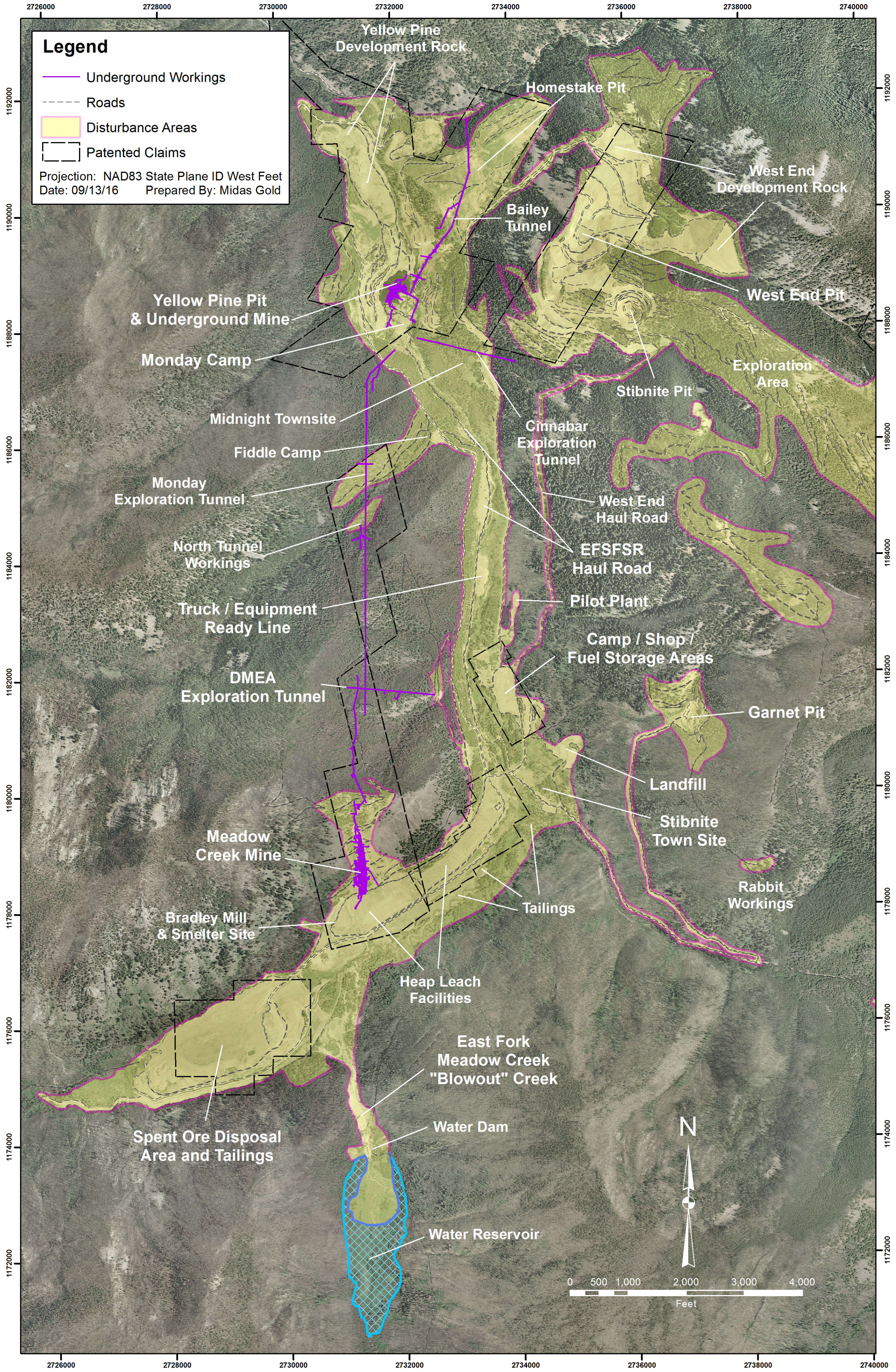
Figure 2, Facilities and Areas Associated with Historical Mining Activities



7.2 SUGAR CREEK

Based on its value for salmon spawning and its relatively undisturbed nature, Midas Gold excluded Sugar Creek as an option for possible tailings storage, development rock placement, ore processing and other mine support facilities, and site access routes. Sugar Creek is a tributary to the EFSFSR and has an existing and long-term value for salmon, steelhead, and bull trout spawning. Except for a small area in the lower part of Sugar Creek, several small areas northwest of Sugar Creek and the upstream tributary Cinnabar Creek, this drainage is mostly undisturbed by mining activities (see Figure 3 and Figure 4).

7.3 GEOLOGIC HAZARDS

Midas Gold has identified areas of possible geologic hazards within the Project area (see Figure 3). These hazards include landslide-prone areas, flood zones, sensitive soils (collapsing soils or swelling soils), ground subsidence/settlement areas, and zones of high erosion potential. To the extent practicable, Midas Gold will avoid locating infrastructure within known geologic hazards to eliminate human safety risks, and to avoid infrastructure instability issues that could result in substantial negative economic and/or environmental consequences.

7.4 AVALANCHE HAZARDS

The climate at the Project area is characterized by cold winters with moderate to heavy snowfall. High levels of snowfall, coupled with steeply sloped terrain, result in areas of high avalanche hazard potential. Midas Gold has delineated the locations of potential avalanche-prone chutes or zones within the Project area (see Figure 3). To the extent practicable, Midas Gold will locate facilities to avoid avalanche-prone areas for facilities such as the ore processing, mine support and housing facilities where Midas Gold workers, contractors or visitors would be concentrated to reduce the risk to human safety and new facilities, and derivative risk to the environment where these hazards could affect the integrity of newly constructed facilities thereby increasing environmental risks.

7.5 STEEP SLOPES

The Project area is located in a mountainous and rugged region. To the extent practicable, Midas Gold will select relatively flat areas for Project components such as the tailings storage facility, the ore processing facility, the mine support facilities (truck maintenance shop), and the housing facility. The objectives for locating facilities in flat areas are to avoid major earthworks (which would increase environmental footprint and costs), minimize excessive site disturbance, and ensure long-term stability, especially for process and tailings storage facilities (see Figure 4), while reducing safety risks to personnel from landslides and/or avalanches (see above).

7.6 WATERS OF THE U.S.

The USACE is responsible for designating jurisdictional Waters of the U.S., and this agency regulates the "dredge or fill" of materials into such Waters of the U.S. (including wetlands) under regulations promulgated under Section 404 of the Clean Water Act[6].

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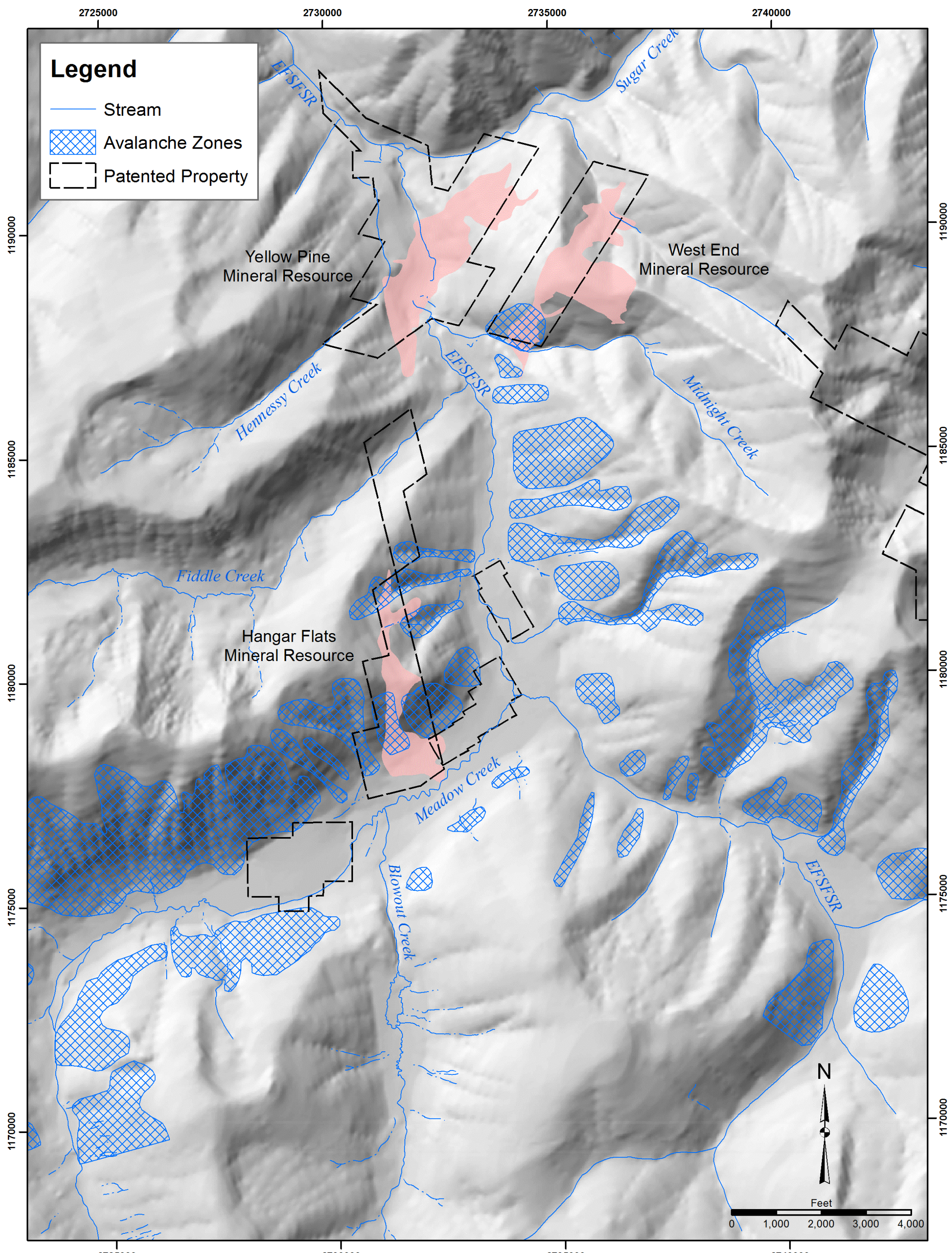
[6] The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. 33 U.S.C §1251 et seq. (1972)

The USACE has determined that certain wetlands and riparian areas found within previously disturbed areas qualify under the regulatory definition as Waters of the U.S.[7] Particularly, given this determination, it will not be possible to entirely avoid jurisdictional Waters of the U.S. However, Midas Gold will avoid, to the extent practicable, Waters of the U.S., especially those found outside of previously disturbed areas.

Midas Gold will also, to the extent practicable, avoid locating infrastructure within stream and wetland Riparian Conservation Areas (**RCAs**) delineated by the Forest Service using the criteria listed in the Payette National Forest Service Forest Plan. Locating facilities outside Waters of the U.S. and RCAs will reduce environmental impact and minimize expensive mitigation requirements. Figure 4 provides an overview of wetlands, other Waters of the U.S., and RCAs. The Project has been designed with mitigation of the existing and planned disturbance in mind from the outset.

[7] The USACE has issued a preliminary Jurisdictional Determination for all Project-area wetlands and Waters of the U.S. delineated from 2011 through 2015. Recently completed delineations in the West End drainage have not been reviewed yet. A final Jurisdictional Determination must be made as part of the wetlands (404) permitting process, in consultation with US EPA.

Figure 3, Avalanche (left) and Geologic (right) Hazard Maps



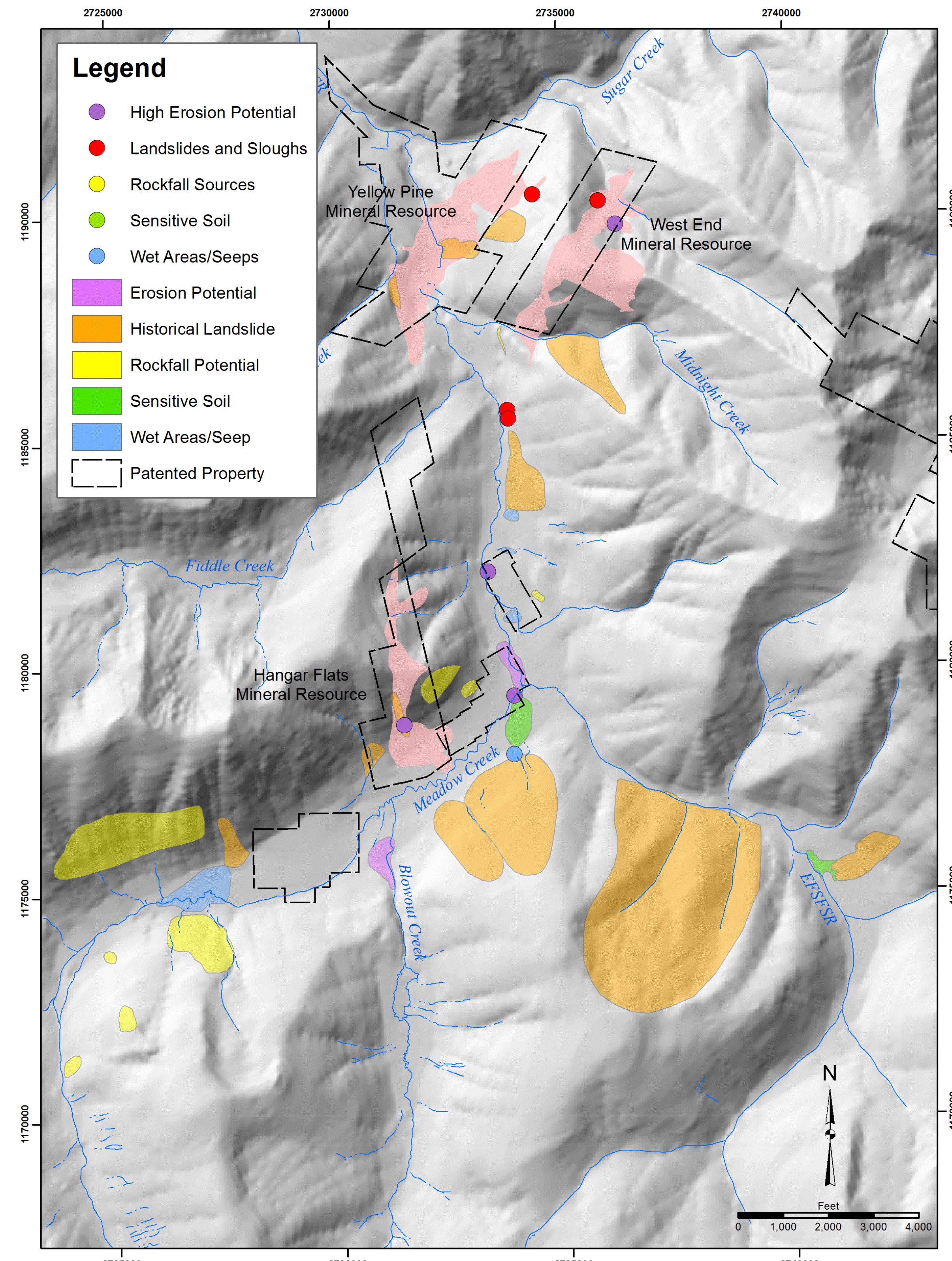


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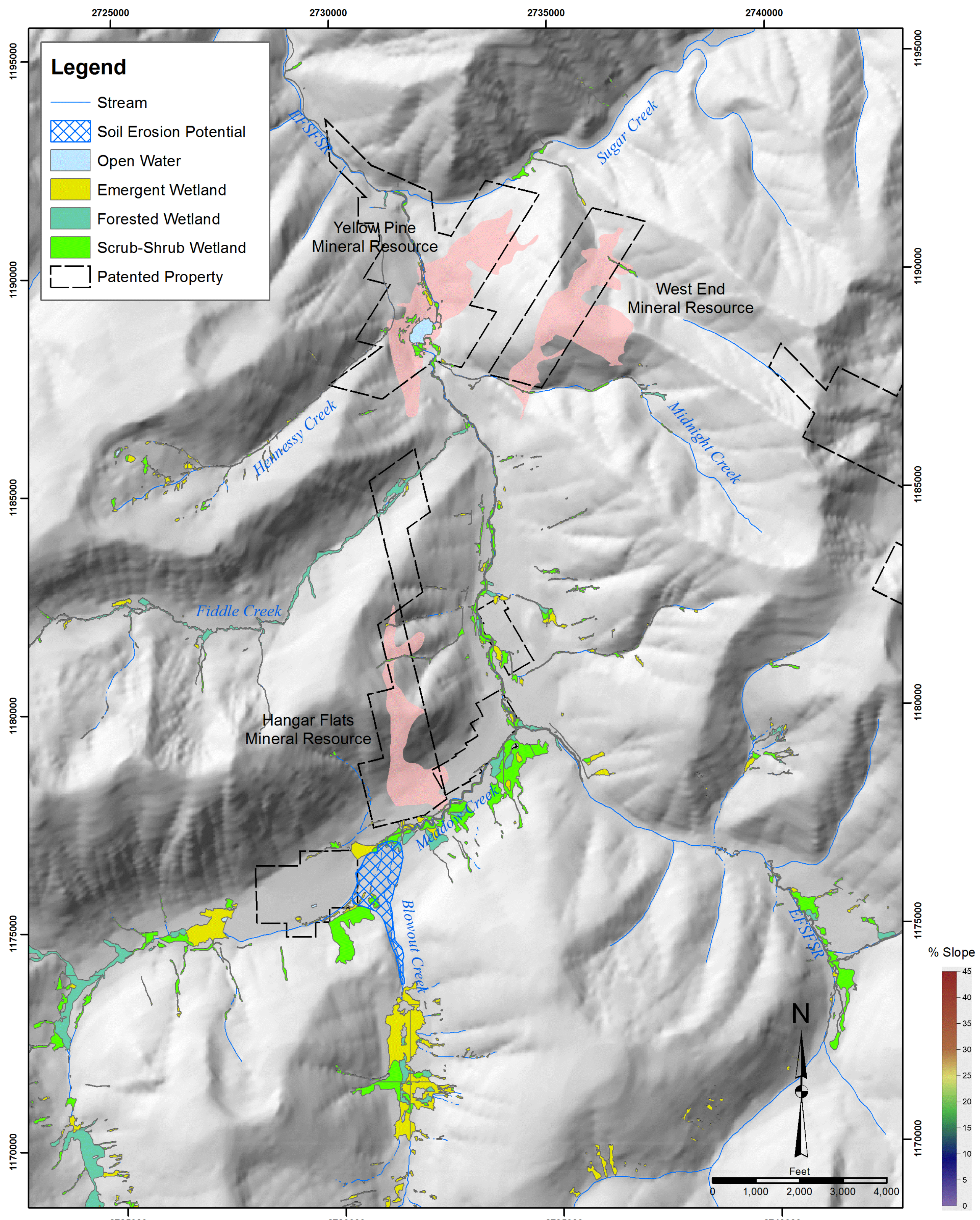
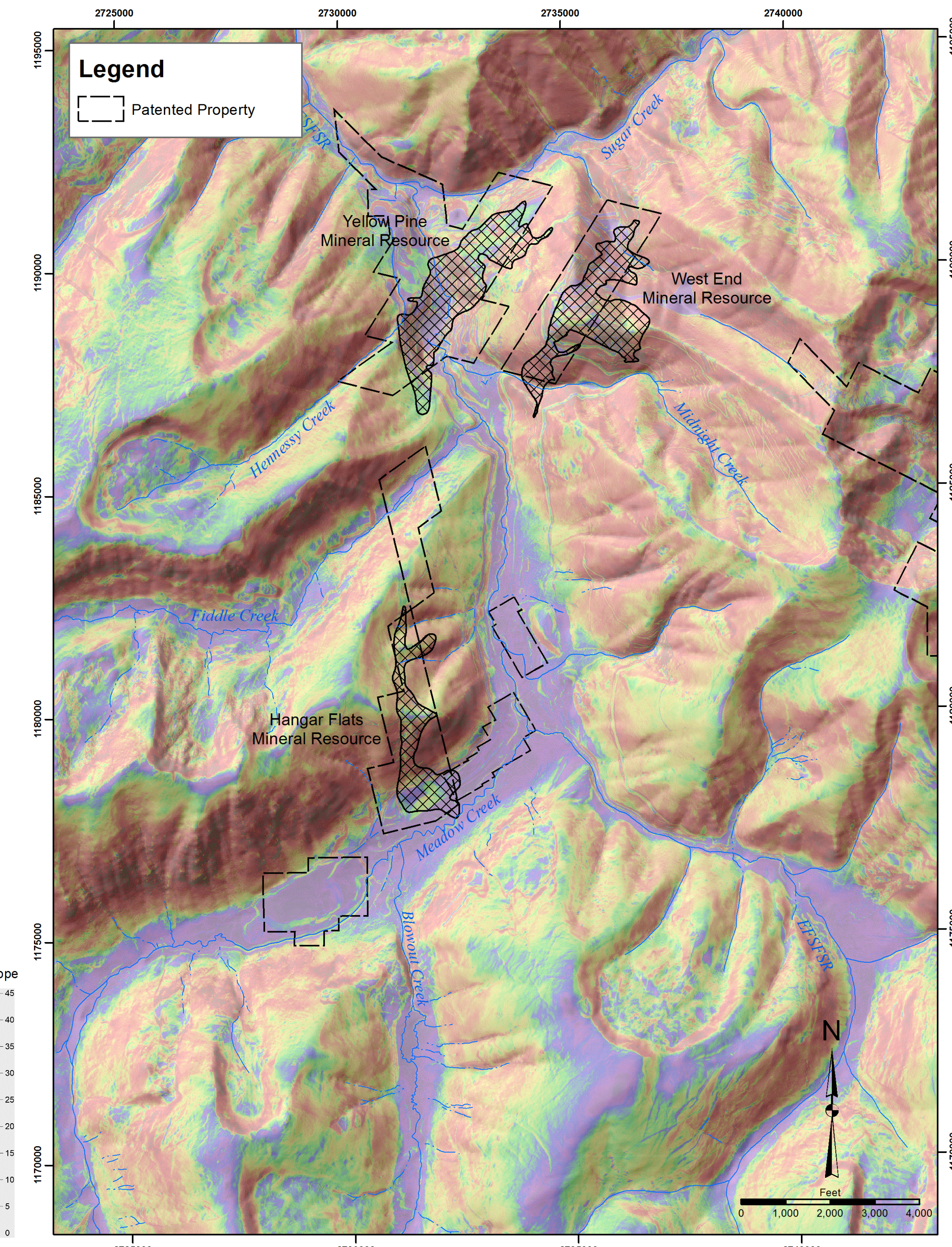
Figure 4, Wetlands (left) and Topographic Gradient (right) Maps





7.7 SURFACE RIGHTS

Midas Gold owns or controls surface rights within the Project area (see Figure 3 and Figure 4) which encompass the majority of the ore proposed to be mined. In addition, to the extent practicable, (especially for ore processing and mine support facilities), Midas Gold chose to locate facilities on such private (patented) land. Locating infrastructure on patented land will minimize Project disturbance on public lands administered by the Forest Service, and increase alternatives for post-mining infrastructure uses.

7.8 REMOTE AREAS

Given expected Project activities and economics, especially the placement needs for the tailings and development rock (estimated at 100 and 350 million tons, respectively), Midas Gold requires mine-related facilities to be located as close as practicable to the mineralized areas and the ore processing plant site in order to meet its economic criteria for rates of return.

Midas Gold established a radius of approximately three miles around the mineralized zones as the outer bounds for mine related facilities, such as the process facilities, tailings facility and development rock placement areas. This three-mile limit is appropriate given the rugged and mountainous terrain within and surrounding the Project site and the economic implications of distances in excess of this radius.

To the north, east and south, this three-mile radius from the Project is truncated by the boundaries of the Frank Church River of No Return Wilderness, designated as an exclusion area under the Project design criteria. To the west, there is the constricted canyon of the EFSFSR, with its steep and towering sidewalls; this canyon is traversed by a single-lane, unpaved road (National Forest Road 50-412) for approximately 14 miles from the Project site to the nearby community of Yellow Pine.

Midas Gold recognizes that the further facilities are placed from the mineralized areas, the greater the support infrastructure, transport logistics, Project footprint, potential for environmental effects, and energy required for transport of ore, development rock, and tailings, all of which affect Project economics. Previously disturbed areas suitable for ore processing facilities, tailings storage, and development rock storage are available within the three-mile zone and benefit from improved economics, reduced Project footprint and reduced environmental effects.

In addition, any site located approximately three miles (or more) from the Project's mineralized zones would be outside Midas Gold's claim block and would not meet the Company's goals of minimizing disturbance by maintaining as compact an operation as practicable and locating facilities, to the extent practicable, on areas already disturbed by past mining activities. Midas Gold would also have to identify and secure a remote site where the Company could construct and operate mine-related facilities, which may not be achievable or could be very costly. Such facilities would most likely involve lands that have not been disturbed by previous mining activities, thus divesting Midas Gold of the opportunity to reuse and clean up the existing brownfield sites in the District.

8 PROJECT COMPONENTS & ALTERNATIVES ASSESSMENT

This section utilizes the aforementioned management directives, design principles, design criteria and other safety, environmental and technical considerations to assess the following Project components and to describe the rationale for elimination of certain alternatives for:

- Project location;
- Mining method;
- Tailings storage facility construction and tailings management methodology;
- Ore processing flowsheet development;
- Ore processing and mine support facilities locations;
- Development rock management;
- Water management[8];
- Fish passage during operations;
- Blowout Creek water and sediment management;
- Site access;
- Site power;
- On-site employee housing; and
- Employee transportation.

8.1 PROJECT LOCATION

Midas Gold plans to develop a mining and ore processing facility on its mineral claims and property in the District where sufficient economic minerals have been defined to support a commercial mining operation; this involves the mining of three mineral resources, reprocessing of legacy tailings and the development of common facilities for ore processing and tailings storage. Figure 1 presents the location of the Project.

The location of the defined *in situ* mineral resources and mineral resources in legacy tailings necessarily controls the location of the mine. The geology of the District is well known, with nearly a century of prospecting, exploration and mineral development work. Midas Gold has explored and studied the mineral deposits of this area since 2009. There are no feasible location alternatives for the proposed Stibnite Gold Project mine area as the *in situ* mineral resources are located where they occur and the legacy tailings are located where they have been placed by prior operations.

Further, the development of all three mineral resources (gold, silver, and antimony) is integral to the effective management of the site, its final restoration and the Project economics. Removal of one or more of the mineral resources as a component of the Project would reduce economic returns to unacceptable levels and would potentially prevent backfilling of the existing Yellow Pine pit and restoration of a permanent riverine channel and fish passage for the EFSFSR, a fundamental objective of Midas Gold.

[8] For the Project, this component involves a bypass for the EFSFSR around the Yellow Pine pit during the development and operation of the Yellow Pine pit.

8.2 MINING METHOD

Mining, for purposes of this section, is the operation that extracts valuable minerals or materials from the earth. Many of the other alternatives are developed based on the choice of mining method and the area to be mined.

Through its exploration work, Midas Gold has identified three near-surface disseminated[9] gold, silver and antimony deposits, localized along north and northeast trending, steeply-dipping to near-vertical structures. The geology and the mineral reserves for the Project area are discussed in detail in the PFS.

As part of its analysis, Midas Gold examined the three fundamental methods of mineral extraction:

- Underground mining;
- Surface mining; and,
- Combination of surface and underground mining.

Each method involves various techniques that are selected to meet site-specific conditions. Selecting a mining method is a complex process that involves consideration of a number of factors, including:

- The spatial characteristics of the deposit (size, shape, orientation and depth);
- The physical properties of the mineral deposit and surrounding rock (rock strength, faults and fractures, etc.); and
- Economic factors, most importantly the grade of the deposit and the current and projected metal prices.

The District has seen all three methods of mining used in the past, and the mining methods were primarily based on the geology, combined with the ore grades, metal prices and the technology of the time.

The mining of the 1920s and 1930s was underground. Miners in that era lacked the sophistication, scale and economics of modern equipment, and they simply extracted the highest-grade mineralized materials in the District's vein systems that were economically feasible at the time. Further, mining companies of that era lacked the mining and processing technology to remove and process the lower mineral grades that surrounded the veins. Expertise and economics of the day did not support mining of the lower-grade disseminated mineralized zones surrounding the higher-grade vein systems. This early underground mining in the District involved narrow openings and passageways, lots of hand-labor, and minimal mechanized equipment. Miners used dynamite and gravity to move rock. Accidents were prevalent, and safety and environmental protection were not priorities during that timeframe.

