Idaho Construction General Permit

Stormwater Pollution Prevention Plan (SWPPP)
Tailing Storage Facility

855 Warm Lake Road Cascade, Idaho 83611
Stibnite Gold Project



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Section 1

Contact information/Responsible Parties

This Stormwater Pollution Prevention Plan (SWPPP) for the Perpetua Resources Inc. (Perpetua) Stibnite Gold Project (SGP) Tailing Storage Facility (TSF) was developed to comply with the Idaho Construction General Permit (CGP) (Permit Number IDR100000). It is intended for submission along with the required Notice of Intent (NOI), as shown in Appendix A, through the Idaho Department of Environmental Quality (IDEQ) E-Permitting System, in preparation for construction of the SGP TSF.

Contact information is provided in the following sections for the site operators and the stormwater team.

1.1 Site Operators (IPDES CGP 7.2.1)

Site operators are actively involved in construction activities and maintain operational control over the entire site or specified areas. Table 1-1 below provides contact information for the site operators, subcontractors, and an emergency 24-hour contact.

Table 1-1. Site Contact Information

Name	Company	Address	Phone Number	E-mail	Area of Responsibility
Site Operators					
Kyle Fend	Perpetua Resources	405 South 8th Street, Suite 201, Boise, Idaho 83702	(208) 901-3047	Kyle.Fend@Perpetua.us	Field Operations Manager
Sam Field	Perpetua Resources	405 South 8th Street, Suite 201, Boise, Idaho 83702	(253) 277-9494	Sam.Field@perpetua.us	Site Operations Superintendent
Blaine Serrin	Perpetua Resources	405 South 8th Street, Suite 201, Boise, Idaho 83702	(509) 998-5527	Blaine.Serrin@perpetua.us	Site Environment Geologist
Emergency 24-Hour Contact					
Kyle Fend	Perpetua Resources	405 South 8th Street, Suite 201, Boise, Idaho 83702	(208) 901-3047	Kyle.Fend@perpetua.us	Owner/Developer

1.2 Stormwater Team (IPDES CGP 6.1-6.4, 7.2.2)

The stormwater team consists of personnel responsible for carrying out activities necessary to comply with the IPDES CGP permit. Stormwater team responsibilities include:

- Design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls).
- Application and storage of treatment chemicals if applicable.
- Conducting inspections.
- Taking corrective actions.

Members of the stormwater team are provided in Appendix B. Prior to the commencement of construction activities, all personnel assigned to the stormwater team will be trained to understand the requirements of this permit and their specific responsibilities with respect to those requirements including:

- The permit deadlines associated with installation, maintenance, removal of stormwater controls and stabilization.
- The location of all stormwater controls on the site required by this permit and how they are to be maintained.
- The proper procedures to follow with respect to the permit's pollution prevention requirements.
- When and how to conduct inspections, record applicable findings, and take corrective actions.

1.2.1 Inspector Training

Additional training is required for staff conducting site inspections. Specific training requirements for personnel responsible for conducting site inspections include one of the following:

- Complete an EPA construction inspection course developed for the EPA CGP and pass the exam.
- Hold a current valid construction inspection certification or license from a program that covers the following:
  - Principles and practices of erosion and sediment control and pollution prevention practices at construction sites.
  - Proper design, installation, and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites.
  - Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of the IPDES CGP Section 4.
- A member of the stormwater team may also conduct inspections if they are working under the supervision of a person who has the qualifications described above.

A training log is provided in Appendix C. The training logs will include subcontractors or outside providers responsible for conducting site inspections.

All members of the stormwater team will be provided with access to an electronic or paper copy of applicable portions of the IDPES CGP permit (Appendix S), the most updated copy of the SWPPP, and other relevant documents or information that must be kept with the SWPPP.

Section 2

Nature of Construction Activities

2.1 Site and Project Description (IPDES CGP 7.2.3, 7.2.4)

The project site is located in rural Idaho, about 100 miles northeast of Boise, on a mix of private property and public lands managed by the USDA Forest Service. The region features steep, rugged, and forested mountains with elevations ranging from approximately 7,800 to 8,900 feet above mean sea level (amsl). Narrow, flat valleys at around 6,500 feet amsl are found along the major drainages. The site is accessible via Stibnite Road to the north and from the south via the future Burntlog Route which will be developed in conjunction with the Stibnite Mine development.

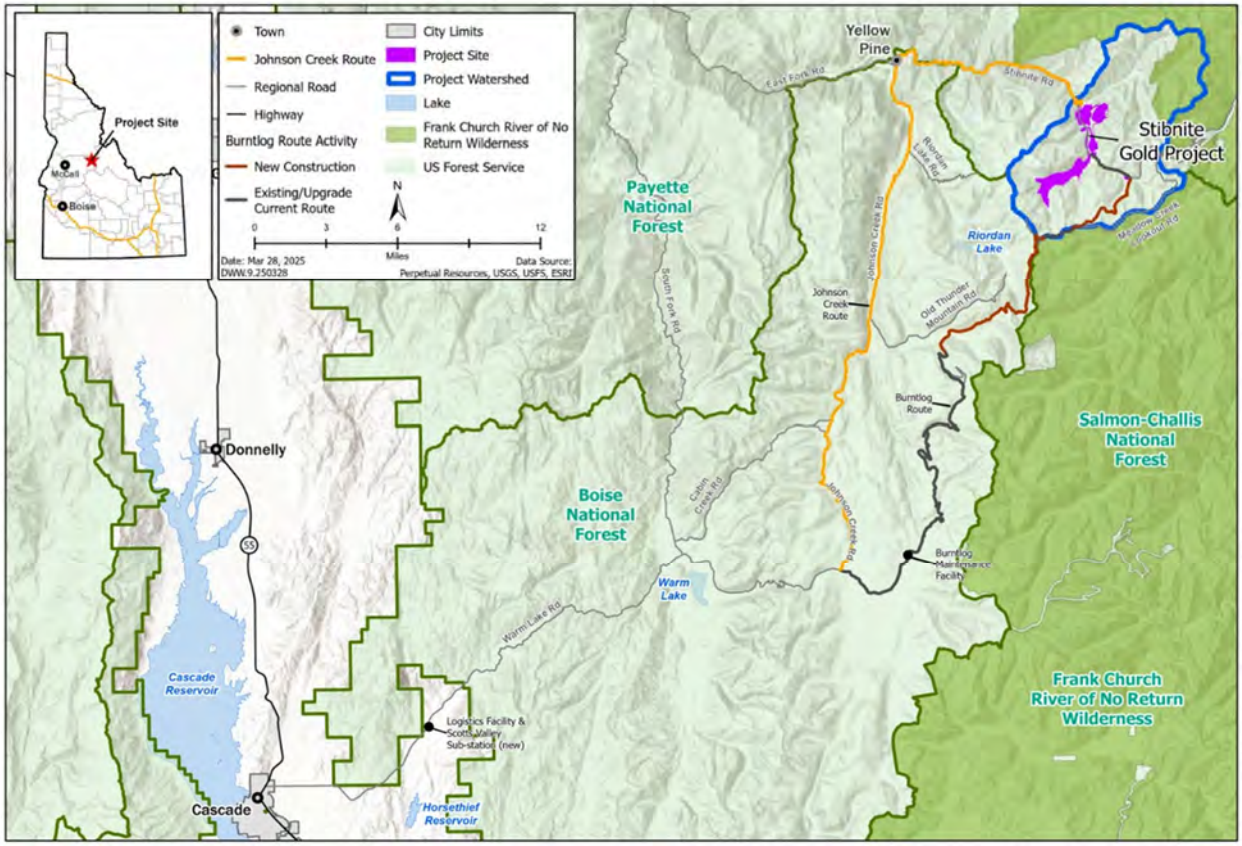


Figure 2-1. Location Map

The TSF is situated within the Meadow Creek drainage, a tributary to the East Fork of the South Fork of the Salmon River (EFSFSR). It will be positioned immediately upstream of the existing Spent Ore Disposal Area (SODA) and lies entirely within the Meadow Creek drainage basin, upstream of Meadow Creek's confluence with EF of Meadow Creek (Blowout Creek).

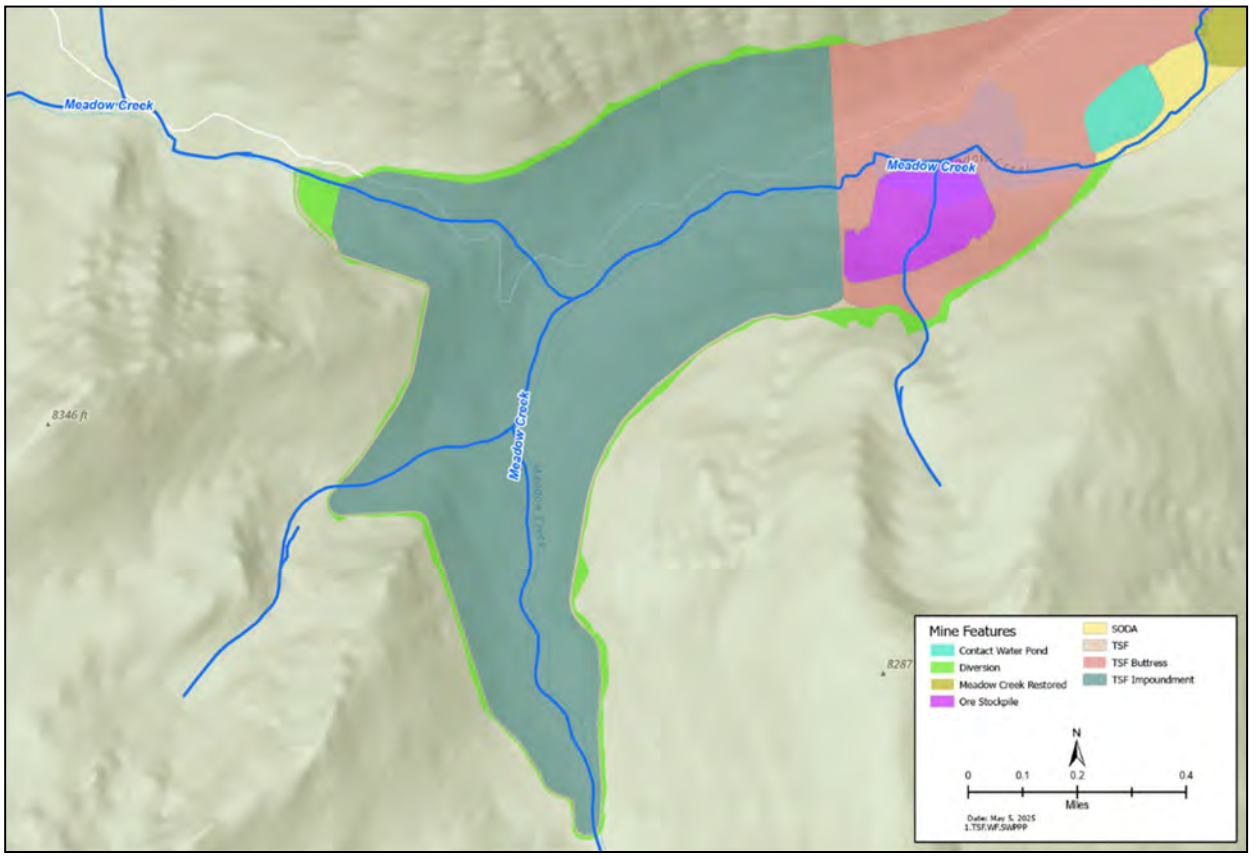


Figure 2-2. TSF Water Features

The TSF impoundment, embankment, and associated water diversions will occupy approximately 423 acres at final buildout with approximately 405 acres of new disturbance. The TSF will be surrounded by an 8-foot-high chain-link fence designed to keep wildlife, such as deer and elk, from entering the impoundment area, preventing liner damage or wildlife drowning.

This SWPPP focuses on construction of the diversions around the TSF and the development of the borrow sources for materials to be used during the construction of the embankment (buttress). The diversion system will include rock-cut channels along the steep hillsides above the TSF and buttress, and excavated channels in alluvium across tributary valley segments. Channel segments excavated in erodible or permeable materials will be lined with rock riprap and a geosynthetic liner to prevent erosion and minimize seepage. The Meadow Creek diversion channel around the TSF and buttress will be designed to convey flows from a minimum 100-year storm event with 1 foot of freeboard.

The valley slopes in the areas outlined as borrow sources will be excavated and sloped to facilitate future liner placement.

Construction of the underdrains below the TSF, construction of the buttress, and liner placement will be covered in a future update to this SWPPP. Project site maps and drawings can be found in Appendix D.

2.1.1 Waterways Information

The construction project will create a diversion for Meadow Creek. The following table notes streams within one-mile downstream of the site and includes water quality designations.

Table 2-1 Waterways Within One Mile	
Stream Name	Quality Designation
Meadow Creek	Impaired
Unnamed Tributary to Meadow Creek	Impaired
East Fork South Fork Salmon River (EFSFSR)	Impaired

2.2 Compliance with Other Requirements (IPDES CGP 7.2.8)

2.2.1 Endangered Species Protection

In accordance with Appendix S of the IDPES CGP requirements, consultation between a Federal Agency and the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service under Section 7 of the Endangered Species Act has concluded. Supporting documentation for this determination is included in Appendix E.

2.2.2 Historic Property Screening Process

Prior professional cultural resource surveys or other evaluations have determined that historic properties do not exist, or prior disturbance at the site has precluded the existence of historic properties. See Appendix F.

2.2.3 Safe Drinking Water Act, Underground Injection Control Requirements

Subsurface stormwater controls such as infiltration trenches, vaults, or drywells are not proposed for this project. If controls that are subject to the Underground Injection Control requirements are to be used, the SWPPP will be amended.

2.3 Discharge information

This project does not discharge stormwater into a Municipal Separate Storm Sewer System. There are waters of the United States (WOTUS) within 50 feet of the project's earth disturbances. Potential points of discharge locations are listed in Appendix G.

Due to the extent of the project, not all discharge points will be active at the same time. For example, the Main Diversion will not be in construction throughout the entire length at the same time. Therefore, the areas containing DP005–DP011 will likely not be in active construction at the same time.

2.4 Project Schedule (IPDES CGP 7.2.3)

The project will require clearing, grubbing, grading, stockpiles, and final grading to prepare the area for the TSF. Work will typically be conducted Monday through Friday from 6AM-6PM. The area will be stabilized with the grading, landscaping, hardscapes, and hydroseeding as needed. The anticipated schedule is provided in Table 2-1. Please note that the dates are projected and may change once construction begins. Phasing is not anticipated for the site construction. Any grading activities and stabilization activities will be added to the Grading and Stabilization Activity Logs (Appendix H).

Table 2-2. Anticipated Construction Schedule		
Construction Activity	Start Date	End Date
On-site mobilization	August 2025	September 2025
Installation of temporary stormwater controls (BMPs)	September 2025	Ongoing throughout project
Site preparation (clearing/grubbing)	September 2025	Ongoing throughout project
Mass Grading	September 2025	Ongoing throughout project
Stockpiles	September 2025	Ongoing throughout project
Final Grading	May 2028	July 2028
Temporary Stabilization	August 2025	Ongoing throughout project
Final Stabilization	July 2028	July 2028
Removal of temporary stormwater controls (BMPs)	July 2028	July 2028
Off-site Mobilization	July 2028	August 2028

2.5 Pollutant Generating Activities (IPDES CGP 7.2.3)

Table 2-3 below outlines various activities on the site that could generate pollutants and the associated pollutants that might be discharged in stormwater from the construction site. It is important to consider potential spills and leaks that could contribute pollutants to stormwater discharges, as well as any known hazardous or toxic substances that may be released during construction. Additional details on the control measures are provided in Section 3.

Table 2-3. Pollutant Activities	
Pollutant-Generating Activity	Pollutants or Pollutant Constituents
Equipment and vehicle fueling	Oil & grease
Storage and handling of waste	General waste; paper, plastics, food containers
Concrete waste from washout activities	Cement & sand
Earth disturbing activities (i.e. clear/grub, excavation, trenching, etc.)	Sediment, oil and grease
Sanitary waste	Deodorizing chemicals, feces, urine, bacteria, parasites, viruses
Dewatering pump out water	Total suspended solids/sediments

2.6 Allowable Non-Stormwater Discharges (IPDES CGP 1.2.2, 7.2.5)

The following are allowable non-stormwater discharges:

- Discharges from emergency fire-fighting activities
- Water used to control dust
- Uncontaminated, non-turbid discharges of ground water or spring water
- Foundation or footing drains
- Construction dewatering water discharge

Trucks spraying water will be used for dust control during this project.

Section 3

Description of Stormwater Controls

Stormwater control measures or Best Management Practices (BMPs) are required at construction sites to minimize the discharge of pollutants in stormwater. IDEQ's Idaho Catalog of Storm Water Best Management Practices Manual (2020) provides information for a variety of specific BMPs. The manual provides fact sheets for each BMP which contains details on the BMP's purpose, guidelines for use during construction, installation steps, schematic(s), and maintenance practices. The fact sheets for the BMPs planned for use in the TSF project are provided in Appendix I. Additional Environmental Design Features identified in the Stibnite Mine Biological Opinions are also included in Appendix I.

3.1 Erosion and Sediment Controls (IPDES CGP 7.2.6)

Erosion controls are typically considered the first line of defense in preventing pollutant discharges related to stormwater. Erosion controls work to slow flows from rainfall and protect exposed soil. Sediment control BMPs work to prevent soil particles that have become suspended in runoff from leaving the site through filtration and settling.

The following section describes detailed erosion and sediment controls as well as other stormwater controls that will be used during construction. Design and use of effective erosion and sediment controls to minimize the discharge of pollutants for construction activities will be based on the expected amount, frequency, intensity, and duration of precipitation; the nature of stormwater discharges and run-on at the site considering impervious surfaces, slopes, and drainage features; and range of soil particle sizes. Descriptions, design specifications, and maintenance requirements for each BMP are provided in Appendix I.

3.1.1 Perimeter Controls

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Specific Perimeter Controls

Silt Fence	
Description	Perimeter BMP installed to prevent pollutants from leaving the site.
Installation	Installation is to be completed prior to earth disturbance.
Maintenance Requirements	If gaps or tears are found, the fence will be repaired immediately. If sediment is accumulating at the bottom of the fence (1/2 the height) and causing strain on the material, the sediment will be removed as required by manufacturer and disposed of in a lawful manner.
Design Specifications	See Appendix I for BMP Specifications.

Earthen Berm	
Description	Perimeter BMP installed to prevent pollutants from leaving the site.
Installation	Installation is to be completed in conjunction with initial earth disturbance.
Maintenance Requirements	Recompact after any erosion and reclaim any sediment that has left the site and replace as appropriate.
Design Specifications	See Appendix I for BMP Specifications.

V-ditch	
Description	Perimeter BMP installed to capture runoff before leaving the site.
Installation	Installation is to be completed in conjunction with initial earth disturbance.
Maintenance Requirements	Remove any areas clogged with debris, dispose of in a trash receptacle. If areas are not draining from accumulated sediment, remove sediment and dispose of in a lawful manner.
Design Specifications	See Appendix I for BMP Specifications.

3.1.2 Sediment Track-Out

The following Sediment Track-Out controls will be used where the construction site abuts a paved road and vehicles from the construction site will exit immediately to a paved road. All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Specific Track-out Controls

Preventing Track-out	
Description	Sweep the adjacent paved streets if applicable.
Installation	Sediment tracked on to a paved road will be removed by the end of the workday.
Maintenance Requirements	Remove the track-out by sweeping, shoveling, or vacuuming the surfaces, or by using other similarly effective means of sediment removal. Hosing or sweeping tracked-out sediment into any storm water conveyance is prohibited.
Design Specifications	See Appendix I for BMP Specifications.

Cobble Track Pad	
Description	Entrance/exit pad of crushed stone to remove accumulated sediment from tires.
Installation	Installation is to be completed prior to earth disturbance.
Maintenance Requirements	If excess sediment/mud has clogged the pore space, the stone can be raked with heavy equipment to dislodge the stone from the mud to extend the life of the stone. This will work for a period depending on the amount of sediment/mud that is being tracked on the pad, but as more pore space is eliminated, the pad can be top dressed in new crushed stone. Replacement of the entire pad might be necessary when the pad becomes filled with sediment. Any large stone carried on the pad must be removed immediately to prevent any damage to pedestrian vehicles.
Design Specifications	See Appendix I for BMP Specifications.

3.1.3 Stockpiles or Land Clearing Debris Piles Comprised of Sediment or Soil

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review this list of Features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Specific Stockpile Controls

Stockpile Management	
Description	Prevent discharge of stockpiled materials.
Installation	As stockpiles are created.
Maintenance Requirements	Topsoil and additional soils that are determined to be suitable for future use will be stockpiled in various locations. Stockpiles must be located outside of any natural buffers and away from any stormwater conveyances and areas where storm water flow is concentrated. If erosion occurs, locations used for stockpiles will be adaptively managed to ensure future impacts are minimized. A sediment barrier is required to be installed along all downgradient perimeter areas if a significant vegetative buffer cannot be maintained. They should be positioned outside of natural buffers and dust prevention is needed. Stockpiles that will be unused for 14 or more days must be stabilized (covered with tarps, blown straw, hydro-mulching). If stockpiles are to remain long term, reduce height, contour, and compact. To aid in stabilization the slopes should be roughened; create track grooves perpendicular to the slopes of the land. Stockpiled soil spoils resulting from linear trench excavations will be placed adjacent to the construction activity. A small interceptor v-ditch can be installed down gradient of the stockpile. A BMP might not be required if backfilling is by the end of the work shift or if a storm event is not imminent based on NOAA forecasting.
Design Specifications	See Appendix I for BMP Specifications.

Dust Control	
Description	Water applications to prevent dust.
Installation	As stockpiles are created.
Maintenance Requirements	Distribution quantity and locations will be adjusted accordingly to inhibit the creation of dust through the duration of construction until final stabilization has been achieved. The water tender will observe if water application is too heavy thereby causing mud and tracking issues or erosion.
Design Specifications	See Appendix I for BMP Specifications.

Surface Roughening	
Description	Surface track walked to create roughened surface to reduce erosion.
Installation	To stabilize stockpile(s) when no longer in use.
Maintenance Requirements	Using construction equipment with track, create track marks in the pile surface longitudinally. The grooves act as small check dams for runoff coming down the slope, reducing sheet and rill erosion. Maintain a crust on the pile for dust control. If rainfall causes vertical ruts on the slope, surface roughening should be repeated on the affected area. Additional stabilization BMPs may be necessary, such as adding temporary seeding.
Design Specifications	See Appendix I for BMP Specifications.

3.1.4 Minimize Dust

Water trucks will be utilized to minimize dust from areas disturbed by construction related activities, therefore reducing erosion caused by wind and sedimentation by the wind. Opacity needs to be less than 20% when it leaves the perimeter of the site.



Opacity is measured as a percentage–0% means that all light passes through; 100% means that no light can pass through. The more particles present, the higher the opacity percentage.

Specific Dust Controls

Water Truck or Equivalent	
Description	Fugitive dust prevention.
Installation	Water truck(s) will be mobilized along with large earth moving equipment.
Maintenance Requirements	Application of water to roadways for dust suppression will be used only when necessary and will not result in erosion or runoff entering water ways. Distribution quantity and locations will be adjusted accordingly to inhibit the creation of dust through the duration of construction until final stabilization has been achieved. The water tender will observe if water application is too heavy thereby causing mud and tracking issues or erosion.
Design Specifications	See Appendix I for BMP Specifications.

3.1.5 Minimize Steep Slope Disturbances

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Specific Steep Slope Controls

Surface Roughening	
Description	Vertical track walking the slope.
Installation	After the slope has been cut, construction has stopped and will not be disturbed again for more than 14 days.
Maintenance Requirements	Surface roughening is a process that helps bind soil particles, which are no longer anchored by vegetation, preventing them from being transported by wind or rain. The grooves created act as small check dams for runoff descending the slope, thereby reducing sheet and rill erosion. To control dust, it is important to maintain a crust on the pile. This area should be inspected during every stormwater inspection, with maintenance conducted as needed. If rainfall causes vertical ruts on the slope, surface roughening should be repeated in the affected area.
Design Specifications	See Appendix I for BMP Specifications.

Straw Wattle	
Description	Placed horizontally across the cut slope to create check dams.
Installation	After the slope is cut and the surface is roughened.
Maintenance Requirements	Inspections should be conducted weekly. If there are any signs of erosion undercutting the wattle or if sediment builds up to at least seventy-five percent of the height of the wattle, maintenance is required.

	Additional rows of wattle may be necessary if too much sediment is accumulating. Any erosion should be filled in, and the wattle may need additional stakes in the affected area.
Design Specifications	See Appendix I for BMP Specifications.

Shot Rock	
Description	Rock placed on the slope to prevent soil movement.
Installation	After the slope is cut and the benches are cut.
Maintenance Requirements	Inspected weekly to ensure the rock has not shifted or sloughed off the slope onto the road or other roadside area. If this were to occur, heavy equipment would be remobilized in the area to replace the rocks in their correct location.
Design Specifications	See Appendix I for BMP Specifications.

3.1.6 Topsoil

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below

Specific Topsoil Control

Topsoiling	
Description	Reusing topsoil that has been stripped during earlier site development activities for future reclamation and revegetation efforts.
Installation	Before a site is fully established.
Maintenance Requirements	Inspect topsoil periodically and after major storm events for signs of erosion such as rills and gullies. Damaged areas should be repaired with additional topsoil and reseeded as necessary to minimize erosion and loss of topsoil.
Design Specifications	See Appendix I for BMP Specifications.

3.1.7 Soil Disturbance

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Specific Soil Disturbance Controls

Protected Areas	
Description	Installation of a boundary around the area of disturbance to protect soil.
Installation	Part of initial disturbance.
Maintenance Requirements	Soil and vegetation disturbance is not allowed beyond the area of disturbance as shown in the Site Maps (Appendix D). Protection of healthy, natural soil is the most effective strategy for preserving soil functions. Not only can the functions be maintained but protected soil organisms are also available to colonize neighboring disturbed areas after construction. Inspect fencing or delineation during required inspections and ensure there are no areas that have been removed or damaged to allow for entry. Ensure that no vehicles or materials have entered the area. If so, repair barriers and/or remove materials.
Design Specifications	See Appendix I for BMP Specifications.

3.1.8 Storm Drain Inlets

There are no storm drain inlets existing or to be installed on this project.

3.1.9 Constructed Site Drainage Features

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Velocity dissipation devices will be used to prevent erosion when new culverts are placed underground. The primary device specified is riprap at outfalls at the end of the culverts to prevent erosion from a higher discharge rate coming from the channeled flow out of the end.

Channel segments excavated in erodible or permeable materials would be lined with rock riprap and a geosynthetic liner to prevent erosion and to minimize seepage where needed.

Specific Constructed Site Drainage Features

Riprap	
Description	To reduce velocity.
Installation	Various dates when specified culverts are installed.
Maintenance Requirements	Culverts are to be protected with ripraps surrounding the outlet opening for final stabilization. During construction temporary dams may be used to dissipate velocity. Properly installed ripraps will prevent scouring at storm water outlets and minimize the potential for downstream erosion by reducing the velocity of concentrated storm water flows. Velocity dissipation shall be installed immediately and for permanent outlet pipes shall remain in place as permanent BMP once construction is complete.
Design Specifications	See Appendix I for BMP Specifications.

3.1.10 Sediment Basins or Similar Impoundments

No sediment basins will be installed during construction

3.1.11 Chemical Treatment

No chemicals will be used to treat the water.

3.1.12 In-Water Work

The following general requirements as listed in the Final Section 401 Water Quality Certification (Appendix J) are to be followed in conjunction with the Environmental Design Features and BMP Specifications described in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

In-Water Activities	
Description	Working on construction projects in-water.
Installation	Work in open water must be kept to a minimum and only when necessary. Equipment must work from an upland site to minimize disturbance within the water way. If this is not practicable, take appropriate measures to ensure disturbance to the water way is minimized. Construction affecting the bed or banks must occur only during periods of low flow and correspond with appropriate in-water work periods for aquatic life. In-water activities in spawning areas must be avoided to the maximum extent practicable during spawning and incubation periods. Activities that construct and maintain intake structures must include adequate fish exclusion screening devices to prevent fish entrainment or capture.
Maintenance Requirements	Fording stream channels is not permitted. Build temporary bridges or other structures if crossings are necessary. Temporary crossing must be perpendicular to channels and located in areas with the least impact. The temporary crossing must be supplemented with clean gravel or treated with other mitigation methods at least as effective in reducing impacts. Temporary crossings must be removed as soon as possible after the project is completed or the crossing is no longer needed. Heavy equipment working in wetlands must be placed on mats or suitably designed pads to prevent damage to the wetlands. Measures must be taken to prevent wet concrete from entering water ways. Perpetua will coordinate with the Idaho Department of Fish and Game on appropriate fish handling, salvage, and protection measures during dewatering activities (see Section 3.1.13 Dewatering Practices and Appendix I for additional guidance).
Design Specifications	See Appendix I for BMP Specifications.

3.1.13 Dewatering Practices

The project may need to dewater areas during construction activities. The size of dewatering work areas shall be minimized to the extent necessary to successfully complete the proposed activities. Gravity feed diversion is the preferred method, a pump is the secondary method. Dissipation of flow energy at bypass outflow will be provided to prevent damage to the stream channel and riparian vegetation.

The following general requirements as listed in the Final Section 401 Water Quality Certification (Appendix J) are to be followed in conjunction with the Environmental Design Features and BMP Specifications described in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Dewatering	
Description	To minimize the discharge of pollutants in groundwater or accumulated stormwater removed from excavations, trenches, foundations, vaults, or other similar points of accumulation.
Installation	Dewatering of a work area will be performed slowly to allow fish the opportunity to leave that area voluntarily, and measures will be taken to ensure fish are unable to return to that work area during dewatering activities.
Maintenance Requirements	Stranded fish found in dewatered segments should be moved to a location (preferably downstream) with water. Baseflow reductions should be avoided and minimized to the greatest extent possible. To minimize sediment transport, stream channel or streambank stabilization must be completed before returning water to a dewatered segment. Route dewatering water through a sediment control designed to minimize discharges with visual turbidity. Do not discharge visible floating solids or foam. Use an oil-water separator or suitable filtration device designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials. Use well-vegetated, upland areas to infiltrate dewatering water before discharge. Do not use waters of the U.S. as part of the treatment area. Minimize sediment discharges from causing erosion: Use stable, erosion-resistant surfaces for discharge from dewatering controls. Avoid placing dewatering controls on steep slopes. Comply with velocity dissipation requirements to prevent re-suspension of sediments For backwash water, either haul it away for disposal or return it to the beginning of the treatment process. Replace and clean the filter media used in dewatering devices when the pressure differential meets or exceeds the manufacturer's specifications. Comply with dewatering-specific monitoring requirements in Section 5.1 and the specific inspection requirements in Section 4.
Design Specifications	See Appendix I for BMP Specifications.

3.1.14 Site Stabilize Exposed Portions

All construction activities are to be completed in compliance with the Environmental Design Features and BMP Specifications listed in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Seeding	
Vegetative, Permanent	
Description	A mix of native seed species appropriate to the site. If vegetation such as willows, sedges or rush mats can be salvaged from disturbed or abandoned areas, they may be used to replant disturbed areas.
Installation	See Site Stabilization Deadlines below
Maintenance Requirements	If rainfall causes vertical ruts on the slope, causing seeding to erode, fill in ruts and re-roughen and reapply seeding per specifications.
Design Specifications	See Appendix I for BMP Specifications.

The following are examples of activities that would constitute the immediate initiation of stabilization:

- Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative products takes place as soon as practicable, but no later than one calendar day of completing soil preparation.
- Applying mulch or other non-vegetative product to the exposed area;
- Seeding or planting the exposed area;
- Starting any of the activities above on a portion of the entire area that will be stabilized; and
- Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

Table 3-1. Site Stabilization Deadlines

Total amount of land disturbance occurring at any one time	Deadline
Five acres or less Note: this includes sites disturbing more than 5 acres total over the course of a project, but that limit disturbance at any specific time to 5 acres or less	Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days, and Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.
More than 5 acres	Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days, and Complete the installation of stabilization measures as soon as practicable, but no later than seven calendar days after stabilization has been initiated.

The requirement to initiate stabilization immediately is triggered as soon as it is known that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days or as soon as you know that construction work is permanently ceased. In the context of this provision, “immediately” means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

If vegetative stabilization measures are being implemented, stabilization is considered “installed” when all activities necessary to seed or plant the area are complete. If non-vegetative stabilization measures are being implemented, stabilization is considered “installed” when all such measures are implemented or applied.

Use wood, straw, bonded fiber matrix, fabric, or other types of surface mulch, as necessary, to control erosion on slopes and embankments. If straw mulch is used, it will be certified as weed-free, applied at a rate up to approximately 2,200 pounds per acre, and applied over a roughened seedbed. Seeding shall conform to Table 3-1.

3.1.14.1 Stabilization Exceptions

Table 3-2. Stabilization Exceptions

Conditions	Steps
Arid, semi-arid, and drought-stricken areas	Immediately initiate and, within 14 calendar days of temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;

(If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used.)	As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and If construction is occurring during the seasonally dry period, document the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.
Unforeseen circumstances (Operators that are affected by unforeseen circumstances, like problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding, that delay the initiation and/or completion of vegetative stabilization.)	Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion; Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and Document the circumstances that prevent you from meeting the deadlines described previously, and the schedule you will follow for initiating and completing stabilization.
Discharges to a sediment or nutrient impaired water or to surface water that is identified by Idaho as Tier II or Tier III for antidegradation purposes.	Complete stabilization as soon as practicable, but no later than seven calendar days after stabilization has been initiated.

3.1.14.2 Final Stabilization Criteria

Final stabilization criteria for any areas not covered by permanent structures are listed below.

- Establish uniform, perennial vegetation (i.e., evenly distributed, without large bare areas) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or
- Implement permanent non-vegetative stabilization measures, like permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles, to provide effective cover.

Table 3-3. Final Stabilization Exceptions

Areas	Steps
Arid, semi-arid, and drought-stricken areas	Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within 3 years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least 3 years without active maintenance.
Disturbed areas on agricultural land that are restored to their preconstruction agricultural use	Section 3.1.14.2 final stabilization criteria do not apply.
Areas that need to remain disturbed	In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials).

Table 3-4. Seed Mixtures and Seeding Rates

Seed Mixture Type	Plant Type	Scientific Name[a]	Common Name	% of Mixture	Pure Live Seeds (PLS)/pounds [b]	Recommended Seeding Rate (PLS/ft²)[c]	Adjusted PLS/ft² using % of mixture	PLS/acre based on rate and % of mixture	PLS pound[d]/acre
Final (and Concurrent) Reclamation Seed Mixtures									
General	Herb	*Linum lewisii*	Lewis flax	15%	295,000	60	9	392,040	1.3
	Herb	*Lupinus sericeus*	Sily Lupine	5%	13,000	60	3	130,680	10.1
	Herb	*Vicia americana*	American vetch	20%	33,000	60	12	522,720	15.8
	Grass	*ReGreen™*		4%	11,000	60	2.4	104,544	9.5
	Grass	*Bromus marginatus*	Mountain brome	10%	78,000	60	6	261,360	3.4
	Grass	*Elymus trachycaulus*	Slender wheatgrass	15%	160,000	60	9	392,040	2.5
	Grass	*Festuca idahoensis*	Idaho fescue	16%	450,000	60	9.6	418,176	0.9
	Grass	*Poa secunda*	Sandberg bluegrass	15%	925,000	60	9	392,040	0.4
				100%		60			43.9

Notes: Table created for Perpetua from Tetra Tech, 2025, ReclamationPlan.

Scientific name based on the PLANTS Database (USDA NRCS,2018).

Sources: USDA NRCS, 2011 and 2012

Sources: Hoag et al., 2001; Strom et al., 2010

Application seeding rate

3.1.15 Fill Material

The following general requirements as listed in the Final Section 401 Water Quality Certification are to be followed in conjunction with the Environmental Design Features and BMP Specifications described in Appendix I. Review the list of features prior to start of construction and follow these requirements in conjunction with the controls listed below.

Filling	
Description	Added soil or other materials to a site to raise its elevation and prevent stormwater runoff from causing erosion or pollution.
Installation	Before construction begins.
Maintenance Requirements	Fill material subject to suspension will be free of easily suspended fine material. Contaminated material may not be used as fill where it will be exposed to surface water. Only clean material may be placed as fill. If dredged material is proposed for use as fill material and there is a possibility the material may be contaminated or highly concentrated with pollutants of concern, then the sediment must be assessed and characterized to determine the suitability of dredge material for unconfined-aquatic placement as well as consistency with Idaho's water quality standards; determine the suitability of post dredge surface; and predict the effect on water quality during dredging. Sediment assessment and characterization following the procedures in the Sediment Evaluation Framework for the Pacific Northwest (RSET 2018) is one tool available for use in sediment assessment and characterization. A different assessment and characterization methodology may be used. An assessment and characterization plan must be submitted for approval to IDEQ before initiating fill activities. Historic tailings and contaminated soils will be separated from soils that are determined to be suitable under an approved assessment and characterization methodology and will be disposed of appropriately. If historic tailings and contaminated soils will be repurposed with the intent for reuse as fill, then the location and use for those soils must meet suitability conditions. Capping materials used on haul roads will be clean and free of materials easily mobilized in storm water runoff (Air Sciences Inc., 2024, Haul Road Capping Plan). Development rock subject to storm water runoff and identified as a potential source for construction materials will meet criteria outlined in Section 6.3 of the Development Rock Management Plan (Perpetua 2025). Temporary fill will be removed in their entirety on or before construction completion. Excavated or staged fill material must be placed so it is isolated from the water's edge or wetlands and not placed where it could reenter waterways.
Design Specifications	See Appendix I for BMP Specifications.

3.1.16 Natural Buffers or Equivalent Sediment Controls

There are receiving waters within 50 feet of the project's earth disturbances. The buffer disturbances are authorized under the Final Section 401 Water Quality Certification dated May 22, 2024 Permit Number NWW-2013-00321 (Appendix J).

3.2 Pollution Prevention Requirements (IPDES CGP 2.3)

3.2.1 Fueling and Maintenance of Equipment or Vehicles

A designated area will be determined after mobilization where minor maintenance, such as adding oil or lubricants for proper operation of equipment, can be conducted. Minor maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operation, fuel tank drain down and removal, and other activities which may result in the accidental

release of contaminants, will be conducted within designated areas and within containment, or as far away from stormwater conveyances and points of offsite discharge as practicable.

Vehicle and Equipment Maintenance/Repair	
Description	Adding oil or lubricants.
Installation	After equipment mobilization.
Maintenance Requirements	No large-scale maintenance is to be conducted onsite. Keep equipment clean, do not allow excessive build-up of oil and grease. Inspect equipment for leaks on a regular basis. Check incoming vehicles for leaking oil and fluids. Secondary containment such as drain pan or drop cloths will be used to catch spills or leaks when removing or changing fluids. Do not hose down areas, rather use dry sweeping. Maintain equipment as needed. Remove equipment from site for major maintenance. Equipment will be inspected at least monthly for leaks.
Design Specifications	See Appendix I for BMP Specifications.

Vehicle and Equipment Fueling	
Description	Adding fuel to equipment mobilization.
Installation	After equipment mobilization.
Maintenance Requirements	All mobile fuelers are required to have an adequate spill kit on hand to prevent the spill of materials onto the site. "Topping-off" will be discouraged when fueling. Secondary containment such as a drip pan or drop cloth will be used to catch spills when filling smaller equipment. Fuel spilled during these operations will be cleaned up immediately and disposed of properly. Inspection of containment areas and fueling areas is ongoing. Keep additional spill cleanup materials onsite and nearby. Fuel storage areas will be inspected with every storm water inspection and maintenance conducted as needed. Fuel is to be stored in containment of 110% capacity.
Design Specifications	See Appendix I for BMP Specifications.

3.2.2 Washing Equipment and Vehicles

There will be no washing of equipment and vehicles onsite.

3.2.3 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

3.2.3.1 Building, Materials, and Building Products

All potential pollutants will be stored and used in a manner consistent with the manufacturer's instructions in a secure location. To the extent practicable, material storage areas will not be located near water ways, creeks and drainages. Minimizing exposure is not required in cases where the exposure to precipitation and to storm water will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of storm water contamination (such as final products and materials intended for outdoor use).

Hazardous Material Management	
Description	Preventing the leakage and/or spillage of hazardous materials
Installation	Utilize through project
Maintenance Requirements	Store materials in appropriate containers; Make sure containers are sealed and closed to avoid contamination and spillage. Plainly label containers (e.g., "Used Oil", "spent Solvents,") that could be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur. Inspect all chemical storage areas for potential waste regularly.
Design Specifications	See Appendix I for BMP Specifications

3.2.3.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

These products will not be used onsite. If this changes, this section will be updated.

3.2.3.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

See Section 3.2.1.

3.2.3.4 Hazardous or Toxic Waste

All hazardous waste materials such as oil filters, petroleum products, and equipment maintenance fluids will be stored in structurally sound and sealed containers, separated from storm water contact. Hazardous waste materials will be stored in appropriate and clearly marked containers and segregated from other non-waste materials. Secondary containment will be provided for all waste materials in the hazardous materials storage area and will consist of commercially available spill pallets. Additionally, all hazardous waste materials will be disposed of in accordance with federal, state, and municipal regulations. Hazardous waste materials will not be disposed of into the on-site dumpsters. All personnel will be instructed, during tailgate training sessions or similar, regarding proper procedures for hazardous waste disposal. Containers should be labeled per RCRA requirements. The individual who manages day-to-day site operations will be responsible for seeing that these procedures are followed.

Hazardous Waste Containment	
Description	Preventing the discharge of hazardous waste
Installation	Utilize through project, waste disposal, and material use
Maintenance Requirements	Inspect all chemical storage areas for potential waste regularly. Make sure containers are sealed and closed to avoid contamination and the potential for creating hazardous waste.
Design Specifications	See Appendix I for BMP Specifications

3.2.3.5 Construction and Domestic Waste

Measures described are (i.e., trash disposal, recycling, and proper material handling) to prevent the discharge of solid materials to WOTUS. All measures will be installed and removed from the job as different phases of the project occur. Waste containers must be sufficient in size and number to contain construction and domestic waste in containment, or a cover must be provided for waste that is blowable or that can leach nutrients, metals, pesticides, herbicides, oil, grease, bacteria, or other pollutants. On business days, it is required to clean up and dispose of waste in designated waste containers and clean up immediately if containers overflow. All garbage and construction debris bins will be provided during the duration of the project to keep the site clear of obstruction, with BMPs clear and functional. Dumpsters will be provided and located as far away as practicable from water/stormwater conveyances, and drainage facilities given site conditions to meet all federal, state, and local regulations. No construction materials will be buried on-site. All personnel will be instructed in preconstruction meetings, tailgate training, etc., regarding the correct disposal of trash and construction debris.

Waste Collection Dumpsters	
Description	To prevent the discharge of trash
Installation	Initial mobilization
Maintenance Requirements	All waste materials will be collected and disposed of in the proper waste bin, some materials will be sorted for different recycling purposes. But trash and construction debris from the site will be deposited in a dumpster. Keep all dumpster lids closed when not in use. For dumpsters and roll off boxes that do not have lids and could leak, ensure that discharges have a control (e.g., secondary containment, treatment). Minimize the potential for waste, garbage and floatable debris to be discharged by keeping exposed areas free of such materials, or by intercepting them before they are discharged. No construction materials will be buried on site. All personnel will be instructed, during preconstruction meetings, regarding the correct disposal of trash and construction debris. Waste containers shall be kept on site during construction. Employee work areas are to be inspected daily for trash, and waste containers are to be emptied at least weekly or as needed. All materials are to be disposed of in a lawful manner.
Design Specifications	See Appendix I for BMP Specifications

3.2.3.6 Sanitary Waste

In order to reduce attractions, during construction and operations, trash and other miscellaneous inert (non-hazardous) waste will be contained in on-site wildlife-resistant facilities and hauled to the Valley County waste transfer station for disposal. Used oils, solvents, grease, and antifreeze will be handled separately from normal trash and garbage. Good housekeeping practices will include minimizing loose trash, odors, and access for wildlife to trash storage or disposal areas and prompt removal of trash. Adequate size and quantity of sanitary waste handling facilities will be provided for the duration of the project. Portable sanitary facilities will be located as far away as practicable from stormwater conveyance, conduit to a water, or at least 10 feet. If it is not possible to maintain at least 10 feet of separation, evaluate the need for additional controls such as secondary containment, additional surface preparation, or berms and implement as appropriate. The sanitary waste facilities must be accessible to the cleaning/emptying trucks. Disposal of sanitary waste from these facilities will be handled by a licensed sanitary service provider and they will ensure the facilities are in working order and pose no threat of overflowing or leaking.

Temporary Sanitary Waste Collection Receptacles (portable toilets)	
Description	To prevent discharge of portable toilets
Installation	Initial mobilization
Maintenance Requirements	They will be inspected according to frequency noted in Section 4 to ensure they are secured to prevent being tipped or knocked over. The sanitary waste facilities must be accessible to the cleaning/emptying trucks. Disposal of sanitary waste from these facilities will be handled by a licensed sanitary service provider and they will ensure the facilities are in working order and possess no threat of overflowing or leaking.
Design Specifications	See Appendix I for BMP Specifications

3.2.4 Washing of Applicators & Containers of used Concrete, Form Release Oils, or Other Materials

The use of concrete may or may not occur during the project. If concrete is used the following requirements listed in the following section should be followed.

Concrete pouring activities can occur numerous times during a project, depending on the size of the project. Therefore, concrete washout areas can change during the project. Washout or cleanout activities must be directed into a leak-proof container on-site; they can easily be relocated on-site

when new empty bins are delivered. The container will be designed so that no overflows can occur due to inadequate sizing or precipitation and emptied or replaced when it reaches 75% capacity. Segregation must occur for paint waste and oil waste from stucco/concrete washout waste and manage the proper disposal separately. Wash concrete only from mixer truck chutes into approved designated concrete wash out facility. Concrete washout facilities shall not be used for disposal of excess concrete and trucks shall not be allowed to back turn and dispose of residual loads. Once concrete waste is washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of per owner requirements. Concrete washout facilities that utilize a leak-proof pit must have a plastic lining material that shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material. The soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material. All washout facilities should be located at least 50 feet and possibly further (where practical) from surface waters, open drainage facilities, and watercourses.

Concrete Washout Facility	
Description	Container/pit designed to hold concrete wash
Installation	Implement prior to concrete pouring activities
Maintenance Requirements	Inspect weekly and throughout active concrete pours to check for capacity. Washout or cleanout activities must be directed into a leak-proof facility on-site. The facility shall be designed so that no overflows can occur due to inadequate sizing or precipitation and emptied or replaced when it reaches 75% capacity. Concrete washout facilities that utilize a leak-proof pit must maintain plastic lining material free of holes, tears or other defects that compromise the impermeability of the material. Once concrete waste is washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of per owner requirements.
Design Specifications	See Appendix I for BMP Specifications

3.2.5 Application of Fertilizers

Fertilizers will not be applied. If this changes, this section will be updated.

3.2.6 Spill Response and Reporting

The primary objective in responding to a spill is to quickly contain the material and prevent or minimize its migration into storm water runoff and conveyance systems. If the release has impacted on-site storm water, it is critical to contain the released material on site and prevent releases into receiving waters.

In the event of an incidental environmental spill of chemicals, diesel fuels, oils or other toxic substances, which is defined as a spill that does not pose an emergency (i.e. the spill does not include high levels of toxic substances, pose a fire or an explosion hazard, necessitate an evacuation, etc.), follow these procedures:

- Alert people in the area, restrict access by unsuspecting individuals, and notify the supervisor of the area. The supervisor will be responsible for notifying Perpetua Management.
- Assess the risk to human health and safety and to the environment. Consult the SDS.
- Once it is determined that it is safe to work in the vicinity of the material and with the material, undertake measures to contain and prevent the spread of the spill. Only attempt to clean up a spill if there is not a chance of any fire, explosion, or vapor hazard.

- Always use appropriate personal protective equipment (rubber gloves, safety glasses or safety visor, respiratory equipment, etc.) when working with chemicals or fuels.
- Once the spill has been contained, perform clean-up of the area. Spill kits are located throughout the site and along the road to the site.
- Construction personnel with primary responsibility for spill response and cleanup will receive training from the site superintendent. This training will include identifying the location of spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

For additional response information and reporting information, see Emergency Contacts and Procedures Summary in Appendix L.

Section 4

Inspections, Maintenance, and Corrective Actions

4.1 Inspection Personnel and Procedures (IPDS CGP 4.5-4.7, 7.2.7)

Inspections will follow the inspection schedule listed in Section 4.4 below. Regular site inspections will be documented using the site inspection forms provided in Appendix K and may be migrated to an electronic tracking application.

During site inspections, the following areas must be inspected at a minimum:

- All areas that have been cleared, graded, or excavated and not yet stabilized:
  - For sites of five acres or less: Initiate stabilization measures immediately in areas where construction has ceased or will be inactive for 14 or more days and complete these measures within 14 days of initiation.
  - For sites of more than five acres: Initiate stabilization measures immediately in areas where construction has ceased or will be inactive for 14 or more days and complete these measures within seven days of initiation.
- All stormwater controls, including pollution prevention controls, installed at the site comply with this permit.
- Material, waste, borrow, and equipment storage and maintenance areas that are covered by the permit.
- All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater.
- All points of discharge from the site.
- All locations where stabilization measures have been implemented.

Inspections are not required in areas that, at the time of the inspection, are considered unsafe for inspection personnel.

During each site inspection, the following will be conducted:

- Check whether all stormwater controls (i.e., erosion and sediment controls and pollution prevention controls) are properly installed, operational, and are working as intended to minimize pollutant discharges.
- Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site.
- Identify any locations where new or modified stormwater controls are necessary to prevent discharge or pollutants.
- Check for signs of visible erosion and sedimentation (e.g., sediment deposits) that have occurred and are attributable to your discharge at points of discharge.
- Check for signs of sedimentation at points downstream from the point of discharge that could be attributable to the sites discharge.
- Identify any incidents of noncompliance observed.

If a discharge is occurring during the inspection, the following actions will be taken:

- Observe each discharge point at the site.
- Document the visual quality of the discharge, noting characteristics such as color, odor, floating, settled or suspended solids, foam, oil sheen, and other indicators of storm water pollutants in the inspection form provided in Appendix K.

For dewatering inspections, record the following details for all areas where construction dewatering is taking place, including stormwater controls and any channelized flow of water to and from those controls:

- Approximate times that the dewatering discharge began and ended on the day of inspection.
- Estimates of the discharge rate (in gallons per day) on the day of inspection.
- Whether a sediment plume, visible sheen, or hydrocarbon deposits were observed on the bottom or shoreline of the receiving water.

Based on the results of investigation:

- Completion of any necessary maintenance will be conducted to ensure stormwater controls remain in effective operation during the permit coverage. Routine maintenance will be completed by the end of the next business day or corrective actions under Section 4.3, whichever applies; and
- Modify your SWPPP site map to reflect changes to your storm water controls that are no longer accurately reflected on the current site map.

Documentation for the site inspections will be recorded using the forms, kept with the SWPPP documents, and made available to an IDEQ inspector upon request. Inspections may migrate to an electronic tracking system for recording purposes and will be available to an IDEQ inspector upon request. Corrective actions will be logged in Appendix M, or electronic tracking system, with dates of identification, means to correct the issue, and date of correction. If the issue requires changes to BMPs or other SWPPP components, these will be noted in the SWPPP Amendment Log (Appendix N). Inspection reports will be completed within 24 hours of the site inspections.

Inspection reports include the following:

- Inspection date.
- Names and titles of staff conducting the inspection.
- Summary of inspection findings including necessary routine maintenance and corrective actions.
- For inspections conducted due to rainfall measuring 0.25 inches or greater, the rain gauge amounts will be included in the report.
- Any conditions that make the site unsafe to access.

4.2 Signatory Requirements (IPDS CGP 9.11(1&2))

Any report or information requirement, including the SWPPP, corrective action log, monitoring and reporting provisions, and any other compliance documentation required by this permit, must be signed by the duly authorized representative (see Appendix O for the authorization letter). A person is a duly authorized representative only if the following is true:

- The authorization is made in writing by one of the following:
  - For a corporation, by a responsible corporate officer as specified in IDAPA 58.01.25.090.01.a.

  - For a partnership or sole proprietorship, by a general partner or the proprietor, respectively as specified in IDAPA 58.01.25.090.01.b.
  - For a municipality, or other public agency, by either a principal executive officer or ranking elected official as specified in IDAPA 58.01.25.090.01.c.
- The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity, such as the position of a plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; and
- The written authorization is kept in the SWPPP.

4.3 Certification (IPDS CGP 9.11(4))

Any person signing any document, including the SWPPP, corrective action log, monitoring and reporting provisions, and any other compliance documentation required by this permit must make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

A copy of all inspection reports will be kept on-site in the construction manager's office, with an additional copy maintained at the Perpetua offices. These reports will be available for an on-site inspection and upon request by IDEQ. All inspection reports will be retained for at least three years from the date that permit coverage expires or is terminated.

4.4 Inspection Schedule (IPDES CGP 4.2-4.4, 7.2.7)

The inspection schedule may be variable dependent on the phase of the project and season. Work schedule changes will be documented in the SWPPP amendment log in Appendix N with the date of the change to inspection frequencies.

Regular inspections

Regular inspections will occur at least once daily.

A properly maintained rain gauge will be provided at the construction office. For any day of rainfall during normal business hours that measures 0.25 or greater the total rainfall measured for the day will be recorded in Appendix P. Rainfall may be tracked by rain gauge with data logger in lieu of using the log in Appendix P.

All members of the stormwater team will report any issues to the project manager or responsible party as soon as possible so it can be corrected.

Dewatering Activity

For sites discharging dewatering water, an inspection will be conducted once each day the discharge occurs.

Reduced inspection

Stabilized Areas: Once areas are stabilized then the inspection frequency may be reduced to twice per month (max of 14 calendar days apart) for the first month and then once per month in the stabilized areas of the site. Stabilization activities and tracking of stabilized areas will be provided in Appendix H.

Arid, Semi-Arid, or Drought Stricken Areas: The project location is not in an arid, semi-arid, or drought-stricken area.

Frozen Conditions: When conditions are suspended due to frozen conditions inspections may be temporarily suspended. The suspension of inspections due to frozen conditions will be logged in Appendix K and rainfall gauge recording will be provided in Appendix P. Rainfall may be tracked by rain gauge with data logger in lieu of using the log in Appendix P. The regular inspection frequency will be adopted upon thawing conditions.

4.5 Corrective Actions (IPDES CGP 5.1-5.4)

Regular inspections will be conducted to address any potential issues promptly.

Corrective Action Triggers

The following list provides triggers for corrective actions:

- A storm water control necessary to comply with the requirements of this permit was never installed or was installed incorrectly.
- Discharges are not meeting applicable water quality standards (WQS).
- A prohibited discharge has occurred (See Section 3).
- A sediment plume, visible sheen, or hydrocarbon deposits are observed in the receiving water during site dewatering activities, or such conditions are reported by IDEQ, EPA, or local authorities.
- Turbidity monitoring shows that discharge exceeds WQS (discharge turbidity 50 NTU or more above background turbidity instantaneously, or 25 NTU above background turbidity for more than 10 consecutive days). See Section 5.1.

Corrective Action Deadlines

For any triggering conditions:

- Immediately take steps to address the condition, including cleanup.
- If the problem does not require significant repair, complete corrective action by the next business day.
- If significant repair is needed, complete it within seven calendar days. If infeasible, document why and schedule the repair as soon as possible.

Comply with any corrective actions required by IDEQ due to permit violations found during inspections. Any corrective actions will be logged in Appendix L with the required information and outcomes.

Corrective Action Log

- Document the condition and the date/time it was identified within 24 hours.
- Document actions taken to address the condition within 24 hours of completion.
- Keep the log at the site or an accessible location for inspections.

- Retain the log for at least three years after permit coverage expires or is terminated.

4.6 Location of SWPPP and Permit Coverage Sign (IPDES CGP 1.5, 7.3)

The SWPPP will be available at the site and located in the onsite construction management office. It will be available for on-site inspection or upon request by IDEQ. The location of the SWPPP will be included on the SWPPP permit coverage sign located at the entrance to the site where it will be visible from the public road.

The permit coverage sign will include the IPDES ID (i.e., the permit tracking number assigned to the NOI), contact name and phone number for obtaining additional construction site information, a web address for the SWPPP (if available) or the following statement; “If you would like to obtain a copy of the SWPPP, contact the Site Representative above.”; and the following statement “If you observe indicators of storm water pollutants in the discharge or in the receiving waterbody, contact IDEQ through the following website: https://www.deq.idaho.gov/about-us/contact-us/”.

4.7 SWPPP Modifications (IPDES CGP 7.4)

The SWPPP will be modified, and new site plans provided if needed within **7 days** of any of the following conditions:

- Whenever new operators become active in construction activities on the site.
- Changes to construction plans, stormwater controls, or other activities that are no longer accurately reflected in the SWPPP including changes made in response to corrective actions triggered under IPDES CGP Section 5.
- Updates to the site map to reflect where operational control has been transferred (and the date of transfer) since initiating permit coverage.
- If inspections or investigations by IDEQ or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit.
- If IDEQ determines it is necessary to install and/or implement additional controls at the site in order to meet the requirements of this permit. A copy of any correspondence describing such measures and requirements and a description of the controls that will be used to meet such requirements will be included with the SWPPP.
- To reflect any revisions applicable to federal, state, tribal, or local requirements that affect the stormwater controls implemented at the site.
- A change in chemical treatment systems or chemically enhanced stormwater control including use of a different treatment chemical, different dosage rate, or different areas of application

The SWPPP does not need to be modified if the estimated dates in the project schedule change during the course of construction.

Records of all SWPPP modifications will be maintained in Appendix M. Each modification entry will include a short summary of the changes and the name of the person authorizing the changes. All modifications made to the SWPPP consistent with IPDES CGP 7.4 must be authorized by a person identified in IPDES CGP 9.1.11.B. Changes will be communicated with other on-site operators that may be impacted by changes to the SWPPP.

Delegation of Authority forms are provided in Appendix O for Perpetua personnel.

Section 5

Water Quality Based Conditions (IPDES CGP 3.1-3.4)

Sediment resulting from this activity must be mitigated to prevent violations of the turbidity standards stipulated in Idaho's water quality standards. A violation of this standard must be reported to the IDEQ regional office immediately. Containment measures such as silt curtains, geotextile fabrics, geomembrane wrap, and silt fence must be implemented and properly maintained to minimize instream sediment suspension and resulting turbidity.

All practical BMPs on disturbed banks and within WOTUS must be implemented to minimize turbidity. Visual observation is acceptable to check BMP functionality. If a sediment plume is observed the project may be causing an exceedance of water quality standards, and the permittee must inspect and correct BMPs. If corrective action is necessary, the BMPs will be inspected to ensure they are operating correctly and if they are exceeding sediment holding capacity. During this time, the work will be ceased. If this does not correct the problem, operating methods could be adjusted to reduce turbidity.

Operators must take corrective action if their discharge causes or contributes to an excursion of any WQS. IDEQ expects compliance with permit conditions to control storm water discharges to meet WQS. Operators must continue implementing storm water controls required under previous permits to meet EPA-approved or established total maximum daily load's (TMDLs) or WQS. For sites discharging to impaired waters, operators must comply with stabilization deadlines and any additional controls specified by IDEQ. See Appendix Q for Dewatering Inspection Form. Water quality monitoring for dewatering or storm event discharges is required only when a site discharges into WOTUS without intervening conveyance systems.

5.1 Turbidity Monitoring Requirements

Requirements for Sites Discharging from Construction Dewatering Activities	
Turbidimeter	Properly and regularly calibrate turbidimeter.
Required Monitoring	At least one sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels. Record background turbidity levels on the Turbidity Monitoring Report form (Appendix R) along with location, date and time. At least one sample per day must also be taken immediately downstream from each point of discharge and within any visible plume. Record the turbidity, location, date, and time of the discharge monitoring. Use the Turbidity monitoring Report form in Appendix R. Downstream samples must be taken immediately following the upstream sample to obtain meaningful and representative results. Sampling from less than every discharge location is allowed if the discharge locations sampled are representative of the site's total discharges.

Dewatering Monitoring	Take at least one turbidity sample from the dewatering discharge after any treatment process, before mixing with the receiving water, on each day of discharge from dewatering activities. Daily sample must be under 50 NTU instantaneously above background of the receiving water, or the running 10 calendar day average of the daily results must be under 25 NTU above background of the receiving water. If either of the above criteria is not met, dewatering must stop and implement corrective actions to address the cause of the exceedance before resuming dewatering operations.

Requirements for Sites Discharging due to Storm Events	
Collecting and evaluating samples	Turbidity Monitoring Operators must conduct turbidity monitoring during construction activities when there is a discharge of pollutants from an unstabilized portion of the site to a WOTUS during operating hours. A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field but grab samples may be collected and taken to a laboratory for analysis. If the operator can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, at least one sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location (latitude & longitude), date, and time must be recorded prior to monitoring downstream of the project area. At least one sample per day must also be taken immediately downstream from each point of discharge and within any visible plume. The turbidity, location, date, and time must be recorded in the log located in Appendix R. The downstream samples must be taken immediately following the upstream samples to obtain meaningful and representative results. Sampling from less than every discharge location is allowed if the discharge locations sampled are representative of the site's total discharges. Results from the discharge location sampling must be compared to the receiving water background levels to determine whether project activities are causing an exceedance of Idaho WQS. Any exceedance of the turbidity standard must be reported to the appropriate IDEQ regional office within 24 hours of the sample event. If the downstream turbidity is 50 NTUs or more above the background turbidity, then the discharge is causing an exceedance of WQS. If the discharge is to a non-flowing or dry stream bed, then the background turbidity is considered 0. The following steps should be followed to ensure compliance with the turbidity standard: 1. Quantify the discharge by collecting turbidity measurements from the discharge point, prior to mixing with the receiving water, and the upstream receiving water monitoring point and compare to Idaho's instantaneous numeric turbidity criterion (50 NTU over background). 2. If the discharge turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring at least once per day until the discharge ceases. If turbidity exceeds background turbidity by more than 50 NTU instantaneously, then stop pollutant discharge activities, conduct corrective action and proceed to step 3. 3. Take immediate action to address the cause of the exceedance (i.e. uncovered stockpiles, exposed disturbed land, failing or damaged sediment control BMPs, etc.). That may include inspecting the condition of project BMPs. If the BMPs are functioning as intended but the turbidity is above the WQS, then the operator must conduct corrective action to modify or improve the BMPs to correct the exceedance. If the project continues to have a visual sediment plume after BMPs have been inspected and modified, turbidity monitoring consistent with Table 5-1 is required. 4. Continue monitoring each day until: 1) the discharge ceases or 2) the discharge meets WQS (no more than 50 NTU over background instantaneously or 25 NTU over background for more than 10 consecutive days). 5. Pollutant discharge activities may continue once one of the two conditions is met in step 4 above. Copies of monitoring reports for turbidity monitoring must be available to IDEQ upon request. The monitoring reports must describe all exceedances and subsequent actions taken, including the effectiveness of the action. Include the date the plume was identified, the calibration records of the turbidimeter, the dates on which pollutant generating activity ceased, and the dates on which pollutant generating activities resumed, as applicable. Keep the monitoring reports in your SWPPP.

Table 5-1. Turbidimeter Monitoring and Sampling When a Plume is Observed		
Turbidity above background [a]	Monitoring/sampling frequency [a]	Additional Action Required
0 to 24 NTU	Visual monitoring every 2 hours	None
25 to 49 NTU	Sample every 2 hours	STOP work after 8 hours in every 24-hour period
25 NTU for 10 or more consecutive days	Sample before and after following instructions[b]	STOP work and follow instructions[b]; notify IDEQ regional office
50 NTU or more	Sample before and after following instructions[c]	STOP work and follow instructions[c]; notify IDEQ regional office

Notes:

a. Sample and report turbidity three times at each location. Use the maximum value of three samples to determine compliance following Table 5-1 directions.

b. Instructions: If BMPs appear to be functioning properly, then the permittee must modify the activity or implement corrective action such as installing additional BMPs (this may include modifying existing BMPs) until additional sampling indicates turbidity standards are met. Sampling can cease when a sediment plume is no longer observed. Work can commence when a sediment plume is no longer observed, and measurements are consecutively below 25 NTU.

c. Instructions: If BMPs appear to be functioning properly, then the permittee must modify the activity or implement corrective action such as installing additional BMPs (this may include modifying existing BMPs) until additional sampling indicates turbidity standards are met. Sampling can cease when a sediment plume is no longer observed. Work can commence when a sediment plume is no longer observed, and measurements are below 50 NTU."

5.2 Turbidity Monitoring Records

A monitoring report is available in Appendix R. Records of monitoring information must include:

- All relevant calibration and maintenance records;
- All original strip chart recordings or other forms for continuous monitoring instrumentation;
- The date, place, and time of sampling or measurement;
- The name of any individuals who performed the sampling or measurements;
- The dates any analyses were performed;
- The name of any individuals who performed the analyses;
- The analytical techniques or methods used;
- The results of the analysis.
- Other information as identified in Section 5.1 Turbidity Monitoring Requirements.

Section 6

Certification and Notification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

X_____ _____

Date

Section 7

References

Air Sciences Inc., 2024, Haul Road Capping Plan for Permit to Construct No. P-2019.0047, Prepared for Perpetua Resources Idaho, Inc., March.

Hoag, J. C., S. K. Wyman, G. Bentrup, L. Holzworth, D. G. Ogle, J. Carleton, F. Berg, and B. Leinard. 2001. "Users Guide to Description, Propagation and Establishment of Wetland Plant Species and Grasses for Riparian Areas in the Intermountain West". USDA-NRCS Technical Note Plant Materials No. 38. Boise, Idaho and Bozeman, Montana. February.

Idaho Department of Environmental Quality, 2020, Idaho Catalog of Storm Water Best Management Practices Manual, April.

Perpetua Resources Idaho, Inc. (Perpetua Resources), 2025, Environmental Monitoring and Management Program Appendix FM-1.1 Development Rock Management Plan, May 2025

Strom, C., J. B. Norton, and T. Loubsky. 2010. "Successful restoration of severely disturbed lands". University of Wyoming Extension.

Tetra Tech, 2025. EMMP Appendix FM-3.1; Reclamation Plan, Stibnite Gold Project Valley County, Idaho, Prepared for Perpetua Resources. March 2025.

USDA NRCS. 2011. Plant Suitability and Seeding Rates for Conservation Plantings in Colorado. Plant Materials Technical Note No. 59 (Revised).

USDA NRCS. 2012. Conservation Plant Species for the Intermountain West. Plant Materials Technical Note No. 24 (Revised 2023).

USDA NRCS. 2018. "The PLANTS Database". National Plant Data Team, Greensboro, NC. http://plants.usda.gov August 2018

Appendix A: NOI Form

I-III Reserved

IV. Project/Site Information

Project/Site Name: Perpetua Stibnite Mine - Tailing Storage Facility

Physical Address: Tailing Storage Facility

Zip Code, City, County State: 83615, Stibnite, Valley County, Idaho

Is your project/site located in Indian country lands? ○ Yes ◉ No

Latitude/Longitude: 44.8861194N/-115.3672583W

Are you requesting coverage under this NOI as a "federal operator" (as defined in Appendix A)? ○ Yes ◉ No

Estimated Project Start Date:
August 2025

Estimated Project Completion Date:
August 2028

Estimated disturbed area of the total project (to the nearest quarter acre): 423

Include an area map identifying the estimated area that may be disturbed. This map should have a resolution of at least 1:24,000 (if a United States Geological Survey (USGS) map is used, provide the title and catalog number). Identify locations of all waters of the U.S. within and one mile downstream of the site's discharge point and identify if any of these waters are listed as impaired, or are identified as Tier 2, Tier 2.5, or Tier 3 waters. Identify any wells, springs, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant as being located within the map area.

Please describe the boundaries of the disturbed area.

The TSF is situated within the Meadow Creek drainage, a tributary to the East Fork of the South Fork of the Salmon River (EFSFSR). It will be positioned immediately upstream of the existing Spent Ore Disposal Area (SODA) and lies entirely within the Meadow Creek drainage basin, upstream of Meadow Creek's confluence with Blowout Creek. The TSF impoundment, embankment, and associated water diversions will occupy approximately 423 acres at final build out with approximately 405 acres of new disturbance.

Type of Construction Site (Check all that Apply)

- ☐ Single-Family Residential
- ☐ Multi-Family Residential
- ☐ Commercial
- ☒ Industrial
- ☐ Institutional
- ☐ Highway or Road
- ☐ Utility

☐ Other(Describe)

Will there be demolition of any structure built or renovated before January 1, 1980? ○ Yes ◉ No

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space? ○ Yes ○ No

Will you be discharging dewatering water from your site? ◉ Yes ○ No

Was the pre-development land used for agriculture (see Appendix A for definition of "agricultural land")? ○ Yes ◉ No

Have earth-disturbing activities commenced on your project/site? ○ Yes ◉ No

If Yes, is your project an "emergency-related project"? ○ Yes ○ No

Have storm water discharges from your project/site been covered previously under an IPDES/NPDES permit? ○ Yes ◉ No

If yes, provide the permit number if you had coverage under EPA's/DEQ CGP's or the IPDES/NPDES permit number if you have coverage under an EPA/DEQ individual permit.

Existing Environmental Permits

Please list other environmental permits associated with your permit as well as IPDES/NPDES permit numbers for operators co-located on this site (other operators and/or entities with control over the plans and specifications).

Permit Type	Permit Number	Effective Date	Expiration Date
See Table Below			

V. Discharge Information

☑ By checking this box, I confirm that I understand that the CGP only authorizes the allowable storm water discharges in Part 1.2.1 and the allowable non-storm water discharges listed in Section 1.2.2. Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, DEQ, or local authorities after issuance of this permit via any means, including the Notice of Intent(NOI) to be covered by the permit, the Storm Water Pollution Prevention Plan (SWPPP), during an inspection, etc. If any discharges requiring IPDES permit coverage other than the allowable storm water and non-storm water discharges listed in Sections 1.2.1 and 1.2.2 will be discharged, they must be covered under another IPDES permit.

Does your project/site discharge storm water into a Municipal Separate Storm Sewer System (MS4)? ○ Yes ◉ No

If yes, please select the name of the MS4 permittee

Are there any surface waters within 50 feet of your project's earth disturbances? ◉ Yes ○ No

For each point of discharge, provide the following receiving water information:

Existing Environmental Permits

Permit Type	Permit Number	Effective Date	Expiration Date
IPDES Individual	ID003006	TBD	TBD
Sanitary Permit	IPDES Application 5822	TBD	TBD
Construction General Permit	IDR100000 (Various on-site locations)	February 17, 2022	February 16, 2027
Multi-Sector General Permit for Stormwater Discharge Associated with Industrial Activity	IDR050000	March 1, 2021	February 28, 2026
Air Quality Permit to Construct	P-2019.0047	June 17, 2022	June 17, 2027

Discharge Information

Discharge Points								
Point of Discharge ID	Latitude Decimal Degrees	Longitude Decimal Degrees	Name of the first water of the U.S. that receives storm water directly from the point of discharge and/or from the MS4	If the receiving water is impaired (on the CWA 303(d) list) list the pollutants that are causing the impairment	If a TMDL has been completed for this receiving waterbody provide the TMDL name and ID	Pollutants for which there is a TMDL	Receiving Water	Designation
001	44.889718°	-115.348527°	Meadow Creek	Temperature & Arsenic	No TMDL	No TMDL	East Fork South Fork Salmon River (EFSFSR)	Category 5
002	44.890124°	-115.354682°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
003	44.890816°	-115.363782°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
004	44.888453°	-115.368651°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
005	44.890010°	-115.375298°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
006	44.882859°	-115.371476°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
007	44.874832°	-115.367337°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
008	44.874359°	-115.365978°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
009	44.877931°	-115.366336°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
010	44.888101°	-115.357787°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
011	44.887964°	-115.353609°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5

Point of Discharge ID	Latitude Decimal Degrees	Longitude Decimal Degrees	Name of the first water of the U.S. that receives storm water directly from the point of discharge and/or from the MS4	If the receiving water is impaired (on the CWA 303(d) list) list the pollutants that are causing the impairment	If a TMDL has been completed for this receiving waterbody provide the TMDL name and ID	Pollutants for which there is a TMDL
See Table Above						

Are any of the surface waters to which you discharge designated by the state anti-degradation policy as a Tier 2 water (High Quality Waters – where the quality of waters exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding Natural Resource Water)? ○ Yes ◉ No

V. Discharge Information(contd...)

Discharge Point:

Receiving Water	Designation
See Table Above	

Discharge Point:

Receiving Water	Designation

Discharge Point:

Receiving Water	Designation

VI. Chemical Treatment Information

Will you use polymers, flocculants, or other treatment chemicals at your construction site? ○ Yes ◉ No

Will you use cationic treatment chemicals at your construction site? ○ Yes ◉ No

Have you been authorized to use cationic treatment by EPA or DEQ in advance of filing your NOI*? ○ Yes ◉ No

Identify the treatment chemicals that you will use

N/A

Upload a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

VII. Storm Water Pollution Prevention Plan (SWPPP) and Personnel Training Information

Has the SWPPP been prepared in advance of filing this NOI? ◉ Yes ○ No

SWPPP Preparer Information

First Name:
Last Name: Jessica Joyner, Brent Leclerc, Reghan Hodges

Professional Title: PM, SME, Project Engineer

Email:
Phone jjoyner@brwncald.com, bleclerc@brwncald.com, rhodges@brwncald.com

☑ Check this box to confirm that all required personnel, including those conducting inspections at your site, will meet the training requirements in Section 6 of this permit

VIII. State/Environmental Laws

1. Nothing in this permit shall be constructed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.
2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

Threatened and Endangered Species Protection Eligibility Criteria

Using the instructions in Appendix C of the CGP, under which criterion listed below are you eligible for coverage under this permit? Check only 1 box, include the required information, and provide a sound basis for supporting the criterion selected. You must consider Endangered Species Act listed threatened or endangered species (ESA-listed) and/or designated critical habitats under the jurisdiction of both the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and select the most conservative criterion that applies.

NOTE: You must use the information from the USFWS IPaC and NOAA Species Directory (see CGP, Appendix C, Part C.2, Step 2) when determining the presence of ESA listed species and critical habitat. Attaching aerial images of the site to this NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion. When evaluating the potential effects of your activities, you must consider effects to listed species or critical habitats within the "action area" of your construction activity, as identified by the USFWS IPaC and/or the NOAA Species Directory. Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

After you submit your NOI and before your NOI is authorized, DEQ may notify you if any additional controls are necessary to ensure your discharges have no likely adverse effects on ESA-listed species and critical habitat.

○ **Criterion A. No ESA-listed species and/or designated critical habitat present in action area.**

Using the process outlined in Appendix C of this permit, you certify that ESA-listed species and designated critical habitats under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.

Basis statement content: A basis statement supporting the selection of this criterion should identify the USFWS and NMFS information sources used. Attaching aerial images of the site to this NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

○ **Criterion B. Eligibility requirements met by another operator under the 2022 CGP.**

Include the other operators IPDES/NPDES ID for which your site's discharge related activities are addressed. IPDES/NPDES #

The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2022 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of IPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2022 CGP operator's notification of authorization under this permit. If your certification is based on another 2022 CGP operator's

certification under criterion C, you must provide DEQ with the relevant supporting information required of existing dischargers in criterion C.

Basis statement content: A basis statement supporting the selection of this criterion should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.

Criterion C. Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat.

ESA-listed species and/or designated critical habitats under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to DEQ that your site's discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any storm water controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in Appendix C of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with this NOI.

Note that attaching the following to your NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion: 1) the species list with the action area used to obtain the list; 2) aerial images of the site; and 3) a copy of the SWPPP.

Basis statement content: A basis statement supporting the selection of this criterion should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

Criterion D. Coordination with USFWS and/or NMFS has successfully concluded.

Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site's discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

Basis statement content: A basis statement supporting the selection of this criterion should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional offices providing that coordination, and the date that coordination concluded.

Criterion E. ESA Section 7 consultation has successfully concluded. *Corespondence with USFWS found at the end of this document*

Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, indicate the result of the consultation:

- biological opinion and/or conference opinion currently in effect from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of ESA-listed species, nor the destruction or adverse modification of critical habitat; or
- written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat.

If eligible under Criterion E, you must also provide supporting documentation for your determination in your NOI and SWPPP, including the Biological Opinion (or ECO tracking number) or concurrence letter. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

Basis statement content: A basis statement supporting the selection of this criterion should identify the federal action agencies involved, the field office/regional offices providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the consultation was completed.

I. Biological opinion from USFWS and/or NMFS that concludes the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or
II. Written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat.

You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

○ **Criterion F. Issuance of section 10 permit.**

Potential take is authorized through the issuance of a permit under section 10 of the ESA by USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species designated critical habitat. You must include copies correspondence between yourself participating agencies in your SWPPP and your NOI.

Basis statement content: A basis statement supporting the selection of this criterion should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional offices providing permits, any tracking numbers or identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the permit was granted.

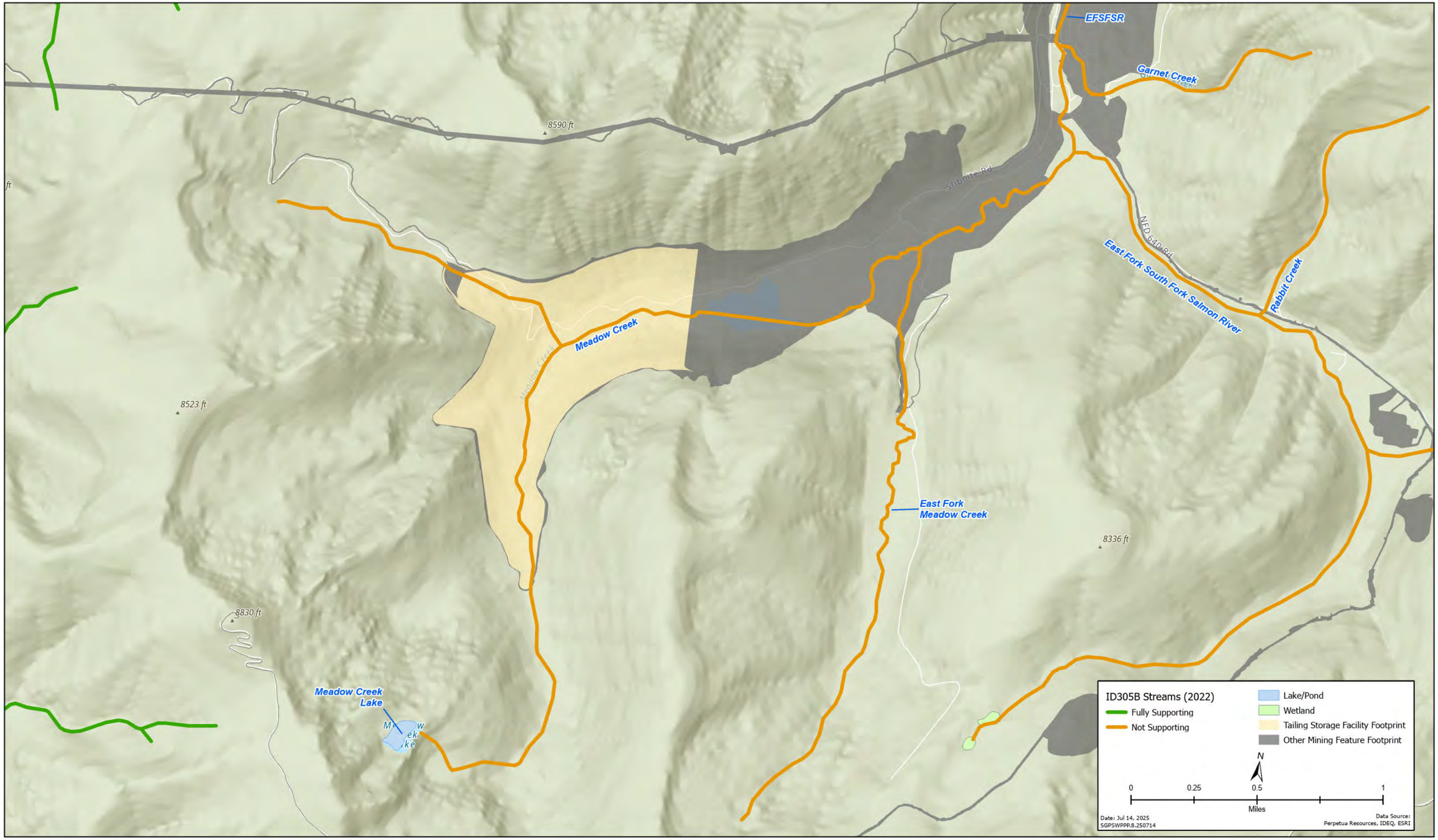
Fees

Coverage is not effective until payment has been received by DEQ. Please identify how you will pay fees:

◉ Electronic Payment through Access Idaho
○ Mail Payment

To make a payment go to the Fee Management on your E-Permitting Home Page

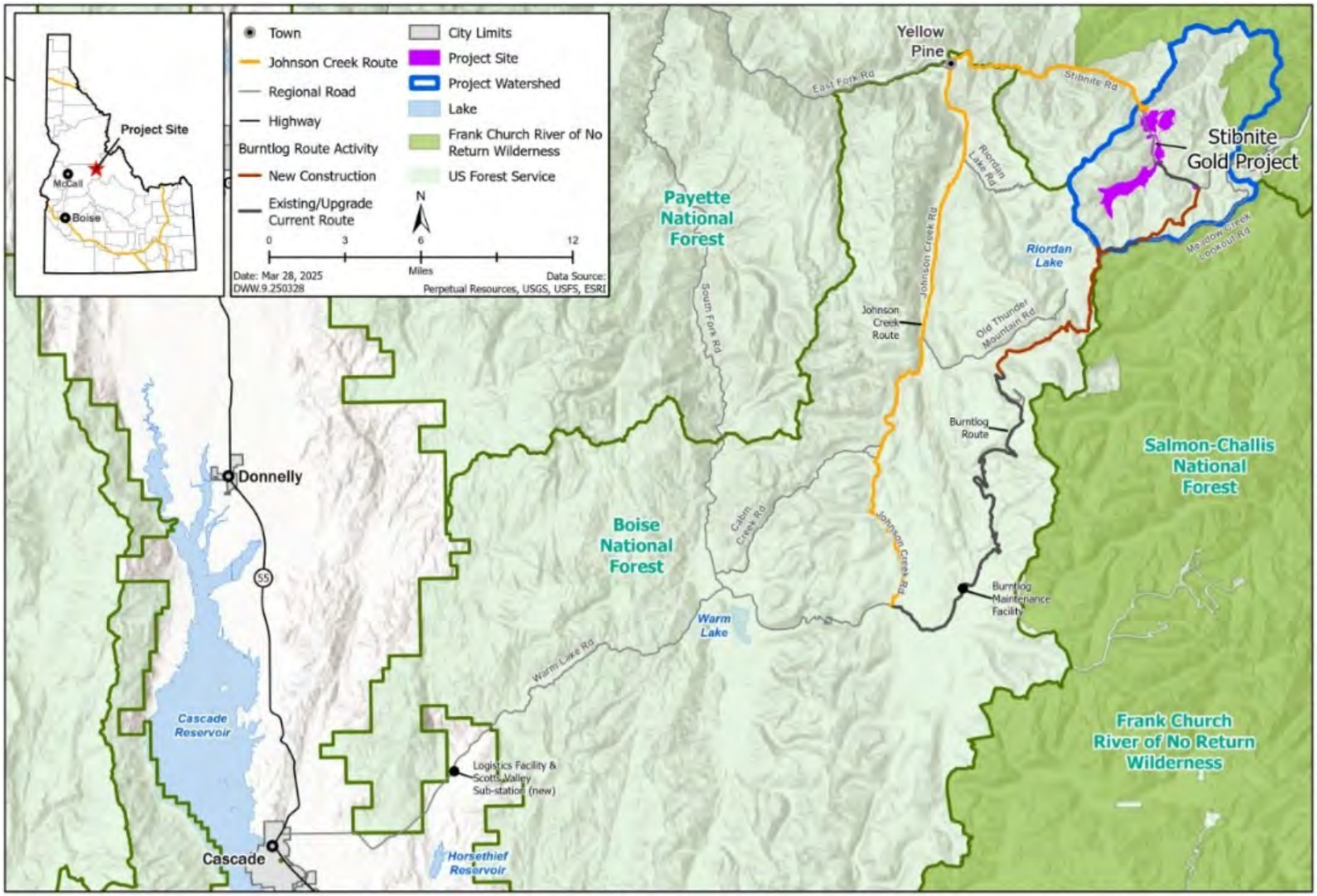
☑ I fully understand the implication of IDAPA 58.01.25.100.01 and accept responsibility for ensuring that all other necessary approvals, authorizations, or permits have been obtained.



Brown AND Caldwell	DATE:	Jul 14, 2025
	Project No:	197200
	Client:	Perpetua Resources
	Figure ID:	SGP_SWPPP.8.250714

Tailings Storage Facility
Waterbodies within 1 mile

Path: Y:\Shared\Clients\Perpetua Resources Corp\PR_Permit\153201 - Perpetua 2025 Ancillary Permitting\120 Bckgnd Ref Info\03 Data\SGP_SWPPP\SGP_SWPPP.aprx\TSF_SWPPP_WB.8 20250714 15:56 PWatts



Project Vicinity Map

Documents Supporting Criterion E. ESA Section 7 Consultation Has Successfully Concluded

1. USFW Letter Re: *Stibnite Gold Project – Valley and Lemhi Counties, Idaho – Biological Opinion, Concurrence and Conference*
2. USNMSF Letter dated 10/7/2024 Re: *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response fro the Stibnite Gold Project, South Fork Salmon River HUC 17060208, Valley County, Idaho; Lemhi River HUC 17060204, Lemhi County, Idaho*.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Idaho Fish and Wildlife Office
1387 S. Vinnell Way, Suite 378
Boise, Idaho 83709
https://www.fws.gov/office/idaho-fish-and-wildlife

In Reply Refer to:
FWS/R1/ES/IFWO/2024-0084691-001
FWS/R1/ES/IFWO/2024-0084691-002
FWS/R1/ES/IFWO/2024-0084691-003

Matthew Davis, Forest Supervisor
Payette National Forest
500 North Mission Street
McCall, Idaho 83638

Kathryn A. Werback, District Commander
U.S. Army Corps of Engineers, Walla Walla District
201 N. 3rd Avenue
Walla Walla, Washington 99362-1876

Subject: Stibnite Gold Project – Valley and Lemhi Counties, Idaho – Biological Opinion, Concurrence, and Conference

Dear Matthew Davis and Kathryn Werback:

This letter transmits the U.S. Fish and Wildlife Service's (Service) letter of concurrence, conference concurrence, and biological opinion (Opinion) for the Stibnite Gold Project on the effects of the subject proposed action to species and habitats listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; [Act]). In a letter dated March 25, 2024, and received by the Service on March 26, 2024, the Payette National Forest (Forest) requested consultation under section 7 of the Act. The letter included a biological assessment (Assessment) describing effects of the proposed subject action to bull trout (*Salvelinus confluentus*), bull trout designated critical habitat, whitebark pine (*Pinus albicaulis*), North American wolverine (*Gulo gulo luscus*), Canada lynx (*Lynx canadensis*), northern Idaho ground squirrel (*Urocitellus brunneus brunneus*), and monarch butterfly (*Danaus plexippus*).

Through the Assessment, the Forest determined that the subject proposed action may affect and is likely to adversely affect bull trout, whitebark pine, North American wolverine, and bull trout designated critical habitat. Our Opinion concludes that the subject proposed action will not jeopardize the continued existence of bull trout, whitebark pine, or North American wolverine and will not destroy or adversely modify designated critical habitat for bull trout. The Forest also

determined that the subject proposed action may affect but is not likely to adversely affect Canada lynx and northern Idaho ground squirrel. The Service concurs with the Forest's determination and presents our rationale below.

Further, the Forest assessed the effects of their proposed action and made a not likely to jeopardize the continued existence of determination for the monarch butterfly. The Forest requested to conference on monarch and requested Service concurrence with their determination. After reviewing the Assessment, we concur with your determination for monarch butterfly and present our rationale below.

Informal Consultation

Proposed Action

The Stibnite Gold Project proposes to develop mine operations to produce gold and silver doré (semi-pure alloy of gold and silver), and antimony concentrates from ore deposits associated with mining claims. The mining action area occurs in Valley County, Idaho, in the Stibnite Mining District, approximately 50 miles east of McCall, Idaho, and the restoration project occurs in Lemhi County, Idaho, approximately 12 miles northwest from Leadore, Idaho. The proposed action phases include geophysical investigation, construction, operations, exploration, closure and reclamation, and post-closure monitoring. Development of the mineral resource will include construction of access and haul roads, construction of supporting infrastructure, open pit mining, ore processing, placement of tailings in a Tailing Storage Facility (TSF), and placement of development rock. Mine operations will occur on patented mining claims on private lands and on unpatented mining claims and other areas of federal public lands administered by the Payette National Forest (Forest). Supporting infrastructure corridors (access and transmission line) are located on the Boise National Forest (BNF), Idaho Department of Lands (IDL), Reclamation, and non-federal lands. The proposed action will take place over a period of approximately 20 to 25 years, not including the long-term, post-closure environmental monitoring and potential long-term water treatment. The proposed action is fully described in the accompanying Opinion and in the Assessment (pp. 14-244).

Environmental design features (EDF; USFS 2024, Appendix B) are intended to minimize effects to Canada lynx and Northern Idaho ground squirrel (NIDGS). The EDFs include, but are not limited to:

- Activities will be modified when practicable to maintain key features of Canada lynx denning habitat or to avoid disruption of denning activities.
- The action area will be surveyed for evidence of breeding, denning, or occurrence of Canada lynx to avoid and minimize effects to this species to the extent practicable during construction-related activities.
- Construction activities will be modified to avoid disruption of Canada lynx denning activities when and where species are present.
- Speed limits will be posted (20 miles per hour [mph] or in some cases 15 mph) for the Burntlog Route, haul roads, and light vehicle access roads for the proposed action.

Slower speed limits will be posted at known wildlife crossings and along defined migratory corridors during migration season.

- If a Canada lynx is sighted, adjustments will be made to operations on a temporary basis.
- Appropriate sound dampening and muffling equipment will be utilized to minimize noise excursion from equipment and facilities. When possible, high noise activities will be scheduled at the same time. Equipment will be monitored and maintained to reduce noise related impacts.
- Electric line power will be utilized during operations to eliminate diesel generator noise, except in emergency situations when grid power is down or temporary use in remote areas where it is not practical to run power lines.
- Pre-construction NIDGS surveys will be conducted during mid-June by two experienced biologists in areas of lower elevation where suitable habitat is indicated by habitat modeling. All potential NIDGS habitat will be surveyed out to 328 feet (100 meters) on either side of the transmission line alignment or facility. Data on NIDGS presence (visual or auditory confirmation, active burrows, runways, fecal pellets, and other sign) will be recorded and GPS coordinates used to identify NIDGS locations.
- NIDGS occupied areas will be flagged and protected from all equipment and human disturbance during construction, operations, closure, and post-closure/monitoring activities out to 0.5 mile from the edge of the occupied area to protect active NIDGS from proposed action activities between late March to early September. The occupied areas will also be protected during the hibernation period out to 500 feet.
- If a NIDGS sighting occurs during construction, the area will be vacated, activities halted, and the Forest and the Service notified on how to proceed.

Canada Lynx

Species and Habitat Presence in the Action Area

There are seven Lynx Analysis Units (LAUs) within the action area, covering approximately 656,493 acres (Assessment, p. 475). The seven LAUs; Stibnite, Yellowpine, Burntlog, Landmark, Warm Lake, East Mountain, and West Mountain; are further classified into existing suitable habitat, source habitat capacity, and unsuitable habitat, where source habitat capacity has the potential to develop into suitable Canada lynx habitat in the future (Assessment, p. 478). Within the action area, there are approximately 124,196 acres of suitable habitat and 225,507 acres of source habitat capacity (Assessment, p. 478). There is no Canada lynx designated critical habitat within the action area. The Lemhi restoration project area is not within any LAUs and the nearest LAU (Hayden Basin), located approximately five miles away, is currently not occupied by Canada lynx.

Surveys conducted between 1999 and 2003 using the National Lynx Protocol detected a single Canada lynx on the BNF at two locations in the Bear Valley area, approximately 18 miles southeast of the action area, but there were no detections on the Forest (Assessment, p. 479). The Forest conducted Canada lynx detection surveys on the BNF Cascade Ranger District (in the Burntlog and Yellowpine LAUs) between 2001 and 2003, and no Canada lynx were detected

during the hair snag/DNA surveys. The closest confirmed Canada lynx detection resulting from formal surveys was on the Lowman Ranger District (BNF) in 1999, approximately 60 miles south of the Village of Yellow Pine (Assessment, p. 479). Field surveys using motion activated cameras and hair snags at bait stations were conducted in 2013 and 2014 within the Stibnite, Yellow Pine, Burntlog, Landmark, and Warm Lake LAUs. No Canada lynx were detected at any of the cameras or in any of the hair samples, and no tracks were observed during placement, servicing, or removal of the cameras or bait stations (Assessment, p. 479). The lack of Canada lynx detections from historical surveys and the large body of hair snag and remote camera survey work, both in the action area and in the larger context of the surrounding ranger districts, suggests Canada lynx are rare in the Forest and BNF, and detections are more likely to result from a dispersing or transient individual rather than a resident (Assessment, p. 479). Although Canada lynx denning habitat exists on the BNF and is predicted to exist in the future across the Forest, there are no verified Canada lynx dens or confirmed evidence of breeding. At present, occurrence of Canada lynx in the action area cannot be confirmed (Assessment, p. 479).

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to Canada lynx from the proposed action is described in the Assessment (pp. 479-484). Effects to an individual or population may occur due to habitat loss and fragmentation, increased competition for resources, vehicle collisions, or disturbance from noise and light.

Geophysical investigation will occur at 40 sites along the proposed Burntlog Route to determine the feasibility of construction. Only four of the total of 40 investigation sites occur within or near unburned lynx habitat: one is a track-boring site, one is a helicopter drill site, and two are truck rig boring sites. Lynx could also be affected through habitat alterations from project activities which could reduce already limited habitat. Approximately 0.6 acres will be disturbed through minor brush clearing and tree removal (Assessment, p. 185). It is likely that less than 0.6 acres of suitable lynx habitat will be disturbed, as most of the investigation sites are not within suitable lynx habitat. Acres of disturbance from geophysical investigation is included in the total acres of modeled lynx habitat and overlaps acres of disturbance within the larger mine project.

Roadways, existing and new, may displace or alter the movement of transient Canada lynx. Construction and use of new access roads will fragment habitat and could act as a barrier to movement. Increased traffic associated with proposed action activities along the new and existing roads will discourage Canada lynx from crossing these roads. Currently there are no known resident individuals within the action area, there is no known denning habitat, and the Forest and BNF are considered secondary Canada lynx habitat. Secondary areas, delineated for the recovery plan outline, are those areas with historical records of Canada lynx presence, but have fewer records than in core areas and have no recent documentation of presence or reproduction (Assessment, p. 479). Proposed EDFs will be implemented to monitor for lynx, maintain habitat, and adjust operations due to lynx sightings. Although proposed action activities may disturb or displace Canada lynx, due to the improbability of occurrence in the action area, classification as secondary habitat, and the implementation of EDFs, effects to Canada lynx from displacement are expected to be insignificant.

Over the course of the proposed action, 258.7 acres of modeled lynx habitat will be disturbed from activities within the mine site, access roads, and utilities, with 92.5 acres of that lost

throughout the duration of the proposed action. Loss of habitat will cause fragmentation, increased competition for resources or habitat, and displacement of individuals from the affected area into nearby habitat. Vegetation removal will be small in scale and is not expected to measurably change the amount of suitable habitat available for transient lynx. The 258.7 acres of vegetation (out of the 124,196 acres of current suitable habitat in the action area) disturbed or removed from the proposed action are expected to have insignificant effects to Canada lynx due the small amount of vegetation affected.

Increased traffic and human presence from proposed action activities may affect Canada lynx through increased risk of vehicle collisions and increased competition for resources. The proposed action includes construction of 15 miles of new road, including new segments to the existing Burntlog Route. Plowing of the Burntlog Route will open new corridors for predators. This could increase the predation on snowshoe hares by other predators or become a source of mortality for prey species, which could affect food availability for transient Canada lynx. Due to the unlikelihood of Canada lynx occurring in the action area, effects to lynx from increased competition for resources is expected to be insignificant. Construction and the year-round operation of the Burntlog Route could be a source of mortality for transient Canada lynx, but this is not expected because Canada lynx have not been documented in the action area, the action area does not contain prime denning habitat, and their movements are often nocturnal when limited vehicle traffic occurs (Assessment, p. 482). Upon closure, the new segments of the Burntlog Route will be decommissioned, recontoured, and reclaimed, which will remove impacts associated with traffic or human access in the long-term (Assessment, p. 483). Impacts from traffic will be minimized via traffic controls and public access restrictions. If a transient individual wanders into the action area, the training of personnel about lynx and slow speed limits is expected to reduce effects to Canada lynx from increased traffic to insignificant levels.

Noise and light disturbance from proposed action activities through all phases may displace transient Canada lynx. Canada lynx often avoid large developments (e.g., ski resorts, facilities, etc.); therefore, it is likely that the mine site area boundary will be a barrier to Canada lynx movement (Assessment, p. 481). A transient lynx may pass through or near the action area, but individuals disturbed by increased noise or light will be able to move away from the disturbance, resulting in insignificant effects to those individuals. Construction associated with utility corridors, substations, communication towers, and off-site facilities are expected to be temporary in nature, while long-term effects are expected throughout the proposed action along roadways, near substations, and off-site facilities. Additionally, increased recreational access, a net gain of 2.3 miles of groomed Over Snow Vehicle (OSV) trails, a 2-acre parking area, and a new 1.9-mile groomed access trail that will cross modeled Canada lynx habitat will cause further impacts during winter due to noise. Noise-reduction strategies (e.g., limiting work to daylight hours and utilizing light shields/downshielding, or directional lighting), employed along access roads, utility corridors, and near communication towers and off-site facilities during the proposed action are expected to minimize the intensity and duration of disturbance (Assessment, p. 483) and reduce impacts to transient Canada lynx to insignificant levels.

Northern Idaho Ground Squirrel (NIDGS)

Species and Habitat Presence in the Action Area

The NIDGS may occur within specific elevations, topography, and vegetation types in the action area (Assessment, p. 479). There is no occupied habitat within the action area, but there are approximately 17,917 acres of modeled suitable habitat (Assessment, p. 485). Idaho Department of Fish and Game monitoring data from 2017 documented 308 individuals at 29 colony sites on Forest lands. The closest occupied site documented is approximately 10 miles south of the action area (Assessment, p. 487). Field surveys were conducted in 2018 and 2019 within modeled suitable habitat, covering almost the entire disturbance footprint of the proposed action, and no observations of NIDGS or signs of activity were documented (Assessment, p. 488). Although no NIDGS or signs of their activity were observed during the surveys, there is a small possibility that NIDGS may occur in the future within suitable habitat (Assessment, p. 488). The Lemhi restoration project area is not within the known NIDGS range and does not have the vegetation communities associated with this species.

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to NIDGS from the proposed action is described in the Assessment (pp. 488-490). No occupied habitat is present in the action area; however, effects were analyzed considering that modeled suitable habitat in the action area could be occupied in the future. Effects to NIDGS could occur from vehicle collisions, habitat loss and fragmentation, disturbance from human presence and noise, and displacement.

Road construction, improvement, and maintenance activities and their associated vehicle traffic, as well as increased proposed action vehicle traffic, could impact NIDGS. An increased risk of mortality due to collisions, particularly during the warmer months when the species is active may result in areas where proposed action components cross modeled suitable habitat. Surveys of modeled suitable habitat will be required before construction activities occur, and all staff and contractors will adhere to speed limits and be trained to reduce wildlife collisions. Due to implementation of EDFs and the lack of documented occupancy in modeled suitable habitat, effects to NIDGS from vehicle collisions are expected to be discountable. Vehicle traffic may create noise disturbance that could cause NIDGS to flee the area and find suitable habitat elsewhere. Effects to NIDGS as a result of increased traffic is expected to be insignificant.

Construction of the utility corridors, substations, and communication towers, as well as maintenance activities in the rights-of-way, will lead to temporary disturbance of approximately 34.5 acres and a loss of 8.8 acres of modeled suitable habitat through the life of the mine. Additionally, construction of new off-site facilities will lead to a loss of approximately 19.3 acres of modeled suitable habitat through the life of the mine. These activities may affect NIDGS through loss and fragmentation of modeled suitable habitat, disturbance from human presence and noise, and displacement. Portions of existing and new roads that overlap modeled suitable habitat may act as a barrier to NIDGS movement and dispersal. Increased habitat fragmentation between colonies could impact dispersal between populations, which could lead to genetic and demographic consequences. If NIDGS sites are determined to be occupied, EDFs such as speed limits, seasonal restrictions, site buffers, and monitoring will be used to avoid or reduce impacts

to NIDGS populations. Therefore, effects to NIDGS as a result of habitat fragmentation is expected to be insignificant. Disturbance from human presence and noise may cause individuals to flee the area, causing them to seek suitable habitat nearby. Effects to NIDGS from disturbance and human presence are expected to be insignificant.

The EDFs, such as seasonal restrictions, site buffers, and monitoring will be used to avoid or reduce impacts to NIDGS populations. Furthermore, site checks and formal surveys will be conducted prior to ground-disturbing activities in modeled suitable habitat. Because of the low likelihood of occurrence in the action area, the required and proposed EDFs to continuously monitor modeled suitable habitat, and trained personnel that can identify and reduce impacts if sites are identified as occupied in the future, effects to NIDGS as a result of the proposed action are expected to be insignificant or discountable.

Concurrence

Based on the Service's review of the Assessment, we concur with the Forest's determination that the action outlined in the Assessment and this letter, may affect, but is not likely to adversely affect Canada lynx or Northern Idaho ground squirrel. This concurrence is based on EDFs that reduce impacts of the proposed action to Canada lynx and northern Idaho ground squirrel habitat to insignificant and discountable levels.

This concludes informal consultation. Further consultation pursuant to section 7(a)(2) of the Act is not required. Reinitiation of consultation on this action may be necessary if: (1) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in the assessment, (2) the action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the analysis, or (3) a new species is listed or critical habitat designated that may be affected by the proposed action. If none of the reinitiation triggers have been met, the Forest will conduct a supplemental information report within ten years, and every ten years thereafter, of the letter of concurrence to determine if reinitiation is warranted. In addition, there will be an informal briefing during a Level 1 meeting annually by March of each year to outline the events covered by this concurrence from the previous year, discuss any concerns, and ensure no reinitiation triggers have been met.

Informal Conference

Monarch butterfly

Environmental Design Features

The EDFs (USFS 2024, Appendix B) are intended to minimize effects to monarch butterfly include, but are not limited to:

- Speed limits will be posted (20 mph or in some cases 15 mph) for the Burntlog Route, haul roads, and light vehicle access roads for the proposed action. Slower speed limits will be posted at known wildlife crossings and along defined migratory corridors during migration season.

- In areas where milkweed and monarch butterflies may be present, surveys for milkweed and flowering nectar plants will be conducted by a qualified botanist prior to construction.
- If suitable monarch habitat (milkweed and nectar sources) is found, these areas will be marked on the ground with stakes and flagging in order to ensure these areas are avoided, to the extent practicable, for equipment staging and proposed action activities.
- Conduct proposed action activities, such as mowing, grubbing, and pesticide and herbicide application, in suitable habitat outside of the estimated timeframe (June through September) when monarchs are likely present, as feasible.
- Avoid the application of pesticides and herbicides on milkweed plants and define buffer zones to protect milkweed occupied areas from nearby areas where pesticides and herbicides are applied.

Species and Habitat Presence in the Action Area

Monarch butterflies are generally limited to elevations at or below 5,600 feet (Assessment, p. 503). Approximately 198,592 acres at or below 5,600 ft exist within the action area, including the entire 138.3-acre Lemhi restoration project area (Assessment, p. 503). Due to limited milkweed occurrence, monarch butterfly presence on the Forest is likely more closely associated with migration than with breeding (Assessment, p. 506). Monarch butterfly and milkweed suitability models in Idaho show the predicted suitability for milkweed species and monarch butterflies on the Forest in the action area to be low (Assessment, p. 506). Surveys have not occurred in the action area for monarch butterfly and according to the Service Monarch Conservation Database, only one acre of milkweed with 21 individual plants has been mapped in Valley County, Idaho, and no milkweed has been mapped in Lemhi County, Idaho. Therefore, while monarch butterflies may occur during the summer and early fall in the action area within suitable vegetation communities, the probability is low (Assessment, p. 506). A full environmental baseline for monarch in the action area is detailed in the Assessment (pp. 503-506).

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to the monarch butterfly is in the Assessment (pp. 506-509). Proposed action activities associated with access road construction and operation, road maintenance, and related traffic may affect monarch from direct mortality through vehicle collisions and disturbance from light, noise, fugitive dust, and increased human activity. Construction and operation of access roads is not planned to occur in suitable habitat but may impact individual monarch through vehicle collisions from increased traffic. The likelihood for this is low, primarily due to vehicles adhering to the proposed action's speed limits and the limited amount of suitable habitat along access roads. Light, noise, and fugitive dust impacts associated with road maintenance and vehicle traffic within suitable habitat (potentially high levels depending on the mining phase) are likely to disturb or displace monarch. Road maintenance activities will be conducted to manage fugitive dust emissions, and noise and light reduction strategies will help reduce impacts. Due to the project's speed limits, fugitive dust management, noise and light reduction measures, and the limited amount of suitable habitat along project access roads, effects to monarch from roads and traffic are expected to be insignificant.

Monarch butterfly exposure to hazardous materials and chemical contamination may occur due to proposed action activities in all phases. The EDFs implemented will include proper transport, containment, handling, and storage of products. A Hazardous Materials Handling and Emergency Response Plan will address procedures for responding to accidental spills or releases of hazardous materials to minimize environmental effects. Therefore, there is little chance of monarch being exposed to hazardous materials and effects are expected to be discountable.

The proposed action includes the loss of approximately 59.7 acres of suitable habitat along utility corridors, at substations and, at communication towers, plus an additional 17.2 acres of habitat associated with off-site facilities. Most habitat loss and fragmentation will last through the life of the mine. An additional 44.5 acres of suitable habitat will be lost along riparian areas of the Lemhi River in the restoration project area, but habitat loss and fragmentation are expected to be temporary and insignificant. Construction activities within suitable habitat will likely displace individuals temporarily, from June to September, but monarch butterflies are highly mobile and wide ranging, allowing them to move to suitable habitat outside of the action area. Monarch EDFs will minimize these impacts by requiring surveys for milkweed and flowering nectar plants in suitable habitat, avoidance measures if monarch are found, and vegetation management measures to reduce impacts to monarch, milkweed, and nectar plants. Furthermore, noise and light reduction strategies will be used to reduce effects to monarch from project related operations and facilities. Therefore, due to the use of EDFs to survey, protect vegetation, reduce impact of vegetation related activities, and reduce noise and light impacts to habitat, effects to monarch from habitat loss and fragmentation are expected to be insignificant.

Conference Concurrence

Based on the Service's review of the Assessment, we concur with the Forest's determination that the action outlined in the Assessment and this letter, is not likely to jeopardize the continued existence of the monarch butterfly. This conference concurrence for monarch is based on the low predicted suitability for milkweed species and monarch butterflies in the action area, the implementation of EDFs to minimize effects, and the mobility and wide range of the species that reduce impacts of the proposed action to monarch butterfly to insignificant and discountable levels. Although the Act does not require conferencing on proposed species or critical habitat, the Forest assessed the effects of the proposed action to the monarch butterfly and requested a conference. Therefore, this letter shall serve as our conference concurrence that the proposed action is not likely to adversely affect the monarch butterfly. If the monarch butterfly is listed under the Act during the term of this action and there have been no significant changes that could warrant reanalysis of effects to the monarch butterfly, the Forest should contact the Service in writing to affirm the validity of the conference concurrence and request it be adopted as a standard concurrence to ensure continued coverage under the Act.

Thank you for your continued interest in the conservation of threatened and endangered species. If you have any questions regarding this consultation, please contact Carla Wise of this office at carla_wise@fws.gov.

Sincerely,

LISA ELLIS Digitally signed by LISA ELLIS
Date: 2024.09.05 11:25:33 -06'00'

Lisa Ellis
State Supervisor

Enclosure: Appendices

cc: USFS (Knesek, Rymerson, Peterson)
NOAA (Lind, Sandow)
USACE (Wilson)
Nez Perce Tribe (Lopez, Kash)
Shoshone Bannock Tribe (Tyler, Cutler)
Shoshone Paiute Tribe (Mason, Gibson)
IDFG (Flack, Bassista, Edelmann)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
LONG BEACH, CA 90802

Refer to NMFS No: WCRO-2023-02924

https://doi.org/10.25923/6zyd-4t83

October 7, 2024

Mr. Matthew Davis
Forest Supervisor
Payette National Forest
500 North Mission Street, Building 2
McCall, Idaho 83638

Lt. Col. Kathryn Werback
U.S. Army Corps of Engineers
Walla Walla District
201 N. 3rd Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Stibnite Gold Project, South Fork Salmon River HUC 17060208, Valley County, Idaho; Lemhi River HUC 17060204, Lemhi County, Idaho.

Dear Mr. Davis and Lt. Col. Werback:

Thank you for your letter of March 26, 2024, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Stibnite Gold Project. Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) [16 U.S.C. 1855(b)] for this action. Upon review, we determined your submittal was sufficient and initiated consultation on March 26, 2024. On July 25, 2024, the U.S. Forest Service (USFS) submitted additional information, modifying the proposed action.

In this biological opinion (opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River (SR) spring/summer Chinook salmon (*Oncorhynchus tshawytscha*) and SR Basin steelhead (*O. mykiss*). NMFS also determined the action will not destroy or adversely modify designated critical habitat for these species. Rationale for our conclusions is provided in the attached opinion.

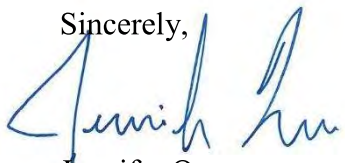
The USFS and the U.S. Army Corps of Engineers (USACE) also determined that the proposed action may affect, but is not likely to adversely affect Southern Resident killer whale (*Orcinus orca*) and their designated critical habitat. NMFS concurs with this determination and provides the rationale for this determination in this opinion.

As required by section 7 of the ESA, NMFS provides an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth terms and conditions, including reporting requirements, that the USFS, USACE, Perpetua Resources, Inc., and any permittee who performs any portion of the action, must comply with in order to be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on EFH pursuant to section 305(b) of the MSA, and includes thirteen Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are similar, but not identical to the ESA terms and conditions. Section 305(b)(4)(B) of the MSA requires federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the EFH Conservation Recommendations, the USFS and USACE must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many Conservation Recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, NMFS asks that you clearly identify the number of Conservation Recommendations accepted.

Please contact Bill Lind, Southern Snake Branch Office, at (208) 391-1282, Bill.lind@noaa.gov or Johnna Sandow, Northern Snake Branch Office, at (208) 378-5737, Johnna.sandow@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Jennifer Quan
Regional Administrator
West Coast Region

Enclosure

cc: K. Knesek – PNF
R. Rymerson - PNF
C. Nalder – PNF
K. Urbanek - USACE
B. Wilson - USACE
K. Hendricks - USFWS
C. Wise - USFWS
M. Lopez - NPT
C. Colter – SBT
B. Gibson - SPT

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Stibnite Gold Project

NMFS Consultation Number: WCRO-2023-02924

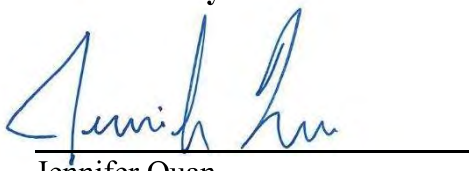
Action Agencies: USDA Forest Service
U.S. Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	If Likely to Adversely Affect, Is Action Likely to Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	If Likely to Adversely Affect, Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha)*	Threatened	Yes	No	Yes	No
Snake River Basin steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Southern Resident Killer Whale (*Orcinus orca*)	Endangered	No	N/A	No	NA

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By: 

Jennifer Quan
Regional Administrator
West Coast Region
National Marine Fisheries Service

Date: *October 7, 2024*

Appendix B: Stormwater Team

Stormwater Team

IPDES Construction General Permit No. IDR100000

Stormwater Team					
Name	Responsibilities/Role	Conducting Inspections?	Training Completed?	Phone Number	E-mail
		☐ Yes ☐ No	☐ Yes ☒ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		
		☐ Yes ☐ No	☐ Yes ☐ No		

Appendix C: Training Documents

Training Log

IPDES Construction General Permit No. IDR100000

If personnel on the stormwater team have completed the storm water inspector training program (IPDES CGP 6.3.1), **include copies of the certificate** showing that the relevant personnel have completed the training and passed the exam.

Projects Name: _____
Course Title: _____
Instructors Name(s)/Title(s): _____
Course Location: _____
Course Date: _____ **Course Length (hours):** _____

Training Topic:

☐Erosion Control BMPs
☐Sediment Control BMPs
☐Non-stormwater BMPs
☐Emergency Procedures
☐Good House Keeping BMPs
☐SWPPP Provisions
☐Conducting Inspections
☐Turbidity Monitoring
☐Other (Specify):

Description:

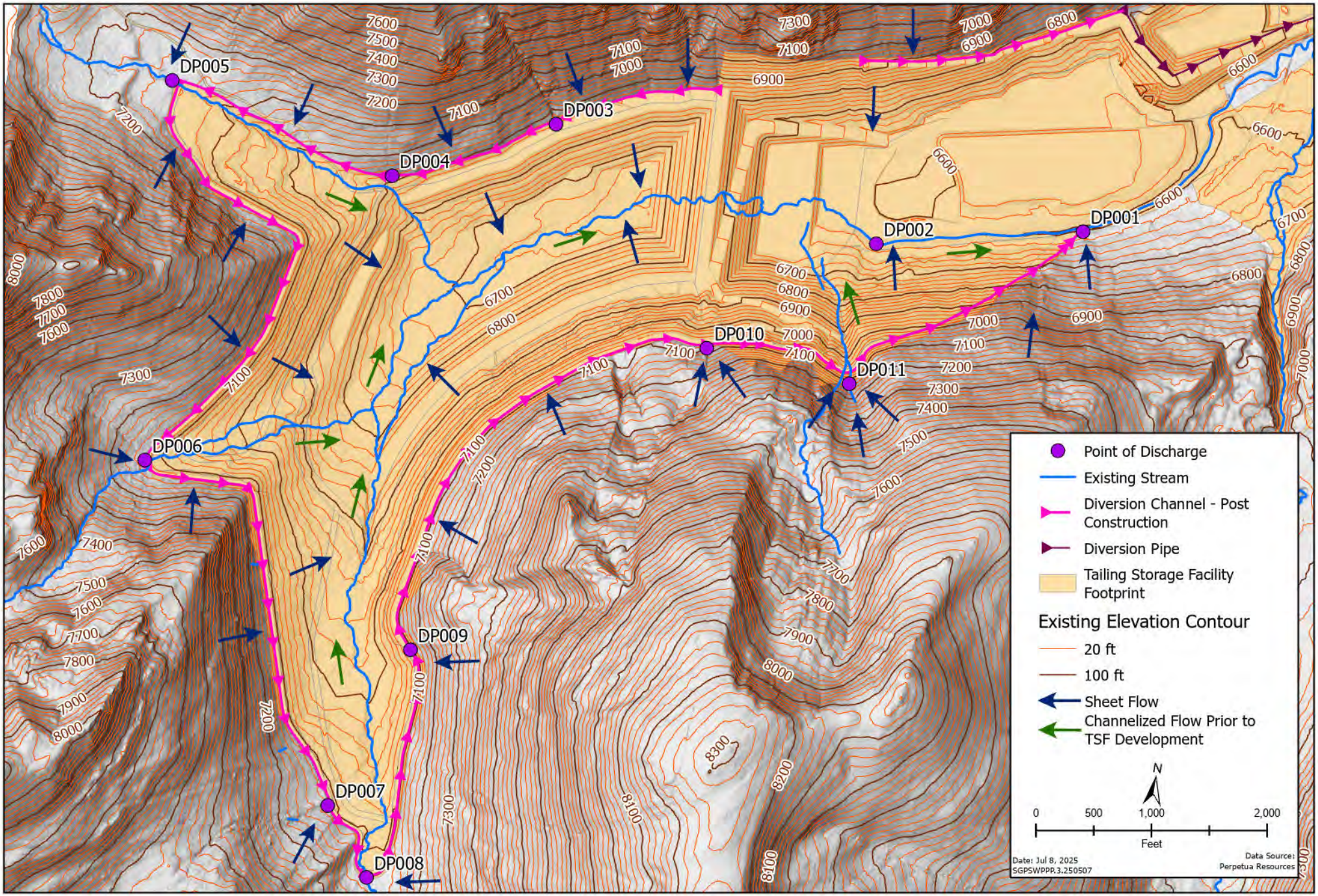
_____
_____
_____

Attendee Roster: (Attach additional pages as necessary)

Name of Attendee	Company/Agency	Signature
Click or tap here to enter text.	Click or tap here to enter text.	

Instructure(s) signature: _____

Appendix D: Site Maps and Drawings

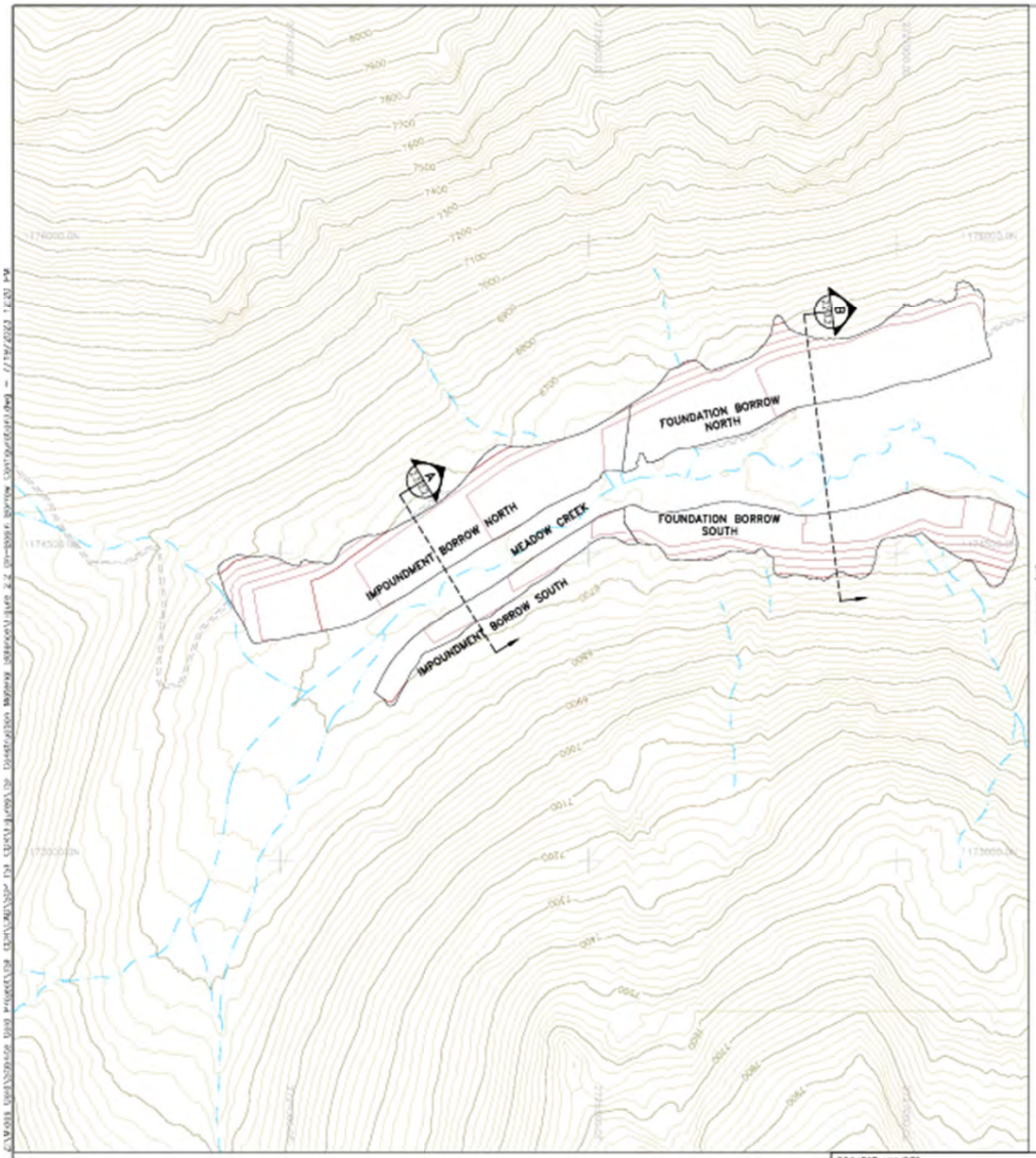


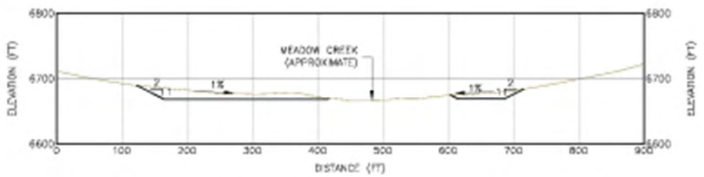
DATE:	Jul 8, 2025
Project No:	197200
Client:	Perpetua Resources
Figure ID:	SGPSWPPP.3.250507

Idaho CGP SWPPP
Tailings Storage Facility

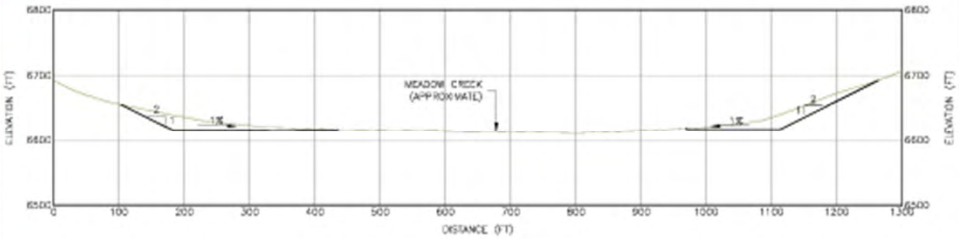
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In-basin Borrow Source Configurations





A IMPOUNDMENT BORROW (TYP.)
NOT TO SCALE



B FOUNDATION BORROW (TYP.)
NOT TO SCALE



PROJECT NUMBER: 825

REVISION	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED
A	07/2023	TSF MATERIAL BALANCE	SB	EM	JWK
B	05/2024	TSF MATERIAL BALANCE	SB	SW	JWK

PREPARED FOR: Perpetua Resources

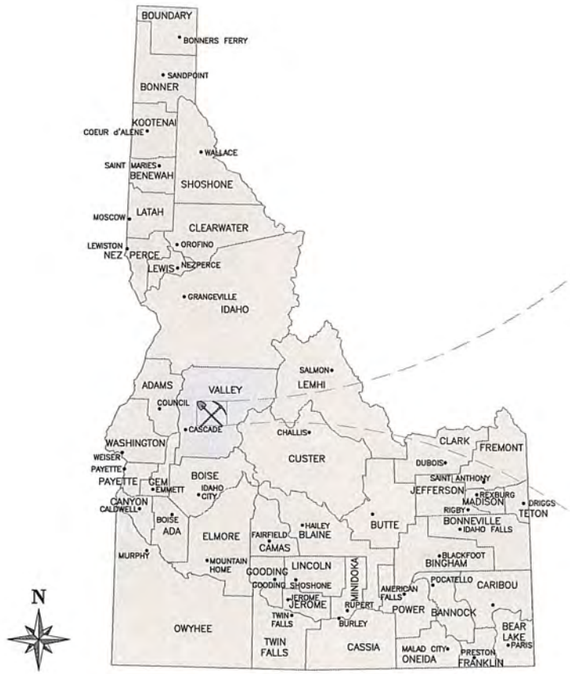
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

STIBNITE GOLD PROJECT

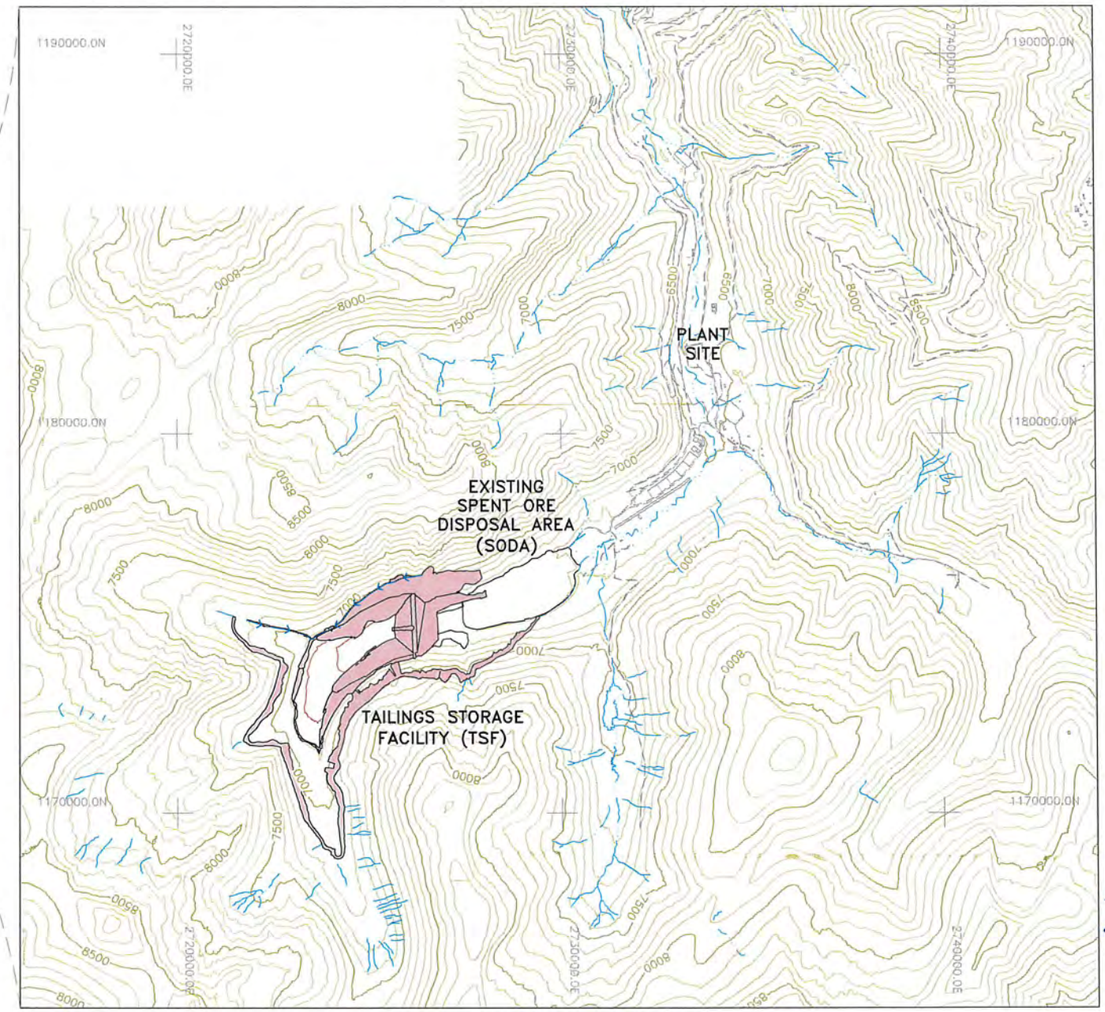
IN-BASIN BORROW SOURCE CONFIGURATIONS

FIGURE 2.2

TAILINGS STORAGE FACILITY
STAGE 1 ISSUED FOR CONSTRUCTION DRAWINGS
STIBNITE GOLD PROJECT



VICINITY MAP
NOT TO SCALE



PROPERTY LOCATION

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES. DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY: JWK DRAWN BY: TG CHECKED BY: JWK APPROVED BY: JWK	PREPARED FOR: Perpetua Resources PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.
		REV	DESCRIPTION	BY	DATE		
		0	ISSUED FOR CONSTRUCTION	JWK	07/2023		
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024		
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		

TITLE: COVER — 2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	01
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 01 OF 34

Shanna Brown – Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\01 COVER.dwg – 12/30/2024 10:26 AM

LEGEND:

- EXISTING CONTOURS (7000)
- PROPOSED CONTOURS (PRIMARY) (7000)
- PROPOSED CONTOURS (SECONDARY) (7000)
- PROPOSED GRADING LIMIT (PRIMARY)
- PROPOSED GRADING LIMIT (SECONDARY)
- EXISTING ROADS
- EXISTING DRAINAGE
- GCL
- NON-WOVEN GEOTEXTILE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- SMARTDITCH® LINER
- LINER LIMIT
- RUBSHEET
- CULVERT
- TAILINGS DISTRIBUTION HEADER PIPELINE
- RECLAIM PIPELINE
- CLEARING AND GRUBBING AREA
- EXISTING GROUND
- EXISTING BEDROCK
- SPENT ORE OR EQUIVALENT FILL
- LINER BEDDING
- STRUCTURAL FILL
- GROUTED BACKFILL
- PIPE BEDDING
- BEDDING MATERIAL
- RIPRAP BEDDING
- RIPRAP
- DRAIN ROCK
- ROAD WEARING COURSE
- CONCRETE
- DEVELOPMENT ROCK
- ZONE A FILL (MINE FLEET AND CONTRACTOR PLACED)
- ZONE B FILL (MINE FLEET PLACED)
- TSF BUTTRESS FILL

ABBREVIATIONS:

CPT	CORRUGATED PLASTIC TUBING
DIA	DIAMETER
EL.	ELEVATION
FT	FEET
GCL	GEOSYNTHETIC CLAY LINER
HDPE	HIGH-DENSITY POLYETHYLENE
IN	INCH
MIN	MINIMUM
O.C.	ON CENTER
RTFP	RESPONSIBLE TAILINGS FACILITY PERSON
SDR	STANDARD DIMENSIONAL RATIO
SODA	SPENT ORE DISPOSAL AREA
TIERRA GROUP	TIERRA GROUP INTERNATIONAL, LTD.
TSF	TAILINGS STORAGE FACILITY
TYP	TYPICAL

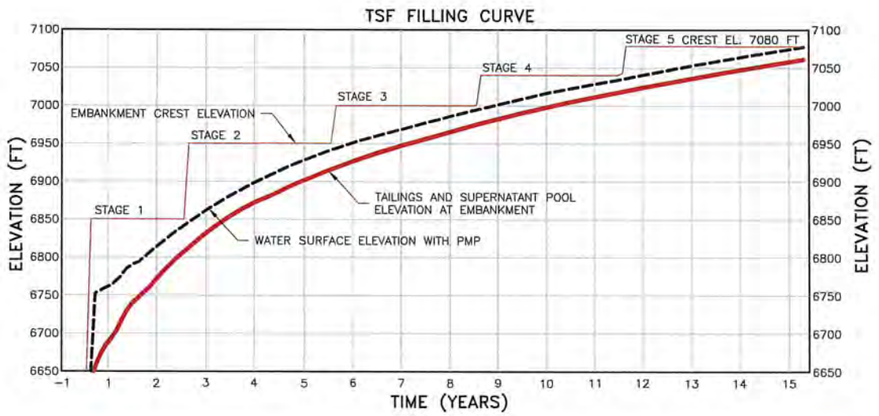
DRAWING INDEX

DWG #	Sheet Title	REV #
01	COVER	2
02	INDEX	2
03	SITE MAP	2
04	TSF GENERAL FACILITIES ARRANGEMENT	2
05	TSF MAIN DIVERSION PLAN	2
06	TSF MAIN DIVERSION PROFILES	2
07	CONFLUENCE 1 PLAN & SECTIONS	2
08	CONFLUENCE 2 PLAN & SECTIONS	2
09	CONFLUENCE 3 PLAN & SECTIONS	2
10	CONFLUENCE 4 PLAN & SECTIONS	2
11	TSF MAIN DIVERSION SECTIONS	2
12	TSF MAIN DIVERSION DETAILS	2
13	TSF MAIN DIVERSION OUTFALL DETAILS & SECTIONS	2
14	STAGE 1 NORTH DIVERSION PLAN	2
15	STAGE 1 NORTH DIVERSION PROFILES	2
16	STAGE 1 NORTH DIVERSION SECTIONS	2
17	GROUND SURFACE PREPARATION	2
18	UNDERDRAIN PLAN	2
19	UNDERDRAIN EXCAVATION PLAN	2
20	UNDERDRAIN PROFILES	2
21	UNDERDRAIN PROFILES	2
22	UNDERDRAIN SECTIONS & DETAILS	2
23	STAGE 1 TSF PLAN	2
24	STAGE 1 TSF TYPICAL SECTIONS	2
25	LINER SYSTEM PLAN & SECTION	2
26	TYPICAL SECTIONS & DETAILS	2
27	OVERDRAIN PLAN	2
28	OVERDRAIN CORRIDOR PLAN, SECTIONS, & DETAIL	2
29	OVERDRAIN CORRIDOR PROFILE & SECTION	2
30	PIPING SCHEMATIC PLAN	2
31	INSTRUMENTATION PLAN	2
32	INSTRUMENTATION SECTION	2
33	SURVEY INFORMATION (1 OF 2)	2
34	SURVEY INFORMATION (2 OF 2)	2

GENERAL CONSTRUCTION NOTES:

1. ALL CONSTRUCTION SHALL BE COMPLETED ACCORDING TO THE PROJECT SPECIFICATIONS AS WELL AS MINE SAFETY AND HEALTH ADMINISTRATION (MSHA) SPECIFICATIONS, LOCAL AND STATE REGULATIONS AND PERPETUA RESOURCES STANDARDS AND POLICIES.
2. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING EXISTING UNDERGROUND UTILITIES PRIOR TO BEGINNING WORK.
3. THE CONTRACTOR SHALL MAKE INDIVIDUAL ASSUMPTIONS REGARDING THE GEOLOGY UNDERLYING THE PROJECT SITE.
4. THE CONTRACTOR SHALL NOT CHANGE OR DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE OWNER AND ENGINEER.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS NOT OBTAINED BY THE OWNER OR OWNER'S REPRESENTATIVES, AND PAY ALL FEES AS REQUIRED BY THE CONSTRUCTION COVERED IN THESE PLANS.
6. ALL WORK AND MATERIALS ARE SUBJECT TO INSPECTION AND APPROVAL BY THE OWNER, MSHA REPRESENTATIVES, OR ANY LOCAL OR STATE AGENCY.
7. ALL ESTIMATES OF QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. CONTRACTOR AND SUBCONTRACTOR ARE RESPONSIBLE FOR DETERMINING ALL QUANTITIES. CONTRACTOR TO PROVIDE ALL WORK AND MATERIALS AS STATED IN THE SCOPE OF WORK.
8. ALL PERSONNEL ARE REQUIRED TO OBTAIN MSHA 24-HOUR TRAINING AND ALL PERPETUA RESOURCES SITE-SPECIFIC TRAINING PRIOR TO PERFORMING WORK.
9. THE CONTRACTOR IS RESPONSIBLE FOR JOB SITE SAFETY OF CONTRACTOR'S OWN PERSONNEL, ALL VISITORS TO THE SITE, AND THE GENERAL PUBLIC.
10. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL EXISTING DISTURBED AREAS, FENCES, WALLS, SHEDS OR OTHER STRUCTURES DAMAGED DURING GRADING ACTIVITIES TO EQUAL OR BETTER CONDITION, AS AGREED UPON BY THE OWNER.
11. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST, EROSION, AND SURFACE WATER FLOWS DURING CONSTRUCTION.
12. THE CONTRACTOR SHALL REMOVE ALL DEBRIS UNDER THIS CONTRACT TO AN APPROVED DUMP SITE FOR DISPOSAL OF THESE MATERIALS (SEE SHEET 17).
13. ALL DIMENSIONS AND ELEVATIONS ARE IN FEET OR INCHES (DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT).
14. ALL STATIONING IS IN FEET, MEASURED HORIZONTALLY.
15. IN CASES WHERE DISCREPANCIES OCCUR BETWEEN SPECIFICATIONS AND DRAWINGS, SPECIFICATIONS GOVERN. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER IN A WRITTEN REQUEST FOR INFORMATION.

TSF FILLING CURVE



REFERENCES:

BROWN AND CALDWELL, 2023. EXISTING GROUND WATER "ec_hds_sp420Layer1.shp" PROVIDED 14 MARCH 2023.

IDAHO MAP. PROVIDED BY "https://idahoparcels.us/web/"

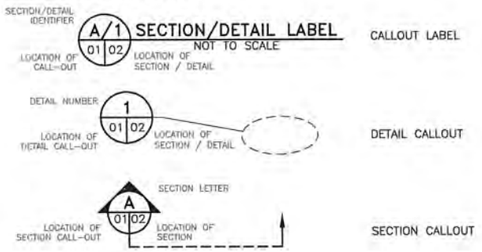
M3 ENGINEERING & TECHNOLOGY, 2014. EXISTING ROADS & STREAMS "X-Existing.dwg" PROVIDED 02 OCTOBER 2014.

M3 ENGINEERING & TECHNOLOGY, 2021. PLANT SITE LINEWORK "X-Stibnite Civil Base 10.12.21.dwg" PROVIDED 12 OCTOBER 2021.

MIDAS GOLD, INC., 2015. PRE-SPENT ORE DISPOSAL AREA (SODA) TOPOGRAPHY "Topography_HistoricTailsArea_StatePlane_NoTailsOrSODA.dxf" PROVIDED 10 NOVEMBER 2015.

PRII. 2011 EXISTING GROUND TOPOGRAPHY "BNFLandtypeTable.xlsx" PROVIDED 03 MARCH 2013.

SYMBOLS & LABELS:



PROFILE LABEL PROFILE LABEL
SCALE: AS SHOWN

GENERAL LABEL GENERAL LABEL

DESCRIPTION LEADER

CUT/FILL ARROWS

12.0 IN / 1.0 FT — DIMENSION (SECONDARY DIMENSION STYLE SET UP TO BE USED IN DRAWING UNITS OF FT, NOT IN)

2 / 1 — SLOPE LABEL

N — NORTH ARROW

SCALE (FT)
0 100 200
CONTOUR INTERVAL 2 FT
SCALE BAR

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

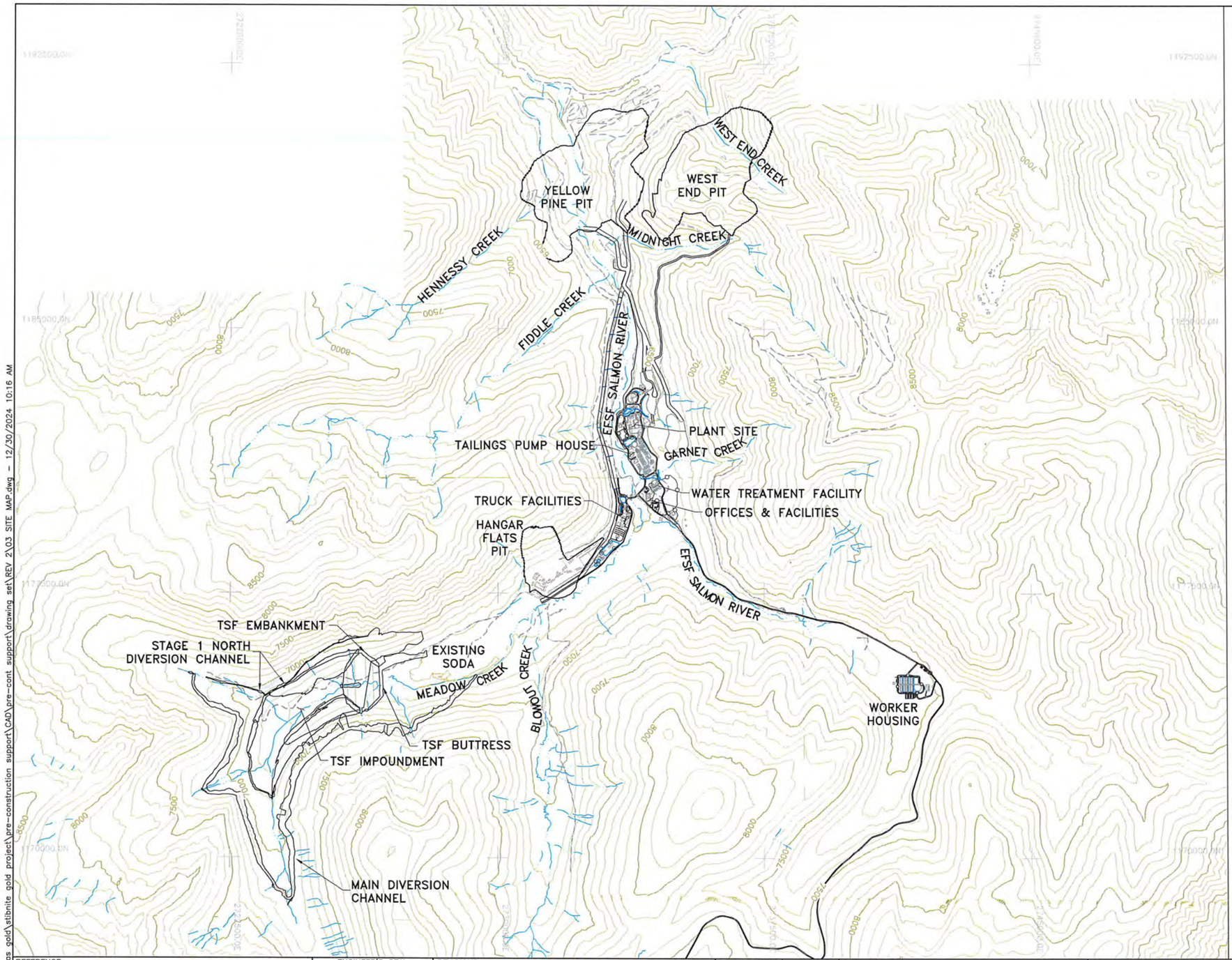
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: INDEX

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 02
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 02 OF 34

Shanna Brown - Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\02 INDEX.dwg - 12/31/2024 12:39 PM



LEGEND:

- 7000 — EXISTING CONTOURS
- TSF FACILITY/INFRASTRUCTURE LIMITS
- EXISTING ROADS
- EXISTING DRAINAGE

N

SCALE (FT)
0 1500 3000
CONTOUR INTERVAL 100 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

Shanna Brown – Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\03 SITE MAP.dwg – 12/30/2024 10:16 AM

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

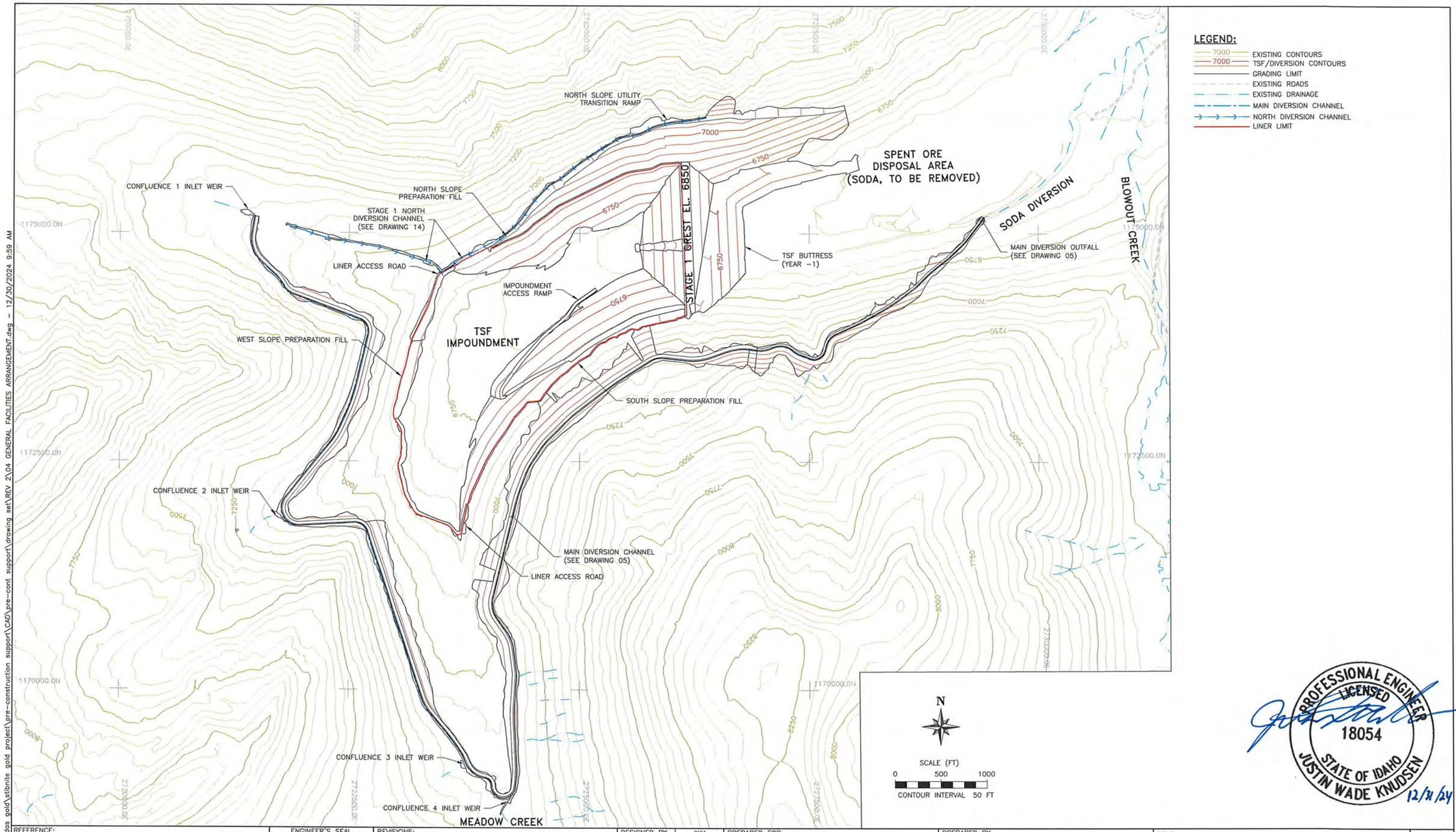
PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: SITE MAP

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 03
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 03 OF 34



LEGEND:

- 7000 EXISTING CONTOURS
- 7000 TSF/DIVERSION CONTOURS
- GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- LINER LIMIT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

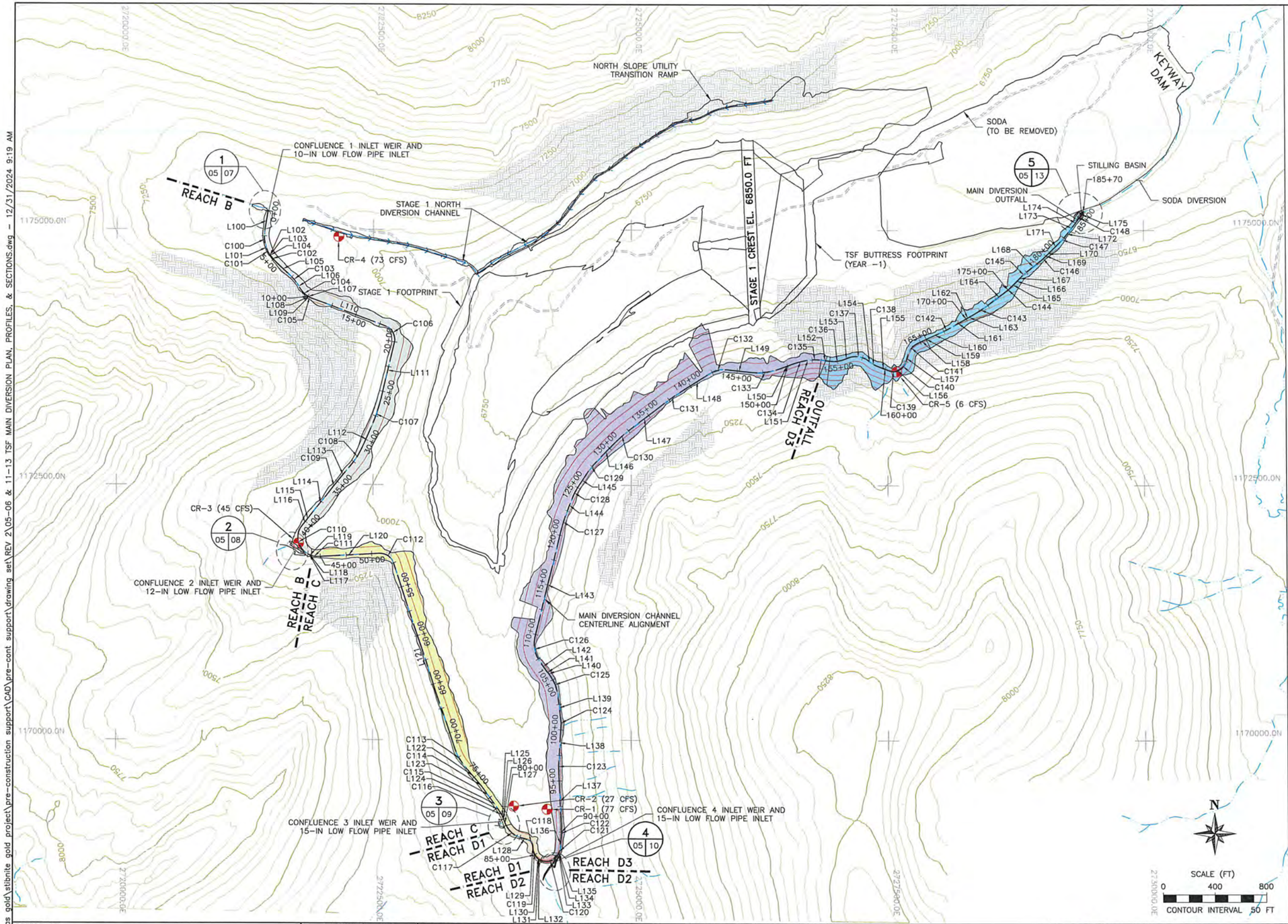
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: TSF GENERAL FACILITIES ARRANGEMENT

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 04
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 04 OF 34

Shanna Brown – Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\04 GENERAL FACILITIES ARRANGEMENT.dwg – 12/30/2024 9:59 AM



LEGEND:

- EXISTING CONTOURS
- DIVERSION CONTOURS
- GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- ROCK OUTCROP
- REACH B
- REACH C
- REACH D1
- REACH D2
- REACH D3
- OUTFALL SHALLOW
- OUTFALL STEEP
- STREAM FLOW REFERENCE POINTS

NOTES:

1. REACH A NO LONGER CONSIDERED IN CURRENT DESIGN. NORTH DIVERSION, CAPTURING ONLY HILLSIDE RUNOFF EAST OF THE START OF REACH B, IS CONSTRUCTED WITH STAGES 1 AND 2 AND DRAINS INTO TSF.
2. LOW FLOW PIPE NOT SHOWN FOR CLARITY. PIPE DIAMETER TRANSITIONS INDICATED IN PLAN VIEW.
3. THE RTFP IS THE PERSON SPECIFICALLY RESPONSIBLE FOR ENSURING REGULAR MAINTENANCE OF THE TSF MAIN DIVERSION. FOR INFORMATION REGARDING RESPONSIBLE PARTIES, REFER TO THE TSF OMS MANUAL.
4. THE FLOW CAPACITIES OF REACH B-D MUST BE PERSEVERED.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

Shanna Brown - Z:\mldos gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\05-06 & 11-13 TSF MAIN DIVERSION PLAN, PROFILES, & SECTIONS.dwg - 12/31/2024 9:19 AM

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

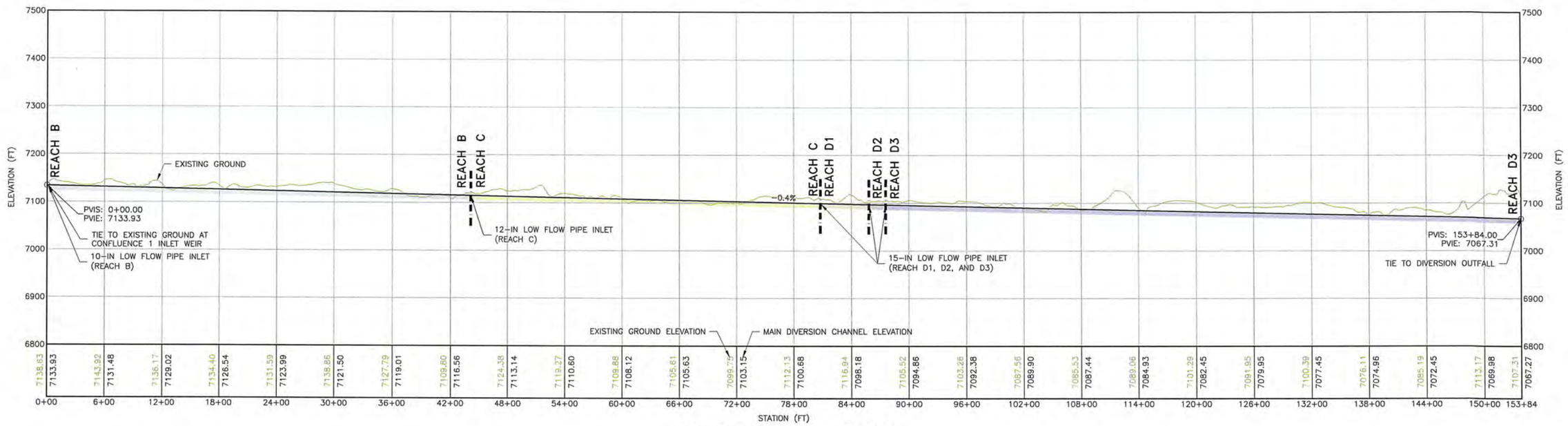
PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

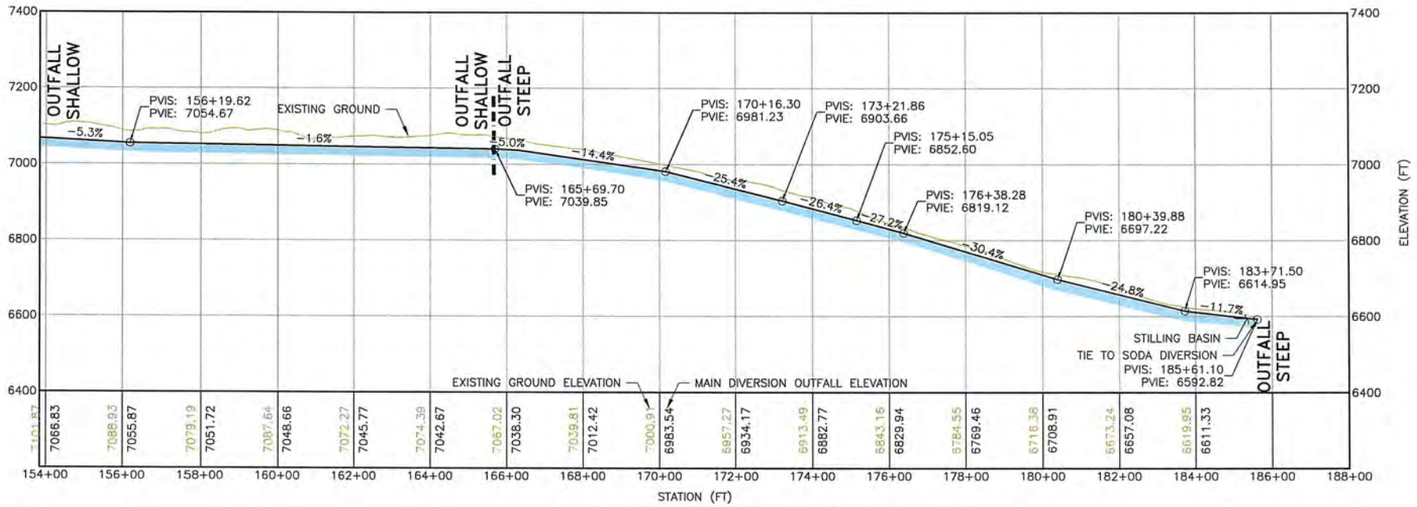
TITLE: TSF MAIN DIVERSION PLAN

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 05
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 05 OF 34



MAIN DIVERSION CHANNEL PROFILE
SCALE: AS SHOWN
VERTICAL EXAGGERATION: 5X

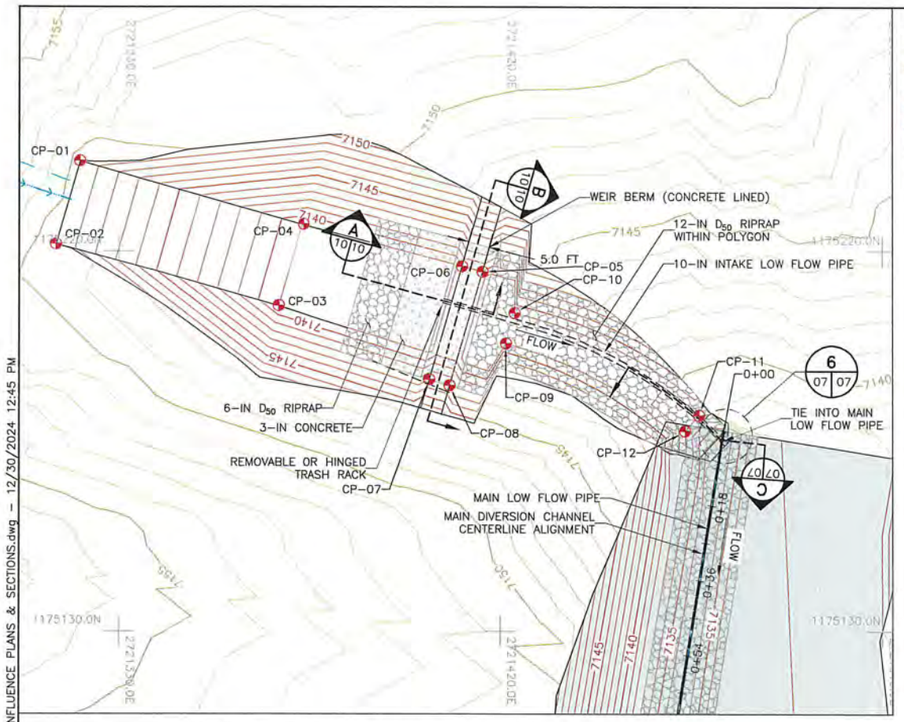


MAIN DIVERSION OUTFALL PROFILE
SCALE: AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY: JWK	PREPARED FOR: Perpetua Resources
		REV	DESCRIPTION	BY	DATE	DRAWN BY: TG	PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY: JWK	TITLE: TSF MAIN DIVERSION PROFILES
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY: JWK	2 REVISION
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		PROJECT: STIBNITE GOLD PROJECT TSF; PROJECT #: 825; DRAWING #: 06
							LOCATION: VALLEY COUNTY, IDAHO; DATE: DECEMBER 2024; SHEET: 06 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\05-06 & 11-13 TSF MAIN DIVERSION PLAN, PROFILES, & SECTIONS.dwg - 12/31/2024 9:19 AM



1 / 05 | 07 CONFLUENCE 1 LOW FLOW WEIR TYPICAL DETAIL
NOT TO SCALE

LEGEND:

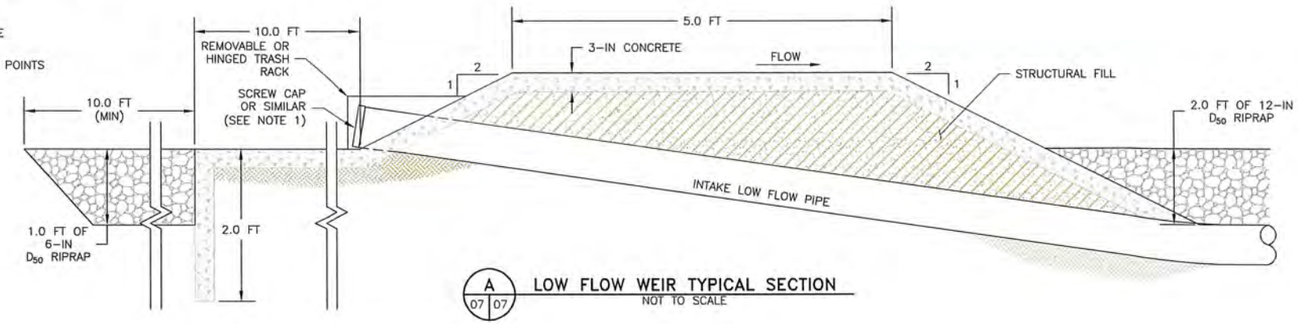
- 7000 EXISTING CONTOURS
- 7000 PROPOSED CONTOURS
- PROPOSED LOW FLOW PIPE
- PROPOSED DRAINAGE
- MAIN DIVERSION CHANNEL
- RIPRAP
- CONCRETE
- CONTROL POINTS

N

SCALE (FT)
0 18 36
CONTOUR INTERVAL 1 FT

NOTE:

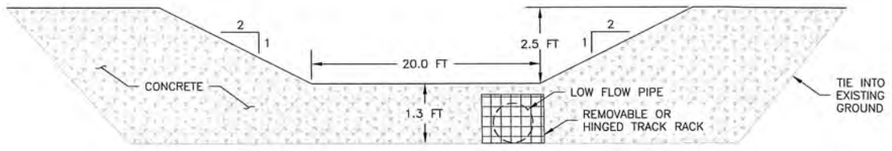
1. SCREW CAP OR SIMILAR TO BE USED TO WINTERIZE INTAKE LOW FLOW PIPE.



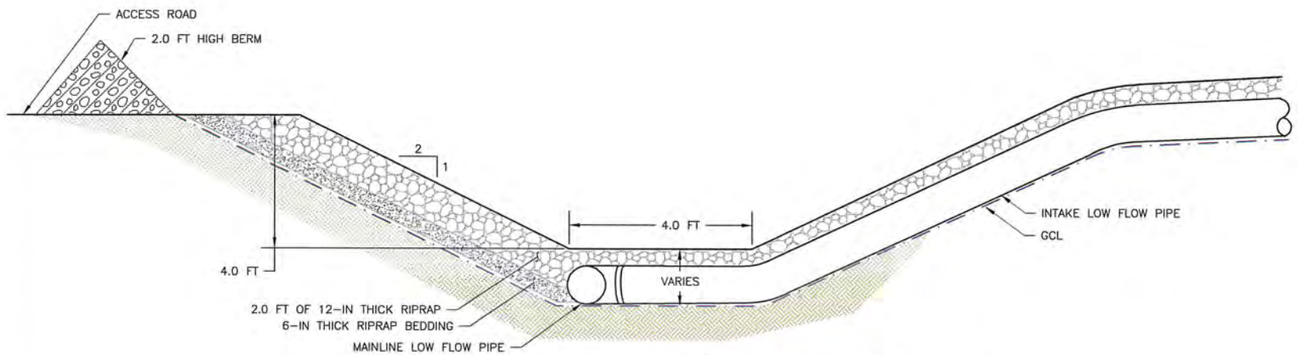
A / 07 | 07 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE

CONTROL POINTS [1]			
POINT	NORTHING	EASTING	ELEVATION
CP-01	1175241.33	2721320.70	7139.00
CP-02	1175221.69	2721315.06	7145.00
CP-03	1175207.06	2721367.59	7139.00
CP-04	1175226.32	2721373.53	7139.00
CP-05	1175215.11	2721415.75	7140.00
CP-06	1175216.39	2721410.92	7140.00
CP-07	1175189.61	2721403.23	7143.00
CP-08	1175188.18	2721408.02	7142.98
CP-09	1175198.16	2721421.29	7139.00
CP-10	1175205.33	2721423.35	7139.00
CP-11	1175181.13	2721466.84	7137.00
CP-12	1175177.39	2721463.53	7137.00

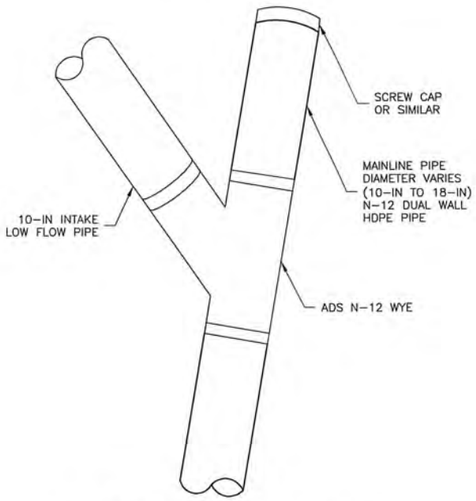
[1] CONTROL POINTS SHOWN IN PLAN VIEW ARE SPECIFICALLY FOR THIS DRAWING ONLY.



