

NEVADA COUNTY, CALIFORNIA
IDAHO-MARYLAND MINE
PROJECT DESCRIPTION

NOVEMBER | 2019

Lead Agency:
Nevada County, Community Development Planning Department

Prepared for:
Rise Grass Valley Inc.

Preparer:
Benchmark Resources

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950 Maidu Avenue, Nevada City, California 95959

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PO Box 271, Grass Valley, California 95945

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Benchmark Resources
2515 East Bidwell Street, Folsom, CA 95630

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1. OVERVIEW

Rise Grass Valley Inc. (Rise) proposes to reinstate underground mining and gold mineralization processing of the Idaho-Maryland Mine (the “project”) in unincorporated Nevada County (County) (see Figure 1, “Regional Location,” and Figure 2, “Site Location”). The proposed facilities and operations will be located on two properties owned by Rise referred to as the Brunswick Industrial Site and the Centennial Industrial Site (see Figure 3a, “Existing Conditions and Surrounding Area,” Figure 3b, “Existing Site Conditions: Brunswick Industrial Site,” and Figure 3c, “Existing Site Conditions: Centennial Industrial Site”). The project comprises five primary elements (see Sheets 1, “Brunswick Industrial Site Plan—Final Grading and Topography”; 2, “Brunswick Industrial Site Plan—Site Plan Details”; 3, “Centennial Industrial Site Plan”; and 4, “Brunswick and Centennial Industrial Sites—Section Views):

1. dewatering the existing underground mine workings,
2. mining existing and new underground mine workings,
3. processing gold mineralization and rock,
4. placing engineered fill at the Brunswick and Centennial Industrial Sites, and
5. export of engineered fill from the Brunswick Industrial Site to support local construction projects.

Rise is seeking approval of a new use permit and reclamation plan to build and operate the facilities for these project elements. This use permit and reclamation plan proposes to allow:

- operation of pumps and a water treatment facility to dewater the underground workings;
- construction of a water pipeline to transport treated water to an outfall located in South Fork Wolf Creek;
- construction of the necessary aboveground facilities at the Brunswick Industrial Site (e.g., headframes and hoists, surface structures, a mineral processing plant) to support underground mining and mineral processing;
- construction of a new service shaft and ventilation shaft from the underground mine to surface at the Brunswick Industrial Site;
- underground mining, including drilling, blasting, and gold mineralization removal;
- gold mineralization and rock processing at the Brunswick Industrial Site and off-site transport of gold concentrate;
- transport of engineered fill from the Brunswick Industrial Site and placement at the Centennial Industrial Site;
- transport of engineered fill from the Brunswick Industrial Site to off-site construction projects;
- placement of engineered fill at the Brunswick Industrial Site; and
- construction of a potable water pipeline to supply residences along a portion of East Bennett Road.

The majority of aboveground facilities, the access to the underground mining, the treated-water outfall structure, and a portion of the engineered fill will be located on Rise’s 119-acre Brunswick Industrial Site. Engineered fill will also be placed on Rise’s 56-acre Centennial Industrial Site. Of the total 175 acres in surface land holdings, approximately 104 acres will be disturbed as a result of construction of the facilities proposed to support dewatering, mining, and processing at the Idaho-Maryland Mine. In addition, Rise owns approximately 2,585 acres of subsurface rights that encompass the historic Idaho-

Maryland Mine workings and Idaho-Maryland Mine Project. Once the aboveground facilities are constructed, Rise will begin dewatering the mine, performing advanced exploration, and mining the underground workings.

2. BACKGROUND

The Idaho-Maryland Mine is a historic, past-producing, underground gold mine. The mine produced 2,414,000 ounces of gold between 1866 and 1956. The mine has been inactive since its closure in 1956 and was inactive for several periods during its production period. In 1901 the mine was allowed to flood with water, and then the mine was dewatered in 1904. In 1914 it was again allowed to flood, and then it was dewatered in 1919. The mine was allowed to flood again after its final closure in 1956.

During its operation, the Idaho-Maryland Mine was one of California's and the United States' most important mines. In 1941, the mine employed approximately 1,000 workers and was California's largest lode gold mine and the United States' second-largest lode gold mine by annual production. The Idaho-Maryland Mine encompasses an extensive system of approximately 73 miles of underground tunnels, many raises, four inclined shafts, and two vertical shafts. The historic mining operation had extensive surface infrastructure adjacent to the Centennial Industrial Site and at the Brunswick Industrial Site, most of which has been dismantled and removed.

The Idaho-Maryland Mine has three distinct sections (Idaho #1, Idaho #3, and Brunswick Mines), which are connected by underground workings. The Union Hill Mine is a smaller mine that was closed in 1918 and has been flooded with groundwater since then. The Union Hill Mine is not connected to the Idaho-Maryland Mine, but is near the Brunswick portion of the Idaho-Maryland Mine. The gold-quartz veins of the Union Hill Mine are believed to be part of the Brunswick vein system. Rise is proposing to dewater the Idaho-Maryland Mine, but not the Union Hill Mine.

A sawmill previously operated on the Brunswick Industrial Site and closed in 1991. All buildings related to the sawmill have been removed. A clay-lined constructed pond and significant paved areas remain from the sawmill operation.

In 1995, in an effort to reopen the Idaho-Maryland Mine, Emgold Mining Corporation acquired a use permit from Nevada County to dewater the mine. This permit was allowed to expire and no work was completed on the dewatering project. In 2005, Emgold submitted an application to the City of Grass Valley to dewater the Idaho-Maryland Mine and restart mining and processing operations. Between 2005 and 2011, the City of Grass Valley implemented environmental review of the application consistent with the California Environmental Quality Act. Emgold subsequently abandoned the use permit application because it could not pay the fees required for continued processing. Rise has no affiliation with Emgold.

3. PROJECT OBJECTIVES

The primary purpose of the project is operation of the Idaho-Maryland Mine. To that end, Rise has the following project objectives:

- Construct a commercially viable, financeable, major underground gold mine operation that will produce 1,000 tons per day (365,000 tons per year) of gold mineralization.
- Locate the project on property that Rise owns that provides an existing access to the underground workings.

- Utilize existing underground access points to limit new aboveground and underground surface disturbance.
- Locate the facilities necessary to support dewatering, mining, and processing on land historically disturbed and zoned for similar industrial type uses.
- Locate the majority of project facilities within a large property holding to provide buffer areas and minimize the potential for adverse environmental effects on neighboring properties.
- Provide property owners along East Bennett Road, an area currently with no service from the Nevada Irrigation District (NID) and using groundwater from wells, a reliable and clean potable water source from the NID.
- Provide jobs that provide a fair living wage for educated and skilled workers.
- Rehabilitate and reclaim the Centennial Industrial Site to allow its future use as industrial land.
- Increase the usable land area at the Brunswick Industrial Site to allow its future use as industrial land.
- Minimize impacts to wetlands, vernal pools, and other special-status species habitat located on the property and, to the extent feasible, mitigate any such impacts identified.

4. REQUESTED ENTITLEMENTS

The following primary entitlements and discretionary actions from the County are anticipated for the project:

- approval of a use permit that will allow:
 - dewatering, treatment, and discharge of groundwater;
 - construction and operation of aboveground facilities to support underground mining and processing of gold mineralization and rock;
 - transport of gold concentrates to buyers throughout the life of the mine;
 - underground drilling, blasting, and mining;
 - transport of engineered fill to the Centennial Industrial Site;
 - placement, grading, and compaction of engineered fill at the Centennial and Brunswick Industrial Sites;
 - transport of engineered fill to local construction projects throughout the life of the mine;
 - construction of a potable water line to property owners on East Bennett Road;
- rezone of the Brunswick Industrial Site from Light Industrial (M1) with Site Performance Combining District (SP) to Light Industrial with Mineral Extraction Combining District (M1-ME) to allow for mining operations on the surface (e.g., processing, waste disposal); and
- approval of a reclamation plan and associated financial assurances to reclaim the project site to a condition suitable for industrial uses as allowed under the properties' existing zoning.

5. SITE SETTING

5.1 Project Location and Access

The project site is located in western unincorporated Nevada County, California. The Brunswick Industrial Site is approximately 2 miles from the center of the city of Grass Valley and State Route 49 (see Figure 2). The Centennial Industrial Site is adjacent to the Grass Valley city limits and within the City of

Grass Valley’s (City’s) near-term annexation timeline. The elevation of the project site ranges from approximately 2,500 feet mean sea level (msl) on the Centennial Industrial Site to 3,000 feet msl on the Brunswick Industrial Site. The Centennial Industrial Site is accessed from Whispering Pines Lane and the Brunswick Industrial Site is accessed from Brunswick Road or East Bennett Road (see Figure 2).

The project site is within Sections 25, 26, and 36 of Township 16 North, Range 8 East and Section 31 of Township 16 North, Range 9 East of the Grass Valley U.S. Geological Survey 7.5-minute quadrangle.

The project site is located entirely within the boundaries of the following Assessor’s Parcel Numbers (APNs):

- **Brunswick Industrial Site:** 006-441-003, 006-441-004, 006-441-005, 006-441-034, 009-630-037, 009-630-039
- **Centennial Industrial Site:** 009-550-032, 009-550-037, 009-550-038, 009-550-039, 009-550-040, 009-560-036
- **Potable Water Pipeline Easement:** 009-560-045, 009-560-016

5.2 Existing Land Uses and Entitlements on the Project Site

The majority of the Brunswick and Centennial Industrial Sites is open space (i.e., but remnants of the previous gold mining and sawmill operations exist on-site. In addition, surface drilling is an allowed use by the County Code and drilling has been conducted periodically since October 2017. These uses and entitlements are discussed further below.

Open Space

As shown in Figure 3b and c, the majority of the site is open space. The terrain is typical of the lower Sierra Nevada foothills, varying between flat ridges and valleys to gently and moderately sloping hillsides. The project areas are located between the main stem of Wolf Creek and South Fork Wolf Creek and are dominated by mixed hardwood-conifer forests with smaller areas of riparian woodland and scrub, chaparral, wetlands, and annual grassland. Table 1, “Vegetation Communities for Brunswick and Centennial Industrial Sites,” lists the vegetation communities within the Brunswick Industrial and Centennial Industrial sites that have developed in these historically disturbed sites.

**TABLE 1
VEGETATION COMMUNITIES FOR BRUNSWICK AND CENTENNIAL INDUSTRIAL SITES**

Community Type	Approximate Acreage
Montane Hardwood—Conifer	20.92
Montane Hardwood	2.13
Ponderosa Pine	4.85
Montane Riparian	20.07
Sierran Mixed Conifer	35.98
Mixed Chaparral	16.24
Manmade Pond	7.28
Wet Meadow	13.37
Developed	19.19
Disturbed	16.84
Annual Grassland	17.89
Freshwater Emergent Marsh Wetland	0.58

Historic Gold Mining Features

As discussed in Section 2 above, underground gold mining occurred below the majority of the property, while aboveground portions of the site were used for various gold mining and processing activities. Portions of the Centennial Industrial Site were used to deposit mine tailings and have naturally revegetated. Several shaft entrances are located on the Brunswick Industrial Site, including the Brunswick and Union Hill shafts. The shafts are covered to prevent inadvertent access. Other portions of the site include graveled or paved areas from previous land uses.

Surface Drilling

Surface drilling on the Brunswick Industrial Site is an allowed use on property zoned Light Industrial (M1). Drilling is conducted to characterize underground resources in anticipation of future mining. Core from the drilling is logged and samples are analyzed off-site.

5.3 Surrounding Land Uses

The project site is surrounded by undeveloped open space, industrial, low-density residential development, and commercial uses. Table 2, “Surrounding Land Uses and Closest Receptors,” provides a summary of the locations of the surrounding land uses and the receptors closest to the project site.