Into the 1930s and 1940s, the high-grade veins in the District were depleted, and underground mining was phased out as being impractical and too expensive for the more disseminated mineralized zones that surrounded the vein systems. Surface mining replaced the underground mining, and this type of mining allowed for economies of scale. Relatively large and cutting-edge equipment (for that time), such as blast hole drills, dozers, shovels and trucks (albeit small and primitive in comparison to today's equipment) brought the technology to mine in an open pit environment. Although ore grades were

[9] Disseminated means that the minerals are scattered particles throughout the rock; the grades of disseminated deposits are typically low, meaning considerable tonnage must be extracted to allow for an economic operation. This contrasts with veins systems, where the minerals are concentrated in tabular or sheet-like form and generally of relatively higher grade.

substantially lower in the zones surrounding the vein systems, surface mining technology could overcome those lower mineral grades through economies of scale and allow for technically and economically feasible mining, but still at substantially higher grades than common for modern mining. Safety improved, but environmental management remained latent. However, even the best technology of the day could not overcome increasingly lower and lower mineral grades and, when commodity prices dropped in the 1950s, economical mining in the District was no longer feasible.

With the increase in gold prices in the 1980s, the evolving advances in surface mining equipment, the discovery of oxide mineralization in the District and the introduction of heap leaching technology in the U.S., it once again became feasible to return to surface mining. The grades were lower than in the past, but the use of heap leaching technology allowed for lower-grade, disseminated oxide deposits to be recovered and processed. Eventually, in 1997, falling gold prices, combined with the low-grade nature of the oxide mineral zones, higher development rock stripping, environmental concerns, and regulatory changes resulted in closure of the mines. There remained the knowledge that additional (but undetermined quantities of) disseminated, low-grade mineralization remained in the District, but economics and technology again lagged.

By 2009, mining and ore processing technology had again improved, and mineral prices increased. Mine planning skills (aided by new computers and software) and mining productivities (both in labor and through larger equipment) had also greatly advanced. This resulted in renewed interest in the lower-grade, disseminated, sulfide mineralized zones of the District. It was at this time that Midas Gold began its program of exploration and evaluation to determine whether there were sufficient quantities of mineral present, and to see if the grades found could be successfully and economically mined. And this time, unlike most of the past ventures in the District, environmental protection and site restoration and reclamation became key components of potential mining and ore processing.

8.2.1 **Underground Mining**

Although underground mining technologies have improved over the past fifty years, generally these methods continue to focus on structural, non-disseminated type deposits and, for the most part, lack the economies of scale that surface mining allows. Underground mining is typically used when the deposit occurs in veins (or confined zones), the grade is relatively high, and/or the deposit is located deeper than can be efficiently and economically reached by surface mining methods.

Although underground mining historically occurred in the District, it is no longer appropriate for the currently known Yellow Pine, West End and Hangar Flats mineralized zones, as there is no accepted underground mining technology that could extract sufficient material from these disseminated mineralized zones to be economically feasible.

In addition, the relatively shallow nature of these remaining lower-grade disseminated zones, combined with the need for full extraction for economic viability, would pose serious safety issues for underground workers. Safety of mineworkers is paramount, and safety concern is always greater for underground versus surface mining.

Further, given the relatively shallow depths of the mineralized zones of the three *in situ* deposits, the areas above any near surface underground workings (even if economically feasible) would be subject to surface subsidence, a concern that would limit the ability for successful surface restoration and reclamation and sterilize[10] some of the ore. Although extensions of all three mineralized systems, particularly at depth, may eventually be found that warrant underground mining extraction, the available information, which is quite extensive, indicates underground mining is not a viable alternative for the known mineral resources and, if used at all, could only serve to supplement surface production. Given the nature of underground mining and its equipment, which is much smaller than surface equipment, Midas Gold would not have the same opportunity to clean up, restore and reclaim the existing brownfields sites as would be possible with the large-scale equipment available in a surface mining operation.

The selective nature of underground mining would also leave much of the bulk disseminated mineralized materials un-extracted; this would be unacceptable, given the nation's needs for domestic minerals, especially antimony. The lower production rates and volumes of underground mining, combined with the intense capital costs of ore processing facilities (which would be needed regardless of how the deposit is mined), would render the site uneconomic for underground mining methods. Simply, the high-grade vein systems extracted via underground mining methods by past mining companies are gone; what remains are lower-grade, disseminated mineralized zones conducive to today's surface mining techniques.

8.2.2 **Surface Mining**

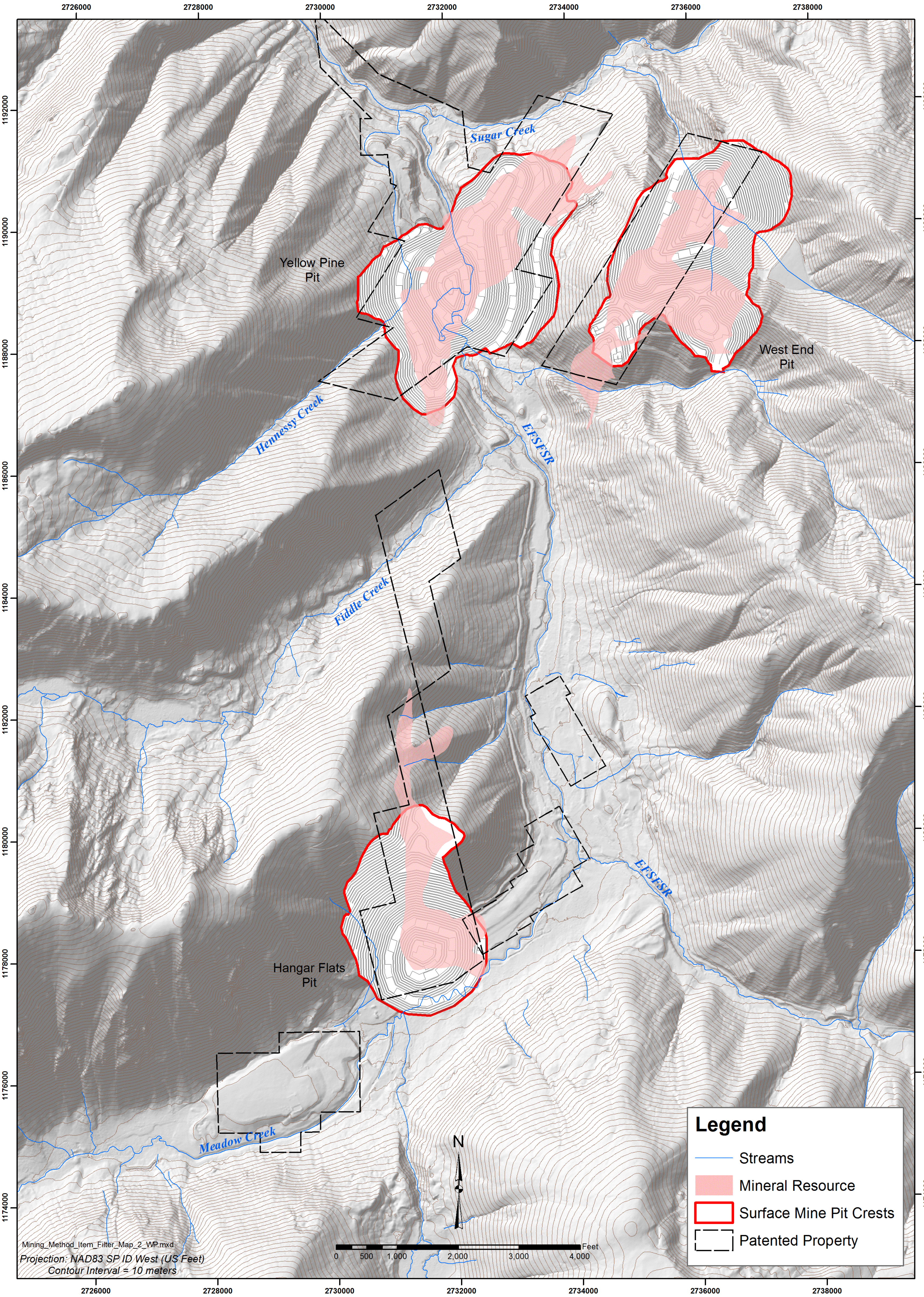
Surface mining is used for the extraction of minable deposits that occur at a relatively shallow depth. Since the three *in situ* deposits at Stibnite outcrop on the surface, surface mining is an appropriate mining method. Given the proximity of the three deposits, the Project would include three open pits: Yellow Pine, Hangar Flats and West End. Figure 5 presents the open pit designs that were developed for the PFS.

Mining would be conducted with a series of benches from which development rock and ore would be extracted. Midas Gold would use conventional open-pit, surface mining techniques and equipment including blast-hole drills, shovels, front-end loaders, and off-highway trucks. Other related mining equipment would include bulldozers, rubber-tired loaders, motor graders, water trucks and other mobile support equipment. This type of equipment is also essential to conduct the earthwork required for the restoration and reclamation of past-disturbed sites.

Although there would be overlap in the open pit redevelopment and operations, the alternative assessment indicates that the general sequence of mining be the Yellow Pine deposit first, Hangar Flats deposit second, and the West End deposit third. This sequence is beneficial from a restoration perspective as it would allow the Yellow Pine Pit (site of the historical Bradley pit, present pit lake and the present upstream limit of salmon passage) to be backfilled with development rock from the adjacent West End pit. This sequence therefore would conform to one of Midas Gold's objectives: that mining will complement site restoration and allow for concurrent reclamation of the Yellow Pine pit. Backfilling of the Yellow Pine pit area is fundamental to re-establishing the EFSFSR in its approximate original position, with a gradient suitable for the restoration of fish passage on a permanent and sustainable basis.

[10] The use of the word "sterilize" in this context refers to a decision and subsequent actions taken that renders the ore infeasible or uneconomic to recover in the future.

Figure 5, Conceptual Open Pit Mines



8.2.3 Combination of Surface and Underground Mining

Midas Gold considered the possibility of combining surface and underground mining to extract minerals from the Yellow Pine, West End and Hangar Flats deposits. A combination of surface and underground mining for the three mineralized zones would add technical complexity, require different management and employment skill sets, use different equipment and separate maintenance facilities, create logistical inefficiencies not needed because the deposits are feasibly mined by surface methods, and would increase capital and operating costs to the point where the currently defined reserves at the Project would likely be uneconomic or fall below the required after-tax internal rate of return.

It is possible, as the open pits develop, that high grade zones of mineralization may be identified in proximity to the open pits that could support parallel underground mining of smaller tonnages of such zones, supplementing open pit mining, but these would always be ancillary to the main feed to the ore processing facilities coming from open pit mining operations, which underground mining could not replace. Consequently, while some underground mining may be feasible in the future, it is not feasible as an alternative from the outset given the currently known mineral reserves and resources and, as a result, will not be included as the preferred alternative in the Project PRO.

8.2.4 Mining Methods Alternative Assessment Conclusions

The results of the mining methods alternative assessment identified surface, or open pit, mining as the preferred mining method for the Stibnite Gold Project. While underground mining methods, concurrent to open pit mining methods, could be used as additional exploration information about potential satellite zones of higher-grade ore is collected outside the currently defined ore reserves that could supplement open pit mining, open pit mining is the only feasible economic method of extraction for the three currently known *in situ* mineral reserves, and is therefore the only method that meets Midas Gold's purpose and need.

Based on the results of the PFS, the scale of the open pit mining operations that would yield economic returns to support financing of the Project involve the open pit mining (and processing) of approximately 75 to 125 million tons of ore and 300 to 400 million tons of development rock over a 10 to 15-year mine life. Subsequent alternative analyses summarized in the following sections of this report will therefore utilize this information as design criteria.

8.3 TAILINGS MANAGEMENT

Once the mining method and general scale of the mining operation has been established, the next component of the Project that is typically determined is the location and type of TSF. The TSF location selection typically precedes that of the process facilities, because the TSF has very unique safety, environmental, capacity/size, and closure criteria that are less flexible when compared to the ore processing facilities.

To facilitate the assessment of potential tailings storage alternatives for the Project, Midas Gold used the following systematic screening approach:

- Identify regulatory, environmental and operational restrictions for tailings storage;
- Establish and list design criteria and considerations for tailings storage facilities;
- Identify tailings storage alternatives; and,

- Assess key environmental, technical and financial aspects of each alternative against Midas Gold's core values, the design criteria and considerations to finalize screening and select alternatives.

The screening process addressed the following elements of TSF design and construction:

- Storage configuration (impoundment, pit, underground, remote);
- Tailings dewatering methodology;
- Embankment construction methodology; and,
- Tailings facility location.

8.3.1 Tailings-Specific Design Criteria and Considerations

Tailings-specific design criteria are used to define viable TSF sites and technologies; design considerations are typically used to assist in decision-making by establishing preferred TSF characteristics or outcomes.

To meet its purpose and need for the Project, Midas Gold needs permanent storage capacity for approximately 100 million tons of tailings. This tonnage meets the Company's direction to design and permit a single life-of-mine storage facility, which will allow for continued, uninterrupted on-site storage operations in a safe, environmentally sound, technically feasible, and economically viable manner, while complying with regulatory requirements. In addition, Idaho regulations require that facilities storing cyanide-treated materials incorporate an impermeable liner system. The governing regulatory authority for TSFs in Idaho is IDEQ. Following gold and silver recovery in the ore processing plant using a dilute cyanide (**CN**) solution, and following neutralization of the tailings supernatant to lower the CN concentration by approximately 2 orders of magnitude, trace amounts of CN will remain in the tailings supernatant; consequently, Midas Gold plans to adhere to the IDEQ Idaho Administrative Code, IDAPA 58.01.13, "Rules for Ore Processing by Cyanidation", despite the very low levels of CN remaining. This Code specifies that a low-permeability lining system is required for CN-bearing solution storage facilities and provides specific guidance on design of these systems. While cyanide-bearing solutions used in ore processing will be neutralized within the ore processing plant before the material is safely transported to the TSF, key design criteria for the Midas Gold TSF are that it be lined and have sufficient capacity to store approximately 100 million tons of tailings.

The siting of the ore processing plant and related facilities should be centralized to balance the haul distances of ore from the three open pits, but tailings will typically be transported from the plant by slurry to a single permanent TSF location. Pipeline slurry transport of tailings is much less expensive than truck haulage; therefore, tailings can be economically moved farther than either development rock or ore.

In addition to the design criteria above, Midas Gold has identified additional considerations to aid in selection of a tailings storage solution. Because of environmental, safety, regulatory and operational criteria, Midas Gold considered the following in the process of establishing viable TSF configurations:

- Avoid areas of known and potential mineralized zones;
- Exclude buffer zones around planned open pits;
- Avoid areas with containment capacity of less than 100 million tons, with preference given to sites having excess, redundant capacity;
- Avoid any configuration requiring additional tailings storage at multiple sites;

- Reject sites/configurations that preclude installation of an impermeable liner;
- Reject sites along the main stem of the EFSFSR (from below Meadow Creek to the town of Yellow Pine);
- Reject side-hill sites / rugged topography;
- When possible, avoid excessive heights (greater than approximately 500 feet) above ore processing facility;
- Avoid sites requiring excessive embankment heights (these may be technically feasible but are not preferred);
- Avoid areas where topography precludes the future placement of additional development rock as a stabilization buttress (these may be technically feasible but not preferred);
- To the extent practicable, avoid sites outside of the areas of existing disturbance; and,
- To the extent practicable, avoid jurisdictional Waters of the U.S.

The reasons for each of these exclusions are discussed further below.

8.3.1.1 Areas of Known and Potential Mineralized Zones

Midas Gold has identified certain areas with current and potential future exploration targets. Although the actual occurrences of surface minable mineral resources (other than the three designated open pit areas) have not been defined at this time, it is prudent to avoid sterilizing potential surface mineable mineralized areas with placement of tailings.

8.3.1.2 Exclusion around Planned Open Pit Mine Areas

Generally, unless there is known mineralization that extends beyond the proposed pit limits, the area immediately surrounding the open pits has greater value for development rock storage than for tailings storage or other uses. The Project has an approximate average stripping ratio of 3.5 to 1; this means that for every ton of ore excavated, there will be an average of 3½ tons of development rock that must be excavated. In general, placement of development rock[11] should be as close as practicable to the open pits to minimize haulage costs (e.g. the longer the haul, the more trucks needed, more staffing cost, more road construction and maintenance, the greater the air emissions, etc.).

In addition, placement/storage of tailings close to a large excavation (open pit) would greatly increase safety and geotechnical concerns, as the substantial quantity of material could contribute to a failure of the pit wall if too close, or produce a tailings runout into areas where people and equipment are working.

[11] Surface mine planners typically aim to place development rock as near the mine as practicable, given the volume of material to be transported and that development rock is usually moved in trucks. At most mines, it is common that development rock tonnage exceeds ore tonnage (even though it is equally important to limit ore haulage for the same economic reasons). Because tailings are normally transported as slurry in a pipeline and pumping a tailings slurry is generally less expensive than truck haulage, a TSF can be more distant from the actual mine areas. The exception would be when development rock can be used for another purpose, such as construction of a tailings embankment.

As an initial operational criterion, Midas Gold established an approximate one-mile buffer zone around the open pit areas to exclude tailings placement. This will allow room for development rock placement and other mining support facilities, and avoidance of safety and geotechnical risks.

8.3.1.3 Tailings Storage Capacity

Midas Gold's purpose and need for the Project requires a life-of-mine TSF with a capacity for approximately 100 million tons of storage. In addition, it is prudent to select a site that allows for expansion in case tailings consolidation rates or water inflows vary from expected values or additional mineral resources are identified during ongoing exploration. Therefore, other considerations being equal, sites with redundant capacity will be preferred to those only meeting the minimum threshold.

8.3.1.4 Tailings Storage at Multiple Sites

Multiple sites for tailings storage at a single operation can be justified in certain instances. An example of multiple tailings storage sites would be at an underground mine, where a portion of the tailings materials could be backfilled underground into a number of mined-out areas. However, as explained above, this situation does not exist at the Project, which will be a surface mining operation.

The other situation where an operator might choose to have multiple tailings storage sites at a single operation is when insufficient area is available for a single storage facility. This is also not the case at the Project, where there are several sites that could each contain the total anticipated volume of tailings. Given infrastructure requirements for a tailings facility (e.g. roads, pipelines, power, pumping stations, and various environmental management and mitigation measures such as diversion structures, monitoring wells, etc.), from an environmental perspective and from an economic perspective it is best to have a single consolidated TSF rather than a series of smaller facilities with duplicative supporting infrastructure increasing the Project footprint and increasing impacts on previously undisturbed lands.

Midas Gold eliminated the use of multiple tailings storage sites as such an approach does not minimize the Project footprint, it does not maximize reuse of previously impacted lands, and it negatively impacts the Project's economics and ability to acquire permits.

8.3.1.5 Requirement for Liner

Idaho regulations require that facilities storing cyanide-containing solutions feature an impermeable liner system to prevent cyanide from reaching groundwater or surface water. Although Midas Gold will be utilizing a cyanide neutralization circuit in its processing facilities that will treat the tailings before transport to the TSF, there may be trace amounts of cyanide remaining in the tailings; as an additional caution, Midas Gold will not adopt any TSF configuration that precludes installation of an engineered liner system.

8.3.1.6 Exclusion along the EFSFSR

The valley area along the EFSFSR between the Project site and the community of Yellow Pine is narrow, with steep and rugged terrain, making it unsuitable for any tailings storage area; widening this route would have substantial impacts on relatively undisturbed portions of the EFSFSR. This route is also subject to frequent avalanche and landslide activity, which would risk workers and equipment, and increase the risk of a tailings discharge into the EFSFSR.

Similarly, the area between the proposed Yellow Pine pit and the EFSFSR's confluence with Meadow Creek, an area heavily disturbed by previous mining and related activities, is not suitable for tailings storage given the perennial nature of the EFSFSR, the adjacent riparian habitat, and (for portions) its higher value for an ore processing plant and various mine support facilities. Further, the perimeter of such a TSF would have a lesser percentage constrained by impenetrable mountains than other potential sites, increasing reliance on the tailings embankment and buttress for confinement. Finally, storage of tailings in this area would reduce Midas Gold's ability to restore the EFSFSR (a key objective for Midas Gold), increase fish habitat and enhance fish migration and populations by taking up a substantial portion of the potentially productive valley bottom and locally increasing the gradient upstream of the Yellow Pine Pit so that reestablishment of a low enough gradient for fish passage at closure would be impracticable. As a result, the main branch of the EFSFSR has been excluded from further consideration.

8.3.1.7 Exclusion Based on Topography

The placement of tailings storage facilities within the confines of relatively flat areas will ensure both operational safety and long-term stability. Outside of the valley bottoms, the District is mountainous and rugged, with most slopes steeper than 3H:1V (ratio of horizontal distance to vertical distance).

Side-hill (avoidance of the flat valley bottoms) storage of 100 million tons of tailings in mountainous terrain was eliminated as a tailings placement alternative because it is impracticable and less geotechnically stable (i.e. higher risk of failure); in addition, an enormous area would be disturbed to build the type of embankment needed to store this volume on steep terrain.

Construction of a side-hill tailings facility would involve cutting into the side hill along the contour (and probably using development rock) to build the embankment necessary to provide sufficient storage area for placement of approximately 100 million tons of the tailings material. This would result in an extremely high and long embankment that would parallel one of the site's drainages and create a vast and elongated visual disturbance. Such an embankment would be extremely inefficient from an economic perspective, as the amount of tailings storage gained per volume of embankment placed would be much lower than for a cross-valley dam configuration.

In addition, a side-hill TSF would most likely have to be constructed in a series of "cells" along the contour to avoid tributary drainages. The construction of a long and high embankment, plus the placement of tailings on the side hill behind the embankment, would raise substantial concerns about geotechnical stability and increase the risk of a failure and tailings excursion into the environment. The steepness of the terrain would pose severe engineering constraints to the design and construction of such a facility. An embankment failure would cause massive physical disturbance and environmental damage to the wetland, riparian and aquatic resources of any adjacent drainage (e.g. Meadow Creek or the EFSFSR) beneath or down-stream of a side-hill embankment. Such an embankment could not be effectively buttressed without placing fill in the valley bottom, eliminating the sole benefit such a configuration would have been intended to provide.

Further, an extensive surface water diversion system would be required above a side-hill facility to divert runoff around the facility. There would also be potential for erosion on the cut and fill slopes of a side-hill facility, leading to potential downstream sedimentation.

As a result of these factors, side-hill storage is precluded as an alternative.

8.3.1.8 Tailings Transport Limitations

It is typically preferred to locate a TSF below the elevation of the ore processing plant to reduce the complexity and costs of the tailings transport system. Transporting tailings well above the ore processing plant elevation requires considerable infrastructure and energy, long runs of high-pressure pipeline, and excessive hydraulic head that requires specialized, positive displacement pumps and/or booster pumping station; these infrastructure components substantially increase the capital and operating costs of the Project, and add technical complexity that increases the likelihood and consequence of tailings transport system failures. Unfortunately, identifying viable TSF sites below the process plant are not always available. To assist in eliminating potential TSF sites with excessive tailings transport requirements, Midas Gold established a maximum pumping lift target of approximately 500 feet above the expected ore processing facility site. Midas Gold recognizes the need for a certain amount of flexibility with the height criteria, but pumping lifts above 500 feet certainly increase technical complexity and increase both capital and operating expense. Therefore, Midas Gold prefers a TSF site with as low a pump lift as can be achieved given the Project site terrain.

8.3.1.9 Embankment Heights

Embankment height affects geotechnical risk and may adversely affect Project economics (by reducing the average amount of tailings storage gained by each increment of dam height, and increasing haulage costs for embankment construction). Therefore, where otherwise similar alternatives differ in embankment height, Midas Gold prefers the alternative with the lesser height.

8.3.1.10 Ability to Install Buttress

It would be preferable to install a buttress (that is, a rock or earthen bench placed against the toe of an embankment) in order to increase the stability of an embankment, whether to simply increase the factors of safety related to the embankment, to meet closure criteria (requiring flatter overall slopes or a more stringent factor of safety) or to facilitate raising the embankment beyond its originally planned crest elevation. Sites that preclude future buttress installation are not preferred; sites amenable to buttress construction will be preferred over otherwise similar sites for tailings storage.

8.3.1.11 Areas of Previous Disturbance

Three of Midas Gold's most important Project goals are: locating facilities on previously disturbed areas, reclaiming areas of past mining disturbance, and minimizing disturbance of previously un-impacted lands. The preferred tailings storage configuration should ideally be located on previously disturbed land.

8.3.1.12 Waters of the U.S.

The preferred tailings storage configuration should ideally be located away from Waters of the U.S. (including waterways and wetlands), where practicable, in order to reduce environmental impact and the cost of mitigation for disturbing Waters of the U.S.

8.3.2 Tailings Storage Configuration Alternatives

Midas Gold identified a broad range of possible tailings management alternatives that involve different storage technologies and different storage location alternatives. The goal here is to only eliminate an alternative if it clearly is not feasible or does not meet Midas Gold's purpose and need for the tailings storage.

Midas Gold considered the following tailings storage configuration alternatives for the Project:

- Storage of tailings in an impoundment retained by an embankment;
- Storage of tailings in one of the surface open pits;
- Underground storage of tailings; or,
- Off-site shipment of ore and/or tailings (remote tailings storage).

Selection of the storage configuration and dewatering technology are interrelated, as certain storage configurations are incompatible with certain dewatering and placement technologies and vice versa. Midas Gold considered the following dewatering technologies, explained further in Section 8.3.3:

- Conventional low density tailings;
- Thickened tailings;
- Paste tailings; and
- Filtered tailings (also referred to as "dry stacked tailings").

Midas Gold recognizes that the level of detail in this assessment for tailings storage alternatives is summary in nature, but sufficient in description for a general understanding of the alternatives. However, substantial engineering analysis and evaluation supports the summary information contained herein. The objective of this assessment is to present potentially reasonable and known tailings storage alternatives, and to eliminate one or more if they obviously are not feasible or do not meet Midas Gold's purpose and need.

8.3.2.1 Impoundment Tailings Storage

Storage of tailings in an impoundment created by an embankment is the most common method of tailings storage, and indeed the most practicable method for low-density or thickened slurries. The configuration outwardly resembles a water dam and reservoir; however, the internal design of the embankment may differ considerably from that of a water dam. Furthermore, water facilities are generally built once to their full dimension whereas tailings storage facilities are constructed with an initial foundation that is then built upon when necessary to keep pace with ore processing rates. Impoundments may be readily lined with impermeable material, when required by environmental regulations or selected by the proponent.

Tailings are typically delivered to the impoundment via a slurry pipeline, and deposited from spigots around the facility perimeter. As tailings settle, seepage water pools at the surface, from where it is withdrawn (reclaimed) and pumped back to the process plant for reuse. Depending on the selected tailings dewatering technology, impoundment storage of tailings generally requires the most water, as water is required for slurry transport and then some is lost to evaporation and entrainment (burial) with the settled tailings.

Key components of a tailings impoundment are the embankment, impoundment liner (when required), tailings and reclaim water pipelines, and supporting roads, power supply, pumps, and surface water diversions. There are several sites in the Project area suitable for development as a tailings impoundment, and impoundment storage is a viable tailings storage configuration at Stibnite.

8.3.2.2 Storage of Tailings in an Open Pit

Tailings may be stored in mined-out pits, either alone or in combination with development rock; however, the Project TSF needs to include an impermeable liner to assure meeting Idaho regulatory requirements. Given the very steep physical geometry of the Project pit walls, long-term liner integrity may be in question without flattening the pit walls to address slope stability and rockfall issues, and to develop slopes that are safe for liner installers. Storage of tailings in open pits is thus technically feasible (though not necessarily for this Project), but expensive and potentially environmentally risky. In-pit storage has the advantage of placing tailings below surrounding grade, such that a failure releasing tailings and surface water is impossible.

The Project will involve three open pits that will be constructed throughout the Project life. Midas Gold plans to backfill the Yellow Pine Pit (upon completing its mining phase) with development rock removed from the West End Pit in order to restore the channel of the EFSFSR. Hangar Flats pit mining will begin after that of Yellow Pine, but will continue and overlap with Yellow Pine and West End mining. With the ongoing and overlapping nature of the open pit mining operations, there will be no feasible way to place tailings into open pits as there will not be an inactive pit available for tailings deposition until near the end of mine life, when the majority of ore has already been processed. Further, installation of a liner system in an open pit is prohibitively expensive and possibly unreliable, thus depriving the area of the groundwater safeguards planned for other surface tailings storage alternatives. For these reasons, the placement of tailings in the open pits at the Project site was eliminated from further consideration as it does not meet Midas Gold’s purpose and need for operational efficiency and protection of the environment.