B / 07 | 07 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE



C / 07 | 07 LOW FLOW PIPE CONNECTION CUT IN SOIL TYPICAL SECTION
NOT TO SCALE



6 / 07 | 07 WYE CONNECTION DETAIL
NOT TO SCALE



REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

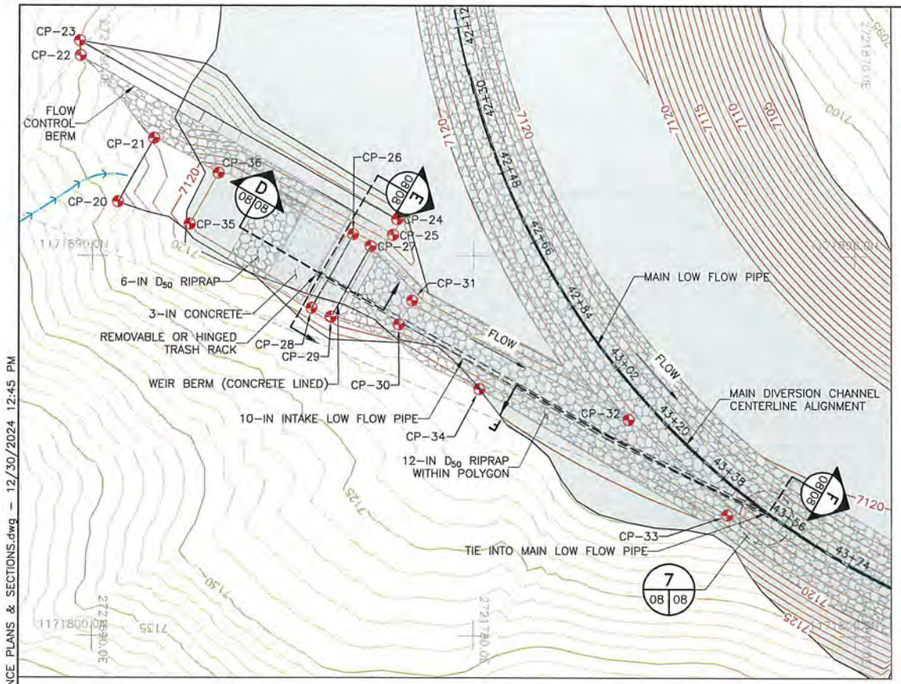
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE:
CONFLUENCE 1
PLAN & SECTIONS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 07
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 07 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\07-10 CONFLUENCE PLANS & SECTIONS.dwg - 12/30/2024 12:45 PM



2 | 05|08 CONFLUENCE 2 LOW FLOW WEIR TYPICAL DETAIL
NOT TO SCALE

LEGEND:

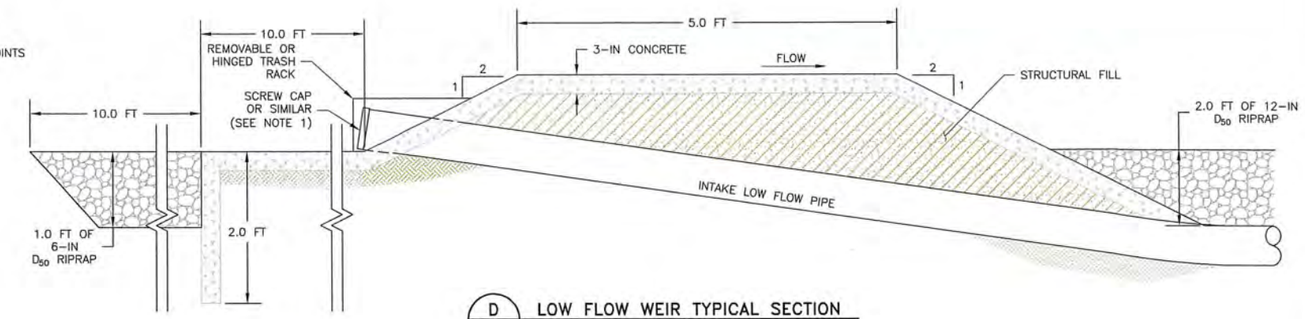
- 7000 EXISTING CONTOURS
- 7000 PROPOSED CONTOURS
- PROPOSED LOW FLOW PIPE
- PROPOSED DRAINAGE
- MAIN DIVERSION CHANNEL
- RIPRAP
- CONCRETE
- CONTROL POINTS

N

SCALE (FT)
0 18 36
CONTOUR INTERVAL 1 FT

NOTE:

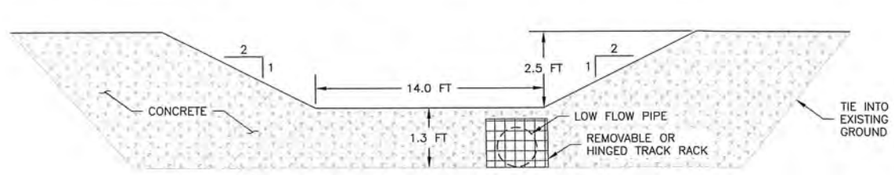
1. SCREW CAP OR SIMILAR TO BE USED TO WINTERIZE INTAKE LOW FLOW PIPE.



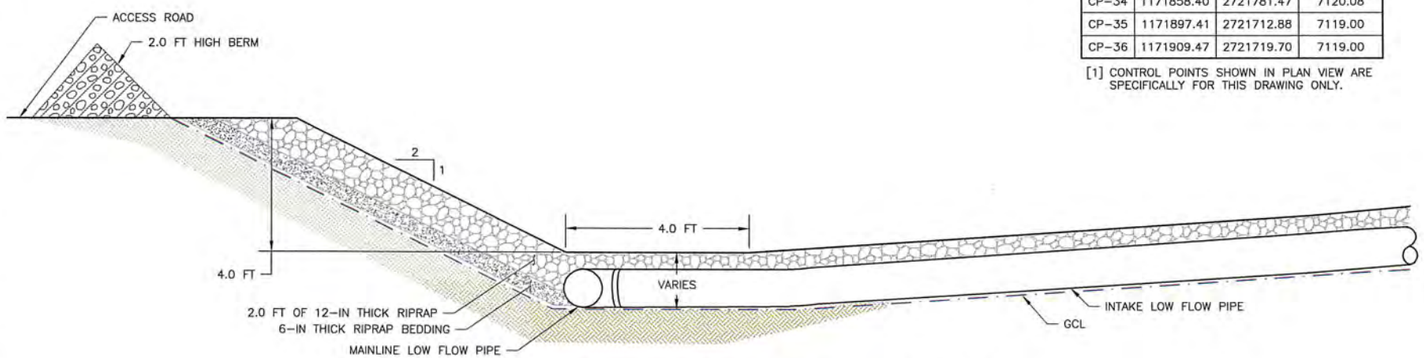
D 08|08 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE

CONTROL POINTS [1]			
POINT	NORTHING	EASTING	ELEVATION
CP-20	1171902.72	2721695.98	7124.32
CP-21	1171917.78	2721704.50	7120.80
CP-22	1171937.28	2721687.13	7125.00
CP-23	1171940.83	2721686.93	7125.00
CP-24	1171898.57	2721762.08	7122.00
CP-25	1171894.83	2721761.04	7122.00
CP-26	1171894.99	2721751.67	7119.70
CP-27	1171892.18	2721755.82	7119.45
CP-28	1171877.58	2721741.81	7119.70
CP-29	1171875.46	2721746.36	7119.45
CP-30	1171873.69	2721762.43	7118.00
CP-31	1171879.30	2721765.61	7118.00
CP-32	1171851.18	2721816.60	7118.00
CP-33	1171828.58	2721839.93	7118.00
CP-34	1171858.40	2721781.47	7120.08
CP-35	1171897.41	2721712.88	7119.00
CP-36	1171909.47	2721719.70	7119.00

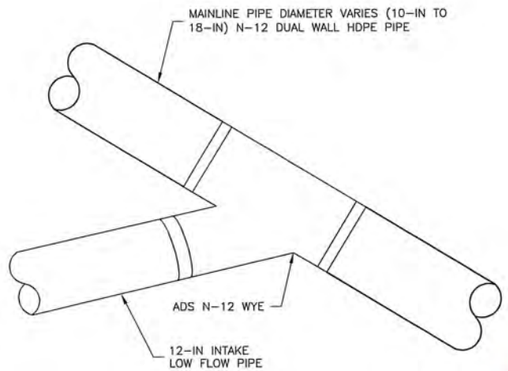
[1] CONTROL POINTS SHOWN IN PLAN VIEW ARE SPECIFICALLY FOR THIS DRAWING ONLY.



E 08|08 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE



F 08|08 LOW FLOW PIPE CONNECTION CUT IN SOIL TYPICAL SECTION
NOT TO SCALE



7 | 08|08 WYE CONNECTION DETAIL
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY:	JWK
		REV	DESCRIPTION	BY	DATE	DRAWN BY:	TG
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY:	JWK
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY:	JWK
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		

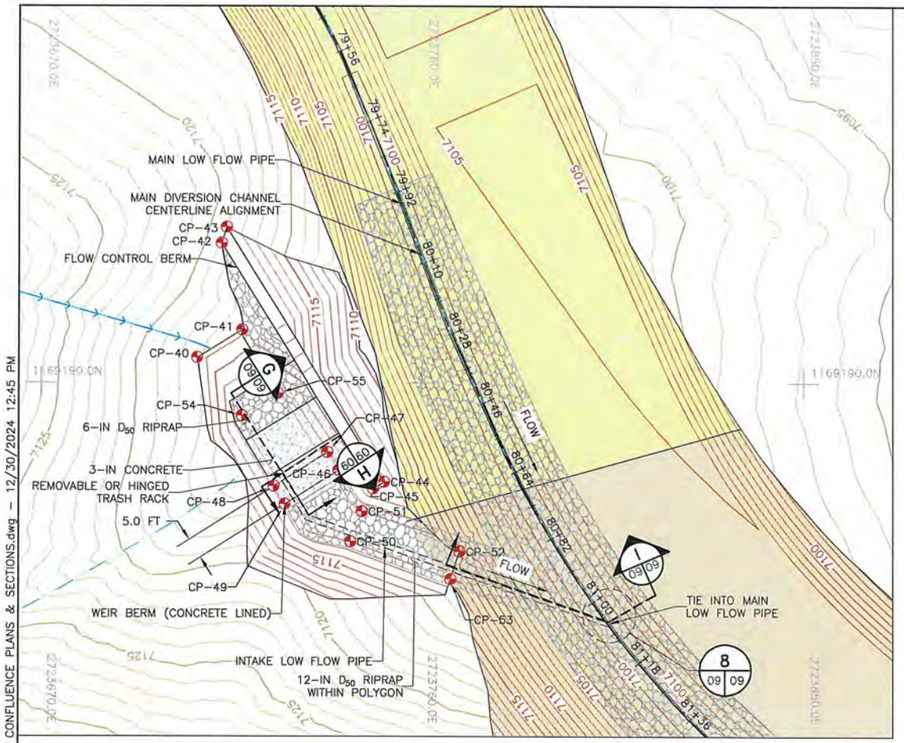
PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: CONFLUENCE 2 PLAN & SECTIONS — 2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	08
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 08 OF 34

Shanna Brown — Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\07-10 CONFLUENCE PLANS & SECTIONS.dwg — 12/30/2024 12:45 PM



3 / 05 09 CONFLUENCE 3 LOW FLOW WEIR TYPICAL DETAIL
NOT TO SCALE

LEGEND:

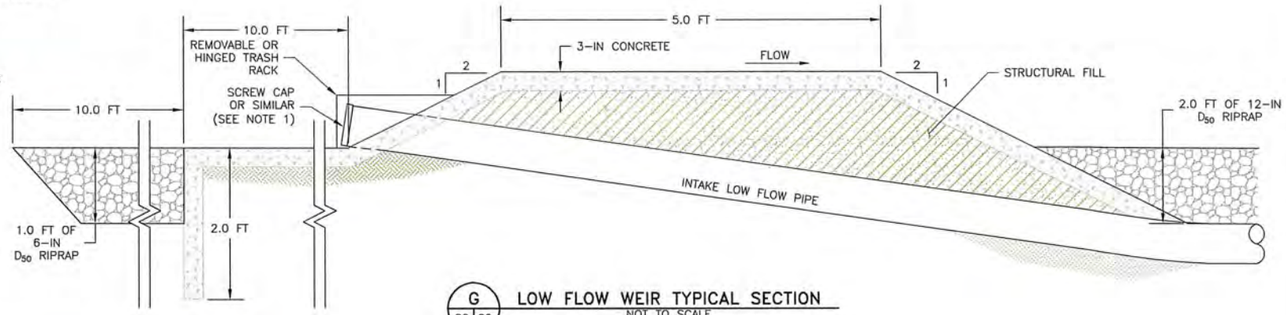
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED LOW FLOW PIPE
- EXISTING DRAINAGE
- PROPOSED DRAINAGE
- MAIN DIVERSION CHANNEL
- RIPRAP
- CONCRETE
- CONTROL POINTS

N

SCALE (FT)
0 18 36
CONTOUR INTERVAL 1 FT

NOTE:

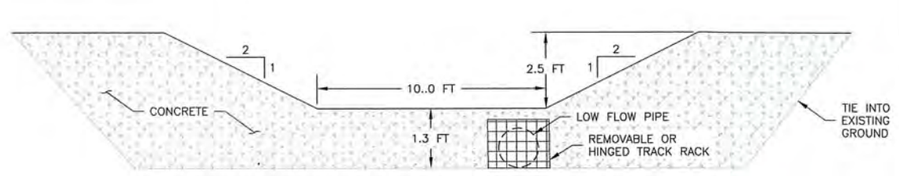
1. SCREW CAP OR SIMILAR TO BE USED TO WINTERIZE INTAKE LOW FLOW PIPE.



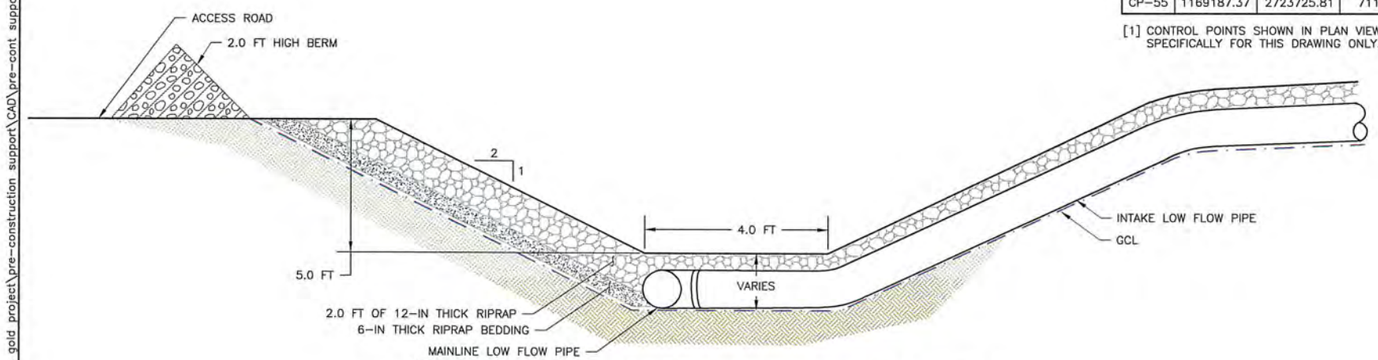
G / 09 09 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE

CONTROL POINTS [1]			
POINT	NORTHING	EASTING	ELEVATION
CP-40	1169195.90	2723706.73	7117.19
CP-41	1169202.47	2723717.36	7115.64
CP-42	1169223.00	2723712.48	7119.00
CP-43	1169226.76	2723713.68	7119.00
CP-44	1169166.44	2723751.11	7115.14
CP-45	1169164.86	2723748.56	7115.14
CP-46	1169169.22	2723740.35	7112.77
CP-47	1169173.46	2723737.70	7112.82
CP-48	1169165.43	2723724.82	7112.82
CP-49	1169161.19	2723727.47	7112.77
CP-50	1169152.30	2723743.23	7112.00
CP-51	1169159.45	2723745.91	7112.00
CP-52	1169149.97	2723768.91	7111.07
CP-53	1169143.43	2723766.84	7112.00
CP-54	1169182.11	2723717.30	7112.00
CP-55	1169187.37	2723725.81	7112.00

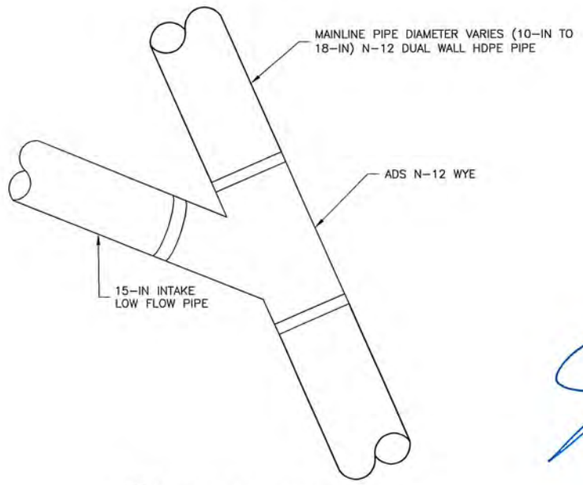
[1] CONTROL POINTS SHOWN IN PLAN VIEW ARE SPECIFICALLY FOR THIS DRAWING ONLY.



H / 09 09 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE



I / 09 09 LOW FLOW PIPE CONNECTION CUT IN SOIL TYPICAL SECTION
NOT TO SCALE



8 / 09,10 09 WYE CONNECTION DETAIL
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

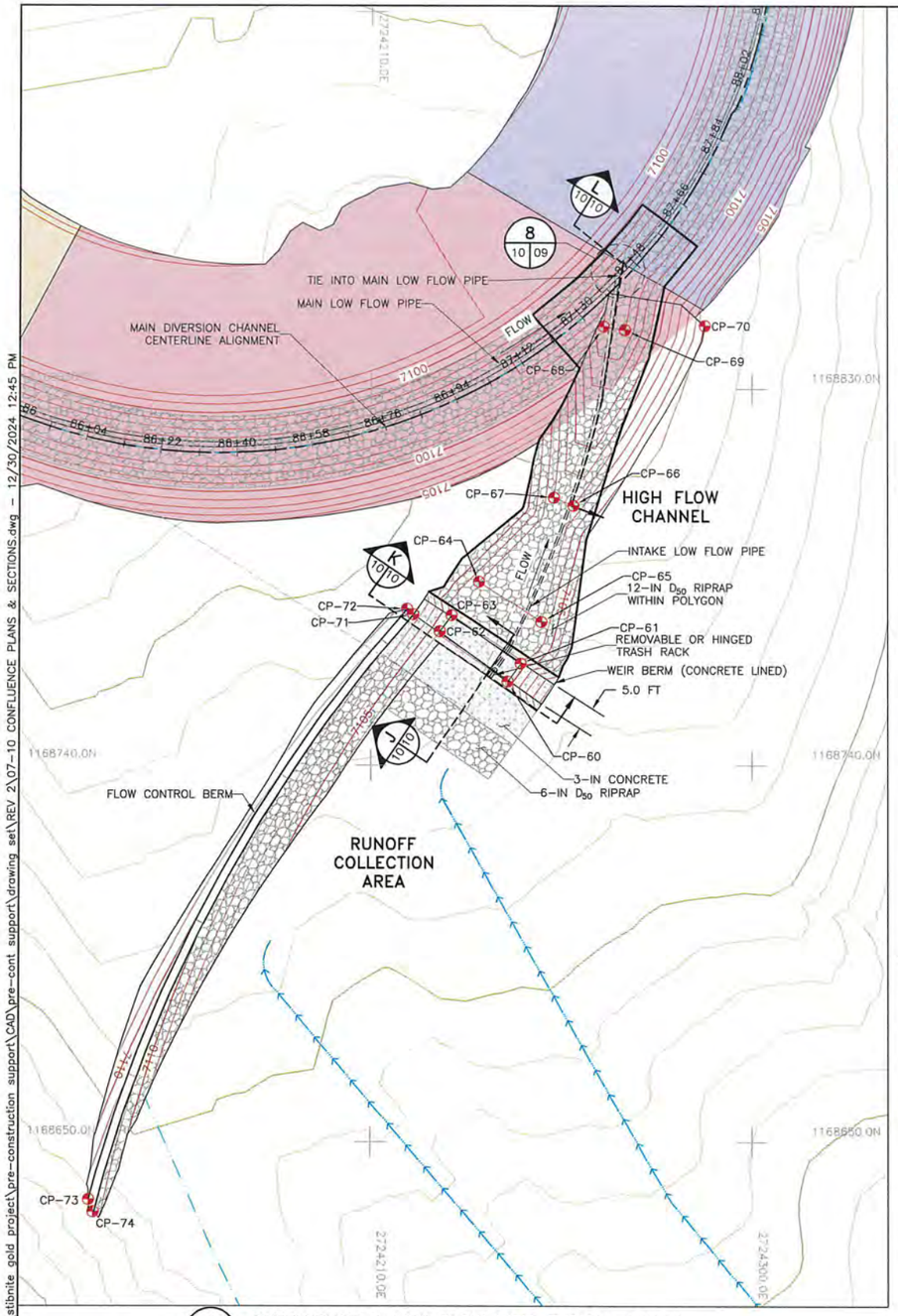
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: CONFLUENCE 3 PLAN & SECTIONS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 09
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 09 OF 34

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4 05|10 CONFLUENCE 4 LOW FLOW WEIR TYPICAL DETAIL
NOT TO SCALE

LEGEND:

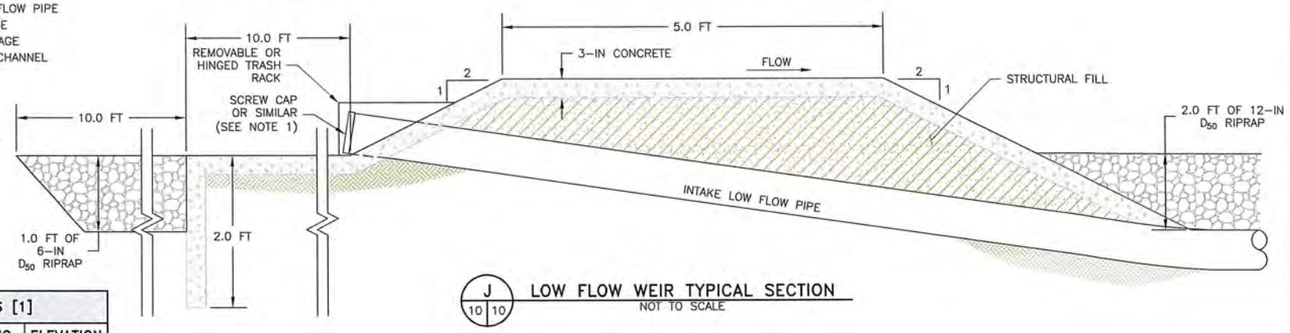
- 7000 EXISTING CONTOURS
- 7000 PROPOSED CONTOURS
- PROPOSED LOW FLOW PIPE
- EXISTING DRAINAGE
- PROPOSED DRAINAGE
- MAIN DIVERSION CHANNEL
- RIPRAP
- CONCRETE
- CONTROL POINTS

NOTE:

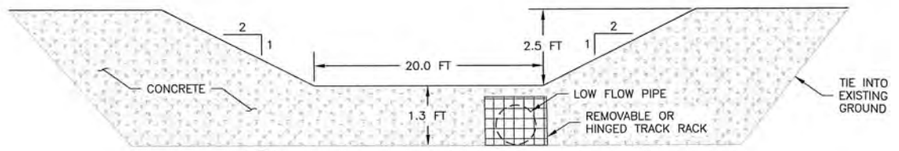
1. SCREW CAP OR SIMILAR TO BE USED TO WINTERIZE INTAKE LOW FLOW PIPE.

CONTROL POINTS [1]			
POINT	NORTHING	EASTING	ELEVATION
CP-60	1168760.03	2724242.24	7103.23
CP-61	1168764.30	2724245.35	7103.23
CP-62	1168772.02	2724226.23	7103.23
CP-63	1168775.84	2724229.01	7103.23
CP-64	1168783.84	2724235.41	7103.00
CP-65	1168774.28	2724250.31	7103.00
CP-66	1168802.05	2724257.83	7102.00
CP-67	1168804.00	2724253.23	7102.00
CP-68	1168844.86	2724265.04	7096.00
CP-69	1168844.07	2724269.94	7096.00
CP-70	1168845.06	2724288.77	7105.13
CP-71	1168776.02	2724219.95	7107.76
CP-72	1168777.35	2724218.45	7107.77
CP-73	1168636.19	2724142.92	7111.78
CP-74	1168633.22	2724144.00	7112.00

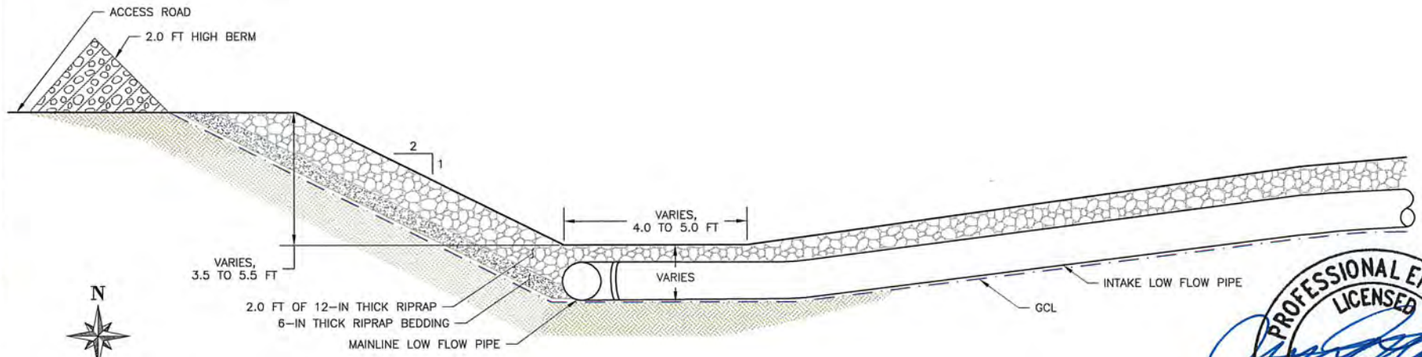
[1] CONTROL POINTS SHOWN IN PLAN VIEW ARE SPECIFICALLY FOR THIS DRAWING ONLY.



J 10|10 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE



K 10|10 LOW FLOW WEIR TYPICAL SECTION
NOT TO SCALE



L 09|09 LOW FLOW PIPE CONNECTION CUT IN SOIL TYPICAL SECTION
NOT TO SCALE

N

SCALE (FT)
0 18 36
CONTOUR INTERVAL 1 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:			
REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

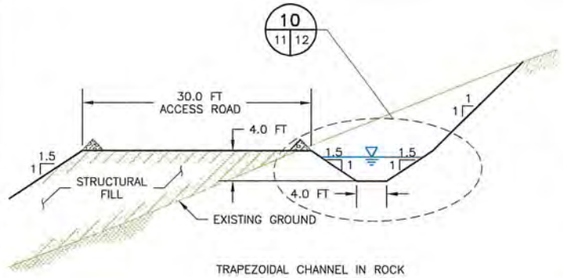
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: CONFLUENCE 4 PLAN & SECTIONS

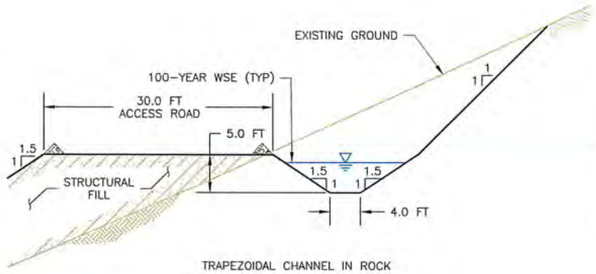
2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 10
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 10 OF 34

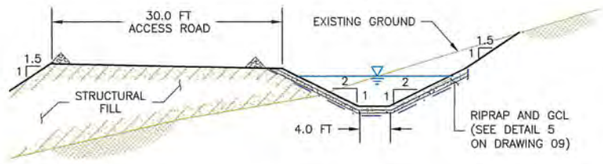
Shanna Brown | Z:\nidos gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\07-10 CONFLUENCE PLANS & SECTIONS.dwg — 12/30/2024 12:45 PM



TRAPEZOIDAL CHANNEL IN ROCK



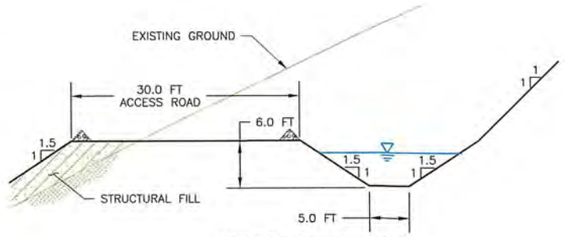
TRAPEZOIDAL CHANNEL IN ROCK



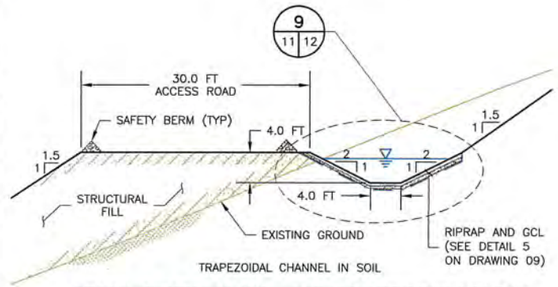
TRAPEZOIDAL CHANNEL IN SOIL

REACH D1, STA. 80+68 – 85+80 TYPICAL SECTION

NOT TO SCALE



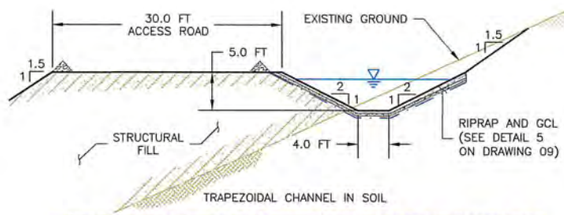
TRAPEZOIDAL CHANNEL IN ROCK



TRAPEZOIDAL CHANNEL IN SOIL

REACH B, STA. 0+06 – 44+16 TYPICAL SECTIONS

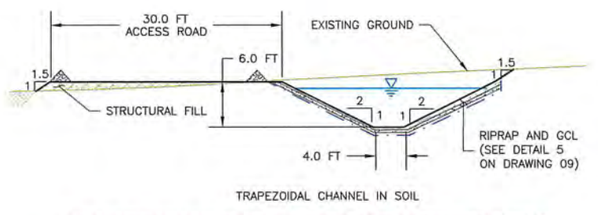
NOT TO SCALE



TRAPEZOIDAL CHANNEL IN SOIL

REACH C, STA. 44+16 – 80+68 TYPICAL SECTIONS

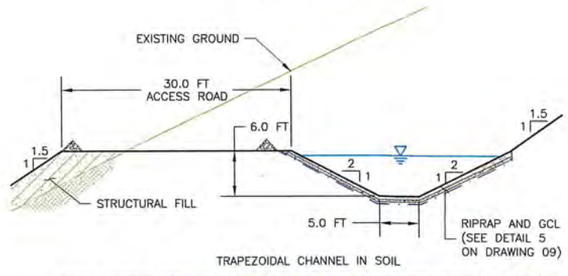
NOT TO SCALE



TRAPEZOIDAL CHANNEL IN SOIL

REACH D2, STA. 85+80 – 87+47 TYPICAL SECTION

NOT TO SCALE



TRAPEZOIDAL CHANNEL IN SOIL

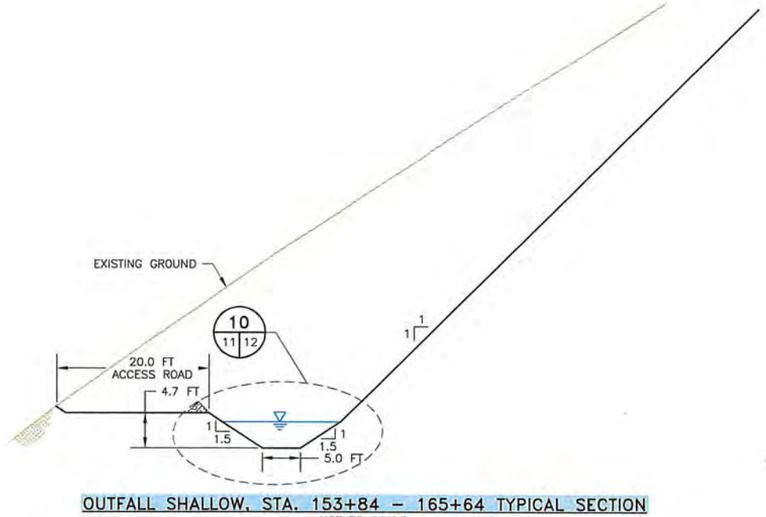
REACH D3, STA. 87+47 – 153+84 TYPICAL SECTIONS

NOT TO SCALE

MAIN DIVERSION GEOMETRY				
REACH	ROCK VS. SOIL	SIDE SLOPES (H:V)	BOTTOM WIDTH (FT)	DEPTH (FT)
B	SOIL	2:1	4.0	4.0
	ROCK	1.5:1		
C	SOIL	2:1	4.0	5.0
	ROCK	1.5:1		
D1	SOIL	2:1	4.0	5.0
D2	SOIL	2:1	4.0	6.0
D3	SOIL	2:1	5.0	6.0
	ROCK	1.5:1		
OUTFALL SHALLOW	ROCK	1.5:1	5.0	4.7
OUTFALL STEEP	ROCK	1.5:1	5.0	4.7

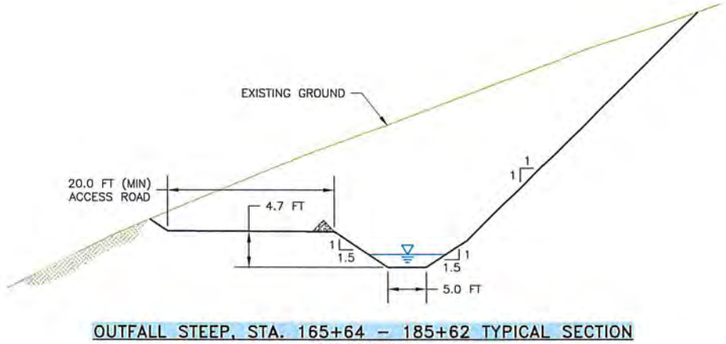
NOTES:

1. LOW FLOW PIPE NOT SHOWN FOR CLARITY. REFER TO DRAWINGS 05 AND 06 FOR PIPE DIAMETER TRANSITIONS.
2. CATCH BENCHES WILL BE CUT IN ROCK SLOPES ABOVE CHANNEL BANK, BUT WERE NOT SHOWN FOR DRAWING CLARITY. SOIL AND ROCK CUT SLOPES WILL VARY FOLLOWING GEOTECHNICAL INVESTIGATION AND ANALYSES PLANNED FOR MID-2025.



OUTFALL SHALLOW, STA. 153+84 – 165+64 TYPICAL SECTION

NOT TO SCALE



OUTFALL STEEP, STA. 165+64 – 185+62 TYPICAL SECTION

NOT TO SCALE

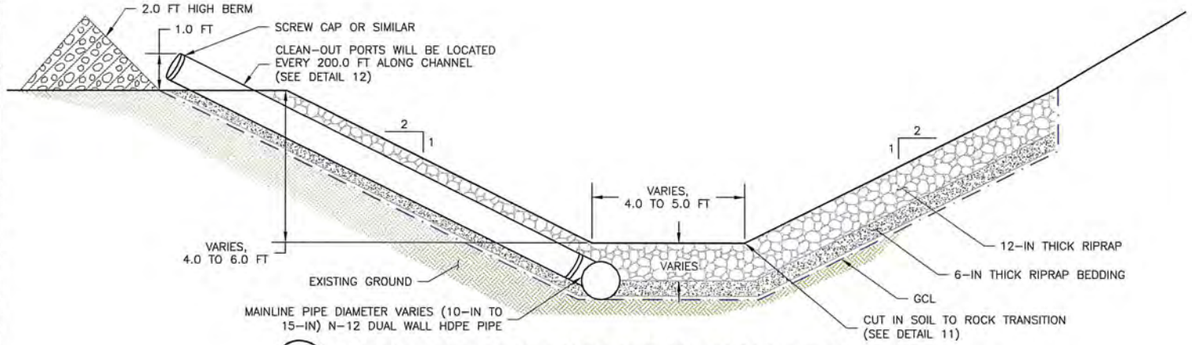
PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

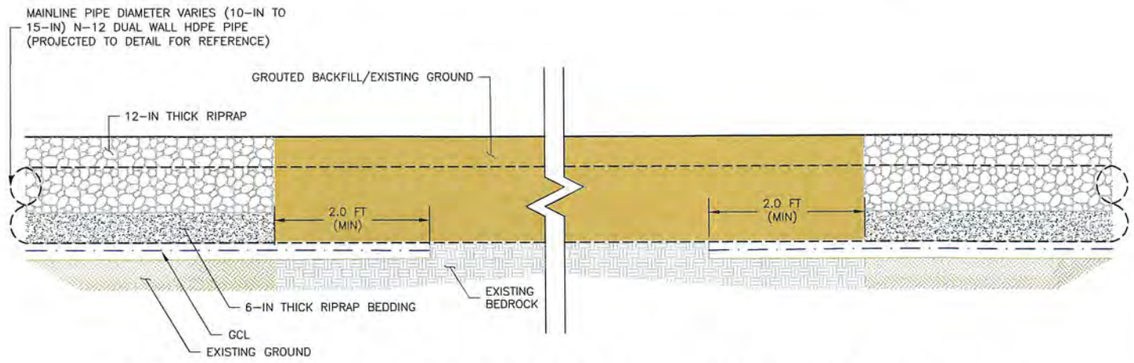
REFERENCE:	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY:	JWK	PREPARED FOR:	PREPARED BY:	TITLE:	
SEE SHEET 02 FOR ALL REFERENCES.		REV	DESCRIPTION	BY	DATE	DRAWN BY:	TG	Perpetua Resources	TIERRA GROUP INTERNATIONAL, LTD.	TSF MAIN DIVERSION SECTIONS	2 REVISION
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY:	JWK			PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY:	JWK			DRAWING #: 11	
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024					LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024
										SHEET: 11 OF 34	

Shanna Brown - Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\05-06 & 11-13 TSF MAIN DIVERSION PLAN, PROFILES, & SECTIONS.dwg - 12/31/2024 9:19 AM

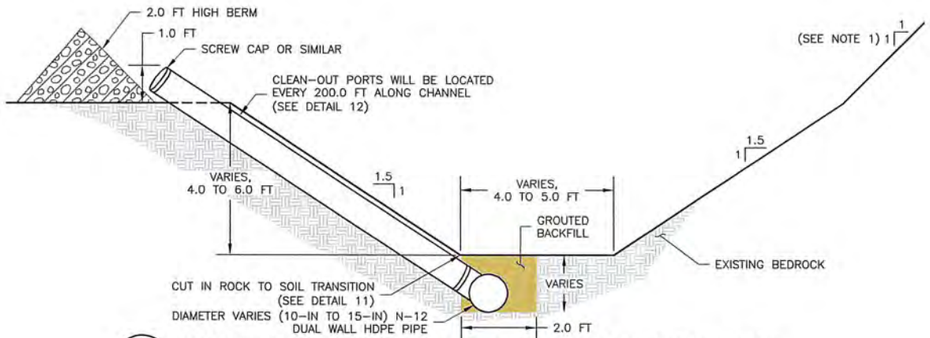
REACH	LOW FLOW RATE (cfs)	MAXIMUM FLOW RATE (cfs)	MINIMUM PIPE INNER DIAMETER (IN)
B	1.54	8.0	10.0
C	2.28	12.0	12.0
D	3.77	19.0	15.0



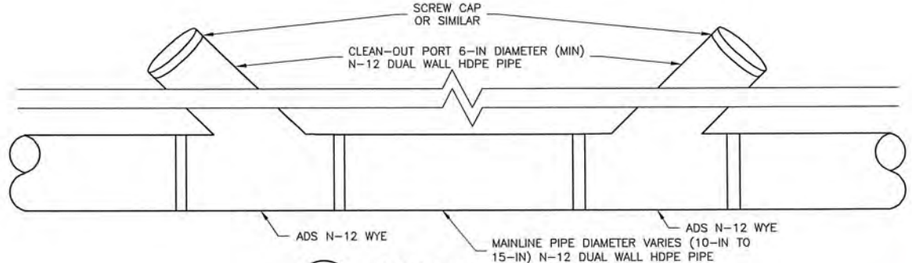
9 | 11 | 12 CHANNEL LINING & LOW FLOW PIPE CUT IN SOIL TYPICAL DETAIL
NOT TO SCALE



11 | 12 | 12 CHANNEL LINING & LOW FLOW PIPE CUT IN SOIL TO ROCK TRANSITION TYPICAL DETAIL
NOT TO SCALE



10 | 11 | 12 CHANNEL LINING & LOW FLOW PIPE CUT IN ROCK TYPICAL DETAIL
NOT TO SCALE



12 | 12 | 12 CLEAN-OUT PORT DETAIL
NOT TO SCALE

NOTE:
1. CATCH BENCHES WILL BE CUT IN ROCK SLOPES ABOVE CHANNEL BANK, BUT WERE NOT SHOWN FOR DRAWING CLARITY.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\05-06 & 11-13 TSF MAIN DIVERSION PLAN, PROFILES, & SECTIONS.dwg - 12/31/2024 9:19 AM

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

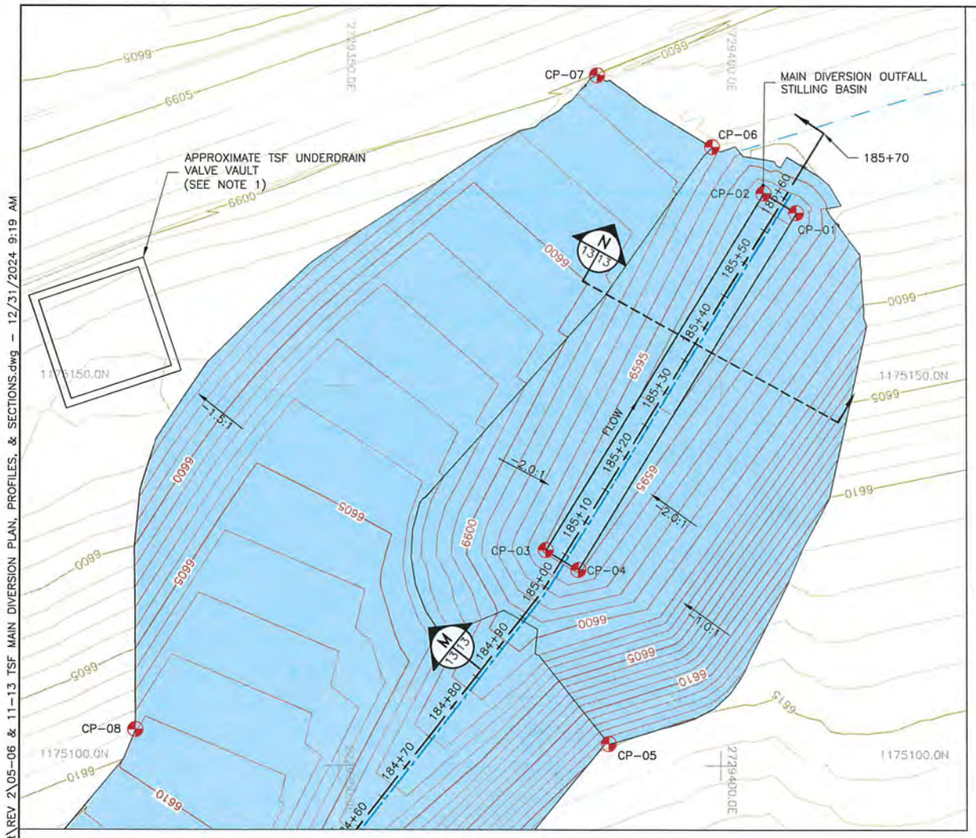
PREPARED FOR: Perpetua Resources

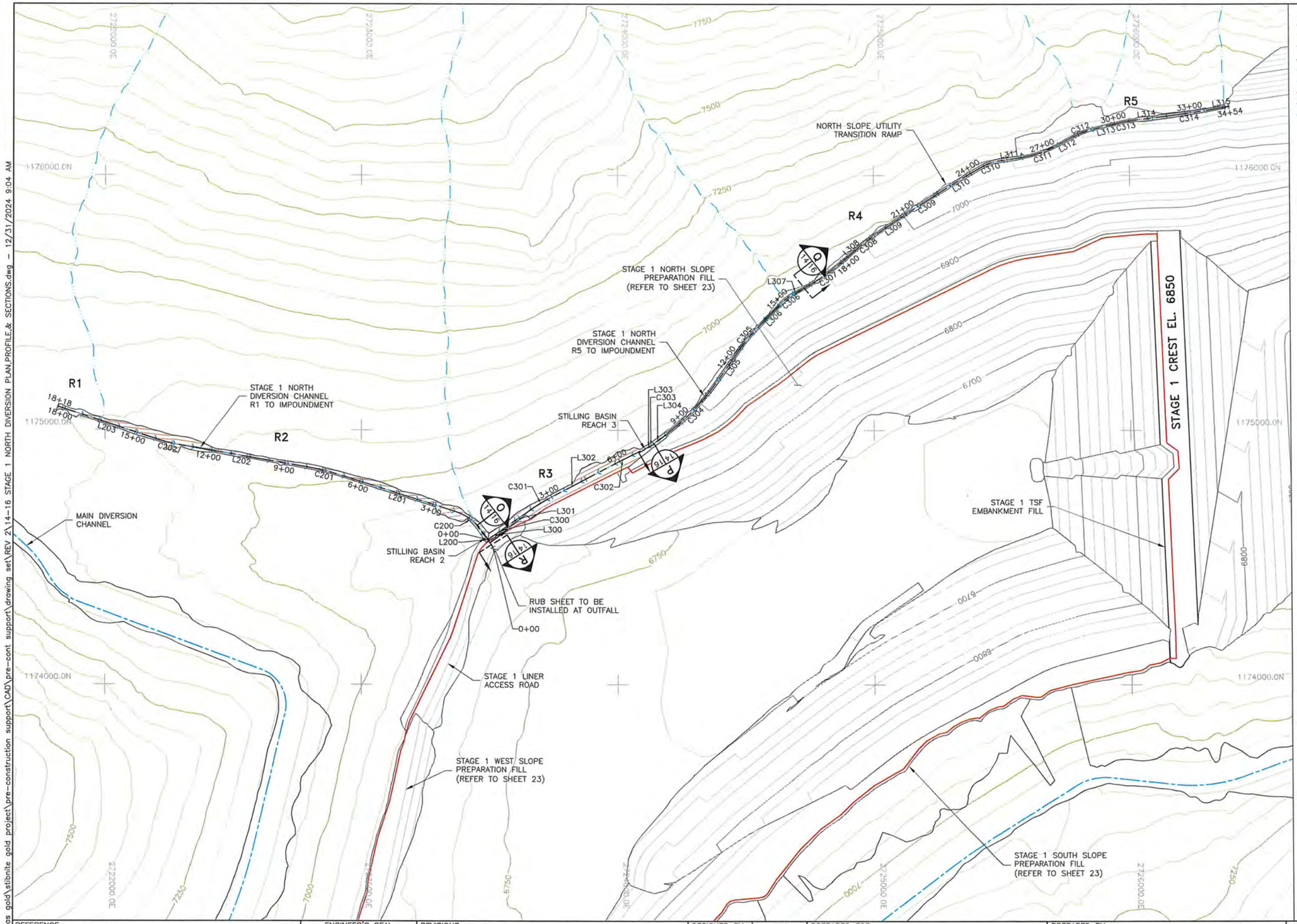
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: TSF MAIN DIVERSION DETAILS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 12
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 12 OF 34


CP-07
CP-06
CP-02
CP-01
CP-03
CP-04
CP-05
CP-08
MAIN DIVERSION OUTFALL STILLING BASIN
185+70
APPROXIMATE TSF UNDERDRAIN VALVE VAULT (SEE NOTE 1)
185+60
185+50
185+40
185+30
185+20
185+10
185+00
184+90
184+80
184+70
184+60
FLOW
2.0:1
1.5:1
1.0:1
N 13|13
M 13|13
6605
6600
6595
6590
6610
6615
6620
6625
6630
6635
6640
6645
6650
6655
6660
6665
6670
6675
6680
6685
6690
6695
6700
6705
6710
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6720
6725
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6735
6740
6745
6750
6755
6760
6765
6770
6775
6780
6785
6790
6795
6800
6805



LEGEND:

- 7000 EXISTING CONTOURS
- 7000 STAGE 1 DAM/BUTTRESS/SLOPE PREPARATION CONTOURS
- STAGE 1 DAM/BUTTRESS/SLOPE PREPARATION GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- LINER LIMIT
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL

NOTES:

1. NORTH DIVERSION CHANNEL WILL HAVE A MINIMUM LONGITUDINAL SLOPE OF 0.5%.
2. MINIMUM CHANNEL DEPTH INCLUDES 1.0-FOOT FREEBOARD.
3. FOR CHANNEL FLOW DEPTHS EQUAL TO OR GREATER THAN 1.3 FT, 0.5 FT COMPACTED FILL BERMS ARE NEEDED.
4. NORTH DIVERSION CONSISTS OF OPEN CHANNEL CONSTRUCTION WITH EXCEPTION OF ROAD CULVERTS.

N

SCALE (FT)
0 200 400
CONTOUR INTERVAL 50 FT
PROPOSED CONTOUR INTERVAL 10 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
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2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

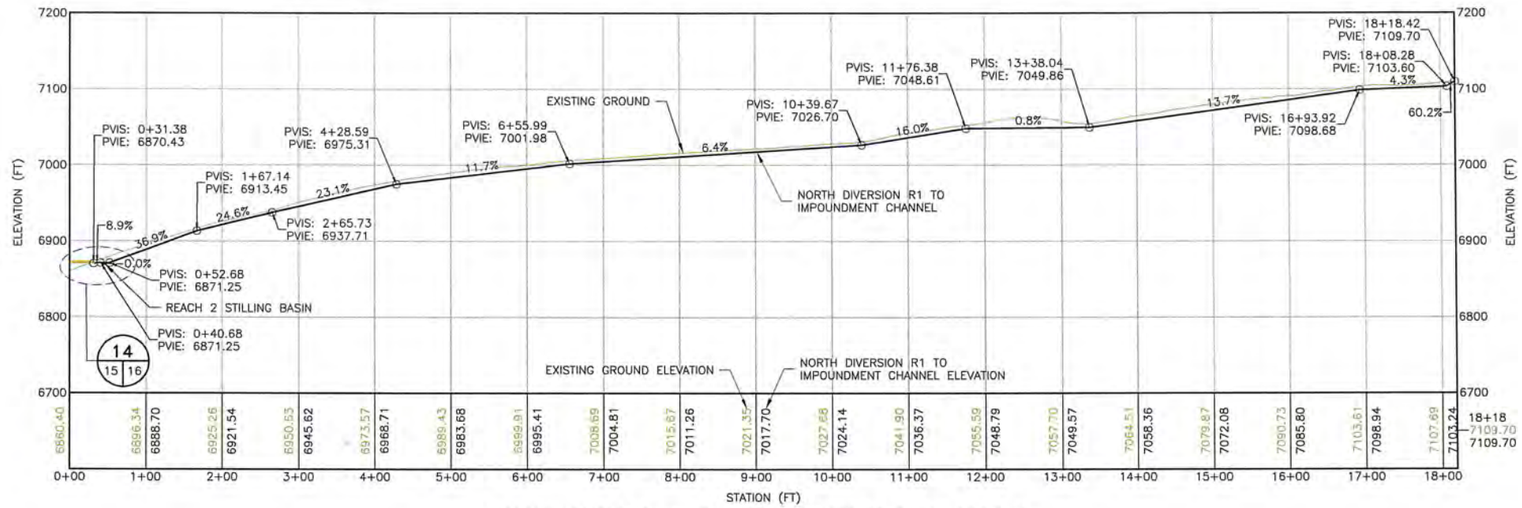
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: STAGE 1 NORTH DIVERSION PLAN

2 REVISION

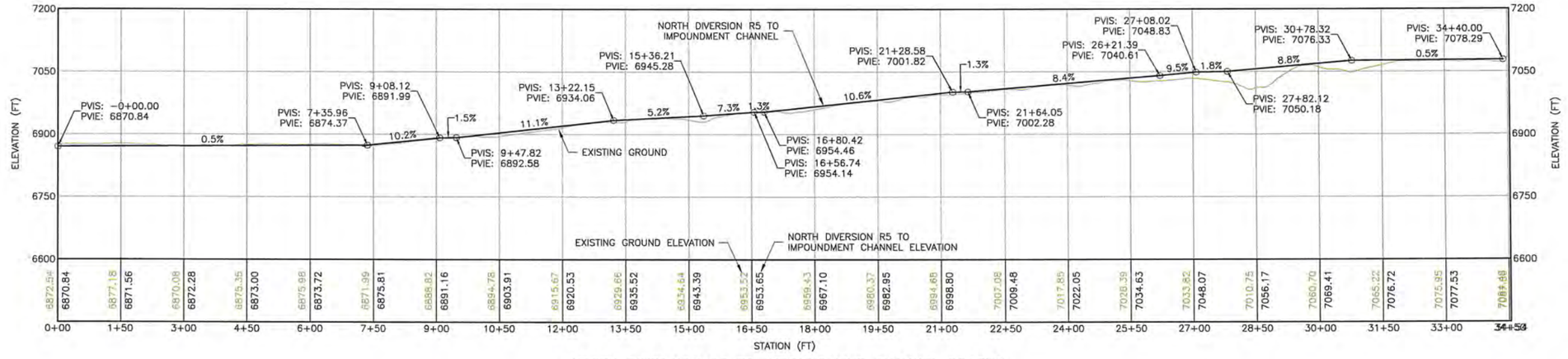
PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 14
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 14 OF 34

Shanna Brown – Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\14-16 STAGE 1 NORTH DIVERSION PLAN,PROFILE,& SECTIONS.dwg – 12/31/2024 9:04 AM



NORTH DIVERSION R1 TO IMPOUNDMENT CHANNEL PROFILE

SCALE: AS SHOWN



NORTH DIVERSION R5 TO IMPOUNDMENT CHANNEL PROFILE

SCALE: AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

Shanna Brown — Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\14-16 STAGE 1 NORTH DIVERSION PLAN,PROFILE,& SECTIONS.dwg — 12/31/2024 9:04 AM

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
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2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
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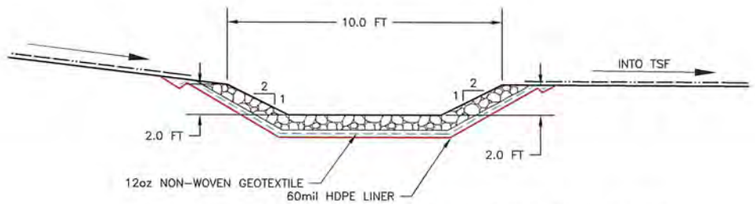
PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

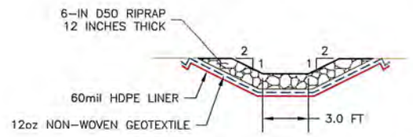
TITLE: STAGE 1 NORTH DIVERSION PROFILES

2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	15
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 15 OF 34

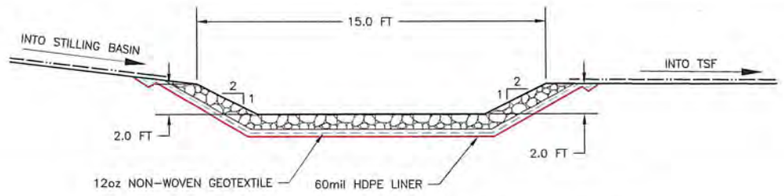


REACH 2 STILLING BASIN LONGITUDINAL SECTION

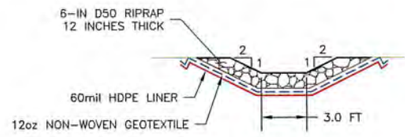


STILLING BASIN CROSS-SECTION

O 14 16 NORTH DIVERSION CHANNEL REACH 2 STILLING BASIN SECTION
SCALE AS SHOWN

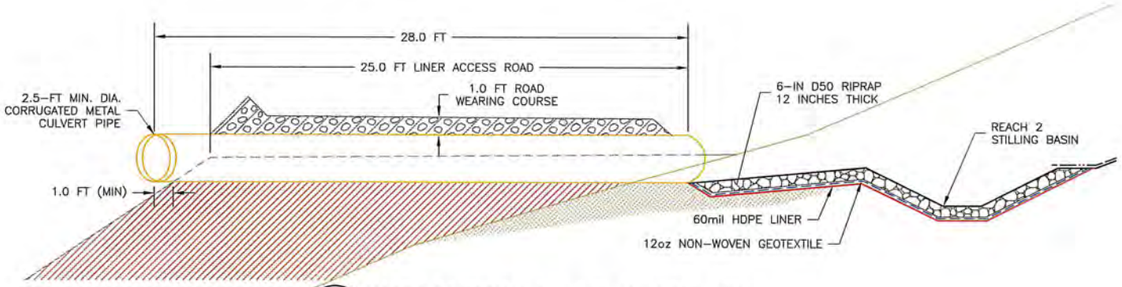


REACH 3 STILLING BASIN LONGITUDINAL SECTION

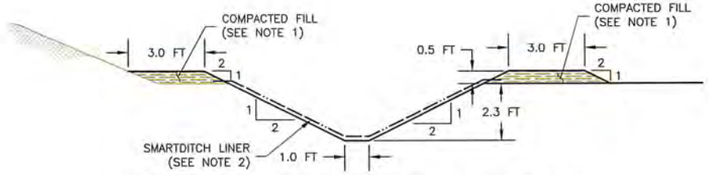


STILLING BASIN CROSS-SECTION

P 14 16 NORTH DIVERSION CHANNEL REACH 3 STILLING BASIN SECTION
SCALE AS SHOWN



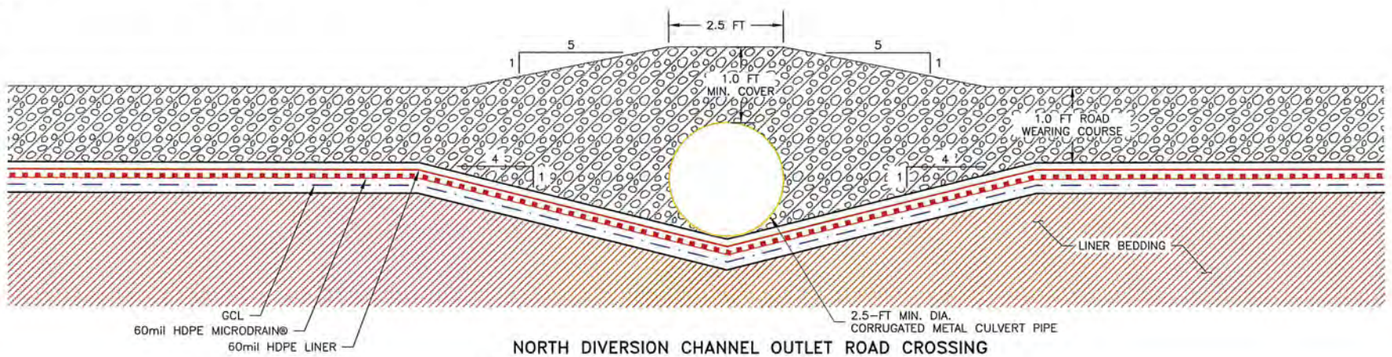
14 15 16 NORTH DIVERSION CHANNEL CULVERT DETAIL
NOT TO SCALE



Q 14 16 NORTH DIVERSION CHANNEL TYPICAL SECTION
SCALE AS SHOWN

NOTES:

1. FOR CHANNEL FLOW DEPTHS EQUAL TO OR GREATER THAN 1.3 FT, 0.5 FT COMPACTED FILL BERMS ARE NEEDED.
2. REFER TO SMARTDITCH® TECHNICAL MANUALS FOR INSTALLATION INSTRUCTIONS.



NORTH DIVERSION CHANNEL OUTLET ROAD CROSSING

R 14 16 NORTH DIVERSION CHANNEL OUTLET TYPICAL SECTIONS
SCALE AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

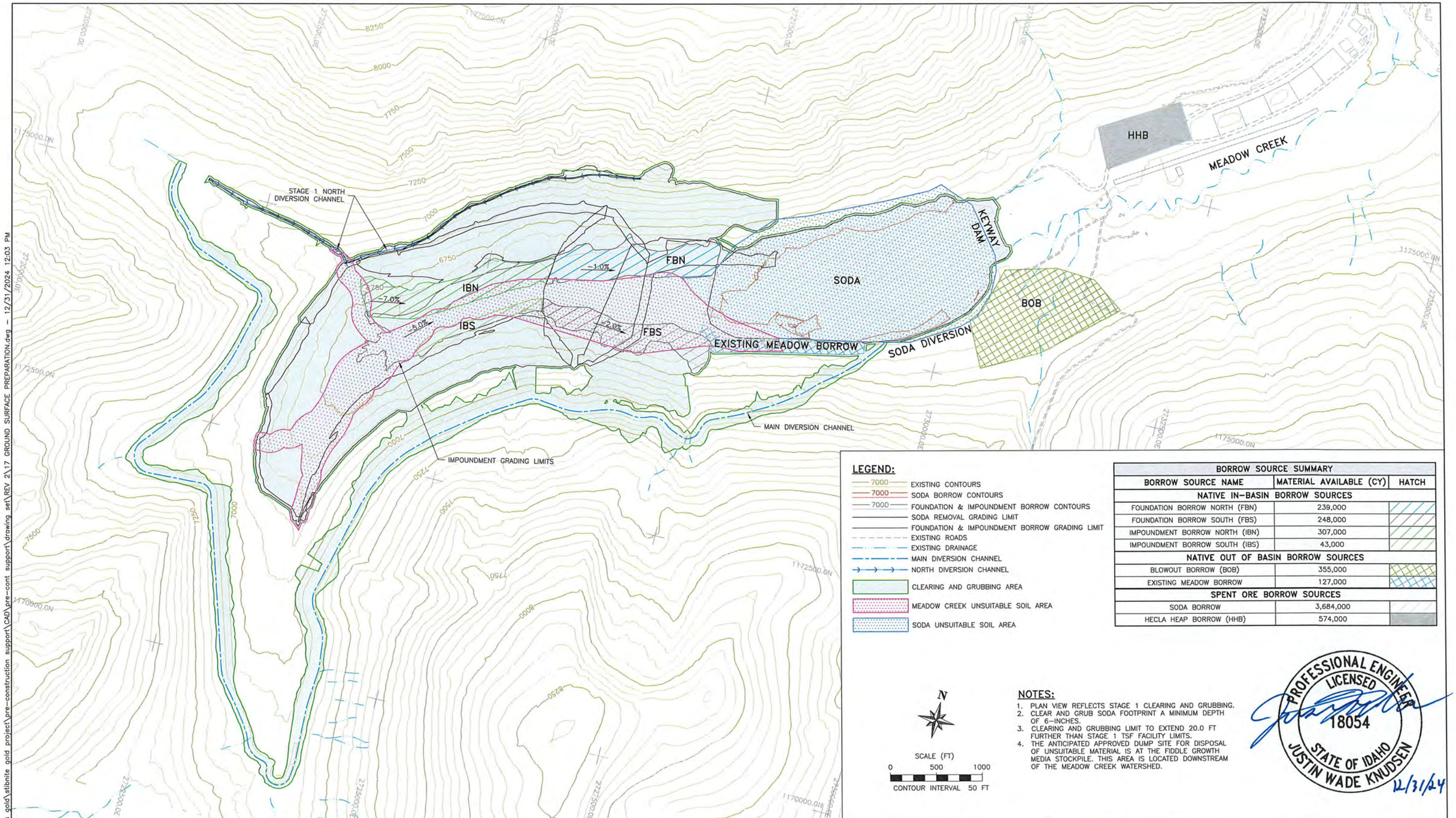
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: STAGE 1 NORTH DIVERSION SECTIONS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 16
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 16 OF 34

Shonna Brown — Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\14-16 STAGE 1 NORTH DIVERSION PLAN,PROFILE,& SECTIONS.dwg — 12/31/2024 9:04 AM



LEGEND:

- 7000 EXISTING CONTOURS
- 7000 SODA BORROW CONTOURS
- 7000 FOUNDATION & IMPOUNDMENT BORROW CONTOURS
- SODA REMOVAL GRADING LIMIT
- FOUNDATION & IMPOUNDMENT BORROW GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- CLEARING AND GRUBBING AREA
- MEADOW CREEK UNSUITABLE SOIL AREA
- SODA UNSUITABLE SOIL AREA

BORROW SOURCE SUMMARY		
BORROW SOURCE NAME	MATERIAL AVAILABLE (CY)	HATCH
NATIVE IN-BASIN BORROW SOURCES		
FOUNDATION BORROW NORTH (FBN)	239,000	
FOUNDATION BORROW SOUTH (FBS)	248,000	
IMPOUNDMENT BORROW NORTH (IBN)	307,000	
IMPOUNDMENT BORROW SOUTH (IBS)	43,000	
NATIVE OUT OF BASIN BORROW SOURCES		
BLOWOUT BORROW (BOB)	355,000	
EXISTING MEADOW BORROW	127,000	
SPENT ORE BORROW SOURCES		
SODA BORROW	3,684,000	
HECLA HEAP BORROW (HHB)	574,000	

N

SCALE (FT)
0 500 1000
CONTOUR INTERVAL 50 FT

NOTES:

1. PLAN VIEW REFLECTS STAGE 1 CLEARING AND GRUBBING.
2. CLEAR AND GRUB SODA FOOTPRINT A MINIMUM DEPTH OF 6-INCHES.
3. CLEARING AND GRUBBING LIMIT TO EXTEND 20.0 FT FURTHER THAN STAGE 1 TSF FACILITY LIMITS.
4. THE ANTICIPATED APPROVED DUMP SITE FOR DISPOSAL OF UNSUITABLE MATERIAL IS AT THE FIDDLE GROWTH MEDIA STOCKPILE. THIS AREA IS LOCATED DOWNSTREAM OF THE MEADOW CREEK WATERSHED.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

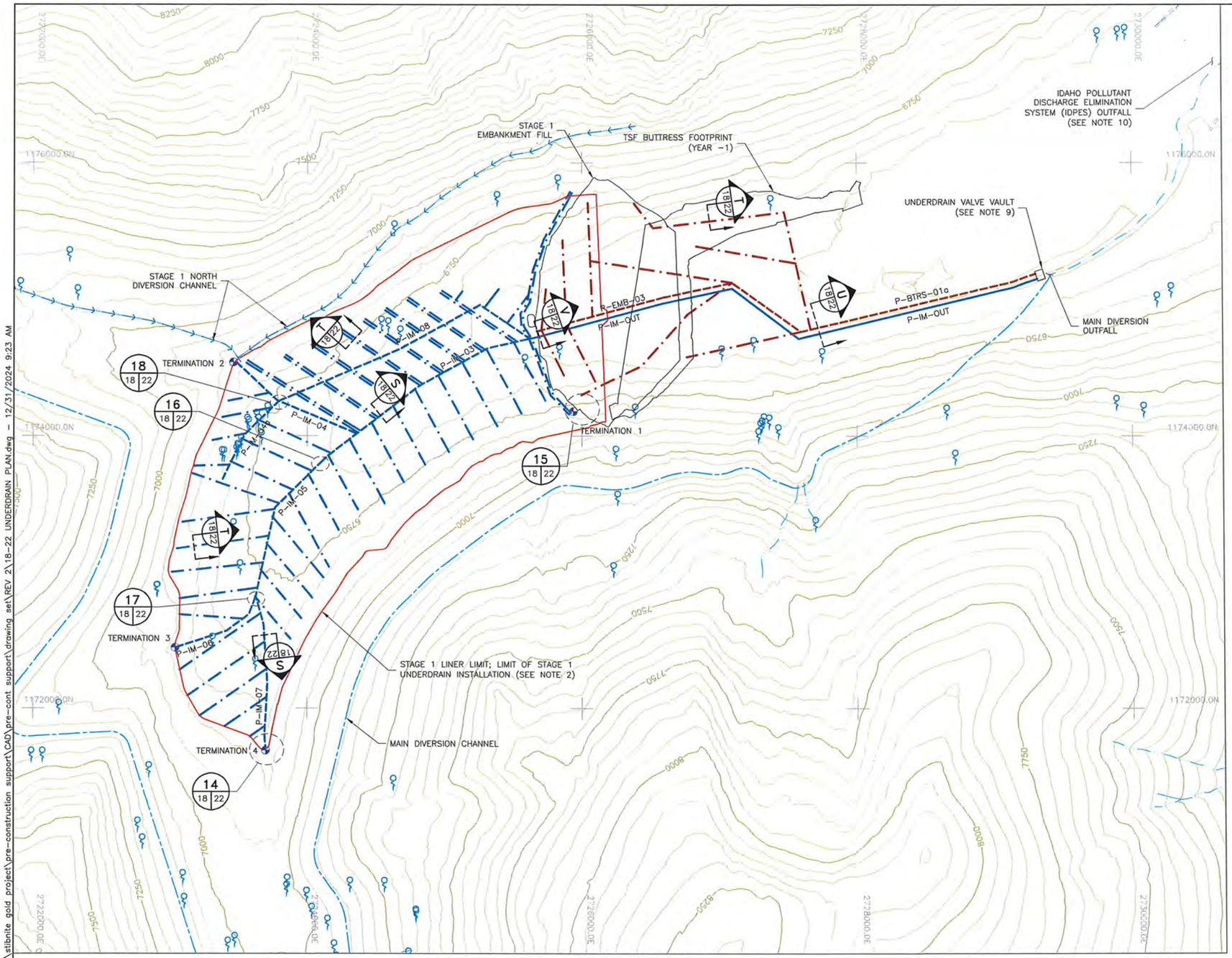
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: GROUND SURFACE PREPARATION

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 17
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 17 OF 34

Shonna Brown — Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\17 GROUND SURFACE PREPARATION.dwg — 12/31/2024 12:03 PM



LEGEND:

- EXISTING CONTOURS
- PROPOSED GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- STAGE 1 LINER LIMIT
- IMPOUNDMENT PRIMARY UNDERDRAIN (SOLID PIPE)
- IMPOUNDMENT PRIMARY UNDERDRAIN (PERFORATED PIPE)
- IMPOUNDMENT SECONDARY UNDERDRAIN (DRAINTUBE)
- EMBANKMENT/BUTTRESS PRIMARY UNDERDRAIN (PERFORATED PIPE)
- EMBANKMENT/BUTTRESS SECONDARY UNDERDRAIN (DRAINTUBE)
- UNDERDRAIN TERMINATION CONTROL POINT
- EXISTING SPRINGS

NOTES:

1. EXISTING TOPOGRAPHY REFLECTS CONDITIONS FOLLOWING MATERIAL BORROW AND IMPOUNDMENT GRADING. TOPOGRAPHY INCLUDES POST-SODA REMOVAL SURFACE.
2. UNDERDRAIN TERMINATIONS SHALL EXTEND AT LEAST 30.0 FT PAST STAGE 1 LINER LIMIT AND MARKED WITH (3) T-POSTS OR SIMILAR FOR FUTURE EXTENSIONS.
3. ADDITIONAL DRAINS MAY BE FIELD FIT DURING CONSTRUCTION.
4. LINER BEDDING TO BE USED IN THE IMPOUNDMENT AND STRUCTURAL FILL IN THE TSF EMBANKMENT AND TSF BUTTRESS FOOTPRINTS.
5. MINIMUM TRENCH WIDTH FOR 6-IN PIPES IS 2.0 FT. MINIMUM TRENCH WIDTH FOR 8.0-IN TO 12-IN PIPES IS 3.0 FT.
6. STAGE 1 NORTH, SOUTH, AND WEST SLOPE PREPARATION FILLS NOT SHOWN FOR CLARITY.
7. ADDITIONAL GEOSYNTHETIC DRAINS, FILTERS, ETC. MAY BE USED TO SUPPLEMENT OR REPLACE PROPOSED DRAIN COMPONENTS SUCH AS PIPES AND GRAVEL.
8. GEOSYNTHETIC DRAINS MAY BE PLACED ON GRADE (AFTER CLEARING AND GRUBBING) INSTEAD OF IN TRENCHES DEPENDING ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION.
9. REFER TO M3 DRAWING 675-EN-110 FOR DESIGN CONTINUATION PRIOR TO THE UNDERDRAIN VALVE VAULT.
10. REFER TO PRII STIBNITE GOLD PROJECT CYANIDATION FACILITY WATER BALANCE REPORT, MAY 2024 FOR IDPES UNDERDRAIN OUTFALL LOCATION.
11. REFER TO SHEET 19 FOR PRIMARY UNDERDRAIN EXCAVATIONS.

DRAIN SEGMENT	ZONE	CUMULATIVE DESIGN FLOW (CFS)	PIPE DIAMETER (IN)	PIPE MAXIMUM FLOW CAPACITY (CFS)	UNDERDRAIN PIPE FOS
P-BTRS-01a	1	1.72	12	4.15	2.4
P-EMB-03	3	0.57	6	1.13	2.0
P-IM-OUT	N/A	2.48	12	4.15	1.7
P-IM-03	3	2.48	10	4.42	1.8
P-IM-04	4	0.08	6	2.53	31.7
P-IM-04a	4	0.08	6	1.85	23.1
P-IM-05	5	1.28	6	1.60	1.3
P-IM-06	6	0.14	6	2.62	18.7
P-IM-07	7	0.77	6	1.85	2.4
P-IM-08	3	0.08	6	1.46	18.30

UNDERDRAIN TERMINATION CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
TERMINATION 1	1174178.1	2725937.0	6775.2
TERMINATION 2	1174537.1	2723462.3	6871.5
TERMINATION 3	1172443.3	2723036.6	6886.5
TERMINATION 4	1171689.5	2723701.4	6863.6

N

SCALE (FT)
0 400 800
CONTOUR INTERVAL 50 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

UNDERDRAIN PLAN

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

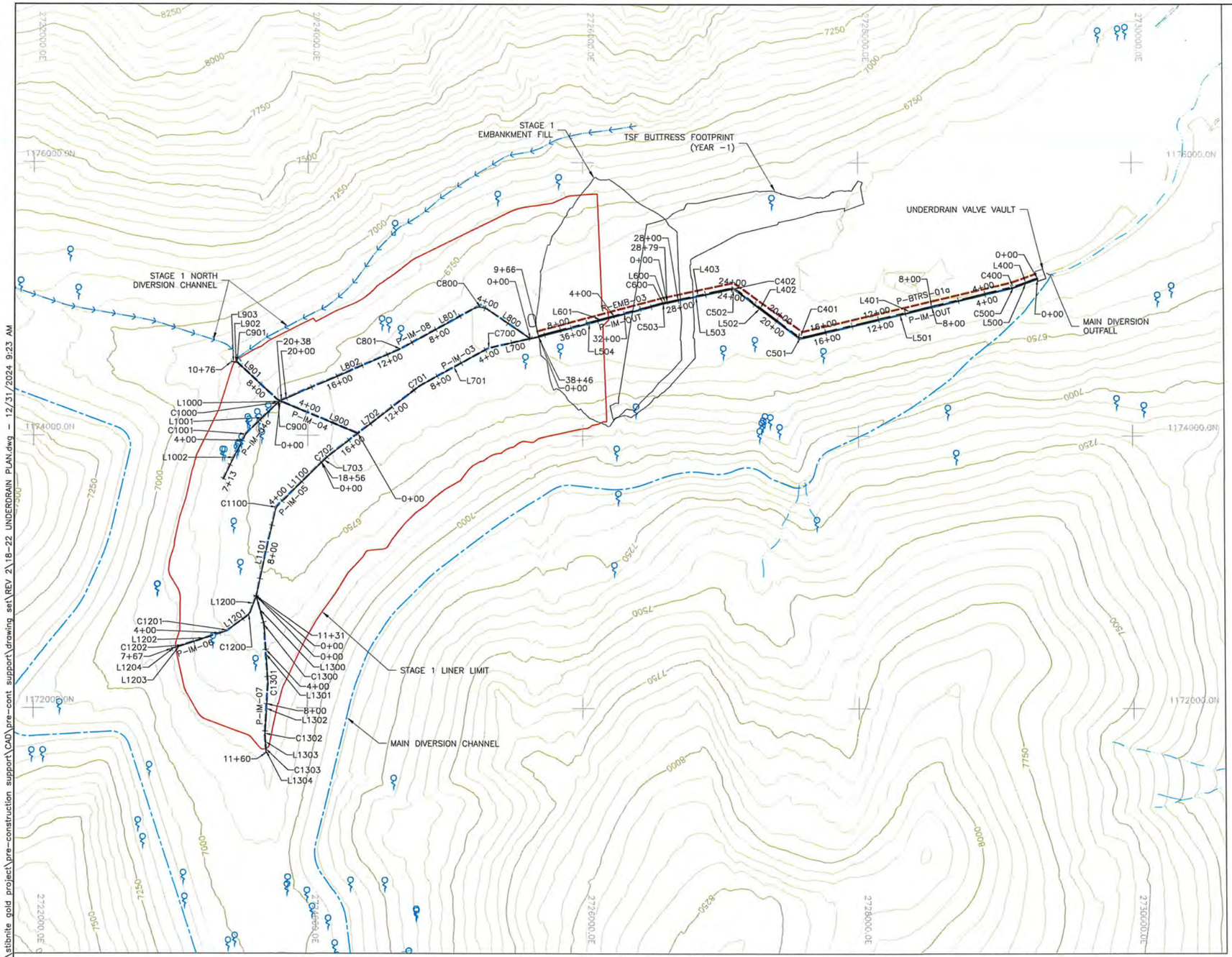
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: UNDERDRAIN PLAN

2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	18
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 18 OF 34

Shanna Brown - Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\18-22 UNDERDRAIN PLAN.dwg - 12/31/2024 9:23 AM



LEGEND:

- 7000 — EXISTING CONTOURS
- PROPOSED GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- STAGE 1 LINER LIMIT
- IMPOUNDMENT PRIMARY UNDERDRAIN (SOLID PIPE)
- IMPOUNDMENT PRIMARY UNDERDRAIN (PERFORATED PIPE)
- EMBANKMENT/BUTTRESS PRIMARY UNDERDRAIN (PERFORATED PIPE)
- EXISTING SPRINGS

N

SCALE (FT)
0 400 800
CONTOUR INTERVAL 50 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

UNDERDRAIN EXCAVATION PLAN

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

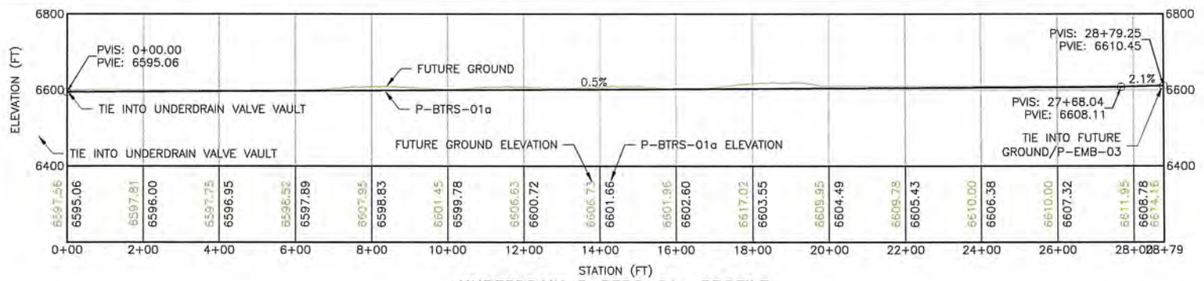
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: UNDERDRAIN EXCAVATION PLAN

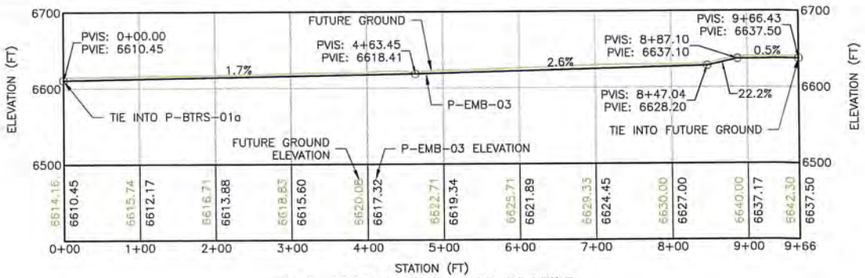
2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 19
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 19 OF 34

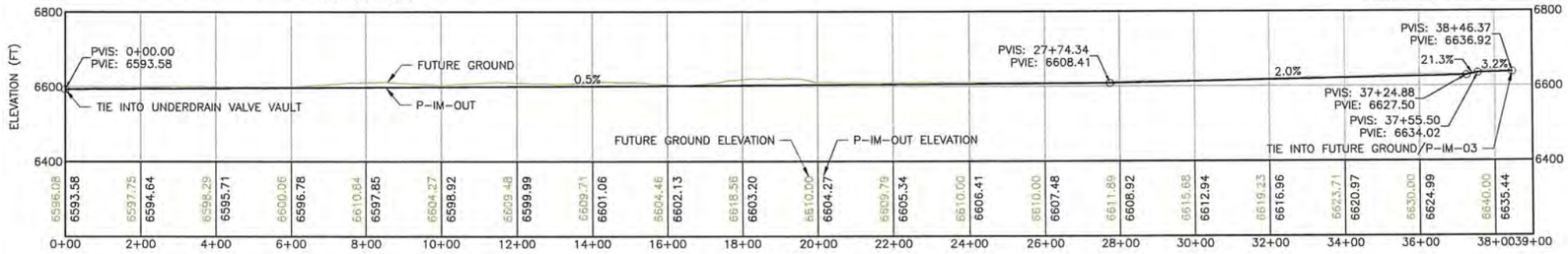
Shanna Brown — Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\18-22 UNDERDRAIN PLAN.dwg — 12/31/2024 9:23 AM



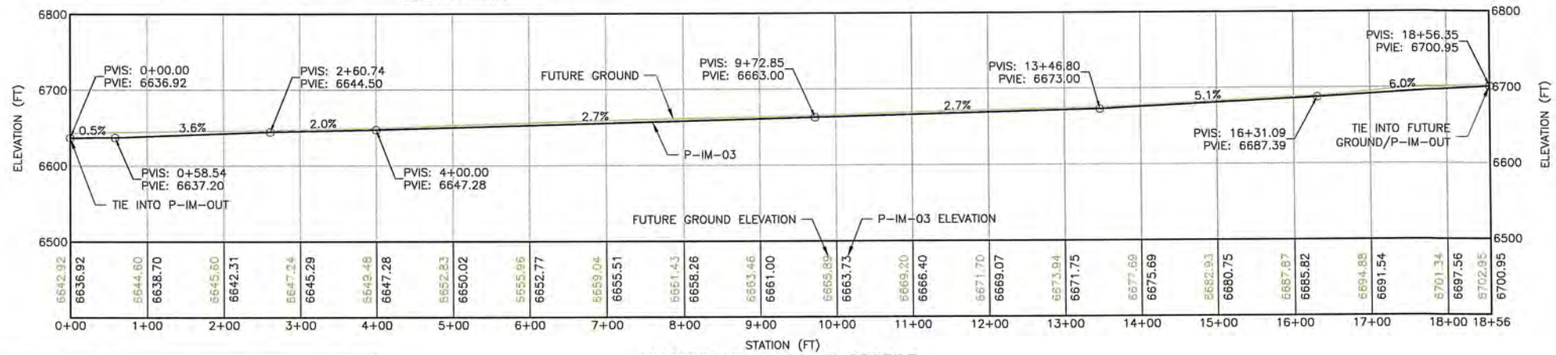
UNDERDRAIN P-BTRS-01a PROFILE
SCALE: AS SHOWN



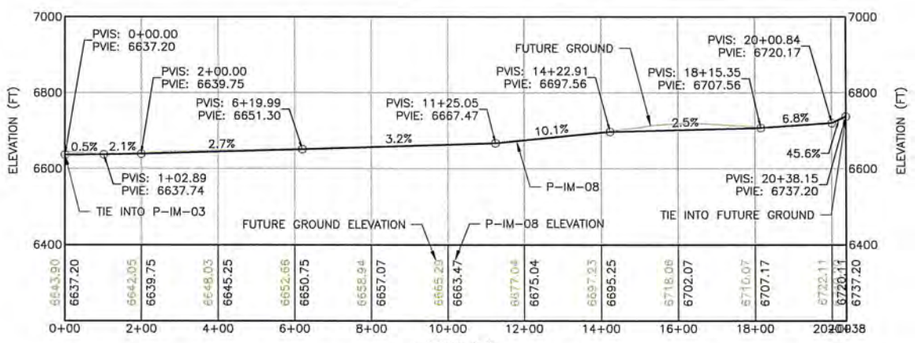
UNDERDRAIN P-EMB-03 PROFILE
SCALE: AS SHOWN



UNDERDRAIN P-IM-OUT PROFILE
SCALE: AS SHOWN



UNDERDRAIN P-IM-03 PROFILE
SCALE: AS SHOWN



UNDERDRAIN P-IM-08 PROFILE
SCALE: AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/21/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY:	JWK
		REV	DESCRIPTION	BY	DATE	DRAWN BY:	TG
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY:	JWK
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY:	JWK
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		

PREPARED FOR: Perpetua Resources

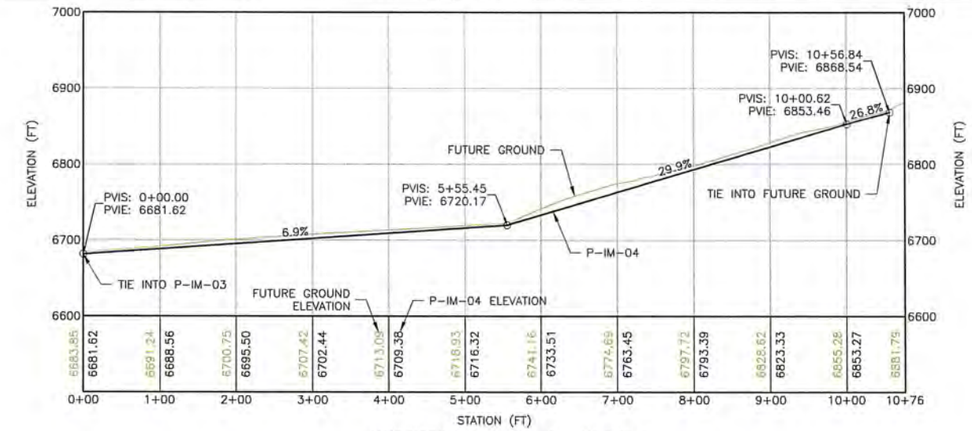
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: UNDERDRAIN PROFILES

2 REVISION

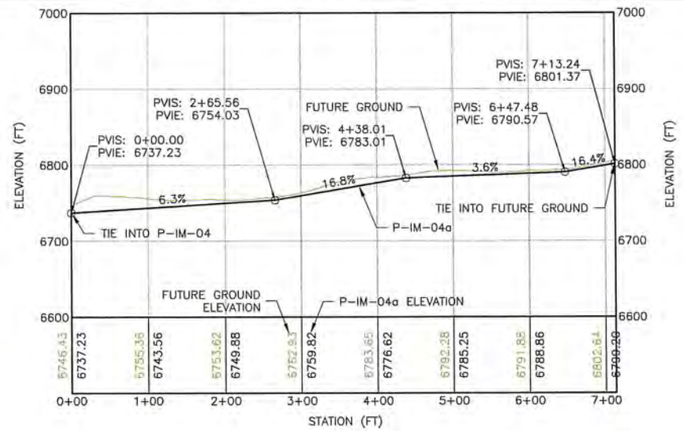
PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	20
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 20 OF 34

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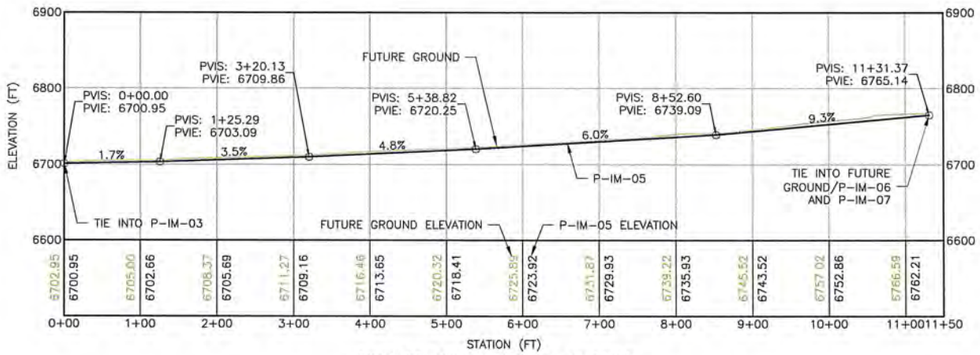
UNDERDRAIN P-IM-04 PROFILE

SCALE: AS SHOWN



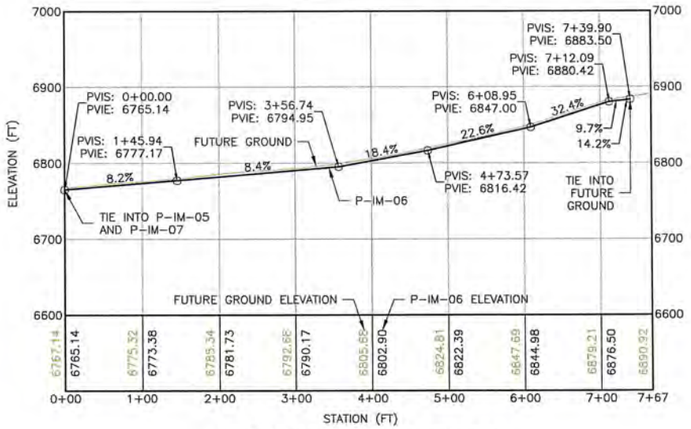
UNDERDRAIN P-IM-04a PROFILE

SCALE: AS SHOWN



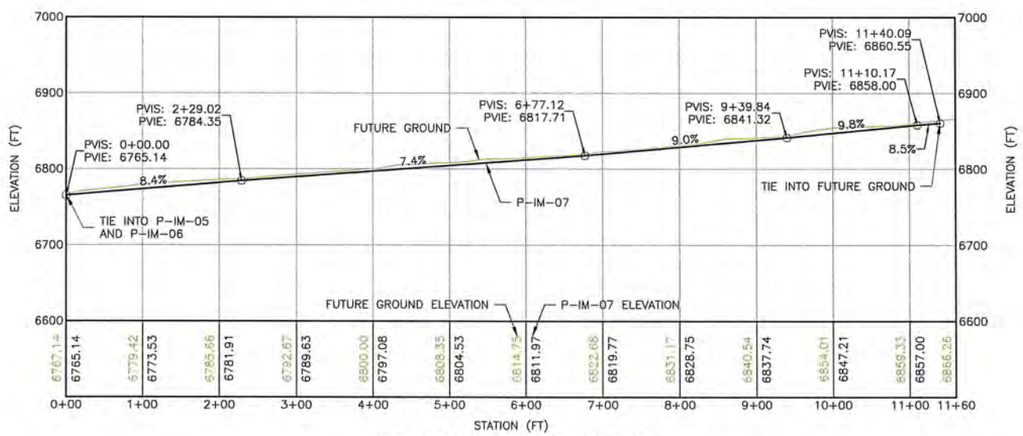
UNDERDRAIN P-IM-05 PROFILE

SCALE: AS SHOWN



UNDERDRAIN P-IM-06 PROFILE

SCALE: AS SHOWN



UNDERDRAIN P-IM-07 PROFILE

SCALE: AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/21/24

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REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

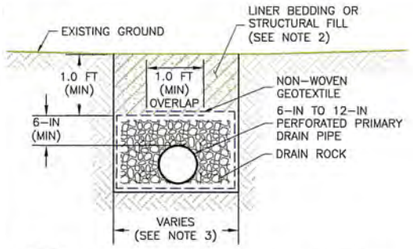
PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

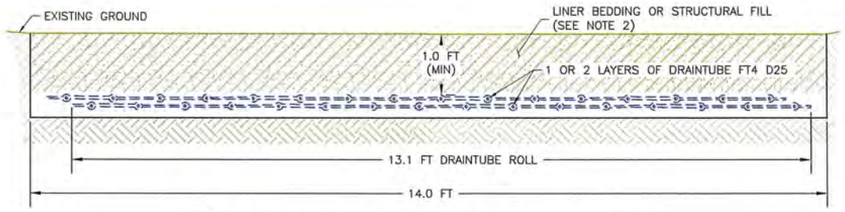
TITLE: UNDERDRAIN PROFILES

2 REVISION

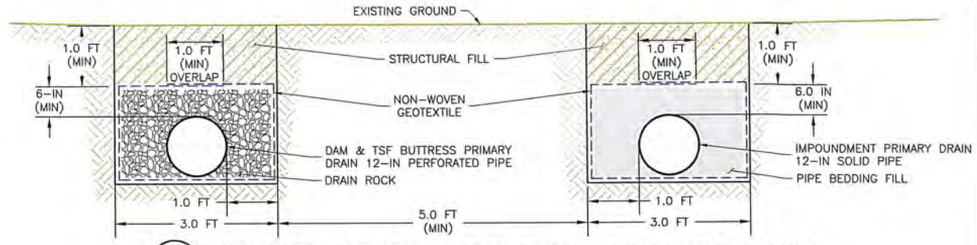
PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	21
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 21 OF 34



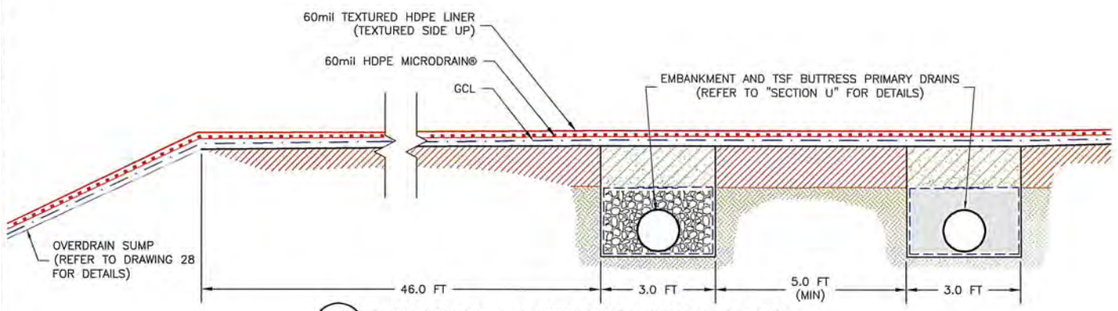
S 18 22 PRIMARY DRAIN TYPICAL SECTION
NOT TO SCALE



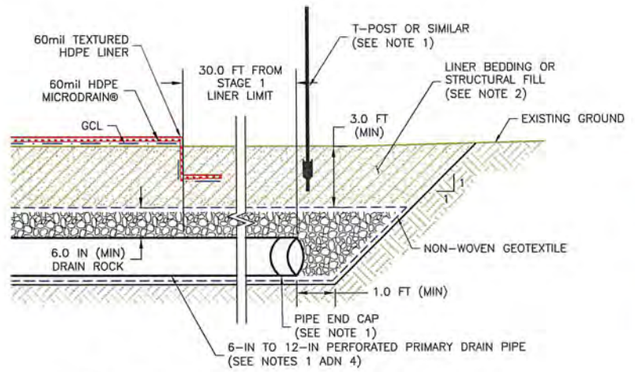
T 18 22 SECONDARY DRAIN TYPICAL 2 LAYER SECTION
NOT TO SCALE



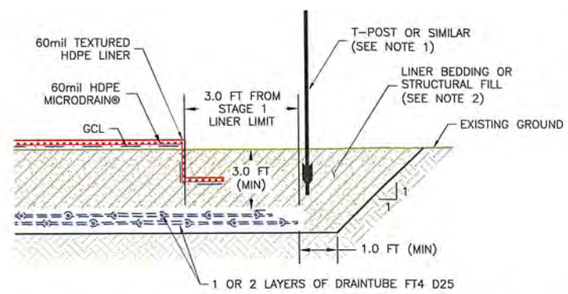
U 18 22 EMBANKMENT AND TSF BUTTRESS PRIMARY DRAIN TYPICAL SECTION
NOT TO SCALE



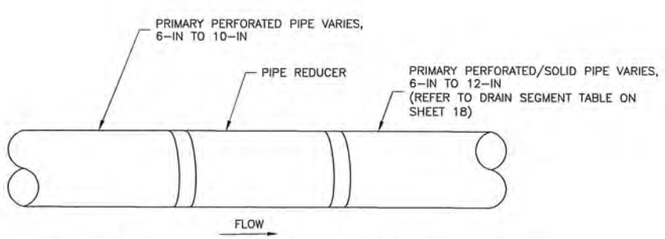
V 18 22 UNDERDRAIN AND OVERDRAIN TYPICAL SECTION
NOT TO SCALE



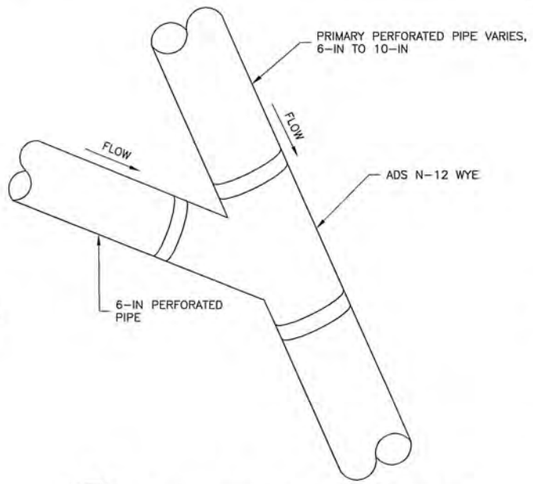
14 18 22 PRIMARY DRAIN TERMINATION TYPICAL DETAIL
NOT TO SCALE



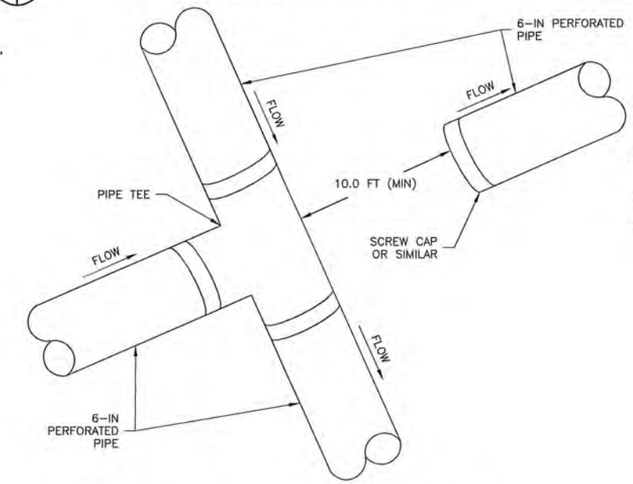
15 18 22 SECONDARY DRAIN TERMINATION TYPICAL DETAIL
NOT TO SCALE



16 18 22 PRIMARY DRAIN REDUCER TYPICAL DETAIL
NOT TO SCALE



17 18 22 PRIMARY DRAIN WYE TYPICAL DETAIL
NOT TO SCALE



18 18 22 PRIMARY DRAIN PIPE TEE TYPICAL DETAIL
NOT TO SCALE

NOTES:

1. UNDERDRAIN TERMINATIONS SHALL EXTEND 3.0 FT PAST STAGE 1 LINER LIMIT. CAP AND MARK UNDERDRAIN WITH (3) T-POSTS OR SIMILAR FOR FUTURE EXTENSIONS.
2. LINER BEDDING TO BE USED IN THE IMPOUNDMENT AND STRUCTURAL FILL IN THE TSF EMBANKMENT AND TSF BUTTRESS FOOTPRINTS. LINER BEDDING 3.0 FT DEPTH A MINIMUM 10.0 FT ON EITHER SIDE OF THE ANCHOR TRENCH.
3. MINIMUM TRENCH WIDTH FOR 6-IN PIPES IS 2.0 FT. MINIMUM TRENCH WIDTH FOR 8-IN TO 12-IN PIPES IS 3.0 FT.
4. MANUAL PERFORATIONS OF 3/8-IN DIAMETER NOMINAL HOLE SIZE/SLOT WIDTHS REQUIRED.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

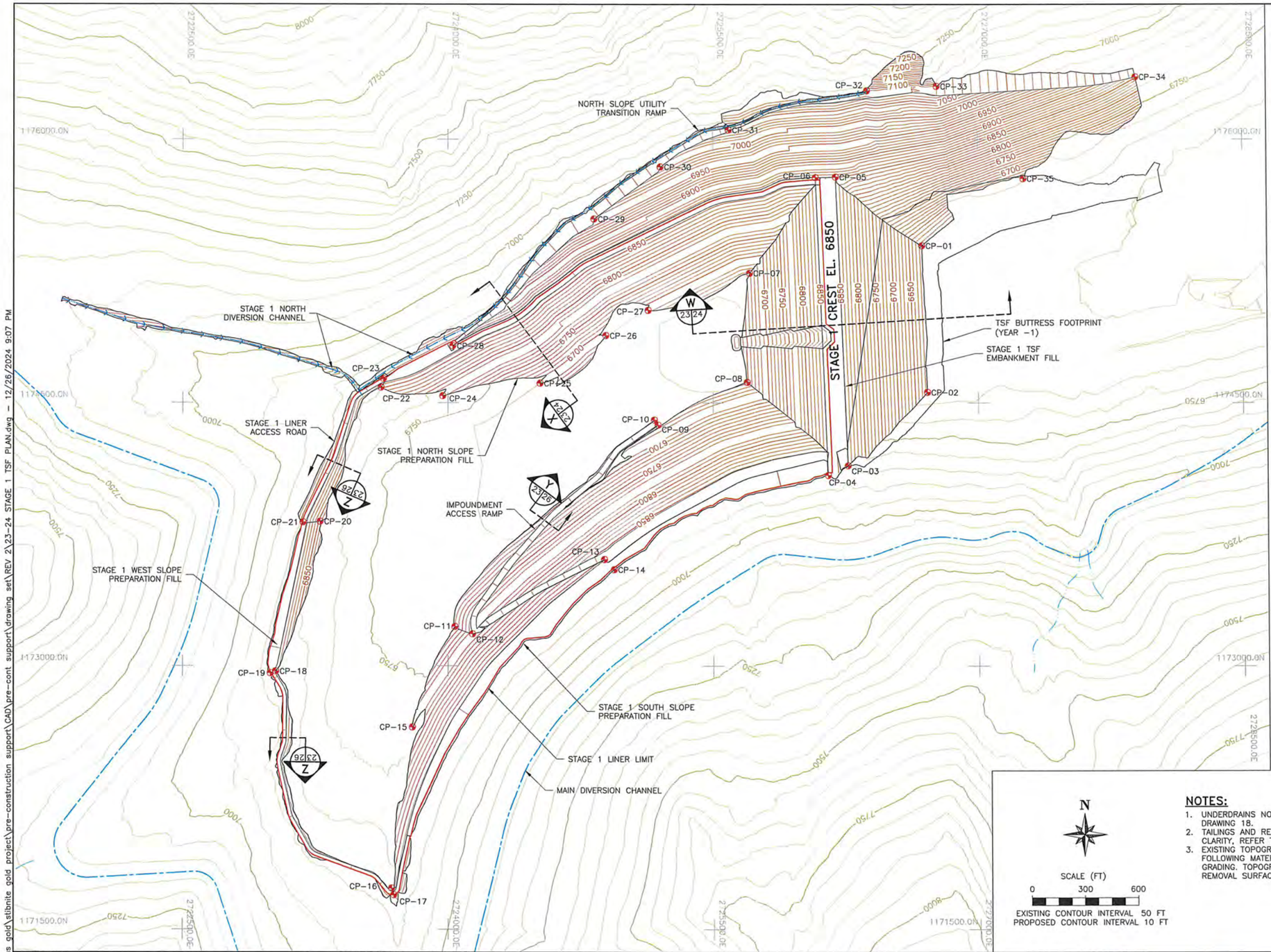
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: UNDERDRAIN SECTIONS & DETAILS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 22
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 22 OF 34

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LEGEND:

- 7000 — EXISTING CONTOURS
- 7000 — STAGE 1 DAM/SLOPE PREPARATION CONTOURS
- STAGE 1 DAM/SLOPE PREPARATION GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- LINER/LCRS LIMIT

CONTROL POINTS [1]			
POINT	NORTHING	EASTING	ELEVATION
CP-01	1175394.13	2726685.20	6613.33
CP-02	1174559.37	2726714.26	6615.92
CP-03	1174141.78	2726262.83	6850.00
CP-04	1174086.85	2726149.99	6850.00
CP-05	1175785.16	2726195.42	6850.00
CP-06	1175782.27	2726081.30	6850.00
CP-07	1175238.89	2725707.42	6667.51
CP-08	1174616.15	2725691.89	6646.99
CP-09	1174372.35	2725189.76	6665.42
CP-10	1174402.06	2725168.88	6662.27
CP-11	1173222.37	2724039.71	6727.52
CP-12	1173180.65	2724139.91	6663.65
CP-13	1173605.81	2724884.94	6854.12
CP-14	1173548.09	2724940.15	6854.64
CP-15	1172649.91	2723799.78	6779.75
CP-16	1171733.20	2723681.99	6862.35
CP-17	1171695.08	2723694.59	6869.99
CP-18	1172967.37	2723028.69	6884.81
CP-19	1172956.41	2722998.55	6889.81
CP-20	1173822.17	2723278.88	6843.66
CP-21	1173818.00	2723181.46	6893.59
CP-22	1174587.03	2723621.24	6853.53
CP-23	1174636.20	2723635.88	6865.32
CP-24	1174538.67	2723971.51	6783.61
CP-25	1174610.66	2724522.29	6699.87
CP-26	1174882.33	2724894.58	6698.36
CP-27	1175027.04	2725134.75	6696.11
CP-28	1174823.71	2724027.68	6863.63
CP-29	1175546.35	2724828.81	6956.73
CP-30	1175842.88	2725204.60	7004.07
CP-31	1176053.81	2725589.10	7042.61
CP-32	1176276.20	2726374.52	7080.61
CP-33	1176301.77	2726771.36	7080.00
CP-34	1176354.87	2727895.53	6853.34
CP-35	1175775.98	2727256.62	6653.69

[1] CONTROL POINTS SHOWN IN PLAN VIEW ARE SPECIFICALLY FOR THIS DRAWING ONLY.

N

SCALE (FT)
0 300 600
EXISTING CONTOUR INTERVAL 50 FT
PROPOSED CONTOUR INTERVAL 10 FT

NOTES:

1. UNDERDRAINS NOT SHOWN FOR CLARITY, REFER TO DRAWING 18.
2. TAILINGS AND RECLAIM PIPELINES NOT SHOWN FOR CLARITY, REFER TO DRAWING 30.
3. EXISTING TOPOGRAPHY REFLECTS CONDITIONS FOLLOWING MATERIAL BORROW AND IMPOUNDMENT GRADING. TOPOGRAPHY INCLUDES POST-SODA REMOVAL SURFACE.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

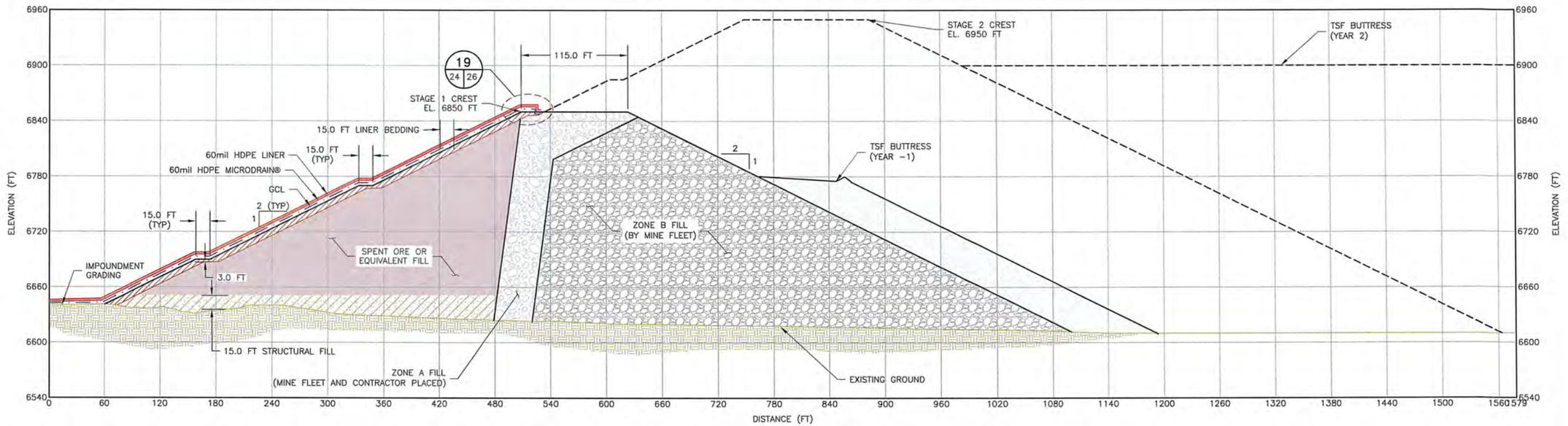
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: STAGE 1 TSF PLAN

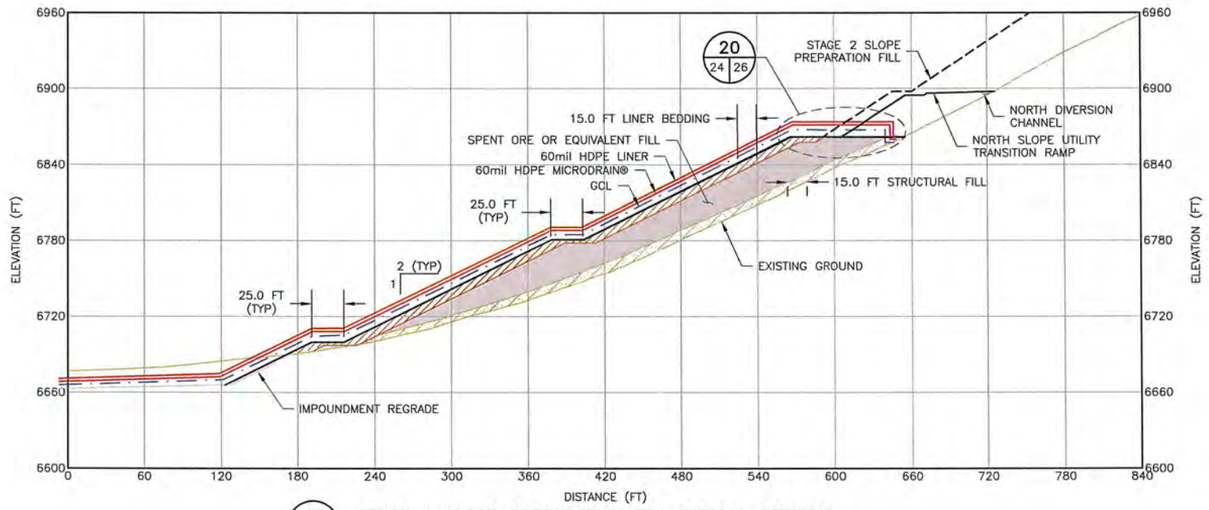
2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 23
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 23 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\23-24 STAGE 1 TSF PLAN.dwg - 12/26/2024 9:07 PM



W
23 24 STAGE 1 TSF EMBANKMENT FILL SECTION
SCALE AS SHOWN

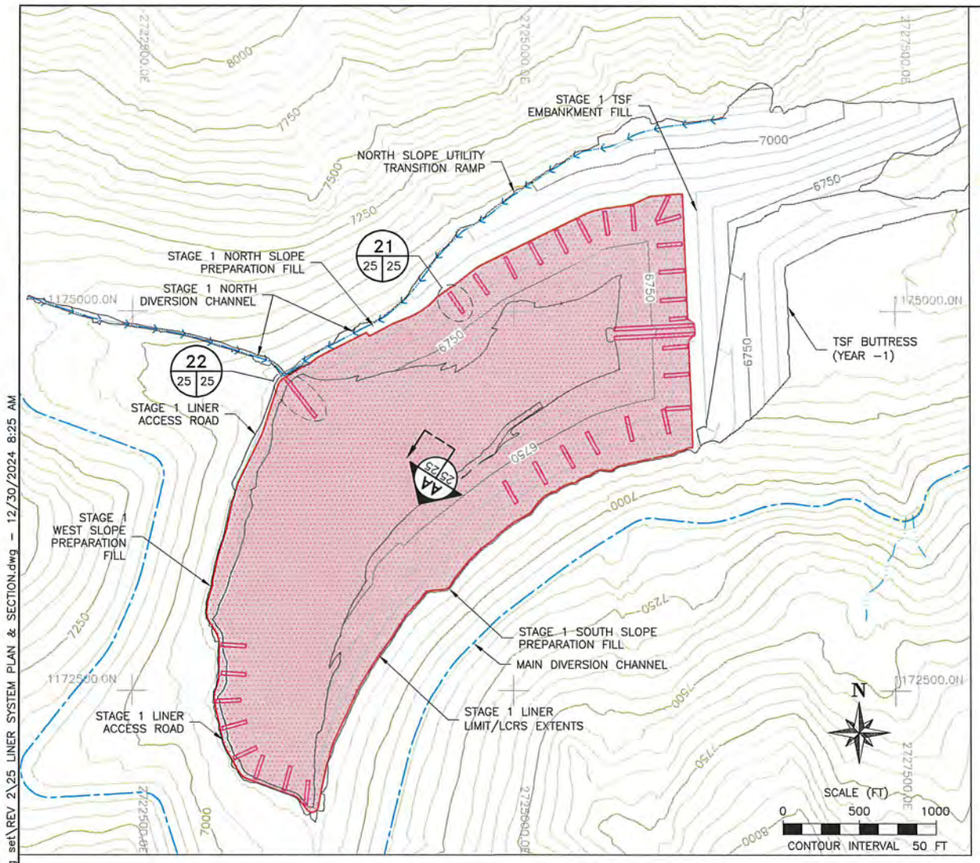


X
23 24 STAGE 1 SLOPE PREPARATION FILL TYPICAL SECTION
SCALE AS SHOWN

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

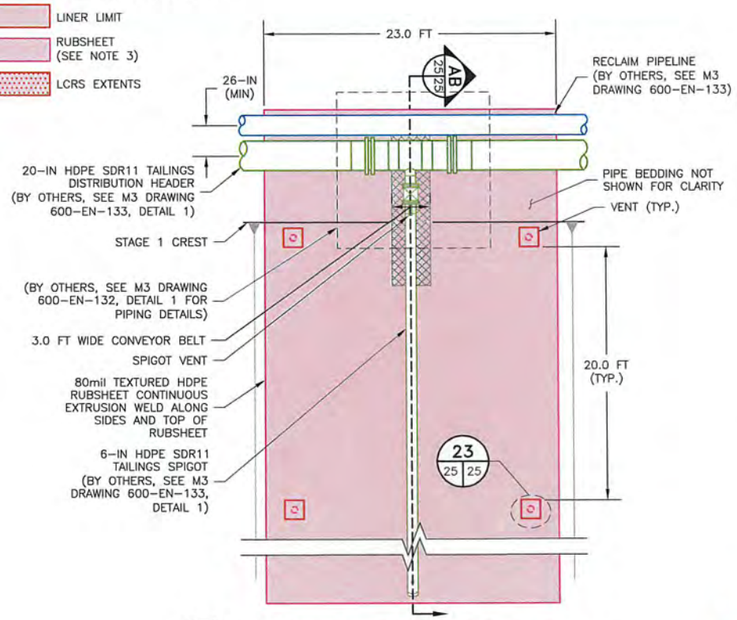
REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY: JWK	PREPARED FOR: Perpetua Resources
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		REV	DESCRIPTION	BY	DATE	DRAWN BY: TG	PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.
		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY: JWK	TITLE: STAGE 1 TSF TYPICAL SECTIONS
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY: JWK	2 REVISION
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		PROJECT: STIBNITE GOLD PROJECT TSF; PROJECT #: 825; DRAWING #: 24
							LOCATION: VALLEY COUNTY, IDAHO; DATE: DECEMBER 2024; SHEET: 24 OF 34

Shonna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\23-24 STAGE 1 TSF PLAN.dwg - 12/26/2024 9:07 PM

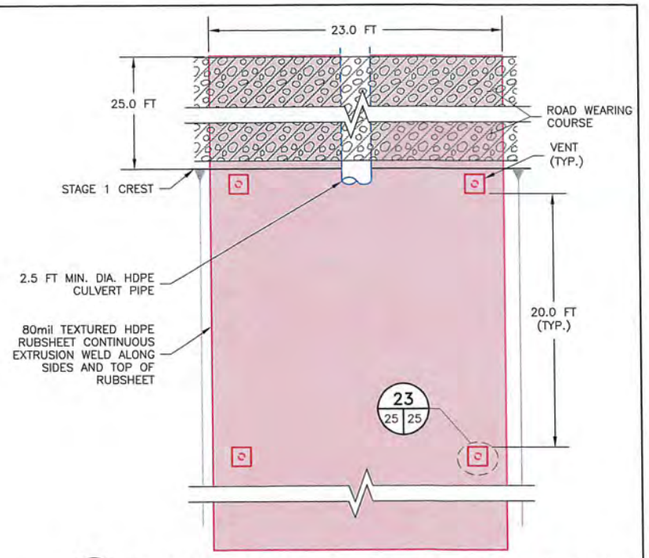


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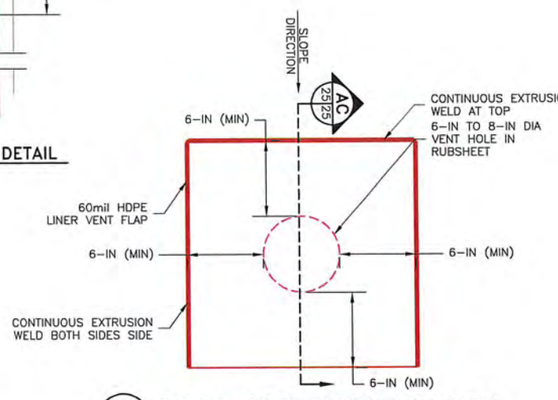
- EXISTING CONTOURS
- TSF/SLOPE PREPARATION CONTOURS
- TSF/SLOPE PREPARATION GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- LINER LIMIT
- RUBSHEET (SEE NOTE 3)
- LCRS EXTENTS



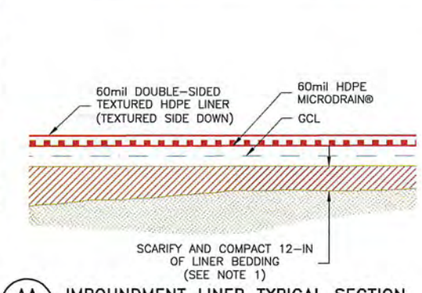
21 / 25 25 SPIGOT AND RUBSHEET PLAN VIEW DETAIL
NOT TO SCALE



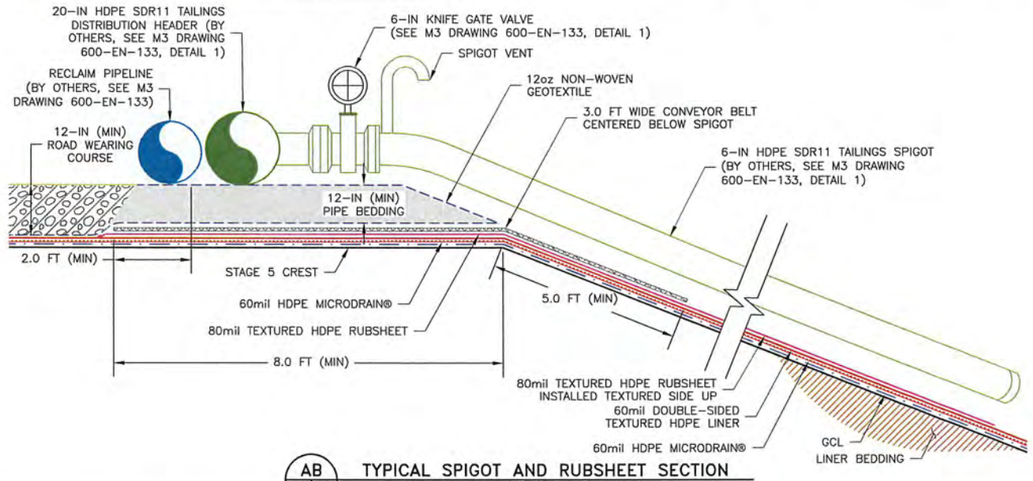
22 / 25 25 WATER DEPOSITION AND RUBSHEET PLAN VIEW DETAIL
NOT TO SCALE



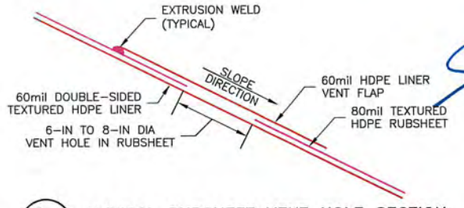
23 / 25 25 TYPICAL RUBSHEET VENT HOLE DETAIL
NOT TO SCALE



AA / 17 17 IMPOUNDMENT LINER TYPICAL SECTION
NOT TO SCALE



AB / 25 25 TYPICAL SPIGOT AND RUBSHEET SECTION
NOT TO SCALE



AC / 25 25 TYPICAL RUBSHEET VENT HOLE SECTION
NOT TO SCALE

NOTES:

1. SCARIFY AND COMPACT 12 INCHES OF NATIVE GROUND TO FORM A SUITABLE SURFACE FOR GCL DEPLOYMENT.
2. RECLAIM AND TAILINGS PIPELINES NOT SHOWN IN PLAN VIEW FOR DRAWING CLARITY, SEE DRAWING 30.
3. SPIGOT RUBSHEET UPSTREAM LENGTH TO BE FIELD FIT AND APPROVED BY ENGINEER.

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/21/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

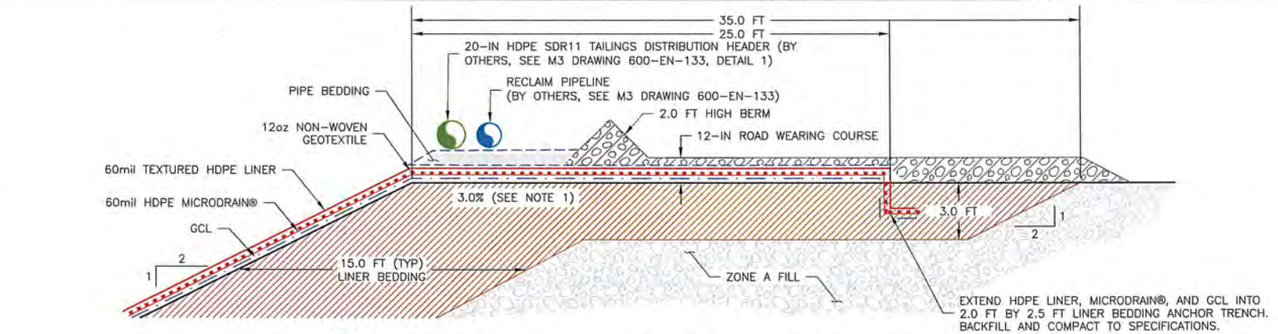
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: LINER SYSTEM PLAN & SECTION

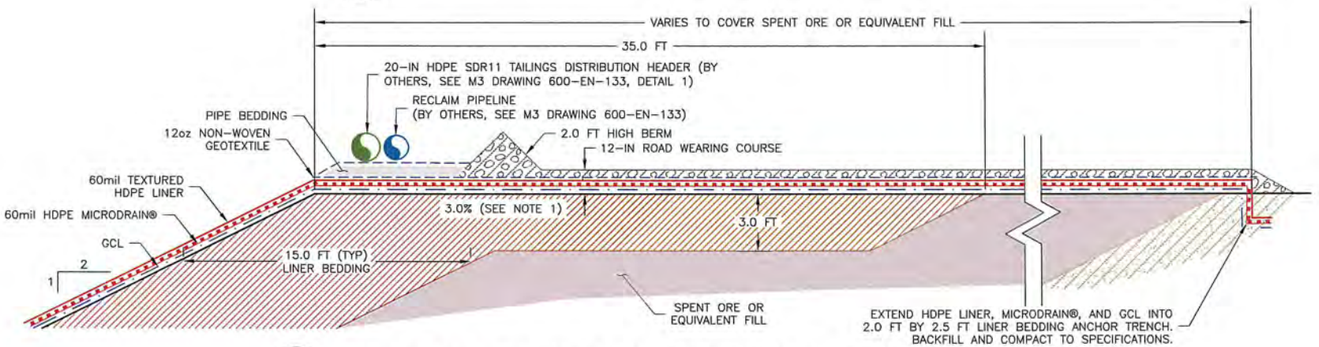
2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 25
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 25 OF 34

Shanna Brown – Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\25 LINER SYSTEM PLAN & SECTION.dwg – 12/30/2024 8:25 AM



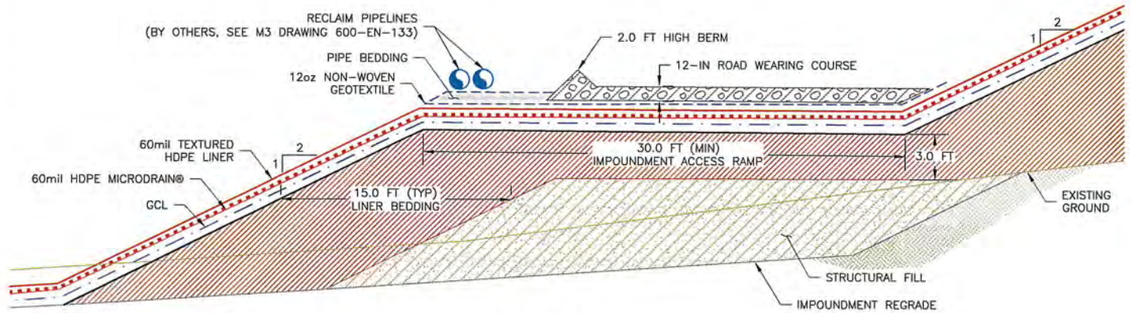
19 (24 | 26) STAGE 1 TSF EMBANKMENT CREST CONSTRUCTION TYPICAL DETAIL
NOT TO SCALE



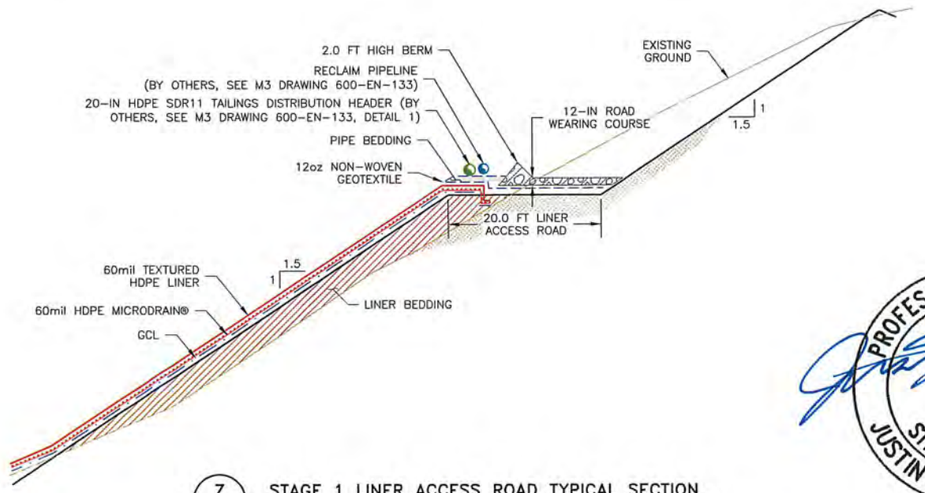
20 (24 | 26) STAGE 1 TSF SLOPE PREPARATION FILL CREST CONSTRUCTION TYPICAL DETAIL
NOT TO SCALE

NOTE:

1. TSF EMBANKMENT/SLOPE PREPARATION FILL CREST GRADED AT 3.0% INTO THE FACILITY.



Y (23 | 26) STAGE 1 IMPOUNDMENT ACCESS RAMP TYPICAL SECTION
NOT TO SCALE



Z (23 | 26) STAGE 1 LINER ACCESS ROAD TYPICAL SECTION
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:			
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		REV	DESCRIPTION	BY	DATE
		0	ISSUED FOR CONSTRUCTION	JWK	07/2023
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

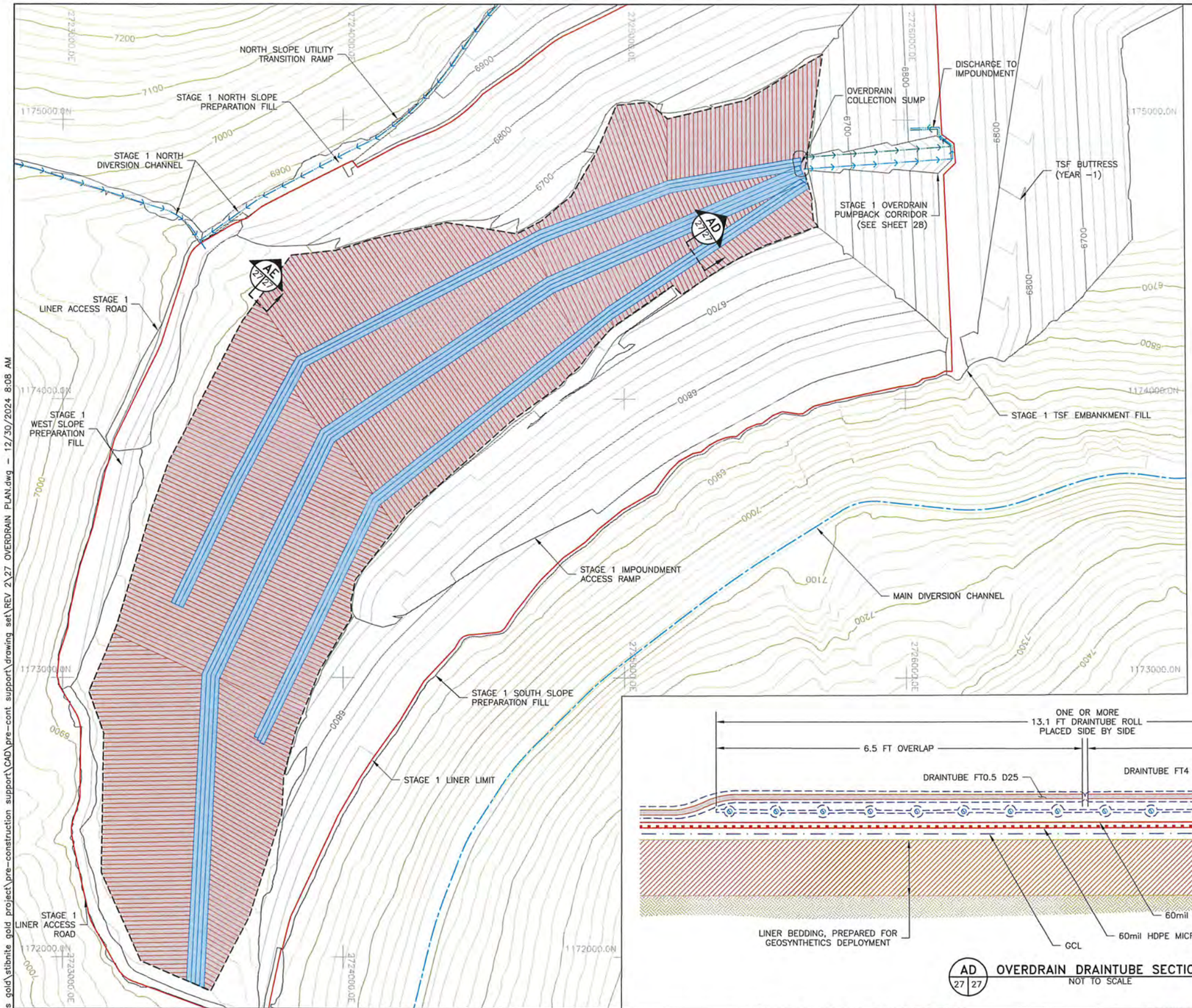
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: TYPICAL SECTIONS & DETAILS

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 26
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 26 OF 34

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LEGEND:

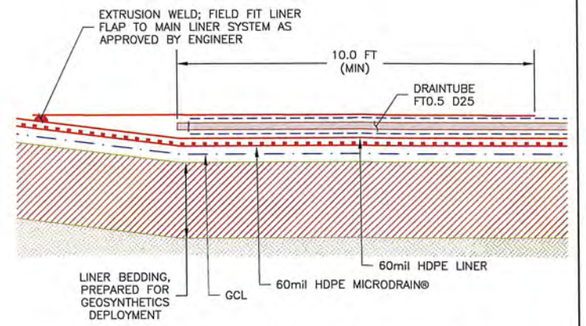
- 7000 EXISTING CONTOURS
- 7000 DAM/SLOPE PREPARATION CONTOURS
- DAM/SLOPE PREPARATION GRADING LIMIT
- STAGE 1 OVERDRAIN PUMPBACK CORRIDOR GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- STAGE 1 LINER LIMIT
- 6-INCH OVERDRAIN RETURN PIPE
- 6-INCH LCRS RETURN PIPE
- DRAINTUBE FT4 D25 (TRANSFER)(SEE NOTE 2)
- DRAINTUBE FT0.5 D25 (COLLECTOR)

NOTES:

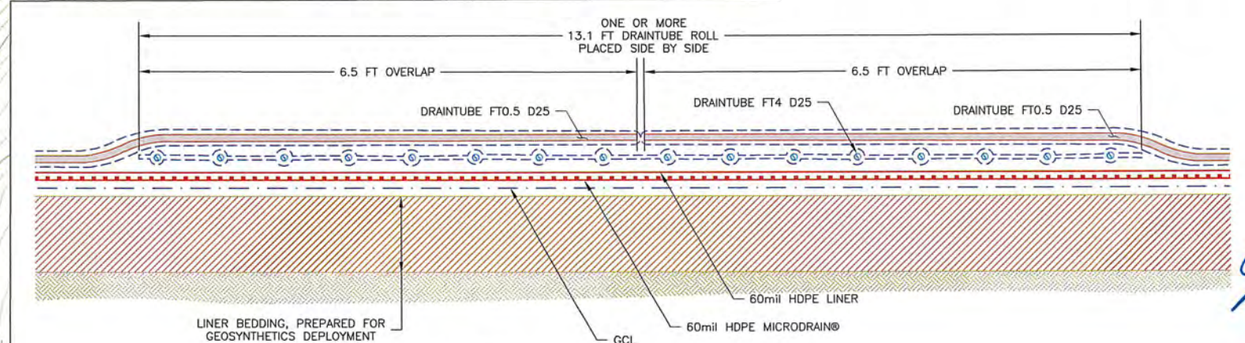
1. UNDERDRAINS NOT SHOWN FOR CLARITY, SEE DRAWING 18.
2. APPARENT DRAINTUBE LINE SPACING AND TRANSFER CORRIDOR WIDTHS ARE EXAGGERATED FOR ILLUSTRATION PURPOSES ONLY. NORTH AND SOUTH TRANSFER CORRIDORS WILL BE 4 ROLL WIDTHS WIDE. THE CENTRAL TRANSFER CORRIDOR WILL BE 7 ROLL WIDTHS WIDE. STANDARD DRAINTUBE ROLL WIDTHS ARE 13.0 FT.

N

SCALE (FT)
0 200 400
CONTOUR INTERVAL 20 FT



AE 27 27 OVERDRAIN BALLAST SECTION
NOT TO SCALE



AD 27 27 OVERDRAIN DRAINTUBE SECTION
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

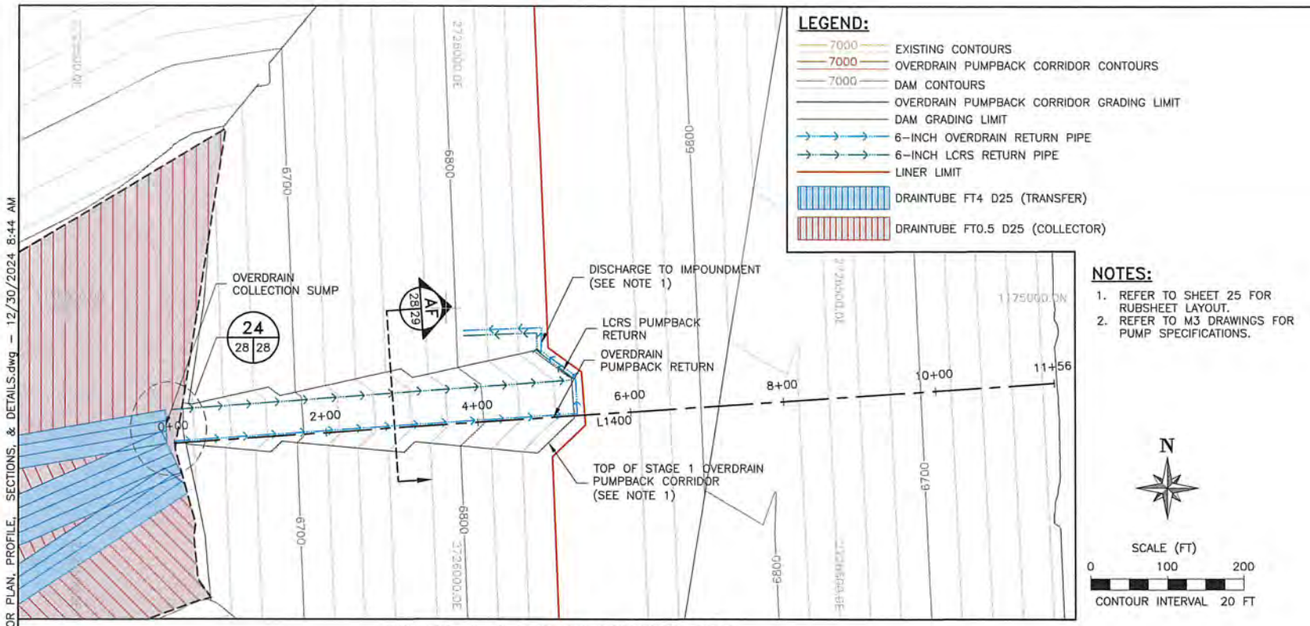
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: OVERDRAIN PLAN

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 27
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 27 OF 34

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LEGEND:

- EXISTING CONTOURS
- OVERDRAIN PUMPBACK CORRIDOR CONTOURS
- DAM CONTOURS
- OVERDRAIN PUMPBACK CORRIDOR GRADING LIMIT
- DAM GRADING LIMIT
- 6-INCH OVERDRAIN RETURN PIPE
- 6-INCH LCRS RETURN PIPE
- LINER LIMIT
- DRAINTUBE FT4 D25 (TRANSFER)
- DRAINTUBE FT0.5 D25 (COLLECTOR)

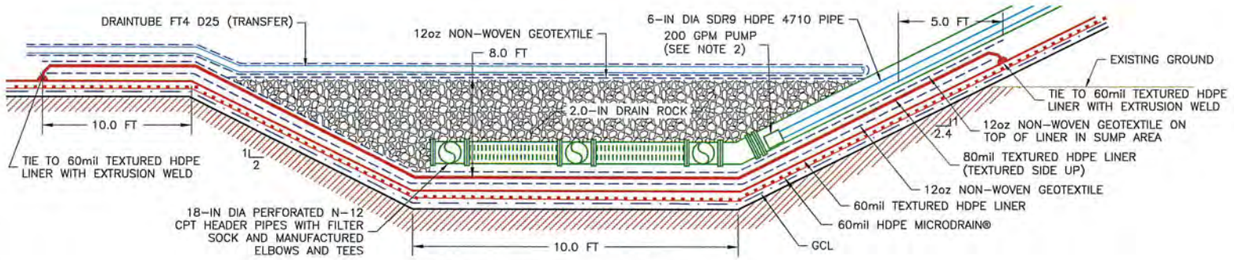
NOTES:

1. REFER TO SHEET 25 FOR RUBSHEET LAYOUT.
2. REFER TO M3 DRAWINGS FOR PUMP SPECIFICATIONS.

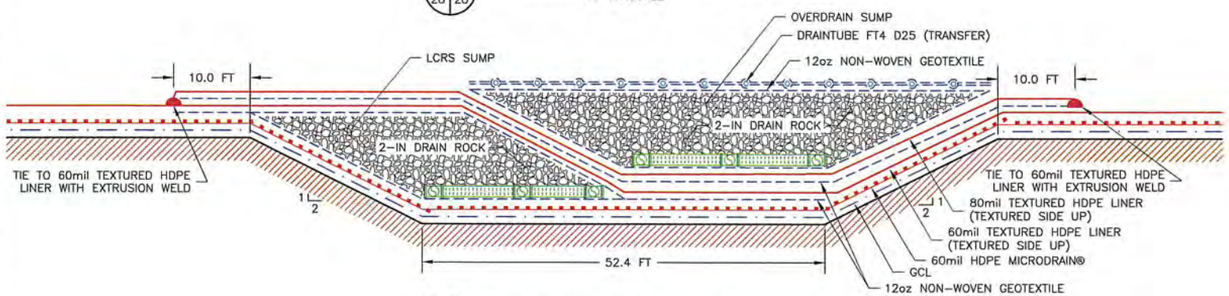
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SCALE (FT)
0 100 200
CONTOUR INTERVAL 20 FT

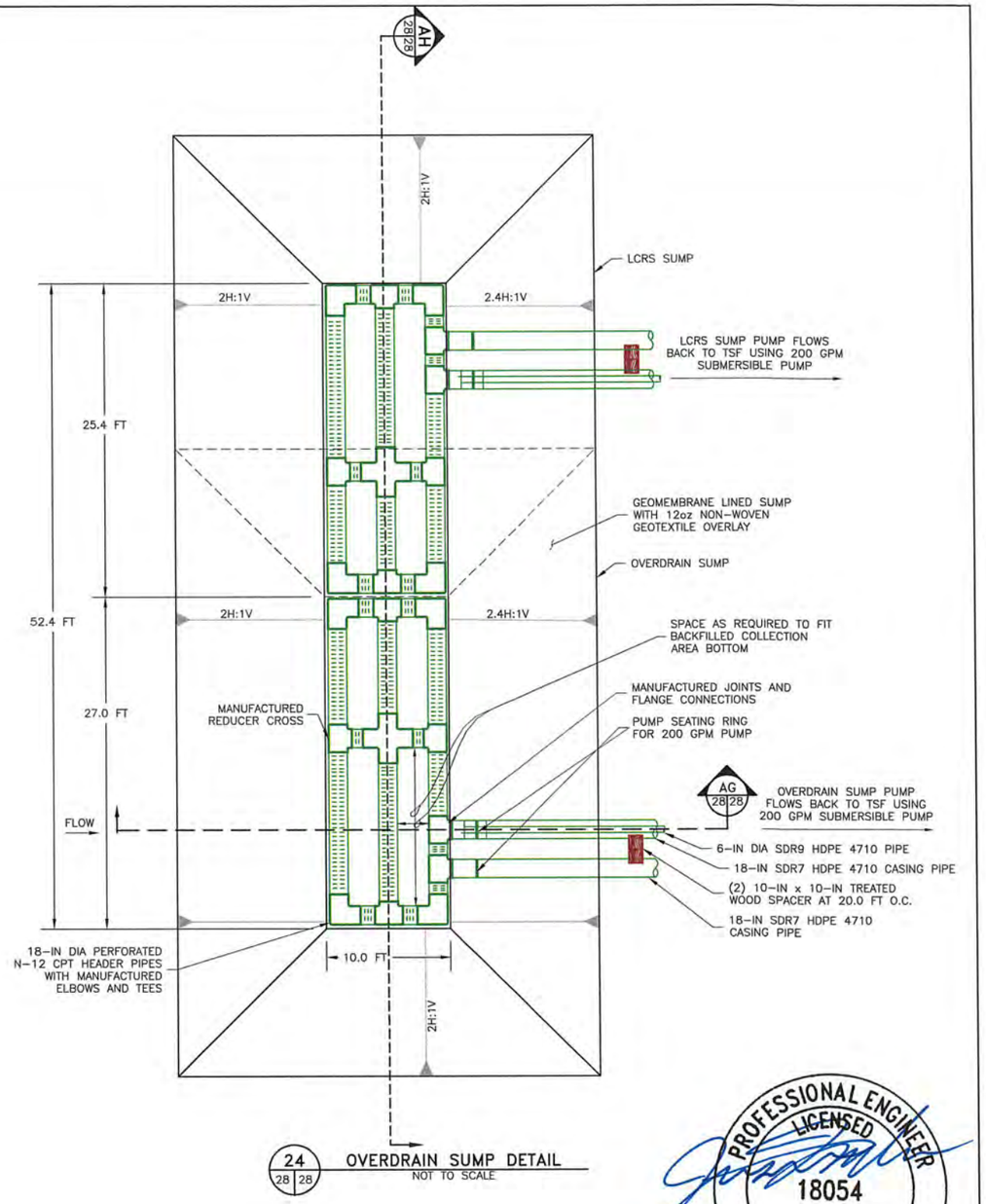
OVERDRAIN PUMPBACK CORRIDOR PLAN
PROFILE ON DRAWING 29



AG 28 28 OVERDRAIN SUMP SECTION
NOT TO SCALE



AH 28 28 OVERDRAIN SUMP SECTION
NOT TO SCALE



24 28 28 OVERDRAIN SUMP DETAIL
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	DESIGNED BY:	JWK
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		DRAWN BY:	TG
		CHECKED BY:	JWK
		APPROVED BY:	JWK

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

PREPARED FOR: Perpetua Resources

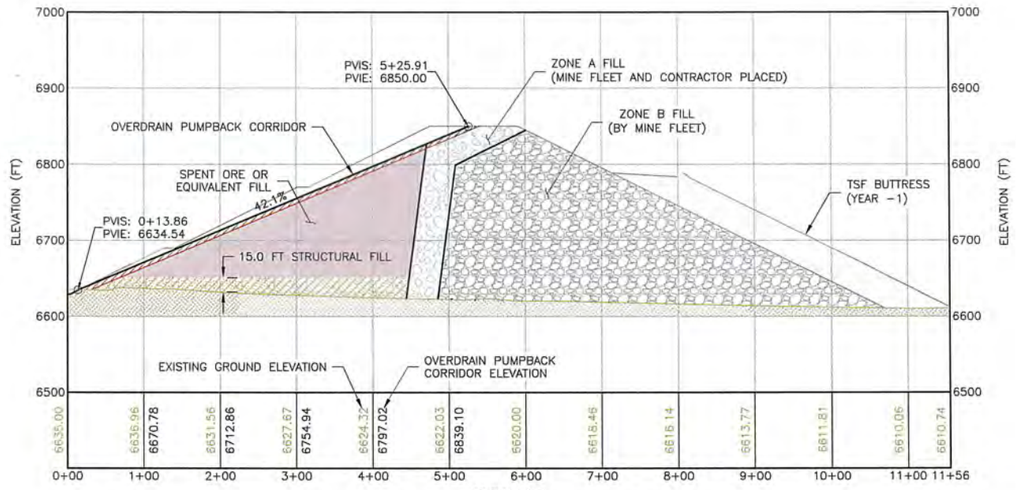
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: OVERDRAIN CORRIDOR PLAN, SECTIONS, & DETAIL

2 REVISION

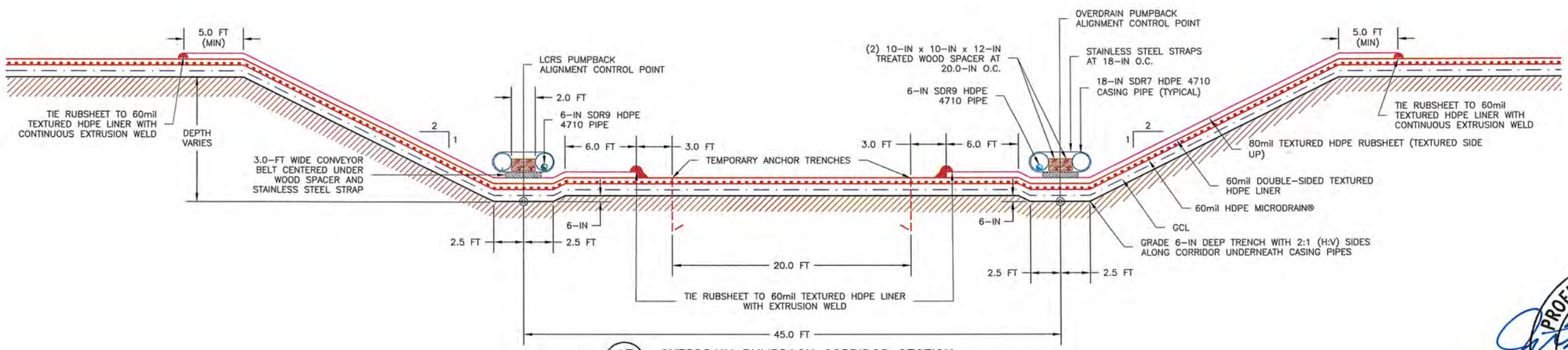
PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	28
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 28 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\28-29 OVERDRAIN CORRIDOR PLAN, PROFILE, SECTIONS, & DETAILS.dwg - 12/30/2024 8:44 AM



OVERDRAIN PUMPBACK CORRIDOR PROFILE

SCALE: AS SHOWN
REFER TO PLAN VIEW ON DRAWING 28

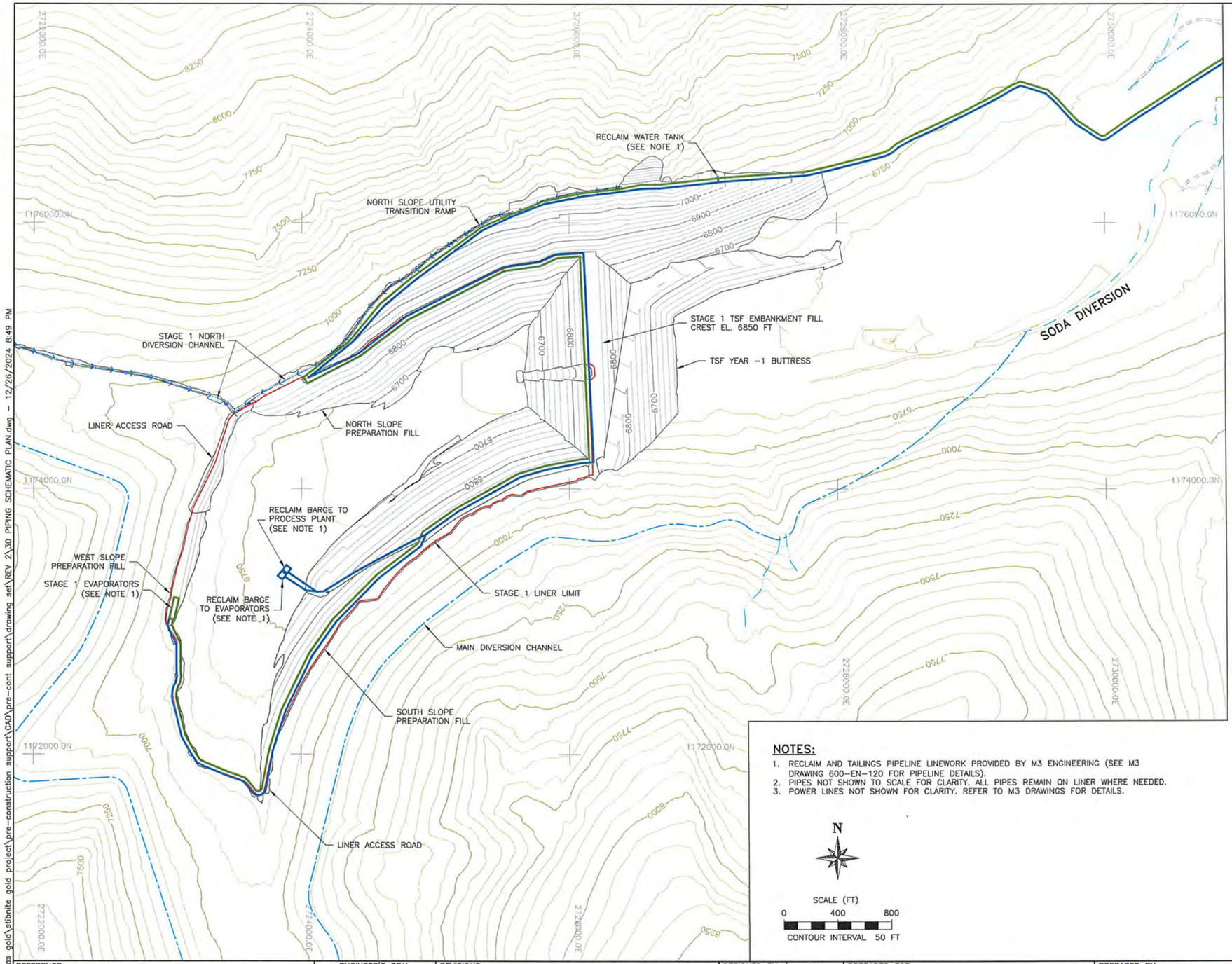


AF 28|29 OVERDRAIN PUMPBACK CORRIDOR SECTION
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/21/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL	REVISIONS:				DESIGNED BY: JWK	PREPARED FOR: Perpetua Resources
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT		REV	DESCRIPTION	BY	DATE	DRAWN BY: TG	PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.
		0	ISSUED FOR CONSTRUCTION	JWK	07/2023	CHECKED BY: JWK	TITLE: OVERDRAIN CORRIDOR PROFILE & SECTION
		1	ISSUED FOR CONSTRUCTION	JWK	05/2024	APPROVED BY: JWK	2 REVISION
		2	ISSUED FOR CONSTRUCTION	JWK	12/2024		PROJECT: STIBNITE GOLD PROJECT TSF; PROJECT #: 825; DRAWING #: 29
							LOCATION: VALLEY COUNTY, IDAHO; DATE: DECEMBER 2024; SHEET: 29 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\28-29 OVERDRAIN CORRIDOR PLAN, PROFILE, SECTIONS, & DETAILS.dwg - 12/30/2024 8:44 AM



LEGEND:

- 7000 EXISTING CONTOURS
- 7000 DAM/SLOPE PREPARATION/BUTTRESS CONTOURS
- DAM/SLOPE PREPARATION/BUTTRESS GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- IMPOUNDMENT/BUTTRESS UNDERDRAIN
- STAGE 1 LINER LIMIT
- STAGE 1 TAILINGS PIPELINE (SEE NOTE 1)
- STAGE 1 RECLAIM PIPELINE (SEE NOTE 1)

NOTES:

1. RECLAIM AND TAILINGS PIPELINE LINEWORK PROVIDED BY M3 ENGINEERING (SEE M3 DRAWING 600-EN-120 FOR PIPELINE DETAILS).
2. PIPES NOT SHOWN TO SCALE FOR CLARITY. ALL PIPES REMAIN ON LINER WHERE NEEDED.
3. POWER LINES NOT SHOWN FOR CLARITY. REFER TO M3 DRAWINGS FOR DETAILS.

N

SCALE (FT)
0 400 800
CONTOUR INTERVAL 50 FT

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN
12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

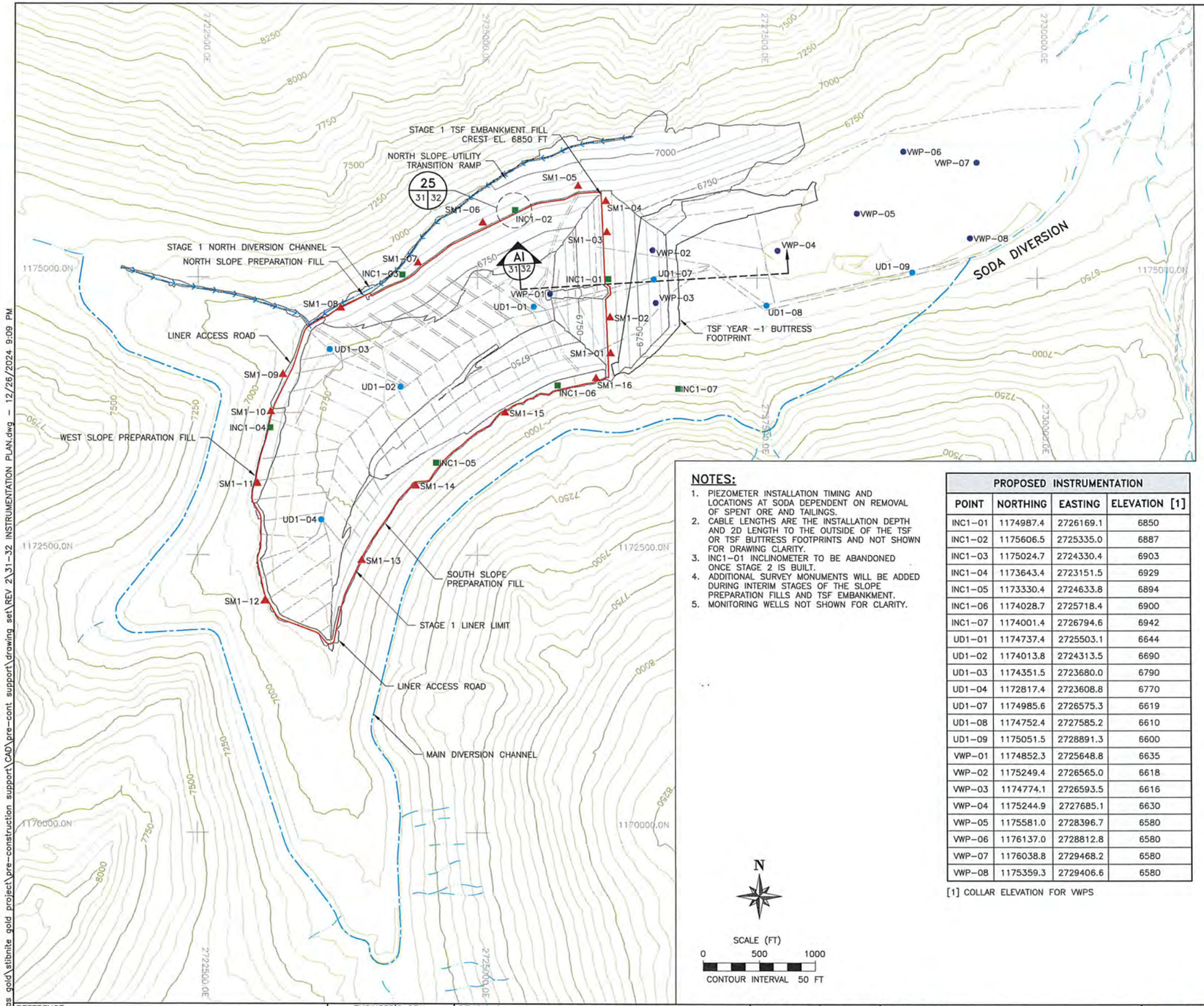
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: PIPING SCHEMATIC PLAN

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 30
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 30 OF 34

Shanna Brown - Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\30 PIPING SCHEMATIC PLAN.dwg - 12/26/2024 8:49 PM



LEGEND:

- 7000 — EXISTING CONTOURS
- 7000 — DAM/SLOPE PREPARATION CONTOURS
- TSF BUTTRESS GRADING LIMIT
- DAM/SLOPE PREPARATION GRADING LIMIT
- EXISTING ROADS
- EXISTING DRAINAGE
- MAIN DIVERSION CHANNEL
- NORTH DIVERSION CHANNEL
- IMPOUNDMENT/BUTTRESS UNDERDRAIN
- STAGE 1 LINER LIMIT
- VWP-XX ● FOUNDATION PIEZOMETER
- UD1-XX ● STAGE 1 UNDERDRAIN PIEZOMETER
- INC1-XX ■ STAGE 1 INCLINOMETER
- SM1-XX ▲ STAGE 1 SURVEY MONUMENT

NOTES:

1. PIEZOMETER INSTALLATION TIMING AND LOCATIONS AT SODA DEPENDENT ON REMOVAL OF SPENT ORE AND TAILINGS.
2. CABLE LENGTHS ARE THE INSTALLATION DEPTH AND 2D LENGTH TO THE OUTSIDE OF THE TSF OR TSF BUTTRESS FOOTPRINTS AND NOT SHOWN FOR DRAWING CLARITY.
3. INC1-01 INCLINOMETER TO BE ABANDONED ONCE STAGE 2 IS BUILT.
4. ADDITIONAL SURVEY MONUMENTS WILL BE ADDED DURING INTERIM STAGES OF THE SLOPE PREPARATION FILLS AND TSF EMBANKMENT.
5. MONITORING WELLS NOT SHOWN FOR CLARITY.

N

SCALE (FT)
0 500 1000
CONTOUR INTERVAL 50 FT

PROPOSED INSTRUMENTATION			
POINT	NORTHING	EASTING	ELEVATION [1]
INC1-01	1174987.4	2726169.1	6850
INC1-02	1175606.5	2725335.0	6887
INC1-03	1175024.7	2724330.4	6903
INC1-04	1173643.4	2723151.5	6929
INC1-05	1173330.4	2724633.8	6894
INC1-06	1174028.7	2725718.4	6900
INC1-07	1174001.4	2726794.6	6942
UD1-01	1174737.4	2725503.1	6644
UD1-02	1174013.8	2724313.5	6690
UD1-03	1174351.5	2723680.0	6790
UD1-04	1172817.4	2723608.8	6770
UD1-07	1174985.6	2726575.3	6619
UD1-08	1174752.4	2727585.2	6610
UD1-09	1175051.5	2728891.3	6600
VWP-01	1174852.3	2725648.8	6635
VWP-02	1175249.4	2726565.0	6618
VWP-03	1174774.1	2726593.5	6616
VWP-04	1175244.9	2727685.1	6630
VWP-05	1175581.0	2728396.7	6580
VWP-06	1176137.0	2728812.8	6580
VWP-07	1176038.8	2729468.2	6580
VWP-08	1175359.3	2729406.6	6580

[1] COLLAR ELEVATION FOR VWPS

PIEZOMETER CABLE LENGTH	
INSTRUMENT	CABLE LENGTH (FT)
UD1-01	1400
UD1-02	1200
UD1-03	1850
UD1-04	1950
UD1-05	1050
UD1-06	1600
UD1-07	4100
UD1-08	2600
UD1-09	1300
INC1-01A	5235
INC1-01B	5260
INC1-01C	5285
VWP-01A	3850
VWP-01B	3850
VWP-01C	3900
VWP-02A	4200
VWP-02B	4300
VWP-02C	4350
VWP-03A	4000
VWP-03B	4150
VWP-03C	3050
VWP-04A	3100
VWP-04B	3100
VWP-04C	2250
VWP-05A	2200
VWP-05B	2200
VWP-05C	2250
VWP-06A	1850
VWP-06B	1850
VWP-06C	1900
VWP-07A	1250
VWP-07B	1300
VWP-07C	1300
VWP-08A	1050
VWP-08B	1100
VWP-08C	1100

NESTED PIEZOMETER ELEVATION	
PIEZOMETER	INSTALLATION DEPTH (FT)
INC1-01A	235
INC1-01B	260
INC1-01C	285
VWP-01A	25
VWP-01B	50
VWP-01C	75
VWP-02A	80
VWP-02B	155
VWP-02C	235
VWP-03A	80
VWP-03B	155
VWP-03C	235
VWP-04A	30
VWP-04B	55
VWP-04C	85
VWP-05A	5
VWP-05B	5
VWP-05C	30
VWP-06A	25
VWP-06B	45
VWP-06C	70
VWP-07A	35
VWP-07B	65
VWP-07C	90
VWP-08A	35
VWP-08B	65
VWP-08C	80

PIEZOMETERS TO BE PLACED IN SAME BOREHOLE AS INCLINOMETER CASING IN SOME CASES.