**TABLE 2
SURROUNDING LAND USES AND CLOSEST RECEPTORS**

Direction	Land Use	Closest Land Use
BRUNSWICK INDUSTRIAL SITE		
North	East Bennett Road, low-density residential, industrial	Residential
West	Open space, low-density residential, South Fork Wolf Creek	Residential
South	Open space, low-density residential	Residential
East	Brunswick Road, open space, low-density residential	Residential
CENTENNIAL INDUSTRIAL SITE		
North	Grass Valley city limits, commercial, industrial, Idaho-Maryland Road	Commercial/Industrial
West	Grass Valley city limits, commercial	Commercial
South	Open space, East Bennett Road, industrial	Industrial
East	Grass Valley city limits, Centennial Drive, industrial, commercial	Industrial/Commercial

5.4 General Plan Land Use Designations and Zoning Classifications

Table 3, “Land Use and Zoning Designations,” provides the *Nevada County General Plan* (Nevada County 2014) and zoning land use designations for each parcel within the project site. All parcels are designated Industrial in the County’s general plan. See Figure 4, “General Plan Designations.”

**TABLE 3
LAND USE AND ZONING DESIGNATIONS**

Parcel Number	Acreage	General Plan Designation	Zoning
CENTENNIAL INDUSTRIAL SITE			
009-550-032	0.48	Industrial (IND)	Light Industrial
009-550-037	4.47	Industrial (IND)	Light Industrial

Parcel Number	Acreage	General Plan Designation	Zoning
009-550-038	40.1	Industrial (IND)	Light Industrial
009-550-039	0.98	Industrial (IND)	Light Industrial
009-550-040	0.13	Industrial (IND)	Light Industrial
009-560-036	10.25	Industrial (IND)	Light Industrial
BRUNSWICK INDUSTRIAL SITE			
006-441-003	15.19	Industrial (IND)	Light Industrial with Site Performance Combining District
006-441-004	0.85	Industrial (IND)	Light Industrial with Site Performance Combining District
006-441-005	50.01	Industrial (IND)	Light Industrial with Site Performance Combining District
006-441-034	16.01	Industrial (IND)	Light Industrial with Site Performance Combining District
009-630-037	21.8	Industrial (IND)	Light Industrial with Site Performance Combining District
009-630-039	15.07	Industrial (IND)	Light Industrial with Site Performance Combining District

Sources: Nevada County 2019, Nevada County Zoning Ordinance.

As shown in Table 3 and Figure 5, “Zoning,” the project site is zoned Light Industrial with six parcels having a Site Performance Combining District.

5.5 Agricultural Use and Agricultural Preserve Contracts

The California Department of Conservation Farmland Mapping and Monitoring Program rates the project site as “Urban and Built Up” and “Other” lands. None of the land within the project site is rated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. In addition, the property is not subject to a Williamson Act contract.

6. SITE PLAN

6.1 Brunswick Industrial Site

The project site plan for the Brunswick Industrial Site comprises five areas: aboveground site facilities, underground mining, treated and potable water pipelines, the Brunswick engineered fill area, and outfall for the treated water to South Fork Wolf Creek (see Sheets 1, 2, and 4). The approximately 29-acre aboveground area will provide all the facilities and infrastructure necessary to support dewatering, underground mining, gold mineralization and rock processing, and loading and transport off-site. An aboveground pipe will convey treated water from the water treatment facility along an existing road to the planned discharge point at South Fork Wolf Creek. The pipe and discharge point are located entirely within the property boundaries. Engineered fill will be placed on ~31 acres of the Brunswick Industrial Site to create a level pad of approximately 21 acres for future industrial use. In total, up to approximately 60 of the 119-acre site could be subject to surface disturbance and/or development for the aboveground facilities and fill placement. The remaining 59 acres will remain as open space and will not be subject to surface disturbance or infrastructure improvements. See Sheets 1, 2, and 4.

To allow for the mining operations on the surface of the Brunswick Industrial Site, including processing, waste disposal, and the reclamation thereof (subject to the regulations in Section L-II 3.22, Surface Mining Permits and Reclamation Plans, of the County Zoning Ordinance), the site will be rezoned from Light

Industrial (M1) with Site Performance Combining District (SP) to Light Industrial with Mineral Extraction Combining District (M1-ME).

6.2 Centennial Industrial Site

Engineered fill will be transported by truck from the Brunswick Industrial Site and placed on approximately 44 acres of the Centennial Industrial Site to create approximately 37 acres for future industrial use. The remaining approximately 12 acres will remain as a private driveway for site access and open space. The open space area will include Wolf Creek, a 100-foot setback for riparian area on Wolf Creek, and an undisturbed zone containing special status plant species. See Sheets 3 and 4.

6.3 Dewatering

The following sections provide a description of the dewatering process. Operational details such as hours of operation, utilities, and access are provided in Section 7, "Operations."

The Idaho-Maryland Mine will be dewatered using the Brunswick shaft to access the underground workings. The dewatering process and aboveground facilities necessary to support dewatering are explained in the following sections.

Initial Mine Dewatering Process

The existing Brunswick shaft located on the northeast side of the Brunswick Industrial Site will provide access to the underground workings for dewatering. Currently, groundwater has filled the underground workings to approximately 260 feet below ground surface, measured at the Brunswick Shaft. The groundwater will need to be removed to access the underground workings for mining.

Initial dewatering of the underground workings will be accomplished using submersible and staged centrifugal pumps. The submersible pump gradually pumps water out of the shaft via a pipeline at a rate of approximately 5.6 cubic feet per second (cfs) or 2,500 gallons per minute (gpm). Approximately 2,500 acre-feet of groundwater will be pumped from the underground workings over an approximately 6-month period. The groundwater will be pumped via a pipeline to an existing clay-lined settling pond for water treatment. The clay-lined pond has a total capacity of approximately 40 acre-feet.

The headframe and hoist at the Brunswick shaft will be installed before initial dewatering begins. Ventilation will be provided with a fan located on the surface and ducting into the Brunswick shaft until the service shaft is complete and the permanent underground ventilation fan can be installed.

Water Treatment

Groundwater sampling has identified two constituents of concern, iron and manganese, above California discharge standards. All water will first be treated to remove the constituents before being discharged into South Fork Wolf Creek. As described previously, groundwater will be pumped from underground workings to the existing 40-acre-foot, clay-lined settling pond. The settling pond will be used for water storage and removal of total suspended solids. An aeration system will be installed in the settling pond that oxygenates the water to precipitate (i.e., create a solid from a solution) a significant portion of dissolved iron. Water will then be pumped to the water treatment plant and filtered to remove the remaining iron and manganese. Settled solids and precipitated iron and manganese will be contained in the clay-lined settling pond, which will be removed approximately every 10 years. The solids removed from the pond will be hauled to an appropriate and approved landfill off-site. The water treatment

system will be designed to allow for contingencies and alternative treatments to remove other constituents of concern or adjust the pH of the water, if necessary.

Treated water will be pumped through a pipe for discharge to South Fork Wolf Creek, as described in the following section. All discharges from the water treatment plant will be discharged into South Fork Wolf Creek per the requirements of the Central Valley Regional Water Quality Control Board, National Pollutant Discharge Elimination System, Number CAG995002. The water discharged into South Fork Wolf Creek is expected to be at least as good or better quality than the water typically flowing through South Fork Wolf Creek.

Treated Water Pipeline and Outfall

After the groundwater has been treated, it will be pumped from the water treatment plant through an aboveground pipeline along an existing access road on the property to an outfall located adjacent to South Fork Wolf Creek. Sheet 1 shows the treated water pipeline route and approximate location of the outfall structure.

The treated water pipeline will be an aboveground pipe and run along surface inside the property boundaries. The treated water pipeline will cross a Pacific Gas and Electric Company (PG&E) power distribution line and NID water line easement. At the easement location, the treated water pipeline will be placed in a manner allowing maintenance vehicles to pass over it and the pipe to be decoupled and moved easily for maintenance.

Operational Dewatering

Groundwater is anticipated to continue to infiltrate the underground workings at a rate of approximately 1.9 cfs (850 gpm) once dewatering is complete. The permitted discharge of 5.6 cfs will provide flexibility to meet the operational requirements for continuous mine dewatering throughout the mine's operation. Operational dewatering during exploration and mining will require the use of centrifugal pumps and sumps at specific elevations during the production life of the mine. Similar to the initial dewatering effort, although at a reduced quantity, groundwater will be pumped to the surface and settling pond via a pipe for water treatment, as described previously in the "Initial Mine Dewatering Process" subsection.

6.4 Underground Mining

Exploration and mining of the underground workings will begin once dewatering is complete. Exploration and mining will occur 24 hours a day and 7 days a week. A detailed description of these activities is provided in the following sections. See Section 6.5 for a description of aboveground processing and Section 7.8 for off-site transport.

Exploration

Underground exploration will take place after mine dewatering is complete and throughout the life of the mine. Exploration will be done primarily with diamond core drilling throughout the mine area. Exploration will produce core samples that will be brought to the surface for analysis to determine future mining areas.

Mine Development (Tunneling)

To provide access to the gold mineralization, an extensive network of tunnels and raises will be constructed throughout the life of the mine. These tunnels are constructed in the nonmineralized rock

which, at the mine, is typically meta-andesite volcanic rock. The tunnels are constructed in 10-foot advances per blast (a “round”). A number of parallel holes are drilled into the rock face, loaded with explosives, and then detonated to fragment the rock. The broken rock is moved to the surface, the tunnel is supported with rock bolts and screen, and then the process starts again to continue advancing the tunnel. A number of tunnels will be under construction throughout the mine area at all times during the life of the mine. Explosives used include ammonia nitrate fuel oil (ANFO) and packaged or bulk emulsion explosives. Explosives are transported to the site from the manufacturer and then immediately moved and stored underground in secure explosive magazines.

New underground tunnels and raises will be created as necessary to access gold-quartz veins or provide the necessary underground infrastructure to transport rock and provide ventilation and escape routes. Rise has approximately 2,585 acres of underground mineral rights as shown in Figure 3a. The location, size, and depth of new underground workings will depend on surface and underground drilling and mineral testing. New underground workings, except for the Service shaft and new ventilation raise, will be below 500 feet of the surface. All underground workings will remain within the boundaries of Rise’s underground mineral rights, shown in Figure 3a.

Mine development in nonmineralized “barren” rock (i.e., nongold bearing) is expected to result in the production of approximately 500 tons per day (182,500 tons per year) of barren rock. The barren rock will be transported from the tunnel face to the mine shaft (using electric or diesel-powered load/haul/dump vehicles, rail cars, and/or conveyors) to underground rock bins located adjacent to the shaft. The rock will then be loaded into the shaft skips, hoisted to the surface, and dropped into one of the compartments of the concrete silo located on the surface. The barren rock will then be transported by trucks on the surface for use as engineered fill.

Gold Mineralization Production (Tunneling and Production Blasting)

Generally, mining of a block of gold mineralization begins by creating horizontal tunnels along the length of a gold-quartz vein, using similar techniques as described in the previous section. Horizontal tunnels are created through the body of mineralization on vertical spacing of approximately every 50 feet. Once the tunnels are completed, a pattern of drill holes are drilled between the two levels. These long holes are then loaded with explosives and detonated to fragment the mineralized rock so that it can be transported to the shaft and then to the surface.

Gold mineralization production through tunneling and long-hole blasting produces 1,000 tons per a day (365,000 tons per year) of mineralized material. Approximately 50 percent of the mineralization will be returned to the underground mine as backfill after processing and the remainder will be used for engineered fill.

Backfill

Mining of gold-quartz veins creates voids that will be filled as mining progresses to ensure the stability of the underground workings. Sand tailings produced by mineral processing on the surface will be blended with cement and water and pumped back into the mine to backfill mined voids. Approximately 50 percent of the sand tailings (500 tons per day) will be placed underground as cemented paste fill.

6.5 Aboveground Facilities Construction and Operations

To support dewatering and underground mining, aboveground structures and processing facilities will need to be constructed. As shown in Sheets 1 and 2, approximately 15 acres of previously disturbed land

on the northeast side of the Brunswick Industrial Site will be graded to construct the ventilation system, headframe and hoist, water treatment plant, collar replacement, mineral processing plant, service shaft, various buildings, internal roads, and parking areas. Site grading will create a flat pad with a 1- to 2-percent grading toward a storm drain system and detention pond to collect sheet flow. Areas will be covered with asphalt or concrete as necessary to support facilities construction. The site currently has approximately 9 acres of impervious asphalt paving from previous land uses. Some of the existing asphalt areas will be removed and some will be reused. After completion of construction, the impervious surfaces and buildings will cover a total of approximately 15 acres of the Brunswick Industrial Site. The following sections provide a description of the aboveground facilities to be constructed and their operation.