8.3.2.3 Underground Storage of Tailings

It is sometimes possible to dispose tailings into mined-out underground workings, but this technique is not available at the Project, which will be a surface mine. Although there has been historical underground mining in the District, these old workings cannot be safely accessed, nor do they have the capacity available to store the tailings generated by the Project. Furthermore, providing impermeable lining of underground workings is of questionable feasibility and effectiveness and poor economics. Therefore, this method of tailings storage was eliminated from further consideration as not meeting Midas Gold’s purpose and need for necessary storage capacity and environmental protection.

8.3.2.4 Remote Tailings Storage Facility

Under this alternative, the process plant would remain in the vicinity of the mineralized areas, but the tailings facility would be remote (outside of the Project area). In this scenario, tailings material would require pumping via pipeline or haulage as filtered tailings to a remote TSF. Mostly likely, due to the mountainous terrain in the Project area, the tailings would have to be pumped or transported downhill on a corridor or road immediately adjacent to the EFSFSR, requiring expensive upgrades to Forest Service Road 50-412 and inducing the environmental risk of a tailings haulage route or pipeline adjacent to the EFSFSR. In addition, given the regulatory requirement for a zero surface water discharge from the ore processing plant and associated infrastructure, there would be the need to pump water back to the plant from the TSF, with the attendant cost for, and environmental impact of, pumps, reclaim pipeline, and electric power.[12] The additional capital and operating costs associated with a remote TSF would be considerable and would like push the Project rate of return below an acceptable threshold and therefore not meet Midas Gold's purpose and need.

Long, isolated stretches of pipelines would be needed for tailings slurry transport to a remote site, and these pipelines would create a high potential risk for vandalism and an increased probability for accidental release of tailings and/or return water through line failure. These risks would be higher than for any on-site TSF alternatives due to the considerably greater length of the line exposed to natural incidents (such as landslides and avalanches) as well as mechanical failure (such as a line breach through wear and tear). As a result, additional personnel would be required to monitor the pipelines on a frequent year-round schedule for the life of the Project. In addition, extensive leak detection monitoring systems would have to be installed along the length of the tailings pipeline and return water pipelines, and protective measures would necessitate the construction and maintenance of lined ditches and drain-down ponds along the right-of-way that would parallel the EFSFSR. These structures would need to be sized to contain a pre-determined volume of tailings and tailings supernatant. Special precautions would be required where the pipelines cross tributaries to the EFSFSR. An all-weather road would also need to be constructed and maintained adjacent to the pipeline right-of-way and the associated ditches and drain-down ponds for use in the event of a tailings or return water pipeline rupture. The pipeline right-of-way, with the associated ditches, drain-down ponds and all-weather road, would likely have to be fenced to exclude wildlife and the public, and wildlife crossings installed at intervals to prevent the corridor from becoming a barrier to wildlife movement.

Further, once transported offsite, a suitable location for tailings storage would have to be identified. There is no obvious site (previously disturbed, former open pits or mine sites) within 50 miles of the Project area with the capacity to handle this volume of tailings. In addition, moving tailings to an offsite facility would mean the environmental footprint of the Project would increase considerably and would expand into previously relatively undisturbed basins of Johnson Creek, the South Fork of the Salmon River or the Payette River, and the runout area from a potential embankment failure may include populated areas, public recreation areas or high value fisheries. As a result of the foregoing considerations, offsite tailings storage has been eliminated from further consideration as it would not meet Midas Gold's purpose and need of a rate of return on the Project, for minimizing the Project footprint and for protection of the environment.

8.3.2.5 Result of Alternative Screening for Tailings Storage Configuration

Midas Gold evaluated four alternative tailings storage configurations: impoundment, in-pit, underground, and remote location. Advantages and disadvantages for each are summarized in Table 1. In-pit and underground tailings storage are both infeasible for the Project as it is a surface mine with continually active mining in three open pits. There is therefore no timely availability of sufficient in-pit storage capacity and no availability of any substantial underground storage capacity. Storage of tailings at a remote location may be technically feasible for the Project, but there are no suitable previously disturbed locations within 50 miles of the Project area. Remote tailings storage would thus offer no advantages to the Project over a facility located within the Project area; it would increase cost, Project

[12] Given the climate in this region of Idaho, large evaporation ponds to eliminate excess process water would be impractical.

footprint, and environmental risk through development of a remote Greenfield[13] site and the required transport infrastructure along the EFSFSR; and it would fail to meet the Project imperatives to minimize footprint and restore areas of prior disturbance. The remaining alternative, storage of tailings in an impoundment, is technically feasible at the Project site and several suitable impoundment sites exist within three miles of the proposed process facilities. Midas Gold prefers this alternative for a number of safety, environmental and economic reasons, and subsequent tailings dewatering technology, impoundment location, and embankment construction alternatives assessments are based on the assumption that tailings will be stored in a surface impoundment near the Project mine site.

Table 1, Tailings Facility Configuration Alternative Assessment Summary

Advantages	**Disadvantages**
Impoundment **[Preferred Alternative]**	
• Conventional, proven solution. • Slurry transport of tailings is relatively low-cost.	• Potentially largest facility footprint. • Embankment failure could represent a safety risk. • Other potential disadvantages (Section 8.3.3) relate to the selection of a tailings dewatering method, and are not inherent in a surface impoundment.
Open Pit*	
• Would utilize existing disturbed area, if feasible. • Failure of the facility is effectively impossible due to storage below surrounding ground level.	• Substantial cost for surface preparation and rockfall mitigation in advance of lining. • Lining may be unreliable due to steep, unstable, angular surfaces. • High risk of groundwater contacting tailings if liner fails. • Infeasible for Project, as overlapping mine sequencing does not allow for availability of an inactive pit for most of Project life.
Underground*	
• Utilize existing underground voids. • Allow mining additional underground resources. • Failure of facility is effectively impossible due to storage underground.	• Expensive as it would require upgrading to paste tailings and lack the economy of scale of bulk transport of slurry to an impoundment. • Lining may be infeasible, or alternative methods (cemented paste) would need regulatory approval. • High risk of groundwater contacting tailings if liner fails. • Infeasible for Project, as the Project is a surface mine and the currently existing underground workings do not have sufficient storage volume (less than 10% of Project needs) and cannot be safely accessed.

13 The term Greenfield is used to describe a property or site that has not been previously used for commercial development or mineral exploitation.

Advantages	Disadvantages
Remote Location	
• No advantages not already inherent in the type of facility and dewatering technology that are paired with the remote location.	• Most expensive method due to additional length of pipelines and all-weather access road to reach the location, in addition to the cost of the storage facility itself. • Requires likely fencing, leak detection systems, ponds, and daily year-round staffing for road/pipeline route to mitigate vandalism and spill risks. • Fencing is possible wildlife migration barrier. • Largest project footprint. • Located on undisturbed land and precludes restoring other disturbed sites. • Increased risk of tailings or reclaim water spill into the EFSFSR. • Embankment failure may put downstream public at risk in addition to Midas Gold personnel. • Increased risk to valuable fisheries and Waters of the U.S. in previously undisturbed watersheds.
**Note: Advantages and disadvantages of open pit and underground storage are strictly theoretical; both of these alternatives are infeasible at the Project site which is a surface mine with continually active pits.*	

8.3.3 Tailings Dewatering Technology Alternatives

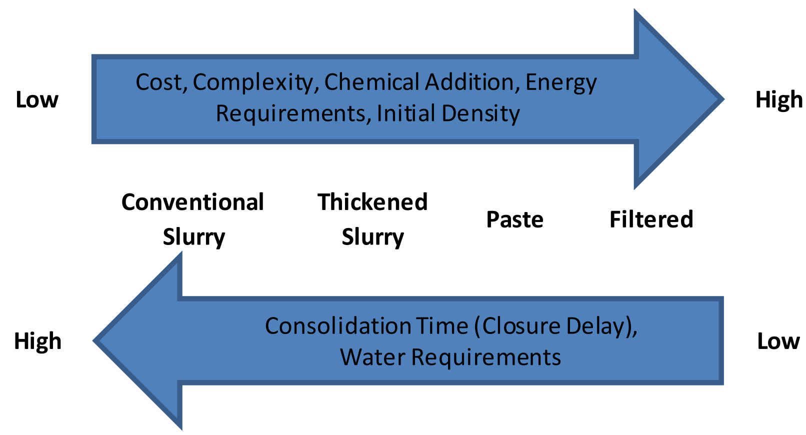
Mineral processing is accomplished with the crushed and finely ground ore mixed with water to form a slurry, separation of the valuable minerals from the bulk of the ground ore, and resulting in the waste product (tailings) containing large volumes of water. Tailings are then partially dewatered at the process plant to recover water for reuse in the process and improve the performance of the tailings transport and storage system. The selection of a tailings dewatering technology affects capital and operating cost, and substantially influences the transport and settling characteristics of the tailings and thus the physical size of the TSF, overall water requirements, and time required for the tailing to consolidate enough to allow placement of closure cover.

Selection of the storage configuration (Section 8.3.2) and dewatering technology are interrelated, as certain storage configurations are optimal with certain dewatering technologies and vice versa. Midas Gold considered the following tailings dewatering technologies for the Project:

- Conventional low density tailings (no dewatering);
- Thickened tailings;
- Paste tailings; and,
- Filtered ("dry-stacked") tailings;

The four dewatering methods are listed in general order of increasing percentage water removal, cost and complexity. Figure 6 depicts the variability in attributes of the four alternatives. The sections below describe the individual alternatives in further detail.

Figure 6, Attributes of Alternative Tailings Dewatering Technologies



8.3.3.1 Conventional Low Density Tailings

This method is commonly used for tailings storage where both tailings and water are stored. No additional dewatering is conducted at the process plant; the process tailings are pumped via pipeline to the TSF. Typical solids densities of tailings range from 25 to 40% (percent solids by weight). Tailings are discharged from spigots that surround the perimeter of the TSF and a tailings "beach" is created using thin-layer, subaerial deposition techniques. Tailings discharge operations typically focus on directing deposition to allow a pool of water to form, which water is reclaimed and pumped back to the mill. As tailings beaches are formed, spigot discharges progress around the perimeter of the facility, and this action helps to promote drying and consolidation of the tailings.

Use of a low-density tailings management approach typically yields the lowest initial capital cost approach for a mining operation as equipment to increase the density of the tailings (thickeners, filters, high viscosity pumping systems, high pressure pipelines, etc.) is not required. However, this approach involves moving a lot of water to/from the ore processing facility and the TSF, which requires substantial pumping capacity and power requirements. Moreover, fines and coarse tailings particles tend to segregate upon discharge from the spigots, which generally leads to low settled tailings densities, slower consolidation of the fines area of the facility, larger embankment heights, greater differential settlement of the tailings, and more difficulty in ultimately closing and reclaiming the TSF.

Advantages and disadvantages of the four dewatering methods are compared in Table 2.

8.3.3.2 Thickened Tailings

This method is similar to conventional tailings storage; however, tailings are passed through a thickener (typically located at the ore processing plant), which elevates the tailings density to approximately 50 - 60% solids by weight through a combination of mechanical removal of water and chemical addition (flocculants and/or coagulants). This allows for the recovery of more water at the plant, lessens the amount of water used for pumping and minimizes the losses through evaporation at the TSF. Tailings are pumped to the TSF using centrifugal pumps and discharged through spigots around the TSF, and a pool of water is formed, from which water is reclaimed and pumped back to the plant for reuse.

Thickened tailings generally settle more quickly when compared to low density tailings, and with less segregation of particle sizes, resulting in a more stable and easily dewatered product as well as greater initial and ultimate in-place density, thus maximizing use of the available storage volume. Subaqueous tailings deposition (fully submerged tailings / no beach) may occur in the early stages of operation due to the small footprint combined with the rate of raise of the tailings surface. Subaqueous tailings deposition typically results in lower settled tailings densities when compared to subaerial deposition; thickening the tailings will help mitigate the reduction in initial tailings density caused by subaqueous deposition. Improved settling also reduces the time required between the end of operations and the placement of a closure fill atop the tailings. However, thickening equipment is costlier to build and operate as it is not used in conventional low density tailings management systems.

Advantages and disadvantages of the four dewatering methods are compared in Table 2.

8.3.3.3 Paste Tailings

Paste tailings are those that have been dewatered using deep cone thickeners and/or vacuum or pressure filters to achieve a material with densities of 60 to 70% solids by weight. Paste tailings typically require flocculants and/or coagulants to be added to tailings (at rates higher than that for thickened tailings) to hasten settling in the thickeners. Paste tailings typically have a toothpaste-like consistency, and are difficult to pump as the increased tailings viscosity requires special positive displacement pumps, which limit the distance and height that the tailings can be pumped.

Paste tailings are most appropriately used in backfilling mined-out underground areas; typically, cement and/or aggregate are added to the paste tailings to form a high-strength material that enables mining above, below and beside the backfilled area. Paste tailings may also be used to backfill mined-out open pits; however, it is not appropriate to use this technique in many situations due to water quality issues associated with the interaction of the tailings supernatant with groundwater adjacent to the pit.

Paste tailings are not a common method for surface tailings storage; however, in arid climates where water is scarce and evaporation rates are high, the technique can be advantageous due to lower overall water consumption. When paste tailings are deposited in surface tailings storage facilities, they typically form beach slope angles of 2 to 6%, depending on the amount of dewatering, the rate of deposition, the size of the facility, the climate, and other factors.

Paste tailings facilities typically have high capital costs associated with the paste thickeners and/or filters, as well as higher operating costs and complexity associated with both the thickening and pumping of the paste tailings. Paste tailings facilities require containment through embankments or in a lined system and they require large external ponds to manage storms and/or snowmelt events. Water quality from the external ponds can be highly variable if the tailings oxidize between runoff events, which can be very problematic for process plants that require consistent water quality to achieve good metallurgical recoveries.

8.3.3.4 Filtered Tailings

Filtered tailings storage is also referred to as “dry stack” deposition. In this method, water is “filtered” from tailings using a mechanical device (such as vacuum or pressure filter systems) with the aid of added chemicals (flocculants and/or coagulants). Filtered tailings have solids densities of 80 to 85%, which are too thick to pump. Rather, filtering tailings produces a soil-like material that can be hauled in trucks, spread with a bulldozer, compacted with heavy equipment, and driven upon by vehicles. Filtered tailings are not totally “dry” but have a typical delivered moisture content of 15 to 20%. Therefore, these tailings are transported to the tailings storage site by trucks or a conveyor system. At the site of deposition, these tailings are “dry stacked” by placing, spreading and compacting the materials to form a relatively unsaturated, dense and stable stockpile. As a result of "dry" placement and relatively low permeability, filtered tailings generally remain mostly unsaturated, resulting in increased oxidation of remaining mineralized material not extracted by ore processing. Oxidation of this material increases the potential for acidic drainage and metals leaching, affecting runoff and seepage water quality.

Compared with other methods, a filtered tailings operation at the Project would be more energy intensive and would require the following additional capital and operating infrastructure beyond the basic requirements for impoundment deposition of tailings slurry:

- Vacuum or pressure filters, compressors and blowers at the plant to dewater the tailings. These devices require persistent maintenance and substantial additional electric power, and their overall availability is limited given the mechanical nature of their operation.
- A large water storage pond adjacent to the filter press facility. This pond must contain water removed from tailings in the dewatering plant, along with a pumping and pipeline system to return water to the mill.
- A covered storage facility next to the filter presses. This storage area must be designed to provide temporary storage for up to approximately 100,000 tons of dry-stack tailings, or about a four-day supply of tailings. The covered storage would be sized for "live" storage, with draw-points and a conveyor constructed beneath the storage structure. The tailings would be conveyed to an external storage hopper or bin, high enough so off-highway trucks could drive beneath the hopper and be loaded. The reason for the four-day storage is to ensure the tailings are kept dry and to allow for operational efficiencies, in the event of mechanical or operational problem at the tailings storage site.
- A fleet of off-highway trucks and other support equipment or a conveyor/stacker system. The trucks would transport the tailings from the ore processing plant to the storage site. This approach would result in increased consumption of diesel for trucks and/or additional electricity requirements for conveyor systems adding costs and additional fuel haulage and energy consumption. If truck haulage is uneconomic, tailings would be transported by a covered conveyor system from the plant to the TSF, with a stacker system at the TSF to discharge the tailings.
- Bulldozers, motor graders and compactors would be needed at the storage site to prepare working areas for tailings placement, to spread the tailings, and to compact the tailings. These trucks and the miscellaneous support equipment would create increased fugitive dust and greenhouse gas emissions over conventional (slurry) tailings placement.
- A rock quarry or a stockpile of suitable development rock. Even with relatively low moisture content, it is often difficult for off-highway trucks to drive on soft and fine-grained tailings material. As a result, rock material is needed to construct a network of rocked roads on top of the tailings surface for such transport.
- A wheel-wash structure at the exit from the dry-stack facility. All vehicles exiting the dry-stack tailings facility would pass through this wheel-wash structure to prevent tracking of tailings materials on to the Project site's haul roads. Without a wheel-wash station, such fine-grained tailings materials would pose sedimentation concerns to the area's watersheds, and would contain trace/residual amounts of cyanide and metals in the remaining pore water.
- A "reclaim" water-storage pond down-drainage of the dry stack TSF. This pond would be used in conjunction with the tailings liner system to contain water that infiltrates through the tailings material (from surface precipitation) and is routed through the finger drains installed

on the liner system. A network of pipes and pumps would be needed to return water to the mill.

Filtered tailings, along with the dry-stack tailing storage technique, involves greater capital investment, increased labor requirements and higher operating and maintenance costs than conventional (slurry) tailings placement; however, it is considered and sometimes used within the mining industry for the following reasons:

- Limited water availability;
- Limited space for tailings storage; and,
- Geotechnical concerns (i.e. location in a high seismic region that restricts embankment construction methods or in areas where foundation conditions entirely prevent the construction of a conventional tailings embankment).

None of the above reasons factor into the proposed Midas Gold operation and storage of tailings. This region of Idaho receives sufficient precipitation, Midas Gold has access to sufficient water for conventional tailings management and storage, and there are locations surrounding the proposed mine site with sufficient area for slurry tailings storage. The dry-stack method of tailings storage would probably involve somewhat less volume (and potentially land area) than conventional slurry, but once runoff ponds are incorporated into the design, the overall footprint of the facility is likely similar or potentially even larger. Lastly, although this region of Idaho has moderate to high seismic potential, suitable TSF sites (Section 8.3.5) near the Project area are formed by cross-valley embankments wherein approximately 90% of the perimeter of the TSF would be surrounded by impenetrable mountains and the remaining 10% will be contained by an embankment constructed of development rock. Further enhancing seismic stability, Midas Gold's preferred alternative is a TSF site where a development rock buttress can be placed downstream of the TSF embankment.

One of the concerns for a dry-stack tailings storage technique at the Project is the potential shortcoming of the technology for dewatering the expected daily tonnage of up to 25,000 tons per day required by the Project design. Although it has been proposed for an Arizona copper mining project (the Rosemont Copper Project) with a projected tonnage of 45,000 tons per day, it has yet to be proven that this operation can attain such throughput, and this project has yet to be developed and constructed. The primary reason for the proposed dry-stack at this Arizona project is the lack of water and the high evaporation rates, conditions that do not exist at the Stibnite Gold Project site.

The largest dry-stack tailings operation in the world was the 18,000 tons per day La Coipa Gold Mine in the Atacama Desert in northern Chile; this facility is no longer operating. The reason for selecting dry-stack at this mine was driven by the lack of water and high evaporation rate at the site. The dry-stack operation at La Coipa was plagued with mechanical difficulties and low operational efficiencies even though the La Copia process plant produced coarse tailings that were expected to have favorable filtration characteristics. The Stibnite Gold Project will produce finely ground tailings (75 micron) that will further inhibit throughput and filter efficiency.

In addition to mechanical difficulties, dry stack operations also result in inconsistent water quality. Ore processing requires consistent water quality to sustain the intended gold and antimony recovery rates; inconsistent reclaim water quality leads to lower recoveries and reduces the financial return of the Project due to water treatment costs. Dry stack tailings tend to produce inconsistent water quality due to sediment (fine particles eroded from the tailings deposit) and variable dissolved solids concentrations in runoff and seepage water, whereas conventional slurry-deposited tailings (whether low-density or thickened) achieve consistent reclaim water quality and improve ore processing performance.

Given the dewatering and pumping infrastructure, additional mobile equipment (e.g. trucks, bulldozers and motor graders), possibly impaired metals recovery, and the added maintenance and operational personnel to implement this storage technique, there would be substantially higher energy use and costs for the dry-stack technique as compared to conventional tailings dewatering methods, with no inherent environmental benefit to the Project.

After consideration of the above logistics, the increased energy required, the added infrastructure, the substantial investment in facilities and equipment, higher capital costs, and the much higher operating costs for using a dry-stack alternative at the Project, with no distinct environmental benefit over slurry tailings deposition, Midas Gold eliminated this alternative from its planning process as it does not meet Midas Gold's purpose and need for a reasonable rate of return for the Project nor does it offer a compelling safety or environmental advantage over the preferred alternative.

Advantages and disadvantages of the four dewatering methods are compared in Table 2.

8.3.3.5 Alternative Screening for Tailings Dewatering Method Conclusions

Midas Gold evaluated four alternative tailings dewatering technologies: conventional low-density tailings, thickened tailings, paste tailings, and filtered tailings. Table 2 lists the relative advantages and disadvantages of the four alternatives.

Paste and particularly filtered tailings substantially increase the Project costs and energy usage, and impair mineral recovery (due to inconsistent reclaim water quality), while offering no discernible environmental advantage over thickened or conventional slurry. The reported reasons for selecting paste or filtered tailings at other projects are not of major concern at the Project site, while their disadvantages remain. Therefore, paste and filtered tailings were eliminated from further consideration as they do not meet Midas Gold's purpose and need for a reasonable rate of return on its investment or provide a notable safety or environmental advantage.

Conventional low-density or thickened slurry are both feasible dewatering technologies for the Project; the preference for either is based on the tradeoff between cost, water handling, and closure considerations. Thickened tailings require additional process equipment, but somewhat reduce the cost of the TSF due to higher initial density of tailings. The detailed cost tradeoff between those competing considerations is out of the scope of this document but concluded in favor of using thickened tailings.

Midas Gold has committed to habitat restoration at closure; thickening tailings promotes higher initial and ultimate tailings density and earlier achievement of ultimate tailings density and thus earlier closure of the TSF, enabling sooner reestablishment of a self-sustaining environment and fish habitat in upper Meadow Creek. Although conventional tailings could be used at the Project site, it would lengthen the time necessary for tailings closure and increase water handling for the pumping of tailings and the return of water to the mill. Because the Project does not require large volumes of water to be stored seasonally for ore processing, the use of thickened tailings would be more appropriate for the Project.

Midas Gold therefore prefers thickening to conventional low-density tailings. Midas Gold will be conducting additional tailings consolidation testing and economic tradeoffs as part subsequent design studies to confirm this conclusion.

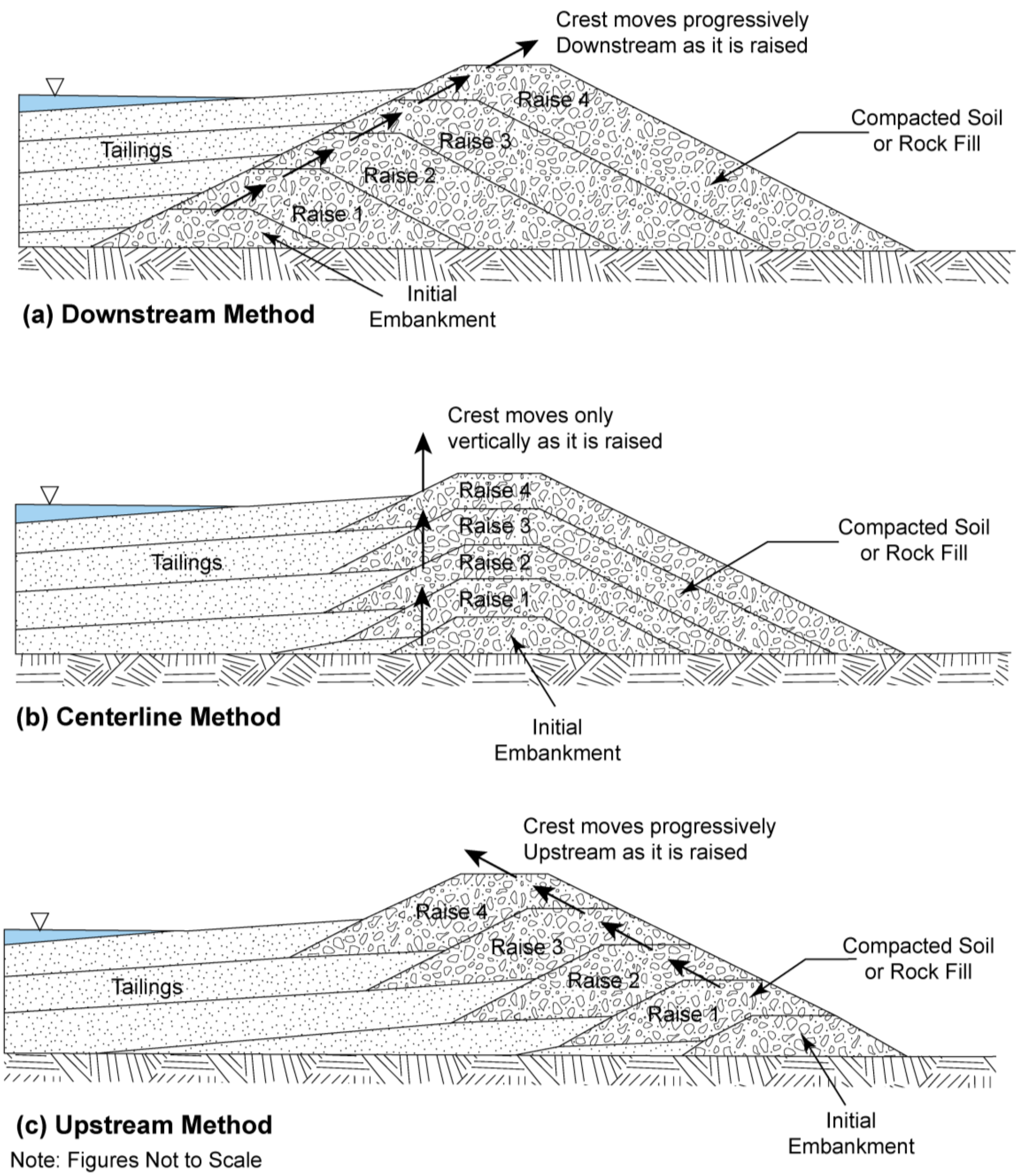
Table 2, Tailings Dewatering Technology Alternative Assessment Summary

Advantages	Disadvantages
Conventional Low-Density Slurry	
• Conventional, proven solution. • Consistent reclaim water quality. • Lowest initial cost.	• Highest water demand and water handling requirements. • Lowest initial and ultimate density. • Largest facility volume and footprint. • Longest period before ability to place closure cover and reclaim site.
Thickened Tailings **[Preferred Alternative]**	
• Less segregation of tailings fine and coarse particles than conventional. • Higher initial and ultimate tailings density than conventional. • Quicker achievement of high density / ability to reclaim site. • Reduced differential settlement. • Reduced water demand versus conventional. • Consistent reclaim water quality.	• Second largest facility volume. • More expensive than conventional tailings.
Paste Tailings	
• High initial and ultimate tailings density. • Quicker achievement of high density / ability to reclaim site. • Low water demand.	• Increased energy usage by diesel, electric, and chemical consumption. • Inconsistent reclaim water quality reduces metallurgical recovery. • Best suited to underground or pit backfill, neither of which are envisioned for the Project. • Increased costs.
Filtered Tailings (Dry Stack)	
• Highest ultimate density / smallest volume of tailings • Immediate achievement of high density / soonest ability to reclaim site. • Lowest water demand.	• Most energy intensive and expensive method. • Highest diesel, electric, and chemical consumption. • Inconsistent reclaim water quality reduces metallurgical recovery. • Questionable reliability with Project's fine tailings and high throughput. • Potentially larger footprint once ponds are considered.