PROPOSED SURVEY MONUMENTS			
POINT	NORTHING	EASTING	ELEVATION
SM1-01	1174315.3	2726188.5	6850
SM1-02	1174638.6	2726184.0	6850
SM1-03	1175406.4	2726156.5	6850
SM1-04	1175686.1	2726147.8	6850
SM1-05	1175820.1	2725901.3	6894
SM1-06	1175489.1	2725047.7	6895
SM1-07	1175127.6	2724470.0	6896
SM1-08	1174720.5	2723778.6	6899
SM1-09	1174121.3	2723261.5	6933
SM1-10	1173786.1	2723154.5	6936
SM1-11	1173139.0	2723034.8	6926
SM1-12	1172079.7	2723102.5	6916
SM1-13	1172448.2	2723968.5	6903
SM1-14	1173120.3	2724451.2	6905
SM1-15	1173778.5	2725247.5	6903
SM1-16	1174091.2	2726060.2	6904

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:			
REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

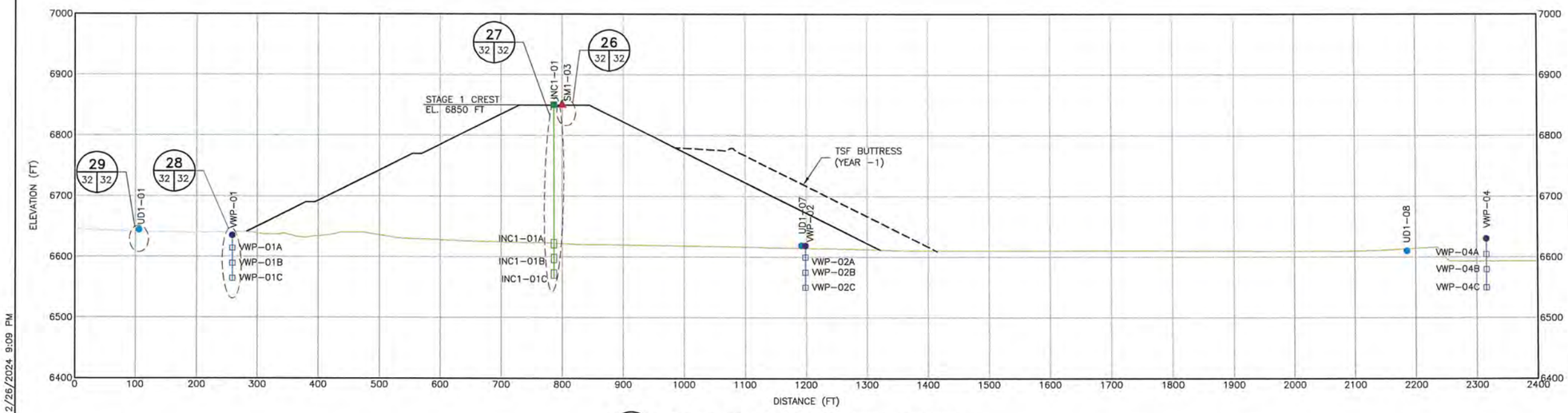
PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: INSTRUMENTATION PLAN

2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	31
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 31 OF 34

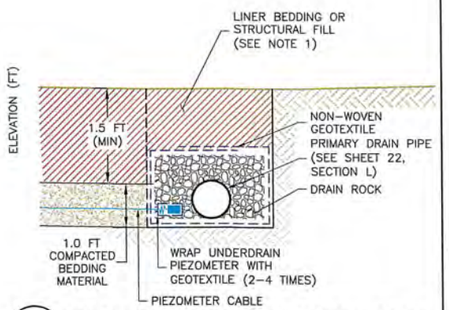
Shonna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\31-32 INSTRUMENTATION PLAN.dwg - 12/26/2024 9:09 PM



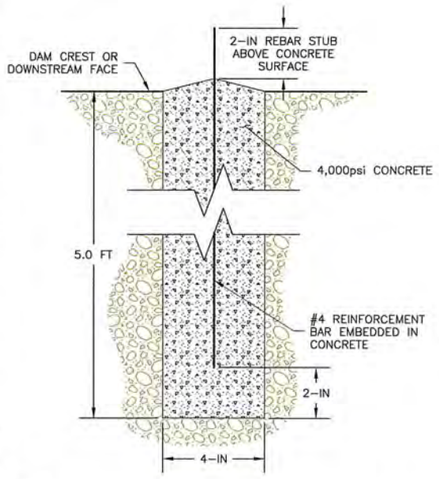
AI 31 | 32 **EMBANKMENT INSTRUMENTATION SECTION**
NOT TO SCALE

NOTE:

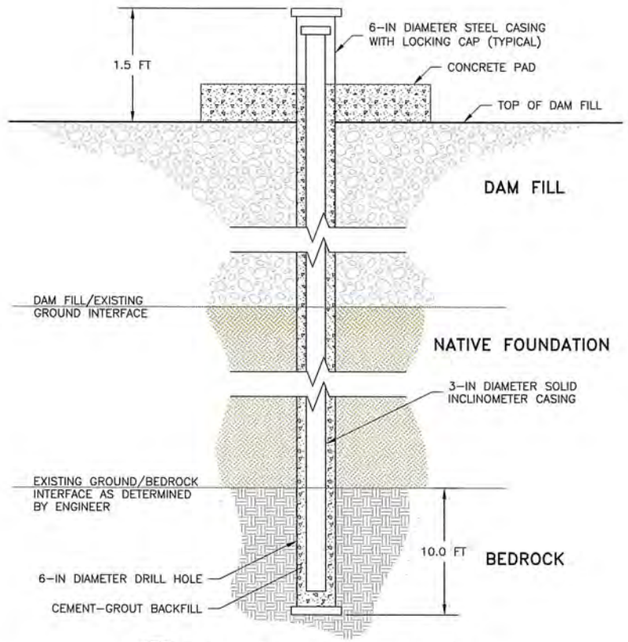
1. LINER BEDDING TO BE USED IN THE IMPOUNDMENT AND STRUCTURAL FILL IN THE TSF EMBANKMENT AND TSF BUTTRESS FOOTPRINTS.



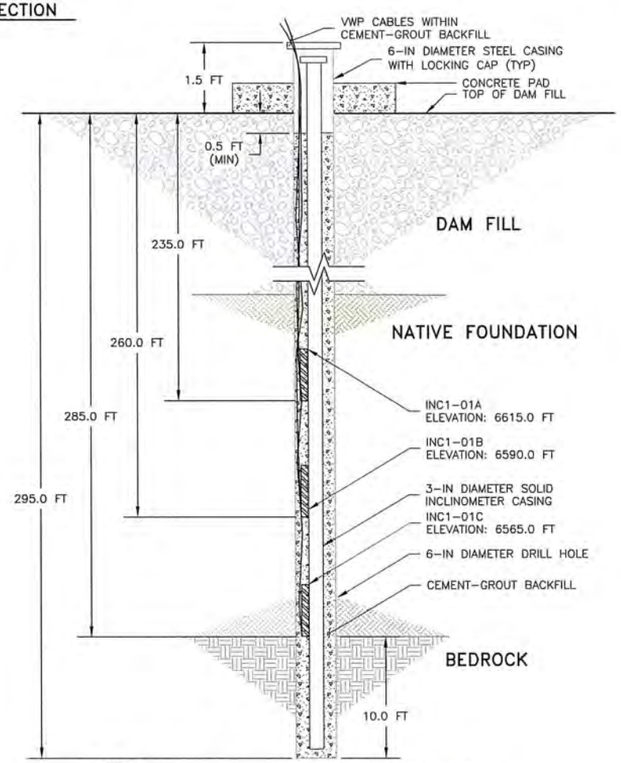
29 32 | 32 **UNDERDRAIN PIEZOMETER TYPICAL DETAIL**
NOT TO SCALE



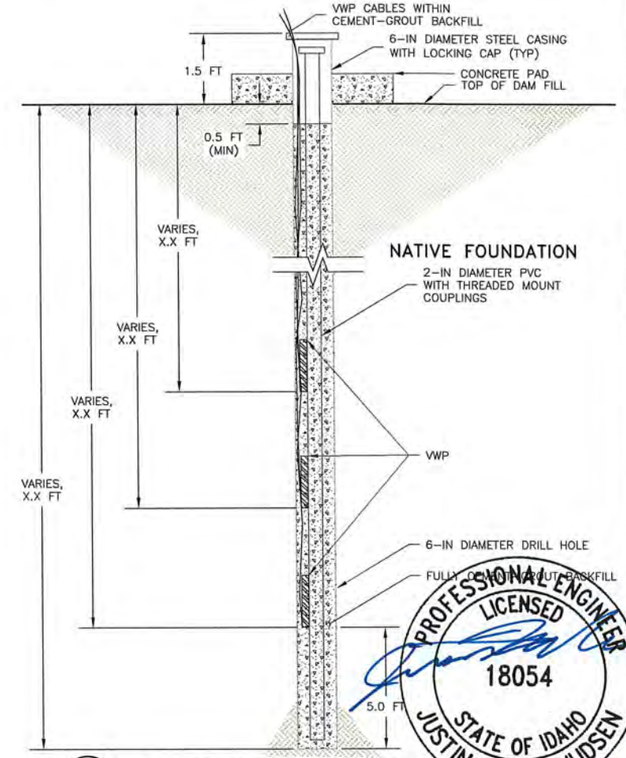
26 32 | 32 **SURVEY MONUMENT TYPICAL DETAIL**
NOT TO SCALE



25 31 | 32 **INCLINOMETER TYPICAL DETAIL**
NOT TO SCALE



27 32 | 32 **INC1–01 WITH NESTED VWPS DETAIL**
NOT TO SCALE



28 32 | 32 **FOUNDATION PIEZOMETER TYPICAL DETAIL**
NOT TO SCALE

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN 12/31/24

REFERENCE: SEE SHEET 02 FOR ALL REFERENCES.	ENGINEER'S SEAL
DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT	

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: INSTRUMENTATION SECTION

2 REVISION

PROJECT: STIBNITE GOLD PROJECT TSF	PROJECT #: 825	DRAWING #: 32
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 32 OF 34

Shonna Brown – Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\31-32 INSTRUMENTATION PLAN.dwg – 12/26/2024 9:09 PM

MAIN DIVERSION CHANNEL ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L100	198.47	S09°10'35"W	(1175177.55, 2721472.71)	(1174981.61, 2721441.06)
L101	0.03	S18°54'32"E	(1174816.73, 2721455.10)	(1174816.70, 2721455.11)
L102	3.04	S74°03'12"E	(1174742.47, 2721491.08)	(1174741.64, 2721494.00)
L103	0.83	S32°39'43"E	(1174743.17, 2721490.63)	(1174742.47, 2721491.08)
L104	2.61	S33°37'25"E	(1174741.64, 2721494.00)	(1174739.47, 2721495.44)
L105	205.48	S46°56'40"E	(1174679.48, 2721546.29)	(1174539.20, 2721696.43)
L106	70.92	S32°14'45"E	(1174468.43, 2721754.97)	(1174408.45, 2721792.81)
L107	2.55	S61°21'39"E	(1174340.31, 2721865.37)	(1174339.09, 2721867.60)
L108	2.72	S15°29'56"E	(1174339.09, 2721867.60)	(1174336.48, 2721868.33)
L109	1.82	S63°08'14"E	(1174336.48, 2721868.33)	(1174335.66, 2721869.95)
L110	771.57	S69°30'40"E	(1174326.64, 2721890.52)	(1174056.57, 2722613.28)
L111	544.72	S13°15'10"W	(1173886.33, 2722704.29)	(1173356.12, 2722579.41)
L112	190.25	S24°19'40"W	(1173034.18, 2722469.87)	(1172860.82, 2722391.50)
L113	254.28	S39°19'36"W	(1172695.82, 2722289.08)	(1172499.12, 2722127.94)
L114	392.73	S38°09'23"W	(1172477.35, 2722110.47)	(1172168.53, 2721867.83)
L115	4.59	S38°09'21"W	(1172168.53, 2721867.83)	(1172164.93, 2721865.00)
L116	84.27	S38°09'21"W	(1172164.93, 2721865.00)	(1172098.66, 2721812.94)
L117	0.49	S66°41'35"E	(1171807.55, 2721886.97)	(1171807.36, 2721887.42)
L118	1.77	S74°25'23"E	(1171807.36, 2721887.42)	(1171806.88, 2721889.12)
L119	2.92	S68°01'54"E	(1171806.88, 2721889.12)	(1171805.79, 2721891.83)
L120	588.28	N86°40'24"E	(1171792.39, 2721973.50)	(1171826.52, 2722560.78)
L121	1904.93	S17°50'10"E	(1171729.99, 2722701.67)	(1169916.61, 2723285.14)
L122	229.61	S39°56'14"E	(1169742.41, 2723381.26)	(1169566.36, 2723528.65)
L123	205.24	S36°46'15"E	(1169547.81, 2723543.33)	(1169383.41, 2723666.19)
L124	106.09	S33°04'06"E	(1169369.26, 2723676.06)	(1169280.35, 2723733.95)
L125	17.68	S23°23'52"E	(1169267.28, 2723740.97)	(1169251.06, 2723747.99)
L126	50.06	S20°55'12"E	(1169251.06, 2723747.99)	(1169204.29, 2723765.86)
L127	27.71	S23°46'56"E	(1169204.29, 2723765.86)	(1169178.94, 2723777.04)
L128	55.47	S74°39'33"E	(1169044.83, 2723932.51)	(1169030.16, 2723986.00)
L129	20.90	S03°14'11"E	(1168960.25, 2724042.51)	(1168939.38, 2724043.69)
L130	2.49	S52°00'42"E	(1168844.26, 2724093.47)	(1168842.73, 2724095.43)
L131	10.11	S43°54'03"E	(1168842.73, 2724095.43)	(1168835.44, 2724102.44)
L132	0.85	S57°48'56"E	(1168835.44, 2724102.44)	(1168834.99, 2724103.16)
L133	2.55	N23°44'05"E	(1168893.58, 2724294.31)	(1168895.91, 2724295.33)
L134	1.80	N37°39'06"E	(1168895.91, 2724295.33)	(1168897.33, 2724296.43)
L135	2.30	N20°57'23"E	(1168897.33, 2724296.43)	(1168899.48, 2724297.25)
L136	112.02	N05°48'26"E	(1168933.34, 2724305.31)	(1169044.78, 2724316.64)
L137	543.02	N02°41'39"W	(1169134.14, 2724319.07)	(1169676.55, 2724293.55)
L138	328.41	N03°38'22"E	(1169813.77, 2724294.68)	(1170141.52, 2724315.52)
L139	247.23	N07°02'16"W	(1170193.60, 2724313.98)	(1170438.97, 2724283.69)
L140	33.72	N34°48'31"W	(1170638.47, 2724207.41)	(1170666.16, 2724188.16)
L141	3.21	S75°58'40"W	(1170666.16, 2724188.16)	(1170665.38, 2724185.05)
L142	140.08	N34°48'31"W	(1170665.38, 2724185.05)	(1170780.39, 2724105.09)
L143	1061.74	N13°29'24"E	(1171007.15, 2724062.41)	(1172039.59, 2724310.09)
L144	135.50	N21°02'44"E	(1172239.04, 2724372.09)	(1172365.50, 2724420.75)

MAIN DIVERSION CHANNEL ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L145	158.71	N32°49'02"E	(1172479.97, 2724478.90)	(1172613.35, 2724564.91)
L146	255.28	N44°36'21"E	(1172739.15, 2724665.74)	(1172920.90, 2724845.00)
L147	382.77	N52°21'48"E	(1173038.28, 2724977.61)	(1173272.02, 2725280.73)
L148	279.95	N57°39'26"E	(1173443.57, 2725525.81)	(1173593.34, 2725762.33)
L149	231.45	S83°52'45"E	(1173633.84, 2725936.21)	(1173609.16, 2726166.34)
L150	155.82	N70°00'46"E	(1173642.59, 2726441.23)	(1173695.85, 2726587.66)
L151	18.94	N81°21'02"E	(1173727.95, 2726713.43)	(1173730.80, 2726732.15)
L152	80.35	S82°03'13"E	(1173731.51, 2726849.05)	(1173720.41, 2726928.63)
L153	30.06	N67°39'12"E	(1173740.05, 2727084.17)	(1173751.48, 2727111.97)
L154	25.90	S52°04'08"E	(1173723.85, 2727313.94)	(1173707.92, 2727334.37)
L155	133.73	S68°43'38"E	(1173673.43, 2727395.08)	(1173624.92, 2727519.69)
L156	16.67	N65°59'01"E	(1173626.61, 2727590.51)	(1173633.40, 2727605.74)
L157	65.19	N15°13'15"E	(1173716.71, 2727677.15)	(1173779.62, 2727694.27)
L158	92.61	N65°16'40"E	(1173896.51, 2727793.22)	(1173935.24, 2727877.34)
L159	4.15	N65°17'09"E	(1173935.24, 2727877.34)	(1173936.98, 2727881.11)
L160	177.73	N65°17'09"E	(1173936.98, 2727881.11)	(1174011.29, 2728042.57)
L161	206.07	N60°22'28"E	(1174039.93, 2728098.37)	(1174141.80, 2728277.51)
L162	4.26	N60°22'28"E	(1174141.80, 2728277.51)	(1174143.90, 2728281.21)
L163	27.66	N60°22'28"E	(1174143.90, 2728281.21)	(1174157.57, 2728305.25)
L164	192.50	N52°54'45"E	(1174291.89, 2728509.30)	(1174407.98, 2728662.86)
L165	98.02	N44°46'47"E	(1174430.84, 2728689.02)	(1174500.42, 2728758.06)
L166	5.18	N44°46'47"E	(1174500.42, 2728758.06)	(1174504.10, 2728761.71)
L167	73.08	N44°46'47"E	(1174504.10, 2728761.71)	(1174555.97, 2728813.18)
L168	220.29	N51°23'42"E	(1174575.62, 2728835.08)	(1174713.08, 2729007.23)
L169	42.43	N45°54'29"E	(1174735.91, 2729033.17)	(1174765.43, 2729063.65)
L170	11.34	N45°54'29"E	(1174765.43, 2729063.65)	(1174773.32, 2729071.79)
L171	189.21	N45°54'29"E	(1174773.32, 2729071.79)	(1174904.97, 2729207.68)
L172	140.06	N37°41'41"E	(1174909.24, 2729211.50)	(1175020.06, 2729297.14)
L173	5.03	N37°41'41"E	(1175020.06, 2729297.14)	(1175024.04, 2729300.21)
L174	123.09	N37°39'40"E	(1175024.04, 2729300.21)	(1175121.49, 2729375.42)
L175	67.72	N31°23'53"E	(1175125.54, 2729378.21)	(1175183.34, 2729413.49)

OVERDRAIN CORRIDOR ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L1400	1155.72	N86°01'49"E	(1174822.15, 2725643.51)	(1174902.16, 2726796.46)

MAIN DIVERSION CHANNEL ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C100	341.00	167.15	028°05'07"	1174981.61, 2721441.06	1174816.73, 2721455.10
C101	341.00	81.85	013°45'11"	1174816.70, 2721455.11	1174743.17, 2721490.63
C102	339.00	78.82	013°19'15"	1174739.47, 2721495.44	1174679.48, 2721546.29
C103	359.00	92.10	014°41'55"	1174539.20, 2721696.43	1174468.43, 2721754.97
C104	198.00	100.61	029°06'54"	1174408.45, 2721792.81	1174340.31, 2721865.37
C105	202.00	22.47	006°22'26"	1174335.66, 2721869.95	1174326.64, 2721890.52
C106	146.00	210.90	082°45'49"	1174056.57, 2722613.28	1173886.33, 2722704.29
C107	1762.00	340.59	011°04'31"	1173356.12, 2722579.41	1173034.18, 2722469.87
C108	744.00	194.76	014°59'56"	1172860.82, 2722391.50	1172695.82, 2722289.08
C109	1367.00	27.92	001°10'13"	1172499.12, 2722127.94	1172477.35, 2722110.47
C110	189.50	346.78	104°50'56"	1172098.66, 2721812.94	1171807.55, 2721886.97
C111	189.00	83.44	025°17'41"	1171805.79, 2721891.83	1171792.39, 2721973.50
C112	139.50	183.80	075°29'26"	1171826.52, 2722560.78	1171729.99, 2722701.67
C113	519.00	200.20	022°06'04"	1169916.61, 2723285.14	1169742.41, 2723381.26
C114	428.00	23.65	003°09'59"	1169566.36, 2723528.65	1169547.81, 2723543.33
C115	267.00	17.25	003°42'10"	1169383.41, 2723666.19	1169369.26, 2723676.06
C116	88.00	14.85	009°40'14"	1169280.35, 2723733.95	1169267.28, 2723740.97
C117	239.00	212.22	050°52'36"	1169178.94, 2723777.04	1169044.83, 2723932.51
C118	77.00	95.98	071°25'21"	1169030.16, 2723986.00	1168960.25, 2724042.51
C119	130.00	110.67	048°46'30"	1168939.38, 2724043.69	1168844.26, 2724093.47
C120	132.00	226.81	098°27'00"	1168834.99, 2724103.16	1168893.58, 2724294.31
C121	132.00	34.90	015°08'58"	1168899.48, 2724297.25	1168933.34, 2724305.31
C122	603.00	89.47	008°30'04"	1169044.78, 2724316.64	1169134.14, 2724319.07
C123	1242.00	137.29	006°20'01"	1169676.55, 2724293.55	1169813.77, 2724294.68
C124	280.00	52.18	010°40'38"	1170141.52, 2724315.52	1170193.60, 2724313.98
C125	445.00	215.69	027°46'15"	1170438.97, 2724283.69	1170638.47, 2724207.41
C126	282.00	237.72	048°17'55"	1170780.39, 2724105.09	1171007.15, 2724062.41
C127	1585.00	209.01	007°33'20"	1172039.59, 2724310.09	1172239.04, 2724372.09
C128	626.00	128.61	011°46'18"	1172365.50, 2724420.75	1172479.97, 2724478.90
C129	785.00	161.51	011°47'19"	1172613.35, 2724564.91	1172739.15, 2724665.74
C130	1309.00	177.23	007°45'27"	1172920.90, 2724845.00	1173038.28, 2724977.61
C131	3239.00	299.27	005°17'38"	1173272.02, 2725280.73	1173443.57, 2725525.81
C132	271.00	181.93	038°27'49"	1173593.34, 2725762.33	1173633.84, 2725936.21
C133	613.00	279.33	026°06'29"	1173609.16, 2726166.34	1173642.59, 2726441.23
C134	657.00	130.01	011°20'16"	1173695.85, 2726587.66	1173727.95, 2726713.43
C135	405.00	117.31	016°35'45"	1173730.80, 2726732.15	1173731.51, 2726849.05
C136	300.00	158.61	030°17'35"	1173720.41, 2726928.63	1173740.05, 2727084.17
C137	203.00	213.57	060°16'40"	1173751.48, 2727111.97	1173723.85, 2727313.94
C138	241.00	70.07	016°39'29"	1173707.92, 2727334.37	1173673.43, 2727395.08
C139	92.00	72.72	045°17'22"	1173624.92, 2727519.69	1173626.61, 2727590.51
C140	128.00	113.40	050°45'46"	1173633.40, 2727605.74	1173716.71, 2727677.15
C141	181.00	158.13	050°03'24"	1173779.62, 2727694.27	1173896.51, 2727793.22
C142	732.00	62.75	004°54'41"	1174011.29, 2728042.57	1174039.93, 2728098.37
C143	1877.00	244.46	007°27'43"	1174157.57, 2728305.25	1174291.89, 2728509.30
C144	245.00	34.78	008°07'58"	1174407.98, 2728662.86	1174430.84, 2728689.02
C145	255.00	29.44	006°36'55"	1174555.97, 2728813.18	1174575.62, 2728835.08
C146	361.00	34.57	005°29'13"	1174713.08, 2729007.23	1174735.91, 2729033.17
C147	40.00	5.73	008°12'48"	1174904.97, 2729207.68	1174909.24, 2729211.50
C148	45.00	4.92	006°15'48"	1175121.49, 2729375.42	1175125.54, 2729378.21

STAGE 1 NORTH DIVERSION CHANNEL R1 TO IMPOUNDMENT ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L200	73.00	N33°50'00"W	(1174539.51, 2723513.95)	(1174600.15, 2723473.30)
L201	460.22	N72°23'46"W	(1174681.02, 2723365.54)	(1174820.20, 2722926.87)
L202	511.84	N80°07'31"W	(1174853.91, 2722788.99)	(1174941.69, 2722284.74)
L203	418.83	N71°43'46"W	(1174959.95, 2722211.88)	(1175091.26, 2721814.17)

STAGE 1 NORTH DIVERSION CHANNEL R1 TO IMPOUNDMENT ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C200	204.00	137.30	038°33'46"	1174600.15, 2723473.30	1174681.02, 2723365.54
C201	1053.00	142.05	007°43'45"	1174820.20, 2722926.87	1174853.91, 2722788.99
C202	513.00	75.17	008°23'45"	1174941.69, 2722284.74	1174959.95, 2722211.88

STAGE 1 NORTH DIVERSION CHANNEL R5 TO IMPOUNDMENT ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L300	60.62	N54°58'02"E	(1174569.44, 2723493.89)	(1174604.23, 2723543.52)
L301	156.50	N54°40'42"E	(1174606.69, 2723547.00)	(1174697.17, 2723674.69)
L302	220.55	N61°53'24"E	(1174727.39, 2723723.59)	(1174831.30, 2723918.13)
L303	2.81	N63°48'45"E	(1174934.05, 2724118.49)	(1174935.29, 2724121.01)
L304	47.03	N53°24'14"E	(1174944.74, 2724136.50)	(1174972.78, 2724174.26)
L305	163.78	N35°00'30"E	(1175192.32, 2724387.80)	(1175326.47, 2724481.76)
L306	162.79	N44°25'22"E	(1175397.30, 2724540.59)	(1175513.56, 2724654.54)
L307	36.71	N61°34'44"E	(1175531.52, 2724678.37)	(1175548.99, 2724710.65)
L308	55.24	N47°56'58"E	(1175686.45, 2724905.26)	(1175723.45, 2724946.28)
L309	187.20	N56°02'44"E	(1175757.18, 2724989.44)	(1175861.73, 2725144.72)
L310	193.50	N58°25'10"E	(1175929.63, 2725250.21)	(1176030.97, 2725415.05)
L311	90.17	N80°53'28"E	(1176057.12, 2725485.57)	(1176071.39, 2725574.60)
L312	58.84	N61°31'52"E	(1176121.32, 2725721.37)	(1176149.37, 2725773.10)
L313	95.09	N76°15'55"E	(1176182.24, 2725858.27)	(1176204.82, 2725950.65)
L314	111.64	N82°58'20"E	(1176216.75, 2726015.78)	(1176230.41, 2726126.58)
L315	53.36	N80°02'47"E	(1176262.16, 2726339.24)	(1176271.38, 2726391.80)

STAGE 1 NORTH DIVERSION CHANNEL R5 TO IMPOUNDMENT ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C300	844.00	4.26	000°17'20"	1174604.23, 2723543.52	1174606.69, 2723547.00
C301	457.00	57.52	007°12'42"	1174697.17, 2723674.69	1174727.39, 2723723.59
C302	6711.00	225.18	001°55'21"	1174831.30, 2723918.13	1174934.05, 2724118.49
C303	100.00	18.17	010°24'31"	1174935.29, 2724121.01	1174944.74, 2724136.50
C304	958.00	307.58	018°23'44"	1174972.78, 2724174.26	1175192.32, 2724387.80
C305	561.00	92.18	009°24'52"	1175326.47, 2724481.76	1175397.30, 2724540.59
C306	100.00	29.94	017°09'22"	1175513.56, 2724654.54	1175531.52, 2724678.37
C307	1004.00	238.83	013°37'46"	1175548.99, 2724710.65	1175686.45, 2724905.26
C308	388.00	54.82	008°05'46"	1175723.45, 2724946.28	1175757.18, 2724989.44
C309	3028.00	125.46	002°22'26"	1175861.73, 2725144.72	1175929.63, 2725250.21
C310	193.00	75.70	022°28'18"	1176030.97, 2725415.05	1176057.12, 2725485.57
C311	461.00	155.77	019°21'36"	1176071.39, 2725574.60	1176121.32, 2725721.37
C312	356.00	91.55	014°44'03"	1176149.37, 2725773.10	1176182.24, 2725858.27
C313	566.00	66.25	006°42'25"	1176204.82, 2725950.65	1176216.75, 2726015.78
C314	4211.00	215.04	002°55'33"	1176230.41, 2726126.58	1176262.16, 2726339.24

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: SURVEY INFORMATION (1 OF 2)

2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	33
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 33 OF 34

Shanna Brown - Z:\midas gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\33 SURVEY INFORMATION.dwg - 12/29/2024 9:59 PM

P-BTRS-01a ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L400	181.48	S70°14'07"W	(1175157.46, 2729310.58)	(1175096.09, 2729139.79)
L401	1548.16	S76°30'26"W	(1175092.96, 2729129.30)	(1174731.74, 2727623.87)
L402	515.29	N52°50'11"W	(1174749.28, 2727540.13)	(1175060.57, 2727129.49)
L403	448.66	S77°43'12"W	(1175078.59, 2727047.81)	(1174983.17, 2726609.41)

P-BTRS-01a ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C400	100.00	10.95	006°16'19"	1175096.09, 2729139.79	1175092.96, 2729129.30
C401	100.00	88.41	050°39'23"	1174731.74, 2727623.87	1174749.28, 2727540.13
C402	100.00	86.30	049°26'37"	1175060.57, 2727129.49	1175078.59, 2727047.81

P-IM-OUT ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L500	181.92	S70°14'07"W	(1175149.93, 2729313.28)	(1175088.41, 2729142.08)
L501	1552.38	S76°30'26"W	(1175085.28, 2729131.60)	(1174723.07, 2727622.06)
L502	515.39	N52°50'11"W	(1174740.62, 2727538.32)	(1175051.97, 2727127.59)
L503	471.56	S77°43'12"W	(1175069.99, 2727045.91)	(1174969.70, 2726585.15)
L504	934.51	S74°53'07"W	(1174968.52, 2726580.34)	(1174724.85, 2725678.15)

P-IM-OUT ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C500	100.00	10.95	006°16'19"	1175088.41, 2729142.08	1175085.28, 2729131.60
C501	100.00	88.41	050°39'23"	1174723.07, 2727622.06	1174740.62, 2727538.32
C502	100.00	86.30	049°26'37"	1175051.97, 2727127.59	1175069.99, 2727045.91
C503	100.00	4.95	002°50'05"	1174969.70, 2726585.15	1174968.52, 2726580.34

P-EMB-03 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L600	26.78	S77°43'12"W	(1174983.17, 2726609.41)	(1174977.47, 2726583.25)
L601	934.71	S74°53'07"W	(1174976.30, 2726578.44)	(1174732.57, 2725676.07)

P-EMB-03 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C600	100.00	4.95	002°50'05"	1174977.47, 2726583.25	1174976.30, 2726578.44

P-IM-03 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L700	358.10	S77°13'50"W	(1174724.85, 2725678.15)	(1174645.70, 2725328.91)
L701	549.55	S60°59'59"W	(1174635.63, 2725302.53)	(1174369.21, 2724821.89)
L702	840.79	S52°15'08"W	(1174360.82, 2724809.15)	(1173846.10, 2724144.33)
L703	51.65	S44°59'43"W	(1173837.73, 2724134.83)	(1173801.21, 2724098.31)

P-IM-03 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C700	100.00	28.33	016°13'50"	1174645.70, 2725328.91	1174635.63, 2725302.53
C701	100.00	15.27	008°44'51"	1174369.21, 2724821.89	1174360.82, 2724809.15
C702	100.00	12.67	007°15'26"	1173846.10, 2724144.33	1173837.73, 2724134.83

P-IM-08 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L800	379.35	N55°59'36"W	(1174711.91, 2725621.06)	(1174924.08, 2725306.59)
L801	598.92	S60°55'44"W	(1174928.58, 2725202.07)	(1174637.57, 2724678.61)
L802	940.21	S66°25'12"W	(1174633.32, 2724670.02)	(1174257.21, 2723808.32)

P-IM-08 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C800	100.00	110.09	063°04'40"	1174924.08, 2725306.59	1174928.58, 2725202.07
C801	100.00	9.58	005°29'28"	1174637.57, 2724678.61	1174633.32, 2724670.02

P-IM-04 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L900	607.52	N67°19'00"W	(1174014.42, 2724361.73)	(1174248.70, 2723801.21)
L901	387.49	N47°06'32"W	(1174267.70, 2723771.71)	(1174531.43, 2723487.81)
L902	6.93	N83°35'10"W	(1174535.09, 2723479.84)	(1174535.86, 2723472.95)
L903	30.00	N83°35'10"W	(1174535.86, 2723472.95)	(1174539.21, 2723443.14)

P-IM-04 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C900	100.00	35.27	020°12'28"	1174248.70, 2723801.21	1174267.70, 2723771.71
C901	14.02	8.93	036°28'38"	1174531.43, 2723487.81	1174535.09, 2723479.84

P-IM-04a ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L1000	14.43	S51°16'32"W	(1174250.71, 2723796.71)	(1174241.68, 2723785.46)
L1001	307.29	S45°45'10"W	(1174235.30, 2723778.24)	(1174020.88, 2723558.11)
L1002	347.77	S26°12'27"W	(1173993.41, 2723538.17)	(1173681.39, 2723384.59)

P-IM-04a ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C1000	100.00	9.64	005°31'22"	1174241.68, 2723785.46	1174235.30, 2723778.24
C1001	100.00	34.11	019°32'43"	1174020.88, 2723558.11	1173993.41, 2723538.17

P-IM-05 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L1100	436.20	S44°59'43"W	(1173801.21, 2724098.31)	(1173492.74, 2723789.90)
L1101	638.03	S12°15'26"W	(1173443.26, 2723762.89)	(1172819.78, 2723627.44)

P-IM-05 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C1100	100.00	57.14	032°44'17"	1173492.74, 2723789.90	1173443.26, 2723762.89

P-IM-06 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L1200	113.13	S20°58'09"W	(1172819.78, 2723627.44)	(1172714.14, 2723586.95)
L1201	154.79	S53°06'06"W	(1172669.96, 2723553.62)	(1172577.02, 2723429.83)
L1202	327.47	S71°51'53"W	(1172561.96, 2723400.92)	(1172460.03, 2723089.71)
L1203	51.41	S72°34'09"W	(1172459.65, 2723088.54)	(1172444.26, 2723039.50)
L1204	30.00	S72°34'09"W	(1172444.26, 2723039.50)	(1172435.27, 2723010.87)

P-IM-06 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C1200	100.00	56.08	032°07'57"	1172714.14, 2723586.95	1172669.96, 2723553.62
C1201	100.00	32.75	018°45'47"	1172577.02, 2723429.83	1172561.96, 2723400.92
C1202	100.00	1.23	000°42'16"	1172460.03, 2723089.71	1172459.65, 2723088.54

P-IM-07 ALIGNMENT LINE TABLE				
#	LENGTH	BEARING	START POINT (N,E)	END POINT (N,E)
L1300	206.60	S15°42'09"E	(1172819.78, 2723627.44)	(1172620.89, 2723683.35)
L1301	416.41	S03°48'12"E	(1172600.46, 2723686.87)	(1172184.96, 2723714.49)
L1302	355.60	S03°18'20"W	(1172172.57, 2723714.54)	(1171817.55, 2723694.04)
L1303	106.39	S03°37'03"E	(1171805.48, 2723694.07)	(1171699.30, 2723700.78)
L1304	29.98	S03°35'59"E	(1171699.27, 2723700.78)	(1171669.34, 2723702.67)

P-IM-07 ALIGNMENT CURVE TABLE					
#	RADIUS	LENGTH	DELTA	START POINT (N,E)	END POINT (N,E)
C1300	100.00	20.77	011°53'58"	1172620.89, 2723683.35	1172600.46, 2723686.87
C1301	100.00	12.41	007°06'32"	1172184.96, 2723714.49	1172172.57, 2723714.54
C1302	100.00	12.08	006°55'23"	1171817.55, 2723694.04	1171805.48, 2723694.07
C1303	100.00	0.03	000°01'04"	1171699.30, 2723700.78	1171699.27, 2723700.78

PROFESSIONAL ENGINEER LICENSED 18054 STATE OF IDAHO JUSTIN WADE KNUDSEN

12/31/24

REFERENCE:
SEE SHEET 02 FOR ALL REFERENCES.

DATUM: HARN/MT, IDAHO STATE PLANE, WEST ZONE, US FOOT

ENGINEER'S SEAL

REVISIONS:

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONSTRUCTION	JWK	07/2023
1	ISSUED FOR CONSTRUCTION	JWK	05/2024
2	ISSUED FOR CONSTRUCTION	JWK	12/2024

DESIGNED BY:	JWK
DRAWN BY:	TG
CHECKED BY:	JWK
APPROVED BY:	JWK

PREPARED FOR: Perpetua Resources

PREPARED BY: TIERRA GROUP INTERNATIONAL, LTD.

TITLE: SURVEY INFORMATION (2 OF 2)

2 REVISION

PROJECT:	PROJECT #:	DRAWING #:
STIBNITE GOLD PROJECT TSF	825	34
LOCATION: VALLEY COUNTY, IDAHO	DATE: DECEMBER 2024	SHEET: 34 OF 34

Shanna Brown — Z:\mides gold\stibnite gold project\pre-construction support\CAD\pre-cont support\drawing set\REV 2\33 SURVEY INFORMATION.dwg — 12/29/2024 9:59 PM

Appendix E: Endangered Species Documentation

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Idaho Fish and Wildlife Office
1387 S. Vinnell Way, Suite 378
Boise, Idaho 83709
https://www.fws.gov/office/idaho-fish-and-wildlife

In Reply Refer to:
FWS/R1/ES/IFWO/2024-0084691-001
FWS/R1/ES/IFWO/2024-0084691-002
FWS/R1/ES/IFWO/2024-0084691-003

Matthew Davis, Forest Supervisor
Payette National Forest
500 North Mission Street
McCall, Idaho 83638

Kathryn A. Werback, District Commander
U.S. Army Corps of Engineers, Walla Walla District
201 N. 3rd Avenue
Walla Walla, Washington 99362-1876

Subject: Stibnite Gold Project – Valley and Lemhi Counties, Idaho – Biological Opinion, Concurrence, and Conference

Dear Matthew Davis and Kathryn Werback:

This letter transmits the U.S. Fish and Wildlife Service's (Service) letter of concurrence, conference concurrence, and biological opinion (Opinion) for the Stibnite Gold Project on the effects of the subject proposed action to species and habitats listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; [Act]). In a letter dated March 25, 2024, and received by the Service on March 26, 2024, the Payette National Forest (Forest) requested consultation under section 7 of the Act. The letter included a biological assessment (Assessment) describing effects of the proposed subject action to bull trout (*Salvelinus confluentus*), bull trout designated critical habitat, whitebark pine (*Pinus albicaulis*), North American wolverine (*Gulo gulo luscus*), Canada lynx (*Lynx canadensis*), northern Idaho ground squirrel (*Urocitellus brunneus brunneus*), and monarch butterfly (*Danaus plexippus*).

Through the Assessment, the Forest determined that the subject proposed action may affect and is likely to adversely affect bull trout, whitebark pine, North American wolverine, and bull trout designated critical habitat. Our Opinion concludes that the subject proposed action will not jeopardize the continued existence of bull trout, whitebark pine, or North American wolverine and will not destroy or adversely modify designated critical habitat for bull trout. The Forest also

determined that the subject proposed action may affect but is not likely to adversely affect Canada lynx and northern Idaho ground squirrel. The Service concurs with the Forest's determination and presents our rationale below.

Further, the Forest assessed the effects of their proposed action and made a not likely to jeopardize the continued existence of determination for the monarch butterfly. The Forest requested to conference on monarch and requested Service concurrence with their determination. After reviewing the Assessment, we concur with your determination for monarch butterfly and present our rationale below.

Informal Consultation

Proposed Action

The Stibnite Gold Project proposes to develop mine operations to produce gold and silver doré (semi-pure alloy of gold and silver), and antimony concentrates from ore deposits associated with mining claims. The mining action area occurs in Valley County, Idaho, in the Stibnite Mining District, approximately 50 miles east of McCall, Idaho, and the restoration project occurs in Lemhi County, Idaho, approximately 12 miles northwest from Leadore, Idaho. The proposed action phases include geophysical investigation, construction, operations, exploration, closure and reclamation, and post-closure monitoring. Development of the mineral resource will include construction of access and haul roads, construction of supporting infrastructure, open pit mining, ore processing, placement of tailings in a Tailing Storage Facility (TSF), and placement of development rock. Mine operations will occur on patented mining claims on private lands and on unpatented mining claims and other areas of federal public lands administered by the Payette National Forest (Forest). Supporting infrastructure corridors (access and transmission line) are located on the Boise National Forest (BNF), Idaho Department of Lands (IDL), Reclamation, and non-federal lands. The proposed action will take place over a period of approximately 20 to 25 years, not including the long-term, post-closure environmental monitoring and potential long-term water treatment. The proposed action is fully described in the accompanying Opinion and in the Assessment (pp. 14-244).

Environmental design features (EDF; USFS 2024, Appendix B) are intended to minimize effects to Canada lynx and Northern Idaho ground squirrel (NIDGS). The EDFs include, but are not limited to:

- Activities will be modified when practicable to maintain key features of Canada lynx denning habitat or to avoid disruption of denning activities.
- The action area will be surveyed for evidence of breeding, denning, or occurrence of Canada lynx to avoid and minimize effects to this species to the extent practicable during construction-related activities.
- Construction activities will be modified to avoid disruption of Canada lynx denning activities when and where species are present.
- Speed limits will be posted (20 miles per hour [mph] or in some cases 15 mph) for the Burntlog Route, haul roads, and light vehicle access roads for the proposed action.

Slower speed limits will be posted at known wildlife crossings and along defined migratory corridors during migration season.

- If a Canada lynx is sighted, adjustments will be made to operations on a temporary basis.
- Appropriate sound dampening and muffling equipment will be utilized to minimize noise excursion from equipment and facilities. When possible, high noise activities will be scheduled at the same time. Equipment will be monitored and maintained to reduce noise related impacts.
- Electric line power will be utilized during operations to eliminate diesel generator noise, except in emergency situations when grid power is down or temporary use in remote areas where it is not practical to run power lines.
- Pre-construction NIDGS surveys will be conducted during mid-June by two experienced biologists in areas of lower elevation where suitable habitat is indicated by habitat modeling. All potential NIDGS habitat will be surveyed out to 328 feet (100 meters) on either side of the transmission line alignment or facility. Data on NIDGS presence (visual or auditory confirmation, active burrows, runways, fecal pellets, and other sign) will be recorded and GPS coordinates used to identify NIDGS locations.
- NIDGS occupied areas will be flagged and protected from all equipment and human disturbance during construction, operations, closure, and post-closure/monitoring activities out to 0.5 mile from the edge of the occupied area to protect active NIDGS from proposed action activities between late March to early September. The occupied areas will also be protected during the hibernation period out to 500 feet.
- If a NIDGS sighting occurs during construction, the area will be vacated, activities halted, and the Forest and the Service notified on how to proceed.

Canada Lynx

Species and Habitat Presence in the Action Area

There are seven Lynx Analysis Units (LAUs) within the action area, covering approximately 656,493 acres (Assessment, p. 475). The seven LAUs; Stibnite, Yellowpine, Burntlog, Landmark, Warm Lake, East Mountain, and West Mountain; are further classified into existing suitable habitat, source habitat capacity, and unsuitable habitat, where source habitat capacity has the potential to develop into suitable Canada lynx habitat in the future (Assessment, p. 478). Within the action area, there are approximately 124,196 acres of suitable habitat and 225,507 acres of source habitat capacity (Assessment, p. 478). There is no Canada lynx designated critical habitat within the action area. The Lemhi restoration project area is not within any LAUs and the nearest LAU (Hayden Basin), located approximately five miles away, is currently not occupied by Canada lynx.

Surveys conducted between 1999 and 2003 using the National Lynx Protocol detected a single Canada lynx on the BNF at two locations in the Bear Valley area, approximately 18 miles southeast of the action area, but there were no detections on the Forest (Assessment, p. 479). The Forest conducted Canada lynx detection surveys on the BNF Cascade Ranger District (in the Burntlog and Yellowpine LAUs) between 2001 and 2003, and no Canada lynx were detected

during the hair snag/DNA surveys. The closest confirmed Canada lynx detection resulting from formal surveys was on the Lowman Ranger District (BNF) in 1999, approximately 60 miles south of the Village of Yellow Pine (Assessment, p. 479). Field surveys using motion activated cameras and hair snags at bait stations were conducted in 2013 and 2014 within the Stibnite, Yellow Pine, Burntlog, Landmark, and Warm Lake LAUs. No Canada lynx were detected at any of the cameras or in any of the hair samples, and no tracks were observed during placement, servicing, or removal of the cameras or bait stations (Assessment, p. 479). The lack of Canada lynx detections from historical surveys and the large body of hair snag and remote camera survey work, both in the action area and in the larger context of the surrounding ranger districts, suggests Canada lynx are rare in the Forest and BNF, and detections are more likely to result from a dispersing or transient individual rather than a resident (Assessment, p. 479). Although Canada lynx denning habitat exists on the BNF and is predicted to exist in the future across the Forest, there are no verified Canada lynx dens or confirmed evidence of breeding. At present, occurrence of Canada lynx in the action area cannot be confirmed (Assessment, p. 479).

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to Canada lynx from the proposed action is described in the Assessment (pp. 479-484). Effects to an individual or population may occur due to habitat loss and fragmentation, increased competition for resources, vehicle collisions, or disturbance from noise and light.

Geophysical investigation will occur at 40 sites along the proposed Burntlog Route to determine the feasibility of construction. Only four of the total of 40 investigation sites occur within or near unburned lynx habitat: one is a track-boring site, one is a helicopter drill site, and two are truck rig boring sites. Lynx could also be affected through habitat alterations from project activities which could reduce already limited habitat. Approximately 0.6 acres will be disturbed through minor brush clearing and tree removal (Assessment, p. 185). It is likely that less than 0.6 acres of suitable lynx habitat will be disturbed, as most of the investigation sites are not within suitable lynx habitat. Acres of disturbance from geophysical investigation is included in the total acres of modeled lynx habitat and overlaps acres of disturbance within the larger mine project.

Roadways, existing and new, may displace or alter the movement of transient Canada lynx. Construction and use of new access roads will fragment habitat and could act as a barrier to movement. Increased traffic associated with proposed action activities along the new and existing roads will discourage Canada lynx from crossing these roads. Currently there are no known resident individuals within the action area, there is no known denning habitat, and the Forest and BNF are considered secondary Canada lynx habitat. Secondary areas, delineated for the recovery plan outline, are those areas with historical records of Canada lynx presence, but have fewer records than in core areas and have no recent documentation of presence or reproduction (Assessment, p. 479). Proposed EDFs will be implemented to monitor for lynx, maintain habitat, and adjust operations due to lynx sightings. Although proposed action activities may disturb or displace Canada lynx, due to the improbability of occurrence in the action area, classification as secondary habitat, and the implementation of EDFs, effects to Canada lynx from displacement are expected to be insignificant.

Over the course of the proposed action, 258.7 acres of modeled lynx habitat will be disturbed from activities within the mine site, access roads, and utilities, with 92.5 acres of that lost

throughout the duration of the proposed action. Loss of habitat will cause fragmentation, increased competition for resources or habitat, and displacement of individuals from the affected area into nearby habitat. Vegetation removal will be small in scale and is not expected to measurably change the amount of suitable habitat available for transient lynx. The 258.7 acres of vegetation (out of the 124,196 acres of current suitable habitat in the action area) disturbed or removed from the proposed action are expected to have insignificant effects to Canada lynx due the small amount of vegetation affected.

Increased traffic and human presence from proposed action activities may affect Canada lynx through increased risk of vehicle collisions and increased competition for resources. The proposed action includes construction of 15 miles of new road, including new segments to the existing Burntlog Route. Plowing of the Burntlog Route will open new corridors for predators. This could increase the predation on snowshoe hares by other predators or become a source of mortality for prey species, which could affect food availability for transient Canada lynx. Due to the unlikelihood of Canada lynx occurring in the action area, effects to lynx from increased competition for resources is expected to be insignificant. Construction and the year-round operation of the Burntlog Route could be a source of mortality for transient Canada lynx, but this is not expected because Canada lynx have not been documented in the action area, the action area does not contain prime denning habitat, and their movements are often nocturnal when limited vehicle traffic occurs (Assessment, p. 482). Upon closure, the new segments of the Burntlog Route will be decommissioned, recontoured, and reclaimed, which will remove impacts associated with traffic or human access in the long-term (Assessment, p. 483). Impacts from traffic will be minimized via traffic controls and public access restrictions. If a transient individual wanders into the action area, the training of personnel about lynx and slow speed limits is expected to reduce effects to Canada lynx from increased traffic to insignificant levels.

Noise and light disturbance from proposed action activities through all phases may displace transient Canada lynx. Canada lynx often avoid large developments (e.g., ski resorts, facilities, etc.); therefore, it is likely that the mine site area boundary will be a barrier to Canada lynx movement (Assessment, p. 481). A transient lynx may pass through or near the action area, but individuals disturbed by increased noise or light will be able to move away from the disturbance, resulting in insignificant effects to those individuals. Construction associated with utility corridors, substations, communication towers, and off-site facilities are expected to be temporary in nature, while long-term effects are expected throughout the proposed action along roadways, near substations, and off-site facilities. Additionally, increased recreational access, a net gain of 2.3 miles of groomed Over Snow Vehicle (OSV) trails, a 2-acre parking area, and a new 1.9-mile groomed access trail that will cross modeled Canada lynx habitat will cause further impacts during winter due to noise. Noise-reduction strategies (e.g., limiting work to daylight hours and utilizing light shields/downshielding, or directional lighting), employed along access roads, utility corridors, and near communication towers and off-site facilities during the proposed action are expected to minimize the intensity and duration of disturbance (Assessment, p. 483) and reduce impacts to transient Canada lynx to insignificant levels.

Northern Idaho Ground Squirrel (NIDGS)

Species and Habitat Presence in the Action Area

The NIDGS may occur within specific elevations, topography, and vegetation types in the action area (Assessment, p. 479). There is no occupied habitat within the action area, but there are approximately 17,917 acres of modeled suitable habitat (Assessment, p. 485). Idaho Department of Fish and Game monitoring data from 2017 documented 308 individuals at 29 colony sites on Forest lands. The closest occupied site documented is approximately 10 miles south of the action area (Assessment, p. 487). Field surveys were conducted in 2018 and 2019 within modeled suitable habitat, covering almost the entire disturbance footprint of the proposed action, and no observations of NIDGS or signs of activity were documented (Assessment, p. 488). Although no NIDGS or signs of their activity were observed during the surveys, there is a small possibility that NIDGS may occur in the future within suitable habitat (Assessment, p. 488). The Lemhi restoration project area is not within the known NIDGS range and does not have the vegetation communities associated with this species.

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to NIDGS from the proposed action is described in the Assessment (pp. 488-490). No occupied habitat is present in the action area; however, effects were analyzed considering that modeled suitable habitat in the action area could be occupied in the future. Effects to NIDGS could occur from vehicle collisions, habitat loss and fragmentation, disturbance from human presence and noise, and displacement.

Road construction, improvement, and maintenance activities and their associated vehicle traffic, as well as increased proposed action vehicle traffic, could impact NIDGS. An increased risk of mortality due to collisions, particularly during the warmer months when the species is active may result in areas where proposed action components cross modeled suitable habitat. Surveys of modeled suitable habitat will be required before construction activities occur, and all staff and contractors will adhere to speed limits and be trained to reduce wildlife collisions. Due to implementation of EDFs and the lack of documented occupancy in modeled suitable habitat, effects to NIDGS from vehicle collisions are expected to be discountable. Vehicle traffic may create noise disturbance that could cause NIDGS to flee the area and find suitable habitat elsewhere. Effects to NIDGS as a result of increased traffic is expected to be insignificant.

Construction of the utility corridors, substations, and communication towers, as well as maintenance activities in the rights-of-way, will lead to temporary disturbance of approximately 34.5 acres and a loss of 8.8 acres of modeled suitable habitat through the life of the mine. Additionally, construction of new off-site facilities will lead to a loss of approximately 19.3 acres of modeled suitable habitat through the life of the mine. These activities may affect NIDGS through loss and fragmentation of modeled suitable habitat, disturbance from human presence and noise, and displacement. Portions of existing and new roads that overlap modeled suitable habitat may act as a barrier to NIDGS movement and dispersal. Increased habitat fragmentation between colonies could impact dispersal between populations, which could lead to genetic and demographic consequences. If NIDGS sites are determined to be occupied, EDFs such as speed limits, seasonal restrictions, site buffers, and monitoring will be used to avoid or reduce impacts

to NIDGS populations. Therefore, effects to NIDGS as a result of habitat fragmentation is expected to be insignificant. Disturbance from human presence and noise may cause individuals to flee the area, causing them to seek suitable habitat nearby. Effects to NIDGS from disturbance and human presence are expected to be insignificant.

The EDFs, such as seasonal restrictions, site buffers, and monitoring will be used to avoid or reduce impacts to NIDGS populations. Furthermore, site checks and formal surveys will be conducted prior to ground-disturbing activities in modeled suitable habitat. Because of the low likelihood of occurrence in the action area, the required and proposed EDFs to continuously monitor modeled suitable habitat, and trained personnel that can identify and reduce impacts if sites are identified as occupied in the future, effects to NIDGS as a result of the proposed action are expected to be insignificant or discountable.

Concurrence

Based on the Service's review of the Assessment, we concur with the Forest's determination that the action outlined in the Assessment and this letter, may affect, but is not likely to adversely affect Canada lynx or Northern Idaho ground squirrel. This concurrence is based on EDFs that reduce impacts of the proposed action to Canada lynx and northern Idaho ground squirrel habitat to insignificant and discountable levels.

This concludes informal consultation. Further consultation pursuant to section 7(a)(2) of the Act is not required. Reinitiation of consultation on this action may be necessary if: (1) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in the assessment, (2) the action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the analysis, or (3) a new species is listed or critical habitat designated that may be affected by the proposed action. If none of the reinitiation triggers have been met, the Forest will conduct a supplemental information report within ten years, and every ten years thereafter, of the letter of concurrence to determine if reinitiation is warranted. In addition, there will be an informal briefing during a Level 1 meeting annually by March of each year to outline the events covered by this concurrence from the previous year, discuss any concerns, and ensure no reinitiation triggers have been met.

Informal Conference

Monarch butterfly

Environmental Design Features

The EDFs (USFS 2024, Appendix B) are intended to minimize effects to monarch butterfly include, but are not limited to:

- Speed limits will be posted (20 mph or in some cases 15 mph) for the Burntlog Route, haul roads, and light vehicle access roads for the proposed action. Slower speed limits will be posted at known wildlife crossings and along defined migratory corridors during migration season.

- In areas where milkweed and monarch butterflies may be present, surveys for milkweed and flowering nectar plants will be conducted by a qualified botanist prior to construction.
- If suitable monarch habitat (milkweed and nectar sources) is found, these areas will be marked on the ground with stakes and flagging in order to ensure these areas are avoided, to the extent practicable, for equipment staging and proposed action activities.
- Conduct proposed action activities, such as mowing, grubbing, and pesticide and herbicide application, in suitable habitat outside of the estimated timeframe (June through September) when monarchs are likely present, as feasible.
- Avoid the application of pesticides and herbicides on milkweed plants and define buffer zones to protect milkweed occupied areas from nearby areas where pesticides and herbicides are applied.

Species and Habitat Presence in the Action Area

Monarch butterflies are generally limited to elevations at or below 5,600 feet (Assessment, p. 503). Approximately 198,592 acres at or below 5,600 ft exist within the action area, including the entire 138.3-acre Lemhi restoration project area (Assessment, p. 503). Due to limited milkweed occurrence, monarch butterfly presence on the Forest is likely more closely associated with migration than with breeding (Assessment, p. 506). Monarch butterfly and milkweed suitability models in Idaho show the predicted suitability for milkweed species and monarch butterflies on the Forest in the action area to be low (Assessment, p. 506). Surveys have not occurred in the action area for monarch butterfly and according to the Service Monarch Conservation Database, only one acre of milkweed with 21 individual plants has been mapped in Valley County, Idaho, and no milkweed has been mapped in Lemhi County, Idaho. Therefore, while monarch butterflies may occur during the summer and early fall in the action area within suitable vegetation communities, the probability is low (Assessment, p. 506). A full environmental baseline for monarch in the action area is detailed in the Assessment (pp. 503-506).

Potential Impacts and Effects from the Proposed Action

A full analysis of effects to the monarch butterfly is in the Assessment (pp. 506-509). Proposed action activities associated with access road construction and operation, road maintenance, and related traffic may affect monarch from direct mortality through vehicle collisions and disturbance from light, noise, fugitive dust, and increased human activity. Construction and operation of access roads is not planned to occur in suitable habitat but may impact individual monarch through vehicle collisions from increased traffic. The likelihood for this is low, primarily due to vehicles adhering to the proposed action's speed limits and the limited amount of suitable habitat along access roads. Light, noise, and fugitive dust impacts associated with road maintenance and vehicle traffic within suitable habitat (potentially high levels depending on the mining phase) are likely to disturb or displace monarch. Road maintenance activities will be conducted to manage fugitive dust emissions, and noise and light reduction strategies will help reduce impacts. Due to the project's speed limits, fugitive dust management, noise and light reduction measures, and the limited amount of suitable habitat along project access roads, effects to monarch from roads and traffic are expected to be insignificant.

Monarch butterfly exposure to hazardous materials and chemical contamination may occur due to proposed action activities in all phases. The EDFs implemented will include proper transport, containment, handling, and storage of products. A Hazardous Materials Handling and Emergency Response Plan will address procedures for responding to accidental spills or releases of hazardous materials to minimize environmental effects. Therefore, there is little chance of monarch being exposed to hazardous materials and effects are expected to be discountable.

The proposed action includes the loss of approximately 59.7 acres of suitable habitat along utility corridors, at substations and, at communication towers, plus an additional 17.2 acres of habitat associated with off-site facilities. Most habitat loss and fragmentation will last through the life of the mine. An additional 44.5 acres of suitable habitat will be lost along riparian areas of the Lemhi River in the restoration project area, but habitat loss and fragmentation are expected to be temporary and insignificant. Construction activities within suitable habitat will likely displace individuals temporarily, from June to September, but monarch butterflies are highly mobile and wide ranging, allowing them to move to suitable habitat outside of the action area. Monarch EDFs will minimize these impacts by requiring surveys for milkweed and flowering nectar plants in suitable habitat, avoidance measures if monarch are found, and vegetation management measures to reduce impacts to monarch, milkweed, and nectar plants. Furthermore, noise and light reduction strategies will be used to reduce effects to monarch from project related operations and facilities. Therefore, due to the use of EDFs to survey, protect vegetation, reduce impact of vegetation related activities, and reduce noise and light impacts to habitat, effects to monarch from habitat loss and fragmentation are expected to be insignificant.

Conference Concurrence

Based on the Service's review of the Assessment, we concur with the Forest's determination that the action outlined in the Assessment and this letter, is not likely to jeopardize the continued existence of the monarch butterfly. This conference concurrence for monarch is based on the low predicted suitability for milkweed species and monarch butterflies in the action area, the implementation of EDFs to minimize effects, and the mobility and wide range of the species that reduce impacts of the proposed action to monarch butterfly to insignificant and discountable levels. Although the Act does not require conferencing on proposed species or critical habitat, the Forest assessed the effects of the proposed action to the monarch butterfly and requested a conference. Therefore, this letter shall serve as our conference concurrence that the proposed action is not likely to adversely affect the monarch butterfly. If the monarch butterfly is listed under the Act during the term of this action and there have been no significant changes that could warrant reanalysis of effects to the monarch butterfly, the Forest should contact the Service in writing to affirm the validity of the conference concurrence and request it be adopted as a standard concurrence to ensure continued coverage under the Act.

Thank you for your continued interest in the conservation of threatened and endangered species. If you have any questions regarding this consultation, please contact Carla Wise of this office at carla_wise@fws.gov.

Sincerely,

LISA ELLIS Digitally signed by LISA ELLIS
Date: 2024.09.05 11:25:33 -06'00'

Lisa Ellis
State Supervisor

Enclosure: Appendices

cc: USFS (Knesek, Rymerson, Peterson)
NOAA (Lind, Sandow)
USACE (Wilson)
Nez Perce Tribe (Lopez, Kash)
Shoshone Bannock Tribe (Tyler, Cutler)
Shoshone Paiute Tribe (Mason, Gibson)
IDFG (Flack, Bassista, Edelmann)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
LONG BEACH, CA 90802

Refer to NMFS No: WCRO-2023-02924

https://doi.org/10.25923/6zyd-4t83

October 7, 2024

Mr. Matthew Davis
Forest Supervisor
Payette National Forest
500 North Mission Street, Building 2
McCall, Idaho 83638

Lt. Col. Kathryn Werback
U.S. Army Corps of Engineers
Walla Walla District
201 N. 3rd Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Stibnite Gold Project, South Fork Salmon River HUC 17060208, Valley County, Idaho; Lemhi River HUC 17060204, Lemhi County, Idaho.

Dear Mr. Davis and Lt. Col. Werback:

Thank you for your letter of March 26, 2024, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Stibnite Gold Project. Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) [16 U.S.C. 1855(b)] for this action. Upon review, we determined your submittal was sufficient and initiated consultation on March 26, 2024. On July 25, 2024, the U.S. Forest Service (USFS) submitted additional information, modifying the proposed action.

In this biological opinion (opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River (SR) spring/summer Chinook salmon (*Oncorhynchus tshawytscha*) and SR Basin steelhead (*O. mykiss*). NMFS also determined the action will not destroy or adversely modify designated critical habitat for these species. Rationale for our conclusions is provided in the attached opinion.

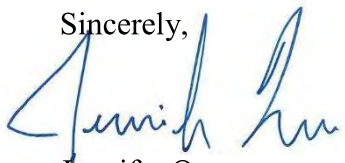
The USFS and the U.S. Army Corps of Engineers (USACE) also determined that the proposed action may affect, but is not likely to adversely affect Southern Resident killer whale (*Orcinus orca*) and their designated critical habitat. NMFS concurs with this determination and provides the rationale for this determination in this opinion.

As required by section 7 of the ESA, NMFS provides an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth terms and conditions, including reporting requirements, that the USFS, USACE, Perpetua Resources, Inc., and any permittee who performs any portion of the action, must comply with in order to be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on EFH pursuant to section 305(b) of the MSA, and includes thirteen Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are similar, but not identical to the ESA terms and conditions. Section 305(b)(4)(B) of the MSA requires federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the EFH Conservation Recommendations, the USFS and USACE must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many Conservation Recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, NMFS asks that you clearly identify the number of Conservation Recommendations accepted.

Please contact Bill Lind, Southern Snake Branch Office, at (208) 391-1282, Bill.lind@noaa.gov or Johnna Sandow, Northern Snake Branch Office, at (208) 378-5737, Johnna.sandow@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Jennifer Quan
Regional Administrator
West Coast Region

Enclosure

cc: K. Knesek – PNF
R. Rymerson - PNF
C. Nalder – PNF
K. Urbanek - USACE
B. Wilson - USACE
K. Hendricks - USFWS
C. Wise - USFWS
M. Lopez - NPT
C. Colter – SBT
B. Gibson - SPT

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Stibnite Gold Project

NMFS Consultation Number: WCRO-2023-02924

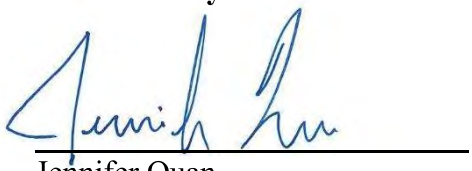
Action Agencies: USDA Forest Service
U.S. Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	If Likely to Adversely Affect, Is Action Likely to Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	If Likely to Adversely Affect, Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha)*	Threatened	Yes	No	Yes	No
Snake River Basin steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Southern Resident Killer Whale (*Orcinus orca*)	Endangered	No	N/A	No	NA

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By: 

Jennifer Quan
Regional Administrator
West Coast Region
National Marine Fisheries Service

Date: *October 7, 2024*

Appendix F: Historic Properties

United States Department of Agriculture

U.S. Forest Service

Payette and Boise National Forests

Final Record of Decision

Stibnite Gold Project

Valley County, Idaho

January 2025

The United States Department of Agriculture (USDA) is committed to making its digital content accessible. USDA customers, employees, job applicants, and members of the public with disabilities must have access to information and communication technology (ICT) comparable to the access available to those without disabilities. The U.S. Access Board ("Access Board") is responsible for developing accessibility standards. In 2017, the Access Board published a Final Rule that updated the accessibility requirements in Section 508 of the Rehabilitation Act of 1973 (Section 508), 29 U.S.C. 794d, and refreshed the guidelines in the law. The Final Rule went into effect on January 18, 2018. The standards are available at Information and Communication Technology: Revised 508 Standards and 255 Guidelines.

For more information, see the USDA Accessibility Statement.

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USDA is an equal opportunity provider, employer, and lender.

Final Record of Decision
Stibnite Gold Project

LEAD AGENCY: U.S. Department of Agriculture
Payette National Forest
500 North Mission Street
McCall, Idaho 83638
(208) 634-0700

Boise National Forest
1249 Vinnell Way Ste 200
Boise, Idaho 83709
(208) 373-4100

DATE DECISION SIGNED: January 3, 2025

COOPERATING AGENCIES: Idaho Department of Environmental Quality
Idaho Department of Lands
Idaho Department of Water Resources
Idaho Office of Energy and Mineral Resources
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
Valley County

Preface

In 2016, the Payette National Forest accepted a proposed Plan of Operations submitted by Perpetua Resources Idaho Inc. (Perpetua). Based on my review of the environmental analysis disclosed in the Stibnite Gold Project Final Environmental Impact Statement (FEIS), specialist reports, other supporting analyses, associated land management plans, the project record, and in consideration of public comments received on the Stibnite Gold Project Draft Environmental Impact Statement (DEIS), and Supplemental DEIS, this Final record of decision (ROD) describes my decision and the rationale for my decision. The draft and final environmental impact statement documents along with other supporting documents can be accessed on the project website (https://www.fs.usda.gov/project/?project=50516).

Perpetua is proposing to develop an open pit mining operation on National Forest System lands located approximately 98 miles by air and 146 miles by road northeast of Boise, Idaho; approximately 44 miles by air and 68 miles by road northeast of Cascade, Idaho; and approximately 10 miles by air and 14 miles by road east of the community of Yellow Pine, Idaho. The deposit associated with the Stibnite Gold Project, which has been explored to date, is located primarily on National Forest System land that is open to mineral entry under the General Mining Law of 1872. The Stibnite Gold Project is located within the Payette and Boise National Forests. The Forest Supervisor for the Payette National Forest was delegated as the responsible official for the Stibnite Gold Project because the proposed mining activities are proposed to occur on the Payette National Forest. Secondary proposed project activities to mining operations such as the access road are proposed to occur within the Boise National Forest.

In the United States, the General Mining Law of 1872 (30 U.S.C. 21-54) is the principal law governing the exploration and development of locatable minerals on federal lands. Surface use of National Forest System lands in connection with operations authorized by the United States mining laws is governed by regulations found at 36 Code of Federal Regulations (CFR) Part 228 Subpart A. Pursuant to 36 CFR 228.8, all such operations shall be conducted so as, where feasible, to minimize adverse environmental impacts on National Forest surface resources.

Prior to authorizing the use of National Forest System lands and approving a plan of operations, the Forest Service must analyze the potential effects of the activities that the agency will authorize in accordance with the National Environmental Policy Act (NEPA). In this case, the Stibnite Gold Project, and its associated activities, proposed by Perpetua, was analyzed in a FEIS (Forest Service 2024a).

Because the Stibnite Gold Project includes the discharge of dredge and fill material into waters of the U.S., including wetlands, the U.S. Army Corps of Engineers, pursuant to Section 404 of the Clean Water Act, will review the Stibnite Gold Project and render a decision to either issue, issue with special condition, or deny a permit for the Stibnite Gold Project. Because of separate agency authorities, the Forest Service and U.S. Army Corps of Engineers each prepared a separate ROD for their respective decisions. The decisions of each agency are developed in coordination with the other. This decision presumes the U.S. Army Corps of Engineers will select the Agency Preferred Alternative identified in the FEIS.

The Draft ROD was published in conjunction with the FEIS and was made available to people and entities on the Stibnite Gold Project mailing list and the general public. This Final ROD was developed following the conclusion of the pre-decisional objection process, as required under 36 CFR 218 Subparts A and B.

Questions can be directed to Kara Kirkpatrick-Kreitinger, Forest Environmental Coordinator at (208) 631-8427 or kara.kirkpatrick-kreitinger@usda.gov.

Sincerely,



Matthew Davis
Forest Supervisor, Payette National Forest

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Nez Perce Tribe and the Forest Service and the Shoshone-Bannock Tribes. A consultation and coordination summary of consultation with the Tribes is available in the Tribal Rights and Interests Specialist Report as well as the project record.

The structure of formal government-to-government consultation is between tribal governing bodies (Executive Committee, Tribal Councils, Tribal Chairperson, traditional Chiefs, or those identified formally by a tribe's governing body as 'representative' of that tribe's interests) and Forest Service Line Officers. Staff-to-staff meetings usually include Forest Service technical specialists and tribal liaison and technical specialists.

The U.S. Army Corps of Engineers has been represented in one or more project-specific Forest Service consultation meetings with each of these tribes, in an informal capacity, to offer information on the Clean Water Act Section 404 permitting process.

The Nez Perce Tribe, Shoshone-Paiute Tribes, and Shoshone-Bannock Tribes were invited on April 30, 2020, to participate in development of a project-specific programmatic agreement and associated Historic Properties Management Plan and Historic Properties Treatment Plan, which are being prepared to mitigate impacts and address Section 106 of the National Historic Preservation Act compliance (see Part 7.7 below for additional details).

The Forest Service remains available for government-to-government consultation with federally recognized tribes. Government-to-government consultation is an ongoing effort by the Forest Service to share information, answer questions, listen to concerns, and resolve issues.

PART 7 LEGALLY REQUIRED FINDINGS

7.1 National Environmental Policy Act

The Council on Environmental Quality (CEQ) has published final rules to amend its regulations implementing the National Environmental Policy Act of 1969 (CEQ 2020, 2024). The amended regulations apply to any NEPA review process begun after the effective date of the final rules. For this project because the NEPA review process began before all the effective dates, the Council on Environmental Quality 1978 regulations, as amended, are the guiding regulations for the Stibnite Gold Project NEPA process.

The NEPA requires public involvement and consideration of potential effects on the quality of the human environment of implementing federal actions. The environmental analysis and public involvement process outlined in the FEIS for the Stibnite Gold Project complies with the requirements set forth by the Council on Environmental Quality for implementing NEPA (40 CFR 1500-1508 (prior to 2020)). These include: 1) considering a range of reasonable alternatives; 2) disclosing direct, indirect, and cumulative effects; 3) using best available scientific information; 4) considering long-term and short-term effects; and 5) disclosing unavoidable adverse effects.

Under the NEPA process, agencies evaluate the environmental and related social and economic effects of their federal action (40 CFR 1508.1(q)). Requirements in Sections 1501.2 and 1501.7 of the CEQ regulations call for the involvement of tribes that may be affected by a federal proposal.

7.2 National Forest Management Act

The National Forest Management Act of 1976 requires the development, maintenance, amendment, and revision of land and resource management plans for each unit of the National Forest System. Under National

Forest Management Act, the Forest Service is to ensure coordination of the multiple uses and sustained yield of products and services under the National Forest System.

The Stibnite Gold Project incorporates all applicable land and resource management plan standards and guidelines, management area prescriptions, and goals and objectives; therefore, the Forest Service decision is consistent with the Boise and Payette National Forest Land and Resource Management Plans, as amended, and complies with the National Forest Management Act. Land management plan consistency evaluations can be found in the project record.

There is a need to amend the Boise and Payette National Forest Land and Resource Management Plans to fully implement the Stibnite Gold Project. The amendments are described in Part 2 "Decision and Rationale" above. The evaluation of substantive requirements for the amendments are analyzed in Chapter 4 and Appendix A of the FEIS. The public was notified of the amendments as required at 36 CFR 219.13(b)(2). The Forest Service has reviewed the proposed mineral development action and the analysis of predicted impacts. The environmental impacts are predicted to be in compliance with established requirements of the Land and Resource Management Plans as amended. The 2021 Modified Mine Plan meets the standards and guidelines in the Payette and Boise Land and Resource Management Plans, as amended. The Selected Alternative will provide for long-term multiple-use management on the Payette and Boise National Forests.

This decision is based on a review of the project record that shows a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgment of any incomplete or unavailable information, scientific uncertainty, and risk. Chapter 7 of the FEIS contains a list of published scientific documents referenced in preparation of the FEIS.

7.3 Federal Land Policy and Management Act (FLPMA)

Title V of the FLPMA of October 21, 1976 (90 Stat. 2743; 43 United States Code [USC] 1761-1771) authorizes the Forest Service to issue permits, leases or easements to occupy, use, or traverse National Forest System lands. Occupancy of National Forest System lands may be authorized when such use is determined to be in the public interest. This is applicable to the existing power transmission line right-of-way being utilized by the project.

7.4 Multiple-Use Sustained Yield Act

The Multiple-Use Sustained-Yield Act of 1960 directs the Secretary of Agriculture to administer renewable surface resources, including the products and services obtained from them, for multiple use and sustained yield. The Multiple-Use Sustained Yield Act does not directly affect the use or occupancy of National Forest System lands, or administration of same, in connection with locatable minerals operations authorized by the United States mining laws.

The Forest Service is required to consider the Selected Alternative relative to compliance with the General Mining Law of 1872, regulations, and land use plans. Environmental design features and mitigation measures analyzed in the FEIS and incorporated into this decision are considered adequately protective of the environment. The Forest Service land use plans acknowledge and allow for the extraction of locatable minerals.

The restoration and reclamation activities within this decision meet the intent of the Multiple Use-Sustained Yield Act to administer the renewable resources of water, recreation and wildlife on the National Forests for multiple use and sustained yield of the products and services.

7.5 General Mining Act of 1872

The statutory right to search for, develop, and extract mineral deposits on federal lands open to mineral entry was established by the General Mining Law of 1872, as amended. These rights include the right to locate a mining claim and the right to reasonable access to the claim for further exploration, development, mining, or necessary ancillary activities.

The Selected Alternative allows Perpetua to exercise its rights under the mining laws in a manner consistent with the requirements governing surface use and occupancy of NFS lands in connection with mining operations consistent with 36 CFR 228A.

7.6 Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act

The Endangered Species Act provides for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of the Endangered Species Act, the Forest Service must consult with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to ensure that its actions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species," which the Secretary of the Interior determines to be critical (16 USC 1536) and consult on essential fish habitat (Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act).

Informal consultation with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration National Marine Fisheries Service on the Stibnite Gold Project began in 2017 by conducting regularly scheduled monthly meetings, primarily for discussions on fish species. The pertinent letters, emails, meetings, and conference calls are summarized in a collaboration memo in the project record.

As described in the FEIS, the Stibnite Gold Project area contains critical habitat for, and populations of, several species listed under the Endangered Species Act. The Forest Service prepared a biological assessment and initiated formal consultation for Stibnite Gold Project effects on listed species and critical habitat with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the Endangered Species Act.

The U.S. Fish and Wildlife Service has jurisdiction over bull trout, Canada lynx, Northern Idaho ground squirrel, wolverine, monarch butterfly, and whitebark pine, while the National Marine Fisheries Service has jurisdiction over Chinook salmon, steelhead, and the killer whale. This decision is compliant with the legal requirements set forth under Section 7 of the ESA and Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act. The Forest Service prepared a biological assessment, and formal consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the ESA and Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act was conducted for project effects on listed species and critical habitat. This Forest Service decision complies with the legal requirements set forth in the acts.

The biological opinion for the project from U.S. Fish and Wildlife Service was signed on September 5, 2024 (BO#FWS/R1/ES/IFWO/2024-0084691-001, FWS/R1/ES/IFWO/2024-0084691-002, FWS/R1/ES/IFWO/2024-0084691-003) and the biological opinion from National Marine Fisheries Service was signed on October 7, 2024 (BO# WCRO-2023-02924). The two regulatory agencies concurred with the following determinations: "*may affect but is not likely to adversely affect*" Southern Resident killer whale and critical habitat, Northern Idaho ground squirrel, and Canada lynx and "*not likely to jeopardize the continued existence*" of the monarch butterfly. The two regulatory agencies made the following determinations "*not jeopardize the continued existence*" of Chinook salmon and critical habitat, steelhead and critical habitat, bull trout and critical habitat, North American wolverine, and whitebark pine.

In their Biological Opinion, the National Marine Fisheries Service provided essential fish habitat conservation recommendations (section 10.4) to the Forest Service per the Magnuson-Stevens Fishery Conservation and Management Act to which the Forest Service responded to as required. The Forest Service acknowledges these recommendations and will seek to incorporate them in relevant agency activities.

Both biological opinions included terms and conditions as outlined in section 10.4 of this document that will be implemented. The U.S. Fish and Wildlife Service biological opinion included monitoring requirements in section 10.5 of this document that will be implemented. The U.S. Fish and Wildlife Service conservation recommendations for bull trout were incorporated into the requirements for this decision.

7.7 National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies to identify historic properties, assess the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation an opportunity to comment on such undertakings. The Idaho State Historic Preservation Office (SHPO) administers the national historic preservation program at the state level. The Section 106 process seeks to accommodate historic preservation concerns with federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties. Section 106 also requires federal agencies to consult with Native American tribes to determine whether there are properties of traditional religious and cultural importance that may be eligible to National Register of Historic Places (54 USC 302706). The Forest Service has consulted with tribes on matters affecting their interests, utilizing both government-to-government and staff-to-staff consultation and coordination. These efforts were and continue to be made to involve local tribal governments and to solicit their input regarding potential effects to historic properties, including potential traditional cultural properties and cultural landscapes.

There are 150 National Register of Historic Places-eligible, National Register of Historic Places-listed, or unevaluated heritage resources in the area of potential effect for the 2021 Modified Mine Plan or Selected Alternative. Of these, 53 historic properties will be within the physical area of potential effect and may be susceptible to physical, vibratory, auditory, and/or visual impacts. An additional 97 historic properties are solely within the vibratory, auditory, and visual area of potential effect and may be susceptible to vibratory, auditory, and visual impacts.

Because of the Stibnite Gold Project's size, scope, and alternatives under consideration, the Forest Service as the lead federal agency, initiated preparation of the programmatic agreement as a management tool to address project effects on heritage resources and to minimize or resolve any potential adverse effects. The programmatic agreement outlines measures for compliance with Section 106 of the National Historic Preservation Act, including but not limited to: protocols for the identification and evaluation of historic properties; permitting requirements; treatment of historic properties; monitoring requirements; inadvertent discovery protocols; curation; and treatment of human remains. The programmatic agreement identifies known adverse effects to historic properties and provides a discussion of proposed mitigation measures that will be implemented. In addition to the programmatic agreement, the Historic Properties Management Plan and Historic Properties Treatment Plans will further refine the requirements for resolution of adverse effects.

The Forest Service collaborated with Consulting Parties (Table 4) in the development of the programmatic agreement to comply with consultation procedures intended to satisfy requirements under the National Historic Preservation Act and the NEPA. On April 30, 2020, the Forest Service initiated the consultation process for the development of the programmatic agreement by extending invitations to participate in the process pursuant to the regulations of Section 106 of the National Historic Preservation Act to interested parties. Letters were sent to the Nez Perce Tribe, Shoshone-Paiute Tribes, and Shoshone-Bannock Tribes

with a request for response within 30 days. Additionally, invitations were extended to the U.S. Army Corps of Engineers, Idaho Power Company, Perpetua, the Idaho State Historic Preservation Office, and the Advisory Council on Historic Preservation. The Forest Service collaborative process included utilizing regularly scheduled periodic meetings to engage the identified Consulting Parties to the programmatic agreement.

Table 4 Programmatic Agreement Consulting Parties

Organization	Role in the Stibnite Gold Project and Programmatic Agreement
United States Department of Agriculture, United States Forest Service, Payette National Forest (Forest Service)	Lead Federal Agency, Signatory
Idaho State Historic Preservation Office (ID SHPO)	Section 106 Compliance, Signatory
Advisory Council on Historic Preservation	Signatory
Idaho Power Company	Invited Signatory
Perpetua Resources Idaho Inc.	Project Proponent; Invited Signatory
Nez Perce Tribe	Consulting Party
Shoshone-Bannock Tribes	Consulting Party
Shoshone-Paiute Tribes	Consulting Party
United States Army Corps of Engineers	Consulting Party
Mary Anne Davis	Consulting Party

Consultation and coordination with consulting parties to resolve adverse effects to historic properties in accordance with Section 106 of the National Historic Preservation Act will continue. The programmatic agreement was developed through discussions with the consulting parties to ensure that the requirements of Section 106 are satisfied. The programmatic agreement outlines the roles and responsibilities of parties, the procedure for identification and evaluation of historic properties, assessment for effects, and each party's responsibilities under the Section 106 process. Therefore, I find that through the execution of the programmatic agreement, the Forest Service has complied with its federal responsibilities under the National Historic Preservation Act.

7.8 Tribal Consultation and Coordination

The U.S. has a unique legal relationship with Native American tribal governments as set forth in the U.S. Constitution, treaties (including the Nez Perce Tribe Treaty of 1855), Executive Orders, federal statutes, federal policy, and tribal requirements, which establish the interaction that must take place between federal and tribal governments. An important basis for this relationship is respect for tribal sovereignty, self-determination, tribal lands, tribal assets and resources, and treaty and other federally recognized and reserved rights. Government-to-government consultation is the process of seeking, discussing, and considering views on policy, and/or, in the case of the Stibnite Gold Project, environmental and cultural resource management issues.

Pursuant to Executive Order 13175 (Tribal Consultation and Coordination), executive departments and agencies are charged with engaging in regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications and are responsible for strengthening the government-to-government relationship between the United States and Indian Tribes.

Appendix G: Discharge Locations

Discharge Locations

IPDES Construction General Permit No. IDR100000

Discharge Points								
Point of Discharge ID	Latitude Decimal Degrees	Longitude Decimal Degrees	Name of the first water of the U.S. that receives storm water directly from the point of discharge and/or from the MS4	If the receiving water is impaired (on the CWA 303(d) list) list the pollutants that are causing the impairment	If a TMDL has been completed for this receiving waterbody provide the TMDL name and ID	Pollutants for which there is a TMDL	Receiving Water	Designation
001	44.889718°	-115.348527°	Meadow Creek	Temperature & Arsenic	No TMDL	No TMDL	East Fork South Fork Salmon River (EFSFSR)	Category 5
002	44.890124°	-115.354682°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
003	44.890816°	-115.363782°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
004	44.888453°	-115.368651°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
005	44.890010°	-115.375298°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
006	44.882859°	-115.371476°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
007	44.874832°	-115.367337°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
008	44.874359°	-115.365978°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
009	44.877931°	-115.366336°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
010	44.888101°	-115.357787°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5
011	44.887964°	-115.353609°	Meadow Creek	Temp. & Arsenic	No TMDL	No TMDL	EFSFSR	Category 5

Appendix H: Grading and Stabilization Activities Log

Grading and Stabilization Log

IPDES Construction General Permit No. IDR100000

Grading and Stabilization Log				
Date Grading Activity Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures Initiated
			Date: ☐Temporary ☐ Permanent	INSERT DATE
			Date: ☐ Temporary ☐ Permanent	INSERT DATE
			Date: ☐ Temporary ☐ Permanent	INSERT DATE
			Date: ☐ Temporary ☐ Permanent	INSERT DATE
			Date: ☐ Temporary ☐ Permanent	INSERT DATE
			Date: ☐Temporary ☐ Permanent	INSERT DATE

Appendix I: Environmental Design Features & Idaho Catalog of Storm Water Best Management Practices

BMP Fact Sheet

IPDES Construction General Permit No. IDR100000

Item Number	Description	Source (include Permit if applicable)
1	Sediment control measures that will be employed as applicable are: Check Dams - used to capture sediment, reduce or prevent excessive bank and bottom erosion, and reduce runoff velocity; Channel Liners - used to line the bottom and/or banks of ditches or channels to prevent and/or reduce erosion, and, to some degree, to capture sediment; Portable Sediment Tank - compartmented containers where sediment-laden water is pumped and held until the sediment settles out by gravity. The treated water can then be discharged to another BMP, storm drainage system, or sanitary sewer system as allowed by state, local, and federal regulations; Temporary Swale - an excavated drainage designed to convey sediment laden-water to a sediment-trapping device or prevent runoff from entering disturbed areas by intercepting and diverting off-site flow to a stabilized outlet; Diversion Dike - temporary berms, often excavated from an adjoining temporary swale used to channel water to a desired location. Diversion dikes protect construction areas from upslope runoff and divert onsite sediment-laden water to sedimentation trapping devices or stable outlets; Temporary Berms - storm drain diversion with a ridge of compost, gravel bags, or sandbags that redirects runoff contributing to a storm drain line or outfall channel so that it may temporarily discharge into a sediment-trapping device. Temporary berms can also reduce the flow velocity of runoff; Turbidity Curtains - contain and settle sediment within lakes, rivers, and other water bodies; Straw Bale Barriers - used as temporary berm, diversion, or barrier to contain sediment onsite by catching and filtering stormwater; Inlet protection - temporarily prevent sediment-laden runoff from entering storm drain inlets. Can include above ground barriers, inserts, mats or over excavation.	Idaho Catalog of Storm Water Best Management Practices April 2020
2	Plume or turbidity monitoring may be required both upstream and downstream of instream work.	FEIS
3	When reintroducing water to dewatered areas and newly constructed channels, a staged rewatering plan will be applied including, as applicable: Turbidity monitoring protocol; Pre-wash the area before rewatering. Turbid wash water will be detained and pumped to the floodplain or sediment capture areas rather than discharging to fish bearing stream; Install seine nets at upstream end to prevent fish from moving downstream until 2/3 of total flow is restored to the channel; Starting in early morning introduce 1/3 of new channel flow over period of 1 to 2 hours; Introduce second third of flow over next 1 to 2 hours and begin fish salvage of bypass channel if fish are present; Remove upstream seine nets once 2/3 flow in rewatered channel and downstream turbidity is within acceptable range (less than 50 NTUs above background or are visible for more than 90 minutes); Introduce final third of flow once fish salvage efforts are complete and downstream turbidity verified to be within acceptable range; Install plug to block flow into old channel or bypass. Remove any remaining seine nets; Record the turbidity reading, location, and time for the background reading approximately 100 feet upstream of the project area using a recently calibrated turbidimeter or via visual observation; Record the turbidity reading, location, and time at the measurement compliance location point approximately 1,000 feet downstream of the project area.	Environmental Protection Plan for ASAOC January 2023
4	Turbidity will be measured (background location and compliance points) every 4 hours while earth disturbing activities are occurring. Turbidity exceeds water quality standards if turbidity levels approach 50 NTUs above background or are visible for more than 90 minutes or begin to approach 100 NTUs above background at any time. If turbidity exceeds water quality standards, the activity will stop until the turbidity level returns to background. The OSCs will be notified of all exceedances and corrective actions at project completion. Contact NMFS and USFWS to determine when work can proceed and if additional BMPs need to be employed to further minimize the intensity of remaining plumes to ensure extent of take is not exceeded. If turbidity controls (coffer dams, wattles, fencing, etc.) are determined ineffective, crews will be mobilized to modify, as necessary. Occurrences will be documented in the project daily reports. Copies of daily logs for turbidity monitoring shall be available to NMFS, USFWS, and IDEQ upon request. The daily logs must describe all exceedances and subsequent actions taken, including the effectiveness of the action.	Environmental Protection Plan for ASAOC January 2023
5	The proponent will implement surface water quality baseline turbidity monitoring, as defined in the Idaho Department of Environmental Quality permit clauses.	ROD; FEIS; BA; BO-US Fish and Wildlife
6	To protect Endangered Species Act -listed fish species, the Project Operator will utilize a standard procedure for channel segment isolation, dewatering, fish salvage, and fish relocation during dewatering or maintenance of natural stream and diversion channels, based on the U.S. Fish and Wildlife Service Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards (U.S. Fish and Wildlife Service 2012). This procedure was developed for the approved 2022 – 2024 Administrative Settlement Agreement and Order of Consent (ASAOC) removal work on site and will be adapted for use by the Project. Additional sources of information on fish protection protocols may be considered in developing the program. For example, the Bonneville Power Administration Habitat Improvement Program III provides a series of conservation measures intended to protect and restore fish and wildlife habitat affected by construction activities. The elements of the standard procedure are described below. For channel isolation and dewatering, to minimize impacts to fish, cofferdams will isolate portions of the proposed channel within the existing ordinary high- water mark to keep water and fish out of a channel until construction is completed. Once construction of a channel is completed (including prewashing the substrate),	ROD; Fish and Aquatic Resources Mitigation Plan; BA; BO-US Fish and Wildlife

	water will be slowly reintroduced into the new channel (one-third of the flow initially), with seine block nets keeping fish from entering the new channel. Seine block nets will be placed in the upstream end of the channel with fish salvage steps described in the next paragraph. Next, two-thirds of the flow will be released into the new channel until flows and turbidity stabilize, and then ultimately all flow will be released into the new channel and the seine block net to the new channel removed. Fish salvage steps before stream dewatering will be: • Identify stream reach that may require fish salvage operations and/or instream water work associated with the Stibnite Gold Project, and which salvage methods are most applicable, as outlined in the fish salvage plan. • Secure necessary fish handling permits to conduct instream water work and fish handling. • Secure and stage all necessary fish capture, isolation, holding, and transportation equipment to execute fish salvage operations. This includes but is not limited to pumps, generators, fuel, fuel spill containers, sanctuary nets, block nets, electrofishing units, seines, transport vehicles, radio communications, buckets (smaller vessel to move fish from to tank to release location) and tanks (if fish are relocated), back up aeration and pumps for staging area fish handling and transportation, backpack for transporting fish, hoses, thermometers, turbidity meter, field data notebooks. • Isolate stream channel via weirs, block nets, sandbags, straw bales, and tarps to prevent fish movement into the fish salvage area. Isolation may occur well in advance of fish salvage operations to prevent adult salmonids from entering the stream or lake. • Partially dewater isolated stream section to improve fish capture efficiency (if needed). Some diverted water should be conveyed through diversion channel(s) to prevent increased turbidity downstream. Isolate water used to pre-wet and clean diversion channel. Use pumps to extract turbid water for land application until diverted water reaches ambient turbidity levels in undisturbed stream. Work area isolation provide a means to limit potential effects to fish by preventing movement into the work area with the goal of safely removing as many fish outside of the work area as practicable. Protocols established in Bonneville Power Administration's Habitat Improvement Program will be followed for work area isolation and fish salvage, which include: • When work area isolation is required, design plans will include all isolation elements, fish release areas, a pump to be used to dewater the isolation area, and, when fish are present, a fish screen that meets National Marine Fisheries Service's fish screen criteria. Wider mesh screens may be used after all fish have been removed from the isolated area. Salvage activities will take place during conditions to minimize stress to fish species, typically periods of the coolest air and water temperatures which occur in the morning versus late in the day. A fish biologist will determine an operational plan to remove Endangered Species Act -listed fish, with the least amount of harm to the fish, before in-water work begins. This will involve either passive movement of fish out of the Project reach through slow dewatering, or actively removing the fish from the Project reach. Should active removal be warranted, a fish biologist will clear the area of fish before the site is dewatered using one or more of a variety of methods including seining, dipping, or electrofishing, depending on specific site conditions. Salvage operations will follow the ordering, methods, and conservation measures specified as follows: • Slowly reduce water from the work area to allow some fish to leave the work area volitionally. • Block nets will be installed at upstream and downstream locations and maintained in a secured position to exclude fish from entering the Project area. Block nets will be secured to the stream channel bed and banks until fish capture and transport activities are complete. Block nets may be left in place for the duration of the Project to exclude fish as long as passage requirements are met. • Nets will be monitored hourly anytime there is instream disturbance. • If block nets remain in place more than one day, the nets will be monitored at least daily to ensure they are secured to the banks and free of organic accumulation. If the Project is within bull trout spawning and rearing habitat, the block nets must be checked every 4 hours for fish impingement on the net, per Bonneville Power Administration (2019) requirements unless a variance can be granted. • Capture fish through seining and relocate to streams. • While dewatering, any remaining fish will be collected by hand or dip nets. • Seines with a mesh size to ensure capture of the residing Endangered Species Act -listed fish will be used. • Minnow traps may be left in place overnight and used in conjunction with seining.	

	• Electrofishing to capture and relocate fish not caught during seining. This step is to be used as a last resort; after all passive techniques have been exhausted. • Continue to slowly dewater the stream reach. • Collect any remaining fish in transport buckets with cold water and relocate to the stream. • Limit the time fish will be held in a bucket and release them as quickly as possible. • The number of fish within a bucket will be limited, and fish will be of relatively comparable size to minimize predation. • Aerators for buckets will be used, or the bucket's water will be frequently changed with cold, clear, water at 15minute, or more-frequent, intervals. • Buckets will be kept in shaded areas; or if in exposed areas, covered by a canopy. • Dead fish will not be stored in buckets used to transport fish but will be left on the streambank to avoid mortality counting errors. Fish capture methods that will be employed during fish salvage operations include both active and passive capture techniques. Brennan-Dubbs (2012) and National Oceanic and Atmospheric Administration (2000) provide guidance on several fish capture techniques. Active capture techniques may include electrofishing, dip netting, seining, minnow traps, and fish herding and/or crowding. Passive capture techniques will include fish traps associated with weirs to exclude juvenile and adult fish from instream work areas. A weir and fish trap will be placed downstream of Yellow Pine pit lake to prevent adult salmonids from entering or reentering the lake thus avoiding the possibility of fish salvage for those migratory fish. The trap will be checked at least once a day and debris accumulation will be removed from the picket panels. Fish will be removed from the trap and immediately released downstream. As with all fish salvage operations, the date, number, and species of fish handled will be documented and provided in a post-salvage operations report.	
7	Surface water withdrawal intake hoses will be situated so as to prevent generation of turbidity in bottom sediments during pumping.	ROD; 2021 Modified Mine Plan; BA; BO-US Fish and Wildlife
8	On-site Restoration Work Stream Isolation and Re-watering Project incorporation of site preparation, staging, and sequencing stream crossing work has been developed for instream restoration work as described in the Fish and Aquatic Resources Mitigation Plan, Section 5.4.7 (Brown and Caldwell, Rio ASE, and BioAnalysts 2021). A planning team with representation from project management, engineering, and fish biology will be assembled to coordinate with construction personnel and equipment operators to plan the staging and sequence for work area isolation, fish capture and removal, and dewatering i.e., • scheduling with in an appropriate in-stream work window, • establishing the length of channel to be isolated for each crossing, • conducting work area isolation and fish salvage in consideration of habitat requirements, flow and temperature conditions, and exposure to turbidity or other unfavorable conditions, and • dewatering via a bypass flume or culvert with diversion by sandbags, sheet piling, or cofferdam. When stream segments require dewatering, they will be isolated using a method appropriate for the location, including block nets, sandbags, diversion, pumps, sheet piling, flashboards, coffer dams, and other structures. The specific method will depend on the stream segment location, diversion sequencing, operational requirements, segment length, segment slope, flow conditions, depth, and fish salvage (see below). All isolation barriers will be monitored during installation and operation. Partial dewatering will generally be conducted during low-flow periods to facilitate stream segment isolation and fish salvage. Whenever possible, dewatering will not begin until fish have been captured and removed for relocation. However, depending on the location and water depth, it may be necessary to partially draw down the water first to perform fish removal. Partial dewatering before fish salvage operations begin may also improve fish capture efficiency by reducing the total volume of stream habitat that needs to be salvaged. In those cases, dewatering pumps will be screened to meet National Oceanic and Atmospheric Administration Fisheries and Idaho Department of Fish and Game standards to avoid entrainment of juvenile fish. Fish capture from work area isolation will consist of: • slowly reducing flow in the work area to allow some fish to leave volitionally, • installation of block nets upstream and downstream of the isolation area with the nets secured to stream channel bed and banks until fish capture is complete and exclusion of fish from the work area is necessary,	Fish and Aquatic Resources Mitigation Plan; BA; BO-US Fish and Wildlife

	• hourly monitoring of block nets during instream disturbance in the work area, • if block nets are in place for more than one day, they will be monitored daily to ensure they are secured to banks and are free of organic accumulation plus monitored every four hours for fish impingement if located in bull trout spawning and rearing habitat (unless a variance is granted by the Forest Service), • seining the isolated area to capture and relocate fish, • if areas are isolated overnight, minnow traps will be placed overnight in conjunction with seining, • collecting any remaining fish by hand or dip nets as dewatering continues, and • if all other techniques have been exhausted, electrofishing may be used to capture remaining fish under electrofishing conservation measures. Captured fish will be relocated as quickly as possible to pre-planned release areas using aerated and shaded transport buckets holding limited numbers of fish of comparable size to minimize predation. Dead fish will not be stored in transport buckets but will be left on the streambank to avoid mortality counting errors. Sediment controls will include the implementation and use of the following as needed in appropriate locations: • in-stream work will conform with the work, turbidity, and dewatering procedures as specified in design conservation measures (RioASE 2023) and adhere to Bonneville Power Administration Habitat Improvement Program conservation measures, • placement of fine mesh silt fences and straw waddles, • minimization of equipment wet crossings with vehicles and machinery crossing at right angles to the main channel whenever possible, • no construction equipment stream crossings will occur within 300 feet upstream or 100 feet downstream of an existing redd or spawning fish, • after construction, temporary stream crossings will be removed and banks restored while adhering to turbidity requirements, • coffer dams and diversion structures will have one foot of freeboard, • dewatering pump discharge will be released onto floodplain areas away from wetlands and construction activities where discharge will fully infiltrate prior to reaching wetlands and surface waters unless otherwise approved, • any return flows from dewatering discharge will meet turbidity requirements, • bag fill materials will be clean, washed, and rounded material meeting standard specifications for drain rock, streambed aggregate, streambed sediments, or streambed cobbles, • work activities within the ordinary high-water channel will conform with the water quality standards established for the project. Upon completion of the instream work, flow diversions will be removed slowly to allow gradual rewatering of the isolated stream segment to minimize turbidity. Once the stream segment is rewatered, the upstream and downstream block nets will be removed. Erosion and sediment control for in-water work will be consistent with controls used for other aspects of the project. Turbidity monitoring and protocols will include: • turbidity monitoring will be required and shall be completed in accordance with designated protocols (for the type of planned work), • work will be performed in a manner that does not cause turbidity exceedances within the waterway, • Areas will be pre-washed before rewatering. Turbid wash water will be detained and pumped to the floodplain or sediment capture areas rather than discharging to fish-bearing channels. • Starting in early morning, one third of new channel flow will be introduced over a period of 1 to 2 hours. • The second third of flow will be introduced over the next 1 to 2 hours. • The final third of flow will be introduced once downstream turbidity verified to be within acceptable range. • if turbidity exceedances do occur, the work will stop to address the turbidity issues, and • construction discharge water will be collected to remove debris and sediment and will meet turbidity requirements for discharging back to receiving streams.	

9	Prior to initiating construction, a Notice of Intent for a Construction General Permit (CGP) will be submitted along with the Stormwater Pollution Prevention Plan (SWPPP), and erosion prevention and sediment control BMPs will be used to manage runoff. BMPs recommended by the Idaho Department of Lands and Idaho Department of Environmental Quality include silt fencing, straw wattles, sedimentation ponds, water bars, flow spreaders, energy dissipators and other features (Idaho Department of Lands 1992; Idaho Department of Environmental Quality 2005). During construction, the BMPs will be inspected and maintained as required by the CGP (i.e., weekly inspections of the condition of BMPs plus turbidity monitoring which become a daily inspection for the day following precipitation events greater than 0.25 inches; weekly and daily reports are maintained on site). If necessary, corrective actions will be taken and the SWPPP will be updated to reflect changes to the BMPs and stormwater management practices. Once construction activities have been completed and the disturbed areas have been stabilized, a Notice of Termination for the CGP will be submitted. After that time, stormwater will be managed using BMPs recommended by the Idaho Department of Lands and Idaho Department of Environmental Quality. General stormwater that is not mine contact water will be managed under an Idaho Multisector General Permit while stormwater that is mine contact water will be collected for consumptive use or water treatment as described in Section 2.4.5.10 of the FEIS. Although Valley County does not have specific stormwater requirements regarding post-construction stormwater management, the 2010 Valley County Comprehensive Plan states: "Valley County has adopted Idaho Department of Environmental Quality's Catalog of Stormwater BMPs for Idaho Cities and Counties along with a Valley County specific addendum table to assist local agencies and developers with the selection, design, installation and maintenance of BMPs to reduce stormwater pollution."	2021 Modified Mine Plan; WMP
10	The Project Operator will implement surface water quality baseline turbidity monitoring, as defined in the Idaho Department of Environmental Quality permit clauses	IPDES Individual Permit - Contact Water Treatment Plant During Operations; MSGP

Idaho Catalog of Storm Water Best Management Practices



State of Idaho
Department of Environmental Quality
April 2020

BMP 1: Minimize Land Disturbance

Description

While land disturbance is unavoidable during site development, it should be minimized to limit environmental impacts on the site. Where grading is required, follow natural landforms and design to guide and slow the flow of runoff (Figure 3).



Figure 3. Disturb only the area needed and clearly define the construction area with fencing.

Applicability

This BMP applies wherever undisturbed areas must be impacted during site preparation, construction, and development.

Limitations

Site constraints such as property boundaries, natural features, legal agreements, and rights of way may affect where land disturbances take place.

Design Basis

When planning a development project, disturb the smallest possible area to minimize hydrologic impacts. Use conservation design techniques to plan developments around natural features and cluster development on the least sensitive areas of the site. Identify sites with environmentally, hydrologically, or socially important features to preserve such as the following:

- Streams and stream buffers
- Floodplains
- Riparian areas
- Existing vegetation
- Forest conservation areas
- Wetlands, springs, and seeps
- Highly erodible soils
- Steep slopes
- Storm water infiltration areas
- Designated open space areas
- Natural corridors and greenways
- Historically significant areas

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

After preservation areas are identified, locate applicable building setbacks or other building restrictions based on local zoning code and subdivision regulations (Figure 4).

The remaining portion of the site is then identified as the development envelope. The proposed development including buildings, access roads, utilities, and other structures should be located only within the development envelope, taking into consideration buildability, accessibility, visual obtrusiveness, and distance from adjacent buildings. Avoid or mitigate the impact of high water tables and shallow bedrock when planning a development.

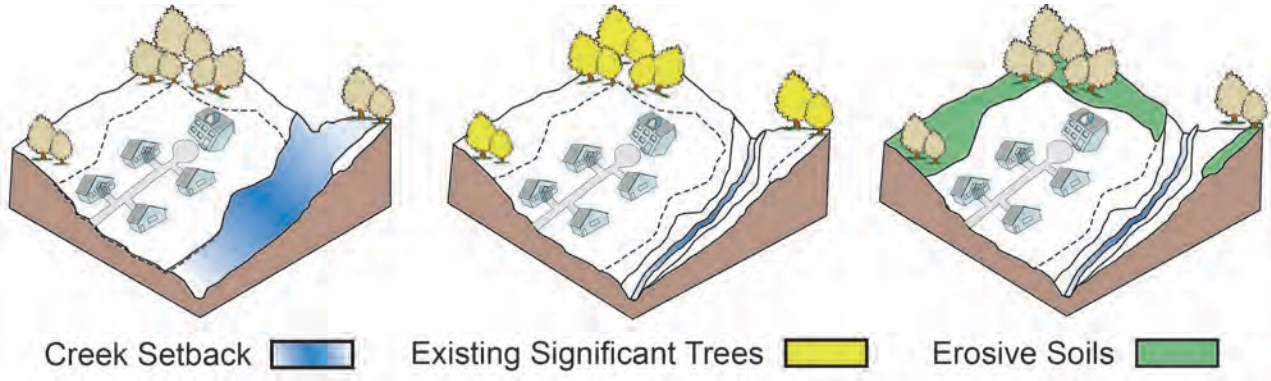


Figure 4. Identify preservation areas and cluster development on the remaining portion of the site.

Construction Guidelines

Minimize the amount of land disturbance required for grading by fitting the development to the natural gradient within the development envelope. For example, orient the major axis of the building parallel to existing contours and stagger floor levels to fit the natural grade.

In locations where site grading is necessary, the proposed grading should mimic the surrounding natural features and landforms and include slopes with a diversity of concave, convex, shaded, sunny, exposed, and sheltered habitats where applicable. This diversity decreases erosion and mass wasting while respecting the geomorphologic processes of natural slopes. Consider natural drop lines to minimize drainage gradients.

To ensure that land disturbance is minimized during construction, include a *limits of disturbance* plan that delineates the boundary between disturbed and protected areas in the construction drawings (Figure 5). This boundary should also be clearly marked in the field with signage, staking, flagging, or fencing. Limit disturbance to the smallest area possible and minimize the area needed to build lots, allow access, and provide necessary utilities based on construction techniques, equipment needs, and physical site constraints. If possible, land disturbance should occur in phases with each phase stabilized and revegetated before proceeding to the next construction phase.

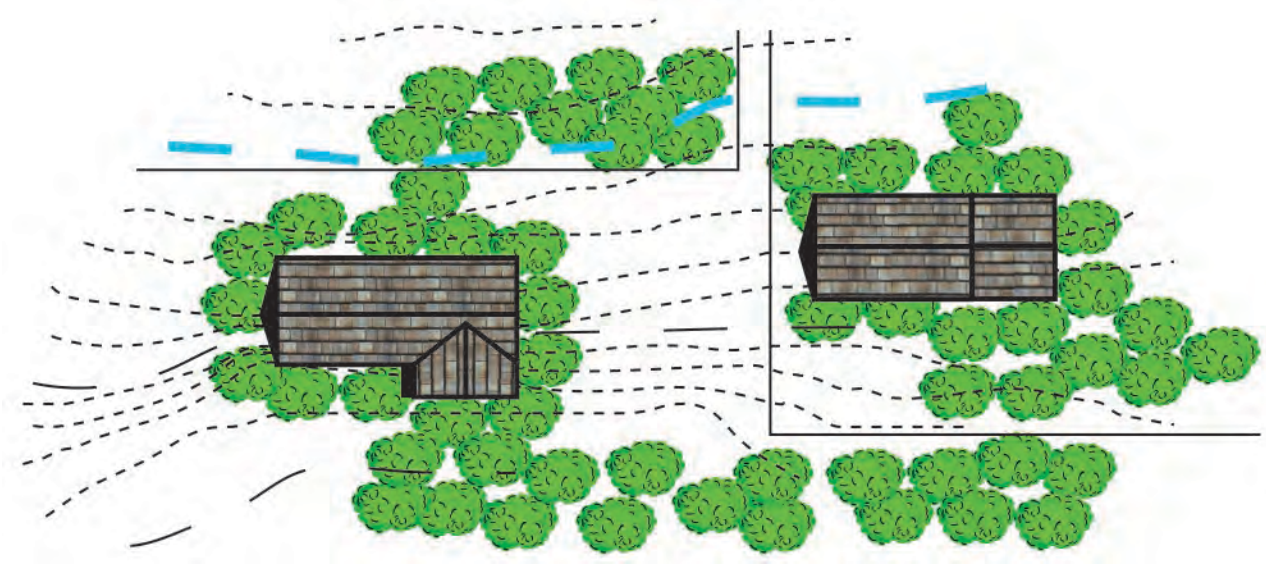


Figure 5. Illustration depicting minimal disturbance areas to be cleared and graded with shading (Corish 1995).

Maintenance

Not applicable

Additional Resources

Arendt, R.G. 1996. *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks.* Washington, DC: Island Press.

Dramstad, W.E., J.D. Olson, and R.T.T. Forman. 1996. *Landscape Ecology Principles in Landscape Architecture and Land-use Planning.* Washington, DC: Harvard University Graduate School of Design, Island Press, and the American Society of Landscape Architects.

Forman, R.T. 1995. *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge University Press, UK.

Forman, R.T. et al. 2002. *Road Ecology: Science and Solutions.* Washington, DC: Island Press.

Johnson, B.R. and K. Hill, eds. 2001. *Ecology and Design: Frameworks for Learning.* Washington, DC: Island Press.

Little, C.E. 1995. *Greenways for America*. Baltimore, MD: The Johns Hopkins University Press.

Puget Sound Action Team. 2003. *Natural Approaches to Stormwater Management.* Seattle, WA: Puget Sound Action Team. *http://www.napawatersheds.org/files/managed/Document/3004/lid_natural_approaches.pdf.*

Smith, D.S. and P. Cawood Hellmund, eds.1993. *Ecology of Greenways.* Minneapolis, MN: University of Minnesota Press.

BMP 2: Minimize Disturbance of Steep Slopes

Description

Minimize disturbance to steep slopes caused by land development activities. Steep slopes are defined as those 15% or greater in grade, unless the term *steep slope* has been otherwise defined by a state, tribe, local government, or industry technical manual. Disturbance includes removing vegetation, excavation, fill, building, regrading, or removing soil.

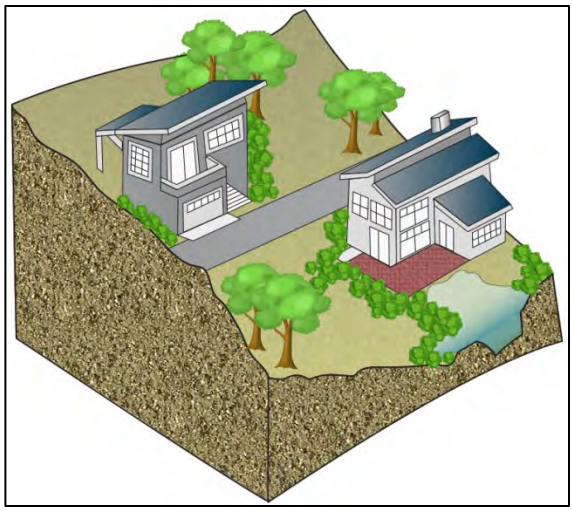


Figure 6. Example of fitting development to natural gradient.

Applicability

Steps to minimize disturbance of steep slopes should be taken during the site design and construction phases of any project on a site with steep slopes. By minimizing disturbance, soil erosion, sedimentation, and pollutant discharge is also minimized.

Design Basis

During the site design phase, locate buildings and roads outside of steep slope areas and relocate development on the portion of the site least likely to impact the natural landforms, geologic features, and vegetation (Figure 6). Conservation design methods can be used to fit development to the natural features of the site. Roads and driveways should follow the natural topography to the greatest extent possible to minimize the amount of grading required.

When it is not possible to locate buildings outside of steep slope areas, they should be located to fit into the hillside instead of altering the hillside to fit the building. For example, orient the major axis of the building along the existing contours and step down the floor levels with the grade changes or reduce the footprint of the building to minimize grading. For slopes greater than 40%, a geotechnical analysis is recommended to ensure that development is not proposed on highly erodible and landslide-prone areas.

If regrading is necessary, blend it in with the natural contours and undulations of the land, with cuts and fills rounded off to eliminate sharp angles on the top, bottom and sides of regraded slopes. The angle of cut

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

and fill slopes should not exceed the natural angle of repose of the soil or rock material, unless structural stabilization is used. Generally, the slope should be not steeper than two horizontal to one vertical (2:1).

Construction Guidelines

If all development is located outside of steep slope areas, these areas should be delineated with fencing, flagging, or other markers and designated as preservation areas that should not be disturbed during construction.

If unavoidable during construction, minimize disturbance to steep slopes to the greatest extent possible. Use erosion and sediment control practices, such as phasing land-disturbing activities, and use control measures designed for steep grades. Phase construction so that the amount of land disturbed at one time and the duration of exposure is limited. Construction BMPs appropriate on or around steep slopes include biofilter bags (BMP 63), fiber rolls (BMP 64), matting (BMP 54), pipe slope drains (BMP 57), and gradient terracing (BMP 59). Permanently stabilize the slope as soon as possible using mulch (BMP 52), landscaping (BMP 32), or channel liners (BMP 61).

Maintenance

If steep slopes are not disturbed, slope maintenance is not required. For any steep slopes that are disturbed and stabilized, maintenance activities associated with the BMP used to stabilize the slope are required.

Additional Resources

EPA (US Environmental Protection Agency). 2012. *EPA Construction General Permit*. National Pollutant Discharge Elimination System Stormwater Program. *https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents*

Land of Sky Regional Council. 2008. *Mountain Ridge and Steep Slope Protection Strategies*. North Carolina.

Thompson, J.W. and K. Sorvig, 2000. *Sustainable Landscape Construction: A Guide to Green Building Outdoors.* Washington, DC: Island Press.

Town of Somers, NY. 2002. “Chapter 148: Steep Slope Protection.” *Code of the Town of Somers.* New York. *http://ecode360.com/11112788.*

BMP 3: Provide Natural Buffers

Description

Natural buffers are areas along surface waters that are undisturbed and where development and land-disturbing activities are prohibited. Ideally, the natural buffer contains existing vegetation. If the natural buffer is not vegetated, native plants can be established to provide storm water management benefits (Figure 7).



Figure 7. Example of a natural buffer along the Boise River.

Applicability

Natural vegetative buffers are best for intercepting sheet flow from disturbed sites, pervious surfaces or other sediment source areas, and filtering storm water runoff before entering a stream, creek, canal, wetland, or other surface water. Buffers reduce the velocity of surface runoff, promote infiltration, and reduce pollutant discharge by capturing and holding sediments and other pollutants carried in the runoff water. These buffers are best suited for areas where the soils are well drained or moderately well drained and where the bedrock and water table are well below the surface.

Construction sites with earth disturbances located within 50 feet of surface water should ensure the storm water runoff from the site to the surface water is treated by a 50-foot natural buffer and/or erosion and sediment controls that achieve a sediment load reduction equivalent to a 50-foot natural buffer.

Natural buffers established and maintained during construction can become a permanent part of the development, providing habitat for wildlife and acting as a natural barrier for noise and views between the development and surface waters.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☒ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	25%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Limitations

Buffers can require significant land space; thick, established vegetative cover is best for sediment removal. Planted or seeded areas cannot be used as buffers for sediment trapping until the vegetation is well established.

Pollutant removal performance is best for buffers with slopes less than 5% within the buffer and contributing flow lengths less than 150 feet. Consider incorporating other BMPs measures in addition to using natural buffers if slopes within the buffer exceed 15%.

Design Basis

The effectiveness of natural buffers for sediment removal depends on buffer width, vegetation density and type, slope, soil group and infiltration rate.

Width

The recommended minimum width of a natural buffer is 50 feet measured perpendicularly from the ordinary high water mark or the edge of bank, bluff, or cliff of the water body (Figure 8 and Figure 9). The high water mark is indicated by clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, and/or the presence of litter/debris. Buffers should be provided on both sides of the surface water if development and land-disturbing activities are occurring on both sides. Take the width measurement at regular intervals along the stream if its flow path changes frequently.

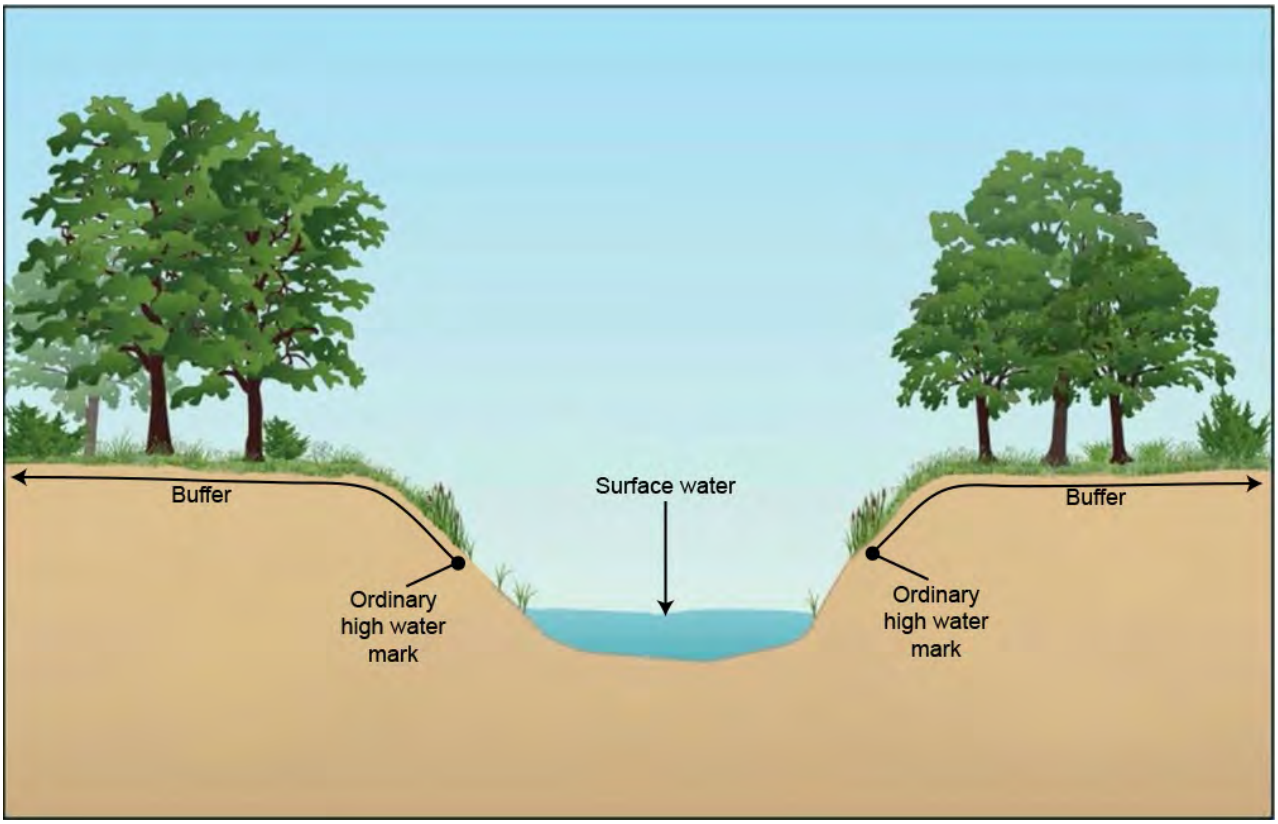


Figure 8. Buffer measurement from ordinary high water mark (EPA 2012a).

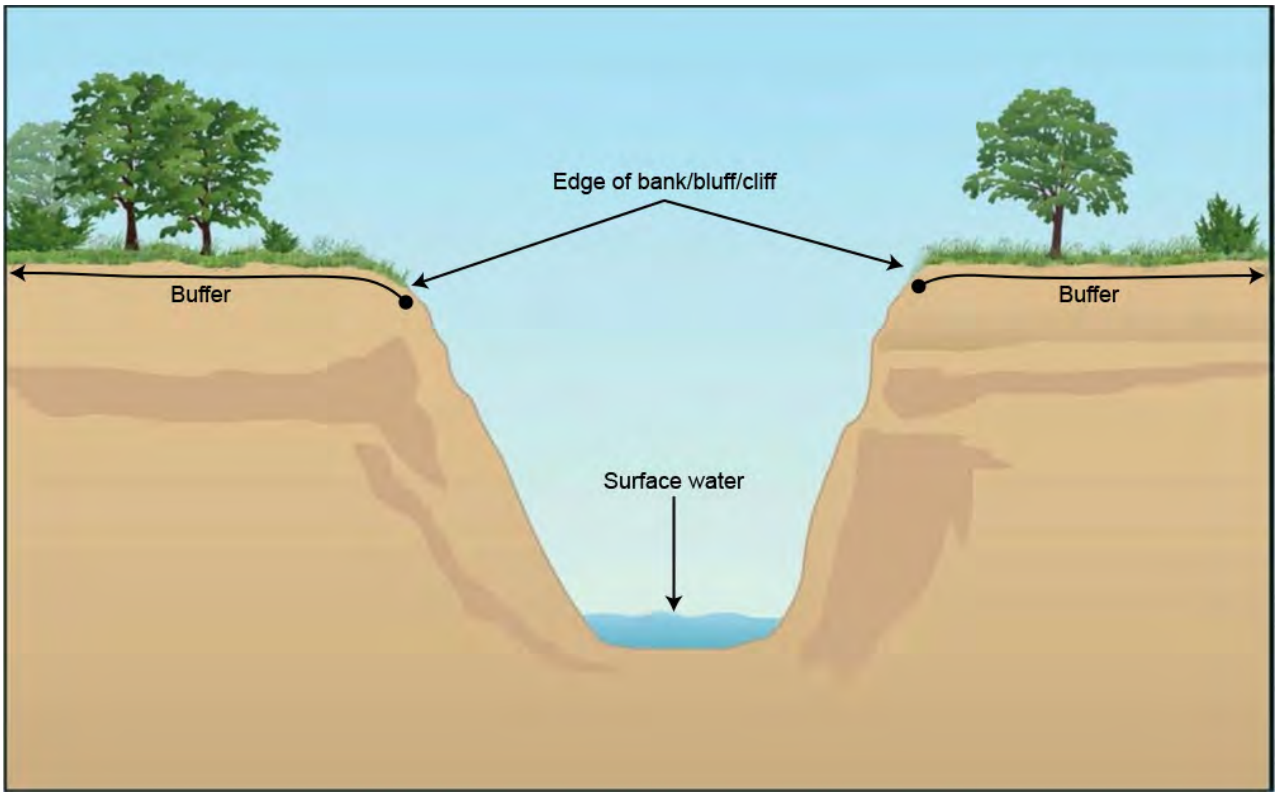


Figure 9. Buffer measurement from the edge of bank, bluff, or cliff (EPA 2012a).

Increasing the buffer width increases sediment removal (Liu and Zhang 2008). If it is feasible, a vegetative buffer with a width of at least 100 feet consisting of three zones should be maintained as a permanent BMP, especially adjacent to sensitive water bodies and wetlands. The three zones shown in Figure 10 include inner Zone 1, middle Zone 2, and outer Zone 3 and are distinguished by function, width, vegetation, and allowable uses. Use progresses from no or low impact (floodplain function and footpaths) within Zone 1, to higher impact (recreational bike paths and storm water BMPs) in Zone 2 to highest impact (lawns, gardens, and grazing) within Zone 3.

Zone 1 serves to protect the physical and ecological integrity of the surface water and has a minimum width of 25 feet plus wetland and critical habitats. Zone 2 provides distance between upland development and Zone 1 to allow for velocity reduction and sediment settling of storm water runoff. The width of Zone 2 is typically 50 to 100 feet, depending on soil type, pollutant source area, and slope and on site-specific factors such as the location and size of the 100-year floodplain. Zone 3 functions to prevent encroachment, filter sediment, and provide space necessary to convert concentrated flow to uniform shallow sheet flow. The minimum width of Zone 3 is 25 feet.

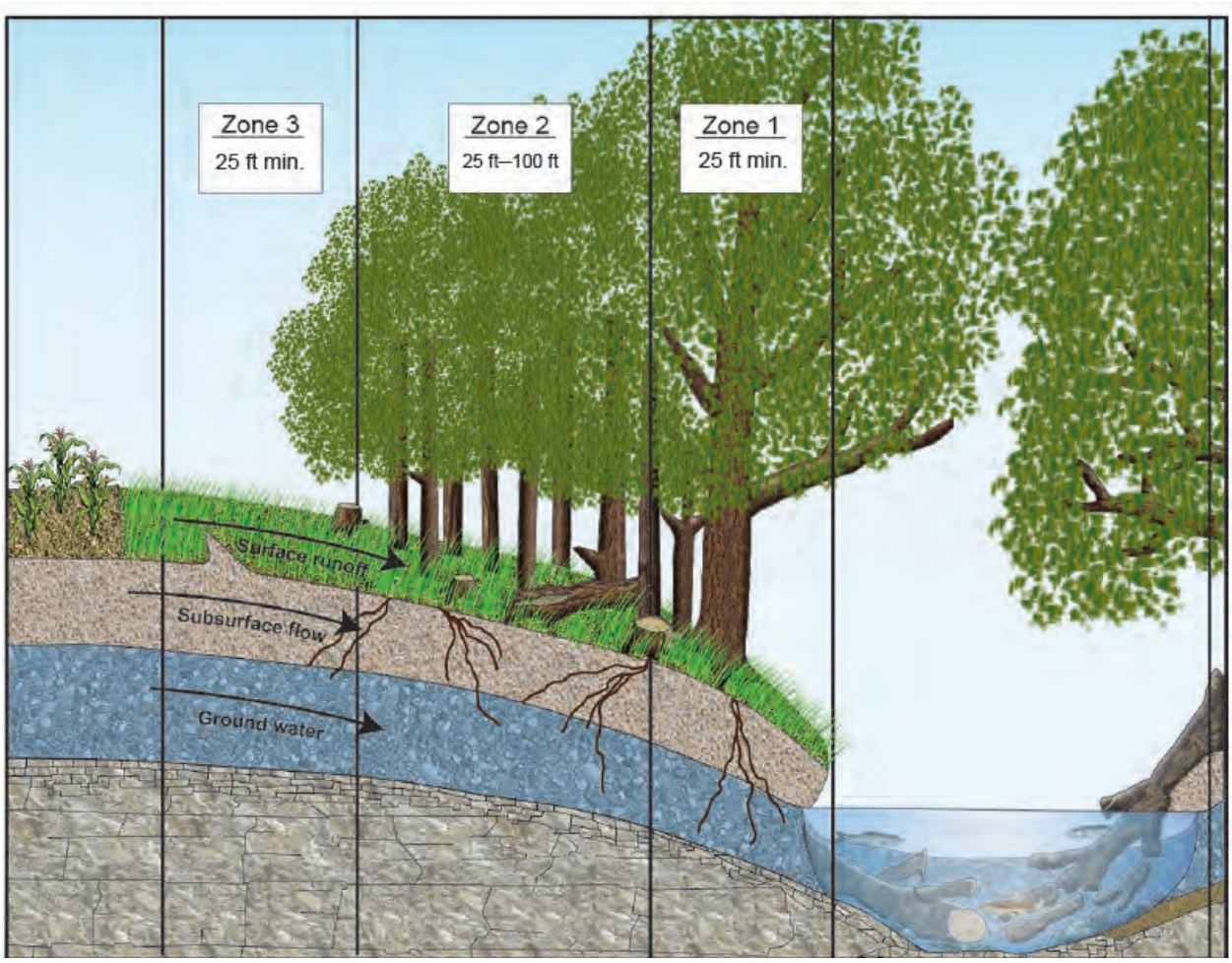


Figure 10. Three zone riparian/forest buffer (Welsch 1991).

The following additional criteria can be used to establish the total width of a three zone buffer (Welsch 1991):

Streamside Buffers

- Hydrologic Soil Group—Increase the width of Zone 2 to occupy any D and C soils subject to frequent flooding. If A or B soils are adjacent to the stream, the minimum combined width of Zone 1 and 2 is 75 feet.
- Area—The width of Zone 2 should be increased to provide a combined width of Zones 1 and 2 equal to one-third of the slope distance from the streambank to the top of the pollutant source area. The effect creates a buffer strip between the development and stream that occupies approximately one-third of the source area.

Pond and Lake-Side Buffers

- Area—The buffer should be at least one-fifth of the drainage area within the source area and is determined by creating a uniform width buffer of the required area between the source area and pond.

Vegetation

Forested buffers are preferred to vegetated strips, and existing vegetation is preferred to planted vegetation, especially near a water body where bank stabilization is desired. Tall, dense stands of grass form good sediment traps, as do willows and alder. A mix of vegetation types including grasses, deciduous and evergreen shrubs, and understory and overstory trees is also effective.

Vegetative cover throughout the buffer should be at least 75% of the total area to ensure adequate sediment removal. In areas where limited vegetation exists, consider enhancing the buffer with targeted plantings. Any planted species should be deep rooted and able to adjust to low oxygen levels. When choosing a planted species, consider site factors such as climatic, hydrologic, and soil conditions, and chose native plants that will adapt.

Other BMPs

In many cases, a vegetative buffer strip will not effectively control runoff and retain sediments unless employed with other control measures. Where heavy runoff or large volumes of sediment are expected, provide diversions or filtering measures above the buffer strip. Other BMPs that can be used with natural buffers include level spreaders or diversion measures such as diversion dikes (BMP 69) and slope drains (BMP 57).

If a 50-foot natural buffer cannot be provided on site, other control measures can be installed to provide equivalent sediment removal. These measures could include a sediment pond, additional perimeter controls, or other BMPs upgradient of the buffer.

Construction Guidelines

Before construction, the buffer boundary should be clearly marked with fencing, flagging, or other marking devices. The most effective delineation device for sensitive areas is steel construction fencing. All equipment, construction debris, and extra soil should be kept out of the natural buffer zone, and soil should not be compacted. Any planted vegetation should be well established before using the buffer for filtering runoff.

Maintenance

Buffers should be inspected at least four times a year and after large storm events exceeding 1 inch. Remove trash and repair any damage to the boundary markers. Any problem sediment accumulation should be removed. Erosion, scouring, or ponding due to channelization or high flows should be repaired with seeding, planting and/or regrading.

Keep vegetation healthy, and avoid excessive use of fertilizers, pesticides, or other chemicals. Naturally deposited leaves, woody debris, and other biomass should remain as they help retain water and filter pollutants. In Zone 3, vegetation may be mowed with clippings left in place.

Additional Resources

EPA (US Environmental Protection Agency). No date. *Riparian/Forested Buffer.* *https://enviroatlas.epa.gov/enviroatlas/DataFactSheets/pdf/ESN/PercentForestandWoodyWetlandsinStreamBuffer.pdf*.

EPA (US Environmental Protection Agency). 2012. *EPA Construction General Permit*. National Pollutant Discharge Elimination System Stormwater Program. *https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents*

Liu, X.X. and M. Zhang. 2008. "Major Factors Influencing the Efficacy of Vegetated Buffers on Sediment Trapping: A Review and Analysis." *Journal of Environmental Quality* 37: 1667–1674.

Welsch, D.J. 1991. *Riparian Forest Buffers*. Radnor, PA: US Department of Agriculture. Publ. NA-PR-07-91. *http://www.na.fs.fed.us/spfo/pubs/n_resource/buffer/cover.htm*

BMP 7: Soil Restoration and Enhancement

Description

Soil restoration and enhancement improves compacted or low organic content soils to increase infiltration capacity, biological characteristics, and the ability of the soil to support vegetation. Improving soil integrity protects air and water quality and ensures human and animal health. Soil offers critical pollutant removal functions through filtration, biological processing by microbial action, and chemical processing (Figure 16).



Figure 16. Straw added to the soil as mulch.

Soil enhancement can restore soil porosity through mechanical loosening (e.g., tilling) and/or adding soil amendments. Soil amendments, like soil conditioners and fertilizers, make the soil more suitable for plant growth and increase water retention capabilities. Examples include biochar, bone meal, peat, coffee grounds, compost, coir, manure, straw, vermiculite, sulfur, lime, meal, compost tea, hydroabsorbent polymers, and sphagnum moss.

Primary BMP Functions and Controls

☐ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☒ Filtration	☒ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
●	Phosphorus
◖	Metals
◖	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Easy
Ease of Installation	Medium
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acres
Max. Slope	30%
NRCS Soil Group	ABCD
Min. Ground Water Separation	3 feet
Min. Bedrock Separation	6 feet

Applicability

Soil restoration and enhancements apply to sites where the soil is suffering from compaction, low organic content, or lack of soil organisms and where topsoil material is lacking or unsuitable to support vegetation. Urban sites often have highly compacted soils that do not allow adequate storm water infiltration. These soils can be further compacted by site preparation, backfill methods, and heavy machinery used in final demolition.

For structural storm water controls using vegetation and relying on infiltration and subsurface recharge, soil enhancement is especially important. Encouraging vegetation and reducing the effects of compaction, soil enhancement may improve the performance of vegetated (biofiltration) swales (BMP 9), bioinfiltration swales (BMP 10), and vegetated filter strips (BMP 11).

Soil enhancement and amendments may also be needed on sites where soil has been stockpiled for extended periods of time; stockpiling disrupts soil health and results in the partial or total loss of microorganisms. Limiting the time stockpiles sit and mixing the top foot of stockpiled topsoil with the remaining soil before final placement will ensure uniform distribution of living organisms.

Limitations

Soil restoration and enhancement may be needed to improve native soils to adequately support proposed landscaping. Depending on the amount of enhancement needed, it can add significant cost. However, improving the soil can ensure that the landscaping will be sustainable over the long term.

Design Basis

Upon completing restoration and enhancement efforts, soils should be of equivalent, or better, quality than local soils and exhibit increased infiltration capacity, healthy biological characteristics, ability to support vegetation, proper soil texture, and adequate resistance to erosion.

Specific improvements may be required for select BMP use. For BMPs where rapid vegetation growth is essential, soil nutrient levels may be adjusted accordingly. Other infiltration BMPs may require enhanced drainage above and beyond that of local soils. For both general and specific soil needs, consult a local cooperative extension office or landscape professional.

Two methods have been shown to restore some soil properties damaged by compaction: (1) adding soil amendments and (2) tilling. Soil amendments, such as fertilizers and conditioners, improve the organic and microbial content and nutrients in the soil so that it can adequately support vegetation. Tilling improves soil's physical characteristics and increases available airspace and permeability. The combination of tilling and soil amendments is often the most effective strategy.

Soil Amendment

For challenging soil amendment needs, such as amending steep slopes, high erodible soils, long project durations, large project areas, or proximity to surface waters, consult a soil scientist to develop a soil amendment specification appropriate to your site. For less complicated soil amendment needs, use the guidelines provided in this BMP and in the fact sheet, *Choosing a Soil Amendment* (Davis and Whiting 2013).

Consider the following factors when selecting a soil amendment:

- How long the amendment will last in the soil
- Soil texture
- Soil salinity and plant sensitivity to salts
- Salt content and pH of the amendment
- Permeability and water retention characteristics of the soil

The properties of a healthy soil include available nutrients, high water-holding capacity, porosity, bulk density, and structure. Nutrients such as nitrogen, phosphorus, and potassium are usually lacking from the soil as plants use large amounts for their growth and survival. The proper nutrient ratio should be determined based on anticipated soil needs. Physical characteristics affect the

spaces between solid particles where water, air, and soil organisms can move (Figure 17). Soil compaction occurs when weight on the soil surface collapses these spaces, creating a hard, solid mass. Water, air, and roots may be completely unable to penetrate compacted soil, reducing or destroying its capacity to sustain life. In general, compaction problems occur when airspace is reduced to 10%–15% of the total soil volume.

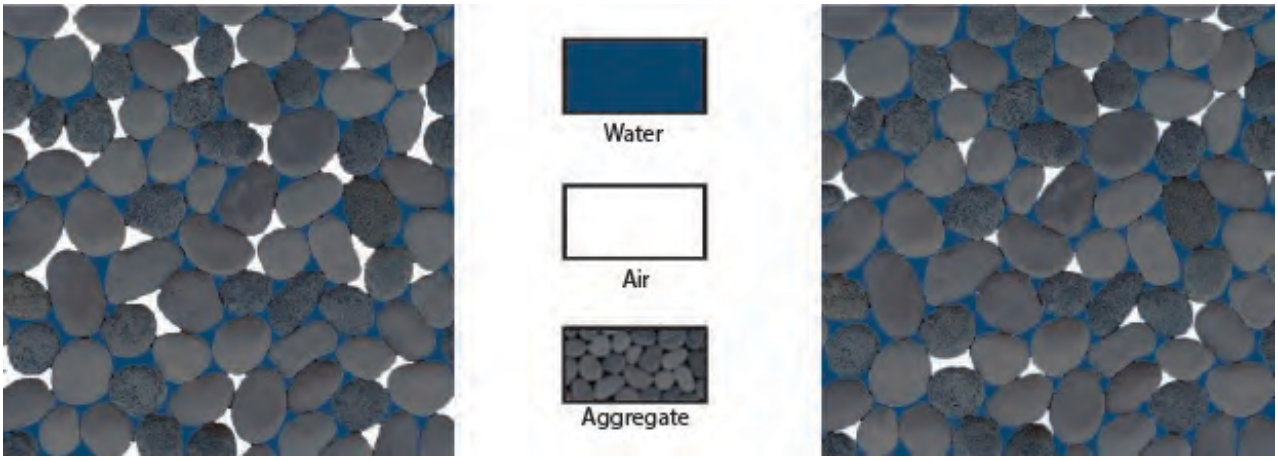


Figure 17. Healthy soil (left) versus compacted soil (right) (Pennsylvania DEP 2006).

To reduce the need for soil restoration, strip topsoil from all parts of the site that will be disturbed and stockpile on site for reuse. In addition to stockpiling existing topsoil in construction areas, soils in other areas should be managed to minimize compaction (BMP 45: Minimize Soil Compaction and BMP 38: Preserve Topsoil and Vegetation). The need for soil restoration can also be reduced by grouping plants that require high soil fertility together and planting native vegetation on the remainder of the site with unamended soils and no long-term irrigation. Short-term or periodic irrigation may be required if planting occurs during a dry season or on sandy soils. Species dependent, watering may also be necessary up to 2 years after planting and during periods of drought or intense heat.

If a site does not contain adequate topsoil, soils should be amended before revegetating. It is preferable to amend existing soils rather than to import large quantities of topsoil as purchasing and transporting clean fill is a high-cost approach. However, in certain instances importing fill may be needed based on vegetation requirements. The use of soil amendments with organic matter that has a low bulk density reduces compaction. The potential hydrologic benefits of compost-amended soils include increasing the soil's permeability and water-holding capacity, which delays and often reduces the peak storm water runoff flow rate (reduces the chance of erosion), and decreases irrigation water, fertilizer, and pesticide requirements. Materials such as compost, leaf mold, partially rotted manure, or composted sewage sludge are excellent, inexpensive sources found commercially. In addition to compost, soil conditioners, amendments, and fertilizers may be appropriate for use where the existing soil is badly damaged.

A list of advantages and disadvantages for a variety of soil amendments is shown in Table 12.

Table 12. Types of soil amendments (EPA 2007).

Amendment	Uses	Advantages	Disadvantages
Biosolids	Nutrient and organic matter source; sorbent properties	Multipurpose, multibenefit soil amendment; highly cost effective; EPA regulated; well characterized, consistent quality	Public concern/perceptions; high nutrient loadings in some settings; some sources have high moisture content.
Manures	Nutrient and organic matter source	Widely and readily available	Not consistently regulated; variable quality; not routinely treated for pathogen reduction; generally uncharacterized.
Compost	Nutrient and organic matter source	Readily accepted; stable product; used in or near water	High cost; limited availability; N quantity usually significantly lower than noncomposted materials.
Digestates	Nutrient and organic matter source	—	New enough to be regulated; variable quality; not routinely treated for pathogen reduction; generally uncharacterized.
Pulp sludges	Organic matter source; slope stabilizer	High C content; large volumes; locally available	Highly variable quality; may contain other residuals (e.g., fly ash, waste lime, clay) that can be a benefit or detriment for intended use. Total C may not reflect available C. Very low nutrient value.
Yard/wood waste	Organic matter source; can be high in C; use for bulking and structure	May be used to control erosion; variable sizes available	Large category; high variability; may be hard to obtain; can contain herbicides.
Ethanol production byproducts	Nutrient and organic matter source	—	New, not regulated; variable quality; not routinely treated for pathogen reduction; generally uncharacterized.
Lime	Increase pH; increase Ca	Regulated; well characterized; very uniform; soil aggregation	Agricultural limestone has low solubility and can become coated and ineffective at severely acidic sites. Can be a source of fugitive dust.
Wood ash	Increase pH; source of mineral nutrients, Ca, Mg, K; use for odor control	Acceptance; cost; multipurpose; limits odor of organic soil amendments	Highly variable; lime equivalent will vary by burn temperature and age of material; dioxins should not be a problem, but tests should be conducted to verify.
Coal combustion products	Increase pH; source of mineral nutrients (e.g., Ca)	Regulated; well characterized; soil aggregation; light color reduces surface temperature for seedlings; increases moisture-holding capacity; reduces odor of organic soil amendments	Varies plant to plant; can be high in B and salts; can leach Se and As.
Sugar beet lime	Increase pH	More reactive than agricultural limestone	Potential fugitive dust.
Cement kiln; lime kiln	Increase pH; high Ca	Highly soluble and reactive	Potential fugitive dust; highly caustic; variable content; may contain contaminants.
Red mud	Increase pH; sorbent	Demonstrated effective in limited testing in Australia and other sites at moderating pH and sorbing metals	Potentially costly; high salt content; variable CCE.
Lime-stabilized biosolids	Increase pH; nutrient and organic matter source; potential sorbent	—	Can have high odor; lower N content than conventional biosolids, variable lime content.
Foundry sand	Modifies texture; sorbent	Good filter; sand replacement	Can have trace metals; significant Na; only Fe and steel sands currently acceptable.
Steel slag	CCE; sorbent; Mn fertilizer	Combination of CCE and sorbent, including Mn	May volatilize ammonia.
Dredged material	Modifies texture; top soil substitute for covering sites	Top soil substitute; ideal for blending with other residuals	Needs dewatering; can have a wide range of contaminants; can have Na.
Gypsum	Good for sodic soil, low pH soil, and soil structure	Improves aggregation; offsets aluminum toxicity	Different sources of waste gypsum and wide range of potential contaminants, many of which are regulated.
Water treatment residuals (WTR)	Good for binding P; potential sorbent	Moderates P availability when mixed with high P soil amendments	Different materials have variable reactivities; may contain As and radioactive isotopes.
Coal combustion products (CCPs)	Sorbent; improve water-holding capacity; excellent mix for biosolids; compost to create cover soil	May have CCE value; large volumes available	Large quantities generally necessary to achieve benefits; can have contaminants. including Se, B, As, and metals

Tilling

Tilling mechanically loosens the soil by aeration, digging, scraping, mixing, subsoiling, or ripping the soil to circulate air into the soil mantle in various layers. Tilling exposes compacted soil devoid of oxygen to air and recreates temporary air space.

Whenever possible, perform tilling and subsoiling when the soil is mostly dry and friable to produce better results. If the soil is too wet, the subsoiler shanks slide through the ground without breaking up the soil, and the shank can actually glaze the soil and compact it more. If the soil is extremely dry, getting the subsoiler into the ground can be difficult, requiring larger, more powerful tractors to pull the shanks through compacted areas. Two passes at an angle to each other may be required to completely fracture compacted soil (Figure 18).

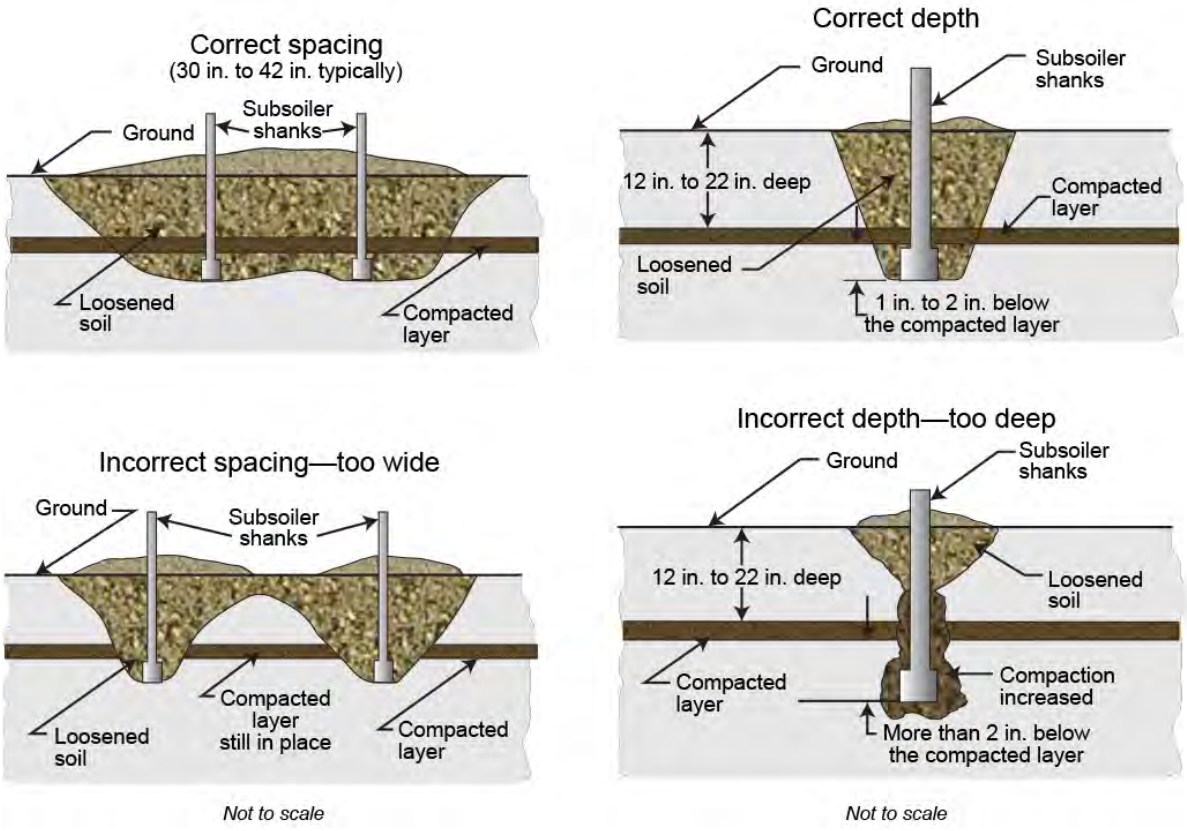


Figure 18. Effect of spacing and depth of subsoiler shanks (USDA 2008).

Other physical methods for addressing compaction include deep-water jetting and air injection, in which compressed air or water is injected to fracture the compressed soil; the fractures are then backfilled with some dry material such as vermiculite.

Determine the depth and thickness of compacted layers before deciding on the soil tilling specifications. Dig a test hole 24 to 30 inches deep and probe the sides with a knife or hand-held soil penetrometer. Soil compacted to depths of 12 to 22 inches will require ripping or subsoiling with properly spaced shanks that run 1 to 2 inches below the compacted layer.

Construction Guidelines

Add soil enhancements and amendments after grading is completed and before landscaping, seeding, or sodding.

Maintenance

After construction, monitor vegetation and adjust the use of further soil enhancements, microbial inoculants, irrigation, fertilizers, pesticides, and herbicides as necessary.

Additional Resources

Craul, P.J. 1992. *Urban Soil in Landscape Design.* Hoboken, NJ: John Wiley & Sons, Inc.

Davis, J.G. and D. Whiting. 2013. *Choosing a Soil Amendment*. Fort Collins, CO: Colorado State University Extension. *http://extension.colostate.edu/topic-areas/yard-garden/choosing-a-soil-amendment/*

EPA (US Environmental Protection Agency). 2007. *The Use of Soil Amendments for Remediation, Revitalization, and Reuse*. Cincinnati, OH: EP Solid Waste and Emergency Response. EPA 542-R-07-013. *http://www.clu-in.org/download/remed/epa-542-r-07-013.pdf*

Pennsylvania DEP (Pennsylvania Department of Environmental Protection). 2006. "BMP 6.7.3 Soil Amendment & Restoration." *Pennsylvania Stormwater Best Management Practices Manual*. Harrisburg, PA: Pennsylvania DEP. Document number 363-0300-002.

Schueler, T. 2000. "Can Urban Soil Compaction be Reversed?" *Watershed Protection Techniques* 3(2): 666–669.

Thompson, J.W. and K. Sorvig. 2000. *Sustainable Landscape Construction: A Guide to Green Building Outdoors*. Washington, DC: Island Press.

USDA (US Department of Agriculture, Forest Service). 2008. *Using Subsoiling to Reduce Soil Compaction*. Missoula, MT: USDA Forest Service, Technology and Development Program. 0834–2828–MTDC.

WDOE (Washington Department of Environmental Quality). 2009. "Building Soil—Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.1" *WDOE Stormwater Management Manual for Western Washington*. *https://ecology.wa.gov/DOE/files/45/4569b90a-217a-40d2-a997-49adb8db5d86.pdf*

BMP 8: Vegetation Restoration

Description

Restoring vegetated areas that have been disturbed or eroded decreases the amount and rate of storm water runoff through increased infiltration and evapotranspiration. Vegetated areas also improve water quality through filtering and can stabilize soil and streambanks (Figure 19).

To develop a vegetation restoration plan, conduct a thorough site evaluation, select a holistic range of native and regionally appropriate vegetation, and control any existing invasive species.



Figure 19. Streambank restoration along Lane's Creek, Caribou County, Idaho.

Applicability

Vegetation restoration focuses on replacing native vegetation that has been disturbed or eroded and should be part of a comprehensive restoration plan. BMP 32: Landscaping provides information on adding vegetation to newly developed areas using seeding, sodding, and planting.

Sustainability is the most important consideration in vegetation restoration. Nonnative sod grass lawns, or managed turf, are unsustainable due to their relatively high irrigation, fertilizer, pesticide, and mowing needs when compared to native species, which are well adapted to Idaho's climate. These grasses should be limited to use in areas where high quantities of sod grass, such as Kentucky bluegrass or perennial ryegrass, are already widely used. Alternative ground covers are available that require less maintenance and also decrease the potential for pollutants to leave the site in runoff.

A vegetation restoration plan may also be used with additional storm water and construction needs such as stabilizing stream and riverbanks and a planting plan for LID BMPs, which mimic natural drainage patterns. The goal of LID is to replicate a site's predevelopment hydrology by using design solutions that infiltrate, filter, store, evaporate, and detain runoff close to where rainfall lands.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☒ Flood Control
☐ Filtration	☒ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Nitrogen
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	NA
Max. Tributary Drainage Area	NA
Max. Upstream Slope	NA
NRCS Soil Group	ABC
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

For more information on LID practices, see Section 3.4 "Develop a Site Plan and Map" on the *EPA LID website*.

Limitations

Permanent revegetation may take several years before sufficient establishment is achieved.

Design Basis

Whenever possible, the need for revegetation should be minimized by adopting practices such as those in BMP 38: Preserve Topsoil and Vegetation. If preserving existing vegetation is not possible, replant with native plants or regionally adapted plants. These plants require less water, fertilizer, and pesticides than introduced species. Additionally, plants native to a region are usually more resistant to insects and diseases than other plants.

Native plant restoration usually involves managing communities rather than individual plants. Plants grow in communities, and understanding the importance of this pattern is essential to creating self-sustaining landscapes. Contact your local cooperative extension office to obtain native plant lists appropriate for the restoration site, or visit one of the resources below:

- *Idaho Master Gardener at the University of Idaho Extension*
- *Lawns at the University of Idaho Extension*
- *Native Plants for Idaho Roadside Restoration and Revegetation Programs*
- *North Idaho Native and Beneficial Plant List*

Base plantings on patterns of plant growth that naturally occur in the region. Field sketch the local growth patterns of regional trees and shrubs and create maps of these patterns on graph paper as roughly scaled plans of the major plants. Similar to a designer's planting plan but derived from naturally occurring patterns, these plant patterns can then be used as models to base designed and constructed plantings.

Divide the site's landscape into zones when designing the planting to take advantage of the varying conditions or microclimates that exist in every landscape and to ensure that vegetation remains healthy while requiring minimal care. These microclimate zones are based on a number of factors: the amount of water required for the vegetation present to flourish, soil group, daily sun light and shading conditions, and possible human and/or animal influences.

Revegetation is not just about replanting appropriate species but also controlling and removing ecologically inappropriate plants. Site restoration requires attention to altered soil, grading, and drainage patterns that may have allowed weeds to become established. Correcting these problems is essential to restoring a healthy plant community. For instance, changing soil conditions to favor native plants can eliminate some invasive species. Invasive plant removal may also be necessary and require grubbing, forking the soil to remove roots or tubers, and/or the selective use of herbicides through low-volume, targeted application (BMP 79: Pesticide Management).

Maintenance

Compared with nonnative lawns consisting of turf, shrub, and perennial plantings, landscapes planted with native species require less maintenance. Native species require minimal watering after

establishment unlike many nonnative species that require watering throughout their lifecycle. Native species also need little to no chemical fertilizers or pesticides. The following are characteristics of native plants that reduce maintenance:

- Species may live for many decades.
- Plants are appealing most of the year as opposed to only in certain seasons.
- Plants can tolerate a wide range of light and moisture conditions.
- Species grow into dense groupings, which reduce and eliminate unwanted weeds.

While native species require reduced maintenance requirements, they still require on-going care and attention:

- Native species cannot compete with invasive species. Mulching with a weed-free material (e.g., clean straw) will keep the weeds and introduction of invasive species at a minimum.
- Cut, rather than pull, weeds. Pulling weeds may damage the roots of young native plants. Pulling also disturbs the soil, encouraging weed growth and invasive species introduction.
- Many native species have adapted to fire-dominated ecosystems. While performing controlled burns is an option, it should only be performed by certified professionals. Cutting and removing the debris from the area mimics the natural fire cycle, is a safe alternative to controlled burns, and exposes soil to the sun's warmth, encouraging growth.

Additional Resources

American Forests. 2015. *CITYgreen*. *http://www.sustainable.org/economy/forestry-a-wood-products/366-american-forests-citygreen*

Idaho Native Plant Society. *https://idahonativeplants.org/*

EPA (US Environmental Protection Agency). 2012. *Landscaping with Native Plants*. *https://www.epa.gov/watersense/what-plant*

EPA (US Environmental Protection Agency). 2014. *Urban Forestry*. Water: Best Management Practices Fact Sheet: *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu*

State of Idaho Department of Agriculture. *Idaho's 67 Noxious Weeds*. *http://www.agri.state.id.us/Categories/PlantsInsects/NoxiousWeeds/watchlist.php*

Thompson, J.W. and K. Sorvig. 2000. *Sustainable Landscape Construction: A Guide to Green Building Outdoors*. Washington, DC: Island Press.

USDA (US Department of Agriculture). 2015. *Resource Library: Invasive Species Lists*. *http://www.invasivespeciesinfo.gov/resources/lists.shtml*

BMP 31: Topsoiling

Description

Topsoiling places material suitable for vegetative growth over disturbed lands. Often topsoiling includes native seeds and propagules in the plant growth mix. Topsoiling may involve transporting soils from off site or reusing the existing topsoil that has been stripped and stockpiled during earlier site development activities (Figure 83).

Sites improved with topsoiling are benefitted by additional biofiltration capacity, increased storm water retention and, through a more established root zone, less watering, fertilizing, and pesticide application requirements.



Figure 83. Placing new topsoil on Pioneer Mountain scenic byway, Orofino, Idaho (*Debco Construction*).

Applicability

Topsoiling is recommended on slopes no greater than 2:1 where native soils are unsuitable for vegetative growth. Topsoiling is an effective way to improve plant establishment on sites where moisture, nutrients, or pH levels are low, or where the existing soil is incapable of supporting root systems. This BMP should be used with BMP 32: Landscaping.

Limitations

Topsoil should not be applied over a subsoil of contrasting permeability. Placing clay-like topsoil over a sandy soil may cause the topsoil to separate from the existing subsoil as water flows between the two soil layers of different permeability. Topsoil should not be applied when the subsoil is frozen or extremely wet.

Stockpiling topsoil for an extended period of time disrupts soil health, resulting in the partial or total loss of microorganisms. Mixing the top foot of stockpiled topsoil with the remainder of the stockpiled topsoil before final placement ensures a uniform distribution of living organisms (BMP 44: Stockpile Management).

Primary BMP Functions and Controls

☐ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ◖ Sediment
- ○ Nitrogen
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Fair
Max. Tributary Drainage Area	Unlimited
Max. Site Slope	50%
NRCS Soil Group	ABCD
Min. Ground Water Separation	3 feet
Min. Bedrock Separation	2 feet

Design Basis

To the maximum extent practicable, the moisture-holding capacity of the soil should be maintained or increased by reusing native topsoil or adding soil amendments. The topsoil should be uniformly distributed at a minimum compacted depth of 4 inches on slopes 3:1 or steeper, and 8 inches deep or greater on flatter slopes. The soil should be approved by an agronomist and may consist of loam, sandy loam, clay loam, silt loam, sandy clay loam, or other mixtures. It should be free of subsoil debris such as sticks, invasive species, stones larger than 1.5 inch diameter, and other extraneous materials.

Topsoil can be obtained commercially or stripped, stockpiled, and replaced following construction. Stockpiled topsoil should undergo a laboratory analysis to determine organic content, pH, and soluble salts. A pH of 6.0 to 7.5 and organic content of not less than 1.5% by weight is recommended. Where soil pH is less than 6.0, lime may be applied to adjust pH to 6.5 or higher. Any soils having soluble salt content greater than 500 parts per million should not be reused.

The topsoil should be tailored to the type of permanent native vegetation desired on site. Traditional topsoil will favor grasses, while the addition of acidic high-carbon amendments may encourage more woody species.

Construction Guidelines

The following guidelines apply to the placement of topsoil:

- The existing or established grade of subsoil should be maintained.
- Lime may be uniformly applied over designated areas where the subsoil is highly acidic or high in clay content.
- Before spreading topsoil, scarify the subgrade to 4 inches deep to permit bonding of subsoil to topsoil. Ripping or restructuring (BMP 45: Minimize Soil Compaction) the subgrade may be necessary in areas that have been overly compacted to restore the infiltrative capacity of the subgrade. Tracking a bulldozer vertically over the slope will pack the soil and create horizontal erosion check slots to prevent topsoil from sliding down the slope.
- Where quantities of stockpiled topsoil on site are limited, it is more desirable to cover all areas of exposed subsoil to a lesser depth than to cover partial areas to the suggested minimum depth.
- Topsoil should not be placed when the subgrade is frozen, excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or vegetation establishment.
- Immediately after topsoil placement, stabilize the soil using landscaping (BMP 32), mulching (BMP 52), matting (BMP 54), or soil binders (BMP 55) before proceeding to the next construction phase.
- Stockpiled topsoil should be protected from erosion (BMP 44: Stockpile Management).

Maintenance

Before a site is fully established, inspect topsoil periodically and after major storm events for signs of erosion such as rills and gullies. Damaged areas should be repaired with additional topsoil and reseeded as necessary to minimize erosion and loss of topsoil.

Additional Resources

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 35: Energy Dissipation Devices

Description

Energy or velocity dissipation devices are located immediately downstream of a pipe, culvert, slope drain, rundown, or other conveyance to reduce the velocity of concentrated storm water flows and prevent scour at the outlet and erosion downstream (Figure 93).



Figure 93. Riprap located below a pipe.

Typical energy dissipation is provided by rock riprap although other devices such as mats, plates, internal dissipators, stilling basins, armored scour holes, or drop structures can also be used. Riprap outlet protection is created by an arranged layer or pile of rock placed over the soil surface below storm drain conveyance outlets.

Applicability

Install energy dissipation devices at the outlets of pipes, culverts, catch basins, sediment basins, ponds, interceptor dikes, and swales or channel sections where the velocity of flow may cause erosion in the receiving channel. Energy dissipation devices are not typically stand-alone BMPs; they are placed upstream of a BMP to facilitate pollutant removal by the downstream practice. Outlet protection should also be used at outlets where the design flow velocity may result in plunge pools (small, permanent pools located at an inlet or outfall).

Energy dissipation outlet protection should be installed early during construction activities and if necessary left as a permanent BMP after construction is completed.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acres
Max. Slope	10%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Limitations

Many types of energy dissipators are available, but many have limitations—such as the type of debris that can be handled, Froude number at the outlet, and tailwater requirements (Table 19). Some limitations to consider with rock riprap include difficulty removing sediment unless the rock is also removed and potential

negative impacts to fish habitat within natural channels. Conveyance outlets on steep slopes (greater than 10%) should have an engineered energy dissipator such as those listed in Table 19 applicable for higher Froude numbers.

Table 19. Energy dissipators and limitations (FHWA 2006).

Dissipator Type	Froude Number[7] (Fr)	Allowable Debris [1]			Tailwater (TW)
		Silt/ Sand	Boulders	Floating	
Flow transitions	na	H	H	H	Desirable
Scour hole	na	H	H	H	Desirable
Hydraulic jump	> 1	H	H	H	Required
Tumbling flow[2]	> 1	M	L	L	Not needed
Increased resistance[3]	na	M	L	L	Not needed
USBR Type IX baffled apron	< 1	M	L	L	Not needed
Broken-back culvert	> 1	M	L	L	Desirable
Outlet weir	2 to 7	M	L	M	Not needed
Outlet drop/weir	3.5 to 6	M	L	M	Not needed
USBR Type III stilling basin	4.5 to 17	M	L	M	Required
USBR Type IV stilling basin	2.5 to 4.5	M	L	M	Required
SAF stilling basin	1.7 to 17	M	L	M	Required
CSU rigid boundary basin	< 3	M	L	M	Not needed
Contra Costa basin	< 3	H	M	M	< 0.5D
Hook basin	1.8 to 3	H	M	M	Not needed
USBR Type VI impact basin[4]	na	M	L	L	Desirable
Riprap basin	< 3	H	H	H	Not needed
Riprap apron[8]	na	H	H	H	Not needed
Straight drop structure[5]	< 1	H	L	M	Required
Box inlet drop structure[6]	< 1	H	L	M	Required
USACE stilling well	na	M	L	N	Desirable

Design Basis

Detailed information on the design of the energy dissipators included in Table 19 is available in the *Hydraulic Design of Energy Dissipators for Culverts and Channels* (FHWA 2006). Gabions, which can be used as energy dissipators, are described in BMP 33. General design information for rock riprap dissipators is provided here because they are commonly used.

Riprap Apron

Riprap aprons are commonly used for temporary protection at the outlet of culverts that are 60 inches in diameter or smaller. Aprons should be constructed at a zero grade with the elevation of the downstream end of the apron equal to the elevation of the receiving channel or adjacent ground. Riprap aprons should be located so that there are no bends in the horizontal alignment.

The width of the apron should extend across the downstream channel bottom and up to the elevation of the normal channel depth or the height of the culvert, whichever is less. The width of the apron adjacent to the pipe should have a width two times the diameter of the outlet pipe, or conform to the pipe end section if used. For stability, key the rock 6 inches deep around the perimeter of the apron.

Determine the length of the apron and size of the riprap using the pipe diameter and design discharge shown in Table 20. The riprap apron should be designed to handle runoff from the largest drainage area and/or design flow to the storm water conveyance. The minimum thickness of the riprap layer should be equal to twice D_{50}. Figure 94 includes a typical plan and cross section for a riprap apron.

Table 20. Riprap apron sizing table (Colorado UDFCD 2010).

PIPE DIAMETER, Do (INCHES)	DISCHARGE, Q (CFS)	APRON LENGTH, La (FT)	RIPRAP D50 DIAMETER MIN (INCHES)
8	2.5 5	5 10	4 6
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 9 12 16
24	30 40 50 60	16 26 26 30	9 9 12 16

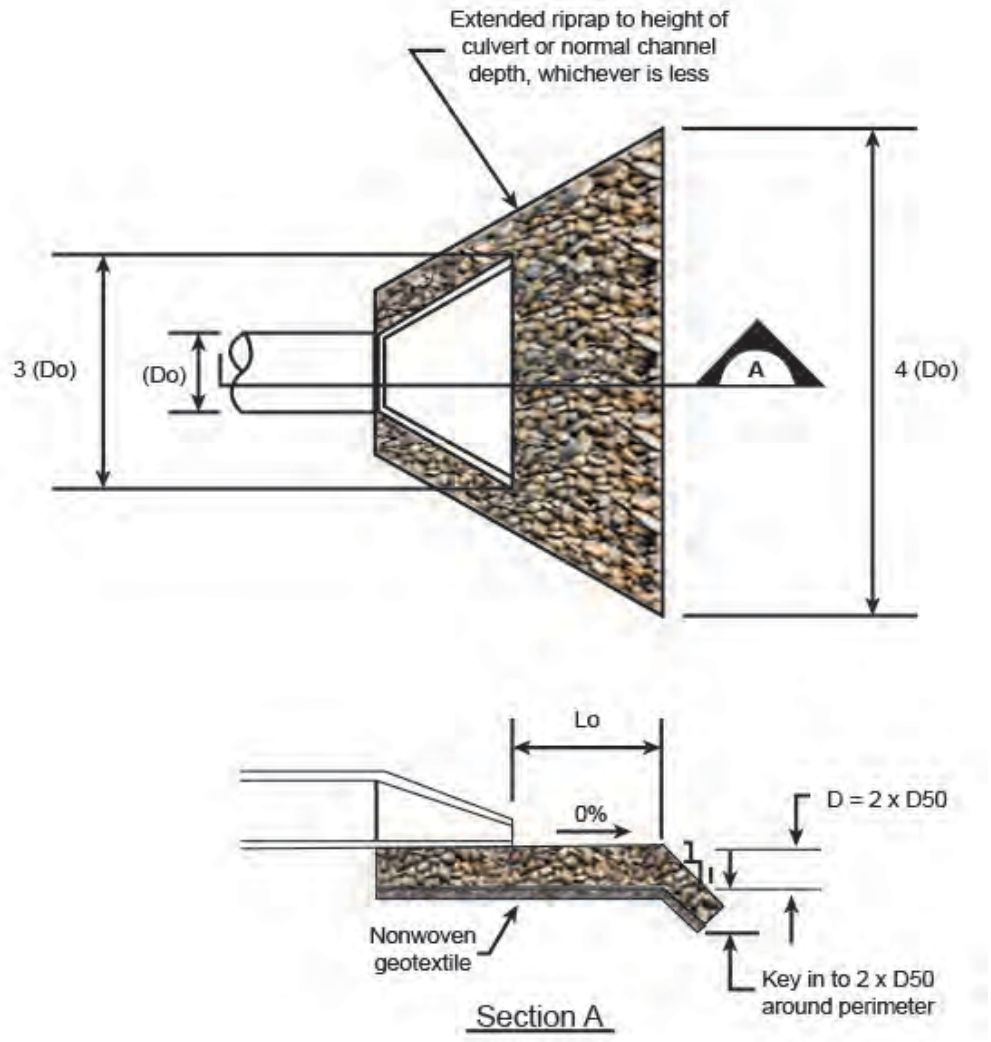


Figure 94. Riprap apron plan (Colorado UDFCD 2010).

Riprap material should be composed of a well-graded mixture of stone size so that 50% of the pieces, by weight, are larger than the D_{50} size. A well-graded mixture is composed primarily of larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone size should be 1.5 times the D_{50} size.

Stone for riprap should consist of field stone or rough unhewn quarry stone. The stone should be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones should be at least 2.5. Recycled concrete equivalent may be used if it has a density of at least 150 pounds per cubic feet and does not have any exposed steel or reinforcing bars.