Brunswick Shaft Entrance Improvements

Collar Replacement and Shaft Refurbishment

The Brunswick shaft is currently covered and will require improvements before installation of ventilation, a headframe and hoist system, and associated infrastructure (e.g., power lines, dewatering pipes, communications) to support underground exploration and mining. The existing concrete collar, which extends through the overburden (soil and weathered rock) from surface to solid bedrock, will be replaced with a new concrete collar to approximately 40 feet below ground surface. In addition, because groundwater is currently approximately 260 feet below the ground surface, many of the timbers above the groundwater level supporting the shaft are anticipated to have suffered rot and will need to be replaced. Timbers will be replaced with new timbers or similar engineered support structures. As dewatering occurs and additional timbers are exposed, timbers will be replaced as necessary.

Ventilation Raise and Exhaust System

The Brunswick shaft will be used as the return air or exhaust for the mine. To allow sufficient air flow, a second shaft will be constructed adjacent to the Brunswick shaft from the surface to 580 feet deep. This shaft will be constructed by raise boring upward from 580 feet underground, and not by blasting, to ensure the existing shaft is not damaged.

A building over the new ventilation raise and the Brunswick shaft will direct exhaust mine ventilation air up through the headframe, where it will exit at a height of approximately 165 feet aboveground.

The combined shafts are sized to allow a total mine ventilation capacity of approximately 200,000 cubic feet per minute (cfm). Ventilation is necessary to provide fresh air for underground workers and disperse equipment emissions.

Underground Support Systems Infrastructure

As initial dewatering exposes the underground workings, but before underground mining operations begin, a variety of support systems will be installed to ensure safe and consistent underground mining operations. A ventilation system will be installed to provide fresh air from aboveground to workers underground. Aboveground facilities necessary to support pumping of fresh air underground include a primary ventilation fan and duct work. The primary ventilation fan will have housing on its sides and a silencer to reduce noise levels. The front of the ventilation fan will have a vent connected to duct work that will carry air underground. In addition, secondary fans will be installed underground to promote air circulation. The ventilation system will be electric.

Once the service raise is completed and the permanent ventilation system is constructed, the primary ventilation fans will be located underground and the temporary ventilation fan on the surface at the Brunswick shaft will be removed.

In addition, a variety of cables and pipes will be needed to transport electrical power, compressed air, and service water underground. Electrical power will be provided by a line power substation and/or aboveground generator to support underground lighting, electrical mobile equipment, and other infrastructure. Aboveground compressors will supply compressed air, which will power tools and equipment.

Hoist and Headframe

Installation of a new hoist and headframe is necessary to support the transport of employees, supplies, barren rock, and mineralized rock to the surface once the underground workings have been dewatered. The approximately 165-foot-high headframe is a structural support that will be constructed out of steel above the Brunswick shaft and enclose the existing concrete silo. The headframe will support the cable(s) that are connected to the hoist on one end and the mine cage and skips on the other end. The headframe and silo will be enclosed inside a pre-engineered metal building and the hoist will be housed in a separate pre-engineered building.

Rock Bin Conveyors and Barren Rock Loading Area

The existing concrete rock silo will be reused. The rock silo has two small compartments and one large compartment. A chute and conveyor system will transfer barren rock from the silo into trucks for transport as engineered fill. The conveyor system and truck loading area will be inside a small building adjacent to the headframe. A chute and covered conveyor system, approximately 335 feet long, will transfer gold mineralization from the silo to the process plant.

Service Shaft

A new mine shaft will be developed on the Brunswick Industrial Site (see Sheets 1 and 2). The service shaft may be circular or rectangular depending on the methods used in its construction. The service shaft will be approximately 1,000 feet southeast of the existing Brunswick shaft and developed to at least 3,280 feet below ground surface. The service shaft will connect to existing underground workings accessible from the Brunswick shaft. The service shaft will be equipped with a hoist and headframe that is approximately 80 feet high to provide movement of workers and materials underground, fresh air ventilation intake, and various services such as compressed air, electricity, and pipes. No barren or mineralized rock removal will occur from this shaft.

The service shaft will be the fresh air ventilation intake. The service shaft is sized to ventilate approximately 200,000 cfm.

The overburden (i.e., soil and weak rock) will be excavated from the surface and a concrete collar installed from the surface profile to the bedrock. The depth to bedrock is approximately 60 feet. The overburden material will be excavated to allow the shaft and concrete collar to be constructed, and then the overburden will be placed and compacted around the concrete collar to the original ground surface elevation.

The service shaft excavation in rock will be constructed from the underground mine workings upward to the surface through a process called raising. This raise excavation could be completed using either mechanical raise boring or Alimak raising:

- **Raise boring** is carried out using a raise bore machine located on the surface. A drill hole is made from the surface to the underground workings. After a cutting head is attached underground to the end of the drill pipe, the raise bore machine pulls the rotating cutting head upward to create a circular excavation in a continuous process.
- **Alimak raising** is carried out using drilling and blasting. The raise is blasted from the bottom upward. Rails are attached to the wall of the raise so that an Alimak raise climber can lift the miners to the working face. An Alimak raise is advanced with each blast in segments of approximately 10 feet. The resulting excavation is rectangular.

Process Plant

Gold mineralization hoisted from the Brunswick shaft will be placed in the existing concrete silo located on the Brunswick property before processing begins (see Sheets 1 and 2). The rock size may be reduced using an underground jaw crusher before hoisting it to the surface.

Gold-bearing material will be transported from the concrete silo using chutes and conveyors to a fully enclosed process plant by a covered conveyor system, approximately 335 in length. Water is added and the mineralized rock is ground in grinding mills to size before the gold is recovered. A gravity concentrator is in the grinding circuit recovers approximately 70 percent of the gold. The slurry of ground mineralized rock and water that results from this process is pumped to a second gold recovery system, sulfide flotation, where the remaining recoverable gold is captured in a sulfide mineral concentrate. The majority of sulfide minerals are recovered in the sulfide mineral concentrate for shipment off-site. Each method will remove gold from the mineralized rock into a concentrate. The gold concentrate will be dewatered using thickeners and filter presses before it is bagged for off-site shipment. The gravity gold concentrate may be further concentrated on-site using gravity, water, and a small furnace to create gold doré bars. Approximately 20 tons of gold concentrate will be produced and bagged on-site per day.

Sand tailings (waste) from the gold recovery process will be dewatered and used for either backfill for the underground mine or stockpiled for transport and use as engineered fill. Sand tailings during backfilling will be transferred to the paste backfill plant, where the sand will be dewatered and mixed with cement into a paste. The paste will be pumped back underground and used to backfill mining voids. Sand tailings not used for backfill will be either directly loaded into trucks in the process plant or stockpiled inside the building. Stockpiled sand tailings will be loaded into transport trucks with a front-end loader during daytime hours. Sand tailings not used as underground backfill will be transported for use as engineered fill.

The processing plant includes common reagents such as collectors, promoters, frothers, and flocculants. No mercury or cyanide will be used in gold mineral processing.

The process plant will be contained in a single building, with dimensions of approximately 425 by 70 by 65 feet (length by width by height). A thickener tank and paste feed tank, several water tanks, and cement silo will be located outside and behind the plant building and masked from view of Brunswick Road.

Engineered Fill Transport

Barren rock hoisted from the Brunswick shaft will be placed in the existing concrete silo located on the Brunswick Industrial Site (see Sheets 1 and 2). The barren rock will be transported from the concrete silo using a series of chutes and conveyors to a fully enclosed truck loading building. Barren rock may be

mixed with sands from the gold processing system to create an engineered fill that meets appropriate geotechnical specifications for construction of the development pad(s).

Trucks will transport barren rock from the Brunswick Industrial Site to the Centennial Industrial Site or Brunswick Industrial Site engineered fill areas.

Transport of barren rock to the Centennial Industrial Site will occur 16 hours per day, 7 days per week. An approximately 44-acre area of the 56-acre Centennial Industrial Site will be filled using engineered fill from the Brunswick Industrial Site over approximately 5 years. On the Brunswick Industrial Site, engineered fill will be transported from the truck loading area to an approximately 31-acre portion of the Brunswick Industrial Site (see Sheets 1 and 2). It will take approximately 6 years to fill the Brunswick Industrial Site fill area to design elevations. Engineered fill produced will also be utilized in the local and regional construction markets.

Detention Pond, Storm Drains, and Culvert Replacement

Both the Brunswick and Centennial Industrial Sites include stormwater drainage, storage, and conveyance features meeting County requirements. As shown on Sheets 1 and 2, the developed portions of the Brunswick Industrial Site will be graded to drain into storm drain lines. In addition, concrete-lined v-ditches will be constructed at the top and toe of the engineered fill pad. The storm drain lines and v-ditches will transport stormwater flows to a detention basin. The detention basin is designed to accommodate up to a 100-year storm events and will discharge approximately 50 feet upstream of South Fork Wolf Creek.

A buried 48-inch culvert crosses the Brunswick Industrial Site. The culvert transports off-site surface drainage from Brunswick Road. South Fork Wolf Creek originates from the outlet of this 48-inch culvert. As shown on Sheets 1 and 2, this culvert will be upgraded and replaced to avoid proposed facilities and development. The new 48-inch culvert will discharge at the same location as the existing 48-inch culvert.

The southwest portion of the water treatment pond berm will be excavated and rebuilt before dewatering commences. The clay liner of the berm may be maintained throughout the life of the project or covered with a geomembrane liner to ensure no seepage from the pond occurs.

As described in Section 6.6 below, engineered fill will be brought onto the Centennial Industrial Site to construct a pad for future development. The engineered fill pad will be surrounded by both storm drain lines and concrete v-ditches that transport stormwater flows to a detention basin. The detention basin is designed to accommodate up to a 100-year storm event and will discharge to the historic drain tower and existing drainage culvert.

Post project storm-water discharge from the Brunswick Site, including the treated mine water discharge of 5.6 cfs, will be equal to or less than the estimated preproject storm-water discharge levels. Postproject storm-water discharge from the Centennial Site will be equal to or less than the estimated preproject storm-water discharge levels. Therefore, with the construction of the storm-water detention ponds, the project will not increase flows in creeks during storm events.

Office, Warehouse, and Changeroom Buildings

Table 4, "Buildings," and Table 5, "Other Structures" provides the description, size, and height of the proposed buildings and structures to be constructed on the Brunswick Industrial Site. In total, approximately 122,000 square feet (sq. ft.) of industrial buildings will be constructed. Building use for the

calculation of required number of parking spaces per Nevada County Code Sec. L-II 4.2.9 can generally be classified as Office (10,100 sq. ft.), General Industrial (50,700 sq. ft.), Manufacturing (51,000 sq. ft.), and Warehouse (14,500 sq. ft.).

**TABLE 4
BUILDINGS**

Building	Gross Area (Square Feet)	Maximum Height (Feet)
BRUNSWICK SHAFT COMPLEX		
Headframe	2,600	165
Shaft building	1,700	25
Conveyor and raise building	700	17
Rock truck loading	1,700	20
Hoist building	2,800	50
Electrical building	800	15
Mine compressor building	1,600	20
PROCESS PLANT AREA		
Process Plant	29,200	64
Process Plant addition	7,300	26
Generator building	3,900	20
WAREHOUSE/OFFICE AREA		
Warehouse	28,900	27
Changeroom and office building	24,600	30
Water treatment plant	8,500	26
Machinery building	1,600	20
SERVICE SHAFT COMPLEX		
Shaft building	2,700	24
Headframe (located in shaft building)	-	80
Hoist building	2,800	50
Electrical building	800	15
Machinery building	1,600	20
Security building	2,400	15

Other Structures

As shown in Table 5, approximately 9,800 square feet of additional structures will be constructed on the Brunswick Industrial Site including tanks located outside the process and water treatment plants, fuel tank, covered conveyor, and breezeway.