8.3.4 Embankment Construction Methodology

Given that the preferred tailings storage configuration is to deposit thickened tailings in an impoundment, the embankment construction methodology is the next decision. A tailings embankment is constructed in stages rather than all at once like a water dam; the embankment is raised approximately every few years to keep pace with mining and tailings production. This staged construction method prevents large areas of the impermeable liner from being exposed unnecessarily to UV degradation and other risks before the upper portions of the facility are actually needed for tailings deposition and also minimizes initial cost and improves Project's rate of return. There are three principal methods for tailings embankment construction, discussed below: upstream, downstream and centerline. The methods are named according to the progression of the dam crest with each successive raise, as shown on Figure 7. "Upstream" relative to a tailings embankment refers to the side on which water and tailings are retained.

Figure 7, Tailings Embankment Construction Methods



8.3.4.1 Downstream Method

Downstream raising consists of adding compacted material to the crest and downstream face of the previous embankment, thereby creating a structure that is fully founded on subgrade or dense, compacted material. It provides the maximum geotechnical stability for a given slope and material type.

It is the state-of-the-art practice for lined facilities, as it allows installation and progressive expansion of liner on the dam face.

8.3.4.2 Centerline Method

Centerline construction consists of adding compacted material to the crest and both faces of the previous embankment, thereby creating a structure where the crest and everything downstream of it is founded on subgrade or dense, compacted material, but the upstream slope is constructed upon tailings of relatively low strength. It provides the better geotechnical stability for a given slope and material type than the upstream method, but is still subject to liquefaction-induced failure in an earthquake. Raising a dam by the centerline method precludes expansion of liner coverage, as there is no practicable way to line the 'zigzag' interface between earth/rock fill and tailings. Centerline methods are normally applied to unlined facilities where drainage of process fluids does not pose an unacceptable environmental risk.

8.3.4.3 Upstream Method

The upstream method consists of adding compacted material to the crest and upstream face of the previous embankment, thereby creating a structure where only the downstream shell of the structure is founded on subgrade or dense, compacted material, but the upstream slope and crest are underlain by tailings of relatively low strength. Upstream construction was the earliest method used for tailings embankment construction, with the bulk of the embankment generally constructed of coarse tailings obtained by running the tailings slurry through hydro-cyclones. Upstream construction provides the lowest geotechnical stability for a given slope and material type of any method, and is highly subject to liquefaction-induced failure in an earthquake. Raising a dam by the upstream method precludes expansion of liner coverage, as there is no practicable way to line the 'zigzag' interface between earth/rock fill and tailings. While historically common, upstream methods are not commonly applied today and generally only to unlined facilities where drainage of process fluids does not pose an unacceptable environmental risk, and located in low-seismic areas.

8.3.4.4 Tailings Embankment Construction Method Alternatives Assessment Conclusions

Midas Gold evaluated three embankment construction methods for applicability to the Project – downstream, centerline, and upstream. The TSF should be lined per State regulations and best practices, and be capable of safely withstanding applicable earthquake forces; both the upstream and centerline methods are inappropriate methods under these conditions as they have been shown to be more susceptible to instability under earthquake loading, and complex liner installations make them more susceptible to fluid containment problems. The remaining method, downstream construction, is Midas Gold's preferred alternative, as it has been shown to result in superior geotechnical stability and can be fitted with a robust impermeable liner system, resulting in effective protection of groundwater and surface water from tailings fluids.

Table 3 summarizes the advantages and disadvantages of each method.

Table 3, Tailings Embankment Construction Method Alternative Assessment Summary

Advantages	Disadvantages
Downstream [**Preferred Alternative**]	
• Most stable under seismic loading. • Facilitates liner installation on the upstream face. • Most stable in seismic events.	• Greatest embankment material volume for a given dam face slope.
Centerline	
• Moderate volume of embankment material for a given dam face slope. • More stable than upstream method.	• Not as stable as downstream method. • Precludes lining the dam face. • Flattening slopes to stable configuration, if possible, leads to excessive embankment material volume and footprint. • More susceptible to failure in seismic events.
Upstream	
• Least volume of embankment material for a given dam face slope.	• Least stable / most susceptible to seismic liquefaction. • Precludes lining the dam face. • Flattening slopes to stable configuration, if possible, leads to excessive embankment material volume and footprint. • More susceptible to failure in seismic events.

8.3.5 Tailings Storage Facility Location Alternatives

Based on the design criteria and other considerations set out in Section 8.3.1, Midas Gold identified locations in the vicinity of the proposed Project that are capable of handling a ±100 million ton TSF. The alternatives for locating tailings storage facilities are:

- Meadow Valley;
- Fiddle Valley;
- EFSFSR Valley; and,
- Blowout Valley.

Each location is discussed in the subsections below and shown on Figure 8. Table 4 lists key quantities associated with each site. Values in Table 4 differ slightly from the PFS dimensions for the Meadow Valley TSF, as the tradeoff study quantities were derived during the PEA, prior to design refinements accomplished in the PFS.

Table 4, Tailings Storage Facility Location Approximate Quantities

Location	Dam Crest Elevation (ft)	Dam Height (ft)	Height Above Process Facilities (ft)	Dam Volume (million yd^3)	Ratio of Embankment Volume to Tailings Volume
Meadow Valley	7,169	486	619	37.7	0.43
Fiddle Valley	7,808	951	1,258	65.1	0.75
EFSFSR Valley	7,234	364	684	15.7	0.18
Blowout Valley	7,415	427	865	26.0	0.30

8.3.5.1 Meadow Valley TSF Site

The Meadow Valley TSF site is the lowest-elevation of the four sites, located west of the existing SODA facility and partially on disturbed ground within a catchment that is highly disturbed by prior mining activities. Prior mining and processing activities by previous operators resulted in tailings placement within the footprint of this site, and process water for those operations was impounded upstream of those tailings. These existing tailings are likely to be a long-term source of metals leaching into surface and groundwater. Use of the Meadow Valley site allows for the recovery and reprocessing of those existing tailings and for the cleanup of legacy impacts prior to construction of the TSF.

The Meadow Valley site allows for storage of greater than ±100 million tons of tailings as the TSF impoundment is fully contained by the surrounding topography for hundreds of feet above the proposed dam crest elevation. Locating a facility in Meadow Valley also presents an opportunity to buttress the TSF embankment with additional development rock, placed in a development rock storage facility just downstream of (and overlapping onto) the TSF embankment on the site of the SODA facility, which buttress substantially increases the stability of the TSF embankment beyond its designed factors of safety and reduces the cost. The location of the Meadow Valley site, upstream of the proposed Hangar Flats pit, also provides a potential additional redundancy for the capture and treatment of seepage and/or turbid runoff from TSF embankment or development rock storage facility in the event that such occurred.

All of the viable TSF sites, including the Meadow Valley site, are valley locations, and therefore will affect wetlands, seeps, and streams. Hillsides above the Meadow Valley site are subject to rockfall hazards, which could damage the liner system; however, rockfall can be mitigated with berms, nets, etc., and damaged areas repaired. With its location in a previously disturbed area, relatively low pumping requirements, and ease of buttressing, Meadow Valley is the preferred alternative site for the TSF.

8.3.5.2 Fiddle Valley TSF Site

The Fiddle Valley TSF site is located southwest of the Yellow Pine Pit, at the highest elevation of the four sites, more than 1,200 feet above the process plant elevation. The area of the Fiddle site is generally undisturbed by prior mining; however, historically there was a water dam and reservoir in the valley and the western portion of the site lies within a U.S. Forest Service Inventoried Roadless area. Due to the steep topography (both side slopes and valley gradient), the Fiddle TSF site requires an excessively tall dam (approximately 950 feet) to achieve ±100 million tons of capacity, and has limited excess capacity since it nearly fills its host valley. As a result of the dam height and upstream topography, the Fiddle Valley facility is extremely inefficient, requiring that approximately 0.75 cubic feet (ft^3) of embankment fill be placed for each cubic foot of tailings storage capacity. Installing an effective buttress for such a facility on steeply sloping terrain would greatly increase the facility footprint. Aerial photography indicates the presence of large-scale historical landslides in the upper portion of the valley, which could jeopardize the integrity of the impoundment liner or risk overtopping the dam should a landslide run into the impoundment.

Due to the excessive pump lift, geotechnical risk, high cost associated with an embankment of its size, potential for landslides affecting impoundment integrity, location in undisturbed forestland (including Roadless area), and lack of excess capacity the Fiddle Valley TSF site was eliminated from consideration.

8.3.5.3 EFSFSR Valley TSF Site

The EFSFSR Valley TSF site is located east of the Meadow Creek confluence along the EFSFSR, in areas previously undisturbed by mining. It is approximately 70 feet higher than the Meadow Valley site, increasing pumping requirements, but has more efficient geometry (0.18 ft^3 embankment/ft^3 tailings storage) due to the wide, relatively gentle valley formed east of the embankment where several tributary valleys converge with the EFSFSR. The EFSFSR Valley site intersects several perennial streams, requiring more complex surface water diversion construction than other sites. The efficient geometry of the site is offset by haul distance to bring development rock from the pits and spent ore from the SODA area; embankment placement is estimated to cost 60% more at the EFSFSR Valley site than at the Meadow Valley site, resulting in the Meadow Valley site having lower overall cost.

Owing to its valley location, constructing the TSF at the EFSFSR Valley site will affect wetlands; however, this is the case for all of the viable TSF sites. The site geologic hazard investigation identified both landslides and avalanche zones within and above the impoundment area, likely requiring additional cost to mitigate. The EFSFSR Valley TSF site has excess capacity in a similar fashion as the Meadow Valley site, and would also be a favorable TSF location were it not for landslide and avalanche risk, its impact on previously undisturbed lands and waterways (including the main stem of the EFSFSR), and somewhat greater overall cost. The EFSFSR Valley site is therefore considered viable, but not the preferred alternative location for the Project TSF.

8.3.5.4 Blowout Valley TSF Site

The Blowout Valley TSF site is located at the former water dam site along Blowout Creek, the second-highest site and more than 800 feet above the process plant elevation. The Blowout Valley is a hanging valley, located approximately 400 feet above the Meadow Valley. Therefore, while embankment economics are relatively favorable at 0.30 ft^3 of embankment per ft^3 of tailings storage, an embankment located near the former water dam could not be effectively buttressed without placing substantial amounts of fill in the adjoining Meadow Valley, thereby eliminating some of the reasons to locate it here as opposed to in the Meadow Valley. The site also has limited excess capacity, as the dam crest would have to be considerably lengthened at substantial expense to raise the embankment.

Midas Gold's drilling investigations revealed that the potential Blowout Valley embankment site is underlain by more than 300 feet of unconsolidated glacial till, part of the lateral moraine where the glaciers in the Meadow and Blowout valleys once converged. These foundation materials present a potential risk to embankment stability, and this risk is magnified by the impracticability of placing a large buttress downslope of the embankment as such a buttress would require a massive quantity of material to simply reach the level of the Blowout Valley TSF embankment toe, let alone the additional material required to create an effective buttress.

The upper portion of the Blowout Valley TSF impoundment area is generally undisturbed with the exception of the stream degradation resulting from the 1966 water dam failure, which led to stream head cutting and a lowered water table in the upper valley, degrading the associated wetlands (further described in Section 8.8). The upper valley also lies within a Forest Service Inventoried Roadless area.

Due to the location in undisturbed forest land (including wetlands and Roadless area), excessive pump lift, lack of buttressing ability, lack of excess capacity, and geotechnical risk associated with extensive soft foundation materials, the Blowout Valley TSF site was eliminated from further consideration.

8.3.5.5 Tailings Facility Location Alternatives Assessment Conclusions

Although the Fiddle Valley and Blowout Valley sites have sufficient volume to contain +/-100 million tons of tailings, these sites require excessive pump lift from the process plant, are located in areas that have generally not been disturbed by mining activities and, in the case of the Fiddle Valley, require risky and inefficient embankment construction. Furthermore, Midas Gold is committed to restoring the upper Blowout Valley wetlands early in the Project as a feature of Project development; placing a tailings facility in Blowout Valley prevents achieving this goal. Since there are other appropriate locations for tailings storage in the Project area, the Fiddle Valley and Blowout Valley sites were eliminated from further consideration as they do not meet Midas Gold's purpose and need to minimize Project footprint, maximize the use of previously disturbed areas, provide long term protection of the environment and give an acceptable rate of return on Midas Gold's investment.

The EFSFSR Valley site is similarly located in undisturbed area, spans multiple perennial stream channels that would need to be diverted, and certain areas of the impoundment are subject to landslides and avalanches. While the EFSFSR Valley site is an otherwise good impoundment location, it has increased avalanche and landslide risk, increased development rock haulage cost and comes in second to the Meadow Valley site, which has lower geologic hazard and avalanche risk and is lowest in overall cost. The EFSFSR Valley area also includes sites that are suitable for employee and contractor lodging, as it is well removed from active mining operations and the associated noise and artificial light. The EFSFSR Valley site was thus eliminated from consideration and the Meadow Valley site identified as the preferred alternative.

The Meadow Valley site, in conjunction with an adjacent development rock storage facility (and buttress), allows Midas Gold to maximize the restoration of the Meadow Creek valley as well as Blowout Creek, including cleanup of legacy tailings placed in the area. The Meadow Valley site is the only potential tailings storage site in the Project area that offers the opportunity to restore past disturbance and is the lowest cost site, and, therefore, was the tailings storage alternative selected by Midas Gold as the preferred alternative. Inclusion of a development rock storage facility (**DRSF**) as a downstream buttress to the embankment of the Meadow Valley TSF results in geotechnical factors of safety well in excess of the minimum design standards and provides an additional measure of assurance that tailings will remain contained even in the event of a large earthquake; the ability to buttress the TSF in the Meadow Valley option further supports the selection of the Meadow Valley location as the preferred alternative.

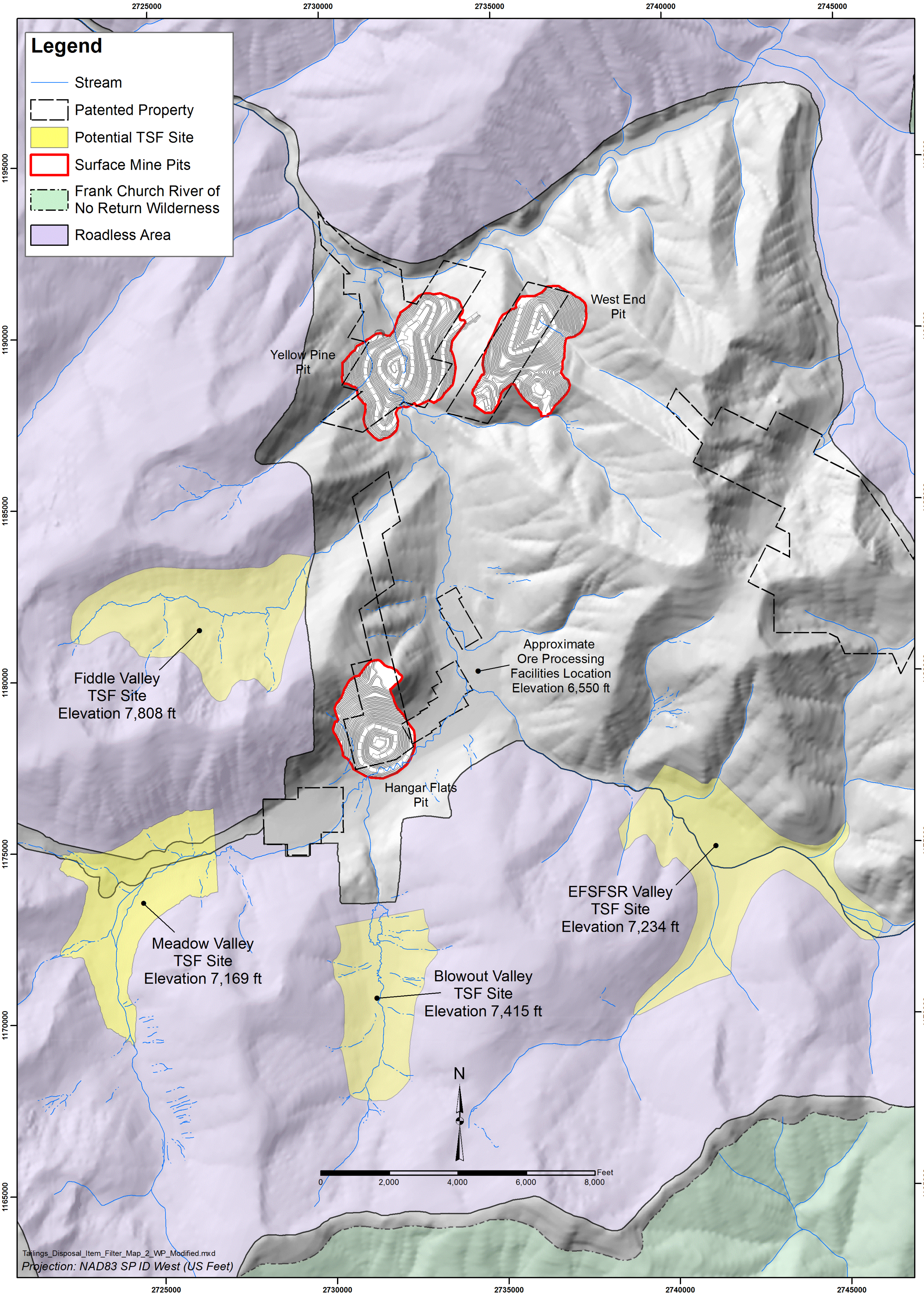
Midas Gold's alternatives assessment has therefore determined that the Meadow Valley site is the preferred alternative for the TSF. The advantages and disadvantages of the four alternative locations for the TSF are summarized in Table 5.

Table 5, Tailings Storage Facility Location Alternative Assessment Summary

Advantages	Disadvantages
Meadow Valley	
• Can be reclaimed on closure to provide a sustainable ecosystem, including fish habitat. • Adequate capacity, with additional redundancy. • Located partially on disturbed land. • Facilitates restoration of upper Meadow Creek including recovery and cleanup of legacy tailings. • Leaves Blowout Valley available for wetland restoration. • Able to buttress with planned DRSF, substantially increasing the factor of safety for the TSF. • Lowest pump lift. • Lowest overall cost.	• Water diversion requirements. • Subject to rockfall from hillsides above impoundment. • Affects wetlands.
Fiddle Valley	
• Adequate capacity but limited redundancy. • No other particular advantages; proximity to process plant negated by excessive pump lift and tall, inefficient embankment.	• Majority of site on undisturbed land, including Roadless area. • Excessive pump lift required. • Excessive dam height. • Affects wetlands. • Buttress requires additional stream impact. • Highest cost. • Aerial photos show large-scale historical landslides have occurred in upper portion of valley which could present a hazard to impoundment integrity. • Proximity to EFSFSR. • Would not support recovery and reprocessing of legacy tailings (a source of metals in surface and groundwater).
EFSFSR Valley	
• Adequate capacity with redundancy. • Low pump lift. • Second-lowest overall cost.	• Located on previously undisturbed land. • Affects wetlands. • Removes suitable employee/contractor lodging sites from potential use. • Major water diversion requirements, including main stem of the EFSFSR. • Subject to landslides and avalanches. • Buttress placement would entail additional stream impact. • Would not support recovery and reprocessing of legacy tailings (a likely source of metals in surface and groundwater).

Advantages	Disadvantages
Blowout Valley	
• Adequate capacity but limited redundancy. • Efficient dam geometry.	• Located largely on undisturbed land, including Roadless area. • Precludes early restoration of upper meadow/wetlands. • Excessive pump lift required. • Affects wetlands. • No practicable buttress due to steep downstream terrain (TSF located in a hanging valley). • Geologic hazards unknown; impoundment footprint not part of study area. • Would not support recovery and reprocessing of legacy tailings (a likely source of metals in surface and groundwater).

Figure 8, Tailings Storage Facility Location Alternatives



8.3.6 Tailings Management Alternative Assessment Conclusions

Based on the screening considered in the previous subsections, Midas Gold selected the Meadow Valley site as the preferred location for tailings storage, using thickened tailings deposited in a lined impoundment. The impoundment will be retained by an embankment constructed principally of development rock, and raised using downstream methods. Thickened tailings allow for the soonest practicable closure and reclamation of the TSF while allowing for an acceptable rate of return on the Project. Downstream construction provides the best seismic stability and facilitates the required liner installation; the location in Meadow Valley also facilitates placement of a DRSF as a buttress downstream of the TSF embankment, further enhancing its geotechnical stability. Utilizing the Meadow Valley location also incorporates the recovery and reuse of the spent heap leach ore in the SODA area, and the recovery and reprocessing of legacy tailings.

In-pit and underground tailings storage are infeasible at the Project site, and were eliminated from consideration. Given the lack of any operational advantages, the general lack of environmental benefits, and the higher costs, Midas Gold eliminated from further consideration the use of either paste or filtered tailings at the Project.

8.4 ORE PROCESSING FLOWSHEET DEVELOPMENT

This section provides an overview of the evolution and selection of the Stibnite Gold Project ore processing flowsheet. Ore processing circuits discussed in this section include: crushing and grinding (often referred to as comminution); antimony flotation; gold liberation; gold extraction; and, process water neutralization.

8.4.1 Crushing & Grinding

Before any of the minerals or metals can be recovered, most gold ores are initially treated through a process of reducing the particle size to a point where the gold becomes exposed from the waste, or gangue, or where the gold becomes completely separated (liberated) from the gangue. Historically, at Stibnite, this was achieved by two stages of crushing followed by grinding of the crushed ore by ball milling. Such processes were appropriate for the small tonnages being employed at the time however, today, the preferred process involves the use of semi-autogenous milling, whereby much of the grinding is achieved by the ore itself. Such a process holds several advantages:

- It drops the overall process plant infrastructure and footprint, an important consideration given the relatively limited space available.
- It eliminates all but a light crushing stage. This considerably reduces dust emission from the process.
- It is, overall, cheaper to operate, especially at higher tonnages, thereby enhancing the economic feasibility of the Project.

The semi-autogenous grinding (**SAG**) product will be subjected to ball milling to achieve the design particle size (eighty percent finer than 200 mesh or 75 microns).

8.4.2 Antimony Flotation

While the majority of the ore tonnage contained within the mineral resource only hosts gold in economically recoverable quantities, roughly 15 percent of the tonnage also contains economic levels of antimony. Accordingly, the flowsheet has been designed such that, where needed, the antimony-bearing mineral (stibnite) can be recovered in addition to the gold. Testing has shown that it is better to recover the stibnite first.

Historically in the District, stibnite was recovered to a concentrate by froth flotation. Froth flotation is a process that is widely used throughout the world to recover a great number of metal-bearing minerals, and is commonly used to recover stibnite to a high-grade marketable antimony concentrate, as is proposed for the Project. Following the removal of the antimony, the remainder of the process focuses on the extraction of the gold.

8.4.3 Gold Liberation

Recovery of gold from ores mined from mineral deposits is achieved through a variety of process routes. The selection of process route is driven by the way in which the gold occurs in the ore.

If the gold is coarse enough, and since gold is a very dense metal, gravity-based methods can be used to recover the gold. However, few gold resources are amenable to this approach, so a process of leaching the gold tends to be preferred (the third option of producing a gold-rich concentrate for sale to a third party has been discussed in Section 6). Usually, the gold can be recovered by direct leaching after grinding, or even after crushing alone.

In the case of the Project, ores mostly contain “refractory” gold. This is gold that is hard or impossible to recover to a doré form through conventional grinding and leaching methods. This is because, during the formation of the mineral resource, the gold was dissolved into some of the host sulfide minerals (mostly pyrite but also arsenopyrite) so it is now atomically dispersed within the lattice of the host mineral itself. This means it is impossible to grind the ore fine enough to release the gold, so the only solution is to break down the host minerals encapsulating the gold. This exposes the gold, making it available for recovery, and is best done by oxidizing the sulfide minerals.

There are three conventional means of achieving this, namely roasting, bacterial oxidation and pressure oxidation. There are also numerous more novel technologies, most of which have not been operated to a substantial commercial extent.

8.4.3.1 Roasting

Prior to the 1980s, roasting was the most common means of oxidizing these sulfide minerals. This includes at Yellow Pine, where a roaster was operated briefly until the mine shut down in 1952. Roasters are still operating in some Nevada gold mines, and in the gold mining industry worldwide, especially where the ores contain organic carbon. The roasting process involves the heating of the sulfides to a temperature of 500 to 700 degrees centigrade, at which point the sulfur and arsenic components of the host minerals are removed, forming gaseous sulfur dioxide and arsenic trioxide. The carbon is burned off as carbon dioxide and the arsenic trioxide is scrubbed from the off-gases. In the past, roasting has been a serious source of air pollution through the release of acidic, metallic, and other toxic compounds. More recently, pollution-control systems to recover the toxins from the off-gas have been effective in improving the environmental performance of roasters, however Midas Gold perceives the environmental risks from the use of this process outweigh the economic benefits. Accordingly, a roasting option has been excluded from further consideration for the Project.

8.4.3.2 Bacterial Oxidation

The breaking down of sulfide minerals by bacteria has been the subject of decades of research. Gold Fields, based in South Africa, were leaders in developing the technology of bacterial oxidation (BIOX®) of gold-bearing sulfides. Today, the process is marketed as environmentally friendly and commercially proven and, while operating in process plants around the world, is not commonly used in North America. Bacterial oxidation requires a stable environment in order to propagate the bacterial culture, which includes stable temperatures, high levels of oxygen availability and large tankage to contain the ore being processed due to the substantially longer residence times required versus pressure oxidation. As a result, bacterial oxidation plants have a relatively large footprint and can consume as much or more power than a pressure oxidation circuit. Provided conditions are right and sufficient ferric iron is available, any arsenic and antimony can be stabilized as ferric arsenate and ferric antimonate, respectively, though generally not as effectively as pressure oxidation.

8.4.3.3 Pressure Oxidation

Pressure oxidation has become established as the most commonly used process for treating refractory gold ores in North America and is widely used on a global basis. In this process, the sulfides are broken down by oxygen in an autoclave (pressure vessel) at temperatures of 180 to 220 degrees centigrade. The material is kept in a water-based pulp by pressurizing the process. The process is fast, the sulfide minerals being broken down within one hour of processing, compared to several days in the case of bacterial leaching. Provided conditions are right and sufficient ferric iron is available (which the Project has), any arsenic and antimony can be stabilized as ferric arsenate and ferric antimonate, respectively, as has been extensively demonstrated at other operations in the U.S. Energy consumption is also reduced where the feed to the pressure oxidation circuit has high enough sulfur levels to make the process autothermic (it generates its own heat through the exothermic (heat generating) oxidation of the sulfides. In the case of the Project, processing of concentrates (as opposed to whole ore) increases the sulfur grades to levels whereby the process will be autothermic, thereby reducing energy consumption for the Project.

8.4.3.4 Other Methods

Other more novel processes have been considered and several have been tested in the past on samples from the District. However, these alternative processes tend not to offer either economic or environmental benefits for the Project and, as they tend to be less commercially proven, they have been omitted as serious candidates for the Project.

8.4.3.5 Preferred Gold Liberation Method

Based on the preceding discussion of potential gold liberation methods, two candidate methods were selected for closer scrutiny; namely bacterial oxidation and pressure oxidation. Of the two, pressure oxidation offers the Project some key advantages:

- The consumption of cyanide (using for leaching within the processing plant following oxidation; see below) is considerably lower. Over the life of the mine, 12 less tons of cyanide would need to be transported to the Project each day, compared to using bacterial oxidation[14].
- In addition, adopting the BIOX® process would require the shipping to site of 85,000 tons of sulfuric acid and 29,000 tons of hydrogen peroxide through the life of the mine. The pressure oxidation process would not require either of these consumables to be delivered to site.
- While both pressure oxidation and bacterial oxidation require the use of lime, the BIOX® process also would require an additional 750,000 tons of limestone, which would have to be trucked to site, or mined locally, effectively increasing the footprint and impact of the Project.
- The BIOX® process has had mixed success elsewhere, when operated in cold climates such as those experienced at the Project site.
- Both processes stabilize arsenic as an iron arsenate compound called "scorodite". However, by virtue of the conditions in which it is formed, the crystalline scorodite formed in the autoclave is typically more stable than the amorphous scorodite formed by the BIOX® process.
- Overall, the pressure oxidation process also offers economic advantages to the Project and is perceived as having a lower risk of technical failure.