A nonwoven geotextile filter is recommended between the riprap and the natural soil to prevent soil movement into and through the riprap. The geotextile filter should meet these base requirements: thickness 10–60 mils, grab strength 90–20 pounds, and conform to the "Standard Test Method for Thickness of Textile Materials" (ASTM D1777) and "Standard Test Method for Breaking Strength and "Elongation of Textile Fabrics" (ASTM D5034 and D5035). Alternatively,

a layer of granular filter material can be used in place of the geotextile. Design granular filter material by comparing particle sizes of the riprap material and the base material using the following relationship (Equation 29):

$$\frac{D_{15}(coarser\ layer)}{D_{85}(finer\ layer)} < 5 < \frac{D_{15}(coarser\ layer)}{D_{15}(finer\ layer} < 40$$

Equation 29. Granular filter size requirements (FHWA 1989).

Where

D_{15} = particle diameter at which 15% of the sediment sample is finer

D_{85} = particle diameter at which 85% of the sediment sample is finer

Riprap Basins

A riprap basin can be used as a permanent energy dissipation device at a conveyance outlet. The basin design is based on armoring a preformed scour hole to allow energy to dissipate at the outlet. The recommended geometry is shown in Figure 95 and Figure 96. The quality of the riprap and characteristics of the filter are the same as those outlined above in "Riprap Aprons."

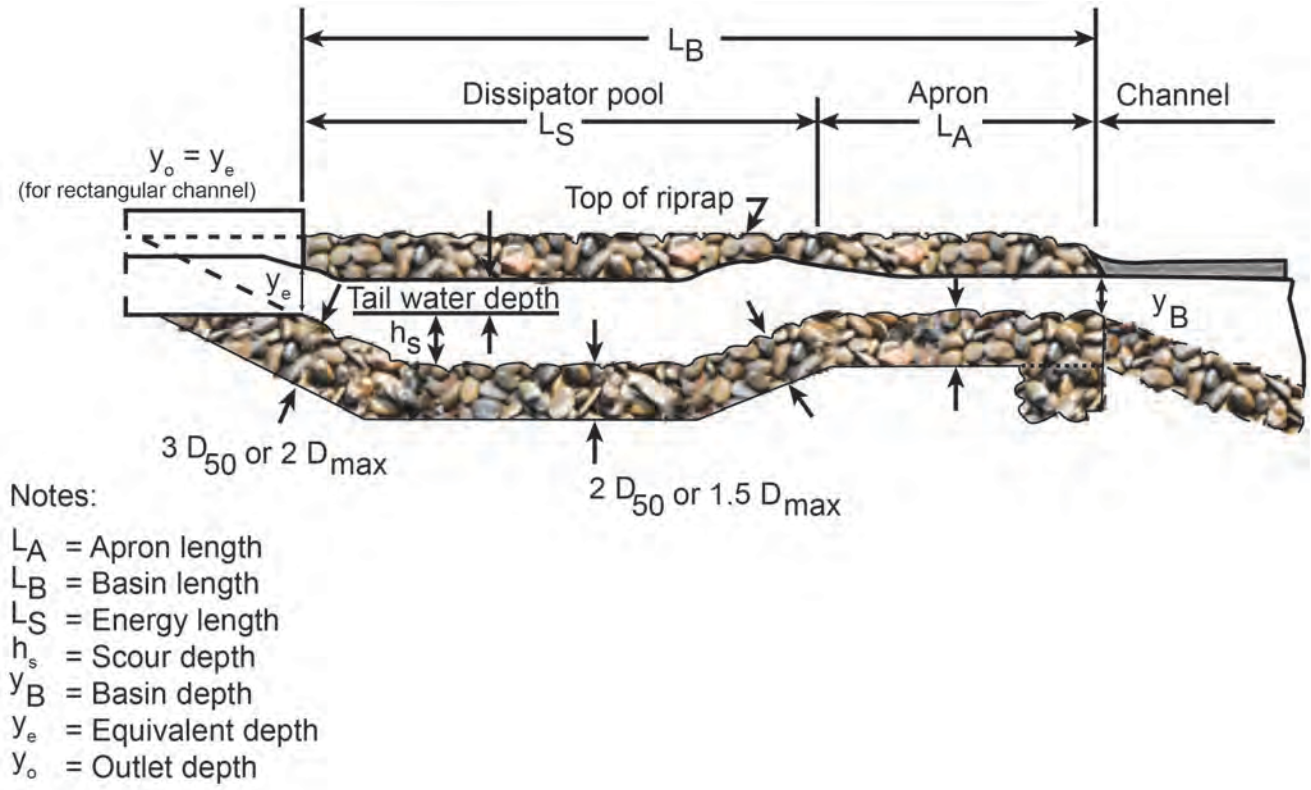


Figure 95. Profile of riprap basin (FHWA 2006).

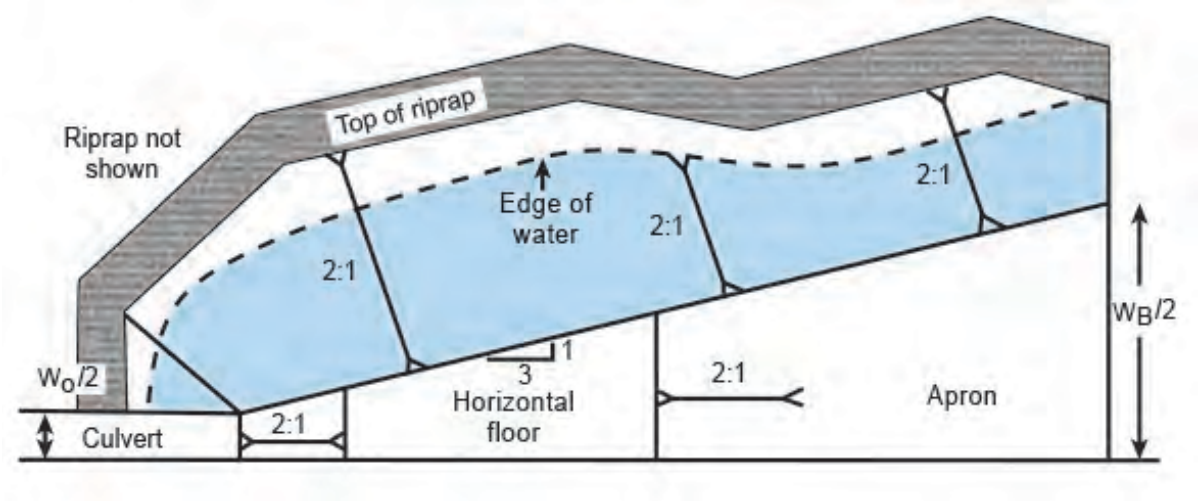


Figure 96. Half plan of riprap basin (FHWA 2006).

Riprap basins have the following features:

- Basin is preshaped and lined with riprap at least $2D_{50}$ thick.
- Riprap floor is constructed at the approximate depth of scour, h_s, that would occur in a thick pad of riprap. The h_s/D_{50} of the material should be greater than 2.
- Length of the energy dissipating pool, L_s, is $10h_s$ but no less than $3W_o$; the length of the apron, L_a, is $5h_s$ but no less than W_o. The overall length of the basin (pool plus apron), L_B, is $15h_s$ but no less than W_o.
- Riprap cutoff wall or sloping apron can be constructed if downstream channel degradation is anticipated.

Fish Passage

In sensitive fish habitat, culverts and their outlets should be designed to avoid impedances to fish and other aquatic fauna. Riprap basins could provide a resting pool, but they should not create a vertical barrier for fish passage. Flows within the culvert and at its inlet and outlet should have velocities and depths comparable to that present in the stream channel.

Construction Guidelines

Complete construction of the outlet protection before allowing erosive flows to pass through the outlet. The subgrade for the filter, riprap, or gabion should be prepared to the required lines and grades. Compact any fill required in the subgrade to a density of approximately that of the surrounding undisturbed material.

Geotextile fabric should be protected from punching, cutting, or tearing; riprap should be placed carefully to avoid damaging the fabric. Stone 4 to 6 inches in diameter may be carefully dumped onto filter fabric from a height not to exceed 12 inches. Stone 8 to 12 inches should be hand placed or the filter fabric covered with 4 inches of gravel and the 8- to 12-inch stone dumped from a height not to exceed 16 inches. Stone greater than 12 inches should only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one-half the D_{50} rock size with the dump height limited to twice the depth of the gravel protection layer (CASQA 2015).

Any damage to the geotextile filter fabric other than an occasional small hole should be repaired by placing another piece of cloth over the damaged part or by completely replacing the fabric. All overlaps whether for repairs or for joining two pieces of fabric should be a minimum of 1 foot.

The stone for riprap or gabion outlets should be delivered and placed so it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones.

Maintenance

Energy dissipation devices should be inspected annually and after heavy storms and high flows. Inspect for scouring under the outlet and dislodged stones, and repair damage promptly. Inspect riprap aprons for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap as necessary. Clean out energy dissipation devices as necessary when approximately half of the void space is filled with sediment and debris. Loose riprap may need to completely removed and replaced to remove sediment.

Additional Resources

CASQA (California Stormwater Quality Association). 2015 *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *https://www.casqa.org*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

EPA (US Environmental Protection Agency). 2014. *Riprap.* Water: Best Management Practices. *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu*

FHWA (US Department of Transportation Federal Highway Administration). 1989. *Design of Riprap Revetment.* Hydraulic Engineering Circular No. 11. Publication No. FHWA-IP-89-016. *https://www.fs.fed.us/biology/nsaec/fishxing/fplibrary/FHWA_1989_Design_of_Riprap_revetment.pdf*

FHWA (US Department of Transportation Federal Highway Administration). 2006. *Hydraulic Design of Energy Dissipators for Culverts and Channels.* Hydraulic Engineering Circular No. 14, 3rd ed. Publication No. FHWA-NHI-06-06. *http://www.fhwa.dot.gov/engineering/hydraulics/pubs/06086/hec14.pdf*

BMP 36: Construction Timing

Description

Proper timing and sequencing of construction activities minimizes erosion and sediment transport by coordinating land-disturbing activities and erosion and sediment control measures installation and by completing construction during periods of low erosion potential (Figure 97). In construction phasing, only a portion of a site is disturbed at one time, and final stabilization is completed before moving on to another part of the site, which limits potential erosion (BMP 1: Minimize Land Disturbance, BMP 39: Clearing Limits, BMP 38: Preserve Topsoil and Vegetation, and BMP 45: Minimize Soil Compaction).



Figure 97. Construction phasing reduces the amount of time soil is exposed (EPA 2003).

Applicability

All construction projects can benefit from upfront planning to phase and sequence construction activities to minimize the extent and duration of disturbance.

Large construction projects and areas where work activities can be timed to coincide with periods of low erosion potential, such as during dry weather, especially benefit from good construction timing. Small projects that are less than 5 acres in size and occur during a short time period during the dry season may qualify for waived NPDES permitting requirements. See EPA's *rainfall erosivity waivers*.

Limitations

Timing construction based on seasonal limitations may not always be possible due to bidding, letting, timing, and contract administration. Additional restrictions may exist on scheduling or sequencing of certain work activities and the maximum allowable exposure of surface area based on environmental permits and requirements.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
●	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Design Basis

The locations and dimensions of BMPs appropriate to the major phases of development should be clearly identified on the SWPPP map and included in the construction drawings (Table 21). In some cases, several drawings may be needed to show construction-phase BMPs placed according to phases of construction (e.g., clearing and grading, utility installation, active construction, and final stabilization) as erosion and sediment controls needed at a site will change as construction progresses.

Consider site characteristics and permit conditions when deciding what kind of erosion control devices to incorporate into a construction project. Select measures that can be installed without disrupting critical timing or sequencing of other construction or erosion control activities.

Construction Guidelines

Phasing

Typical phasing best practices include the following:

- Conduct work in phases so that some portions of the project site are final-graded and stabilized before the next phase of the project is started.
- Limit the amount of disturbed area at any given time on a site to the extent practical. For example, a 100-acre subdivision might be constructed in five phases of 20 acres each.
- If stockpiled material is carried over from one phase to the next, position carryover material in a location easily accessible for the pending phase so the stabilized area is not disturbed.

Timing and Sequencing

Typical timing and construction sequencing best practices include the following:

- Schedule construction during seasonal low-runoff periods under favorable soil moisture conditions, whenever possible.
- Allow time to install sediment collection systems, drainage systems, and runoff diversion devices before beginning ground-disturbing work in an area.
- Install and maintain effective soil stabilization measures as work progresses, not just when construction is completed.
- Initiate slope stabilization measures within 14 calendar days after construction activities in the portion of the site where earthmoving activities have temporarily or permanently ceased.
- Develop a scheduling/sequencing plan addressing the construction sequencing to reduce erosion potential. If using a Critical Path Method (CPM) for scheduling, incorporate the erosion control and storm water management practices into the method.

Table 21. Recommended BMPs for construction phases (Colorado UDFCD 2010).

Project Phase	Best Management Practice
Predisturbance site access	• Install sediment controls downgradient of access point (on paved streets this may consist of inlet protection) (BMP 66, BMP 74). • Establish vehicle tracking control at entrances to paved street. Fence as needed (BMP 40, BMP 65). • Use construction fencing to define the project's boundaries and limit access to areas of the site not to be disturbed (BMP 41). **Note**: it may be necessary to protect inlets in the general vicinity of the site, even if not downgradient, if there is a possibility that sediment tracked from the site could contribute to the inlets.
Site clearing and grubbing	• Install perimeter controls (e.g., silt fence and wattles) as needed on downgradient perimeter of site (BMP 64, BMP 65). • Limit disturbance to areas planned for disturbance and protect undisturbed areas within the site (e.g., construction fence and flagging) (BMP 1, BMP 2, BMP 3, BMP 39). • Preserve vegetative buffer at site perimeter (BMP 2, BMP 38). • Create stabilized staging area (BMP 37). • Locate portable toilets on flat surface away from drainage paths. Stake in areas susceptible to high winds (BMP 50). • Construct concrete washout area and provide signage (BMP 47). • Establish waste disposal areas (BMP 51). • Install sediment basins (BMP 66). • Create dirt perimeter berms and or brush barriers during grubbing and clearing (BMP 70). • Separate and stockpile topsoil; leave roughened and/or cover (BMP 31). • Protect stockpiles with perimeter control BMPs. Locate stockpiles away from drainage paths and access from the upgradient side so perimeter controls can remain in place on the downgradient side. Use erosion control blankets, temporary seeding, and/or mulch for stockpiles that will be inactive for an extended period (BMP 44). • Leave disturbed area of site in a roughened condition to limit erosion. Consider temporary revegetation for areas of the site that have been disturbed but will be inactive for an extended period (BMP 8, BMP 32, BMP 58). • Water to minimize dust but not to the point that watering creates runoff (BMP 43).
Utility and infrastructure installation	**In addition to the BMPs above**: • Close trench as soon as possible (generally at the end of the day). • Use rough-cut street control or apply road base for streets that will not be promptly paved (BMP 40, BMP 41). • Provide inlet protection as streets are paved and inlets are constructed (BMP 74). • Protect and repair BMPs as necessary. • Perform street sweeping as needed (BMP 75).
Building construction	**In addition to the BMPs above**: • Implement materials management and good housekeeping practices for home building activities (BMP 80, BMP 90). • Use perimeter controls for temporary stockpiles from foundation excavations (BMP 44). • For lots adjacent to streets, lot-line perimeter controls may be needed at the back of curb (BMP 41).
Final grading	**In addition to the BMPs above**: • Remove excess or waste materials (BMP 48, BMP 49, BMP 50, BMP 51). • Remove stored materials (BMP 32).

Project Phase	Best Management Practice
Final stabilization	**In addition to the BMPs above**: • Seed and mulch/ tackify (BMP 32, BMP 52). • Seed and install blankets on steep slopes (BMP 32, BMP 53, BMP 54) • Remove all temporary BMPs when site reaches final stabilization (BMP 62, BMP 68, BMP 70).

Maintenance

Continually monitor site conditions and work progress. Update the project work schedule to maintain appropriate timing and sequencing of construction and control applications. When the construction schedule is altered, erosion and sediment control measures in the SWPPP and construction drawings should be adjusted to reflect exiting conditions. Maintain appropriate erosion and sediment control measures that align with construction phasing and sequencing.

Additional Resources

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 37: Staging Areas

Description

Staging areas are clearly designated locations where construction equipment, vehicles, stockpiles, waste bins, office trailers, and other construction-related materials may be stored on site. Staging areas should be located, constructed, and maintained to prevent the discharge of sediment, solid waste, dust, trash, debris, or other pollutants from the site (Figure 98).



Figure 98. Construction staging area (Colorado UDFCD 2010).

Applicability

Most construction sites require a staging area. The size of the staging area depends on the size and type of the project and duration of construction.

Limitations

Some sites have limited space available, and it may be desirable to place the staging area off site or within an adjacent roadway. Staging areas in roadways require special measures to prevent materials from washing into existing storm inlets.

Measures to prevent storm water from entering the staging area tend to concentrate flow and can result in excessive erosion downstream if additional BMPs are not installed.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☒ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ◖ Phosphorus
- ◖ Metals
- ◖ Bacteria
- ◖ Hydrocarbons
- ◖ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Design Basis

Size and Location

Size the staging area so that it provides appropriate space to accommodate storage and parking needs, as well as loading and unloading operations. When designing the stabilized staging area, minimize the area of disturbance to the maximum extent practical as oversizing the staging area may disturb existing vegetation in excess of the project requirements (BMP 1: Minimize Land Disturbance and BMP 39: Clearing Limits). Oversizing increases costs and requires long-term stabilization after the

construction period. Consider using off-site parking areas and restrict vehicle access to the site if possible to minimize the size needed for staging.

Place staging areas where site impacts will be minimized and at least 50 feet away from streams, surface waters, or wetlands. If possible, locate the staging area in a place that will be disturbed, such as the planned location for a road or parking area, and move it as construction progresses to limit the amount of unnecessary site disturbance.

Features

The staging area should have a stabilized surface, either paved or covered with 2- to 4-inch diameter aggregate at 3 to 6 inches deep, and accessed by a stabilized construction entrance. If the staging area is located in an area that would not be otherwise disturbed, consider using construction mats in lieu of rock to minimize long-term stabilization needs. BMP 41: Stabilized Construction Roads and Staging Areas provides more information on surface treatment requirements.

The grading in and around the staging area should control uncontaminated flow by diverting it around areas that may have pollutants and also contain potentially contaminated flows or divert them to treatment facilities.

Surround the staging area by construction fencing to prevent unauthorized access to construction materials. Perimeter sediment controls such as silt fence (BMP 65), sediment fiber rolls (BMP 64), or other measures should also be installed around the area as appropriate.

Materials storage should follow guidelines from BMP 77: Outdoor Storage, BMP 46: Spill Prevention and Control, and BMP 87: Outdoor Loading and Unloading of Materials. To comply with the Construction General Permit (EPA 2012b), storage areas for building products must provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these products from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas.

Materials should be stored separately as appropriate using guidelines from BMP 48: Hazardous Materials Management. Hazardous or toxic wastes should be stored separate from construction and domestic waste. Flammable and combustible material should be segregated and stored in appropriately sized secondary containment.

Flow Diversion

Limiting the flow across staging areas reduces the volume of storm water that may carry pollutants from the area and require treatment. If the staging area cannot be located away from areas expected to receive significant volumes of storm water runoff, flow diversion BMPs, such as storm water conveyances, dikes, or berms, are needed.

Storm Water Conveyances

Storm water conveyances include either temporary or permanent channels, gutters, drains, or sewers. The conveyances are constructed or lined with many different materials, including concrete, clay tiles, asphalt, plastics, metals, riprap, compacted soils, and vegetation. By their

nature, storm water conveyances concentrate flow, and storm water should be routed through stabilized structures to discharge to a receiving water or other storm water BMP.

In planning for storm water conveyances, consider the amount and speed of typical storm water runoff. Also, consider the storm water drainage patterns, so that channels may be located to collect the most flow and built to handle the appropriate runoff volume. When deciding on the type of material for the conveyance, consider the material's resistance, durability, and compatibility with any pollutants it may carry.

Conveyance systems are most easily installed when a facility is initially constructed. Where possible, use existing grades to decrease costs. Grades should be positive to allow for the continued movement of the runoff through the conveyance system; however, grades should not increase velocity, causing excess erosion. When assessing erosion potential, consider the materials used for lining the conveyance and types of outlet controls provided. Reference the following BMPs for additional design parameters.

- BMP 28: Conveyance Furrows for Roof Runoff
- BMP 56: Riprap Slope Protection
- BMP 57: Pipe Slope Drain
- BMP 68: Temporary Swale

Dikes and Berms

Diversion dikes or berms are ridges built to block runoff from passing beyond a certain point. In planning for dike installation, consider the slope of the drainage area, height of the dike, amount of runoff it will need to divert, and type of conveyance that will be used with the dike. Steeper slopes result in higher volumes of runoff and higher velocities, which the dike should be capable of handling. Dikes are limited in their ability to manage large volumes of runoff. Temporary dikes (usually made of dirt) generally only last for 18 months or less but can become permanent structures by stabilizing them with vegetation. Slope protection such as vegetation is crucial for preventing the erosion of the dike. For additional design parameters, see BMP 69: Diversion Dike and BMP 70: Temporary Berms.

Construction Guidelines

Staging areas should be planned and designed before starting construction; however, certain BMPs, such as dikes and berms, may be constructed at any time. Implementing staging areas and associated drainage needs should also be incorporated into BMP 36: Construction Timing.

Specific construction methods apply to the type of conveyance, dikes, berms, graded areas, and pavements being used. Refer to applicable BMPs for construction guidelines.

Maintenance

Maintenance of staging areas includes inspecting and repairing the stabilized surface, repairing perimeter controls, and following good housekeeping practices.

Storm water diversions, such as conveyances and dikes, should be inspected regularly and within 24 hours of a storm event. Daily inspections may be required during periods of prolonged rainfall

as heavy storms may clog or damage the conveyances or wash away parts of temporary dikes. Any necessary repairs should be made immediately to ensure the structure continues to function effectively.

Inspect unpaved, graded areas to check for gullies and other signs of erosion. Inspect paving regularly for cracks that may allow contaminants to seep into the ground. Ensure drains receiving the discharge from the paved area remain free of clogged sediment or other debris so that the water does not back up into areas where pollutants may be.

When construction is complete, debris, unused stockpiles, and materials should be recycled or disposed of properly (Section 3.10.7, "Construction Disposal Alternatives"). Permanently stabilize staging areas with vegetation or other surface cover planned for the development.

Additional Resources

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

BMP 38: Preserve Topsoil and Vegetation

Description

Protect topsoil and vegetation (e.g., trees, grasses, and other plants) by preventing disturbance or damage to specified areas of the construction site. Preserving natural vegetation and native topsoil prevents soil erosion by minimizing the amount of bare soil exposed to erosive forces (Figure 99). Vegetation also provides storm water detention, biofiltration, and aesthetic value.

Even if existing vegetation will not remain permanently after construction is completed, existing vegetation and topsoil can still be preserved with proper phasing during construction to provide a stable surface cover.



Figure 99. Preserve vegetation (Elkhart County SWCD 2007).

Applicability

This BMP applies to all construction sites with existing vegetation. Areas where preserving vegetation and topsoil can be particularly beneficial are floodplains, wetlands, streambanks, steep slopes, and other areas where structural erosion controls would be difficult to establish, install, or maintain.

Compared to newly planted or seeded areas, preserving natural vegetation has many advantages:

- Handles higher quantities of storm water runoff than newly seeded areas.
- Does not require time to establish.
- Greater filtering capacity because the vegetation and root structure are denser in preserved natural vegetation than in newly seeded areas.
- Requires less maintenance, watering, and chemical application (e.g., fertilizer and pesticides) than new vegetation.
- Enhances aesthetics.
- Provides areas for infiltration, reducing the quantity and velocity of storm water runoff.
- Allows areas where wildlife can remain undisturbed.
- Provides noise buffers and visual screens for construction operations.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Limitations

Preserving natural vegetation may be impractical in some situations because it may constrict the area available for construction activities, or it may not be cost-effective in areas with high land values. In areas with high land values, projects may need to be designed with little or no vegetation intended to remain to maximize development density. For sites with diverse topography, it may be difficult and expensive to save existing vegetation while grading the site for the development.

Design Basis

Successfully preserving vegetation requires good planning and site management. Preserving natural vegetation may affect some aspects of staging, work sequencing, and construction cost. Erosion control measures may be needed around the perimeter of the preserved area to maintain adequate water flow and drainage and prevent damage from excessive erosion or sedimentation.

Identify areas to be protected on the construction plans. Preserve individual natural vegetation, such as trees, shrubs, or vines, although preserving vegetation in clumps may be more practical. Protection areas should extend to the dripline of any trees to be preserved. The dripline marks the edge of the tree's foliage where drips from rainfall would drop. When selecting trees to be preserved, consider the location, vigor, age, species, and wildlife benefits of the tree. Healthy, older trees that are well-suited to the site conditions and are beneficial to wildlife are most important to preserve.

Vegetation protection areas should be marked in the field before any site disturbance begins. Clearly mark the areas to be preserved with construction fencing and/or a perimeter control, such as silt fencing (BMP 65) or fiber rolls (BMP 64) if the protected area is located downgradient of areas to be disturbed. Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position. No construction activity, including stockpiling, materials storage, or equipment parking, should be allowed within the protected area.

Plants must be protected from three types of injuries possible during construction: impacts, grade changes, and excavations. By instructing employees and subcontractors to honor the limits of protection areas, the vegetation should be protected from these injuries.

Construction Guidelines

Check the project plans for areas designated for preserving natural vegetation. Keep all construction equipment, materials, and waste out of the designated areas. Root pruning and fertilizing before construction is recommended where trees are near the edge of protected areas. These practices should be supervised by a licensed arborist for the maximum survival rate.

Do not modify existing drainage patterns through or into any preservation area unless specifically directed by the plans or approved by the local permitting authority.

Retain protective fencing until all construction activity is complete to avoid damage during site cleanup and final stabilization.

Maintenance

Inspect fencing at regular intervals to ensure it is in place, and the preserved vegetated areas remain undisturbed and are not overwhelmed by sediment. Implement maintenance or restorative actions as needed. Proper maintenance is important to ensure healthy vegetation that can control erosion.

Different species, soil groups, and climatic conditions will require different maintenance activities such as mowing. Perform maintenance regularly, especially during construction.

If damage occurs to a tree, consult an arborist for guidance on how to care for the tree. If a tree in a designated preservation area is damaged beyond repair, remove and replace with a 2-inch diameter tree of the same or similar species. If damage occurs to vegetation, reseed the area with the same or similar species.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *https://www.casqa.org*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

Elkhart County SWCD (Elkhart County Soil and Water Conservation District). 2007. *BMP Hall of Fame*. Goshen, IN.

EPA (US Environmental Protection Agency). 2014. *Preserving Natural Vegetation*. Water: Best Management Practices. *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu*

King County (King County, Washington). 2009. *King County, Washington Surface Water Design Manual.* Seattle, WA: King County, Department of Natural Resources.

BMP 39: Clearing Limits

Description

Establishing well-defined clearing limits on a construction site reduces the amount of bare soil exposed to erosive forces and prevents erosion and storm water sedimentation. Limits are accomplished by controlling the amount of ground cleared and grubbed at any one time and minimizing the amount of time bare ground is exposed before slope protection or stabilization measures are put into place (Figure 100).

This measure, with appropriate timing (BMP 36: Construction Timing), can reduce unneeded erosion and sedimentation (BMP 1: Minimize Land Disturbance and BMP 38: Preserve Topsoil and Vegetation).



Figure 100. Construction fencing used to define clearing limits on a construction site.

Applicability

This BMP is suitable for all construction sites where areas of undisturbed vegetation will be retained while other vegetation areas must be removed to facilitate construction. Careful coordination of land clearing, grading, and erosion control measures (BMP 36: Construction Timing) should be a design consideration for all projects.

Limitations

Establishing clearing limits may not apply on sites where existing vegetation cannot be preserved.

Design Basis

Minimizing land disturbance should occur during the site design phase (BMP 1: Minimize Land Disturbance), and clearing limits should be identified on the SWPPP.

- Before site design begins, delineate all sensitive areas and any vegetation (such as desirable trees) to be preserved within the project site.
- Evaluate the erosion potential of the project site (based on slope, soil group intended season of

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

work, and use of heavy equipment). Avoid clearing steep slopes whenever possible. Retain the native topsoil and vegetation to the maximum extent possible.

Based on the erosion evaluation, prepare a site plan that minimizes disturbance to sensitive areas, desirable vegetation, steep slopes, and erosive soils. In the project site plan, clearly specify the maximum allowable exposure area (Figure 101).

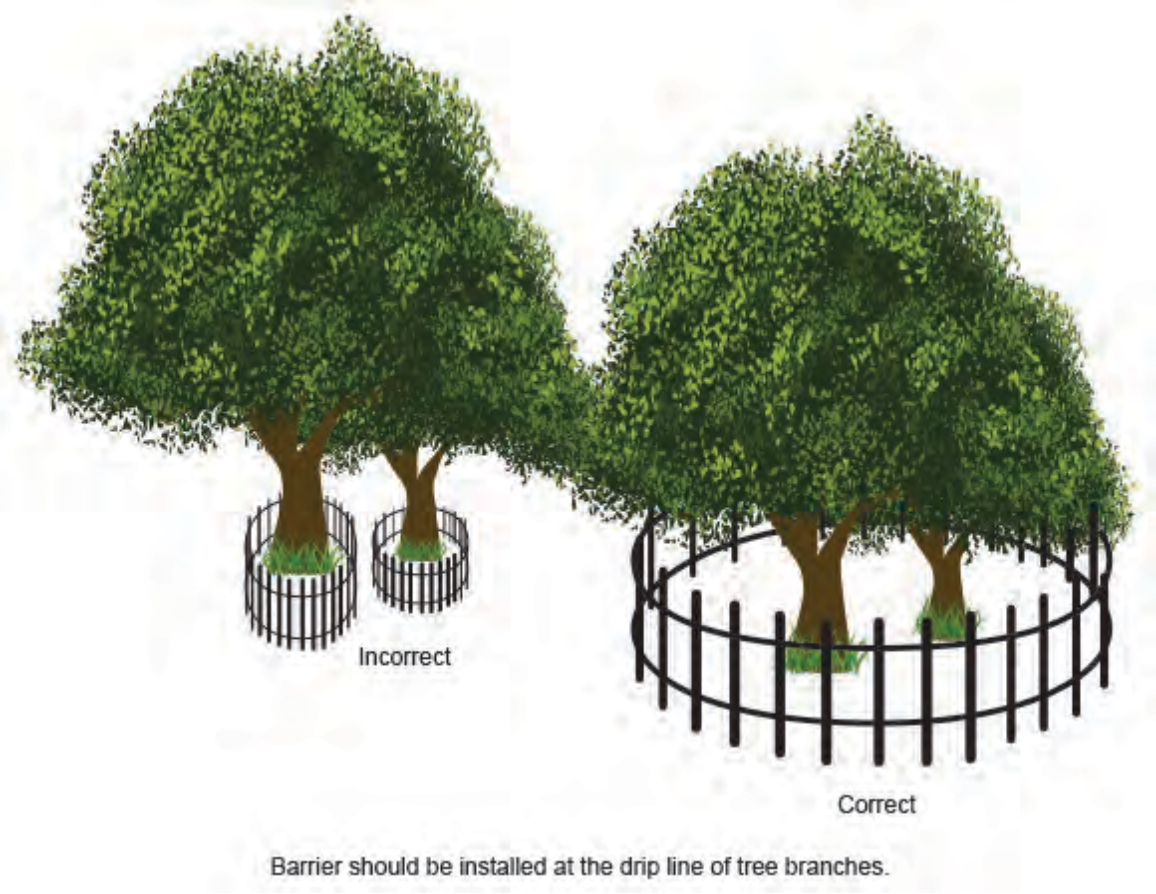


Figure 101. Vegetation barrier installation.

Construction Guidelines

During construction, the clearing limits should be clearly marked with brightly colored tape or plastic or metal safety fencing before beginning any land-disturbing activities, including clearing and grubbing. If tape is used, ensure it is 3 to 6 feet high, supported with sturdy vegetation or stakes, and highly visible.

Inform equipment operators of vegetation areas that should be left undisturbed and those not needed for the specified construction or related staging activities (BMP 38: Preserve Topsoil and Vegetation). Retain the duff layer, native top soil, and natural vegetation in an undisturbed state to the maximum degree practicable. Where clearing is required, follow these practices:

- Minimize compacted native soil by using plywood sheets, mulch, or wood chips.
- Do not place fill or deep cuts within dripline of trees to be preserved.

- Stabilize and reclaim the slope as work progresses to minimize the amount of disturbed soil. At a minimum, stabilization measures should be initiated within 14 days after ceasing work in a given area or as soon as practicable during seasonally arid periods.
- Conduct work in units or stages so that construction and stabilization takes place promptly after clearing and grubbing activities are completed.
- Schedule construction phasing to ensure cleared and graded areas are ready for seeding during the specified seeding season for the site location (BMP 32: Landscaping).
- Implement soil stabilization measures concurrently with the clearing and grading progress work to minimize the length of time that bare ground lies exposed to erosion.

Maintenance

Inspect fencing regularly and repair or replace as needed. Conduct periodic inspections to check for unnecessary ground disturbance. Check for clearing and grubbing beyond the contractor's capability to keep grading and pollution control measures current (according to accepted work schedule). Maintain clearing and grubbing limit markings until work is completed in that area. Remove and properly dispose of the material used in implementing this BMP.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

Central Oregon Intergovernmental Council. 2010. *Central Oregon Stormwater Manual.* 2010. Bend, OR.

King County (King County, Washington). 2009. *King County, Washington Surface Water Design Manual.* Seattle, WA: King County, Department of Natural Resources.

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 41: Stabilized Construction Roads and Staging Areas

Description

Stabilized construction roads and staging areas are clearly designated areas where construction equipment and vehicles travel and stockpiles, waste bins, material storage, and other construction-related equipment are stored. Stabilizing these areas immediately after grading reduces erosion caused by construction traffic and construction activities (Figure 108).

Methods for reducing erosion on stabilized construction roads are included in BMP 42.



Figure 108. Temporary construction access road (ITD 2014).

Applicability

Stabilize roads and staging areas whenever they are used by construction traffic or where concentrated traffic occurs, such as around materials storage areas. Stabilization is especially important for construction during wet weather, where dust can be a problem, on slopes greater than 5%, and/or adjacent to water bodies. This practice is also important on large sites where heavy equipment traverses the site for large grading operations.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Slope	15%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	3 feet

Limitations

During design and planning, minimize the disturbance area to the maximum extent practical. Oversizing the stabilized staging area may result disturbing existing vegetation more than required for the project. Excess disruption increases costs and requirements for long-term stabilization after construction.

Temporary roads that encroach on jurisdictional wetlands require appropriate permits.

Design Basis

Location

Place construction roads and staging areas where site impacts will be minimized and as far away as possible

from streams, surface waters, or wetlands. Sites that include permanent roads or parking areas are recommended for construction roads and staging areas.

Temporary roads should mimic the natural slope, not disrupt natural drainage pathways, and have a maximum longitudinal slope of 15%. Grade the roads to prevent runoff from leaving the site. Roadways should be graded to drain transversely into stabilized drainage swales or gravel berms next to the road. Direct intercepted runoff from the road to a sediment trap (BMP 66) or other sediment control measure.

Surface

Roads and staging areas should be constructed to handle the maximum expected loads during construction, and whenever possible, placed on a firm, compacted subgrade. If design recommendations are not available from a geotechnical or civil engineer, stabilize the surface by either paving or placing 2- to 4-inch diameter aggregate 3 to 6 inches deep.

The aggregate can be crushed rock, gravel base, recycled concrete, or crushed surfacing base course. Early application of road base is generally suitable where a layer of coarse aggregate is specified for final road construction.

Geotextile Fabric

Most installations will include geotextile fabric placed over the entire area to be covered with aggregate. Work on single residential lots will generally not need geotextile fabric unless there is potential for excessive erosion, a high water table, or other risk factors. The geotextile should be a woven or nonwoven fabric consisting only of continuous chain polymeric filaments or polyester yarns. The geotextile should be rot resistant and inert to commonly encountered chemicals, hydrocarbons, and mildew. ITD's *Standard Specifications for Highway Construction*, Section 718 provides guidance on geotextile properties for a variety of applications (ITD 2017).

Fencing

Construction fencing may be needed to limit access of vehicles to roads and staging areas that are stabilized and to prevent unauthorized access to construction materials.

Sediment Control

Perimeter sediment controls such as silt fence (BMP 65), sediment fiber rolls (BMP 64), or other measures may be needed around construction staging areas. Erosion control methods for temporary roads include road sloping, rolling dips, waterbars, open-top box culverts, or level spreaders. BMP 42: Erosion Prevention on Construction Roads provides more information.

Construction Guidelines

Construction roads and staging areas should be stabilized immediately after grading. If construction roads do not adequately reduce track out to adjacent property or roadways, a wheel wash system may be required as described in BMP 40: Vehicle Sediment Control.

Maintenance

Inspect all devices regularly, especially after large storm events. Make repairs promptly to avoid progressive damage. Aggregate should be added as required to maintain a stable driving surface and to stabilize areas that have eroded. Remove accumulated sediments as necessary from roadside swales to ensure proper functioning.

After construction is complete, temporary construction roads and staging areas should be removed and the area, regraded, and restored to preconstruction condition or better using permanent erosion and sediment control BMPs. Remove or stabilized trapped sediment and permanently stabilize disturbed areas. When a temporary construction road or staging area is used for a permanent road or parking surface, the subgrade is subject to inspection before final paving.

Additional Resources

ITD (Idaho Transportation Department). 2017. "Geotextiles." Section 718. *Standard Specifications for Highway Construction*. Boise, ID.

ITD (Idaho Transportation Department). 2014. "Sediment Control Best Management Practices." SC-12 Temporary Roads and Standard Drawing P-1-F. *Best Management Practices*. *http://apps.itd.idaho.gov/apps/env/BMP/PDF%20Files%20for%20BMP/Chapter%201/Chapter%201%20Erosion%20Control%20Best%20Management%20Practices.pdf*

BMP 42: Erosion Prevention on Construction Roads

Description

Haul roads, detours, access roads, and other unpaved or temporary roadbeds associated with a construction project should include erosion prevention measures (Figure 109). BMP 41 provides recommendations for temporary construction roads. Erosion prevention measures for temporary construction roads include the following:

- **Waterbar (or cross ditch)**—A cut and berm built at a downward angle across the roadway, extending from the cut bank to the opposite fill shoulder. Waterbars reduce erosion by diverting storm water runoff from the road surface and directing it to a safe discharge area.
- **Road sloping**—A method of constructing the road with an inward slope of 1% to 2% from the fill slope to the cut slope. Sloped roads are designed to divert surface water off the entire road surface and concentrate flows to discharge into a sediment basin (BMP 66) or another sediment control device.
- **Rolling dip**—A method of constructing the road with shallow, outward-sloping dips or undulations to collect surface runoff and convey it away from the road surface.



Figure 109. Sloped area on side of road directs storm water.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acres
Max. Slope	15%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	3 feet

Applicability

A waterbar is a temporary or permanent drainage facility on light-use, low-maintenance, unpaved roads. Waterbars should be placed above grade changes to prevent water from flowing down steeper portions of roads or skid trails. Bars may also be placed above intersections of roads, skid trails, or landings to protect these disturbed areas.

Road sloping is used as a drainage measure on temporary or low-traffic haul roads where erosion of the roadbed and fill slope is unlikely due to low runoff volume or intensity.

A rolling dip is used as a runoff diversion measure to prevent erosion of the road surface. Rolling dips are effective on long inclines to keep storm water from flowing directly down the road, where it may cause gullying and other damage to the road surface and grade.

Limitations

A waterbar is suitable only for light-use, low-maintenance, unpaved roads. Road sloping is suitable only for low-traffic haul roads where runoff volume and intensity are low. A rolling dip is not suitable on road grades steeper than 5%.

Design Basis

Waterbars are generally constructed using a blade-equipped tractor or by hand. The size of the waterbar depends on the amount of precipitation in the area, soil erodibility, and anticipated traffic (Figure 110).

- The waterbar should extend from the cut-bank side of the road completely across to the fill-slope side.
- Cut dimensions: Up to 18 inches deep across road, 8 to 18 inches deep at outlet, 3 to 4 feet wide.
- Berm dimensions and orientation: 12 to 18 inches high with 5-inches minimum height, skewed at angle of 30° to 40° across road.
- Discharge: Runoff should not be directed onto fill material without proper energy dissipation and drainage away from the fill.

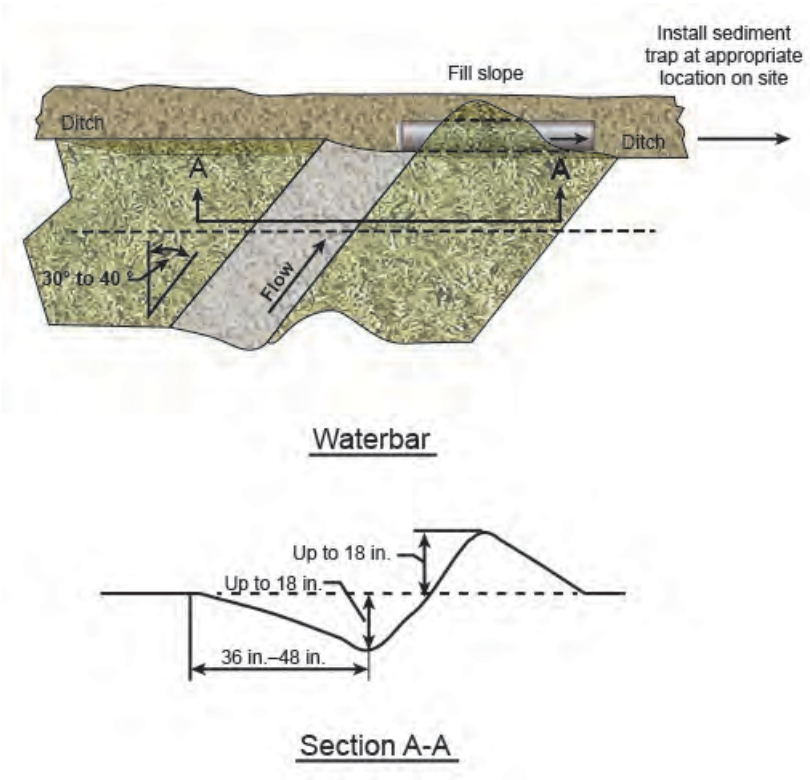


Figure 110. Waterbar (ITD 2014).

Road slope should be approximately 1% to 2% from the fill slope inward to the cut slope. Berms on the outside of the road should be limited or removed to allow water to flow off the road surface. Provide sediment collection or erosion-control measures at the toe of the cut slope to prevent excessive erosion and sediment transport (Figure 111).

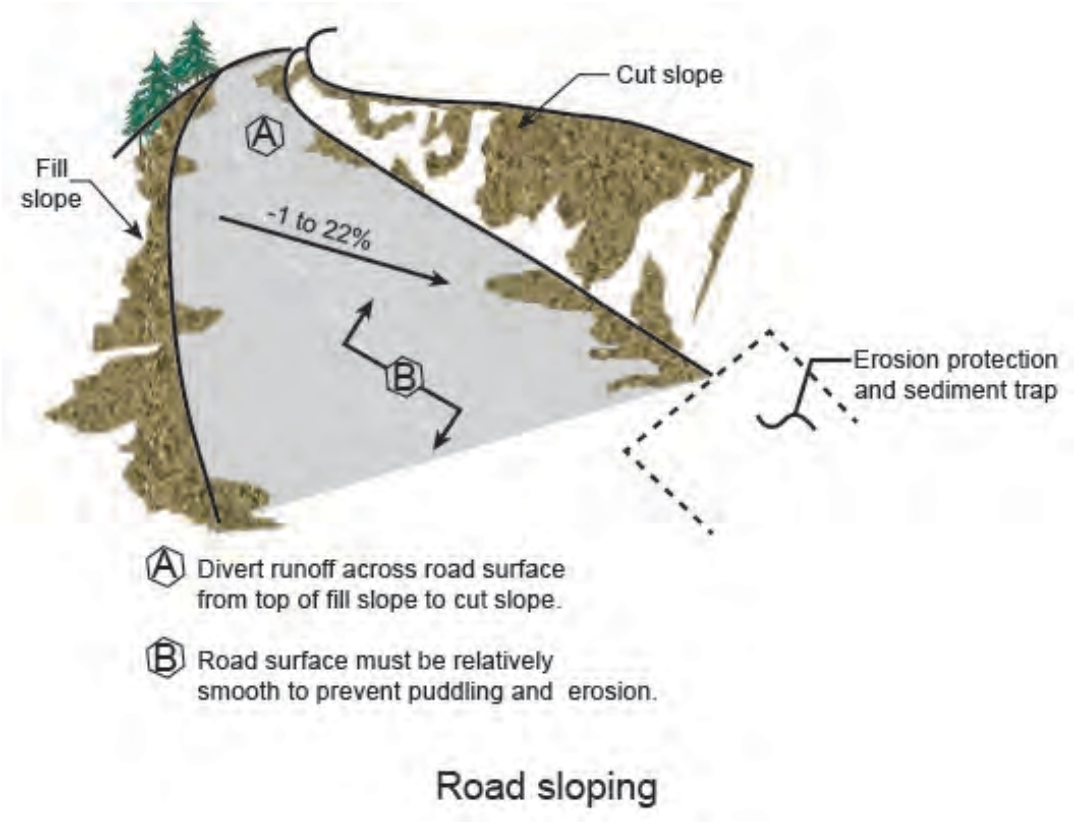
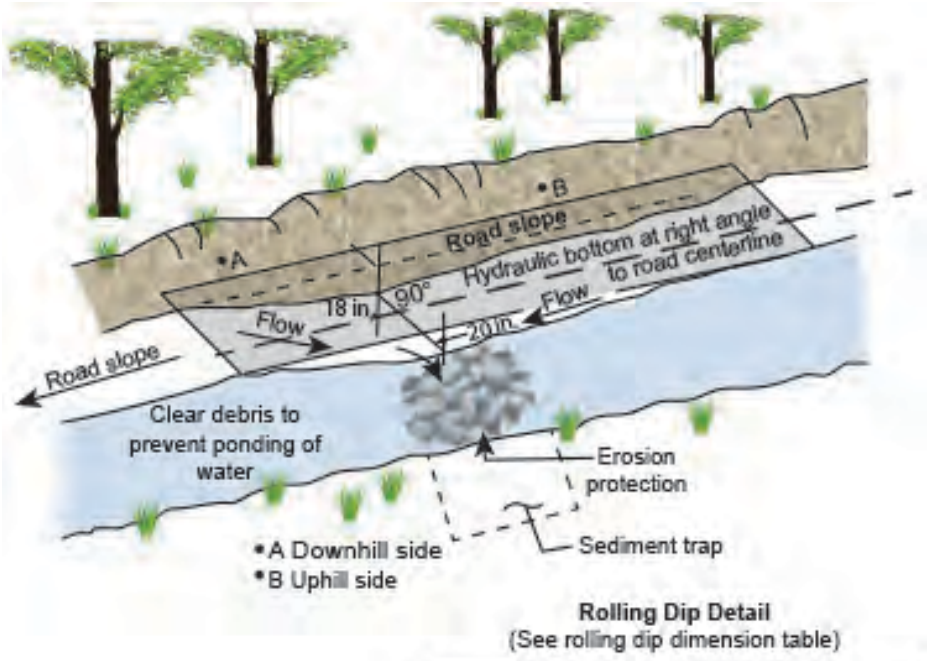


Figure 111. Road sloping (ITD 2014).

A rolling dip applies to roads greater than 150 feet long. When designing rolling dips, consider the unique topography of the site. In general, the dip should be approximately 1 foot below the surface plane of the road. The upgrade approach to the bottom of the dip should be 65 to 75 feet long, and the downgrade approach to the bottom of the dip should be 25 to 35 feet long depending on the longitudinal slope of the road. Align the dip across the road at nearly a 90^{o} angle, and slope it outward approximately 5% (Figure 112).



Rolling Dip Detail
(See rolling dip dimension table)

Rolling Dip Dimension Table		
% Road Slope	A (Downhill)	B (Downhill)
0%—4%	35 ft	65 ft
4%—6%	25 ft	75 ft

Figure 112. Rolling dip (ITD 2014).

As shown in Figure 110 to Figure 112, concentrated discharge from construction roads should be handled appropriately by routing through sediment control BMPs such as a sediment trap (BMP 66) or portable sediment tank (BMP 67).

Construction Guidelines

Waterbar—Cut each waterbar into solid soil to a minimum depth of 6 inches next to the cut bank and 8 inches at the road shoulder, with an adverse grade on the downroad or downgrade side of the waterbar. Build a continuous, firm berm of soil, at least 6-inches above normal grade, parallel to the waterbar cut on its downhill side. Include a bank tie-in point, cut 6 to 12 inches into the roadbed. For added stability, the bar may be compacted with a nonerosive fill material. The completed waterbar should extend across the full roadway width, aligned at an angle of 30^{o} to 40^{o} relative to the roadway. A dissipation or filter device (such as riprap or silt fence) may be needed below the waterbar to control erosion and trap sediment.

Road Sloping—Build into the road during construction. Install erosion- and sediment-control measures downslope before completing the finish grade of the sloped road. Then construct the outward slope of 1% to 2%, as specified in the contract plans.

Rolling Dip—Build into the road, during construction and follow the natural contours of the land. Install erosion and sediment measures at the low point of the dip (drainage outfall to fill slope) before final grading to direct storm water discharge from the dip. Construct the dip according to

the specifications shown in the contract plans. If not specified, make the dip 1 foot deep, with a 23-foot long approach on the downgrade side and a 66-foot long approach on the upgrade side.

Maintenance

Inspect all devices regularly according to provisions of the contract or project site plan. Make repairs promptly to avoid progressive damage. Remove accumulated sediments as necessary to ensure proper functioning.

Properly constructed waterbars should require little or no maintenance. However, all waterbars need to be open at the lower end so water can easily flow away from the roadway. Hand shovel work may be necessary following high runoff periods or severe storms to ensure unrestricted flow.

For road sloping, minor regrading may be required to maintain slope angle.

For a rolling dip, outflows should be kept free of debris to prevent ponding.

Additional Resources

ITD (Idaho Transportation Department). 2014. “Sediment Control Best Management Practices.” Standard Drawing Erosion and Sediment Control Drawing P-1-F. *Best Management Practices*. *https://apps.itd.idaho.gov/apps/StandardDrawings/All_Standards_2016-06.pdf*

BMP 43: Dust Control

Description

Dust control and wind erosion prevention BMPs keep soil particles from entering the air as a result of land-disturbing construction activities by protecting the soil surface, roughening the surface, and/or reducing the surface wind velocity (Figure 113).



Figure 113. Sprinkling water for dust control on a pathway construction project, Driggs, Idaho.

Dust control practices apply to either disturbed graded areas or construction roadways. For disturbed graded areas, practices such as seeding or sodding (BMP 32), mulching (BMP 52), using soil binders (BMP 55), sprinkling, surface roughing (BMP 58) or practices that provide prompt surface cover can be used. For construction roadways, practices such as using a stabilized surface (BMP 41), sprinkling, or using chemical dust tackifiers are options. Wind barriers can control wind currents and minimize the amount of dust transported into air and water.

Applicability

Use control measures on any construction site where the potential exists for air or water pollution from dust, especially when open, dry areas of soil are anticipated on site and where heavy construction activity such as clearing, grading, excavation, demolition, or excessive vehicle traffic takes place. Dust control is especially important in regions experiencing long periods without rain and during the summer when soil can become dry and vulnerable to transport by wind. In many cases, water erosion control measures incorporated into the project will indirectly prevent wind erosion.

Limitations

Vegetative dust control measures may not be practical during dry periods without a reliable supply of establishment water. Other methods should be stipulated in the project contract to ensure that dust control is not overlooked.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Wind barriers (such as walls or fences) can be part of the long-term dust control strategy in arid and semiarid areas, but they are not a substitute for permanent stabilization.

Chemically treated subgrades may make the soil water repellent, interfering with long-term infiltration and vegetation/revegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents that must be handled properly.

Overwatering may cause erosion and wash sediment or other constituents into the drainage system.

Design Basis

Develop a dust control plan before construction. The plan should evaluate the site with potential dust emission sources identified, provide a selection of dust control methods for each area of the site, determine the maintenance needed, and monitor the effectiveness of the selected dust control measures. The site evaluation should consider the soil type, prevailing wind direction, and effects of other prescribed erosion control measures.

Dust Prevention

The best method of controlling dust is to prevent dust production:

- **Minimize the surface area disturbed—**By limiting the amount of bare soil exposed at one time, less ground is disturbed, less dust is raised while working, and less cleanup is required when work is done. During project design, identify areas where ground disturbance will not be allowed and fence or provide signage during construction. Design and locate haul roads, detours, and staging areas to avoid unnecessary exposure of bare ground.
- **Limit dusty work on windy days—**Minimize amount of ground disturbance occurring when potential for wind erosion is highest. Apply dust suppression measures when needed. Monitor dust suppression efforts to ensure dust emissions are adequately controlled. Depending on weather conditions, adjust to fewer or more frequent application intervals.
- **Clean up dusty spills immediately—**Do not wait for the next scheduled housekeeping; the mess will just get bigger and cleanup will take longer.
- **Plan ahead to limit dust—**Avoid using areas most susceptible to wind erosion. In the storm water site plan, specify staging or work-sequencing techniques that minimize the risk of wind erosion from bare soil. In most cases, a change will be required from traditional construction techniques that allow large areas to be disturbed at the outset of construction and remain exposed for long periods of time.

Graded Areas

Clearing and grading activities create the opportunity for large amounts of dust to become airborne. Stabilize graded areas as soon as practicable after disturbance and do not leave open areas uncovered. The following practices can help with dust control in graded areas:

- **Grow vegetative ground cover**—Exposed areas that are not being paved should be stabilized using vegetation and landscaping (BMP 32) to prevent wind and water erosion. When rainfall is insufficient to establish vegetative cover, mulching (BMP 52) conserves

moisture, prevents surface crusting, reduces run-off erosion, and helps to establish vegetation. It is a critical treatment on sites with erosive slopes.

- **Use wind barriers**—Barriers prevent erosion by obstructing the wind near the ground and preventing the soil from blowing off site. Wind, snow, or silt fences or similar barriers are temporary measures that can reduce wind velocity. Perennial grass, bushes, stands of trees, rock walls, wooden board fences, or earthen banks are more permanent measures that can serve as wind barriers. A wind barrier generally protects soil downwind for a distance of 10 times the height of the barrier. If additional protection is needed, use other methods with the barrier.
- **Surface roughening**—Deep tillage in large open areas brings soil clods to the surface where they rest on top of dust, preventing it from becoming airborne. Tilling or disking should leave 6-inch (minimum) furrows, preferably perpendicular to the prevailing wind direction, to gain the greatest reduction in wind erosion. If the surface cannot be furrowed perpendicular to the prevailing wind direction, roughening the surface by using a ripper/scarifier (grader) or a ripper (cat) will produce the desired result of a 6-inch irregular surface. BMP 58: Slope Roughening provides more information.

Construction Roadways and Storage Areas

Temporary construction roads and storage areas should be stabilized using recommendations in BMP 42: Erosion Prevention on Construction Roads to minimize the amount of dust generated by construction vehicles. Other recommendations for dust control on construction roadways and storage areas include the following:

- **Water and/or sweep often**—Sprinkle the site with water until the surface is wet. Apply at a rate of 3 gallons per acre so that the soil is wet but not saturated or muddy and so that no dust is being generated. To ensure vehicle traffic is not picking up dust from wind action and carryout, water and sweep roadways often. Fewer treatments are necessary in cool, wet weather.
- **Spray-on chemical soil treatments (palliatives)**—Spray-on soil binders form a bond between soil particles keeping them grounded. Chemicals include mineral salts, petroleum resins, asphalt emulsion, acrylics, and adhesives. These treatments must be reapplied periodically to ensure continued effectiveness. Chemical tackifiers should only be used on mineral soils, and the chemicals should not create any adverse effects on storm water, plant life, surface water, or ground water. Check with DEQ to ensure the material to be applied is not harmful and may be used for this purpose.
- **Reduce speed limits**—Reduce speed limits on unpaved surfaces to 10 to 15 miles per hour for well-traveled areas and heavy vehicles. Never exceed 25 miles per hour for any vehicle on any unpaved surface.
- **Prevent transport of dusty material off site**—Minimize transport of dusty material off site by rinsing vehicles before they leave the property, tightly cover loaded trucks, and provide stabilized construction roads and staging areas (BMP 41).
- **Enclose storage and handling areas**—If dusty materials are frequently loaded and unloaded in storage and handling areas, enclose the areas to reduce dust production. Use storage silos, three-sided bunkers, or open-ended buildings. If handling is less frequent, try wind fencing. Conveyor loading may require enclosure or the use of water or foam spray bars both above and below the belt surface to reduce emissions.

- **Keep storage piles covered**—When storage piles are not in use, apply a physical cover or a dust suppressant spray to reduce dust emissions. Limit the working face of the pile to the downwind side. Most emissions come from loading the pile, loadout from the pile, and truck and loader traffic in the immediate area if the pile is batch loaded. Keep the drop height low to reduce dust and the ground at the base of the pile clear of spills.

Construction Guidelines

Dust control measures should be considered and selected before clearing and grading activities. During construction, monitor dust control activities on a regular basis to ensure the measures taken are adequately preventing airborne dust from leaving the site.

Maintenance

Dust control requires constant attention: it is not a one-time or once-in-awhile activity. Dust control sprinkling may have to be done several times a day during hot, dry weather.

Areas protected by mulch, adhesive emulsions, or barriers need to be checked at regular intervals according to the inspection schedule in the storm water plan.

Apply spray-on chemical treatments using the manufacturer's specified rates and according to all federal, state, and local regulations. Chemical products should be stored, handled, and disposed of according to all applicable local and state regulations and policies.

Additional Resources

DEQ (Idaho Department of Environmental Quality). 2013. *Controlling Fugitive Dust at Construction Sites.* Boise, ID: DEQ.

EPA (US Environmental Protection Agency). 2014. *Dust Control*. Water: Best Management Practices. *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#constr*

BMP 44: Stockpile Management

Description

Stockpile management procedures and practices reduce or eliminate air and storm water pollution from stockpiled erodible materials, such as soil, sawdust, landscaping bark, compost, sand, fly ash, stucco, hydrated lime, Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, aggregate subbase, premixed aggregate, asphalt minder (or *cold mix* asphalt), and pressure-treated wood. Raw material stockpiles can easily erode during storm events and contribute suspended solids, nutrients, metals, and pH changes to storm water runoff (Figure 114).



Figure 114. Covered stockpile (ITD 2014).

Applicability

Implement stockpile management on all construction sites that stockpile and store erodible materials or have land-clearing debris composed, in whole or in part, of sediment or soil.

Limitations

Covering alone may not protect exposed materials from contact with storm water runoff and run-on. Using plastic sheeting to cover stockpiles can increase runoff volume and rates and potentially cause failure of sediment controls placed around the stockpile's perimeter. In extremely windy areas, tarpaulins and sheeting may require additional weights or securing.

Design Basis

Location

Locate stockpiles a minimum of 50 feet away from concentrated storm water flows, drainage courses, and inlets and outside of any natural buffers (BMP 2) and in areas that will remain undisturbed for the longest period of time as construction progresses.

Do not place stockpiles in streets or paved areas unless no other practical alternative exists.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Covering

Covering prevents storm water from coming into contact with potential pollutants, minimizes sediment discharge, and reduces material loss from blowing wind. Covering is a simple, effective, and inexpensive way to reduce or prevent pollution from stockpiles. Materials used as stockpile covers include tarpaulins, plastic sheeting, and pervious fabrics; mulches (BMP 52), vegetation (BMP 32), or soil binders (BMP 55) can be used for soil stockpiles that will be in place for longer periods of time.

Plastic sheeting with nylon reinforcement can be more durable than standard sheeting; avoid sheeting made of photodegradable plastics. Due to the relatively rapid breakdown of most polyethylene sheeting, it is unsuitable for applications over 6 months.

Sediment Control

Place a temporary sediment control barrier around the stockpile's perimeter to protect it from storm water run-on from the site and the site from runoff from the stockpile. Perimeter control barriers such as berms (BMP 70), dikes (BMP 69), fiber rolls (BMP 64), silt fences (BMP 65), or biofilter bags (BMP 63) can be used. For stockpiles located on paved areas, rock socks are recommended for perimeter control, and all inlets with the potential to receive sediment from the stockpile should be protected (BMP 74: Inlet Protection).

Implement dust and wind erosion control practices as appropriate on all stockpiled material. Place bagged materials on pallets and under cover.

Accumulated sediment on pavement or other impervious surfaces should not be hosed down or swept into any storm water conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water.

Nonactive Stockpile Protection

Nonactive stockpiles of the following materials should be protected as follows:

Soil stockpiles—Cover soil stockpiles or protect with soil stabilization measures and a temporary perimeter sediment barrier at all times. Unless permit requirements or other local regulations specify otherwise, soil stockpiles should be covered or stabilized within 14 days after the stockpile is placed or sooner if site conditions, such as highly erodible soils or expected rainfall, warrant. For site discharges to impaired waters, complete stabilization activities within 7 calendar days.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate subbase—Cover and protect stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of *cold mix*—Place cold mix stockpiles on and cover with plastic sheeting, or a comparable material, at all times and surround covered stockpile with a berm.

Stockpiles/storage of pressure-treated wood—Cover pressure-treated wood with plastic sheeting or comparable material at all times and surround with a berm.

Stockpiles of fly ash, stucco, and hydrated lime (basic materials)—At all times, cover stockpiles of materials that may raise the pH of runoff with plastic sheeting and surround with a berm.

Active Stockpile Protection

For actively used stockpiles, the perimeter sediment control barrier should have a stabilized designated access point on the upgradient side of the stockpile. Divert runoff around or away from the stockpile on the upstream side of the stockpile.

Cover all actively used stockpiles before the onset of precipitation. Stockpiles of *cold mix*, treated wood, and basic materials should be placed on and covered with plastic sheeting or a comparable material and surrounded by a berm before the onset of precipitation.

Construction Guidelines

Stockpiles should be protected immediately if they are not scheduled to be used within 14 days of placement.

To cover stockpiles with tarpaulins or plastic sheeting, obtain enough fabric or sheeting to cover the indicated volume or area. Anchor the edges of the covering with stakes, tie-down ropes, large rocks, tires, or other readily available, heavy objects. Maintain an overlap of 3 feet along the borders and securely anchor the overlap area so that it does not separate (by wind or other causes).

Maintenance

During the rainy season, inspect the stockpile BMPs weekly before forecasted rain events, daily during extended rain or high wind events, and after the rain or high wind events end. During the nonrainy season, inspect BMPs every 2 weeks. Make any necessary repairs after inspection.

Repair and/or replace perimeter controls and covers as needed to keep them functioning properly. Sediment should be removed when it reaches one-third of the barrier height.

Frequently inspect coverings for damage and general wear. Repair or replace coverings immediately, or as needed. Inspect plastic sheeting more frequently during periods of high winds or extreme heat.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. “Stockpile Management.” *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *https://www.casqa.org/resources*

ITD (Idaho Department of Transportation). 2014. “Stockpile Management.” *Best Management Practices.* Boise, ID: ITD. *https://apps.itd.idaho.gov/apps/env/BMP/PDF%20Files%20for%20BMP/Chapter%204/WM-4%20Stockpile%20Management.pdf*

BMP 46: Spill Prevention and Control

Description

A spill prevention and control plan includes procedures for preventing spills of hazardous waste and methods for handling and cleaning up spills (Figure 116). Numerous spill containment methods range from large structural barriers to simple, small drip pans. The benefits vary based on cost, maintenance requirements, and the size of spill control.



Figure 116. Collapsible wall containment berm (*The Spill Source*).

Applicability

Develop a spill prevention and control plan for any construction site where hazardous wastes are stored or used. Hazardous wastes include pesticides, paints, cleaners, petroleum products, fertilizers, deicing materials, and solvents.

Limitations

Some sites may also be subject to the oil pollution regulations specified in 40 CFR 112 and CWA §331, and required to develop a Spill Prevention Control and Countermeasure (SPCC) plan. Check with federal, state, and local agencies that may also have applicable regulations that must be adhered to.

Design Basis

Address the following elements in a spill control and response plan.

Spill Prevention

Prevention is the first line of defense in protecting storm water runoff from contamination due to spills and leaks:

- Use recycled, reclaimed, or reused materials where possible to reduce the amount of new material needed. Substitute less or nontoxic materials for toxic materials.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
○	Phosphorus
●	Metals
○	Bacteria
●	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

- Routinely maintain and check the condition of containers holding hazardous waste, and replace containers that are leaky, corroded, or otherwise deteriorating.
- Label all containers according to their contents. Educate all employees on how to prevent spills and how to clean up if a spill occurs. All employees should be able to recognize and report illegal dumping incidents.

Spill Control and Containment

Identify potential spill source locations such as loading and unloading areas, materials storage areas, processing areas, and waste disposal areas. Containment methods include diking, curbing, and drip pans. If a spill occurs, adequately control and contain the spill to prevent contaminating surface water or ground water.

Containment diking consists of temporary or permanent berms or retaining walls designed to hold spills. Diking is one of the best protective measures against storm water pollution because it surrounds the area of concern and keeps spill materials separated from the storm water outside of the diked area (BMP 69: Diversion Dike and BMP 70: Temporary Berms).

Diking is commonly used for controlling large spills or releases from liquid storage and transfer areas because it is an effective containment method around tank truck loading and unloading areas. The size of a containment dike system for tank truck loading and unloading operations should be capable of holding a volume equal to any single tank truck compartment plus some amount of freeboard to ensure that discharge from the secondary containment area will not occur.

Materials used to construct the dike should be strong enough to safely hold spilled materials. The materials used usually depend on what is available on site and the substance to be contained. Dikes may be made of earth (i.e., soil or clay), concrete, synthetic materials (liners), metal, or other impervious materials. Containment dikes may need to be designed with impervious materials to prevent leaking or pollution of storm water, surface water, and ground water supplies.

In general, strong acids and bases may react with metal containers, concrete, and some plastics. Where spills may consist of these substances, consider other alternatives. More reactive organic chemicals may also need to be contained with special liners. If uncertain about the suitability of certain dike construction materials, refer to the Material Safety Data Sheet (MSDS) for the chemical being contained.

Curbing, like containment diking, is a barrier that surrounds an area of concern and prevents spills or leaks from being released to the environment by routing runoff to treatment or control areas. The terms *curbing* and *diking* are sometimes used interchangeably, but curbing is usually small scale and cannot contain large spills like diking. Common materials used for curbing include earth, concrete, synthetic materials, metal, or other impenetrable materials. Asphalt is also a common material used in curbing. Curbing is inexpensive, easy to install, and provides excellent control of run-on. As with diking, materials spilled within a curbed area can be collected for proper disposal and/or recycling.

When using curbing for runoff control, protect the curb by limiting traffic and installing reinforced curbs in areas of concern. Materials spilled within a curbed area can be tracked outside of that area when personnel and equipment leave the area. This tracking can be minimized by grading within

the curbing to direct the spilled materials to a downslope side of the curbed area, keeping the materials away from personnel and equipment that pass through the area. It will also allow the materials to accumulate in one area and make cleanup much easier. Manual or mechanical methods, such as those provided by sump systems, can be used to remove accumulated material from a curbed area.

Drip pans are used to contain very small volumes of leaks, drips, and spills. Drip pans can be depressions in concrete, asphalt, or other impenetrable materials or they can be made of metals, plastic, or any material that does not react with the dripped chemicals. Empty or discarded containers may be used as drip pans. Drip pans catch material or chemical drips that can be cleaned up easily or recycled before contacting storm water. Drip pans can be a temporary or permanent measure.

Use drip pans at any site where valves and piping are present and the potential exists for small-volume leakage and dripping. Although leaks and drips should be repaired and eliminated as part of preventive maintenance programs, drip pans provide a temporary solution where repair or replacement is delayed. In addition, drip pans provide a safeguard when positioned beneath areas where leaks and drips may occur. Drip pans are inexpensive, easy to install, and simple to operate. They allow for reuse or recycling of the collected material.

When using drip pans, consider local weather conditions, the location of the drip pans, materials used for the drip pans, and how the pans will be cleaned. Drip pans should be inspected and cleaned frequently, so place them in areas that are easy to reach. Avoid placing drip pans in precarious positions such as next to walkways or on uneven surfaces. Drip pans in these locations are easily overturned and may present a safety or environmental hazard.

Weather is also an important factor. Heavy winds and rainfall can move or damage drip pans because the pans are small and lightweight. Secure the pans by installing or anchoring them to platforms, place behind wind blocks, or tie the pans down.

Cleanup and Disposal

Clean up spills or contaminated surfaces immediately using dry cleanup measures where possible and eliminating the source of the spill to prevent discharge or further discharge. Adequate supplies should be available at all times to handle spills, leaks, and disposal of used liquids from fueling and maintenance of equipment or vehicles. When cleaning up spills, follow MSDS guidelines to prevent unintentional chemical reactions.

If spilled materials are hazardous, the cleanup materials are also hazardous and must be disposed of properly. If the spill is large, a Hazmat team or private spill cleanup company may be necessary depending on permit requirements.

Reporting

Keep a record of any spills, including the date and time of the incident, causes, duration, response procedures, and persons notified. If a spill occurs, and it is not contained by the on-site containment methods, report it to the proper authorities. Federal regulations require that oil spills

into a navigable water or adjoining shoreline above a certain threshold must be reported to the National Response Center at (800) 424-8802. Oil spills must be reported in the following cases:

- Violate applicable water quality standards.
- Cause a film or *sheen* upon, or discolor, the surface of the water or adjoining shorelines.
- Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

Spills should also be reported to local agencies, such as the fire department, if necessary to assist with cleanup.

Construction Guidelines

Spill prevention and containment measures should be employed as long as hazardous materials are stored on site. Key spill response personnel should be identified before the project starts, and all employees and subcontractors should be trained on spill prevention, response, and cleanup procedures.

Maintenance

Update the spill prevention and control plan when changes occur in staffing, to the site, or where the materials are stored. Regular inspections should be conducted to ensure proper procedures are posted and cleanup equipment is available. Guidelines for maintaining spill containment measures are provided below:

Containment dikes should be inspected during or after significant storms or spills to check for washouts or overflows. Regular testing is recommended to ensure that the dikes can hold spills. Soil dikes may need to be inspected on a more frequent basis.

Changes in vegetation, inability of the structure to retain storm water, dike erosion, or soggy areas indicate problems with the dike's structure. Damaged areas should be patched and stabilized immediately, where necessary. Earthen dikes may require special maintenance of vegetation, such as mowing and irrigation.

When evaluating the performance of the containment system, pay attention to the overflow system because it is often the source of uncontrolled leaks. If overflow systems do not exist, accumulated storm water should be released periodically. Polluted storm water should be treated before release. Mechanical parts (e.g., pumps) or manual systems (e.g., slide gates and stopcock valves) may require regular cleaning and maintenance.

Curbing is sized to contain small spill volumes, and frequent maintenance is needed to prevent overflow of any spilled materials. Inspect all curbed areas regularly and clean clogging debris. Repair the curb by patching or replacing it as needed to ensure effective functioning. Conduct inspections before forecasted rainfall events and immediately after storm events. If spilled or leaked materials are observed, start cleanup immediately to allow space for future spills. Prompt cleanup of spilled materials will prevent dilution by rainwater, which can adversely affect recycling opportunities.

Drip pan effectiveness depends on site operators paying attention and emptying the pans when they are nearly full. Because of their small holding capacities, drip pans easily overflow if not emptied. Recycling efforts can be affected if storm water accumulates in drip pans and dilutes the spilled material. Ensure clearly specified and easy to follow practices for reuse, recycle, and/or disposal of pans, especially the disposal of hazardous materials. Consider dumping the drip pan contents into a nearby larger-volume storage container and periodically recycling the contents of the storage container.

Frequent inspection of the drip pans is necessary due to the possibility of leaks in the pan itself. Check for random leaking of piping or valves and for irregular, slow drips that may increase in volume. Conduct inspections before forecasted rainfall events to remove accumulated materials. Empty accumulations immediately after each storm event.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org.*

EPA (US Environmental Protection Agency). 2014. *Spill Prevention and Control Plan*. Water: Best Management Practices. *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu.*

BMP 49: Concrete Waste Management

Description

Concrete waste management prevents pollutant discharge to storm water from concrete waste by conducting off-site washout, performing on-site washout in a designated area, and training employees and subcontractors on proper management techniques (Figure 119).

Concrete washwater typically contains toxic metals and is caustic and corrosive with a high pH around 12 (EPA 2012a).



Figure 119. Hay bale temporary washout pit (*On Site Washout*).

Applicability

This BMP applies to all project sites that will generate concrete washwater or liquid concrete waste from on-site concrete mixing or concrete delivery. This includes sites with concrete pours for features such as foundations, footings, curbs, sidewalks, floors, piles, and for projects that generate cementitious (i.e., properties of cement) washwater and solids from materials such as mortar, plaster, stucco, and grout.

Check local permitting requirements and regulations for concrete waste management to ensure compliance.

Limitations

Off-site washout of concrete wastes may not always be possible. On-site washout facilities should be lined or a waterproof containment system should be used if shallow ground water is present to prevent ground water contamination.

Washout areas that are lined with plastic can make it difficult to recycle or reuse hardened concrete because the lining becomes bound up with the concrete.

Using aboveground hay bale washout pits may not be feasible for concrete pumping trucks with low hanging hoppers.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ○ Sediment
- ○ Phosphorus
- ● Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	3 feet
Min. Bedrock Separation	N/A

Design Basis

Washing out concrete trucks should be completed at an approved off-site location if possible or in designated on-site areas only. Do not wash out concrete trucks into storm drains, open ditches, streets, or streams. Several types of washout containment systems can be used, and all concrete washout water and solids should be recycled or reused. The approach to the concrete washout areas should be stabilized with gravel (BMP 41) or a paved construction road.

Site Selection

Locate concrete washout areas at least 50 feet from storm drains, open ditches, or water bodies. The washout site should not be located in an area where shallow ground water may be present, such as near natural drainages, springs, or wetlands. Washouts should be located at least 400 feet away from any natural drainage pathway or water body and at least 1,000 feet from wells or drinking water sources.

Place washouts in a location accessible to concrete trucks and where the majority of the concrete will be poured. On large sites with extensive concrete work, use multiple locations to make it more convenient and increase compliance with the BMP guidelines. Provide clear signage at the concrete washout area.

Washout Containers

A washout pit can be constructed either above or below grade. Above grade pits can be constructed with hay bales lined with a polyethylene liner. Below grade pits can be constructed by excavating an area, berming around three sides of the pit, and lining the pit with plastic. A minimum length and width of 10 feet is recommended, although a larger size may be needed to contain the anticipated waste based on the estimated concrete volume to be used. The polyethylene lining should be impermeable with a 16-mil minimum thickness.

Prefabricated concrete washout containers made of vinyl or metal are available from several different vendors. The containers are usually portable, reusable, and easier to install than hay bale washout pits or excavated pits.

Washout boxes or buckets with pumps can be mounted on the back of ready mix concrete trucks. The boxes or buckets are used to capture water from washing the chute after a pour is completed, and the washwater and solids can be returned to the ready mix plant for recycling.

Construction Guidelines

The following practices will reduce storm water pollution from concrete wastes:

- Avoid mixing excess amounts of fresh concrete or cement on site.
- Avoid dumping excess concrete in nondesignated dumping areas.
- Wash out wastes into the temporary pit where the concrete can set, broken up, and disposed of properly.
- When washing concrete to remove fine particles and expose the aggregate, drain the water to a bermed or level area.

- Avoid washing sweepings from exposed aggregate concrete into the street or storm drain. Instead, collect and return sweepings to an aggregate base stockpile or dispose of in the trash.
- Train employees and subcontractors in proper concrete waste management.

After construction is completed, remove concrete waste from the washout pit, and restore and reclaim the area.

Maintenance

Inspect concrete washout facilities daily and after heavy rains to check for leaks and damage to the facility.

If using a temporary pit, dispose of the hardened concrete on a regular basis. Washout pits should be cleaned or additional facilities should be constructed when the washout is 75% full, or there is less than 4 inches of freeboard for an aboveground facility or 1 foot of freeboard for a belowgrade facility.

Inspect the plastic lining of temporary pits to ensure it has not been damaged. Reline as necessary.

Before heavy rains, lower the liquid level in the washout container or cover the container to avoid overflow during the storm.

Additional Resources

EPA (US Environmental Protection Agency. 2012. *Concrete Washout*. Stormwater Best Management Practice. *http://www.epa.gov/npdes/pubs/concretewashout.pdf*

BMP 50: Sanitary and Septic Waste Management

Description

Proper sanitary and septic waste management prevents the pollutant discharge to storm water from sanitary and septic waste by providing convenient, well-maintained septic waste facilities, and arranging for regular service and disposal (Figure 120). Portable sanitary facilities are self-contained units consisting of gravity fed holding tanks that temporarily store human waste.

This BMP does not cover permanent developments that will have permanent sanitary sewer facilities with proper on-site or off-site disposal according to local regulations.



Figure 120. Portable sanitary facility (ITD 2014).

Applicability

Portable sanitary facilities are often needed to supplement permanent facilities at special events or on construction sites. Per OSHA requirements, construction sites that do not have sanitary sewer service available shall be provided with a toilet facility, unless the crew is mobile and has transportation readily available to a nearby toilet facility.

Limitations

Access to the septic waste facility must be provided so that they can be regularly serviced. A sufficient number of units should be provided to accommodate all personnel on site.

Design Basis

Sanitary and septic wastes for portable and permanent facilities should be disposed of according to state and local requirements. The following guidance applies to placing, operating, and disposing of portable and temporary sanitary systems.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
○	Phosphorus
○	Metals
●	Bacteria
○	Hydrocarbons
●	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Portable Sanitary Facilities

- Locate portable sanitary facilities in a convenient location but away from high traffic areas. If site conditions allow, place facilities at least 50 feet from a drainage facility or watercourse.
- Ensure that a licensed sanitary and septic waste hauler maintains sanitary and septic facilities and keeps them in good working order. A list of permitted septic tank pumpers is available at: *https://www.deq.idaho.gov/water-quality/wastewater/septic-and-septage/*.
- Avoid using biocides, such as formaldehyde, to prevent odor. Use nonformaldehyde, biological treatments to breakdown wastes and minimize odor.
- Stake or secure portable units to a fixed object to prevent overturning, especially in high wind areas.
- Under section 4.1.2(6) of the Americans with Disabilities Act Accessibility Guidelines, at least 5% of single-user portable toilets clustered at a single location must be accessible.
- Always treat and dispose of portable toilet waste according to state and local requirements. Municipal sewage treatment plants are an acceptable disposal option for untreated portable toilet wastes.
- Do not discharge or bury untreated wastewater.
- Dispose of sewage from recreational vehicles (RVs) at approved facilities, which include wastewater treatment plants, RV parks, dealers or storage facilities, or recreational sites. A list of RV dump stations in Idaho is provided at *http://www.rvdumps.com/idaho/*.

Temporary Septic Systems

- If using an on-site disposal system such as a temporary septic system, comply with local health agency requirements.
- On-site disposal systems must be designed per DEQ's *Technical Guidance Manual for Individual and Subsurface Sewage Disposal Systems*https://www.deq.idaho.gov/water-quality/wastewater/septic-and-septage/. If discharging to a centralized sanitary sewer system, contact the local wastewater treatment plant for permitting and other requirements. Ensure that temporary septic systems treat wastes to required levels before discharging.
- Ensure that temporary sanitary facilities discharging to a sanitary sewer system are properly connected to help eliminate illicit discharges.

Maintenance

- Inspect facilities weekly before forecasted rain events and daily during periods of extended rain.
- Contact service contractors immediately if leaks are detected.
- Arrange for regular waste collection for portable facilities.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

DEQ (Idaho Department of Environmental Quality). 2018. *Technical Guidance Manual for Individual and Subsurface Sewage Disposal Systems*. Boise, ID: DEQ. *https://www.deq.idaho.gov/water-quality/wastewater/septic-and-septage/*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

BMP 51: Solid Waste Storage and Disposal

Description

Solid waste, more commonly known as garbage or trash, is any discarded material that is abandoned or recycled. Items that are commonly considered solid waste include product packaging, landscape clippings, paper, bottles, food scraps, construction wastes, paint, and batteries. Solid waste management procedures and practices are designed to prevent or reduce the discharge of litter and other pollutants to storm water (Figure 121). Practices include tracking and reducing waste generation, using proper storage and disposal methods, reusing and recycling when possible, and preventing run-on and runoff from waste management areas.



Figure 121. Pet waste container.

More information on proper handling, storing, and disposing hazardous waste is provided in BMP 48: Hazardous Materials Management. Storing and handling pesticides and other landscaping chemicals is provided in BMP 78: Fertilizer Management and BMP 79: Pesticide Management. BMP 46: Spill Prevention and Control provides information on properly storing and handling liquid waste.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
○	Phosphorus
○	Metals
●	Bacteria
○	Hydrocarbons
●	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Applicability

This BMP applies to industrial operations, construction sites, businesses, residences, public parks, recreation areas, and large outdoor events where solid waste is generated and temporarily stored.

Limitations

For commercial and municipal operations, an effective waste management system requires training employees (BMP 91) and signage. Extra management time may be required to ensure that all personnel follow proper procedures for storing, disposing, and handling solid waste.

Limitations are related to disposing of residential solid waste *(https://www.deq.idaho.gov/waste-management-and-remediation/solid-waste/residential-household-wastes/)* and restrictions on burning household residential waste in burn barrels

or other types of incinerators (*https://www.deq.idaho.gov/air-quality/smoke-and-burning/can-i-burn/*).

Design Basis

The best way to reduce the impact of waste on storm water runoff is to reduce the amount of waste generated. Practices that reduce the amount of solid waste disposed of in a landfill are encouraged, including waste tracking, waste reduction, recycling, and composting. Properly storing and disposing of solid waste that is generated is required to protect environmental and aquatic resources.

Waste Tracking

Tracking the amount of waste materials used on site or in the home increases awareness of the amount of materials used and provides a baseline for waste reduction. Consider the following when tracking waste:

- Prioritize waste streams using manifests, biennial reports, permits, environmental audits, Superfund Amendments and Reauthorization Act Title III reports, emission reports, and NPDES monitoring reports.
- Prepare inventory reports.
- Maintain data on chemical spills.
- Track emissions.
- Review raw material and production data—composition sheets, material safety data sheets, batch sheets, product or raw material inventory records, production schedules, and operator data logs.
- Review economic data:
  - Waste treatment and disposal costs
  - Product utility and economic costs
  - Operation and maintenance labor costs.

Waste Reduction

Waste reduction can be accomplished by selecting products with the least amount of packaging or materials that can be returned and reused, purchasing durable goods rather than disposable ones, and buying in bulk. For industrial or commercial operations, assess process activities where wastes are generated to determine where waste can be eliminated or reduced. This involves collecting process-specific information, setting pollution prevention targets, and developing, screening, and selecting waste reduction options for further study. Modify processes or equipment to generate less waste.

Recycling

Recycling recovers materials from the solid waste stream to make new products, which reduces the amount of virgin raw materials needed to make products and the amount of material going into landfills. Regions vary on the items collected for recycling. Common items that may be recycled include glass, cardboard, some types of plastics, aluminum cans, steel cans, scrap metal, wire,

paper, and gray board. Other nontraditional recyclables include used motor oil, batteries, printer cartridges, and electronics (E-waste).

Some jurisdictions offer curbside recycling to residential and commercial customers. Recycling or material separation may also be required for construction sites.

Composting

Approximately 38% of municipal solid waste consists of organic materials, such as food waste, yard wastes, wood waste, and manure. Composting is the process of creating the optimal conditions for biological decomposition of organic material to produce a stable, nutrient-rich material that can be used as a soil amendment or fertilizer for plants.

Composting can be accomplished on a small scale, such in a residential back yard, or large scale, such as a municipal operation. For either operation, controlled decomposition requires a proper balance of *green* organic materials (e.g., grass clippings, food scraps, manure), which contain large amounts of nitrogen, and *brown* organic materials (e.g., dry leaves, wood chips, branches), which contain large amounts of carbon but little nitrogen.

Storage

For both construction and domestic waste, provide waste containers (e.g., dumpster or trash receptacle) of sufficient size and number to contain all waste expected to be generated. On construction sites, clean up and dispose of waste in designated waste containers on each work day. Waste containers must be cleaned up immediately if they overflow. The following practices are recommended:

- All waste containers kept outside should have lids.
- Storage areas for building products should provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these products from coming into contact with rainwater or use a similarly effective means designed to prevent pollutant discharge from the storage areas.
- Replace leaking waste containers.
- Inspect the storage area regularly to pick up loose scraps of material and dispose of them properly.
- Ensure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, and curing compounds) are not disposed of in dumpsters designated for construction debris.
- In areas close to bear habitat, ensure storage containers have bear-proof locks and lids.
- Collect and properly dispose of pet waste at private residences and in public areas.

Run-on and Runoff Prevention

Preventing storm water from entering or running off the waste storage area reduces or eliminates the potential for contaminants from entering the runoff and polluting downstream water bodies. The following best practices prevent run-on and runoff:

- Protect waste materials from direct contact with rain by covering the area with a permanent roof or covering waste piles with temporary covering material, such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene, or hypalon.

- If possible, place waste storage areas indoors after ensuring that all safety concerns such as fire hazards and ventilation are addressed.
- Store waste materials on a paved surface that is bermed or drains to a dead-end holding tank.
- To avoid tracking materials off site, keep the waste management area clean by sweeping and cleaning up spills immediately. Never drive vehicles through spills. If necessary, wash vehicles in designated areas before the vehicles leave the site (BMP 84). Collect and properly dispose of the washwater.
- Cover, enclose, or berm industrial wastewater management areas whenever possible to prevent contact with run-on or runoff.

Disposal

Municipal solid waste should be collected and properly disposed of in a solid waste disposal facility. Hazardous waste must be disposed of in an appropriate disposal and/or recycling facility.

Education

Educate employees, subcontractors, and suppliers on solid and sanitary waste disposal procedures and potential dangers to the environment and human health.

Instruct employees, subcontractors, and suppliers in identifying solid and sanitary wastes, hold regular meetings to update staff on the current standing of wastes on site, and implement a solid waste disposal plan.

Maintenance

Inspect solid waste collection containers regularly and arrange for regular waste collection.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

EPA (US Environmental Protection Agency). 2014. *General Construction Site Waste Management*. Water: Best Management Practices.

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

BMP 52: Mulching

Description

Mulching is a temporary soil stabilization or erosion control practice where materials such as straw, grass, grass hay, compost, or wood chips or fibers are placed on or incorporated into the soil surface. Hydraulic mulching, or hydromulching, is a process that combines mulching materials with a tacking agent and is applied in slurry with water to temporarily stabilize bare slopes or other bare areas. Hydromulching is an economical way to protect slopes from erosion (Figure 122).



Figure 122. Wood chips dispensed on the side of a road to help slow runoff.

In addition to stabilizing soils, mulching can reduce the velocity of storm water runoff over an area. When used together with seeding or planting, mulching aids in plant growth by holding the seed, fertilizers, and topsoil in place, helping to retain moisture, and insulating against extreme temperatures.

Applications

Mulching protects the soil surface from splash erosion. It retards runoff, traps sediment, and creates more favorable conditions to assist germination and early plant development. The following mulches are suitable for use at construction sites:

- Vegetative materials—wheat straw, rye straw, barley straw, and grass hay
- Wood products—wood cellulose fibers, wood chips, bark, and sawdust
- Other organic materials—leaves, peat, manure, and compost
- Rock products—gravel and crushed stone
- Fabricated mulch—jute, burlap, coconut (coir), excelsior, and Kraft paper string

Mulch is an immediate, effective, and inexpensive means of controlling dust and erosion and aids revegetation of construction sites. It protects exposed soils subject to heavy erosion, retains moisture (minimizing watering needs), and requires no removal as most of mulching materials deteriorate naturally.

Primary BMP Functions and Controls

☒Construction	☐Permanent
☒Erosion Control	☒Sediment Control
☐Source Control	☐Flood Control
☐Filtration	☐Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
◖	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	2 acres
Max. Upstream Slope (conventional)	50%
Max. Upstream Slope (hydromulch)	15%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Mulch is often used alone in areas where temporary seeding cannot be used because of the season or climate. It may be used with other treatments for increased effectiveness. Use of mulch may or may not require a binder, netting, or tacking agent to hold the mulch in place. On steep slopes and critical areas, such as waterways, mulch matting is used with netting or can be anchored to hold it in place.

To aid in establishing vegetation, mulch seeded and planted areas where slopes are steeper than 2:1, where runoff is flowing across the area, or when seedlings need protection from bad weather. If the mulching effect is to be maintained longer than 3 months, the preferred mulch is vegetative material. Wheat straw is the most preferred vegetative material, followed by rye straw, barley straw, or grass hay.

Wood chips are suitable for areas that will not be closely mowed and around ornamental plantings. Chips decompose slowly and do not require tacking. Wood chips can be very inexpensive if they are obtained from trees cleared on the site. Chips should not be used on slopes greater than 6% because they tend to wash down slopes.

Bark mulch is suitable for areas planted with grasses that will not be closely mowed. The bark may be applied mechanically or by hand.

Crushed stone and gravel mulches are appropriate for dust control and soil protection on low-use dirt roads, driveways, and other areas of light vehicular activity within the construction site.

Hydromulching is an effective way to increase water retention (reducing erosion) from 6 months up to 1 year. Beyond 1 year, the effectiveness drops off. Hydraulic mulching can be applied to areas that are within about 200 feet of a road or that can otherwise be reached by truck. Small roadside slopes and large, relatively flat areas are well adapted to this method. When adequate moisture exists, the slurry can be combined with seed and fertilizer to initiate stabilization and revegetation in a single application. Mulch usually lasts about 1 year. The growing vegetation is needed to provide continued stabilization.

Limitations

Disadvantages of mulch include the following:

- It may delay germination of some seeds because cover reduces the soil surface temperature.
- Mulch can be easily blown or washed away by runoff if not secured or incorporated. Lightweight mulch, such as straw, requires matting, crimping, or other methods to hold it in place.
- Some mulch materials, such as wood chips, may absorb nutrients necessary for plant growth.
- Straw mulch provides organic matter as it breaks down and is incorporated into the soil. If applications are too heavy, however, soil nutrient levels (especially nitrogen) may decline during decomposition. Prescribed application rates of the straw mulch and specified fertilizer should be strictly followed. Using a fertilizer low in phosphorus is recommended.
- Synthetic spray-on materials are not recommended except for temporary dust/erosion control or for steep, rocky slopes where other mulches and mechanical methods cannot be effectively applied. The synthetic mulches may create impervious surfaces and can have adverse effects on water quality.

- Avoid applying mulch as the only control on long slopes. Break up concentrated flows on these slopes using methods recommended in other BMPs.
- Hydromulching loses effectiveness after 1 year.
- Hydromulching is only suited for physically stable slopes (at natural angle of repose, or less).
- Avoid hydromulching on long uninterrupted slopes. Break up concentrated flows with other BMPs, such as BMP 59: Gradient Terracing or BMP 60: Check Dams.

Design Basis

Stone and Gravel

- After the gravel or stone is applied, construction traffic may move over it. Areas that become compacted or depressed should be remulched to the same level as the remaining area to prevent flows from the site from becoming channelized into these depressions.
- After activities are completed on site, the gravel or stone mulch may be left in place during revegetation operations.
- When used for driveways or dirt roads, a filter blanket should be placed under the gravel.

Straw

- Straw mulch forms a loose layer when applied over a loose soil surface. To protect the mulch from wind drifting and water damage, stabilize it by covering with netting, such as jute, or by spraying it with a tacking agent. Straw mulch should cover the entire seeded area or exposed slope. The mulch should extend into existing vegetation or stabilized areas on all sides to prevent wind or water damage, which may start at the edges of the mulched area
- Apply straw fibers to form a uniform cover of loose straw through which 20% or less of the original ground surface can be seen. No large clumps of unscattered straw should exist after application.
- On small slopes, straw mulch should be applied by hand broadcasting to a uniform depth of 2 to 3 inches. On larger slopes, straw can be blown onto the slope to achieve a uniform cover of 2 to 3 inches.

Wood Chips

- Due to bacterial action during decomposition, nutrient concentrations in the soil may be depressed under a layer of wood chips. Applications should not exceed the specified thickness that would cause a marked decline in some soil nutrients for longer periods.
- When using wood chips to mulch revegetation projects, the specified application of fertilizer should be increased approximately 25% to replenish soil nutrients lost due to breakdown of wood chips.

Mulch Effectiveness

- Crushed stone and gravel mulches retain their effectiveness indefinitely if properly applied and protected from compacting traffic. Sediment generation is reduced 70% to 90%, and nutrient generation is reduced 50% to 70%.

- Straw mulches and hydromulches initially have a high sediment and nutrient reduction, but breakdown of the organic fibers decreases their effectiveness with time. Sediment and nutrient reduction estimates are shown in Table 22.
- Wood chips deteriorate more slowly than wood fiber and, therefore, retain their effectiveness longer. Sediment and nutrient reduction estimates for wood chips is shown in Table 22.

Table 22. Estimated removal efficiencies of mulches.

Age of Mulch	Wood Chips		Hydromulch		Straw (without vegetation)	
	Sediment Reduction (%)	Nutrient Reduction (%)	Sediment Reduction (%)	Nutrient Reduction (%)	Sediment Reduction (%)	Nutrient Reduction (%)
0–2 months	90–95	60–80	70–80	50–70	90–95	60–80
2 months–1 year	90–95	60–80	70–80	50–70	70–90	50–70
1–2 years	80–90	50–70	40–60	20–50	40–60	20–50
More than 2 years	50–60	30–50	10–30	0–10	10–30	0–10

Construction Guidelines

Seeding (temporary or permanent) can take place before or concurrently with mulching. Other surface runoff control measures should be installed before seeding and mulching. If seed is applied before mulch, mulch should be applied to seeded areas immediately after seeding.

Mulches should not be applied when free surface water is present but may be applied to damp ground.

The choice of materials for mulching will be based on the type of soil to be protected, site conditions, season, and economics.

Straw Mulch

The straw should be stabilized to prevent it from being damaged by water or wind (blown away). Use one of the following methods to apply straw mulch:

- Hand punching can be used on small sites, sites with rock and stone on the surface, sites with slopes that are steeper than 3:1, or sites that have been wattled. Take care not to damage wattling or planted vegetation. Use a spade or shovel to punch the straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 4 inches into the slope. The straw bunches should resemble the tufts of a toothbrush.
- Roller punching can be used on large, gently sloping sites without significant outcroppings of rock and stone. Do not use roller punching on sites that have been wattled (unless adequate space exists between lines of wattling) or on planted sites. A roller equipped with straight studs not less than 6 inches, from 4 to 6 inches wide, and approximately 3/4-inch thick will best accomplish the desired effect. Studs should stand approximately 8 inches apart and should be staggered. All corners should be rounded to prevent withdrawing the straw from the soil. Vegetative planting may be conducted following roller punching.
- Crimper punching involves specially designed straw-crimping rollers, which are suitable for use wherever roller punching can be used. The crimpers consist of serrated disk blades,

set 4 to 8 inches apart, which force straw mulch into the soil. Crimping should be done in two directions with the final pass conducted across the slope rather than up and down it.

- Tacking agents may be used on any type of site but are best used only on very stony or rocky soils or small, steep slopes. Apply 28.5 cubic feet per acre (ft^3/ac) of the tacking agent or its equivalent over the straw mulch. Agents that are neutral or nearly neutral in color and have demonstrated effectiveness for the soils and climate of the application area are acceptable.
- Matting may be used on large, steep areas that cannot be punched with a roller. Jute or wood excelsior on plastic netting should be applied over unpunched straw (BMP 54: Matting).

Hydromulching

- Wood fiber may be dyed to aid in uniform placement. Dyes should not stain concrete or painted surfaces nor injure plant or animal life when applied at the manufacturer's recommended rate.
- Application of the slurry should proceed until a uniform cover is achieved. The applicator should not be directed at one location for too long or the applied water will cause erosion.
- The hydraulic mulching machine should be equipped with a gear-driven pump and a paddle agitator. Agitation by recirculation from the pump is not acceptable. Agitation should be sufficient to produce homogeneous slurry of tacking agent and mulch (and seed fertilizer, if used).
- Application rates according to the manufacturer's recommendation for each site situation should be used.

Maintenance

Inspect all mulched areas periodically according to the inspection interval prescribed in the project site storm water plan and after runoff-producing storm events. Inspect for damage due to wind, water, or human disturbance. Repair damaged areas of the mulch immediately. If hydromulching, repair damaged areas at the original specifications. Reseed or replant such areas, if necessary, before replacing the mulch cover. Straw mulch and other organic products do not have to be removed when the vegetation becomes established.

Additional Resources

EPA (US Environmental Protection Agency). 2014. "Mulching." *Stormwater Best Management Practices: Compost Blankets*. https://www3.epa.gov/npdes/pubs/compostblankets.pdf

BMP 54: Matting

Description

Matting is a porous net or fibrous sheet laid over the ground surface for slope stabilization and erosion control or used to hold mulch in place and protect it against wind or water damage. Matting may be used to stabilize channels and swales until vegetative cover becomes established. Matting and netting are sometimes classified as geotextiles (BMP 53); in this catalog, matting is considered to be biodegradable materials made from straw, coconut (coir), jute, wood fiber (excelsior), paper, and/or cotton (Figure 126). Some of these organic materials may be held in place by plastic netting.



Figure 126. Jute matting applied over a steep slope in Jackson Hole, Wyoming.

Applicability

While a variety of biodegradable matting materials may be used for erosion control, the main types include woven (jute), wood fibers, and plastic-bonded. Applications for these matting types are listed below.

Jute matting is a heavy fiber net that is generally purchased in rolls and is stapled/anchored to slopes to provide a uniform covering. This covering protects mulches, provides additional water-holding capacity, and aids in moderating environmental fluctuations near the ground surface (as does mulch).

Jute matting can be applied over straw, grass hay, wood fiber, or manure mulches when wind or water damage would occur without a protective net. Matting is the best single method for protecting the integrity of a mulched area. It may be applied alone as an alternative to straw or wood fiber mulches on flat sites for dust control and seed germination enhancement but should not be applied alone where runoff quantities are significant.

Wood fiber (excelsior) matting is made by bonding wood excelsior fibers to a paper or plastic reinforcing net. The matting is purchased in rolls and stapled to slopes to provide a uniform covering

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	100 acres
Max. Upstream Slope	100%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	2 feet

to protect mulches, provide enhanced water-holding capacity, and aid in moderating environmental fluctuations near the ground surface.

Plastic netting (photo/biodegradable) is a monolithic plastic cloth-like material used primarily to hold straw and other materials in place. Plastic netting is more durable than jute or wood fiber matting. While it is easier to handle and requires less labor, it has no mulch capabilities. Plastic netting alone provides no soil stabilization or erosion control and is best used to hold down mulches until vegetation becomes established.

Matting can be useful in the following circumstances:

- Construction sites becoming temporarily inactive (inactive period greater than 2 weeks and less than 1 year).
- Graded areas receiving permanent revegetation treatment by seeding.
- Bare areas receiving permanent revegetation treatment by seeding.

Limitations

Matting should not be used where overland water flow will exceed 6.5 ft/s. Because of the following characteristics of plastic netting and wood fiber matting, jute matting, straw, or straw-coconut matting are preferred.

Plastic netting does not function as mulch (as does jute matting) because it does not absorb water. When plastic netting is used to anchor straw mulch, it increases the effectiveness of the mulch, but it does not provide direct control of erosion and sedimentation or nutrient generation. Straw mulch rates should be increased 25% when plastic netting is used instead of jute or straw. Plastic netting will degrade over time when exposed to sunlight.

Wood fiber matting is more difficult to put in place than jute and is less predictable in controlling erosion. When properly applied, wood fiber matting can be as effective as jute matting at sediment and nutrient reduction, but it can 10% to 20% less effective when not properly installed.

Biodegradable matting should be chosen to match the expected length of service.

Design Basis

Jute matting should be fiber cloth of a uniform plain weave, undyed and unbleached single jute yarn, 3 to 4 feet wide and weighing an average 0.4 pounds per linear foot of cloth with a tolerance of plus or minus 5%. The matting should have approximately 78 warp ends per width of cloth and 45 weft ends per linear meter of cloth. The yarn should be of a loosely twisted construction having an average twist of not less than 6.3 turns per 4 inches and should not vary in thickness by more than half of its normal diameter.

Wood fiber matting should consist of machine-produced mats of curled wood excelsior, of which 80% have an 8 inches or longer fiber length. The matting should be of consistent thickness with the fiber evenly distributed over the entire area of the blanket (backing). The topside of each blanket should be covered with a 1- x 3-inch weave of twisted Kraft paper or biodegradable plastic mesh that has a high wet strength. Blankets should be fire and smolder resistant and contain no chemical additives. Blankets should be in rolls 3 to 4 feet wide and 130 to 200 feet long.

Plastic netting with mesh opening from 1/10 x 1/10 inches to 1/5 x 1/5 inches should be applied over straw mulch, similar to the method specified below for jute matting.

Effectiveness—Jute matting acts like straw mulch or hydromulch. Sediment reduction is typically 70% to 90% for up to 6 months, 40% to 60% for up to 2 years, and 10% to 30% beyond 2 years. Nutrient reduction is estimated at 50% to 70% for 6 months, 20% to 50% for up to 2 years, and 0% to 10% beyond 2 years.

Due to the difficulty of proper application, wood excelsior matting has a more variable effectiveness than straw, jute, or hydromulch, but when properly applied, it can be as effective. Sediment reduction should range from 50% to 90%, 20% to 60%, and 0% to 30% in 6 months, 2 years, and beyond 2 years, respectively. Nutrient reductions for the same time periods are estimated to be 30% to 70%, 10% to 50%, and 0% to 10%.

Construction Guidelines

The following guidelines apply to all matting and netting installations (Figure 127):

- The soil should be reasonably smooth. Fill and compact any gullies and rills. Rocks, vegetation, or other obstructions that rise above the level of the soil should be removed.
- After site preparation and seeding (if any), roll the netting or matting onto the surface from the top of the slope to the bottom of the slope. Do not install the rolls in a horizontal direction across the slope face; the rolls should follow water flow direction.
- At the top of the area, bury the end of each roll in a trench at least 8 inches deep. Backfill and tamp the trench.
- Overlap the sides of the rolls at least 4 inches and ensure there is at least a 3-foot overlap when an uphill roll joins a downhill roll. The uphill roll should overlie the downhill roll.
- Extend the matting beyond the edge of the mulched or seeded area at least 1 foot at the sides and 3 feet at the top and bottom of the area. If existing vegetation or structures mark the boundaries of the area, the matting should continue into the stable vegetated area or to the edge of the structure.
- Staples should be driven perpendicularly into the slope face. Place them approximately 3 feet apart down the sides and center of the roll and not more than 1 foot apart at the upper end of a roll or at the end overlap of two rolls.
- Staples should be of heavy gauge wire (7/100 inch diameter or greater), bent into a U-shape, with legs at least 6 inches long, and a 1-inch crown. Use longer staples and greater frequency in loose or sandy soil.
- Ensure the matting makes uniform contact with the slope face underneath. No *bridging* of rills or gullies should be allowed.
- If wood fiber matting is to be applied without other mulches, the minimum thickness of mat should be 1.5 inches. If the mat is to be applied over other mulches, the minimum mat thickness should be 0.5 inches.

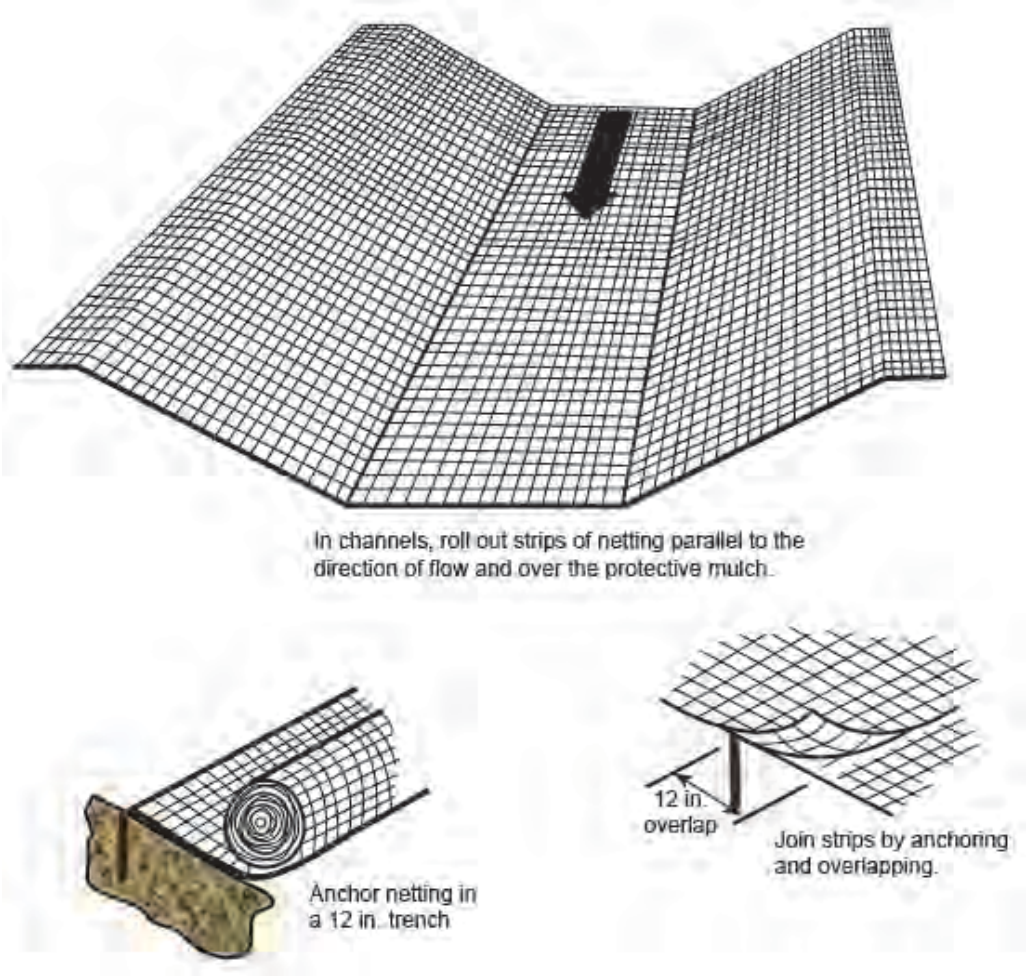


Figure 127. Matting.

Maintenance

Inspect the matting at regular intervals and after each runoff-producing storm event. Repair the matting or netting as necessary to restore complete coverage and full effectiveness. The matting must maintain contact with the group at all times.

Additional Resources

EPA (US Environmental Protection Agency). 2014. *Geotextiles.* Water: Best Management Practices. *https://www.epa.gov/watersense/best-management-practices*

BMP 55: Soil Binders

Description

Disturbed soil is easily eroded by wind or storm water runoff. Soil binders include soil stabilizers applied to disturbed soil to reduce wind and water erosion when construction activities temporarily cease and dust palliatives are used to reduce dust emissions from mechanical and wind forces. Typically dust palliatives do not have the longevity of soil stabilizers (Figure 128).

The use of treatment chemicals must comply with federal, state, and local regulations. The type of chemicals used must be approved and documented in the storm water management plan.



Figure 128. Soil stabilizer application in Douglas County, Colorado (Colorado UDFCD 2010).

Applicability

Soil binders are suitable for use on disturbed soil areas requiring temporary erosion protection on both mild and steep slopes. Binders are often used in areas where work has temporarily stopped but is expected to resume before vegetation can become established. Soil binders are typically used with other BMPs to increase performance, and the treated area should discharge to a sediment basin or other BMP. Apply soil binders to the following:

- Rough-graded soils that will be inactive for a period of time
- Final-graded soils before applying final stabilization (e.g., paving, planting, and mulching)
- Temporary haul roads before placing crushed rock surfacing
- Compacted soil road base
- Construction staging, materials storage, and layout areas
- Soil stockpiles
- Areas that will be mulched

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Nitrogen
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Fair
Max. Tributary Drainage Area	Unlimited
Max. Upstream Slope	NA
NRCS Soil Group	ABCD
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

Limitations

- Soil binders should not be directly applied to water or allowed to enter a water body.
- Do not use soil binders on a slope that flows into a water body if it will result in a discharge of the soil binder, unless it passes through a sediment trap or sediment basin.
- Always use soil binders with other BMPs, but not in place of other BMPs, including erosion and sediment controls.
- Site soil type dictates appropriate the soil binder to be used. Be aware that soil binders may not function effectively on silt or clay soils or in highly compacted areas. Follow the manufacturer's recommendations for use with certain soil conditions.
- Some soil binders may not perform well in low relative humidity.
- Certain soil binders may not cure adequately if exposed to low temperatures within 24 hours of application.
- Avoid using soil binders in high vehicle and pedestrian traffic areas because effectiveness is minimized under these conditions.
- Soil binders are temporary and may need reapplication.

Design Basis

General Considerations

- Soil binders should be nontoxic to plant and animal life. Obtain an MSDS from the manufacturer to ensure site runoff is not exposed to pollutants contained within the soil binder.
- Soil binders designated for erosion and sediment control should be *water soluble*, *linear,* or *noncross linked*.
- All areas not being actively worked on should be covered and protected from rainfall. Soil binders should not be the only cover BMP used.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Storm water runoff from soils treated with a soil binder should pass through a sediment control BMP before discharging to surface waters. The type of control BMP suggested varies by the size of the contributing drainage area.
  - When the total drainage area is greater than or equal to 5 acres, soil binder-treated areas should drain to a sediment basin.
  - Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a minimum of three check dams per acre. Maximize the total number of check dams used to achieve the greatest amount of settling before discharging from the site. Space each check dam evenly in the drainage channel.
- On the sites treated with a soil binder, use silt fencing and fiber rolls to limit sediment discharge to sediment traps and sediment basins.

Selecting a Soil Binder

Soil binder selection depends on site conditions (i.e., environmental factors, soil moisture content, and soil texture). Consult the manufacturer for proper soil binder selection. Products should have a manufacturer's certification that it is nontoxic to plant or animal life and nonstaining to concrete or painted surfaces.

Factors to consider when selecting a soil stabilizer or dust palliative product include its suitability to the situation, soil types and surface materials, and frequency of application.

Suitability to situation—Consider where the product will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time stabilization will be needed and if the product will be placed in an area where it will degrade rapidly.

Soil types and surface materials—Fines and moisture content are key properties of surface materials. Consider a soil stabilizer or dust palliative's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials. Soil information can be obtained from the project's geotechnical report or from the NRCS website.

Application Frequency—Application frequency can be affected by subgrade conditions, surface type, climate, and maintenance schedule. Frequent applications could lead to high costs. Application frequency may be minimized if the dust palliative has good penetration, low evaporation, and good longevity. Consider that frequent application will also require frequent equipment cleanup.

Several types of soil binders are available: plant-material based (short-lived), plant-material based (long-lived), polymeric emulsion blends, cementitious based, and petroleum based. Plant-material based (short-lived) soil binders should only be used as dust palliatives due to their short-lived nature. Plant materials include guar, psyllium, and starch. Plant-material based (long-lived) includes tall oil pitch/pitch and rosin emulsion, and lignin sulfonate.

Polymeric emulsion blends include acrylic copolymers and polymers; liquid polymers of methacrylates and acrylates; copolymers of sodium acrylates and acrylamides; polyacrylamide and copolymer of acrylamide (PAM); and hyrocolloid polymers. Gypsum is a cementious-based soil binder, and petroleum resin emulsion is a petroleum-based soil binder.

Table 24 and Table 25 provide a summary of the properties of the soil binder types.

Table 24. Soil stabilizer properties for erosion control in nontraffic areas (ITD 2014).

Chemicals	Plant-Material Based (Short-Lived)	Plant-Material Based (Long-Lived)	Polymeric Emulsion Blends	Cementitious-Based Stabilizers
Relative cost	Low	Low	Low	Low
Resistance to leaching	High	High	Low to moderate	Moderate
Resistance to abrasion	Moderate	Low	Moderate to high	Moderate to high
Longevity	Short to medium	Medium	Medium to long	Medium
Minimum curing time before rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with existing vegetation	Good	Poor	Poor	Poor
Mode of degradation	Biodegradable	Biodegradable	Photodegradable/ chemically degradable	Photodegradable/ chemically degradable
Labor intensive	No	No	No	No
Specialized application equipment	Water truck or hydraulic mulcher	Water truck or hydraulic mulcher	Water truck or hydraulic mulcher	Water truck or hydraulic mulcher
Liquid/powder	Powder	Liquid	Liquid/powder	Powder
Surface crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Cleanup	Water	Water	Water	Water
Erosion control application rate	Varies	Varies	Varies	4,500 to 13,500 L/ha

Note: liter per hectare (L/ha)

Table 25. Soil stabilizer properties for erosion control in traffic areas (ITD 2014).

Chemicals	Ligninosulfonate	Tall Oil Pitch Emulsion	Petroleum Resin Emulsion
Relative cost	Moderate	Moderate	Moderate
Resistance to leaching	Low	High	High
Longevity	Medium	Medium to long	Medium
Minimum curing time before rain	24 hours +	30–60 minute (prime coat) 8–24 hours (mixed Into base)	0–4 hours
Mode of degradation	Biodegradable	Biodegradable	Photo/chemically degradable
Labor intensive	No	No	No
Specialized application equipment	Water truck or hydraulic mulcher	Water truck or hydraulic mulcher	Water truck or hydraulic mulcher
Surface crusting	Yes, but dissolves on rewetting	Yes	Yes
Cleanup	Water	Water, before it dries	Water, before it cures

Construction Guidelines

After selecting an appropriate product, prepare the untreated soil surface before applying the soil binder. Proper application ensures the soil binder's total effectiveness. Follow these guidelines when applying soil binders during construction:

- Soil binder application should adhere to all state and local regulations.
- Follow manufacturer's recommendation for application rates and prewetting of the application area.
- The untreated soil surface should contain sufficient moisture to assist the agent in achieving uniform distribution.
- Before application, roughen embankment and fill areas.
- Consider the drying time for the selected product and apply with sufficient time before anticipated rainfall. Generally, soil stabilizers and dust palliatives require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure times. Soil stabilizers and dust palliatives shall not be applied during or immediately before rainfall.
- Soil stabilizers and dust palliatives shall not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the air temperature is below 4°C (40°F) during the curing period.
- Some soil binders, when combined with water, are slippery and can be a safety hazard. Take care to prevent spills of soil binder powder onto paved or impervious surfaces. During any application of soil binders, prevent overspray from reaching pavement and creating a safety hazard.
- Avoid overspray onto travel ways, sidewalks, drainage channels, and existing vegetation.
- Do not add soil binders to water discharging from the site.
- Refer to MSDS for worker protection requirements.

Maintenance

Regular inspection and maintenance is important for ensuring the effectiveness of the soil binder. Follow manufacturer's recommendations for reapplication and for maintaining and cleaning equipment after use. The following are additional maintenance guidelines:

- Inspect BMPs before rain events: daily during extended rain events, after rain events, weekly during the rainy season, and at 2-week intervals during the nonrainy season.
- Reapply soil binders according to manufacturer's recommendations or as specified by the supervising erosion control professional.
- Areas where erosion is evident should be repaired and soil binders reapplied as soon as possible.
- While making repairs, exercise care to minimize the damage to protected areas, as any area damaged will require reapplying the soil binders.
- More soil binder applications may be required for steep slopes, silty and clayey soil (NRCS Classification Type "C" and "D" soils), long grades, and high precipitation areas.
- Inspections and maintenance should be recorded in the SWPPP and according to the prescribed schedule.

Additional Resources

EPA (US Environmental Protection Agency). 2014. *Chemical Stabilization*. Water: Best Management Practices *https://www.epa.gov/sites/production/files/2015-11/documents/idde_manualwithappendices_0.pdf*

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

King County (King County, Washington). 2009. *King County, Washington Surface Water Design Manual.* Seattle, WA: King County, Department of Natural Resources.

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 56: Riprap Slope Protection

Description

Slopes that experience high runoff velocities from concentrated flows can be unstable and cause excessive erosion and sedimentation. Riprap slope protection is created by layers or piles of rock placed over the soil surface. Riprap, when used as slope protection, protects against erosion, stabilizes the slope, and dissipates the energy of surface water flow (Figure 129).

If used along a surface water body such as a river, lake, or stream, permits may be required from Idaho Department of Lands, IDWR, and US Army Corps of Engineers (each agency has local offices throughout the state). These agencies may have specifications for placing riprap so inquire early in the design to facilitate obtaining the permits.



Figure 129. Riprap stabilization of the Salmon River Road, Riggins, Idaho.

Applicability

Riprap slope protection can be used on channel side slopes or bottoms, cut and fill slopes, streambanks, bridge embankments, below dikes or detention pond spillways, or any area where the velocity of flow may cause erosion.

Limitations

The steepness of the slope limits the applicability of riprap since slopes steeper than 1V:2H can cause riprap loss due to erosion and sliding. It may be difficult to remove sediment from riprap without completely removing and replacing the riprap. If used improperly, riprap can increase erosion. In addition, riprap can be more expensive than other stabilization options.

Design Basis

The design of riprap slope protection depends on the soil conditions, site characteristics, and expected flows. When designing riprap slope protection, apply the following guidelines.

Primary BMP Functions and Controls

☐ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Nitrogen
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acre
Max. Upstream Slope	40%
NRCS Soil Group	ABCD
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

Gradation

Rock riprap material should be composed of a well-graded mixture of angular stone size so that 50% of the pieces, by weight, are larger than the D_{50} size as determined using standard testing methods. A well-graded mixture is defined as a mixture that includes a variety of stone sizes so that the voids between the stones are filled. Riprap gradations that fall within the range of D_{100}/D_{50} and D_{50}/D_{20} from 3.0 to 1.5 are acceptable.

Size

Size the riprap so the permissible shear stress of the riprap material is greater than the hydrodynamic force of water flowing in the channel or over the slope. The permissible shear stress (Table 26) indicates the force required to initiate movement of the stone particles (Equation 33–Equation 35).

Table 26. Typical permissible shear stresses for bare soil and stone linings (FHWA 2005).

Lining Category	Lining Type	Permissible Shear Stress (pounds per square foot)
Bare soil[a] Cohesive (PI = 10)	Clayey sands	0.037–0.095
	Inorganic silts	0.027–0.11
	Silty sands	0.024–0.072
Bare soil[a] Cohesive (PI ≥ 20)	Clayey sands	0.094
	Inorganic silts	0.083
	Silty sands	0.072
	Inorganic clays	0.14
Bare soil[b] Cohesive (PI ≤ 10)	Finer than coarse sand D_{75} < 0.05 inches	0.02
	Fine gravel D_{75} = 0.3 inches	0.12
	Gravel D_{75} = 0.6 inches	0.24
Gravel mulch[c]	Coarse gravel D_{50} = 1 inch	0.4
	Very coarse gravel D_{50} = 2 inches	0.8
Rock riprap[c]	D_{50} = 0.5 feet	2.4
	D_{50} = 1 foot	4.8

a. Based on Equation 33 assuming a soil void ratio of 0.5 (USDA 1987).
b. Based on Equation 34 derived from USDA (1987).
c. Based on Equation 35 Shield's parameter equal to 0.047

$$\tau_{p,soil} = (c_1 PI^2 + c_2 PI + c_3)(c_4 + c_5 e)^2 c_6$$

Equation 33. Permissible soil shear stress for cohesive soils.

Where:

$\boldsymbol{\tau_{p,soil}}$ = soil permissible shear stress (lb/ft^2)
PI = plasticity index
e = void ratio
$c_1, c_2, c_3, c_4, c_5, c_6$ = coefficients (Table 27)

Table 27. Coefficients for permissible soil shear stress (USDA 1987).

ASTM Soil Classification	Applicable Range	C_1	C_2	C_3	C_4	C_5	C_6 (SI)	C_6 (CU)
GM	10 ≤ PI ≤ 20 20 ≤ PI	1.07	14.3	47.7 0.076	1.42 1.42	-0.61 -0.61	4.8×10^{-3} 48.	10^{-4} 1.0
GC	10 ≤ PI ≤ 20 20 ≤ PI	0.0477	2.86	42.9 0.119	1.42 1.42	-0.61 -0.61	4.8×10^{-2} 48.	10^{-3} 1.0
SM	10 ≤ PI ≤ 20 20 ≤ PI	1.07	7.15	11.9 0.058	1.42 1.42	-0.61 -0.61	4.8×10^{-3} 48.	10^{-4} 1.0
SC	10 ≤ PI ≤ 20 20 ≤ PI	1.07	14.3	47.7 0.076	1.42 1.42	-0.61 -0.61	4.8×10^{-3} 48.	10^{-4} 1.0
ML	10 ≤ PI ≤ 20 20 ≤ PI	1.07	7.15	11.9 0.058	1.48 1.48	-0.57 -0.57	4.8×10^{-3} 48.	10^{-4} 1.0
CL	10 ≤ PI ≤ 20 20 < PI	1.07	14.3	47.7 0.076	1.48 1.48	-0.57 -0.57	4.8×10^{-3} 48.	10^{-4} 1.0
MH	10 ≤ PI ≤ 20 20 ≤ PI	0.0477	1.43	10.7 0.058	1.38 1.38	-0.373 -0.373	4.8×10^{-2} 48.	10^{-3} 1.0
CH	20 ≤ PI	—	—	0.097	1.38	-0.373	48.	1.0

Notes: GM—silty gravels, gravel-sand silt mixtures; GC—clayey gravels, gravel-sand-clay mixtures; SM—silty sands, sand-silt mixtures; SC—clayey sands, sand-clay mixtures; ML—inorganic silts, very fine sands, rock flour, silty or clayey fine sands; CL—inorganic clays of low-to-medium plasticity, gravelly clays, sandy clays, silty clays, lean clays; MH—inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts; CH—inorganic clays of high plasticity, fat clays

$$\tau_{p,soil} = \alpha D_{75}$$

Equation 34. Permissible soil shear stress for course-grained noncohesive soils.

Where:

$\boldsymbol{\tau_{p,soil}}$ = soil permissible shear stress (lb/ft^2)

D_{75} = soil size where 75% of the material is finer (in.)

α = unit conversion constant, 0.75 (SI), 0.4 (CU)

$$\boldsymbol{\tau_p = F_*(\gamma_s - \gamma)D_{50}}$$

Equation 35. Permissible shear stress for riprap and gravel linings.

Where:

τ_p = permissible shear stress (lb/ft^2)

F_* = Shield's parameter, dimensionless

γ_s = specific weight of the stone (lb/ft^2)

γ = specific weight of the water (62.4 lb/ft^2)

D_{50}= mean riprap size (ft)

The maximum shear stress on a channel bottom can be calculated using Equation 36.

$$\tau = \gamma ds$$ **Equation 36. Shear stress at the bottom of a channel.**

Where

τ = maximum shear stress at channel bottom (lb/ft^2)

γ= unit weight of water, 62.4 lb/ft^3

d = maximum flow depth (ft)

s = channel gradient (ft/ft)

The maximum shear on the side of a channel is generally less than that on the channel bottom and is given by Equation 37:

$$\tau_s = K_1 \tau$$ **Equation 37. Shear stress at the side of a channel.**

Where

τ_s = side shear stress (lb/ft^2)

τ = maximum shear stress at channel bottom (lb/ft^2)

K_1= ratio of channel side shear to bottom shear stress

For trapezoidal and triangular channels, where Z is the horizontal dimension (1:Z, V:H) Equation 38 may be applied for K_1:

$K_1 = 0.77$ for $Z \leq 1.5$

$K_1 = 0.066Z\ 0.67$ for $1.5 < Z < 5$

$K_1 = 1.0$ for $5 \leq Z$

Equation 38. Ratio values for side shear to bottom shear stress.

Thickness

The thickness of the riprap layer varies depending on the application but in no case should it be less than 6 inches. For smaller rock sizes where D_{50} is 15 inches or less, a thickness of 1.5 to 2 times D_{100} is recommended. For D_{50} greater than 15 inches, a thickness of 1.2 to 1 times D_{100} can be used. Table 28 lists some examples of riprap sizes and thicknesses for various unit shear stresses.

Table 28. Example rock riprap sizes and thickness.

Unit Shear Stress (pounds per square foot)	D_{50} (inches)	D_{100} (inches)	Minimum Blanket Thickness (inches)
0.67	2	4	6
2.00	6	9	14
3.00	9	14	20
4.00	12	18	27
5.00	15	22	32
6.00	18	27	32
7.80	21	32	38
8.00	24	36	43

Stone Quality

Riprap should consist of field stone or rough unhewn quarry stone. The stone must be hard and *angular* (to create an interlocking stone blanket) and of a quality that will not disintegrate with exposure to water, weathering, or freeze/thaw cycles. The specific gravity of the individual stones should be at least 2.5 to prevent scour and mobilization of the material. Table 29 lists common rock types and their specific gravities. Note that although talc and sandstone meet the specific gravity requirement, these materials should not be used in riprap construction because of water solubility and scouring concerns. Use best judgment when selecting riprap material.

Table 29. Common rock types and associated specific gravity and density (EDUMine 2018).

Rock Type	Specific Gravity	Ton/yd^3
Basalt	2.8–3.0	2.11–2.36
Granite	2.6–2.7	2.19–2.28
Quartzite	2.6–2.8	2.19–2.36
Gneiss	2.6–2.9	2.19–2.44
Dolomite	2.50–2.60	2.36–2.44
Talc	2.6–2.8	2.19–2.36
Sandstone	2.2–2.8	1.85–2.36

Filter

A filter is a layer of material placed between the riprap and the underlying soil to prevent soil movement into and through the riprap. The need for a filter depends on the characteristics of the native material underlying the riprap, but it is needed in most cases.

Filters can be either gravel or a geosynthetic fabric. Geosynthetic fabrics can be woven or nonwoven monofilament yarns and should have adequate permeability to prevent uplift pressures from forming (Table 30). Other basic requirements include a thickness of 10–60 mils, grab strength of 90–120 pounds, and conform to ASTM D-1777 and ASTM D5034 and D5035.

Table 30. Maximum apparent opening size for geotextile filters (FHWA 1998).

Soil Type	Maximum Apparent Opening Size for Geotextile Filters (millimeters)
Noncohesive, less than 15% passing the 0.075 mm (US #200) sieve	0.43
Noncohesive, 15% to 50% passing the 0.075 mm (US #200) sieve	0.25
Noncohesive, more that 50% passing the 0.075 mm (US #200) sieve	0.22
Cohesive, plasticity index greater than 7	0.30

Gravel filter blankets should be designed by comparing particle sizes of the riprap material and the underlying base material using Equation 39, Equation 40, and Equation 41 (FHWA 2005). The recommended minimum filter thickness is 6 inches.

$$\frac{D_{15\ UPPER}}{D_{85\ LOWER}} < 5$$ **Equation 39. Lower particle size ratio.**

$$5 < \frac{D_{15\ UPPER}}{D_{15\ LOWER}} < 40$$ **Equation 40. Medium particle size ratio.**

$$\frac{D_{50\ UPPER}}{D_{50\ LOWER}} < 40$$ **Equation 41. Upper particle size ratio.**

In the equations above, *upper* refers to the overlying material, and *lower* refers to the underlying material. These relationships must hold between the filter blanket and base material and between the riprap and filter blanket.

Placement

Riprap placement shall follow immediately after filter placement. Place riprap so it forms a dense, well-graded mass of stone with minimum voids. Riprap shall be placed at its full thickness in one lift.

In a channel, place riprap so it extends to the maximum flow depth, or to a point where vegetation will satisfactorily control erosion. Ensure riprap extends to five times the bottom width upstream and downstream at the beginning and ending of the curve and the entire curved section.

On slopes, key the toe of the riprap in at the base. The toe should be excavated to 2 feet deep. The design thickness of the riprap shall be extended to a minimum of 3 feet horizontally from the slope. The finished grade of the riprap should blend with the surrounding area. Figure 130 and Figure 131 show cross sections of riprap placed in channels and on channel side slopes.

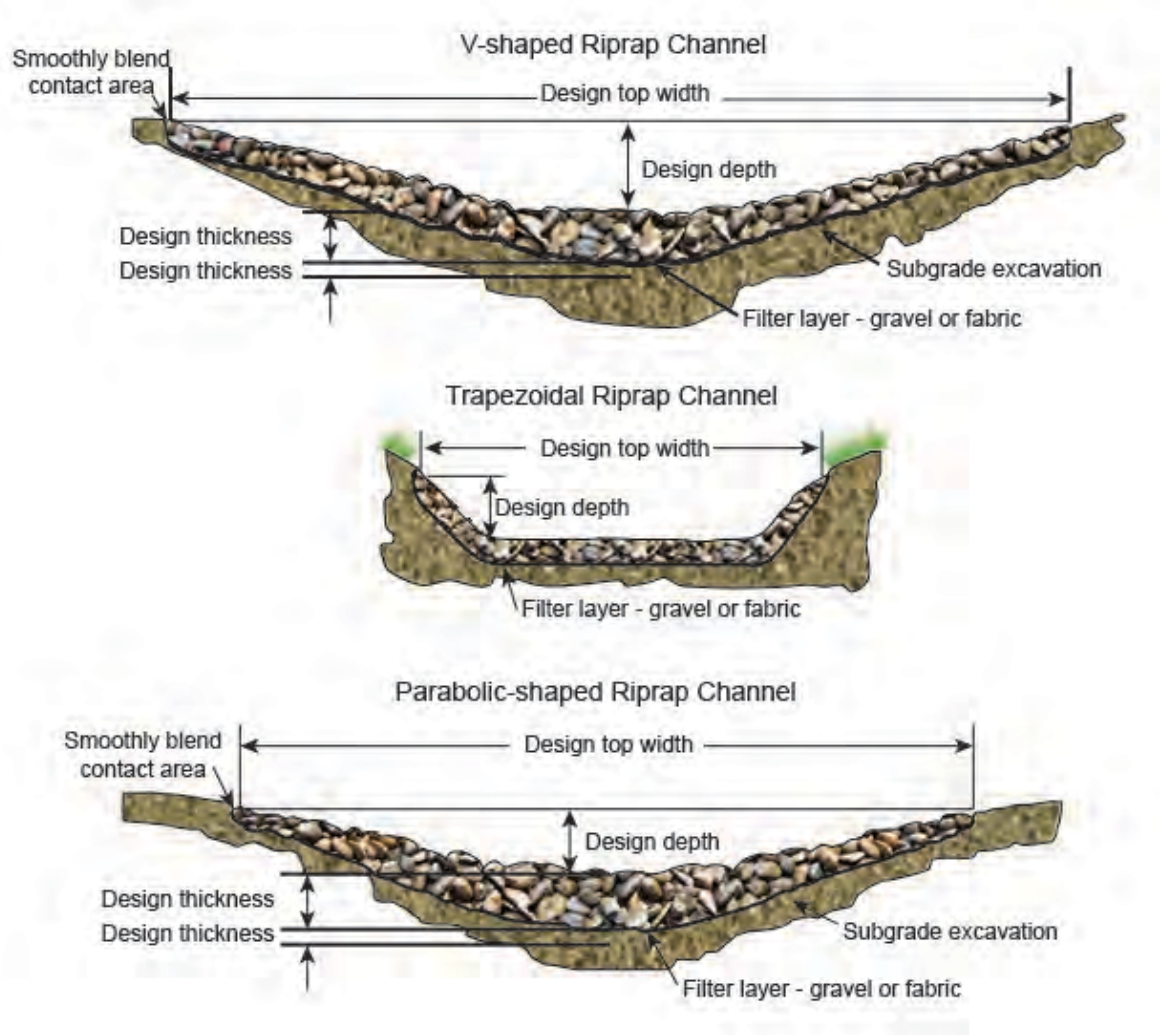


Figure 130. Riprap channel cross sections.

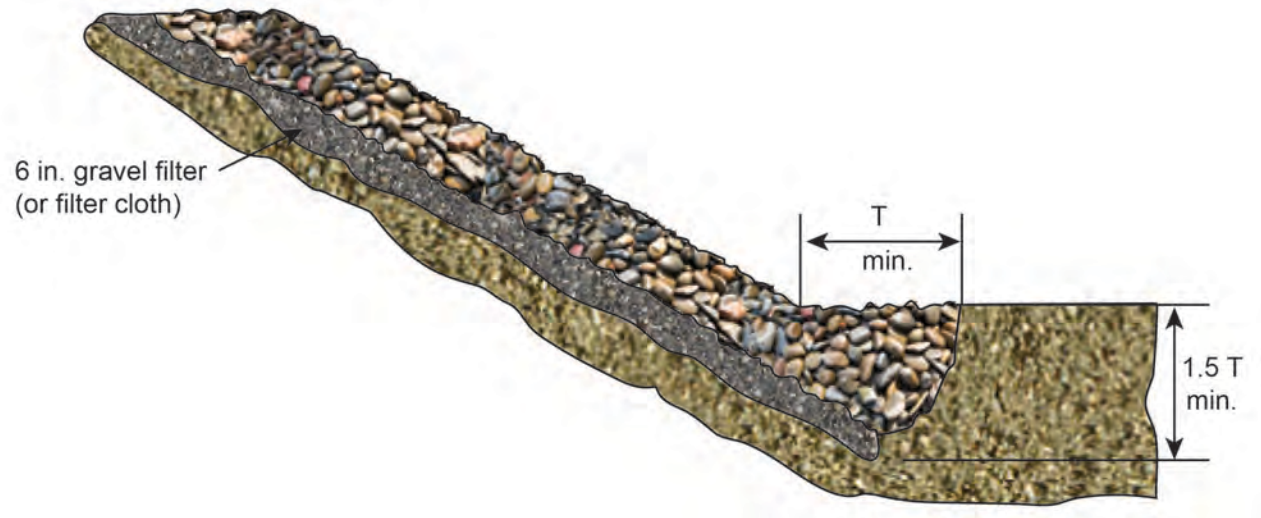


Figure 131. Riprap on channel side slope.

Grouted Riprap

Grouted riprap consists of a stone bed with voids filled with grout or concrete to form a veneer of cementitious-bonded aggregate armor. Grouting riprap is an option if the required stone sizes are not available for a conventional riprap installation or in areas of high shear stress or nonuniform flow conditions, such as at transitions in channel shape or at energy dissipation structures.

Grouted riprap should consist of stone with less than 5% passing a 2-inch sieve and have qualities similar to nongrouted riprap. The median rock size should not exceed 0.67 times the blanket thickness. Figure 132 illustrates the relationship between design velocity and recommended riprap blanket thickness for grouted installations.

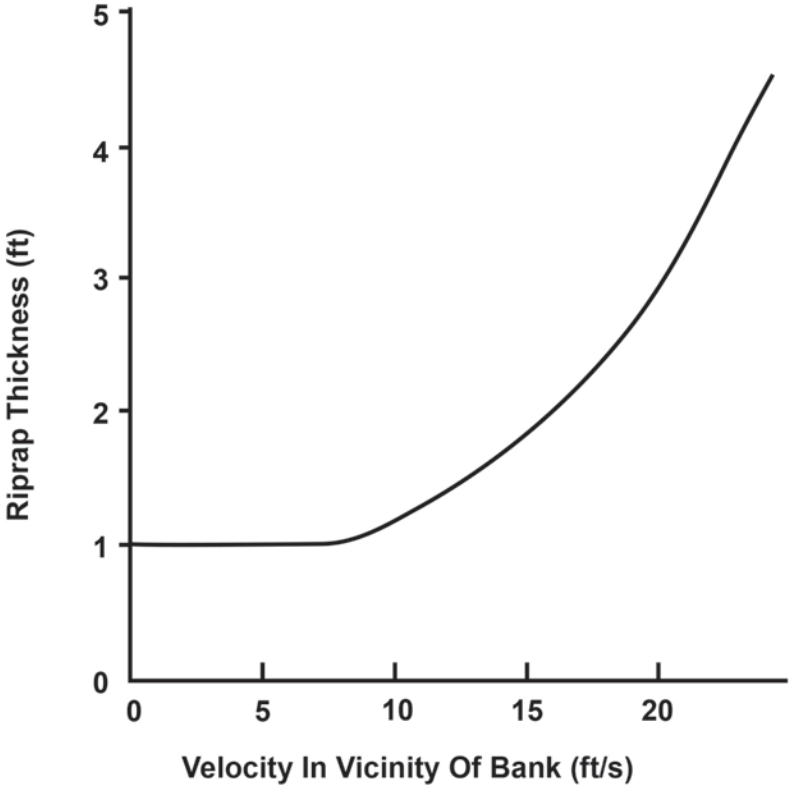


Figure 132. Grouted riprap thickness as a function of flow velocity (UDOT 2004).

Grouted riprap is a rigid revetment and will not conform to changes in the bank geometry due to settlement. Special attention should be placed on edge treatment, foundation design, and mechanisms for hydrostatic pressure relief to avoid failure from undermining or lining breakup. To form a firm foundation, the bank should be free of all trees and debris and tamped or lightly compacted to provide sufficient bearing capacity to support the dry weight of the revetment alone or the submerged weight of the revetment plus the weight of the water in the wedge above the revetment for design conditions, whichever is greater. Pressure relief should be provided using weep holes that extend through the grout surface to the interface with the gravel underdrain layer. Recommended edge treatments and weep holes are illustrated in Figure 133.

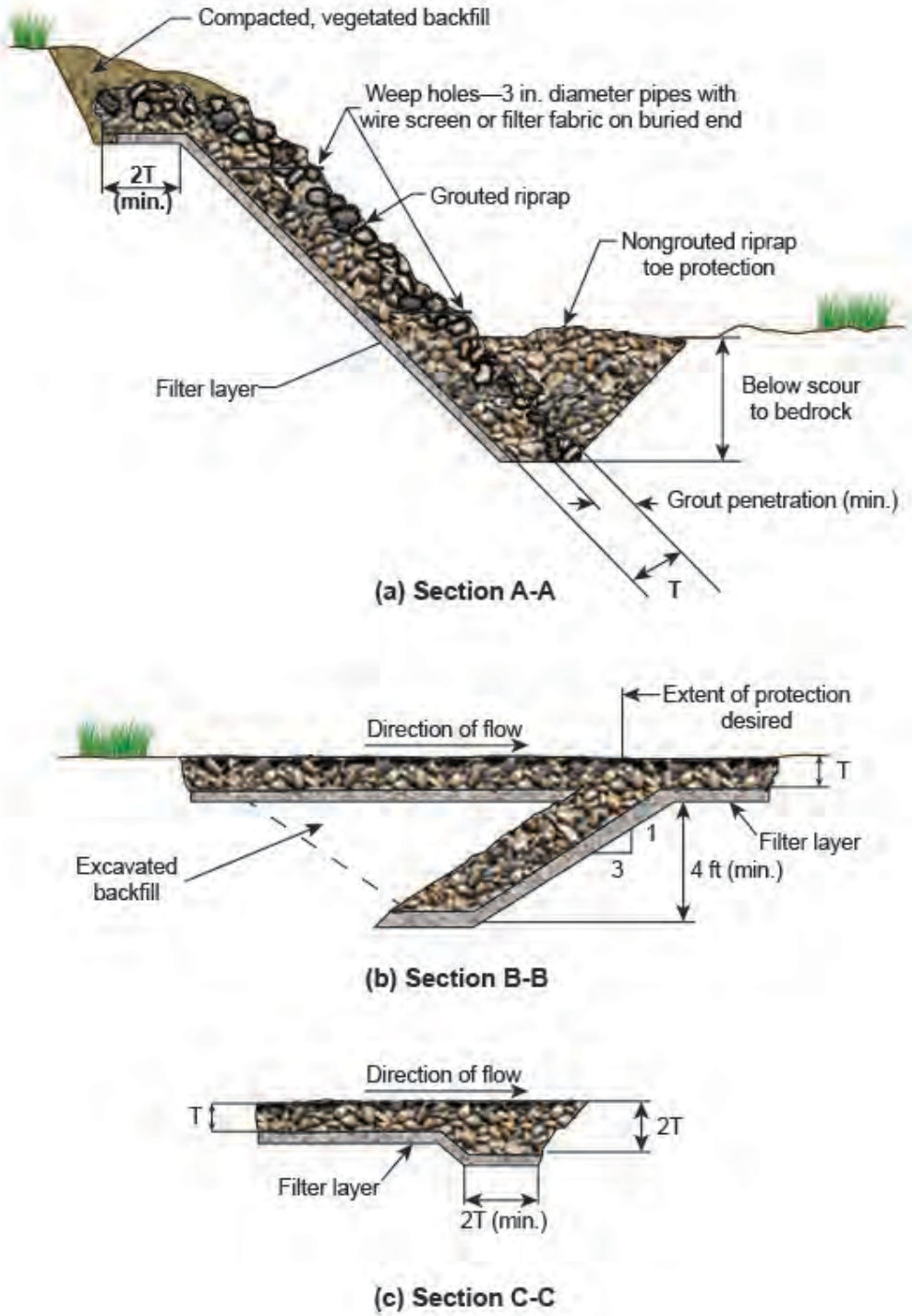


Figure 133. Grouted riprap cross section (top), upstream end treatment (middle), and downstream end treatment (bottom).

Construction Guidelines

- The subgrade for the filter and riprap should be prepared to the final grades. Any fill required in the subgrade should be compacted to a density approximately equal to that of the surrounding undisturbed material.
- Geosynthetic fabric should be protected from punching, cutting, or tearing. Any damage other than an occasional small hole should be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps whether for repairs or for joining two pieces of cloth should be a minimum of 1 foot.
- Riprap stone should be placed by equipment and constructed to the full course thickness in one operation to avoid displacement of underlying materials.
- The stone for riprap should be delivered and placed in a manner that ensures it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones.
- Take care when placing riprap to prevent damage to the filter fabric. A combination of hand or equipment placement may be necessary depending on size and location of the riprap.
- Grout strength of 2,000 to 2,500 psi is recommended for grouted riprap installations.
- Underwater placement of grouted riprap should be avoided.
- Rock should be wet immediately before commencing grouting operations for grouted riprap installation.
- Complete construction of the riprap protection before allowing erosive flows to pass over the protected surface.

Maintenance

Once riprap has been installed, the maintenance needs are relatively low. Inspect after heavy storms and high flows for scouring and any dislodged stones. Repair all damage promptly.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

FHWA (US Department of Transportation Federal Highway Administration). 2005. *Design of Roadside Channels with Flexible Linings*. Hydraulic Engineering Circular-15 (HEC-15). Publication No. FHWA-NHI-05-114. *http://www.fhwa.dot.gov/engineering/hydraulics/library_arc.cfm?pub_number=15&id=32*

Hazra and ODOT (Hazra Engineering Company and Oregon Department of Transportation, Geo/Environmental Section). 2005. *ODOT Erosion Control Manual: Guidelines for Developing and Implementing Erosion and Sediment Controls.*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

UDOT (Utah Department of Transportation). 2004. *UDOT Manual of Instruction—Roadway Drainage, Bank Protection.* *http://www.udot.utah.gov/main/uconowner.gf?n=200403161050503*

BMP 58: Slope Roughening

Description

Exposed disturbed soil is highly susceptible to wind and water erosion. Slope roughening by tracking, scarifying, imprinting, or tilling a disturbed area roughens the soil surface to create horizontal grooves, furrows, depressions, crimped mulch, or small steps running parallel to the contour (Figure 137).



Figure 137. Exposed soil temporarily stabilized by roughening the surface (*North Idaho Hydroseeding*).

Slope roughening reduces the speed of runoff, increases infiltration rates, and traps sediment, as well as establishes vegetative cover by providing stable and level areas where seedlings can take hold and grow. Leaving the slope in a roughened condition controls erosion and provides suitable rooting areas for plant seedlings better than a finely graded slope.

Applicability

Slope roughening is simple, inexpensive, and immediate short-term erosion control for bare soil where vegetative cover is not planned or not yet established. The practice is appropriate for all slopes including altered slopes, temporary stockpiles, sediment basins, berms, and swales.

Applied with appropriate machinery, this measure is used before permanent seeding/planting (BMP 32: Landscaping). All slopes steeper than 3:1 and greater than 5 feet in vertical height require roughening and may require terracing, grooving, or furrowing before seeding (BMP 59: Gradient Terracing).

Limitations

Site and soil conditions may limit the use of slope roughening. This BMP is limited to slopes in medium to highly cohesive soils or in soft rock that can be excavated without ripping. The method is not applicable in NRCS Type A soils such as sands, moraines, and other depositional soils. Slope angle on the site should be gentle enough to permit access to heavy equipment.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☐ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Nitrogen
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	1 acre
Max. Upstream Slope	20%
NRCS Soil Group	BCD
Min. Ground Water Separation	5 feet
Min. Bedrock Separation	3 feet

This BMP is not a stand-alone measure and should be implemented with other BMPs, such as mulching (BMP 52), perimeter controls (BMP 64 or BMP 65), or sediment basins (BMP 66). Consider the type of BMP that follows soil roughening as some BMPs are not designed for installation over roughened surfaces. For example, do not use erosion control matting (BMP 54) with soil roughening because the *bridging* effect suspends the blanket above the seed bed.

Slope roughening is a temporary measure because the serrations have limited effectiveness in more than a gentle rain. If the roughening is washed away in a heavy storm, the surface must be reroughened and reseeded.

Tracking with heavy equipment will compact soils, which is not desirable in areas that will be revegetated. Scarifying, tilling, or ripping (BMP 46: Minimize Soil Compaction) are better surface roughening techniques in locations where revegetation is planned.

Design Basis

Different methods can be used to roughen the slope surface, including stair-step grading, grooving (using disks, spring harrows, or teeth on a front-end loader), contour furrowing, and tracking (driving a crawler tractor up and down a slope, leaving the cleat imprints perpendicular to the slope). Figure 138 shows tracking and contour furrows. Selecting an appropriate method depends on the slope's grade, mowing requirements after vegetative cover is established, whether the slope was formed by cutting or filling, and type of equipment available.

Slopes Steeper than 2:1

Any slope steeper than 2:1 should be terraced or stair-step graded, with benches wide enough to retain sediment eroded from the slope above (BMP 59: Gradient Terracing).

Slopes between 3:1 and 2:1

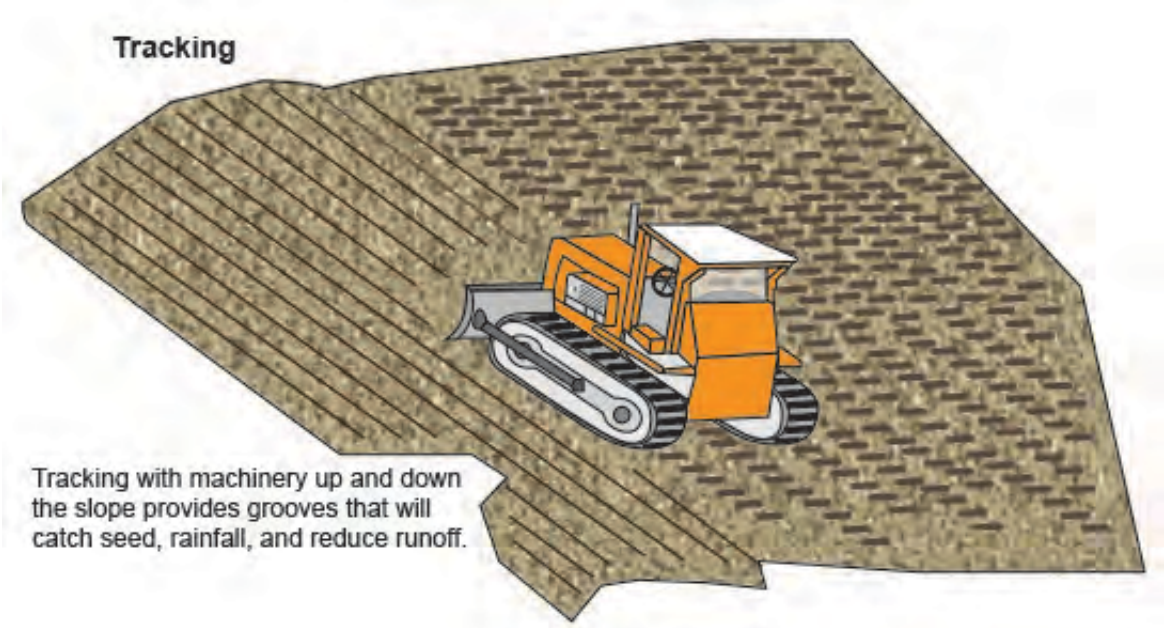
Cut slopes with a gradient steeper than 3:1 but flatter than 2:1 should be stair-step graded or groove cut (Figure 139). Stair-step grading works well with soils containing large amounts of small rock. Each step catches material discarded from above and provides a level site where vegetation can grow. Stairs should be wide enough to work with standard earth-moving equipment. Any equipment that can be safely operated on the slope, including those described above, can perform grooving. Grooves should not be less than 3 inches deep or more than 16 inches apart.

Fill slopes with a gradient steeper than 3:1 but flatter than 2:1 should consist of properly compacted lifts no greater than 8 inches deep. The slope face should consist of loose, uncompacted fill 4 to 6 inches deep that can be left rough or can be grooved as described above, if necessary.

Avoid excessive compacting of the soil surface, especially when tracking, as soil compaction inhibits vegetation growth and causes higher runoff speed. Limit roughening with tracked machinery on soils that do not compact easily, and avoid tracking on clay soils.

Slopes Flatter than 3:1

Any cut or filled slope that will be mowed should have a gradient flatter than 3:1. Such a slope can be roughened with shallow grooves parallel to the slope contour by using normal tilling. Grooves should be close together (less than 10 inches and not less than 1 inch deep).



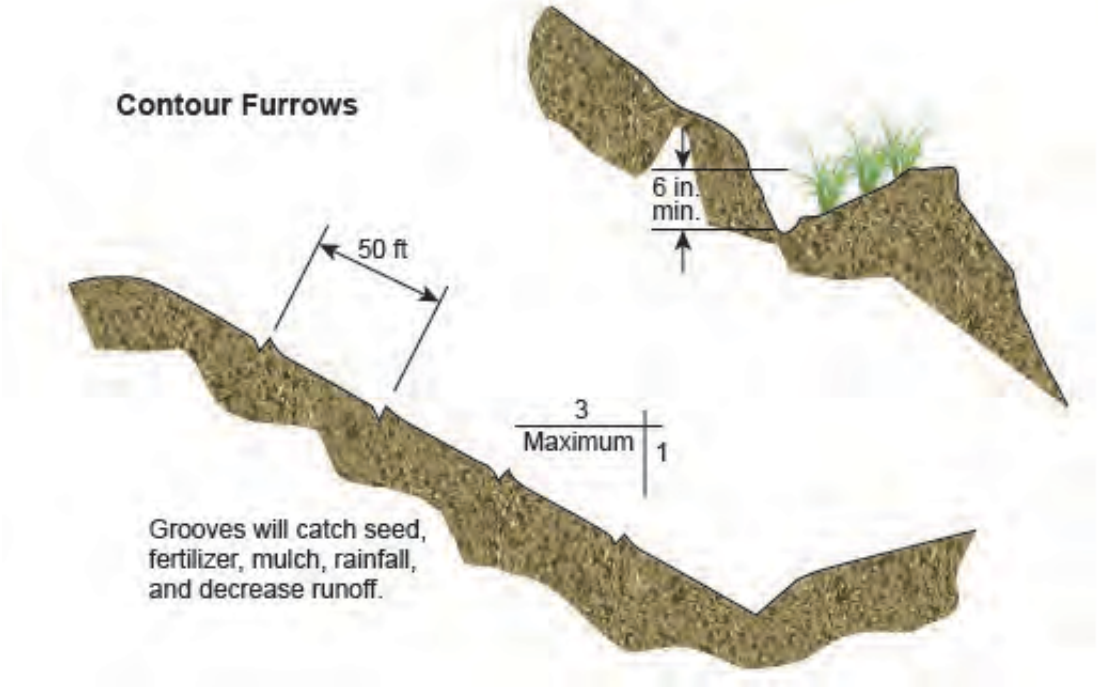


Figure 138. Contour furrow diagram (King County 2009).

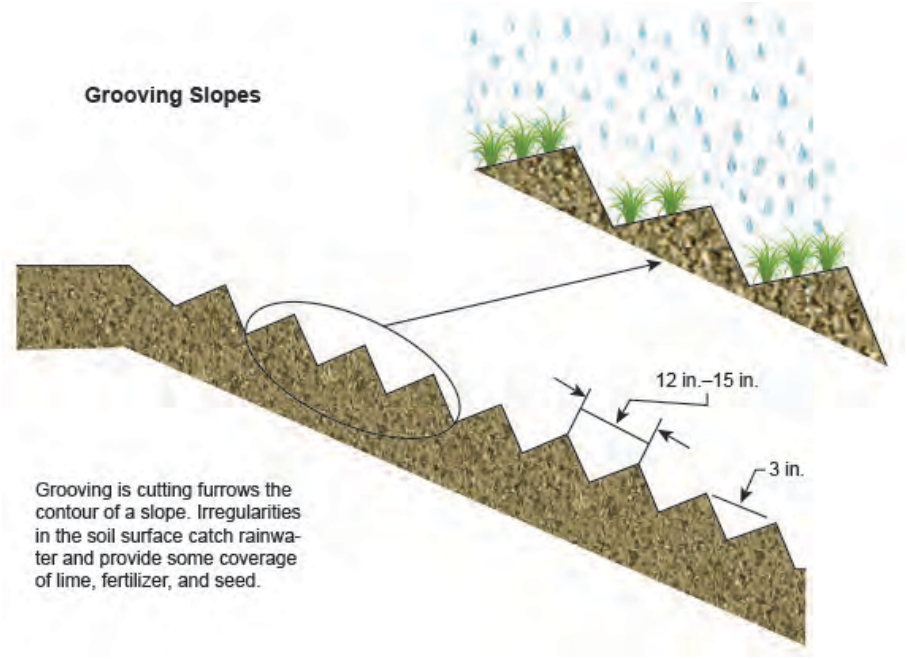


Figure 139. Grooving slope diagram.

Construction Guidelines

While fill slopes can be constructed with a roughened surface, cut slopes that have been smooth graded must be roughened as a subsequent operation. Before slope roughening, BMPs such as seeding, sodding, planting (BMP 32: Landscaping), and temporary mulching (BMP 52: Mulching) may be used to stabilize an area. For steeper slopes and slopes that will be left roughened for longer periods of time, a combination of surface roughening and vegetative stabilization (BMP 8: Vegetation Restoration) can be used.

Timing of Work

Surface roughening should be applied immediately after grading activities have ceased (temporarily or permanently) in an area. To slow erosion, complete slope or surface roughening as soon as possible after the vegetation has been removed from the slope. The roughened areas should be seeded quickly, preferably within 7 days after serration/roughening if weather conditions or water availability permits. For material that ravels or sloughs readily, delay the revegetation effort until at least 30 days after slope serration (BMP 36: Construction Timing).

Equipment

Various types of heavy equipment may be successfully used for slope roughening:

- A front-end loader equipped with disks, harrows, or teeth can make grooves across the slope.
- Driving a crawler tractor up and down the slope will make cleat imprints perpendicular to the slope.
- A dozer, equipped with a special blade containing a series of square grooves and positioned at the same angle as the cut, can serrate the slope along the contours.

Methods

- Minimally compact fill slopes constructed with highly erodible soils or soils containing high clay content before establishing a roughened surface. Avoid excessive compaction, which causes reduced infiltration rates and suppresses vegetation rooting.
- Roughen soils with sand textural components with tracked machinery as these soils are less likely to become unduly compacted.
- Make the grooves or depressions approximately horizontal (or parallel the slope toe if its profile grade is less than 2%).
- Excavate each series of grooves in the opposite direction from the preceding series to minimize buildup of loose material at the ends of the steps or cuts.
- Remove loose material collected at the ends of steps and blend the ends into the natural ground surface.
- If rocks are encountered that are too hard to rip, blend the grooves into the rock.
- For soil roughening adjacent to roadways, remove materials that fall into the ditch line or roadway along with rock fragments larger than one-third the shelf width.
- Construct a slope bench at the bottom of the slope face.

Maintenance

- Inspect the slopes periodically for damage from surface runoff and seepage, and inspect after each runoff-producing storm.
- Prohibit vehicles and equipment from driving over roughened slopes. Tire tracks may smooth out the roughening and increase soil compaction.
- Repair damage caused by construction-related activities as soon as possible.
- If rills appear (small watercourses with steep sides and usually less than 4 inches deep), fill immediately and promptly regrade the slope so it is adequately protected.

Additional Resources

CASQA California Stormwater Quality Association. 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

EPA (US Environmental Protection Agency). 2014. *Soil Roughening.* Water: Best Management Practices. *http://water.epa.gov/polwaste/npdes/swbmp/Soil-Roughening.cfm*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

King County Department of Natural Resources and Parks. (2009). *King County Washington Surface Water Design Manual*, King County, WA.

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 60: Check Dams

Description

Check dams are used to capture sediment, reduce or prevent excessive bank and bottom erosion, and reduce runoff velocity. These small dams are constructed across open channels, swales, or drainageways. Typically constructed out of rock and gravel, logs, treated lumber, sandbags, or manufactured barriers, check dams may be temporary or permanent (Figure 143).



Figure 143. A rock check dam reduces runoff velocity.

Applicability

Check dams are often used in natural or constructed channels or swales where adequate vegetation cannot be quickly established. Temporary check dams are used during construction to slow runoff velocities, capture sediment, and prevent erosion. Permanent check dams can reduce runoff velocities and reduce or prevent erosion in open channels, swales, and drainage ways. Permanent check dams can be used with biofiltration swales (BMP 9) to reduce velocities and enhance filtration.

Limitations

Never place check dams in live flowing streams unless approved by appropriate local, state, and/or federal authorities. Check dams should not be used as stand-alone trapping devices.

Design Basis

- Drainage area to the check dam should be between 1 and 4 acres.
- Check dams should be spaced so that the toe of each upstream dam is never higher than the top of the next downstream check dam. Excavating a sump immediately upstream from the check dam may improve its effectiveness.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☒ Sediment Control
☐ Source Control	☒ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	4 acres
Max. Slope	50%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	2 feet

- Maximum toe to crest height should be 2 feet. The center of the dam should be at least 6 inches lower than either edge to form a weir for the outfall.
- The check dam should be as much as 20 inches wider than the banks of the channel to prevent undercutting as overflow water reenters the channel.
- When installing a series of check dams in a channel, provide outlet stabilization below the lowest check dam (where the risk of erosion is greatest) and consider the use of channel linings or protection such as matting or riprap where significant erosion or prolonged submergence may occur.
- Materials (Figure 144 and Figure 145):
  - Stone—2 to 16 inches in diameter
  - Logs—6 to 8 inches in diameter
  - Sandbags filled with pea gravel
  - Filter fabric meeting the standard specifications (BMP 65: Silt Fence)
- Logs should be driven into the ground a minimum of 28 inches.

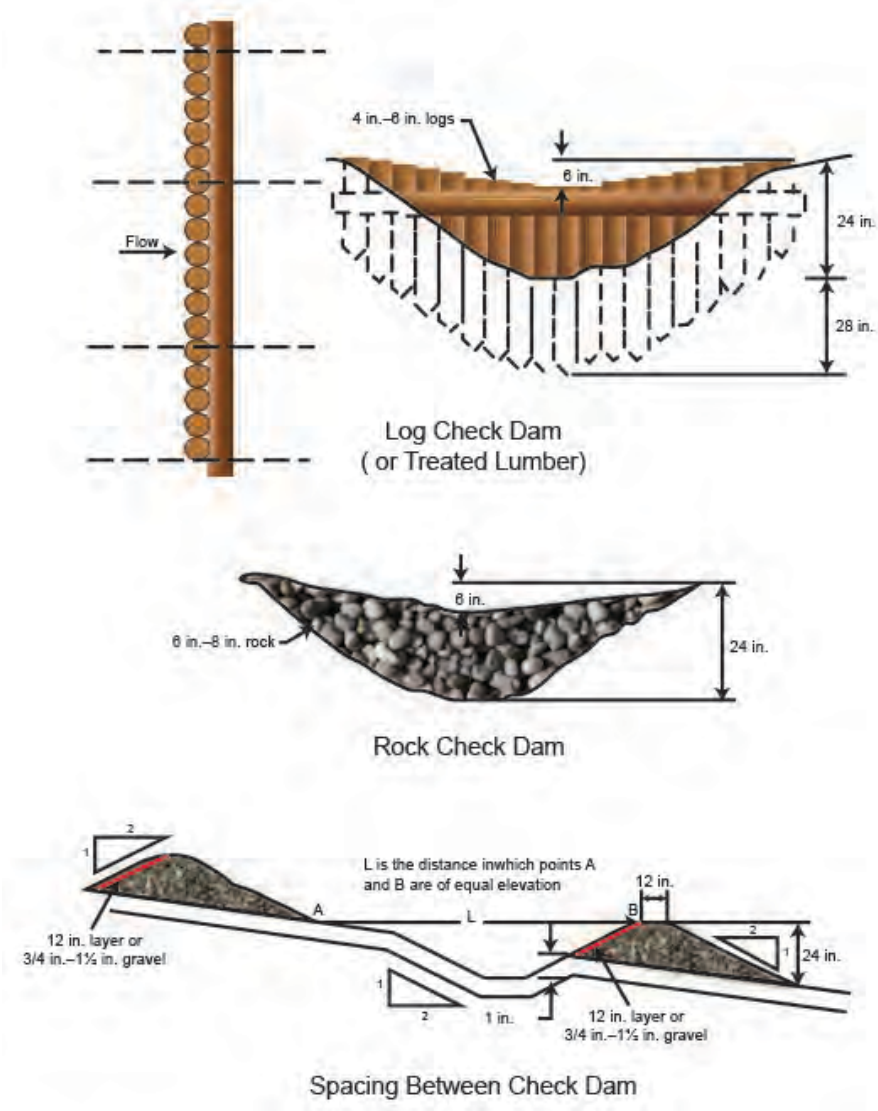


Figure 144. Log and rock check dams.

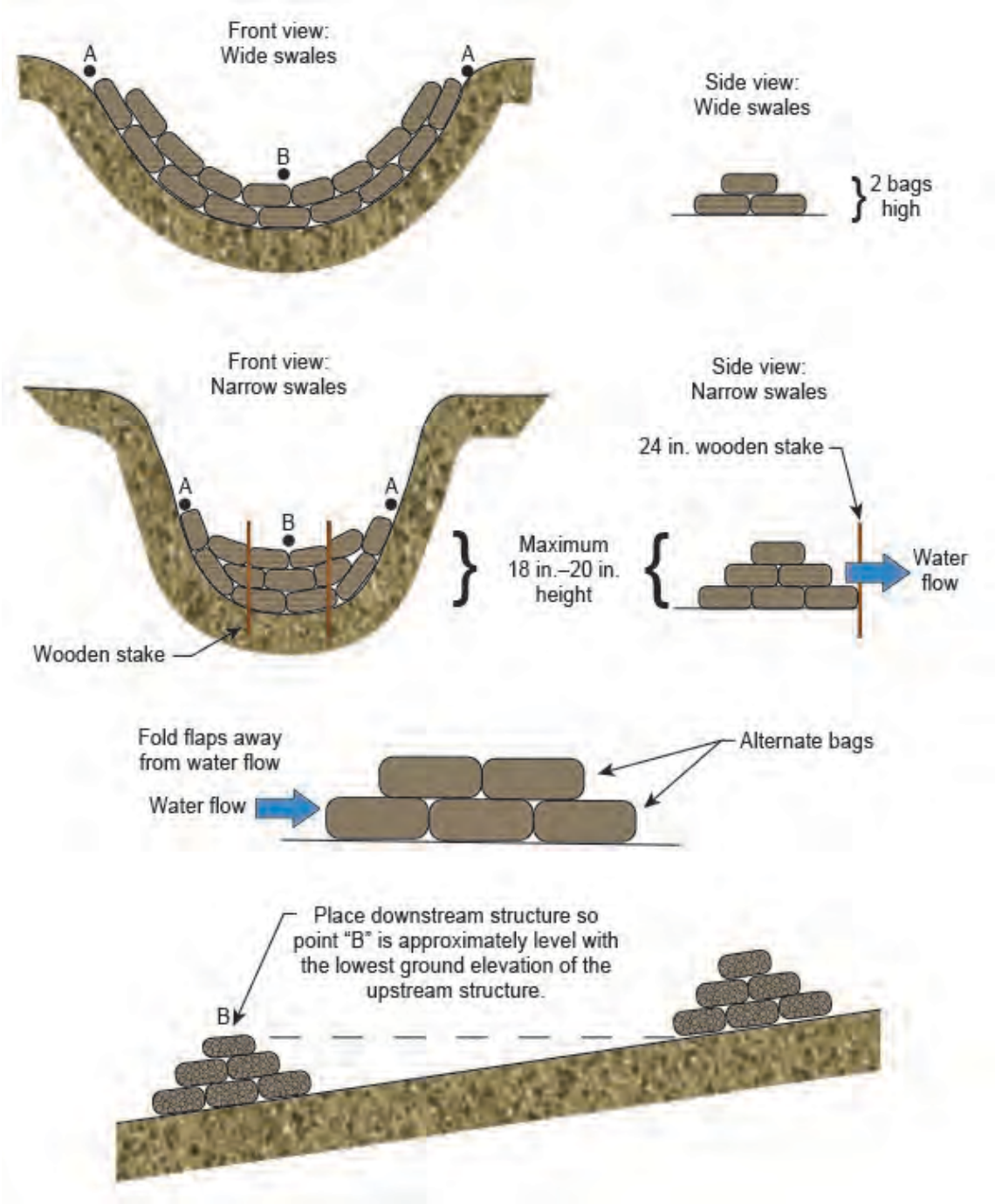


Figure 145. Bag check dam.