**TABLE 5
OTHER STRUCTURES**

Building	Gross Area (Square Feet)	Maximum Height (Feet)
Covered conveyor (Brunswick shaft to process plant)	3,400	35
Breezeway (security building to changerroom/office)	1,400	11
PROCESS PLANT		
Clean water tank	535	30
Process water tank	455	30
Tailings thickener	2,400	34
Paste filter feed tank	535	30
Cement silo	115	40

Building	Gross Area (Square Feet)	Maximum Height (Feet)
WATER TREATMENT PLANT		
Treated water tank	315	30
GENERATOR BUILDING		
Diesel fuel tank (30,000 gallons)	600	20

Parking

A total of 217 parking spaces will be provided at the Brunswick Industrial Site and distributed as shown in Table 6, "Parking." Landscaping of parking areas will be designed and constructed in compliance with County regulations. An area for bicycle racks is incorporated into the site design at the Brunswick Industrial Site and will have a minimum of 11 racks (44 bicycle spaces).

**TABLE 6
PARKING**

Area	Regular	Compact	Electric Vehicle	Wheelchair Accessible	Wheelchair Van Accessible	Total
Main parking lot	119	56	13	–	–	188
Office and warehouse	5	–	–	6	1	12
Process plant	10	–	–	1	1	12
Brunswick shaft	5	–	–	–	–	5
TOTAL	139	56	13	7	2	217

6.6 Industrial Pad Development

Centennial Industrial Site

The 56-acre Centennial Industrial Site was historically used by the Idaho-Maryland Mine to deposit mine tailings. These mine tailings were never compacted. Some of the materials used to build the tailings berm and small quantities of mineralized rock contain elevated metals. As a result, under existing conditions, the majority of the property cannot be developed because of unstable soils and/or contamination. Rise is working with the California Department of Toxic Substances Control (DTSC) to develop a plan that consolidates and caps the contaminated soils in a manner consistent with current federal and state regulations.

Rise will use the engineered fill generated as waste by-product of the gold mining process described above to fill and grade the Centennial Industrial Site. The fill and grading activities will disturb approximately 44 of the 56-acre Centennial Industrial Site. The remaining 12 acres will be avoided, which includes Wolf Creek, a minimum 100-foot setback, and special-status plant species. See Sheet 3.

As described above, the engineered fill will be transported from the Brunswick Industrial Site to the Centennial Industrial Site using haul trucks. Approximately 1.6 million tons of engineered fill over a 5-year period will be trucked from the Brunswick Industrial Site to the Centennial Industrial Site for placement and compaction. The average transport of engineered fill will be 1,000 tons per day or 365,000 tons per year. A maximum transport rate of up to 2,000 tons of engineered fill per day is required to make up for periodic weather or operational delays. Truck payloads will be approximately 20 tons per truck and therefore will require up to 100 trips per day and an average of 50 trips per day.

The environmental cleanup work at the Centennial Industrial Site will be completed under the DTSC voluntary cleanup program. After this environmental cleanup work is completed, engineered fill from the Brunswick Industrial Site will be placed, graded, and compacted. Engineered fill may be mixed on-site using mobile equipment to ensure uniformity and meet specifications for compaction. Engineered fill will continue to be placed, graded, and compacted in a series of lifts to an elevation ranging between 2,520 and 2,570 msl (approximately 30 to 70 feet above ground surface). Fill slopes will be 3:1 (horizontal to vertical) or flatter. (Sheet 4 provides sections views of the grading plan.) Following completion of fill activities, the fill slopes will be revegetated to control erosion and ensure slope stability. The final grading will result in 37 acres of flat developable land on property zoned industrial.

Brunswick Industrial Site

Engineered fill will be transported from the silo and process plant using haul trucks to an approximately 31-acre area of the Brunswick Industrial Site for placement (see Sheets 1 and 2). Approximately 2.2 million tons of engineered fill over a 6-year period will be placed and compacted. The production and daily transport rate will be the same as described above for the Centennial Industrial Site. Engineered fill will continue to be placed, graded, and compacted in a series of lifts to an elevation ranging between 2,820 and 2,830 msl (approximately 80 feet to 90 feet above ground surface). Fill slopes will be 3:1 (horizontal to vertical) or flatter. Following completion of fill activities, the fill slopes will be revegetated to control erosion and ensure slope stability. The final grading will result in 21 acres of flat developable land on property zoned for industrial uses.

6.7 Potable Water Pipeline

A buried potable water pipeline will be added to provide water to residences along a portion of East Bennett Road. Figure 6, "Route of Potable Water Pipeline," shows the route of the water line along East Bennett Road. The existing NID potable water pipeline will be extended on East Bennet Road to provide potable water service to residences currently on wells that may be affected by the project.

An approximately 1¼-mile-long by 2 feet-wide stretch of East Bennett Road will be temporarily disturbed to bury the potable water pipeline. Installation of the buried potable water pipeline will generally involve trenching, pipe placement, backfill, and cover replacement. Initially, an approximately 24-inch-wide by 42-inch-deep open trench will be developed. Excavated asphalt will be disposed of consistent with County regulations and overburden will be stockpiled for use as backfill. Upon completion of trenching in a specific section of the route, the 8-inch pipeline will be installed. The pipe will be covered with the stockpiled soil removed during trenching or engineered fill, as required by County guidelines. The backfilled trench within the East Bennett Road right-of-way will then be paved consistent with County guidelines.

Residences on the streets of Cordell Court, Miskin Court, Amethyst Court, Emerald Court, Diamond Court, and Old Mine Road and several private driveways will be offered the opportunity to connect to this new potable water line. Residential connection to this new potable water line will be voluntary and at the property owner's discretion but at Rise's cost. The pipeline will be installed within the County right-of-way in the streets named and stubbed at the property owner's property boundary in a location designated by the County. If the property owner decides to connect to the potable water line, Rise will fund the permitting and construction costs. The potable water pipeline will connect with the main water line on Whispering Pines Lane and Brunswick Road (see Figure 6).

7. OPERATIONS

7.1 Hours of Operation and Employment

Hours of operation will vary based on the project element. Table 7, “Hours of Operation,” provides the hours of operation and approximate duration.

**TABLE 7
HOURS OF OPERATION**

Project Element	Hours of Operation	Duration ¹
Initial dewatering	24 hours a day, 7 days a week	6 months
Aboveground facility outside construction	7:00 a.m.–7:00 p.m., Monday–Saturday	18 months
Aboveground facility inside construction	24 hours a day, 7 days a week	18 months
Aboveground facility operations—gold mineralization processing	24 hours a day, 7 days a week	80 years
Underground exploration/mining	24 hours a day, 7 days a week	80 years
Off-site hauling—gold concentrate	6:00 am-10:00 pm, 7 days a week	80 years
Off-site hauling—engineered fill	6:00 am-10:00 pm, 7 days a week	80 years
Outside truck loading by loader	7:00 a.m.–7:00 p.m., 7 days a week	80 years
Placement, grading, and compaction of engineered fill at Centennial Industrial Site	7:00 a.m.–3:30 p.m., Monday–Friday	5 years
Placement, grading, and compaction of engineered fill at Brunswick Industrial Site	7:00 a.m.–3:30 p.m., Monday–Friday	6 years

Notes:

¹ Durations are approximate and dependent on factors such as equipment and personnel availability, fluctuations in the economy, and technical details.

During construction a workforce of approximately 52 persons is estimated. Rise anticipates employing approximately 121 workers to support initial underground mining which will increase to approximately 312 direct employees during full operations. At full operations, approximately 44 employees will work regular 8-hour days, 5 days per week, and approximately 268 employees will work 12-hour shifts, 7 days on and 7 days off. Shift change for 12-hour employees will be 7 a.m. and 7 p.m. Work shifts for 8-hour employees will be from 7 a.m. to 3:30 p.m. Table 8, “Workforce,” provides the shift and number of employees listed by worker role. Freight deliveries to the site will be 7 a.m.–7 p.m.

**TABLE 8
OPERATIONS WORKFORCE**

Workforce	Shift	Total Employees	Employees per Shift
Management and technical staff	8 hours a day, 5 days a week— dayshift	36	36
Assaying and construction	8 hours a day, 5 days a week— dayshift	4	4
Underground mine	12 hours a day, 7 days on, 7 days off	202	50
Mineral processing	12 hours a day, 7 days on, 7 days off	64	16

Workforce	Shift	Total Employees	Employees per Shift
Truck transport of engineered fill	12 hours a day, 7 days on. 7 days off	2	1
Centennial or Brunswick Industrial Site—placement and compaction of engineered fill	8 hours a day, 5 days per week—dayshift	4	4
TOTAL WORKFORCE		312	111

7.2 Equipment

Expected equipment associated with underground mining, water treatment, gold mineralization processing, and engineered fill activities is provided in Table 9, “Typical Equipment.” The type of vehicles used will vary somewhat over time depending on availability and the introduction of new models to suit different conditions.

**TABLE 9
TYPICAL EQUIPMENT**

Equipment ¹	Uses
UNDERGROUND MINING OPERATIONS	
Jaw crusher	Primary crushing of gold mineralization and barren rock before hoisting to the surface
Drills	Drill holes for explosives placement and core drilling. Electric-Hydraulic and pneumatic.
Jumbo drill carriages	Wheeled carriers and hydraulic lifts for jumbo drills
Load/haul/dump vehicles and rail cars	Load barren and mineralized rock. Move mined barren and mineralized rock to rock bins
Personnel vehicles	Small wheeled vehicles for person transport.
Headframes, hoists, and skips	Hoist barren and mineralized rock to the surface and deposit in concrete silo. Hoist people, materials, and equipment from underground to surface.
Water pumps	Pump water from underground workings to surface for dewatering
Ventilation fans	Maintain air circulation in the underground workings
Alimak	Lift for drilling and placing explosives to create raises
Shotcrete machine	Spray concrete into the walls of the galleries to prevent rockfall
Explosives loader	Transport and load explosives
Compressor	Provides compressed air to underground mine
WATER TREATMENT PLANT	
Pressure Vessels	Manganese Dioxide filtration and activated carbon
Pumps	Transfer of water for treatment and discharge
Turbine Aerator	Aeration of water in treatment pond
MINERAL PROCESSING OPERATIONS	
Conveyor belts	Convey gold mineralization from the concrete storage silo to the gold recovery processing plant. Convey barren rock into truck loading building
SAG mill (16’x8’, 1250hp)	Primary grinding of gold mineralization
Ball mill (11’x18’, 1250hp)	Secondary grinding of gold mineralization
Gravity gold concentrator	Initial removal of gold from mineralized rock
Gold Recovery	Shaking tables and doré furnace
Sulfide flotation cell	Secondary removal of gold from mineralized rock
Cyclone and screens	Classification of materials by size
Thickeners	Settling of solids and removal of water.

Equipment ¹	Uses
Filter Presses	Dewatering of concentrate and sand tailings
Paste backfill plant	Dewater fines and combine with cement for backfill in abandoned underground workings
Pumps	Various slurry pumps to transfer material between processes
Compressor	Provides compressed air for process plant
ENGINEERING FILL OPERATIONS	
Dozer (CAT D8 or similar)	Move, grade, and compact engineered fill
Grader (CAT 140H or similar)	
Excavator (CAT 385 or similar)	
Roller compactor	
Haul trucks (20 ton)	Haul and dump engineered fill
Water truck	Water haul roads and fill areas
Front-end loader (CAT 980 or similar)	Mix barren rock and sand into engineered fill and load engineered fill into haul trucks for off-site transport
Mobile auger blending plant	Mobile plant for blending rock and sand
Mobile tire washing plant	Washing of truck tires leaving non paved sites
BRUNSWICK SURFACE MISCELLANEOUS	
Pick-up trucks	Transport materials and people
Service truck (mechanical)	Service mobile and stationary equipment
Skid steer/forklift	Move smaller material
Manlift	Elevate workers
Grove rough terrain crane	Pick-and-carry operations and off-road and "rough terrain" applications
Portable generator	Provide mobile electricity for small tools
Welder	For repairs to machinery
FUEL, CHEMICAL, AND EXPLOSIVE STORAGE	
Aboveground diesel fuel storage tank (30,000 gallons – Brunswick Industrial Site & 1,200 gallons – Centennial Industrial Site.)	Storage of fuel for trucks and mobile equipment

Notes:

¹ Equipment will be purchased at the time it is needed and may differ from equipment listed.