Pressure oxidation is sometimes applied to the entire ore (or in this case, where applicable, tailings from antimony recovery), or to a sulfide mineral concentrate produced from the ore by froth flotation. In this case, a mineral concentrate is created for pressure oxidation by froth flotation. This allows for the process to be heat-neutral (autothermic), so virtually eliminating the need for fuel to keep the process hot, reducing the energy requirements of the Project and its environmental footprint.

8.4.4 Gold Extraction

Once the gold is liberated from the host minerals, it is extracted through a process of selective gold dissolution from the gangue[15]. Gold is difficult to dissolve – which is one of its key attributes. There are only a few chemicals that will dissolve gold.

The most favored process worldwide is cyanidation, which uses a sodium or potassium cyanide solution at high pH to dissolve the gold. First developed in 1886, cyanidation has been safely used on hundreds of mines in the United States and around the world to extract the vast majority of the world's gold from ores for 130 years. Some potential alternative leaching agents exist:

- Chlorine was used in the nineteenth century, before being superseded by the more environmentally benign and cheaper cyanidation process. Although very effective as a leaching agent, the safety hazards associated with using chlorine are substantial and, unlike cyanide, which readily decomposes into harmless products after use, chlorine will remain indefinitely in the environment. Accordingly, chlorine has not been considered as a realistic alternative to cyanide for a long time, and is not a candidate for the Project.

[14] The Project as designed would use up to approximately 10 tons of sodium cyanide each day. With BIOX® this daily consumption would more than double to over 23 tons per day. Sodium cyanide is a solid, packaged and shipped in durable, watertight drums or boxes.

[15] In mining, **gangue** is a term used to describe the commercially worthless material that surrounds or is mixed with a commercially valuable material in an ore deposit.

- Thiourea, used in conjunction with hydrogen peroxide or ozone under acidic conditions dissolves gold. Thiourea, however, is ecotoxic to aquatic life, and is thought to be carcinogenic while hydrogen peroxide and ozone are difficult and dangerous chemicals to handle. The process is also expensive; accordingly, it is rarely seen as an alternative to cyanide and has been eliminated as an option for the Project.
- Ammonia has been proposed as an alternative to cyanide, but its use has never been developed commercially. Ammonia is used, rarely, in conjunction with cyanide in the leaching of copper-rich gold ores. Ammonia is toxic to aquatic life.
- Calcium thiosulfate leaching (**CTS**) is a process being developed primarily by Barrick Gold Corporation at their Goldstrike mine in Nevada. Particularly suited to their specific ore type, it uses calcium thiosulfate as a leaching agent. The CTS-based process is known to be fickle and difficult to control, and industry experience is very limited (the first process started at Goldstrike in late 2015 following substantial delays in implementation). Accordingly, it is not seen as a viable commercially proven alternative to cyanide at this stage.

Accordingly, cyanidation (fully contained within the processing circuit) was adopted as the preferred alternative process for the Project. A neutralization step is included following gold extraction is to prevent cyanide from leaving the process plant, as described in the following section. The leach process conditions designed for the Project are industry-standard, technically proven, commercially viable and environmentally protective.

8.4.5 Process Water Neutralization

To ensure the water leaving the process is protective of human health, fish and wildlife, Midas Gold has included a detoxification process for the pulp leaving the cyanidation process, before such materials leave the process area. This neutralization process uses the commercially and technically proven process where free cyanide and weakly or moderately bound metal-cyanate complexes present in the waste stream are oxidized to cyanate (**CNO-**) by the addition of sulfur dioxide (**SO_2**) and oxygen. This process is widely used in the mining industry globally, including the U.S. As a result, only trace levels of cyanate products are contained in the tailings leaving the process area. In addition to the oxidation of cyanide, metals are also removed from solution by precipitation as metal hydroxides. Unlike the alkaline chlorination oxidation process, the proposed cyanide neutralization process is capable of removing stable iron-cyanide complexes from solution. Ferricyanides are reduced to insoluble ferricyanide salts and precipitated from solution. The presence of iron-cyanide complexes is undesirable given their ability to decompose in the presence of sunlight, releasing free cyanide. As a result, the SO_2 process has been selected as the preferred alternative for cyanide neutralization due to its proven success in protecting the environment.

8.5 ORE PROCESSING FACILITIES LAYOUT

The Project will require ore processing facilities that include ore stockpiles, crushing and grinding equipment, flotation and other metallurgical extraction equipment, reagent and grinding media storage areas, maintenance areas, water treatment facilities, and tailings handling infrastructure[16].

[16] Although part of ore processing, the placement of tailings is a unique component that is addressed separately in Section 8.3.

Selection of the preferred ore processing facilities site was based on the Project design criteria and design considerations presented in Sections 6 and 7, respectively, and based on the following additional ore processing facilities design considerations:

- The site should be centralized to provide convenient access to the mining areas;
- Placement on property controlled by Midas Gold is preferred;
- Placement on relatively level ground to avoid extensive earthmoving and to minimize incremental Project footprint;
- Avoidance of potential mineral resource and exploration prospect areas that may be mined in the future if a commercial deposit is defined and permitted;
- Avoidance of areas appropriate for tailings and development rock storage;
- Placement on areas with near-surface bedrock to increase foundation stability and minimize foundation costs, particularly for heavy vibrating equipment such as crushers and grinding mills;
- Placement on areas of previous disturbance; and,
- Avoidance, to the extent practicable, of important environmental resources, such as Waters of the U.S.

Four sites were identified within the Project area that met the design criteria and design considerations:

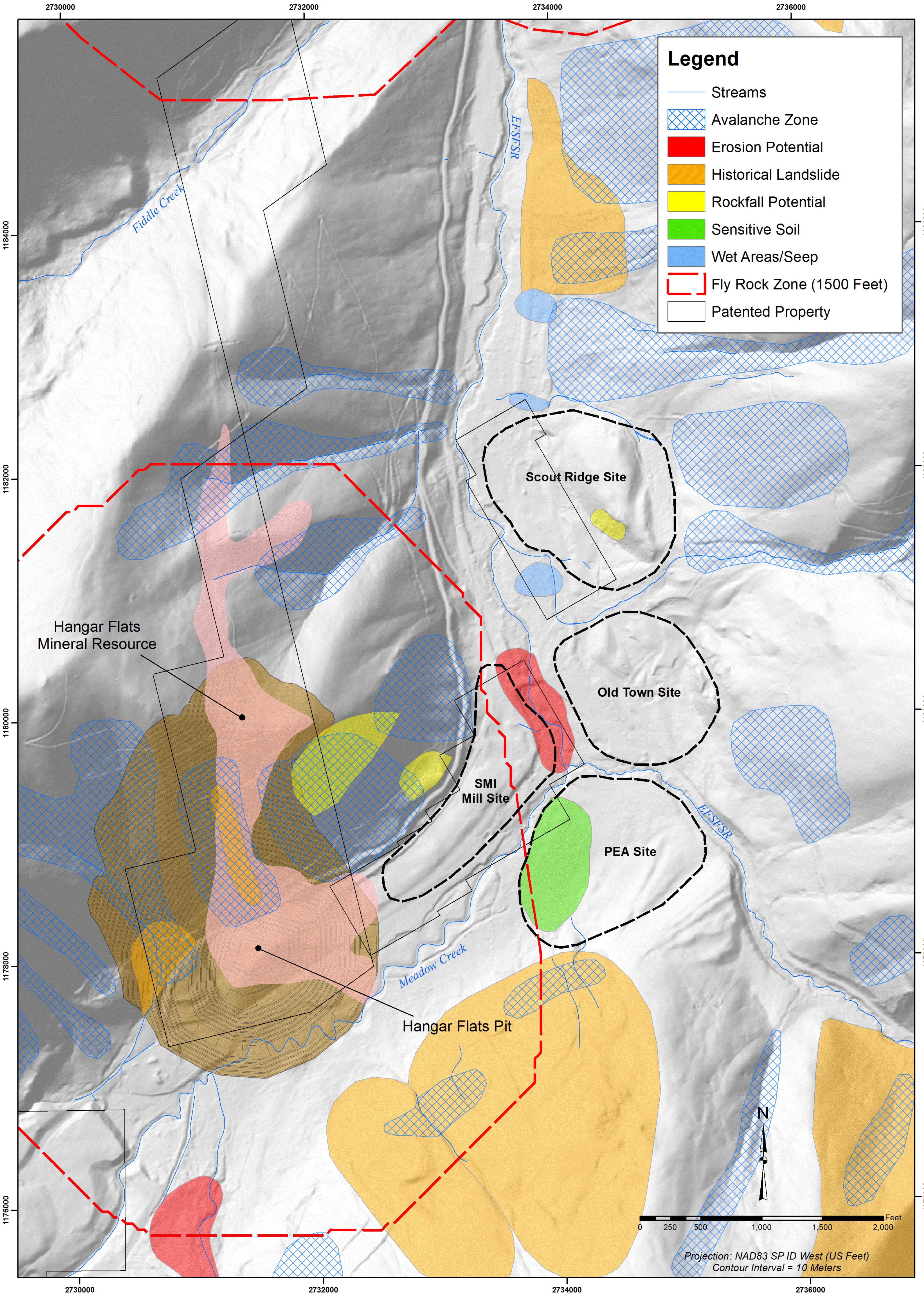
1. **PEA Site** – this site was identified as the preferred site in a report developed by SRK Consulting (Canada) Inc. titled *Preliminary Economic Assessment* (**PEA**) *Technical Report for the Golden Meadows Project, Idaho* dated September 21, 2012[17] and is located due south of the confluence of the EFSFSR and Meadow Creek.
2. **Old Town Site** – this site is where the former town of Stibnite was located and is northeast of the confluence of the EFSFSR and Meadow Creek.
3. **Scout Ridge Site** – this site is located immediately north of the Old Town Site, on the east side of the EFSFSR and was the preferred site in the PFS.
4. **SMI Mill Site** – this site is where the former Stibnite Mines Inc. (**SMI**) processing facilities were located and is on the north side of Meadow Creek east of the proposed Hangar Flats open pit.
5. **Remote Site** – In addition to the above 4 sites (see Figure 9), Midas Gold examined the possibility of a remote ore processing facility site.

The following sections describe and discuss the advantages and disadvantages of each alternative.

[17] The PEA design has been superseded by the PFS design, as presented in the PFS design report and subsequently modified in this PRO. The PEA is referenced to provide historical background on the site selection process, and does not apply to the presently-proposed Project configuration.

RESTORE THE SITE

Figure 9, Ore Processing Facilities Layout Alternatives



8.5.1 PEA Site

The PEA Site occupies a low-lying terrace on the south side of Meadow Creek. The alluvial deposits of Meadow Creek provide a broad flat area for the plant location, however, the depth to bedrock is considerable, measured in one drill hole (MGI-13-357), located in the middle of the PEA Site, to be approximately 160 feet. In such a location, foundations for heavy, vibrating equipment like grinding mills would require deep excavations and large amounts of compacted engineered fill.

This site has numerous forested wetlands, and, to avoid wetland impacts, structures would have to be moved to the east onto slopes. Location here would require excessive earthwork to level areas for structures.

This site has shallow groundwater, as evidenced by the abundance of wetlands. Foundation work would impact this shallow groundwater and, although the ground is flat here, this site is bound to be problematic with respect to groundwater, especially for foundation work.

The main portion of the PEA Site has a favorable gentle topography, but there is no suitable place for a crusher on the south side of Meadow Creek. The best location for a primary crusher close to the PEA Site is on the north side of Meadow Creek within the patented claims of the SMI Mill site. This would necessitate the installation of a covered conveyor system across Meadow Creek.

Because the PEA Site is largely covered by wetlands, it will be difficult to prevent comingling of contact water around plant facilities with natural surface water and shallow groundwater. There is ample space on this site to locate collection ponds; however, the topography across the parcel is fairly flat on the north side of the site, meaning that there is not a good natural gradient for diverting flows. In order to segregate contact water, foundations for facilities in the PEA Site will have to be elevated in order to provide a gradient for contact water to flow. In addition, the PEA Site is bounded by active streams (EFSFSR and Meadow Creek) on two sides, so water management will have to account for surface water control in two directions.

The PEA Site would be founded on glacial moraine and alluvial soils. While avalanche is unlikely to be a major concern, the site is bounded by both historical landsides and sensitive soils. Geologic hazards would be a major impediment to safe development of this site. This site does not meet Midas Gold's purpose and need for protection of the environment, minimizing footprint and safety.

8.5.2 Old Town Site

The Old Town Site is due north of the confluence of the EFSFSR and Meadow Creek. Its northern boundary is Garnet Creek, a small stream that reports into the EFSFSR. Bedrock depths are variable from over 100 feet on the south side of the location and shallowing to the north and east. The soils are primarily broadly graded alluvial sands and gravels, and the groundwater conditions are favorable, with very few occurrences of wetlands, springs or seeps. The eastern edge of the Old Town site meets a west-facing slope of bedrock.

The Old Town Site would allow most structures at an ore processing facility to be built a distance of 300 to 1000 feet from the EFSFSR. However, a two-way haul truck bridge crossing across the EFSFSR would be needed for access to the primary crusher. The tailings and reclaim water pipelines would also need to cross the streams via a pipe bridge. Development rock haul trucks could remain on the west side of the valley to the Meadow Valley site (where development rock would be used in the construction of the TSF, including a buttress) without having to cross the river.

The Old Town Site, as its name implies, is the old location of Stibnite town. This site has numerous existing foundations, although the structures above the foundations no longer exist.

The Old Town Site terrain provides good flexibility for locating surface water diversion channels and collection ponds at a safe distance from the EFSFSR. The main impediment to surface water management could be Garnet Creek located on the north side of this site. This small stream could be controlled using armored channels, small bridges or culverts, where needed.

The Old Town Site is generally free of geologic hazards, and is therefore favored from this perspective. Avalanche hazards, however, may be an issue at this site, although they are deemed to be manageable.

8.5.3 **Scout Ridge Site**

The Scout Ridge Site lies to the north of Garnet Creek on the east side of the EFSFSR. The majority of this site is located on Midas Gold patented claims and has been previously disturbed, and, most of Midas Gold's current buildings and facilities are located here. In addition, the old West End haul road that was used in the 1980s runs directly through the Scout Ridge Site.

The site borders the base of a slope of bedrock and covers Scout Ridge, an outcrop ideally suited for heavy foundations. The alluvial soils have some minor wetlands but most of the facilities could be located to avoid them.

Scout Ridge will require some leveling of bedrock. However, most of this site is level or shallowly sloping, so there would not be much need for heavy earthwork or retaining walls.

The Scout Ridge Site is located on a wide portion of the EFSFSR valley. This would allow most major structures for an ore processing facility to be located 500 feet to 900 feet from the EFSFSR, with more minor ancillary buildings still being some 200 feet to 300 feet from the stream. Control of contact water and storm runoff would be manageable on this site.

Similar to the Old Town Site, a two-way haul truck bridge crossing across the EFSFSR will be needed for access to the primary crusher for an ore processing facility at this location. In addition, tailings and reclaim water pipelines would need to cross the streams via a pipe bridge. Development rock haul trucks could remain on the west side of the EFSFSR valley, without having to cross the EFSFSR.

Like the Old Town Site, the Scout Ridge Site occupies relatively flat terrain but is free of the abundant wetlands that the PEA Site possesses. The terrain provides good flexibility for locating surface water channels and collection ponds at a safe distance from the EFSFSR. The main impediment to surface water management could be Garnet Creek which is located on the south side of the site. This small stream, which has been impacted by legacy water diversions and disturbance related to the town of Stibnite, could be controlled using armored channels, small bridges and culverts, where needed.

The Scout Ridge Site is generally free of geologic hazards, and, similar to the Old Town Site, avalanche hazards are considered to be manageable. As a result, this site is a preferred alternative.

8.5.4 **SMI Mill Site**

The SMI Mill Site is located along the west side of the EFSFSR-Meadow Creek confluence, on patented claims, at the base of a relatively steep east-facing slope. The Meadow Valley is somewhat narrow in this location, and bedrock outcrops on the west side of this site. However, the bedrock slope is very steep here and appears to continue beneath the valley alluvial fill. A drill hole on the eastern side of the

SMI Mill Site (MG-12-215-PC) reached bedrock at over 200 feet. Overall, the foundation conditions at this site are favorable but without much opportunity to locate facilities on bedrock.

The probable crusher location for the SMI Mill site would be located at the base of a fairly steep slope on the west side of the EFSFSR. The haul road would have to be located almost flush against the crusher pad to keep it out of the EFSFSR. Any crusher pad at this location would require large amounts of bedrock excavation both downslope and upslope to fit in the narrow area available. The coarse ore stockpile would also be located in a tight position between the steep slope on the west and a development rock haul road; excessive excavation and blasting would be required at this site. Similarly, the grinding mills and flotation cells would have to be located against the steep bedrock slope to the south and would require excessive excavation and blasting. This area was identified as a high rock-fall hazard area; therefore, appreciable rock-fall mitigation would be necessary to protect workers and facilities.

Most of the ore processing facilities would fit on patented claims that cover this site with the exception of the primary crusher and coarse ore stockpile. However, because of the narrow nature of the site, a development rock haul road would be required on the south side of Meadow Creek, which would impact substantial wetlands and offset much of the environmental benefits of this layout. Additionally, three bridge crossings for ore and development rock haul routes would be required, including two for the EFSFSR and one for Meadow Creek.

Facilities at the SMI Mill Site would be located 200 to 500 feet from Meadow Creek and the EFSFSR, which is considerably closer than at the other proposed ore processing sites. This site would also be crowded with facilities and access roads, making it more difficult to manage meteoric water at the site. Suitable terrain for process water and stormwater ponds is minimal. Closer proximity to the two major waterways in the area would increase the potential for environmental incidents, and therefore does not meet Midas Gold's purpose and need for protection of the environment.

8.5.5 Remote Mill and Tailings Storage Facility

Under this alternative, ore would be hauled or conveyed to an ore processing facility located outside of the main Project area. Such a set-up would require the construction and maintenance of a haul road (approximately 100 feet wide) for mine trucks or a conveyor system to physically transport the ore material to the remote site. The most practical, economically feasible and logical transport for large tonnages of either ore or tailings would be "downhill" to use gravity, thus, in the rugged mountainous country of this part of Idaho, such transport would be within the narrow valley adjacent to the EFSFSR.

Given the narrow EFSFSR canyon downstream of the Project area, it would be very difficult and expensive to widen the existing Forest Service 50-412 Road to handle the large off-highway trucks necessary to haul ore material to a remote mill; and, there are too many curves to feasibly use an over-land conveyor system. Upgrading this route would have a substantial environmental impact on the EFSFSR and the route would be subject to substantial and frequent avalanche and landslide hazards.

Further, once transported offsite, a suitable location for ore processing facilities would have to be identified. There is no obvious site (previously disturbed, former open pits or mine sites) within 50 miles of the Project area with the capacity to host these facilities. In addition, moving ore to an offsite facility would mean the environmental footprint of the Project would expand into previously relatively undisturbed basins of Johnson Creek, the South Fork of the Salmon River or the Payette River, which would not meet Midas Gold's purpose and need of minimizing the Project footprint and minimizing risk to fisheries by staying away from travel adjacent to fish-bearing waterways to the maximum extent practicable. As a result, a remote processing facility was eliminated from further consideration as it does not meet Midas Gold's purpose and need for environmental protection, minimizing Project footprint and developing a Project with robust economics.

8.5.6 Ore Processing Facilities Alternative Assessment Conclusions

To aid in establishing the preferred ore processing plant site for the Project, Midas Gold worked with its engineering consultants to develop a weighted, qualitative scoring system that considered key design criteria and design considerations discussed herein. A summary of the results of the analysis is provided in Table 6.

The results indicate that the Old Town and Scout Ridge Sites are strongly preferred for ore processing facilities; they also appear to be preferred for very similar reasons. This is not surprising given their close proximity and similar orientation to the topography, open pits, rivers, etc. Similarly, the PEA and SMI Mill Sites score poorly for very similar reasons, which is also not surprising given that those sites occupy much of the same terrain. The primary challenges for the latter sites are associated with their encroachment into undisturbed areas and wetlands, difficulties with site water management, geologic and avalanche hazards, and foundation conditions.

Table 6, Site Layout Alternatives Assessment Scoring Summary

Layout Criteria	Weighting of Criteria	Layout Scoring Summary			
		PEA Site	Old Town Site	Scout Ridge Site	SMI Mill Site
Safety Considerations	15%	9%	13%	12%	5%
Environmental, Permitting & Social Considerations	25%	10%	20%	19%	15%
Operational Flexibility Considerations	10%	7%	6%	6%	5%
Capital Expenditure (**CAPEX**) Considerations	30%	16%	29%	29%	16%
Operating Expenditure (**OPEX**) Considerations	20%	13%	19%	19%	18%
Totals	**100%**	**55%**	**87%**	**85%**	**60%**

The results support the recommendation that the PEA Site and SMI Mill Site be eliminated from further consideration as potential ore processing plant sites. Further, it is recommended that future optimization of the Project focus on a layout that utilizes both the Scout Ridge and Old Town sites terrain, as it would seem logical that an optimized design that utilizes both parcels could be developed. For example, the Scout Ridge Site is preferred for heavy vibrating equipment such as crushers and grinding mills due to the presence of robust outcropping bedrock; whereas the Old Town Site is generally flatter terrain and is preferred for buildings that do not need to be founded on bedrock, such as warehouses, maintenance shops, administration and other ancillary infrastructure. The final ore processing facilities layout is provided in the PRO.

RESTORE THE SITE

8.6 ONSITE INFRASTRUCTURE

Mine operations need support facilities that include maintenance shop, offices, warehousing and outside storage areas, first aid and safety related facilities, equipment and worker parking, fuel storage and water supply facilities, explosive storage[18] and housing[19].

Similar to the location of the ore processing facility, the location of the mine support facilities should be centralized to provide convenient access to the mining areas and to reduce the Project footprint. The general criteria for locating mine support facilities are the same as for the ore processing facilities, which include:

- Placement on areas of previous disturbance;
- Compact layout to reduce incremental disturbance; and,
- Avoidance of important environmental resources, such as Waters of the U.S.
- Placement on property owned by Midas Gold;
- Placement on relatively level ground to avoid extensive earthmoving;
- Avoidance of potential resource areas that could be mined in the future; and,
- Avoidance of areas appropriate for tailings and development rock placement.

Since it was determined that the Scout Ridge Site was better suited for ore processing facilities, along with some administrative and storage facilities, the choice for mine support facilities (maintenance shops and equipment parking) was between the PEA Site and the SMI Mill Site. These sites generally meet the criteria of being Midas Gold owned, relatively level, previously disturbed areas in the valley bottom of the EFSFSR centrally located among the proposed mining areas (see Figure 9).

For similar reasons as those discussed in Section 8.5, Midas Gold decided that SMI Mill Site was better than the PEA Site for the mine support facilities (excluding employee housing and an explosive storage area – both of which should be remote from the maintenance and ore processing facilities) due to the considerably greater legacy disturbance at the SMI Mill Site and the extensive forested wetlands at the PEA Site. The exact placement of the facilities can be finalized as part of the design work for the PRO.

8.7 DEVELOPMENT ROCK MANAGEMENT

Development rock is unmineralized or uneconomic mineralized rock excavated during mining to access ore. Development rock removal is an integral part of mining operations and, once removed from the mine, this material must be used for restoration or construction activities or stored in stable and suitable sites. To meet its purpose and need for the Project, Midas Gold must be able to remove, handle and have adequate capacity for approximately 350 million tons of development rock over the proposed life of the Project.

[18] Explosive storage is also a mine support facility, but this facility must be remote from other facilities and conform to the requirements of the Mine Safety and Health Administration (**MSHA**). Once facilities, roads, tailings and development rock storage areas are determined, the siting of the explosive storage area can be made.

[19] Given its location, the Project will need on-site housing for contractors and Midas Gold workers; a housing facility should be located remote from the operational areas, including ore processing and mine support facilities, to limit noise impacts to the housing facility, where workers will rest and sleep. Contractor and employee housing is discussed in Section 8.13.

8.7.1 Types of Development Rock Storage Facilities

The types of development rock storage facilities that most mining operations develop and manage are summarized as follows:

1. **Surface Storage** – The most common approach to managing development rock is to develop storage facilities on the surface in close proximity to pit areas, as long as the location does not have unacceptable environmental impacts, does not interfere with ore production, or does not occur in areas where future mining or the possibility of future mining exists. For mining operations with multiple pits, which is the case for this Project, it is common to have multiple storage facilities, each in proximity to its source pit.
2. **In Pit Storage** -- When mined-out pits are available and nearby, direct backfilling into mined-out pits can be advantageous to both limit future disturbance and to restore pre-mining topography and possibly streams. The primary limitations of pit backfilling are that it must be shown to be a geochemically and environmentally appropriate alternative; it must not interfere with ongoing ore production; and it must not occur where future mining, or the possibility of future mining, exists.
3. **Construction Material** -- Development rock from a mining operation can have beneficial uses as construction material (e.g. for tailings embankment construction). If there are areas where development rock can be used for appropriate construction projects, assuming appropriate geochemical characterization of the material confirms its suitability, it may be cost-effective to haul this material further to avoid developing a quarry that would create additional site disturbance.
4. **Underground Storage** – For underground mining operations, a common method of development rock storage is in mined-out underground workings. Often the development rock is crushed and mixed with cement to make a high-strength structural material that could facilitate mining above, below and adjacent to mined-out underground areas. Although there has been historical underground mining in the District, these old workings cannot be easily or safely accessed, have only a fraction of the volume required for development rock generated by the Project, and most of the historical workings will be mined-out by the Project. Therefore, this method of development rock storage was eliminated from further consideration.
5. **Offsite Storage** – Transporting development rock to offsite storage facilities is not a common management method. This type of method would only be used in extreme cases where no suitable storage was available at site. For the same reasons discussed for transport of tailings in Section 8.3, the off-site transport of development rock does not make environmental, economic or logistical sense; therefore, this alternative was eliminated from further consideration for the Project.

8.7.2 Development Rock Storage Design Considerations

To further constrain the potential development rock storage alternatives, Midas Gold established a list of general design considerations that set physical boundaries and parameters for development rock storage sites. These design considerations are described in the following sections.

8.7.2.1 Avoiding Environmentally Sensitive Areas

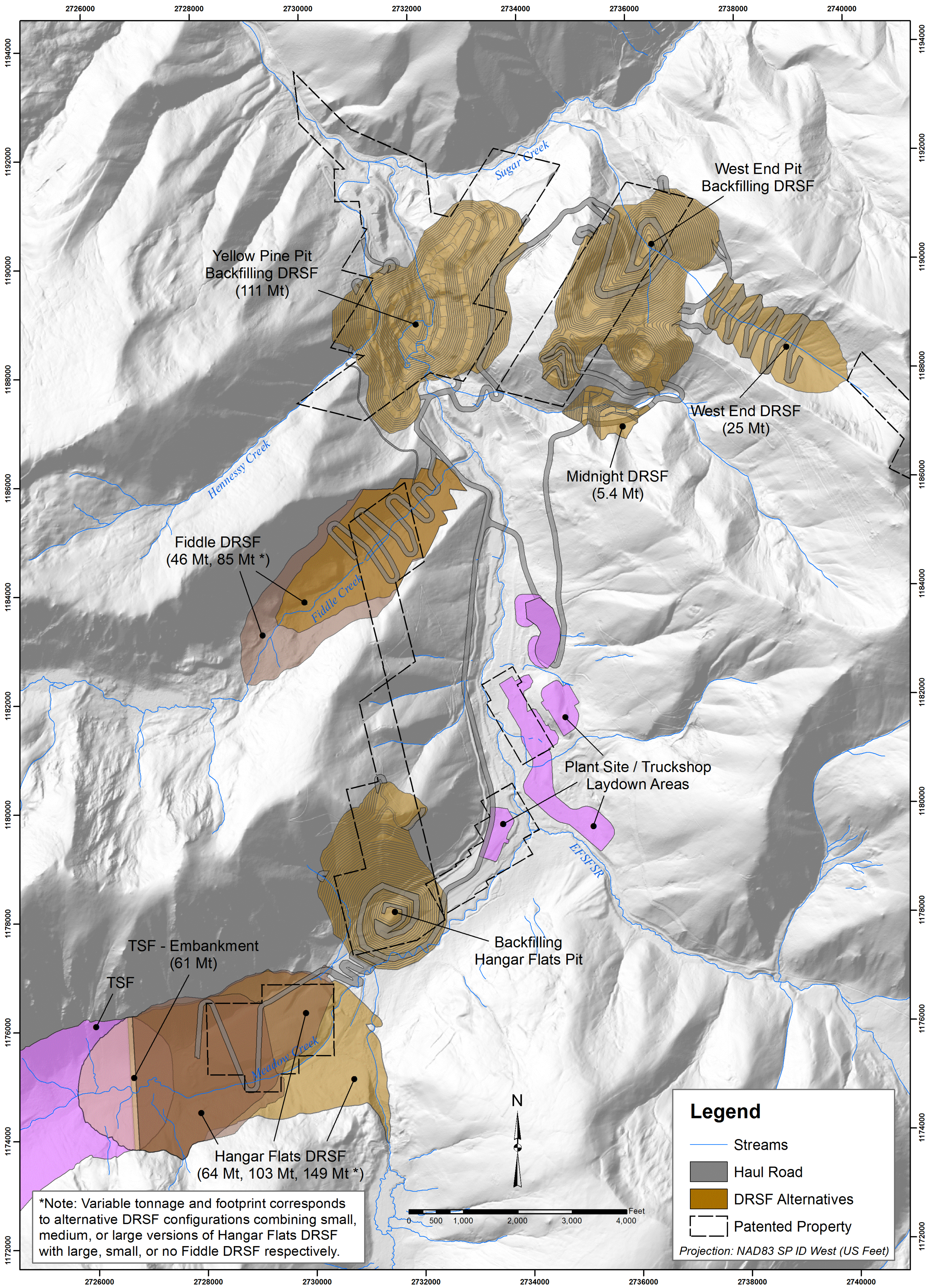
Midas Gold has excluded areas along the main EFSRSR (above and below the proposed Yellow Pine pit area) and in the valley area of the Sugar Creek watershed from consideration for development rock storage to protect the environment in those areas; permit the restoration and enhancement of waterways, fish habitat, and riparian habitat; and continue or restore passage for anadromous fish.