Construction Guidelines

Rock check dams—Place the stones on filter fabric either by hand or by using appropriate machinery; do not dump stones in place. Keep the side slopes 2:1 or flatter. Line the upstream side of the dam with a layer of 3/4 to 1-1/2-inch gravel; 12 inches deep is an option for additional channel protection.

Log check dams—Firmly embedded the logs in the ground. Filter cloth may be attached to the upstream side of the dam to retard flow and trap additional sediment. If a filter cloth is used, securely staple it to the top of the dam and adequately anchor in the streambed.

Bag check dams—Ensure all bags are securely sealed. Place the bags by hand or use appropriate machinery to place them in an interlocking pattern.

Manufactured barriers—An array of three-dimensional manufactured barriers is also available: triangular and burrito-shaped, prefilled and fillable on site, reusable and disposable, and temporary and permanent. Triangular silt dikes are temporary, reusable barriers consisting of a triangular urethane foam core covered by permeable, woven geotextile fabric. Usually from 16 to 20 inches wide at the base and 8 to 10 inches high, a silt dike is used at the toe of a slope to contain sediment from runoff or perpendicular to the flow of water in a drainage ditch.

The flexibility of the materials in manufactured barriers allows conformity to many channel configurations:

- Fasten to soil with staples or to rock and pavement with adhesives.
- Build temporary sediment ponds, diversion ditches, concrete wash-out facilities, curbing, water bars, level spreaders, and berms.

Riprap may be necessary on the downstream side of the dam to protect the channel from scour.

Maintenance

- Inspect the check dams regularly and after every runoff-producing storm to ensure structural integrity. Repair as needed to ensure the BMP is in good working order.
- Remove accumulated debris, trash, and leaves. Remove sediment from behind the dam when the depth reaches of one-half the original height of the dam (measure at this center).
- Dispose of all materials properly so pollution problems are not increased at the disposal site.
- Restore stone as necessary so the dams maintain the correct height.
- On bag dams, inspect the sandbag fabric for signs of deterioration.
- Ensure that contributing drainage area has been completely stabilized before removing a temporary check dam.

Additional Resources

EPA (US Environmental Protection Agency). 2014. *Check Dams*. Water: Best Management Practices. *http://water.epa.gov/polwaste/npdes/swbmp/Check-Dams.cfm*

BMP 62: Temporary Stream Crossing

Description

A temporary stream crossing provides a safe and stable means for construction vehicles to cross streams or watercourses without moving sediment into streams, damaging the streambed or channel, or causing flooding. A bridge or culvert allows construction vehicles temporary access across a stream or watercourse (Figure 149).



Figure 149. Temporary stream crossing using culverts (Ohio EPA 2014).

Applicability

A temporary stream crossing is used when heavy equipment must be moved from one side of a stream channel to another, or where light-duty construction vehicles have to cross the stream channel frequently for a short time period. Temporary stream crossings should be installed only when it is necessary to cross a stream and alternative routes to access the site are not feasible or a permanent crossing is not feasible or not yet constructed.

The specific vehicle loads and conditions of the stream will dictate the type of stream crossing that is appropriate.

Bridges are the preferred method to cross a stream as they provide the least obstruction to flows and fish migration.

Culverts are relatively easy to construct; a pipe (or pipes) can be placed in the channel and covered with aggregate. Temporary culverts can result in disturbance to the channel during construction and removal.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☒ Sediment Control
☐ Source Control	☒ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Easy
Ease of Installation	Hard
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acres
Max. Upstream Slope	25%
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	6 feet

Limitations

- Temporary bridges may be expensive to install.
- Culverts cause greater disturbance during installation and removal. In sensitive stream systems, these impacts may not be justifiable.

- Always attempt to minimize or eliminate the need to cross streams. Temporary stream crossings are a direct source of pollution so make every effort to use an alternate method such as a longer detour. When it is necessary to cross a stream, a well-planned approach minimizes damage to the streambank and reduces erosion.

Using stream crossing measures below the high-water mark of a stream or other water body considered a water of the United States should be carefully evaluated for local, state, and federal permit requirements. All necessary permits must be obtained before commencing work within the water body.

Design Basis

In-stream excavation should be limited to what is necessary to install the temporary bridge or culvert as described below:

General

- Locate the temporary crossing where the least soil disturbance will occur in the existing waterway banks. When possible, locate the crossing at the point receiving minimal surface runoff.
- Locate culverts and bridges so a direct line of approach exists at both the entrance and exit. Do not allow abrupt bends at the entrance or exit unless suitable erosion protection is provided.
- Align the centerline of both roadway approaches with the crossing alignment centerline at a minimum distance of 50 feet from each bank of the waterway being crossed. If physical or right-of-way restraints preclude the 50 feet minimum, provide a shorter distance. All fill materials associated with the roadway approach should be clean rock (nonerodible) and limited to a maximum height of 2 feet above the existing floodplain elevation.
- Construct a water diverting structure such as a swale (across the roadway on both roadway approaches) 50 feet (maximum) on either side of the waterway crossing. This structure will prevent roadway surface runoff from directly entering the waterway. Measure the 50 feet from the top of the waterway bank. Design the diverting structure according to the BMP fact sheet in this catalog for the individual design standard chosen. If the roadway approach is constructed with a reverse grade away from the waterway, a diverting structure is not required.
- Ensure all crossings are as narrow as practical to provide safe passage of equipment and minimize the impact to the streambank and riparian vegetation.
- Remove all temporary crossings within 14 calendar days after the structure is no longer needed.

Materials

- Use only clean rock (3/4 inch to 4 inches). Do not use erodible fill, such as earth or soil materials, for construction within the waterway channel.
- Use filter cloth, consisting of either woven or nonwoven plastic, polypropylene, or nylon, to distribute the load, retain fines, increase drainage of the aggregate, and reduce mixing of the aggregate with the subgrade soil. Filter cloths should be used as required by the specific method.

Considerations for Choosing a Specific Type of Crossing

- Select a design that least disrupts the existing terrain of the stream reach. Consider the effort required to restore the area after the temporary crossing is removed.
- Locate the temporary crossing where the least soil disturbance will occur in the existing waterway banks. When possible locate the crossing at the point receiving minimal surface runoff.
- Consider that the physical constraints of a site may prevent selecting one or more of the standard stream crossings.
- Consider that the time of year may prevent selecting one or more of the standard stream crossings due to fish spawning or migration restrictions.
- Consider vehicular loads, traffic patterns, and crossing frequency when choosing a specific type of stream crossing.
- Keep in mind that crossings require various amounts of maintenance and bridges require the least maintenance.
- Consider that ease of removal and subsequent damage to the waterway are factors in the stream crossings chosen.

Temporary Bridge

- As the preferred method for waterway crossings, temporary bridge construction causes the least disturbance to the waterway bed and banks when compared to culverts or fords (Figure 150).
- Temporary bridges pose the least potential for creating barriers to aquatic migration. The construction of a temporary bridge or culvert should not cause a significant water level difference between the upstream and downstream water surface elevations.
- Most bridges can be quickly removed and reused.

Temporary Culvert

- A temporary access culvert is consists of a section of circular pipe, pipe arches, or oval pipes of reinforced concrete, corrugated metal, or structural plate used to convey flowing water through the crossing (Figure 151).
- Select culvert material and depth of cover based on the expected construction load.
- Temporary culverts are used when the channel is too wide for normal bridge construction, or the anticipated load may prove unsafe for single-span bridges.
- The length of the temporary culvert should extend a minimum of 1 foot beyond a stable side slope from the road crossing.
- Temporary culverts can be salvaged and reused.

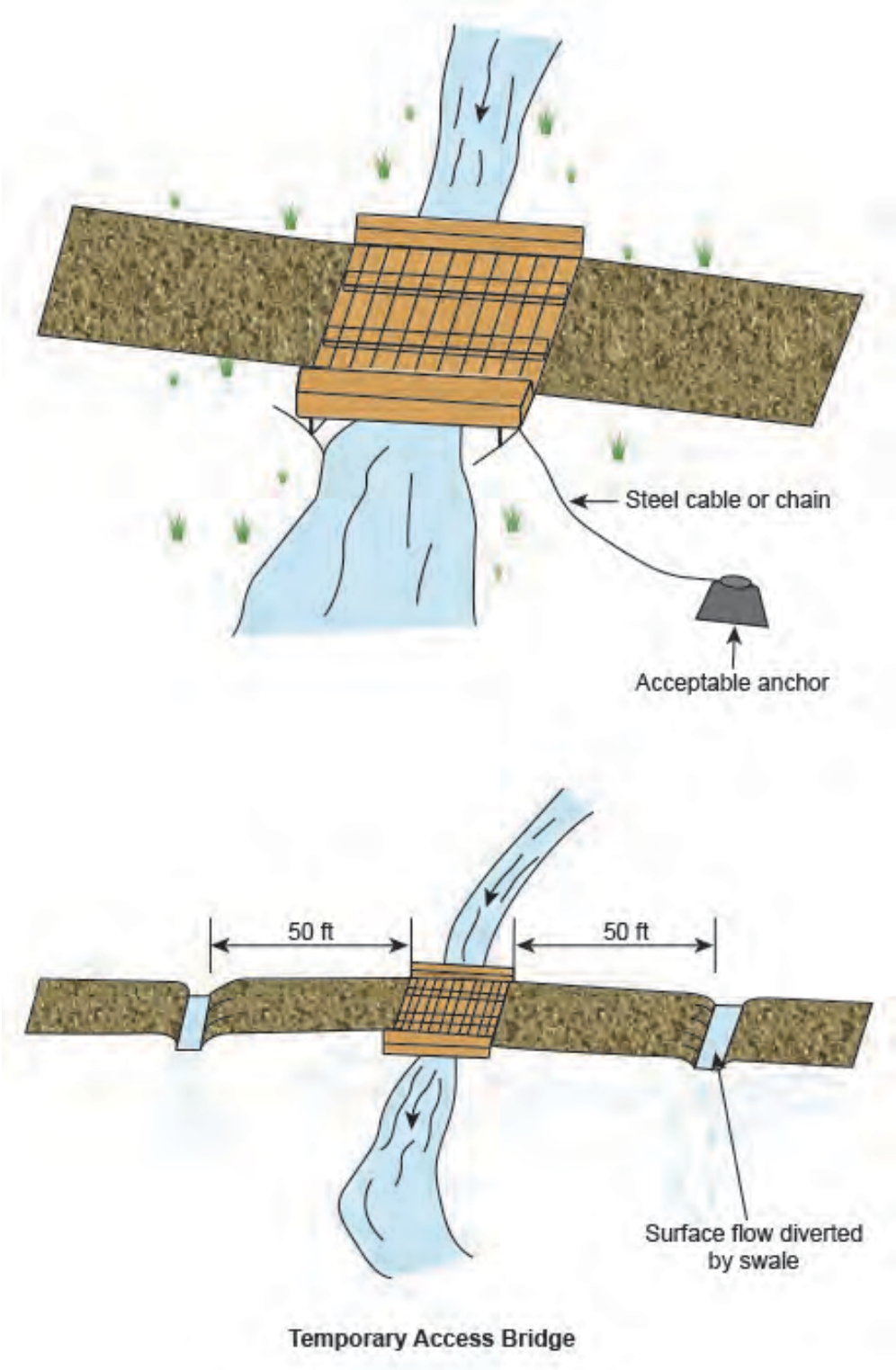


Figure 150. Temporary access bridge.

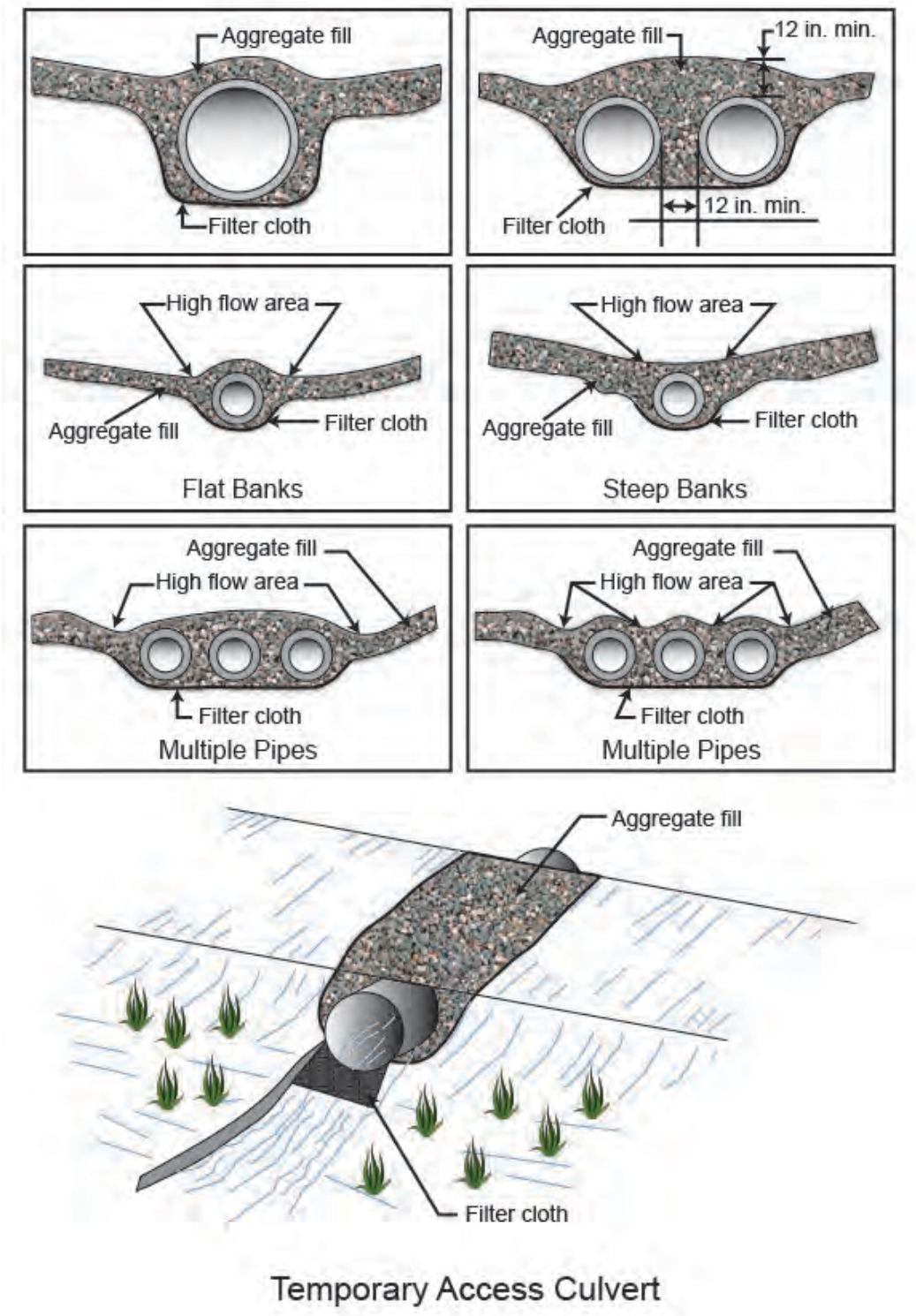


Figure 151. Temporary access culvert.

Construction Guidelines

Temporary Bridge

- Construction, use, or removal of a temporary access bridge will not normally have any time-of-year restrictions since construction, use, or removal should not affect the stream or its banks.
- Construct a temporary bridge structure at or above bank elevation to prevent entrapping floating materials and debris.
- Place abutments parallel to and on stable banks.
- Construct bridges to span the entire channel. If the channel width exceeds 8 feet (as measured from top-of-bank to top-of-bank), a temporary footing, pier, or bridge support may be constructed within the waterway. One additional footing, pier, or bridge support will be permitted for each additional 8-foot width of the channel. No footing, pier, or bridge support will be permitted within the channel for waterways less than 8-feet wide.
- Stringers should either be logs, sawn timber, prestressed concrete beams, metal beams, or other approved materials.
- Decking materials should be of sufficient strength to support the anticipated load. All decking members should be placed perpendicular to the stringers, butted tightly, and securely fastened to the stringers. Butt decking materials tightly to prevent any soil material tracked onto the bridge from falling into the waterway below.
- Run planking (optional) should be securely fastened to the length of the span. Provided one run plank for each track of the equipment wheels. Although run planks are optional, they may be necessary to properly distribute loads.
- Install curbs or fenders along the outer sides of the deck. Curbs or fenders are an option to provide additional safety.
- Securely anchor bridges at only one end using steel cable or chain. Anchoring at only one end prevents channel obstruction if floodwaters float the bridge. Acceptable anchors are large trees, large boulders, or driven steel anchors. Anchoring should be sufficient to prevent the bridge from floating downstream and possibly causing an obstruction to the flow.
- Stabilize all areas disturbed during installation within 14 calendar days of the disturbance.

Temporary Culvert

- All culverts must be strong enough to support the maximum expected loads.
- The size of the culvert pipe should be the largest pipe diameter that will fit into the existing channel without major excavation of the waterway channel or without major approach fills. If a channel width exceeds 3 feet, additional pipes may be used until the cross-sectional area of the pipes is greater than 60% of the cross-sectional area of the existing channel. The minimum culvert size used is a 12-inch diameter pipe.
- The culvert should extend a minimum of 1 foot beyond the upstream and downstream toe of the aggregate placed around the culvert. The culvert should never exceed 40 feet in length.
- Place filter cloth the streambed and streambanks before placing the pipe culvert and aggregate. The filter cloth should cover the streambed and extend a minimum 6 inches and

a maximum of 1 foot beyond the end of the culvert and bedding material. Filter cloth reduces settlement and improves crossing stability.
- Install the invert elevation of the culvert on the natural streambed grade to minimize interference with fish migration (free passage of fish).
- Cover the culvert with a minimum of 1 foot of aggregate. If multiple culverts are used, separate them by at least 12 inches of compacted aggregate fill.
- Stabilize all areas disturbed during culvert installation within 14 calendar days of the disturbance.

Maintenance

- Inspections should be performed periodically and after runoff events to ensure that the bridge, culvert, streambed, and the streambanks are in good condition and that sediment is not entering the stream or blocking fish passage or migration.
- Maintenance should be performed, as needed, to ensure that the structure complies with the standards and specifications, including removing and disposing of any trapped sediment or debris. The decking and curbs of bridges should be kept free of sediment. Sediment should be disposed of outside of the floodplain and stabilized. Areas adjacent to the crossing shall maintain vegetative stabilization.
- When the temporary crossing is no longer needed, all structures, including abutments and other bridging materials, should be removed within 14 calendar days. In all cases, the crossing materials should be removed within 1 year of installation or according to permit requirements.
- Final cleanup should consist of removing the temporary crossing from the waterway, removing all construction materials, restoring the original stream channel cross section, and protecting the streambanks from erosion. All removed materials should be stored outside the waterway floodplain.
- Removing the bridge or culvert and cleaning up of the area should be accomplished without construction equipment working in the waterway channel if possible. Otherwise, turbidity curtains (BMP 71) can be used to minimize downstream turbidity caused by bridge or culvert removal.
- All areas disturbed during removal should be stabilized within 14 calendar days of the disturbance.

Additional Resources

EPA (US Environmental Protection Agency). 2014. *Temporary Stream Crossings*. Water: Best Management Practices. *http://water.epa.gov/polwaste/npdes/swbmp/Temporary-Stream-Crossings.cfm*

BMP 63: Biofilter Bags

Description

Biofilter bags are plastic mesh bags filled with wood chips, compost, or similar biological material used as temporary sediment barriers. Biofilter bags detain storm water runoff and allow a slow rate of discharge to pass through the biological material, which allows sediment to settle and filters runoff. The bags may also be used to divert small amounts of runoff around active work areas or direct runoff to a slope drain, sediment trap, or other filtration/sedimentation BMP (Figure 152).



Figure 152. Compost filter socks used to slow and filter runoff.

Applicability

Biofilter bag barriers are an effective temporary measure that can be rapidly deployed at storm drain inlets, across minor swales and ditches, as diversion dikes and berms, along property lines, to reduce energy from concentrated flow, and for other applications where a temporary barrier is needed and structural strength is not required. These barriers are versatile and can be constructed in many combinations to achieve the required structure.

These are common locations to place biofilter bag barriers:

- At the toe of embankment slopes
- As filter cores for log check dams
- In front of silt fences
- As check dams in unlined ditches
- Surrounding inlets along paved streets (BMP 74: Inlet Protection)
- Around temporary stockpile areas
- Parallel and upgradient of roadways to keep sediment from paved areas

Limitations

- Biofilter bags are barriers suitable only where flow rates are low (1 cfs or less).
- The bags have a limited life span and require regular inspections and repair and periodic replacement (approximately every 2–3 months).

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☒ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Nitrogen
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Fair
Max. Tributary Drainage Area	NA
Max. Upstream Slope	10%
NRCS Soil Group	ABCD
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

- Biofilter bags are easily damaged by construction equipment.
- Without proper staking, biofilter bags will easily fail on slopes.
- Biofilter bags and their accumulated sediment are often not cleaned up properly, which leaves the sediment to wash away with the next rain event.
- If not properly installed, biofilter bags can become buoyant and easily displaced. Like all BMPs, biofilter bags must be properly installed and maintained to be effective.

Design Basis

Biofilter bags come in a variety of sizes, (e.g., 30 x 18 inches and 30 x 9 inches) and may contain between 1 and 2 cubic yards of material each. Design guidelines are as follows (Figure 153):

- A minimum undisturbed buffer zone of 3 feet is needed between the barriers and surface waters to safely remove the barrier and accumulated sediments.
- Embed the biofilter bag barriers to a minimum depth of 6 inches and backfill the entire length of the barrier. Securely anchor each bag with two stakes (2 x 2 inches x 3 feet) or drive in steel drift pins at least 20 inches into the ground.
- Overlap biofilter bags a minimum of 6 inches.
- Place biofilter bags along level contours.
- Place the first barrier row of biofilter bags near the toe of the slope with subsequent spacing continuing upgradient from that point.
- Where multiple slope gradients contribute to the same drainage area, steepness refers to the steepest section contributing to the biofilter bag barrier.
- Space biofilter bag barriers closer on steeper slopes (CASQA 2004a):
  - Slopes between 20:1 and 4:1—Maximum spacing of 20 feet
  - Slopes between 4:1 and 2:1—Maximum spacing of 15 feet
  - Slopes between 2:1 or steeper—Maximum spacing of 10 feet

Construction Guidelines

- Barriers used for sediment control at the toe of slopes should be in place before disturbing the slope. Install these barriers a short distance away from the toe of the slope to increase the effective area but outside of any ditch channel.
- When flows are expected to be high enough to surpass the infiltration capacity of the devices, the center (low point) bags should be wrapped in filter fabric with a 3-foot tail stapled securely and extending from the downgradient side of the barrier to prevent scouring. The ends of the adjacent barriers should tightly overlap one another.
- Any gaps between barriers should be filled with tightly wedged straw.
- For concentrated flow applications, extend the end of the barrier so that the bottoms of the end units are at a higher elevation than the top of the lowest middle unit to ensure that sediment-laden water flows through or over the barrier instead of around the ends.

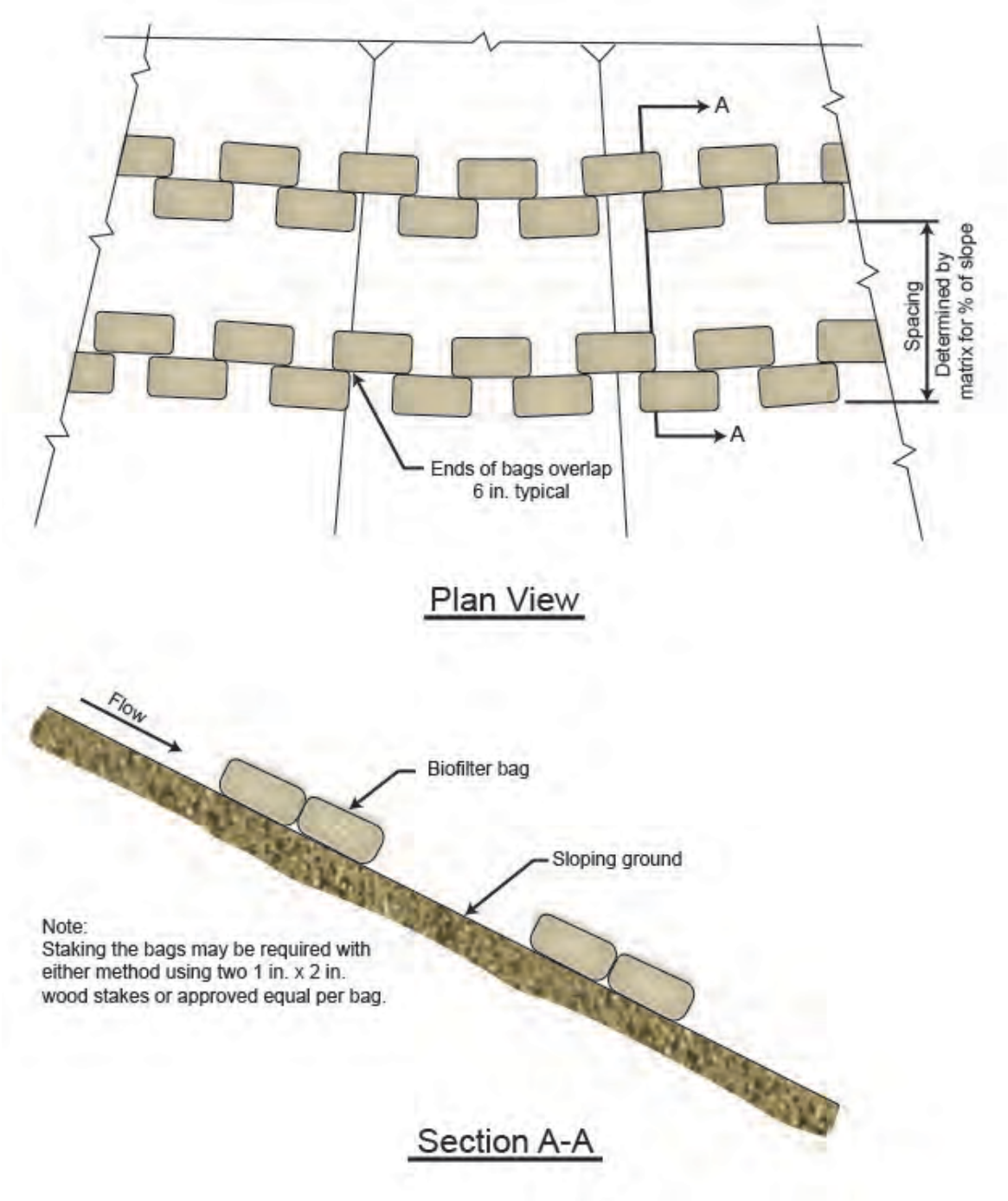


Figure 153. Biofilter bag spacing.

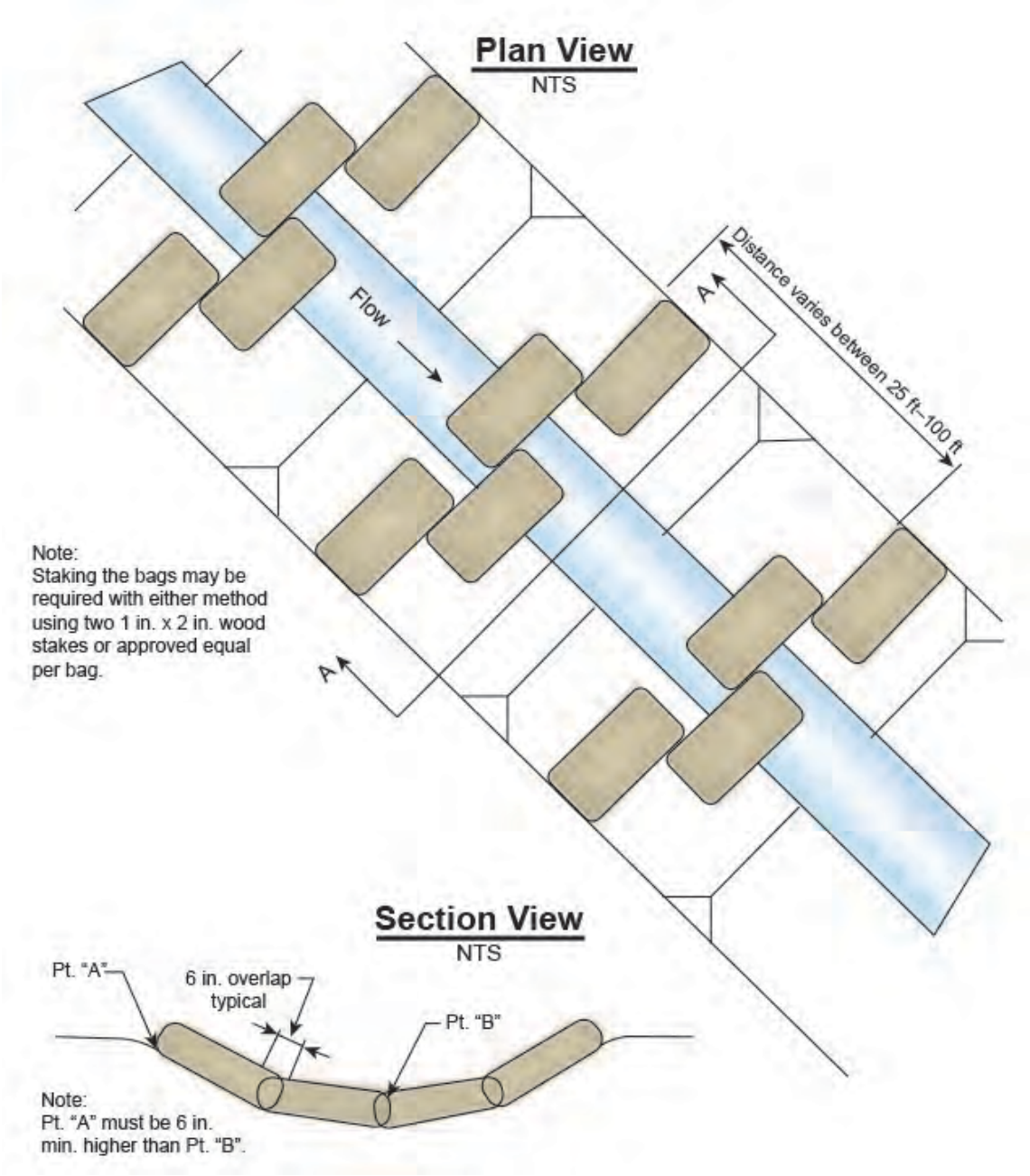


Figure 153. continued. Biofilter bag spacing.

Maintenance

- Perform one inspection during the first runoff-producing event after installation to ensure proper functioning.
- Remove sediment when it reaches one-third of the barrier height.
- Biofilter bags exposed to sunlight must be replaced every 2 to 3 months. Inspect periodically to determine if replacements are needed.
- Immediately repair damaged barriers, undercutting, or end runs.
- If approved, use biofilter bags as landscaping mulch after construction is complete.

- Within 30 days of final site stabilization, remove temporary sediment barriers and any stakes, pins, or rebar used.

Additional Resources

CASQA California Stormwater Quality Association. 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *https://www.casqa.org*

ODEQ (Oregon Department of Environmental Quality). 2013. *Construction Stormwater Best Management Practices Manual: 1200-C NPDES General Permit.* Portland, OR.

BMP 64: Fiber Rolls

Description

A fiber roll (or wattle or sediment control log) consists of straw, flax, rice, coconut, or other biodegradable material wrapped in ultraviolet degradable polypropylene netting or a biodegradable material such as burlap, jute, or coir. Fiber rolls placed at the toe and on the face of slopes intercept runoff and reduce flow velocity, release the runoff as sheet flow, and provide sediment removal from the runoff. By interrupting the slope length, fiber rolls reduce erosion (Figure 154).



Figure 154. Fiber rolls placed along the top of slope in Sandpoint, Idaho.

Applicability

Fiber rolls can be used in small drainage areas and flatter grades due to their low profile. Applications include the following:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
- At the end of a downward slope where it transitions to a steeper slope
- Along the perimeter of a project
- As check dams in unlined ditches with minimal grades and low velocity flows
- Downslope of exposed soil areas
- Around temporary stockpiles
- As a temporary curb for conveying water to catch basins and pipe slope drains
- For catch-basin inlet protection when they are properly anchored or weighted
- As part of a multilayered perimeter control along a receiving water

Limitations

Fiber roll limitations include the following:

- Not effective unless trenched and staked.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	Varies
NRCS Soil Group	ABCD
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

- Do not use on slopes subject to creep, slumping, or landslides.
- At the toe of slopes greater than 5:1, install rolls a minimum of 20 inches in diameter or install to achieve the same protection (i.e., stacked smaller diameter fiber rolls).
- Difficult to move once saturated.
- Do not use in traffic crossing areas.
- Limited sediment capture zone and should only be used for small drainage areas.

Design Basis

Fiber rolls should be placed along the contour (perpendicular to the slope or fall line) to avoid concentrating flows. The maximum recommended tributary drainage area per 100 lineal feet of roll is approximately 0.25 acres with a disturbed slope length of up to 150 feet and a tributary slope gradient no steeper than 3:1 (Colorado UDFCD 2010). Longer and steeper slopes require additional measures. Table 34 provides a general guideline for spacing the rolls.

Table 34. Fiber roll installation spacing (EPA 2014b).

Slope (H:V)	Spacing measured along face of slope (feet)
1:1	10
2:1	20
3:1	30
4:1	40

In soft, loamy soils, place the rows closer together and trench into the ground 3 to 5 inches. In hard, rocky soils, place the rows farther apart and trench into the ground 2 to 3 inches. The minimum trench depth should be one-quarter to one-third of the thickness of the fiber roll, and the trench width should be equal to the roll diameter.

Fiber rolls should be securely staked through the center of the roll into the ground with wood stakes (nominal classification of 0.75 x 0.75 inches and minimum length of 24 inches) or with willow cuttings. Place stakes 3 to 4 feet apart and at each end of the roll. Extend the stakes 3 to 5 inches above the top of the roll. Rebar can also be used to stake fiber rolls with the rebar flush with the top of the roll. Rebar is not biodegradable, so remove it after the fiber rolls are no longer needed.

The ends of the fiber roll should be turned up the slope to prevent runoff from going around the roll. If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

Secure fiber rolls used along sidewalks or around catch-basin inlets with trenches and/or staking. Alternatively, a roll with gravel, sand, or other ballast material can be used to provide additional weight when staking the roll is not feasible. Place rolls 1 to 1-1/2 feet away from a storm drain inlet (Figure 155 and Figure 156).

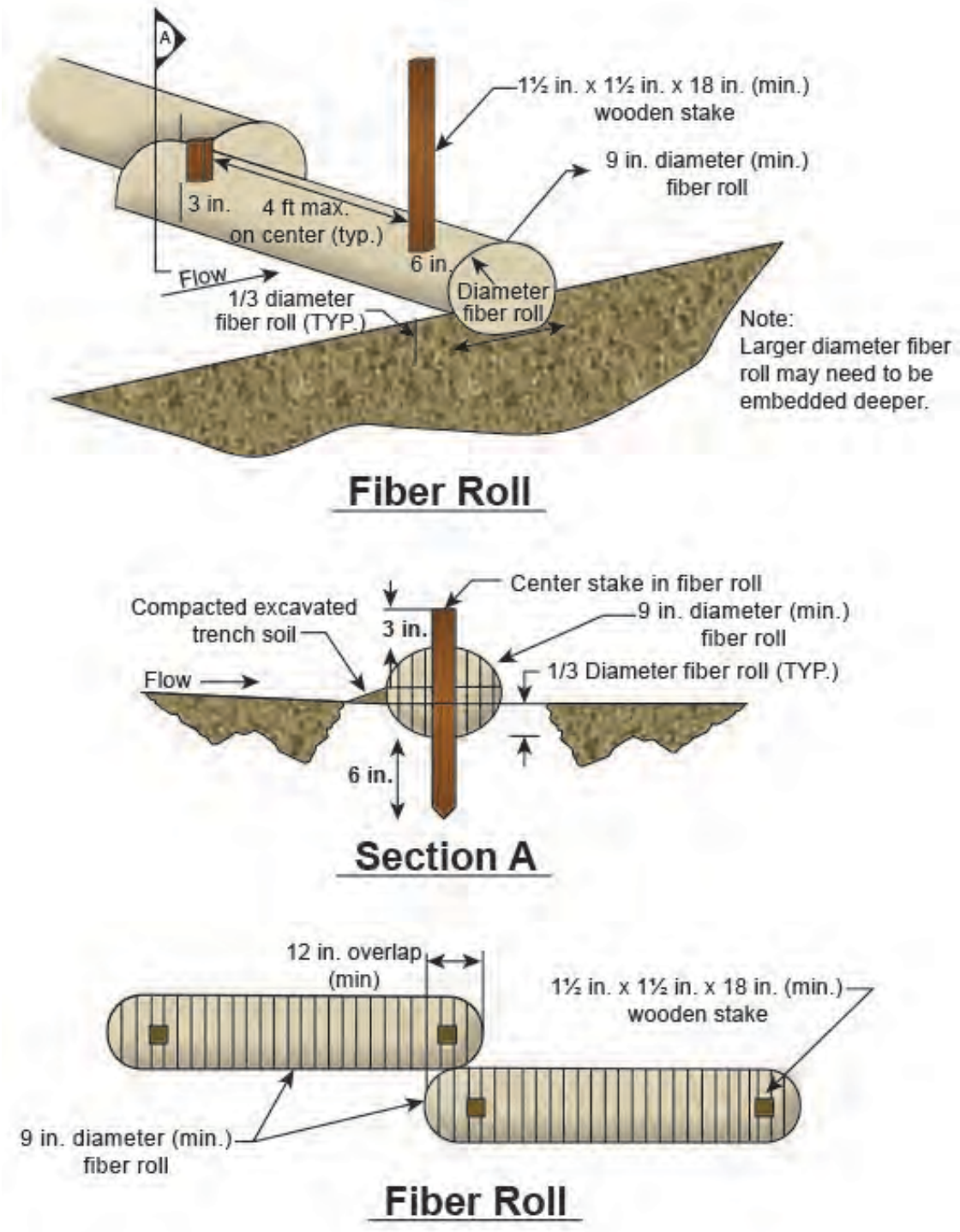


Figure 155. Fiber roll staking, trenching, and joints (Colorado UDFCD 2010).

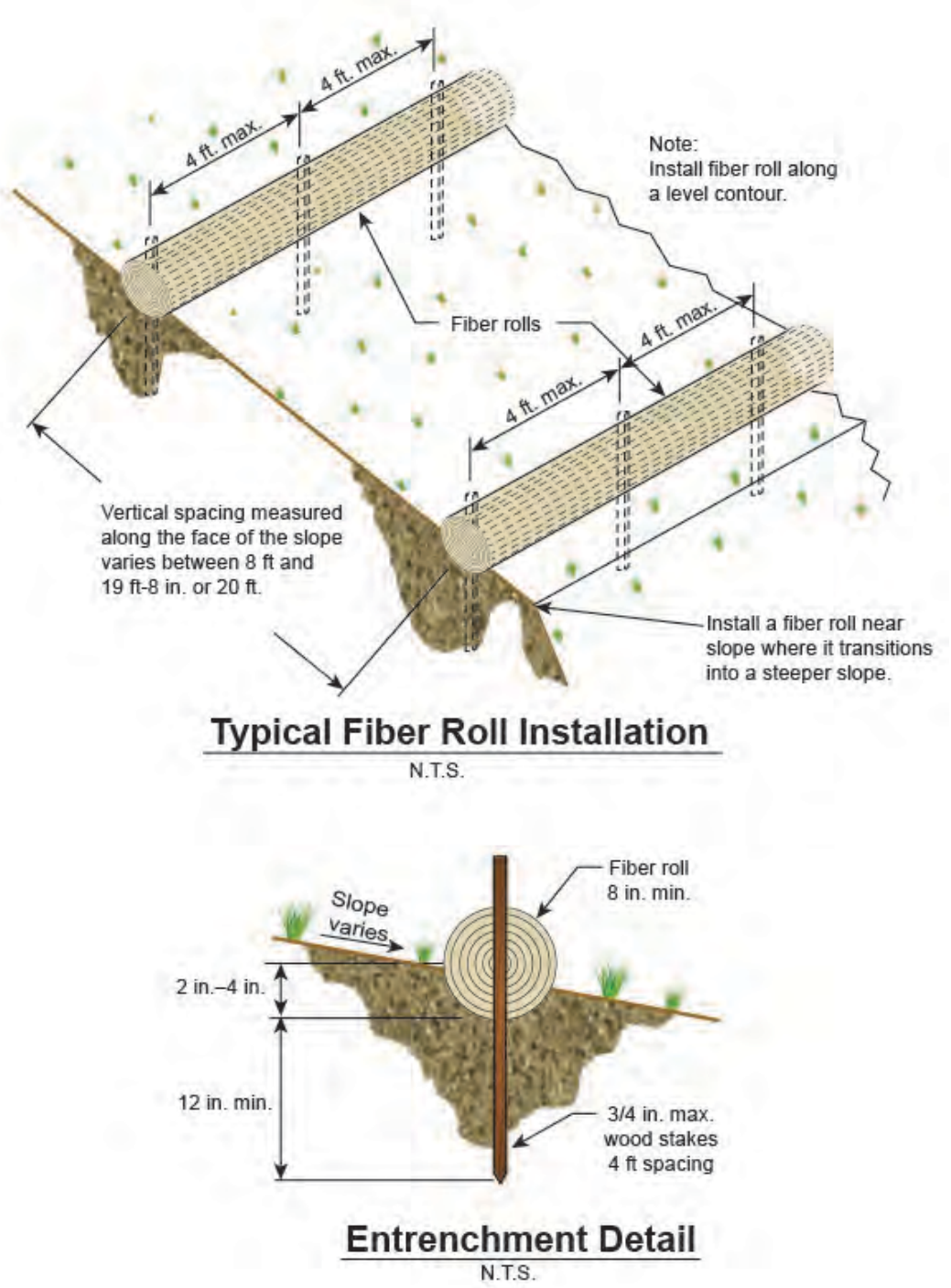


Figure 156. Fiber roll installation.

Construction Guidelines

Use prefabricated fiber rolls 8 to 20 inches in diameter. Install trenches and fiber rolls from the base of the slope and work up. Prepare the slope before installation. Before inserting the wooden stakes, it may be necessary to drive pilot holes using a straight bar through the roll and into the soil.

Maintenance

Fiber rolls should be inspected before forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at 2-week intervals during the nonrainy season.

Repair or replace split, torn, unraveling, crushed, or slumping fiber rolls. Secure and reanchor rolls as necessary.

If the fiber roll is used as a sediment capture device or as an erosion control device to maintain sheet flows, periodically remove accumulated sediment to maintain BMP effectiveness. Sediment should be removed before sediment reaches one-half the distance between the top of the fiber roll and the adjacent ground surface. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of in appropriate location.

When used for slope protection with erosion control blankets, fiber rolls are typically left in place after construction where they will eventually degrade. If they are used as perimeter control or inlet protection, they are typically removed.

Additional Resources

CALTRANS (California Department of Transportation, Division of Construction). 2003. *Construction Site Best Management Practice Manual*. Sacramento, CA.

EPA (US Environmental Protection Agency). 2014. *Fiber Rolls.* Water: Best Management Practices. *http://water.epa.gov/polwaste/npdes/swbmp/Fiber-Rolls.cfm*

BMP 65: Silt Fence

Description

A silt fence is a temporary sediment barrier created with a porous fabric stretched and attached to supporting posts. Woven wire fence backing is necessary with several types of filter fabric commonly used. The silt fence ponds sediment-laden storm water runoff, and the sediment is retained by settling (Figure 157).



Figure 157. Silt fence (York County Conservation District 2009).

Applicability

Silt fences can be used around the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The fences should remain in place until the disturbed area is permanently stabilized.

Silt fences can also be used along the toe of fills, on the downhill side of large through-cut areas, along streams, at grade breaks on cut/fill slopes, and above interceptor dikes.

Limitations

Silt fence is a popular BMP choice on construction sites, but to work effectively, it must be properly designed, installed, and maintained.

Do not use silt fences where water concentrates in a ditch, channel, or drainageway or where soil conditions prevent the minimum fabric toe-in depth or minimum depth for installation of support posts. If concentrated flow occurs after installation, place rock berms or other corrective measures in the areas of concentrated flow.

Silt fences should not be used in places where vehicle or equipment crossing is expected.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ◖ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ◖ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	0.25 acres/ 100 lineal feet
Max. Upstream Slope	33%
NRCS Soil Group	ABCD
Min. Ground Water Separation	2 feet
Min. Bedrock Separation	2 feet

Design Basis

Location

Proper placement and design of silt fence is critical to its effectiveness. Silt fence installed along a contour should have a maximum disturbed tributary drainage area of 10,000 ft^2 per 100 feet of fence with a maximum tributary slope length of 150 feet and a tributary slope gradient of 3:1. Longer and steeper slopes require additional measures, such as multiple rows of silt fence or other sediment control. Placement and length should also consider the maximum allowable slope lengths contributing runoff to a silt fence as listed in Table 35.

Table 35. Maximum allowable slope lengths.

Slope Steepness	Maximum Slope Length (feet)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

Place the silt fence as close to the contour as possible, with the area below the fence undisturbed or stabilized. Long runs of silt fence should be avoided to limit opportunities for large areas of concentrated water. Extend each end of the silt fence upslope to prevent runoff from going around the end. Multiple J-hooks can be used to break up long runs and provide ministorage areas to pond small amounts of water.

The location and details for silt fence should be shown on the SWPPP map and contain the following minimum requirements:

- Type, size, and spacing of fence posts
- Size of woven wire fences
- Type of filter fabric used
- Method of anchoring the filter fabric
- Method of fastening the filter fabric to the fencing support

Materials

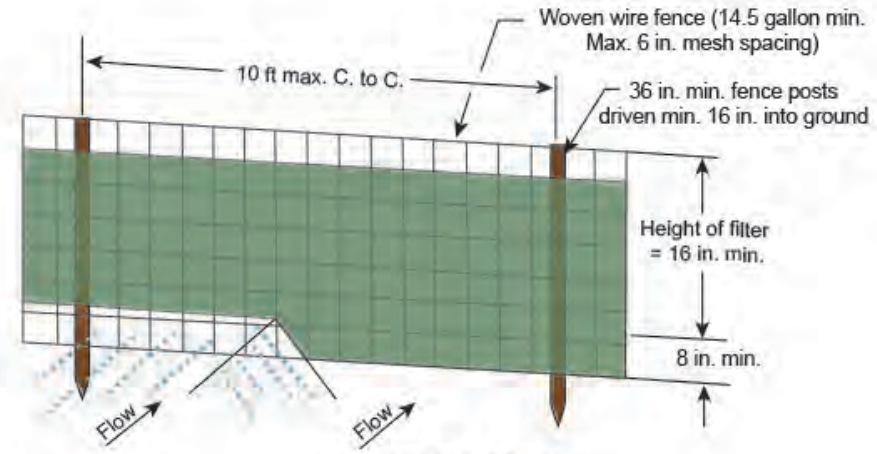
The filter fabric should meet specifications for silt fence materials included in ASTM D6461, unless otherwise approved by the appropriate erosion and sediment control plan approval authority. The fabric can be woven, nonwoven, or monofilament with a minimum width of 36 inches (Figure 158 and Figure 159).

Support posts should be 36 to 48 inches long and can be either wood or steel. Wood posts should be sound quality wood with a minimum cross-sectional area of 3 square inches, typically 2 x 2 inches nominal dimensions. Steel posts can be standard “T” or “U” sections weighing not less than 1 pound per linear foot. Steel posts can be easier to drive into compacted ground to a

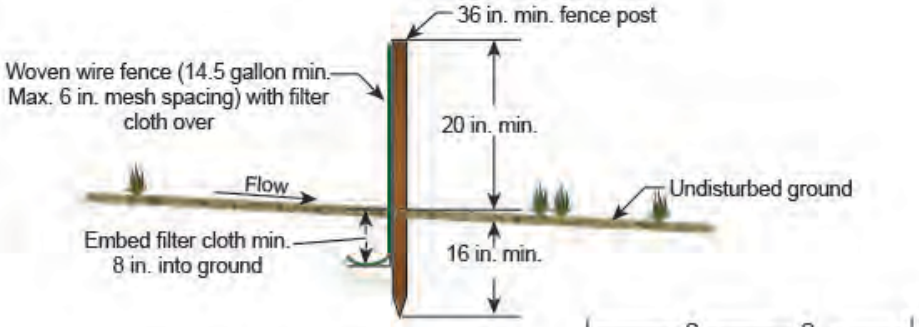
depth sufficient enough to hold the fabric up and support the horizontal load of retained water and sediment.

Woven wire fence can be used to help the silt fence withstand heavy rain or high wind events. Wire fencing should be a minimum 14.5 gage with a maximum 6-inch mesh opening, or as approved.

In lieu of constructing silt fence on site using the above recommended materials, prefabricated units can be used if installed per the manufacturer's instructions. Prefabricated fences do not allow for variable post spacing or posting after the ground is compacted.



Perspective View



Section

Construction Notes for Fabricated Silt Fence

1. Woven wire fence to be fastened securely to fence posts with wire ties or staples.
2. Filter cloth to be fastened securely to woven wire fence with ties spaced every 24 in. at top and mid-section.
3. When two sections of filter cloth adjoin each other, they shall be overlapped by 6 in. and folded.
4. Maintenance shall be performed as needed and material removed when bulges develop in the silt fence.

Figure 158. Silt fence diagram.

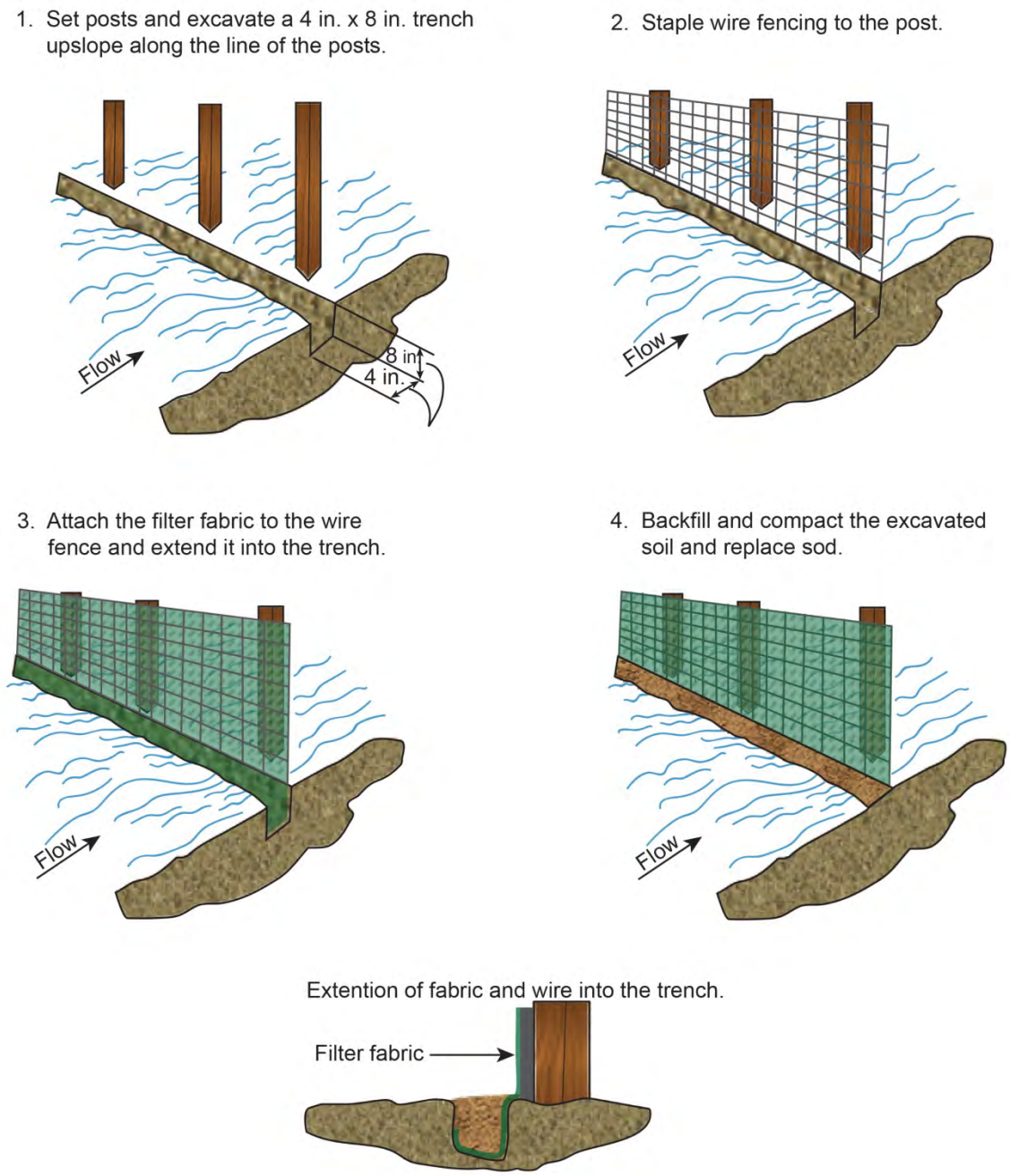


Figure 159. Silt fence construction diagram.

Construction Guidelines

Install the silt fence after cutting and slashing trees and before excavating haul roads, fill benches, or any soil-disturbing construction activity within the contributing drainage areas.

Silt fence can be installed using either the traditional trenching method or the static slicing method. The trenching method places the fence along a 6-inch wide x 8-inch deep trench; the fabric is keyed into the trench; and the trench is backfilled and compacted. To reduce sediment load, replace the vegetation or sod removed to create the trench.

The static slicing method uses a narrow blade pulled behind a tractor to create a 12-inch deep slit where the silt fence fabric is placed. Once the fabric is installed, the soil is compacted on both sides of the slit using tractor tires. The static slicing method achieves better performance with less time and effort than the trenching method (EPA 2012b).

Other guidelines for constructing and installing a silt fence include the following:

- Space posts 10 feet apart when a woven wire fence is used and no more than 6 feet apart when using extra-strength filter fabric (without a wire fence). Extend the posts a minimum of 18 inches into the ground, 24 inches if heavy sediment load is expected, and 30 inches if heavy wire-backed fencing is used. For prefabricated fencing, use the manufacturer's recommendations for post embedment depth.
- If standard strength filter fabric is used, fasten the optional wire mesh support fence to the upslope side of the posts using heavy duty wire staples, tie wires, or hog rings. Extend the wire mesh support to the bottom of the trench. Staple or wire the filter fabric to the fence.
- Extra strength filter fabric does not require a wire mesh support fence. Staple or wire the filter fabric directly to the posts.
- Do not attach filter fabric to trees.
- Where ends of filter fabric come together, overlap, fold, and staple the ends to prevent sediment bypass.
- Where joints in the fabric are required, splice it together only at a support post, with a minimum 6 inch overlap, and securely seal the joint.
- Extend the embedded filter fabric in a flap anchored by backfill to prevent the fabric from pulling out of ground.

Maintenance

Silt fences should be inspected periodically and after runoff events for damage (such as layover or tearing by wind, animals, or equipment) and for the amount of accumulated sediment. Remove the sediment when it reaches one-half the height of the silt fence. Where access is available, machinery can be used; otherwise, the sediment should be removed manually.

- Remove sediment deposits before heavy rain or when high water is anticipated.
- Place sediment deposits in an area protected by sediment and erosion control measures and where little danger of erosion exists.
- The life span of silt fence is generally 5 to 8 months. Remove and replace damaged silt fencing.
- If the silt fence has become clogged and no longer drains, replace it or install a second silt fence either above or below the original fence to collect additional sediment.
- Do not remove the silt fence until land-disturbing activities are completed and contributing drainage areas have been stabilized. Ensure the fabric is cut at ground level; remove the wire and posts and remaining sediment; and rake, seed, and mulch the area immediately.

Additional Resources

EPA (US Environmental Protection Agency). 2012. *Silt Fences*. Stormwater Best Management Practice. *http://www.epa.gov/npdes/pubs/siltfences.pdf*

BMP 69: Diversion Dike

Description

Diversion dikes are temporary berms, often excavated from an adjoining temporary swale (BMP 68), used to channel water to a desired location. Diversion dikes protect construction areas from upslope runoff and divert on-site sediment-laden water to sedimentation trapping devices or stable outlets (Figure 168).

A diversion dike located on the perimeter of a site prevents off-site storm water runoff from entering a disturbed area and prevents sediment-laden storm water runoff from leaving the construction site or disturbed area. The outside slope of a perimeter dike that blocks clean off-site water must have a nonerosive surface.



Figure 168. Earth dike diverting flows at a construction site (CALTRANS 2003).

Applicability

Diversion dikes can be used on most construction sites in the following situations:

- Installed above a disturbed area to divert flows and reduce runoff.
- Installed below a disturbed area to convey runoff to a sediment trapping device.
- To reduce amount and velocity of runoff flow over a large slope face.
- At or near the perimeter of a construction area to keep sediment-laden runoff from leaving the site.
- To prevent flooding from adjacent water bodies by installing along roadways and construction site borders.
- For slopes greater than 10% consider using other types of storm drain diversions, such as a pipe slope drain (BMP 57).

Limitations

- Despite the simplicity of an earth-constructed diversion dike, improper design can limit effectiveness and contribute to erosion and flood damage by concentrating flow.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Fair
Max. Tributary Drainage Area	10 acres
Max. Upstream Slope	10%
NRCS Soil Group	BCD
Min. Ground Water Separation	5 feet
Min. Bedrock Separation	5 feet

- Earth dikes may create additional disturbed area on site and create barriers to construction equipment.
- Earth dikes should not be constructed on easily eroded soils or on steep slopes unless soil stabilization practices are used.
- When the drainage area above the earth or perimeter dike is greater than 10 acres, consult the NRCS standards and specifications for diversions.

Design Basis

Diversion dikes are often constructed of compacted soil or coarse aggregate. If a swale is used with the dike, it should have a positive grade to a stabilized outlet. To protect against erosion, stabilize the channel with erosion control matting or other stabilization measures as outlined in BMP 68: Temporary Swale. For shallower slopes (less than 5%), stabilization may be achieved with matting (BMP 54) or mulching (BMP 52) techniques. For steeper slopes (greater than 5%) or high flow velocities, additional stabilization and erosion prevention techniques such as check dams (BMP 60), velocity dissipation (BMP 35). and temporary channel liners (BMP 61) should be incorporated into the design.

Dikes with and without swales that will be part of a permanent drainage plan should be designed by a licensed professional engineer. Dikes and swales that are part of the permanent infrastructure for the site can be stabilized long term with landscaping, seeding, and sodding (BMP 32).

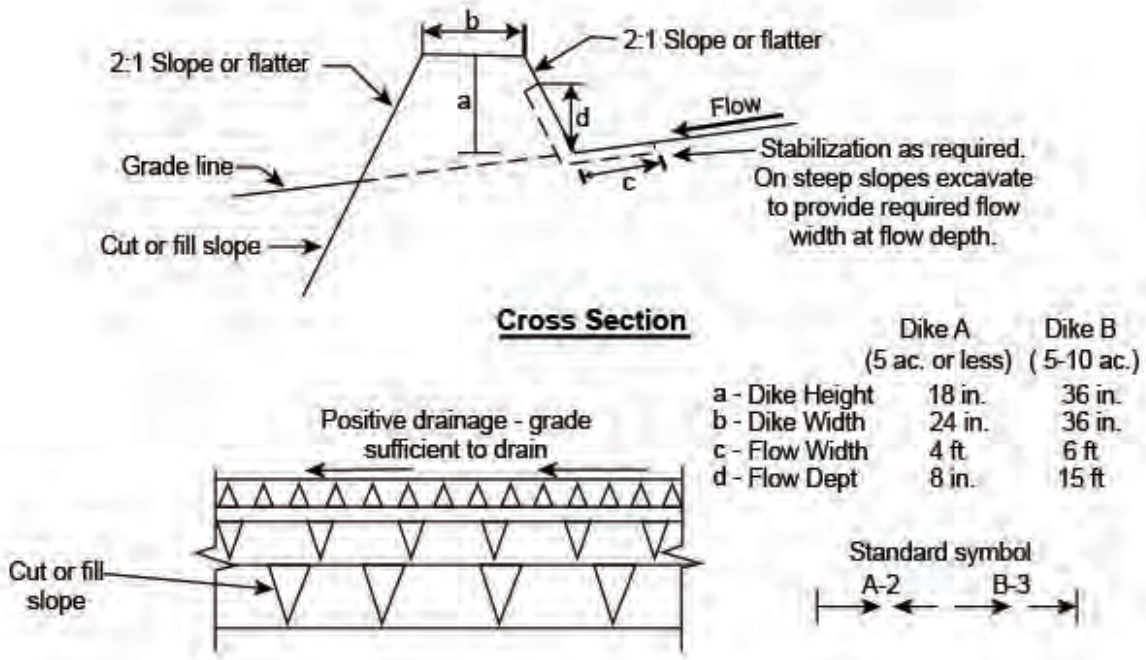
Diversion dikes that convey runoff from disturbed areas should be diverted to a sediment-trapping device. Runoff from undisturbed areas can be channeled to an existing or temporary swale (BMP 68) or to a level spreader (BMP 30).

Table 38 and Figure 169 provide design criteria for earthen diversion dikes, and Figure 170 provides criteria for earth and perimeter dikes. Any perimeter dike/swale should not be constructed outside the property lines without obtaining legal easements from adjacent property owners.

Diversion dikes can also be constructed using other materials, such as jersey barriers with bottom weep holes plugged or piping, which may not have the same erosion potential as earth dikes.

Table 38. Suggested diversion dike design criteria.

Description	Dike A	Dike B
Drainage area	5 acres or less	5–10 acres
Dike height	18 inches	3 feet
Dike width	2 feet	3 feet
Flow width	4 feet	6 feet
Flow depth in channel	8 inches	15 inches
Side slopes	2:1 or flatter	2:1 or flatter



Construction Specifications

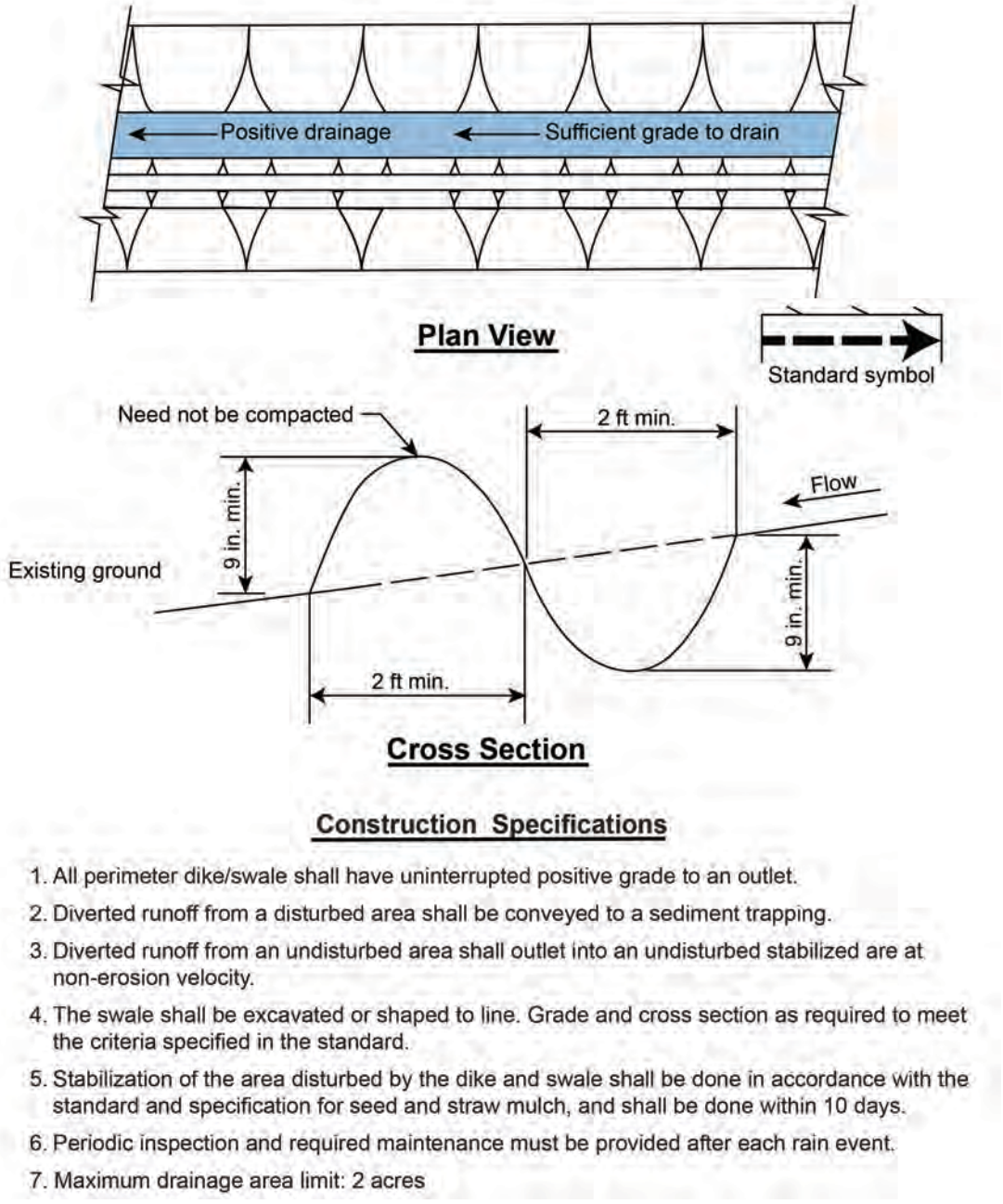
1. All dikes shall be compacted by earth-moving equipment.
2. All dikes shall have positive drainage to an outlet.
3. Top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic.
4. Field location should be adjusted as needed to utilize a stabilized safe outlet.
5. Earth dikes shall have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin where either the dike channel or the drainage area above the dike are not adequately stabilized.
6. Stabilization shall be: (A) in accordance with standard specifications for seed and straw mulch or straw mulch if not in seeding season. (B) Flow channel as per the chart below.

Flow Chart Stabilization

Type of Treatment	Channel Grade	Dike A	Dike B
1	0.5–3.0%	Seed and straw mulch	Seed and straw mulch
2	3.1–5.0%	Seed and straw mulch	Seed using jute or excelsior; sod; 2 in. stone
3	5.1–8.0%	Seed with jute or sod; 2 in. stone	Lined riprap 4 in.–8 in.
4	8.1–20%	Lined riprap 4 in.–8 in.	Engineering design

7. Periodic inspection and required maintenance must be provided after each rain event.

Figure 169. Earth dike design criteria.



Construction Specifications

1. All perimeter dike/swale shall have uninterrupted positive grade to an outlet.
2. Diverted runoff from a disturbed area shall be conveyed to a sediment trapping.
3. Diverted runoff from an undisturbed area shall outlet into an undisturbed stabilized are at non-erosion velocity.
4. The swale shall be excavated or shaped to line. Grade and cross section as required to meet the criteria specified in the standard.
5. Stabilization of the area disturbed by the dike and swale shall be done in accordance with the standard and specification for seed and straw mulch, and shall be done within 10 days.
6. Periodic inspection and required maintenance must be provided after each rain event.
7. Maximum drainage area limit: 2 acres

Figure 170. Perimeter dike design criteria.

Construction Guidelines

Install the dike before the majority of soil-disturbing construction activity begins. Earth and perimeter dikes should be properly compacted with earth-moving equipment and stabilized at least 10 days after installation. Stabilized outlets should be provided at the terminus of earth and perimeter dikes. Construction traffic over earth and perimeter dikes should be minimized and eliminated when possible.

If not part of the permanent drainage plan, completely remove temporary earth and perimeter dikes after the contributing drainage area is stabilized or when construction is completed.

Maintenance

Inspect dikes before and after rain events, daily during extended events, and weekly during the rainy season. During dry weather periods, inspect dikes bimonthly and look for signs of erosion and slope instability. Check outlets at each inspection and repair as needed to avoid gully formation.

Repair damage to the dike and associated flow channel immediately. Remove sediment and debris regularly. Reseed/stabilize the dike as needed to maintain its stability irrespective of wet or dry weather periods. If material must be added to the dike, ensure it is properly compacted by earth-moving equipment.

Mow vegetation regularly to encourage thicker, healthier growth. Minimize fertilizer use because excess nutrients may compound water quality problems.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *http://www.casqa.org.*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

EPA (US Environmental Protection Agency). 2020. *Temporary Diversion Dikes.* Water: Best Management Practices. *http://water.epa.gov/polwaste/npdes/swbmp/Temporary-Diversion-Dikes.cfm*

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 70: Temporary Berms

Description

A temporary berm is a storm drain diversion with a ridge of compost, gravel bags, or sandbags that redirects runoff contributing to a storm drain line or outfall channel so that it may temporarily discharge into a sediment-trapping device (Figure 171). Temporary berms can also reduce the flow velocity of runoff, partially release the runoff as sheet flow, and provide some sediment removal.



Figure 171. Gravel bag berm (*Natural Building Blog*).

Applicability

Use diversions whenever construction site runoff would otherwise contribute sediment-laden water to a watercourse or to a storm water system that was not originally designed to handle increased pollutant load.

Temporary berms can be used to divert runoff away from newly constructed slopes until vegetation is established or until permanent measures are in place. Temporary berms are most appropriate in areas that have sheet flow drainage characteristics and where perimeter control is needed:

- Along the perimeter of a construction project site
- Downslope of exposed soil areas
- Around temporary stockpiles
- Downslope of paved surfaces

Gravel bag barriers can also be used where flows are moderately concentrated such as in ditches, swales, and around storm drain inlets.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

◖	Sediment
○	Nitrogen
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Easy
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	5 acres
Max. Upstream Slope	50%
NRCS Soil Group	ABCD
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

Limitations

Do not use temporary berms for drainage areas greater than 5 acres or for contributing slopes steeper than 5%. For larger areas, a more permanent structure should be used. Temporary berms by themselves do not control erosion or remove significant quantities of sediment from runoff and should be used as part of a treatment train. Additional limitations include the following:

- Diverted flow may increase in volume and velocity causing downstream erosion. Additional BMPs may be needed with temporary berms.
- Installation can be labor intensive and costly, especially for gravel bag berms.
- Compost berms may leach nutrients, such as dissolved phosphorous and nitrogen, and should not be used in areas that drain to phosphorous-sensitive water bodies. When compost berms are no longer needed, immediately use the berms to amend the soil in preparation for landscaping (BMP 32).
- Burlap bags for gravel or sand have limited durability for long-term projects. Degraded bags that rupture when removed can increase pollutant load when the contents spill.
- Diversions will likely require approval from local officials.
- Storm drain diversions should not increase the existing downgradient sediment load.

Design Basis

General Guidelines

When applying a storm drain diversion technique, one of the following approaches may be used;

- **Off-line diversion** of sediment-laden runoff requires constructing a temporary sediment trap (BMP 66) at the outlet location of the diverted flow.
- **In-line diversion** within a storm drain is achieved by temporarily blocking the permanent outfall and installing a temporary outfall ditch or pipe. The temporary outfall conveys storm water flow to a sediment trap or basin. The diversion may be implemented at any point above a permanent outfall or before connecting into an existing storm drain system.
- **Delayed outfall completion** of a permanent storm drain outfall when constructing a new storm water system to temporarily divert storm water flow into a sediment trap (BMP 66), diversion dike (BMP 69), or temporary swale (BMP 68). The chosen BMP should be constructed to one side of the proposed permanent storm drain location whenever possible.

The following sections include general design criteria for compost berms, gravel bag berms, and sandbag berms.

Compost Berm

Compost filter berms perform most effectively when constructed approximately 1–1.5 feet high x 2–3 feet wide with a maximum spacing of 20 feet

Materials used in compost berms can be selected to target site-specific objectives in capturing sediment and other pollutants or supporting vegetation. Ensure the acquired compost is free of weeds and invasive species because compost berms contain constituents that may adversely affect water quality in receiving water bodies. The compost should meet the parameters in Table 39. Determine whether the receiving water bodies are impaired for specific contaminants that may be present in compost (e.g., sediment and nutrients). Table 39 provides recommendations on selecting the best compost for use in filter berms.

Table 39. Compost filter berm material parameters (adapted from Alexander 2003).

Parameters	Filter Berm to be Vegetated	Filter Berm to be Left Unvegetated
pH	5.0–8.5	NA
Soluble salt concentration (electrical conductivity in dS/m)	Maximum 5	NA
Moisture content (%, wet weight basis)	30–60	30–60
Organic matter content (%, dry weight basis)	25–65	25–100
Particle size (% passing a selected mesh size, dry weight basis)	3 inches, 100% passing 1 inch, 90% to 100% passing 3/4 inch, 70% to 100% passing 1/4 inch, 30% to 75% passing Maximum particle size length of 6 inches (no more than 60% passing 1/4 inch in high rainfall/flow rate situations)	3 inches, 100% passing 1 inch, 90% to 100% passing 3/4 inch, 70% to 100% passing 1/4 inch, 30% to 75% passing Maximum particle size length of 6 inches (no more than 50% passing 1/4 inch in high rainfall/flow rate situations)
Stability Carbon dioxide evolution rate	<8	NA
Physical constraints (man-made inerts)	<1	<1

Notes: deciSiemens per meter (dS/m)

Sandbag and Gravel Bag Berms

The following design criteria are suitable for sandbag and gravel bag berms (Figure 172).

Berm dimensions:

- Height—20 inches minimum
- Top width—20 inches minimum
- Bottom width—approximately 4.25 to 5 feet
- Bag size–length 2 to 2.6 feet, width 16 to 20 inches, depth or thickness 6 to 8 inches

Bag material should be woven polypropylene, polyethylene, or polyamide fabric, minimum unit weight 4 ounces per square yard; mullen burst strength exceeding 300 psi (ASTM D3786); and ultraviolet stability exceeding 70% (ASTM D4355).

Fill material for sandbag berms should be clean and free from clay balls, organic matter, and other deleterious materials that could leach from the bag. The filled bags should be between 88 to 132 pounds in mass.

Bag material for gravel bag berms should meet the same design considerations as sandbag berms. Fill material for gravel bag berms should be between 0.4 and 0.8 inch in diameter and clean and free from clay balls, organic matter, and other deleterious materials. The filled bags should be between 28 and 48 pounds in mass.

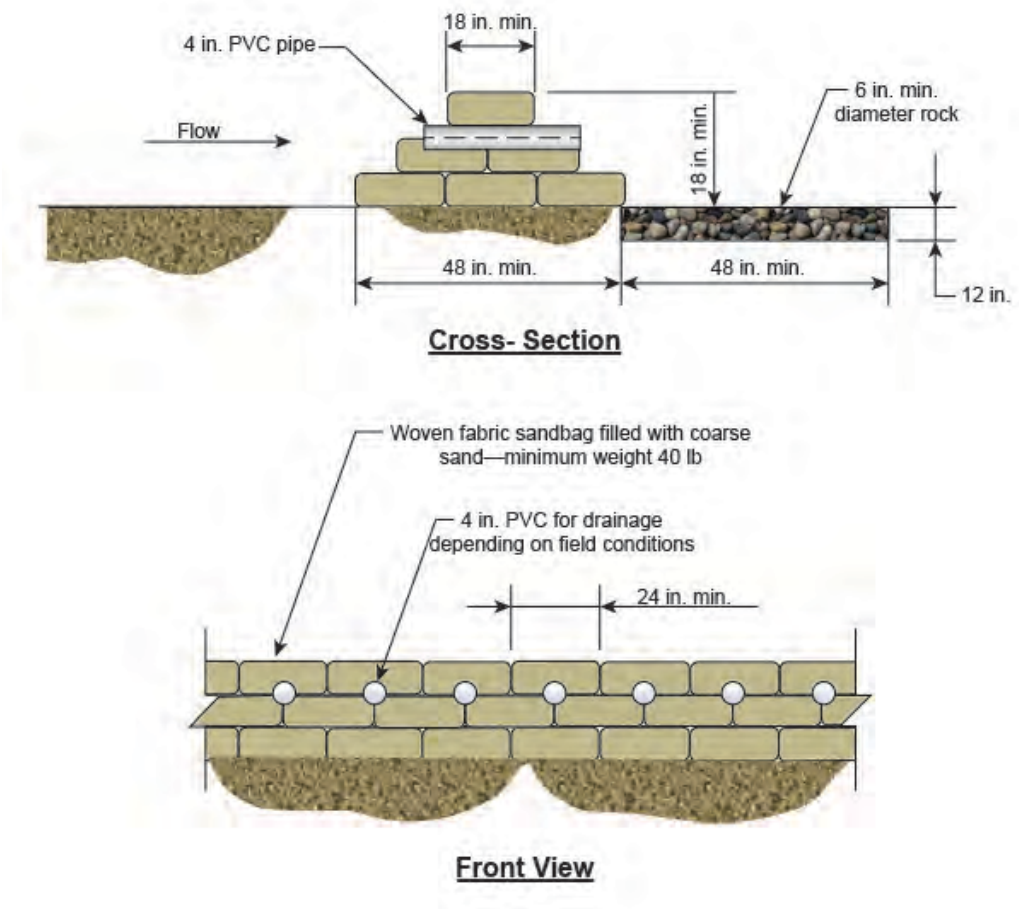


Figure 172. Sandbag berm.

Construction Guidelines

General Guidelines

When the areas contributing sediment to the system have been stabilized, follow the procedures below to restore the system to its planned use.

- Flush the storm drain system to remove any accumulated sediment.
- Remove the sediment control devices, such as traps, basins, dikes, and swales.
- For sites where an inlet was modified, seal the temporary diversion orifice and open the permanent outfall pipe.
- Establish a permanently stabilized outfall channel as noted on the plans.
- Restore the area to grades shown on the plan and stabilize with vegetative measures.
- For basins that will be converted from a temporary to a permanent storm water management measure, remove the accumulated sediment, determine outlets are as designed, and seed all disturbed areas to permanent vegetation.

Temporary berms should be constructed along a level contour when used as a perimeter sediment control device. Turn ends of the berm row upslope in a J-hook fashion to prevent flow around the

ends. At the toe of slopes, place berms 5 to 10 feet away from the toe or as far from the toe as practicable.

Compost Berm

Compost berms may be left in place or spread evenly after construction is completed to revegetate and augment on-site soil. Depending on desired usage, compost can be preseeded before placement as a berm or seeded postconstruction. Allowing compost BMPs to remain in place following construction may be advantageous for sensitive areas and stream buffer zones as they can limit the reentry of heavy construction equipment.

Sandbag and Gravel Bag Berms

Sandbag and gravel bag berms should be installed to prevent flow under or between bags. Stack bags in an interlocking fashion to provide additional strength for resisting the force of the flowing water. Do not stack sandbags more than three high without broadening the foundation using additional sandbags or providing additional stability.

Maintenance

- Establish an ongoing maintenance program to ensure the system functions properly.
- Inspect storm water diversion systems and remove debris within 24 hours after each rainfall event as heavy storms may clog or damage the system.
- Periodically inspect temporary diversion structure outfalls and after each major storm for any visible erosion.
- Periodically inspect and maintain compost berms to ensure unwanted vegetation is eliminated before it is established.
- Reshaped or replace sandbags and gravel bags as needed during inspection. When sediment reaches 6 inches deep, remove and properly dispose of the accumulated sediment.
- Leave temporary berms in place until all protected areas are stabilized, then remove the berms to avoid creating additional sediment loads. Remove sandbags and gravel bags by hand to prevent damage from heavy equipment.

Additional Resources

Alexander, R. *Standard Specifications for Compost for Erosion/Sediment Control (Filter Berms)*. 2003. Specification MP 9-03. American Association of State Highway and Transportation (AASHTO) Provisional Standards Manual. Apex, NC: R. Alexander Associates, Inc. *http://compostingcouncil.org/admin/wp-content/plugins/wp-pdfupload/pdf/32/AASHTO-Specifications.pdf*

CASQA California Stormwater Quality Association. 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *http://www.casqa.org.*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

EPA (US Environmental Protection Agency). 2002. *Flow Diversion.* *http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_fl.pdf*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

New York State DEC (New York State Department of Environmental Conservation). 2005. *New York State Standards and Specifications for Erosion and Sediment Control*. Albany, NY: Division of Water. *http://www.dec.ny.gov/chemical/29066.html*

ODEQ (Oregon Department of Environmental Quality). 2013. *Construction Stormwater Best Management Practices Manual*. 1200-C NPDES General Permit. Portland, ID: ODEQ.

BMP 71: Turbidity Curtains

Description



Figure 173. Sediment trapped inside a turbidity curtain.

With the proper use of erosion and sediment control BMPs, sediment should not enter waters of the United States. However, for construction work that must occur within or immediately adjacent to a water body, the increase in turbidity should be addressed. Turbidity curtains, or silt curtains or particle curtains, contain and settle sediment within lakes, rivers, and other water bodies (Figure 173).

A turbidity curtain consists of vertically suspended material that hangs from floats along its top and ballast weights at its bottom. The curtains can completely contain sediment and water within a specific area or prevent sediment from moving past the curtain, allowing time for suspended sediment to settle to the bottom of the water body.

Applicable federal, state, and local permits must be obtained before any construction within waters of the United States or use of a silt curtain where pollutants will be added to the water inside the curtain. A silt fence (BMP 65) or silt fence material ***cannot*** be used as a silt curtain; these two BMPs function very differently and are not interchangeable.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
◖	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	Medium
Freeze/Thaw Resistance	Fair
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Applicability

Turbidity curtains can be used within rivers, streams, lakes, reservoirs, or other water bodies that are downstream or adjacent to projects that involve ground disturbance, dredging, or filling within or immediately adjacent to a waterway. Project examples include bridge construction, dam removal and restoration, or pipeline crossings.

Limitations

Do not install turbidity curtains within water bodies unless they are specifically engineered to withstand expected water velocity, wind and boat wakes, and

are approved by appropriate local, state, and/or federal authorities. The curtains are not recommended for operations in the open ocean.

Design Basis

Turbidity curtains should be designed and selected for specific site conditions. For sites with flow velocities or currents greater than 5 feet per second, a qualified engineer and product manufacturer should approve of the use (Figure 174).

Many proprietary turbidity curtains are available, and only curtains successfully field tested by the manufacturer should be used. Follow the manufacturer's recommendations for designing and deploying silt curtains. Many manufacturers and state transportation departments classify turbidity curtains into three categories:

- Type I—For small inland lakes, ponds, and canals with calm conditions and no current, sheltered from wind and waves
- Type II—For rivers, lakes, and streams with moving water and moderate current (velocities up to 3.5 feet per second) and/or moderate wind and wave action
- Type III—For nearshore ocean environments and tidal areas and rivers, bays, and lakes with strong currents and high velocities (up to 5 feet per second), and significant wind and wave action (more than 1 foot).

In still, shallow water not subject to wind or currents, the curtain should extend to a depth that allows at least 2 feet of clearance between the bottom of the curtain and the bottom of the water body and be anchored or staked. In moving water or where significant wind or wave action is present, a 10 to 12 foot depth is most practical, even in deep water. Curtains deeper than this can be subject to very large loads with consequent strain on the material and mooring system.

Materials should have ultraviolet light inhibitors and tensile strength sufficient to withstand predicted flows and a slippery surface that causes the sediment particle to slide down the length of the curtain. All material seams and line attachments should be sewn or vulcanized welded into place. Use materials with bright colors, when applicable, to alert boaters or swimmers recreating near the work site.

If hydrocarbons could be present, the turbidity curtain should have a line of oil sorbent boom placed parallel to the curtain for its full length. The floating sorbent boom can be anchored directly to the turbidity curtain to absorb any hydrocarbons before they can contact the curtain.

Flotation devices for turbidity curtains should be flexible, buoyant units contained in an individual flotation sleeve or collar attached to the curtain. If the curtain will be deployed for an extended period of time in an area frequented by waterfowl, floats should be enclosed in a material of sufficient weight to resist the efforts of geese to use the stuffing as nest material. The anchoring systems should be designed based on the anticipated conditions and anchored every 100 feet at a minimum (Figure 175). In areas with high wave action or high flows, anchors may need to be spaced at shorter intervals to prevent tangling. All anchors should have a floating anchor buoy or other identifying mark. A safe means should be available for workers to maintain the silt curtain because resetting the anchors and repairing the curtain are sometimes necessary. Navigation lights should be added if the curtain is to remain deployed all night.

Deployment of the silt curtain is as important as the curtain design. Due to dredging equipment, or currents, obstacles, or other factors, curtains cannot completely circle the project. Manufacturer recommendations on deployment should be followed given these circumstances; it should not be a trial and error process.

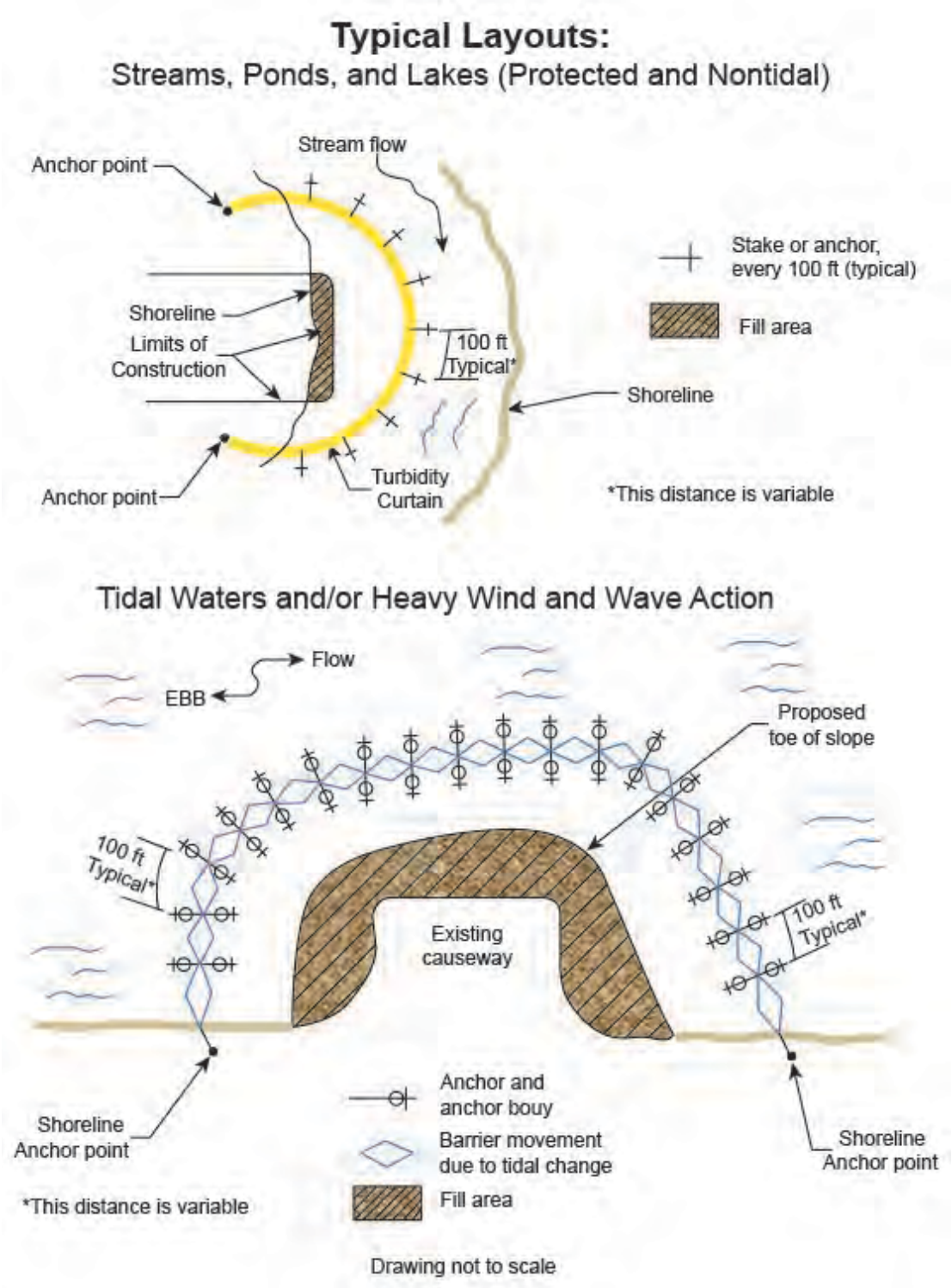


Figure 174. Turbidity curtain typical layouts (City of Portland, Oregon 2008).

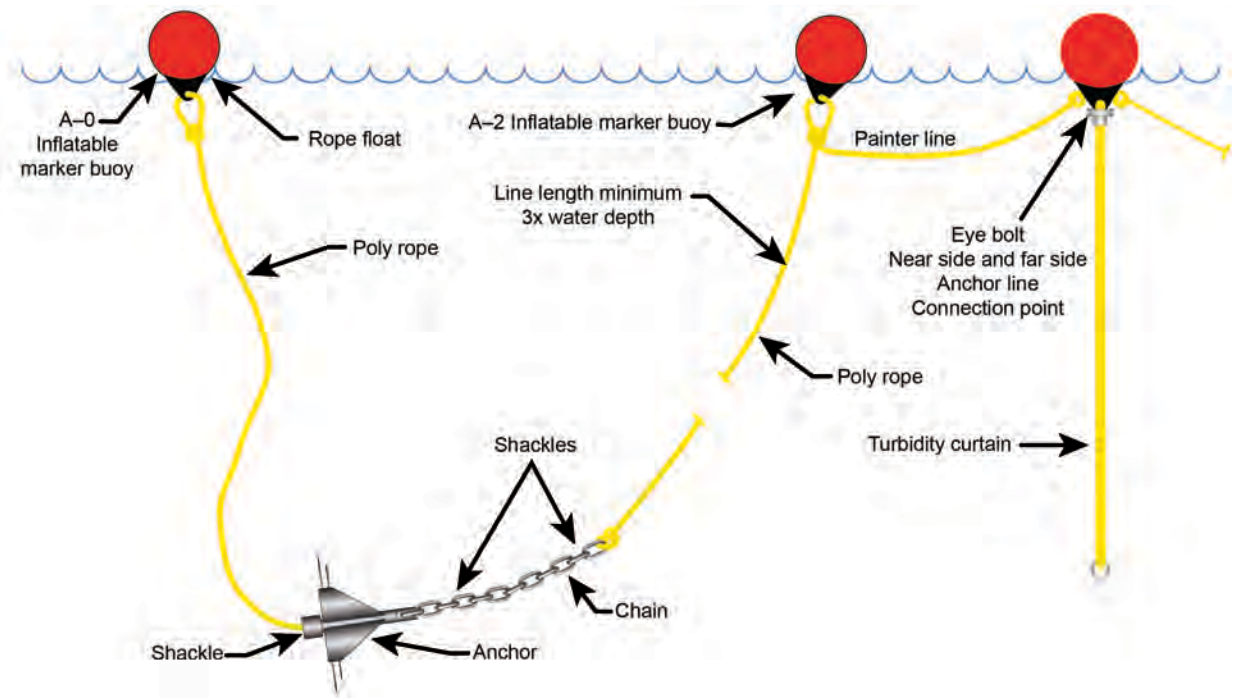


Figure 175. Turbidity curtain anchoring detail (*GEI Works*).

Construction Guidelines

Install turbidity curtains according to applicable permit requirements and follow the manufacturer's recommendations and guidelines for installation and safety measures.

Maintenance

Turbidity curtains should be inspected daily when construction is actively occurring or when it is located in a navigable water body. If turbid water is being released from a curtain, check the bottom anchors, joints, flotation, and material. Ensure the bottom of the curtain is not resting on the bed of the water body because sweeping motion created by wind and boat wakes can create a considerable amount of turbidity. Make repairs as needed, following the manufacturer's instructions for fabric and material repair. If repeated repairs are required for a curtain, the curtain strength relative to the flow velocity may need to be reevaluated or an alternative deployment strategy used.

When the project is finished, wait until the turbidity of the water inside the curtain matches the water outside of the curtain; the curtain can then be removed and cleaned before storage. All cleaning operations should use good sediment control practices to ensure the sediment does not reenter the waterway.

Remove turbidity curtains soon as the water within the curtain clears and matches the clarity of the water outside the curtain. Follow the manufacturer's recommendations for removal, and to prevent sediment resuspension, carefully pull the curtain towards the construction site. The removal area should be clear of any obstructions that could tear the fabric. Properly dispose of trapped sediment.

Additional Resources

City of Portland Oregon. 2008. *Erosion and Sediment Control Manual*. Portland, OR. *https://www.portlandoregon.gov/bds/article/94539*

Elastic/American Marine, Inc. 2015. *Turbidity Curtains*. Carmi, IL. *www.turbiditycurtains.com*

Illinois Urban Manual. 2012. "Silt Curtain-Floating." *Illinois Urban Manual Practice Standard*. *http://www.aiswcd.org/wp-content/uploads/2013/06/urbst9171.pdf*

Abasco. 2017. "Turbidity and Silt Curtain Installation." Sediment Control Products. Humble, TX. *https://www.abasco.com/turbiditycurtaininstallation.html*

BMP 73: Dewatering

Description

Dewatering is used to control and appropriately dispose of ground water or rainwater from excavations or inundated areas. Both storm water and nonstorm water discharges are typically pumped to a dewatering BMP that removes sediment and treats the water as needed and then conveys or pumps it to a receiving water body or well-vegetated area. BMPs used with dewatering are sediment basins (BMP 66), portable sediment tanks (BMP 67), or dewatering filter bags (Figure 178).



Figure 178. Bags used to filter silt and sediment from dewatering operations (*GEI Works*).

Dewatering discharge may require a permit or other authorization from the local drainage authority. Discharges to surface waters and ground waters must comply with IDAPA 58.01.02 and IDAPA 58.01.11. Permits from IDWR may also be needed.

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☒ Erosion Control	☒ Sediment Control
☐ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Metals
- ○ Bacteria
- ○ Hydrocarbons
- ○ Litter

Other BMP Considerations

Relative Cost	$$$
Maintenance Requirements	High
Ease of Installation	Hard
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Applicability

Dewatering BMPs are applicable in the following types of locations:

- Construction sites saturated after a large storm event
- Excavations for building foundations
- Utilities, maintenance, and infrastructure installation and repair project sites:
  - Electrical conduits
  - Vaults/tanks
  - Sewer and storm drain systems
  - Phone and cable lines
  - Gas or other fuel lines
- Excavated sites or graded areas with existing conditions such as ponds and wetlands

Limitations

In Idaho, all dewatering activities regardless of the discharge volume require compliance with the "Water Quality Standards" (IDAPA 58.01.02). Dewatering operations for nonstorm water require and must

comply with applicable permits, local ordinances, and regulations. The presence of contaminated water requires coordinating with the local DEQ office and the local drainage authority to guarantee proper treatment and disposal.

Design Basis

Dewatering BMP selection will vary on site topographic and geological conditions, anticipated discharge quantities, and discharge location. Dewatering discharges should be treated to remove sediment and any contaminants before discharging from the site. Depending on season, flow rate, volume, or residual contamination, the discharge may be allowed to flow to the following:

- The ground and vegetated areas in a manner that ensures no erosion or erosive runoff leaving the site, which may require a permit or other authorization from the local drainage authority.
- The storm drain system, which may require a permit or letter of authorization with discharge restrictions.
- The sanitary sewer, which may require a permit or letter of authorization with discharge restrictions.

Figure 179 illustrates methods for placing a pump to dewater a pond filled with water or using a submersible pump.

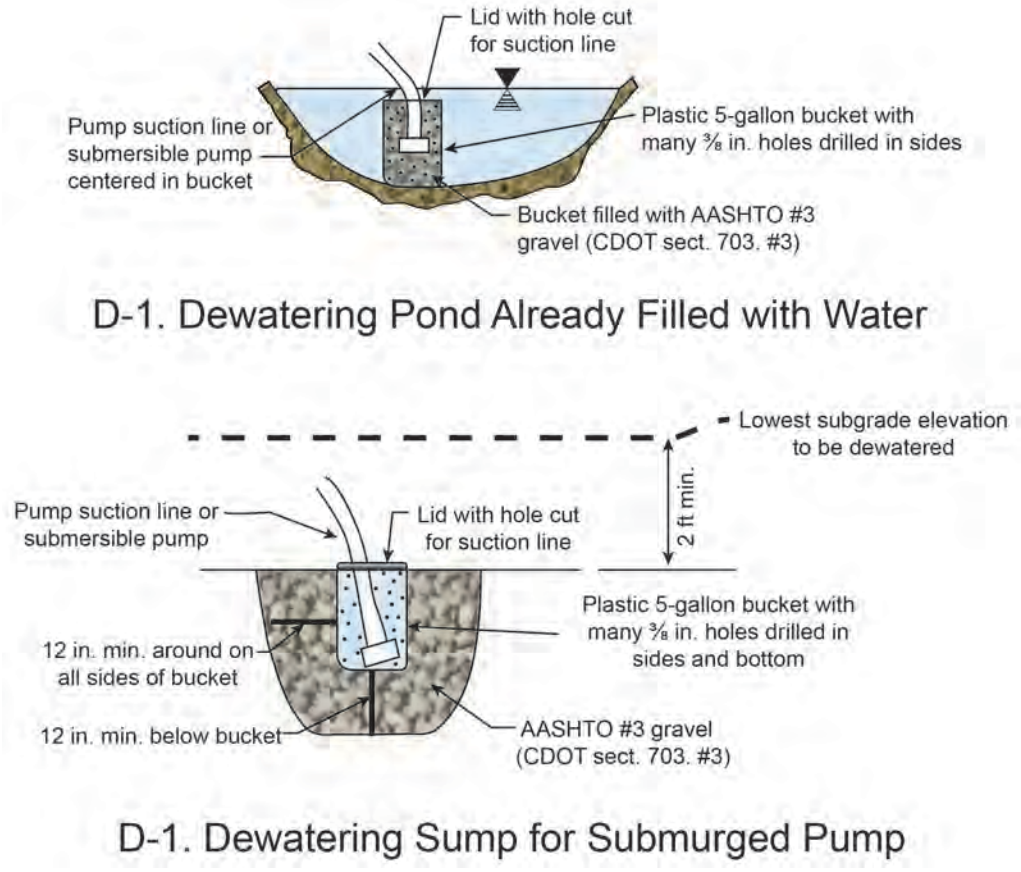


Figure 179. Dewatering for pond already filled with water (top) and dewatering sump for submerged pump (bottom) (Colorado UDFCD 2010).

Treatment

The site should be assessed for the issues listed below to assist the local drainage authority in determining which treatment and discharge option to approve:

- Perform a historical site assessment for soil and ground water records. If contaminants are suspected, the water should be tested by a certified laboratory. Results should be discussed with municipal and DEQ staff before any dewatering activities.
- If the water is cloudy or turbid, the dissolved and/or settleable solids in the water should be filtered or settled out before discharge. Evaluate geotechnical information on soil grain size distribution and hydrometer settling characteristics to select an appropriate filtration and sedimentation BMP.
- In addition to a review of water and/or soil laboratory results, determine if contaminants are present in impounded water by inspecting for odors, discoloration, and/or an oily sheen.
- If contaminants may be, or are present, a certified laboratory should test the proposed discharge waters with results submitted to the local drainage authority. Sampling and testing requirements will be determined on a case-by-case basis depending on site history or suspected pollutants. Contact DEQ or the local authority responsible for receiving water bodies or treatment systems before testing for assistance in identifying the required parameters of concern and any sampling requirements. After review, the local drainage authority will specify if any pretreatment is required before discharge.

To treat water that has been pumped from an inundated area, sedimentation BMPs such as a sediment trap (BMP 66) or a portable sediment tank (BMP 67) can be used. Settling tanks should contain sampling ports for potential contaminant analysis. Effluent should be allowed to settle in a sedimentation BMP for a minimum of 4 hours or until the water is clear (Figure 180).

In some cases, on-site chemical treatments may be required to facilitate removing clays and fine silts. Any use of chemicals to improve effluent water quality should have state and EPA approval before use. BMP 72: Flocculation provides more information on chemical treatment.

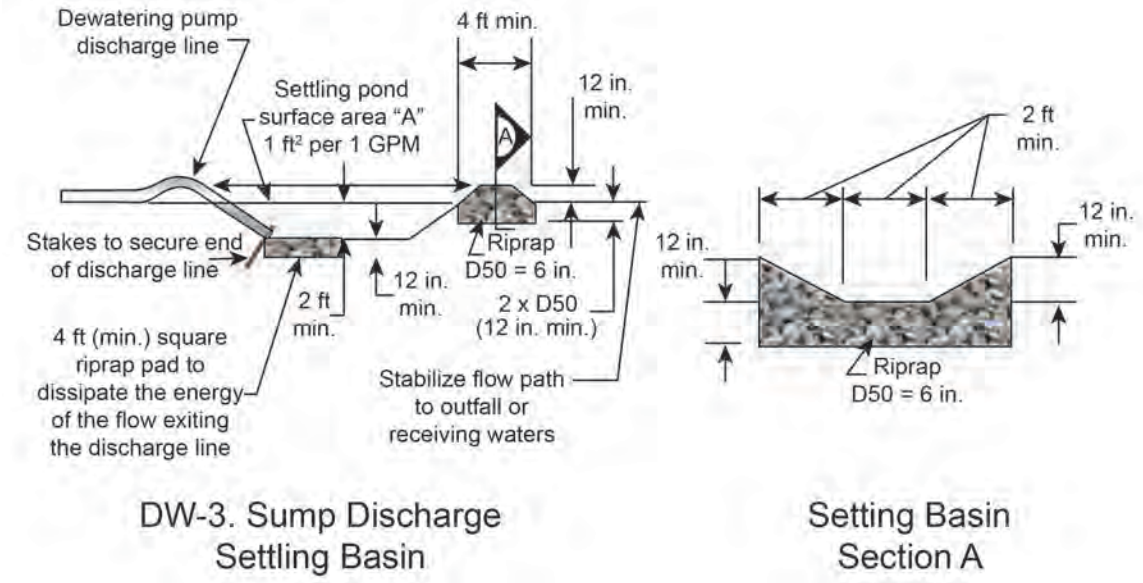


Figure 180. Sump discharge and settling basin (Colorado UDFCD 2010).

Filtering through a sieve or other filter media (swimming pool filter) may be an option for filtering construction dewatering operations. Simple on-site filter systems can be constructed including: wrapping the ends of the suction and discharge pipes with filter fabric; discharging through a series of drums filled with successively finer gravel and sand; and other filtering techniques like those described in BMP 74: Inlet Protection.

Portable tanks can be used to receive pumped water through the top of the tank, which then passes through a filter fabric that retains sediment and the filtered water is discharged through the bottom of the tank. Dewatering tanks can remove settleable solids, some visible oil and grease, some metals, and trash. The tank size depends on flow volume, constituents of concern, and residency period required.

A dewatering filter bag is a square or rectangular bag made of nonwoven geotextile fabric into which water is pumped (Figure 181). The filter bag collects sand, silt, and fines as filtered water seeps out. These systems do not always work on fine clay soils, and they should not be placed within water bodies or wetlands. Depending on site conditions and soil composition, additional downgradient erosion controls such as fiber rolls (BMP 64) or silt fencing (BMP 65) may be needed.

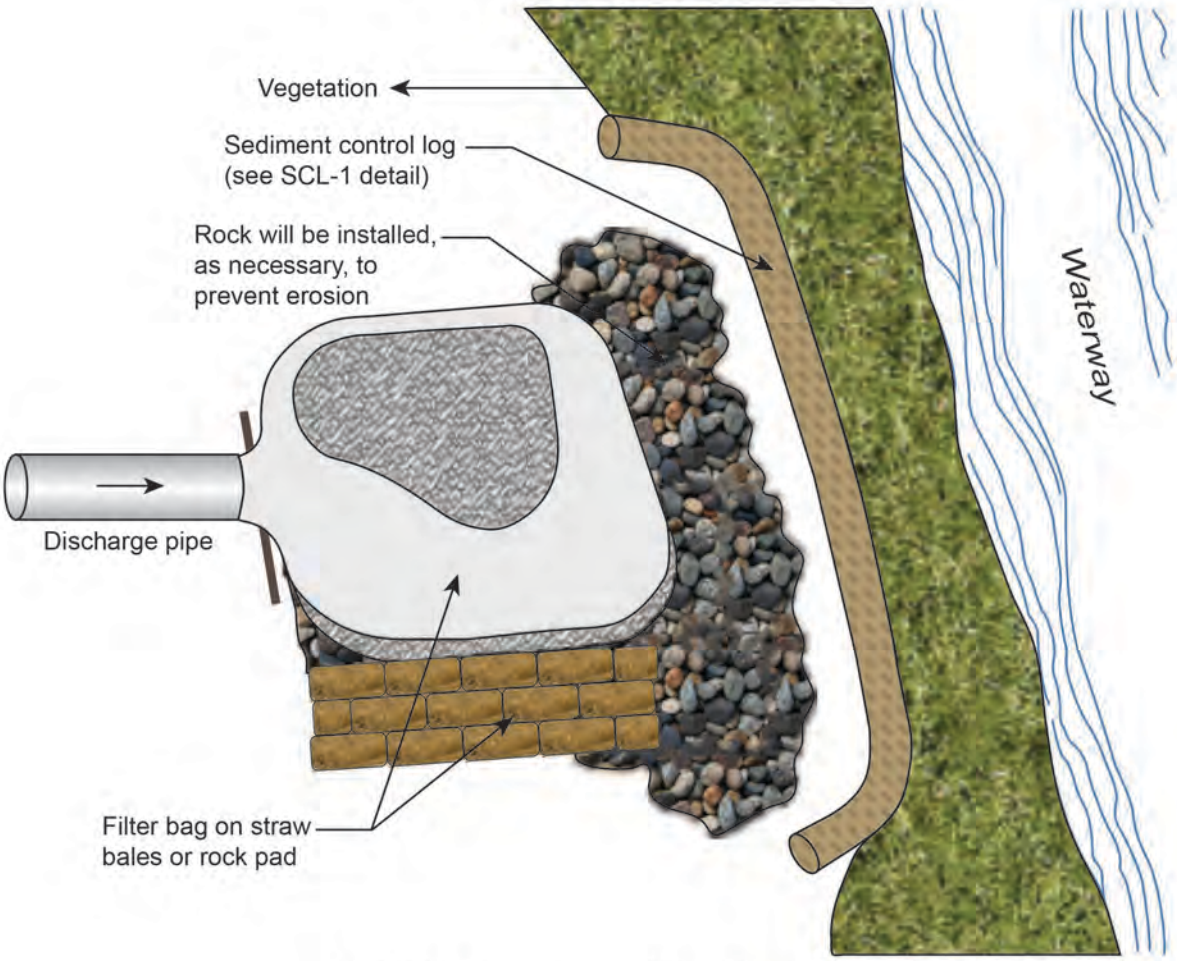
Construction Guidelines

Inspect and verify that dewatering BMPs are in place and functioning before dewatering activities begin. As part of the SWPPP, a dewatering plan should be submitted and reviewed by a certified professional engineer before dewatering-related work. The plan should detail the following:

- Location of dewatering activities and equipment, as well as discharge points
- Expected quantity of water to be discharged
- Pump capacity
- Any additional erosion and sediment control required at the point of discharge
- Water quality sampling locations (if required)

Maintenance

- Check the filtering devices daily to ensure they are unclogged and operating correctly. Maintenance and inspections of dewatering BMPs should be proactive and not reactive. Adjustments may be needed depending on the amount of sediment in the water being pumped.
- Systems should be filled in or otherwise removed when permanent dewatering controls are in place and connected to an approved treatment and receiving system.
- Sediment should be proactively removed from a sediment basin before the basin reaches half full to avoid high flows transporting previously settled material. Filtered sediment material should be dried and reused on site in a mixture with other site soils or should be appropriately disposed of based on composition and levels of contaminants present.



DW-4. Dewatering Filter Bag

Dewatering installation notes:

1. See plan view for:
   - Location of dewatering equipment.
   - Type of dewatering operation (DW-1 to DW-4).
2. The owner of contractor shall obtain a construction discharge (dewatering) permit from the state prior to any dewatering operations discharging from the site. All dewatering shall be in accordance with the requirements of the permit.
3. The owner or operator shall provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry conditions and to lower and maintain the ground water level a minimum of 2–ft below the lowest point of excavation and continuously maintain excavations free of water until backfilled to final grade.

Figure 181. Dewatering filter bag (Colorado UDFCD 2010).

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *https://www.casqa.org*

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

Hazra and ODOT (Hazra Engineering Company and Oregon Department of Transportation, Geo/Environmental Section). 2005. *ODOT Erosion Control Manual: Guidelines for Developing and Implementing Erosion and Sediment Controls.*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

BMP 75: Street Sweeping

Description

Streets, roads, and highways accumulate potential storm water pollutants such as sediment, debris, trash, road salt, and trace metals. Street sweeping, if conducted properly, can reduce the pollutant load to receiving waters, reduce potential clogging of storm sewer systems and downstream BMPs, and control dust (Figure 188).



Figure 188. Regenerative air system sweeper for the City of Hayden, Idaho.

Applicability

Street sweeping can be used in most urban areas where sediment and litter accumulation is a concern. In cold climates, street sweeping used during ice-free periods and after the spring snowmelt removes the salt, sand, and grit applied to the roads throughout the winter. Permeable pavements (BMP 19) should be vacuumed with appropriate equipment as part of basic routine maintenance to ensure the pavement operates effectively.

Streets adjacent to an active construction site should be swept when necessary as part of the construction site storm water management plan. Construction sites should also take measures to control sediment track out (BMP 40: Vehicle Sediment Control) to limit the need for street sweeping.

Limitations

Street sweeping is not effective at removing oil and grease. Older mechanical sweepers are limited in ability to remove fine sediment, and sweepers with newer technology can be costly.

Design Basis

Three types of street-sweeping technologies are available: traditional mechanical sweepers that use a broom and conveyor belt, vacuum-assisted sweepers, and regenerative air sweepers that blast air onto the pavement to loosen sediment particles and vacuum

Primary BMP Functions and Controls

☐ Construction	☒ Permanent
☐ Erosion Control	☒ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
○	Hydrocarbons
●	Litter

Other BMP Considerations

Relative Cost	$$$
Maintenance Requirements	Medium
Ease of Installation	N/A
Freeze/Thaw Resistance	Good
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

them into a hopper. For maximum particulate removal, sweepers should be operated at optimum manufacturer-recommended speeds and sweeping patterns, with brushes properly adjusted.

The various sweeping technologies are appropriate in different situations. In general, mechanical broom sweepers remove larger and heavier debris than other technologies and are better for removing construction debris and granular materials such as millings and gravel. Vacuum-assisted sweepers clean rough and potholed roadways and with extended nozzles can efficiently clean street gutters. A benefit of regenerative air sweepers is they do not vent or exhaust back into the atmosphere, but the debris must be small enough to be picked up. Some regenerative air sweepers also use water to control ambient dust and lubricate the impeller.

Schedule

A regular sweeping schedule is recommended with a minimum monthly sweeping of curbed streets during the nonwinter months when the streets are clear of snow. More frequent street sweeping may be needed depending on site conditions and in the vicinity of active construction sites. Complete street sweeping during dry weather. Wet cleaning or flushing of streets should be avoided; use dry methods where possible.

Street-sweeping schedules should be posted with signs along streets and on the municipality's website so that the public knows to not park cars along the street during designated sweeping days.

Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, and proximity to watercourses:

- Increase sweeping frequency for streets with high pollutant loads, especially in high traffic and industrial areas.
- Conduct street sweepings before the wet season to remove accumulated sediments.
- Increase the sweeping frequency for streets in special problems areas, such as streets around special events, areas of high litter, or high erosion zones.

To evaluate the effectiveness of a street-sweeping program, municipalities should maintain accurate logs of the number of curb-miles swept and the amount of waste collected.

Sweepings Storage and Disposal

Street sweeping material includes sediment, salt, trace metals, leaves, trash, and other debris. The collected sweepings contain pollutants that should be tested before disposal to determine if the material is hazardous. Municipalities must adhere to all federal and state regulations that apply to the sweeping's disposal and reuse.

The debris and dirt from street sweeping activities should be stored and disposed of properly. Swept material should not be stored along the side of the street or near a storm drain inlet. Keep debris storage to a minimum during the wet season or ensure debris piles are contained or covered.

Maintenance

Street-sweeping equipment should be regularly maintained and kept in good working order. Regularly inspect vehicles and equipment for leaks and repair promptly. Keep spare parts in stock to prevent downtime. Maintenance requirements may be greater for certain types of sweepers. Replace old sweepers with new technologically advanced sweepers, such as regenerative air sweepers, that maximize pollutant removal.

Additional Resources

CASQA (California Stormwater Quality Association). 2004. *Stormwater Best Management Practice Handbook: Municipal*. Menlo Park, CA. *http://www.casqa.org/*

EPA (US Environmental Protection Agency). 2017. *Parking Lot and Street Cleaning*.

BMP 77: Outdoor Storage

Description

Storm water can become polluted when contaminants in materials or liquids stored on-site wash off or dissolve into storm water runoff. If raw materials or liquids must be stored outdoors due to indoor space limitations, proper storage techniques can prevent or reduce the discharge of pollutants to storm water.

Contaminant prevention is achieved by reducing contact with storm water, installing safeguards against accidental releases, using secondary containment, conducting regular inspections, and training employees in safe handling and operating procedures and spill cleanup techniques.



Figure 190. Outdoor storage of hazardous materials (*SafeSpace*).

Applicability

Proper outdoor storage should be used at all construction sites, industrial sites, commercial facilities, and municipal facilities when storing sensitive materials (Figure 190):

- Soil stabilizers and binders
- Fertilizers, pesticides, and herbicides
- Detergents and other cleaning compounds
- Building material and site waste
- Waste oils and petroleum-based products
- Solvents and liquids
- Construction equipment
- Asphalt and concrete compounds
- Hazardous wastes and materials
- Any substance detrimental to environmental conditions

Primary BMP Functions and Controls

☒ Construction	☐ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$$
Maintenance Requirements	Medium
Ease of Installation	Hard
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Limitations

Tarps and temporary protective structures can be susceptible to wind damage. Permanent storage sheds should meet building and fire code requirements and may need a building permit before construction.

Accidental releases of materials from aboveground liquid storage tanks, drums, and dumpsters present

the potential for contaminating storm and ground waters with many pollutants. Properly training employees in spill cleanup procedures prevents contamination. This requires additional time and resources to educate employees.

Design Basis

Depending on location, materials, and storage capacity, some facilities may be covered by the SPCC rule and will be required to prepare and implement a SPCC plan. EPA provides more information at *http://www2.epa.gov/oil-spills-prevention-and-preparedness-regulations/overview-spill-prevention-control-and.* Use the following design approaches to protect materials from rainfall, run-on, runoff, and wind dispersal:

Storage Areas

- All sensitive materials should be covered at all times. Cover the storage area with a roof when possible.
- If material cannot be covered with a roof, protect the material with a temporary covering made of polyethylene, polypropylene, or hypalon, and secure it with weighted tires or sandbags.
- Locate outdoor storage areas on nonpermeable paved surfaces free of cracks and gaps, where possible.
- When sensitive materials cannot be located in a storage container or on a nonpermeable paved surface, line the soil or gravel with an impermeable barrier.
- A minimum slope of 1.5 % is recommended for outdoor storage areas to minimize water pooling on site. Minimizing water pooling is particularly important with materials that may leach pollutants into storm or ground water, such as compost, logs, and wood chips.
- Build a berm around storage areas to minimize storm water run-on and contain unexpected spills.
- Design the storm water system to minimize catch basins in the interior of the area as catch basins in the interior tend to fill rapidly with manufacturing material.
- Always have MSDS available for all materials detrimental to soil and/or water quality. The MSDS should include information on procedures for handling substances in a safe manner and information on physical characteristics, toxicity, reactivity, storage, disposal, and spill-handling procedures.

Container Management

To limit the possibility of storm water pollution, containers used to store dangerous waste or other liquids should be kept inside a building unless this is impractical due to site constraints. If the containers are placed outside, employ the following procedures:

- Place dumpsters used to store items awaiting transfer to a landfill in a lean-to structure or keep otherwise covered. Keep dumpsters in good condition.
- Tell employees to avoid dumping liquids in dumpsters and ensure dumpster lids are always closed.
- Place a fillet (radius) on both sides of the curb to facilitate moving the dumpster.
- Keep waste container drums in an area such as a service bay and ensure the drums have tight-fitting lids affixed at all times. If drums are kept outside, store them in a lean-to type

structure, shed or walled- in container to keep rainfall from reaching the drums. The storage area should have berms and be paved with an appropriate material.
- Label containers or tanks clearly.

Storage of Liquids

With the design approaches listed above, use the following measures to protect liquid in storage containers:

- Store hazardous materials to meet specific federal, state, and local standards. Some sensitive areas, such as source water protection zones, may require special containment.
- Use a *doghouse* shed for storing small liquid containers if the environment is appropriate. A doghouse shed consists of two solid structural walls and two canvas-covered walls. The floor is wire mesh and above secondary containment.
- Place tight-fitting lids on all containers. Secure drums stored in areas where unauthorized persons may gain access to prevent accidental spillage or unauthorized use.
- Liquid storage containers should be resistant to corrosion or damage from the materials stored for the duration of use on site.
- Berm or surround the tank or container with an appropriate secondary containment system with an impervious surface (see below).
- Place drip pans or absorbent materials beneath all mounted taps and at all potential drip and spill locations during filling and unloading.
- Place containers used for removing liquid in a containment area. Use a drip pan at all times.
- Install overflow protection devices to warn the operator or provide automatic shutdown of transfer pumps.
- Install protection guards (bollards) around tanks and piping to prevent construction vehicle damage.
- Label containers or tanks clearly.
- Install an oil and water separator, if necessary, in facilities with *spill ponds.* Facilities using spill ponds designed to intercept, treat, and/or divert spills should contact the appropriate regulatory agency regarding environmental compliance.
- Facilities storing reactive, ignitable, or flammable liquids should comply with fire codes. A SPCC plan may be required when storing contaminated or hazardous liquids on site.

Secondary Containment

Liquid storage tanks should be surrounded by a secondary containment system with an impervious surface. Leaks can be detected more easily and spills can be contained when secondary containment systems, such as berms, dikes, liners, vaults, or double-walled tanks, are installed. In an emergency, dikes can be used for controlling large spills or releases from liquid storage transfer areas.

Containment dikes are berms or retaining walls designed to hold spills. The dike surrounds the area and holds the spill, keeping spill materials separated from storm water. Containment dikes should be large enough to contain 100% of the volume of the largest container plus the amount of rainwater equal to a 25-year storm event. Diked areas used as secondary containment for vehicles containing liquid waste should be capable of holding an amount equal to the volume of the tank

truck compartment. The containment area design must include a means to remove uncontaminated storm water to maintain capacity and effectiveness.

Dike construction material should be impervious and strong enough to safely hold spilled materials. Dike materials consist of earth, concrete, synthetic materials, metal, or other impervious materials. Avoid using metal containers, concrete, and some plastics for dike materials if strong acids or bases will be stored outside. These dike materials could react with strong acids or bases if a spill occurs. More active organic chemicals may require special liners for dikes.

Curbing is common at many facilities in small areas where handling and transfer of liquid materials occur. Curbing is usually small scale and does not contain large spills like diking. Curbing can redirect contaminated storm water away from the storage area and can be used in areas where liquid materials are transferred from one container to another. Asphalt is a common material used for curbing; however, earth, concrete, synthetic materials, metal, or other impenetrable materials may also be used. Curbs should have manually controlled pump systems rather than common drainage systems to collect spilled materials. The curbed area should be inspected regularly to clear clogged debris and maintained frequently to prevent overflow of any spilled materials. Slope the liquid storage area, located inside the curb, to a drain. Install a dead-end holding tank in the drain for used oil or dangerous waste.

Construction Guidelines

All employees should receive training for properly handling outdoor material, liquid storage containers, and spill cleanup procedures. Employees should be familiar with the SPCC plan and have the tools and knowledge to immediately begin cleanup when a spill occurs. When dangerous waste, liquid chemicals, or other wastes are loaded or unloaded at the construction site, ensure properly trained employees are present.

Use engineering safeguards to reduce accidental releases of pollutants and prevent operator errors:

- Overflow protection devices on tank systems warn the operator to shut down transfer pumps when the tank reaches full capacity.
- Protective guards (bollards) around tanks and piping prevent vehicle or forklift damage.
- Clearly tag or label all containers, tanks, and valves.

Maintenance

Good maintenance practices are prevent storm water contamination from materials and liquids stored on site:

- Keep outdoor storage containers in good condition, check regularly for leaks, and ensure storage container lids are on tightly.
- Sweep paved storage areas monthly. Do not hose down areas contributing to storm drains.
- Store and maintain appropriate spill cleanup materials, such as brooms, dustpans, and vacuum sweepers, near the storage area.
- Schedule frequent waste collection to prevent overfilling storage containers.

Conduct the following inspections weekly or before storm events:

- Inspect for damage or cracks and repair or patch curbing as necessary.

- Check for accumulated rainfall in the secondary containment system (remove and discharge properly).
- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Check for leaks or spills when pumping liquids or gases from a truck or rail car to a storage facility or vice versa.
- Inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, tank walls, and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system. Correct problems or potential problems immediately.
- Inspect tanks, containers, and containment-holding tanks daily for leaks and spills. Replace leaking and/or deteriorating containers and collect all spilled liquids for proper disposal.
- Inspect tank systems and regularly test the tank's integrity to identify problem areas. Registered and specifically trained professional engineers can identify and correct potential problems such as loose fittings, poor welding, and improperly or poorly fitted gaskets on newly installed tank systems.
- During and after significant storms or spills, inspect dikes for washout or overflows.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *http://www.casqa.org/*

EPA (US Environmental Protection Agency). 2017. *General Construction Waste Management, Hazardous Waste Storage. https://www.epa.gov/hw/learn-basics-hazardous-waste*

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 78: Fertilizer Management

Description

Proper fertilizer application, storage, handling, and disposal prevent contamination of surface water and ground water and adverse impacts to aquatic life. Proper management also prevents increased algae growth in water bodies. Nitrogen and phosphorous are the fertilizer components of greatest concern to water quality (Figure 191).



Figure 191. Landscape fertilizing.

Applicability

Good fertilizer management applies to all locations in agricultural production or landscaping, including those maintained by municipalities, individual homeowners, businesses, commercial operations, or homeowner associations.

Limitations

Few limitations are associated with implementing proper fertilizer management practices. Some larger sites in agricultural production or areas with extensive landscaping may require employees trained specifically for managing these facilities. Other options include hiring agricultural or horticultural professionals to manage and maintain these facilities who know the proper use of fertilizers.

Fertilizer applied through an irrigation system (chemigation) has regulatory requirements including equipment inspection before use. For more information, visit the Idaho State Department of Agriculture (ISDA 2006) at *https://agri.idaho.gov/main/chemigation/*. These requirements are designed to protect the source of irrigation water, whether it is ground water, surface water, or a municipal water supply from contamination.

Design Basis

Within landscape areas, one of the best practices to reduce or eliminate the need for fertilizers is to use native and adapted vegetative species. These types of plants do not require additional fertilization because

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
●	Nitrogen
●	Phosphorus
○	Metals
○	Bacteria
○	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Low
Ease of Installation	N/A
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

they grow well in native soil without added fertilizers. Additionally, native and adapted plants require less water and irrigation, which reduces the potential for irrigation runoff water to transport chemicals off site.

For landscaping areas, agricultural fields, or residential gardens that do require replacing soil nutrients through fertilization, select the appropriate fertilizer type and apply it at the appropriate rate and time using the right method. Fertilizers should be selected based on the site's unique soil, plant, and climatic conditions to minimize the amount of nitrogen or phosphorous that is not used by plants and lost either through leaching or runoff.

Fertilizer Selection

Using the appropriate form of nitrogen fertilizer can reduce leaching to ground water sources. For example, nitrate forms of nitrogen fertilizer are readily available to plants but are subject to leaching losses. Nitrate forms should be used when plants are vigorously growing and can use the amount applied. Ammonium nitrogen fertilizers are not mobile because the ammonium form of nitrogen binds to soil particles and the plant roots have to reach the soil particle where the ammonium nitrogen is located. In warm and moist soil conditions, bacteria convert the ammonium nitrogen into the nitrate form, which takes a few days to a few weeks depending on the conditions. In addition, some types of ammonium nitrogen are subject to volatilization and significant losses may occur if not incorporated into the soil after application. Sources of organic nitrogen, such as compost or aged manure, are converted over time by soil microbes into forms available to plants, and are another fertilizer option to use.

Phosphorous fertilizers are less subject to leaching because most forms of phosphorus bind to the soil particles and do not move through the soil column. Surface water runoff that carries soil particles containing phosphorus into rivers or streams are a concern. To minimize phosphorous in surface runoff, use it only when needed as determined through soil testing and at the recommended rates.

Application Rate

Soils should be tested and evaluated for nutrient deficiencies every year to determine the amount of fertilizer needed for a particular location. In addition to soil characteristics, account for other sources that will contribute nitrogen and phosphorous to the soil. Sources of nitrogen include plants in the legume family, irrigation water, and organic matter. A portion of the soil organic matter is converted over time by soil microbes into forms of phosphorous and nitrogen that are available for the plant to use. It may take several years for the phosphorus and nitrogen contained in organic material to become *plant available*. For more information on fertilizer application see the *University of Idaho Extension* (2011).

Application Timing

The timing of fertilizer application is important. Fertilizers should ideally be applied during the time of year that is optimal for maximum vegetation uptake and growth. Generally, in the spring is best with small additional applications in certain areas throughout the growing season. When application practices allow the nitrate form to remain in the soil after the growing season, the nitrate can potentially leach into the ground water. Fertilizers should not be applied during high temperatures, windy conditions, or immediately before or during rainfall events.

Application Techniques

Use application techniques that increase efficiency and allow the lowest effective application rate. Fertilizer placement in the root zone enhances plant nutrient uptake and minimizes losses. Subsurface-applied or incorporated fertilizer should be used instead of surface application of fertilizer. Mechanically incorporate surface-applied fertilizers after application. Never apply fertilizers to frozen ground or near surface waters or storm water conveyance channels and limit use on slopes and areas with high runoff or overland flow.

Fertilizers should be applied according to the label instructions. Overapplying fertilizers can pollute surface water and ground water resources. Mix and load sprayers in an area with spill control in place.

Storage and Handling

Follow label directions for storing and mixing fertilizer and disposing of empty containers. Protect permanent fertilizer storage and mixing sites from spills, leaks, or storm water infiltration and locate them away from wellheads and surface water bodies.

Fertilizers should be stored in enclosed areas, in covered impervious containment (plastic sheeting or temporary roofs), or use a similarly effective means to prevent these chemicals from coming into contact with rainwater (BMP 77: Outdoor Storage and BMP 46: Spill Prevention and Control). MSDS should be readily accessible at all times.

Maintenance

Keep fertilizer application equipment properly calibrated according to the manufacturer's instructions and in good repair. For larger agriculture operations, recalibrate equipment periodically to compensate for wear in pumps, nozzles, and metering systems. Calibrate sprayers when new nozzles are installed.

Keep and review records to evaluate the effectiveness of pesticides used. Comply with all disposal requirements included on the registered fertilizer label.

Additional Resources

Colorado UDFCD (Colorado Urban Drainage and Flood Control District). 2010. *Urban Storm Drainage Criteria Manual, Volume 3 Best Management Practices*. Denver, CO. *http://udfcd.org/wp-content/uploads/2014/07/Title-Page.pdf*

EPA (US Environmental Protection Agency). 2001. *Source Water Protection Practices Bulletin: Managing Agricultural Fertilizer Application to Prevent Contamination of Drinking Water*. *http://nepis.epa.gov/Exe/ZyNET.exe/*

EPA (US Environmental Protection Agency). 2017. *Municipal Landscaping*. *https://archive.epa.gov/greenacres/web/html/index.html*

University of Idaho Extension. 2014. Idaho Master Gardener Program Handbook. 16th ed. Moscow, ID. *http://www.extension.uidaho.edu/mg/resources/handbook/MGHbook.pdf*

BMP 82: Equipment Yard Design Features

Description

Equipment yards storing vehicles and equipment can generate wastes, such as solvents, antifreeze, oils, and greases, from cleaning and maintenance activities or improperly maintained equipment. Properly designed equipment yards control storm water pollution by reducing or eliminating polluted runoff from contaminating storm water and preventing unnecessary run-on of storm water onto the site (Figure 195).

Spill prevention controls (BMP 46) and on-site personnel training (BMP 91) should also be implemented in equipment yards.



Figure 195. Equipment yard during construction of the Salmon River Road, Riggins, Idaho.

Applicability

These design features apply to all equipment yards, both temporary construction and permanent facilities, and wherever vehicles or equipment are stored, cleaned, maintained, or fueled.

Limitations

A large area may be required for structural equipment yard BMPs to accommodate proper grading, berming, or segregated service areas. If the equipment yard cannot be designed properly, consider storing equipment off site in a more suitable location.

Design Basis

Ideally, equipment storage, maintenance, and process areas should be covered and the area around it graded to drain away from the building or covered area.

- The roof cover option used at a given site is subject to the site layout, available space, affordability, and limitations imposed by other regulations. Examples of storage options include, but are not limited to, the following:

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

  - A prefabricated storage shed to enclose and cover materials (ensure these structures meet applicable building and fire codes).
  - A lean-to structure against an existing building to cover materials and prevent contact with rain.
  - A stand-alone canopy that provides cover but no walls.

If the equipment yard cannot be covered, the following recommendations minimize storm water run-on and runoff from the area:

- Grade the equipment yard to drain to a longitudinal drain or install curbs or berms to direct all storm water to a central collection point in the yard and then to the sanitary sewer according to applicable industrial pretreatment requirement and approval of the sewer authority.
- Consider paving the surface with concrete in areas where asphalt may react with spilled liquids (BMP 46: Spill Prevention and Control).
- Provide BMPs such as an oil and water separators (BMP 15) if there is the possibility for oil to be released. All sites should implement source controls (BMP 46).
- Segregate the area where vehicles are serviced and install special permanent controls:
  - Drain the area to a single collection point, preferably connected to a holding tank. Consult with a professional engineer for proper sizing of the holding tank for the required design storm. The drain may require an oil and water separators (BMP 15) or sand and grease trap and should be approved by local regulatory authorities.
  - Grade the activity area higher than the parking lot or surround the activity area with a berm, curb, or dike to prevent storm water run-on.
  - Construct a special area that segregates the *dirtiest* equipment (e.g., roof tar and asphalt paving equipment) from other equipment. Use berms, curbs, or dikes to keep discharges, leaks, and runoff separate from other activity areas.

Maintenance

- Regularly maintain oil and water separators and sand and grease traps.
- Periodically inspect equipment yard pavement, berming, and curbing for gaps or cracks, and repair immediately.

Additional Resources

CASQA California Stormwater Quality Association. 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *http://www.casqa.org/*

Washington State Department of Ecology. 2012. *Stormwater Management Manual for Western Washington*. Lacey, WA. Publ. 12-10-030. *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html*

BMP 83: Vehicle and Equipment Refueling

Description

BMPs for transferring fuel to vehicles, equipment, or storage tanks prevent storm water pollution from heavy metals, toxic materials, and oil and grease (Figure 196). Controlling the source of contaminants is particularly important because these contaminants are not easily removed by other storm water treatment controls. Source control can be provided through careful design of the initial fuel storage area, retrofitting existing installations, and using proper spill control and cleanup procedures.



Figure 196. Mobile fueling truck (ITD 2014).

Ideally, vehicles and equipment used on construction sites would use permanent, off-site refueling stations because these stations are usually better equipped to handle fuel spills according to local, state, and federal regulations. If off-site facilities cannot be used, properly designed fleet or equipment fueling areas can control storm water pollution by reducing or eliminating pollutants entering storm water.

Applicability

This BMP applies to both temporary fueling facilities for construction sites and permanent commercial or industrial fueling facilities. Construction sites often use either mobile refuelers or aboveground storage tanks with secondary containment. Mobile fueling, also known as fleet fueling, wet fueling, or wet hosing, is the practice of filling vehicle fuel tanks using tank trucks that are driven to the yards or sites where the vehicles to be fueled are located. BMP 77 provides more information on secondary containment and outdoor storage of liquid materials.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

○	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
●	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Easy
Freeze/Thaw Resistance	NA
Max. Tributary Drainage Area	NA
Max. Upstream Slope	NA
NRCS Soil Group	NA
Min. Ground Water Separation	NA
Min. Bedrock Separation	NA

Limitations

Retrofitting existing fueling areas to minimize storm water exposure or spill runoff is more difficult than using good design and initially installing fueling areas that incorporate storm water BMPs.

Maintenance is critical for proper functioning of oil and water separators.

Design Basis

Vehicle and Equipment Fueling Design Features

- Cover the fueling area to prevent rain from falling directly on the activity area. The cover's minimum dimensions should be equal to or greater than the area within the grade break or the fuel dispensing area to ensure adequate coverage.
- Equip the storm drain and sewer inlets that drain the fueling area with a shutoff valve to keep fuel out of the drain in the event of a fuel spill. Keep the valve closed at all times except during rain events where no contamination is present. Curtail fueling activities when the shutoff valve should be open, or use a large drip pan under the vehicle to capture any spilled fuel.
- Separate the fueling area from the rest of the facility, not only to contain any fuel spills, but also to prevent storm water run-on. Select from the following drainage design guidelines:
  - Grade the fueling area so it is either *mounded* or elevated. A mounded grading scheme is recommended.
  - Grade the entire fueling area to drain to a single collection point inlet. Design the grading to prevent run-on.
  - Install high berms around the area to redirect water from a large storm to a single collection point inlet.
  - Install a holding tank where accumulated liquids can be pumped.
  - Pave the fueling area with concrete rather than asphalt; asphalt can react with or absorb gasoline and other materials.
  - Apply a suitable sealant to protect the asphalt from spilled fuels in areas where covering the asphalt is not feasible and the fuel island is surrounded by pavement.
  - Install an oil and water separator (BMP 15) to collect spills if a dead-end holding tank is not used.
  - Install vapor recovery nozzles to control drips as well as air pollution.

Spill Management and Reporting

- Prepare an emergency response plan with designated personal available on site or on call to properly implement and manage spills (BMP 46).
- Keep appropriate absorbents on hand and convenient to fueling areas.
- Report uncontrolled spills to local agencies such as the local police department or fire department.
- Report significant spills into a water body to the National Response Center at (800) 424-8802.

Designated Fueling Area

For facilities with large amounts of mobile equipment that currently use a mobile fuel truck to fuel the equipment, consider establishing a designated fueling area. Except for tracked equipment, such as bulldozers or small forklifts, most vehicles can travel to a designated area with little lost time. Place temporary *caps*, such as a bentonite mat or a spill mat, over nearby catch basins or manhole covers to prevent spilled fluid from entering the storm drain. Upon fueling is completed, remove the mat and dispose as hazardous waste.

The following spill control measures (BMP 46) reduce spilling or reduce the loss of spilled fuels from the site:

- Discourage *topping off* vehicle fuel or underground storage tanks. Topping off tanks increases the risk of spilling fuel onto the ground.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Store and maintain appropriate spill cleanup materials in a location known to all employees near the fueling operation; ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Use absorbent materials on small spills. Remove the absorbent materials promptly and dispose as hazardous waste.
- Obey all federal and state requirements for both underground and aboveground storage tanks.
- Avoid mobile fueling of industrial equipment around the facility; transport the equipment to designated fueling areas.
- Train employees in proper fueling procedures.
- Do not leave fueling operations unattended.

Maintenance

- Using a qualified professional, periodically test aboveground and belowground tanks for integrity.
- Inspect and maintain holding tanks, oil and water separators, and on-site treatment or recycling units regularly.
- Inspect the holding tank regularly to ensure it is not overfilled.
- Test holding tank contents before discharge or disposal.
- Inspect and maintain berms, curbs, dikes, or slopes regularly.
- Regularly clean oil and water separators at the appropriate intervals.
- Keep ample supplies of spill cleanup materials on site.
- Inspect fueling areas and storage tanks regularly.
- Repair and patch berms as needed.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *http://www.casqa.org/*

EPA (US Environmental Protection Agency). 2012. *EPA Construction General Permit*. National Pollutant Discharge Elimination System Stormwater Program. *http://www.epa.gov/npdes/stormwater-discharges-construction-activities#overview*

EPA (US Environmental Protection Agency). 2020. *Municipal Vehicle Fueling*. *https://www.epa.gov/npdes/oil-and-gas-stormwater-permitting#undefined*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

King County (King County, Washington). 2009. *King County, Washington Surface Water Design Manual.* Seattle, WA: King County, Department of Natural Resources.

BMP 84: Vehicle and Equipment Cleaning, Maintenance, and Repair

Description

Proper vehicle and equipment cleaning, maintenance, and repair procedures prevent pollutants, heavy metals, and toxic materials from entering ground water and surface water supplies and creating public health and environmental risks (Figure 197). Wastes often generated by cleaning, maintenance, and repair activities include, but are not limited to the following:

- Solvents
- Antifreeze
- Brake fluids
- Batteries
- Motor oils
- Fuels
- Lubrication greases



Figure 197. Vehicle maintenance prevents pollution.

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
○	Phosphorus
◖	Metals
○	Bacteria
◖	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Applicability

This BMP applies in all locations where vehicle and equipment cleaning, maintenance, and repair take place with a focus on permanent facilities, such as auto repair shops, industrial facilities, fleet storage facilities, and residential homes. BMP 47: Construction Equipment Washing and Maintenance provides information on temporary facilities located on construction sites.

Limitations

Many common vehicle maintenance and washing routines contribute to environmental pollution. Businesses that are unable to comply with the following guidelines should have their vehicles washed at a commercial establishment or mobile washer that conforms to these specifications.

Vehicle and equipment cleaning, maintenance, and repair can generate significant pollutant concentrations and may require permitting,

monitoring, pretreatment, and inspections. Contact local wastewater treatment plant staff for additional information and the appropriate local authority to guarantee compliance with local standards.

Space and time limitations may preclude all work being conducted indoors.

Training is a key aspect of this BMP—ensure employees are trained to properly to prevent spills and leaks.

Design Basis

Vehicle and Equipment Cleaning

Washing vehicles and equipment outdoors or in areas where washwater flows onto the ground can pollute storm water and ground water due to the presence of diesel, gasoline, hydraulic fluid, or oil residues in the washwater. Facilities that wash or steam clean a large number of vehicles or equipment should consider contracting this work to a commercial business, which is generally better equipped to handle and dispose of washwater properly. Contracting out this work can also be economical because it eliminates the need for a separate washing/cleaning operation.

Steam cleaning and washing should be conducted on site only if the site is equipped to capture all the water and other wastes. If washing/cleaning must occur on site, wash vehicles in a designated area. Direct liquid to designated areas where it can be pretreated to remove pollutants before discharge to the sanitary sewer.

Disposal Site Options

Storm Drain—Discharges from vehicle and equipment cleaning, maintenance and repair activities should never be directed to storm drains. In areas designated for cleaning, maintenance, and repair activities, stencil “DO NOT DUMP WASTE” on the storm drain inlets.

Sanitary Sewer—Pump into sanitary system cleanout/sink or into an on-site private sanitary sewer manhole; verify with the facility manager that it is not a storm drain manhole. Solids separation will be required before disposal to prevent clogging the system.

Landscape or Soil Area—Discharge should be directed to an area sufficient to contain all the water. (Note: Be aware that soapy washwater may degrade habitat and adversely affect landscaping). The area should be used for minimum discharge flows only. Repetitive use of the same area or excessive wash volume to the same area may be illegal. Discuss discharge practices with property owner.

If disposal to the sanitary sewer and/or to a landscaped area is not possible, contract with a company capable of hauling the washwater off site to an authorized disposal site.

Designated Wash Areas

The designated wash areas must provide the following:

- Clearly labeled
- Paved with concrete
- Covered and contained to prevent contact with storm water
- Sloped for washwater collection
- Connected to the sanitary sewer or to a dead-end holding tank
- Equipped with an oil and water separator
- Allowable to rinse down the body of a vehicle with just cold water without implementing any BMPs

Several proprietary products are commercially available that enable runoff collection.

Some unavoidable evaporation may occur from paved surfaces. If a significant amount of washwater runoff evaporates at the site before it can be collected, and the site is routinely used for this purpose, the paved area itself should be cleaned every 6 months, or at the end of the wash service contract, whichever comes first. Any washwater used during this procedure should be collected and discharged to a sanitary sewer.

Cleaning and Degreasing Engines, Equipment, and Auto and Truck Drive Trains

It is likely that pollutants (petroleum products and metals) from engine-cleaning activities are concentrated in these washwaters, so the local wastewater treatment plant will require treatment before discharge into the sanitary sewer. Contact the local wastewater treatment plant for requirements and additional information.

If a sanitary sewer is not available or treatment of the washwater is not feasible, contact a company capable of hauling (i.e., tanker truck) the washwater off site to dispose at an authorized site.

Household Automobile Washing

- Wash your car directly over a vegetated or pervious area or ensure the washwater drains to a vegetated or pervious area, which allows the water and soap to soak into the ground instead of running off into a local water body.
- Ideally, no soap or detergent should be used, but if you do use one, select one without phosphates.
- Sweep driveways and street gutters before washing vehicles to cleanup dirt, leaves, trash, and other materials that may flow to the storm drain along with your washwater. This practice reduces storm drain maintenance costs and protects water quality.
- Use commercially available products that allow you to clean a vehicle without water. Developed for areas where water is scarce, these products save water and reduce pollution.
- Use a nozzle on the hose to save water.
- Do not wash your car if rain is expected.
- Consider not washing your car at home. Use a commercial car wash with a recycle system that discharges wastewater to the sanitary sewer for treatment.

Vehicle and Equipment Maintenance and Repair

Vehicle or equipment maintenance and repair is a potentially significant source of storm water pollution. Activities that can contaminate storm water include engine repair and service (e.g., parts cleaning, spilled fuel, and oil), fluid replacement, and outdoor equipment storage and parking (leaking engines). When performing maintenance and repair, the following practices should be addressed:

- Keep equipment and the equipment yard clean; ensure oil and grease accumulations do not build up excessively.
- Ensure incoming vehicles are checked for oil and fluid leaks.
- Use a properly sized drip pan underneath leaking vehicles and equipment when storing vehicles or performing maintenance. Drain pans (usually 1 x 1 foot) are generally too small to contain certain equipment fluids, such as antifreeze. Drip pans (3x 3 feet) may have to be purchased or fabricated when needed.
- Store idle equipment under cover.
- Inspect equipment for leaks on a regular basis, particularly vehicles parked or stored long term.
- Use an indoor garage or vehicle maintenance area designed to prevent storm water pollution. Avoid changing motor oil or performing equipment maintenance in inappropriate areas.
- Recycle greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic fluids, and transmission fluids. Collect and store these recyclable materials separately in secondary containment.
- Ensure oil filters are completely drained for at least 24 hours before recycling or disposing of them.
- Do not pour materials down storm drains or hose down work areas; sweep work areas instead.
- Use rags for small spills, a damp mop for general cleanup, and dry absorbent materials for larger spills. Avoid hosing down areas. Dry floor-cleaning methods may not be sufficient for some spills (BMP 46).
- Clean equipment yard storm drain inlets regularly and especially after large storms.
- Train employees in spill prevention and cleanup procedures.
- Store cracked batteries in a nonleaking secondary container, even if all the acid has drained out. If a battery is dropped, treat it as if it is cracked and store it in a containment area until you are sure it is not leaking.

Waste Reduction

- Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane, or methylene chloride. Dispose of these cleaners as hazardous waste.
- Clean without using liquid cleaning products (e.g., using a wire brush) whenever possible to reduce hazardous waste.
- Use liquid cleaners at a centralized station so the solvents and residues stay in one area.
- Locate properly sized drip pans, drip boards, and drying racks to direct drips back into a solvent tank or fluid-holding tank for reuse.

Safer Alternatives

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials:

- Use noncaustic detergents instead of caustic cleaning agents for parts cleaning (ask your supplier about alternative cleaning agents).
- Use phosphorus free cleaners whenever possible.
- Use detergent-based or water-based cleaning systems in place of organic solvent degreasers.
- Replace toxic solvents with nontoxic solvents.
- Choose recyclable cleaning agents.
- Reduce the number of solvents used to make recycling easier and lower hazardous waste management costs. Often, one solvent can perform a job as well as two solvents.

Interior Shop Area Cleaning

When possible, follow these shop area cleaning BMPs:

- Do not hose down the shop floor into streets or parking lots. Dry sweep regularly.
- Use nontoxic cleaning products. Baking soda paste works well on battery heads, cable clamps and chrome; mix the soda with a mild, biodegradable dishwashing soap to clean wheels and tires; for windows, mix white vinegar or lemon juice with water.
- To reduce or eliminate waste, fix sources of drips or leaks where possible. Routinely inspect the engine compartment, and regularly replace worn seals on equipment.
- To avoid or control spills and leaks:
  - Prepare and use easy to find spill containment and cleanup kits. Include safety equipment and cleanup materials appropriate to the type and quantity of materials that could spill.
  - Pour kitty litter, sawdust, or cornmeal on spills.
  - Change fluids carefully. Use a drip pan to avoid spills. Prevent fluid leaks from stored vehicles. Drain fluids such as unused gas, transmission and hydraulic oil, brake and radiator fluid from vehicles or parts kept in storage. Simple work practices reduce the chance of spills.
  - Use a funnel to pour liquids (like lubricants or motor oil) and place a tray underneath to catch spills. Place drip pans under the spouts of liquid storage containers. Clean up spills immediately.
  - See BMP 46: Spill Prevention and Control for more information.

Household Automobile Maintenance

- Recycle all oils, antifreeze, solvents, and batteries. Many local car parts dealers and gas stations accept used oil. A household hazardous waste facility in your area may accept oil, oil filters, antifreeze, and solvents. Some communities and counties hold household hazardous waste turn-in days that will accept car wastes including old batteries. Old batteries can be worth money, so call battery shops find out if they purchase used batteries.

- Never dump new or used automotive fluids or solvents on the ground, in a storm drain or street gutter, or in a water body. Eventually, the waste will make its way to local surface waters or ground water, including the water we drink.
- Do not mix wastes. The chlorinated solvents in some carburetor cleaners can contaminate a huge tank of used oil, rendering it unsuitable for recycling. Keep wastes in separate containers, label properly, and store them out of the weather.
- To dispose of a used oil filter, punch a hole in the top and let it drain for 24 hours. A large funnel in the top of the oil storage container comes in handy for draining. After draining the filter, wrap it in two layers of plastic and dispose of it in your regular garbage or recycle at a local household hazardous waste facility if one is available.
- Use care in draining and collecting antifreeze to prevent accidental spills. Spilled antifreeze can be deadly to cats and dogs that ingest it.
- Perform service activities on concrete or asphalt or over a plastic tarp to make spill cleanup easier. Keep a bag of kitty litter available to absorb spills. If a spill occurs, sprinkle a layer of absorbent on the spill, let it absorb for a while, and then sweep it up. Place the contaminated litter in a plastic bag, tie it up, and dispose in the regular garbage. Do not leave kitty litter in the rain as it is difficult to clean up.
- For outside autobody work, use a tarp to catch material from grinding, sanding, and painting. Double bag the waste in plastic and place it in the garbage.

Reporting

Report uncontrolled spills to the local police or fire departments. A significant spill into a water body should be reported to the National Response Center at (800) 424-8802.

Maintenance

- Inspections shall be conducted as required by the NPDES permit or contract specifications.
- BMPs should be inspected weekly, before rain events, daily during rain events, and after rain events.
- Inspect and maintain berms, curbs, dikes, or slopes regularly.
- Regularly clean oil and water separators at the appropriate intervals.
- Keep ample supplies of spill cleanup materials on-site.
- Inspect and maintain holding tanks, oil and water separators, and on-site treatment or recycling units regularly.

Additional Resources

CASQA (California Stormwater Quality Association). 2015. *California Stormwater Best Management Practices Handbook: Construction.* Menlo Park, CA. *http://www.casqa.org/*

EPA (US Environmental Protection Agency). 2012. *EPA Construction General Permit*. National Pollutant Discharge Elimination System Stormwater Program. *http://www.epa.gov/npdes/stormwater-discharges-construction-activities#overview*

EPA (US Environmental Protection Agency). 2017. *Municipal Vehicle and Equipment Maintenance*. *https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater-documents*

EPA (US Environmental Protection Agency). 2017. *Menu of BMPs: Municipal Vehicle and Equipment Washing*. *https://www3.epa.gov/npdes/pubs/sector_s_airtransmaint.pdf*

ITD (Idaho Transportation Department). 2014. *Best Management Practices.* Boise, ID: ITD.

BMP 85: Remote Access Roads and Rail Corridors

Description

Remote access roads, such as forest roads, active roads, incidental haul roads, inactive roads, and low-volume logging roads, as well as rail corridors can contribute to storm water pollution and added runoff due to increases in impervious area, contamination from materials used during construction, and more vehicular traffic. Properly designed and maintained storm water controls will minimize adverse effects from roads and rail corridors (Figure 198).



Figure 198. Remote access road with rolling drain dip (University of Idaho 2015).

Applicability

All linear projects such as access roads, rail corridors, streets, and utility projects within right of ways pose unique storm water management challenges and should follow the guidelines in this BMP.

Limitations

Certain site layout and use requirements, such as a narrow right of way, may prohibit implementing portions of this BMP.

Design Basis

- Follow design criteria for appropriate transportation corridor BMPs to remove storm water pollutants, control erosion, and promote infiltration.
- Maintain all BMPs used along roads and corridors according to the respective guidelines.

Access and Construction Guidelines

When available, existing roads and disturbed areas should be used before constructing new roads. For new roads, consider the following (Figure 199):

- The *right of way* is generally publicly owned land acquired for and devoted to

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☒ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

●	Sediment
◖	Phosphorus
◖	Metals
◖	Bacteria
●	Hydrocarbons
○	Litter

Other BMP Considerations

Relative Cost	$$
Maintenance Requirements	Medium
Ease of Installation	Medium
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

transportation purpose, under and adjacent to the highway. The right-of-way line marks the limit between the land secured for public use and adjacent private property.

- *Clearing limits* determine the removal all obstructing vegetation as designated on the ground or on the road construction drawings.
- *Roadway* or *construction limits* define the area of active construction.

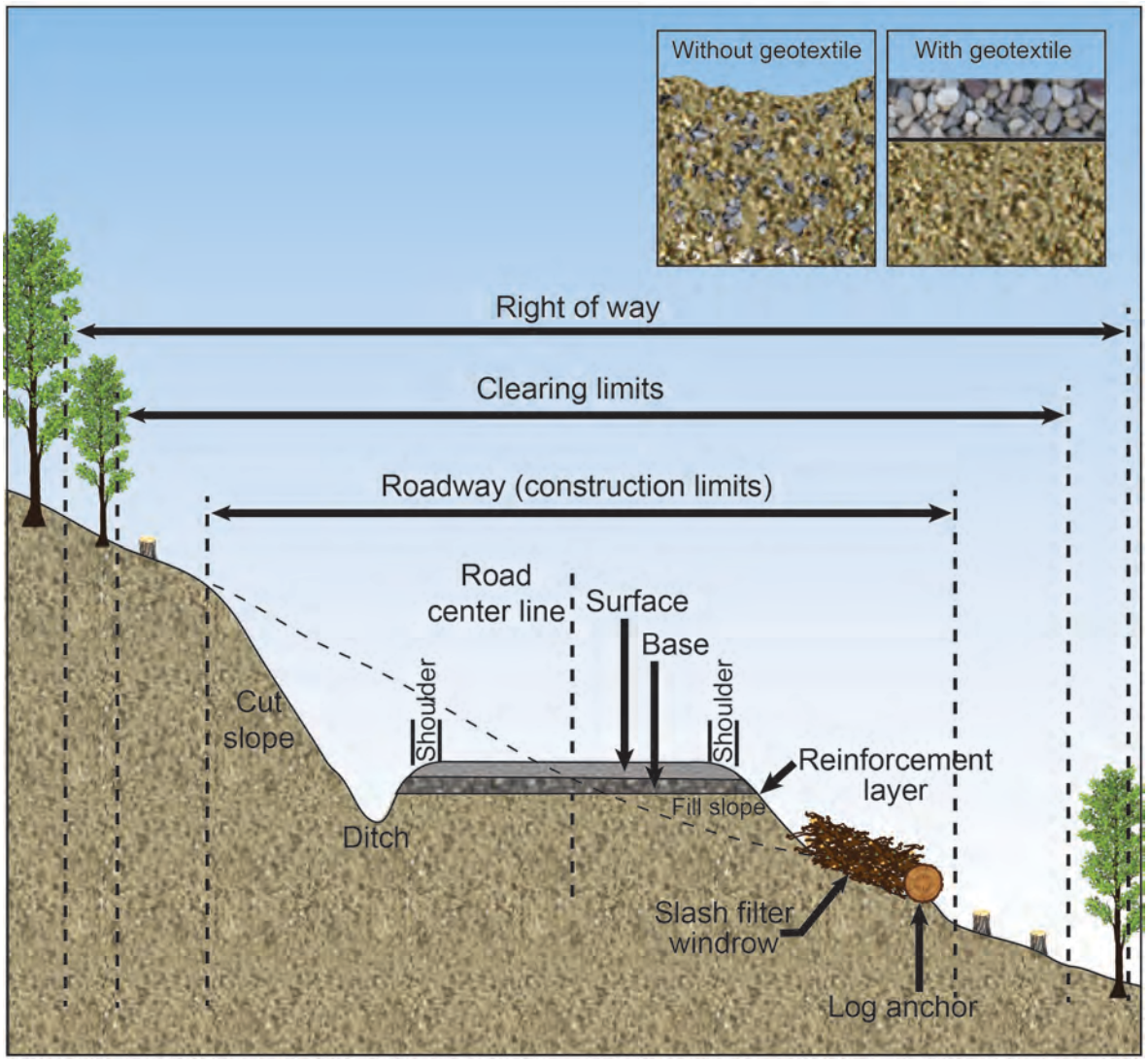


Figure 199. Typical cross section for new road construction (University of Idaho 2015).

General recommendations include the following:

- Grade roads high in the center, or crown, and slope outward to divert water to the sides of the road. Storm water should not be allowed to drain across the width of the road but carried in ditches or roadside culverts. An exception would be locations where the road must be superelevated around sharp turns.
- Some soils may produce road sections with a *soft bottom*, where the road surface does not compact properly. In these situations, rock surfacing may become buried in the subgrade and require reapplication. A variety of synthetic materials, called geotextiles (BMP 53), can be effective for separating rock and soil layers.

- Common forest road drainage techniques include rolling drain dips, cross ditches, relief culverts and roadside ditching. Each of these options is discussed in *Idaho Forestry Best Management Practices Manual* (University of Idaho 2015) at *http://www.uidaho.edu/extension/idahoforestrybmps*.
- Slash filter windrows, structures made out of waste logs and compacted slash, are placed along the roadside to prevent erosion. Combining slash filter windrows with other BMPs such as seeding (BMP 32) and mulching (BMP 52) provides the most effective method of reducing sediment delivery to streams.
- In less stable soils that tend to give way easily, gentle cut and fill slope angles above and below the driving surface will decrease erosion from these slopes.
- On more stable soils or solid rock, less material is likely to tumble down onto the road surface or give way below it, allowing for steeper cut slope angles.

Before road construction begins, determine the appropriate road profiles for each section of the road, as well as cut and fill slope angles.

Full-bench construction excavates the hill slope so that the entire road surface is cut into the hillside and no fill is deposited on the downhill side (Figure 200). Excavated material is hauled to stable disposal locations. The Idaho Forest Practices Act (IDAPA 20.02.01.040) requires "roads constructed on slopes greater than 60% in unstable or erodible soils shall be full benched without fill slope disposal. Fills must be kept to a minimum at stream and draw crossings. A variance is required if a full bench is not used."

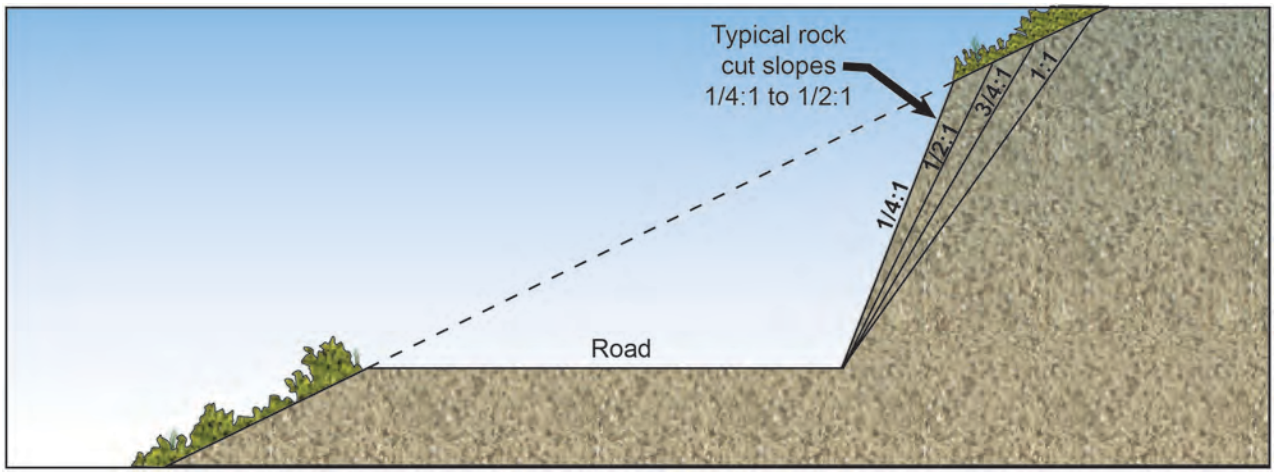


Figure 200. Full-bench construction (University of Idaho 2015).

Balanced cut and fill construction uses materials excavated on the uphill side of a road as compacted fill material on the downslope side (Figure 201). In Idaho, this is the most common road construction method where full-bench methods are not required. The road design should match the soil group, generally with more moderate slope angles for less stable soils.

If small dips or draws must be filled and/or small hills must be removed, balance the cuts and fills and keep material hauling a short a distance if possible. If material must be moved long distances from cut areas to fill locations, costs can increase rapidly.

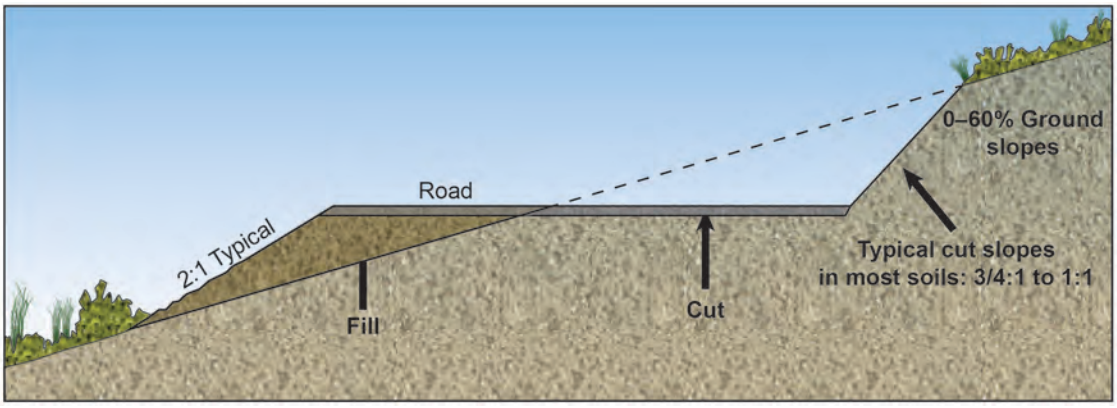


Figure 201. Balanced cut and fill construction (University of Idaho 2015).

Through-cut construction is used where the ground must be cut through to avoid an overly steep road grade, such as on the crest of a steep hill (Figure 202).

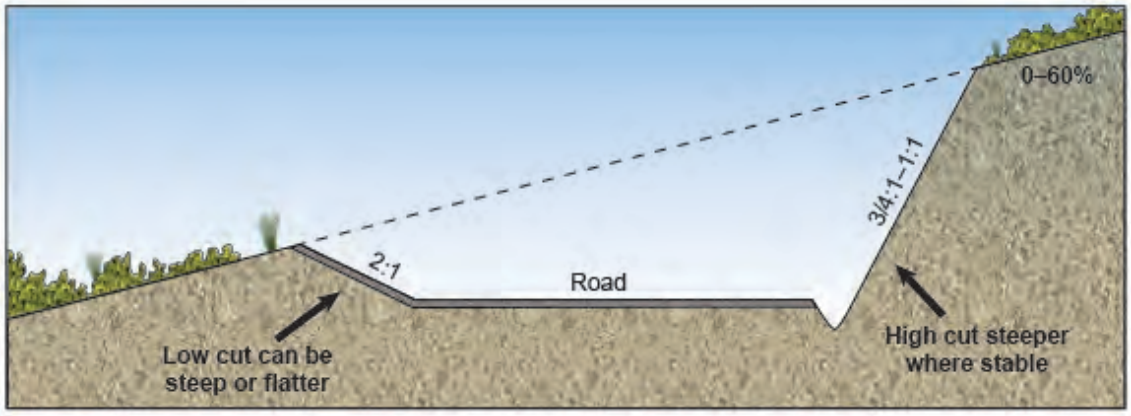


Figure 202. Through-cut construction (University of Idaho 2015).

Through-fill construction is the opposite of a through cut. It is a segment of road that is entirely composed of fill material, with fill slopes on both sides of the road. Through-fill construction is often used on flat terrain where water is likely to pond and to cross draws or wet or swampy ground (Figure 203).

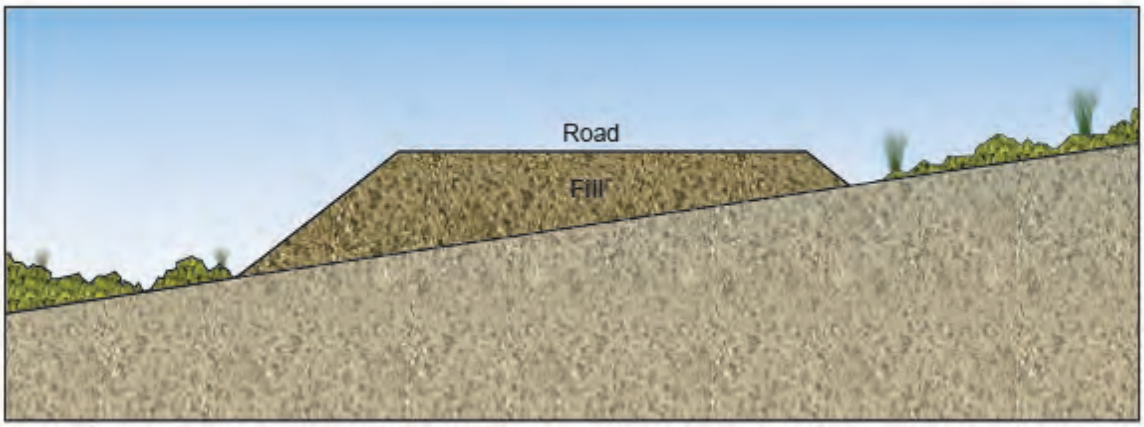


Figure 203. Through-fill construction (University of Idaho 2015).

Rail Corridor Guidelines

- Use less-toxic wood preservatives, such as ammoniacal copper zinc arsenate or copper naphthenate, instead of creosote and pentachlorophenol on railroad ties or use concrete or other nonwooden ties. While these preservatives are approved for railroad ties, they are not generally suggested for general public or residential use.
- Control spills and dust from railroad unloading (BMP 87). If the rail line delivers or picks up liquids in bulk or in containers, add spill-control loading docks with shutoff valves (BMPs 46 and 81). If parked railroad cars drip fluids, install a drip pan between the rails at the loading dock.

Maintenance

Inspect roadside BMPs according to their respective maintenance and inspection requirements.

Additional Resources

EPA (US Environmental Protection Agency). 2014. Chromated Copper Arsenate (CCA): *Consumer Safety Information Sheet: Inorganic Arsenical Pressure-Treated Wood*. *https://www.atsdr.cdc.gov/CCA-Treated_Wood_Factsheet.pdf* *http://www.beyondpesticides.org/assets/media/documents/infoservices/pesticidesandyou/spring%2003/cca%20factsheet.pdf*

Railway Tie Association. 2015. *Information, Education, Research & Development, Stewardship.* *http://www.rta.org/*

University of Idaho. 2015. *Idaho Forestry Best Management Practices*. Moscow, ID: College of Natural Resources. *http://www.uidaho.edu/extension/idahoforestrybmps/*

BMP 91: Employee Training

Description

Employee training ensures proper installation, maintenance, and subsequent operational success of storm water BMPs. In-house employee training programs are established to teach employees about storm water management, potential contaminant sources, and BMPs (Figure 209).