7.3 Fuel and Equipment Maintenance Facilities

Diesel fuel will be stored on-site in aboveground tanks with secondary containment, as required by existing regulations. In addition, a minor amount of petroleum products may be stored on-site for routine maintenance of the aboveground facilities.

An approved spill prevention, control, and countermeasures plan will guide reporting, control, and cleanup activities in the event of a spill.

7.4 Water Supply and Consumption

The Idaho-Maryland Mine will have a surplus of water from the natural groundwater flow into the underground workings. Once dewatering is completed, approximately 1.9 cfs, or 850 gpm (approximately 1,224,000 gallons per a day), are estimated to be pumped to the surface and settling pond. This water will support all project-related water demand (i.e., mining and processing activities). The process plant will run on a closed circuit.

Groundwater consumed during operations is estimated to be 123,000 gallons per day. Water consumption includes water vapor in ventilation air, cemented paste backfill, concentrates and engineered fill, and dust control and compaction of engineered fill. The following list provides a description of project elements consuming groundwater:

- **Underground mining service water:** This includes water use for dust suppression in rock drills and blasted rock piles, which is piped into the mine workings. No net consumption of water will result from these activities because water in underground workings is pumped to the surface for reuse.
- **Water Vapor in Ventilation:** Ventilation air flow through the mine working will become saturated with water vapor, consuming approximately 40,000 gallons per day of water.
- **Cemented Paste Backfill:** Water is needed to transport and bind the cemented paste backfill underground. This water is permanently retained in the backfill or used in the hydration of cement. Backfilling will consume approximately 20,000 gallons of water per day, assuming a 15 percent water content by mass and 500 tons per day of backfill placed.
- **Gold Concentrates and Engineered Fill:** Concentrates and engineered fill shipped off-site will contain approximately 24,000 gallons of water per day.
- **Dust Control and Compaction:** Active fill areas and unpaved surfaces require water to control fugitive dust and engineered fill placed at the Brunswick Industrial Site must be compacted to meet design standards. These activities are estimated to consume up to 42,000 gallons per day of water.

An average of approximately 5,700 gallons per day of potable water will be purchased from NID for sinks, toilets, and showers installed in buildings at the Brunswick Industrial Site.

Water needed for compaction and dust suppression during activity at the Centennial Industrial Site will be purchased from NID. Approximately 42,000 gallons of water per day may be required for dust suppression and compaction. Compacting 8 hours per day and 5 day per week requires water service of up to 125 gallons per minute.

7.5 Utilities

Electricity will be supplied by Pacific Gas and Electric Company. Total connected load is estimated at approximately 10 MW with a net load of approximately 6 MW. Backup power generation will be provided by four diesel generators with a capacity to provide approximately 6 MW on a continuous basis.

7.6 Lighting

The Brunswick Industrial Site will require outdoor and indoor lighting. Indoor lighting will be required for all buildings. The outside area will have shielded, downward-facing outdoor lighting for safety and security. Work at the Centennial Industrial Site will be done during daylight hours. All lighting will comply with County Development Code Design Guidelines, County Code, and currently adopted California Building Code requirements.

7.7 Sanitary Systems

An on-site septic field system will be built at the Brunswick Industrial Site for the permanent toilets, sinks, and shower facilities planned. The project will include portable chemical toilets and hand-washing stations to employees working underground and at the Centennial Industrial Site.

7.8 Access and Vehicle Trips

Access to the Brunswick Industrial Site is provided by gated entrances on both East Bennett Road and Brunswick Road. The primary entrance/exit for employees, vendors, and haul trucks will be from Brunswick Road. The East Bennett Road entrance will be used as an exit for haul trucks and large delivery trucks turning right onto East Bennett Road, for emergency personnel and, as necessary, for equipment movement.

Access to the Centennial Industrial Site is located at Whispering Pines Lane. Only employees and haul trucks will use this entrance.

Engineered fill from the Brunswick Industrial Site will be hauled to the Centennial Industrial Site via Brunswick Road and Whispering Pines Lane. Engineered fill from the Brunswick Industrial Site to other customers will be hauled using Brunswick Road to State Route 20/49. Off-site haul of gold concentrate will average one truck trip per a day using Brunswick Road to State Route 20/49.

Table 10, “Projected Employee Trip Generation Estimates,” provides a summary of employee vehicle trips. Table 11, “Projected Truck Trip Generation Estimates,” provides a summary of operational and vendor truck trips.

**TABLE 10
PROJECTED EMPLOYEE TRIP GENERATION ESTIMATES**

Uses	Axles	Daily Round Trips	Shift Change 1 7:00 AM		Shift Change 2 3:30 PM		Shift Change 3 7:00 PM	
			Entering	Exiting	Entering	Exiting	Entering	Exiting
BRUNSWICK INDUSTRIAL SITE								
Employees ¹ (weekdays)	2	174	107	67	0	40	67	67
Employees (weekends)	2	67	67	67	0	0	67	67
CENTENNIAL INDUSTRIAL SITE								
Employees ¹ (weekdays)	2	4	4	0	0	4	0	0
Employees (weekends)	2	0	0	0	0	0	0	0

Notes:

¹ Table 4 provides hours of operation and the number of employees.

TABLE 11
PROJECTED TRUCK TRIP GENERATION ESTIMATES

Uses	Axles	Avg. Daily Round Trips	Max. Daily Round Trips	AM Peak Hour		PM Peak Hour	
				Entering	Exiting	Entering	Exiting
Haul trucks with engineered fill ¹	5	50	100	8	8	8	8
Haul truck with gold concentrate	5	1	5	0	0	0	0
Fuel trucks ²	5	1	2	0	0	0	0
Freight Trucks	5	1	3	0	0	0	0
Outside services ³	2	3	4	0	0	0	0

Notes:

- ¹ Based on estimate of maximum 2,000 tons per day of engineered fill and off-site transport using 20-ton highway haul trucks (or approximately 100 trips per day).
- ² Fuel consumption is estimated at maximum 12,000 gallons per day, which, using a 7,500-gallon tanker, equals 11.2 trips per week, or approximately 2 trips per day and none during peak hours. This is a worst-case scenario that assumes operations need to rely on generator power for a period of time.
- ³ Outside services includes vendors, deliveries, and other ancillary vehicle traffic to support operations

7.9 Site Security and Fencing

The project site has perimeter fencing and all access locations are gated and secured. Additional fencing around the aboveground facilities may be installed if deemed necessary for security and safety. Additionally, private security services will be provided if Rise determines them necessary.

7.10 Mine Rescue and Emergency Response

The project will include fully trained and equipped mine-rescue teams. Mine-rescue teams will be trained in accordance with Mine Safety and Health Administration (MSHA) regulations and will be available to respond to underground and surface fires, accidents, or medical emergencies. The operator will seek cross-training opportunities and mutual-aid agreements with local emergency response organizations and other mining operations. The project will always have skilled tradesmen on-site, including electricians and mechanics.

8. RECLAMATION PLAN

Upon completion of underground mining, access to underground workings will be closed consistent with federal and state regulations. Upon completion of aboveground gold processing and off-site sale of engineered fill, the Brunswick Industrial Site will be reclaimed. A majority of the aboveground facilities and structures will remain to support the sites postmining industrial land use. Table 12, “Reclamation Plan Summary for Operation Components,” provides a summary of which project components will remain. All paved surfaces, including access roads, parking areas, and driveways, will remain to facilitate access to the site and buildings. The Brunswick and Centennial Industrial Sites fill slopes will be revegetated with an erosion-control seed mix to reduce erosion and maintain fill slope stability. The fill pads will be maintained until they are used or sold for future industrial purposes.

TABLE 12
RECLAMATION PLAN SUMMARY FOR OPERATION COMPONENTS

Site Component	Reclamation Plan
Potable water extension	To remain to service East Bennett residential area.
BRUNSWICK INDUSTRIAL SITE	
Engineered fill	Transported from process plant, Compacted and graded in lifts per geotechnical report recommendations. Side slopes will be vegetated and the pad will be an area for future industrial use.
Covered conveyor from Brunswick headframe to process plant	To be dismantled and removed.
Brunswick and Service shaft headframes and headframe buildings	To be dismantled and removed.
Brunswick shaft	To be closed per applicable state and federal regulations.
Service shaft	To be closed per application state and federal regulations.
Buildings (Including Mineral processing plant, changeroom and office, warehouse, hoist rooms, generator, water treatment plant, etc.)	Contents of buildings to be removed; buildings to remain for future industrial use.
Site drainage facilities	To remain on-site for support of future industrial development.
Diesel fuel tank (30,000 gallon)	To be emptied and removed.
Process tanks (clean water, process water, tailing thickener, paste filter feed tank, cement silo, finish water tank)	To remain for future industrial use.
Water treatment pond	To remain on-site for future industrial uses.
South Fork Wolf Creek	Outfall pipeline to be removed after mine dewatering activities no longer needed.
Paved surfaces, access, and roads	To remain.
CENTENNIAL INDUSTRIAL SITE	
Engineered fill	Transported from process plant, Compacted and graded in lifts per geotechnical report recommendations. Side slopes will be vegetated and the pad will be an area for future industrial use.
Site drainage facilities	To remain on-site for support of future industrial development.
Paved surfaces, access, and roads	To remain.

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REFERENCES AND RESOURCES

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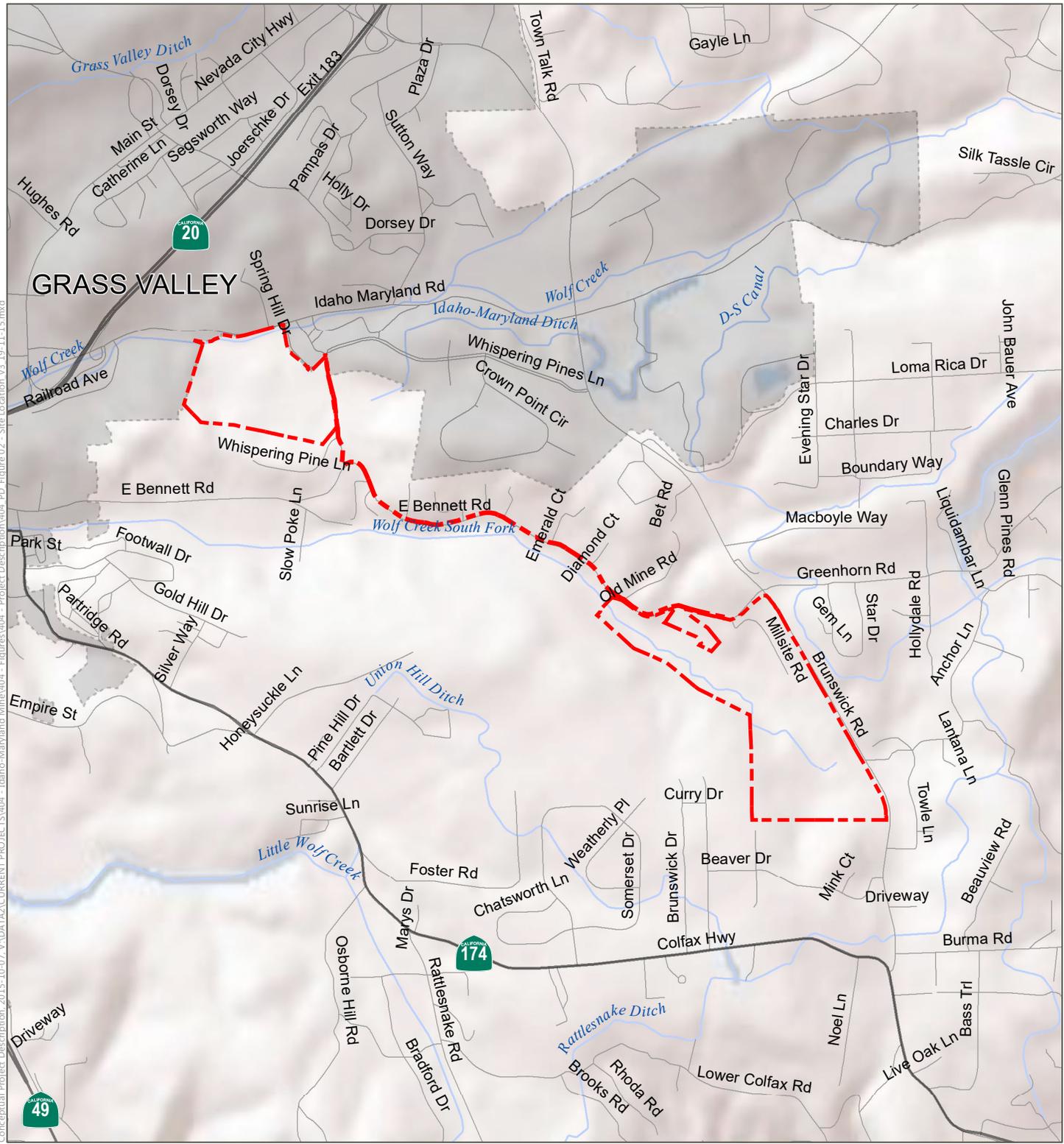
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FIGURES