8.7.2.2 Proximity to Pits

Unless there is some beneficial use for development rock (such as use in the construction of a tailings embankment, tailings buttress or road fill), in general, it is strongly preferred to store development rock in close proximity to the pit the material is derived from. Midas Gold recognizes that the further the distance from the open pits, the greater the costs for haul road infrastructure, transport logistics, air emissions, environmental controls and reclamation, and energy required for development rock transport. To minimize these factors, Midas Gold selected a search zone for development rock storage within a distance of approximately one mile from each of the three open-pits. If suitable areas cannot be found within the 1-mile distance criteria, then Midas Gold would expand the search area as necessary.

In general, this design consideration favors development rock storage facilities (**DRSFs**) located in the Fiddle valley (for the Yellow Pine pit); the West End valley (for the West End pit development rock not used to backfill the Yellow Pine pit), and downslope of the TSF embankment to form a buttress to the TSF (for the Hangar Flats pit). The majority of the West End development rock will, however, be used to backfill the Yellow Pine pit, thereby allowing the re-establishment of the EFSFSR to a configuration comparable to the pre-mining conditions, and the permanent and sustainable restoration of anadromous fish passage to the headwaters of the EFSFSR and its tributaries. Figure 10 illustrates some alternative sizes for DRSFs located in these areas based on preliminary mine planning done to support the PFS.

Figure 10, Development Rock Storage Alternatives



8.7.2.3 Maximizing Restoration Opportunities

Midas Gold also screened development rock placement options based on their potential to enhance restoration opportunities, with a particular focus on anadromous fish. From the restoration perspective, it was apparent that placing development rock from West End mining in the Yellow Pine pit and placing Yellow Pine development rock in the lower Fiddle valley would both have positive results. These two alternatives would allow restoration of the EFSFSR channel to its pre-mining profile, restoration of anadromous fish passage to the headwaters of the EFSFSR and its tributary (Meadow Creek), reduce the size of the other DRSFs and thereby maximize the length of Meadow Creek that can be rehabilitated to support salmon redds, spawning and habitat.

Were a "no backfill" alternative to be selected for the Yellow Pine pit, this would prevent restoration of the EFSFSR channel to a gradient that supports upstream fish passage, increase the footprint of other DRSFs on site, and result in the creation of a larger pit lake in the main stem of the EFSFSR. Furthermore, the alternate location for West End development rock would likely be at the Hangar Flats DRSF, negatively impacting the economics of the West End deposit (due to the longer haul), potentially rendering all or a part of that deposit uneconomic, and reducing the overall Project returns below the required threshold. As a result, not backfilling the Yellow Pine pit with West End development rock does not meet Midas Gold's purpose and need to optimize site restoration, restore anadromous fish passage, reduce the Project footprint, optimize resource extraction and provide an economic return.

Similarly, were the Fiddle area to be rejected as an alternative DRSF, Yellow Pine development rock would have to be placed in the next most likely location, the Hangar Flats DRSF, negatively impacting the economics of the Yellow Pine deposit, increasing the size of the Hangar Flats DRSF and thereby consuming valuable future salmon spawning grounds and habitat in Meadow Creek, and reduce wetland and riparian habitat available for restoration. A slight positive for a larger Hangar Flats DRSF would be increased buttressing of the TSF; however, since the buttress is already much larger than required in any foreseeable circumstances, this benefit is outweighed by the negative implications.

8.7.2.4 Avoid Rehandling

Moving development rock presents a substantial cost to a mining operation. The handling of development rock more than once (known as "rehandling") typically has substantial negative impacts to the Project economics; rehandling also increases dust emissions, diesel consumption and associated air emissions. Development rock storage areas should be appropriately designed to form permanent features on the landscape once placed.

Given the planned sequencing of the mine pits at the Project, it will be possible to backfill the Yellow Pine pit from development rock removed from the West End pit, but neither the West End pit nor the Hangar Flats pit can be feasibly backfilled without rehandling substantial quantities of development rock, which would have substantial negative impacts on the Project economics and reduce the return on investment for the Project below the required thresholds; this would not meet Midas Gold's purpose and need for a reasonable return on its investment in the Project.

8.7.2.5 Areas of Known and Potential Mineralized Zones

Midas Gold has identified a number of exploration prospects and, although the actual occurrence of a substantial surface minable mineral resources has not been confirmed at this time in these areas, it is prudent to avoid "sterilizing" such areas by placing development rock over them to potentially preclude future evaluation and extraction. However, Midas Gold has not identified any obvious potential development rock storage areas that were specifically excluded from consideration on the basis of known or potential mineralized zones.

8.7.2.6 Development Rock Haulage Profile

In general, it is desirable to design development rock (and ore) haul routes such that loaded trucks haul in a downward gradient, and empty trucks have an upward gradient; this type of haulage profile has trucks operating at their most efficient speed, with the highest fuel efficiency and least greenhouse gas and other air emissions, and the smallest truck fleet. It is important to consider this principle in identifying efficient DRSFs. To aid in reducing the number of potential DRSF sites, Midas Gold established a haulage elevation target of 500 feet (or less) above the haul road exit point from the pit as the upper bound for development rock haulage. Midas Gold recognizes the need for a certain amount of flexibility with the elevation criteria, but haulage logistics above 500 feet certainly increase technical complexity and both capital and operating expense.

While the upper Fiddle Valley area has sufficient capacity to store a substantial amount of development rock, this site is above the 500-foot haulage elevation (as well as outside the one-mile distance limit and located outside area of past mining disturbance). Further, the upper Fiddle area is in a Forest Service Inventoried Roadless Area, and one of Midas Gold's criteria is to minimize disturbance on such Roadless Areas. Since there are other locations for development rock placement in the Project area, including the lower Fiddle valley area, the upper Fiddle Valley has been eliminated from further consideration.

8.7.2.7 Areas of Previous Disturbance

The Meadow (Hangar Flats), lower Fiddle Valley, and the West End sites, along with the backfill of the Yellow Pine pit area, are sites within the Project area that have been disturbed by past mining operations, and are considered appropriate for development rock placement. Combined, they have the capacity to contain 350 million tons of development rock.

The potential development rock placement sites in Hennessy, Midnight, Blowout and EFSRSR above the confluence with Meadow Creek have limited or no areas of past mining disturbance; therefore, these sites were excluded from consideration for development rock placement.

8.7.2.8 Geotechnical Considerations

Midas Gold also screened potential DRSFs on the basis of geotechnical considerations, including foundation conditions (avoiding weak or saturated soils), DRSF stability, and potential impact of a run-out failure and mitigation thereof. In general, taller and steeper facilities on steep, wet, and/or unstable terrain present the highest risk of geotechnical failure as well as the longest potential runout[20] distance.

In evaluating the various DRSFs, the Hangar Flats DRSF location was judged to have the lowest geotechnical concerns as it lies in a flat valley bottom with a considerable horizontal offset distance between the DRSF and the Hangar Flats pit. In the unlikely event of a slope failure, runout would be limited to relatively flat terrain in the valley bottom, and would not reach the pit. Furthermore, during operations, the groundwater levels under the Hangar Flats DRSF would be lower than pre-mining

[20] "Runout distance" is the distance away from a facility to which the products (water, mud, tailings, loose rock, debris etc.) of a failure of the facility would travel.

conditions due to the combined effects of the lined TSF located upstream and the Hangar Flats pit-dewatering system located downstream, eliminating concerns with foundation saturation.

The other valley locations evaluated were considered to pose greater geotechnical risks than Hangar Flats, due principally to terrain steepness. Fiddle DRSF is relatively high and located in moderately steep terrain; West End DRSF lies on similarly steep terrain, and a instability could disrupt mining operations. These concerns can be mitigated by proper design and operation of the Fiddle and Meadow DRSFs, particularly by limiting the steepness of the downstream face. The upper East Fork of Meadow Creek (**Blowout Creek**) valley is relatively flat, but is underlain by deep, largely saturated glacial till, alluvium, and colluvium. Its position in a hanging valley also precludes buttress construction if instability occurs, and makes a long slide runout reaching Meadow Creek possible. The Midnight location has the greatest potential for instability, as it lies atop a historical landslide – a concern only mitigated by the limited height of the Midnight facility. If the Blowout and Midnight locations had not already been eliminated from consideration based on their lack of prior disturbance, they would be eliminated based on their potentially unstable foundation conditions.

In-pit backfills have stability concerns due to height and steepness and the potential for runout to endanger workers and disrupt pit operations. Backfilling an inactive pit is thus preferred to an active one, making Yellow Pine a preferable backfill location over the Hangar Flats or West End pits, which will be mined last in any event and thus have no logical rock source for backfill.

The Hangar Flats, lower Fiddle, and the West End sites, along with backfilling the Yellow Pine pit, are either of limited concern for geotechnical issues, or concerns are readily addressed by proper design and operations, and thus are appropriate for development rock placement. The Midnight and Blowout sites were eliminated from consideration due to potentially unstable foundation conditions, and backfilling either of the active West End or Hangar Flats pits is both precluded by the mining sequence and is less preferred than backfilling the inactive Yellow Pine pit.

8.7.3 Development Rock Alternatives Assessment Conclusions

Midas Gold proposes to develop DRSFs that are safe, efficient, maximize restoration opportunities, minimize new disturbance, while being economic to develop and operate. Numerous DRSF locations were identified in the vicinity of the proposed Project that, when combined, have the capacity to store the tonnage of development rock from the Project. Where feasible development rock storage facilities designs were generated, they are shown on Figure 10. Provided below is a discussion on each of the DRSFs that were considered as part of the alternative assessment process:

- **TSF Embankment (as construction material):** The TSF embankment requires more than 60 Mt of rockfill. This is very productive use for development rock as it precludes the need to develop one or more borrow areas to provide the necessary rock fill. Consequently, Midas Gold proposes to use development rock from both the Yellow Pine and Hangar Flats pits for TSF embankment construction.
- **Blowout Creek Valley:** This hanging valley is the site of a former water reservoir and, while it has appreciable potential development rock storage capacity, the area has abundant wetlands, it is relatively unimpacted by mining activities in the upper portion of the valley, and its high elevation makes haulage cost prohibitive; consequently, this area was excluded from consideration for development rock storage.
- **West End Valley:** West End Valley is immediately east and upslope of the West End pit. The valley has been used for development rock storage in the past and it is feasible to expand the

existing DRSF. The valley has limited storage capacity; based on the mine planning completed for the PFS, this valley can accommodate only approximately 25 Mt before the haul distance becomes cost prohibitive. However, this capacity is adequate for mining of the West End pit until the Yellow Pine pit becomes available for backfilling.

- **Midnight Valley:** Midnight Valley is due south of the West End pit. Haul roads were developed and operated across this valley in the 1980s and 1990s to support mining the West End area. However, the valley has limited storage capacity relative to the amount of disturbance that would be required; moreover, based on the shape of the West End pit, hauling to backfill the Yellow Pine pit is much more efficient. The potential DRSF site in Midnight Valley also lies atop a historical landslide. Consequently, this valley was excluded from consideration for development rock storage.
- **Yellow Pine Pit:** As discussed in Section 6, the Project development plan must include the ability for fish to naturally migrate upstream from the current blockage in the EFSFSR. In order for this criterion to be met, the Yellow Pine pit must be partially or fully backfilled. Given that the terrain around the West End pit is constrained with appropriate, proximal development rock storage areas, that the West End development rock is geochemically suitable[21] for backfilling, and that the West End pit is mined last, development rock from West End is an appropriate solution to backfill the Yellow Pine pit. Based on the mine planning completed for the PFS, the Yellow Pine pit can accommodate the balance of the development rock from West End pit (approximately 111 Mt) that cannot be stored in the West End DRSF.
- **Hennessy Valley:** The Hennessy Valley is due west and upslope from the Yellow Pine pit. The lower portion of this valley is heavily impacted by historical mining and will be mined as part of the Yellow Pine pit; the upper portion of the valley, where there is potential to store development rock, is relatively unimpacted by historical mining. While this valley is close to the Yellow Pine pit, it is a very steep valley with minimal storage capacity and a long vertical climb to get there; consequently, it was excluded from consideration for development rock storage.
- **Fiddle Valley and Hangar Flats (Meadow Valley):** Fiddle Valley is the most proximal area of appreciable storage capacity to the Yellow Pine pit; similarly, Meadow Valley is the most proximal area of appreciable capacity to the Hangar Flats pit. Both areas are heavily impacted by previous mining activity. However, they differ in terms of their wetlands footprints, and their future productivity in terms of fish habitat. Numerous design iterations were completed to minimize impacts to existing wetlands and haul distances, while maximizing anadromous fish habitat; Figure 10 illustrates three of those iterations with storage capacities of 149, 103 and 64 Mt for the Hangar Flats DRSF and 0, 46 and 85 Mt for the Fiddle DRSF. Ultimately, the size of the two DRSFs that yielded the optimal combination of factors was the small Meadow Valley DRSF (64 Mt) and the large Fiddle Valley DRSF (85 Mt) as it maximizes preservation of anadromous fish habitat.
- **Hangar Flats and West End Pits:** While it is possible to store development rock in both of these pits, the mine plan necessitates that these pits be mined late in the mine life, and because their

[21] West End development rock is high in carbonate, which provides buffering to any sulfide minerals present in the Yellow Pine pit walls, thereby negating the already-low potential for acid rock drainage to affect groundwater within the backfill.

shapes are conical, there is little opportunity to backfill these pits without rehandling development rock at considerable cost.

Based on the preceding alternative assessment, the following development rock storage areas will be included in the Project PRO:

- TSF embankment construction;
- Hangar Flats (Lower Meadow Valley; also serves as buttress for the TSF embankment)
- Lower Fiddle valley;
- West End Valley; and
- Backfilling of Yellow Pine pit.

Similarly, the following areas will not be used for development rock storage:

- Sugar Valley;
- EFSFSR Valley;
- Hennessy Valley;
- Midnight Valley;
- Upper Fiddle Valley
- Blowout Valley;
- West End pit; and
- Hangar Flats pit.

8.8 EFSFSR WATER MANAGEMENT

In 1938, the Bradley Mining Company (**BMC**) diverted the EFSFSR from its natural valley-bottom alignment into surface channels to facilitate open pit mining operations in the valley bottom in the area of the currently proposed Yellow Pine pit. Later, in 1942, BMC installed a tunnel oriented along the east side of the valley to divert the EFSFSR into Sugar Creek. When open pit mining ceased, the upstream portal of the BMC tunnel was backfilled and flow from the EFSFSR reported to the mined-out open pit, where it formed a small lake that is often locally referred to as the “Glory Hole.” As a result of the design of the initial diversion channel, the later use of a diversion tunnel, the subsequent steepness and unstable nature of the highwall of the pit, the continuing erosion of development rock dumps over which the EFSFSR flows into the pit, and coarse boulders comprising the current waterway, the BMC surface diversion, tunnel and finally the Glory Hole have acted as blockages to anadromous fish passage since 1938.

To mine and then backfill the Yellow Pine pit, which is largely in the same footprint as the BMC open pit, Midas Gold proposes to route the EFSFSR around the proposed pit area. Midas Gold considered three alternative water management methodologies to manage the EFSFSR flows:

- Surface channel;
- Pipeline; or,
- Tunnel.

The following sections describe and present the advantages and disadvantages of each of these alternative water management methodologies.

8.8.1 Surface Channel

To manage the EFSFSR flows via a surface channel, and undertake concurrent mining operations in the Yellow Pine pit, the surface channel would have to be constructed on a bench of the open pit mine. While possible, this approach would undoubtedly negatively impact open-pit development and operations by requiring a wide bench to accommodate the channel and maintenance access to it, and the channel would have to be moved multiple times to accommodate the sequential expansion of the open pit. The channel would have to be designed to handle the high runoff that comes during the spring season in the mountainous terrain of Idaho, with additional safeguards for potential extreme storm events. Preventing runoff and sediment from the open pit walls from entering the EFSFSR channel would require that an interception channel above the EFSFSR channel would be required, which presents additional substantial logistical challenges given the steep terrain.

Such a channel would have to be fitted with a low-permeability liner system to prevent seepage into the underlying rock strata since such seepage could create open pit highwall instability, which would be an unacceptable safety risk for the people operating equipment below the channel. In addition, instability of the highwall would impact water and fish in the EFSFSR channel, and potentially fill the open pit with water in the event of a failure. It is expected that the Mine Safety and Health Administration (**MSHA**), the U.S. federal government agency that oversees mine safety, would not allow such an open channel, given its inherent safety risks to miners and equipment working in the mine below such an open channel, unless the open pit were greatly reduced in size, which would be economically devastating to the Project.

Lastly, open pit highwalls are typically designed and excavated at factors of safety that are lower when compared to those applied to other water management structures, like dams, tunnels, channels, etc. The rationale for the lower factors of safety for mine pits is that mine pits are temporary excavations that are monitored using an intricate system of deformation-monitoring equipment; if movement is detected, people and equipment can be notified and moved to safety then be remobilized once movement has either occurred or ceased. In the case of a diversion channel, this would not be a feasible scenario as failure of the EFSFSR channel would be an unacceptable outcome; therefore, the entire open pit would have to be designed with different factors of safety associated with the channel, and the pit would likely increase in footprint and strip ratio, but the amount of ore mined would likely be less, resulting in substantially negative economic consequences to the Project. The increase in the pit footprint and loss of ore would be further exacerbated by the additional width required for the channels on the pit wall.

Finally, given the frequent relocation of the surface channel, changing conditions along such a channel and potential impacts on it from adjacent mining, it is doubtful that anadromous fish would migrate upstream along such a channel. As a result, a surface channel does not meet Midas Gold's purpose and need with respect to safety, environmental protection and sustainable migration of anadromous fish upstream.

8.8.2 Pipeline

A pipeline system would have many of the same design features and technical challenges as an open channel. There would be similar logistical concerns and factor of safety issues for a pipeline system as for an open channel, and the pipeline would have to be sized to handle spring high flows and storm events, which probably means that multiple pipelines would be required.

A pipeline would have some distinct advantages over an open channel as it would not require a runoff and sediment interception channel upstream of the EFSFSR channel, the pipeline would not likely require as much terrain as an open channel, and a pipeline would not have to have a constant downward gradient as it could have some segments that are under pressure and have an upward gradient. However, while a surface channel could theoretically be designed to facilitate upstream fish passage, a pipeline would not be conducive to fish passage and would therefore prevent a resumption of fish passage to the headwaters of the EFSFSR until after mine closure. As a result, placing the EFSFSR into a pipeline does not meet Midas Gold's purpose and need with respect to safety, environmental protection and sustainable early migration of anadromous fish upstream.

8.8.3 **Tunnel**

Midas Gold assessed two different alignments for a tunnel to manage the EFSFSR around the Yellow Pine pit: one alternative was an alignment on the east side of the valley; the other alternative considered the west side of the valley. Midas Gold concluded that the west side of the valley was the preferred alternative in order to avoid potential impacts to Sugar Creek, which has sensitive salmon spawning habitat. Discharging much larger volumes of water carried by the EFSFSR into the much lower flows of Sugar Creek would likely affect water quality and stream stability, and negatively impact both fish migration and fish habitat.

Using a tunnel to manage EFSFSR flows differs appreciably from a channel or a pipeline as it separates the EFSFSR water management from mining activities, which means the tunnel could be constructed before mining activities are started. A tunnel also has a number of other advantages including:

- It is constructed in rock, which is better able to withstand erosive forces associated with extreme storm events;
- It can be designed at a constant and shallow gradient suitable for fish passage due to longer path length as compared to a pipeline or surface channel;
- It would provide cooler water temperatures, which would benefit fisheries, since the current drainage is poorly vegetated and poorly shaded, resulting in higher water temperatures than desirable during summer months.
- A tunnel can be readily fitted with a low-flow channel that allows upstream and downstream fish passage even under low-flow conditions. The low-flow channel design also allows for regular inspection and maintenance of the tunnel;
- A tunnel would reduce pore water pressures and increase geotechnical stability of the open pit highwall, versus the other water management approaches that could negatively impact geotechnical stability;
- Since a tunnel and surface mining are not linked, a tunnel does not increase the footprint of the pit, nor does it negatively impact the amount of ore mined or appreciably add to the development rock mined; and,
- A tunnel provides much more flexibility in terms of the ability to backfill the Yellow Pine pit to restore the EFSFSR to the approximate gradient that existed prior to historical mining, enabling fish to naturally migrate up-river to the headwaters of the EFSFSR and Meadow Creek past the current blockage. Restoration of the EFSFSR across the backfilled Yellow Pine Pit would reestablish connectivity to the headwaters that has not existed since 1938. Once the EFSFSR is restored post-backfilling of the Yellow Pine pit, the entrances to the new tunnel would be sealed to prevent water flow and access by the public.

The primary disadvantage of a tunnel is economic; it is the most expensive approach to managing water around the Yellow Pine pit. However, this extra expense is warranted by the many positive aspects of the tunnel as identified above. As a result, a tunnel best meets Midas Gold's purpose and need with respect to safety, environmental protection and sustainable early migration of anadromous fish upstream and is therefore the preferred alternative.

8.8.4 EFSFSR Water Management Alternative Assessment Conclusions

The EFSFSR water management alternative assessment identified three alternatives for managing the EFSFSR flows around the Yellow Pine open pit: a surface channel, one or more pipelines, or a tunnel. The safest and most technically and environmentally sound alternative was determined to be installation of a tunnel on the west side of the Yellow Pine pit; consequently, this alternative will be included in the Stibnite Gold Project PRO as the preferred alternative.

8.9 FISH PASSAGE DURING OPERATIONS

As full restoration of the EFSFSR channel will occur after the mining and backfilling of the Yellow Pine pit, Midas Gold investigated alternatives for fish passage during mine operations. A diversion tunnel was identified above as the preferred EFSFSR water management alternative, over channel and pipeline alternatives, in part because a tunnel separated from mining activities has a greater likelihood of successful fish passage. Open channel and pipeline alternatives are therefore not discussed further in this section. Three fish passage alternatives during the operational phase were identified:

- No fish passage during operations;
- Trap and truck fish around the Yellow Pine pit, releasing them upstream; or,
- Design the diversion tunnel to facilitate fish passage.

The following sections present the advantages and disadvantages of each alternative fish passage approach.

8.9.1 No Fish Passage during Operations

Foregoing fish passage until the EFSFSR is reestablished across the Yellow Pine pit backfill would be the lowest-cost alternative. It would also simplify water and sediment management activities and stream restoration construction in the upstream area as there would be fewer seasonal restrictions on in-stream work and temporary works would not have to consider anadromous fish passage in their design. However, delaying fish passage contradicts Midas Gold's intention to restore the site from legacy-mining impacts early in Project life, and may cause unacceptable negative impacts on the existing salmon runs that are sustained by the present trap/truck transfer program. Midas Gold believes that fish passage should be provided during operations to develop and maintain a sustainable anadromous population in the Meadow Creek drainage that is able to migrate up and downstream of its own volition, and prefers an alternative that allows this.

8.9.2 Trap and Truck

Idaho Department of Fish and Game (**IDFG**) presently takes running salmon from two traps on Johnson Creek and the South Fork of the Salmon River, and transports them by truck to the IDFG fish hatchery in McCall for propagation. When surplus fish are available from the hatchery program (not all years), they are transported by truck and released in lower Meadow Creek. This program has been somewhat successful, with both spawning and juvenile salmon being observed in Meadow Creek. However, while juvenile salmon can travel downstream, spawning adults are not able to swim back upstream in the EFSFSR due to the blockage presented by the Glory Hole.

The trap and truck program is labor-intensive, and requires additional light-vehicle traffic through the mine property, via a route that is intended to be closed to the public during operations for safety reasons. It has also not been determined whether trapping and trucking salmon would be more or less successful than a tunnel solution, in terms of numbers of fish successfully spawning in Meadow Creek. While truck transfer of fish through the Project area is a proven solution, the fish so transported are not naturally from this area and, as a result, Midas Gold prefers to develop a solution that minimizes traffic through the Project area and that does not require active, ongoing human intervention to support fish passage. Rather, Midas Gold prefers a solution that allows fish to move naturally up and downstream along the EFSFSR without human intervention.

8.9.3 **Tunnel**

Fish passage through the EFSFSR tunnel requires the addition of a low-flow channel in the floor of the approximately 15-foot wide tunnel, along with resting pools and engineered habitat structures to ensure proper depth and velocity for fish passage over a range of flow rates. Lights would be needed within the tunnel to simulate natural daylight. Together, the required upgrades increase the cost of the diversion tunnel, but allow fish passage during operations while not increasing vehicle traffic within the Project area, and assure continuous uninterrupted fish passage unconstrained by a trapping/truck transfer schedule. Further, it allows local fish to return to their own spawning grounds, a more natural outcome than trucking fish from other drainages. Fish passage through a tunnel of this length has a limited number of precedents, so Midas Gold will undertake adaptive management practices, such as changes to the lighting scheme and entrance/exit water levels, based on observed fish behavior.

Tunnel passage does not preclude truck transfer as a supplemental method, particularly while the details of the tunnel lighting scheme and entrance/exit structure water levels are being refined. While more study is required to establish key design dimensions for the low-flow channel and details of the habitat structures and lighting system, work done to date suggests that tunnel fish passage is feasible.

8.9.4 **EFSFSR Operational Fish Passage Alternatives Assessment Conclusions**

The EFSFSR operational fish passage alternative assessment identified three alternatives for providing fish passage around the Yellow Pine open pit during operations: delaying fish passage until closure, trapping and trucking fish for release upstream, or enhancements to the EFSFSR tunnel to facilitate fish passage in the tunnel. Delaying fish passage until closure does not meet Midas Gold's environmental sustainability goals, and was rejected on that basis. Of the other alternatives, Midas Gold prefers to provide fish passage via an engineered channel within the EFSFSR tunnel, as this allows for uninterrupted fish transit, supports fish returning to their own spawning grounds, limits the need for ongoing human intervention, and does not increase traffic through the Project area. Trap and truck transfer is a proven method that Midas Gold also finds acceptable, and expects will be needed to establish a returning population in Meadow Creek and as a supplemental method during tunnel construction and initial operations until a sustainable salmon run is established.

In the event the tunnel is administratively unacceptable or proves ineffective at passing upstream migrating fish, well established techniques such as capture and haul are available to provide fish passage upstream during operations until the final reclamation of the Yellow Pine Pit and completion of the newly constructed surface channel for the EFSFSR across the backfilled pit. These techniques support an adaptive management strategy to help achieve the goal of opening the upper EFSFSR basin to anadromous fish passage.