Programs should provide personnel with an understanding of SWPPP for municipal facilities or construction sites as appropriate. Cover BMP operation and maintenance, safety hazards, practices for preventing discharges, and procedures for responding quickly and properly to toxic and hazardous material incidents.



Figure 209. Employee meeting in Valley County, Idaho (*Midas Gold*).

Applicability

Employees directly involved in storm water activities or potentially polluting activities should receive general storm water and targeted BMP training tailored to their activities. Training should include municipal employees, construction personnel and supervisors, and commercial or industrial operators who oversee storm water BMPs. Education all staff, regardless of field responsibilities, about general storm water awareness and detection of illicit discharges.

Limitations

Common challenges an employee training program may encounter include the following:

- Lack of commitment from senior management
- Poor communication between all parties involved
- Lack of employee motivation
- Lack of incentive to become involved in BMP implementation

Primary BMP Functions and Controls

☒ Construction	☒ Permanent
☐ Erosion Control	☐ Sediment Control
☒ Source Control	☐ Flood Control
☐ Filtration	☐ Infiltration

Typical Effectiveness for Targeted Pollutants

- ◖ Sediment
- ◖ Phosphorus
- ◖ Metals
- ◖ Bacteria
- ◖ Hydrocarbons
- ◖ Litter

Other BMP Considerations

Relative Cost	$
Maintenance Requirements	Easy
Ease of Implementation	Easy
Freeze/Thaw Resistance	N/A
Max. Tributary Drainage Area	N/A
Max. Upstream Slope	N/A
NRCS Soil Group	N/A
Min. Ground Water Separation	N/A
Min. Bedrock Separation	N/A

Approaches and Best Management Practices

The following are specific criteria for implementing an employee training program:

- Ensure strong commitment and periodic input from senior management.
- Communicate frequently to ensure adequate understanding of the storm water management plan goals and objectives.
- Use experience from past spills to prevent future spills.
- Make employees aware of BMP monitoring and spill reporting procedures.
- Develop operating manuals and standard procedures.
- Continue education in an on-going, yearly process.

An employee training program should be an on-going, yearly process. Typically, training combines formal classroom-style programs held on an annual basis with more frequent weekly *tailgate* meetings held on site and covering general project updates and short BMP training sessions. Consider the following training suggestions:

- Integrate storm water training with existing training programs that are required for your business or municipality by other regulations such as the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120) and SPCC plan (40 CFR 112). Many commercial and industrial facilities have employee training programs that address health- and safety-related issues. Training on storm water management and BMPs can and should be incorporated into these programs.
- In Section 3.10.7, "Construction Disposal Alternatives," use Table 11 to train employees in proper and consistent methods for disposing of materials.
- Check employees' work practices periodically to ensure BMPs are properly implemented. Post informational and reminder signs in common work areas and stencil "DO NOT DUMP WASTE" messages on storm drains.
- Be aware that site owners are also responsible for customer activities. Ask customers to avoid discarding liquids into trashcans or liquids or solids into storm drains.
- Employ ongoing education through
  - Posters and bulletin boards
  - Employee meetings and training courses
  - Field training programs followed by a discussion of site-specific BMPs by trained personnel

Maintenance

After training, managers should periodically check the employees work to ensure that BMPs are being installed and maintained properly. Ensure facility SWPPP and BMP guidance documents are available to employees after training is completed.

Additional Resources

CASQA California Stormwater Quality Association. 2004. *California Stormwater Best Management Practices Handbook: New Development and Redevelopment*. Menlo Park, CA. *http://www.casqa.org/*

EPA (US Environmental Protection Agency). 1999. *Employee Training*. Stormwater Management Fact Sheet. *http://www3.epa.gov/npdes/pubs/empltrng.pdf*

EPA (US Environmental Protection Agency). 2015. *Municipal Employee Training and Education*. National Pollutant Discharge Elimination System (NPDES). *https://www.epa.gov/npdes/tmdl-npdes-permits-training-user-guides*

Appendix J: 401 Water Quality Certification

Idaho Department of Environmental Quality
Final Section 401 Water Quality Certification

May 22, 2024

Project Name: Stibnite Gold Project

Permit Number: NWW-2013-00321

Applicant/Authorized Agent: Laurel Sayer – Perpetua Resources Idaho, Inc.

Project Location: Midnight, Valley County, Idaho; 44.908650°, -115.328892°

Receiving Water Body: Numerous tributaries to the North Fork Payette River and East Fork of the South Fork Salmon River and adjacent wetlands

Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended; 33 U.S.C. Section 1341(a)(1); 40 C.F.R. 121; and Idaho Code §§ 39-101 et seq. and 39-3601 et seq., the Idaho Department of Environmental Quality (DEQ) has authority to review activities receiving federal permits and issue water quality certification decisions.

In accordance with federal regulations found at 40 C.F.R. § 121.4, all project proponents must submit a request for a prefiling meeting at least 30 days in advance of submitting a certification request. A prefiling meeting request was received by DEQ on 4/21/2023. To facilitate early engagement and project coordination, DEQ accepted an opportunity to host a prefiling meeting that was conducted on 5/17/2023, to seek clarification and to discuss the project and potential information needs.

Based upon review of the federal permit application, readily available water quality materials, and certification request in accordance with 40 C.F.R. §§ 121.5 (b) and (c), and 121.7(c), received on 5/26/2023, DEQ certifies that if the permittee complies with the terms and conditions imposed by the federal permit and the conditions set forth in this water quality certification, then it is reasonable for DEQ to conclude that the activity will comply with water quality requirements, including applicable requirements of the Clean Water Act §§ 301, 302, 303, 306, and 307, Idaho's "Water Quality Standards" (IDAPA 58.01.02), and other appropriate water quality requirements of state law.

Pursuant to Clean Water Act §§ 401 (a)(1),40 C.F.R. § 121.7 (d), and IDAPA 58.01.02.052.08, DEQ issued a 30-day public notice to solicit comments on the draft certification on 3/6/2024 through 4/5/2024. At the request of a public commenter, DEQ extended the comment period through 4/12/24. Public comments received during the comment period were considered by

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DEQ to inform the certification decision and conditions. Public comments and responses are provided in Appendix E.

This certification does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity. This certification does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations or permits.

1 Project Description

The Stibnite Gold Project (SGP) proposed by Perpetua Resources Idaho, Inc. (PRII) is a mining and reclamation operation near Yellow Pine in Valley County, Idaho. The operation footprint impacts federal, state, and private lands in both the North Fork Payette River and South Fork Salmon River subbasins. The Stibnite Mining District was first mined in the early 1900s and experienced intermittent mining activities through 1997. During that time, mining related facilities were constructed in the basin and ultimately abandoned. Various remediation and reclamation activities have taken place to remove structures and contaminated/hazardous material, but environmental concerns still exist in the basin resulting from previous mining activities. Many of the mining impacts for the proposed SGP will overlap with historic mining impacts already present in the Meadow Creek subbasin, although the proposal will also include new impacts from new and improved infrastructure, and active mining operations. All previous mining activities and remediation efforts predate PRII's ownership.

Under the proposed action plan, the project proponent would be spending the first 3 years constructing infrastructure and preparing for mining operations. PRII has also proposed remediating and restoring some areas unaffected by mining operations early in the project, including portions of Blowout Creek. Next, operational construction and mining activities would take place over an estimated 15 years, while mine closure and reclamation would take place during years 16 to 25. Activities proposed for Clean Water Act § 404 permitting and § 401 water quality certification under the action plan include the following:

- Transmission line construction and improvements
- Access road construction and improvements, including stream crossings
- Mining and backfill activities
- Dewatering and diversion activities
- Construction and maintenance of tailings storage
- Construction of tailing storage buttress
- Construction of Stibnite Gold Logistics facility
- Road maintenance facilities
- Worker housing facilities

Extensive groundwater and surface water monitoring will be required during construction and operation phases. Project activities will also include construction for restoration and

remediation efforts. Postclosure and reclamation will include environmental monitoring to demonstrate the efficacy of remediation at the site.[1]

Over the life of the project, dredge and fill activities for the SGP would impact an estimated combined 111,737 linear feet of streams in the North Fork Payette River and South Fork Salmon River subbasins. Additionally, the project would impact an estimated 150.44 acres of jurisdictional wetlands between the two subbasins. Mitigation and remediation projects are proposed to compensate for both permanent and temporary impacts to water bodies in the two subbasins. More details on project background and activities found in the *Stibnite Gold Project Supplemental Draft Environmental Impact Statement (SDEIS)* (USDA 2022).

2 Antidegradation Review

As part of its water quality standards program, Idaho has an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051). DEQ adopted regulations to implement the antidegradation policy (IDAPA 58.01.02.052).

Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier I review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).

Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).

Tier III Protection. The third level of protection applies to water bodies designated as outstanding resource waters and requires that activities do not lower water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ employs a water-body-by-water-body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved DEQ Integrated Report (DEQ 2022) and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

[1] Pursuant to DEQ's policy and interpretation of the scope of certification at 40 CFR 121.3, "DEQ's evaluation of project activities seeking certification of Clean Water Act § 404 permit authorization from the Army Corps of Engineers has been and will remain focused on the potential water quality impacts from the proposed project's activity and not the operation." *Scope Directive for 2023 Clean Water Act Section 401 Water Quality Certifications for Section 404 Permits* (DEQ 2024). DEQ's § 401 water quality certification will consider all activities proposed for Clean Water Act § 404 permitting.

2.1 Pollutants of Concern

The pollutants of concern for this project are sediment, temperature, pH, bacteria (*Escherichia coli*), nutrients (including ammonia, nitrates, nitrites, total phosphorus, and ortho-phosphate), antimony, arsenic, mercury, methylmercury, copper, cadmium, lead, zinc, and cyanide. As part of the § 401 water quality certification, DEQ requires the applicant to comply with various conditions to protect water quality and meet Idaho's water quality standards, including the water quality numeric and narrative criteria applicable to these pollutants.

2.2 Receiving Water Body Level of Protection

The proposed project impacts 33 assessment units (AUs) within the North Fork Payette River and South Fork Salmon River subbasins. Appendix A describes AU numbers and names, as well as designated beneficial uses, according to IDAPA 58.01.02 §§ 110 through 160, In addition to these uses, all waters of the United States are protected for agricultural and industrial water supply, wildlife habitat, and aesthetics (IDAPA 58.01.02.100).

Each water body will receive necessary protections for existing and designated beneficial uses. Appendix B offers water body protection levels provided for each use.

2.3 Protection and Maintenance of Existing Uses (Tier I Protection)

A Tier I review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses will be maintained and protected. The numeric and narrative criteria in the water quality standards are set at levels that ensure protection of existing and designated beneficial uses.

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. Once a TMDL is developed, discharges of causative pollutants will be consistent with the allocations in the TMDL (IDAPA 58.01.02.055.05). Before developing the TMDL, the water quality standards require applying the antidegradation policy and implementation provisions to maintain and protect uses (IDAPA 58.01.02.055.04).

The following seven EPA-approved TMDLs have been developed within the North Fork Payette River and South Fork Salmon River subbasins:

- *South Fork Salmon River Subbasin Assessment and attached TMDL* (DEQ 2002)
- *South Fork Salmon River Subbasin Temperature TMDL and Revised Sediment Targets: Addendum to the SF Salmon River Subbasin Assessment and TMDL* (DEQ 2012)
- *Cascade Reservoir Phase I Watershed Management Plan* (DEQ 1996)
- *Cascade Reservoir Phase II Watershed Management Plan* (DEQ 1998)

- *North Fork Payette River Subbasin Assessment and Total Maximum Daily Load* (DEQ 2005)
- *Cascade Reservoir Watershed Phase III Water Quality Management Plan and TMDL Five-Year Review* (DEQ 2009)
- *Cascade Reservoir Tributary TMDL Addendum* (DEQ 2011)

The TMDL goals aim to reduce sediment, temperature, and nutrients in the North Fork Payette River subbasin, and temperature and sediments in the South Fork Salmon River subbasin. Throughout the life of the project, the applicant will implement, install, maintain, monitor, and adaptively manage best management practices (BMPs) to reduce erosion and minimize turbidity levels in receiving water bodies downstream of the project. Permanent erosion and sediment controls will be implemented that will minimize or prevent future sediment contributions from the project area. The applicant proposed a package of Environmental Protection Measures (EPMs), made up of federal and state agency approved BMPs and proposed project plans (Appendix C), intended to reduce and minimize impacts to water quality during construction pertaining to dredge and fill activities. Additionally, the applicant is required to perform environmental reclamation, remediation, and restoration to the site once active mining is complete, which will be designed to align with TMDL goals. The applicant will meet with DEQ at least annually throughout the life of the project to discuss EPM effectiveness and adaptive management actions, and to discuss changes to TMDLs and/or state water quality standards relevant to the project. The conditions set forth in this certification are sufficient to ensure that as long as the applicant complies with these conditions, all project activities are consistent with TMDL implementation goals.

Throughout the life of the project, the applicant will monitor changes to water temperatures, as conditioned in this certification. Temperature data will be assessed by the permittee in relation to relevant TMDLs and Idaho's water quality standards. Adaptive modeling may be provided to assess temperature impacts from the project and conditions that are current and representative throughout the life of the project. A report will be provided to DEQ annually by March 31, as conditioned in this certification.

Throughout the life of the project, the applicant will monitor metals of concern, as conditioned in this certification. Metals data will be assessed by the permittee in relation to relevant TMDLs and Idaho's water quality standards. A report will be provided to DEQ annually by March 31, as conditioned in this certification.

Throughout the life of the project, the applicant will monitor cyanide according to the final Cyanidation Permit conditions. Cyanide data will be assessed by the permittee in relation to relevant TMDLs and Idaho's water quality standards. A report will be provided to DEQ annually by March 31, as conditioned in this certification.

The applicant will monitor sediment, temperature, pH, bacteria (*Escherichia coli*), and nutrients (including ammonia, nitrates, nitrites, total phosphorus, and ortho-phosphate) as proposed in the *Water Resources Monitoring Plan* (2021b) or the most recently updated and approved version, and according to this certification and other state- and federal-issued permits.

Monitoring data will be assessed by the permittee in relation to relevant TMDLs and Idaho's water quality standards. A report will be provided to DEQ annually by March 31, as conditioned in this certification.

If the project is conducted according to the provisions of the project plans, federal permit, and conditions of this certification, then it is reasonable for DEQ to conclude that the project will comply with the state's numeric and narrative water quality criteria. These criteria are set at levels that protect and maintain existing and designated beneficial uses.

There is no available information indicating the presence of any existing beneficial uses aside from those that are already designated and discussed in Appendix B. The conditions in the certification ensure that the level of water quality necessary to protect both existing and designated uses is maintained and protected in compliance with the Tier I provisions of IDAPA 58.01.02.051.01 and 58.01.02.052.07.

2.4 High-Quality Waters (Tier II Protection)

The project will impact 28 water bodies that are considered high quality for a combination of beneficial uses. Appendix B provides a list of water bodies and beneficial uses under Tier II protection. Water quality relevant to these uses must be maintained and protected, unless lowering water quality is necessary to accommodate important social or economic development.

To determine whether degradation will occur, DEQ must evaluate how the permit issuance will affect water quality for each pollutant that is relevant to aquatic life, salmonid spawning, and recreation uses of the receiving water bodies (IDAPA 58.01.02.052.06). These pollutants include the following: sediment, temperature, bacteria, nutrients (including ammonia, nitrates, nitrites, total phosphorus, and ortho-phosphate), antimony, arsenic, mercury, methylmercury, copper, cadmium, lead, zinc, and cyanide. Project implementation is expected to degrade water quality through the addition of excess thermal loading and the reduction of stream flows via groundwater drawdown, as described in the surface water and groundwater quantity section of the SDEIS. Throughout the life of the project, BMPs will be implemented through additional permitting to minimize degradation, while mitigation and remediation efforts are designed to reestablish beneficial uses during mining and postmining phases. F provides the socioeconomic justification for degradation. With the proposed environmental protection measures and socioeconomic justification, the project complies with IDAPA 58.01.02.051.02 and IDAPA 58.01.02.052.06.

To maintain the ambient water quality conditions for all other pollutants of concern, environmental protection measures, and permanent erosion and sediment controls must be implemented to minimize or prevent future sediment contributions from the project area. DEQ concludes that this project complies with the Tier II provisions of IDAPA 58.01.02.051.02, 58.01.02.052.06, and 58.01.02.052.08.

Other Source Controls

Required under DEQ's Tier II analysis and antidegradation implementation, other new and existing point source and nonpoint source controls within the East Fork of the South Fork Salmon River subbasin were reviewed. This included collaborative interagency review facilitated under the National Environmental Policy Act (NEPA). The North Fork Payette River subbasin was not included because there is no degradation to Tier II water bodies.

Through this review, DEQ identified the Yellow Pine Drinking Water Facility as the only existing point source in the subbasin. This facility may periodically discharge to Boulder Creek for operational maintenance, north of Yellow Pine, and does not have an active discharge permit.

Through this review, DEQ identified the Cinnabar Mine site as the only known nonpoint source in the subbasin. The site is located southeast of Yellow Pine, in the Cinnabar Creek drainage, upstream of the SGP impact area. Currently, the site does not have pollutant control measures in place and is considered an inactive abandoned mine.

DEQ will continue working with designated management entities to ensure the highest statutory and regulatory requirements, and cost-effective and reasonable BMPs will be implemented at the two identified sites. Neither site is expected to impact or be impacted by the SGP operation.

Any future nonpoint sources in the subbasin would be controlled according to IDAPA 58.01.02.350.

Through interagency collaboration and Tier II analysis, other source controls, existing or new to the subbasin, have been reviewed and the project complies with IDAPA 58.01.02.052.08.b.

3 Conditions Necessary to Ensure Compliance with Water Quality Standards or Other Appropriate Water Quality Requirements of State Law

The following conditions ensure the Stibnite Gold Project complies with Idaho's water quality standards and other appropriate water quality-related requirements of state law applicable to receiving water bodies. This certification will expire in conjunction with the federal permit expiration.

The following conditions apply generally throughout the project, except where additional conditions are specifically denoted to apply towards determined AUs and/or beneficial uses. Additional protective conditions include implementation of continuous temperature monitoring and additional metals monitoring in agreement with DEQ (Appendix D).

3.1 General Conditions

This certification is based on review of the federal permit application, readily available water quality-related materials, and certification request submitted by PRII on 5/26/2023, and is

conditioned upon the requirement that any modification (e.g., change in work windows) of the permitted activity will first be provided to DEQ for review to determine compliance with Idaho's water quality standards.

Because DEQ is certifying only the activity described in the certification request, this condition ensures that discharges under circumstances that differ from those described in the certification request will comply with 33 U.S.C. § 1341, 40 C.F.R. 121, and other applicable water quality requirements, including without limitation 33 U.S.C. § 1311(a), Idaho Code § 39-108, IDAPA 58.01.02.051, IDAPA 58.01.02.052, IDAPA 58.01.02.080, IDAPA 58.01.02.200, IDAPA 58.01.02.210, IDAPA 58.01.02.250, IDAPA 58.01.02.251, IDAPA 58.01.02.252, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. DEQ reserves the right to modify this certification in accordance with 40 C.F.R. § 121.10 if DEQ determines that, due to changes in relevant circumstances—including without limitation, changes in project activities, the characteristics of the receiving water bodies, or state water quality standards—there is no longer reasonable assurance of compliance with the water quality standards or other appropriate requirements of state law. Because DEQ is certifying only the activity described in the certification request based on information available at the time of certification, this condition ensures that discharges from activities not described in the certification request, or where there has been a change in the characteristics of or water quality standards applicable to the receiving water body, will comply with 33 U.S.C. § 1341, 40 C.F.R. 121, and other applicable water quality requirements, including without limitation 33 U.S.C. § 1311(a), Idaho Code § 39-108, IDAPA 58.01.02.051, IDAPA 58.01.02.052, IDAPA 58.01.02.080, IDAPA 58.01.02.200, IDAPA 58.01.02.210, IDAPA 58.01.02.250, IDAPA 58.01.02.251, IDAPA 58.01.02.252, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.
2. If ownership of the project changes, the certification holder will notify DEQ, in writing, upon transferring this ownership or responsibility for compliance with these conditions to another person or party. The new owner/operator will request, in writing, the transfer of this water quality certification to the new name.

   This condition ensures that, if ownership changes, DEQ has the minimum information to support ongoing compliance with 33 U.S.C. § 1341, 40 C.F.R. 121, this water quality certification, and other applicable water quality requirements, including without limitation Idaho Code § 39-108, IDAPA 58.01.02.080, and IDAPA 58.01.02.400.

3. A copy of this certification must be kept on the job site and readily available for review by any contractor working on the project and any federal, state, or local government personnel.

   This condition ensures all responsible parties, including on-site contractors, are aware of and comply with this water quality certification and other applicable water quality requirements, including without limitation Idaho Code § 39-108, IDAPA 58.01.02.080, and IDAPA 58.01.02.400.

4. The applicant is responsible for all work done by contractors and must ensure the contractors are informed of and follow all the conditions described in this certification and the federal permit.

   This condition ensures all responsible parties, including on-site contractors, comply with this water quality certification and applicable water quality requirements, including without limitation Idaho Code § 39-108, IDAPA 58.01.02.080, and IDAPA 58.01.02.400.

5. PRII must obtain all necessary federal, state, and local authorizations prior to commencement of any activity that could be expected to violate Idaho's water quality standards.

6. The applicant will obtain appropriate coverage from the Idaho Pollutant Discharge Elimination System (IPDES) program, which may include Industrial Permit, Multi-Sector General, and/or Construction General Permits.

   This condition ensures that work authorized under the federal permit complies with water quality requirements prohibiting unauthorized storm water discharges, including without limitation 33 U.S.C. § 1311(a), 33 U.S.C. § 1342(p), IDAPA 58.01.02.080, and IDAPA 58.01.02.400.

3.2 Special Conditions

1. The applicant will perform surface and groundwater monitoring according to all proposed project monitoring plans and other state and federal agencies. Monitoring will include all constituents of interest required by DEQ and partner agency-issued permits and is subject to modifications throughout the life of the project. Quality assurance and control measures for monitoring and data management will be implemented according to a quality assurance project plan (QAPP) developed in accordance with EPA guidance (*Guidance for Quality Assurance Project Plans*, EPA QA/G-5). DEQ will ensure that a QAPP exists. Compliance with the QAPP is a condition of this 401 certification; violations of the QAPP may result in enforcement actions by DEQ.
2. For the life of the project, the applicant will provide an annual report to DEQ summarizing activities performed under this certification over the previous year. The annual report will describe the project activities and mitigation/remediation performed, status and condition of the activities and mitigation/remediation performed, water quality problems encountered, actions taken to address water quality-related issues, and outcomes and expected outcome timelines for the activities and mitigation/remediation performed. The report will also summarize monitoring data performed over the year for the activities summarized in the annual report with direct comparisons to Idaho's water quality criteria and where exceedances occurred. The report will be due March 31st, and a meeting will be held within 2 months of receiving the report, at DEQ's discretion.

3. The applicant will host a meeting with DEQ and other cooperating state, federal, and tribal agencies every 3 years, for the life of the project, to discuss project progress and milestones. This meeting may include, but is not limited to, discussions on mitigation efforts and moneys spent, remediation efforts and plans, project changes, changes to monitoring plans, and to assess the continued reasonable assurance for compliance with water quality standards and/or other appropriate requirements of state law. DEQ reserves authority to require plans, corrective actions, and additional monitoring necessary to address and correct water quality-related issues and violations that may develop as a result of construction, maintenance, and other project activities.
4. PRII will implement continuous temperature monitoring at sampling locations described in Appendix D. Monitoring will be conducted by PRII, and monitoring data will be assessed with DEQ at least annually to ensure the appropriateness of proposed temperature mitigation measures. Quality assurance and control measures for monitoring and data management will be implemented according to a QAPP.
5. PRII will monitor metals at sampling locations, described in Appendix D, to characterize and compare to criteria described in IDAPA 58.01.02 for metals, in accordance with the QAPP, and in addition to the locations already proposed in all other project monitoring plans. PRII will compare monitoring results with applicable water quality criteria and submit results to DEQ for review at least annually.
6. DEQ reserves the authority under this certification to require additional plans, corrective actions, and monitoring, at any time, as needed to ensure nonpoint source activities associated with the project do not result in adverse water quality impacts. Water quality-related issues will be discussed during the annual meeting, when necessary.
7. For the life of the project, PRII will maintain an electronic public access point, and provide physical copies to the public, upon request, for reference documents listed in Appendix C.

3.3 Fill Material

The following conditions 3.3.1–3.3.6 are necessary to protect beneficial uses in accordance with Idaho's water quality standards, including without limitation: IDAPA 58.01.02.051, IDAPA 58.01.02.200, IDAPA 58.01.02.210, IDAPA 58.01.02.250, IDAPA 58.01.02.251, IDAPA 58.01.02.252, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. Fill material subject to suspension will be free of easily suspended fine material. Contaminated material may not be used as fill where it will be exposed to surface water. Only clean material may be placed as fill, including during reclamation activities. If dredged material is proposed for use as fill material and there is a possibility the material may be contaminated or highly concentrated with pollutants of concern, then the permittee must assess and characterize sediment to determine the suitability of dredge material for unconfined-aquatic placement as well as consistency with Idaho's water quality standards; determine the suitability of post dredge surfaces; and predict the effect on water quality during dredging. Sediment assessment and characterization following the procedures in the *Sediment Evaluation Framework for the Pacific Northwest* (RSET 2018) is one tool available for use in sediment assessment and

characterization. A different assessment and characterization methodology may be used. PRII must submit assessment and characterization plans for DEQ approval before initiating this work.

2. Historic tailings and contaminated soils will be separated from soils that are determined to be suitable under an approved assessment and characterization methodology and will be disposed of appropriately. If historic tailings and contaminated soils will be repurposed with the intent for reuse as fill, then the location and use for those soils must meet suitability conditions.
3. Capping materials used on haul roads will be clean and free of materials easily mobilized in storm water runoff.
4. Development rock subject to storm water runoff and identified as a potential source for construction materials will meet criteria outlined in Section 6.3 of the *Development Rock Management Plan* (PRII 2022a).
5. Temporary fills will be removed in their entirety on or before construction completion.
6. Excavated or staged fill material must be placed so it is isolated from the water's edge or wetlands and not placed where it could reenter waters of the United States.

3.4 Erosion and Sediment Control

The following conditions 3.4.1–3.4.18 protect beneficial uses in accordance with Idaho's water quality standards, including without limitation IDAPA 58.01.02.051, IDAPA 58.01.02.200, IDAPA 58.01.02.250, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. BMPs for sediment and erosion control suitable to prevent exceedances of Idaho's water quality standards and consistency with TMDL goals will be selected and installed before starting construction at the site. One resource to evaluate appropriate BMPs is the *Idaho Catalog of Storm Water Best Management Practices* (DEQ 2020). Other resources, including EPMs proposed by PRII, may also be used for selecting appropriate BMPs.
2. Permanent erosion and sediment control measures will be installed to provide long-term sediment and erosion control and prevent sediment from entering waters of the United States.
3. Permanent erosion and sediment control measures will be installed at the earliest practicable time consistent with good construction practices and will be maintained throughout the project.
4. Structural fill or bank protection will consist of materials that are placed and maintained to withstand predictable high flows in waters of the United States.
5. A BMP inspection and maintenance plan must be developed and implemented by the Applicant. The BMP inspection and maintenance plan is subject to review and modification by DEQ. At a minimum, BMPs must be inspected and maintained daily during project implementation and replaced or augmented if they are not effective.
6. All construction debris, scraps, particles, and other associated materials will be captured and properly disposed of so they cannot enter waters of the United States or cause water quality degradation.

7. Disturbed areas suitable for vegetation will be seeded or revegetated using clean soil and growth media, when necessary, to prevent subsequent soil erosion (EPA 2000).
8. Maximum fill slopes will be material that is structurally stable once placed and does not slough into the stream channel during construction, during periods before revegetation, or after vegetation is established.
9. Sediment from disturbed areas or sediment that can be tracked by vehicles onto pavement must not leave the site in amounts reasonably expected to enter waters of the United States. Placement of clean aggregate at all construction entrances or exits and other BMPs such as truck or wheel washes, if needed, must be used when earth-moving equipment leaves the site and travels on paved surfaces to prevent track-out.
10. Application water to roadways for dust suppression will be used only when necessary and will not result in erosion or runoff entering waters of the United States.
11. Storm water control and infiltration structures will utilize velocity dissipation devices to prevent erosion and minimize disturbance to existing vegetated areas.
12. During construction of new roads, drainage, erosion, and sediment controls will be implemented to minimize runoff to waters of the United States, consistent with the *Idaho Forestry Best Management Practices Field Guide* (UI 2015) and *Idaho Catalog of Storm Water Best Management Practices* (DEQ 2020).
13. Stockpiles will be managed and maintained to minimize erosion from storm water and wind. If erosion occurs, locations used for stockpiles will be adaptively managed to ensure future impacts are minimized.
14. Appropriate BMPs will be implemented for storm water flows, which become or are intended to be channelized. These channels will be inspected regularly to ensure erosion, incision, or scour do not occur because of failed BMPs.
15. PRII will implement BMPs to prevent acid rock drainage (ARD) from entering waters of the United States. The pH monitoring results will be assessed at least annually to determine changes from expected pH levels. If ARD is found to contribute to changes in pH, then BMPs will be adaptively managed to prevent further impacts.
16. Manage and maintain erosional features that have the potential for exposing material mined from open pits (i.e., development rock) throughout the life of the project.
17. If necessary, temporary erosion and sediment control structures and BMPs will be constructed, implemented, and maintained until permanent measures are functional.
18. All water diversions will be designed and sized to meet appropriate peak flow recurrence intervals, and contingency measures will be implemented to ensure that significant flow events, such as rain-on-snow events, do not result in erosion or uncontrolled runoff.

3.5 Turbidity

The following conditions 3.5.1–3.5.4 protect beneficial uses according to Idaho's water quality standards, including without limitation IDAPA 58.01.02.051, IDAPA 58.01.02.200.08, IDAPA 58.01.02.250.02.e, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. Sediment resulting from this activity must be mitigated to prevent violations of the turbidity standards stipulated in Idaho's water quality standards. Any violation of this standard must be reported to the DEQ regional office immediately.
2. Containment measures such as silt curtains, geotextile fabrics, and silt fences must be implemented and properly maintained to minimize instream sediment suspension and resulting turbidity. One resource to evaluate appropriate BMPs is the *Idaho Catalog of Storm Water Best Management Practices* (DEQ 2020). Other resources may also be used for selecting appropriate BMPs.
3. All practical BMPs on disturbed banks and within waters of the United States must be implemented to minimize turbidity. Visual observation is acceptable to determine whether BMPs are functioning properly. If a sediment plume is observed, the project may be causing an exceedance of water quality standards, and the permittee must inspect the condition of the project BMPs. If the BMPs appear to be functioning improperly, then corrective action must be taken, and the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).
4. If the project continues to have a visual sediment plume after BMPs have been inspected and modified, turbidity monitoring consistent with Table 1, is required.
    a. A properly and regularly calibrated turbidimeter is required for sample collection measurements that are analyzed in the field. The turbidimeter should be calibrated before each use or according to the manufacturer's recommendations. The calibration log should be maintained and made available to DEQ at least annually or upon request. Instantaneous grab samples may be collected for field analysis and taken to a laboratory for analysis as needed. When turbidity monitoring is required, a grab sample must be collected at an undisturbed area immediately upstream from the in-water disturbance or discharge to establish background turbidity levels. Background turbidity, latitude/longitude, date, and time must be recorded before monitoring downstream. A sample must be collected immediately downstream from the in-water disturbance or point of discharge and within the visible sediment plume. The turbidity, latitude/longitude, date, and time must be recorded for each sample. The downstream sample must be taken immediately following the upstream sample to obtain meaningful and representative results.
    b. Results from the downstream sampling location must be compared to the upstream sample location or background turbidity to determine whether project activities are causing an exceedance of Idaho's water quality standards. If the downstream turbidity is 50 nephelometric turbidity units (NTUs) or greater than the upstream turbidity, then the project is causing an exceedance of the water quality standards. Any exceedance of the turbidity standard must be reported to the appropriate DEQ regional office within 24 hours of the sample event.
    c. Earth-disturbing activities may continue once turbidity readings return to within 50 NTU over background instantaneously, or if turbidity has exceeded 25 NTU over background for more than 10 consecutive days, once turbidity readings have no longer exceeded 25 NTU over background for at least 24 consecutive hours.

d. Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The report must describe all exceedances and subsequent corrective actions taken, including the effectiveness of the action.

Table 1. Turbidimeter monitoring and sampling when a plume is observed.

Turbidity Above Background[a]	Monitoring/Sampling Frequency[a]	Additional Actions Required
0 to 24 NTU	Visual monitoring every 2 hours	None
25 to 49 NTU	Sample every 2 hours	STOP work after 8 hours in every 24-hour period
25 NTU for 10 or more consecutive days	Sample before and after following instructions[b]	STOP work and follow instructions[b]; notify DEQ regional office
50 NTU or more	Sample before and after following instructions[c]	STOP work and follow instructions[c]; notify DEQ regional office

a. Sample and report turbidity three times at each location. Use the maximum value of three samples to determine compliance following Table 1 directions.
b. Instructions: If BMPs appear to be functioning properly, then the permittee must modify the activity or implement corrective action such as installing additional BMPs (this may include modifying existing BMPs) until additional sampling indicates turbidity standards are met. Sampling can cease when a sediment plume is no longer observed. Work can commence when a sediment plume is no longer observed, and measurements are consecutively below 25 NTU.
c. Instructions: If BMPs appear to be functioning properly, then the permittee must modify the activity or implement corrective action such as installing additional BMPs (this may include modifying existing BMPs) until additional sampling indicates turbidity standards are met. Sampling can cease when a sediment plume is no longer observed. Work can commence when a sediment plume is no longer observed, and measurements are below 50 NTU.

3.6 In-Water Work

The following conditions 3.6.1–3.6.14 protect beneficial uses according to Idaho's water quality standards, including without limitation IDAPA 58.01.02.051, IDAPA 58.01.02.200, IDAPA 58.01.02.250, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. Work in open water must be kept to a minimum and only when necessary. Equipment must work from an upland site to minimize disturbance of waters of the United States. If this is not practicable, take appropriate measures to ensure disturbance to waters of the United States is minimized.
2. Construction affecting the bed or banks must occur only during periods of low flow and correspond with appropriate in-water work periods for aquatic life.
3. Fording stream channels is not permitted. Build temporary bridges or other structures if crossings are necessary.
4. Temporary crossings must be perpendicular to channels and located in areas with the least impact. The temporary crossings must be supplemented with clean gravel or treated with other mitigation methods at least as effective in reducing impacts. Temporary crossings must be removed as soon as possible after the project is completed or the crossing is no longer needed.
8. Heavy equipment working in wetlands must be placed on mats or suitably designed pads to prevent damage to the wetlands.
5. Work in waters of the United States is restricted to areas specified in the application.

9. Measures must be taken to prevent wet concrete from entering waters of the United States when placed in forms and/or from truck washing.
10. PRII will coordinate with the Idaho Department of Fish and Game on appropriate fish handling, salvage, and protection measures during dewatering activities.
6. In-water activities in spawning areas must be avoided to the maximum extent practicable during spawning and incubation periods.
7. Activities that construct and maintain intake structures must include adequate fish exclusion screening devices to prevent fish entrainment or capture.
8. Dewatering of a work area will be performed slowly to allow fish the opportunity to leave that area voluntarily, and measures will be taken to ensure fish are unable to return to that work area during dewatering activities.
9. Stranded fish found in dewatered segments should be moved to a location (preferably downstream) with water.
10. Baseflow reductions should be avoided and minimized to the greatest extent possible.
11. To minimize sediment transport, stream channel or streambank stabilization must be completed before returning water to a dewatered segment.
12. Stream diversions will be constructed, and erosion control measures implemented, prior to mine feature development at the site.
13. Diversions constructed with erodible materials will be armored or lined to prevent erosion and/or failure of the diversion structure.
14. Diversions must be constructed to provide capacity for predictable high flow events.

3.7 Vegetation Protection and Restoration

The following conditions 3.7.1–3.7.8 protect beneficial uses according to Idaho's water quality standards, including without limitation IDAPA 58.01.02.051, IDAPA 58.01.02.200, IDAPA 58.01.02.250, IDAPA 58.01.02.253, and IDAPA 58.01.02.400.

1. To the maximum extent practicable, staging areas and access points should be placed in open, upland areas.
2. Fencing and other protective barriers should be used to mark the construction areas.
3. Where possible, alternative equipment should be used (e.g., spider hoe or crane).
4. If authorized work results in unavoidable vegetative disturbance, native riparian and wetland vegetation must be successfully reestablished at the completion of authorized work to benefit water quality and meet thermal loading targets to meet numeric criteria where applicable for salmonid spawning and cold water aquatic life.
5. To the maximum extent practicable, vegetation providing shade to stream, and river channels will be preserved throughout the life of the project.
6. PRII will update the 2015 *Weed Management Plan* (Midas Gold 2015) according to the *Reclamation and Closure Plan* (PRII 2021a) before construction to address construction activities, new disturbances, introduction of new vehicles, reclamation activities, and other proposed construction and mining operations.
7. PRII will apply clean mulch to reclaimed slopes greater than 30% slope to stabilize and prevent erosion and promote revegetation efforts.

8. Reclamation performance standards discussed in the *Reclamation and Closure Plan* (PRII 2021a) will be summarized and reviewed with DEQ during the 3-year meetings.

3.8 Management of Hazardous or Deleterious Materials

The following conditions 3.8.1–3.8.10 protect beneficial uses according to Idaho's water quality standards, including without limitation IDAPA 58.01.02.051, IDAPA 58.01.02.080, IDAPA 58.01.02.200, IDAPA 58.01.02.400, IDAPA 58.01.02.800, and IDAPA 58.01.02.850.

1. Petroleum products and hazardous, toxic, and/or deleterious materials must not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of waters of the United States. Adequate measures and controls must ensure the materials will not enter waters of the United States because of high water, precipitation runoff, wind, storage facility failure, accidents, or unauthorized third-party activities.
2. Primary and secondary containment will be required where potentially hazardous materials, chemicals, and wastes would be subject to runoff and will be stored in a location that minimizes potential for entering waters of the United States.
3. Any construction materials and waste, landscaping materials and waste, sanitary materials and waste, will be contained and managed appropriately to minimize the potential for entering waters of the United States.
4. Emergency spill response procedures must be in place and include spill response kits (e.g., oil absorbent booms or other equipment). Spill response supplies at locations where spills have a greater risk of occurring will be deployed and maintained during the life of the project.
5. Vegetable-based hydraulic fluid should be used on equipment operating in or directly adjacent to the channel if this fluid is available.
6. Daily inspections of all fluid systems on equipment to be used in or near waters of the United States must ensure no leaks or potential leaks exist before equipment use. A logbook of daily equipment inspections must be kept on site and provided to DEQ upon request.
7. Equipment and machinery must be removed from within 100 feet of waters of the United States before refueling, repair, and/or maintenance.
8. Equipment and machinery must be steam cleaned of oils and grease in an upland location or staging area with appropriate wastewater controls and treatment capability before entering waters of the United States. Any wastewater or wash water must not enter waters of the United States.
9. If an unauthorized release of hazardous material occurs, the responsible persons in charge must:
    a. Make every reasonable effort to abate and stop a continuing spill.
    b. Make every reasonable effort to contain spilled material so it will not reach surface or ground waters of the United States.
    c. Call 911 if immediate assistance is required to control, contain, or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office during normal working hours or Idaho State Communications Center

after normal working hours (1-800-632-8000). If the spilled volume is above federal reportable quantities, contact the National Response Center (1-800-424-8802).

d. Contact Boise Regional Office: (208) 373-0550.

10. Collect, remove, and properly dispose of spill and cleanup materials in a manner approved by DEQ.

3.9 Culverts

The following conditions 3.9.1–3.9.7 control erosion, sediment, and turbidity to protect beneficial uses according to Idaho's water quality standards, including without limitation IDAPA 58.01.02.200 and IDAPA 58.01.02.250.

1. To prevent road surface and culvert bedding material from entering a stream, culvert crossings must include BMPs to retain road base and culvert bedding material. For perennial waters, the permittee should consider Idaho's "Stream Channel Alterations Rules" (IDAPA 37.03.07). Another source of BMPs for culvert installation are found in the "Rules Pertaining to the Idaho Forest Practices Act" (IDAPA 20.02.01). Examples of BMPs include, but are not limited to, parapets, wing walls, inlet and outlet rock armoring, compaction, suitable bedding material, antiseep barriers such as bentonite clay, or other acceptable roadway retention systems.
2. The culvert must not constrict the stream channel and must not be angled so the outflow is directed toward the streambank. The culvert's flow line must match the existing stream invert at its entrance and exit. Adequate grade control must be installed to prevent channel down cutting or excessive deposition from occurring.
3. Culverts must be installed so they do not impede fish passage for all species, observed or known to be present at some point during the year, in the stream where the culvert is constructed.
4. The culvert outflow must be armored with riprap to provide erosion control. This riprap will be clean, angular, dense rock that is free of fines and resistant to aquatic decomposition.
5. Culverts must be sized appropriately to maintain the natural drainage patterns and predictable high flows.
6. Culverts will be maintained regularly and inspected after significant storm events to ensure functionality. If maintenance requires disturbances to soils around the culvert, then appropriate BMPs must be applied to reduce and minimize sediment and erosion at the site.
7. Culverts and associated materials will be completely removed in decommissioned stream crossings, and the site will be restored to its most feasible natural state.

3.10 Treated Wood

The following condition meets Idaho 's water quality standards, including without limitation IDAPA 58.01.02.200 and IDAPA 58.01.02.210.

1. Treated wood will not be used for structures in contact with, directly over, or immediately adjacent to waters of the United States.
2. The *Guidance for the Use of Wood Preservatives and Preserved Wood Products In or Around Aquatic Environments* (DEQ 2008) must be considered when using treated wood materials in the aquatic environment. The DEQ guidance references the *Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments (*Western Wood Preservers Institute et al. 2011). This BMP document provides recommended guidelines for producing and installing treated wood products for use in sensitive environments.

These conditions ensure that toxic chemicals are not introduced into waters of the United States.

3.11 Dredge Material Management

Upland disposal of dredged material must include prevention of the material from reentering waters of the United States.

This condition ensures that no unauthorized discharge occurs from upland disposal sites according to 33 U.S.C. § 1311(a) and Idaho's water quality requirements, including without limitation Idaho Code § 39-108, IDAPA 58.01.02.080, and IDAPA 58.01.02.400

3.12 Pollutants/Toxins

In conformance with IDAPA 58.01.02.200, the use of chemicals such as sterilants, growth inhibitors, fertilizers, and deicing salts during construction should be limited to the best estimate of optimum application rates. All reasonable measures must be taken to avoid excess application and introduction of chemicals into waters of the United States.

4 Required Notification

The permittee must notify the Boise Regional Office when authorized work begins and if the applicant or organization is transferred or changes.

5 Right to Appeal Final Certification

The final § 401 Water Quality Certification may be appealed by submitting a petition to initiate a contested case, pursuant to Idaho Code § 39-107(5) and the "Rules of Administrative Procedure before the Board of Environmental Quality" (IDAPA 58.01.23), within 35-days of the date of the final certification.

Questions or comments regarding the actions taken in this certification should be directed to the Boise Regional Office at (208) 373-0550.



Aaron Scheff
Regional Administrator
Boise Regional Office

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Appendix A. SGP Impacted Assessment Units Existing and Designated Beneficial Uses

Water Body Name	Assessment Unit	CWAL	SS	PCR	SCR
North Fork Payette River - 1st and 2nd order	ID17050123SW001_02	X	X	X	
North Fork Payette River – Cascade to Smiths Ferry	ID17050123SW001_06	X	X	X	
Big Creek - 1st and 2nd order	ID17050123SW004_02	X	X	X	
Big Creek - upper 3rd order (Snag Creek to Horsethief Creek)	ID17050123SW004_03	X	X		X
Beaver Creek - 1st and 2nd order	ID17050123SW006_02	X			
West Mountain tributaries to Cascade Reservoir	ID17050123SW007_02	X	X	X	
Cascade Reservoir	ID17050123SW007L_0L	X	X	X	
Boulder/Willow Creek - 1st and 2nd order irrigated sections	ID17050123SW011_02	X	X		X
Boulder Creek - 3rd order (Louie Creek to mouth)	ID17050123SW011_03	X	X		X
Lake Fork - Little Payette Lake to Cascade Reservoir	ID17050123SW012_03	X	X	X	
SF Salmon River - 4th order (Curtis Cr. to Buckhorn Cr.)	ID17060208SL010_04	X	X	X	
Trail Creek & Curtis Creek - 1st and 2nd order	ID17060208SL017_02	X	X		
Curtis Creek - 3rd order (Trail Creek to SF Salmon River)	ID17060208SL017_03	X	X	X	
All 1st and 2nd order streams in Warm Lake Creek drainage	ID17060208SL019_02	X	X	X	
Warm Lake and Cabin Creeks - 3rd order	ID17060208SL019_03	X	X		X
East Fork of the South Fork Salmon River - 1st and 2nd order	ID17060208SL023_02	X	X	X	
East Fork of the South Fork Salmon River - 1st and 2nd order	ID17060208SL023_02a	X	X	X	
East Fork of the South Fork of the Salmon River - 3rd order	ID17060208SL023_03	X	X	X	
East Fork South Fork Salmon River - 4th order section	ID17060208SL023_04	X	X	X	
Upper Johnson Creek and tributaries - 1st and 2nd order	ID17060208SL025_02	X	X	X	
Lower Johnson Creek - 1st and 2nd order tributaries	ID17060208SL025_02a	X	X	X	
Johnson Creek - 3rd order	ID17060208SL025_03	X	X	X	
Johnson Creek - 4th order	ID17060208SL025_04	X	X	X	
Burntlog Creek and tributaries - 1st and 2nd order	ID17060208SL026_02	X	X	X	
Burntlog Creek and tributaries - 3rd order	ID17060208SL026_03	X	X	X	
Trapper Creek & tributaries - 1st and 2nd order	ID17060208SL027_02	X	X	X	
Trapper Creek - 3rd order	ID17060208SL027_03	X	X	X	
Riordan and NF Riordan Creeks - 1st and 2nd order	ID17060208SL028_02	X	X	X	
Riordan Creek - 3rd order (North Fork to mouth)	ID17060208SL028_03	X	X	X	
Sugar Creek & tributaries - 1st and 2nd order	ID17060208SL029_02	X	X	X	

Water Body Name	Assessment Unit	CWAL	SS	PCR	SCR
Sugar Creek - 3rd order (Cane Creek to mouth)	ID17060208SL029_03	X	X	X	
Tamarack Creek - 3rd order (Bum Cr. to SF Salmon River)	ID17060208SL030_03	X	X	X	
Profile Creek - 3rd order (Missouri Cr. to SF Salmon River)	ID17060208SL031_03	X	X	X	
CWAL – Cold Water Aquatic Life; SS – Salmonid Spawning; PCR – Primary Contact Recreation; SCR – Secondary Contact Recreation					

Appendix B. Water Body Levels of Protection for the SGP Impacted Assessment Units

Water Body Name	Assessment Unit	Beneficial Use	Tier I	Tier II
North Fork Payette River - 1st and 2nd order	ID17050123SW001_02	CWAL	X	X
		SS	X	X
		PCR	X	X
North Fork Payette River – Cascade to Smiths Ferry	ID17050123SW001_06	CWAL	X	
		PCR	X	X
		SS	X	
Big Creek - 1st and 2nd order	ID17050123SW004_02	PCR	X	X
		CWAL	X	X
		SS	X	X
Big Creek - upper 3rd order (Snag Creek to Horsethief Creek)	ID17050123SW004_03	SCR	X	X
		SS	X	X
		CWAL	X	X
Beaver Creek - 1st and 2nd order	ID17050123SW006_02	CWAL	X	
West Mountain tributaries to Cascade Reservoir	ID17050123SW007_02	CWAL	X	
		PCR	X	
		SS	X	
Cascade Reservoir	ID17050123SW007L_0L	CWAL	X	
		PCR	X	X
		SS	X	
Boulder/Willow Creek - 1st and 2nd order irrigated sections	ID17050123SW011_02	CWAL	X	
		SCR	X	X
		SS	X	
Boulder Creek - 3rd order (Louie Creek to mouth)	ID17050123SW011_03	CWAL	X	
		SCR	X	X
		SS	X	
Lake Fork - Little Payette Lake to Cascade Reservoir	ID17050123SW012_03	CWAL	X	
		PCR	X	X
		SS	X	
SF Salmon River - 4th order (Curtis Cr. to Buckhorn Cr.)	ID17060208SL010_04	CWAL	X	
		SS	X	
		PCR	X	X
Trail Creek & Curtis Creek - 1st and 2nd order	ID17060208SL017_02	SS	X	
		CWAL	X	
Curtis Creek - 3rd order (Trail Creek to SF Salmon River)	ID17060208SL017_03	PCR	X	X
		SS	X	X
		CWAL	X	X
	ID17060208SL019_02	CWAL	X	

Water Body Name	Assessment Unit	Beneficial Use	Tier I	Tier II
All 1st and 2nd order streams in Warm Lake Creek drainage		PCR	X	X
		SS	X	
Warm Lake and Cabin Creeks - 3rd order	ID17060208SL019_03	CWAL	X	
		SS	X	
		SCR	X	X
East Fork of the South Fork Salmon River - 1st and 2nd order	ID17060208SL023_02	CWAL	X	
		SS	X	
		PCR	X	X
East Fork of the South Fork Salmon River - 1st and 2nd order	ID17060208SL023_02a	PCR	X	X
		CWAL	X	X
		SS	X	X
East Fork of the South Fork of the Salmon River - 3rd order	ID17060208SL023_03	CWAL	X	
		SS	X	
		PCR	X	
East Fork South Fork Salmon River - 4th order section	ID17060208SL023_04	CWAL	X	
		SS	X	
		PCR	X	
Upper Johnson Creek and tributaries - 1st and 2nd order	ID17060208SL025_02	CWAL	X	X
		SS	X	
		PCR	X	X
Lower Johnson Creek - 1st and 2nd order tributaries	ID17060208SL025_02a	SS	X	X
		CWAL	X	X
		PCR	X	X
Johnson Creek - 3rd order	ID17060208SL025_03	PCR	X	X
		CWAL	X	X
		SS	X	X
Johnson Creek - 4th order	ID17060208SL025_04	SS	X	
		CWAL	X	
		PCR	X	X
Burntlog Creek and tributaries - 1st and 2nd order	ID17060208SL026_02	CWAL	X	X
		PCR	X	X
		SS	X	X
Burntlog Creek and tributaries - 3rd order	ID17060208SL026_03	CWAL	X	X
		PCR	X	X
		SS	X	X
Trapper Creek & tributaries - 1st and 2nd order	ID17060208SL027_02	SS	X	X
		CWAL	X	X
		PCR	X	X
Trapper Creek - 3rd order	ID17060208SL027_03	PCR	X	X
		SS	X	X

Water Body Name	Assessment Unit	Beneficial Use	Tier I	Tier II
		CWAL	X	X
Riordan and NF Riordan Creeks - 1st and 2nd order	ID17060208SL028_02	PCR	X	X
		SS	X	X
		CWAL	X	X
Riordan Creek - 3rd order (North Fork to mouth)	ID17060208SL028_03	PCR	X	X
		SS	X	X
		CWAL	X	X
Sugar Creek & tributaries - 1st and 2nd order	ID17060208SL029_02	CWAL	X	X
		SS	X	X
		PCR	X	X
Sugar Creek - 3rd order (Cane Creek to mouth)	ID17060208SL029_03	SS	X	X
		CWAL	X	X
		PCR	X	
Tamarack Creek - 3rd order (Bum Cr. to SF Salmon River)	ID17060208SL030_03	CWAL	X	X
		SS	X	X
		PCR	X	X
Profile Creek - 3rd order (Missouri Cr. to SF Salmon River)	ID17060208SL031_03	PCR	X	X
		CWAL	X	X
		SS	X	X
CWAL – Cold Water Aquatic Life; SS – Salmonid Spawning; PCR – Primary Contact Recreation; SCR – Secondary Contact Recreation				

Appendix C. Reference Documents for Public Records

Document Name	Document Owner	Most Recent Version
Compensatory Mitigation Plan for Streams and Wetlands	Perpetua Resources	2023
Development Rock Management Plan	Perpetua Resources	2022
Environmental Monitoring and Management Program: Environmental Legacy Management Plan	Perpetua Resources	2021
Environmental Monitoring and Management Program: Transportation Management Plan	Perpetua Resources	2022
Environmental Protection Plan	Perpetua Resources	2023
Fisheries and Aquatic Resources Mitigation Plan	Perpetua Resources	2021
Reclamation and Closure Plan	Perpetua Resources	2021
Stibnite Gold Project Supplemental Environmental Impact Statement	US Forest Service	2021
Stibnite Gold Project Water Management Plan	Perpetua Resources	2021
Water Resources Monitoring Plan	Perpetua Resources	2021

Appendix D. Temperature and Metals Monitoring Locations

Monitoring Site ID	Water Body Name	Assessment Unit	Continuous Temperature[a]	Metals, Dissolved[b]
SW-1	West End Creek	ID17060208SL029_02	X	X
SW-4	EFSFSR	ID17060208SL023_03		X
SW-6	West End Creek	ID17060208SL029_02	X	
SW-8	Sugar Creek	ID17060208SL029_03		X
SW-9	EFSFSR	ID17060208SL023_04	X	X
SW-13	EFSFSR	ID17060208SL023_03	X	
SW-14	EFSFSR	ID17060208SL023_03	X	
SW-29	EFSFSR	ID17060208SL023_02	X	
SW-39	EFSFSR	ID17060208SL023_03	X	

EFSFSR – East Fork South Fork Salmon River

a. Perpetua Resources Idaho, Inc. and DEQ will enter into an agreement to implement an appropriate Continuous Temperature Monitoring Plan.

b. Metals will be monitored in addition to proposed monitoring in the *Water Resources Monitoring Plan* (PRII 2021) (or any subsequent Water Resources Monitoring Plan approved by USFS). Metals monitoring will include arsenic, mercury, antimony, methylmercury, copper, cadmium, lead, and zinc.

Appendix E. DEQ's Response to Comments for Perpetua Resources Idaho, Inc. Stibnite Mine Section 401 Certification

1	Salmon River Brewery
2	Salmon Raft & Idaho Steelhead Guides
3	Amy Cooper (citizen)
4	Nez Perce Tribe
5	Collaborative NGO's (Idaho Rivers United, Save the South Fork Salmon, Idaho Conservation League, Earthworks)
6	Debbie & Rick Fereday (citizens)
7	Perpetua Resources, II

Comment Number	Section Title	Commenter	Comment Summary	Response
1	General comments	1, 2, 3, 6	Comment summary: This project will have water quality impacts that will harm the environment and affect us economically because our business is based on tourism and outdoor recreation. There is no guarantee that accidents such as spills, will not occur, and the risks of this certification outweigh the reward.	Thank you for your comments. All permitted activities in our state must comply with regulations in accordance with IDAPA 58.01.02. Numeric and narrative criteria in Idaho's water quality standards are set at levels that ensure protection of existing and designated beneficial uses. Therefore, standards are placed on the discharge of pollutants and on human activities which may adversely affect public health and water quality. Activities proposed for this project have been assessed and conditioned subject to Clean Water Act §§ 404 and 401, which only includes the discharge of dredged or fill material in waters of the United States. Conditions in the certification have been developed to ensure that discharges associated with the project's dredge and fill activities prevent degradation of water quality. If the permittee complies the terms and conditions imposed by the federal permit and the conditions set forth in the § 401 water quality certification, then it is reasonable for DEQ to conclude that project activities will comply with all water quality requirements, including applicable requirements of the Clean Water Act §§ 301, 302, 303, 306, and 307, Idaho's water quality standards (IDAPA 58.01.02), and any and all other applicable appropriate water quality requirements of state law. In addition to the § 401 water quality certification, various additional federal, state, and local agency permits are required for this project to regulate the discharge of pollutants into waters of the United States and to ensure that Idaho's water quality standards are maintained and protected.
2	General comment	1	"Historically many projects like this go bankrupt, leaving behind a mess for the local community to deal with…"	Additional remediation rules and financial assurance requirements have been implemented by the State of Idaho to ensure funds are readily available if any unanticipated environmental violation occurs. In addition, PRII is required to have a remediation fund for cleanup and improvements after the mine is closed, even if they were to go bankrupt, those funds remain.

Comment Number	Section Title	Commenter	Comment Summary	Response
3	General comments	3, 6	Idaho state statute and regulations both require that any activity that proposes to significantly degrade "High Quality Waters" (Tier II water bodies) must prove that such degradation is necessary to accommodate important economic or social development in the area in which the waters are located.	Under IDAPA 58.01.02.052.08, a Tier II Analysis is required only when activities or discharges, subject to a permit or license, will cause degradation. However, DEQ may allow significant degradation, only if it is determined to be necessary to accommodate important economic or social development in the area in which the waters are located. Perpetua Resources, II (PRII) has provided an analysis of alternatives aimed at selecting the most appropriate approaches that can be reasonably implemented to avoid and minimize the degradation of water quality. Please refer to the Alternatives Analysis and Socioeconomic Justification (AASJ) for the socioeconomic justification of degradation in 16 waterbodies. The 401 certification and the AASJ, provided by the applicant, evaluates degradation only for activities associated with the dredge and fill permit. Additional activities related to the project may occur and will require additional federal, state, and local agency permits. During the NEPA analysis conducted by the United States Forest Service (USFS), the placement of roads and power structures for the Clean Water Act § 404 permit proposed in the project area are identified as the least degrading alternative, thereby having the least impact. Under IDAPA, the applicant has properly conducted the Tier II Analysis. In support of the NEPA process and in cooperation with USFS through the development of the Social and Economic Conditions Specialist Report (USFS 2022c), Highland Economics conducted an analysis of the economic impacts of the Stibnite Gold Project (SGP), including direct jobs and income created by the SGP, indirect jobs and income resulting from purchases of goods and services related to the SGP, and induced impacts resulting from increased household spending. Throughout various phases of the project, it is anticipated that employees would spend their earnings within their community of residence, given their bi-weekly shift schedules and employee housing at the mine site's remote location. As a result, the economic benefits to the Valley and Adams counties economies would be related to the income earned by SGP staff that live within the local area. The contribution of relatively well-paying local area employment and labor income from the SGP would result in increased spending and increased economic activity within the local economy during the entire project period.

Comment Number	Section Title	Commenter	Comment Summary	Response
4	II, Specific Comments	4	The Draft 401 Certification inadequately addresses the complex and potentially significant impacts of the Proposed Project on water quality, particularly in relation to mercury pollution, sedimentation, and temperature increases.	This certification evaluated the potential impacts within the scope of the § 404 permit. Mercury should not be discharged during the activities as part of § 404 Army Corps of Engineer (USACE) permitted activity, to which the certification conditions are written. If the best management practice conditions are followed, then sedimentation will be monitored and limited to the conditions of the permit (Section 3.4 of the § 401 certification). Temperature is addressed in the Alternative Analysis and Socioeconomic Justification (AASJ) under IDAPA 58.01.02.052. As mentioned in DEQ's first response, there are a host of other permits necessary for the SGP which will address additional project impacts.
5	II, Specific Comments	4	The Draft 401 Certification also lacks effective proposed mitigation measures, such as monitoring for successful or failed best management practices ("BMPs") and Environmental Protection Measures ("EPMs").	DEQ agrees with various public comments addressing success or failure of BMPs and has added language into the certification stating: "*A BMP inspection and maintenance plan must be developed and implemented by the Applicant. The BMP inspection and maintenance plan is subject to review and modification by DEQ. At a minimum, BMPs must be inspected and maintained daily during project implementation and replaced or augmented if they are not effective*." in Section 3.4.5 of the § 401 certification.
6	II, Specific Comments	4	The Draft 401 Certification does not contain specific monitoring requirements, and it relies on outdated total maximum daily loads ("TMDL") to provide data and information on the current conditions of surface water within the proposed project area.	Please refer to the monitoring plan finalized in the Environmental Impact Statement (EIS). DEQ's § 401 certification does not lead monitoring efforts for the project; however, DEQ is providing additional requirements to require a more robust monitoring plan in the EIS. DEQ revised Section 2.3 and 2.4 of the § 401 certification. DEQ is aware of the data gaps for the North Fork Payette River and South Fork River subbasins. DEQ is working to prioritize data collection and evaluation of these basins provided the level of activity and current environmental pressures.
7	II, Specific Comments	4	The Draft 401 Certification also contains an insufficient alternative analysis and socioeconomic justification for allowing the Proposed Project to degrade Tier II high-quality waters, which is particularly troubling to the Tribe.	As a result of various public comments, DEQ has requested additional information be added to the AASJ by PRII and Brown and Caldwell. The additional information meets the requirements in IDAPA 58.01.02.051 and .052

Comment Number	Section Title	Commenter	Comment Summary	Response
8	II, Specific Comments	4	The Draft 401 Certification is insufficiently rigorous in safeguarding Idaho's water resources, which are also the water resources vital to the Tribe's cultural, subsistence, and ecological values.	All permitted activities in our state must comply with regulations in accordance with DEQ's Water Quality Standards under IDAPA 58.01.02. Numeric and narrative criteria in Idaho's water quality standards are set at levels that ensure protection of existing and designated beneficial uses. Therefore, standards are placed on the discharge of pollutants and on human activities which may adversely affect public health and water quality. Activities proposed for this project have been assessed and conditioned subject to Clean Water Act §§ 404 and 401, which includes the discharge of dredged or fill material in waters of the United States. Conditions in the certification have been developed to ensure that discharges associated with the project's dredge and fill activities prevent degradation of water quality. If the permittee complies with the terms and conditions imposed by the federal permit and the conditions set forth in the § 401 water quality certification, then it is reasonable for DEQ to conclude that project activities will comply with all water quality requirements, including applicable requirements of the Clean Water Act §§ 301, 302, 303, 306, and 307, Idaho's water quality standards (IDAPA 58.01.02), and any and all other applicable appropriate water quality requirements of state law.
9	Section 2.3 Protection and Maintenance of Existing Uses	4	We urge IDEQ to provide a clear timeline for the review and updating of these TMDLs. Given the dynamic nature of aquatic ecosystems and the potential for significant environmental changes, it is critical that these TMDLs are reflective of current conditions. Also, IDEQ should clearly state in the Draft 401 Certification the conditions that will ensure all Proposed Project activities are consistent with the implementation goals of these TMDLs.	DEQ is aware of the data gaps for the North Fork Payette River and South Fork River subbasins. DEQ is working to prioritize data collection and evaluation of these basins provided the level of activity and current environmental pressures.
10	Section 2.3 Protection and Maintenance of Existing Uses	4	The Tribe recommends prioritizing the development of the South Fork Salmon River Subbasin TMDL due to the proximity of the Proposed Project and the need for a current Subbasin Assessment and water quality improvement plan in the watershed.	Please see the comment response in number 9 (above). Additionally, DEQ is looking into utilizing existing multi-organization and agency data for a 5-year review on these subbasins.

Comment Number	Section Title	Commenter	Comment Summary	Response
11	Section 2.3 Protection and Maintenance of Existing Uses	4	The Tribe proposes the establishment of a joint monitoring committee comprising IDEQ officials, the Tribe's environmental experts, and stakeholder representatives to co-develop and refine the WRMP. This committee would also be tasked with ensuring that all monitoring plans are immediately actionable, with predefined triggers for adaptive responses.	Please refer to the monitoring plan finalized in the EIS. DEQ's § 401 certification does not lead monitoring efforts for the project; however, DEQ is providing additional monitoring requirements to supplement the more robust monitoring plan in the EIS. DEQ revised Section 2.3 and 2.4 of the § 401 certification.
12	II, Specific Comments	4	The tribe recommends that IDEQ clearly state the limits and specific monitoring requirements/conditions. The acceptable metal and contaminant concentrations that PRII will be help to throughout the SGP should be identified now, at the permitting stage.	This project will require additional permitting under, but not limited to, Idaho Pollution Discharge Elimination System (IPDES), Point of Compliance (POC), and cyanidation. The § 401 certification refers to targets only if/when identified in TMDL or state criteria. Please refer to the *Scope Directive for 2023 Clean Water Act Section § 401 Water Quality Certifications for Section § 404 Permits*, specifying the scope of the § 401 certification.
13	II, Specific Comments	4	Will monitoring occur after significant rain events or during periods of high flow to assess the impact on water quality and sediment displacement?	This condition would apply more appropriately to IPDES General Permit (GP) coverage. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
14	II, Specific Comments	4	How will monitoring occur to evaluate impacts on wetlands and Waters of the United States ("WOTUS") to ensure that any adverse effects are quickly identified and mitigated?	DEQ has limited authority over wetlands due to the lack of designated beneficial uses applicable to wetland protection. Please refer to USACE for the wetland mitigation plan.
15	II, Specific Comments	4	Will specific monitoring occur to evaluate the effectiveness of "BMPs" in reducing environmental impacts? It is imperative that decisions and monitoring plans explicitly address how BMPs will be monitored and assessed for efficacy.	This condition would apply more appropriately to IPDES GP coverage. Please refer to the Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits, specifying the scope of the § 401 certification.
16	II, Specific Comments	4	Will high concentrations (thresholds) of pollutants in surface water trigger any type of action? Detailed action plans should be in place for any exceedances of these thresholds.	This condition would apply more appropriately to IPDES and cyanidation permit coverage. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.

Comment Number	Section Title	Commenter	Comment Summary	Response
17	II, Specific Comments	4	1. The acceptable metal and contaminant concentrations that Perpetua will be responsible for maintaining for post-closure conditions should be identified now, at the permitting stage. 2. Post-closure monitoring is necessary because liners often fail over time. The mitigation plan must specify the actions to be taken if concentrations in groundwater or surface water downgradient of lined facilities show increasing trends in contaminant levels. 3. A response action plan should be defined now that will be followed if a failure should occur. Without a well-defined, specific action plan accounting for all potential types of failures and accidental releases or spills, WOTUS cannot be protected during operations.	Please refer to Special Condition 3.2.1. This is outside of the scope of the § 401 certification and is presumed to be covered under other permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
18	II, Specific Comments	4	The conditions necessary to ensure compliance with Idaho water quality standards or other appropriate water quality requirements described throughout the Draft 401 Certification are unclear. The Draft 401 Certification states, "additional protective conditions can be reviewed in Appendix E," but the Tribe was unable to locate any there. The additional protective conditions should be stated more clearly in this section and/or appendices.	These additional protective conditions are included in the additional monitoring requirements of the certification. This includes continuous temperature monitoring and dissolved metals monitoring locations, listed in Appendix D.
19	II, Specific Comments	4	The acceptable metal and contaminant concentrations that PRII will be held to throughout the Proposed Project should be identified now, at the permitting stage. Additionally, the quality assurance and quality control measures are not clearly specified in this special condition. Is the quality assurance project plan ("QAPP") completed, and, if so, does it include monitoring requirements? Will IDEQ be approving the QAPP? Will the public be able to comment on the QAPP?	Specific monitoring requirements are being worked through in the EIS and other permitting processes. The § 401 certification does not outline specific monitoring requirements outside additional monitoring required under this certification. However, that monitoring will be agreed upon later when the project is closer to permitting.

Comment Number	Section Title	Commenter	Comment Summary	Response
20	Section 3.2 Special Conditions ; No. 2	4	The proposed condition for annual reporting is insufficient as it does not ensure timely communication and the opportunity for adaptive management. The Tribe recommends that reporting intervals be increased to quarterly or biannually. Furthermore, clear thresholds should be put in place to trigger a reevaluation of Proposed Project activities or to halt operations if environmental standards are not met.	Additional language was added to Section 3.2.6 of the § 401 certification, stating, "DEQ reserves the authority under this certification to require additional plans, corrective actions, and monitoring, at any time, as needed to ensure nonpoint source activities associated with the project do not result in adverse water quality impacts."

Comment Number	Section Title	Commenter	Comment Summary	Response
21	II, Specific Comments	4	Below is a list of missing monitoring sites from that document that were omitted but should be included in the Draft 401 Certification, or details should be provided as to why these sites were not selected for monitoring: 1. SW-5 EFSFSR upstream of confluences of streams discharging from the SGP monitoring at this site would be an acceptable baseline monitoring point; 2. SW-38 Midnight Creek downstream of piped diversion, upstream of confluence with EFSFSR; 3. SW-12 Midnight Creek upstream of piped diversion; 4 SW-27 Fiddle Creek downstream of piped diversions of Fiddle Creek and Hennessy Creek prior to discharge to EFSFSR; 5. SW-28 EFSFSR upstream of Fiddle Creek confluence and culvert under haul road; 6. SW-19 Meadow Creek just upstream of confluence with EFSFSR at downstream end of lined stream section; 7. SW-20 East Fork Meadow Creek (Blowout Creek) upstream of Meadow Creek in section to be restored; 8 SW-22 Meadow Creek downstream of TSF operations and upstream of IPDES discharge point; 9. SW-41 Meadow Creek below TSF interceptor ditch and underdrain sump. Additionally, the quality assurance and control measures are not clearly specified in this special condition (See Special Condition 1).	DEQ selected monitoring locations for a variety of reasons, which includes capturing overall temperature impacts to East Fork South Fork Salmon River (EFSFSR) below the mining site, existing IPDES monitoring locations, and Tier II waterbodies. The locations suggested in this comment, though important, were not chosen for continuous monitoring, but will include in situ temperature monitoring in the larger Water Resources Management Plan (WRMP), provided by PRII. It is not predicted that piping sections of tributaries will have a negative impact on temperature, however, West End Creek is a Tier II waterbody and therefore some additional monitoring will be required to prove that presumption, unlike Midnight and Fiddle Creeks, which are not predicted to have negative impacts on temperature.

Comment Number	Section Title	Commenter	Comment Summary	Response
22	II, Specific Comments	4	Sampling locations are not consistent with those mentioned in the WRMP and Appendix E (See above). The monitoring requirements and applicable water quality criteria should be clearly stated. Furthermore, the monitoring requirements for all sampling parameters specific to this WQC should be included in the QAPP. The quality assurance and control measures are not clearly specified in the special conditions (See Special Condition 1).	The additional monitoring within the § 401 certification is not listed under the WRMP and is specific to this certification. Additionally, monitoring included in the § 401 certification is designed to not overlap with other monitoring requirements under other DEQ permits. Therefore, it is additional protective coverage and information from what was originally planned/required. As stated in Section 3.2.1 of the § 401 certification, DEQ will ensure a QAPP exists and will be addressed at a later date, which is not outlined in the § 401 certification.
23	II, Specific Comments	4	The Tribe recommends the use of continuous instream turbidity sensors in addition to the conditions set forth in Table 1 for turbidity monitoring and sampling when a plume is observed.	DEQ's turbidity monitoring requirement is to identify failures in BMP implementation and to adaptively manage BMPs. However, additional language was included in Section 3.5.4. of the § 401 certification, stating, DEQ requires turbidity calibration logs and turbidity data to be included in the annual report and discussed at the meeting.
24	Section 3.8	4	The Tribe recommends that Perpetua Resources have a spill response plan in place before the work covered in this Draft 401 Certification and that IDEQ review and approve Perpetua Resources' plan to ensure it adequately protects beneficial uses.	This is outside of the scope of the § 401 certification and is presumed to be covered under other permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
25	II, Specific Comments	4	The Proposed Project necessitates careful consideration of its environmental implications, particularly concerning high-quality waters. The Tribe holds substantial reservations regarding IDEQ's Alternatives Analysis and Socioeconomic Justification ("AASJ"). Firstly, the socioeconomic justifications provided in the AASJ do not convincingly demonstrate the necessity of the Proposed Project's benefits for local community development, as mandated by regulatory standards. Secondly, the Tribe is concerned by IDEQ's insufficient assessment of the impacts of a comprehensive range of pollutants of concern on Tier II waters. A more thorough and detailed analysis by IDEQ is needed to ensure the protection of these critical water resources.	Please refer to Brown and Caldwell's response to public comments (Appendix F).

Comment Number	Section Title	Commenter	Comment Summary	Response
26	II, Specific Comments	4	The Brown and Caldwell AASJ attempts to rationalize the degradation of Tier II waters by the Proposed Project. However, it falls short of meeting the explicit statutory and regulatory standards that dictate such degradation must be indispensable for local socioeconomic development. This is a crucial omission, as both Idaho Code § 39-3603(b) and IDAPA 58.01.02.052.08.d require a demonstration that any proposed degradation of water quality must be explicitly justified by the need to accommodate important economic or social development. The AASJ does not adequately demonstrate the economic impacts, nor the necessity of the socioeconomic benefits provided by the Proposed Project, for the local community's development. The lack of detailed evidence or analysis proving that such benefits are essential for the surrounding communities, especially given the current socioeconomic resilience of Valley County, significantly undermines IDEQ's justification for degrading Tier II waters. As described in section 5.1 of the AASJ, Valley County's economy is thriving, bolstered considerably by its recreation and tourism industries, which offer year-round opportunities. This sector plays a crucial role in the local economy. As noted in the AASJ, "per capita wages throughout Idaho are lower than the national average, though Valley County per capita wages are much closer to the national average," largely due to this vital sector of the economy. The proposed mining activity could, in fact, detrimentally affect the local economy and is clearly not a necessity as the economic diversity and performance in Valley County exceeds that of the rest of Idaho.	Please refer to Brown and Caldwell's response to public comments (Appendix F).

Comment Number	Section Title	Commenter	Comment Summary	Response
27	II, Specific Comments	4	Section 5.2.2 of the AASJ states Perpetua, "remains the sole hope for full remediation of the Site." This claim is simply not credible. The AASJ completely disregards the Tribe's active role in hatchery supplementation, fishery research, and watershed restoration efforts near and downstream of the Proposed Project or the many alternative clean-up approaches that could be taken at the site should Perpetua's Proposed Project not go forward.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
28	II, Specific Comments	4	Please clarify why additional AUs were omitted from the list of waterbodies warranting Tier II protection in the AASJ. Alternatively, please account for these AUs in the AASJ.	Please refer to Brown and Caldwell's response to public comments (Appendix F). Additionally, DEQ determined a total of 33 AUs within the SGP boundary. Twenty-eight of those AUs are designated as Tier II waterbodies; however, only 16 of the listed Tier II waterbodies are expected to be impacted by temperature criteria exceedance under this 401 certification. These 16 Tier II waterbodies are the only waterbodies required to be addressed in the AASJ.
29	II, Specific Comments	4	The AASJ provides a weak rationale for the West End Creek Diversion. West End Creek as not been surveyed using IDEQ's beneficial use reconnaissance program ("BURP") monitoring protocols, and the flows referenced in the socioeconomic justification are over a decade old. *Clarification Request:* BURP monitoring efforts should be prioritized at West End Creek to reflect the current condition of West End Creek.	Please refer to Brown and Caldwell's response to public comments (Appendix F). Additionally, West End Creek is a tributary of Sugar End Creek, which DEQ collected data in 2018 and assessed in 2020; therefore, the data for West End Creek is presumed to be current.

Comment Number	Section Title	Commenter	Comment Summary	Response
30	II, Specific Comments	4	1. Revise the AASJ and the Draft 401 Certification to include a detailed inventory of potential pollutants from the Proposed Project's mining operations, considering both standard pollutants and those unique to the geology of the mine site and the nature of the mining process itself. 2. Utilize quantitative methods to assess the baseline conditions and Proposed Project-induced changes, focusing on sedimentation, erosion, atmospheric deposition, and the risk of hazardous spills. 3. Evaluate the cumulative impact of potential pollutants on water quality and ecosystem services. This assessment should consider synergistic effects where the presence of multiple pollutants may exacerbate the environmental impact beyond what would be predicted when considering each pollutant in isolation.	This comment focuses on operational impacts, which are outside of the scope of the 401 certification. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification. However, DEQ has added additional language to include ammonia in the list of constituents to be monitored in Section 2.3.
31	II, Specific Comments	4	The AASJ should detail how each BMP and EPM is adapted to the site-specific conditions and challenges of the Proposed Project area. This includes considerations for soil types, water flow patterns, sensitive habitats, and culturally significant sites.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
32	II, Specific Comments	4	A robust monitoring plan should be linked to each BMP and EPM, detailing how their effectiveness will be assessed over time. This plan should include clear, measurable indicators of success, frequency of monitoring, and thresholds for action. The plan should also outline how BMPs and EPMs will be adapted in response to monitoring results or unforeseen environmental changes.	This is outside of the scope of the § 401 certification and is presumed to be covered under other permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.

Comment Number	Section Title	Commenter	Comment Summary	Response
33	II, Specific Comments	4	How long will BMPs be monitored post-mining? More detail is necessary given that the Reclamation and Closure Plan states that its goal "is to limit and/or eliminate long-term monitoring and maintenance following closure." *Recommendation:* The AASJ should include a clear, detailed monitoring schedule that extends beyond the closure of the mine, and should specify the frequency of monitoring activities, the parameters to be monitored, and the methodologies to be used.	Post-mining monitoring can only be enforced for the length of the federal permit, which is dependent on the expiration of the USACE § 404 permit. However, there may be an additional monitoring agreement created at a later date.
34	II, Specific Comments	4	Multiple TMDLs identify excessive solar loading as a persistent issue in this area, contributing to streams exceeding temperature standards essential for bull trout habitat. The timeline for restoring these streams to a state that supports designated beneficial uses is uncertain and could take years to decades after mining operations and closure activities conclude. Additionally, the time required to reestablish vegetation, which plays a crucial role in moderating stream temperatures, is not clearly defined.	Requiring a timeframe for vegetation re-establishment is unrealistic, and it is more effective to monitor and adaptively manage revegetation restoration efforts; however, the § 401 certification requires vegetation to be reestablished for the benefit of water quality and to meet TMDL targets. Please see Section 3.7 of the § 401 certification for revegetation conditions pertaining to the relevant actions permitted under the § 401 certification.

Comment Number	Section Title	Commenter	Comment Summary	Response
35	II, Specific Comments	4	The Draft 401 Certification lacks detailed information regarding how Perpetua will address the impact of groundwater drawdown on stream flows, which is crucial for ensuring the protection and mitigation of affected waterbodies. Reductions in stream flow can concentrate pollutants, elevate water temperatures, and disrupt habitats for aquatic species, thereby affecting the water body's ability to support designated beneficial uses. These concerns should be addressed in the Draft 401 Certification in further detail, and explanations should be added regarding how the applicant will ensure that the water quality will remain sufficient to fully protect existing uses. *Question: 1)* Will IDEQ update their watershed assessments and TMDLs to ensure that water quality will be adequate to fully protect the existing uses?	This is outside of the scope of the § 401 certification and is associated with operational impacts. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
36	Section 1.a	5	The AASJ fails to demonstrate how degradation is necessary to support important socioeconomic development to the local community. Ultimately, the draft Certification and the AASJ fail to show how the SGP's proposed economic benefits are particularly and specifically important to Valley County, let alone, how the anticipated water quality degradation is necessary for such benefits to be achieved (as opposed to being provided by existing socioeconomic instruments of Valley County).	Please refer to Brown and Caldwell's response to public comments (Appendix F).
37	Section 1.b	5	The AASJ presents a biased assessment and incomplete depiction of the impacts on the local economy.	Please refer to Brown and Caldwell's response to public comments (Appendix F).

Comment Number	Section Title	Commenter	Comment Summary	Response
38	Section 1.c	5	The AASJ preferred alternative is short sighted and assumes an overly optimistic version of site reclamation.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
39	Section 1.d	5	The AASJ provides little context on the high quality nature of Tier II waters.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
40	Section 1.e	5	The AASJ fails to assess the impacts of all Pollutants of Concern from all degrading proposed activities.	Please refer to Brown and Caldwell's response to public comments (Appendix F). Additionally, this is outside of the scope of the § 401 certification and is associated with operational impacts. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
41	Section 1.f	5	The AASJ fails to properly assess the impacts of proposed activities to human health.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
42	Section 1.g	5	Section 5.3.4 of the AASJ generally minimizes the effects the SGP will have on users of Tier II waters calling various potential effects "short-term", "minor", and "localized". The omission of important impacts to water quality and water use, as well as the cherrypicked statements from the AASJ, show its obvious bias not only to its recreational impacts analysis, but its entire socioeconomic analysis and conclusions.	Please refer to Brown and Caldwell's response to public comments (Appendix F).
43	Specific Comment	5	DEQ should carefully consider the conclusions of the Idaho Headwater's Economic Study and reevaluate the socioeconomic benefits the proposed activity and the SGP provide to Valley County.	Please refer to Brown and Caldwell's response to public comments (Appendix F). As a result of various public comments, DEQ has requested additional information to be added to the AASJ by PRII and Brown and Caldwell. The additional information meets the appropriate rules in IDAPA 58.01.02.

Comment Number	Section Title	Commenter	Comment Summary	Response
44	Specific Comment	5	DEQ should require a more accurate assessment of mercury deposition, and impacts to Tier I and Tier II water quality, by following the recommendations outlined in the EPA's 2023 SDEIS comments (see Attachment B). DEQ should also require additional mitigation measures (such as additional mercury air emissions controls) to preclude the predicted mercury water quality standard exceedances and ensure that the incremental increase in mercury concentration over time does not result in exceedances of fish-tissue criterion.	This is outside of the scope of the § 401 certification and is presumed to be covered under other permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
45	Section 3.2.1	5	This [Special Condition 1] lacks specificity and it is unclear how it fits with the various monitoring required both by the draft Certification (Appendix E) as well as monitoring required by any other current or future requirements (DEQ groundwater Point of Compliance, USFS Final EIS requirements, or DEQ IPDES permit requirements).	Specific monitoring requirements are being worked through in the EIS and other permitting processes. The § 401 certification does not outline specific monitoring requirements outside additional monitoring required under this certification. However, that monitoring will be agreed upon later when the project is closer to permitting.
46	Section 3.2.1	5	Furthermore, quality assurance project plan (QAPP) requirements are vague. Numerous QAPPs are likely to be in existence covering different monitoring plans/requirements if the SGP moves forward, but it is unclear if this requirement means for Perptua to develop a QAPP specific to Appendix E monitoring or some other QAPP may be used to fulfill this condition. In either case, this condition should be modified to require DEQ approval of any QAPP used for final Certification monitoring compliance.	Per condition 3.2.1 of the § 401 certification, DEQ will ensure the facility creates a QAPP in accordance with the appropriate guidance (listed below). Compliance with the QAPP is a condition of the § 401 certification, and if results submitted from sampling and testing do not conform with the QAPP, indicate violations of the § 401 certification or associated permit, DEQ may consider initiating the proper enforcement mechanism. QAPP requirements are identified in the Environmental Protection Agency (EPA's) *Guidance for Quality Assurance Project Plans QA/G-5*. Additionally, DEQ has several additional permitting mechanisms in place to provide protections to water quality.

Comment Number	Section Title	Commenter	Comment Summary	Response
47	Section 3.2.3	5	Given the highly volatile nature of the hardrock metals market, we recommend that this condition be modified to require the proposed meeting occur once every three years (as opposed to five years). Furthermore, this condition should also be modified to require Perpetua to submit an operations suspension plan prior to SGP operations. Such a plan would describe how Perpetua plans to maintain 401 Certification compliance given the challenges of reduced resources and presence on site. Requiring such a plan is not a novel or unreasonable requirement given Idaho State rules on mine tailings impoundments require a dam abandonment plan be developed for mine tailings impoundments.	DEQ agrees and has altered the meeting occurrence to every three years; instead of the initially proposed 5-years. Within the *Reclamation and Closure Plan*, and referenced in the § 401 certification, DEQ shall be given a 30-day notice before activities subside. Additionally, there are bonding requirements and proposed funds for site reclamation in the event that abandonment or closure occurs, which is presumed to be covered under other plans and permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
48	Section 3.2.4	5	We suggest clarity around QAPP requirements and DEQ approval be added (See Special Condition number 1 above).	Per condition 3.2.1 of the § 401 certification, DEQ will ensure the facility creates a QAPP in accordance with the appropriate guidance (listed below). Compliance with the QAPP is a condition of the § 401 certification, and if results submitted from sampling and testing do not conform with the QAPP, indicate violations of the § 401 certification or associated permit, DEQ may consider initiating the proper enforcement mechanism. QAPP requirements are identified in EPA's *Guidance for Quality Assurance Project Plans QA/G-5*.
49	Section 3.2.5	5	This condition cites IDAPA 58.02.02 in error (it is assumed IDAPA 58.01.02 is intended). Nevertheless, it is unclear what exact metals monitoring requirements of IDAPA 58.01.02 are intended to be complied with (subsection 090.02 outlines metal sampling procedures but specifically for NPDES purposes). It is also unclear why this condition requires DEQ approval of any QAPP while special conditions related to temperature QAPPs do not.	DEQ corrected the IDAPA citation 58.02.02 to reflect 58.01.02. Additionally, DEQ removed language from the § 401 certification stating the QAPP required DEQ's approval. DEQ will ensure a QAPP exists; however, the QAPP will not be approved by DEQ.

Comment Number	Section Title	Commenter	Comment Summary	Response
50	Section 3.2.7	5	It is unclear exactly how this condition intends for "public access" to be maintained for project documents. Would this condition simply require Perpetua to provide project documents when asked by a member of the public or rather provide a publicly accessible format (assumedly electronic) where project documents are continuously maintained? The distinction between how this condition exactly applies to "project documents relevant to this certification" and Appendix C documents is also unclear. Finally, if the intent is for Perpetua to retain responsibility of maintaining public access to these documents, additional requirements requiring timely delivery of documents to the public should be added.	DEQ modified the language in Section 3.2.7 of the § 401 certification stating: "For the life of the project, PRII will maintain an electronic public access point, and provide physical copies to the public, upon request, for reference documents listed in Appendix C."
51	Section 3.2	5	The SDEIS and EPA comments have repeatedly raised concerns about the potential impacts to surface water from the use of soils with high metal concentrations, particularly mercury, antimony and arsenic, for reclamation purposes.54 IDEQ should incorporate the EPA's recommendations for using uncontaminated soils for reclamation, or applying specific screening criteria for soils (with supporting data) that will adequately protect surface waters from degradation or noncompliance.	Please refer to Section 3.3 for conditions regarding fill material. DEQ has added language stating: "Contaminated material may not be used as fill where it will be exposed to surface water. Only clean material may be placed as fill, including during reclamation activities."

Comment Number	Section Title	Commenter	Comment Summary	Response
52	Section 3.3.1 and 3.3.2	5	These conditions specify that only "clean" material be used as fill and that "contaminated material" may not be used as fill as well as requirements for treating historic tailings or other "contaminated soils" differently from other "suitable soils" Although this condition provides some specifics on how clean and contaminated material will be evaluated, some of these specifics appear to only apply to dredge material that will be used as fill while other considerations remain unaddressed. Ultimately, given the historic contamination at the SGP and naturally elevated metal concentrations in soil/rock, we are concerned that particular care must be used in evaluating fill material to avoid degradation of water quality. Some material proposed for fill at the SGP might not be considered contaminated with respect to background conditions but would be considered contaminated compared to average background conditions elsewhere in Idaho. These conditions should be modified to add clarity and ensure that Tier I and Tier II protections are met.	DEQ has added language stating: "If dredged material is proposed for use as fill material and there is a possibility the material may be contaminated or highly concentrated with pollutants of concern, then the permittee must assess and characterize sediment to determine the suitability of dredge material for unconfined-aquatic placement as well as consistency with Idaho's water quality standards; determine the suitability of post dredge surfaces; and predict the effect on water quality during dredging."
53	Section 3.3.4	5	Similar to comments presented above for fill material conditions 1 and 2, the use of contaminated site material presents an obvious pathway for water quality degradation. The same considerations for fill conditions 1 and 2 should be considered for this condition. In addition, the impact of dust suppressant agents represents an unconsidered factor that should be addressed.	Please refer to Section 3.3.3 of the § 401 certification stating: "Capping materials used on haul roads will be clean and free of materials easily mobilized in storm water runoff."
54	Section 3.4.5	5	This condition should be modified to require DEQ approval of the BMP inspection and maintenance plan.	DEQ agrees and has added: "*The BMP inspection and maintenance plan is subject to review and modification by DEQ"* in Section 3.4.5 of the § 401 certification.

Comment Number	Section Title	Commenter	Comment Summary	Response
55	Section 3.4.7	5	This condition should be modified to require the use of soil and growth media that is evaluated to be appropriate for the type of vegetation proposed within the specific conditions of the SGP.	DEQ agrees and has added language stating; "Disturbed areas suitable for vegetation will be seeded or revegetated using clean soil and growth media, when necessary, to prevent subsequent soil erosion" in Section 3.4.7 of the § 401 certification.
56	Section 3.7.10	5	This condition should be modified to include chemical (or non-water) dust suppressants as well as water suppressants. Failure to do so could allow the use of chemical suppressants without proper BMPs.	DEQ agrees and has added language allowing chemical dust suppressants in Section 3.7.10 of the § 401 certification.
57	Section 3.5.3	5	Perpetua should be required to install continuous instream turbidity monitors in strategic locations within impacted AUs (ID17060208SL026_02, ID17060208SL027_02, and ID17060208SL028_02) to ensure that BMPs are functioning appropriately. In addition, given the large area of the SGP, its many proposed activities, and the general level of resources available to Perpetua, continuous instream turbidity monitoring is also appropriate for all monitoring sites identified within Appendix E. While continuous turbidity monitoring is not typical of DEQ 401 Certification conditions, the SGP represents a unique project of significantly larger scale than most 401 Certification projects/activities.	DEQ's turbidity monitoring requirements are to identify failures in BMP implementation and to adaptively manage BMPs. However, additional language was included in Section 3.5.4. of the § 401 certification, stating, DEQ requires turbidity calibration logs and turbidity data to be included in the annual report and discussed in the annual meeting.
58	Section 3.5.4	5	Table 1 presented under this condition should be retained but modified to incorporate continuous turbidity monitoring per condition 3 comments.	Please refer to comment 57.
59	Section 3.5.4.e	5	Please see comments related to Erosion and Sediment Control above.	Please refer to the comments above, or Section 3.4 to review changes pertaining to erosion and sediment control conditions.

Comment Number	Section Title	Commenter	Comment Summary	Response
60	Specific Comment	5	A condition should be added that requires Perpetua to develop a written spill response plan that specifically addresses reasonably anticipated hazardous or deleterious material spills to all applicable Tier I and Tier II waters. Such a spill response plan should be required to outline the nature and quantity of reasonably anticipated spills, how they will be responded to in order to minimize water quality impacts, how any long term impacts will be remediated, and how any spills will be avoided in the first place. Such plans for petroleum and oil spills are commonly required under EPA regulations (Spill Prevention Control and Countermeasure plans).58 Thus the need to plan for spills of hazardous or other materials specific to water quality impacts has similar analogs and is consistent with the federal 401 Improvements. Such a plan should require review and approval by DEQ.	This is outside of the scope of the § 401 certification and is presumed to be covered under other permits. Please refer to the *Scope Directive for 2023 Clean Water Act § 401 Water Quality Certifications for § 404 Permits*, specifying the scope of the § 401 certification.
61	Section 3.9	5	This condition requires culverts to allow for fish passage but does not define what type of fish species should be considered. Given the multitude of fish species that can be found in the SGP and surrounding area (including the particularly sensitive species of Bull trout, Chinook Salmon, and Steelhead trout) and the different hydraulic conditions required for their passage, this condition should be modified to require fish passage for all fish species observed or known to be present within the waters the culvert is to be placed in.	DEQ agrees and has added language stating: "Culverts must be installed so they do not impede fish passage for all species, observed or known to be present at some point during the year, in the stream where the culvert is constructed" in Section 3.9.3 of the § 401 certification.

Comment Number	Section Title	Commenter	Comment Summary	Response
62	Specific Comment	7	While the Draft Certification references some of these permits, Perpetua recommends that IDEQ explicitly state in the Final Certification that it is a condition of the CWA 401 certification that Perpetua obtain these listed permits. This condition should address any objections that there are potential adverse water quality impacts associated with the SGP that were not considered by IDEQ as part of its 401 certification review.	There is no requirement for DEQ to explicitly state additional permit requirements for projects outside of the § 401 certification, nor does DEQ want to assume liability for explicitly stating certain permit requirements at the risk if incidentally leaving information out.
63	Specific Comment	7	Perpetua recommends that the Final Certification expand its discussion of beneficial environmental outcomes that will occur as a result of the SGP. In particular, because of the reclamation, restoration, and remediation activities described in Section I above, Perpetua's work associated with the SGP will actually result in water quality improvements within the headwaters of East Fork South Fork Salmon River watershed of the South Fork Salmon subbasin, including creating improvements to certain currently impaired conditions. It also is important that the administrative record for this CWA 401 proceeding include the data and predictive information relating to the water quality improvements that will be produced over time (including water quality benefits downstream for neighboring jurisdictions) due to the SGP.	This is outside the scope and purpose of the § 401 certification. Benefits or justification for a project are the responsibility of the Applicant, not DEQ. Therefore, it is inappropriate for DEQ discussion outside of ensuring a completed antidegradation review in accordance with IDAPA 58.01.02.052.

Comment Number	Section Title	Commenter	Comment Summary	Response
64	Specific Comment	7	As a result of the environmental controls and protective measures that Perpetua will utilize in the SGP, along with the environmental benefits that will accompany Perpetua's reclamation, restoration, and remediation work, the project will over time produce water quality improvements relative to existing conditions, with respect to the key pollutants of concern, namely, arsenic and antimony. Long term water temperature improvements result from the SGP with maximum stream temperatures near to (within 0.2°C) or below existing conditions once Stibnite Lake is established. The Technical Memorandum in attached Exhibit C highlights these improvements. Additional information is provided in Perpetua's materials supporting its 401 certification request and in the Draft SDEIS.	Thank you for your comment.

Comment Number	Section Title	Commenter	Comment Summary	Response
65	Specific Comment	7	For the avoidance of doubt and to reduce risk of future uncertainty, Perpetua recommends for the reasons set forth in Section II(C) of this letter that the Final Certification include an explicit statement that IDEQ has determined that the SGP will not impact any water quality of neighboring jurisdictions and will not cause or contribute to any violations of any water quality requirements of any potential neighboring jurisdictions downstream of the project. The Technical Memorandum attached to Exhibit C of this letter includes the summary analysis and data supporting these findings. A brief summary of the basis for this determination should be included in the Final Certification to assist EPA Region 10 in making its "no effect"/"may affect" determination pursuant to the 2023 Rule. In addition to the analysis provided in Exhibit C, attached Exhibit A includes possible language for IDEQ to consider with respect to the neighboring jurisdiction matters and the absence of any impacts on water quality Oregon or Washington.	Neighboring jurisdiction will fall under review of the EPA. DEQ believes that by issuing the § 401 certification with the conditions identified that downstream waters will be protected from impacts associated with the activities permitted under the § 404 USACE dredge and fill permit.
66	General Revisions	7	Perpetua have provided suggested revision to the certification, in the form of redline edits.	DEQ appreciates the time put into suggestions for the § 401 certification and has incorporated editing revisions, such as some citation corrections; however, DEQ will not be implementing language additions/revisions or suggested conditions to be incorporated as part of the § 401 certification.

Appendix F. Revised Alternative Analysis and Socioeconomic Justification and PRII Response to Comments

See document attached at end of document.

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May 8, 2024

Ms. Meghan Cline
Idaho Department of Environmental Quality
1445 N. Orchard Street
Boise, ID 83706

Re: Request for Information/Draft 401 Certification
Project Name: Stibnite Gold Project
Permit Number: NWW-2013-00321

Dear Ms. Cline:

Perpetua Resources Idaho, Inc. ("Perpetua" or "Company") provides this response to the Request for Information ("Request") from the Idaho Department of Environmental Quality ("IDEQ" or "Agency") in your email dated April 24, 2024.

Specifically, IDEQ is seeking input from Perpetua regarding responses to comments received by IDEQ directed at the Alternatives Analysis and Socioeconomic Justification ("AASJ") that accompanied IDEQ's Draft Clean Water Act Section 401 water quality certification (WQC) during the public review and comment period that closed April 12, 2024. A revised AASJ accompanies this transmittal letter; in addition, Perpetua is providing responses to comments requested by IDEQ in the attached comment table. This letter provides a legal backdrop to these documents.

I. INTRODUCTION

The Clean Water Act (CWA) gives the State of Idaho an important and sovereign voice in the permitting of federal projects that could affect the State's water quality.

Specifically, under Section 401 of the CWA, federal agencies cannot authorize activities that may result in a discharge into jurisdictional waters until the State, whose waters would be affected by the discharge, certifies that the activity will comply with Sections 301, 302, 303, 306, and 307 of the CWA (or waives the Section 401 requirement, either affirmatively or through inaction). The United States Supreme Court has interpreted CWA Section 401 as a broad delegation of conditioning authority to the states. *Pub. Util. Dist. No. 1 of Jefferson Cty. V. Wash. Dep't of Ecology*, 511 U.S. 700 (1994).

A. Standard of Review and Background on Process to Date

1. Standard of Review

IDAPA 58.01.02.052.08.e.ii describes the discretion afforded IDEQ in evaluating the AASJ:

> The Department shall review all pertinent information and, after intergovernmental coordination, public notice and input, make a determination … *whether degradation of water quality is necessary* to accommodate *important* economic or social development. (Emphasis added.)

The key terms in this balancing test are, the Agency must decide "whether" water quality degradation is "necessary" and if economic and social development is "important."

1. Process to Date

Perpetua Resources has been engaged in pre-application communication and coordination with regulatory agencies since 2018. Perpetua Resources has had at least 50 meetings and teleconferences with IDEQ to discuss water quality-related facets of the Stibnite Gold Project ("SGP" or "Project") and the preparation and review process for the CWA Section 401 WQC request. A dredge and fill permit application for the SGP was submitted to the United States Army Corps of Engineers (USACE) under Section 404 of the CWA to address impacts to wetlands and other surface waters under the jurisdiction of the federal government (i.e., WOTUS) on April 7, 2023. A pre-filing meeting request was filed on April 21, 2023, and the meeting was held with IDEQ on May 17, 2023. Subsequently, the CWA Section 401 WQC request was filed on May 26, 2023. IDEQ coordinated with USACE to establish the reasonable period of time for review of the request, which was set at 364 days, to be completed May 24, 2024.

In November 2023, IDEQ requested an AASJ as part of the antidegradation review. Perpetua submitted a draft AASJ to IDEQ on January 22, 2024. Comments were received from IDEQ on February 9, 2024, and a revised AASJ was submitted to IDEQ on February 21, 2024, which was accepted as final by IDEQ and included with the Draft 401 certification. On Wednesday April 24, 2024, IDEQ requested input from Perpetua on public comments to the AASJ. As will be shown, the Agency does not come to the AASJ circulated for public comment from a blank slate. The initial AASJ presented for public comment with the draft 401 certification by IDEQ was developed with input from the Agency.

Beginning in late 2023, Perpetua's representatives began engaging with the IDEQ team on how the contours of the AASJ would be developed and be consistent with the Agency's preference on scope. After significant exchange between IDEQ and Perpetua, it was mutually agreed that:

1. A subset of sixteen Assessment Unit (AUs) would be the focus of the AASJ with regard to Tier II protection and socioeconomic justification for potential degradation with temperature as the primary reason for the AASJ.

2. IDEQ does not have the ability to determine significant degradation in a 401 antidegradation review and therefore the AASJ would only address the potential for degradation beyond ambient conditions.

3. The socioeconomic benefits for the entire project would be weighed against the potential for degradation with respect to temperature in the sixteen AUs identified.

4. Perpetua would provide in the draft AASJ an alternatives analysis keyed from the Supplemental Draft Environmental Impact Statement (SDEIS) issued by the United States Forest Service (USFS) and that the evolution of the SGP in general would be framed in the socioeconomic justification.

5. Certain operational elements of the SGP related to Tier II AUs, including transmission line rights of way, the Burntlog Route, and West End pit would be included in the draft AASJ as it related to the evaluation by IDEQ of the socioeconomic justification due to their potential for degradation relative to temperature; and

6. That the AASJ factor in IDAPA 58.01.02.052.08.d.iv related to "[r]etention of assimilative capacity for future activities or discharges" would not be required by IDEQ because [the Agency would be unable to assess assimilative capacity due to an unknown pollutant load] and [it was deemed unnecessary for this 401 certification due to its particular relevance for the IPDES program].

With this Agency feedback, the AASJ dated February 21, 2024, was revised accordingly, submitted to IDEQ, and circulated for public comment.

B. Summary of Comments

The commenters to the AASJ attempt to generally impeach the information and socioeconomic analysis of the Stibnite Gold Project provided to IDEQ by Perpetua. These comments are misplaced for the following reasons.

First, the Agency has broad certification authority and wide discretion under IDAPA 58.01.02.052.08.d to consider the socioeconomic justification proposed by Perpetua to issue its CWA Section 401 water quality certification. The commenters' efforts to re-write the clear and unambiguous language of the IDAPA regulations are not persuasive.

Second, IDEQ has appropriately developed the parameters of the socioeconomic factors and information it will need to review under IDAPA in order to proceed with its Section 401 water quality certification. The draft AASJ was developed in consultation with IDEQ and its construct fulfills the necessary steps IDEQ must undertake to determine how "important" the economic and social development will be around the Stibnite Gold Project.

Finally, IDEQ's review of the AASJ is incomplete absent consideration by IDEQ of the long-term environmental benefits that will be advanced by Perpetua through the Stibnite Gold Project. Importantly, environmental values under IDAPA 58.01.02.052.08.d.ii ("cleanup/restoration of a closed facility") will be undertaken in the Stibnite Mining District by mining. Further, two important socioeconomic considerations, simultaneous job creation and employment and a permanent clean up solution to a legacy site legally abandoned by the federal government, are fulfilled by the Project.

II. DISCUSSION

A. The Appropriate Application of IDAPA by IDEQ

Under Idaho's administrative rules and Agency guidance governing its process for 401 water quality certification, IDEQ must balance and evaluate (qualitatively) the potential water quality degradation of waters warranting Tier II protection within the Project area subject to the USACE 404 permit with the accommodation of "*important* economic or social development."[1]

[1] "Degradation of water quality deemed necessary must also be determined by the Department to accommodate *important* economic or social development. Therefore, the applicant seeking authorization to degrade water quality must at a minimum identify the *important* economic or social development for which lowering water quality is necessary." IDAPA 58.01.02.052.08.d. (Emphasis added).

Unlike other parts of IDAPA where IDEQ's 401 water quality certification calls for precision, the AASJ regulations provide broad discretion to IDEQ to exercise its sovereign certification authority, when necessary, with qualitative judgments on socioeconomic factors. See IDAPA 58.01.02.052.08.d.iv ("Factors identified in the socioeconomic justification should be quantified whenever possible but for those factors that cannot be quantified a qualitative description of the impacts may be accepted.") Numeric data will inform the Agency as to the parameters of the IDAPA factors, but it is clear IDEQ is entitled to determine the *importance* of economic or social development qualitatively.

The commenters misinterpret IDAPA's AASJ analytical toolbox by suggesting to IDEQ that "any proposed degradation of water quality must be *explicitly* justified" (emphasis added) and that any benefits determined by the Agency are required to be "*essential* for the surrounding communities." (emphasis added) *See* Nez Perce Tribe's Comments on the Draft 401 Water Quality Certification for the Stibnite Gold Project Proposed by Perpetua Resources Idaho, Inc. (April 12, 2024) at 7. It is also suggested that the AASJ should be constrained to analyzing future economic benefits "particularly and specifically important to Valley County".

First, nowhere in the IDAPA regulations do the words "indispensable," "explicit," or "essential" appear as a modifier to any socioeconomic factor. Instead, IDAPA speaks to "*relevant*" social, economic and environmental health benefits," IDAPA 58.01.02.052.08.d.iiii (emphasis added); that such"[b]enefits and costs that must be analyzed *include, but are not limited to*" five factors set forth in that subsection, *id*.; and "*[p]otential* health impacts" *id*. 58.01.02.052.08.d.iiii.(3). Qualitative terms such as "relevant," "includ[ing], but not limited to;" and "potential" are far from rigid, unyielding analytical directives under the IDEQ regulations as the commenters promote.

Second, *nowhere* does IDAPA 58.01.02.052.08.d. confine the analysis of the socioeconomic benefit to information provided by Perpetua to IDEQ to so limited a geographic reach of Idaho. True, IDAPA speaks to "economic benefits to the community;" and "services to the community," *see id.* at 58.01.02.052.08.d.iii (1)-(2), but in the same context, IDAPA also affords the Agency ample discretion to consider broader socioeconomic justification beyond Valley County. As an example, the closely-held interests by the commenters (and shared by Perpetua) in anadromous fish restoration and recovery are *decidedly not* confined solely to Valley County. Future conservation of these species envision a journey from the Stibnite site to the Pacific Ocean and then a return to Valley County to spawn. Such social and economic benefits are not so limited in scope as proposed in these comments, but, importantly, this multi-state excursion for these ESA listed species can only begin through reconnection of habitat via construction of SGP's fish tunnel. This particular example

speaks volumes why the AASJ analysis by IDEQ cannot be as constricted as suggested by the commenters.

Finally, the commenters attempt to conjure ambiguity of the IDAPA framework that will guide IDEQ's determination. Administrative regulations are subject to the same principles of statutory construction as statutes. *Mason v. Donnelly Club,* 135 Idaho 581, 586 (2001). Interpretation of a rule begins with an examination of the literal words of the rule. *Mason,* 135 Idaho at 586. The language of the rule, like the language of a statute, should be given its plain, obvious, and rational meaning. *Id.* "[A] statute is not ambiguous merely because an astute mind can devise more than one interpretation of it." *Rim View Trout Co. v. Higginson,* 121 Idaho 819, 823, 828 P.2d 848, 852 (1992).

In this case, the astute minds of the commenters are attempting to create ambiguity in IDAPA where there is none.

B. The Scope of the AASJ As Applied to the Stibnite Gold Project

The draft AASJ was focused by IDEQ in purpose and scope to the sixteen AUs determined by the Agency to warrant Tier II protection with the potential for degradation relative to temperature.

The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade, or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the transmission line right-of-way expansion, and the diversion of West End Creek around West End pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure.

While Perpetua believes that, with the exception of West End Creek, there would be no possibility of degradation to any of the AUs warranting Tier II protection, Perpetua deferred to IDEQ and conservatively assumed potential degradation in the sixteen AUs evaluated in the AASJ.

The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification.

C. The Future Water Quality Benefits of the Stibnite Gold Project

IDAPA 58.01.02.052.08.d.ii affords IDEQ the opportunity to consider "the important social or economic development associated with the activity which can include cleanup/restoration of a closed facility." In the AASJ, the Company has described the pre-permitting cleanup of the Stibnite site it has voluntarily invested in through the Administrative Settlement Agreement and Order on Consent (ASAOC).

Rather, to the extent that the IDAPA framework connects "cleanup/restoration of a closed facility" to social and economic development, several additional features of the Stibnite Gold Project are discussed below, and by this reference, Perpetua's comments to IDEQ on the draft 401 water quality certification dated April 12, 2024 are incorporated herein.

1. Litigation Settlement with the Nez Perce Tribe and Development of the South Fork Salmon Water Quality Enhancement Fund

On August 8, 2023, the Nez Perce Tribe and Perpetua filed a final Settlement Agreement in U.S. District Court on the Clean Water Act lawsuit brought by the Tribe in 2019. The Parties entered a court-ordered dispute resolution process with a mediator in February 2021. The Clean Water Act lawsuit was related to pollutants entering the East Fork of the South Fork of the Salmon River. The pollutants stem from historical mining activity in the legacy Stibnite and Yellow Pine district of central Idaho which predate Perpetua's ownership interests in the site.

The Settlement Agreement provides for a total contribution of $5 million (with $1 million in attorney fees) by Perpetua to a South Fork Salmon Water Quality Enhancement Fund ("Fund") to be used by the Tribe solely to support water quality improvement projects in the South Fork Salmon River watershed and shall be focused on reducing pollutant loadings from the Stibnite Mining District (including the Stibnite Mine Project site and the Cinnabar Mine site), including downstream restoration if warranted, and areas of metal contamination of stream sediments in these vicinities.

Perpetua will contribute a total of $4 million to the Fund through annual payments of $1 million each year for four consecutive years, beginning no later than one year after the Court has approved the Parties' Settlement Agreement. Up to $300,000 may be credited against Perpetua's total contribution of $4 million to the Fund for an in-kind data collection project near the abandoned Cinnabar mine site to assist the Tribe in future decision making for the Fund.

This good faith settlement of a Clean Water Act dispute by Perpetua with the Nez Perce Tribe is resource dedication to cleanup that will ultimately be governed and determined by the Tribe.

1. Removal of legacy tailings (underlying the Spent Ore Disposal Area [SODA] area) to eliminate potential sources of metals leaching into the groundwater.

The loading contribution of the unlined Spent Ore Disposal Area, over which an impermeable cap was supposed to have been constructed pursuant to the *Mobil Oil* consent decree, is estimated at approximately 10 tons of arsenic which have leached from the SODA (including the underlying Bradley Mining tailings) in the past 20 years. See letter to Chase Cusack from Alan Haslam, VP Permitting, Perpetua Resources (April 12, 2024) at 9.

As an outcome of Perpetua's Stibnite Gold Project, the SODA area of the Stibnite site will be transformed through the reprocessing of ore-grade tailings and become the foundation for the Tailings Storage Facility. This feature of the Project is an investment in a critical improved water quality outcome due to the long-term operation of the Project and thus is a perfect fit for IDEQ consideration as socioeconomic justification under IDAPA 58.01.02.052.08.d.ii.

2. Removal and Relocation of Legacy Development Rock Adjacent to the East Fork South Fork of the Salmon River (EFSFSR)

As already brought to the attention of the Agency in its initial AASJ, the SGP will operate and simultaneously address legacy impacts to improve habitat and restore the Stibnite site. Early on and throughout the design process, as central goals for the SGP development and operation, Perpetua focused on key restoration and mitigation principles in establishing a "net benefit" goal for the SGP. A key operational parameter (and future environmental benefit) will be legacy material handling.

The general baseline water quality of the Stibnite site is well understood, but Perpetua is particularly mindful of the water quality upstream origin of the East Fork South Fork of the Salmon River (EFSFSR) near the Project site. This important watershed has been specifically addressed in the 2021 MMP, and as the Project proceeds, Perpetua will remove, relocate, and where appropriate, repurpose legacy development rock to remove sources of erosion and sediment that potentially affect the water quality in the EFSFSR. This is accomplished, as it will elsewhere throughout the Project footprint, *as a function of the responsible execution of mining*. Accordingly, this broad "activity" again meets IDAPA 58.01.02.052.08.d.ii. and can be

accounted for by IDEQ appropriately in its socioeconomic justification for its 401 water quality certification.

3. Removal of Potentially Contaminated Materials from the Legacy Ore Processing Facility and Smelter Sites

Finally, and again befitting Perpetua's commitment to appropriate legacy material handling during operations, the Project is fundamentally designed to remove potentially contaminated materials from the legacy ore processing facility and smelter sites (and any other contaminated areas identified during construction and operations), and place such materials in appropriately designed, engineered, and constructed permanent storage facilities.

Importantly, such a critical function of Perpetua's future operations – legacy handling and proper storage – are seamlessly integrated into the Project. Stated differently, cleanup of a currently abandoned Idaho mine site plagued by poor water quality (*see* IDAPA 58.01.02.052.08.d.ii "cleanup/restoration of a closed facility") will be undertaken *by mining*. The Project will fulfill two important socioeconomic considerations for IDEQ consideration: simultaneous job creation and employment in addition to a permanent clean up solution to a legacy site legally forsaken by the federal government.

III. CONCLUSION

As noted above, the CWA affords the State of Idaho an important – indeed *sovereign* - voice in the permitting of federal projects that could affect the State's water quality. Perpetua Resources respects the broad delegation of conditioning authority of the State of Idaho to undertake its Clean Water Act 401 water quality certification.

The Company has provided IDEQ appropriate information to make its evaluation on the socioeconomic justification supporting its 401 water quality certification. This response for additional information by the Agency further provides a record for appropriate action by IDEQ under its regulations at IDAPA 58.01.02.052.08.d that are neither constraining nor ambiguous as has been suggested by the commenters. Perpetua stands ready to provide any additional information supporting the socioeconomic justification for the Clean Water Act Section 401 water quality certification to be concluded by the Agency.

If you have any questions, please do not hesitate to contact us.

Respectfully submitted,



Alan D. Haslam
Vice President, Permitting
Perpetua Resources Idaho, Inc.

Attachments
SEJ-401 Technical Memorandum – revised final
SEJ-401 Technical Memorandum Redlines
AASJ Comment Response Table
Economic Review and Comment on Power Report Technical Memorandum by Highland Economics, Feb 2023

cc: Lance Holloway, IDEQ
Aaron Scheff, IDEQ
Michael Short, IDEQ

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Technical Memorandum

Prepared for: Perpetua Resources Idaho, Inc. (Perpetua Resources)

Project Title: Stibnite Gold Project

Project No.: 159446

Technical Memorandum

Subject: Idaho Department of Environmental Quality Alternatives Analysis and Socioeconomic Justification

Date: May 8, 2024

To: Perpetua Resources

From: Brown and Caldwell

Prepared by: _____
Melissa Boglioli, Senior Environmental Scientist

Reviewed by: _____
Paul M. Leonard, VP, Fellow, Water Resources

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List of Abbreviations

AA	Alternatives Analysis
AASJ	Alternatives Analysis and Socioeconomic Justification
amsl	above mean sea level
ASAOC	Administrative Settlement Agreement and Order on Consent
ATSDR	Agency for Toxic Substances and Disease Registry
AUs	Assessment Units
BT	Bull Trout
BMP	best management practices
BURP	Beneficial Use Reconnaissance Program
CFR	Code of Federal Regulations
cfs	cubic feet per second
CUP	Conditional Use Permit
CW	cold water
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DRSF	development rock storage facility
E. coli	Escherichia coli
EFMC	East Fork of Meadow Creek
EFSFSR	East Fork South Fork of the Salmon River
EIS	Environmental Impact Statement
EOY	End of Mining Year
FEIS	Final Environmental Impact Statement
IPCo	Idaho Power Company
IR	Integrated Report
IRA	Inventoried Roadless Area
km	kilometers
kV	kilovolt
LEDPA	Least Environmentally Damaging Practicable Alternative
LOAEL	Lowest Observed Adverse Effects Level
MDAT	maximum daily average temperature
MDMT	maximum daily maximum temperature
MMP	Modified Mine Plan
NEPA	National Environmental Policy Act
OH	overhead
ORW	Outstanding Resource Waters
OSV	over snow vehicle
PCR	primary contact recreation
PRO	Plan of Restoration and Operations
RCA	Riparian Conservation Area
RFAI	Requests for Additional Information
ROD	Record of Decision
ROW	right-of-way
SC	Sugar Creek
SDEIS	Supplemental Draft Environmental Impact Statement
SJ	Socioeconomic Justification
SGP	Stibnite Gold Project
SODA	Spent Ore Disposal Area
SPLNT	Stream and Pit Lake Network Temperature
SS	Salmonid Spawning
STEM	science, technology, engineering, and math
TCRA	time critical removal actions
T-line	transmission line
TSF	tailings storage facility
USACE	U.S. Army Corps of Engineers
USFS	United States Forest Service
WEC-HW	West End Creek headwaters
WOTUS	Waters of the United States
WQC	Water Quality Certification

Executive Summary

In April 2023, Perpetua submitted a CWA (Clean Water Act) Section 404 application to the U.S. Army Corps of Engineers (USACE) for dredge and fill impacts to Waters of the United States (WOTUS) in association with the Stibnite Gold Project (SGP). Under Section 401 of the CWA, a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into WOTUS unless a 401 Water Quality Certification (WQC) is issued, or certification is waived. Furthermore, every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain state 401 WQC that the proposed activity will comply with state water quality standards. The IDEQ is the agency designated in the State of Idaho to make 401 WQC decisions.

In May 2023, Perpetua requested a 401 WQC from IDEQ. As part of the antidegradation review of the submitted request, IDEQ identified 28 Assessment Units (AUs) within the SGP footprint warranting Tier II protection, with 16 of these determined to have the potential for degradation beyond ambient conditions with respect to temperature and warranting analysis. As such, an Alternatives Analysis (AA) and a Socioeconomic Justification (SJ) are required as part of the 401 WQC process (IDAPA 58.01.02, Section 052.08, subsections c and d). This document was prepared to satisfy these requirements and its purpose and scope is focused on the dredge and fill activities associated with the 16 AUs determined by IDEQ to warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these 16 AUs against the socioeconomic benefits to the community of the SGP as a whole to provide a rationale to warrant the potential for degradation beyond ambient conditions with respect to temperature.

The specific components of the SGP associated with the 16 AUs warranting Tier II protection and analysis include access routes to the mine site (both Burntlog and Johnson Creek Routes), transmission line access roads and rights-of-way (ROW), and West End pit. Dredge and fill activities in these areas include stream crossings for transmission line access roads and mine site access routes, wetland conversion from scrub-shrub to emergent wetland adjacent to streams flowing within the widened ROW, and the diversion of West End Creek around and downstream of West End Pit during mining operations.

For each of the specific SGP components associated with the AUs warranting Tier II protection and analysis, and the SGP as a whole, multiple alternatives have been considered and various design iterations have been developed to reduce impacts and to arrive at the least degrading plan for the SGP. From the Plan of Restoration and Operations (PRO; Midas Gold 2016) to the Modified Plan of Restoration and Operations (ModPRO; Brown and Caldwell 2019), to the ModPRO2 (Perpetua 2021) which became the 2021 Modified Mine Plan (2021 MMP) in the Supplemental Draft Environmental Impact Statement (SDEIS; USFS 2022d), analyses and feedback have shaped the SGP with modifications made to reduce environmental impacts.

The social and economic benefits of the SGP are numerous and include:

- Stibnite Mine Site Cleanup that will remove legacy mining materials and sources of sedimentation and contamination, improving and protecting future surface water quality:
  - $7.5 million committed by Perpetua for the pre-permitting cleanup of the Stibnite Mining District, already underway as part of the voluntary Administrative Settlement Agreement and Order on Consent (ASAOC) which is separate from but associated with the SGP
  - Additional reclamation and restoration of the site during the operations and reclamation and closure phases of the SGP
- Jobs created, salaries, and wages paid during each phase of the SGP. The SGP is anticipated to employ residents of Idaho, including Valley County, and contribute to economic growth and stability in the area:
  - 30 workers during the planning phase ($4.4 million in annual salaries and wages)

  - 640 workers during the construction phase ($66 million in annual salaries and wages)
  - 580 workers during the operations phase ($52.8 million in annual salaries and wages)
  - 160 workers during the reclamation and closure phase ($6.6 million in annual salaries and wages)
  - 40 workers during the monitoring phase ($1.6 million in annual salaries and wages)
- Perpetua's creation of Stibnite Foundation has provided and will continue to provide funding to non-profit organizations that work to meet various socioeconomic needs of the communities of southern Idaho County, Valley County and Adams County:
  - Initial $300,000 in cash contributions and 150,000 shares in the company
  - Commitment of additional $950,000 prior to operations phase
  - $500,000 annual contribution during operations phase
  - $200,000 in grants to local organizations supporting arts, science, education, and recreation
- Perpetua has made $2 million of direct investments in the local community to assist students in college and career preparation and supporting workforce development:
  - $40,000 to support McCall-Donnelly Career Technical programs
  - Over $185,000 in STEM education programming for local schools
  - Over $800,000 in student scholarships
  - Over $35,000 in support for the West Central Mountains Economic Development Council
  - $18,500 for Idaho STEM Center to support Shoshone-Bannock Tribes' Junior/Senior High School
- Perpetua's road condition and recreational access improvements have provided benefits to the local community of Yellow Pine and recreational users of the area, including.
  - $85,000 in permitting support for avalanche removal
  - $106,000 in 2021 to clear avalanche debris from Stibnite Road
  - $177,582 for dust abatement services on Johnson Creek and Stibnite Roads
  - $12,795 for dust abatement services for the Village of Yellow Pine
  - Over $800,000 for gravel surfacing, dust abatement, graded road segments, and upgraded and repaired culverts on Johnson Creek and Stibnite Roads.
- Perpetua will provide $4 million of contributions to a South Fork Salmon Water Quality Enhancement Fund (the "Fund") to be used by the Nez Perce Tribe to support water quality improvement projects in the South Fork Salmon River watershed.
- Perpetua is constructing or rebuilding a minimum of ten substations and upgrading or building seventy-four miles of transmission line which will add capacity and reliability to Valley County and the Village of Yellow Pine power infrastructure.

In addition, there are other agreements and commitments Perpetua has made with the local communities regarding road maintenance, materials transport safety, intersection improvements, traffic minimization, emergency response and training, and employment policies listed and described in Section 5 that will not only increase safety but will provide additional socioeconomic benefits.

The least degrading alternative is the 2021 MMP. In consideration of the dredge and fill activities proposed within the areas of the 16 AUs warranting Tier II protection with the potential for degradation beyond ambient conditions with respect to temperature, the benefits to the economy of Valley County and the services being provided to the community in association with the SGP provide a rationale to warrant the potential for degradation.

Section 1: Purpose

This document's purpose and scope is focused on the dredge and fill activities associated with the 16 AUs, determined by IDEQ, to warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these 16 AUs against the socioeconomic benefits to the community of the SGP as a whole to justify the potential for degradation beyond ambient conditions with respect to temperature.

This document is provided in addition to the May 26, 2023, CWA WQC request package submitted to IDEQ, which included:

- Request Form: (IDEQ 401 WQC Request Form_ADH Signed_05_26_2023.pdf)
- Attachment 1: (20230526_Attachment 1_SGP_401_CertificationRequest.pdf)
  - Appendix A, Assessment Unit Summaries (20230713_App A Assessment Unit Summaries.pdf)
  - Appendix B, Assessment Unit Tables
    - North Fork Payette Basin (20230526_App B Table NFPS.pdf)
    - South Fork Salmon Basin (20230526_App B Table SFSB.pdf)
    - Filterable Excel file with each table in its own tab (20230526_AppendixB_Tables.xlsx)
- Appendix C, Environmental Protection Measure Matrix (20230526_App C Environmental Protection Measure Matrix.xlsx)
- Appendix D, Webmap
  - Webmap Users Guide (Appendix D Webmap Users Guide.pdf)
  - ArcGIS Online Webmapping Application tool, "IDEQ Assessment Tool FINAL,"
  - Excel file with attribute tables for every GIS layer (PRII_SGP_401WQC_WebmapTables.xlsx)

Section 2, Project Approach and Development, lays out the guiding principles and administrative history of the SGP which has led to the current configuration of the proposed project.

Section 3, Antidegradation Review, describes in more detail the types of USACE dredge and fill impacts to WOTUS occurring that are associated with the 16 AUs warranting Tier II protection and analysis with the potential for degradation beyond ambient conditions with respect to temperature. These impacts include stream crossings for transmission line access roads and mine site access routes (both new and upgraded or replaced culverts as well as maintained culverts and bridges), wetland conversion from scrub-shrub to emergent wetland adjacent to streams flowing within the widened transmission line ROW, and the diversion of West End Creek around and downstream of West End pit with the eventual capture and retention of the upper West End Creek at West End pit lake after reclamation and closure.

Section 4, Alternatives Analysis, focuses on the specific components of the SGP that are associated with the 16 AUs warranting Tier II protection and analysis with the potential for degradation beyond ambient conditions with respect to temperature. These components include the access routes, transmission line, and West End pit area of the mine site. Alternatives considered are described relative to reduction in impacts and the arrival at the current preferred alternative in the 2021 MMP.

Section 5, Socioeconomic Justification, follows the relevant portions of the outline provided in IDAPA 58.01.02, Section 052.08, subsection d, with subsections addressing the affected community, the economic development associated with the SGP, and social, economic, and environmental health benefits and costs associated with the preferred alternative.

Together these sections provide the required supporting analysis for the 16 AUs identified as warranting Tier II protection and analysis and demonstrate that the SGP has been designed to be least degrading, as well as

providing social and economic benefits that establish a rationale to warrant the action causing the potential for degradation beyond ambient conditions with respect to temperature, (in this case are stream crossings for transmission line access roads and mine site access routes) wetland conversion from scrub-shrub to emergent wetland adjacent to streams flowing within the widened ROW, and the diversion of West End Creek around and downstream of West End pit.

Section 2: Project Approach and Development

The SGP, in its entirety, proposes to occupy and use United States Forest Service (USFS) lands for operations associated with open-pit mining and ore processing. From the outset, Perpetua has incorporated the objectives of addressing historical impacts; protecting the environment during all SGP phases; and completing reclamation that incorporates stream restoration, wetland construction and enhancement, reforestation, and wildlife habitat enhancement.

Perpetua considers the health and safety of people, the protection of the environment, and the sustainability of project activities to be the core values that drive all aspects of project activities (Midas Gold 2016). This foundation of core values is reflected in the commitments to safety, environmental responsibility, community, accountability, integrity, and transparency; the training of employees so they understand and appreciate these core values; and company performance as measured by achievement of these goals.

Since the commencement of activities at the SGP, guided by the core values, Perpetua established environmental principles that are reflected in robust policies on and off site to protect the natural environment. Perpetua's commitment to the environment goes beyond just protecting what is there by identifying opportunities to enhance the ecosystem in which the SGP operates and by addressing legacy impacts to improve habitat and restore the site. Early on, and throughout the design process, as central goals for the SGP development and operation, Perpetua focused on key restoration and mitigation principles in establishing a "net benefit" goal for the SGP. These activities are listed below under the three general categories of legacy material handling, sediment management, and fish habitat, spawning, and passage.

- Legacy Material Handling
  - Remove and re-process legacy tailings (underlying the Spent Ore Disposal Area [SODA] area) to eliminate potential sources of metals leaching into the groundwater.
  - Remove, relocate, and where appropriate, repurpose legacy development rock from adjacent to the East Fork South Fork of the Salmon River (EFSFSR) to remove sources of erosion and sediment that potentially affect the water quality in the EFSFSR.
  - Re-use legacy spent ore material and legacy development rock for construction activities to reduce the amount of fresh material required to be mined for construction purposes.
  - Remove unconstrained and potentially contaminated materials from the legacy ore processing facility and smelter sites (and any other contaminated areas identified during construction and operations), and place such materials in appropriately designed, engineered, and constructed permanent storage facilities.
- Sediment Management
  - Reforest the SGP area to reduce sediment run-off that negatively impacts water quality and fish habitat, and enhance vegetation, riparian habitat, and tree canopy that would support increased wildlife populations and manage water temperature, thereby enhancing fish habitat.
  - Provide a permanent replacement for the rapidly filling Yellow Pine pit lake that is acting as a catchment for sediment transport from the headwaters of the EFSFSR.

  - Implement sediment control actions, such as repairing the effects of the legacy dam failure at East Fork of Meadow Creek (EFMC, aka Blowout Creek), thereby reducing sediment input into Meadow Creek and the EFSFSR, which should improve fish habitat and encourage additional spawning and natural fish population growth, resulting in a beneficial environmental outcome.
- Fish Habitat, Spawning, and Passage
  - Remove existing barriers to fish migration and re-establish salmon and steelhead passage to the headwaters of the EFSFSR and Meadow Creek.
  - Re-establish fish habitat and spawning areas in the newly accessible EFSFSR and Meadow Creek.
  - Restore stream channels and riparian habitat that were altered or impacted by previous mining, to improve fish habitat, fish spawning and fish passage, in support of developing a robust population of natural migratory fish.
  - Enhance fish habitat, spawning beds, and fish passage in drainages upstream of the current blockage to fish passage, in further support of developing a robust population of natural migratory fish, providing a beneficial environmental outcome.

In addition to the site rehabilitation from legacy disturbance, Perpetua will minimize the SGP's footprint and related impacts by using existing roads and by locating new facilities on previously impacted ground to the maximum reasonable extent and away from riparian areas to minimize potential impacts on or risks to water quality and fish populations.

Planning for this SGP began with the development and submittal of the PRO in September 2016 to the United States Forest Service (USFS). Leading up to the submittal of the PRO, Perpetua completed extensive exploration, alternatives analyses, and pre-feasibility studies. These evaluations included efforts to design a project that met the purpose and need, but also minimized the potential environmental impacts to the greatest reasonable and practicable extent. This included an iterative process of evaluating the size, location, and design of project components (e.g., pits, tailings storage facility [TSF], development rock storage facility [DRSFs], etc.) and interrelated infrastructure (e.g., access and haul roads, transmission lines, and public access routes). The minimization of potential impacts to natural and human resources was a central element of these efforts.

The USFS accepted the PRO as administratively complete in December 2016 and began to process the application. On June 5, 2017, the USFS announced in the Federal Register its intent to prepare an Environmental Impact Statement (EIS) to evaluate and disclose the potential environmental effects of the PRO and occupying USFS lands and making necessary changes to the Payette and Boise National Forest Land Resource Management Plans. Scoping for the EIS was completed in 2017, and the USFS began to evaluate whether to approve the PRO as submitted by Perpetua, or to require changes or additions to meet the requirements for environmental protection and reclamation set forth at 36 CFR 228 Subpart A before approving a final plan. The USFS began a review of alternatives and design features that may be determined reasonable and necessary to meet USFS regulations for locatable minerals set forth at 36 CFR 228 Subpart A, and that may require changes and/or additions to the SGP as proposed.

While the USFS was in the process of evaluating alternatives, Perpetua continued to refine and clarify the PRO. This included completing more detailed feasibility analyses and reevaluating the components of the SGP to explore how they might be modified to further avoid and minimize environmental impacts, meet the SGP purpose and need, and result in a better project overall. Perpetua's own studies of the potential effect of the project on the impact footprint and key resources such as wetlands and streams, water quality, federally listed species, public use, and other environmental considerations pointed to areas in which the SGP's environmental performance might be improved though modifications of the PRO. Perpetua evaluated numerous options leading to either adoption or rejection of certain component alternatives.

At the same time, the USFS was refining its understanding and description of the PRO. The USFS submitted to Perpetua more than 146 Requests for Additional Information (RFAI), seeking clarification of the details of the PRO to describe the PRO fully and accurately in the Draft EIS (DEIS) as the "Proposed Action." In some cases, responding to these RFAIs produced additional information and potentially feasible alternatives to components of the PRO that led to consideration of additional potential modification of SGP components, operations, or environmental measures that would still meet the SGP purpose and need but also further reduce its environmental impacts.

The culmination of this process shows that Perpetua developed incremental improvements to the PRO and submitted a modified PRO as its refined proposal to be evaluated in the EIS. After discussions with the USFS, Perpetua submitted the ModPRO in September 2019, prior to the preparation of the SGP DEIS. The SGP PRO and ModPRO were included in the SGP DEIS submitted in August 2020.

A second proposed modification to refine and improve the PRO and ModPRO resulted in the ModPRO2 and herein referred to as the 2021 MMP. The 2021 MMP was finalized in October 2021 to further reduce potential environmental impacts in alignment with Perpetua Resources' Core Values.

SGP refinements in the 2021 MMP:

- Are supported by updated data and analysis;
- Address persistent potential environmental impacts not sufficiently reduced by refinements included in the original ModPRO;
- Are informed by public and reviewing agencies' comments on the DEIS,
- Align with the National Environmental Policy Act (NEPA) and all applicable federal, state, and local regulations and permit requirements, and
- Align with the SGP development approach in the SGP Feasibility Study (M3 Engineering and Technology 2021).

The 2021 MMP presents a smaller footprint. Mining methods, ore processing, exploration activities, water management, and supporting features including structures, access, haul roads and infrastructure are similar to the PRO and/or the ModPRO or are modified to reduce environmental impacts.

The actions proposed under the 2021 MMP would take place over a period of approximately 20 to 25 years, not including the long-term, post-closure environmental monitoring or potential long-term water treatment. The phases of the SGP include:

- Construction (approximately three years; Mine years -3 through -1);
- Mining and Ore Processing Operations (approximately 15 years; Mine years 1 through 15);
- Surface and Underground Exploration (approximately 17 years, beginning during construction and continuing concurrent with operations; Mine years -2 through 15); and
- Closure and Reclamation (Mine year 16+). Most activities in the Closure and Reclamation period would be completed within five years. However, closure water management and water treatment are expected to continue for as long as 25 years (Mine years 16 through 40).

Based on the scope of the mine plan refinements in the 2021 MMP, the USFS determined that a Supplemental Draft EIS (SDEIS) for the SGP was warranted. In October 2022, the USFS released the SDEIS for public review and comment. One alternative evaluated in the SDEIS, which varied from the 2021 MMP, is using Johnson Creek as the main project access route along with a No Action Alternative (USFS 2022d). The SDEIS identified the 2021 MMP as the preferred alternative. The USFS will publish a Final EIS (FEIS) along with a draft Record of Decision (ROD), followed by a 45-day objection period, and publication of the Final ROD after the USFS has responded to objections.

Section 3: Antidegradation Review

In April 2023, Perpetua submitted a CWA Section 404 application to the USACE for dredge and fill impacts to WOTUS and on May 26, 2023 requested 401 WQC from IDEQ. As part of the 401 WQC process, an antidegradation review is required (IDAPA 58.01.02.052.04). This review includes a tier determination using a water body by water body approach based on an assessment of the chemical, physical, biological, and other information available regarding the water body. This assessment uses the most recent federally approved Idaho 2022 Integrated Report (IR) (IDEQ 2022), which summarizes water quality throughout the state (IDAPA 58.01.02.052.05).

3.1 Tier II Analysis

There are three tiers of antidegradation protection (IDEQ 2023):

> "Tier I protection is the minimum level of protection and requires that the level of water quality necessary to protect existing uses be maintained and water quality criteria be met. Tier I protection applies to all surface waters, regardless of the current water quality or designated use (IDAPA 58.01.01.052.01). A review is conducted to prevent authorizing an activity or discharge that would cause or contribute to a beneficial use not being fully supported or violation of water quality criteria. Tier I protection and review account for existing beneficial uses and must be performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07)."
>
> "Tier II protection applies to the subset of surface waters that are of high quality as determined on a water body-by-water body basis. For these high-quality waters, Tier II provides an added layer of protection in addition to Tier I minimum protection. A Tier II determination protects high-quality waters from degradation by requiring an analysis of the necessity for significant degradation and the social or economic importance of the activity before it is allowed (IDAPA 58.01.02.052.08). Significant degradation may occur only after an acceptable analysis of alternatives for avoiding or minimizing pollution of the water and an acceptable social or economic justification of importance of the action causing degradation."
>
> "Tier III protection, the highest level of protection, prohibits degradation, and applies only to waters of the highest quality or with other outstanding resource values that the legislature has designated by law as worthy of such protection (Outstanding Resource Waters [ORWs]). No ORWs have been designated in Idaho as of 2022."

For assessment and reporting purposes, IDEQ subdivides Idaho's waters into AUs. An AU is a group of similar stream segments within a water body unit with similar hydrology (e.g., Strahler stream order), land-use practices, ownership, or land management. Overall, a total of thirty-three AUs have been identified as associated with the SGP footprint. As part of the antidegradation review of the submitted request, IDEQ identified 16 of these AUs as High Quality Waters with the potential for degradation beyond ambient conditions with respect to temperature that warrant Tier II protection and analysis.

Idaho's water bodies were coded to the 1:250,000-scale hydrography and named based on the 1:100,000-scale hydrography. In contrast, delineated wetlands and streams were identified in the field and therefore mapped to a much finer scale. To determine wetland and stream impacts associated with an AU, each delineated wetland and stream was assigned an AU based on where it is located within the landscape and which AU is downhill or downstream of it.

There are 28 water bodies (AUs) listed in Appendix B of IDEQ's Draft Certification identified as warranting Tier II protection for cold water aquatic life (CWAL), salmonid spawning (SS), primary contact recreation (PCR) and/or secondary contact recreation (SCR). For this analysis, 16 water bodies were identified by IDEQ, and provided in a list to Perpetua, as high-quality waters with the potential for degradation beyond ambient

conditions with respect to temperature that warrant Tier II protection and analysis. These 16 water bodies determined the scope and purpose of this document.

The twelve AUs identified by IDEQ as warranting Tier II protection that were not included in the list of AUs provided by IDEQ for inclusion in this analysis are listed below with their designated beneficial uses noted:

- ID17050123SW001_06 – PCR
- ID17050123SW007L_0L – PCR
- ID17050123SW011_02 – SCR
- ID17050123SW011_03 – SCR
- ID17050123SW012_03 – PCR
- ID17060208SL010_04 – PCR
- ID17060208SL017_03 – CWAL, SS, PCR
- ID17060208SL019_02 – PCR
- ID17060208SL019_03 – SCR
- ID17060208SL023_02 – PCR
- ID17060208SL025_04 – PCR
- ID17060208SL026_03 – CWAL, SS, PCR

For AUs listed above that are Tier II based on PCR or SCR only, they were not included in the list because the potential for degradation is focused only on temperature, as per the IDEQ.

Also, with no dredge and fill activities occurring within AUs ID17060208SL017_03 or ID17060208SL026_03, they were not included in the list because there is no potential for degradation relative to temperature from project activities as none would occur here.

Table 1 lists the 16 identified AUs along with their location within the SGP footprint, the proposed impacts to delineated streams and wetlands associated with each AU, and the CWA Section 404 dredge and fill action that would be the potential source of degradation with respect to temperature. Following Table 1 is a description of each CWA Section 404 dredge and fill action proposed as it relates to the identified AUs warranting Tier II protection and analysis, and a consideration of the likelihood for degradation from this action with respect to temperature.

Figure 1 shows the location of the 16 AUs within the SGP area relative to the transmission line, access route, and mine site components of the SGP footprint. Some AUs are associated with multiple components and therefore the following list is not additive.

- Ten AUs listed as warranting Tier II protection and analysis within the SGP footprint are associated with transmission line re-routes and upgrades. No stream impact is proposed in five of the AUs as the streams will traverse the proposed ROW for the transmission line but will not be impacted by dredge and fill. However, some of these streams are adjacent to areas of scrub-shrub wetland that will be converted to emergent wetland within the widened ROW. In the other five AUs associated with the transmission line, the impacts are due to the installation of new culverts or the upgrade, replacement, or maintenance of existing culverts for transmission line access roads.
- Nine AUs are associated with roads along mine site access routes, namely Burntlog Road (four AUs), Johnson Creek Road (three AUs), Warm Lake Road (one AU), and Stibnite Road (three AUs). For these access roads, all the impacts proposed are for the installation of new culverts or the upgrade, replacement, or maintenance of existing culverts and bridges.

- Finally, one AU is associated with the West End pit on the mine site. The impact proposed is the diversion of West End Creek around West End pit to avoid comingling of creek water with mine affected waters with the upper end of West End Creek being captured and retained in West End pit lake after reclamation and closure.

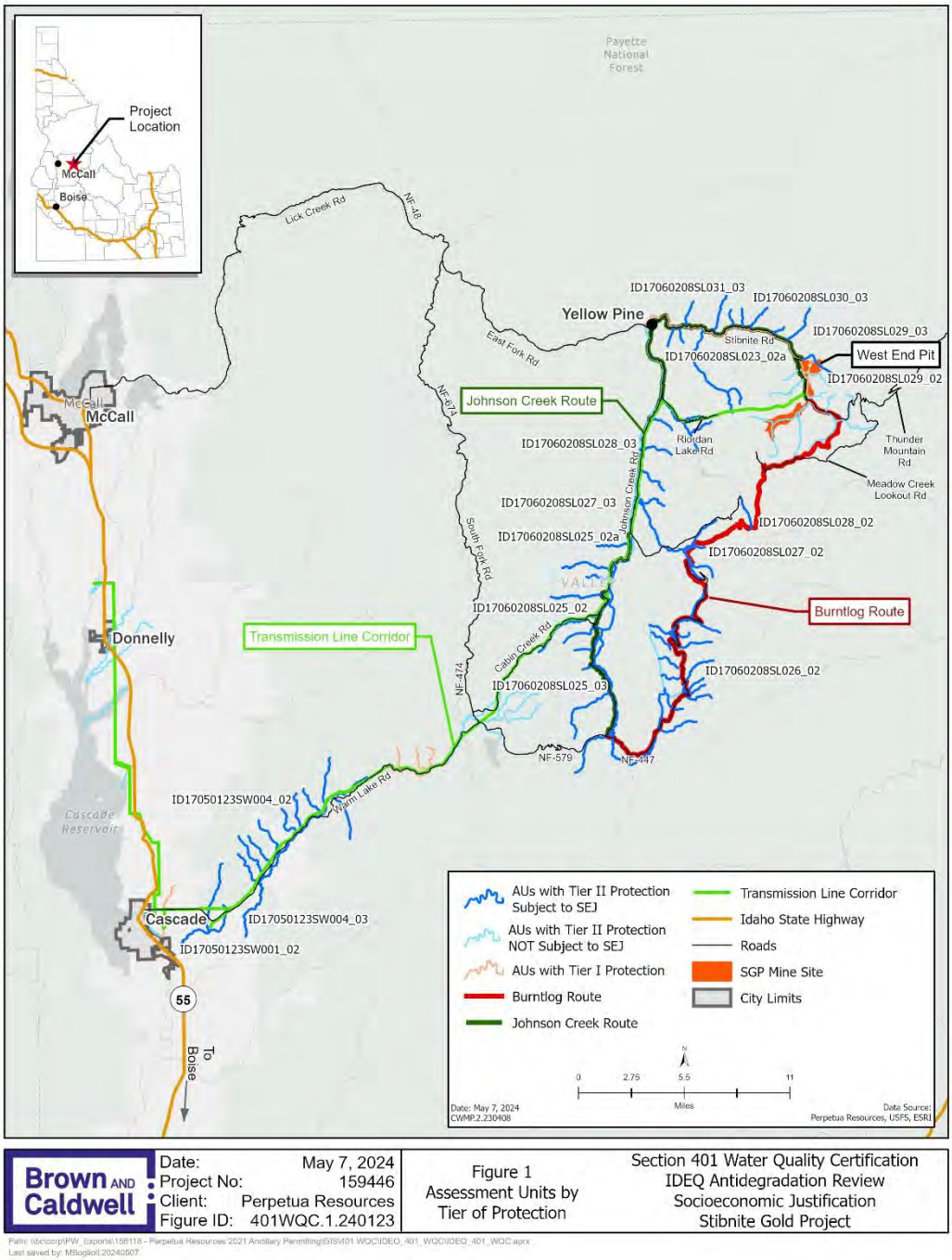


Figure 1. Assessment Units According to Antidegradation Protection Tier with Associated SGP Components

Table 1. Stream Assessment Units Identified by IDEQ as Requiring Tier II Protection and Analysis With the Potential for Degradation (With Respect to Temperature)

AU ID	AU Name and Strahler Stream Order	SGP Component	Delineated Stream Impact (linear feet)[1]	Delineated Wetland Impact (acres)[1]	Source of Potential Degradation
North Fork Payette Basin					
ID17050123SW001_02	North Fork Payette 1st & 2nd order	re-route of T-line	none	0.5	Streams within existing T-line components and new T-line ROW footprint with OH T-lines.
ID17050123SW004_02	Big Creek 1st & 2nd order	T-line upgrade	117	2.5	One new and one replacement culvert; Streams within existing T-line components and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.
ID17050123SW004_03	Big Creek upper 3rd order	T-line upgrade	none	1.4	Streams within existing T-line components and new T-line ROW footprint with OH T-lines.
South Fork Salmon Basin					
ID17060208SL023_02a	EFSFSR 1st & 2nd order	Stibnite Road, T-line upgrade	none	1.5	Maintenance of two culverts on Stibnite Road and stream within new T-line ROW.
ID17060208SL025_02	Upper Johnson Creek and tributaries 1st & 2nd order	T-line upgrade, crossings of Johnson Creek Road	140	4.7	Maintenance of five culverts and one upgraded/replaced culvert on Johnson Creek Road; six upgraded/replaced culverts and one new culvert on T-line access roads. Streams within existing T-line components and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.
ID17060208SL025_02a	Lower Johnson Creek 1st & 2nd order tributaries	T-line upgrade	none	1.3	Maintenance of two bridges and three culverts on Johnson Creek Road and existing T-line access roads; Streams within existing T-line components and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.

AU ID	AU Name and Strahler Stream Order	SGP Component	Delineated Stream Impact (linear feet)[1]	Delineated Wetland Impact (acres)[1]	Source of Potential Degradation
ID17060208SL025_03	Johnson Creek 3rd order	T-line upgrade, Johnson Creek Road, Warm Lake Road, Burntlog Road	176	0.8	Upgrade/replacement of four culverts, maintenance of thirteen culverts on Johnson Creek, Warm Lake, and Burntlog Roads; Streams within existing T-line components and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.
ID17060208SL026_02	Burntlog Creek & tributaries - 1st & 2nd order	Burntlog Road	3366	4.4	Three new and 51 upgraded/replaced culverts during construction of Burntlog Route.
ID17060208SL027_02	Trapper Creek & tributaries 1st & 2nd order	Burntlog Road	1537	2.0	Seventeen new and four upgraded/replaced culverts during construction of Burntlog Route; some new culverts in areas of new road resulting in the loss of adjacent scrub-shrub wetlands and forest canopy.
ID17060208SL027_03	Trapper Creek 3rd order	T-line upgrade	none	0.1	One maintained culvert on Johnson Creek Road; Stream within existing T-line ROW and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.
ID17060208SL028_02	Riordan & NF Riordan Creeks 1st & 2nd order	T-line upgrade, Burntlog Road	159	0.8	Three new culverts on Burntlog Road; two upgraded/replaced culverts for T-line access road; Streams within existing access roads for T-line and new T-line ROW footprint with OH T-lines and some areas adjacent to scrub-shrub conversion.
ID17060208SL028_03	Riordan Creek 3rd order (North Fork to mouth)	T-line install, Johnson Creek Road	30	0.1	One maintained culvert on Johnson Creek Road; Two upgraded/replaced culverts on T-line access road; Streams within new T-line ROW footprint with OH T-lines and

AU ID	AU Name and Strahler Stream Order	SGP Component	Delineated Stream Impact (linear feet)[1]	Delineated Wetland Impact (acres)[1]	Source of Potential Degradation
					adjacent to 0.1 acres of scrub-shrub conversion.
ID17060208SL029_02	Sugar Creek & tributaries 1st & 2nd order	West End pit	1008	0.7	Diversion of West End Creek into open channel and underground pipe for life of mine. After closure the upper portion of West End Creek will be captured and retained at West End pit lake.
ID17060208SL029_03	Sugar Creek 3rd order (Cane Creek to mouth)	Stibnite Road	15	none	One upgraded/replaced culvert on Stibnite Road.
ID17060208SL030_03	Tamarack Creek 3rd order (Bum Cr. to SF Salmon River)	Stibnite Road	none	none	One maintained bridge on Stibnite Road.
ID17060208SL031_03	Profile Creek 3rd order (Missouri Creek to South Fork Salmon River)	Stibnite Road	none	none	One maintained bridge on Stibnite Road.

Notes:

[1]: Delineated stream and wetland impact as per USACE, IDWR and IDL Joint Permit Application submitted April 7, 2023

Abbreviations:

AU: Assessment Unit

SGP: Stibnite Gold Project

T-line: transmission line

ROW: right of way

OH: overhead

3.2 Sources of Potential Degradation

Regardless of project component, there are three CWA Section 404 activities proposed that are associated with the 16 AUs identified as warranting Tier II protection and analysis with the potential for degradation beyond ambient conditions with respect to temperature. These include stream crossings for roads, conversion of wetland vegetation adjacent to streams traversing transmission lines, and the diversion of West End Creek around West End pit.

3.2.1 Stream Crossings

Road maintenance, improvement, and construction may require the upgrade or replacement of existing culverts, bridges, as well as construction and installation of new culverts and bridges at stream crossings across the SGP. Stream crossings within AUs warranting Tier II protection and analysis are associated with transmission line access roads and mine site access routes.

The existing road networks used to access transmission line structures may require maintenance or improvements to allow construction equipment safe access into the power line corridor. These maintenance and improvement activities include the upgrade or replacement of existing culverts and the installation of new culverts at stream crossings.

Warm Lake Road runs east from the State Route 55 intersection in Cascade, then heads northeast and east once more before it terminates in Landmark after 37 miles. At this point, both the Johnson Creek Route and Burntlog Route begin. Culverts along Warm Lake Road will be maintained during the life of the SGP, and no construction is planned. Therefore, no AUs warranting Tier II protection and analysis have the potential to be degraded with respect to temperature for Warm Lake Road.

Activities associated with the identified AUs warranting Tier II protection and analysis along the Johnson Creek Route include road resurfacing, and the maintenance or replacement of culverts, as appropriate. The Johnson Creek Route will be used as a primary mine access route for the first two years of mine construction while the Burntlog Route is being constructed. Once construction of the Burntlog Route is completed, the Johnson Creek Route would no longer be used and the improvements to the Johnson Creek Route would remain after mining operations end.

There are 28 perennial, 38 intermittent, and 20 ephemeral stream crossings delineated along the proposed Burntlog Route that are associated with AUs warranting Tier II protection and analysis. At each of these crossings, culverts will either be installed, maintained, or upgraded and replaced. Perpetua will minimize the footprint of the Burntlog Road during the initial upgrade and extension construction to avoid needless vegetation removal, thereby reducing soil erosion and stream shading loss in areas of stream crossings.

New and upgraded or replaced stream crossings associated with access roads would be designed to minimize potential impacts on surface water hydrology, water quality, and fish passage. Bridges and culverts would be maintained to allow proper drainage and limit sediment delivery to area streams.

As noted throughout the SGP documents, pre-construction water management activities would include the installation of surface water management features and implementation of best management practices (BMPs) to reduce erosion and sediment delivery to streams. These water management features and BMPs could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; energy dissipation structures; terraces; and other features specified in construction permits.

Erosion control measures, such as silt fencing, ditch checks and other measures, will be installed and maintained to minimize environmental impact. Bridges and culverts will also be maintained to

allow water drainage and limit sediment delivery to area streams. These design parameters will reduce sedimentation, thus protecting water quality for the life of the SGP.

At the end of the operations phase of the SGP, the transmission line segment from the mine site to the Johnson Creek Substation will be reclaimed, and the segment from the Johnson Creek Substation to the Lake Fork Substation will be left intact to service current and future utility customers along the route, including the Yellow Pine area. The access roads will be reclaimed in a manner similar to mine roads where compacted areas will be scarified (i.e., deep ripped) with a dozer-mounted ripper shank or disk, or otherwise left in a roughened condition prior to growth media/seed bank material placement and revegetation. These areas will also be recontoured to their approximate original condition by reestablishing drainages and grading disturbed areas to blend with adjacent topography. Culverts will be removed to reestablish drainage. Riprap or other armoring methods are anticipated to be necessary in reestablished some drainages to limit scour and head cutting (Tetra Tech 2021).

The approximately 15 miles of Burntlog Route connecting to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be decommissioned by pulling back and re-contouring road cuts to slopes that are similar to pre-project conditions, and that would be consistent with the surrounding terrain as practicable. Once all final mine reclamation and closure work has been completed, Perpetua would remove ditches, cross drains, culverts, safety berms, mile markers, guardrails, and signs on roads if these features are no longer needed. As appropriate, Perpetua will leave water bars or other erosion or sediment control structures, but any long-term road maintenance for the Burntlog Road will revert to the responsibility of the USFS on completion of this reclamation work.

The width of vegetation to be removed along a waterbody to accommodate the road corridor and thus a culvert will only be approximately fifty feet wide and will be minimized to the extent practicable near stream crossings. Water redirected by erosion and sediment controls may be exposed to sunlight for a longer period and could become warmer before seeping into the ground or joining a waterbody. However, the volume of this water and the temporal nature of precipitation would not be expected to be large enough to substantially affect the temperature of the AU in an appreciable way. For culverts existing prior to the project, that will remain post-project, and will be maintained during the SGP and after reclamation and closure by Perpetua or USFS, the potential for degradation would be equal to current conditions and not SGP related.

Taking into consideration the dredge and fill activities proposed to upgrade, replace, or install stream crossings within the areas of the AUs warranting Tier II protection, the benefits to the economy of Valley County and the services being provided to the community in association with the SGP provide a rationale to warrant the potential for degradation with respect to temperature.

3.2.2 Wetland Conversion in Transmission Line ROW

During construction of the transmission line upgrade and extension, the removal of vegetation to widen the ROW corridor would be required. The transmission line ROW will be 100 feet wide. Approximately 90 percent of the transmission line has an existing 70-foot ROW that will be widened an additional 15-feet to either side of the center line. The segment between the Johnson Creek substation and Stibnite will include new vegetation removal even though approximately 70 percent of the segment follows a previous transmission line ROW.

Following removal of the transmission line segment between the Johnson Creek substation and Stibnite in the 1970's, vegetation re-established along the historic ROW. Construction and maintenance of the ROW for the new and upgraded transmission line will require that wetland

vegetation classified as forested, or scrub-shrub be converted to emergent by cutting back trees and shrubs. There is no ground disturbance proposed for this wetland conversion. In some AUs identified as warranting Tier II protection and analysis, there are streams that flow through areas of scrub-shrub wetlands within the transmission line ROW. After conversion, these areas would be maintained as emergent wetlands.

The benefits to the economy of Valley County and the services provided to the community, in association with the SGP, provide a rationale to warrant the potential for degradation with respect to temperature. This takes into consideration the dredge and fill activities related to the conversion of scrub-shrub wetland vegetation and emergent wetlands adjacent to streams that traverse the widened areas of transmission line ROW within the areas of the AUs warranting Tier II protection.

3.2.3 West End Creek Diversion

West End Creek is classified as a first order perennial stream. In the Surface Water Hydrology Baseline Study (HydroGeo 2012), West End Creek is characterized as a small tributary which drains into Sugar Creek from the south with flow that disappears and reappears through French drains among historic waste rock piles. West End Creek has been heavily impacted by legacy mining and mining-related activities, including development rock placement over the stream channel, diversion of the stream, and mining out of portions of the stream channel.

West End Creek, as well as the other tributaries along this segment of Sugar Creek, starts out very steep and as it nears the confluence with Sugar Creek, it has a much flatter gradient. This results in different habitats, and suitability for salmonids only in the lower reaches. Figure 2 illustrates West End Creek from the headwaters to the confluence of Sugar Creek and the proximity of West End Creek to the confluence of Sugar Creek and EFSFSR. The confluence of West End Creek with Sugar Creek is approximately 3,400 feet upstream of the EFSFSR and Sugar Creek confluence. West End Creek is approximately 8,200 feet long from its headwaters, through West End pit, to Sugar Creek. Two aboveground segments of West End Creek were delineated within the SGP footprint (Tetra Tech 2013; Figure 2). The upper portion, south of the West End pit location, is approximately 2,300 feet long and the middle portion, within the legacy mining area, is approximately 860 feet long. In the Wetland Resources Baseline Study (Tetra Tech 2013), the ordinary high water mark for these portions of West End Creek within the Project footprint is reported to range between one half and two feet deep and one to three feet wide. The lower portion of West End Creek from the northernmost extent of the legacy mining area to where it joins Sugar Creek is approximately 1,870 feet (Figure 2). This length of stream is outside of the project footprint. Overall, approximately 3,170 feet (or almost forty percent) of West End Creek is currently flowing subsurface though the legacy waste rock dump areas.

West End Creek drains an area of 0.6 square miles. The estimated peak discharge of a 100-year event is 10 cubic feet per second (cfs). In May 2009, West End Creek was flowing with a discharge of 2.1 cfs at the confluence with Sugar Creek. Daily average stream flows for the headwaters are 0.02 cfs.

The contribution of the flow of West End Creek is very small relative to the typical flow in Sugar Creek. Sugar Creek drains an area of 18 square miles before it joins the EFSFSR. The estimated peak discharge for a 100-year event is 289 cfs but may range from 142 to 590 cfs. In May 2009 Sugar Creek had a flow of 145 cfs at 3,700 feet upstream of its confluence with EFSFSR (approximately the location of the confluence of West End Creek with Sugar Creek), which is seventy times the flow of West End Creek during the same sampling period, and a flow of 205 cfs at the confluence with EFSFSR.

The primary source of flow in West End Creek changes as it makes its way through the watershed. From the headwaters of West End Creek to the point at which the streambed reaches an elevation of 6,365 feet above mean sea level (amsl; Figure 2), the streambed flows over bedrock, above the level of the groundwater, and therefore the flow along this stretch is fed entirely by precipitation and runoff. This stretch of West End Creek includes the SGP footprint and where the West End pit lake will be. From 6,365 feet amsl down to the confluence of West End Creek with Sugar Creek (approximately 1525 feet), the streambed meets the water table, which becomes the primary source of flow, with precipitation and runoff being secondary sources. This lower portion of West End Creek is entirely downstream of the area of West End pit and downstream of where the West End pit lake will be. Therefore, while the upper and middle portion of West End Creek's surface flow will be captured and retained at West End pit following mining activities, West End Creek will continue to have surface flow downstream of West End pit where it will continue to have connection with groundwater and continue to receive input from precipitation and runoff from this portion of the West End Creek watershed.

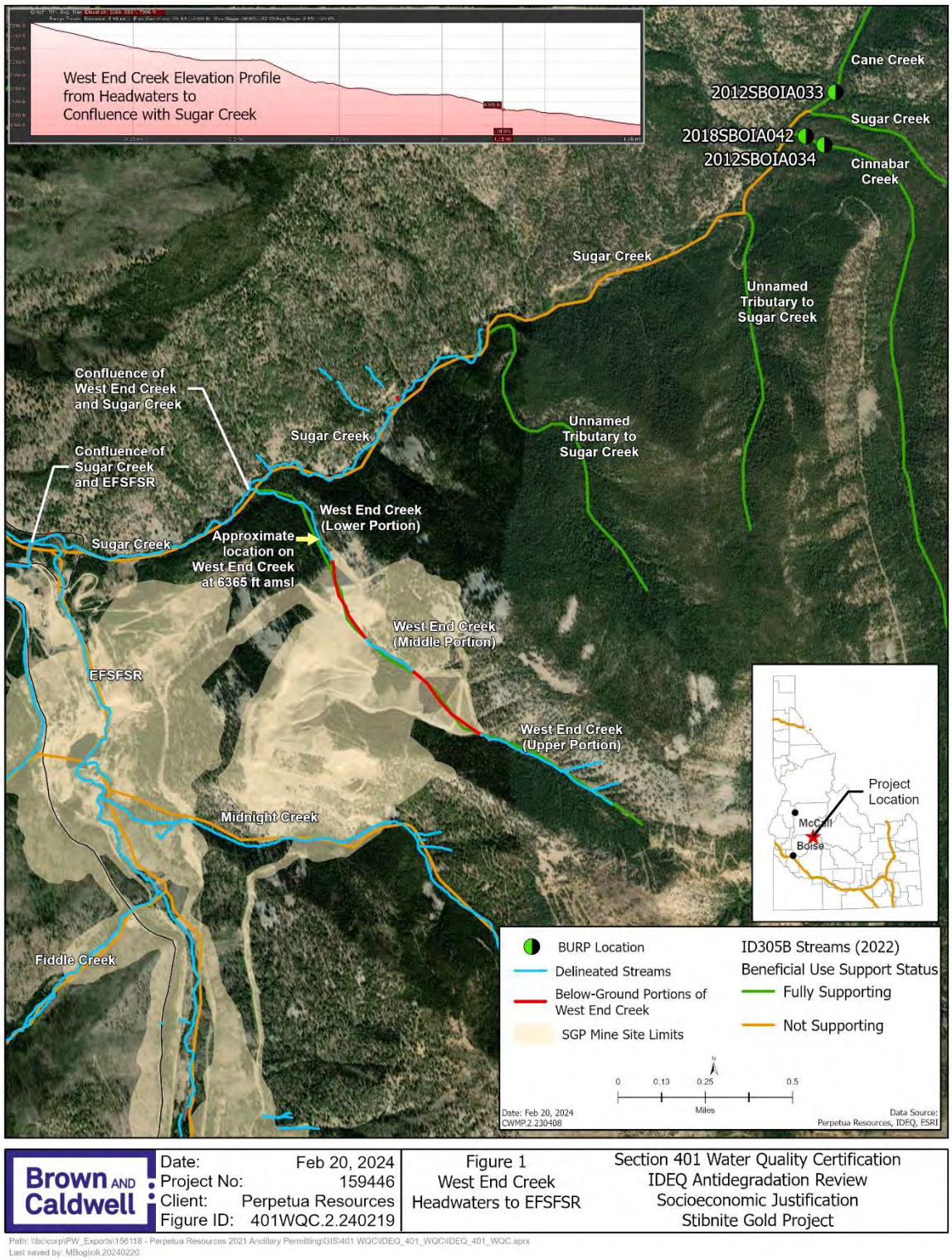


Figure 2. Above- and below-ground portions of West End Creek in relation to AU ID17060208SL029_02 BURP site locations and the confluences of West End Creek with Sugar Creek and Sugar Creek with EFSFSR.

Beneficial Uses

AU ID17060208SL029_02, which includes West End Creek, and identified as Sugar Creek and tributaries that are first and second order, has the following unassessed and assessed beneficial uses designated in the 2022 IR (IDEQ 2022):

- Unassessed
  - Wildlife Habitats
  - Aesthetics
  - Water Supply - Agricultural
  - Water Supply - Industrial
- Assessed
  - Recreation - Primary Contact Recreation
  - Aquatic Life - Cold Water Aquatic Life
  - Aquatic Life – Salmonid Spawning

Wildlife habitats, aesthetics, and agricultural and industrial water supply uses are designated for all Idaho water bodies (IDEQ 2016).

Assessed beneficial uses are based on biological and habitat data collected at representative sites within AUs as part of the Beneficial Use Reconnaissance Program (BURP). This data is used to assist in determining the existing uses and beneficial use support status of Idaho's water bodies. The two representative stream sites used to assess beneficial use for AU ID17060208SL029_02 are Cinnabar Creek and Cane Creek.

IDEQ collected BURP data for Cinnabar Creek, which is within AU ID17060208SL029_02, in September 2012 (2012SBOIA034) and August 2018 (2018SBOIA042). These BURP sites are both located approximately 50-60 meters upstream of Cinnabar Creek's confluence with Sugar Creek. IDEQ collected BURP data for Cane Creek, also within AU ID17060208SL029_02, in September 2012 (2012SBOIA033). This site is located approximately 50 meters upstream of Cane Creek's confluence with Sugar Creek. Sampling methods follow BURP protocols and include a water sample, a macroinvertebrate sample in each of three riffle habitats, a fish sample typically using a backpack electroshock, and in situ measurements (i.e., air and water temperature in degrees Celsius [°C]), stream pH, conductivity in microsiemens per centimeter [uS/cm], and flow in cfs). Table 2 presents the results for BURP sites surveyed in AU ID17060208SL029_02 since 2007. The summary report and additional associated data for AU ID17060208SL029_02 can be viewed on the IDEQ BURP data viewer website at Summary (idaho.gov).

Table 2. Sampling results for BURP sites surveyed in AU ID17060208SL029_02 since 2007

BURP site	Location	Date	Macros	Fish	Air Temp °C	Water Temp °C	pH	Cond uS/cm	Flow cfs
2018SBOIA042	Cinnabar Creek	08/2018	525 individuals of 54 species	181	15	6.5	8.5	182	4.14
2012SBOIA034	Cinnabar Creek	09/2012	588 individuals of 56 species	n/a	22	6.4	n/a	158.3	2.36
2012SBOIA033	Cane Creek	09/2012	575 individuals of 50 species	192	15	6.5	n/a	119.9	2.02

Notes:

1: Bull trout (Salvelinus confluentus): ten between 40 and 85 millimeters (mm), seven between 130 and 180 mm, and one 485 mm

2: Rainbow trout (Oncorhynchus mykiss): four; Shorthead Sculpin (Cottus confuses): seven; and Bull trout: eight

Abbreviations:

BURP = Beneficial Use Reconnaissance Program

n/a = not applicable

uS/cm = microsiemens per centimeter

cfs = cubic feet per second

°C = degrees Celsius

Based on Water Body Assessment Guidance, 3rd edition (WBAG III; IDEQ 2016), both Cane and Cinnabar Creeks, and thus AU ID17060208SL029_02, meet the criteria for Cold Water Aquatic Life, which include the presence of coldwater indicator macroinvertebrate species, a fish assemblage dominated by coldwater species, and/or the presence of bull trout during July or August.

Salmonid spawning, a subcategory of Coldwater Aquatic Life, was also determined to be a designated use for AU ID17060208SL029_02in the 2022 IR (IDEQ 2022) based on the WBAG III criteria of summertime presence of juvenile salmonids (i.e., individuals less than 100 mm overall length) in first through fourth order streams. WBAG III states that:

> "The presence of these juveniles may be considered sufficient evidence that salmonid spawning has occurred in the near vicinity based on the expectation that juvenile fish stay close to their redd location. In that case, salmonid spawning may be considered an existing use for assessment purposes in the portions of the AU for which the site is representative."