SOURCES: ESRI World Shaded Relief accessed May 2019, ESRI World Topographic Map accessed May 2019; ESRI World Streetmap, 2009; compiled by Benchmark Resources in 2019

-  Project Location
-  City Boundary
-  County Boundary
-  Interstate Highway
-  State Route

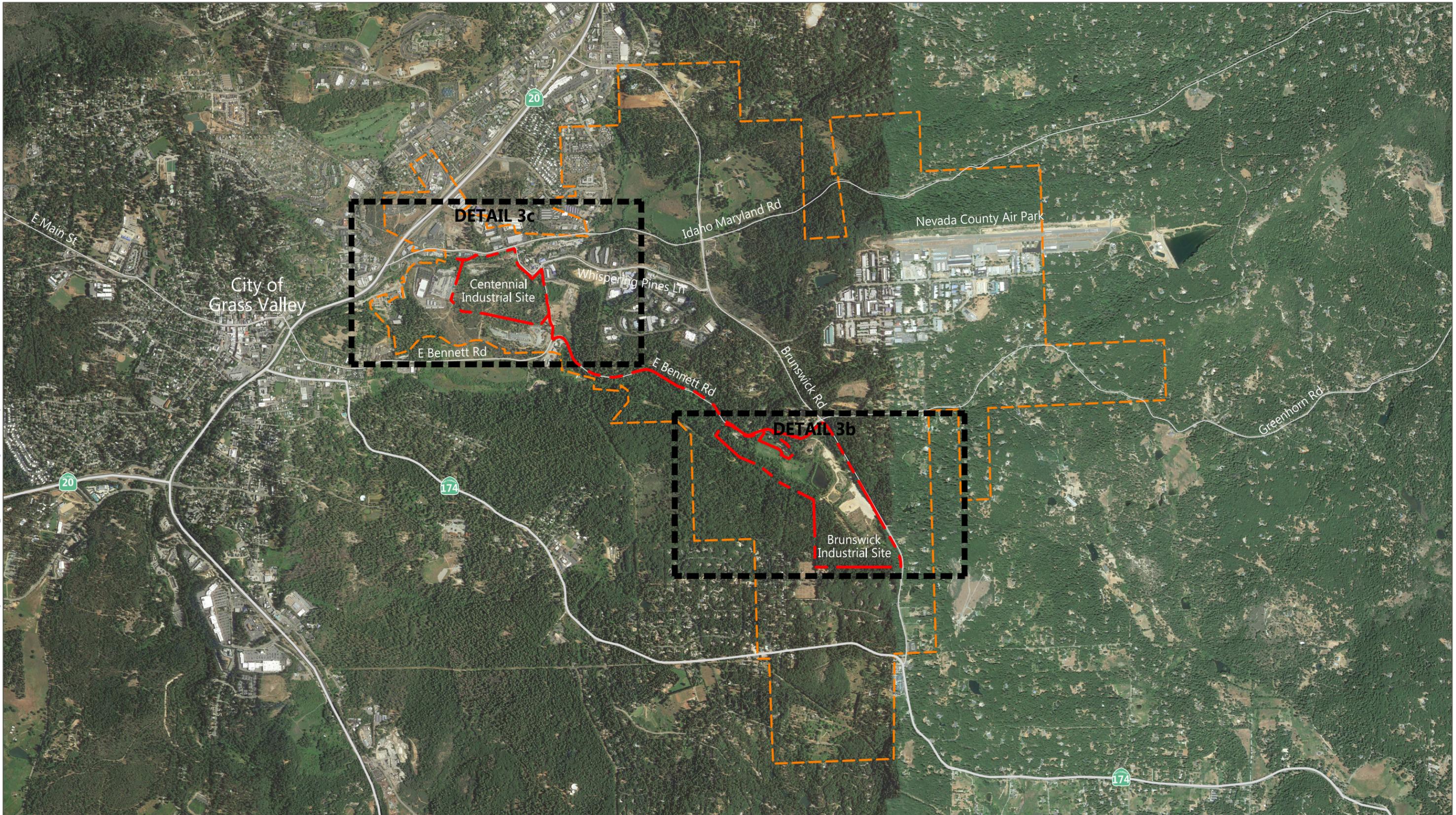


Conceptual Project Description, 2015-10-07, V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description\404_PD_Figure 02 - Site Location.v3_19-11-15.mxd

SOURCES: ESRI World Shaded Relief accessed May 2019, ESRI World Topographic Map accessed May 2019; ESRI World Streetmap, 2009; City Boundary-Nevada County Open Data - GIS Division, accessed November 2019; adapted by Benchmark Resources in 2019

- Project Boundary
- City Boundary
- State Route
- Street
- Waterway

V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description



SOURCE: Google Earth Pro (flown 5-17-2018); compiled by Benchmark Resources in 2019

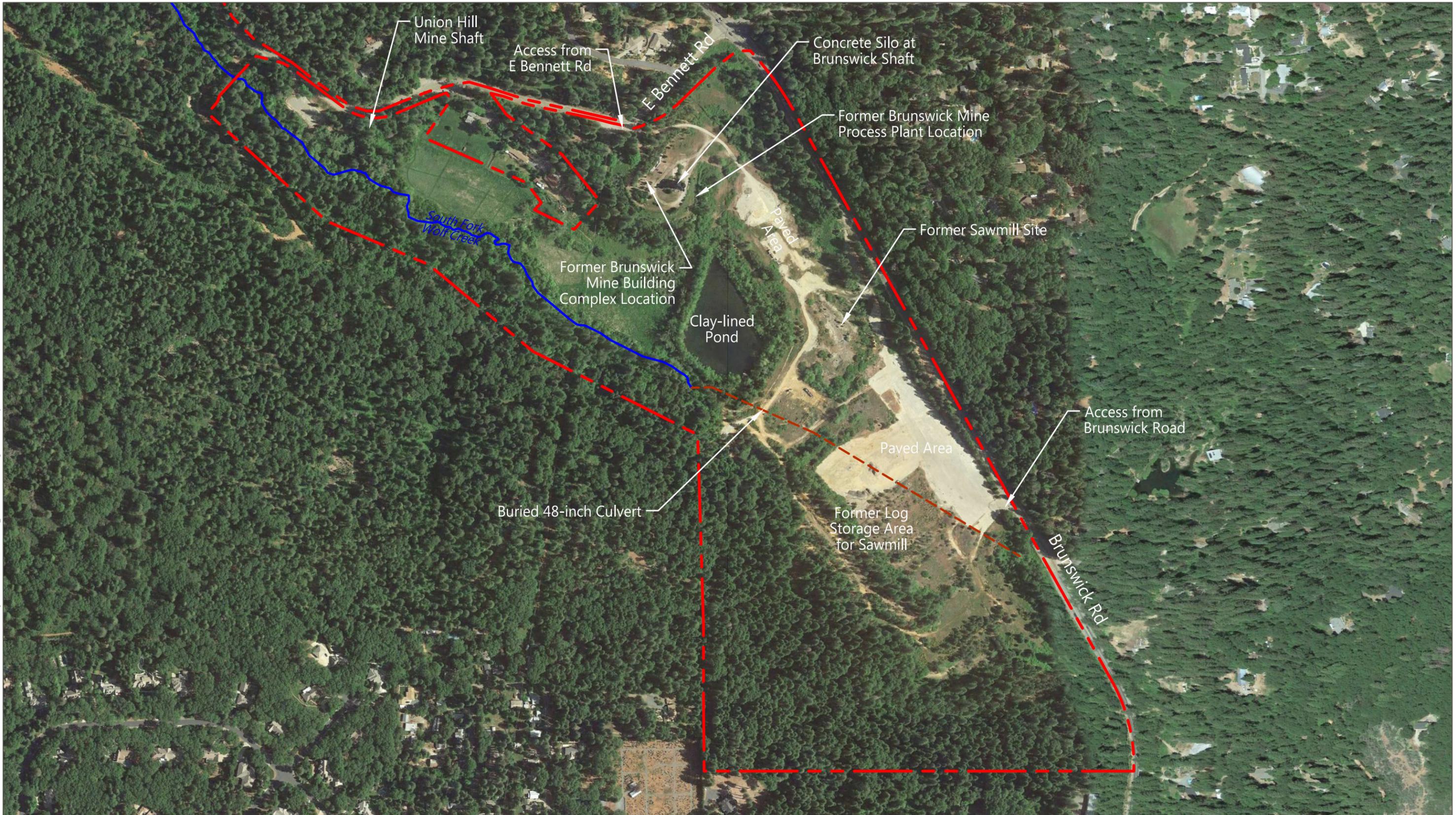
NOTES:

- 1. New underground workings will not extend within 500 feet of the surface, except at access points on-site.
- 2. See Figure 3b and Figure 3c for detail maps shown.

- - - - - Project Boundary
- - - - - Underground Mineral Rights Boundary
- State Route
- Street



V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description

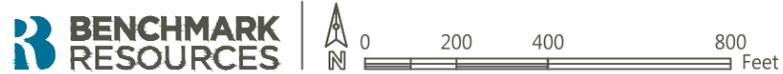


SOURCE: AERIAL-Google Earth Pro (flown 5-17-2018); compiled by Benchmark Resources in 2019

NOTES:

- 1. See Figure 3a for detail location.

- Project Boundary
- - - Buried Culvert
- Waterway



Existing Site Conditions: Brunswick Industrial Site
 IDAHO-MARYLAND MINE PROJECT DESCRIPTION
Figure 3b

V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description



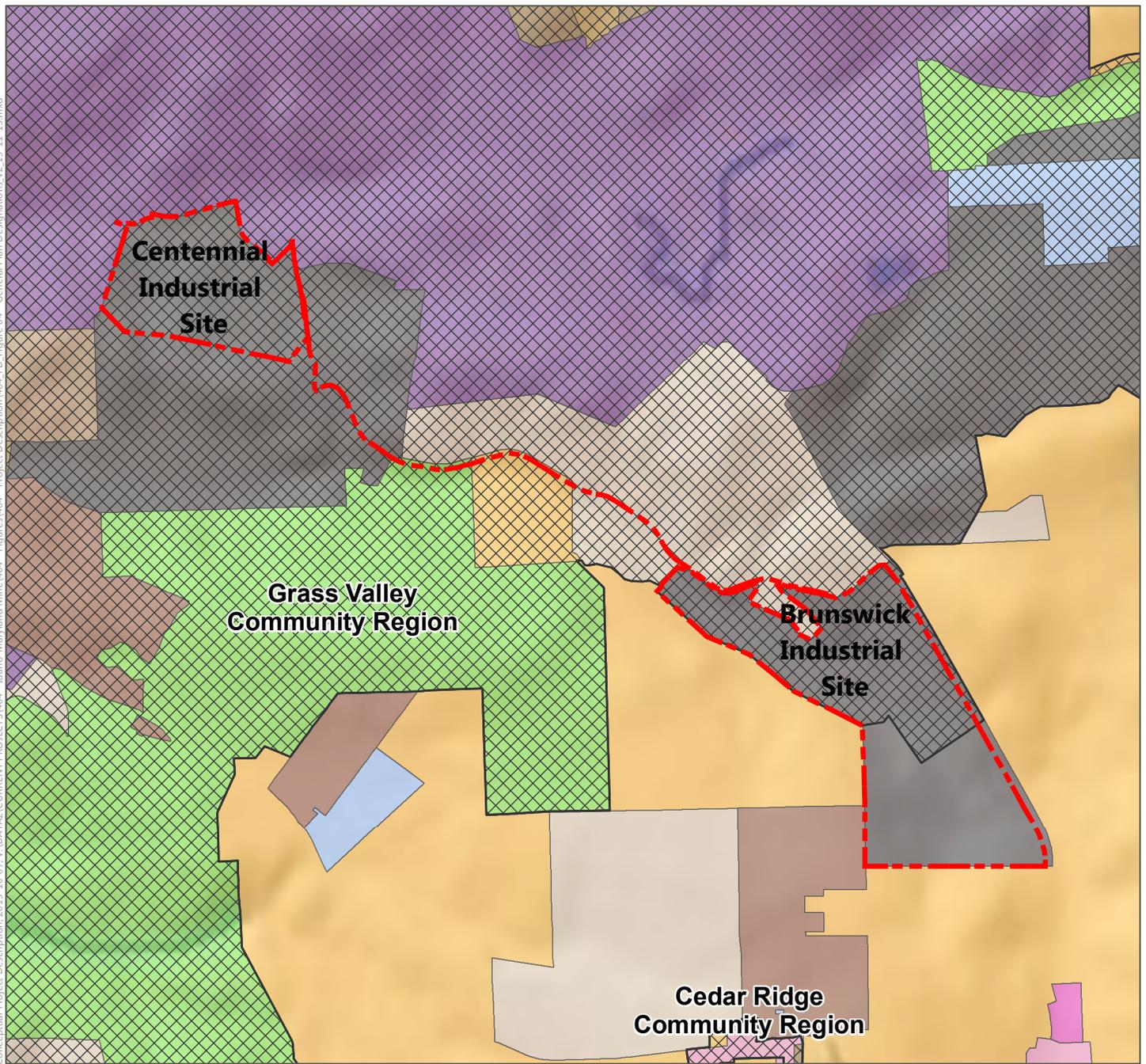
SOURCE: Google Earth Pro (flown 5-17-2018); compiled by Benchmark Resources in 2019