8.10 BLOWOUT CREEK WATER & SEDIMENT MANAGEMENT

The East Fork of Meadow Creek (**EFMC**) is commonly and locally known as “Blowout Creek”. The name “Blowout Creek” results from a past (1966) water dam failure in the upper EFMC watershed, which resulted in: substantial incising, head-cutting and erosion of the EFMC; a substantial drop in the water table and impairment of the wetlands in the EFMC valley; failure of several downstream bridges; and massive initial and ongoing turbid flows into the EFSFSR water system.

Following the failure, limited restoration efforts between the 1980s, and 2000s occurred by multiple parties with the goal of rehabilitating Blowout Creek from the water dam failure. Such efforts included episodes of willow plantings and woody debris placement on eroded slopes within the incised erosional cut; however, the watershed continues to introduce substantial sediment loading to Meadow Creek and to the EFSFSR due to ongoing erosion within the gully, the alluvial fan created by the failure, and continuing head-ward erosion in the upper meadow. This sediment degrades the quality of the gravels for salmon redds in Meadow Creek and adds sediment into the EFSFSR below its confluence with Meadow Creek. In addition, the head cutting in Blowout Creek has resulted in the water table falling by more than 14 feet in the valley above the failed dam, substantially impairing and degrading the quality and functionality of approximately 30 acres of wetlands in the EFMC valley.

Midas Gold proposes to restore natural fish passage upstream of the Yellow Pine Pit (see Section 8.8), and the most productive (historically) fish habitat upstream of the current EFSFSR blockage is in lower Meadow Creek. Solving the fish passage challenge without providing suitable habitat upstream of the blockage would yield marginal ecological benefits; consequently, Midas Gold developed alternatives for decreasing fine sediment generated by Blowout Creek to improve the fish habitat in lower Meadow Creek. The following alternatives were considered, not all of which are mutually exclusive:

1. **Sediment Pond:** Construct one or more sediment ponds downstream of the incised Blowout Creek channel and upstream of the confluence with Meadow Creek. The sediment ponds would be designed to settle suspended solids in Blowout Creek and thereby reduce fine sediment from inundating lower Meadow Creek.
2. **Armor Blowout Creek:** Armor Blowout Creek with large riprap to prevent further erosion of the invert of the creek, and layback (flatten) and armor the valley side-slopes adjacent to the armored segment to reduce sediment reporting to the creek.
3. **French Drain:** Install a French drain in the incised segment of Blowout Creek to convey flows from the Blowout Creek valley to lower Blowout Creek and install a barrier upstream of the rock drain to raise the water table in Blowout Creek valley.
4. **Pipeline:** Install a surface or shallow-buried pipeline with an intake near the former dam location and outlet near Meadow Creek, and construct a barrier upstream of the pipeline to raise the water table in Blowout Creek valley.
5. **Meadow Creek Restoration:** Steepen the gradient of Meadow Creek from its current gradient of <0.5% to more than 1.5% increase the flow velocity in Meadow Creek to inhibit suspended fines from Blowout Creek from settling in Meadow Creek.

Table 7 provides a summary of the advantages and disadvantages associated with these five alternatives.

Table 7, Blowout Creek Alternative Assessment Summary

Advantages	Disadvantages
Sediment Pond	
• Conventional, proven solution. • Most cost effective solution. • Excavated material for ponds can be used for Project development borrow source.	• Ponds require regular maintenance to manage sediment buildup, which means more than one pond may be required. • Does not address the root causes of the sediment problem (i.e. bank erosion and head cutting). • Not a suitable long-term or closure solution. • Does not support restoration of wetlands and riparian habitat in the Blowout Creek valley. • Subject to re-suspension of sediment in a high run-off event, where collected sediment could be washed downstream.
Armor Blowout Creek	
• Addresses root cause of the majority of sediment (i.e. incised segment of Blowout Creek). • Allows fish to migrate from upper Blowout Creek to Meadow Creek. • This approach does not preclude the ability to also address the upper Blowout Creek head cutting separately. • Long-term solution.	• Does not address head cutting in upper Blowout Creek. • Appreciable earthworks required for stable layback of incised chute segment of Blowout Creek. • Large diameter boulders required for stable channel bottom and could be challenging to install in narrow valley bottom. • Does not support restoration of wetlands and riparian habitat in the Blowout Creek valley. • Expensive.
French Drain	
• Addresses root cause of the source of sediment in upper and incised segments of Blowout Creek. • Most effective alternative in minimizing sediment to Meadow Creek. • Supports restoration of wetlands and riparian habitat in the Blowout Creek valley. • Good long-term solution. • Top of French drain can form robust creek bottom once French drain is closed.	• Appreciable quantity of large diameter rocks required to construct French drain, which implies a large external borrow area or special handling of development rock from the open pits. • Prevents fish from migrating from upper Blowout Creek to Meadow Creek until surface channel is established. • Difficult to prevent surface water from ultimate channel from entering French drain. • Expensive.

Advantages	Disadvantages
Pipeline	
• Addresses the root cause of the source of sediment from the head cutting of Blowout Creek. • Likely effective in minimizing sediment to Meadow Creek. • Could install a channel above the pipeline for a good long-term solution. • This approach does not preclude the ability to also address the upper Blowout Creek head cutting separately. • Allows fish to migrate from upper Blowout Creek to Meadow Creek. • Cost effective.	• Does not address the root cause of the source of sediment in the incised segment of Blowout Creek. • Not a good long-term solution unless combined with another alternative to enable the pipeline to be closed.
Meadow Creek Restoration	
• Avoids disturbing Blowout Creek. • Improves fish habitat in Meadow Creek. • Allows fish to migrate from upper Blowout Creek to Meadow Creek. • Could implement other solutions to address root cause of problems in Blowout Creek at a later time. • Cost effective.	• Does not address the root cause of the source of sediment in upper and incised segments of Blowout Creek. • Does not reduce turbidity of flows from Blowout Creek, which could impair functionality of restoration work in Meadow Creek over time.

Based on the information in Table 7, Midas Gold has concluded that the French drain is the preferred alternative as it is a robust, long-term solution that addresses the root cause of the problems with Blowout Creek. It is the best solution for getting the creek bed to a vertical alignment that is close to the pre-dam failure alignment, and it does not require laying-back the slopes on the incised reach of the creek. It also supports the restoration of wetlands and riparian habitat in the Blowout Creek valley and provides protection for Meadow Creek. Restoration of Meadow Creek, which is a parallel but separate activity, provides enhanced and sustainable spawning habitat for anadromous fish. The French drain alternative therefore meets Midas Gold's purpose and need for enhanced and sustainable anadromous fish habitat.

8.11 PROJECT ROAD ACCESS

Currently the Project is accessed via three primary routes, originating from the towns of McCall or Cascade, Idaho. Portions of each of these routes would require improvement to accommodate increased Project-related truck traffic, larger vehicles, year-round operations, and elevated environmental protections.

Multiple segments of each access route were analyzed in the engineering design of the Project to address concerns related to transportation of personnel, mine equipment, supplies and ore concentrate transportation. The guiding principles included:

- Reduce travel adjacent to rivers and streams to safeguard water quality in the event of a spill and to reduce dust-related sediment delivery to rivers and streams (which negatively impacts fish habitat and spawning redds);
- Minimize Project footprint, particularly within riparian conservation areas;

- Limit or avoid long-term travel through the community of Yellow Pine and along the settled portions of Johnson Creek;
- Reducing the potential for vehicle-on-vehicle accidents in more heavily travelled areas;
- Reduce the risk of avalanche and landslide hazards to human safety and sustaining operations; and,
- Provide safe, year-round access.

During operations, mine traffic is expected to increase by over 70 average daily trips (ADT). This includes approximately 50 heavy-duty vehicles such as buses, fuel trucks, and supply trucks; and over 20 light duty trucks or vans moving personnel.

The site access alternatives considered were as follows:

- South Fork Route;
- Lick Creek Route;
- Johnson Creek Route;
- Cabin/Trout Creek Route;
- Thunder Mountain Route;
- Riordan Creek Route; and,
- Burntlog Route.

Figure 11 illustrates the various road segments that when combined form the preceding routes. The following sections describe each of these routes.

8.11.1 South Fork Route

Existing year-round access from State Highway 55 to the community of Yellow Pine and then on to Stibnite is known as the "**South Fork Route"**. This route is approximately 85.7 miles and is as follows:

- Northeast from town of Cascade to junction with South Fork Road via two-lane, paved Warm Lake Road (County Road 10-579, Forest Service road (FS) 579) for 25 miles;
- North from junction with Warm Lake Road via single-lane, paved South Fork Road (County Road 50-674, FS 474/674) immediately adjacent to the South Fork of the Salmon River for 32.2 miles;
- East from junction with South Fork Road to community of Yellow Pine via single-lane, unpaved East Fork Road (FS 412) immediately adjacent to the EFSFSR for 14.5 miles; and,
- East from community of Yellow Pine to Stibnite via single-lane, unpaved road (FS 412) immediately adjacent to the EFSFSR for 14 miles.

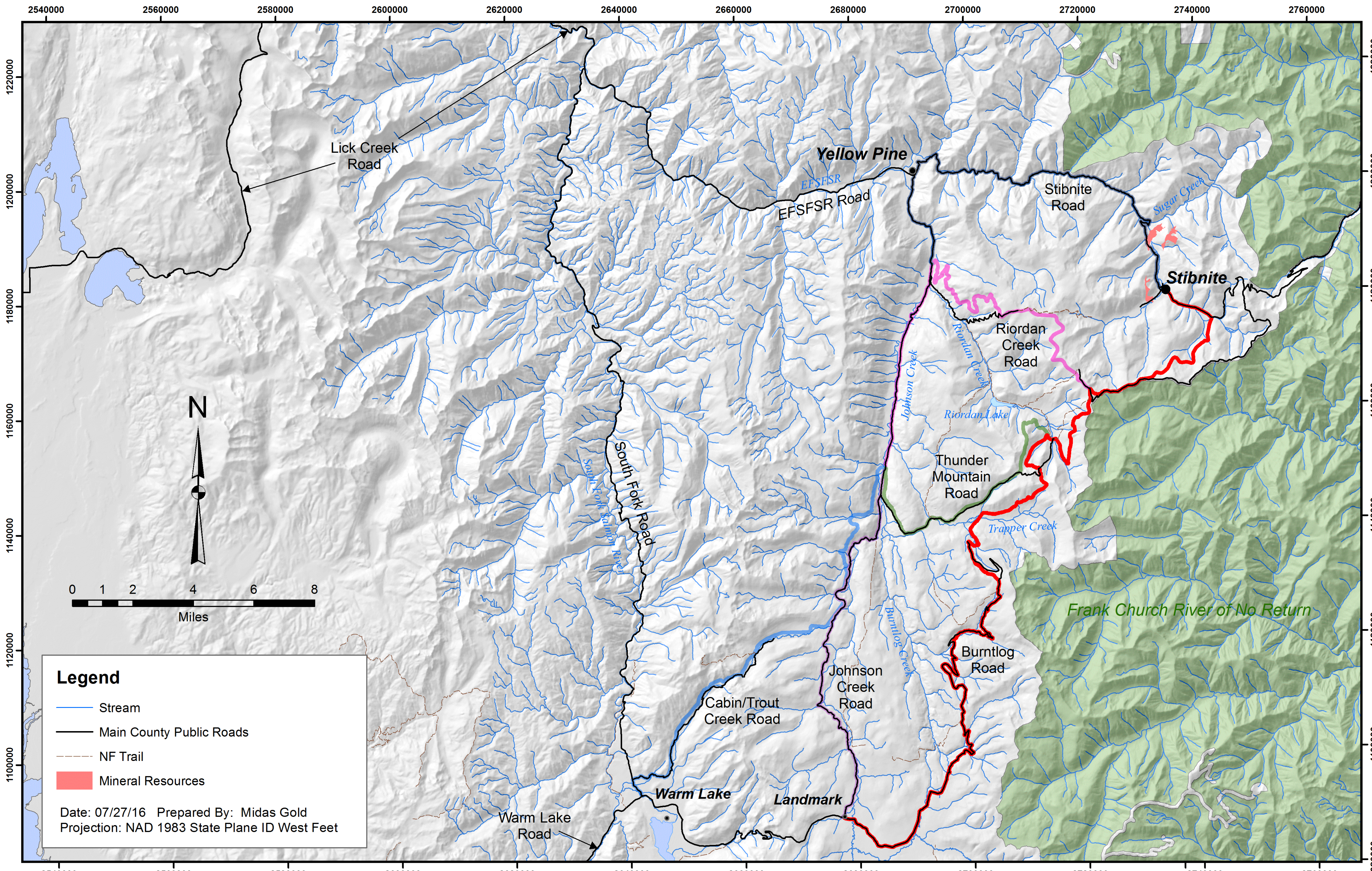
Normal one-way travel time for the South Fork Route from the town of Cascade to Stibnite is estimated at 3 hours and 30 minutes.

While this route already exists, dangerous curves pose potential safety problems for heavy truck traffic. The route is juxtaposed to the South Fork of the Salmon River, which is designated as critical habitat for anadromous fish, and heavy truck traffic is not desirable on this route. The proximity of vehicle traffic immediately adjacent to a substantial salmon fishery means increased risk of negative impacts from sedimentation from dust and runoff, increased risk of vehicle incidents impacting the South Fork or

EFSFSR and spills entering the South Fork and/or EFSFSR. Further, use of this route would increase potential conflicts with local residents and recreationists that use this route.

RESTORE THE SITE

Figure 11, Project Access Alternatives



8.11.2 Lick Creek Route

Another existing route available to access the Project site, but only in snow-free months, starts near the town of McCall and is identified as the "**Lick Creek Route"**. This routing is approximately 93 miles from Cascade on State Highway 55 (through McCall) and about 64 miles from McCall; this routing is as follows:

- North from Cascade to McCall via two-lane, paved State Highway 55 for about 30 miles;
- Eastward from McCall to the community of Yellow Pine via single-lane, unpaved Lick Creek Road (FS-412) for about 33 miles;
- East from the junction with Lick Creek Road to the community of Yellow Pine via single-lane, unpaved East Fork Road (FS 412) immediately adjacent to the SFSR and EFSFSR for 16 miles; and,
- East from community of Yellow Pine to Stibnite via single-lane, unpaved road (FS 412) immediately adjacent to the EFSFSR for about 14 miles.

Normal one-way travel time for this route from the town of Cascade to the town of McCall and on to Stibnite is estimated at 3 hours and 45 minutes.

While this route exists, and is very pleasurable to travel due to its outstanding natural beauty, it is not suitable for year-round access, due to the high avalanche danger in segments of the road, steep terrain, and high snowfall in winter. Further, the proximity of vehicle traffic immediately adjacent to a substantial salmon fishery means increased risk of sedimentation from dust and runoff impacting anadromous fish habitat and redds, increased risk of vehicle incidents impacting the EFSFSR and/or South Fork and spills entering same.

8.11.3 Johnson Creek Route

The primary, current access used principally by Midas Gold to the Project site during the summer and fall is identified as the "**Johnson Creek Route"**. This routing is approximately 74.6 miles from State Highway 55 and is as follows:

- Northeast from town of Cascade to Landmark via two-lane, paved Warm Lake Road (County Road 10-579, Forest Highway (FH) 22 and FS 579) for 35.6 miles;
- North from Landmark to community of Yellow Pine via single-lane, unpaved Johnson Creek Road (County Road 10-413, FS 413) for 25.3 miles, most of which is immediately adjacent to, or close to, Johnson Creek; and,
- East from community of Yellow Pine to Stibnite via single-lane, unpaved road (FS 412) immediately adjacent to the EFSFSR for about 14 miles.

Normal one-way travel time for this route from the town of Cascade to Stibnite is estimated at 3 hours.

For early construction activities, Midas Gold plans to access the Project site using this route, which is the same route that has been used historically for access to the site, and for exploration activities since 2009. The Johnson Creek Road will require minor alignment change/widening, ditching, culvert repair, graveling, snow removal and dust suppression to support the increased road use during the initial Project construction work.

While this existing route is currently used for Midas Gold access to the Project site, it is not available at certain times of the year when the Johnson Creek Road is impassable due to snow, so the alternative access used by Midas Gold and residents of Yellow Pine is known as the South Fork Route (see Section 8.11.1).

The Johnson Creek Route would be problematic for long-term access to the Project because of concerns about water quality impacts, especially sediment to the nearby Johnson Creek, and increased risk of spills reaching the proximal Johnson Creek. Further, using the Johnson Creek Route would increase the potential for conflicts with, and impacts on, local residents and recreationists along the Johnson Creek Road and in Yellow Pine.

8.11.4 Burntlog Route

After input from local community members, Midas Gold examined the "**Burntlog Route**", which is approximately 72 miles from State Highway 55 near the town of Cascade to the Project site and is as follows:

- Northeast from town of Cascade to Landmark via two-lane, paved Warm Lake Road (County Road 10-579, FS 579) for about 36 miles;
- East and northeast from near Landmark via single-lane, unpaved Burntlog Road (FS 447) for approximately for 18 miles;
- Northeast via a new 8-mile extension to the Burntlog Road to tie with a realigned upgraded Thunder Mountain Road (FS 440);
- Northwest on, unpaved, upgraded and realigned Old Thunder Mountain Road for approximately 6 miles until reaching the summit on FS 1290; and,
- East on the existing, single-lane, unpaved FS 1290 for 2½ miles and an additional approximately 4-mile new road extension down to the existing Thunder Mountain Road (FS 375) and the proposed Stibnite Lodge.

The Burntlog Route would avoid travel adjacent to Johnson Creek and the South Fork of the Salmon River, with minimal travel adjacent to the EFSFSR that would be necessary in the final approach to the Project site. This routing would also bypass the community of Yellow Pine and residences along the Johnson Creek road, thus eliminating (or greatly reducing) Project-related traffic in those communities. Expected normal one-way travel time for this route from the town of Cascade to the Project site is estimated at 3 hours.

The existing Burntlog Road would transition to an extended new road alignment that connects it to the existing Thunder Mountain Road.

The existing Thunder Mountain road (FS 1290) traverses both sides of the ridge between the EFSFSR drainage and the Indian Creek drainage and was built historically to provide access to the Thunder Mountain gold rush. A buffer between the wilderness boundary and the existing forest road was established when the wilderness was created, and remains today. The original road alignment avoids features such as ancient landslides and will be upgraded and utilized for the Burntlog access road to maintain public and transportation safety and limit exposure to potential geological and geotechnical features.

Midas Gold selected the Burntlog Route over the other alternatives for the following reasons:

- Least road length containing steep vertical grades and within avalanche and landslide potential areas;
- Much less elevation loss after the first summit;

- Least amount of excavation and hauling excess rock material to a disposal site;
- Least amount of new disturbance to previously undisturbed National Forest lands and RCAs;
- Minimizes the risk of hazardous material spills into major waterways (only one significant stream crossing over the entire route);
- Least road length paralleling streams (compared with the other routes that travel along the South Fork of the Salmon River, EFSFSR, and Johnson Creek), reducing the risk of hazardous material spills and sediment load into streams;
- Least road length shared with residents of Yellow Pine, along Johnson Creek, and other road users accessing Big Creek and other back country areas, reducing the potential for impacts, road use conflicts and accidents;
- Least amount of retaining walls;
- Lowest construction cost when compared to the other access alternatives; and,
- Shortest time amongst alternatives to construct.

As a result, the Burntlog Route meets Midas Gold's purpose and need for the lowest environmental footprint, lowest risk of negative environmental consequences, least negative impacts on local residents, highest safety potential, and lowest cost.

We also note that the concept of using the Burntlog Route for the Stibnite Gold Project access was originally suggested by a Yellow Pine resident at one of Midas Gold's community meetings.

8.11.5 **Combination Alternatives**

The following transportation alternative segments can be combined into multiple alternatives to access the Project site and are only described in its relative segment.

8.11.5.1 Cabin/Trout Creek Route

Another possible alternative for Project site access is identified as the Cabin/Trout Creek Route. This routing is approximately 63 to 66 miles from State Highway 55 (depending on how it is combined with other routes) and is as follows:

- Northeast from town of Cascade to junction with South Fork Road via two-lane, paved Warm Lake Road (County Road 10-579, Forest Service road (FS) 579) for 25 miles;
- North from junction with Warm Lake Road via single-lane, paved South Fork Road (County Road 50-674, FS 474/674) for 0.70 miles;
- East on single-lane, unpaved Cabin-Trout Creek Road (FS 467) for approximately 10 miles to the junction with Johnson Creek;
- North from the junction with Cabin-Trout Creek Road via single-lane, upgraded and realigned Johnson Creek Road (County Road 10-413, FS 413) for 2 miles to the intersection with Ditch Creek Trail (FS 410);
- North from the intersection with Ditch Creek Road (FS 410) via a new, extended road segment and bridge for 5 miles to the intersection with the existing Johnson Creek Road; and,
- From this point on Johnson Creek one could utilize either the Riordan Creek alternative or Old Thunder Mountain alternative.

While the two variations of route (Old Thunder Mountain or Riordan Creek) represent the shortest and second shortest distance, respectively, from Cascade to the Project, it would have the most miles of new road construction across previously undisturbed National Forest lands. This route has the steepest grades and crosses a number of landslide areas.

This routing is not available at certain times of the year when the Johnson Creek Road is impassable due to snow. In addition, the existing (unpaved) Johnson Creek Road (where located immediately adjacent to Johnson Creek) would need a considerable upgrade to handle regular heavy truck and employee traffic.

The difficulty and high costs of road building, along with associated negative impacts, such as cut and fill slopes and numerous retaining walls, makes this Cabin/Trout Creek Route alternative impractical. This route would not meet Midas Gold's purpose and need from either an economic or environmental perspective.

8.11.5.2 Old Thunder Mountain Route

From the end of the Cabin/Trout Creek Route, one of the two additional alternatives to reach the project site is the Old Thunder Mountain Route. This route is approximately 63 miles from State Highway 55 when coupled with the Cabin/Trout Creek Route. The route is as follows:

- Starting at Johnson Creek Road (FS 413) at the end of the Cabin Trout Creek Route head East along the existing, single-lane, unpaved Old Thunder Mountain Road (FS440) for 6 miles;
- Northwest on, unpaved, upgraded and realigned Old Thunder Mountain Road for about 6 miles until reaching the summit on Meadow Creek Ridge Lookout Road (FS 1290); and,
- East on the existing, single-lane, unpaved FS 1290 for 2½ miles and an additional approximately 4-mile new road extension down to the existing Thunder Mountain Road (FS 375) and the proposed Stibnite Lodge.

Expected normal one-way travel time for this route from the town of Cascade to the Project site is estimated at 2 hours and 45 minutes.

While this route represents the shortest distance from Cascade to the Project, it would have substantial miles of new road construction across previously undisturbed National Forest lands. This route has the steepest grades and crosses a number of landslide areas, which increases risks to road users and the potential for interruption of operations. The difficulty and high costs of road building, along with associated negative impacts, such as cut and fill slopes and numerous retaining walls, makes this alternative impractical. This route would not meet Midas Gold's purpose and need from either an economic, safety, or environmental perspective.

8.11.5.3 Riordan Creek Route

From the end of the Cabin/Trout Creek Route, one of the two additional alternatives to reach the project site is the Riordan Creek Route. This route is approximately 66 miles from State Highway 55 when coupled with the Cabin/Trout Creek Route. The route is as follows:

- Starting at Johnson Creek Road (FS 413) at the end of the Cabin Trout Creek Route head north along the existing single-lane, unpaved Johnson Creek Road (County Road 10-413, FS 413) for 7.3 miles, most of which is immediately adjacent to, or close to, Johnson Creek;
- East along a new road alignment for 6.7 miles to the top of Antimony Ridge and then south for about 3.3 miles until it connects to the Meadow Creek Ridge Lookout Road (FS1290); and,

- East on the existing, single-lane, unpaved Meadow Creek Lookout Road (FS 1290) for 2½ miles and an additional approximately 4-mile new road extension down to the existing Thunder Mountain Road (FS 375) and the proposed Stibnite Lodge.

Expected normal one-way travel time for this route from the town of Cascade to the Project site is estimated at 3 hours.

While this route represents the second shortest distance from Cascade to the Project, it would have many miles of new road construction across previously undisturbed National Forest lands. This route has steep grades and the existing (unpaved) Johnson Creek Road (where located immediately adjacent to Johnson Creek) would need a considerable upgrade to handle regular heavy truck and employee traffic.

This route would be problematic for long-term access to the Project because of concerns about water quality impacts, especially sediment to the nearby Johnson Creek, and increased risk of spills reaching the proximal Johnson Creek. Further, using the Johnson Creek Route would increase the potential for conflicts with, and impacts on, local residents and recreationists along the Johnson Creek Road.

The difficulty and high costs of road building, along with associated negative impacts such as earthworks and road length, makes this alternative impractical. This route would not meet Midas Gold's purpose and need from either an economic or environmental perspective.

8.11.6 **Site Access Alternative Assessment Conclusions**

Based on the alternative assessment summarized in this section, Midas Gold has selected the Burntlog Route[22] as the preferred site access route. Other access routes considered, but eliminated from further consideration include:

- South Fork Route;
- Lick Creek Route;
- Old Thunder Mountain Route;
- Riordan Creek Route;
- Johnson Creek Route (except for use during early construction work); and,
- Cabin/Trout Creek Route.

8.12 PROJECT POWER SUPPLY

The mining and ore processing facilities at the Project are estimated to require a total instantaneous power demand of approximately 40 to 50 megawatts (MW) during operations. The power supply must be reliable, with the ability to meet electricity demand 24 hours per day, 365 days per year.

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[22] The use of the Burntlog Route for Project site access and the development of the Yellow Pine pit will eliminate traffic on Forest Service 50-412 from the confluence of EFSFSR and Sugar Creek through the Project site to connect with Forest Road 375 (Thunder Mountain Road). For residents and visitors to the community of Yellow Pine wanting to access Thunder Mountain Road, Midas Gold believes there are options for ATV traffic around the Stibnite site, but the Company suggests that the Forest Service, who oversees and manages a travel management plan for the Forest and has designated Inventoried Roadless areas, consider such alternatives as part of their EIS process, perhaps by forming a working stakeholders group (that will include Midas Gold) to advise them.

Midas Gold considered the following power supply alternatives for the Project:

- On site power supply with renewable power generation (solar, wind, hydroelectric, and geothermal);
- On site power supply with reciprocating engines (powered by diesel fuel or other fossil fuels);
- On site power supply with natural gas turbines;
- On site power supply with circulating fluidized bed combustion coal-fired power; and,
- Off-site power supply from Idaho Power Company (**IPCo**) connected via transmission line.

The following sections describe these alternatives, and their costs, advantages and disadvantages. Table 8 provides a summary of all-in life-of-mine power cost for those alternatives for which detailed cost estimates were prepared.

Table 8, Site Power Supply Cost Estimates (45 MW basis, 12-year life-of-mine, undiscounted)

Power/Fuel Alternative	Delivered Fuel Cost	Capital Expense (million $)	Annual Operating Expense (million $)	Total Life-of-Mine Cost (million $)	Life-of-Mine Unit Cost ($ per kWh)
IPCo Grid Power	$ 0.05876/kWh	61.1	23.2	339	0.072
Diesel Engine	$ 3.00 / gal	60.1	74.3	951	0.201
Natural Gas Turbine	$ 6.88 / MBtu	48.0	31.9	430	0.091
Coal Plant	$ 3.83 / MBtu	178.4	19.6	413	0.087

8.12.1 **Renewable Power Generation**

Renewable energy is generally defined as energy that is collected from resources that are naturally replenished over a short time scale, such as sunlight, wind, hydro and geothermal heat. Provided below are descriptions and commentary of each of these power supply alternatives.

Solar Power: Midas Gold currently uses a photovoltaic system to supply electric power for exploration facilities. This system includes solar panels to absorb and convert sunlight into electricity, a solar inverter to change the electric current from DC to AC, and miscellaneous cabling and other electrical accessories. This system has been very successful for the exploration facilities with 100% reliance on solar having been achieved in mid-2016. Despite this success at the exploration stage, the large-scale solar system needed to supply reliable and constant electric power for Project facilities, such as the ore processing facility, is not reliable (given its dependence on sunlight availability and the lack of electric storage capacity necessary for the power load at the Project site). In addition, the very large area (approximately 500 acres) needed for solar panels[23] and the necessity for a back-up electric generating

[23] The photovoltaic power facility at the Nellis Air Force base in Nevada uses approximately 70,000 large solar panels occupying over 140 acres to generate 14 MW of electric power per day. Using this facility as comparison, to supply the 50 MW demand at the Project, approximately 500 acres would be needed. However, Nellis Air Force base is located near Las Vegas, which experiences an average of 294 sunny days per year. Contrast this to Boise, Idaho, which has an average of 206 sunny days per year (the Project site would be expected to have even fewer average sunny days per year given its location in the mountains). In addition, solar “farms” are typically constructed on flat ground as steep topography limits the amount of sunlight available for panel exposure to the sun. Given other facilities and the other multiple uses for flat areas in this part of Idaho render solar power impractical for the scale and reliability needed for the Project.

facility such as discussed above render a solar system impractical from a technical and economic perspective.