NOTES:

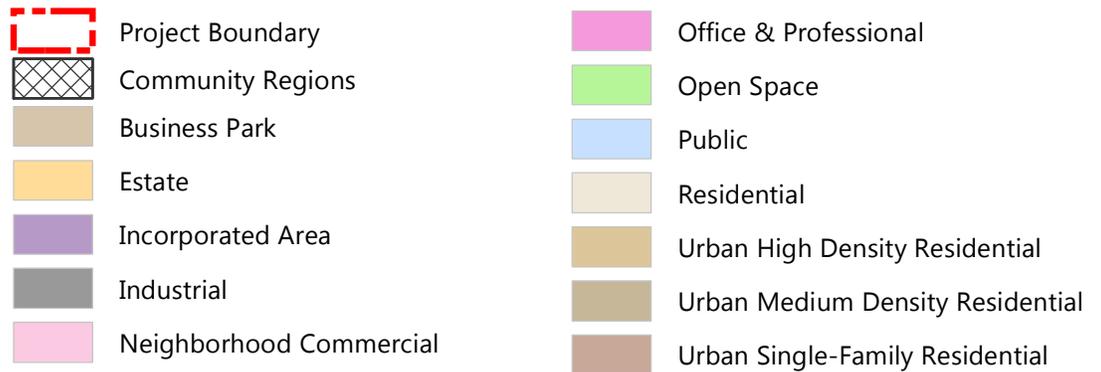
- 1. See Figure 3a for detail location.

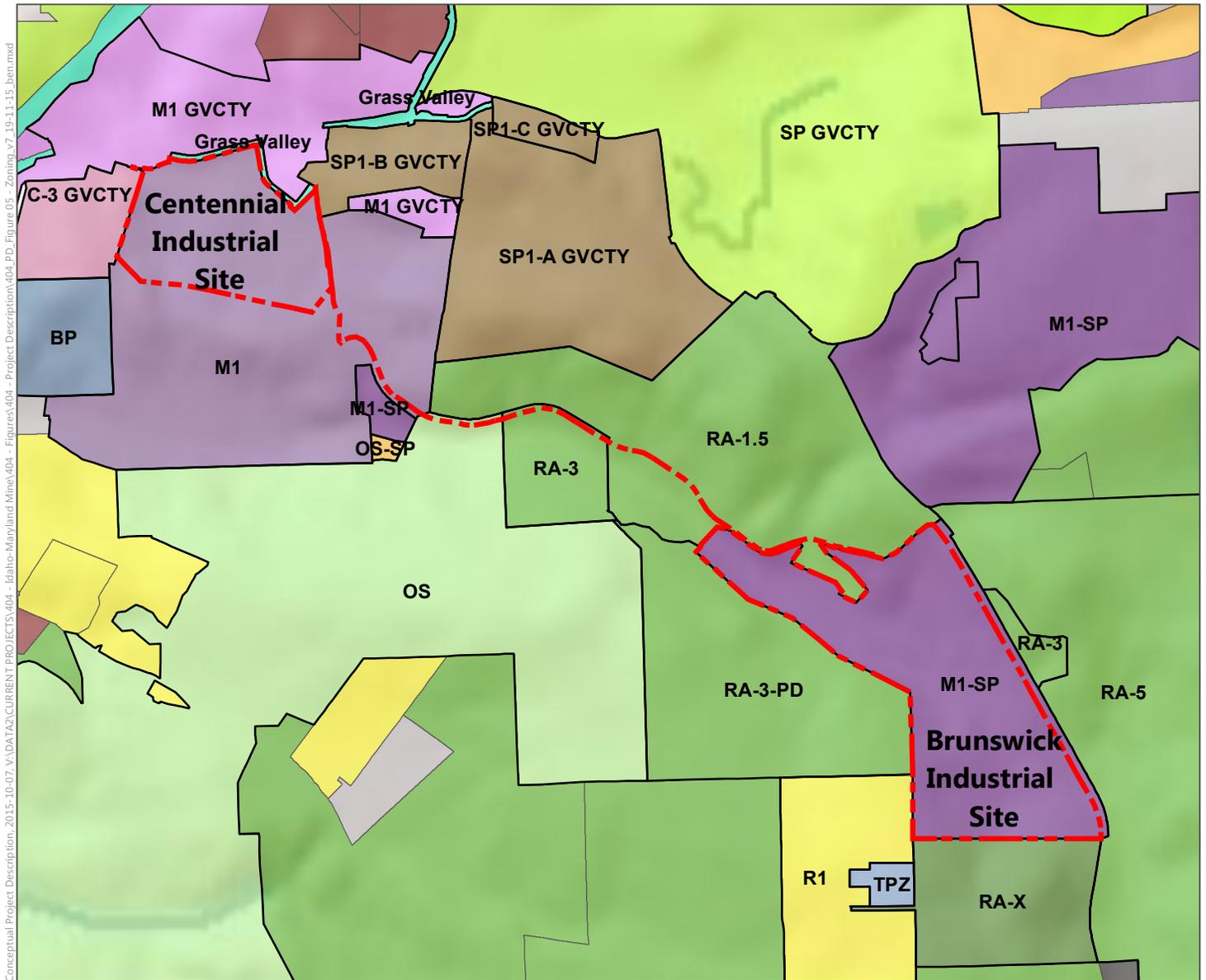
- Project Boundary
- Waterway

Conceptual Project Description, 2015-10-07, V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description\404_PD_Figure 04 - General Plan Designations v2_19-11-15.mxd



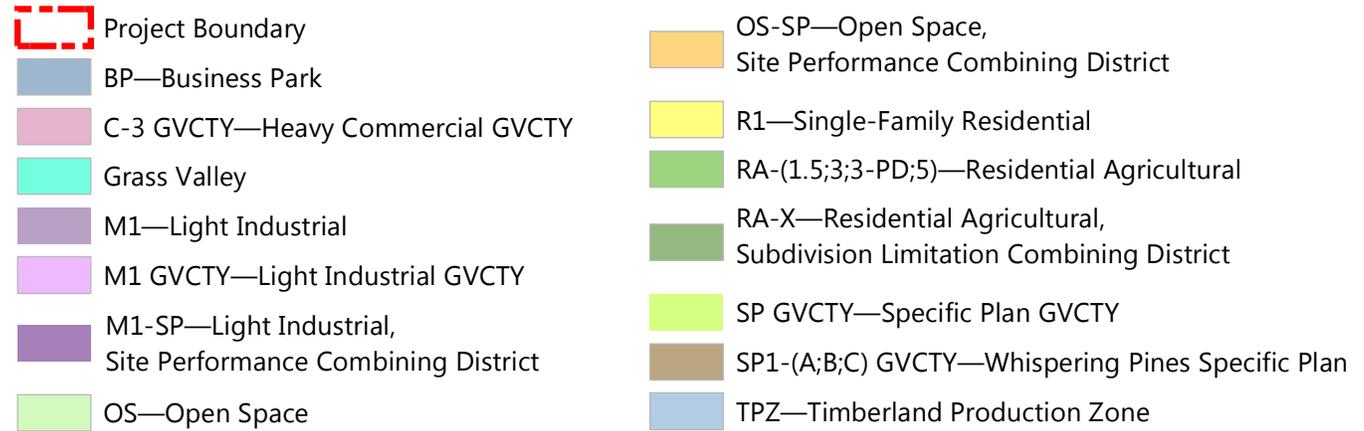
SOURCES: ESRI World Shaded Relief accessed May 2019, ESRI World Topographic Map accessed May 2019; ESRI World Streetmap, 2009; General Plan Designations—County of Nevada - Open Data - GIS Division "General Plan - Landuse"; adapted by Benchmark Resources in 2019



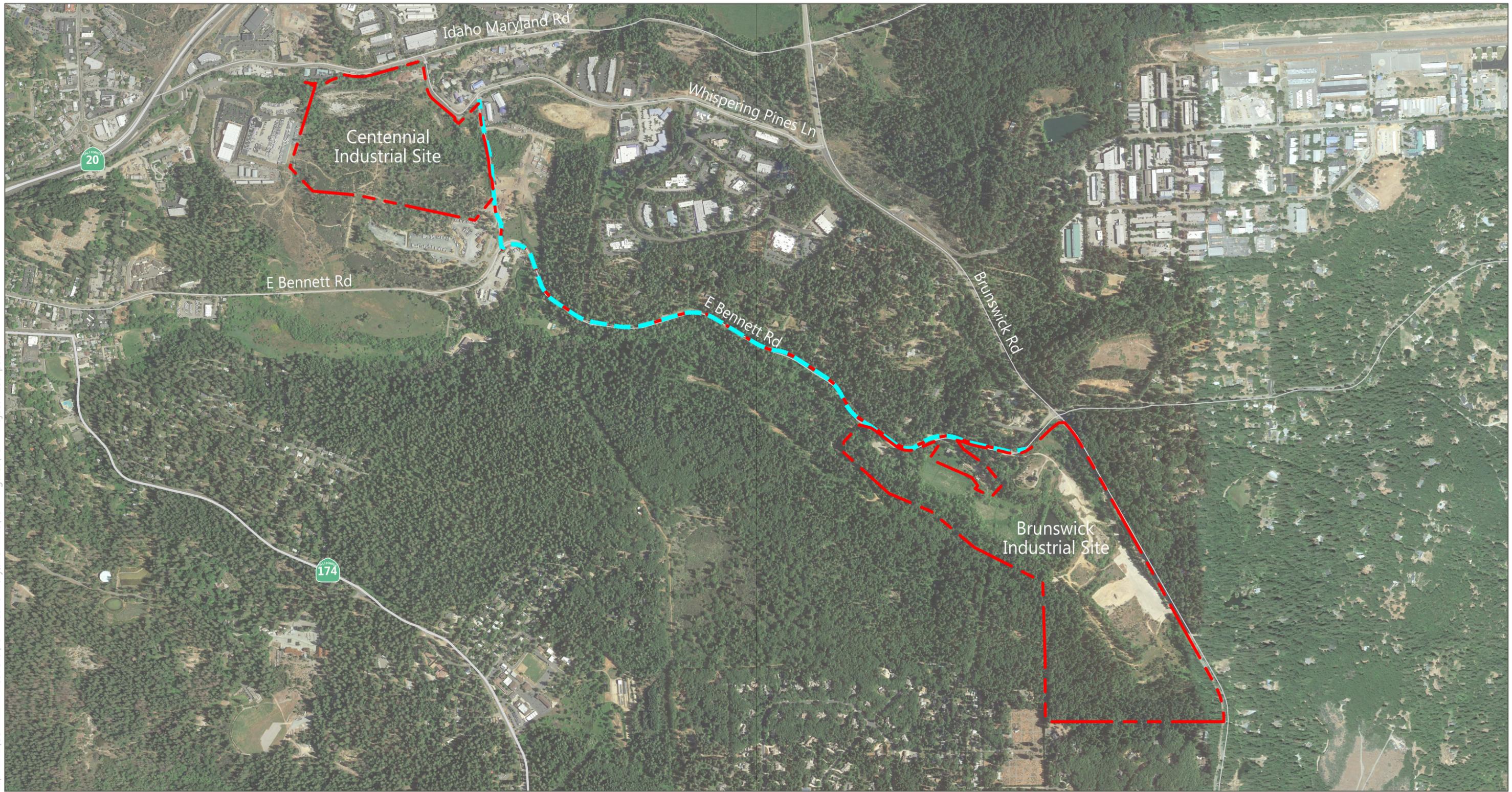


SOURCES: ESRI World Shaded Relief accessed May 2019, Zoning—County of Nevada - Open Data - GIS Division "Zoning Districts" (10-17-2018); Nevada County Zoning Ordinance (Article 2; Section L-II 2.1 Establishment of Zoning Districts); adapted by Benchmark Resources in 2019

- NOTES:
- "GVCTY" refers to City of Grass Valley Zoning Ordinance descriptions.
 - Zoning descriptions pulled from "ZONEDETAIL" field attributes for areas under Nevada County Zoning Ordinance; descriptions pulled from "ZONETYPE" field attributes for areas under City of Grass Valley Zoning Ordinance.
 - Labels pulled from "ZONECODE" filed with some labels combined in legend for simplicity.



V:\DATA\CURRENT PROJECTS\404 - Idaho-Maryland Mine\404 - Figures\404 - Project Description



SOURCE: Aerial—Google Earth Pro (flown 5-17-2018); Pipeline—Rise Gold Corp, 2019; compiled by Benchmark Resources in 2019

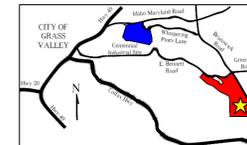
-  Project Boundary
-  Potable Water Pipeline
-  State Route
-  Street

SHEETS

Building Number	Building Name	Area (ft ²)	Building Number	Building Name	Area (ft ²)
1	Brunswick Headframe	2,600	16	Cement Silo	110
2	Brunswick Shaft Building	1,700	17	Water Treatment Plant	8,500
3	Brunswick Raise Building	280	18	Treated Water Tank	310
4	Brunswick Conveyor Building	420	19	Machinery Building	1,600
5	Brunswick Rock Truck Loading	1,700	20	Changeroom and Offices	24,600
6	Brunswick Electrical	800	21	Warehouse	28,900
7	Brunswick Mine Compressor	1,600	22	Service Shaft	2,700
8	Brunswick Hoist	2,800	22a	Service Headframe	300
9	Covered Conveyor	3,400	23	Security Building	2,400
10	Process Plant	29,200	24	Service Hoist	2,800
11	Process Plant Addition	7,300	25	Machinery Building	1,600
12	Clean Water Tank	530	26	Service Electrical	800
13	Process Water Tank	450	27	Breezeway	1,400
14	Tailings Thickener	2,400	28	Fuel Tank (30,000 gal)	600
15	Paste Filter Feed Tank	530	29	Generator Building	3,900



Idaho-Maryland Mine Project
 Rise Grass Valley Inc.
 PO Box 271
 Grass Valley, California, USA 95945



Brunswick Industrial Site
 Nevada County
 SEC. 31, T. 16N, R. 9E., M.D.M
 Total Area = 118.93 Acres
 Assessor Parcel Numbers:
 09-630-37, 09-630-39, 09-441-03, 09-441-04,
 09-441-05, 09-441-34
 Current Zoning M1-SP
 Proposed Zoning M1-ME

LEGEND

- Water Treatment Pond
- Structure - Planned
- Structure - Planned - removed at mine closure
- Paved Road - Existing offsite
- Paved Road - Planned onsite
- Paved Parking and Sidewalks - Planned
- Paved Area - Planned

- Section Line
- Brunswick Industrial Site - Boundary
- Elevation Contour Line - 2 foot intervals
- Elevation Contour Line - 10 foot intervals
- Proposed treated mine water discharge pipe
- Creek - Perennial

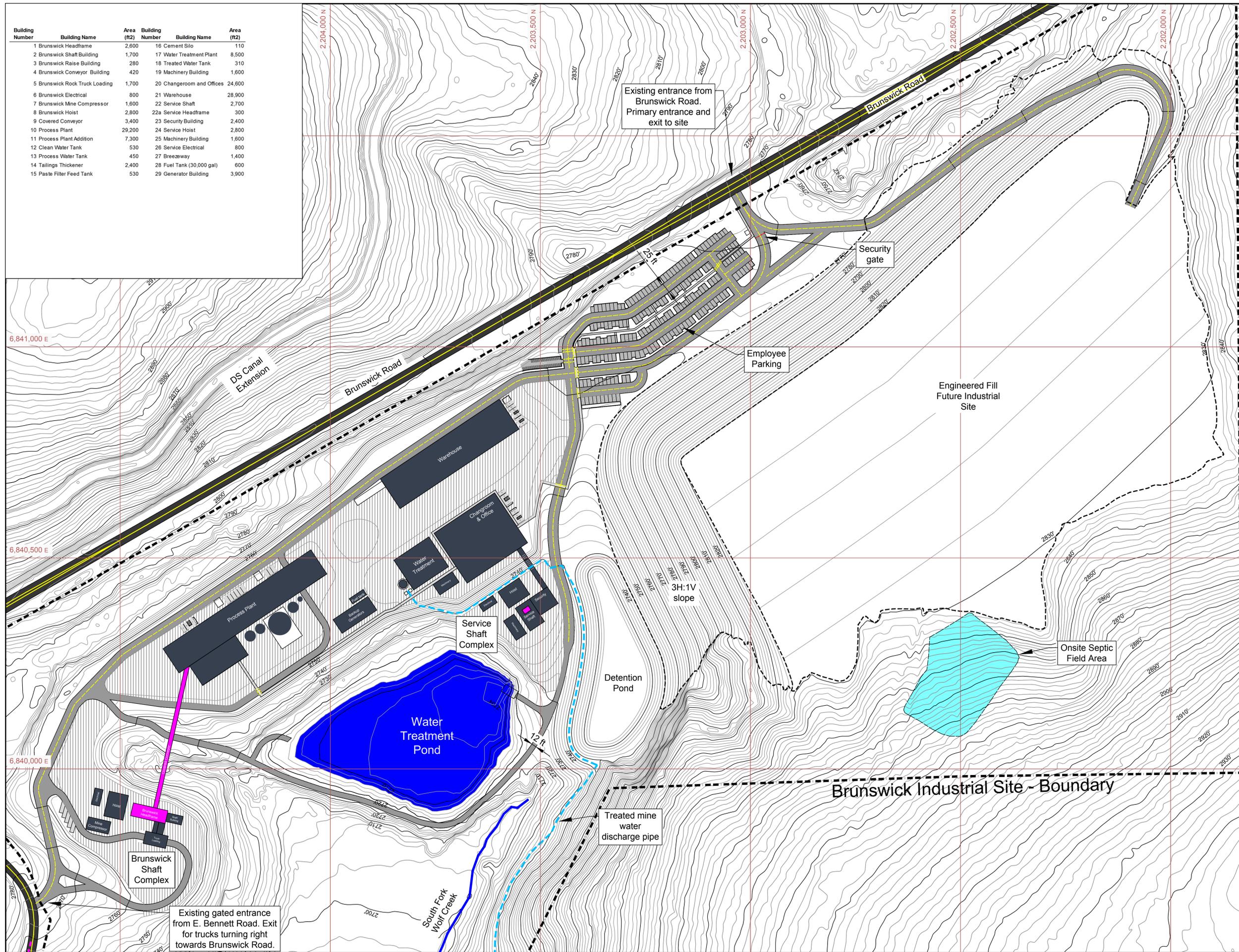
Domestic water source: Nevada Irrigation District
 Industrial water source: Treated mine water (groundwater)
 Sewage disposal by onsite septic system
 Orphir Hill Fire Protection District
 Electrical power from Pacific Gas and Electric Company
 Asphalt surfacing on all roads and parking areas.
 Surface run-off shown on grading and drainage plan drawings
 Exterior lighting details shown on lighting plan drawings
 Landscaping details shown on landscaping plan drawings
 Final grading topography based on:
 Preliminary Grading Plan prepared by Nevada City
 Engineering Inc.



SCALE 1"=100'
 250 ft

Project Description
Sheet 2
 Brunswick Industrial Site Plan Details

Drawnby : Rise Grass Valley
 Nov 11 / 19





Idaho-Maryland Mine Project
 Rise Grass Valley Inc.
 PO Box 271
 Grass Valley, California, USA 95945



Brunswick Industrial Site
 Nevada County
 SEC. 31, T. 16N, R. 9E., M.D.M
 Total Area = 118.93 Acres
 Assessor Parcel Numbers:
 09-630-37, 09-630-39, 09-441-03, 09-441-04,
 09-441-05, 09-441-34
 Current Zoning M1-SP
 Proposed Zoning M1-ME

Centennial Industrial Site
 Nevada County, SEC. 26, T. 16N, R. 8E.,
 M.D.M
 Total Area = 56.41 Acres
 Assessor Parcel Numbers:
 09-550-32, 09-550-37, 09-550-38, 09-550-39,
 09-550-40, 09-560-36
 Current Zoning M1 / Proposed Zoning M1

LEGEND

- Area of fill excavation planned
- Undisturbed Ground
- Current / original ground surface
- Property Boundary
- Final Ground Surface

Final grading topography based on:
 Preliminary Grading Plan prepared by Nevada City
 Engineering Inc.

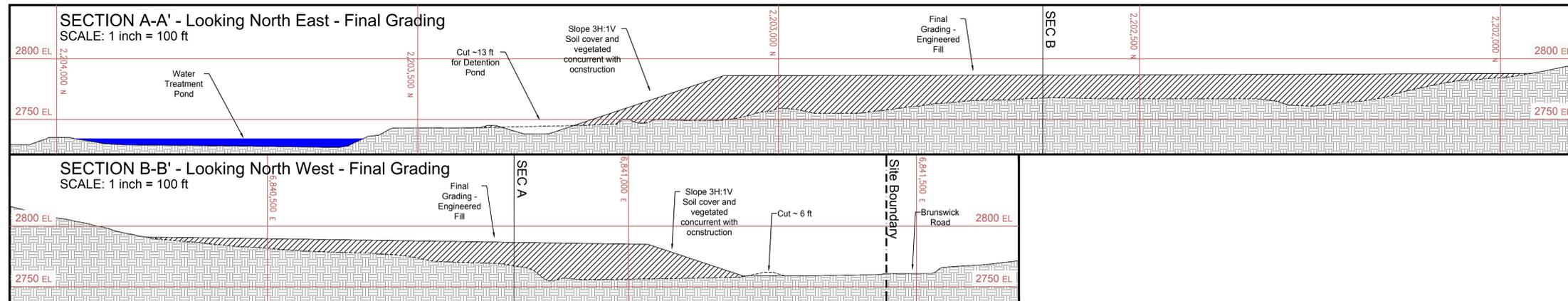


SCALE 1"=100'
 250 ft
Lidar & Airphotos by Aero Geometrics with survey control by Nevada City Engineering, May 7th 2018; Grass Valley, CA; Horizontal Datum: NAD83 (2011), Vertical Datum: GEOID 12B, NAVD 88 Projection: California State Plane Zone 2, Combined Scale Factor: 0.9979891

Project Description
Sheet 4
Section Views

Drawnby : Rise Grass Valley
 Nov 11 / 19

BRUNSWICK INDUSTRIAL SITE - SECTIONS



CENTENNIAL INDUSTRIAL SITE - SECTIONS