However, Midas Gold will build upon its experience with solar power generation that has been used successfully for exploration facilities and will look to using supplemental solar power generation, likely from panels to be installed on the rooftops of the on-site employee housing facility and other buildings. This will supplement line power and reduce greenhouse gas emissions through the use of renewable energy generation.

Wind Power: Wind energy converts wind into electricity, using airflow to drive wind turbines. Like solar energy, wind energy is unpredictable over short time scales and would require back-up power. Wind farms are typically constructed on flat plateaus where wind direction and gusts remain strong and consistent. Mountainous terrain hinders predictable wind flow and would pose installation challenges. In addition, wind turbines present a hazard to birds. As a result, it is not practical, technically feasible nor economically sound to depend on wind power.

Onsite Hydroelectric Power: This type of power is created by the flow or falling force of water to drive turbines. However, even during high flow periods, the EFSFSR does not produce enough flow or gravitational drop to generate the electricity necessary for the Project. The permitting of a reservoir at the Project site capable of containing the volume of water necessary to provide uninterrupted 40 to 50 MW of hydro-electric power is highly unlikely given the volume and speeds of water flow in the EFSFSR, and potential impacts to Waters of the U.S. and the fish species in the site's waterways. As a result, it is not practical, technically feasible nor economically and environmentally sound to depend on hydropower generated on site.

Geothermal Power: This is energy generated from the heat present deep within the Earth. Pipes drilled and installed deep into the Earth's crust are filled with water, then geothermal gradients within the Earth's crust vaporize the water and the resultant steam drives surface turbines to produce electricity. The primary challenge in using this technology is in finding the geothermal resource, and there are no known geothermal reservoirs of appropriate size close to the Project site. Moreover, a geothermal wellfield capable of providing the resultant steam to drive a 40 to 50 MW power station is a very large operation, and the ability to discover, characterize, and permit the wellfield and power plant consistent with the Stibnite Gold Project is infeasible. As a result, it is not practical or technically feasible to depend on geothermal power generated on site from hypothetical and unproved geothermal sources.

Conclusions on Renewables: The energy-intensive parts of ore processing (crushing, grinding, etc.) are continuous processes (as opposed to batch processes), wherein equipment is most economically sized to run constantly with a feed rate equal to the average mining rate, with relatively small allowances for maintenance downtime. Therefore, power demand is also continuous, requiring reliable, consistent power supply. Renewable power generation alternatives would not be reliable sources of power for the Project's 40 to 50 MW demands required 24 hours per day, 365 days per year. Therefore, any renewable power generation would require another, duplicate power source alternative. The provision of two power sources would substantially increase the capital cost for the Project, with negative economic consequences. Midas Gold does plan to install supplemental solar power at the site; however, a more reliable primary source of power is required.

8.12.2 IPCo Power Service

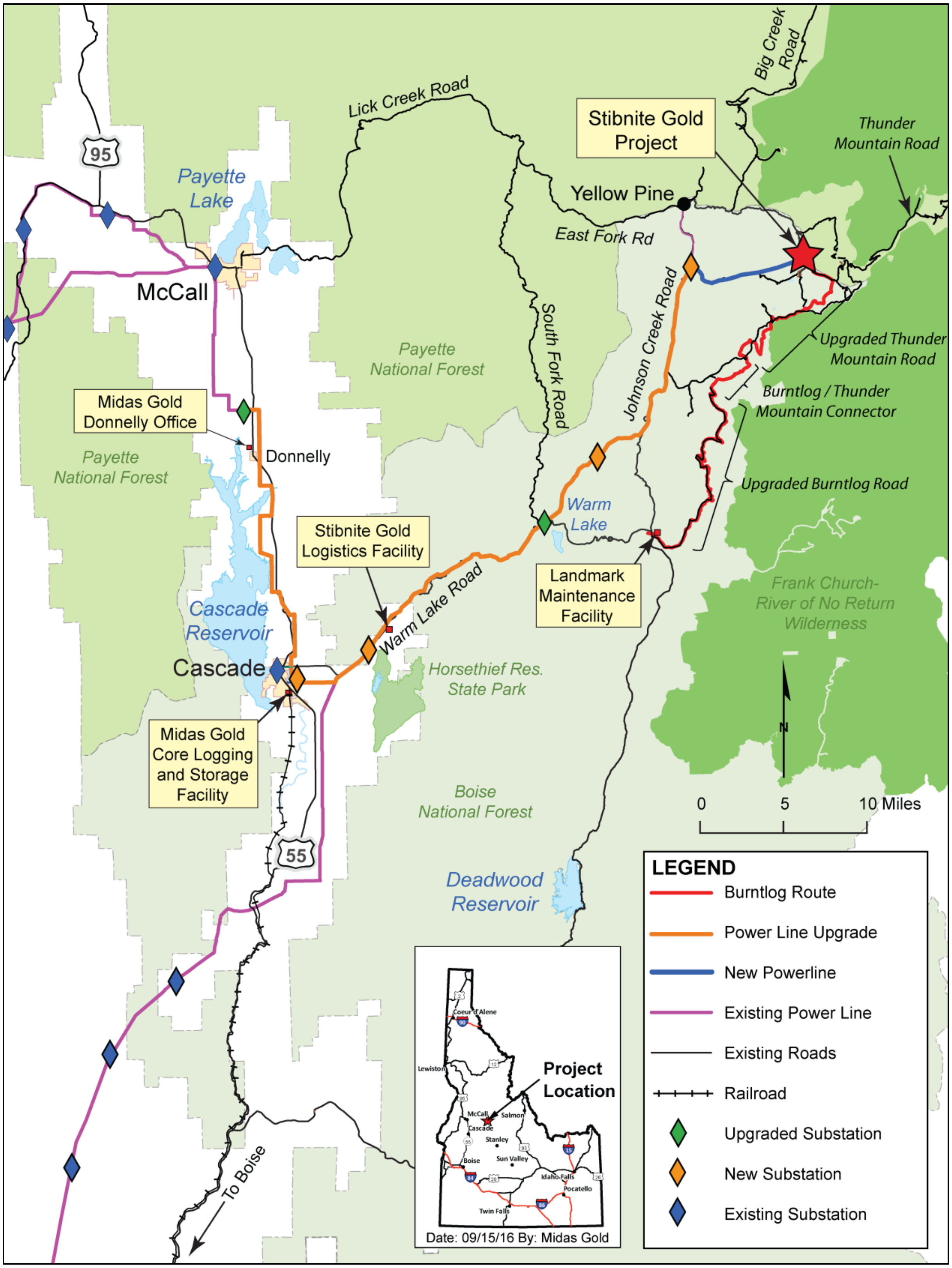
In 1944, IPCo completed construction of a 106-mile, 69 kV power transmission line from Emmett to Stibnite; the project took 8 months to build. Until the 1970s, this 69-kV powerline provided electricity to the Project area; however, eight miles of powerline from the community of Yellow Pine to the Project site have since been removed.

To return power to the site to support mine operations, Midas Gold would enter into an agreement with IPCo to upgrade their existing electric service to Yellow Pine and re-construct the powerline into the Project site. To meet Project power requirements, IPCo would upgrade the existing electric service from its Lake Fork substation, south of McCall, along IPCo's existing right-of-way to Yellow Pine (see Figure 12). The construction for the upgraded electric transmission line would probably also require replacement of existing structures along the existing right-of-way.

From the Lake Fork substation, there is an existing 42-mile long 69 kV electric transmission line that passes through Cascade and connects with a substation near Warm Lake.

RESTORE THE SITE

Figure 12, IPCo Power Transmission System Upgrade Requirements



Electricity for the community of Yellow Pine is presently provided by an existing 21.5-mile long 12.5 kV electric distribution line that connects to the Warm Lake substation. Both of these existing power lines are inadequate to meet expected power requirements and loads at the Project and must be upgraded to a 138 kV service to meet Midas Gold's purpose and need for 40 to 50 MW of power.

In addition to upgrading the electric transmission line, IPCo would upgrade the switchgear and substations along the line to meet the needs of the Project and maintain stable supply to the local communities. A new substation, identified as the Johnson Creek substation, would be installed near the community of Yellow Pine to provide energy to Yellow Pine and the Project site. While the power line and substation near Yellow Pine are under construction, Midas Gold would use generators to provide electric power service to Yellow Pine and for the Project construction activities.

Environmental benefits of line power delivered to the Project site include: elimination of greenhouse gas emissions related to onsite power generation; elimination of fuel haulage to site for power generation purposes; reduced overall capital and operating cost; and, simplification of the permitting process.

Further, industrial line power rates in Idaho are some of the lowest in the country, providing an economic justification that supports the environmental and safety-driven considerations noted above. Factoring in capital improvement costs of $61 million and line power cost of $0.05876 per kWh, the life-of-mine power cost for 45 MW service is approximately $0.072 per kWh. Therefore, connecting to line power aligns with Midas Gold's core values for a reduced environmental footprint, minimizes cost, and meets the Company's purpose and need.

8.12.3 **Reciprocating Engines**

Reciprocating engines, (aka piston engines) employ the expansion of hot gases to generate pressure to push then rotate a crankshaft. Reciprocating engines burn a variety of fuels, including natural gas, light fuel oil, heavy fuel oil, biodiesel, biofuels, and crude oil. Four to five 15,000-gallon trucks of diesel fuel (or other fuels) would need to be transported to the site on a daily basis to meet the engine demands necessary to provide 40 to 50 MW of power, for an annual consumption of 20 million gallons. This fuel-transport traffic would increase fugitive dust and greenhouse gas emissions generated during transportation of the fuel, as well as increase traffic, along the site access route. Increased fuel haulage would also increase the risk of spills or accidents along the route, with potential for negative environmental and safety implications.

Storage would have to be provided at the site to account for winter weather conditions that could hinder such daily transportation.

Air quality emissions for carbon dioxide (**CO_2**), sulfur dioxide (**SO_2**) and nitrogen oxide (**NO_x**) would have to be considered, and it is doubtful that a fossil fuel power plant of the size needed for the Project could be permitted at the site. Depending on the fuel composition (% sulfur) and operating conditions, consumption of the quantities of fossil fuels required to generate the 40 to 50 MW of power with a diesel reciprocating engine is estimated to cause emissions of 243,000 to 304,000 tons of CO_2, 75 to 93 tons of SO_2 and 4,700 to 5,900 tons of NO_X annually[24].

[24] Diesel emissions estimate based on MAN 18V32/40 engines (5+2), 44.5 MW generation capacity, off-road diesel fuel, and AP-42 emissions factors. Range represents calculated emissions, normalized and scaled to 40 and 50 MW.

Fuel-generated onsite power, depending on the world price of oil at the time, would cost approximately \$0.20 per kWh, which would have a substantial negative consequence to Project economics and drive returns below those that would meet Midas Gold's purpose and need. The combination of negative environmental impacts, environmental risks related to fuel haulage, and higher cost means that reciprocating engine based power generation would not meet Midas Gold's purpose and need to minimize environmental impacts, and likely push economic returns below an acceptable threshold.

8.12.4 Natural Gas Turbines

Gas turbines work by forcing compressed air and fuel through a turbine that spins a shaft used to drive an electric generator. Although burning natural gas produces lower emissions than burning diesel fuel, air quality emissions for CO_2, SO_2 and NO_x would have to be considered, and it is doubtful, even with lower emissions from burning natural gas, that a power plant of the scale needed to provide electric power for site operations could be easily permitted. An estimated 14 to 15 natural gas delivery trucks would be required on a daily basis for a total fuel consumption of over 4.4 billion cubic feet per annum, which would increase truck traffic on the site access roads, as well as increase fugitive dust, particulate, and greenhouse gas emissions from such traffic. Increased fuel haulage would increase the risk of spills or accidents along the route, with negative environmental and safety implications, which does not align with Midas Gold's core values. Storage would have to be provided at the site to account for winter weather conditions that could hinder such daily transportation. Consumption of the quantities of natural gas required to generate the 40 to 50 MW of power is estimated to cause emissions of 197,000 to 246,000 tons of CO_2, 5.7 to 7.1 tons of SO_2 and 572 to 715 tons of NO_X annually[25], better than reciprocating engines and coal, but still substantially higher than grid power.

Further, natural gas generated onsite power, depending on the regional delivered price of natural gas at the time, would cost approximately \$0.091 per kWh, which would again have a negative consequence to Project economics and possibly drive returns below those that would meet Midas Gold's purpose and need. The combination of negative environmental impacts and higher cost means that natural gas based power generation would not meet Midas Gold's purpose and need to minimize environmental impacts, and may push economic returns below an acceptable threshold.

8.12.5 Circulating Fluidized Bed Combustion Coal-Fired Power

Circulating Fluidized Bed Combustion coal electric-generating power stations have rotating machinery to convert combustion heat energy into mechanical energy, which operates a steam turbine to produce electricity. The air emissions (CO_2, SO_2 and NO_x) for a 40 to 50 MW coal-fired power plant, even with state-of-art pollution control technology, would likely preclude permitting such a plant at the site. In addition, there are no known commercial coal reserves in Idaho, so coal would have to be imported from mines in Utah, Wyoming or Montana. The nearest rail yards to the Project site are in Cascade, Idaho, so a coal off-loading facility would have to be constructed.

A 40-50 MW coal-fired power plant would require an annual supply of approximately 15 to 25, 25-ton truck loads per day, 365 days per year, for a total of 135,000 to 225,000 tons of coal to be transported by truck to the Project site; this would create additional fugitive dust and greenhouse gas emissions, as

[25] Natural gas emissions estimate based on GE LM2500+RD gas turbine, 49.7 MW generation capacity, CNG fuel, and AP-42 emissions factors. Range represents calculated emissions, normalized and scaled to 40 and 50 MW.

well as increase traffic, along the site access route. Coal power generation emissions vary with coal composition (energy and sulfur content) as well as amount of added lime; the estimates herein are based on use of 4% sulfur coal at 10,500 to 14,000 BTU/lb and 7:1 calcium to sulfur fraction. Depending on the coal composition and assuming modern emission control measures, consumption of the quantities of coal required to generate the 40 to 50 MW of power is estimated to cause emissions of 423,000 to 621,000 tons of CO_2, 265 to 442 tons of SO_2 and 338 to 563 tons of NO_X annually[26], greater than both reciprocating diesel and natural gas engines in the case of CO_2 and SO_2, and similar to natural gas with respect to NO_x. Additional on-site facilities, such as a coal storage area, cooling ponds, lime storage, and ash handling and storage areas, would be needed. All of this would add to the political, regulatory, environmental and technical impracticality of constructing a coal-fired power plant at the Project site. Further, construction and operation of such a power plant while a cleaner, simpler, and lower-cost alternative (line power) exists would not align with Midas Gold's core values.

Secondarily, coal-generated onsite power, depending on the regional delivered price of coal at the time, would cost approximately $0.087 per kWh, which would have a negative consequence to Project economics and may drive returns below those that would meet Midas Gold's purpose and need. The combination of negative environmental impacts and higher cost means that coal based power generation would not meet Midas Gold's purpose and need to minimize environmental impacts, and likely push economic returns below an acceptable threshold.

8.12.6 Site Power Supply Alternatives Assessment Conclusions

Based on the alternative assessment summarized in the preceding sections, Midas Gold concluded that on-site power generation alternatives are not preferred given the scale needed for Project operations, the capital and operating cost thereof, the negative environmental impacts, and the safety and environmental risks of transporting large quantities of fuel. IPCo has available electric power that can be delivered to the site with an upgrade of existing powerlines and the installation of minimal new powerlines (see Section 8.12.2). Consequently, Midas Gold has selected transmission line power from IPCo as its preferred alternative for primary power supply for the Project; however, Midas Gold will also build upon its experience with solar power generation at site to install supplemental solar power capacity and reduce power requirements from IPCo.

Other primary power supply alternatives that were considered, but will not form part of the primary power supply[27] for the Project include:

- On site reciprocating engines;
- On site natural gas turbines;
- On site circulating fluidized bed combustion coal-fired power; and
- On site renewable energy sources for base loads such as solar, wind, hydro and geothermal, other than expanded supplemental solar energy.

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[26] Coal emissions estimate based on circulating fluidized bed combustion (CFBC) steam turbine plant, 40.0 MW generation capacity, AP-42 emissions factors, bituminous coal at 4% sulfur and 10,500 to 14,000 Btu/lb heat content, and lime addition at 7:1 Ca:S molar ratio. Range represents calculated emissions, normalized and scaled to 40 and 50 MW.

[27] While Midas Gold prefers to use grid power for the primary supply, certain remote and/or infrequently-powered equipment may be powered by portable diesel generators, particularly during construction.

8.13 CONTRACTOR AND EMPLOYEE HOUSING

Since the Project is located in a relatively remote area of Idaho, Midas Gold considered whether to provide for on site or near site housing for contractors and employees. Three basic alternatives were considered:

- No company-sponsored housing;
- On-site housing; and,
- Housing in the community of Yellow Pine.

8.13.1 No Midas Gold Employee Housing

Staffing the entire construction and operations workforce from the nearby population centers in Valley County (population ±9,500) of McCall (population ±3,000) and Cascade (population ±1,000) has the potential to eliminate the need for an on-site or near-site housing facility. While this scenario offers appreciable financial advantages to the Project, the substantial daily commute[28] from the towns of Valley County (Cascade and McCall) is not practical, increases safety risks to road users from increased traffic, and increases dust and greenhouse gas emissions from increased road traffic, and was therefore eliminated as an alternative for the Project.

8.13.2 On-Site Housing

Historically, workers at the District mines, and often their families, lived at Stibnite. During World War II, Stibnite was an incorporated town with a peak population of more than 750 people, comprised of Bradley Mining Company employees and their families. The town site area included employee homes, recreation center, hospital, school, automobile service station, and a municipal waste landfill. Stibnite also featured a bowling alley, a theater, a ski team, and a high school football team. Other "neighborhoods" existed adjacent to the main Stibnite town site; these included the Fiddle and Midnight neighborhoods.

For its exploration activities, Midas Gold has a facility capable of housing up to 60 workers on-site. This exploration housing facility can be used to house initial construction personnel.

Several potential locations for the housing facilities were evaluated around and within the Project site on the basis of environmental impacts associated with the footprint of the facility, safety from avalanche and geologic hazards such as landslides, cost, security, noise from mining operations, traffic, quality-of-life and operational ease. The location selected for the housing facilities is approximately 1½ miles southeast of the confluence of the EFSFSR and Meadow Creek, adjacent to the existing Thunder Mountain Road; the location is quiet, yet located close enough to the site to yield minimal commute times, and is easily accessible from the proposed new access road.

[28] Round trip good weather (summer) commute times by road to the Project are approximately seven hours from McCall and six hours from Cascade; longer commute times can be expected during bad-weather (winter) conditions. Such daily commuting would also create additional traffic on regional and site access roads, increase driving-related safety risks, and decrease the quality of life for Midas Gold workers and contractors. When added to normal 10 or 12-hour work shifts, there would be unacceptably long days for employees. This situation would magnify the risk of fatigue related traffic incidents.

8.13.3 Near-Site Housing in Yellow Pine

Midas Gold considered the alternative of housing employees and contractors in the community of Yellow Pine during mine operations. However, the primary reason that it was eliminated from consideration is Midas Gold's employee and contractor headcount is an order of magnitude higher than the population of Yellow Pine, and the impacts to local traffic, noise, and overall quality of life would be substantial. While some Yellow Pine business owners and entrepreneurs may welcome the impact of the population increase, other residents may be vehemently opposed.

Lastly, after the Burntlog Road is upgraded and extended, it is expected that Forest Service Road 412 will be closed for public access from the confluence of Sugar Creek and the EFSFSR to the Project site, thereby excluding any public traffic from the community of Yellow Pine to the Project site via that route. This means workers would have to travel from Yellow Pine to Stibnite via Landmark, which is a similar distance from Cascade to Stibnite and too far for daily commuting; consequently, this alternative was not considered viable.

8.13.4 Contractor and Employee Housing Alternative Assessment Conclusions

Midas Gold completed an alternative assessment to determine the most appropriate method of managing its employees and contractors in the context of the remote location of the site. The assessment considered on site housing, nearby housing (in the community of Yellow Pine) and daily commuting from the local population centers of Cascade and McCall. Based on the alternative assessment completed, Midas Gold established on site housing as the preferred alternative as commuting times from Cascade and McCall were unreasonably long, resulting in increased safety risks to Midas Gold employees, contractors and other road users from increased traffic, low quality-of-life due to excessively long work days, and increased dust and greenhouse gas emissions from increased road traffic. Housing a large number of workers in Yellow Pine and daily commuting from there to and from the Project site likewise would have safety, logistical and other hurdles and clear disadvantages compared to on site housing.

8.14 EMPLOYEE TRANSPORTATION

In an effort to reduce traffic to and from the Project site, reduce the onsite employee housing requirements and provide more regular weekday jobs within the local community, Midas Gold will locate offsite administrative offices in Valley County with easy access to State Highway 55 and the Warm Lake Highway. These facilities will be collectively known as the Stibnite Gold Logistics Facility (SGLF) and will be located on private land.

To assess the most effective way to manage transporting employees and contractors to site for their shifts from SGLF to Stibnite (see Section 8.13), Midas Gold completed an alternative assessment. Three alternatives for employee transportation were considered:

- Individual transportation;
- Carpooling; and,
- Busing and vanpooling.

8.14.1 Individual Transportation

This alternative would involve the least effort and cost to Midas Gold. It would also provide employees and contractors with the most flexibility in getting to/from the site. However, of the alternatives considered, it would put the highest volume of traffic on the roads to the site, which could negatively affect employee and public safety, increase wildlife mortalities, increase dust and other vehicle emissions, and decrease the enjoyment and convenience of recreationists and local residents, particularly those that live in the communities of Yellow Pine and Warm Lake, and along Johnson Creek. This alternative would also require the most on-site parking, which would result in increased site disturbance.

8.14.2 Carpooling

Under this alternative, employees would be encouraged to car pool to the Project, but such an arrangement would be difficult to enforce, even if Midas Gold offered incentives. Although traffic volumes and resultant consequences discussed in the preceding section would be reduced over individual transportation, there would continue to be elevated risks to employee and public safety, increased risks to the environment and wildlife, and the potential lessening of the enjoyment and convenience of residents and recreation users of the area.

8.14.3 Company Busing and Vanpooling

This alternative would be the costliest and time consuming for Midas Gold to manage, but busing and vanpooling would result in the lowest level of employee traffic to the site, increasing safety by reducing the potential for accidents, reducing dust and greenhouse gas emissions from traffic, and limit negative effects on local residents and recreation users. Therefore, Midas Gold has decided to provide busing and vans as the primary means of employee and contractor transportation to the site and will mandate its employees and contractors use the buses and vans.

Midas Gold expects that workers will appreciate its convenience and cost savings versus driving private vehicles to the mine site. The busing of employees will reduce road traffic (thereby lowering the risk of traffic accidents and incidents along the access route), reduce fuel consumption required in a non-busing scenario, and reduce the number of vehicle transits, which will lessen greenhouse gas emissions, dust generation and sediment runoff that can cause sediment impacts on surrounding vegetation and drainages.

Due to management responsibilities, need for specially equipped vehicles, or certain personal considerations, some Midas Gold and contractor personnel will use individual vehicles for transportation to the Project site. These vehicles will be authorized for use at the site and on-site parking will be available for these vehicles.

8.14.4 Employee Transportation Alternative Assessment Conclusions

An alternative assessment to establish the safest and most efficient and environmentally sound way to transport employees and contractors from the Stibnite Gold Logistics Facility to Stibnite was completed. The primary conclusion from the assessment is that the preferred alternative is for Midas Gold to manage a busing and vanpooling system and discourage to the maximum reasonable extent individual transportation and carpooling. The preferred approach minimizes traffic on the roads, which is: safer for employees, contractors, the public and wildlife; minimizes fuel consumption, vehicle dust and engine emissions, which is better for air and water quality; and, reduces parking requirements at Stibnite, which reduces overall Project disturbance.

9 SUMMARY

As part of its internal discussions and deliberations, including the preparation of the PFS, Midas Gold considered and screened many alternatives, with the goal of assembling a rational, environmentally driven, technically focused, workable and economically feasible plan for the Project. This exercise allowed Midas Gold to develop its Plan of Restoration and Operations for submittal to the Forest Service and other agencies. Table 9 displays the alternatives that Midas Gold selected for various project components, along with the numerous alternatives that were considered but eliminated for the PRO.

Table 9, Summary of Alternative Screening for Plan of Restoration and Operations

Component	Proposed Action	Alternatives Eliminated from Consideration in the Plan of Restoration and Operations
Mining Method	Surface mining (three open pits)	• Underground mining • Combination of surface and underground mining
Tailings Placement	Thickened tailings deposition at Meadow Valley site	• Conventional tailings • Paste tailings • Filtered tailings • Tailings storage in open pits • Underground storage of tailings • Tailings storage at multiple sites • Side-hill placement • Off-site shipment and tailings storage • Other locations eliminated: – Main EFSFSR – EFSFSR (above confluence with Meadow Creek) – Sugar Creek – Fiddle – Blowout
Ore Processing Flowsheet	Crushing, semi-autogenous grinding (SAG), ball milling, froth flotation, pressure oxidation of refractory (sulfide) ore, cyanide leaching, on-site production of gold-silver doré, off-site processing of antimony concentrate	• Multi-stage crushing followed by ball milling • Gravity separation • Roasting or bacterial oxidation (BIOX®) of refractory (sulfide) ore • Chlorine, thiourea, ammonia, or calcium thiosulfate leaching • Off-site processing of gold concentrate • On-site leaching and refining of antimony
Ore Processing Facilities	Scout Ridge and Old Town Sites	• Off-site remote areas • PEA Site • SMI Mill Site
Mine Support Facilities	SMI Mill Site	• Off-site remote areas • PEA Site

Component	Proposed Action	Alternatives Eliminated from Consideration in the Plan of Restoration and Operations
Development Rock Placement	Use as construction material for tailings embankment and tailings buttress Backfill for mined-out Yellow Pine pit Engineered storage facilities at locations including West End, Lower Fiddle, and Meadow valley / Hangar Flats	• Placement in underground mine workings • Off-site storage • Other locations eliminated: – Main EFSFSR – EFSFSR (above confluence with Meadow Creek) – Sugar Creek – Upper Fiddle – Hennessy – Midnight – Blowout
EFSFSR Water Management for Yellow Pine Pit	Tunnel on west side of Yellow Pine pit	• Surface channel • Pipeline(s) • Tunnel on east side of Yellow Pine pit
Fish Passage During Operations	Fish passage in EFSFSR diversion tunnel	• Delay of fish passage until closure • Fish passage solely via trapping and truck transfer
Blowout Creek Water and Sediment Management	French drain with barrier to raise groundwater level in upper valley, armor lower Blowout Creek bed	• Sediment pond(s) • Armor Blowout Creek channel • Pipeline • Restoration of Meadow Creek only with no restoration activities in Blowout Creek
Site Access	Burntlog Route	• South Fork Route • Lick Creek Route • Johnson Creek Route • Thunder Mountain Route • Riordan Creek Route • Cabin/Trout Creek Route
Site Power (during operations)	Transmission line power service supplied by Idaho Power Company with supplemental solar power generation on site	• On-Site Power Generation by: – Diesel generators – Reciprocating engines – Natural gas turbines – Circulating fluidized bed coal-fired power – Wind power – Hydroelectric power – Geothermal power
Employee and Contractor Housing	On-site housing for employees and contractors	• Daily commute by contractors and employees • Housing in the community of Yellow Pine
Employee Transportation	Busing and van pooling	• Individual transportation • Car pooling

The plan to be submitted to the Forest Service as the PRO represents a comprehensive package of feasible, economic and environmentally sound alternatives that comprise a Project that is designed to be beneficial to all stakeholders. Figure 13 presents the preferred Stibnite Gold Project general arrangement that incorporates the results of the alternative assessments.

Figure 13, Preferred Stibnite Gold Project Layout Resulting from Preceding Alternative Assessments