Bull trout are highly stenothermal (i.e., found only in cold waters). Bull trout are unlikely to be found in the wild at temperatures greater than 19°C (IDEQ 2016). However, Coldwater Aquatic Life – Salmonid Spawning criteria are a daily average water temperature of 9°C in September and October to support spawning and a maximum weekly maximum temperature of 13°C during June, July, and August for juvenile bull trout rearing (IDAPA 58.01.02.250.g).

Primary contact recreation (PCR) describes activities where ingestion of water is likely or expected, such as swimming, water skiing, or diving. Absent actual observation, primary contact recreation is an existing use if conditions that are conducive to safe, full immersion in the water body exist between May and September. WBAG III states that:

> "Although the contact recreation *Escherichia coli* (E. coli) criterion is the same regardless of whether the use is primary or secondary, it is important to identify which threshold to apply to trigger additional monitoring."

E. coli concentration is measured as most probable number per 100 milliliters (MPN/100 mL). The water sample collected in August 2018 from Cinnabar Creek had an *E. coli* concentration of 1 MPN/100 mL, which is less than the 406 MPN/100 mL concentration required to trigger additional sampling and indicates full support of PCR in AU ID17060208SL029_02.

No BURP data has been collected in West End Creek. However, as West End Creek is within AU ID17060208SL029_02, the designated unassessed and assessed beneficial uses in the 2022 IR must be maintained for West End Creek during construction, operations, and closure and reclamation (IDEQ 2023; IDAPA 58.01.02.051.01.) . In the SDEIS, at or above where the West End pit lake is planned, West End creek is characterized as a non-fish-bearing stream and contributes minor flow to Sugar Creek. Furthermore, according to the ModPRO2 SPLNT Water Modeling Report (BC 2022b), West End Creek is a small stream with limited or no capacity to support fish, particularly anadromous species. This portion of the creek has very steep gradients that limit fish access and provide limited habitat space, particularly during summer low flow conditions. If BURP data were to be collected at a distance upstream of the confluence with Sugar Creek that is similar to where BURP data were collected for Cane and Cinnabar Creek, it is possible the data would show fish using West End Creek as a refugia. Fish would not be able to access any portions of West End Creek proposed to be diverted during operations nor captured and retained in West End pit lake during reclamation and closure.

Construction and Operations

During construction and operations, West End Creek would be diverted temporarily around the existing West End pit within constructed surface water channels. The channel segment constructed over fill would be lined with a geosynthetic liner to prevent seepage. A geotextile and/or transition layer of sand/gravel followed by riprap would be placed over the liner for erosion protection. The lower portion of the West End Creek diversion would be piped underground as a design feature of the Project to maintain stream temperatures. During this construction and operations phase of the SGP, stream flows are not expected to change.

BMPs for West End Creek and West End pit include:

- Streams would be routed into the diversions by temporary flow barriers, such as berms or cofferdams that redirect flows from the existing stream channel into the diversion channel.
- Monitoring locations have been proposed in the Water Resources Monitoring Plan and are required as conditions of the IDEQ Draft Water Quality Certification. Monitoring provides real time information to either confirm plans are being met or take corrective active when needed.
- Water treatment during construction and operations is anticipated for contact water, which will be routed to the ore processing facility, contact water storage ponds, water treatment plant (WTP), or enhanced evaporation systems following collection within West End pit as well as from pit dewatering.
- Equipment used in sensitive habitat areas would be cleaned and inspected prior to use to mitigate the risk of noxious weeds transport, introduction of contaminated materials from other locations, and hydrocarbon leaks/spills.
- Surveys have been conducted in and around the West End Creek drainage area, with no heritage and cultural resource impacts identified in association with the West End Creek or West End Creek diversion. A Programmatic Agreement with the USFS has been developed that will direct project activities and mitigation measures associated with avoiding and addressing heritage and cultural resources impacts.

Closure and Reclamation

At closure and reclamation, the West End Creek diversion would be removed, and the upper end of West End Creek would be routed into the West End pit in a rock chute on the highwall adjacent to the

upper legacy development rock dump, downstream of which a pit lake is anticipated to form in the main portion of the West End pit. The up to 400-feet-deep West End pit lake will fill gradually, and lake levels will fluctuate seasonally and with longer-term climate variations; however, the lake is not expected to completely fill with water or spill due to the limited catchment area (Brown and Caldwell 2021).

As stated previously, downstream of West End pit lake, West End Creek contacts the water table. Therefore, while the upper portion of West End Creek's surface flow will be captured and retained at West End pit following mining activities, West End Creek will continue to have surface flow downstream of West End pit where it will continue to have connection with groundwater and receive additional input from precipitation and runoff.

In addition, portions of West End Creek will be restored as on-site mitigation for WOTUS stream impacts.

Maintenance of Beneficial Uses

Unassessed beneficial uses, including wildlife habitats, aesthetics, and agricultural and industrial water supply uses, which are designated for every water body in Idaho, will continue to be provided in West End Creek.

There is no expectation of any risk of *E. coli* being introduced into West End Creek as a result of the SGP. For this reason, PCR will be maintained in this water body.

As stated previously, IDEQ collected BURP data in AU ID17060208SL029_02 but not in West End Creek. With water temperature being a primary factor for the designation of the Coldwater Aquatic Life beneficial use, the predicted temperatures of West End Creek inform the determination that these uses will be maintained.

The Stream and Pit Lake Network Temperature (SPLNT) Model was developed to simulate temperatures under existing conditions and the No Action Alternative and to predict changes in stream and pit lake temperatures associated with SGP Alternatives (BC 2022a) for representative mine years (end of mine year [EOY]#). In the SPLINT modeling, West End Creek was divided into three distinct segments, using shadebreaks, which are locations where a distinct change in amount of shade was determined from the shade modeling:

- West End Creek, Headwater to shadebreak (0.76 kilometers [km])
- West End Creek, shadebreak to shadebreak (1.13 km)
- West End Creek, shadebreak to Sugar Creek (1.60 km)

Sugar Creek was also modeled upstream and downstream of its confluence with West End Creek. There are seven segments from the headwaters of Sugar Creek to the confluence with West End Creek (totaling 2.13 miles) and one segment downstream of the confluence where it ends at EFSFSR (0.74 miles).

The longitudinal profile figures shown in Figures 3 and 4 compare the 2021 MMP and the No Action Alternative, which is shown for reference on each figure as a dashed navy-blue line. The West End flow path ends at the downstream end of the SPLNT model domain just downstream of the Sugar Creek and EFSFSR confluence. These profiles display either the simulated average or maximum temperature for the maximum weekly summer conditions along with the IDEQ thermal criteria (cold water [CW]; salmonid spawning [SS]; bull trout [BT]; maximum daily maximum and average temperatures [MDMT and MDAT]).

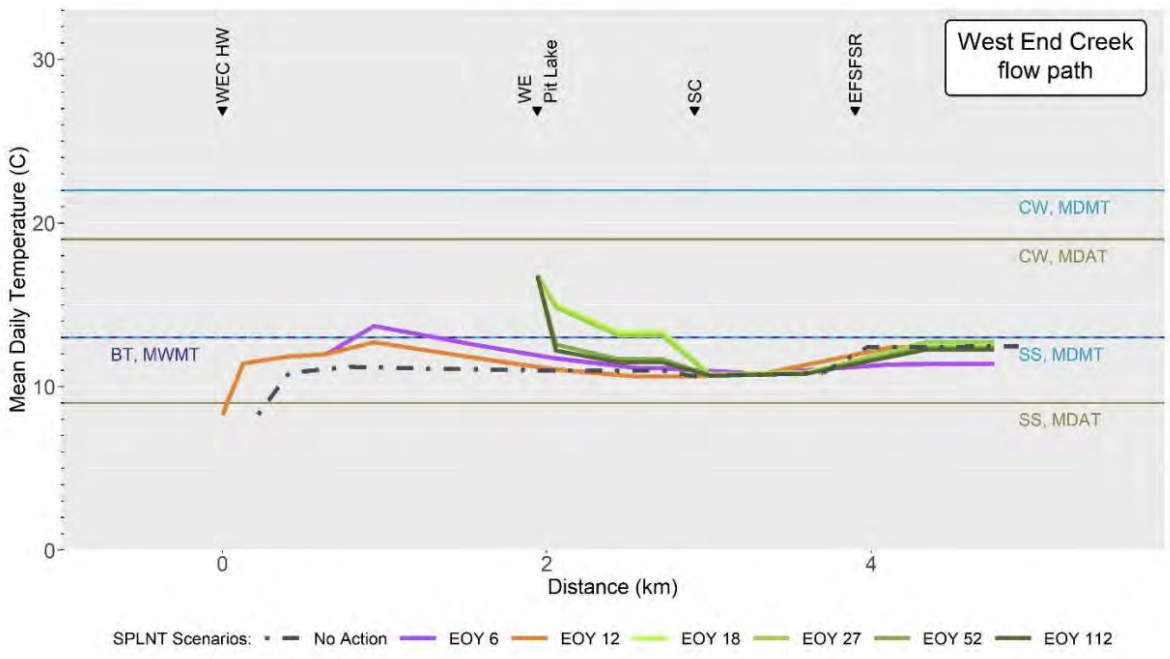


Figure 3. Simulated Mean Daily Temperatures for the Maximum Weekly Summer Condition Compared to IDEQ Water Temperature Criteria for West End Creek Flow Path

Notes: WEC-HW is West End Creek headwaters, SC is Sugar Creek; see text for definitions of temperature criteria for bull trout (BT), cold water (CW), and salmon spawning (SS); EOY is end of Mining Year; SPLNT is Stream and Pit Lake Network Temperature Model.

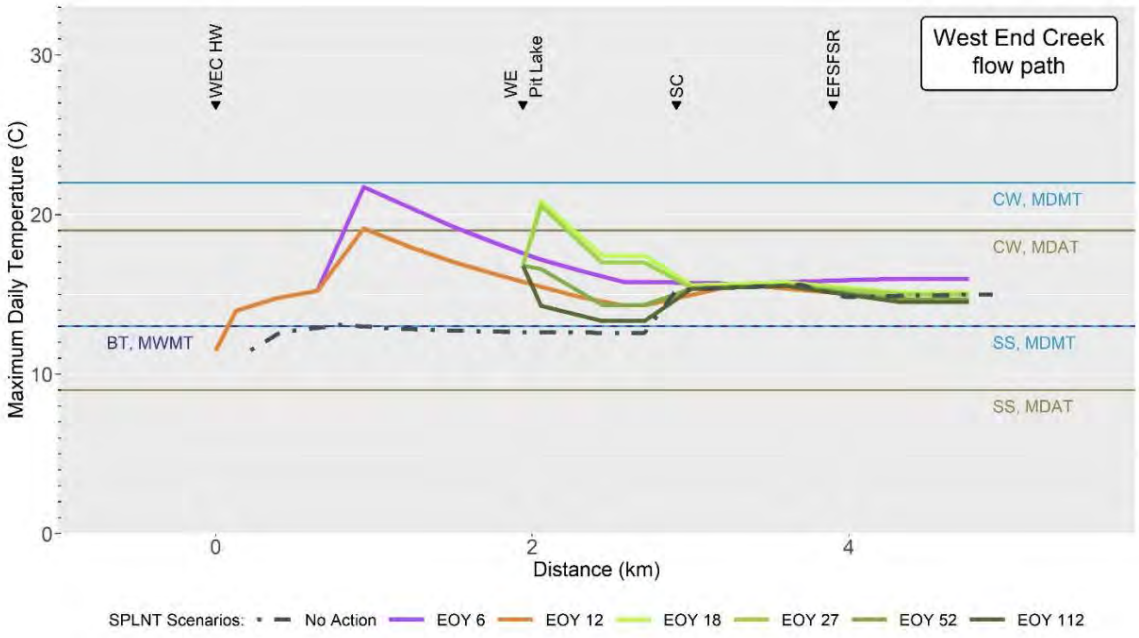


Figure 4. Simulated Maximum Daily Water Temperatures for the Maximum Weekly Summer Condition Compared to IDEQ Water Temperature Criteria for West End Creek Flow Path

These longitudinal temperature profiles show the following patterns:

- During operations model runs (EOY6 and EOY12):
  - During mining of West End pit, stream flow upstream of the pit is diverted in an open channel and simulated maximum temperatures are warmer than the No Action Alternative by 6°C to 9°C depending on the season simulated. Daily average temperatures are 1°C to 3°C warmer. West End Creek is too steep and small to support fish now and is unlikely to support fish in the future.
  - Around and downstream of the pit, low flows are diverted in a pipe, and the stream temperatures decrease during operations.
  - Average simulated maximums remain below the CW MDMT and MDAT criteria thresholds.
  - In Sugar Creek, simulated maximums and averages are similar to the No Action Alternative for all mine years and seasons simulated.
- Post-closure model runs (EOY18 and beyond):
  - West End pit lake is not predicted to discharge under the ModPRO2. A small discharge from West End pit lake has been assumed to provide a headwater flow for the model to West End Creek downstream of the pit lake. This assumption results in simulated temperatures that are higher than the No Action Alternative near the pit lake.
  - Average simulated maximums remain below the CW MDMT and MDAT criteria thresholds.
  - In Sugar Creek, simulated maximums and averages are similar to No Action Alternative for all mine years and seasons simulated.

Maximum temperatures for maximum weekly summer conditions were modeled to predict the highest temperatures attained based on the highest temperatures recorded over the last one hundred years of climate data. The more likely temperatures, but still based on the highest temperatures recorded over the last one hundred years, for West End Creek during the summer were modeled as the average weekly temperatures during summer. Based on the modeled average weekly temperatures for West End Creek over the course of construction, operations, and closure and reclamation, water temperatures are sufficient to maintain the designated use of Coldwater Aquatic Life.

As stated above, in the SDEIS, West End Creek is characterized as a non-fish-bearing stream and contributes minor flow to Sugar Creek. Furthermore, according to the ModPRO2 SPLNT Water Modeling Report (BC 2022b), West End Creek is a small stream with limited or no capacity to support fish, particularly anadromous species. This creek has very steep gradients that limit fish access and provide limited habitat space, particularly during summer low flow conditions.

While salmonid spawning is a beneficial use designated for the entire AU that includes West End Creek, this creek is simply one part of a larger system of first and second order tributaries to the third order Sugar Creek. As salmonid spawning is not currently supported in West End Creek, the SGP activities associated with West End Creek will not impact the portions of the system that do support salmonid spawning and will not decrease the overall availability of habitat in this AU for salmonid spawning. Therefore, the dredge and fill activities related to the diversion of West End Creek and the eventual capture and retention of the upper portion of the creek in the West End pit lake will not impact overall achievement of this beneficial use for the AU.

Taking into consideration the dredge and fill activities related to the diversion of West End Creek during construction and operations and the eventual capture and retention of the upper West End

Creek at West End pit lake after reclamation and closure, the benefits to the economy of Valley County and the services being provided to the community in association with the SGP provide a rationale to warrant the potential for degradation with respect to temperature.

Section 4: Alternatives Analysis

An extensive alternatives analysis was conducted for the NEPA process and CWA 404 permitting application for the SGP. This process resulted in many improvements to the environmental performance of the SGP, and in its draft CWA Section 404(b)(1) Guidelines Alternatives analysis, Perpetua identified the 2021 MMP as the Least Environmentally Damaging Practicable Alternative (LEDPA) in compliance with the CWA Section 404(b)(1) Guidelines Alternatives Requirements. The 2021 MMP is also the least degrading alternative for the purposes of the 401 WQC.

As described in Section 2.1 of Perpetua's 404(b)(1) report, which accompanied the April 2023 CWA 404 permit application submission to USACE, the LEDPA evaluation included consideration of alternatives meeting the project purpose and need, compliance with state and federal laws and regulations, reduction of environmental effects, is technically feasible, and economically feasible. Given that each alternative considered meets all other evaluation criteria, the analysis of alternatives considered for SGP project components discussed herein, from the PRO to the ModPRO to the 2021 MMP, is primarily an environmental effects comparison.

This section focuses on the alternatives considered and changes that were made for the specific SGP components associated with the 16 identified AUs warranting Tier II protection and analysis with the potential for degradation beyond ambient conditions with respect to temperature. Alternatives were considered and changes were made with the goal to reduce impacts to WOTUS and other environmental resources. These included measures to reduce effects along access routes, transmission lines, and the West End pit. Table 3 includes a comparison of the alternatives considered during each phase of this project: the project development phase, the PRO, ModPRO, and 2021 MMP. A detailed description of why the alternatives were excluded is provided in the sections below.

Table 3. Comparison of Alternatives Considered

Project Component or Subcomponent	Project Development Phase	PRO	ModPRO	ModPRO2 (2021 MMP)
Access Roads	• South Fork Route • Lick Creek Route • Cabin/Trout Creek Route (combined with either Old Thunder Mountain Road or Riordan Creek Route) • Old Thunder Mountain Route • Riordan Creek Route • Johnson Creek Route • Burntlog Route	• Johnson Creek route for mine site access during early construction with limited improvements. No longer used when Burntlog Route completed. • Burntlog Route for mine site access during construction, mining and ore processing operations phases, and through closure and reclamation phase. • New sections of Burntlog Route to be decommissioned after the closure and reclamation period. Widened/upgraded sections of Burntlog Route returned to original conditions.	Same as the PRO except the following were also considered for the Burntlog Route: • Burntlog 8A (Riordan Creek Segment) • Horseshoe (south of Black Lake) • Riordan Option (northern end of Riordan Creek valley)	Same as ModPRO except Burntlog 8A was the selected alternative.

Project Component or Subcomponent	Project Development Phase	PRO	ModPRO	ModPRO2 (2021 MMP)

Transmission Lines	Power generation for the SGP:
	• Hydrocarbon Fuel
	  • Diesel
	  • Natural Gas
	  • Coal
	• Renewable Energy
	  • Solar
	  • Wind
	  • Hydro
	  • Geothermal
	• IPCo transmission line upgrades
		Contract IPCo to upgrade power transmission and distribution system, and construct additional 9 miles of overhead 138-kV line.	Same as the PRO except the following were also considered for transmission lines:
			• Thunder Mountain Estates subdivision requests alternative alignments between Donnelly and Cascade
			• The Thunder Mountain Estates Bypass approximately one mile east of Cascade on Warm Lake Road.
				Same as the ModPRO except the reroute would follow a more direct route along Warm Lake Road and would be located in Boise National Forest and Idaho Department of Lands property instead of private property. The following were also considered for transmission lines:
				• Construction of overhead distribution underbuild on the new H-frame transmission structures.
				• Construction of a parallel distribution line.
				• Construction of an underground distribution line within the existing Johnson Creek Road ROW.
				  • Selected option to route underground and minimize disturbance and impacts to vegetation.

Project Component or Subcomponent	Project Development Phase	PRO	ModPRO	ModPRO2 (2021 MMP)
West End pit*		Temporarily redirect West End Creek around West End pit and West End DRSF during operations.	Same as the PRO except the following: • Eliminate the West End DRSF, West End Creek diversion would start lower in the drainage to serve only West End pit as an open channel. Reclamation and Closure alternatives: • Route West End Creek into West End pit. • Route West End Creek into surface diversion to the northeast to allow for water to disperse into an adjacent steep zero-order catchment outside permitted project footprint. • Maintain a sidehill surface ditch and pipe diversion on a steep, inaccessible slope. • Route West End Creek into a surface diversion to the west, either towards the YPP backfill or Midnight Creek.	Same as the ModPRO except the following: • Diversion around West End pit within constructed surface water channels lined with geosynthetic liner, lower portion of West End Creek diversion piped underground. Reclamation and Closure is the same as the ModPRO, the West End Creek would be routed into West End pit as the selected alternative, however a reduction to the overall SGP area to be closed and reclaimed was identified in the ModPRO2.

Notes:

** Work would not occur until mine years 7 through 12*

Abbreviations:

PRO = Plan of Restoration and Operations

ModPRO = Modified Plan of Restoration and Operations

MMP = Modified Mine Plan

4.1 Access Routes

Currently the SGP 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 SGP-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 SGP 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 red uce dust-related sediment delivery to rivers and streams;
- Minimize the SGP footprint, particularly within riparian conservation areas (RCAs);
- Limit or avoid long-term travel through the community of Yellow Pine and along the settled portions of Johnson Creek;
- Reduce 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.

Seven routes were initially considered, with two additional options to be combined with the Cabin/Trout Creek Route for a complete access route from State Highway 55 to the SGP (Midas Gold 2016, Appendix G). Five of these routes are listed below with the reasons for being eliminated from further consideration. The remaining two routes, the Johnson Creek Route and the Burntlog Route, are discussed in more detail as they continued to be considered through to the SDEIS.

- South Fork Route
  - Dangerous curves posed potential safety problems for heavy truck traffic.
  - Position relative to the South Fork of the Salmon River, which is designated as critical habitat for anadromous fish, would result in a threat to water quality in this water body due to a potential increase in sedimentation, vehicle incidents, and spills.
  - Increased potential for conflicts with local residents and recreationists using this route.
- Lick Creek Route
  - Not suitable for year-round access due to avalanche danger, steep terrain and high winter snowfall.
  - Position relative to the South Fork of the Salmon River and the EFSFSR would result in a threat to water quality in this water body due to a potential increase in sedimentation, vehicle incidents, and spills.
- Cabin/Trout Creek Route (combined with either Old Thunder Mountain Route or Riordan Creek Route)
  - Realignment and upgrade of Old Thunder Mountain Road for approximately six miles.
  - Five miles of new road construction necessary including a new bridge, in previously undisturbed National Forest Lands
  - Johnson Creek Road is not available at certain times of the year due to snow.
  - Required upgrades and realignments to Johnson Creek Road, including numerous cut and fill slopes and retaining walls.
- Old Thunder Mountain Route
  - This route has the steepest grades and crosses several landslide areas.
  - Four miles of new road construction.

- Riordan Creek Route
  - This route has steep grades.
  - Fourteen miles of new road construction.
  - Proximity to Johnson Creek would result in a threat to water quality in this water body due to a potential increase in sedimentation, vehicle incidents, and spills.

The Johnson Creek Route (formerly known as Yellow Pine Route) was initially considered for mine site access as it is an existing route. This route provides access to the SGP from SH 55, north of the city of Cascade, via Warm Lake Road for approximately 34 miles, then north on Johnson Creek Road (CR 10-413) for approximately 25 miles to the village of Yellow Pine, and from Yellow Pine east approximately 14 miles to the SGP via Stibnite Road (CR 50-412). The portion of the route that includes Johnson Creek Road and Stibnite Road is known as the Johnson Creek Route. This route was first considered because it includes no new road construction in an Inventoried Roadless Area (IRA).

However, the Johnson Creek Route is primarily situated topographically adjacent to the valley bottom, paralleling Johnson Creek and then the EFSFSR. This route is located in close proximity to streams (i.e., within 100 feet) for 6.5 miles, or 18 percent, of its approximately 36-mile length. This greatly increases the potential for fuel and hazardous chemical spills to impact surface water quality. If a spill were to occur in the Burntlog Route, by comparison, the route exists within 100 feet of a stream for only 1.69 miles, or 4 percent of its length (Tetra Tech 2023).

Additionally, under the Johnson Creek Route, road widening and straightening, along with drainage and bridge improvements would be required for the Johnson Creek Road (CR 10-413) portion of the Johnson Creek Route. The Stibnite Road (FR 50412) portion would be improved by straightening curves, laying back steep rocky slopes, constructing retaining walls, and installing 182 18-inch culverts and two 60-inch culverts (USFS 2022a). Culvert installation could potentially have long term impacts on water current patterns and circulation along improved portions of the Johnson Creek Route, which would not occur under the 2021 MMP, Burntlog Route.

The concept of extending the Burnt Log Road and connecting it to other existing USFS system roads to provide a designated mine access route for the SGP was originally suggested by a Yellow Pine resident at one of Perpetua's community meetings, which took place during the development of the PRO. Perpetua's initial PRO thus proposed the Burntlog Route, which would provide long-term access to the SGP by upgrading and extending USFS Road NF-447 (known as Burnt Log Road, a legacy logging road) and upgrading portions of USFS Roads 1290 and 375 (known as Meadow Creek Lookout Road and Thunder Mountain Road, respectively). The Burntlog Route proposes construction in the Burnt Log, Black Lake, and Meadow Creek IRAs, but use of the Burntlog Route would be shorter than the historically used routes to access the SGP Area. Its use would also largely separate mine traffic from residential and recreational traffic along the Johnson Creek Route. The Johnson Creek Route would still be used for mine site access during early construction (approximately 2 to 3 years) with limited improvements so the 18.8 miles of temporary road construction along the Burntlog Route can occur. Once the Burntlog Route construction is completed the Johnson Creek Route will no longer be used, and the risk of impacts to water quality from mine-related traffic will be greatly reduced.

When comparing the two routes and the potential impact to water quality, the Johnson Creek Route would cross 21 streams in comparison to the 37 from the Burntlog Route. However, the Johnson Creek Route would require nearly 220 acres of new cut and fill along existing roadways that follow segments of Johnson Creek and EFSFSR to make those roadways useable for mine access during the SGP lifespan (HDR 2017b). As a result, this route would have 107,650 linear feet of stream impacts while the Burntlog Route would only have 11,486 linear feet of stream impacts, which is almost an order of magnitude smaller.

Overall, the benefits of the Burntlog Route, as compared to the other six routes, include:

- Least road length containing steep vertical grades and within potential avalanche and landslide potential areas;
- Reduced 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;
- Least road length paralleling streams, reducing the risk of hazardous material spills (including fuel and reagents) and sediment load into major waterways (Johnson Creek and EFSFSR);
- Least amount of retaining walls;
- Lowest construction cost when compared to the other access route alternatives; and,
- Shortest time amongst alternatives to construct.

As Perpetua continued to consider and evaluate alternatives, the Burntlog Route alignment was field reviewed in September 2017 to assess technical and logistical feasibility, to seek routing efficiencies, to identify and avoid difficult terrain and geohazards, and to identify opportunities for the avoidance and minimization of impacts to environmental resources such as wetlands.

During the continued evaluation of the Burntlog Route, three alternative alignments were evaluated (Midas Gold 2018; Parametrix 2017) which included:

- Burntlog 8A (Riordan Creek Segment) included a modification of a portion of the Burntlog-Thunder Mountain Connector. Burntlog 8A maintained a higher elevation in the Riordan Creek drainage, provided a more direct route to the SGP, required fewer drainage crossings, and reduced wetland impact.
- Horseshoe was the second route alternative that took a similar path to 8A but went further south around the south side of Black Lake.
- Riordan Option 2 was the route alignment that followed the northern end of the Riordan Creek valley and was considered as an option that might be less risky for avalanches.

Ultimately, the Burntlog 8A alignment of the Burntlog Route was chosen as it would provide access to the mine site during operations via the same route as the original Burntlog Route with the exception of a 5.28-mile-long section that will be placed at a higher elevation in the Riordan Creek drainage. This segment of the Burntlog Route would be relocated to the south side of the Riordan Creek drainage and cross Riordan Creek north of Black Lake. The approximately 5.28-mile-long road segment has 12 stream crossings including 3 perennial streams. Overall, the Burntlog Route would be 36.9 miles, including 18.8 miles of temporary road constructed for mine access, and was identified as the preferred and least degrading alternative. This was based on having the lowest environmental footprint, lowest risk of negative environmental consequences, least negative impacts on local residents, highest safety potential, and lowest cost.

4.2 Transmission Line

The SGP would require approximately 60 megawatts of electrical power. Starting in 2013, Perpetua considered both on-site and off-site generation source alternatives for power needs (Power Engineers 2013). On-site scenarios would involve fuel transportation to the SGP site. Off-site alternatives considered both renewable and hydrocarbon fueled options. As a result, the following power sources were considered:

- Hydrocarbon Fuel
  - Diesel

    Diesel is a high energy density fuel with low storage costs but high nitrogen oxide, carbon monoxide and sulfur dioxide emissions, as well as high fuel price operating costs make this fuel source prohibitive. Additionally, a study was conducted in 2014 to evaluate an overland pipeline delivery

approach but with respect to permitting, environmental impacts and economics, this is not a viable option for the project (M3 Engineering and Technology 2014).

- Natural Gas

  Natural gas is not available by pipeline in the area. Liquefied natural gas is less energy dense and is challenging to store as it must be stored at cryogenic temperatures in an insulated vessel. Compressed natural gas can be delivered in pressurized tank trailers but both types of gas would require frequent deliveries and as of 2013 the amount of this fuel needed was not available in the region and would need to be transported from out of state or from Canada.

- Coal

  Coal is available by rail from Wyoming but would need to be transported by truck to a power plant that would need to be constructed between Cascade and Stibnite.

- Renewable Energy

  For both solar and wind, backup sources of energy would be required. Also, grounding systems for all renewable energy sources would be needed due to the lack of availability of load centers for disbursement of surplus energy.

  - Solar

    Calculations using solar radiation maps and annual average solar resource potentials for the Stibnite area determined that a solar array in excess of 450 acres would be necessary to meet energy demands for the SGP. Additionally, it is estimated that the backup power source would be operational much of the year, making this alternative unworkable.

  - Wind

    Approximately 24 towers supporting 2.5MW turbines would need to be constructed to meet the energy demands of the SGP. Construction on ridge-tops would require difficult road building and high tower construction costs. Backup power would also be necessary for a majority of the year, making this alternative unworkable.

  - Hydro

    Mine projects historically relied heavily on onsite hydro power. In fact, a dam existed on East Fork of Meadow Creek (Blowout Creek) that historically provided water flow for a power plant located on Sugar Creek near its confluence with the EFSFSR. However, for the SGP, there is not sufficient elevation drop available to produce the power necessary and therefore this option is not viable.

  - Geothermal

    The closest source of geothermal power is in the Vulcan Hot Springs area, 4.5 miles south of Warm Lake and 28 straight line miles from Stibnite. It is unknown if this area could produce the necessary energy for the SGP and would also require power plant construction and transmission facilities between the plant to the site and is therefore not a viable option.

- Idaho Power Company (IPCo) connection upgrade

  Connection to the IPCo grid would require an upgrade to the entire transmission system from Oxbow Station to Yellow Pine and construction of a new transmission line to the SGP. A transmission line easement exists from Warm Lake to the SGP site but the powerline and related structures that, until the 1970s, provided 69-kV line-power electricity to the Stibnite area have been removed. This IPCo connection option provides a reliable power supply for the SGP and eliminates the need for fuel transport, on- and off-site construction, and major backup power supplies.

All hydrocarbon energy alternatives are similar in installation costs to a connection to IPCo, except for circulating fluidized bed combustion, which is more than 2.5 times more expensive. However, per kilowatt

hour costs are substantially less expensive for the IPCo connection alternative as compared to the hydrocarbon alternatives. Both viable renewable energy alternatives (solar and wind) are substantially more expensive for installation and more expensive per kilowatt hour, as well as requiring land acquisition. Therefore, a connection to IPCo with the required upgrades was chosen as the best alternative.

As previously stated, the existing 69-kilovolt (kV) transmission line in the area is not capable of supporting the 60-megawatt power requirement of the SGP and does not extend to the mine site. Therefore, Perpetua will contract with IPCo to upgrade their power transmission and distribution system, and construct an additional 9 miles of overhead 138-kV line from the new Johnson Creek Substation along portions of existing transmission line ROWs to a new Stibnite Substation located at the mine site, with associated line and structure upgrades from Lake Fork substation to Johnson Creek substation along the existing route. The upgraded powerline will benefit residents dependent on that powerline through more stable and reliable access to power. Use of the existing transmission line rights-of-way will minimize new disturbance, provide low carbon electric power to site, and minimize fuel haulage to the site that would otherwise be required to power diesel, coal or propane on-site generators and, as a result, substantially reduce the amount of fuel consumed on site and in hauling the fuel to site, as well as reducing the risk of fuel spills.

Following submittal of the PRO, IPCo and private landowners in the Thunder Mountain Estates subdivision provided feedback on the proposed alignment described in the PRO and requested alternative alignments be considered for the upgraded transmission line. To address these concerns, Perpetua identified two route modifications to the PRO alignment. The first route modification proposed by IPCo is located between Donnelly and Cascade, approximately 1 mile south of the intersection of Old State Road and Kantola Lane. Approximately 0.4 miles of the existing powerline in this area is located within wetland areas on the eastern side of Cascade Reservoir. IPCo expressed concern about constructability and impacts to wetlands during construction and maintenance of the line and proposed relocating approximately 0.9 miles of the transmission line approximately 3,200 feet north to the old railroad grade. This reroute results in completely avoiding the 0.4 miles of wetland impacts along the existing powerline alignment. (HDR 2019).

The second route modification, known as the Thunder Mountain Estates Bypass, begins approximately one mile east of Cascade, Idaho on Warm Lake Road. Perpetua received feedback from landowners in the Thunder Mountain Estates subdivision during the public scoping period that followed submittal of the PRO. In general, landowners were worried about the potential impacts to their viewshed, property values, and the likely increase in electromagnetic fields from the construction of the 138-kV transmission line. Perpetua recognized the concerns of landowners in the subdivision and directed the transmission line engineer (HDR) to conduct a trade-off study to evaluate the design requirements, impacts, and cost estimate of the base case and the proposed route modifications in a Technical Memo dated April 15, 2019 (HDR, 2019). As a result, a second route modification reroutes approximately 5.4 miles of the upgraded 138-kilovolt (kV) transmission line to avoid the Thunder Mountain Estates subdivision. The reroute would follow a more direct route along Warm Lake Road and would be located in Boise National Forest and Idaho Department of Lands property instead of private property. The Thunder Mountain Estates Bypass route modification would require the proposed Cascade Switching Substation be moved from the intersection of Thunder City Road and Weant Lane to Warm Lake Road.

As the project continued to evolve, the 2021 MMP improvements to the transmission line were the same as the ModPRO, except for the addition of 3 miles of underground distribution power from the Johnson Creek substation south to Wapiti Meadows, on-site voltage changes from 24.5 kV to 34.5 kV, and the increase in electrical power from 50 megawatts to approximately 60 megawatts required to run the SGP. A trade-off study was conducted to evaluate the following three options for continuing to provide distribution power to the residents south of the Johnson Creek substation currently served by the existing overhead distribution line:

- Construction of overhead distribution underbuild on the new H-frame transmission structures;

  - For distribution underbuild the spacing between the existing structures would need to be shortened from 600 feet to 300 feet, resulting in increased disturbance along the ROW.
- Construction of a parallel distribution line; and,
  - A parallel distribution line would require widening the ROW beyond the proposed 100 feet and increase the amount of disturbance for the new pole sets.
  - Construction of an underground distribution line within the existing Johnson Creek Road ROW.
  - This option results in the least amount of ground disturbance as it would be trenched in an existing road ROW and would also result in less visual impact.

The third option was chosen as it would require less overall disturbance and impacts to vegetation. The underground distribution power will be trenched within the existing borrow ditch parallel to Johnson Creek Road, resulting in no additional ground disturbance by temporarily re-disturbing this previously disturbed area.

Existing roads (with temporary spur roads as needed) will be used to gain access for line upgrade construction and any long-term maintenance of the transmission line. Minor upgrades to the Trout/Cabin Creek Road will be required to facilitate year-round power line maintenance and to facilitate using this route as a groomed over snow vehicle (OSV) route.

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. Electricity for 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 electric demand and loads at the SGP and must be upgraded to a 138 kV capacity line.

Although the Warm Lake to Yellow Pine distribution line is energized at 12.5 kV, the structures and corridor were originally designed and constructed for 69 kV transmission line (consistent with the previous electric service to Stibnite). Upgrading to a 138 kV transmission line involves a marginally wider corridor and taller structures. The new line will provide reliable long-term electric service both to Yellow Pine residents and to the Stibnite Gold Project community.

After closure activities, when the need for substantial onsite electric power requirements have passed, Perpetua will disassemble the electric transmission line from the Johnson Creek substation to the site and reclaim temporary spur roads along this transmission line. The Johnson Creek substation will also be removed and reclaimed. The Village of Yellow Pine will be serviced by the Warm Lake substation and the upgraded electric transmission line will remain to provide long-term electric power to existing users along the line with greater reliability of service than the current situation, thereby providing a long-term benefit to local communities; Perpetua expects that IPCo will continue to maintain that line.

Ultimately, the 2021 MMP transmission line alignment and associated access roads provide the least degrading alternative as, for the majority of the alignment, the existing transmission corridors will be followed. Furthermore, where it is not, impacts to wetlands have been reduced and landowners' concerns have been addressed to satisfaction.

4.3 West End Pit

The West End pit is in the northeast portion of the proposed mine site, east of and at a higher elevation than the Yellow Pine pit, generally situated between Sugar Creek to the north and Midnight Creek to the south. The West End pit would be in the same general location as historical open pit mining where multiple open pits, mine benches, waste rock dumps, and areas of deep backfill exist. Activities in the West End Creek and West End pit area would not occur until the operational phase of the SGP during mine years 7 through 12.

In the PRO, Perpetua proposed to temporarily redirect West End Creek around the West End pit and West End DRSF during operations. Diverting West End Creek away from the historical West End development rock dumps would improve water quality and prevent clean runoff from entering the West End pit. At closure, Perpetua proposed in the PRO to route West End Creek onto the top of the West End DRSF to feed wetland habitat created atop the DRSF. Overflows from the wetlands were to be routed alongside the DRSF to the West End pit.

After further analysis during the development of the ModPRO, Perpetua determined that the West End DRSF would be eliminated, and the West End Creek diversion would start lower in the drainage to serve only West End pit. This diversion was proposed to be an open channel.

The 2021 MMP expanded further on the types of diversions needed for the SGP, including in the West End pit area. Streams that run through areas proposed for mining related disturbance would be diverted to prevent generation of contact water or commingling of contact and non-contact water, keeping clean water clean, and to prevent flooding of mine facilities by runoff generated off site. As a result, West End Creek would be temporarily diverted around West End pit within constructed surface water channels. Channel segments constructed over fill would be lined with a geosynthetic liner to minimize seepage. A geotextile and/or transition layer of sand/gravel, followed by riprap or similar, would be placed over the liner for erosion protection. The lower portion of the West End Creek diversion would be piped underground as a design feature to maintain stream temperatures.

With the elimination of the West End DRSF during the development of the ModPRO, several alternatives were considered regarding post mining restoration of West End Creek and include the following:

- Route West End Creek into West End pit, forming a lake
  - Sediments from disturbances upstream of the SGP would settle out.
  - Small catchment area prevents water from spilling out of lake and traveling downgradient
  - Downstream water impacts are de minima per BC's modeling.
- Route West End Creek into a surface diversion to the northeast allowing the water to disperse into an adjacent steep zero-order catchment outside the permitted project footprint.
  - Additional ground disturbance necessary.
  - Likely to result in the introduction of increased sediment into Sugar Creek.
- Maintain a sidehill surface ditch and pipe diversion on a steep, inaccessible slope.
  - Ditch failure likely at some point in the future.
- Route West End Creek into a surface diversion to the west, either towards the YPP backfill or Midnight Creek.
  - Extensive amounts of mine waste handling would be required to successfully accomplish this, making it impractical and uneconomical.

The preferred option, presented in the ModPRO, was to route West End Creek into West End pit. In the 2021 MMP, the reclamation and closure plans for the West End pit area represented no change to the approach to, and scope and nature of, closure and reclamation versus what was detailed in the ModPRO except a reduction to the overall SGP area to be closed and reclaimed. The West End Creek would be routed into the West End pit in a rock chute on the highwall adjacent to the upper legacy development rock dump, below where a pit lake is anticipated to form in the main portion of the West End pit. The up to 400-feet-deep West End pit lake will fill gradually, lake levels will fluctuate seasonally and with longer-term climate variations; however, the lake is not expected to completely fill with water or spill due to the limited catchment area.

The final West End Creek diversion plan represents the least degrading alternative, as the overall footprint of the SGP has been reduced through the elimination of the West End DRSF and the diversion design considers

the need to maintain cold stream temperatures by piping a portion of the stream underground. In this way, West End Creek flow during operations will not affect the stream temperatures in Sugar Creek. After reclamation and closure, the upper portion of West End Creek's surface flow will be captured and retained at West End pit lake.

Section 5: Socioeconomic Justification

The SGP will result in important economic and social benefits within the Valley County area and in Idaho as a whole. The social and economic benefits of the SGP justify the temporal nature and potential of degradation to the 16 AUs listed as warranting Tier II protection and analysis with respect to temperature.

5.1 Affected Community

The SGP is in Valley County, the fifth largest county in Idaho by area (approximately 3,665 square miles), 88 percent of which are public lands. Cascade is the Valley County seat, and McCall is the largest population center. From the early 1900s through to the late 1990s, Valley County's economy was strongly supported by the mining and timber industries. However, in recent years, Valley County's economy has transitioned to a greater reliance upon government employment (local and federal) and businesses supporting the tourism industry.

5.1.1 Population

As of January 2024, the Idaho Department of Labor (2024) estimated that Valley County had a year-round population of 12,464 people, although Valley County does experience a seasonal increase of residents during the summer months.

Just over 99 percent of the population in Valley County is reported to be White, with the remaining population reported to be Asian (0.6 percent), Native American (0.3 percent), and Black (0.1 percent). Almost five percent of the population is reported to be Hispanic or Latino, of any race. The population is divided evenly between male and female, with the median age being 50 years old. Almost 99 percent of the population graduated from high school, with 51 percent having attended college and almost 30 percent holding an advanced degree.

Valley County experienced robust population growth from 2002 through 2007, largely fueled by amenity migration (aka relocation for quality of life purposes) into the McCall area and real estate speculation around the Tamarack Resort. During this time, the region experienced inflating land prices because of investor interest and second home purchases. With the economy slowing in 2008, Tamarack's well-publicized financial problems, and ultimate filing for bankruptcy protection in 2008, land prices fell, and population growth ebbed in 2009. Since 2010, Valley County has seen a 26 percent increase in population.

5.1.2 Employment

According to the Valley County Labor Force and Economic Profile (Idaho Department of Labor 2024), there are a total of 4,914 jobs reported with covered wages in Valley County. Major employers (>100 employees) within Valley County in 2022, in ascending order, were Shore Lodge, USFS, McCall-Donnelly School District, Tamarack Food and Beverage, Valley County, and Brundage Mountain Resort. The industries of leisure/hospitality (tourism), trade/transportation/utilities, and education and health services were the largest contributors of jobs in Valley County in 2022.

With three of the top employers in Valley County related to resort lodging and activities, it is clear that the tourism industry is an important part of the Valley County economy. Valley County boasts year-round

recreation opportunities including skiing, snowshoeing, snowmobiling, hunting, fishing, camping, hiking, golfing, mountain biking, rafting, kayaking, canoeing, swimming, and rock climbing.

Public employers, including Federal and County governments, as well the local school district, make up the remaining major employers in Valley County.

The contribution of natural resource industries to the Valley County economy is very low (1.5 percent in 2022; Idaho Department of Labor 2024); over the past few decades, limited supplies of private timber and restrictive government land use policies have resulted in a decline in the timber and mining industries, once important sectors of the economy of Valley County. Recent Perpetua mineral exploration work is the primary contributor to mining-related employment in Valley County.

Per capita wages throughout Idaho are lower than the national average, though Valley County per capita wages are much closer to the national average:

- Valley County: $64,666
- Idaho: $56,614
- United States: $65,470

As of January 2024, Valley County had the ninth highest unemployment rate in the State. From its high of nearly 14 percent in 2011, the unemployment rate in Valley County dropped to approximately 4.4 percent as of December 2023. In addition to longer term fluctuations in unemployment, Valley County has a high variability in monthly unemployment rates due to the seasonal nature of many jobs associated with the tourism industry, related to the winter ski season and summer tourism and construction.

5.1.3 Housing

According to the US Census Bureau (2023), as of July 2022 there were approximately 12,900 housing units in Valley County. The February 2023 Demographic Trend and Forecast Report for Valley County (Clearwater 2023) states that approximately 30 percent of these units are occupied by full-time residents and of those, approximately 81 percent are owner-occupied. This indicates there are a significant number of housing units in Valley County that are vacation rentals or second homes. The median value of owner-occupied housing for 2018-2022 was $471,000 with a median gross rent of $962 per month for residential rental units.

5.2 Economic Development Associated with the Activity

Investment in redeveloping the historical Stibnite District provides a new economic driver to increase jobs and economic activity in a rural community. It also provides the only currently identified opportunity to address environmental legacies at the abandoned site.

Perpetua proposes to clean up the existing conditions of historically impacted areas, recover and re-mill old tailings, reuse the existing waste materials such as development rock and spent heap leach ore, mine the remaining portions of previously mined gold-silver-antimony deposits, and produce a concentrate of antimony and gold-silver doré bars. Both concurrent and post-operations closure and reclamation will be undertaken with the goal of a self-sustaining natural ecosystem, enhanced habitat for the natural fish and wildlife populations, and improved water quality at the site.

5.2.1 Site History

Over the past century, prior to Perpetua's involvement, the Stibnite Mining District was subject to considerable prospecting and exploration, underground and surface mining, milling, tailings disposal, smelting, ore heap leaching activities, spent ore disposal, waste rock disposal, hydro-power development, water retention dam construction, forestry, and saw milling. These activities led to the establishment of housing camps, the town of Stibnite with its multiple neighborhoods, and associated infrastructure to support the mineral activities as well as various restoration activities. In addition, the SGP area has been

impacted by numerous forest fires. These historical actions have changed the course, nature, and quality of rivers and streams in the area, and left substantial surface disturbance, detrimental environmental impacts, and residual surface features that persist to this day.

5.2.2 Site Clean-up as per the Administrative Settlement Agreement and Order on Consent

The Stibnite Mining District is a still contaminated legacy mining area. Through a process involving two major Federal court consent decrees, the United States, including the EPA, legally resolved their liability under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, codified as amended at 42 U.S.C §§ 9601-9675 ("CERCLA"). With these consent decrees, the Stibnite site has legally and officially been abandoned by the federal government.

The Stibnite Mining District has not been abandoned by Perpetua. On January 15, 2021 Perpetua entered into a voluntary Administrative Settlement Agreement and Order on Consent (ASAOC) along with the EPA and USFS Region 4 (with the concurrence of the U.S. Department of Justice). Under the first phase of the ASAOC, Perpetua has committed over a four-year period (Phase I) to undertake CERCLA "time critical" removal actions ("TCRA") to address water quality concerns that have plagued the Stibnite site for decades. Additionally, if the SGP proceeds, the ASAOC contemplates that there are additional phases to cleanup under the ASAOC which hinge on Perpetua securing its permitting and infrastructure to operate the SGP.

Perpetua did not cause the environmental problems at Stibnite. However, after three years of extensive discussions with multiple state and federal regulators and the Nez Perce (through separate EPA consultation) and Shoshone-Bannock Tribes, Perpetua, through the ASAOC, will provide more resources dedicated to site cleanup than the entire United States agreed to pay as a settling party in 2012 to settle its potentially responsible party liability at Stibnite and other sites subject to the consent decree.

Another recent development will likely produce improved environmental performance for the Stibnite Mining District. On August 8, 2023, after several years of court-ordered mediation, Perpetua and the Nez Perce Tribe filed a final Settlement Agreement (the "Settlement Agreement") to resolve a Clean Water Act case brought by the Tribe in 2019. The Settlement Agreement provides for total payments of $5 million (with $1 million in attorney fees) by Perpetua over a four-year period which includes $4 million of contributions by Perpetua to a South Fork Salmon Water Quality Enhancement Fund (the "Fund") to be used by the Nez Perce Tribe to support water quality improvement projects in the South Fork Salmon River watershed. As noted in the Settlement Agreement, the Fund "shall be used solely to support water quality improvement projects in the South Fork Salmon River watershed and shall be focused on reducing pollutant loadings from the Stibnite Mining District (including the Stibnite Mine Project Site and the Cinnabar Mine Site … including downstream restoration if warranted, and areas of metal contamination of stream sediments in these vicinities."

As far as can be ascertained from water quality data collected after April 2012, the date of approval of the Bradley Mining Company consent decree, surface water quality downstream of the Stibnite site remained consistently poor after the site was effectively "abandoned" by the Federal government.

For example:

- EPA's Primary Drinking Water Standard was consistently exceeded from 2012-2019;
- Arsenic loading in the EFSFSR is estimated to have averaged 3,500 lbs/year through the years 2012 - 2014;
- Surface water geochemistry indicated that in 2012, on average, the chronic criteria for protection of aquatic life was consistently exceeded in surface water data collection points downstream from the Spent Ore Disposal Area for arsenic; and, finally
- The loading contribution of the SODA, over which an impermeable cap was supposed to have been constructed pursuant to the Mobil CD, is estimated at approximately 10 tons of arsenic which have

leached from the SODA (including the underlying Bradley Mining tailings) in the past 20 years. Perpetua's Stibnite Gold Project would fully remediate these sources.

Perpetua has committed $7.5 million to begin pre-permitting cleanup of the Stibnite Mining District under the ASAOC. As set forth in its public securities filing (10-Q for Q3 2023), during the nine-month period ended September 30, 2023, Perpetua had actually spent $8.7 million expecting to improve water quality which included moving more than 300,000 tons of legacy mine waste and tailings away from sensitive waterways on the Stibnite Site and relocating it to areas where it can be more safely stored. Perpetua completed the majority of the TCRA activity by the end of 2023 and any work to fully complete Phase I will take place during the work season of 2024. Prior to the execution of Phase I of the ASAOC by Perpetua, the last known clean up at the Stibnite Site was in 2005. Perpetua, through its investment in the ASAOC and its vision for the SGP, remains the most feasible path to full remediation of the Site. Soon after the DEIS was published and the public comment closed, Perpetua began work on designing removal actions to improve water quality, with the first construction on such actions beginning during summer 2022. Perpetua's pre-permitting investment in cleanup of Stibnite will exceed over $17 million upon conclusion of Phase I of the ASAOC. Permitting the SGP will provide a long-sought cleanup path for this legacy site through the vehicle of responsible resource development.

5.2.3 Site Reclamation and Restoration as part of Operations and Closure

Perpetua recognizes that redevelopment of the previously mined lands provides a unique opportunity to clean up existing disturbed sites and reclaim previously impacted areas, while also providing social and economic benefit to the community. While clean-up of the site has already begun through the ASAOC, reclamation will be undertaken concurrently as mining activities move through the site in phases. Once the mining activities are completed overall, final reclamation and restoration will commence.

Concurrent reclamation during the operations phase of the SGP has been designed to provide permanent, low-maintenance achievement of final reclamation goals on completed portions of the site prior to the overall completion of mining activities throughout the SGP. Approximately 37 percent of the reclamation would be completed concurrent to mining and ore processing; remaining reclamation activities would be completed during closure.

Final closure and reclamation that had not been concurrently reclaimed would include removing all structures and facilities; installing cap and cover systems; recontouring and improving drainages; creating wetlands; reconstructing various stream channels; decommissioning of the EFSFSR diversion tunnel; growth media placement; planting and revegetation on disturbance areas; and reopening Stibnite Road (FR 50-412) through the SGP.

Surface water flow diversion of portions of the EFSFSR, Garnet Creek, Meadow Creek, Midnight Creek, and Hennessy Creek would be reclaimed and incorporated into constructed wetlands (i.e., Garnet Creek) or restored stream channels across the reclaimed TSF (i.e., Meadow Creek) or Yellow Pine pit backfill.

The Burntlog Route would be needed until the TSF is fully reclaimed, after which the newly constructed portions of the road would be decommissioned and reclaimed, and the currently existing portions of the road would be returned to their prior use.

Closure and reclamation activities would help create post-mining land uses of wildlife and fisheries habitat and dispersed recreation at the SGP. By reopening Stibnite Road (FR 50412) over the backfilled Yellow Pine pit, recreational access to Thunder Mountain would be restored.

In accordance with Idaho Code Section 47-1512, 36 CFR 228.13 (a), 33 CFR 332.4 (c) (13), and Section 15 of Perpetua's Draft Compensatory Mitigation Plan (April 2023) and prior to the commencement of SGP work, Perpetua will provide state and federal agencies financial assurance instruments with an equivalent value of the estimated reasonable costs needed for the agencies to successfully implement the agency approved

Reclamation and Closure plan in the event of an operator default. These financial assurance instruments will include estimated costs for general mine and access road reclamation, approved stream and wetland compensatory mitigation activities, cyanide facilities permanent closure, as well as post closure water treatment. The estimated reasonable costs include the direct costs of performing the closure work by a 3rd party contractor and the indirect cost of agency administration, engineering and design work, and contingencies. Cost estimates will be based on reclamation and closure of the SGP as approved by a USFS record of decision (ROD). Upon final publication of a ROD, final financial assurance cost estimates can be calculated.

It is highly unlikely that the clean-up and restoration of the site on a standalone basis would be funded by taxpayers, the State of Idaho, or any federal agency, such as the USFS, the EPA, or the NOAA National Marine Fisheries Service. Restoration of the site would include the 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, if conducted by a state or federal agency, would likely not be able to take advantage of the more suitable (larger scale) equipment Perpetua will use to conduct the activities and would require the construction of all other associated infrastructure, such as offices, maintenance facilities and housing, all of which are proposed under the SGP. Further, without the integrated redevelopment of the SGP and access to the ore processing facility, the metals currently contained in the legacy tailings would remain unaddressed as a potential future risk.

5.2.4 Fisheries Enhancement and Restoration Efforts of the Nez Perce Tribe

Perpetua acknowledges work the Nez Perce Tribe has undertaken near and downstream of the SGP, including hatchery supplementation, fishery research, and watershed restoration efforts. These projects include the Johnson Creek Artificial Propagation Enhancement Operations and Maintenance project, the Lamprey Restoration Project, the Johnson Creek Artificial Propagation Enhancement Monitoring and Evaluation program, the Salmon River Basin Integrated Status and Effective Monitoring Project, the Lower Snake River Compensation Program, the Secesh Chinook and Joseph Creek Steelhead Adult Abundance project, the McCall Watershed Division Project, as well as a variety of CWA 319 restoration projects. Perpetua recognizes the value and contribution of these projects to the fishery resources within the Salmon River watershed and beyond.

Perpetua is committed to removing barriers to fish migration and re-establishing fish passage, fish habitat, and spawning areas as a component of the SGP, all in support of developing a robust population of natural migratory fish. This is a common goal of both Perpetua and the Nez Perce Tribe.

It is also a goal of Perpetua to reduce the loading of sediment and transport of heavy metals downstream of the SGP site, through the pre-permitting cleanup, during design, construction, and operation of the SGP, and finally with the execution of the reclamation and closure plan. Improvement of water quality flowing from the SGP area will only be achieved in our lifetimes by the removal of legacy mining materials. Otherwise, the only remaining existing remedy is through the eventual passage of time, which would merely result in the existing sediments and heavy metals being carried downstream, and subsequent deposition of sediment and the dilution, rather than removal, of contaminants.

5.3 Social, Economic, and Environmental Health Benefits and Costs Associated with the Preferred Alternative

Since the initiation of SGP development in 2009, Perpetua has understood the importance of providing information on the potential impacts from proposed activities. For project-related impacts that are of concern to community members, it is equally important to demonstrate how those impacts will be addressed to mitigate their effects. From 2009 through 2022, Perpetua hosted 1,133 community discussions, including 64 office hours and 79 webinars. Perpetua has spent 14,091 staff hours engaging with the

community and have hosted 228 tours of the site. Numerous studies have been conducted and reports prepared to inventory and understand the social, economic, and environmental setting of the SGP. These include:

- 2018 Economic Impact Study
- 2018 Community Agreement
- 2019 Workforce Survey
- 2020 NEPA Comment Review
- 2022 Stibnite Advisory Council, Community Needs Assessment
- 2022 NEPA Comment Review

In 2018, Perpetua entered into a Community Agreement with eight local communities to formalize a process of communication to identify immediate and ongoing needs for infrastructure support, environmental protection, economic development, and public safety. The 2018 Community Agreement led to the creation of the Stibnite Advisory Council (SAC or Council) as an ongoing forum between the corporate leadership of Perpetua Resources and these eight communities. The Council has met over 56 times in the last five years to raise questions from their communities, request detailed technical updates, assess community needs, identify potential impacts from future proposed operations and to identify opportunities to mitigate impacts and promote positive opportunities. Since inception, the Council has prepared a community needs assessment, conducts regular workforce survey analysis, sponsors independent citizen's water monitoring at Stibnite, and has hosted over thirty presentations on topics ranging from a third-party review of the Tailings Storage Facility to transportation plans.

In January 2022, Perpetua prepared the Stibnite Gold Project Community Impact and Mitigation Review summarizing the community impact and mitigation efforts for the SGP (Perpetua 2022). It was updated in February 2023 to highlight community meetings and outreach efforts to local governmental entities and other stakeholders to discuss the potential impacts of exploration and mine development activities on the surrounding communities.

5.3.1 Economic Benefits to the Community

The SGP would generate significant economic benefits to the local communities, counties, the State of Idaho, and the nation both directly and indirectly over the construction, operation, and closure and reclamation phases of the mine (Highland Economics 2018; USFS 2022c; USFS 2022d). Economic benefits will be derived through an increase in jobs and the influx of money spent in the local economy, in addition to the benefits that Perpetua is and will provide the local communities through the Stibnite Foundation, which was formed because of the 2018 Community Agreement outlined above. In support of the NEPA process and in cooperation with USFS through the development of the Social and Economic Conditions Specialist Report (USFS 2022c), Highland Economics conducted an analysis of the economic impacts of the SGP, including direct jobs and income created by the SGP, indirect jobs and income resulting from purchases of goods and services related to the SGP, and induced impacts resulting from increased household spending. The Highland Economics report, "Economic Impact Analysis of the Stibnite Gold Project," was relied on for the DEIS and SDEIS with respect to employment and wage information and is the main source of information for this document as well.

Employment

As stated in the SDEIS (USFS 2022d), employment impacts from the SGP would be beneficial for the long term, both locally and regionally. The economic benefits of employment at the SGP would differ between the planning, construction, operations, and reclamation and closure phases. During construction, an average of 640 workers (including subcontracted employees) would likely be employed annually (Highland Economics 2018; USFS 2022c). For the SGP's operating phase, the projected average annual employment and work

residency for SGP operations would be 580 workers (including subcontracted employees) over the 15-year operating period (Highland Economics 2018; USFS 2022c). SGP's projected average annual employment and work residency for the five-year closure and reclamation phase is estimated at 160 workers, decreasing to 40 workers for the subsequent monitoring phase (Highland Economics 2018; USFS 2022c).

Overall, the SGP is estimated to support 4,690 direct, indirect, and induced jobs for residents nationwide during the construction period, 2,690 jobs nationwide during the operations period, and 330 jobs nationwide during the closure and reclamation period (indirect jobs are resulting from purchase of goods/services for the site and induced jobs are resulting from household spending; Highland Economics 2018; USFS 2022c).

Planning Phase

In 2022, Perpetua had 25 full-time employees and 5 part-time employees, with a total cash compensation of approximately $4.4 million dollars. Eighty-one percent of employees were based in Idaho, with 46 percent of employees based in Valley County. In 2022, Perpetua purchased goods and or services from 138 Idaho vendors, spending a total of $12.4 million in Idaho (Perpetua 2023).

Construction Phase

The SGP will require a 3-year construction phase to build all the necessary infrastructure, ore processing facilities and mine features. It is expected that most local construction workers would be adequately qualified and/or trainable for mine operations work and that many construction workers living locally or elsewhere within Idaho would likely accept mine operations jobs. These, and other local residents, would be adequately qualified for the general, administrative, and maintenance positions.

During the 3-year construction phase, it is projected that approximately $66 million (in 2017 dollars) in salaries and wages would be paid annually for the construction workforce of 640 workers. Assuming approximately 68 percent of the workforce would be Idaho residents, $44.6 million in salaries and wages are projected to be paid to Idaho residents working for the SGP and the Valley and Adams counties workforce would receive $17.2 million per year in salary and wage income from the SGP (Highland Economics 2018; USFS 2022c).

Based on the projected total annual direct labor cost of $66 million during this phase, the average, fully burdened annual compensation in 2017 dollars of all SGP employees (i.e., including management staff) is calculated to be $96,600 (Highland Economics 2018; USFS 2022c). This fully burdened compensation accounts for overtime, as well as employee health and other benefits.

The statewide income impact during the 3-year period of construction is estimated to be $110.9 million per year. Of this statewide total, the overall local income impact is expected to total $28.8 million per year for Valley and Adams counties' residents. Outside of Idaho, the SGP is projected to support $215.5 million in direct, indirect, and induced income resulting in a nationwide total of $326.4 million (i.e., combined total of Idaho and elsewhere in the U.S. (Highland Economics 2018; USFS 2022c).

Operations Phase

During operations, it is projected that approximately $52.8 million (in 2017 dollars) in salaries and wages would be paid annually to its operations workforce of 580 workers. Assuming approximately 68 percent of the workforce would be Idaho residents, $42.2 million in salaries and wages would be paid to Idaho residents working for the SGP. Of this, Valley and Adams counties residents are projected to receive $18.5 million in annual salary and wage income (Highland Economics 2018; USFS 2022c).

Based on the projected total annual direct labor cost of $52.8 million, the average fully burdened annual compensation of all SGP employees (i.e., including management staff) during operations is calculated to be

$90,600 (in 2017 dollars) (Highland Economics 2018; USFS 2022c). This fully burdened compensation accounts for overtime, as well as employee health and other benefits.

The statewide income impact during the 15-year period of operations is estimated to be $71.6 million per year. Of this statewide total, the overall local income impact is expected to total $29.3 million per year for Valley and Adams counties residents. Outside of Idaho, the SGP is projected to support $114.8 million in direct, indirect, and induced income resulting in a nationwide total of $186.4 million (i.e., combined total of Idaho and elsewhere in the U.S.; Highland Economics 2018; USFS 2022c).

Closure and Reclamation Phase

It is projected that approximately $6.6 million (2017 dollars) in salaries and wages would be paid annually to the 160 workers during closure and reclamation. Assuming approximately 68 percent of the workforce would be Idaho residents, $5.3 million in salaries and wages would be paid to Idaho residents working for the SGP. Of this, Valley and Adams counties residents are projected to receive $3.6 million in annual salary and wage income (Highland Economics 2018; USFS 2022c).

Based on the projected total annual direct labor cost of $6.6 million during this phase, the average fully burdened annual compensation of all SGP employees (i.e., including management staff) is calculated to be $80,000 (in 2017 dollars) (Highland Economics 2018; USFS 2022c). This fully burdened compensation accounts for overtime, as well as employee health and other benefits.

The closure and reclamation phase is estimated to support $7.8 million in annual income statewide. The total local income supported by the SGP's closure and reclamation phase is expected to be $5.0 million. The SGP is estimated to contribute $16.4 million direct, indirect, and induced income per year nationwide (i.e., $7.8 million in Idaho and $8.6 million elsewhere in the U.S.; Highlands Economics 2018; USFS 2022c) during SGP's closure and reclamation phase.

Monitoring Phase

During the subsequent post-closure monitoring phase, it is projected that approximately $1.6 million (2017 dollars) in salaries and wages would be paid to 40 workers. Valley and Adams counties residents are projected to account for 20 of these employees and to receive $0.9 million in annual salary and wage income (Highland Economics 2018; USFS 2022c).

The statewide income impact during the monitoring phase is estimated to be $2.1 million per year. Of this statewide total, the overall local income impact is expected to total $1.3 million per year for Valley and Adams counties residents. Outside of Idaho, the SGP is projected to support $2.5 million in direct, indirect, and induced income resulting in a nationwide total of $4.6 million (i.e., combined total of Idaho and elsewhere in the U.S.; Highland Economics 2018; USFS 2022c).

Overall Economic Benefit

In all phases of the SGP, it is anticipated that employees would spend their earnings within their community of residence, given their bi-weekly shift schedules and employee housing at the mine site's remote location. As a result, the economic benefits to the Valley and Adams counties economies would be related to the income earned by SGP staff that live within the local area. The contribution of relatively well-paying local area employment and labor income from the SGP would result in increased spending and increased economic activity within the local economy during the entire project period.

SGP-related local jobs and earnings that result in spending and economic activity within the local economy would then support further local employment and income growth. However, the fluctuation in projected direct income impact from construction ($66 million) to operations ($52.8 million) to reclamation and closure ($6.6 million) to post-closure ($1.3 million) is recognized as a potential source of cyclical socioeconomic impacts on the local area economy. The USFS Social and Economic Conditions Specialist

Report found that the impacts on the local area's economy depend on employees' responses after their mine employment ends, as well as their other employment opportunities. If the local area's economy is strong and there are sufficient job opportunities with adequate earning potential for the unemployed mine workers, then the adverse economic impacts on the local economy could be limited if the unemployed mine operations workers are re-employed locally.

Stibnite Foundation

As part of the 2018 Community Agreement and to offset any impacts to the local area's economy as a result of the fluctuations in employment through the various phases of the SGP, a charitable profit-sharing endowment, the Stibnite Foundation (https://stibnitefoundation.com/), was created. The Stibnite Foundation is intended to provide long-term sustained economic support to community non-profit organizations and regional community needs. The Stibnite Foundation is not intended to address the impacts of the mine. Since 2019, Perpetua has contributed $300,000 in cash contributions and 150,000 shares in the company to build the Stibnite Foundation. Perpetua has promised to contribute another $950,000 to the Stibnite Foundation between now and commencement of operations. Once in operation, the 2018 Community Agreement guarantees a minimum of $500,000 annually or up to one percent of the total comprehensive income less debt repayment annually. The Foundation is run by eight community representatives and two representatives of Perpetua. To-date, the Stibnite Foundation has awarded approximately $200,000 in giving to local organizations based on an annual grant application process.

In addition to the Foundation, Perpetua has contributed over $2 million in investments in the local community including scholarships, science, technology, engineering, and math (STEM) resources, sustainability efforts, and contributions to local and charitable organizations since 2014. Of the social investments Perpetua has made, many focus on developing a strong workforce. For example, community investments have included $40,000 to support McCall-Donnelly Career Technical programs, over $185,000 in STEM education programming for local schools, and over $80,000 in student scholarships. In addition to workforce development initiatives, Perpetua has contributed over $35,000 and countless staff hours to support the West Central Mountains Economic Development Council to evaluate and propose sustainable housing solutions for the region.

Tribal Engagement

In addition to working in the immediate community, Perpetua has extended opportunities for engagement with Idaho's tribes. Perpetua has engaged directly in over 80 meetings with tribal governments. This engagement has opened opportunities for discussions regarding workforce development. In 2023, Perpetua provided the Idaho STEM Action Center with $18,500 to support the Shoshone-Bannock Tribes' Junior/Senior High School. The joint funding allowed the Idaho STEM Action Center to hire to an associate professor with Idaho State University to provide professional support for the teachers at Shoshone-Bannock Tribes' Junior/Senior High School, lesson plans and hands-on opportunities for students, and increase readiness for STEM school designation.

5.3.2 Provision of Necessary Services to the Community

Through stakeholder engagement and agency feedback extending from pre-permitting community engagement, the 2017 scoping process, the 2020 DEIS (USFS 2020) and the 2022 SDEIS, Perpetua has made many agreements and commitments with local communities, which are outlined below. Public services and infrastructure would be affected by increased use during construction and operations but would benefit from improvements to roads and access plus upgrades to electrical power utilities.

Prior to commencement of the SGP, Perpetua will meet the following requirements and commitments (Perpetua 2022):

General

- Impact Agreement: The Conditional Use Permit (CUP) for the Stibnite Logistics Facility stipulates that Perpetua shall enter into an agreement with Valley County to mitigate impacts to the roads and other county service providers and infrastructure, such as Fire, EMS, Sheriff, solid waste, etc. Perpetua has begun discussions with Valley County on an impact agreement in 2024. The agreement must be finalized before Perpetua can begin development at the logistics facility.

Roads

- Road Maintenance: Perpetua has had an annual road maintenance agreement with Valley County since 2009. The agreement commits Perpetua to provide all standard maintenance (grading, snow plowing, servicing ditches, culverts, and bridges) along the Stibnite Road between Yellow Pine and Stibnite.
- Transport Safety: As a part of best management practices for transporting sensitive loads, Perpetua has placed emergency response kits along the South Fork Road, EFSF Road, Johnson Creek Road and Stibnite Road as a company resource for responses to emergency situations, to reduce response time and minimize impacts to the environment and local community.
- In addition, Perpetua has established pilot car protocols for oversized load transportation and always uses pilot and chase cars, as well as HAZWOPER trained staff with emergency response equipment, while conducting fuel hauls along Johnson Creek Road into Stibnite.
- Road Improvements: In addition to the requirements of the 2009 road agreement, and in compliance with stipulations of the drilling and exploration permits granted in 2011 and 2015, the following are examples of work Perpetua has conducted to improve road conditions and recreational access:
  - Perpetua assisted Valley County in avalanche removal with permitting support work in 2019 through 2021 totaled well over $85,000 and an additional $106,000 in 2021 to clear avalanche debris from the Stibnite Road. This work covered costs that would have otherwise required taxpayer dollars and allowed the road to open sooner for recreational traffic.
  - Since 2014, Perpetua has provided dust abatement services to support recreational travel and limit impacts on sensitive waterways along Johnson Creek Road and Stibnite Road, totaling $177,582. This is a benefit to recreational and other users.
  - Perpetua has also assisted the Village of Yellow Pine with dust abatement to reduce impacts of seasonal travel. Work has totaled $12,795 since 2014.
  - Perpetua has added gravel surfacing, applied dust abatement, graded road segments, and upgraded and repaired culverts on Johnson Creek and Stibnite Road to help reduce impacts to waterways and fisheries. Work has totaled over $800,000 since 2014.
- Road Impact Agreement: The conditions of the Logistics Facility CUP stipulate that Perpetua shall enter into an agreement with Valley County to mitigate impacts to the road system, including maintenance of Warm Lake Road, prior to site grading or improvements to the Stibnite Gold Logistics Facility.
- Intersections: To address the SGP's impacts on the transportation corridor, Perpetua is working with the Idaho Transportation Department, City of McCall and Valley County Road Department regarding the design and construction of intersection improvements on Highway 55, Warm Lake Road, Deinhard Lane and Boydstun Street. Perpetua will work with the City of McCall and the Idaho Transportation Department to develop cooperative agreements that formalize roles and responsibilities for the design and construction of the State Highway 55 intersections at Deinhard Lane and Boydstun Street.
  - Final design of the Warm Lake Road and State Highway 55 intersection is complete and ready for construction.
  - The Deinhard Lane and State Highway 55 intersection is also complete and ready for construction.
  - Negotiations and design of the Boydstun St and State Highway 55 intersection in McCall are ongoing.

- Traffic: Perpetua has recognized the need to minimize traffic impacts on recreational and residential traffic and has committed to limit traffic to weekdays during business hours whenever possible.

  Communications: Perpetua has developed planning materials outlining public communications regarding road conditions and access. Communications could include signage along Warm Lake Road and in the Village of Yellow Pine in addition to a website that would provide regular updates.

Utilities

- Powerline: Perpetua will construct or rebuild a minimum of ten substations and upgrade or build 74 miles of transmission line adding additional capacity and reliability to Valley County and the Village of Yellow Pine power infrastructure, to address concerns regarding fire/climate resilience and to sustain larger loads from expected economic growth.

Emergency Response

- Emergency medical technicians and emergency equipment and supplies would be on-site, including an ambulance, first aid, and medical supplies. These facilities would minimize the demand on local services and provide medical services for workers and site-visitors in an otherwise remote area.
- First Responder Training: Through a community needs assessment developed by the Stibnite Advisory Council, Perpetua understands that providing first responder training and resources regarding spills or accidents is a community priority.
- Perpetua has begun sharing and is committed to continue sharing relevant training and has committed to providing a hazardous response trailer stationed in Cascade.
- Perpetua will continue to work closely with local fire, EMS, and law enforcement departments to offer joint safety/emergency training and share information on Perpetua's safety protocols and plans.
- Perpetua is committed to communicating emergency preparedness plans with local health, safety, and transportation jurisdictions.
- Perpetua has committed to noticing and transporting hazardous materials and fuel according to standard operating procedures plus management of cyanide in accordance with the policies and requirements of the International Cyanide Management Institute.

Employment

- Perpetua has committed to provide training opportunities to facilitate the hiring of qualified local workers using local colleges and universities.
- Perpetua has committed to prioritize local hiring, contracting and provision of supplies and services.
- Perpetua has committed to work with local school districts to identify gap funding for first year students that in-migrate due to SGP employment.
- Employee Transportation: Through the community needs assessment developed by the Stibnite Advisory Council, Perpetua understands that there is community interest in employee commuter parking and busing alternatives to facilitate access to workforce transportation throughout the region. Perpetua will continue to work with the Stibnite Advisory Council to evaluate opportunities for partnership on this matter. In 2022 and 2023, Perpetua partnered with the West Central Mountains Transit Working Group to sponsor a pilot bus transit program to transport local residents between New Meadows and McCall.
- Employee Housing: Perpetua will build on-site facilities to house the on-site workforce, which accounts for up to 90 percent of the workforce. Onsite housing alleviates potential new pressures on the housing market.

Waste Management

- Waste: Perpetua has committed to hauling all solid and hazardous waste outside of Valley County for processing during the construction and operations phases, bypassing the Valley County transfer station, and avoiding the addition of any waste burden on Valley County.

5.3.3 Potential Health Impacts Related to the Proposed Activity

Potential health and safety impacts to the general public and the SGP workforce were evaluated in the DEIS and the SDEIS. Of the potential health impacts, removal of legacy mine materials along with regulatory requirements and SGP design features minimizes potential effects associated with air quality, soil quality and water quality resulting from changing environmental conditions. As a matter of best practices and Perpetua's core values and commitment to safety, all Site Safety Plans and health and safety policies will be closely adhered to, to ensure public and environmental safety throughout the entirety of the SGP.

A public health assessment for the SGP (ATSDR 2003) completed by the Bureau of Health and Safety, Division of Health, Idaho Department of Health and Welfare evaluated exposure pathways for surface soil, surface water and airborne particulates and sediments associated with different contaminants at the site. This assessment found that it is unlikely that the contaminants at the Stibnite site will result in any adverse public health effects for the reclamation workers and recreational users, since the estimated exposure doses are either below the corresponding health guideline values, or below the corresponding Lowest Observed Adverse Effects Levels (LOAELs) in all the related studies. To obtain quantitative estimates, this report added all estimate cancer risk from all locations and assumed the same workers would finish all the reclamation by finishing one site per working season. As a result, the theoretical estimated highest cancer risk for the reclamation workers would be 2 cancer cases estimated for 10,000 workers exposed. Therefore, predicted increased risk of cancer from arsenic is so low as to be negligible to the reclamation workers and recreational users.

Common physical hazards related to terrain include extremely steep slopes, rock cliffs, uneven terrain, and fallen trees. The SGP could increase exposure to natural hazards such as avalanches due to the increase in the number of people traveling and working in the area. Avalanches, rock falls, debris flows, and flash floods also present a potential hazard for travelers, recreationists, and Forest Service and Perpetua employees, and areas that are not traditionally flood-prone are subject to changes to the landscape caused by wildfires. Notable landslides and avalanches occurred in 2014, 2017, 2019, and 2021 along the SFSR Road (FR 474/50674) and the Stibnite portion of the McCall-Stibnite Road (CR 50-412).

Superimposed on the physical terrain, the mine site contains some dilapidated structures, old mining equipment, underground mine openings (all collapsed and/or closed), and altered landscapes, such as mine pits, abandoned and reclaimed townsites, abandoned and reclaimed mine and exploration roads, hydroelectric generating foundations, municipal dumps at various locations, the reclaimed Hecla heap leach pad, the spent ore disposal area, and waste rock disposal areas. Perpetua has proposed measures to mitigate potential public safety issues related to these features. For example, "danger" and "no-trespassing" signs are posted near pits and waste rock disposal facilities where terrain is steep and benches could be unstable. Efforts also have been made to render old adits inaccessible by collapsing the entrances and posting warning signs. However, numerous hazards still exist throughout the mine site, including discarded sharp, rusted metal objects, foundation remnants, nails, glass, and other debris (HDR 2017a).

There currently are no active domestic groundwater wells used for drinking water within 15 miles of the mine site. Yellow Pine's public water system uses surface water from Boulder Creek, which is located approximately 15 miles downstream of the mine site and is a tributary to the EFSFSR but drains an area unaffected by prior mining activities. Because groundwater in the SGP area does not represent a drinking water source, the ATSDR Public Health Assessment eliminated groundwater quality from consideration as a public health concern (ATSDR 2003).

Based on surface water sampling and analyses, antimony, arsenic, and mercury are considered the key chemicals of public health interest in surface water in the analysis area and these constituents are naturally elevated in the region (Brown and Caldwell 2017). The ATSDR Public Health Assessment (ATSDR 2003) evaluated potential public health risk associated with exposure to contaminants in surface water from the mine site and concluded that contaminants in surface water would be unlikely to result in adverse health effects for recreational users in the existing mine site (ATSDR 2003). In addition, the assessment concluded that for recreational fishers and even for local fishers from American Indian tribes, who have higher fish consumption rates (estimated at 2.5 times other recreational fishers), consumption of fish harvested from surface waters in the mine site is unlikely to result in any adverse health effects.

Finally, with 500 or more employees living and dining in close quarters, the potential for transmission of infectious diseases exists. Employees from the local community who lodge at the on-site facility could potentially transmit infectious diseases to the local communities upon return from the on-site housing facility. Therefore, worker safety protocols include basic measures for good hygiene and protection of infectious disease transmission; and on-site health care services would provide basic treatments for worker illnesses.

Table 4, which is copied here from the SDEIS Table 4.18-3, summarizes the possible health impacts for the SGP as a whole, both positive and negative, direct and indirect, of different categories relevant to human health, including the environment, economy, public services and infrastructure, and demographics. Each possible health impact is graded with respect to magnitude and likelihood as low, medium, or high, with the overall impact on public health determined as a combination of magnitude and likelihood and classified as negligible, minor, moderate, or major.

Table 4. Summary of Public Health Benefits and Costs Impacts for the 2021 MMP

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Impact Relevant to Public Health and Safety	Possible Health Impact	Positive or Negative Health Impact?	Pathway of Health Impact	Magnitude of Impact	Possibility of Impact	Overall Impact on Public Health (Magnitude x Possibility)
Environment	Soil	Reclamation of legacy mining materials	Minimizes direct contact with hazardous pollutants Improved environmental quality	Chronic Disease Well-Being/ Psychosocial	Positive	Direct - Contact	Closure and Reclamation: Medium	Closure and Reclamation: High	Closure and Reclamation: Moderate
Environment	Surface Water	Reclamation of surface conditions, re- vegetation to reduce run-off of hazardous pollutants to streams and rivers	Minimization of direct contact with hazardous pollutants Reduction of hazardous pollutants in fish harvested from local waterbodies Improved environmental quality	Chronic Disease Nutrition Well-Being/ Psychosocial	Positive	Direct and Indirect	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Environment	Air	Localized impacts to air quality from fugitive dust and particulate emissions during mine operations; diesel emissions from vehicle traffic and machinery	Inhalation of pollutant emissions	Chronic Disease - Well- Being/ Psychosocial	Negative	Direct – Pollutant Inhalation	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Environment	Soil	Deposition impacts to soil from proposed mine operations	Direct contact with hazardous pollutants	Chronic Disease- Well- Being/ Psychosocial	Negative	Direct - Contact	Construction and Operations: Medium Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Minor Closure and Reclamation: Negligible

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Impact Relevant to Public Health and Safety	Possible Health Impact	Positive or Negative Health Impact?	Pathway of Health Impact	Magnitude of Impact	Possibility of Impact	Overall Impact on Public Health (Magnitude x Possibility)
Environment	Groundwater	Leaching of contaminants to groundwater from proposed mine operations	Degraded environmental quality	Well-Being/ Psychosocial	Negative	Indirect	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Environment	Soil	Uptake of contaminants from soil into subsistence foods (berries and plants)	Ingestion of contaminants from edible plants and berries	Chronic Disease Nutrition Well-Being/ Psychosocial	Negative	Indirect - Bioaccumulation	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Environment	Surface Water	Direct contact with hazardous pollutants released to surface water	Direct contact with hazardous pollutants Ingestion of hazardous pollutants in fish harvested from local waterbodies	Chronic Disease Nutrition Well-Being/ Psychosocial	Negative	Direct	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Environment	Terrain	Disturbance of existing terrain and features	Injury due to natural hazards: avalanche, land slide, flash flooding and water hazards, wildfires	Injury Well-Being/ Psychosocial	Negative	Direct - Injury	Construction and Operations: High Closure and Reclamation: High	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Moderate Closure and Reclamation: Moderate

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Impact Relevant to Public Health and Safety	Possible Health Impact	Positive or Negative Health Impact?	Pathway of Health Impact	Magnitude of Impact	Possibility of Impact	Overall Impact on Public Health (Magnitude x Possibility)
Economy	Personal (income, employment)	Increase in local employment	Increased income Increased food security/ improved nutrition Increased access to health care through employee benefits, including insurance	Chronic Disease Well-Being/ Psychosocial	Positive	Indirect	Construction and Operations: Medium	Construction and Operations: High	Construction and Operations: Major
Economy	Personal (income, employment)	Decrease in local employment	"boom and bust" impact reduced demand for private and public goods and services reduction in demand for labor	Chronic Disease Well-Being/ Psychosocial	Negative	Indirect	Closure and Reclamation: Medium	Closure and Reclamation: Medium	Closure and Reclamation: Moderate
Public Services and Infrastructure	Need for new infrastructure	Worker Housing Facility	Increased access to health care and emergency service support Increased emergency services in remote area	Chronic Disease Infectious Disease Injury Well-Being/ Psychosocial	Positive	Indirect	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Moderate Closure and Reclamation: Moderate
Public Services and Infrastructure	Need for new infrastructure	Worker Housing Facility	Potential transmission of infectious disease	Infectious Disease	Negative	Indirect	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Minor Closure and Reclamation: Minor

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Impact Relevant to Public Health and Safety	Possible Health Impact	Positive or Negative Health Impact?	Pathway of Health Impact	Magnitude of Impact	Possibility of Impact	Overall Impact on Public Health (Magnitude x Possibility)
Public Services and Infrastructure	Roads	Construction of improved mine access road	Improved access to remote area for emergency responders	Injury Well-Being/ Psychosocial	Positive	Indirect	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Moderate Closure and Reclamation: Moderate
Public Services and Infrastructure	Roads	Construction of improved mine access road, Increased trucking traffic on mine access routes	Increased potential for hazardous waste spill Increased potential for traffic accidents	Injury Well-Being/ Psychosocial	Negative	Direct	Construction and Operations: High Closure and Reclamation: High	Construction and Operations: Medium Closure and Reclamation: Medium	Construction and Operations: Major Closure and Reclamation: Major
Public Services and Infrastructure	Transmission Lines	Increased power demand to support mine operations	Increased exposure to electro-magnetic field (EMF) along transmission lines	Chronic Disease Injury Well-Being/ Psychosocial	Negative	Direct	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible
Demographics	Land use	Disturbance of current recreational land use	Alteration or elimination of recreational sites	Well-Being/ Psychosocial	Negative	Indirect	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Impact Relevant to Public Health and Safety	Possible Health Impact	Positive or Negative Health Impact?	Pathway of Health Impact	Magnitude of Impact	Possibility of Impact	Overall Impact on Public Health (Magnitude x Possibility)
Demographics	Land use	Noise disturbances during mine blasting and vehicle noise along access routes	Psychological effects due to noise	Well-Being/ Psychosocial	Negative	Indirect	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Low Closure and Reclamation: Low	Construction and Operations: Negligible Closure and Reclamation: Negligible

5.3.4 Impacts to Direct and Indirect Uses Associated with High Quality Waters (e.g., Fishing, Recreation and Tourism)

Public use would be restricted within the mine site during construction, operations, and closure and reclamation by fencing near the security-monitored gates, and signs warning the public against entry into the mine site. For safety reasons, there would be no hunting allowed within areas posted or fenced during construction or mine operation to ensure worker safety; however, hunting may continue on public lands outside of fenced or posted mine site areas in accordance with applicable regulations.

The SGP would not have any direct impacts on recreational river use downstream of the mine site. Under the SGP operations and closure, water quality of surface flow departing from the SGP would be the same or better than existing baseline conditions (up to a 40 percent improvement in arsenic levels in EFSFSR downstream of Sugar Creek); therefore, there would not be impacts to the quality of downstream waterways (USFS 2021) and the use by recreational river users. There would be no change in potential human health impacts from dermal contact or ingestion of river water downstream. There could be indirect short-term impacts to setting (i.e., visual changes and noise) most of which would be short term during construction of the Burntlog Route, while mine traffic is using Warm Lake and Johnson Creek roads. These impacts would be short term, minor, and localized. With respect to West End Creek, access to this high-quality water (as an AU listed as warranting Tier II protection) would be restricted from construction through reclamation and closure. Loss of access to this stream may impact some recreational or tourist uses, and would be long-term, minor, and localized (USFS 2022d).

Apart from the mine site area, existing recreation opportunities, access, and use would continue in the existing recreation setting (USFS 2022b). Long term, the reclamation activities should improve the quality of the aquatic habitat and sport fishing compared to the current conditions. There would be no stream flow changes to streams along either the Johnson Creek Route or the Burntlog Route.

References

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Commenter	Section	Comment	Perpetua Response
4	II, Specific Comments	High-Quality Waters (Tier II Protection): The Proposed Project necessitates careful consideration of its environmental implications, particularly concerning high-quality waters. The Tribe holds substantial reservations regarding IDEQ's Alternatives Analysis and Socioeconomic Justification ("AASJ"). Firstly, the socioeconomic justifications provided in the AASJ do not convincingly demonstrate the necessity of the Proposed Project's benefits for local community development, as mandated by regulatory standards. Secondly, the Tribe is concerned by IDEQ's insufficient assessment of the impacts of a comprehensive range of pollutants of concern on Tier II waters. A more thorough and detailed analysis by IDEQ is needed to ensure the protection of these critical water resources.	The Alternatives Analysis and Socioeconomic Justification (AASJ) was focused in purpose and scope to the 16 assessment units (AUs) determined by IDEQ to warrant Tier II protection with the potential for degradation relative to temperature. The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade, or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the transmission line (TLine) right-of-way (ROW) expansion, and the diversion of West End Creek around West End pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure. The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification. The purpose and scope of the AASJ has been more fully described in the updated version of the AASJ. In the Executive Summary, the following edits and additions have been made to paragraph 2: "In May 2023, Perpetua requested a 401 WQC from IDEQ. As part of the antidegradation review of the submitted request, IDEQ identified 28 ~~16~~ Assessment Units (AUs) within the SGP footprint warranting Tier II protection, with sixteen of these determined to have ~~and analysis with~~ the potential for degradation beyond ambient conditions with respect to temperature and warranting analysis. As such, an Alternatives Analysis (AA) and a Socioeconomic Justification (S~~E~~J) was completed ~~are required~~as part of the 401 WQC process (IDAPA 58.01.02, Section 052.08, subsections c and d). This document was prepared to satisfy these requirements and its purpose and scope is focused on the dredge and fill activities associated with the sixteen AUs determined by IDEQ to warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these sixteen AUs against the socioeconomic benefits to the community of the SGP as a whole to provide a rationale to warrant the potential for degradation beyond ambient conditions with respect to temperature." In Section 1: Purpose, the following edits and additions have been made to paragraph 1: "This document's purpose and scope is focused on ~~examines~~ the dredge and fill activities associated with the sixteen AUs determined by IDEQ to ~~that~~ warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these sixteen AUs against the socioeconomic benefits to the community of the SGP as a whole to justify ~~potential degradation~~ the potential for degradation beyond ambient conditions with respect to temperature. This document is provided in addition to the May 26, 2023, CWA WQC request package submitted to IDEQ, which included: • Request Form: (IDEQ 401 WQC Request Form_ADH Signed_05_26_2023.pdf) • Attachment 1: (20230526_Attachment 1_SGP_401_CertificationRequest.pdf) - Appendix A, Assessment Unit Summaries (20230713_App A Assessment Unit Summaries.pdf) - Appendix B, Assessment Unit Tables ➢ North Fork Payette Basin (20230526_App B Table NFPS.pdf) ➢ South Fork Salmon Basin (20230526_App B Table SFSB.pdf) ➢ Filterable Excel file with each table in its own tab (20230526_AppendixB_Tables.xlsx) - Appendix C, Environmental Protection Measure Matrix (20230526_App C Environmental Protection Measure Matrix.xlsx) - Appendix D, Webmap ➢ Webmap Users Guide (Appendix D Webmap Users Guide.pdf) ➢ ArcGIS Online Webmapping Application tool, "IDEQ Assessment Tool FINAL," ➢ Excel file with attribute tables for every GIS layer (PRII_SGP_401WQC_WebmapTables.xlsx)" In Section 1: Purpose, the following edits and additions have been made to paragraph 7: Together these sections provide the required supporting analysis for the 16 AUs identified as warranting Tier II protection and analysis and demonstrate that the SGP has been designed to be least degrading, as well as providing social and economic benefits that establish a rationale to warrant ~~justify~~ the action causing the potential for degradation beyond ambient conditions with respect to temperature, which in this case are stream crossings for transmission line access roads and mine site access routes, wetland conversion from scrub-shrub to emergent wetland adjacent to streams flowing within the widened ROW, and the diversion of West End Creek around and downstream of West End pit ~~potential to degrade high quality waters with respect to temperature~~. Additionally, Perpetua addressed a comprehensive range of pollutant of concerns as part of the 401 Water Quality Certification (WQC) request package.

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			Specifically in response to Section 6 of the IDEQ request form titled "Methods and Means Proposed to Monitor Discharge and Equipment/Measures Planned to Treat, Control, or Manage the Discharge," the following categories of pollutants of concern are addressed: Temperature, Sediment and Turbidity, Toxic Substances, Ammonia, pH, Dissolved Oxygen, Bacteria, Nitrogen and Phosphorus, Hazardous and Deleterious Materials, and Color and Odor. Stream and wetland impact avoidance and minimization efforts are outlined and design features, best management practices, and monitoring plans for the protection of water quality for each category of pollutants of concern are provided in detail.
4	II, Specific Comments	Insufficiency of Socioeconomic Justification: The Brown and Caldwell AASJ attempts to rationalize the degradation of Tier II waters by the Proposed Project. However, it falls short of meeting the explicit statutory and regulatory standards that dictate such degradation must be indispensable for local socioeconomic development. This is a crucial omission, as both Idaho Code § 39-3603(b) and IDAPA 58.01.02.052.08.d require a demonstration that any proposed degradation of water quality must be explicitly justified by the need to accommodate important economic or social development. The AASJ does not adequately demonstrate the economic impacts, nor the necessity of the socioeconomic benefits provided by the Proposed Project, for the local community's development. The lack of detailed evidence or analysis proving that such benefits are essential for the surrounding communities, especially given the current socioeconomic resilience of Valley County, significantly undermines IDEQ's justification for degrading Tier II waters. As described in section 5.1 of the AASJ, Valley County's economy is thriving, bolstered considerably by its recreation and tourism industries, which offer year-round opportunities. This sector plays a crucial role in the local economy. As noted in the AASJ, "per capita wages throughout Idaho are lower than the national average, though Valley County per capita wages are much closer to the national average," largely due to this vital sector of the economy. The proposed mining activity could, in fact, detrimentally affect the local economy and is clearly not a necessity as the economic diversity and performance in Valley County exceeds that of the rest of Idaho.	Under Idaho's administrative rules and Agency guidance governing its process for 401 certification, IDEQ must balance and evaluate (qualitatively) the potential water quality degradation of the Project subject to the Corps' 404 permit with the accommodation of "important economic or social development." See IDAPA 58.01.02.052.08.d. Unlike other parts of IDAPA where IDEQ's 401 certification calls for precision, the AASJ regulations provide broad discretion to IDEQ to exercise its sovereign certification authority, when necessary, with qualitative judgments on socioeconomic factors. IDAPA 58.01.02.052.08.d.iv states: "Factors identified in the socioeconomic justification should be quantified whenever possible but for those factors that cannot be quantified a qualitative description of the impacts may be accepted." Numeric data will inform the Agency as to the parameters of the IDAPA factors, but it is clear IDEQ is entitled to determine the importance of economic or social development qualitatively. The commenters misinterpret IDAPA's AASJ analytical toolbox by suggesting to IDEQ that "any proposed degradation of water quality must be explicitly justified" and that any benefits determined by the Agency are required to be "essential for the surrounding communities." Nowhere in the IDAPA regulations do the words "indispensable," "explicit," or "essential" appear as a modifier to any socioeconomic factor. Instead, IDAPA speaks to "relevant" social, economic and environmental health benefits," IDAPA 58.01.02.052.08.d.iiii; that such"[b]enefits and costs that must be analyzed include, but are not limited to" five factors set forth in that subsection, id.; and "[p]otential health impacts" id. 58.01.02.052.08.d.iiii.(3). Qualitative terms such as "relevant," "includ[ing], but not limited to;" and "potential" are far from rigid, unyielding analytical directives under the IDEQ regulations as the commenters promote.
4	II, Specific	Insufficiency of Socioeconomic	IDAPA 58.01.02.052.08.d.ii states: "Describe the important social or economic development associated with the activity which can include

Commenter	Section	Comment	Perpetua Response
	Comments	Justification: Section 5.2.2 of the AASJ states Perpetua, "remains the sole hope for full remediation of the Site." This claim is simply not credible. The AASJ completely disregards the Tribe's active role in hatchery supplementation, fishery research, and watershed restoration efforts near and downstream of the Proposed Project or the many alternative clean-up approaches that could be taken at the site should Perpetua's Proposed Project not go forward.	cleanup/restoration of a closed facility." The cleanup of the site by Perpetua through Phase I of the voluntary ASAOC totals over $17 million to date. Separately, the Settlement Agreement between Perpetua and the Nez Perce Tribe totals $5 million in investment commitment to the South Fork Salmon Water Quality Enhancement Fund for use by the Nez Perce Tribe to support water quality improvement projects in the South Fork Salmon River watershed. The statement in Section 5.2.2 that Perpetua "remains the sole hope for full remediation of the Site" is based on the history of reclamation and clean-up projects at the Site. The following language has been added to the AASJ in Section 5.2.2 to clarify: Prior to the execution of Phase I of the ASAOC by Perpetua, the last known clean up at the Stibnite Site was in 2005. Perpetua, through its investment in the ASAOC and its vision for the SGP, remains the ~~sole hope~~ most feasible path to ~~for~~ full remediation of the Site. The following language has been added to the AASJ in Section 5.2.4, Fisheries Enhancement and Restoration Efforts of the Nez Perce Tribe: "Perpetua acknowledges work the Nez Perce Tribe has undertaken near and downstream of the SGP, including hatchery supplementation, fishery research, and watershed restoration efforts. These projects include the Johnson Creek Artificial Propagation Enhancement Operations and Maintenance project, the Lamprey Restoration Project, the Johnson Creek Artificial Propagation Enhancement Monitoring and Evaluation program, the Salmon River Basin Integrated Status and Effective Monitoring Project, the Lower Snake River Compensation Program, the Secesh Chinook and Joseph Creek Steelhead Adult Abundance project, the McCall Watershed Division Project, as well as a variety of CWA 319 restoration projects. Perpetua recognizes the value and contribution of these projects to the water quality and fishery resources within the Salmon River watershed and beyond. Perpetua is committed to removing barriers to fish migration and re-establishing fish passage, fish habitat, and spawning areas as a component of the SGP, all in support of developing a robust population of natural migratory fish. This is a common goal of both Perpetua and the Nez Perce Tribe. It is also a goal of Perpetua to reduce the loading of sediment and transport of heavy metals downstream of the SGP site, through the pre-permitting cleanup, during design, construction, and operation of the SGP, and finally with the execution of the reclamation and closure plan. Improvement of water quality flowing from the SGP area will only be achieved in our lifetimes by the removal of legacy mining materials. Otherwise, the only remaining existing remedy is through the eventual passage of time, which would merely result in the existing sediments and heavy metals being carried downstream, and subsequent deposition of sediment and the dilution, rather than removal, of contaminants."
4	II, Specific Comments	Insufficiency of Socioeconomic Justification: The socioeconomic justification must correctly account for the stream assessment units ("AUs") requiring Tier II protection and analysis. Table 1 of the AASJ identifies sixteen AUs within the Proposed Project's footprint, the proposed impacts to the delineated streams and wetlands associated with each AU, and the potential source of degradation with respect to temperature. Page 6 of the Draft 401 Certification application, however, states, "[t]he project will impact 29 waterbodies that are considered high quality for a combination of beneficial uses." Appendix B of the Draft 401 Certification provides a list of the waterbody levels of protection for the Proposed Project-impacted AUs. *Clarification Request:* Please clarify why additional AUs were omitted from the list of waterbodies warranting Tier II protection in	To avoid confusion, the AASJ has been edited in fourteen locations throughout to indicate that there are **16** AUs identified as warranting Tier II protection and analysis **with the potential for degradation beyond ambient conditions with respect to temperature**. The AASJ has been edited and the following text added to Section 3.1: "There are 28 water bodies (AUs) listed in Appendix B of IDEQ's Draft Certification identified as warranting Tier II protection for cold water aquatic life (CWAL), salmonid spawning (SS), primary contact recreation (PCR) and/or secondary contact recreation (SCR). For this analysis, 16 water bodies were identified by IDEQ, and provided in a list to Perpetua, as high-quality waters with the potential for degradation beyond ambient conditions with respect to temperature that warrant Tier II protection and analysis. These 16 water bodies determined the scope and purpose of this document. The twelve AUs identified by IDEQ as warranting Tier II protection that were not included in the list of AUs provided by IDEQ for inclusion in this analysis are listed below with their designated beneficial uses noted: • ID17050123SW001_06 – PCR • ID17050123SW007L_0L – PCR • D17050123SW011_02 – SCR • ID17050123SW011_03 – SCR • ID17050123SW012_03 – PCR • ID17060208SL010_04 – PCR • ID17060208SL017_03 – CWAL, SS, PCR • ID17060208SL019_02 – PCR • ID17060208SL019_03 – SCR • ID17060208SL023_02 – PCR

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		the AASJ. Alternatively, please account for these AUs in the AASJ.	• ID17060208SL025_04 – PCR • ID17060208SL026_03 – CWAL, SS, PCR For AUs listed above that are Tier II based on PCR or SCR only, they were not included in the list because the potential for degradation is focused only on temperature, as per the IDEQ. Also, with no dredge and fill activities occurring within AUs ID17060208SL017_03 or ID17060208SL026_03, they were not included in the list because there is no potential for degradation relative to temperature from project activities as none would occur here. “
4	II, Specific Comments	Insufficiency of Socioeconomic Justification: The AASJ provides a weak rationale for the West End Creek Diversion. West End Creek as not been surveyed using IDEQ’s beneficial use reconnaissance program (“BURP”) monitoring protocols, and the flows referenced in the socioeconomic justification are over a decade old. *Clarification Request:* BURP monitoring efforts should be prioritized at West End Creek to reflect the current condition of West End Creek.	The rationale for diverting West End Creek during mining activities in West End pit is to avoid the comingling of creek water with mine affected waters. Perpetua would assert this is a strong rationale for the West End Creek Diversion. It is accurate that West End Creek has not been surveyed using IDEQ's BURP monitoring protocols. The Tier II protection afforded to the AU that encompasses West End Creek (ID17060208SL029_02) has BURP sampling sites at Cinnabar Creek and at Cane Creek. The designated beneficial uses for this AU are based on those BURP sites. The flows referenced in the AASJ are those measured during baseline studies conducted for the SGP and as conditions have not been altered, it is reasonable that these flows continue to be representative of West End Creek. It is Perpetua's understanding that IDEQ is considering the establishment of a BURP sampling location on West End Creek.
4	II, Specific Comments	EPMs and BMPs: The AASJ fails to adequately list or reference the specific EPMs and BMPs that will address temperature degradation and other impacts on Tier II waters. Which BMPs will be implemented to minimize degradation to Tier II streams specifically to ensure adequate protection of existing uses? *Recommendation*: The AASJ should detail how each BMP and EPM is adapted to the site-specific conditions and challenges of the Proposed Project area. This includes considerations for soil types, water flow patterns, sensitive habitats, and culturally significant sites.	BMPs related to stream crossings are discussed on pages 12-13 of the AASJ and includes the following language: "New and upgraded or replaced stream crossings associated with access roads would be designed to minimize potential impacts on surface water hydrology, water quality, and fish passage. Bridges and culverts would be maintained to allow proper drainage and limit sediment delivery to area streams. As noted throughout the SGP documents, pre-construction water management activities would include the installation of surface water management features and implementation of best management practices (BMPs) to reduce erosion and sediment delivery to streams. These water management features and BMPs could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; energy dissipation structures; terraces; and other features specified in construction permits. Erosion control measures, such as silt fencing, ditch checks and other measures, will be installed and maintained to minimize environmental impact. Bridges and culverts will also be maintained to allow water drainage and limit sediment delivery to area streams. These design parameters will reduce sedimentation, thus protecting water quality for the life of the SGP." The following language has been added to the AASJ in Section 3.2.3, West End Creek Diversion, under Construction and Operations: "BMPs for West End Creek and West End pit include: • Streams would be routed into the diversions by temporary flow barriers, such as berms or cofferdams that redirect flows from the existing stream channel into the diversion channel. • Monitoring locations have been proposed in the Water Resources Monitoring Plan and are required as conditions of the IDEQ Draft Water Quality Certification. Monitoring provides real time information to either confirm plans are being met or take corrective active when needed. • Water treatment during construction and operations is anticipated for contact water, which will be routed to the ore processing facility, contact water storage ponds, water treatment plant (WTP), or enhanced evaporation systems following collection within West End Pit as well as from pit dewatering." • Equipment used in sensitive habitat areas would be cleaned and inspected prior to use to mitigate the risk of noxious weeds transport, introduction of contaminated materials from other locations, and hydrocarbon leaks/spills. • Surveys have been conducted in and around the West End Creek drainage area, with no heritage and cultural resource impacts identified in association with the West End Creek or West End Creek diversion. A Programmatic Agreement with the USFS has been developed that will direct project activities and mitigation measures associated with avoiding and addressing heritage and cultural resources impacts. The IDEQ Draft Certification, in General Conditions #5 and #6 states, "5. PRII must obtain all necessary federal, state, and local authorizations prior to commencement of any activity that could be expected to violate Idaho’s water quality standards." and "The applicant will obtain appropriate coverage from the Idaho Pollutant Discharge Elimination System (IPDES) program, which may include Industrial Permit, Multi-Sector General, and/or Construction General

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			Permits. This condition ensures that work authorized under the federal permit complies with water quality requirements prohibiting unauthorized storm water discharges, including without limitation 33 U.S.C. § 1311(a), 33 U.S.C. § 1342(p), IDAPA 58.01.02.080, and IDAPA 58.01.02.400." Furthermore, the Draft Certification also lists conditions relative to Fill Material, Erosion and Sediment Control, Turbidity, In-Water Work, Vegetation Protection and Restoration, Management of Hazardous or Deleterious Materials, Culverts, Treated Wood, Dredge Material Management, and Pollutants/Toxins. These conditions will be met in the SGP as will all other conditions for all other permits, including the development of SWPPPs and SPCCs.
5	1.a	The AASJ fails to demonstrate how degradation is necessary to support important socioeconomic development to the local community. Ultimately, the draft Certification and the AASJ fail to show how the SGP's proposed economic benefits are particularly and specifically important to Valley County, let alone, how the anticipated water quality degradation is necessary for such benefits to be achieved (as opposed to being provided by existing socioeconomic instruments of Valley County).	Under Idaho's administrative rules and Agency guidance governing its process for 401 certification, IDEQ must balance and evaluate (qualitatively) the potential water quality degradation of the Project subject to the Corps' 404 permit with the accommodation of "important economic or social development." See IDAPA 58.01.02.052.08.d. Unlike other parts of IDAPA where IDEQ's 401 certification calls for precision, the AASJ regulations provide broad discretion to IDEQ to exercise its sovereign certification authority, when necessary, with qualitative judgments on socioeconomic factors. IDAPA 58.01.02.052.08.d.iv states: "Factors identified in the socioeconomic justification should be quantified whenever possible but for those factors that cannot be quantified a qualitative description of the impacts may be accepted." Numeric data will inform the Agency as to the parameters of the IDAPA factors, but it is clear IDEQ is entitled to determine the importance of economic or social development qualitatively. The commenters misinterpret IDAPA's AASJ analytical toolbox by suggesting to IDEQ that "any proposed degradation of water quality must be explicitly justified" and that any benefits determined by the Agency are required to be "essential for the surrounding communities." It is also suggested that the AASJ should be constrained to analyzing future economic benefits solely to Valley County. First, nowhere in the IDAPA regulations do the words "indispensable," "explicit," or "essential" appear as a modifier to any socioeconomic factor. Instead, IDAPA speaks to "relevant" social, economic and environmental health benefits," IDAPA 58.01.02.052.08.d.iiii (emphasis added); that such"[b]enefits and costs that must be analyzed include, but are not limited to" five factors set forth in that subsection, id.; and "[p]otential health impacts" id. 58.01.02.052.08.d.iiii.(3). Qualitative terms such as "relevant," "includ[ing], but not limited to;" and "potential" are far from rigid, unyielding analytical directives under the IDEQ regulations as the commenters promote. Second, nowhere does IDAPA 58.01.02.052.08.d. confine the analysis of the socioeconomic benefit information provided by Perpetua to IDEQ to so limited a geographic reach of Idaho. True, IDAPA speaks to "economic benefits to the community;" and "services to the community," see id. at 58.01.02.052.08.d.iii (1)-(2). As an example, the closely-held interests by the commentators (and shared by Perpetua) in anadromous fish restoration and recovery are decidedly not confined solely to Valley County. Future conservation of these species envision a journey from the Stibnite site to the Pacific Ocean and then a return to Valley County to spawn. Such social and economic benefits are not so limited in scope as proposed in these comments, but, importantly, this multi-state excursion for these ESA listed species can only begin through habitat reconnection of habitat via construction of SGP's fish tunnel. This particular example speaks volumes why the AASJ analysis by IDEQ cannot be as constricted as suggested by the commenters.
5	1.b	The AASJ presents a biased assessment and incomplete depiction of the impacts on the local economy.	The employment numbers, spent wages, and analysis as provided in section 5 of this AASJ are from the USFS Social and Economic Conditions Specialist Report (https://usfs-public.app.box.com/v/PinyonPublic/file/1050470625746), which was provided with the SDEIS and originates from the Highlands Economics 2018 Report. The Power Consulting Idaho Headwaters Report the commenter provided as Attachment A (Power Report) is cited as a means to rebut the USFS specialist report. In a 2023 analysis of the Power Report, Perpetua contracted Highland Economics to review the Power Report. The memorandum prepared by Highland Economics in 2023, titled *Economic Review and Comment on Power Report*, indicates that many of the claims asserted in the Power Report are not substantiated by data nor are the appropriate methodologies applied. In addition, many of the conclusions determined in the Power Report are a result of examples from projects with very different scopes, scales, and locales that, according to the Highland Economics memorandum, is a major determining factor when trying to accurately assess the socioeconomic impact of a project. The Highlands Economics review of the Power Report is provided as an attachment to this comment response table.
5	1.c	The AASJ preferred alternative is short sighted and assumes an overly optimistic version of site reclamation.	Alternatives analysis for the SGP is included in other permitting documents, such as the DEIS, SDEIS, and 404(b)(1). The AASJ's purpose and scope focused on the 16 AUs determined by IDEQ to warrant Tier II protection with the potential for degradation relative to temperature. The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the TLine ROW expansion, and the diversion of West End Creek around West End Pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure. The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua

Commenter	Section	Comment	Perpetua Response
			addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification. Careful consideration and planning has gone into the development of the Project. Perpetua has a multitude of mitigation measures, monitoring plans, adaptative management strategies, emergency response plans, restoration plans, closure plans, as well as bonding. The commenter's assertion that Perpetua's Reclamation and Closure Plan (RCP) is inadequate, overly optimistic, and appears to be based on a general association, with a few specifically identified abandoned mine situations. The commenter provides no reference to any specific inadequacies in Perpetua's RCP. In Section 5 of the RCP, Perpetua outlines how the company will address an unplanned temporary closure scenario to stabilize facilities and maintain compliance with permit conditions and environmental regulations. Additionally, several state and federal agencies require performance and reclamation bonds with sufficient funding to carry out the approved RCP including the stream and wetland restoration described in the Compensatory Mitigation Plan. Reclamation success risks are mitigated through indirect costs incorporated into the bond value calculations as directed by IDAPA 20.03.02.120 and 36 CFR 228A with several layers of contingencies.
5	1.d	The AASJ provides little context on the high quality nature of Tier II waters.	The AASJ's purpose and scope focused on the 16 AUs determined by IDEQ to warrant Tier II protection with the potential for degradation relative to temperature. The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the TLine ROW expansion, and the diversion of West End Creek around West End Pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure. The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification. It is solely the responsibility of IDEQ to determine the Tier of protection warranted by each AU associated with the SGP. While the USFS may have characterized waterbodies within the SGP to be "outstanding" in the SDEIS, this characterization is different from the statutory requirements of IDAPA 58.01.02.052. In fact, Tier III applies only to waters that have been designated by the State legislature as "Outstanding Resource Waters," of which none have been designated to date within the State of Idaho. Furthermore, while not required by regulation and therefore not included in the AASJ, there has been extensive analysis in understanding the impacts this project may have on National Wild and Scenic Rivers (WSRs). The Middle Fork Salmon River and Salmon River are National Wild and Scenic Rivers. The EFSFSR flows into the South Fork Salmon River and on into the Salmon River (approximately 61 miles from project). The project as a whole will not impact the high quality of these waters and their eligibility as WSRs. Finally, as for the specific streams discussed by the commenter as being deemed eligible for inclusion in the National Wild and Scenic River System (Burntlog Creek, Johnson Creek, and South Fork Salmon River), the following dredge and fill activities for each are as follows: • Burntlog Creek (on Tier II list in AASJ) - within the drainage area of this AU there will be 51 upgraded or replaced culverts, and 3 new culverts, all of which will be installed to allow fish passage. • Johnson Creek (on Tier II list in AASJ) - within the drainage area of this AU there will be maintenance of 21 culverts and 2 bridges, 11 upgraded culverts, and one new culvert (all of which will be installed to allow fish passage), some areas of wetland conversion adjacent to streams within TLine ROWs which are in the drainage area but not on Johnson Creek or tributaries proper. • South Fork Salmon River is not in the SGP footprint and not on the list of AUs addressed by the AASJ.
5	1.e	The AASJ fails to assess the impacts of all Pollutants of Concern from all degrading proposed activities.	The AASJ was focused in purpose and scope on the 16 AUs determined by IDEQ to warrant Tier II protection with the potential for degradation relative to temperature. The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the transmission line (TLine) right-of-way (ROW) expansion, and the diversion of West End Creek around West End Pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure. The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification. The purpose and scope of the AASJ has been more fully described in the updated version of the AASJ.

Commenter	Section	Comment	Perpetua Response
			In the Executive Summary, the following edits and additions have been made to paragraph 2: "In May 2023, Perpetua requested a 401 WQC from IDEQ. As part of the antidegradation review of the submitted request, IDEQ identified 28 ~~16~~ Assessment Units (AUs) within the SGP footprint warranting Tier II protection, with 16 of these determined to have ~~and analysis with~~ the potential for degradation beyond ambient conditions with respect to temperature and warranting analysis. As such, an Alternatives Analysis (AA) and a Socioeconomic Justification (SJ) was completed as part of the 401 WQC process (IDAPA 58.01.02, Section 052.08, subsections c and d). This document was prepared to satisfy these requirements and its purpose and scope is focused on the dredge and fill activities associated with the 16 AUs determined by IDEQ to warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these 16 AUs against the socioeconomic benefits to the community of the SGP as a whole to provide a rationale to warrant the potential for degradation beyond ambient conditions with respect to temperature." In Section 1: Purpose, the following edits and additions have been made to paragraph 1: "This document's purpose and scope is focused on ~~examines~~ the dredge and fill activities associated with the 16 AUs determined by IDEQ to ~~that~~ warrant Tier II protection and analysis, examines the alternatives considered, and weighs the potential impacts to these 16 AUs against the socioeconomic benefits to the community of the SGP as a whole to justify ~~potential degradation~~ the potential for degradation beyond ambient conditions with respect to temperature. This document is provided in addition to the May 26, 2023 CWA WQC request package submitted to IDEQ, which included: • Request Form: (IDEQ 401 WQC Request Form_ADH Signed_05_26_2023.pdf) • Attachment 1: (20230526_Attachment 1_SGP_401_CertificationRequest.pdf) - Appendix A, Assessment Unit Summaries (20230713_App A Assessment Unit Summaries.pdf) - Appendix B, Assessment Unit Tables ➢ North Fork Payette Basin (20230526_App B Table NFPS.pdf) ➢ South Fork Salmon Basin (20230526_App B Table SFSB.pdf) ➢ Filterable Excel file with each table in its own tab (20230526_AppendixB_Tables.xlsx) - Appendix C, Environmental Protection Measure Matrix (20230526_App C Environmental Protection Measure Matrix.xlsx) - Appendix D, Webmap ➢ Webmap Users Guide (Appendix D Webmap Users Guide.pdf) ➢ ArcGIS Online Webmapping Application tool, "IDEQ Assessment Tool FINAL," ➢ Excel file with attribute tables for every GIS layer (PRII_SGP_401WQC_WebmapTables.xlsx)" In Section 1: Purpose, the following edits and additions have been made to paragraph 6: Together these sections provide the required supporting analysis for the 16 AUs identified as warranting Tier II protection and analysis and demonstrate that the SGP has been designed to be least degrading, as well as providing social and economic benefits that establish a rationale to warrant ~~justify~~ the action causing the potential for degradation beyond ambient conditions with respect to temperature, which in this case are stream crossings for transmission line access roads and mine site access routes, wetland conversion from scrub-shrub to emergent wetland adjacent to streams flowing within the widened ROW, and the diversion of West End Creek around and downstream of West End Pit ~~potential to degrade high quality waters with respect to temperature~~. Additionally, Perpetua addressed a comprehensive range of pollutant of concerns as part of the 401 Water Quality Certification (WQC) request package. Specifically in response to Section 6 of the IDEQ request form titled "Methods and Means Proposed to Monitor Discharge and Equipment/Measures Planned to Treat, Control, or Manage the Discharge," the following categories of pollutants of concern are addressed: Temperature, Sediment and Turbidity, Toxic Substances, Ammonia, pH, Dissolved Oxygen, Bacteria, Nitrogen and Phosphorus, Hazardous and Deleterious Materials, and Color and Odor. Stream and wetland impact avoidance and minimization efforts are outlined and design features, best management practices, and monitoring plans for the protection of water quality for each category of pollutants of concern are provided in detail. There are 28 water bodies (AUs) listed in Appendix B of IDEQ's Draft Certification identified as warranting Tier II protection for cold water aquatic life (CWAL), salmonid spawning (SS), primary contact recreation (PCR) and/or secondary contact recreation (SCR). For the Socioeconomic Justification document, 16 water bodies were identified by IDEQ, and provided in a list to Perpetua, as High-Quality waters with the potential for degradation beyond ambient conditions with respect to temperature that warrant Tier II protection and analysis. These 16 water bodies determined the scope and purpose of the AASJ. The twelve AUs not included in the list of AUs provided by IDEQ for inclusion in the AASJ are listed below and their designated beneficial uses are noted: -ID17050123SW001_06 – PCR -ID17050123SW007L_0L – PCR

Commenter	Section	Comment	Perpetua Response
			-ID17050123SW011_02 – SCR -ID17050123SW011_03 – SCR -ID17050123SW012_03 – PCR -ID17060208SL010_04 – PCR -ID17060208SL017_03 – CWAL, SS, PCR -ID17060208SL019_02 – PCR -ID17060208SL019_03 – SCR -ID17060208SL023_02 – PCR -ID17060208SL025_04 – PCR -ID17060208SL026_03 – CWAL, SS, PCR For AUs listed above that are Tier II based on PCR or SCR only, they were not included in the AASJ list because the potential for degradation is focused on temperature, as per the IDEQ. Also, with no dredge and fill activities occurring within AUs ID17060208SL017_03 or ID17060208SL026_03, they were not included in the AASJ list because there is no potential for degradation relative to temperature from project activities as none would occur here. To avoid confusion, the AASJ has been edited in fourteen locations throughout to indicate that there are 16 AUs identified as warranting Tier II protection and analysis with the potential for degradation beyond ambient conditions with respect to temperature.
5	1.f	The AASJ fails to properly assess the impacts of proposed activities to human health.	The SDEIS includes an analysis of public health impacts and is "limited to affected communities outside of the operations boundary area and associated facilities and does not include a direct evaluation of anticipated work force safety/health issues." The Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Assessment was prepared in relation to the SGP site being added to EPA's NPL list (Superfund). Human health impacts related to the project are discussed in the text and listed in the addition of Table 4 (Table 4.18-3 of the SDEIS) to the AASJ. While risk to human health on site was determined to be low in the ASTDR, based on exposure pathways for surface soil, surface water and airborne particulates and sediments, the continued loading of heavy metals to surface water from legacy mining impacts continues to be a risk to human health through the consumption of fish or water directly and is evidenced by the 2022 Idaho Integrated Report, where the AUs associated with Meadow Creek and the EFSFSR are reported as impaired for arsenic, antimony, and mercury. It is reduction of this loading of heavy metals to the surface waters that is a major public health benefit of the SGP. To further illustrate this point, in Section 5.2.2 of the AASJ, water quality data collected since 2012 indicates: • EPA's Primary Drinking Water Standard was consistently exceeded from 2012-2019; • Arsenic loading in the EFSFSR is estimated to have averaged 3,500 lbs/year through the years 2012 - 2014; • Surface water geochemistry indicated that in 2012, on average, the chronic criteria for protection of aquatic life was consistently exceeded in surface water data collection points downstream from the Spent Ore Disposal Area for arsenic; and, finally • The loading contribution of the SODA, over which an impermeable cap was supposed to have been constructed pursuant to the Mobil consent decree (CD), is estimated at approximately 10 tons of arsenic which have leached from the SODA (including the underlying Bradley Mining tailings) in the past 20 years. <u>In Section 5.3.3, Potential Health Impacts Related to the Proposed Activity, the following language has been added and starts at paragraph 8:</u> "Table 4, which is copied here from the SDEIS Table 4.18-3, summarizes the possible health impacts as a whole, both positive and negative, direct and indirect, of different categories relevant to human health, including the environment, economy, public services and infrastructure, and demographics. Each possible health impact is graded with respect to magnitude and likelihood as low, medium, or high, with the overall impact on public health determined as a combination of magnitude and likelihood and classified as negligible, minor, moderate, or major." Table 4, Summary of Public Health Benefits and Costs Impacts for the 2021 Modified Mine Plan (MMP), which is pulled directly from the SDEIS (Table 4.18-3) follows that passage.
5	1.g	Section 5.3.4 of the AASJ generally minimizes the effects the SGP will have on users of Tier II waters calling various potential effects "short-term", "minor", and "localized". The omission of important impacts to water quality and water use, as well as the cherrypicked statements from	The AASJ's purpose and scope focused on the 16 AUs determined by IDEQ to warrant Tier II protection with the potential for degradation relative to temperature. The dredge and fill activities occurring in these AUs are due only to the replacement, upgrade or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the TLine ROW expansion, and the diversion of West End Creek around West End Pit during mining activities with the eventual capture and retention of the upper end of West End Creek in the West End pit lake after reclamation and closure. The AASJ was submitted to IDEQ in draft form for review and comment by IDEQ. Perpetua addressed all comments, requested edits, and additions from IDEQ and submitted a revised AASJ to IDEQ which was accepted as final for attachment to the Draft Certification.

Commenter	Section	Comment	Perpetua Response
		the AASJ, show its obvious bias not only to its recreational impacts analysis, but its entire socioeconomic analysis and conclusions.	The SDEIS considered the potential impacts to the recreational environment in great detail, identifying different issues and indicators for understanding the extent of those issues. Perpetua recognizes the recreational significance of this area and as such has worked extensively with local, state, and federal partners as well as local community members to develop a plan of operations that protects this resource as well as the safety of those recreating in the general area. The AASJ document highlighted the main topics identified in the SDEIS with respect to recreation, satisfying IDAPA 052.08.d.iii.4. As documented in the AASJ, as well as in the DEIS, SDEIS, and Recreation Specialist Report, Perpetua recognizes there will be impact to recreators within the Operations Area Boundary during the construction and operations phases of the SGP. However, these impacts will be limited in extent due to the duration and nature of those phases. In other words, the recreational value of the site will not be permanently lost. Some recreational activities, such as fishing, may in fact realize an enhancement due to the improvements in water quality expected with the SGP, as well as improved fish passage to allow fish access to historically cut-off stream reaches. As stated in the Recreation Specialist Report (SDEIS Section 7.3.3.1), construction of the 2021 MMP could result in cumulative effects to the recreation setting due to additional noise and activity, cumulative effects to recreation experiences due to access delays, and further reduced recreation opportunities due to noise and wildlife displacement, but cumulative effects would be temporary and conclude when the 2021 MMP activities conclude. The AASJ utilized an exhaustive list of previously prepared documents and accompanying analyses to satisfy the requirements of IDAPA section 58.02. The use of terms such as "short-term", "minor" and "localized" are directly from the SDEIS and widely accepted terminology in NEPA documents. The dredge and fill activities that are the focus of the AASJ are the replacement, upgrade, or installation of new culverts associated with transmission line access roads and the construction of the Burntlog Route, the conversion of forested or shrub-scrub wetlands to emergent wetlands adjacent to streams within the TLine ROW expansion, and the diversion of West End Creek around West End Pit during mining activities. All these dredge and fill activities are indeed short-term, minor, and localized.

Notes:

Commenter 4 - Nez Perce Tribe, Mary Jane Miles for Shannon Wheeler, angelaj@nezperce.org, kenc@nezperce.org (4/12/2024)

Commenter 5 - Collaborative NGOs, nkunath@idahorivers.org, savethesouthforksalmon@gmail.com, wtiedemann@idahoconservation.org, bgestring@earthworks.org (4/12/2024)

Memo

To: Alan Haslam, Perpetua Resources Idaho Inc.

CC:

From: Barbara Wyse, Highland Economics

Date: February 6, 2023

Re: Economic Review and Comment on Power Report

At your request, I have reviewed the report, *An Evaluation of the Potential Socio-Economic Impacts of the Proposed Stibnite Mine on Valley County, Idaho*, prepared by Montana based Power Consulting, Incorporated (hereafter referred to as the 'Power Report'). I reviewed the Power Report sources, methods, and conclusions. This memo summarizes my comments on the aspects of the report and its conclusions that in my opinion are not substantiated by available data or an appropriate methodology. My review is focused solely on the Power Report; I have not conducted a separate or complete evaluation of the socioeconomic impacts of the Stibnite Gold Project (SGP).

I have, however, completed several NEPA socioeconomic analyses of mines throughout the United States. The socioeconomic impact of any given mine varies based on numerous factors including the mine physical characteristics (e.g., size, design, location, distance from local communities, etc.), mine operational characteristics (e.g., employment and housing practices, environmental management, etc.), environmental context (e.g., type, proximity, and sensitivity of resources), and the local socioeconomic context (e.g., demographics, size, culture, and economic structure of the local community, etc.).

To defensibly portray expected socioeconomic impacts, an analysis of the proposed SGP must consider all these project-specific and setting-specific factors to properly evaluate the potential effects on Valley County and surrounding areas. Further, while socioeconomic effects experienced at other mines can serve as a guide to the possible *types* of socioeconomic effects that may be experienced in Valley County as a result of the SGP, a credible analysis must evaluate and communicate the extent to which the *magnitude* of effects would differ based on the local context and the specific features of the proposed project. A robust socioeconomic analysis should provide a balanced, complete, and plausible picture of the expected beneficial and adverse impacts that may be experienced. As highlighted in my comments below, in my opinion the Power Report does not follow these important principles in many instances in its characterization of the expected socioeconomic effects of the proposed SGP, and it incorrectly asserts that the Draft Environmental Impact Statement (DEIS; USFS, 2022) and the subsequent Supplemental Draft Environmental Impact Statement (SEIS; USFS 2023) did not use appropriate methods.

My concerns with the Power Report and its conclusions relate to four main areas of analysis: economic impacts, public service impacts, social impacts, and recreation/tourism economy impacts. Each of these is addressed separately below.

Economic Impacts

The Power report incorrectly suggests[1] that the economic impact analysis presented in the DEIS did not use economic logic to estimate the proportion of mine inputs (including supplies, material, equipment, and employees) procured or hired locally and associated economic ripple effects.

In fact, it appears that the Power Report authors did not review the source analysis for the SDEIS and DEIS economic impact estimates. The source analysis, which was submitted to and reviewed by the U.S. Forest Service in 2018[2], did carefully consider the local economy and its context as well as use economic logic to develop reasonable estimates of the proportion of local procurement and employment to use in the projections of local economic impact.

The economic impacts reported in the SDEIS and DEIS did not, as the Power Report implies, assume that if there is a supplier in the local area, all supplies will be purchased from that supplier. In fact, the economic impact modeling in the SDEIS and DEIS assumes that only 10% of the construction material, equipment, and services would be purchased locally (see Table 4.21-2 in the SDEIS), and only 16% of operating material, equipment, and services would be purchased locally. As two examples:

- The Power Report uses the example of diesel fuel, and notes that the SGP will likely try to minimize costs and have diesel fuel brought in from a regional supplier. The report implies that the economic modeling reflected in the DEIS/SEIS assumed that 100% of all diesel would be purchased locally. In fact, the results in the SDEIS and DEIS are based on economic modeling that assumed, as an input to the model, that only 5% of diesel fuel for the mine would be purchased locally.
- The Power Report uses the example of mining equipment as an area that the DEIS and SDEIS may have over-estimated economic impacts. The Power Report notes that "Valley County does not produce mining equipment; nor is it a retail supplier of such equipment". This is correct, and the SDEIS and DEIS economic impact estimates are based on the assumption that 0% of such equipment would be procured from Valley County.

Similarly, SDEIS and DEIS estimates of the proportion of mine employees who would be local residents are based on best available data from existing mines and reasonable assumptions to estimate the proportion of mine employees who would reside in the local area (a mid-estimate of 30% to 35% of the labor force during construction and operations).[3] Without providing alternative estimates or data from

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[1] The specific language in the Power Report (page 23): "If one is not very careful with the results of IMPLAN, specifically in a small, isolated economy, one can, mistakenly, allow connections that do not have an economic logic to them. We strongly believe that this is the case with the modeling done for the proposed mine."

[2] Economic Impact Analysis of the Stibnite Gold Project, April 17, 2018, prepared by Highland Economics, available at: https://perpetuaresources.com/wp-content/uploads/2020/05/SGP-Economic-Impact-Report_April-17-Final.pdf.

[3] This compares with approximately 80% of mine workers residing in the local area (Custer or Lemhi Counties) for the Thompson Creek Mine, which operated through 2014 with a one week on, one week off schedule. Data from remote mines in Alaska and the available data on the number of local miners relative to the size of the local

other mining operations, the Power Report asserts that it does not expect this portion of SGP mining employment to be filled by local residents. The Power Report relies on housing costs as a primary reason that mining employment will not be local, and incorrectly asserts that Valley County housing is more expensive than Boise housing.[4] However, the Valley County average cost of housing, measured by median rents, is actually 10% to 20% lower in Valley County than elsewhere in Idaho or in Ada County where Boise is located, and where the Power Report asserts many employees would live.[5]

In describing other potential types of economic impacts, specifically effects of potential boom/bust cycles and associated effects on public services and local economies, the Power Report does not contextualize possible effects in light of the fact that the proposed mine would constitute a small portion of the local economy.

The economic literature on the effects of mining on long-term economic growth indicates that the effects of mining vary by location based on several factors, particularly the local economy's reliance on mining. In describing the local economy of Valley County at the beginning of the report, the Power Report notes that the economy is a service-sector economy that is *not* currently dependent on mining (with 1.4% of current employment in mining).[6] However, later, when describing the potential effects of boom/bust cycles, the Power Report does not contextualize or evaluate impacts in light of the fact that this feature of the local economy would tend to limit boom/bust cycle effects. This is despite the fact that when it introduces the topic of boom/bust adverse effects, the Power Report notes the importance of mining dependence, stating that ""While ***mining dependent communities***, when they are mining, often have higher than average wages and salaries associated with that mining, they also live in fear of the next drop in commodity prices" [emphasis added]. Valley County cannot be accurately characterized as a mining dependent economy or community, nor in my opinion, could it be characterized as such with the expected growth in local mining employment projected to result from the SGP as presented in the DEIS/SDEIS.

<u>Public Service Impacts</u>

Power Report overestimates local costs of potential increased school enrollment by a factor of 5.

The Power Report describes generally how an increase in demand can increase the cost of a range of

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population both indicate that 20% to 50% of mining operation employees may be local residents. See source analysis: Economic Impact Analysis of the Stibnite Gold Project, April 17, 2018, prepared by Highland Economics, available at: https://perpetuaresources.com/wp-content/uploads/2020/05/SGP-Economic-Impact-Report_April-17-Final.pdf.

[4] For example, as stated on page 2 of the Power Report: "What this adds up to is a housing market that is more expensive than the national average, more expensive than nearby Boise, and a market that will become increasingly less affordable for the locals if the mine is built and operates."

[5] In the period 2014 to 2018 (the latest available data period from the US Census Bureau), median rent in Valley County was $760 compared with $825 average in Idaho and $950 in Ada County where Boise is located. More recent data from Rentdata.org shows a similar relationship currently, with a 2-bedroom apartment in Valley County in 2021 renting for 20% less than in Ada County.

[6] Even with the DEIS/SDEIS projected increase in mining-related employment due to the Stibnite Mine, the local economy would not be dependent on mining (mining-related employment would still be less than 5% of employment, assuming no change in the size of other sectors).

public services. It focuses on local schools to provide a quantitative example of increased costs. However, in this quantitative example, it provides an incorrect estimate of the potential increased costs to the local area of the SDEIS/DEIS projected potential public school enrollment of 80 students.

Specifically, the Power Report states (page 23-24): "*If we believe that 80 students is the right number, then this will cost Valley County more than $670,000, which is significantly more than the increase in property taxes that the proposed mine will pay. Put another way, those 80 students would take up all the property tax money that is gained due to the presence of the mine in Valley County, and then some, and leave none for the other services which will have added costs because of the population increase.*" This is based on the Power Report assuming $8,376 in school spending per student, and assuming 100% of school spending is from local sources.[7] However, Idaho public schools are primarily funded from state general funds and federal funds, with only a proportion of funding coming from local sources. For fiscal year 2021, according to the Idaho State Department of Education, local funds accounted for 21.7% of total school funding across the State of Idaho.[8] Similarly, looking at the 2022-2023 McCall-Donnelly school district budget, the actual proportion of the school budget that is from local sources is 20.7%.[9] If we apply this proportion (20.7%) to the value used by the Power Report of $8,367 in average per pupil spending, this equates to approximately $139,000 in annual local costs, not $670,000 in local costs. An increased cost of $139,000 annually would be more than covered by the $300,000 (2017 dollars) projected annual property tax revenues directly paid by the SGP. At the state level, the mine is forecast to provide $6.5 million annually (2017 dollars) in state revenues during mine operation to support additional public services that are funded by the state, including those related to schools, roads, etc.

Further, the Power Report does put the potential increase in public service demand into the proper local context. The relative socioeconomic effect of increased public service demand is typically best understood based on the relative increase in local employment and local population. The increase in projected local employment and population from the DEIS/SDEIS due to the proposed mine is estimated at approximately 2% to 3% of current levels.[10] To further put this in context, over the last 20 years, Valley and Adams County employment has fluctuated on an annual basis by up to 9% and increased by up to 12% annually. Between 2010 and 2020, the region experienced approximately 20% population growth. In other words, the projected impact of the SGP on public service demand is smaller than the annual variability recently experienced in Valley and Adams counties. This context is important for people to understand and relate to the degree of change expected, and the implications for public services.

[7] While the Power Report includes a footnote indicating that school funding is complicated, they conclude that "there are some assumptions that must be made to come to this calculation and in the end the numbers are relatively similar, so we will stick with the calculations in the main body of this report which are far easier to understand."

[8] Source website: https://www.sde.idaho.gov/finance/files/general/manuals/Funding-Formula-FY21.docx

[9] Source website:
https://core-docs.s3.amazonaws.com/documents/asset/uploaded_file/3060/MDSD/2219786/Fiscal_Year_2023.pdf

[10] Note that the Power Report does not expect higher population growth, in fact it questions this level of population growth, as discussed above in the economic impact analysis section.

Social Impacts

To illustrate potential social impacts, the Power Report provides social statistics from other mines situated in very different socioeconomic contexts with vastly greater increases in non-local population. This may mislead readers regarding the expected social impacts of the SGP.

To appropriately use statistics from other mines to describe expected effects in Valley County and surrounding areas requires: 1) providing the full context of the statistic and its source, and 2) describing the applicability/relevance of the provided statistic based on the similarities or differences in the socioeconomic contexts of the other mine locations compared to Valley County and surrounding areas. The Power Report does not do this. Instead, the Power Report presents numerous statistics from elsewhere, often without context regarding the source location, and with no substantive discussion on how similar/dissimilar the source context was to Valley County, and without providing important caveats, supporting evidence, or analysis regarding the applicability (or lack thereof) of the statistics to the proposed mine and Valley County.

This lack of discussion regarding the applicability of statistics from other locations is particularly disturbing as many of the social impact statistics provided in the Power Report are from a different context. Many of the statistics are from scarcely populated rural areas that experienced a rapid influx of thousands of non-resident workers with no on-site workcamps to house non-resident workers; very different from what is proposed at the SGP. Many of these example mines experienced very rapid population growth (10X or more the rates projected to be expected in Valley and Adams counties), with a high non-resident workforce living in towns accounting for a high proportion of the total population. As noted in one of the articles cited in the Power Report[11], "As more than a century of sociological and criminological research and theorizing confirms, it is the ***relative scale and pace of socio-demographic change*** that can produce social disorganization and dislocation in communities." (Emphasis added.) The scale and pace of demographic change that form the basis for many of the social impact statistics in the Power Report are much greater than expected due to the proposed SGP. For example:

- The Power Report presents statistics from a study (Archbold, 2014) on policing in the Bakken oil production region in North Dakota, where interviews with police in 2013 indicated that the number of calls for police doubled or tripled. But what the Power Report does not present, is that the total population increased at a similar rate due to the scale of the influx of people. According to the St. Louis Federal Reserve, "Average employment in North Dakota shale counties almost tripled from about 3,000 in 2001 to 8,500 in 2012."[12] The article cited in the Power report also notes that: "Steady oil production has resulted in rapid population growth for many communities located in the Bakken region. Williams County (ranked second for growth rate) and Stark County (ranked fifth) in western North Dakota are included on the list of the ten fastest growing counties in the United States from 2011-2012". As such, there may not have been a rise in the per capita rate of police calls, as the population and employment in these counties also doubled or tripled.

[11] Carrington, K. The resource boom's underbelly: Criminological impacts of mining development. Australian and New Zealand Journal of Criminology. 2011.

[12] https://www.minneapolisfed.org/article/2014/bakken-stands-out-in-comparison-with-other-shale-drilling-areas

- The Power Report cites a study[13] in Australia on rates of higher violence in mining towns. These towns all have very high visitor mining populations relative to resident populations[14], with most non-resident workers living in "single-persons" quarters located adjacent to the towns", rather than in a worker camp at the mine site, as would be the case with the proposed SGP, and with much higher proportion of visitor workers relative to resident populations than would result even if all mine workers were to choose to reside in Valley County, and not the worker camp.
- The Power Report cites a statistic related to crime from a mining area in another very dissimilar context – aboriginal communities in northern Canada.[15] Not only is this from a very dissimilar context, but the statistic is not directly tied to mining. The statistic that the Power report uses from this study is the proportion of crime in the Northwest Territories of Canada that is related to alcohol/drug use; this statistic is not actually directly tied to the effects of mining on alcohol or drug use or crime in the region.

<u>Recreation/Tourism Economy Size Relative to Proposed Mine</u>

The Power Report overstates the relative size of the local recreation and tourism economy compared to the value of projected mining wages.

The Power Report concludes that a 2% decline in recreation/tourism would offset any benefits of the mining wages. I believe a more accurate accounting is that there would need to be a 45% to a 100% decline in recreation/tourism in any given year in Valley County for adverse effects on recreation/tourism to offset projected gains in local annual wages associated with operating the mine. This is based on the following adjustments:

- Including projected indirect/induced local income benefits of the mine, and not just direct local miner salaries.
- Converting projected direct and indirect mine-related income to 2021 dollars for apples to apples comparison with the 2021 values for recreation and tourism income (versus leaving it in 2017 dollars as presented in the SDEIS), results in $34.0 million in projected local personal income per year (compared to the Power Report use of $18.7 million in 2017 dollars of direct SGP employee wages).
- Not including, as done in the Power Report, ALL Valley County non-labor income[16] and ALL Valley County income in tourism-associated sectors (retail trade, all

[13] Carrington, K. The resource boom's underbelly: Criminological impacts of mining development. Australian and New Zealand Journal of Criminology. 2011.

[14] The article provides data indicating that even before the largest boom took place, the non-resident or visitor miner population accounted for 12% to 37% of the local population in these area, after which the non-resident population increased much more. This visitor miner population boom occurred prior to the study estimates of changes in crime (i.e., the study estimates of changes in crime were based on much higher population increases).

[15] Gibson, G. Canada's Resilient North: The Impact of Mining on Aboriginal Communities. Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health 3(1).

[16] Non-labor income, or the portion of people's income that is not dependent on employment includes government assistance programs for lower income households (Medicaid, food stamps, etc.), income to retirees (Medicare, pensions, other retirement income), and investment income /rents/ insurance payments. These non-labor payments average approximately 40% of total income across the entire U.S., and tend to be higher in rural areas which tend to have older populations and fewer employment opportunities. The Powers report is correct that Valley County has high non-labor income in 2021 of 56%. But to put this in context, 12 other counties in Idaho

arts/recreation/entertainment, and all food services and accommodation activity) as recreation/tourism-dependent income. While some of the activity in Valley County in these sectors is related to recreation and tourism, much is not recreation or tourism-dependent. All counties in Idaho and across the United States, regardless of the size of the recreation and tourism sectors, have these industries and have non-labor income. For example, in other non-metro Idaho Counties, non-labor income accounts for 45% of all income, as opposed to 58% in Valley County, and income in tourism-associated sectors account for 6.8% of income in all Idaho non-metro counties, as opposed to 11.6% of income in Valley County[17]. Including all income in these sectors overstates the importance of the recreation and tourism-dependent economy.

- Due to the difficulty of separating out the proportion of income in the sectors chosen by the Power Report to estimate the income dependent on recreation/tourism, I estimate recreation and tourism-related income in two alternative ways by:
    i. Using the Power Report's estimate of the increase in local income related to public lands and natural amenities, $7,400 per person per year, or an estimated $87.3 million in total increased annual personal income, which reflects both direct and indirect/induced effects associated with environmental amenities (see page 45 of the Power Report). Comparing this value to the $39 million in annual projected local mining income indicates that annual tourism/recreation-related income would need to decline by approximately 45% to offset the projected annual benefits to local income from the mine.
    ii. Using the $34 million in projected 2017 Valley County income (2017 dollars, equivalent to $39 million in 2021 dollars) directly and indirectly associated with all tourism and travel in the County, as published in a report on the economic impacts of travel for Visit Idaho.[18] The $34 million figure, which includes all travel such as business travel and travel to visit friends and family and not just travel related to outdoor recreation and amenities, indicates that there would need to be a 100% decline to Valley County travel/tourism to offset the projected benefits to local income from the mine. That is, all income related to Valley County travel and tourism would need to be eliminated in any given year.
- Comparing annual income levels from tourism/recreation and the mine, rather than comparing life of mine estimates of SGP-related local income to 25 years of recreation/tourism income as done in the power Report. As noted in the Power Report, "A new study based on long-term monitoring data from four sites in the western United States shows that cleanup efforts can allow affected streams to recover to near natural conditions within 10 to 15 years after the start of abatement work."[19]

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had non-labor income greater than 50% in 2021. Some of this income is related to retirees "voting with their feet" and choosing to live in Valley County, but much of this income would remain in Valley County regardless of economic or environmental conditions.

[17] This is based on data from the Economic Profile System developed by Headwaters Economics, and downloaded from https://headwaterseconomics.org/eps

[18] https://commerce.idaho.gov/content/uploads/2018/11/IDImpFinal17.pdf

[19] Regarding effects on tourism of hazardous spills, a 2014 study conducted for the U.S. Department of Interior's Bureau of Ocean Energy Management (see https://espis.boem.gov/final%20reports/5451.PDF) of the effects on recreation and tourism of the Deepwater Horizon spill found that for Gulf Coast counties with a sizeable recreation

and tourism industry, employment effects were limited and rebounded after the spill: “For the most part, counties with more than 1,000 tourism employees in 2009q2 experienced either only initial (temporary) declines in tourism-related employment or no initial declines in employment followed by growth.” It is important to note that recreation-related employment did decrease in many areas in the immediate aftermath of the spill, and that the effects of the Deepwater Horizon spill on employment change were mitigated given that the spill occurred right after the recession, when tourism was already down, and the spill-response also necessitated an influx of people to the region which offset declines in tourism. BP also provided funds to promote tourism in the aftermath of the spill.

Appendix K: Site Inspection Form

Inspection Log

IPDES Construction General Permit No. IDR100000

Directions: Record daily inspections in accordance with Section 4 of the SGP TSF SWPPP. This report must be readily available to IDEQ upon request. Record corrective actions or maintenance in Appendix M of the SWPPP. For a dewatering inspection, use the form in Appendix Q of the SWPPP. Use additional pages when necessary and note page numbers at bottom.

Date:	Rainfall (inches):	Site Location:	
Inspector Name:	Title/Company:	Email and/or phone number:	Inspector Signature[1]:

Area of site: *(Circle the Area inspecting)*
☐**Cleared – Excavated – Graded Area** ☐**Stockpile Storage** ☐**Temporarily Stabilized Areas**
☐**Final Stabilized Areas** ☐**Waste Management** ☐**Equipment Storage and Maintenance**
☐**Dewatering/Discharge Points** ☐**Other:**

Notes:

Is the area safe: ☐Yes ☐No	...if no, why/where?	Is a discharge occurring: ☐Yes ☐No If yes... observe all discharge points and record any monitoring results in monitoring log.	Observation[2]:

Storm water controls are properly installed, operational, and are working as intended to minimize pollutant discharges?	☐Yes ☐No	If no.... What are the corrective actions and/or maintenance repairs/replacements?
Are there signs that will lead to spills, leaks, or other accumulation of pollutants on the site?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?
New or modified storm water controls needed?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?
Visible erosion and/or sedimentation?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?

Identify any incidents of noncompliance observed:

Area of site: *(Select the Area inspecting)*
☐**Cleared – Excavated – Graded Area** ☐**Stockpile Storage** ☐**Temporarily Stabilized Areas**
☐**Final Stabilized Areas** ☐**Waste Management** ☐**Equipment Storage & Maintenance**
☐**Dewatering/Discharge Points** ☐**Other:**

Notes:

Is the area safe: ☐Yes ☐No	...if no, why/where?	Is a discharge occurring: ☐Yes ☐No If yes... observed all discharge points and record any monitoring results in monitoring log.	Observation[2]:

Storm water controls are properly installed, operational, and are working as intended to minimize pollutant discharges?	☐Yes ☐No	If no.... What are the corrective actions and/or maintenance repairs/replacements?
Are there signs that will lead to spills, leaks, or other accumulation of pollutants on the site?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?
Now of modified storm water controls needed?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?
Visible erosion and/or sedimentation?	☐Yes ☐No	If yes... What are the corrective actions and/or maintenance repairs/replacements?

Identify any incidents of noncompliance observed:

[1]*Signing this document acknowledges the Certification requirements as written in Section 4.3 of the Perpetua Stibnite Gold Mine TSF SWPPP.*

[2] *Color; odor; floating, settled or suspended solids; foam; oil sheen; and other indicators of storm water pollutants.*

Appendix L: Emergency Contacts and Procedures Summary

Emergency Coordinators			
Name/Title	Title	Business	Cell
Kyle Fend	Field Operations Manager	1-208-901-3047	1-208-866-8579
Sam Field	Site Operations Superintendent	1-253-277-9494	1-253-277-9494
Blaine Serrin	Site Environmental Geologist	N/A	1-509-998-5527

Emergency Notification Numbers	
Federal	
National Response Center (24-hour)	1-800-424-8802
EPA Region 610	1-800-887-6063
State	
Idaho Department of Environmental Quality (IDEQ)	During Normal Business Hours: 1-208-332-8100 Non-Business Hours: Report to the State Communications Center at 1-800-632-8000
Idaho Department of Lands	1-208-634-7125
Local	
Fire, Police, Medical–Emergency	911
Emergency Medical Services (McCall)	1-208-382-5160
Life Flight (Boise)	1-208-367-3287
Valley County Sheriff	1-208-382-5160
Krassel Ranger District	1-208-634-2757
Central District Health (McCall)	1-208-630-8001
Kennedy Fuel (Cascade)	1-208-382-4430 (o) 1-208-271-6414 (m)
Leonard Petroleum (Boise)	1-208-336-1155 (o) 1-208-861-8051 (m)
External Spill Response/Cleanup Assistance (Specialty Environmental Services, Inc.)	1-208-327-9977 (o) 1-208-863-4667 (m)

Emergency Response Procedures	
1	Account of all personnel and ensure their safety.
2	Eliminate all ignition sources in the immediate area.
3	Attempt to seal or somehow stop the leak and contain the spill with equipment from the appropriate spill kit, if it can be done safely.
4	Block any outfall from the fuel storage areas with fuel absorbing booms or socks.
5	Attempt to divert flow away from the ditches with a spill barrier or the spill kits.
6	Call 911, if necessary, to alert Fire Department or other Emergency Services. Satellite phones may be the only available phone service onsite.
7	Contact the manager(s) and report the situation and status.
8	Notify any external spill response assistance (e.g., OSRO).
9	Report as required to the appropriate authorities (ONLY if authorized to do so).
10	Begin appropriate cleanup, as determined by the primary contacts.

Source: Aquionix, Inc., SPCC Plan, 2024.

Appendix M: Maintenance Log and Corrective Action Log

Corrective Action & Maintenance Log

IPDES Construction General Permit No. IDR100000

Corrective Action and Maintenance Log					
Inspection/ Identification Date	Date identified	Description of problem or repair need	Description of action(s) taken	Completed within 24-hours?	Notes
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	
				☐ Yes ☐ No	

Appendix N: SWPPP Amendment Log

Amendment Log

IPDES Construction General Permit No. IDR100000

SWPPP Modifications: Modifications or changes made to construction plans, stormwater controls, or other activities at the site that are no longer accurately reflected in the SWPPP need to be updated. The log below denotes a record of changes and updates to the SWPPP; including but not limited to additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures, and updates to site maps.

SWPPP Amendment Log*		
Description of the Amendment	**Date of Amendment**	**Amendment Prepared by [Name(s)/Title]**

**Instead of using the table, SWPPPs/BMPs can also be redlined to show changes as long as the red lines are initialed and dated.*

Appendix O: Delegation of Authority

Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the IDEQ's Construction General Permit (CGP), at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, State, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in IPDES CGP 9.11, and that the designee above meets the definition of a "duly authorized representative" as set forth in Section 9.11.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Appendix P: Rainfall Gauge Recording

Rainfall Guage Log

IPDES Construction General Permit No. IDR100000

Directions: Use the table below to record the rainfall gauge readings at the beginning and end of each workday. Click or tap to fill in spots.

Rainfall Guage Recording											
Month/Year:				Month/Year:				Month/Year:			
Day	Start Time (AM/PM)	End Time (AM/PM)	Weather* gauge reading (inches)	Day	Start Time (AM/PM)	End Time (AM/PM)	Weather* gauge reading (inches)	Day	Start Time (AM/PM)	End Time (AM/PM)	Weather* gauge reading (inches)
1	:	:		1	:	:		1	:	:	
2	:	:		2	:	:		2	:	:	
3	:	:		3	:	:		3	:	:	
4	:	:		4	:	:		4	:	:	
5	:	:		5	:	:		5	:	:	
6	:	:		6	:	:		6	:	:	
7	:	:		7	:	:		7	:	:	
8	:	:		8	:	:		8	:	:	
9	:	:		9	:	:		9	:	:	
10	:	:		10	:	:		10	:	:	
11	:	:		11	:	:		11	:	:	
12	:	:		12	:	:		12	:	:	
13	:	:		13	:	:		13	:	:	
14	:	:		14	:	:		14	:	:	
15	:	:		15	:	:		15	:	:	
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23	:	:		23	:	:		23	:	:	
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25	:	:		25	:	:		25	:	:	
26	:	:		26	:	:		26	:	:	
27	:	:		27	:	:		27	:	:	
28	:	:		28	:	:		28	:	:	
29	:	:		29	:	:		29	:	:	
30	:	:		30	:	:		30	:	:	
31	:	:		31	:	:		31	:	:	

**If weather is rain, snow, or sleet, please specify.*

Appendix Q: Dewatering Inspection Form

Dewatering Discharge Log

IPDES Construction General Permit No. IDR100000

Dewatering Discharge Log										
Complete this form within 24 hours of completing the inspection.										
Inspector Name:			Title/Company:				Email/Phone #:			
Dewatering Location:			Longitude:				Latitude:			
Month/year:		Flow Method:			Inspector Signature:				Date:	
Day	Start time	End time	Rate of Discharge (gal/day)	Sediment Plume (Y/N)	Suspended Solids (Y/N)	Oil/ Grease Sheen Present (Y/N)	Odor (Y/N)	Corrective Action Required? (Y/N)	Corrective Action Notes	Corrective Action Completion Date
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
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Appendix R: Turbidity Monitoring Form

Weekly Turbidity Monitoring Report

IPDES Construction General Permit No. IDR100000

Directions: Record turbidity monitoring information in accordance with Section 5: Water Quality Based Conditions – Turbidity Monitoring Requirements of the Storm Water Pollution Prevention Plan. This report must be readily available to Idaho DEQ upon request. Relevant strip chart recordings shall be attached as applicable. Complete weekly for each discharge (stormwater or dewatering event). Use additional forms for multiple discharges or extended work weeks.

Discharge Point No.:	Latitude:	Longitude:	Corrective Action Log

Sample Date & Time	Calibration Date	Turbidity Measurement (NTU)			Corrective Action?	Corrective Action Taken:	Date:
		Background	Downstream	Net			
					☐Yes ☐No		

Sample Collector Name:	Title/Company:	Signature:

Sample Date & Time	Calibration Date	Turbidity Measurement (NTU)			Corrective Action?	Corrective Action Taken	Date
		Background	Downstream	Net			
					☐Yes ☐No		

Sample Collector Name:	Title/Company:	Signature:

Sample Date & Time	Calibration Date	Turbidity Measurement (NTU)			Corrective Action?	Corrective Action Taken	Date
		Background	Downstream	Net			
					☐Yes ☐No		

Sample Collector Name:	Title/Company:	Signature:

Sample Date & Time	Calibration Date	Turbidity Measurement (NTU)			Corrective Action?	Corrective Action Taken	Date
		Background	Downstream	Net			
					☐Yes ☐No		

Sample Collector Name	Title/Company:	Signature:

Sample Date & Time	Calibration Date	Turbidity Measurement (NTU)			Corrective Action?	Corrective Action Taken	Date
		Background	Downstream	Net			
					☐Yes ☐No		

Sample Collector Name:	Title/Company:	Signature:

Reviewed by (Authorized Official): _____ **Signature:** _____ **Date:** _____

**Signing this document acknowledges the Certification requirements as written in Section 4.3 of the Perpetua Stibnite Gold Mine TSF SWPPP*

Appendix S: Copy of the IPDES CGP

Issuance Date:	01/10/2022
Effective Date:	02/10/2022
Expiration Date:	02/09/2027

Idaho Pollutant Discharge Elimination System Discharge Permit No. IDR100000

Construction General Permit for Discharge Activities

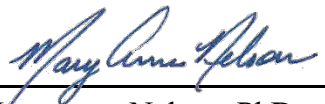
Idaho Department of Environmental Quality

Surface & Wastewater Division
IPDES Program
1410 N. Hilton
Boise, ID 83706

In compliance with the provisions of the State of Idaho Environmental Protection and Health Act Title 39, Chapter 1, "Rules Regulating the Idaho Pollutant Discharge Elimination System Program" (IDAPA 58.01.25) and the Federal Water Pollution Control Act (Clean Water Act) Title 33 United States Code, Section 1251 et seq.

Operators of construction activities (defined in Appendix A) in Idaho that meet the requirements of Section 1.1 Eligibility of this IPDES general permit are authorized to discharge in accordance with the permit conditions that follow.

A copy of this general permit must be kept at all construction activities covered by this permit



Mary Anne Nelson, PhD
Administrator, Surface and Wastewater Division

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1. Coverage under This Permit

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage.

1.1 Eligibility

1. An Operator of a construction site for which discharges that enter or have the potential to enter Waters of the United States (WOTUS) may apply for coverage under this permit. IDAPA 58.01.25.102.01. For this permit, "Operator" is defined in Appendix A to mean any party associated with a construction project that meets either of the following two criteria:

   A. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications ("plans and specifications" includes the construction drawings, the Storm Water Pollution Prevention Plans, and any other plans and specifications used on the project); or

   B. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

   Where multiple operators are associated with the same project, all operators must obtain permit coverage.[1] Subcontractors generally are not considered operators for this permit.

2. This permit covers construction activities that:

   A. Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale[2] that will ultimately disturb one or more acres of land; or

   B. Have been designated by DEQ as needing permit coverage under 40 CFR 122.26(a)(1)(v) or 40 CFR 122.26(b)(15)(ii).

3. The construction activities are within the state of Idaho where DEQ is the permitting authority, but not within tribal reservation boundaries.

4. Discharges from your site are not:

   A. Already covered by a different IPDES permit for the same discharge; or

[1] If the operator of a "construction support activity" (See Section 1.2.1.C) is different than the operator of the main site, that operator must also obtain permit coverage. See Section 7.1 for clarification on the sharing of permit related functions between and among operators on the same site and for conditions that apply to developing a Storm water Pollution Prevention Plan (SWPPP) for multiple operators associated with the same site.

[2] A "common plan of development or sale" is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one common plan. The "common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot.

B. In the process of having coverage under a different IPDES permit for the same discharge be denied, terminated, or revoked.[3,4]

5. You are able to demonstrate that you meet one of the criteria listed in Appendix C with respect to the protection of species that are federally listed as endangered or threatened under the Endangered Species Act (ESA) and federally designated critical habitat.

6. For new sources (as defined in Appendix A) only:

   A. DEQ has not, prior to authorization under this permit, determined that discharges from your site will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, DEQ may notify you that an individual permit application is necessary. However, DEQ may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically, to meet water quality standards (WQS). In the absence of information demonstrating otherwise, DEQ expects that compliance with the requirements of this permit, including the requirements applicable to discharges in Section 3, will not cause, have the reasonable potential to cause, or contribute to an excursion above any applicable WQS.

   B. Discharges from your site to a Tier II or Tier III water[5] will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, DEQ expects that compliance with this permit, including the requirements applicable to discharges in Sections 3.2, 3.3, and 3.4, will not lower the water quality of such waters.

7. If you plan to add cationic treatment chemicals, as defined in Appendix A, to storm water and/or authorized non-storm water prior to discharge, you may not submit your NOI until and unless:

   - You notify DEQ in advance, and
   - DEQ authorizes coverage under this permit after you include appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of WQS.

   If you decide to utilize cationic treatment chemicals after submitting your NOI, you must still obtain DEQ approval prior to utilizing cationic treatment chemicals. Please refer to Appendix H for a suggested format for requesting chemical treatment. Requests for chemical treatment

[3] Sections 1.1.4.A and 1.1.4.B do not include sites currently covered under the 2017 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

[4] Except for a site being made ineligible for coverage under this permit because it falls under the descriptions of Sections 1.1.4.A or 1.1.4.B, DEQ may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

[5] Your site will be considered to discharge to a Tier II or Tier III water if the first water of the U.S. to which you discharge is identified by the State of Idaho as a Tier II or III water. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the water body that receives the storm water discharge from the storm sewer system. For discharges that reach a canal or other manmade water conveyance system, the first water of the U.S. to which you discharge is the water body that receives the storm water discharge from the canal or other manmade water conveyance system.

must be submitted to the local DEQ Regional Office at least 30 days prior to submitting the NOI.

1.2 Types of Discharges Authorized[6]

1. The following storm water discharges are authorized under this permit provided appropriate storm water controls are designed, installed, and maintained.

   A. Storm water discharges, including storm water runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activities under 40 CFR 122.26(b)(14) or 122.26(b)(15)(i).

   B. Storm water discharges designated by DEQ as needing a permit under 40 CFR 122.26(a)(1)(v) or 122.26(b)(15)(ii).

   C. Storm water discharges from construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:

      i. The support activity is directly related to the construction site required to have permit coverage for storm water discharges;

      ii. The support activity is not a commercial operation, and does not serve multiple, unrelated construction sites;

      iii. The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and

      iv. Storm water controls are implemented in accordance with Section 2 and Section 3 of this permit for discharges from the support activity areas.

   D. Storm water discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

2. The following non-storm water discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Section 2 and Section 3 of this permit:

   A. Discharges from emergency fire-fighting activities;

   B. Fire hydrant flushing activities;

   C. Landscape irrigation;

[6] See "Discharge" as defined in Appendix A. Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA Section 402(k) by disclosure to DEQ, EPA, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

D. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;

E. Water used to control dust;

F. Potable water including uncontaminated water line flushing activities;

G. External building washdown, provided soaps, solvents, or detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A);

H. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly to a waters of the U.S., storm drain inlet, or storm water conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;

I. Uncontaminated air conditioning or compressor condensate;

J. Uncontaminated, non-turbid discharges of ground water or spring water;

K. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and

L. Construction dewatering water discharged in accordance with Section 2.4 of this permit.

3. Also authorized under this permit are discharges of storm water listed in Section 1.2.1 or authorized non-storm water discharges listed in Section 1.2.2, commingled with a discharge authorized by a different IPDES permit and/or a discharge that does not require IPDES permit authorization.

1.3 Prohibited Discharges[7]

1. Wastewater from washout of concrete, unless managed by an appropriate control as described in Section 2.3.4 of this permit.
2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
3. Fuels, oils, or other pollutants used in vehicle or equipment operation and maintenance.
4. Soaps, solvents, or detergents used in vehicle or equipment washing or external building washdown.
5. Toxic or hazardous substances from a spill or other release.
6. Dewatering water discharged from a contaminated site. [8]

[7] DEQ includes these prohibited non-storm water discharges as a reminder that the only non-storm water discharges authorized by this permit are in Section 1.2.2. Any unauthorized non-storm water discharges must be covered under an individual permit or an alternative general permit.

[8] Contaminated sites are sites subject to existing remediation activities (e.g., National Priorities List, Superfund/CERCLA or RCRA sites).

To prevent the above-listed prohibited non-storm water discharges, operators must comply with the applicable pollution prevention requirements in Section 2.3 of this permit.

1.4 Submitting Your Notice of Intent (NOI)

1. Operators associated with your construction site who meet the eligibility requirements in Section 1.1, and who seek coverage under this permit, must submit a complete and accurate NOI to DEQ according to the deadlines in Table 1 prior to commencing construction activities.

   Exception: If you are conducting construction activities in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that you complete and submit an accurate NOI within 30 calendar days after commencing construction activities establishing that you are eligible for coverage under this permit. You must also provide documentation in your SWPPP to substantiate the occurrence of the public emergency.

2. You must develop a SWPPP consistent with Section 7 before submitting your NOI for coverage under this permit.
3. You must use DEQ's IPDES E-Permitting System to electronically prepare and submit your NOI for coverage under this permit unless you receive an electronic reporting waiver from DEQ. The IPDES E-Permitting System may be accessed at https://www2.deq.idaho.gov/water/ipdes. Waivers from electronic reporting may be granted based on one of the following:

   A. If your operational headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband internet access in the most recent report from the Federal Communications Commission; or

   B. If you have limitations regarding available computer access or computer capability.

If DEQ grants you approval to use a paper NOI, and you elect to use it, you must complete the form found in Appendix F.

4. Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

Table 1. NOI Submittal Deadlines

Type of Operator	NOI Submittal Deadline[9]	Permit Authorization Date[10]
Operator of a new site (i.e., a site where construction activities commence on or after February 10, 2022).	At least 14 calendar days prior to commencing construction activities.	At least 14 calendar days after DEQ notifies you that it has received a complete NOI. DEQ will send an authorization with your IPDES Permit Number and dates of authorization, unless DEQ notifies you that your authorization is delayed or denied.
Operator of an existing site (i.e., a site with 2017 EPA CGP coverage where construction activities commenced prior to February 10, 2022).	No later than April 11, 2022.[11]	
New operator of a permitted site (i.e., an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site."	At least 14 calendar days before the date the transfer to the new operator will take place.	
Operator of an "emergency related project" (i.e., a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services).	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately and fully covered at least 14 calendar days after DEQ notifies you it has received a complete NOI. DEQ will send you an authorization with your IPDES Permit Number and dates of authorization, unless DEQ notifies you that your authorization is delayed or denied.

[9] If you miss the deadline to submit your NOI, all discharges from your construction activities will be unauthorized under the CWA until they are covered by this or a different IPDES permit. DEQ may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

[10] Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage. Discharges are not authorized until you have received authorization with the dates of authorization and your IPDES permit number.

[11] Existing coverages under the 2017 EPA CGP that do not meet this NOI renewal deadline will be automatically terminated 60 days after effective date of permit.

5. If, after submitting your NOI, you need to correct or update any fields, you may do so by submitting a Change NOI form using the IPDES E-Permitting System. Waivers from electronic reporting may be granted as specified in Section 1.4.2. If DEQ has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix F.
6. When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in section 8.3.
7. Once covered under this permit, your coverage will last until:
   A. You terminate permit coverage consistent with Section 8 ("Terminating Coverage") in this permit.
   B. You receive permit coverage under a different IPDES permit or a reissued or replacement version of this permit after expiring on February 9, 2027.
   C. You fail to submit an NOI for coverage under a reissued or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.
   D. You fail to pay the annual fee for permit coverage which remains delinquent in excess of 180 days.

1.5 Requirement to Post Notice of Permit Coverage

1. You must post a sign or other notice of your permit coverage at a safe, publicly accessible location near the construction site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right of way.[12] At a minimum, the notice must include:
   A. The IPDES ID[13] (i.e., the permit tracking number assigned to your NOI and available on the DEQ webpage: https://www2.deq.idaho.gov/water/ipdes);
   B. A contact name and phone number for obtaining additional construction site information;
   C. The Uniform Resource Locator (URL) for the SWPPP (if available) or the following statement; "If you would like to obtain a copy of the SWPPP, contact the Site Representative above."; and
   D. The following statement "If you observe indicators of storm water pollutants in the discharge or in the receiving waterbody, contact DEQ through the following website: https://www.deq.idaho.gov/about-us/contact-us/".

[12] If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.
[13] When multiple operators are sharing a SWPPP on a project, each of their IPDES IDs must be included on the posted Notice of Permit Coverage.

1.6 Severability

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected.

2. Technology-Based Effluent Limits

You must comply with the following technology-based effluent limits in this section for all authorized discharges.[14]

2.1 General Storm Water Control Design, Installation, and Maintenance Requirements

You must design, install, and maintain storm water controls required in Sections 2.2, 2.3, and 2.4 to minimize the discharge of pollutants in storm water from construction activities. [15] To meet this requirement, you must:

1. **Account for the following factors in designing your storm water controls:**
   A. The expected amount, frequency, intensity, and duration of precipitation.
   B. The nature of storm water runoff (i.e., flow) and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design storm water controls to control storm water volume, velocity, and peak flow rates to minimize discharges of pollutants in storm water and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.
   C. The soil type and range of soil particle sizes expected to be present onsite.
2. **Design and install all storm water controls in accordance with good engineering practices, including applicable design specifications.**[16]
3. **Complete installation of storm water controls by the time each phase of construction has begun.**
   A. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (e.g., buffers, perimeter controls, exit

[14] For each of the effluent limits in Section 2, as applicable to your site, you must include in your SWPPP: (1) a description of the specific controls to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for installation/implementation. See Section 7.2.6.

[15] The permit does not dictate the type of storm water control to be used to comply with the requirements of this Section, nor does it recommend or endorse specific products or vendors. The choice of the specific type of storm water control to use to comply with the requirements of this Section is up to the operator.

[16] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. The explanation in the SWPPP can utilize manufacturer specifications to help explain the departures. You must also comply with any additional design and installation requirements specified for the effluent limits in Sections 2.2., 2.3, and 2.4.

point controls, storm drain inlet protection) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.[17]

B. Following the installation of these initial controls, install and make operational all storm water controls needed to control discharges prior to subsequent earth disturbing activities.

4. Ensure that all storm water controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

A. Comply with any specific maintenance requirements for the storm water controls listed in this permit, as well as any recommended by the manufacturer.[18]

B. If at any time you find that a storm water control needs routine maintenance (i.e., a repair or replacement that can be completed by the end of the next business day), you must immediately initiate the needed maintenance work, and complete such work by the end of the next business day.

2.2 Erosion and Sediment Control Requirements

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in storm water from construction activities.

1. Provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances.

A. Compliance alternatives. For any disturbance within 50 feet of waters of the U.S. located on your project, you must comply with one of the following alternatives:

i. Provide and maintain a 50-foot undisturbed natural buffer; or

ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that, in combination, achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or

iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

B. Exceptions. See Appendix D, Section D.2 for exceptions to the compliance alternatives.

2. Direct storm water to vegetated areas and maximize storm water infiltration and filtering to reduce pollutant discharges, unless infeasible.

[17] Note that the requirement to install storm water controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of storm water controls.
[18] Any departures from maintenance recommendations made by the manufacturer must reflect good engineering practices and be explained in your SWPPP.

3. Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.[19]

A. The perimeter control must be installed upgradient of any natural buffers established under Section 2.2.1 unless the control is being implemented pursuant to Section 2.2.1.A.

B. Install sediment controls along any perimeter areas of the site that will receive pollutant discharges.[20]

C. After installation, to ensure that perimeter controls continue to work effectively:

i. Remove sediment before it has accumulated to one-half of the above ground height of any perimeter control, and

ii. After a storm event, if there is evidence of storm water circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.

D. Exception. For areas at linear construction sites as defined in Appendix A, where perimeter controls are infeasible, implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

4. Minimize sediment track out

A. Restrict vehicle use to properly designated exit points.

B. Use appropriate stabilization techniques[21] at all points that exit onto paved roads.

Exception: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls[22] are implemented to minimize sediment track out.

C. Implement additional track out controls[23] as necessary to ensure that sediment removal occurs prior to vehicle exit, and

D. Where sediment has been tracked out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track out occurs. Remove the track out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of

[19] Examples of perimeter controls include fiber rolls, filter berms, different types of silt fences such as wire-backed, super silt fence, or multi-layer geotextile silt fence, compost filter socks, gravel barriers, and temporary diversion dikes.
[20] To prevent storm water from circumventing the edge of the perimeter control, permittees should consider installing the perimeter control along the contour of the slope and extending both sides up slope forming a crescent.
[21] Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric.
[22] Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles onsite to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., steep slopes).
[23] Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

sediment removal. You are prohibited from hosing or sweeping tracked out sediment[24] into any storm water conveyance, storm drain inlet, or water of the U.S.

5. **Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil.[25]**
   A. Locate the piles outside of any natural buffers established under Section 2.2.1 and away from any storm water conveyances, drain inlets, and areas where storm water flow is concentrated.
   B. Install a sediment barrier along all downgradient perimeter areas of sediment or soil stockpiles or land clearing debris piles.[26]
   C. For piles that will be unused for 14 or more days, provide cover[27] or appropriate temporary stabilization.
   D. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any storm water conveyance, storm drain inlet, or water of the U.S.
6. **Minimize dust.** On areas of exposed soil, minimize dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in storm water from the site.
7. **Minimize steep slope disturbances.** Minimize the disturbance of steep slopes (as defined in Appendix A).
8. **Preserve native topsoil, unless infeasible.**[28]
9. **Minimize soil compaction.**[29] In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:
   A. Restrict vehicle and equipment use in these locations to avoid soil compaction; and
   B. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.
10. **Protect storm drain inlets.**

[24] Fine grains that remain visible (e.g., staining) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Section 2.2.4.
[25] The requirements in Section 2.2.5 do not apply to the storage of rock, such as rip rap, landscape rock, pipe bedding gravel, and boulders. Refer to Section 2.2.3.A for the requirements that apply to these types of materials.
[26] Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.
[27] Examples of cover include tarps, blown straw, and hydroseeding.
[28] Stockpiling topsoil at off-site locations or transferring topsoil to other locations is an example of practice that is consistent with the requirements in Section 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain or may not have space to stockpile native topsoil onsite for later use, in which case it may not be feasible to preserve topsoil.
[29] Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

A. Install inlet protection measures that remove sediment from discharges prior to discharge from your site to a water of the U.S., provided you have authority to access the storm drain inlet;[30] and

B. Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

11. Control storm water discharges, including both peak flow rates and total storm water volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.[31]

12. If you install a sediment basin or similar impoundment:

A. Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Section 2.2.1;

B. Design the basin or impoundment to avoid collecting water from wetlands;

C. Design the basin or impoundment to provide storage for either the calculated volume of storm water from a 2-year, 24-hour storm or 3,600 cubic feet per acre drained;

D. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;[32]

E. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and

F. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

13. If using treatment chemicals (e.g., polymers, flocculants, coagulants), including pre-approved cationic chemicals as specified in Section 1.1.8:

A. Use conventional erosion and sediment controls before and after the application of treatment chemicals. Chemicals may only be applied where treated storm water is directed to a sediment control before discharge;

B. Select appropriate treatment chemicals. Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharge;

[30] Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

[31] Examples of control measures that can be used to comply with this requirement include the use of erosion controls and/or velocity dissipation devices (e.g., check dams, sediment traps), within and along the length of a storm water conveyance and at the outfall to slow down storm water.

[32] The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

C. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm resistance cover and surrounded by secondary containment structures, or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in storm water or by any other means (e.g., storing chemicals in a covered area, having a spill kit available onsite and ensuring personnel are available to respond expeditiously in the event of a leak or spill);

D. Comply with state/local requirements. Comply with applicable state and local requirements regarding the use of treatment chemicals;

E. Use chemicals in accordance with good engineering practices and specifications of the chemical manufacturer/supplier. Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the manufacturer/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice;

F. Ensure proper training. Ensure that all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training prior to beginning application of treatment chemicals. Among other things, the training must cover proper dosing requirements; and

G. Perform additional measures specified by DEQ for the authorized use of cationic chemicals. If you have been authorized to use cationic chemicals at your site pursuant to Section 1.1.7, you must perform all additional measures as conditioned by your authorization to ensure that the use of such chemicals will not cause an exceedance of WQS.

14. Stabilize exposed portions of the site. Implement and maintain stabilization measures that minimize erosion from exposed portions of the site in accordance with Sections 2.2.14.A and 2.2.14.B.

A. Stabilization deadlines.[33]

[33] DEQ may determine, based on an inspection carried out under Section 4.8 and corrective actions required under Section 5.3, that the level of sediment discharge on the site requires a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing storm water controls, DEQ may require stabilization to correct this problem.

Table 2. Site Stabilization Deadlines

Total amount of land disturbance occurring at any one time[34]	**Deadline**
Five acres or less Note: this includes sites disturbing more than five acres total over the course of a project, but that limit disturbance at any specific time to five acres or less	• Initiate the installation of stabilization measures immediately[35] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[36] and • Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.[37]
More than five acres	• Initiate the installation of stabilization measures immediately[38] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[39] and • Complete the installation of stabilization measures as soon as practicable, but no later than seven calendar days after stabilization has been initiated.[40]

[34] Limiting disturbances to five acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five acres. The following examples would qualify as limiting disturbances at any one time to five acres or less:

1. The total area of disturbance for a project is five acres or less.
2. The total area of disturbance for a project will exceed five acres, but the operator ensures that no more than five acres will be disturbed at any one time through implementation of stabilization measures. Site stabilization can be used to consider areas no longer disturbed, so that the five-acre cap is not exceeded to require 14-day stabilization deadlines. For instance, if an operator completes stabilization of two acres of land on a five-acre disturbance, then two additional acres could be disturbed while still qualifying for longer than 14 day stabilization deadlines.

[35] The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in 1-3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

[36] The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

[37] If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

[38] See note 30

[39] See note 31

[40] See note 32.

B. Stabilization Exceptions.

i. Arid, semi-arid, and drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used:

a. Immediately initiate and, within 14 calendar days of temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;

b. As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and

c. If construction is occurring during the seasonally dry period, indicate the beginning and ending dates of the seasonally dry period and your site conditions in your SWPPP. Also include the schedule you will follow for initiating and completing vegetative stabilization.

ii. Unforeseen circumstances. Operators that are affected by unforeseen circumstances[41] that delay the initiation and/or completion of vegetative stabilization:

a. Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;

b. Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and

c. Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Section 2.2.14.A and the schedule you will follow for initiating and completing stabilization.

iii. Discharges to a sediment or nutrient impaired water or to surface water that is identified by Idaho as Tier II or Tier III for antidegradation purposes. Complete stabilization as soon as practicable, but no later than seven calendar days after stabilization has been initiated.

C. Final stabilization criteria (for any areas not covered by permanent structures):

i. Establish uniform, perennial vegetation (i.e., evenly distributed, without large bare areas) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or

ii. Implement permanent non-vegetative stabilization measures[42] to provide effective cover.

[41] Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.
[42] Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

iii. Exceptions:

a. **Arid, semi-arid, and drought-stricken areas** (as defined in appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within three years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.

b. **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** Section 2.2.14.C final stabilization criteria do not apply.

c. **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials).

2.3 Pollution Prevention Requirements[43]

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in storm water and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

1. For equipment and vehicle fueling and maintenance:

A. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;[44]

B. If applicable, comply with the Oil Pollution Prevention requirements in 40 CFR part 112, Clean Water Act Section 311, and IDAPA 58.01.02.851;

C. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;

D. Use drip pans and absorbents under or around leaky vehicles;

E. Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and

[43] Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to storm water will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of storm water contamination (such as final products and materials intended for outdoor use).

[44] Examples of effective means include:

- Locating activities away from waters of the U.S. and storm water inlets or conveyances so that storm water coming into contact with these activities and cannot reach waters of the U.S.;
- Providing secondary containment (e.g., spill berms, dikes, spill containment pallets) and cover where appropriate; and
- Having a spill kit available onsite and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

F. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

2. For equipment and vehicle washing:

A. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;[45]

B. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and

C. For storage of soaps, detergents or solvents, provide either cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these detergents to precipitation and to storm water or a similarly effective means designed to minimize the discharge of pollutants from these areas.

3. For storage, handling, and disposal of building products, materials, and wastes:

A. For building materials and building product,[46] provide either cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these detergents to precipitation and to storm water or a similarly effective means designed to minimize the discharge of pollutants from these areas.

Minimizing exposure is not required in cases where the exposure to precipitation and to storm water will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of storm water contamination (such as final products and materials intended for outdoor use).

B. For pesticides, herbicides, insecticides, fertilizers, and landscape materials:

i. In storage areas, provide either cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these detergents to precipitation and to storm water or a similarly effective means designed to minimize the discharge of pollutants from these areas.

ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label.

C. For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:

i. Store chemicals in water-tight containers;

ii. Store containers a minimum of 50 feet from waters of the U.S., drainage system, and storm drain inlets;

[45] Examples of effective means include locating activities away from waters of the U.S. and storm water inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

[46] Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

iii. If stored outside, use a spill containment pallet or similar device to capture small leaks or spills; and

iv. Have a spill kit available onsite that is in good working condition (i.e., not damaged, expired, or used up) and ensure personnel are available to respond expeditiously in the event of a leak or spill.

v. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

D. For hazardous or toxic wastes:[47]

i. Separate hazardous or toxic waste from construction and domestic waste;

ii. Store waste in sealed containers that are constructed of suitable materials to prevent leakage and corrosion and labeled in accordance with applicable Resources Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;

iii. Store all outside containers within appropriately-sized secondary containment (e.g., spill berms, dikes, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in a covered area, having a spill kit available onsite);

iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal state, tribal and local requirements;

v. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge; and

vi. Follow all other federal, state, tribal, and local requirements regarding hazardous or toxic waste.

vii. All spills of hazardous material, deleterious material or petroleum products which may impact waters (ground and surface) of the State of Idaho must be immediately reported. Call 911 if immediate assistance is required to control, contain, or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office in the table below during normal working hours or Idaho State Communications Center after normal working hours. If the spilled volume is above federal reportable quantities, contact the National Response Center.

[47] Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

a. For Immediate Assistance: Call 911

b. National Response Center: (800) 424-8802

c. Idaho State Communications Center: (208) 632-8000

Table 3. Regional Office Contact Numbers

Regional Office	Toll Free Number	Phone Number
Boise	888-800-3480	208-373-0550
Coeur d'Alene	877-370-0017	208-769-1422
Idaho Falls	800-232-4635	208-528-2650
Lewiston	877-541-3304	208-799-4370
Pocatello	888-655-6160	208-236-6160
Twin Falls	800-270-1663	208-736-2190

E. For construction and domestic wastes:[48]

i. Provide waste containers (e.g., dumpster, trash receptacle) of sufficient size and number to contain construction and domestic wastes;

ii. For waste containers that have lids, keep waste container lids closed when not in use, and close lids at the end of the business day and during storm events. For waste containers that do not have lids, provide either cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these detergents to precipitation and to storm water or a similarly effective means designed to minimize the discharge of pollutants from these areas;

iii. On business days, clean up and dispose of waste in designated waste containers; and

iv. Clean up immediately if containers overflow.

F. For sanitary waste, position portable toilets so that they are secure and will not be tipped or knocked over (e.g., secure with stakes that tie to the portable toilets and go into the ground), and so that they are located away from waters of the U.S. and storm drain inlets or conveyances.

4. For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

[48] Examples of construction and domestic wastes include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, Styrofoam, concrete, demolition debris, and other trash or building materials.

A. Direct wash water into a leak-proof container or leak-proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation;

B. Handle washout or cleanout wastes as follows:

   i. Do not dump liquid wastes in storm sewers or waters of the U.S.;

   ii. Dispose of liquid wastes in accordance with applicable requirements in Section 2.3.3; and

   iii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Section 2.3.3; and

C. Locate any washout or cleanout activities as far away as possible from waters of the U.S. and storm water inlets or conveyances, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

5. For the application of fertilizers:

A. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer's specifications where appropriate in accordance with Section 7.2.6.B.ix;

B. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;

C. Avoid applying before heavy rains that could cause excess nutrients to be discharges;

D. Never apply to frozen ground;

E. Never apply to storm water conveyance channels; and

F. Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

6. Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Section 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or greater than a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 and the Idaho State Comm Center at (208) 632-8000 as soon as you have knowledge of the release. You must also, within seven calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release to DEQ through the IPDES E-Permitting System. State, tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

2.4 Construction Dewatering Requirements

Comply with the following requirements to minimize the discharge of pollutants in ground water or accumulated storm water that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, in accordance with Section 1.2.2.

1. Route dewatering water through a sediment control (e.g., sediment trap or basin, pumped water filter bag) designed to minimize discharges with visual turbidity;[49]
2. Do not discharge visible floating solids or foam;
3. Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials. The discharge must not cause the formation of a visible sheen or visible hydrocarbon deposits on the bottom or shoreline of the receiving water;
4. To the extent feasible, use well vegetated, upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using waters of the U.S. as part of the treatment area;
5. To minimize sediment discharges from causing erosion:
   A. Use stable, erosion resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotextiles underlayment) for the discharge from dewatering controls;
   B. Do not place dewatering controls, such as pumped water filter bags, on steep slopes (as defined in Appendix A); and
   C. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Section 2.2.11. The discharge must not cause re-suspension of sediments upon discharge to the receiving water.
6. For backwash water, either haul it away for disposal or return it to the beginning of the treatment process;
7. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications; and
8. Comply with dewatering-specific monitoring requirements in Section 3.3 and the specific inspection requirements in Section 4.

3. Water Quality-Based Effluent Limits

All Operators must control discharges as necessary to meet applicable numeric and narrative Idaho WQS for any discharges authorized under this permit, with compliance required upon beginning discharge.

[49] For this permit, visual turbidity refers to a sediment plume or other cloudiness in the water caused by sediment that can be identified by an observer.

3.1 General Effluent Limits to Meet Applicable WQS

If at any time an operator becomes aware (e.g., through self-monitoring or by notification from the state), or DEQ determines, that the operator's discharge causes or contributes to an excursion of any applicable water quality standard, the operator must take corrective action required in Section 5 up to and including the ceasing of the discharge, if necessary.

In the absence of information demonstrating otherwise, DEQ expects that compliance with the conditions in this permit will result in storm water discharges being controlled as necessary to meet applicable WQS.

If you were required to install and maintain storm water controls specifically to meet the assumptions and requirements of an EPA approved or established TMDL (for any parameter) or to otherwise control your discharge to meet WQS during your coverage under a previous permit, you must continue to implement such controls as part of your coverage under this permit.

3.2 Water Quality Based Conditions for All Sites

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by Idaho as Tier II or Tier III for antidegradation purposes you must comply with the stabilization deadline specified in Section 2.2.14.B.iii.

If you discharge to a water that is impaired for a parameter other than a sediment related parameter or nutrients, DEQ will inform you if any additional controls are necessary for your discharge to meet WQS, including for it to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL, or if coverage under an individual permit is necessary.

In addition, on a case-by-case basis, DEQ may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, storm water controls, and/or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

A. Implement controls[50] to minimize the exposure of PCB containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to storm water; and

B. Ensure that disposal of such materials is performed in compliance with applicable state, federal, and local laws.

[50] Examples of controls to minimize exposure of PCBs to precipitation and storm water include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, construction a containment area so that all dust or debris generated by the work remains within the protected area and using tools that minimize dust and heat (<212°F). For additional information refer to Section IV.2.3.3 of the CGP Fact Sheet.

3.3 Water Quality Based Conditions for Sites Discharging from Construction Dewatering Activities

Monitoring for dewatering discharges is only required when a site discharges into WOTUS, with no intervening conveyance systems or other intermediaries.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field but grab samples may be collected and taken to a laboratory for analysis. If the operator can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, at least one sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date, and time must be recorded prior to monitoring downstream of the project area. At least one sample per day must also be taken immediately downstream from each point of discharge and within any visible plume. The turbidity, location, date, and time must be recorded in a log. The downstream samples must be taken immediately following the upstream samples to obtain meaningful and representative results. Sampling from less than every discharge location is allowed if the discharge locations sampled are representative of the site's total discharges.

You must take at least one turbidity sample from the dewatering discharge after any treatment process , before mixing with the receiving water, on each day of discharge from dewatering activities. The following criteria must be met:

- The daily sample must be under 50 NTU instantaneously above background of the receiving water, or
- The running 10 calendar day average of the daily results must be under 25 NTU above background of the receiving water.

If either of these criteria is not met, you must stop the dewatering discharge and implement corrective actions to address the cause of the exceedance before resuming dewatering operations.

The turbidity measurements must be taken in the field using a turbidimeter. The turbidimeter must be calibrated properly and regularly.

An example monitoring report is available in Appendix I. Records of monitoring information must include:

a. All relevant calibration and maintenance records;
b. All original strip chart recordings or other forms for continuous monitoring instrumentation;
c. The date, place, and time of sampling or measurement;
d. The name of any individuals who performed the sampling or measurements;
e. The dates any analyses were performed;
f. The name of any individuals who performed the analyses;
g. The analytical techniques or methods used; and
h. The results of the analysis.

Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The monitoring log must describe all exceedances and subsequent actions taken, including the effectiveness of the action. Include the date the plume was identified, the calibration records of the turbidimeter, the dates on which pollutant generating activity ceased, and the dates on which pollutant generating activities resumed, as applicable. Keep the monitoring log in your SWPPP.

3.4 Water Quality Based Conditions for Sites Discharging due to Storm Events

Monitoring for storm event discharges is only required when a site discharges into WOTUS, with no intervening conveyance systems or other intermediaries.

Turbidity Monitoring

Operators must conduct turbidity monitoring during construction activities when there is a discharge of pollutants from an unstabilized portion of the site to a water of the U.S. during operating hours.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field but grab samples may be collected and taken to a laboratory for analysis. If the operator can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, at least one sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date, and time must be recorded prior to monitoring downstream of the project area. At least one sample per day must also be taken immediately downstream from each point of discharge and within any visible plume. The turbidity, location, date, and time must be recorded in a log. The downstream samples must be taken immediately following the upstream samples to obtain meaningful and representative results. Sampling from less than every discharge location is allowed if the discharge locations sampled are representative of the site's total discharges.

Results from the discharge location sampling must be compared to the receiving water background levels to determine whether project activities are causing an exceedance of Idaho WQS. If the downstream turbidity is 50 NTUs or more above the background turbidity[51], then the discharge is causing an exceedance of WQS. The following steps should be followed to ensure compliance with the turbidity standard:

1. Quantify the discharge by collecting turbidity measurements from the discharge point, prior to mixing with the receiving water, and the upstream receiving water monitoring point and compare to Idaho's instantaneous numeric turbidity criterion (50 NTU over background).
2. If the discharge turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring at least once per day until the discharge ceases. If turbidity exceeds background turbidity by more than 50 NTU instantaneously, then stop pollutant discharge activities, conduct corrective action and proceed to step 3.

[51] If the discharge is to a non-flowing or dry stream bed, then the background turbidity is considered 0.

3. Take immediate action to address the cause of the exceedance.[52] That may include inspecting the condition of project BMPs. If the BMPs are functioning as intended but the turbidity is above the WQS, then the operator must conduct corrective action to modify or improve the BMPs to correct the exceedance.
4. Continue monitoring each day until: 1) the discharge ceases or 2) the discharge meets WQS (no more than 50 NTU over background instantaneously or 25 NTU over background for more than 10 consecutive days).
5. Pollutant discharge activities can resume at the site when one of the two conditions in Step 5 is met.

   An example monitoring report is available in Appendix I. Records of monitoring information must include:

   a. All relevant calibration and maintenance records;
   b. All original strip chart recordings or other forms for continuous monitoring instrumentation;
   c. The date, place, and time of sampling or measurement;
   d. The name of any individuals who performed the sampling or measurements;
   e. The dates any analyses were performed;
   f. The name of any individuals who performed the analyses;
   g. The analytical techniques or methods used;
   h. The results of the analysis.

   Copies of monitoring reports for turbidity monitoring must be available to DEQ upon request. The monitoring reports must describe all exceedances and subsequent actions taken, including the effectiveness of the action. Include the date the plume was identified, the calibration records of the turbidimeter, the dates on which pollutant generating activity ceased, and the dates on which pollutant generating activities resumed, as applicable. Keep the monitoring reports in your SWPPP.

4. Site Inspection Requirements

4.1 Visual Monitoring Requirements for Applicators

The person inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that any person conducting inspections pursuant to this section has received the minimum training required in Section 6.3.

[52] The cause may be uncovered stockpiles, exposed disturbed land, failing or damaged sediment control BMPs, etc.

4.2 Frequency of Inspections[53]

At a minimum, you must conduct a site inspection in accordance with one of the two schedules below, unless you are subject to the Section 4.3 increase in inspection frequency or qualify for a Section 4.4 reduction in the inspection frequency:

1. At least once every seven calendar days; or
2. Once every 14 calendar days[54], and once each day that there is a discharge from your site to a water of the U.S. from a storm event of 0.25 inches or greater of rain.[55] To determine whether 0.25 inches or greater of rain has occurred at your site, you must keep a properly maintained rain gauge on your site or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Section 4.7.1d.

4.3 Increase in Inspection Frequency for Sites Discharging Dewatering Water

The increased inspection frequencies established in this section take the place of Section 4.2 inspection frequencies for the portion of the site affected.

For sites discharging dewatering water, you must conduct an inspection once each day the discharge occurs. The Section 4.2 inspection frequency still applies to all other portions of the site unless the site is affected by the reduced frequency in Section 4.4.

4.4 Reductions in Inspection Frequency

1. Stabilized Areas.

   A. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month in any area of your site where the stabilization steps in Section 2.2.14.A have been completed. If construction activity resumes in this portion of the site, the inspection frequency immediately increases to that required in Sections 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.

   B. *Exception*. For "Linear Construction Sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues in other areas, you may reduce the frequency of inspections to twice per month for the

[53] Inspections are only required during the site's normal working hours.

[54] The standard inspection can be conducted simultaneously with a rain event inspection if the rain event inspection coincides with the normal inspection. If the standard inspection occurs prior to accumulating 0.25 inches of rain, then the standard inspection would not count for the rain event inspection.

[55] "Within 24 hours of the occurrence of a storm event" means that you must conduct an inspection with 24 hours once a storm event has produced 0.25 inches within a 24-hour period, even if the storm event is continuing. If there is a storm event at your site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the end of the storm. For example, if 0.3 inches of rain falls on Day 1, 0.25 inches of rain falls on day 2, and 0.1 inches of rain fall on Day 3, you would be required to conduct a first inspection with 24 hours of the Day 1 rainfall and a second inspection within 24 hours of the Day 2 rainfall, but a third inspection would not be required within 24 hours of the Day 3 rainfall.

first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in Section 2.2.14.A have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event of 0.25 inches or greater. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, re-stabilization, inspections must resume at the inspection frequency in Section 4.4.1.A. Inspections must continue until final stabilization is visually confirmed following a storm event of 0.25 inches or greater.

2. Arid, Semi-Arid, or Drought Stricken Areas (As defined in Appendix A). If it is the seasonally dry period (as defined in Appendix A) or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. You must document that you are using this reduced schedule and the beginning and end dates of the seasonally dry period in your SWPPP. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must keep a properly maintained rain gauge on your site or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Section 4.7.1.D.

3. Frozen Conditions.

   A. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin if:

      i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Sections 4.2 and 4.3 as applicable;

      ii. Land disturbances have been suspended; and

      iii. All disturbed areas of the site have been stabilized in accordance with Section 2.2.14.A.

   B. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:

      i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must resume your regular inspection frequency as described in Sections 4.2 and 4.3 as applicable; and

      ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Section 2.2.14.A.

4.5 Areas That Must be Inspected

During your site inspection, you must inspect the following areas of your site at a minimum:

1. All areas that have been cleared, graded, or excavated and not yet stabilized consistent with Section 2.2.14.A;
2. All storm water controls, including pollution prevention controls, installed at the site to comply with this permit;[56]
3. Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;
4. All areas where storm water typically flows within the site, including drainageways designed to divert, convey, and/or treat storm water;
5. All areas where construction dewatering is taking place, including storm water controls to treat the dewatering discharge and any channelized flow of water to and from those controls;
6. All points of discharge from the site; and
7. All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

4.6 Requirements for Inspections

1. During each site inspection, you must at a minimum;
   A. Check whether all storm water controls (i.e., erosion and sediment controls and pollution prevention controls) are properly installed, operational, and are working as intended to minimize pollutant discharges;
   B. Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
   C. Identify any locations where new or modified storm water controls are necessary to meet the requirements of Sections 2 and/or 3;
   D. Check for signs of visible erosion and sedimentation (e.g., sediment deposits) that have occurred and are attributable to your discharge at points of discharge and, if applicable, on the banks of any waters of the U.S. flowing within or immediately adjacent to the site. Check also for signs of sedimentation at points downstream from the point of discharge that could be attributable to your discharge[57]; and
   E. Identify any incidents of noncompliance observed.

[56] This includes the requirement to inspect for sediment that has been tracked our from the site onto paved roads, sidewalks, or other paved areas consistent with Section 2.2.4

[57] Permittees can check for downstream signs of sedimentation from the perimeter of their construction site. This requirement does not include monitoring areas the permittee cannot legally access.

2. If a discharge is occurring during your inspection:
   A. Observe all discharge points at the site;
   B. Document the visual quality of the discharge[58], and take note of the characteristics of the storm water discharge, including color; odor; floating, settled or suspended solids; foam; oil sheen; and other indicators of storm water pollutants; and
   C. Record any monitoring results collected in accordance with Section 3.3 or Section 3.4 in a monitoring log.
3. For dewatering inspections conducted pursuant to Section 4.5.5, record the following:
   A. Approximate times that the dewatering discharge began and ended on the day of inspection;
   B. Estimates of the rate (in gallons per day) of discharge on the day of inspection;
   C. Whether or not a sediment plume, or a visible sheen or visible hydrocarbon deposits on the bottom or shoreline of the receiving water, was observed (note: if either are observed, corrective action is required pursuant to Section 5.1.5); and
   D. Record any monitoring results in accordance with Section 3.3 in a monitoring log.
4. Based on the results of your inspection:
   A. Complete any necessary maintenance repairs or replacements under Section 2.1.4 or corrective actions under Section 5, whichever applies; and
   B. Modify your SWPPP site map in accordance with Section 7.4.1 to reflect changes to your storm water controls that are no longer accurately reflected on the current site map.

4.7 Inspection Report

1. You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
   A. The inspection date;
   B. Names and titles of personnel conducting the inspection;
   C. A summary of your inspection findings, covering at a minimum the observations made in accordance with Section 4.6, including any necessary routine maintenance pursuant to Section 2.1.4.B or corrective action pursuant to Section 5.1;
   D. If you conducted an inspection because of rainfall measuring 0.25 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
   E. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.

[58] This documentation may be in the form of photographs or a written description of the discharge.

2. Each inspection report must be signed in accordance with Section 9.1.11.
3. You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by DEQ.[59]
4. You must retain all inspection reports completed for this Section for at least three years from the date that your permit coverage expires or is terminated.

4.8 Inspection by DEQ

You must allow DEQ, or an authorized representative of DEQ, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls that are not onsite to comply with this permit, you must arrange for DEQ to have access at all reasonable times to those areas where the shared controls are located.

Pursuant to Idaho Code §39-108, the operator must allow DEQ's compliance, inspection, and enforcement (CIE) personnel, or authorized representative (including an authorized contractor acting as a representative of DEQ), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;
2. Access and copy and records that must be kept under the conditions of this permit;
3. Inspect your construction site, including any construction support activity areas covered by this permit (see Section 1.2.1.C), any storm water controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and
4. Sample or monitor for the purpose of ensuring compliance.

5. Corrective Actions

5.1 Conditions Triggering Corrective Action

You must take corrective action to address permit noncompliance. The following conditions are triggers for corrective action:

[59] Inspection reports may be prepared, signed, and kept electronically, rather than in paper form, if the records are:
- In a format that can be read in a similar manner as a paper record;
- Legally dependable with no less evidentiary value than their paper equivalent;
- Immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form.

For additional guidance on the proper practices to follow for the electronic retention of inspection report records, refer to the Fact Sheet discussion related to Section 4.7.3.

1. A storm water control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
2. Your discharges are not meeting applicable WQS; or
3. A prohibited discharge has occurred (See Section 1.3); or
4. You observe a sediment plume or a visible sheen or visible hydrocarbon deposits on the bottom or shoreline of the receiving water during discharge from site dewatering activities (See Section 4.6.3.D), or you are informed by DEQ, EPA, or local authorities of such conditions. Note that where you observe any of these conditions you are required to take immediate action to address the condition consistent with Section 5.2.1 (in addition to taking other steps required in Section 5.2 to correct the problem), including immediately suspending the discharge and taking steps to ensure that the controls being used are operating effectively; or
5. Your turbidity monitoring shows that your discharge exceeds WQS (discharge turbidity 50 or more NTU above background turbidity instantaneously, or 25 NTU above background turbidity for more than 10 consecutive days).

5.2 Corrective Action Deadlines

For any corrective action triggering conditions in Section 5.1, you must:

1. Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events;
2. When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day;
3. When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven calendar days from the time of discovery. If it is infeasible to complete installation or repair within seven calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the storm water controls and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the storm water controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven calendar days of completing this work.

5.3 Corrective Action Required by DEQ

You must comply with any corrective actions required by DEQ as a result of permit violations found during an inspection carried out under Section 4.8.

5.4 Corrective Action Log

1. For each corrective action taken in accordance with this Section, you must record the following in a corrective action log:

A. Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.

B. Within 24 hours of completing the corrective action (in accordance with the deadlines in Section 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.

2. Each entry to the corrective action log must be signed in accordance with Section 9.1.11.

3. You must keep a copy of the corrective action log at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by DEQ.[60]

4. You must retain the corrective action log for at least three years from the date that your permit coverage expires or is terminated.

6. Storm Water Team Formation and Staff Training Requirements

6.1 Storm Water Team

Each operator, or group of operators, must assemble a "storm water team" that will be responsible for carrying out activities necessary to comply with this permit. The storm water team must include the following people:

1. Personnel who are responsible for the design, installation, maintenance, and/or repair of storm water controls (including pollution prevention controls);

2. Personnel responsible for the application and storage of treatment chemicals (if applicable);

3. Personnel who are responsible for conducting inspections as required in Section 4.1; and

4. Personnel who are responsible for taking corrective actions as required in Section 5.

Members of the storm water team must be identified in the SWPPP pursuant to Section 7.2.2.

6.2 General Training Requirements for Storm Water Team Members

Prior to the commencement of construction activities, you must ensure that all persons[61] assigned to the storm water team understand the requirements of this permit and their specific

[60] The corrective action log may be prepared, signed, and kept electronically, rather than in paper form, if the records are:

- In a format that can be read in a similar manner as a paper record;
- Legally dependable with no less evidentiary value than their paper equivalent;
- Immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form.

For additional guidance on the proper practices to follow for the electronic retention of inspection report records, refer to the Fact sheet discussion related to Section 4.7.3.

[61] If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding and training prior to assuming responsibilities related to compliance with this permit. For emergency-related projects, the requirement to train personnel prior to

responsibilities with respect to those requirements, including the following related to the scope of their job duties:

1. The permit deadlines associated with installation, maintenance, removal of storm water controls and stabilization;
2. The location of all storm water controls on the site required by this permit and how they are to be maintained;
3. The proper procedures to follow with respect to the permit's pollution prevention requirements; and
4. When and how to conduct inspections, record applicable findings, and take corrective actions. Specific training requirements for person conducting site inspections are included in Section 6.3.

You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers (unless the subcontractors or outside service providers are responsible for conducting the inspections required in Section 4, in which case you must provide such documentation consistent with Section 7.2.2), but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.

6.3 Training Requirements for Persons Conducting Inspections

Any personnel conducting site inspections on your site pursuant to Section 4 must, at a minimum:

1. Complete an EPA construction inspection course developed for the EPA CGP and have passed the exam; or
2. Hold a current valid construction inspection certification or license from a program that must, at a minimum, cover the following:
   A. Principles and practices of erosion and sediment control and pollution prevention practices at construction sites;
   B. Proper design, installation, and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites; and
   C. Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Section 4; or
3. A member of the storm water team may also conduct inspections if they are working under the supervision of a person who has the qualifications described above.

commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

6.4 Storm Water Team's Access to Permit Documents

Each member of the storm water team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of the SWPPP, and other relevant documents or information that must be kept with the SWPPP.

7. Storm Water Pollution Prevention Plan (SWPPP)

7.1 General Requirements

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Section 7 prior to their NOI submittal.[62, 63] The SWPPP must be kept up to date throughout coverage under this permit. If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

7.2 SWPPP Contents

At a minimum, the SWPPP must include the information as specified in this Section and as specified in other parts of this permit.

1. All site operators. Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.

2. Storm water team. Identify the personnel (by name and position) that you have made part of the storm water team pursuant to Section 6.1, as well as their individual responsibilities, including which members are responsible for conducting inspections.

   Include documentation that each member of the storm water team has received the training required by Section 6. If personnel on your team elect to complete the EPA inspector training program pursuant to Section 6.3.1, you must include copies of the certificate showing that the relevant personnel have completed the training and passed the exam.

3. Nature of Construction Activities.[64] Include the following:

[62] The SWPPP does not establish the effluent limits and/or other permit terms and conditions that apply to your site's discharges; these limits, terms, and conditions are established in this permit.

[63] Where there are multiple operators associated with the same site, they may develop a group SWPPP instead of multiple individual SWPPPs. Regardless of whether there is a group SWPPP or multiple individual SWPPPs, each operator is responsible for compliance with the permit's terms and conditions. In other words, if Operator A relies upon Operator B to satisfy its permit obligations, Operator A does not have to duplicate those permit related functions if Operator B is implementing them for both operators. However, Operator A remains responsible for permit compliance if Operator B fails to implement any measures necessary for Operator A to comply with the permit. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not compromise any other operators' controls and/or shared controls.

[64] If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself (no Change NOI is necessary), or in associated records, as appropriate.

A. A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition[65];

B. The size of the property (in acres);

C. The total area expected to be disturbed by the construction activities (to the nearest quarter acre);

D. A description of any on-site and off-site construction support activity areas covered by this permit (see Section 1.2.1.C);

E. The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;

F. A description and projected schedule for the following:

   i. Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting, filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;

   ii. Temporary or permanent cessation of construction activities in each portion of the site;

   iii. Temporary or final stabilization of exposed areas for each portion of the site; and

   iv. Removal of temporary storm water controls and construction equipment or vehicles, and the cessation of construction related pollutant generating activities;

G. A list and description of all pollutant generating activities[66] on the site. For each pollutant generating activity, include an inventory of pollutants or pollutant constituents (e.g., sediment, fertilizers, pesticides, paint, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels) associated with that activity, which could be discharged in storm water from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to storm water discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction; and

H. Business days and hours for the project;

I. If you are conducting construction activities in response to a public emergency (See Section 1.4), a description of the cause of the public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), information substantiating its occurrence (e.g., state disaster declaration or similar state or local declaration), and a description of the construction necessary to reestablish the affected public services.

[65] The critical piece of information is determining whether demolition of a structure of 10,000 square feet or more, that had work completed prior to 1980, is occurring, because it may contain PCBs and appropriate BMPs need to be used for such structures.

[66] Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations.

4. Site Map. Include a legible map, or series of maps, showing the following features of the site:
   A. Boundaries of the property;
   B. Locations where construction activities will occur, including:
      i. Locations where construction activities will occur (note any phasing), including any demolition activities;
      ii. Approximate slopes before and after major grading activities (note any steep slopes [as defined in Appendix A]);
      iii. Locations where sediment, soil, or other construction materials will be stockpiled;
      iv. Any water of the U.S. crossings;
      v. Designated points where vehicles will exit onto paved roads;
      vi. Locations of structures and other impervious surfaces upon completion of construction; and
      vii. Locations of onsite and offsite construction support activities covered by this permit (See Section 1.2.1.C);
   C. Locations of any waters of the U.S. within the site and all waters of the U.S. located within one mile downstream of the site's discharge points. Also identify if any are listed as impaired or are identified as Tier II or Tier III water;
   D. Any areas of federally listed critical habitat within the site and upstream and downstream from the storm water discharge point into a stream segment that may be affected by these discharges;
   E. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures);
   F. Drainage patterns of storm water and authorized non-storm water before and after major grading activities;
   G. Storm water and authorized non-storm water discharge locations including:
      i. Locations where storm water and/or authorized non-storm water will be discharged to storm drain inlets;[67] and
      ii. Locations where storm water or authorized non-storm water will be discharged directly to waters of the U.S. (e.g., not via a storm drain inlet);
   H. Locations of all potential pollutant generating activities identified in Section 7.2.3.G;
   I. Locations of storm water controls, including natural buffer areas and any shared controls utilized to comply with this permit; and

[67] The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

J. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

5. Non-Storm water Discharges. Identify all authorized non-storm water discharges in Section 1.2.2 that will or may occur.

6. Description of Storm water Controls.

A. For each of the Section 2.2 erosion and sediment control effluent limits, Section 2.3 pollution prevention effluent limits, and Section 2.4 construction dewatering effluent limits, as applicable to your site, you must include the following:

i. A description of the specific controls to be implemented to meet the effluent limit;

ii. Any applicable storm water control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);[68]

iii. Routine storm water control maintenance specifications; and

iv. The projected schedule for storm water control installation/implementation.

B. You must also include any of the following additional information as applicable.

i. Natural buffers and/or equivalent sediment controls (See Section 2.2.1 and Appendix D). You must include the following:

a. The compliance alternative to be implemented;

b. If complying with alternative 2, the width of natural buffer retained;

c. If complying with alternative 2 or 3, the erosion and sediment controls used to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;

d. If complying with alternative 3, a description of why it is infeasible to provide and maintain an undisturbed natural buffer of any size;

e. For "Linear Construction Sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and

f. A description of any disturbances exempt under Section 2.2.1 that occur within 50 feet of a water of the U.S.

ii. Perimeter controls for a "Linear Construction Site" (See Section 2.2.3.D). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to

[68] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

minimize discharges of pollutants in storm water associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in in the SWPPP must include the Section 2.2.3.A requirements that sediment be removed before it has accumulated to one half of the above ground height of any perimeter control.

iii. Sediment Track Out Controls (See Sections 2.2.4.B and 2.2.4.C). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.

iv. Sediment Basins (see Section 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.

v. Treatment Chemicals (see Section 2.2.13), you must include the following:

a. A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;

b. A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;

c. If DEQ authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a discharge that does not meet WQS;

d. The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;

e. Information from any applicable Safety Data Sheets (SDS);

f. Schematic drawings of any chemically enhanced storm water controls or chemical treatment systems to be used for application of the treatment chemicals;

g. A description of how chemicals will be stored consistent with Section 2.2.13.C;

h. References to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and

i. A description of the training that personnel who handle and apply chemicals have received prior to permit coverage or will receive prior to use of the treatment chemicals at your site.

vi. Stabilization Measures (See Section 2.2.14). You must include the following:

a. The specific vegetative and/or non-vegetative practices that will be used;

b. The stabilization deadline that will be met in accordance with Section 2.2.14.A.i-iii;

c. If complying with the deadlines for sites in arid, semi-arid, or drought stricken areas, the beginning and ending dates of the seasonally dry period (as defined in Appendix A) and the schedule you will follow for initiating and completing vegetative stabilization; and

d. If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.

vii. Spill Prevention and Response Procedures (See Section 1.3.5 and Section 2.3). You must include the following:

a. Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employees responsible for detection and response of spills or leaks; and

b. Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Section 2.3.6 and established under either 40 CFR 110, 117, or 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.

You may also reference the existence of Spill Prevention, Control, and Countermeasures (SPCC) plans developed for the construction activity under Section 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan onsite.[69]

viii. Waste Management Procedures (See Section 2.3.3). Describe the procedures you will follow for handling, storing, and disposing all wastes generated at your site consistent with all applicable federal, state, tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.

[69] Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Section, either as part of your existing plan or supplemented as part of the SWPPP.

ix. Application of Fertilizers (See Section 2.3.5). Document any departures from the manufacturer's specifications where appropriate.

7. Procedures for Inspection, Maintenance, and Corrective Action.

   Describe the procedures you will follow for maintaining your storm water controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Section 2.1.4, Section 3.3, and Section 5 of this permit. Also include:

   A. The inspection schedule you will follow, which is based on whether your site is subject to Section 4.2 or Section 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Section 4.4;

   B. The location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;

   C. If you will be reducing your inspection frequency in accordance with Section 4.4.1.B, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;

   D. If you will be reducing your inspection frequency in accordance with Section 4.4.3, the beginning and ending dates of frozen conditions on your site; and

   E. Any maintenance or inspection checklists or other forms that will be used.

   F. If you are unable to conduct an inspection due to safety concerns, document the safety concerns in the inspection report.

8. Compliance with Other Requirements.

   A. Threatened and Endangered Species Protection. Include documentation required in Appendix C supporting your eligibility regarding protection of threatened and endangered species and designated critical habitat.

   B. Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Storm Water Controls. If you are using any of the following storm water controls at your site, document any contact you have had with EPA or the applicable state agency[70] responsible for implementing the requirements for underground injection wells in the safe drinking water Act and EPA's implementing regulations at 40 CFR 144-147. Such controls would generally be considered Class V UIC wells:

      i. Infiltration trenches (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);

      ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate storm water flow; and

[70] For Idaho UIC program contacts, refer to the following IDWR website: https://idwr.idaho.gov/wells/injection-wells/.

iii. Drywells, seepage pits, or improved sinkholes (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

9. SWPPP Certification. You must sign and date your SWPPP in accordance with Section 9.1.11.

10. Post Authorization Additions to the SWPPP. Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

    A. A copy of your NOI submitted to DEQ along with any correspondence exchanged between you and DEQ related to coverage under this permit;

    B. A copy of the authorization you receive from DEQ assigning your IPDES ID (i.e., permit tracking number);

    C. A copy of this permit (an electronic copy easily available to the storm water team is also acceptable).

7.3 SWPPP Availability

You must keep a current copy of your SWPPP at the site or at an easily accessible location so it can be made available at the time of an on-site inspection or upon request by DEQ, EPA, or a local agency approving storm water management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).[71]

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

7.4 SWPPP Modifications

1. You must modify your SWPPP, including the site maps, within seven days of any of the following conditions:

    A. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, storm water controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Section 5. You do not need to modify your SWPPP if the estimated dates in Section 7.2.3.F change during the course of construction;

[71] The SWPPP may be prepared, signed, and kept electronically, rather than in paper form, if the records are:
- In a format that can be read in a similar manner as a paper record;
- Legally dependable with no less evidentiary value than their paper equivalent;
- Immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form.

For additional guidance on the proper practices to follow for the electronic retention of inspection report records, refer to the Fact Sheet discussion related to Section 4.7.3.

B. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;

C. If inspections or investigations by DEQ or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;

D. Where DEQ determines it is necessary to install and/or implement additional controls at your site to meet the requirements of this permit, the following must be included in your SWPPP:

   i. A copy of any correspondence describing such measures and requirements; and

   ii. A description of the controls that will be used to meet such requirements;

E. To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the storm water controls implemented at the site; and

F. If applicable, if a change in chemical treatment systems or chemically enhanced storm water control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

2. You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Section 7.2.9) and a brief summary of all changes.

3. All modifications to the SWPPP consistent with Section 7.4 must be authorized by a person identified in Section 9.1.11.B.

4. Upon determining that that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

8. Terminating Coverage

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to DEQ a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Section 8.

8.1 Minimum Information Required in NOT

1. IPDES ID (i.e., permit tracking number) provided by DEQ when you received coverage under this permit;

2. Basis for submission of the NOT (See Section 8.2);

3. Operator contact information;

4. Name of site and address (or a description of location if no street address is available);

5. Turbidity Monitoring Report; and

6. NOT Certification.

8.2 Conditions for Terminating CGP Coverage

You must terminate CGP coverage only if you meet the condition in 8.2.1 and one or more of the conditions in Sections 8.2.2 through 8.2.4 have occurred. Until your termination is effective per Section 8.5, you must continue to comply with the conditions of this permit.

1. The permittee certifies that their project is not subject to any pending State or Federal enforcement actions, including citizens suits brought under State or Federal law, and
2. You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (See Section 1.2.1.C), and you have met all of the following requirements:
   A. For any areas that (1) were disturbed during construction, (2) are not covered by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Section 2.2.14.C;
   B. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long term use following your termination of permit coverage;
   C. You have removed all storm water controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable; and
   D. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long term use following your termination of permit coverage; or
3. You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or
4. You have obtained coverage under an individual or alternative IPDES general permit.

8.3 How to Submit an NOT

You must use the IPDES E-Permitting System to electronically prepare and submit an NOT for the 2022 CGP. To access the IPDES E-Permitting System, go to https://www2.deq.idaho.gov/water/ipdes.

Waivers from electronic reporting may be granted as specified in Section 1.4.2. If DEQ grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix G.

8.4 Deadline for Submitting the NOT

You must submit an NOT within 30 calendar days after any one of the conditions in Section 8.2 occurs.

8.5 Effective Date of Termination of Coverage

Your authorization to discharge under this permit terminates at midnight on the day DEQ receives the NOT through the E-Permitting System.

9. Standard Permit Conditions

The following conditions apply to all IPDES permits. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the operator from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

9.1 Duty to Comply

The operator must comply with all permit requirements. Any permit noncompliance constitutes a violation of this permit, Idaho Law, and the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

The operator must comply with effluent standards or prohibitions established under the Clean Water Act Section 307(a) for toxic pollutants and with standards for sewage sludge use or disposal established under the Clean Water Act Section 405(d) and IDAPA 58.01.25.380 within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

9.2 Duty to Reapply

If the operator intends to continue an activity regulated by this permit after the expiration date, the operator must submit a NOI and receive authorization in accordance with the new permit once DEQ issues it.

9.3 Need to Halt or Reduce Activity Not a Defense

The operator cannot assert as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with this permit.

9.4 Duty to Mitigate

The operator must take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

9.5 Proper Operation and Maintenance

The operator must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the operator to achieve compliance with the conditions of this permit. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. The operator must operate backup or auxiliary facilities or similar systems that are installed by the operator only when the operation is necessary to achieve compliance with the conditions of the permit.

9.6 Permit Actions

This permit may be modified, revoked, and reissued or terminated for cause as specified in IDAPA 58.01.25.201 and 58.01.25.203. The filing of a request by the operator for a permit modification, revocation, and reissuance, termination, or notification of planned changes or anticipated noncompliance does not stay any permit condition.

9.7 Property Rights

The issuance of, or coverage under, an IPDES permit does not convey any property rights or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local laws or regulations. The issuance of, or coverage under, an IPDES permit does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity and does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations, or permits. Historical and archaeological resources and burial sites may be protected by state or federal law. Contact the State Historic Preservation Office for more information.

9.8 Duty to Provide Information

The operator must furnish to DEQ, within a reasonable time, any information that DEQ may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The operator must also furnish to DEQ, upon request, copies of records this permit requires.

9.9 Inspection and Entry

Pursuant to Idaho Code §39-108, the operator must allow DEQ's compliance, inspection, and enforcement (CIE) personnel, or authorized representative (including an authorized contractor acting as a representative of DEQ), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the operator's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise required by the Clean Water Act, any substances or parameters at any location.

9.10 Monitoring and Records

The operator must comply with the following monitoring and recordkeeping conditions:

1. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity;
2. The operator must retain all monitoring information, for a period of at least three years from the date of termination or expiration of permit coverage. This period may be extended by request of DEQ;
3. Records of monitoring information must include:
   a. All relevant calibration and maintenance records;
   b. All original strip chart recordings for continuous monitoring instrumentation or other forms of data approved by DEQ;
   c. Copies of all reports required by the permit;
   d. Records of all data used to complete the NOI for the permit;
   e. The date, exact place, and time of sampling or measurement;
   f. The name of any individuals who performed the sampling or measurements;
   g. The dates any analyses were performed;
   h. The name of any individuals who performed the analyses;
   i. The analytical techniques or methods used;
   j. The results of the analysis.
4. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless another test method is required by 40 CFR Part 401 through 471 or Part 501 through 503.

9.11 Signatory Requirements

1. All NOIs must be signed as follows:
   a. For a corporation, by a responsible corporate officer as specified in IDAPA 58.01.25.090.01.a.
   b. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively as specified in IDAPA 58.01.25.090.01.b.
   c. For a municipality, or other public agency, by either a principal executive officer or ranking elected official as specified in IDAPA 58.01.25.090.01.c.
2. Any report or information required by this permit, including the SWPPP, corrective action log, monitoring and reporting provisions, and any other compliance documentation required by this permit, must be signed by a person described in item 1 or by a duly authorized representative of that person. A person is a duly authorized representative only if the following is true:
   a. The authorization is made in writing by a person described in item 1 above;
   b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; and
   c. The written authorization is kept in the SWPPP.

3. Changes to authorization. If an authorization is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of IDAPA 58.01.25.130.04 must be submitted to DEQ before or together with any report, information, or application to be signed by an authorized representative. However, if the only change that is occurring is a change in contact information or a change in the facility's address, the operator need only make a modification to the existing NOI submitted for authorization.
4. Certification. Any person signing a document under this section must make the following certification:

   I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
5. The operator must ensure that any electronic submission of any report or information required by this permit, notice of intent, monitoring and reporting provisions, and information requested by DEQ satisfies all of the relevant requirements of 40 CFR 3 (Cross-Media Electronic Reporting) and 40 CFR 127 (NPDES Electronic Reporting Requirements).

9.12 Reporting Requirements

Planned Changes. The operator must give notice to DEQ as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limits in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

Anticipated Noncompliance. The operator must give advance notice to DEQ of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

Transfers. This permit is nontransferable to any person except after notice to DEQ> where a facility wants to change the name of the operator. The new owner or operator must submit a NOI in accordance with Section 1.4 and Table 1. See also requirements in Section 9.1.11.1 and 9.1.11.2. The original operator (the first owner or operators) must submit a NOT pursuant to Section 8.

Monitoring Reports. Monitoring results must be reported at the intervals specified elsewhere in the permit.

Monitoring results must be reported in a report along with the project's NOT. If you monitor any pollutant more frequently than required by the permit using testing procedures approved under 40 CFR 136, the results of this monitoring must be included in the calculation and reporting of the data submitted in the monitoring report.

Twenty-four hour reporting. In addition to reports required elsewhere in this permit:

1. The operator must report any noncompliance which may endanger health or the environment directly to the DEQ Regional Office through the 24-hour IPDES hotline at 1-833-IPDES24 (1-833-473-3724). Any information must be provided orally within 24 hours form the time you become aware of the circumstances. A written submission must also be provided within five days of the time you become aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
2. The following must be included as information which must be reported within 24 hours under this paragraph:
    a. Any unanticipated bypass which exceeds any effluent limit in the permit (40 CFR 122.41(m)(3)(ii))
    b. Any upset which exceeds any effluent limit in the permit
    c. Violation of a maximum daily discharge limit for any numeric effluent limit (40 CFR 122.44(g).)
3. DEQ may waive the written report on a case-by-case basis for reports under Section 9.12 24-hour reporting if the oral report has been received within 24 hours.

Other noncompliance. The operator must report all instances of noncompliance not reported under Section 9.12. Monitoring Reports, Compliance Schedules, and 24-hour Reporting, at the time monitoring reports are submitted. The reports must contain the information listed above.

Other Information. Where the operator becomes aware that it failed to submit any relevant facts in the NOI or submitted incorrect information in the NOI or in any report to DEQ, it must promptly submit such facts or correct information.

9.13 Bypass of Treatment Facilities

Bypass is prohibited. DEQ may take enforcement action against an operator for a bypass unless:

1. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. “Severe property damage” does not mean economic loss caused by delays in production;
2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The operator submitted a notice of a bypass to DEQ in accordance with Section 9.12. Notices of anticipated bypass must be submitted electronically to DEQ unless a waiver for paper notices has been granted. Electronic notice of bypass can be submitted using the IPDES E-Permitting System (https://www2.deq.idaho.gov/water/ipdes). Notices of unanticipated bypass must be submitted in accordance with the 24 hour reporting in Section 9.12.

   DEQ may approve an anticipated bypass, after considering its adverse effects, if DEQ determines that it will meet the three conditions listed above.

   If the operator knows in advance of the need for a bypass, it must submit prior notice to the Department, if possible at least 10 days before the date of the bypass.

   The operator must submit notice of an unanticipated bypass as required in Section 9.12.

   Bypasses not exceeding limits are allowed to occur and are not subject to the notification requirements if the bypass does not cause effluent limits to be exceeded and only if it is for essential maintenance to assure efficient operation.

9.14 Upset Terms and Conditions

An upset is an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

1. Effect of an upset -- An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limits if the operator demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence the following:
   a. An upset occurred and the causes of the upset;
   b. The permitted facility was at the time being properly operated;
   c. The operator submitted notice of the upset as required under Section 9.12; and
   d. The operator timely complied with any remedial measures required under Section 9.4.
2. A determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is not a final administrative action subject to judicial review.
3. Burden of proof—In any enforcement proceeding, the operator seeking to establish the occurrence of an upset has the burden of proof.

9.15 Penalties for Violations of Permit Conditions

If the operator violates any permit condition, filing or reporting requirement, duty to allow or carry out inspections, entry or monitoring requirements, or any other provision in this permit the operator is subject to administrative, civil, or criminal enforcement.

Pursuant to Idaho Code §39-175E and §39-108, any person who violates any rule, permit or order related to the IPDES program shall be liable for a civil penalty not more than

$10,000 per violation or $5,000 for each day of a continuing violation, whichever is greater.

Pursuant to Idaho Code §39-175E, §39-108 and §39-117, any person who willfully or negligently violates any IPDES standard or limit, permit condition or filing requirement shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than $10,000 per violation or for each day of a continuing violation.

Pursuant to Idaho Code §39-175E, §39-108 and §39-117, any person who knowingly makes any false statement, representation or certification in any IPDES form, in any notice or report required by an IPDES permit, or who knowingly renders inaccurate any monitoring device or method required to be maintained shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than $5,000 per violation or for each day of a continuing violation.

Pursuant to Idaho Code §18-113, a misdemeanor violation of the IPDES program requirements as set forth in §39-117, is also punishable by imprisonment in a county jail not exceeding 6 months.

In addition to civil penalties as described above, pursuant to Idaho Code §39-175E and §39-108, any person who has been determined to have violated any provision of the rules, permits or orders relating to the IPDES program shall be liable for any expense incurred by the state in enforcing the program requirements, or in enforcing or terminating any nuisance, source of environmental degradation, cause of sickness or health hazard.

9.16 Availability of Reports

In accordance with IDAPA 58.01.21, "Rules Governing the Protection and Disclosure of Records in the Possession of the Department of Environmental Quality," information submitted to DEQ pursuant to this permit may be claimed as confidential by the operator. In accordance with IDAPA 58.01.25.002, permit applications, Notices of Intent, permits, and effluent data are not considered confidential. Any confidentiality claim must be asserted at the time of submission by stamping the words "trade secret," "proprietary," or "confidential" on each page containing such information. If no claim is made at the time of submission, DEQ may make the information available to the public without further notice to the operator. If a claim is asserted, the information will be treated in accordance with the procedures in IDAPA 58.01.21.

9.17 Transfers

This permit is not transferable to any person except as specified in IDAPA 58.01.25.202. DEQ may require modification, or revocation and reissuance of this permit, and may incorporate such requirements as may be necessary under IDAPA 58.01.25.202.

9.18 State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the operator from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the

Clean Water Act. This includes, but is not limited to, IDAPA 58.01.02, 58.01.16, and 58.01.17.

9.19 Retention of Records

Copies of the SWPPP and all documentation required by this permit, including records of all data used to complete the NOI to be covered by this permit, must be retained for at least three years from the date that permit coverage expires or is terminated. This period may be extended by request of DEQ at any time.

Appendix A
Definitions, Abbreviations, and Acronyms

A.1. Definitions

Action Area – All areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. See 50 CFR 402. For the purposes of this permit and for application of the threatened and endangered species protection eligibility requirements, the following areas are included in the definition of action area:

- The areas on the construction site where storm water discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavations, site development, or other ground disturbance activities occur) and the immediate vicinity.
- The areas where storm water discharges flow from the construction site to the point of discharge into receiving waters.
- The areas where storm water from construction activities discharges into receiving waters and the areas in the immediate vicinity of the point of discharge.
- The areas where storm water controls will be constructed and operated, including any areas where storm water flows to and from the storm water controls
- The areas upstream and/or downstream from the storm water discharge into a stream segment that may be affected by these discharges.

Agricultural Land – cropland, grassland, rangeland, pasture, and other agricultural land, on which agricultural and forest related products or livestock are produced and resource concerns may be addressed. Agricultural lands include cropped woodland, marshes, incidental areas included in the agricultural operation, and other types of agricultural land used for the production of livestock.

Antidegradation Policy or Antidegradation Requirements – the WQS regulation that requires states and tribes to establish a three tiered antidegradation program:

- Tier I maintains and protects existing uses and water quality conditions necessary to support such uses. An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur. Where an existing use is established, it must be protected even if it is not listed in the WQS as a designated use. Tier I requirements are applicable to all surface waters.
- Tier II maintains and protects high quality waters – waterbodies where existing conditions are better than necessary to support CWA 101(a)(2) fishable/swimmable uses. Water quality can be lowered in such waters. However, state tier II programs identify procedures that must be followed and questions that must be answered before a reduction in water quality can be allowed. In no case may water quality be lowered to a level which would interfere with existing or designated uses.

- Tier III maintains and protects water quality in outstanding national resource waters (ONRWs). Except for certain temporary changes, water quality cannot be lowered in such waters. ONRWs generally include the highest quality waters of the United States. However, the ONRW classification also offers special protection for waters of exceptional ecological significance, i.e., those which are important, unique, or sensitive ecologically. Decisions regarding which water bodies qualify to be ONRWs are made by states and authorized Indian tribes.

Arid Areas – areas with an average annual rainfall of 0 to 10 inches. For assistance in determining average annual rainfall in specific locations, operators may refer to the NOAA National Mapping webpage (https://www.ncdc.noaa.gov/cag/national/mapping), the PRISM Climate Group's Time Series Values for individual locations (https://prism.oregonstate.edu/explorer/), or EPA's US EPA EnviroAtlas (https://www.epa.gov/enviroatlas), or other similar data sources unless disapproved by DEQ.

Bank (e.g., stream bank or river bank) **–** the rising ground bordering the channel of a water of the U.S.

Bluff – a steep headland, promontory, riverbank, or cliff

Borrow Areas – the areas where materials are dug for use as fill, either onsite or offsite.

Business Day – for the purposes of this permit, a business day is a calendar day on which construction activities will take place.

Bypass – the intentional diversion of waste streams from any portion of a treatment facility. (IDAPA 58.01.25)

Cationic Treatment Chemical – polymers, flocculants, or other chemicals that contain an overall positive charge. Among other things, they are used to reduce turbidity in storm water discharges by chemically bonding to the overall negative charge of suspended silts and other soil materials and causing them to bind together and settle out. Common examples of cationic treatment chemicals are chitosan and cationic PAM.

Commencement of Construction Activities – the initial disturbance of soils (or "breaking ground") associated with clearing, grubbing, grading, or excavating activities or other construction related activities (e.g., stockpiling of fill material; placement of raw materials at the site).

Common Plan of Development or Sale – a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one common plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot.

Construction Activities – earth-disturbing activities, such as the clearing, grading, and excavation of land, and other construction related activities (e.g., stockpiling of fill material; placement of raw materials at the site) that could lead to the generation of pollutants. Some of the types of pollutants that are typically found at construction sites are:

- Sediment;
- Nutrients;
- Heavy metals;
- Pesticides and Herbicides;
- Oil and Grease;
- Bacteria and Viruses;
- Trash, Debris, and Solids;
- Treatment Polymers;
- Concrete and related products waste; and
- Any other Toxic Chemicals

Construction and Development Effluent Limitations and New Source Performance Standards (C&D Rule) – As published in 40 CFR 450, the regulation requiring effluent limitations guidelines (ELGs) and new source performance standards (NSPS) for controlling the discharge of pollutants from construction sites.

Construction Site or Site – the land or water area where construction activities will occur and where storm water controls will be installed and maintained. The construction site includes construction support activities, which may be located at a different part of the property from where the primary construction activity will take place, or on a different piece of property altogether.

Construction Support Activity – a construction related activity that specifically supports the construction activity and involves earth disturbance or pollutant generating activities of its own and can include activities associated with concrete or asphalt batch plants, equipment staging yards, materials storage areas, excavated material disposal areas, and borrow areas.

Construction Waste – a discarded material (such as packaging materials; scrap construction materials; masonry products; timber, steel, pipe, and electrical cuttings; plastics; and Styrofoam).

Conveyance Channel – a temporary or permanent waterway designed and installed to safely convey storm water flow within and out of a construction site.

Corrective Action – action taken to repair, replace, or reinstall a storm water control necessary to return to permit compliance.

Critical Habitat – as defined in the Endangered Species Act at 16 U.S.C. 1531 for a threatened or endangered species, (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act, upon a determination by the Secretary that such areas are essential for the conservation of the species.

CWA – Formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972. Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq. (IDAPA 58.01.25)

Dewatering – the act of draining accumulated storm water and/or ground water from building foundations, vaults, and trenches, or other similar points of accumulation.

Direct Discharge - a discharge of pollutants from a construction project into a Water of the U.S. with no intervening owners of land or conveyance between the project and the WOTUS.

Discharge – when used without qualification, means the "discharge of a pollutant." [IDAPA 58.01.25.010.27]

Discharge of a Pollutant – Any addition of any pollutant or combination of pollutants to waters of the United States from any point source. This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any indirect discharger (IDAPA 58.01.25.01.28)

Discharge Point – for the purposes of this permit; the location where collected and concentrated storm water flows are discharged from the construction site.

Discharge Related Activity – activities that cause, contribute to, or result in storm water and allowable non-storm water point source discharges, and measures such as the siting, construction, and operations of storm water controls to control, reduce, or prevent pollutants from being discharged.

Discharge to an Impaired Water – for the purposes of this permit, a discharge to an impaired water occurs if the first water of the U.S. to which you discharge is identified by a state, tribe, or EPA pursuant to Section 303(d) of the Clean Water Act as not meeting an applicable water quality standard and (1) requires development of a total maximum daily load (TMDL) (pursuant to section 303(d) of the CWA); or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the storm water discharge from the storm sewer system.

Domestic Waste – for the purposes of this permit, typical household trash, garbage or rubbish items generated by construction activities.

Drainageway – an open linear depression, whether constructed or natural, that functions for the collection and drainage of surface water.

Drought-Stricken Area – for the purposes of this permit, an area in which the National Oceanic and Atmospheric Administration's U.S. Seasonal Drought Outlook indicates for the period during which the construction will occur that any of the following conditions are likely: (1) "Drought to persist or intensity," (2) "Drought ongoing, some improvement," (3) "Drought likely

to improve, impacts ease," or (4) "Drought development likely". See https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

Earth Disturbing Activity – actions taken to alter the existing vegetation and/or underlying soil of a site, such as clearing, grubbing, grading, site preparation (e.g., excavating, cutting, and filling), soil compaction, and movement and stockpiling of top soils.

Earth Disturbing Activities Conducted Prior to Active Mining Activities– Consists of two classes of earth disturbing (i.e., clearing, grubbing, grading and excavation) activities:

a. Activities performed for purposes of mine site preparation, including: cutting new rights of way (except when related to access road construction); providing access to a mine site for vehicles and equipment (except when related to access road construction); other earth disturbances associated with site preparation activities on any areas where active mining activities have not yet commenced (e.g., for heap leach pads, waste rock facilities, tailings impoundments, wastewater treatment plants); and

b. Construction of staging areas to prepare for erecting structures such as to house project personnel and equipment, mill buildings, etc., and construction of access roads.

Note: only earth disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining (see b. above) are considered to be construction and therefore storm water discharges from these activities are eligible for coverage under this permit. See Section 1.2.1.B. The activities in a. above are not considered construction and therefore storm water discharges associated with this activity are not eligible for coverage under this permit.

Effective Operating Condition – for the purposes of this permit, a storm water control is kept in effective operating condition if it has been implemented and maintained in such a manner that it is working as designed to minimize pollutant discharges.

Effluent Limits – for the purposes of this permit, any part of the Section 2 or Section 3 requirements.

Effluent Limitations Guideline (ELG) – A regulation published by the EPA under the Clean Water Act section 304(b) to adopt or revise effluent limitations. (IDAPA 58.01.25)

Eligible – for the purposes of this permit, refers to storm water and allowable non-storm water discharges that are authorized for coverage under this general permit.

Emergency Related Project – a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services.

Endangered Species – defined in the Endangered Species Act at 16 U.S.C. 1531 as any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

Excursion – a measured value that exceeds a specified limit.

Existing Site – a site where construction activities commenced prior to February 17, 2022.

Exit Points – any points of egress from the construction site to be used by vehicles and equipment during construction activities.

Exposed Soils – for the purposes of this permit, soils that as a result of earth disturbing activities are left open to the elements.

Federal Operator – an entity that meets the definition of an Operator in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

Final Stabilization – on areas not covered by permanent structures, either (1) uniform, perennial vegetation (e.g., evenly distributed, without large bare areas) has been established, or for arid or semi-arid areas, will be established that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas, and/or (2) permanent non-vegetative stabilization measures (e.g., riprap, gravel, gabions, and geotextiles) have been implemented to provide effective cover for exposed portions of the site.

General Contractor – for the purposes of this permit, the primary individual or company solely accountable to perform a contract. The general contractor typically supervises activities, coordinates the use of subcontractors, and is authorized to direct workers at a site to carry out activities required by the permit. General Contractors typically meet the eligibility requirement 1.1.1.B.

Hazardous Substances or Hazardous or Toxic Waste – for the purposes of this permit, any liquid, solid, or contained gas that contain properties that are dangerous or potentially harmful to human health or the environment. See also 40 CFR 261.2

Impaired Water (or "Water Quality Impaired Water" or "Water Quality Limited Segment") – a water is impaired for purposes of this permit if it has been identified by a state, tribe or EPA pursuant to Section 303(d) of the CWA as not meeting applicable state or tribal WQS (these waters are called "water quality limited water bodies" under IDAPA 58.01.02.010.112). Impaired waters include both waters with approved or established TMDLs, and those for which a TMDL has not yet been approved or established.

Impervious Surface – for the purpose of this permit, any land surface with a low or no capacity for soil infiltration including, but not limited to, pavement, sidewalks, parking areas and driveways, packed gravel or soil, or rooftops.

Indian Country – (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (b) all dependent Indian communities within the borders of the United States, whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. [IDAPA 58.01.25.010.43]

Infeasible – for the purposes of this permit, infeasible means not technologically possible or not economically practicable and achievable in light of best industry practices. EPA notes that it does not intend for any permit requirement to conflict with state water rights law.

Install or Installation – when used in connection with storm water controls, to connect or set in position storm water controls to make them operational

IPDES – the state program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under the Clean Water Act sections 307, 402, 318, and 405. (IDAPA 58.01.25)

IPDES E-Permitting System – DEQ's online system for submitting electronic Construction General Permit forms and other submissions required by this permit.

Jar Test – a test designed to simulate full-scale coagulation/flocculation/sedimentation water treatment process by takin into account the possible conditions.

Landward– positioned or located away from a waterbody and toward the land.

Large Construction Activity – defined at 40 CFR 122.26(b)(14)(x) and incorporated here by reference. Large construction activity that includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than five acres of land or will disturb less than five acres of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than five acres. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

Linear Construction Site – includes the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area.

Minimize – to reduce and/or eliminate to the extent achievable using storm water controls that are technologically available and economically practicable and achievable in light of best industry practices.

Mining Activity– for the purposes of this permit, includes mining related construction activities defined at 40 CFR 122.26(b)(14)(x) and 122.26(b)(15)(i), and active mining activities defined at 40 CFR 122.26(b)(14)(iii). Both of these sub categories of activities include earth disturbing activities, with the latter also including such activities as: extraction, removal or recovery, and beneficiation of mined material from the earth; removal of overburden and waste rock to expose mineable material; and site reclamation and closure activities.

Mining Operations – for the purposes of this permit, mining operations are grouped into two distinct categories, with distinct effluent limits, and requirements applicable to each: 1) earth disturbing activities conducted prior to active mining activities; and 2) active mining activities, which includes reclamation.

Municipal Separate Storm Sewer System or MS4 – defined at 40 CFR 122.26(b)(8) as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

- Owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
- Designed or used for collecting or conveying storm water;
- Which is not a combined sewer; and
- Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2

National Pollutant Discharge Elimination System– The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under the Clean Water Act sections 307, 402, 318, and 405. (IDAPA 58.01.25)

Native Topsoil– the uppermost layer of naturally occurring soil for a particular area, and is often rich in organic matter, biological activity, and nutrients.

Natural Buffer – for the purposes of this permit, an area of undisturbed natural cover surrounding waters of the U.S. within which construction activities are restricted. Natural cover includes the vegetation, exposes rock, or barren ground that exists prior to commencement of earth disturbing activities.

Natural Vegetation – vegetation that occurs spontaneously without regular management, maintenance, or species introductions or removals, and that generally has a strong component of native species.

New Operator of a Permitted Site – an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site".

New site – a site where construction activities commenced on or after February 10, 2022.

New Source – for the purposes of this permit, a construction project that commenced construction activities after February 1, 2010.

New Source Performance Standards (NSPS) – for the purposes of this permit, NSPS are technology-based standards that apply to construction sites that are new sources under 40 CFR 450.24

Non-Storm water Discharges – discharges that do not originate form storm events. They can include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, or pipe testing water.

Non-Turbid – a discharge that is free from visual turbidity. For the purposes of this permit, visual turbidity refers to a sediment plume or other cloudiness in the water caused by sediment that can be identified by an observer.

Notice of Intent – the form (electronic or paper) required for authorization of coverage under the Construction General Permit.

Notice of Termination – the form (electronic or paper) required for terminating coverage under the Construction General Permit.

Operational – for the purposes of this permit, storm water controls are made "operational" when they have been installed and implemented, are functioning as designed, and are properly maintained.

Operator – for the purpose of this and in the context of storm water discharges associated with construction activity, any party associated with a construction project that meets either of the following two criteria:

A. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications ("plans and specifications" includes the construction drawings, the SWPPP, and any other plans and specifications used on the project); or

B. The party has day-today operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Subcontractors are not considered operators for the purposes of this permit.

Ordinary High-Water Mark – the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris.

Permitting Authority – for the purposes of this permit, DEQ, or an authorized representative.

Point of Discharge – See "Discharge Point."

Point Source – any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff. (IDAPA 58.01.25.010.65)

Pollutant – dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water (Excerpted from IDAPA 58.01.25). For purposes of this definition, a "biological pesticide" is considered a "biological material," and any "pesticide residue" resulting from use of a "chemical pesticide" is considered a "chemical waste."

Pollution Prevention Controls – storm water controls designed to reduce or eliminate the addition of pollutants to construction site discharges through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

Polymers – for the purposes of this permit, coagulants and flocculants used to control erosion on soil or to enhance the sediment removal capabilities of sediment traps or basins. Common construction site polymers include Polyacrylamide (PAM), chitosan, alum, polyaluminum chloride, and gypsum.

Prohibited Discharges – discharges that are not allowed under this permit, including:

- Wastewater from washout of concrete;
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- Soaps or solvents used in vehicle and equipment washing;
- Toxic or hazardous substances from a spill or other release; and
- Waste, garbage, floatable debris, construction debris, and sanitary waste.

Provisionally Covered Under this Permit – for the purposes of this permit, DEQ provides temporary coverage under this permit for emergency related projects prior to receipt of a complete and accurate NOI. Discharges from earth disturbing activities associated with the emergency related projects are subject to the terms and conditions of the permit during the period of temporary coverage.

Qualified Person – a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact storm water quality, and the appropriate skills and training to assess the effectiveness of any storm water controls selected and installed to meet the requirements of this permit.

Receiving Water – Those waters of the United States to which there is a discharge of pollutants. (IDAPA 58.01.25)

Routine Maintenance – anticipated maintenance of storm water controls.

Run-on – sources of storm water that drain from land located upslope or upstream from the regulated site in question.

Seasonally Dry Period – a month in which the long-term average total precipitation or rain is less than or equal to 0.5 inches. Refer to EPA's Climate Lookup Tool and supporting maps for assistance in determining whether a site is operating during a seasonally dry period for the area, or other similar data sources unless disapproved by DEQ.

Semi-Arid Areas – areas with an average annual rainfall of 10 to 20 inches. For assistance in determining average annual rainfall in specific locations, operators may refer to the NOAA National Mapping webpage (https://www.ncdc.noaa.gov/cag/national/mapping), the PRISM

climate Group's Time Series Values for individual locations (https://prism.oregonstate.edu/explorer/), or EPA's US EPA EnviroAtlas (https://www.epa.gov/enviroatlas), or other similar data sources unless disapproved by DEQ.

Shared Control – for the purposes of this permit, a storm water control, such as a sediment basin or pond, used by two or more operators that is installed and maintained for the purpose of minimizing and controlling pollutant discharges from a construction site with multiple operators associated with a common plan of development or sale. Any operators that are contributing storm water from their construction activities to a shared control are considered to rely upon a shared control.

Small Construction Activity – defined at 40 CFR 122.26(b)(15) and incorporated here by reference. A small construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than one acre and less than five acres of land or will disturb less than one acre of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one acre and less than five acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

Small Residential Lot – for the purpose of this permit, a slot being developed for residential purposes that will disturb less than 1 acre of land, but is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre.

Snowmelt – the conversion of snow into overland storm water and ground water flow as a result of warmer temperatures.

Spill – for the purpose of this permit, the release of a hazardous or toxic substance from its container or containment.

Stabilization – the use of vegetative and/or non-vegetative cover to prevent erosion and sediment loss in areas exposed through the construction process.

Steep Slopes – where a state, tribe, local government, or industry technical manual (e.g., storm water BMP manual) has defined what is to be considered a steep slope, this permit's definition automatically adopts that definition. Where no such definition exists, steep slopes are automatically defined as those that are 15 percent or greater in grade.

Storm Event – a precipitation event that results in a measurable amount of precipitation.

Storm Sewer – a system of pipes (separate from sanitary sewers) that carries storm water runoff from buildings and land surfaces.

Storm Sewer System – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) designed or used for collecting or conveying storm water.

Storm Water – storm water runoff, snowmelt runoff, and surface runoff and drainage.

Storm Water Control – refers to any best management practice or other method (including narrative effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

Storm Water Discharge Associated with Construction Activity – as used in this permit, a discharge of pollutants in storm water to waters of the United States from areas where earth disturbing activities (e.g., clearing, grubbing, grading, or excavation) occur, or where construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck chute washdown, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants), are located.

Storm Water Inlet – a structure placed below grade to conduct water used to collect storm water runoff for conveyance purposes.

Storm Water Team – the group of individuals responsible for oversight of the development and modifications of the SWPPP, and oversight of compliance with the permit requirements. The individuals on the Storm water Team must be identified in the SWPPP.

Subcontractor – for the purposes of this permit, an individual or company that takes a portion of a contract from the general contractor or from another subcontractor.

SWPPP (Storm Water Pollution Prevention Plan) – a site-specific, written document that among other things: (1) identifies potential sources of storm water pollution at the construction site; (2) describes storm water controls to reduce or eliminate pollutants in storm water discharges from the construction site; and (3) identifies procedures the operator will implement to comply with the terms and conditions of this general permit.

Temporary Stabilization – a condition where exposed soils or disturbed areas are provided temporary vegetative and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either final stabilization can be achieved, or until further construction activities take place to re-disturb this area.

Thawing Conditions – for the purposes of this permit, thawing conditions are expected based on the historical likelihood of two or more days with daytime temperatures greater than 32°F. This date can be determined by looking at historical weather data. Note: the estimation of thawing conditions is for planning purposes only. During construction the operator will be required to conduct site inspections based upon actual conditions (i.e., if thawing conditions occur sooner than expected, the operator will be required to conduct inspections at the regular frequency).

Threatened Species – defined in the Endangered Species Act at 16 U.S.C. 1531 as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Tier II Waters – for antidegradation purposes, pursuant to IDAPA 58.01.02.051, those waters that are characterized as having water quality that exceeds the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water.

Tier III Waters – for antidegradation purposes, pursuant to IDAPA 58.01.02.051, Tier III waters are identified as having high quality waters constituting an Outstanding National Resource Water (ONRW), such as waters of National Parks and State Parks, wildlife refuges, and waters of exceptional recreational or ecological significance.

Total Maximum Daily Load or TMDL – the sum of the individual wasteload allocations (WLAs) for point sources and load allocations for nonpoint sources and natural background. If

receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the Las for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measure.

Toxic Waste – see Hazardous Substances.

Treatment Chemicals – polymers, flocculants, or other chemicals used to reduce turbidity in storm water.

Turbidity – a condition of water quality characterized by the presence of suspended solids and/or organic material.

Uncontaminated Discharge – in the context of the authorized non-storm water discharges, a discharge that meets applicable WQS.

Uplands – the dry land area above and landward of the ordinary high water mark.

Upset – An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (IDAPA 58.01.25)

Water Dependent Structures – structures or facilities that are required to be located directly adjacent to a waterbody or wetland, such as a marina, pier, boat ramp, etc.

Water Quality Standards – A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. Water quality standards also include an antidegradation policy and implementation procedures. States, tribes and EPA adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the CWA (See CWA sections 101(a)2 and 303(c)). Where necessary, EPA has the authority to promulgate federal water quality standards.

Waters of the United States – The term "Waters of the United States or waters of the U.S.," as defined in 40 CFR 122.2, revised as of June 22, 2020, by 85 Federal Register 22250-22342 (April 21, 2020), unless said revision is stayed, overturned or invalidated by a court of law or withdrawn by EPA, in which case the Department incorporates by reference the term "Waters of the United States or waters of the U.S." as defined in 40 CFR 122.2, revised as of December 23, 2019. (IDAPA 58.01.25)

Wetlands – means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. [40 CFR 122.2]

A.2. Abbreviations and Acronyms

BMP	Best Management Practice
CBI	Confidential Business Information
CGP	Construction General Permit
CFR	Code of Federal Regulations
CWA	Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 *et seq.*)
DEQ	Idaho Department of Environmental Quality
ECHO	EPA Enforcement and Compliance History Online
ELG	Effluent Limitations Guideline
EPA	U. S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
FWS	U. S. Fish and Wildlife Service
IPDES	Idaho Pollutant Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
MSGP	Multi-Sector General Permit
NEPA	National Environmental Policy Act
NTU	Nephelometric Turbidity Units
NMFS	U. S. National Marine Fisheries Service
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
NRCS	National Resources Conservation Service
NSPS	New Source Performance Standards
ONRW	Outstanding National Resource Water
PAM	Polyacrylamide
POTW	Publicly Owned Treatment Works
RUSLE	Revised Universal Soil Loss Equation

SDS	Safety Data Sheet
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Storm water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UIC	Underground Injection Control
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
U.S.C.	United States Code
WQS	Water Quality Standard

Appendix B.
Small Construction Waivers and Instructions

These waivers are only available to storm water discharges associated with small construction activities (i.e., 1-5 acres or less than 1 acre but part of a larger common plan of development that is 1-5 acres). As the operator of a small construction activity, you may be able to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on: (1) a rainfall erosivity waiver, (2) a TMDL analysis, or (3) an equivalent analysis that determines allocations for small construction sites are not needed. Each operator, otherwise needing permit coverage, must notify DEQ of its intention for a waiver. It is the responsibility of those individuals wishing to obtain a waiver from coverage under this general permit to submit a complete and accurate waiver certification as described below. Where the operator changes or another is added during the construction project, the new operator must also submit a waiver certification to be waived.

B.1 Rainfall Erosivity Waiver

Under this scenario, the small construction project's rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than five during the period of construction activity. The operator must certify to DEQ that construction activity will occur only when the rainfall erosivity factor is less than five. The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a stabilization practice that will provide interim non-vegetative stabilization can be used for the end of the construction period, provided the operator commits (as a condition of waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the CGP have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with its certification statement constitutes acceptance of and commitment to complete the final stabilization process. The operator must submit a waiver certification to DEQ prior to commencing construction activities.

> *Note: the rainfall erosivity factor "R" is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: a Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), pages 21-64, dated January 1997; United States Department of Agriculture (USDA), Agricultural Research Service.*

EPA has developed an online rainfall erosivity calculator to help small construction sites determine potential eligibility for the rainfall erosivity waiver. You can access the calculator from EPA's website at: https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites. The R factor can easily be calculated by using the construction site latitude/longitude or address and estimated start and end dates of construction. This calculator may also be useful in determining the time periods during which construction activity could be waived from permit coverage. You may find that moving your construction activity by a few weeks or expediting site stabilization will allow you to qualify for the waiver. Use this online calculator or the Construction Rainfall Erosivity Waiver Fact Sheet (https://www.epa.gov/sites/production/files/2015-10/documents/fact3-1.pdf) to assist in determining the R Factor for your small construction site.

If you are the operator of the construction activity and eligible for a waiver based on low erosivity potential, you can submit a rainfall erosivity waiver electronically via DEQ's E-Permitting System (https://www2.deq.idaho.gov/water/ipdes), unless you received a waiver from DEQ (See Section 1.4.1 of the CGP).

> *Note: if the R factor is five or greater, you do not qualify for the rainfall erosivity waiver, and must obtain coverage under an IPDES permit (e.g., the CGP), unless you qualify for the Water Quality Waiver as described in B.2 below.*

If your small construction project continues beyond the projected completion date given on the waiver certification, you must recalculate the rainfall erosivity factor for the new project duration. If the R factor is below five, you must update all applicable information on the waiver certification and retain a copy of the revised waiver as part of your records. The new waiver certification must be submitted prior to the project completion date listed on the original waiver form to assure your exemption from permitting requirements is uninterrupted. If the new R factor is five or above, you must obtain IPDES permit coverage.

B.2 TMDL Waiver

This waiver is available if the state has established and EPA has approved a TMDL that addresses the pollutants of concern for the impaired water and has determined that controls on storm water discharges from small construction activity are not needed to protect water quality. The pollutants of concern include sediment (such as total suspended solids, turbidity, or siltation) and any other pollutant that has been identified as a cause of impairment of any waterbody that will receive a discharge from the construction activity. Information on TMDLs that have been approved by EPA is available at https://www.epa.gov/tmdl and from Idaho at https://www.deq.idaho.gov/water-quality/surface-water/total-maximum-daily-loads/.

If you are the operator of the construction activity and eligible for a waiver based on compliance with an EPA-established or approved TMDL, you must provide the following information in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operators;
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the waterbodies that would be receiving storm water discharges from your construction project;
5. The name and approval date of the TMDL;
6. A statement, signed and dated by an authorized representative as provided in Section 9.1.11, that certifies that the construction activity will take place and that the storm water discharges will occur, within the drainage area addressed by the TMDL.

B.3 Equivalent Analysis Waiver

This waiver is available for discharges to unimpaired waters only. The operator can develop an equivalent analysis that determines allocations for their small construction site for the pollutants of concern or determines that such allocations are not needed to protect water quality. This waiver requires a small construction operator to develop an equivalent analysis based on existing

in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

If you are a construction operator who wants to use this waiver, you must develop your equivalent analysis and provide the following information to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operators;
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The names of the waterbodies that would be receiving storm water discharges from your construction project;
5. Your equivalent analysis;
6. A statement, signed and dated by an authorized representative as provided in Section 9.1.11, that certifies that the construction activity will take place and that the storm water discharges will occur, within the drainage area addressed by the TMDL.

B.4 Waiver Deadlines and Submissions

1. Waiver certifications must be approved prior to commencement of construction activities.
2. If you submit a TMDL or equivalent analysis waiver request, you are not waived until DEQ approves your request. As such, you many not commence construction activities until receipt of approval from DEQ.
3. Late Notifications: operators are not prohibited from submitting waiver certifications after initiating clearing, grading, excavation activities, or other construction activities. DEQ reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and waiver authorization is granted.

Submittal of a waiver certification is an optional alternative to obtaining permit coverage for discharges of storm water associated with small construction activity, provided you qualify for the waiver. Any discharge of storm water associated with small construction activity not covered by either a permit or a waiver may be considered an unpermitted discharge under the Clean Water Act. As mentioned above, DEQ reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and either discharge authorization is granted or a complete and accurate waiver certification is submitted. DEQ may notify any operator covered by a waiver that they must obtain IPDES permit coverage. DEQ may notify any operator who has been in non-compliance with a waiver that they may no longer use the waiver for future projects. Any member of the public may petition DEQ to take action under this provision by submitting written notice along with supporting justification.

Complete and accurate TMDL or equivalent analysis waiver requests must be sent to the DEQ state office.

Appendix C. Eligibility Procedures Relating to Threatened and Endangered Species Protection

In accordance with Section 1.1.5 of the CGP, you must follow the procedures in this appendix to select your eligibility under one of the criteria in Section C.1 of this appendix with respect to the protection of federally listed threatened or endangered species and federally designated "critical habitat" [hereinafter "threatened and endangered species"] under the Endangered Species Act (ESA) from discharges and discharge-related activities authorized under this permit.

If you do not meet one of the ESA Eligibility Criteria, you may not be eligible for coverage under this permit.

You must complete your eligibility selection outlined in the Endangered Species Protection section of the Notice of Intent (NOI) in the E-Permitting System and provide all information as required on your NOI that supports the eligibility criterion you qualify per Section 1.1.5 of the permit.

While coordination between you and the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS)(together, the "Services") may not be required in all cases, coordination with the Services, and documentation of that coordination early in the planning process prior to submitting your NOI, may facilitate a more rapid NOI review and approval.

This appendix is organized as follows:

- **Part C.1:** Threatened and Endangered Species Protection Eligibility Criteria
- **Part C.2:** Procedures for Determining Which Threatened and Endangered Species Protection Criterion Applies

C.1 Threatened and Endangered Species Protection Eligibility Criteria

As required by Section 1.1.5, you must certify in your NOI that you meet one of the eligibility criteria listed below (A-F) to be eligible for coverage under this permit. Once you determine the applicable eligibility criterion, you must:

- Specify the basis for your selection of the applicable eligibility criterion, and if required, provide documentation that is the basis for the eligibility criterion you selected your determination with the NOI form; and
- Provide documentation in your SWPPP that is sufficient to support your determination selection that you satisfy the requirements of the applicable criterion.

NOTE: You must use the information from the USFWS IPaC (where available, otherwise from the appropriate USFWS field office) and NOAA Species Mappers (see Part C.2 of this appendix, Step 2) when determining the presence of ESA listed species and critical habitat. Attaching: 1) the species list with the action area used to obtain the list and 2) aerial images of the site to the NOI is helpful to DEQ, USFWS, and NMFS in confirming eligibility. When evaluating the potential effects of your activities, you must consider effects to listed species and critical habitats within the "action area" of your construction activity. Note: NMFS's jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

The definition of "action area," which is contained in Appendix A, is repeated below for convenience.

"Action Area" – all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. See 50 CFR part 402. For the purposes of this permit and for application of the Endangered Species Act requirements, the following areas are included in the definition of action area:

- The areas on the construction site where storm water discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity. (Example: Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity or where grading causes storm water to flow into a small wetland or other habitat that is on the site that contains listed species.)
- The areas where storm water discharges flow from the construction site to the point of discharge into receiving waters. (Example: Where storm water flows into a ditch, swale, or gully that leads to receiving waters and where listed species (such as listed amphibians) are found in the ditch, swale, or gully.)
- The areas where storm water from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge. (Example: Where storm water from construction activities discharges into a stream segment that is known to harbor listed aquatic species.)
- The areas where storm water controls will be constructed and operated, including any areas where storm water flows to and from the storm water controls. (Example: Where a storm water retention pond would increase thermal discharges to coolwater habitats.)
- The areas upstream and/or downstream from the storm water discharge into a stream segment that may be affected by these discharges. (Example: Where sediment discharged to a receiving stream settles downstream and impacts a breeding area of a listed aquatic species.)

Criterion A	**No ESA- listed species and/or designated critical habitat present in action area.** Using the process outlined in this Appendix, you certify that ESA-listed species and designated critical habitats under the jurisdiction of USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of the permit. **Basis statement content:** A basis statement supporting the selection of this criterion must identity the USFWS and NMFS information sources used. Reliance on state resources is not acceptable. Attaching aerial images of the site as wells as the species list showing no listed species of critical habitats to this NOI is helpful to DEQ, USFWS and NMFS in confirming eligibility under this criterion. Please note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

Criterion B	**Eligibility requirements met by another operator under the 2022 CGP.** The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2022 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the IPDES ID from the other 2022 CGP operator's notification of authorization under this permit. If your certification is based on another 2022 CGP operator's certification under criterion C, you must provide DEQ with the relevant supporting information required of existing dischargers in criterion C in your NOI form. **Basis statement content:** A basis statement supporting the selection of this criterion must identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.
Criterion C	**Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat.** ESA-listed species and/or designated critical habitats under the jurisdiction of USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to DEQ that your site's discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any storm water controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in this Appendix; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with this NOI. Attaching: 1) the species list with the action area used to obtain the list; 2) aerial images of the site; and 3) a copy of the SWPPP to the NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. **Basis statement content:** A basis statement supporting the selection of this criterion must identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and

	designated critical habitat under the jurisdiction of USFWS and/or NMFS were considered in the evaluation and explain how the conclusion was reached.
Criterion D	**Coordination with USFWS and/or NMFS has successfully concluded.** Coordination between you and USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence confirmation from USFWS and/or NMFS that your site's discharges and discharge-related activities are consistent with a not likely to adversely affect determination for ESA-listed species and/or critical habitat in your action area. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI. **Basis statement content:** A basis statement supporting the selection of this criterion must identify whether USFWS or NMFS or both agencies participated in coordination, the field/regional offices providing that coordination, and the date that coordination concluded.
Criterion E	**ESA Section 7 consultation has successfully concluded.** Consultation between a Federal Agency and USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, Indicate the result of the consultation: I. biological opinion and/or conference opinion and incidental take statement currently in effect from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of ESA-listed species, nor the destruction or adverse modification of critical habitat; or II. written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. If eligible under Criterion E, you must also provide supporting documentation for your selection of Criterion E in your NOI and SWPPP, including the Biological Opinion (or ECO tracking number) or concurrence letter. You must include copies of the correspondence between yourself and USFWS and/or NMFS in your SWPPP and your NOI. **Basis statement content:** A basis statement supporting the selection of this criterion must identify the federal action agencies involved, the field/regional offices providing that consultation, any tracking numbers of identifiers

	associated with that consultation (e.g., IPaC number, ECO number), and the date the consultation was completed.
Criterion F	**Issuance of section 10 permit.** Potential take is authorized through the issuance of a permit under section 10 of the ESA by USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI. **Basis statement content:** A basis statement supporting the selection of this criterion must identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field/regional offices providing permits, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS E number), and the date the permit was granted.

You must comply with any applicable terms, conditions, or other requirements developed in the process of meeting one of the eligibility criteria in this section to remain eligible for coverage under this permit. Documentation of these requirements must be kept as part of your SWPPP (see Part 7.2.9.a).

The Services will, within 14 days of submission of the NOI, advise DEQ whether they believe the planned discharges meet the selected eligibility criterion, whether the eligibility criterion could be met with additional conditions, or whether the eligibility criterion is not met. With respect to ESA issues, DEQ recognizes the Services expertise and will carefully consider their conclusions in identifying eligibility for authorization, either with or without additional conditions. In the event the Services place a hold on your NOI, DEQ will notify you as to whether your discharges are authorized or whether an individual permit will be required.

C.2 Procedures for Determining which Threatened and Endangered Species Protection Criterion Applies

You must follow the procedures in this Part to determine the criterion listed above under which your site is eligible for permit coverage.

C.2.1 Step 1 - Determine if You Meet the Eligibility Requirements of Criterion B.

I. Determine whether you are eligible under criterion B (because another operator has accounted for your action area in their valid certification of eligibility under the 2022 CGP).

II. If your facility does not meet criterion B (e.g., due to difference in action area, lack of analysis of appropriate effects, new listings or designation of critical habitat), proceed to Step 2 below.

Criterion B Eligibility Requirements

- **If your discharges and discharge-related activities <u>were</u> already addressed in another operator's valid certification of eligibility under the current 2022 CGP that included your action area** (e.g., a general contractor or developer may have completed and filed an NOI for the entire action area with the necessary ESA certifications (Criterion A, C, D, E, or F)), you may be eligible under Criterion B. To be eligible for coverage, you must confirm that all three of the following are true:

 You have confirmed that the other operator's certification of eligibility accounted for your action area and that the eligibility certification was valid.

 There has been no lapse of NPDES permit coverage in the other operator's certification.

 You will comply with all measures that formed the basis of the other operator's valid certification of eligibility. Provide the operator's NPDES permit number and list any measures that you must comply with (or enter "N/A" if none exist).

If all three of the above are true, you may select criterion B on your NOI. You must include in your NOI the NPDES ID assigned to the other operator's authorization under this permit, and a description of the basis for the criterion selected on your NOI form, including the eligibility criterion selected in the other operator's NOI. You must include this documentation in your SWPPP.

If any of the above is not true, you may not select criterion B and must proceed to Step 2. For example, if there are any listed species in your action area that were not addressed in the other operator's certification, you are not eligible under criterion B.

By certifying eligibility under Criterion B, you must comply with any terms and conditions imposed under the eligibility requirements of the criterion for which the other operator has established eligibility (either Criterion A, C, D, E, or F) to ensure that your discharges and discharge-related activities are protective of listed species and/or critical habitat.

Note: If you are unable to meet these eligibility requirements, then you may either establish eligibility under one of the other criteria, or you may consider applying to DEQ for an individual permit.

Under Criterion B, you must provide documentation in your SWPPP of any of these terms and conditions, as well as the other operator's basis for establishing eligibility. You must also provide a description of the basis for your selection of Criterion B on your NOI form, including the eligibility criterion (A, C, D, E, or F) that was certified to by the other operator, and must provide the NPDES ID from the other operator's notification of authorization under this permit.

If your certification is based on another operator's certification under criterion C, you must provide the documentation required in the NOI for criterion C, namely: 1) what federally listed species and/or designated habitat are in your "action area"; and 2) the distance between your site and the listed species or designated critical habitat (in miles).

C.2.2 Step 2 - Determine if Listed Threatened or Endangered Species or their Designated Critical Habitats are Likely to Occur in your Site's Action Area

First, determine the extent of your action area. You must determine whether species listed as either threatened or endangered, or their critical habitats are located in your site's action area (i.e., all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action, including areas beyond the footprint of the site that are likely to be affected by storm water discharges, discharge-related activities, and authorized non-storm water discharges). Consider the following in determining the action area for your facility:

- Discharges of pollutants into downstream areas can expand the action area well beyond the footprint of your facility and the discharge points. Account for the controls you will

be implementing to minimize pollutants and the receiving waterbody characteristics (e.g., perennial, intermittent, ephemeral) in determining the extent of physical, chemical, and/or biotic effects of the discharges. All receiving waterbodies that could receive pollutants from your facility must be included in your action area.

- Discharge-related activities must also be accounted for in determining your action area. Discharge-related activities are any activities that cause, contribute to, or result in storm water and authorized non-storm water point source discharges, and measures such as the siting, construction, and operation of storm water controls to control, reduce, or prevent pollutants from being discharged.

If you have any questions about determining the extent of your action area, you may contact DEQ or the Services for assistance. https://www.epa.gov/npdes/contact-us-stormwater#regional Next, you must determine, to the best of your knowledge, whether species listed as either threatened or endangered, or their critical habitats (see definitions of these terms in Appendix A), are in your site's action area. To make this determination, you should first determine if listed species and/or critical habitat are expected to exist in your county or township. USFWS and NMFS maintain lists of federally listed endangered or threatened species on their internet sites.

- For NMFS species and critical habitat information, use the following webpages: https://www.webapps.nwfsc.noaa.gov/portal/apps/webappviewer/index.html?id=7514c715b8594944a6e468dd25aaacc9
- For USFWS Fish and Wildlife Service species information, use the online mapping tool IPaC (the Information, Planning, and Consultation System) located at http://ecos.fws.gov/ipac/, and follow these steps:
    - Select Get Started
    - Define your action area: Use one of the mapping features (e.g., sketch, polygon or line drawing tool) to draw your entire action area.
        - For the aquatic portion of your action area, trace the waterbodies with the tool to characterize your action area.
        - If your proposal will include any upland activities (i.e., discharge-related activities), or if there is some aspect of your discharge that would potentially result in effects to terrestrial species, include the corresponding upland areas within your action area.
    - When you are done, go to confirm and press *Continue*.
    - Select *Define Project* to request an Official Species List
    - Complete the fields on the Official Species List Request page and include "(CGP)" at the end of the project description.
        - For Classification, select "Water Quality Modification".
        - Select the appropriate requesting agency/organization type (for most operators, this should be "Other").
    - Submit the request to acquire an Official Species List, which should show both listed species as well as any designated critical habitat that are present in the action area in the previous step.

- *Note: If a link to an Official Species List is not available on the page, follow the web link of the offices indicated, or contact the office directly by mail or phone if a web link is not shown.*

Keep a copy of the species and critical habitat lists from the Services with your SWPPP and use the lists to complete your NOI. For USFWS species, include the full printout from your IPaC query/Official Species List. You can include the map from your IPaC query. For NMFS species, include the full printout from the Species Directory with the correct Region selected.

- **If listed species and/or critical habitat may exist in your action area, you must do one or more of the following:**
  - Conduct visual inspections. This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal storm water collection systems.
  - Conduct a formal biological survey. In some cases, particularly for larger construction sites with extensive storm water discharges, biological surveys may be an appropriate way to assess whether species are located in the action area and whether there are likely to be adverse effects to such species. Biological surveys are frequently performed by environmental consulting firms.
  - If required (e.g., federal operators), conduct an environmental assessment under the National Environmental Policy Act (NEPA). Some construction activities might require review under NEPA for specific reasons, such as federal funding or other federal involvement in the project. Note: Coverage under the CGP does not trigger such a review for individual projects/sites.

    and
  - Follow the instructions in Steps 3 – 5 below, as applicable. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this CGP may require measures to protect critical habitat that are separate from those to protect listed species.

Criterion A Eligibility Requirements

- **If there are no listed species and no critical habitat areas in your action area**, you may be eligible for criterion A. To be eligible for coverage under criterion A, you must confirm that the following is true:
  - I have confirmed there to be no ESA-listed species and no critical habitat in my action area.
- If the above is true, you may select criterion A on your NOI form. You must also provide a description of the basis for the criterion selected on your NOI form and provide documentation supporting the criterion selected in your SWPPP. Note: If your Official Species List from USFWS indicated no species or critical habitat were present in your action area, include the full consultation tracking code at the top of your Official Species List in your NOI in the basis statement for Criterion A. If an Official Species List was not

available on IPaC, list the contact date and name of the Service staff with whom you corresponded to verify no USFWS species or critical habitat were present in your action area.

- If the above is not true, you may not select criterion A and must proceed to Step 3 to determine if you can become eligible under criterion C.

Note: For existing dischargers that have previously obtained coverage under criterion A, you must verify whether ESA-protected species and/or critical habitat are expected to exist in your action area, as described above. Please note that if you now find that your action area overlaps with ESA-protected species or critical habitat, you must proceed to Step 3.

C.2.3 Step 3 - Determine if the Construction Activity's Discharges or Discharge-Related Activities Are Likely to Adversely Affect Listed Threatened or Endangered Species or Designated Critical Habitat

If in Step 2 you determined that listed species and/or designated critical habitat could exist in your action area, you must next assess whether your discharges or discharge-related activities are likely to adversely affect ESA-listed threatened or endangered species or designated critical habitat.

Potential adverse effects from discharges and discharge-related activities include:

- *Hydrological*. Storm water discharges may cause siltation, sedimentation, or induce other changes in receiving waters such as temperature, salinity, or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Where a storm water discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs that can impact listed species or critical habitat.
- *Habitat*. Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of storm water controls, may adversely affect listed species or their habitat. Storm water may drain or inundate listed species habitat.
- *Toxicity*. In some cases, pollutants in storm water may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If you are having difficulty determining whether your project is likely to adversely affect listed species or critical habitat, or one of the Services has already raised concerns to you, you should contact the appropriate Services office for assistance.

- If adverse effects to listed threatened or endangered species or their critical habitat are not likely, then you may select eligibility criterion C on the NOI form. You must provide the following specific information on your NOI form: 1) the federally listed species and/or designated habitat that occur in your "action area"; and 2) the distance between your site and the listed species or designated critical habitat (in miles). You must also provide a copy of your site map with your NOI.

- ***If adverse effects to listed threatened or endangered species or their critical habitat <u>are</u> likely***, you must follow Step 4 below.

C.2.4 Step 4 - Determine if Measures Can Be Implemented to Avoid Adverse Effects
If you make a preliminary decision in Step 3 that adverse effects from your construction activity's discharges or discharge- related activities are likely to occur, you can still receive coverage under eligibility criterion C of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for CGP coverage.
These measures may involve relatively simple changes to construction activities such as re-routing a storm water discharge to bypass an area where species are located, relocating storm water controls, or by modifying the "footprint" of the construction activity. If you are unable to ascertain which measures to implement to avoid the likelihood of adverse effects, you must coordinate with USFWS and/or NMFS, in which case you would not be eligible for coverage under eligibility criterion C, but may instead be eligible for coverage under eligibility criterion D, E, or F (described in more detail in Step 5)

- **If you can install and implement appropriate measures to avoid the likelihood of adverse effects**, then you may check eligibility criterion C on the NOI form. The measures you adopt to avoid or eliminate adverse effects must be implemented for the duration of the construction project and your coverage under the CGP. You must also provide a description of the basis for the criterion selected, and the following specific information on your NOI form: 1) the federally listed species and/or designated habitat are located in your "action area"; and 2) the distance between your site and the listed species or designated critical habitat (in miles).
- **If you cannot ascertain which measures to implement to avoid the likelihood of adverse effects**, you must follow the procedures in Step 5.

C.2.5 Step 5 - Determine if the Eligibility Requirements of Criterion D, E, or F Can Be Met
If in Step 4 you cannot ascertain which measures to implement to avoid the likelihood of adverse effects, you must contact USFWS and/or NMFS. You may still be eligible for CGP coverage if likely adverse effects can be addressed through meeting criterion D, E, or F.

Criterion D Eligibility Requirements

- **Criterion D:** Coordination between you and the Services has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on federally- listed threatened or endangered species and federally-designated critical habitat, and resulted in a written confirmation from the relevant Services that the effects of your site's discharges and discharge- related activities are consistent with a not likely to adversely affect determination for ESA- listed species or designated critical habitat.
- If you have met the requirements of criterion D, you may select eligibility criterion D on the NOI form. You must provide a description of the basis for the criterion selected on your NOI form and must include copies of the correspondence between you and the applicable Service in your SWPPP.

Criterion E Eligibility Requirements

- **Criterion E**: Consultation between a federal agency and the Services under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge- related activities on federally- listed threatened or endangered species and federally- designated critical habitat. The result of this consultation must be (1) a biological opinion and/or conference opinion and incidental take statement currently in effect that concludes that the action in question (taking into account the effects of your site's discharges and discharge- related activities) is not likely to jeopardize the continued existence of listed species, n or the destruction or adverse modification of critical habitat; or (2) written concurrence from the applicable Services with a finding that the effects of the site's discharges and discharge- related activities are consistent with a not likely to adversely affect determination for ESA listed species or designated critical habitat.

  If consultation under section 7 of the ESA has concluded, you may be eligible for coverage under criterion E. To be eligible for coverage under criterion E, you must confirm that both of the following are true:

  - A consultation between a federal agency and the Services under section 7 of the ESA has concluded. Consultations can be either formal or informal, and would have occurred only as a result of a separate federal action (e.g., during application for an individual wastewater discharge permit or the issuance of a wetlands dredge and fill permit), and the consultation must have addressed the effects of your industrial activity's discharges and discharge-related activities on all ESA-listed threatened or endangered species and all designated critical habitat in your action area. The result of this consultation must be either:
    - A biological opinion currently in effect that concludes that the action in question (taking into account the effects of your facility's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The biological opinion must have included the effects of your facility's discharges1 and discharge-related activities on all the listed species and designated critical habitat in your action area. To be eligible under (i), any reasonable and prudent measures specified in the incidental take statement must be implemented;
    - Written concurrence (e.g., letter of concurrence) from the applicable Services with a finding that your facility's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. The concurrence letter must have included the effects of your facility's discharges and discharge-related activities on all the ESA-listed species and/or designated critical habitat on your species lists acquired from the Services as part of this worksheet.

  - The consultation does not warrant reinitiation under 50 CFR §402.16; or, if reinitiation of consultation is required (e.g., due to a new species listing or critical habitat designation; new information), you have reinitiated the consultation and the result of the consultation is consistent with the statements above. Attach a

copy of any reinitiation documentation from the Services or other consulting federal agency.

- **If both of the above are true, you may select criterion E on your NOI**. You must also provide a description of the basis for the criterion selected on your NOI form and you must include documentation in your SWPPP. In both your SWPPP and NOI you must also provide the Biological Opinion (or ECO tracking number) or concurrence letter and any other documentation supporting your eligibility certification. You must also include copies of the correspondence between yourself and the Services in your SWPPP.

  For more information on section 7 consultation, see 50 CFR part 402. If you receive a "jeopardy opinion," you may continue to work with USFWS and/or NMFS and DEQ to modify your project so that it will not jeopardize listed species or designated critical habitat.

  Note that most consultations are accomplished through informal consultation. When conducting informal ESA section 7 consultation as a non-federal representative, you must follow the procedures found in 50 CFR Part 402 of the ESA regulations. You must notify the Services of your intention and agreement to conduct consultation as a non-federal representative.

  Consultation may also occur in the context of another federal action at the construction site (e.g., where ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project that incorporates a section 7 consultation).

  Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, operators may, if they wish, initiate consultation with the Services at Step 4.

- Whether ESA section 7 consultation must be performed with USFWS, NMFS, or both Services depends on the listed species that may be affected by the operator's storm water discharges. In general, the NMFS has jurisdiction over marine, estuarine, and anadromous species. Operators should also be aware that while formal section 7 consultation provides protection from incidental takings liability, informal consultation does not.

- If you have met the requirements of criterion E, you may select eligibility criterion E on the NOI form. You must provide a description of the basis for the criterion selected on your NOI form and must include copies of the correspondence between yourself and the Services in your SWPPP.

Criterion F Eligibility Requirements

- **Criterion F:** Any potential take of ESA-protected species occurring as a result of discharges from your construction activities are authorized through the issuance of an incidental take permit under section 10 of the ESA, and this authorization addresses the effects of the site's discharges and discharge-related activities on federally-listed species and federally-designated critical habitat.

  If your construction activities are the subject of a permit under section 10 of the ESA, and this authorization addresses the effects of your facility's discharges and discharge-related activities on ESA-listed species and designated critical habitat in your action area, you

may be eligible for coverage under criterion E. To be eligible or coverage under criterion E, you must confirm that the following is true:

- A permit has been issued under section 10 of the ESA. The permit authorization specifically addresses the effects of your facility's discharges and discharge-related activities (if applicable) on all federally-listed species and designated critical habitat in your action area.

- **If the above is true, you may select criterion F on your NOI.** You must also provide a description of the basis for the criterion selected on your NOI form and must include documentation in your SWPPP. In both your SWPPP and your NOI you must provide a copy of the section 10 permit issued by the Services.

  Note: You must follow the Services' procedures when applying for an ESA section 10 permit (see 50 CFR §17.22(b)(1) for USFWS and §222.22 for NMFS). Application instructions for section 10 permits can be obtained from http://www.fws.gov and http://www.nmfs.noaa.gov or by contacting the appropriate Service office.

Appendix D. Buffer Requirements

The purpose of this appendix is to assist you in complying with the requirements in Section 2.2.1 of the permit regarding the establishment of natural buffers and/or equivalent sediment controls. This appendix is organized as follows:

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D.1 Sites Required to Provide and Maintain Natural Buffers and/or Equivalent Erosion and Sediment Controls

The requirement in Section 2.2.1 to provide and maintain natural buffers and/or equivalent erosion and sediment controls applies for any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances. If the water of the U.S. is not located within 50 feet of earth-disturbing activities, Section 2.2.1 does not apply. See E – 1.

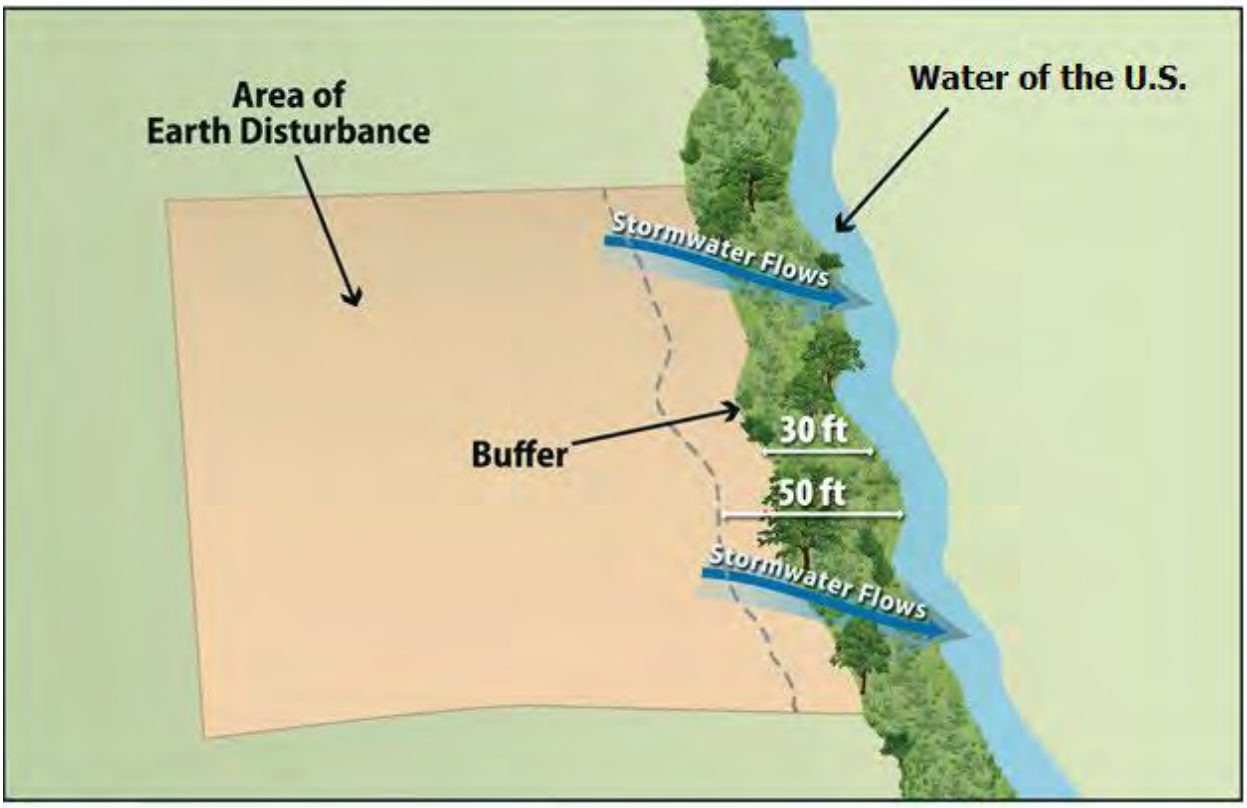


Figure E-1 Example of earth-disturbing activities within 50 feet of a water of the U.S.

D.2 Compliance Alternatives and Exceptions

D.2.1 Compliance Alternatives

If Section 2.2.1 applies to your site, you have three compliance alternatives from which you can choose, unless you qualify for any of the exceptions (see below and Section 2.2.1.A):

1. Provide and maintain a 50-foot undisturbed natural buffer; or
2. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
3. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

The compliance alternative selected must be maintained throughout the duration of permit coverage.

See Section D.2.2 below for exceptions to the compliance alternatives.

See Section D.2.3 for requirements applicable to providing and maintaining natural buffers under compliance alternatives 1 and 2 above.

See Section D.2.4 for requirements applicable to providing erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer under compliance alternatives 2 and 3 above.

D.2.2 Exceptions to the Compliance Alternatives

The following exceptions apply to the requirement to implement one of the Section 2.2.1.A compliance alternatives (see also Section 2.2.1.B):

- The following disturbances within 50 feet of a water of the U.S. are exempt from the requirements Section 2.2.1 and this Appendix:
    - Construction approved under a CWA Section 404 permit; or
    - Construction of a water-dependent structure or water access areas (e.g., pier, boat ramp, trail).
- If there is no discharge of storm water to waters of the U.S. through the area between the disturbed portions of the site and any waters of the U.S. located within 50 feet of your site, you are not required to comply with the requirements in Section 2.2.1 and this Appendix. This includes situations where you have implemented controls measures, such as a berm or other barrier that will prevent such discharges.
- Where no natural buffer exists due to preexisting development disturbances (e.g., structures, impervious surfaces) that occurred prior to the initiation of planning for the current development of the site, you are not required to comply with the requirements in Section 2.2.1 and this Appendix.

Where some natural buffer exists but portions of the area within 50 feet of the water of the U.S. are occupied by preexisting development disturbances, you are required to comply with the requirements in Section 2.2.1 and this Appendix. For the purposes of calculating the sediment load reduction for either compliance alternative 2 or 3, you are not expected to compensate for the reduction in buffer function that would have resulted from the area covered by these preexisting disturbances. Clarity about how to implement the compliance alternatives for these situations is provided in D.2.3 and D.2.4 below.

If during your project, you will disturb any portion of these preexisting disturbances, the area removed will be deducted from the area treated as a "natural buffer."

- For "linear construction sites" (see Appendix A), you are not required to comply with this requirement if site constraints (e.g., limited right-of-way) make it infeasible to implement one of the Section 2.2.1.A compliance alternatives, provided that, to the extent feasible, you limit disturbances within 50 feet of any waters of the U.S. and/or you provide supplemental erosion and sediment controls to treat storm water discharges from earth disturbances within 50 feet of the water of the U.S. You must also document in your SWPPP your rationale for why it is infeasible for you to implement one of the Section 2.2.1.a compliance alternatives, and describe any buffer width retained and supplemental erosion and sediment controls installed.
- For "small residential lot" construction (i.e., a lot being developed for residential purposes that will disturb less than 1 acre of land, but is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre), you have the option of complying with one of the "small residential lot" compliance alternatives in Section D.3 of this appendix.

Note that you must document in your SWPPP if any disturbances related to any of the above exceptions occurs within the buffer area on your site.

D.2.3 Requirements for Providing and Maintaining Natural Buffers

This part of the appendix applies to you if you choose compliance alternative 1 (50-foot buffer), compliance alternative 2 (a buffer of < 50 feet supplemented by additional erosion and sediment controls that achieve the equivalent sediment load reduction as the 50-foot buffer), or if you are providing a buffer in compliance with one of the "small residential lot" compliance alternatives in Section D.3.

Buffer Width Measurement

Where you are retaining a buffer of any size, the buffer should be measured perpendicularly from any of the following points, whichever is further landward from the water:

1. The ordinary high water mark of the water body, defined as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris; or
2. The edge of the stream or river bank, bluff, or cliff, whichever is applicable.

Refer to Figures D-2 and D-3. You may find that specifically measuring these points is challenging if the flow path of the water of the U.S. changes frequently, thereby causing the measurement line for the buffer to fluctuate continuously along the path of the waterbody. Where this is the case, DEQ suggests that rather than measuring each change or deviation along the water's edge, it may be easier to select regular intervals from which to conduct your measurement. For instance, you may elect to conduct your buffer measurement every 5 to 10 feet along the length of the water.

Additionally, note that if earth-disturbing activities will take place on both sides of a water of the U.S. that flows through your site, to the extent that you are establishing a buffer around this water, it must be established on both sides. For example, if you choose compliance alternative 1, and your project calls for disturbances on both sides of a small stream, you would need to retain the full 50 feet of buffer on both sides of the water. However, if your construction activities will only occur on one side of the stream, you would only need to retain the 50-foot buffer on the side of the stream where the earth-disturbance will occur.

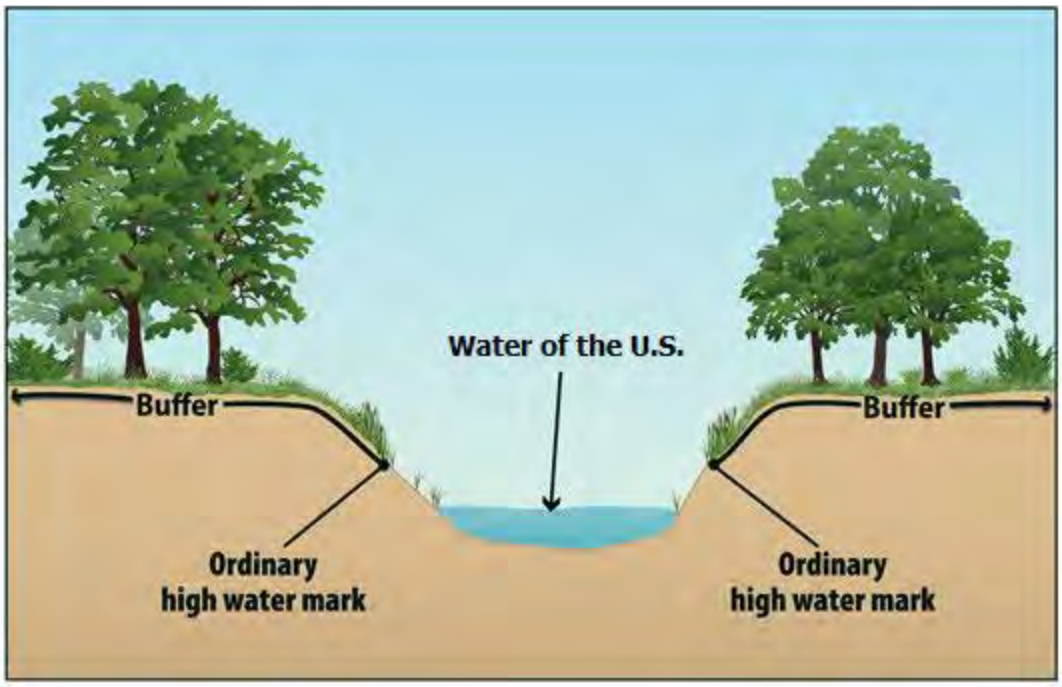


Figure D-2 Buffer measurement from the ordinary high water mark of the water body, as indicated by a clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, and/or the presence of litter/debris.

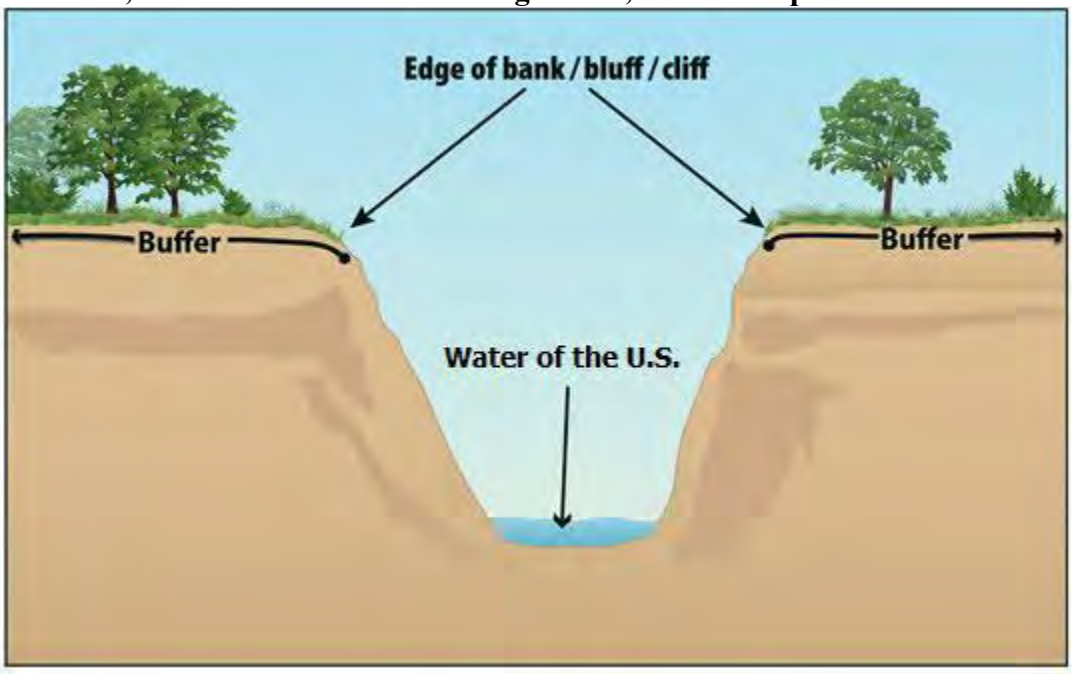


Figure D-3 Buffer measurement from the edge of the bank, bluff, or cliff, whichever is applicable.

Limits to Disturbance Within the Buffer

You are considered to be in compliance with the requirement to provide and maintain a natural buffer if you retain and protect from construction activities the natural buffer that existed prior to the commencement of construction. If the buffer area contains no vegetation prior to the commencement of construction (e.g., sand or rocky surface), you are not required to plant

vegetation. As noted above, any preexisting structures or impervious surfaces may occur in the natural buffer provided you retain and protect from disturbance the buffer areas outside of the preexisting disturbance.

To ensure that the water quality protection benefits of the buffer are retained during construction, you are prohibited from conducting any earth-disturbing activities within the buffer during permit coverage. In furtherance of this requirement, **prior to commencing earth-disturbing activities on your site, you must delineate, and clearly mark off, with flags, tape, or a similar marking device, the buffer area on your site.** The purpose of this requirement is to make the buffer area clearly visible to the people working on your site so that unintended disturbances are avoided.

While you are not required to enhance the quality of the vegetation that already exists within the buffer, you are encouraged to do so where such improvements will enhance the water quality protection benefits of the buffer. (Note that any disturbances within the buffer related to buffer enhancement are permitted and do not constitute construction disturbances.) For instance, you may want to target plantings where limited vegetation exists, or replace existing vegetation where invasive or noxious plant species (see http://plants.usda.gov/java/noxiousDriver) have taken over. In the case of invasive or noxious species, you may want to remove and replace them with a diversity of native trees, shrubs, and herbaceous plants that are well-adapted to the climatic, soil, and hydrologic conditions on the site. You are also encouraged to limit the removal of naturally deposited leaf litter, woody debris, and other biomass, as this material contributes to the ability of the buffer to retain water and filter pollutants.

If a portion of the buffer area adjacent to the water of the U.S. is owned by another party and is not under your control, you are only required to retain and protect from construction activities the portion of the buffer area that is under your control. For example, if you comply with compliance alternative 1 (provide and maintain a 50-foot buffer), but 10 feet of land immediately adjacent to the water of the U.S. is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you must only retain and protect from construction activities the 40-foot buffer area that occurs adjacent to the property on which your construction activities are taking place. DEQ would consider you to be in compliance with this requirement regardless of the activities that are taking place in the 10-foot area that is owned by a different party than the land on which your construction activities are taking place that you have no control over.

Discharges to the Buffer

You must ensure that all discharges from the area of earth disturbance to the natural buffer are first treated by the site's erosion and sediment controls (for example, you must comply with the Section 2.2.3 requirement to install sediment controls along any perimeter areas of the site that will receive pollutant discharges), **and if necessary to prevent erosion caused by storm water flows within the buffer, you must use velocity dissipation devices.** The purpose of this requirement is to decrease the rate of storm water flow and encourage infiltration so that the pollutant filtering functions of the buffer will be achieved. To comply with this requirement, construction operators typically will use devices that physically dissipate storm water flows so that the discharge entering the buffer is spread out and slowed down.

SWPPP Documentation
You are required to document in your SWPPP the natural buffer width that is retained. For example, if you are complying with alternative 1, you must specify in your SWPPP that you are providing a 50-foot buffer. Or, if you will be complying with alternative 2, you must document the reduced width of the buffer you will be retaining (and you must also describe the erosion and sediment controls you will use to achieve an equivalent sediment reduction, as required in Section E.2.4 below). Note that you must also show any buffers on your site map in your SWPPP consistent with Section 7.2.4. Additionally, if any disturbances related to the exceptions in Section D.2.2 occur within the buffer area, you must document this in the SWPPP.

D.2.4 Guidance for Providing the Equivalent Sediment Reduction as a 50-foot Buffer
This part of the appendix applies to you if you choose compliance alternative 2 (provide and maintain a buffer that is less than 50 feet that is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot buffer) or compliance alternative 3 (implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot buffer).

Determine Whether it is Feasible to Provide a Reduced Buffer
DEQ recognizes that there will be a number of situations in which it will be infeasible to provide and maintain a buffer of any width. While some of these situations may exempt you from the buffer requirement entirely (see D.2.2), if you do not qualify for one of these exemptions, there still may be conditions or circumstances at your site that make it infeasible to provide a natural buffer. For example, there may be sites where a significant portion of the property on which the earth-disturbing activities will occur is located within the buffer area, thereby precluding the retention of natural buffer areas.

Therefore, you should choose compliance alternative 2 if it is feasible for you to retain some natural buffer on your site. (Note: For any buffer width retained, you are required to comply with the requirements in Section D.2.3, above, concerning the retention of vegetation and restricting earth disturbances.) Similarly, if you determine that it is infeasible to provide a natural buffer of any size during construction, you should choose alternative 3.

Design Controls That Provide Equivalent Sediment Reduction as 50-foot Buffer
You must next determine what additional controls must be implemented on your site that, alone or in combination with any retained natural buffer, achieve a reduction in sediment equivalent to that achieved by a 50-foot buffer.

Note that if only a portion of the natural buffer is less than 50 feet, you are only required to implement erosion and sediment controls that achieve the sediment load reduction equivalent to the 50-foot buffer for discharges through that area. You would not be required to provide additional treatment of storm water discharges that flow through 50 feet or more of natural buffer. See Figure D-4.

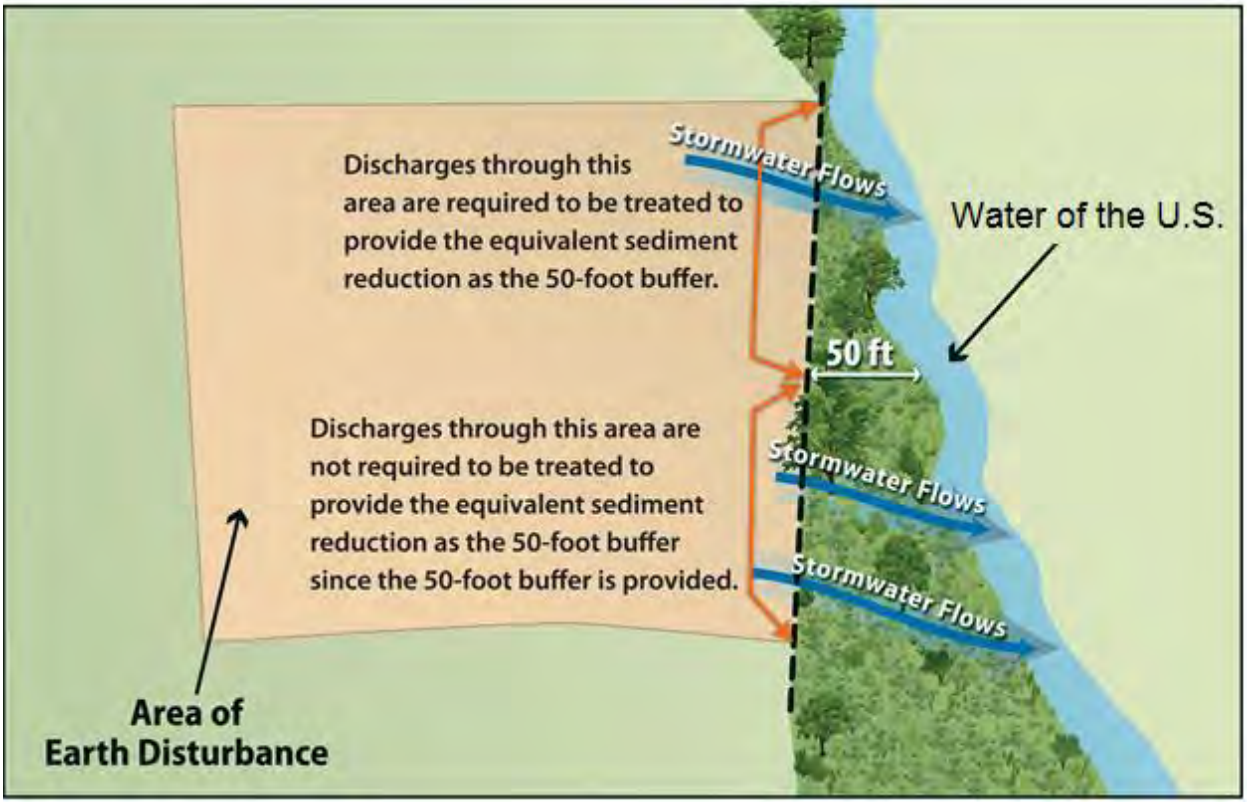


Figure D-4 Example of how to comply with the requirement to provide the equivalent sediment reduction when only a portion of your earth-disturbances discharge to a buffer of less than 50-feet.

Steps to help you meet compliance alternative 2 and 3 requirements are provided below.

D.2.4 Step 1 - Estimate the Sediment Reduction from the 50-foot Buffer

In order to design controls that match the sediment removal efficiency of a 50-foot buffer, you first need to know what this efficiency is for your site. The sediment removal efficiencies of natural buffers vary according to a number of site-specific factors, including precipitation, soil type, land cover, slope length, width, steepness, and the types of erosion and sediment controls used to reduce the discharge of sediment prior to the buffer. DEQ has simplified this calculation by developing buffer performance tables covering a range of vegetation and soil types for the areas covered by the CGP. See Attachment 1 of this Appendix, Table D-4. Note: buffer performance values in Table D-4 represent the percent of sediment captured through the use of perimeter controls (e.g., silt fences) and 50-foot buffers at disturbed sites of fixed proportions and slopes.[72]

[72] DEQ used the following when developing the buffer performance tables:
• The sediment removal efficiencies are based on the U.S. Department of Agriculture's RUSLE2 ("Revised Universal Soil Loss Equation 2") model for slope profiles using a 100-foot long denuded slopes.
• Sediment removal was defined as the annual sediment delivered at the downstream end of the 50-foot natural buffer (tons/yr/acre) divided by the annual yield from denuded area (tons/yr/acre).
• As perimeter controls are also required by the CGP, sediment removal is in part a function of the reduction due to a perimeter control (i.e., silt fence) located between the disturbed portion of the site and the upstream edge of the natural buffer and flow traveling through a 50-foot buffer of undisturbed natural vegetation.
• It was assumed that construction sites have a relatively uniform slope without topographic features that accelerate the concentration for erosive flows.
To represent the influence of soil, EPA analyzed 11 general soil texture classifications in its evaluation of buffer performance. To represent different types of buffer vegetation, EPA evaluated 4 or more common vegetative types for each state/territory covered under the permit. For each

Using Table D-4 (see Attachment 1 of this Appendix), you can determine the sediment removal efficiency of a 50-foot buffer for your geographic area by matching the vegetative cover type that best describes your buffer area and the type of soils that predominate at your site. For example, if your buffer vegetation corresponds most closely with that of tall fescue grass, and the soil type at your site is best typified as sand, your site's sediment removal efficiency would be 44 percent.

In this step, you should choose the vegetation type in the tables that most closely matches the vegetation that would exist naturally in the buffer area on your site regardless of the condition of the buffer. However, because you are not required to plant any additional vegetation in the buffer area, in determining what controls are necessary to meet this sediment removal equivalency in Step 2 below, you will be able to take credit for this area as a fully vegetated "natural buffer."

Similarly, if a portion of the buffer area adjacent to the water of the U.S. is owned by another party and is not under your control, you can treat the area of land not under your control as having the equivalent vegetative cover and soil type that predominates on the portion of the property on which your construction activities are occurring.
For example, if your earth-disturbances occur within 50 feet of a water of the U.S., but the 10 feet of land immediately adjacent to the water of the U.S. is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10 foot area adjacent to the stream as having the equivalent soil and vegetation type that predominates in the 40 foot area under your control. You would then make the same assumption in Step 2 for purposes of determining the equivalent sediment removal.

Alternatively, you may do your own calculation of the effectiveness of the 50-foot buffer based upon your site-specific conditions, and may use this number as your sediment removal equivalency standard to meet instead of using Table D-4. This calculation must be documented in your SWPPP.

D.2.4 Step 2 - Design Controls That Match the Sediment Removal Efficiency of the 50-foot Buffer

Once you determine the estimated sediment removal efficiency of a 50-foot buffer for your site in Step 1, you must next select storm water controls that will provide an equivalent sediment load reduction. These controls can include the installation of a single control, such as a sediment pond or additional perimeter controls, or a combination of storm water controls. Whichever controls you select, you must demonstrate in your SWPPP that the controls will provide at a minimum the same sediment removal capabilities as a 50-foot natural buffer (Step 1). You may take credit for the removal efficiencies of your required perimeter controls in your calculation of equivalency,

vegetation type evaluated, EPA considered only permanent, non-grazed, and non-harvested vegetation, on the assumption that a natural buffer adjacent to the water of the U.S. will typically be undisturbed. EPA also evaluated slope steepness and found that sediment removal efficiencies present in Tables D-4 are achievable for slopes that are less than nine percent. DEQ is utilizing EPA's research for the purposes of this appendix.

because these were included in calculating the buffer removal efficiencies in Table D-4. (Note: You are reminded that the controls must be kept in effective operating condition until you complete final stabilization on the disturbed portions of the site discharging to the water of the U.S.)

To make the determination that your controls and/or buffer area achieve an equivalent sediment load reduction as a 50-foot buffer, you should use a model or other type of calculation. As mentioned above, there are a variety of models available that can be used to support your calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other models. A couple of examples are provided in Attachment 3 to help illustrate how this determination could be made.
If you retain a buffer of less than 50 feet, you may take credit for the removal that will occur from the reduced buffer and only need to provide additional controls to make up the difference between the removal efficiency of a 50 foot buffer and the removal efficiency of the narrower buffer. For example, if you retain a 30 foot buffer, you can account for the sediment removal provided by the 30 foot buffer retained, and you will only need to design controls to make up for the additional removal provided by the 20 feet of buffer that is not being provided. To do this, you would plug the width of the buffer that is retained into RUSLE or another model, along with other storm water controls that will together achieve a sediment reduction equivalent to a natural 50-foot buffer.

As described in Step 1 above, you can take credit for the area you retained as a "natural buffer" as being fully vegetated, regardless of the condition of the buffer area.
For example, if your earth-disturbances occur 30 feet from a water of the U.S., but the 10 feet of land immediately adjacent to the water of the U.S. is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10-foot area as a natural buffer, regardless of the activities that are taking place in the area. Therefore, you can assume (for purposes of your equivalency calculation) that your site is providing the sediment removal equivalent of a 30-foot buffer, and you will only need to design controls to make up for the additional removal provided by the 20-foot of buffer that is not being provided.

D.2.4 Step 3 - Document How Site-Specific Controls Will Achieve the Sediment Removal Efficiency of the 50-foot Buffer

In Steps 1 and 2, you determined both the expected sediment removal efficiency of a 50-foot buffer at your site, and you used this number as a performance standard to design controls to be installed at your site, which alone or in combination with any retained natural buffer, achieves the expected sediment removal efficiency of a 50-foot buffer at your site. The final step is to document in your SWPPP the information you relied on to calculate the equivalent sediment reduction as an undisturbed natural buffer.
DEQ will consider your documentation to be sufficient if it generally meets the following:

- For Step 1, refer to the table in Attachment 1 that you used to derive your estimated 50-foot buffer sediment removal efficiency performance. Include information about the buffer vegetation and soil type that predominate at your

site, which you used to select the sediment load reduction value in Table D-4. Or, if you conducted a site-specific calculation for sediment removal efficiency, provide the specific removal efficiency, and the information you relied on to make your site-specific calculation.

- For Step 2, (1) Specify the model you used to estimate sediment load reductions from your site; and (2) the results of calculations showing how your controls will meet or exceed the sediment removal efficiency from Step 1.

If you choose compliance alternative 3, you must also include in your SWPPP a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size.

D.3 Small Residential Lot Compliance Alternatives

DEQ has developed two additional compliance alternatives applicable only to "small residential lots" that are unable to provide and maintain a 50 foot buffer.

A **small residential lot** is a lot or grouping of lots being developed for residential purposes that will disturb less than 1 acre of land, but that is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre.

The following steps describe how a small residential lot operator would achieve compliance with one these 2 alternatives.

D.3.1 Small Residential Lot Compliance Alternative Eligibility

In order to be eligible for the small residential lot compliance alternatives, the following conditions must be met:

- The lot or grouping of lots meets the definition of "small residential lot"; and
- The operator must follow the guidance for providing and maintaining a natural buffer in Part D.2.3 of this Appendix, including:
    - Ensure that all discharges from the area of earth disturbance to the natural buffer are first treated by the site's erosion and sediment controls, and use velocity dissipation devices if necessary to prevent erosion caused by storm water within the buffer;
    - Document in the SWPPP the natural buffer width retained on the property, and show the buffer boundary on your site plan; and
    - Delineate, and clearly mark off, with flags, tape, or other similar marking device, all natural buffer areas.

D.3.2 Small Residential Lot Compliance Alternatives

You must next choose from one of two small residential lot compliance alternatives and implement the storm water control practices associated with that alternative.

Note: The compliance alternatives provided below are not mandatory. Operators of small residential lots can alternatively choose to comply with the any of the options that are available to other sites in Section 2.2.1.a and D.2.1 of this Appendix.

Small Residential Lot Compliance Alternative 1
Alternative 1 is a straightforward tiered-technology approach that specifies the controls that a small residential lot must implement based on the buffer width retained. To meet the requirements of small residential lot compliance alternative 1, you must implement the controls specified in Table D–1 based on the buffer width to be retained. See footnote 5, below, for a description of the controls you must implement.

For example, if you are an operator of a small residential lot that will be retaining a 35-foot buffer and you choose Small Residential Lot Compliance Alternative 1, you must implement double perimeter controls between earth disturbances and the water of the U.S.
In addition to implementing the applicable control, you must also document in your SWPPP how you will comply with small residential lot compliance alternative 1.

Table D-1 Alternative 1 Requirements[73]

Retain 50-foot Buffer	Retain <50 and >30 foot Buffer	Retain <= 30 foot Buffer
No Additional Requirements	Double Perimeter Controls	Double Perimeter Controls and 7-Day Site Stabilization

Small Residential Lot Compliance Alternative 2
Alternative 2 specifies the controls that a builder of a small residential lot must implement based on both the buffer width retained and the site's sediment discharge risk. By incorporating the sediment risk, this approach may result in the implementation of controls that are more appropriate for the site's specific conditions.

D.3.2 Step 1 – Determine Your Site's Sediment Risk Level
To meet the requirements of Alternative 2, you must first determine your site's sediment discharge "risk level" based on the site's slope, location, and soil type. To help you to determine your site's sediment risk level, DEQ developed a table for different slope conditions.
After you determine which table applies to your site, you must then use the table to determine the "risk level" (e.g., "low", "moderate", or "high") that corresponds to your site's location and predominant soil type.[74]

For example, based on Table E-2, a site with a 4 percent average slope and with predominately sandy clay loam soils would fall into the "Low" risk level.

Table D-2 Risk Levels for Sites in Idaho

	Soil Type

[73] **Description of Additional Controls Applicable to Small Residential Lot Compliance Alternatives 1 and 2:**
• **No Additional Requirements:** If you implement a buffer of 50 feet or greater, then you are not subject to any additional requirements. Note that you are required to install perimeter controls between the disturbed portions of your site and the buffer in accordance with Part 2.2.3.
• **Double Perimeter Control:** In addition to the reduced buffer width retained on your site, you must provide a double row of perimeter controls between the disturbed portion of your site and the water of the U.S. spaced a minimum of 5 feet apart.
• **Double Perimeter Control and 7-Day Site Stabilization:** In addition to the reduced buffer width retained on your site and the perimeter control implemented in accordance with Part 2.2.3, you must provide a double row of perimeter controls between the disturbed portion of your site and the water of the U.S. spaced a minimum of 5 feet apart, and you are required to complete the stabilization activities specified in Parts 2.2.14 within 7 calendar days of the temporary or permanent cessation of earth-disturbing activities.
74 One source for determining your site's predominant soil type is the USDA's Web Soil Survey located at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Average Slope	Clay	Silty Clay Loam or Clay-Loam	Sand	Sandy Clay Loam, Loamy Sand or Silty Clay	Loam, Silt, Sandy Loam, or Silt Loam
<= 3%	Low	Low	Low	Low	Low
3-6%	Low	Low	Low	Low	Low
6-9%	Low	Low	Low	Low	Low
9-15%	Low	Low	Low	Low	Low
>15%	Low	Low	Low	Low	Moderate

D.3.2 Step 2 – Determine Which Additional Controls Apply
Once you determine your site's "risk level", you must next determine the additional controls you need to implement on your site, based on the width of buffer you plan to retain. Table D-3 specifies the requirements that apply based on the "risk level" and buffer width retained. See footnote 4, above, for a description of the additional controls that are required.

For example, if you are the operator of a small residential lot that falls into the "moderate" risk level, and you decide to retain a 20-foot buffer, using Table D-3 you would determine that you need to implement double perimeter controls to achieve compliance with small residential lot compliance alternative 2.
You must also document in your SWPPP your compliance with small residential lot compliance alternative 2.

Table D-3 Alternative 2 Requirements

Risk Level Based on Estimated Soil Erosion	Retain >= 50' Buffer	Retain <50' and >30' Buffer	Retain <30' and >10' Buffer	Retain <10' Buffer
Low Risk	No Additional Requirements	No Additional Requirements	Double Perimeter Control	Double Perimeter Control
Moderate Risk	No Additional Requirements	Double Perimeter Control	Double Perimeter Control	Double Perimeter Control and 7-day Site Stabilization
High Risk	No Additional Requirements	Double Perimeter Control	Double Perimeter Control and 7-day Site Stabilization	Double Perimeter Control and 7-day Site Stabilization

ATTACHMENT 1

Sediment Removal Efficiency Tables[75]

DEQ recognizes that very high removal efficiencies, even where theoretically achievable by a 50-foot buffer, may be very difficult to achieve in practice using alternative controls.

Table D-4 Estimated 50-foot Buffer Performance in Idaho*

Type of Buffer Vegetation**	Estimated % Sediment Removal				
	Clay	**Silty Clay Loam or Clay-Loam**	**Sand**	**Sandy Clay Loam, Loamy Sand or Silty Clay**	**Loam, Silt, Sandy Loam or Silt Loam**
Tall Fescue Grass	42	52	44	48	85
Medium-density Weeds	28	30	28	26	60
Low-density Warm-season Native Bunchgrass (i.e., Grama Grass)	25	26	24	24	55
Northern Mixed Prairie Grass	28	30	28	26	50
Northern Range Cold Desert Shrubs	28	28	24	26	50

* Applicable for sites with less than nine percent slope

** Characterization focuses on the under-story vegetation

75 The buffer performances were calculated based on a denuded slope upgradient of a 50-foot buffer and a perimeter controls, as perimeter controls are a standard requirement (see Section 2.2.3).

ATTACHMENT 2

Using the Sediment Removal Efficiency Tables – Questions and Answers

– What if my specific buffer vegetation is not represented in Table D-4?

Table D-4 provides a wide range of factors affecting buffer performance; however, there are likely instances where the specific buffer vegetation type on your site is not listed. If you do not see a description of the type of vegetation present at your site, you should choose the vegetation type that most closely matches the vegetation type on your site. You can contact your local Cooperative Extension Service Office (http://nifa.usda.gov/partners-and-extension-map) for assistance in determining the vegetation type in Table E-4 that most closely matches your site-specific vegetation.

– What if there is high variability in local soils?

DEQ recognizes that there may be a number of different soil types on any given construction site. General soil information can be obtained from USDA soil survey reports (http://websoilsurvey.nrcs.usda.gov) or from individual site assessments performed by a certified soil expert. Table D-4 presents eleven generic soil texture classes, grouping individual textures where DEQ has determined that performance is similar. If your site contains different soil texture classes, you should use the soil type that best approximates the predominant soil type at your site.

– What if my site slope is greater than 9 percent after final grade is reached?

As indicated in the buffer performance tables, the estimated sediment removal efficiencies are associated with disturbed slopes of up to 9 percent grade. Where your graded site has an average slope of greater than 9 percent, you should calculate a site-specific buffer performance.

– How do I calculate my own estimates for sediment reduction at my specific site?

If you determine that it is necessary to calculate your own sediment removal efficiency using site-specific conditions (e.g., slopes at your site are greater than 9 percent), you can use a range of available models that are available to facilitate this calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other equivalent models.

– What is my estimated buffer performance if my site location is not represented by table E-4?

You may choose to conduct a site-specific calculation of the buffer performance.

– What if only a portion of my site drains to the buffer area?

If only a portion of your site drains to a water of the U.S., where that water is within 50 feet of your earth disturbances, you are only required to meet the equivalency requirement for the storm water flows corresponding to those portions of the site. See Example 2 below for an example of how this is expected to work.

ATTACHMENT 3

Examples of How to Use the Sediment Removal Efficiency Tables

Example 1. Comparatively Wet Location (7.5 acre site located near Kellogg)

The operator of a 7.5-acre construction site near Kellogg has determined that it is infeasible to establish a buffer of any size on the site, and is now required to select and install controls that will achieve an equivalent sediment load reduction as that estimated in E-4 for their site conditions. The first step is to identify what percentage of eroded sediment is estimated to be retained from a 50-foot buffer. For this example, it is assumed that the site has a relatively uniform gentle slope (3 percent), so Table D-4 can be used to estimate the 50-foot buffer sediment load reduction. If the site's buffer vegetation is best typified by Northern Range Cold Desert Shrubs and the underlying soil is of a type best described as loamy sand, the 50-foot buffer is projected to capture 26 percent of eroded sediment from the construction site.

The second step is to determine what sediment controls can be selected and installed in combination with the perimeter controls already required to be implemented at the site (see Section 2.2.3), which will achieve the 26 percent sediment removal efficiency from Table D-4. For this example, using the RUSLE2 profile model, it was determined that installing a pair of shallow-sloped diversion ditches to convey runoff to a well-designed and maintained sediment basin provides 99 percent sediment removal. Because the estimated sediment reduction is greater than the required 90 percent that a 50-foot buffer provides, the operator will have met the buffer requirements. See Figure D-5. The operator could also choose a different set of controls, as long as they achieve at least a 26 percent sediment removal efficiency.

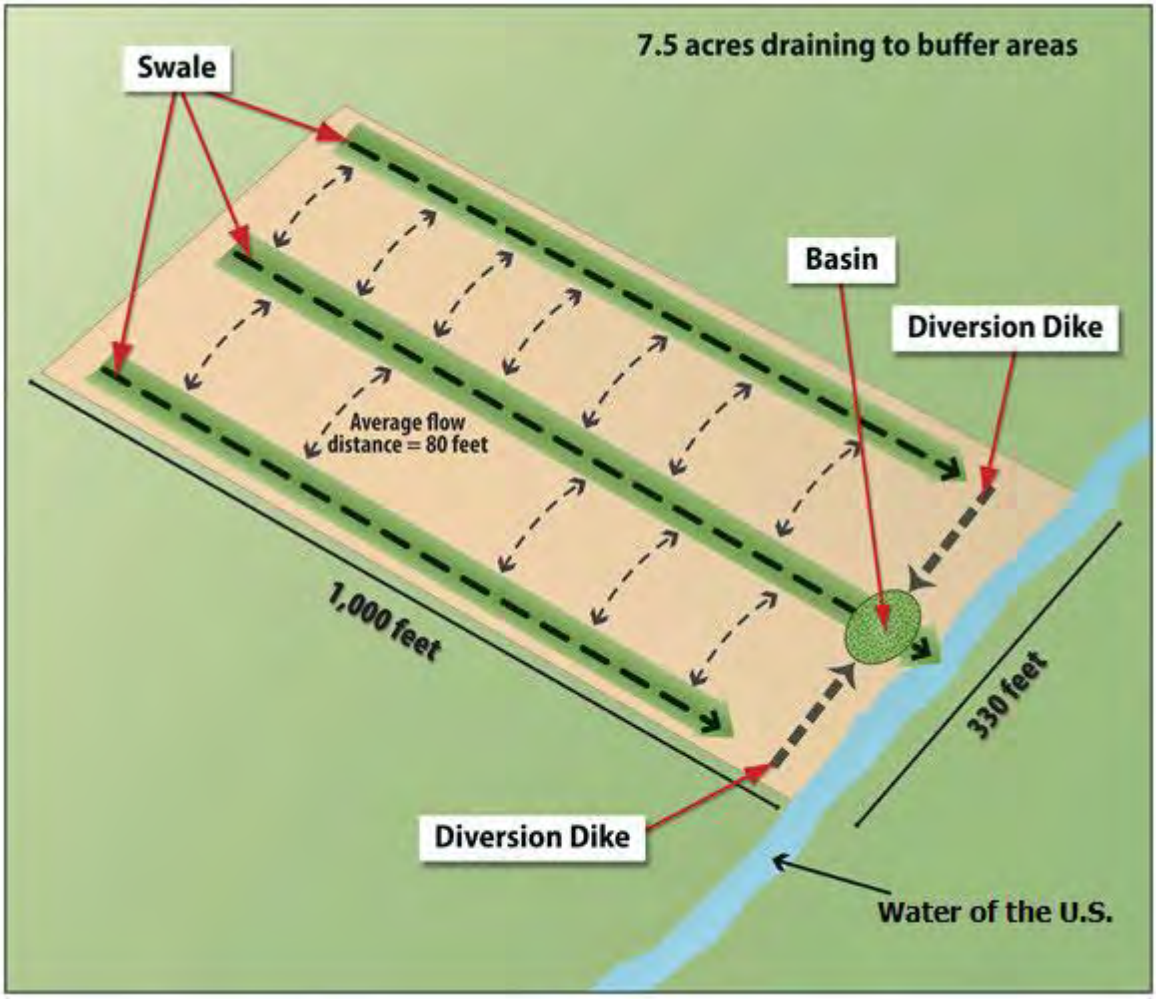


Figure D-5 Example 1 – Equivalent Sediment Load Reductions at a 7.5 ac Site outside Kellogg, ID.

Example 2. Arid Location With Pre-existing Disturbances in the Natural Buffer (6.5 acre site located outside Boise)

An operator of a site outside the City of Boise determines that it is not feasible to provide a 50-foot buffer, but a 28-foot buffer can be provided. Because the operator will provide a buffer that is less than 50 feet, the operator must determine which controls, in combination with the 28-foot buffer, achieve a sediment load reduction equivalent to the 50-foot buffer. In this example, the project will disturb 6.5 acres of land, but only 1.5 acres of the total disturbed area drains to the buffer area. Within the 28-foot buffer area is a preexisting concrete walkway. Similar to Example 1, the equivalence analysis starts with Step 1in Part D.2.4 of this Appendix with a review of the buffer performance (Table D-4). The operator determines that the predominant vegetation type in the buffer area is medium-density weeds, the soil type is similar to silt, and the site is of a uniform, shallow slope (e.g., 3 percent grade). Although the operator will take credit for the disturbance caused by the concrete walkway as a natural buffer in Step 2, here the operator can treat the entire buffer area as being naturally vegetated with medium-density weeds. Based on this information, the operator refers to Table E-4 to estimate that the 50-foot buffer would retain 60 percent of eroded soil.

The second step is to determine, based on the 60 percent sediment removal efficiency found in Table E-4, what sediment controls, in combination with the 28-foot buffer area, can be implemented to reduce sediment loads by 60 percent or more. The operator does not have to account for the reduction in buffer function caused by the preexisting walkway, and can take credit for the entire 28-foot buffer being fully vegetated in the analysis. For this example, using the RUSLE2 profile model, the operator determined that installing a fiber roll barrier between the silt fence (already required by Section 2.2.3) and the 28-foot buffer will achieve an estimated 84 percent sediment removal efficiency. See Figure E-6. Note that this operator is subject to the requirement in Section D.2.3 of this Appendix to ensure that discharges through the silt fence, fiber roll barrier, and 28-foot buffer do not cause erosion within the buffer. The estimated sediment reduction is greater than the required 60 percent; therefore the operator will have met the buffer alternative requirement.

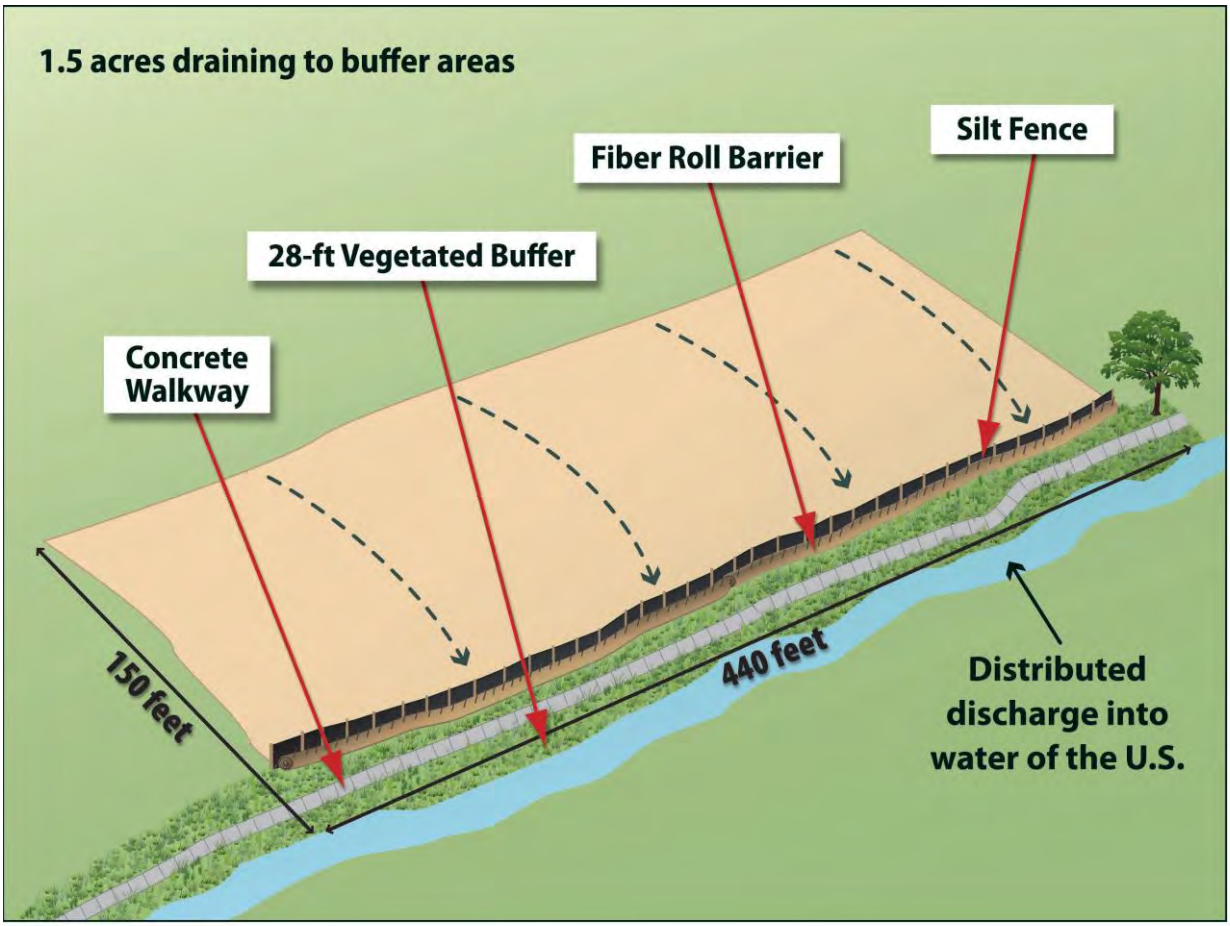


Figure D-6 Example 2 – Equivalent Sediment Load Reductions at a 6.5 ac Site outside the City of Boise.

Appendix E. 2-Year, 24-hour Storm Frequencies

Section 2.2.12 of the permit indicates that if you install a sediment basin, one of the design requirements is to provide storage for either (1) the calculated volume of runoff from a 2-year, 24-hour storm, or (2) 3,600 cubic feet per acre drained. This appendix is intended to provide a guide to operators to determine the volume of precipitation associated with their local 2-year, 24-hour storm event.

The operator should start out by determining their local 2-year, 24-hour storm volume. The rainfall frequency atlases, technical papers, and the Precipitation Frequency Data Server (PFDS) developed by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) serve as national standards for rainfall intensity at specified frequencies and durations in the United States. To determine precipitation frequency based on permit area in Idaho, use NOAA Atlas 2, Vol. 5; Technical Paper 40. DEQ notes that operators may also use alternative peer-reviewed data sources to determine the 2-year, 24-hour storm for their site.

NOTE: Precipitation Frequencies on the NOAA Atlas 2, Vol. 5 are in tenths of an inch and will have to be converted to inches to determine precipitation volume. NOAA Atlas 2, Vol. 5 can be accessed at https://hdsc.nws.noaa.gov/hdsc/pfds/other/id_pfds.html.

Appendix F - Notice of Intent (NOI) Form and Instructions

Section 1.4.1 requires you to use the IPDES E-Permitting System to prepare and submit your NOI electronically unless DEQ grants you an electronic reporting waiver.

NOTICE OF INTENT FOR THE 2022 IPDES CONSTRUCTION GENERAL PERMIT
Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in Section 8 of the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage. Refer to the instructions at the end of this form.

I. Approval to Use Paper NOI Form
Have you been granted a waiver from electronic reporting from DEQ[76]? YES NO

If yes, check which waiver you have been granted, the name of the DEQ staff person who granted the waiver, and the date of approval:

Waiver granted:
[ ] The owner/operator's headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission.
[ ] The owner/operator has issues regarding available computer access or computer capability.

Name of DEQ staff person that granted the waiver:
Date approval obtained:

If no, complete the Notice of Intent online using the IPDES E-Permitting System (https://www2.deq.idaho.gov/water/ipdes).

II. Other Permit Information
Provide the IPDES ID for any other operators co-located on the same site (other operators and/or entities with control over the plans and specifications):

III. Operator Information
Operator Information
Operator Name:

Are you requesting coverage under this NOI as a "federal operator" as defined in Appendix A? YES | NO

Mailing Address:
Street:
City:
State:
ZIP Code:
County or Similar Government Division:
Phone: Ext.

[76] You are required to obtain approval from DEQ prior to using this paper NOI form. If you have not obtained a waiver, you must file the NOI electronically using the E-Permitting System.

E-mail:
Operator Point of Contact Information:
First Name, Middle Initial, Last Name:
Title:
NOI Preparer (Complete if NOI was prepared by someone other than the certifier):
First Name, Middle Initial, Last Name:
Organization:
Phone:
Ext.
E-mail:

IV. Project/Site Information
Project/Site
Name:
Project/Site Address:
Street/Location:
City:
State:
ZIP Code:
County or Similar Government Subdivision:
For the project/site you are seeking permit coverage, provide the following information:
Latitude/Longitude (Use decimal degrees and use Horizontal Reference Datum WGS 84):
Latitude: ___ ___. ___ ___ ___ ___° N (decimal degrees)
Longitude: ___ ___ ___. ___ ___ ___ ___° W (decimal degrees)

Is your project/site located in Indian country lands? YES | NO
If yes, apply for coverage under EPA's CGP.

Estimated Project Start Date:
Estimated Project Completion Date:
Estimated Area to be Disturbed (to the nearest quarter acre):
Type of Construction Site (check all that apply):
Single-Family Residential | Multi-Family Residential | Commercial | Industrial | Institutional
Highway or Road | Utility | Other _____

Will there be demolition of any structure built or renovated before January 1, 1980? YES | NO

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space? YES | NO

Will you be discharging dewatering water from your site? YES | NO

Was the pre-development land use used for agriculture (see Appendix A for definition of "agricultural land")? YES | NO

Have earth-disturbing activities commenced on your project/site? YES | NO

If yes, is your project an "emergency-related project" (see Appendix A)? YES | NO

Have storm water discharges from your project/site been covered previously under an NPDES/IPDES permit? YES | NO

If yes, provide the NPDES/IPDES ID (if you had coverage under EPA's 2017 CGP) or the NPDES/IPDES permit number if you had coverage under an EPA individual permit:

V. Discharge Information

By indicating "Yes" below, I confirm that I understand that the CGP only authorizes the allowable storm water discharges in Part 1.2.1 and the allowable non-storm water discharges listed in Section 1.2.2. Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, DEQ, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the Storm Water Pollution Prevention Plan (SWPPP), during an inspection, etc. If any discharges requiring IPDES permit coverage other than the allowable storm water and non-storm water discharges listed in Sections 1.2.1 and 1.2.2 will be discharged, they must be covered under another IPDES permit.

YES | NO

Does your project/site discharge storm water into a Municipal Separate Storm Sewer System (MS4)? YES | NO

If yes, identify which MS4 system your project/site discharges to:

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? YES | NO

Receiving Waters Information: (Attach a separate list if necessary)

Point of Discharge ID (include latitude and longitude)	For each point of discharge, provide the following receiving water information:		
	Provide the name of the first water of the U.S. that receives storm water directly from the point of discharge and/or from the MS4 that the point of discharge discharges to:	If the receiving water is impaired (on the CWA 303(d) list), list the pollutants that are causing the impairment:	If a TMDL been completed for this receiving waterbody, providing the following information:
			TMDL Name and ID: Pollutants for which there is a TMDL:
			TMDL Name and ID: Pollutants for which there is a TMDL:
			TMDL Name and ID: Pollutants for which there is a TMDL:

Are any of the waters of the U.S. to which you discharge designated by DEQ authority under its antidegradation policy as a Tier II water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier III water (Outstanding National Resource Water)? YES | NO

If yes, names of receiving waters and its designation (Tier II or Tier III):

VI. Chemical Treatment Information

Will you use polymers, flocculants, or other treatment chemicals at your construction site? YES | NO

If yes, will you use cationic treatment chemicals at your construction site*? YES | NO

If yes, have you been authorized to use cationic treatment chemicals by DEQ in advance of filing your NOI*? YES | NO

If you have been authorized to use cationic treatment chemicals by DEQ, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

Please indicate the treatment chemicals that you will use:

_____

_____

_____

_____

* Note: You are ineligible for coverage under this permit unless you notify DEQ in advance and DEQ authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

VII. Storm Water Pollution Prevention Plan (SWPPP) and Personnel Training Information

Has the SWPPP been prepared in advance of filing this NOI, as required? YES NO

Check this box to confirm that all required personnel, including those conducting inspections at your site, will meet the training requirements in Section 6 of this permit. [ ]

SWPPP Contact Information:
First Name, Middle Initial Last Name:
Professional Title:
Phone:
Ext.
E-mail:

VIII. Endangered Species Protection

Using the instructions in Appendix C of the CGP, under which criterion listed below are you eligible for coverage under this permit? Check only 1 box, include the required information, and provide a sound basis for supporting the criterion selected. You must consider Endangered Species Act listed threatened or endangered species (ESA-listed) and/or designated critical habitats under the jurisdiction of both the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and select the most conservative criterion that applies.

NOTE: You must use the information from the USFWS IPaC and NOAA Species Directory (see CGP, Appendix C, Part C.2, Step 2) when determining the presence of ESA listed species and critical habitat. Attaching aerial images of the site to this NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion. When evaluating the potential effects of your activities, you must consider effects to listed species or critical habitats within the "action area" of your construction activity, as identified by the USFWS IPaC and/or the NOAA Species Directory. Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

After you submit your NOI and before your NOI is authorized, DEQ may notify you if any additional controls are necessary to ensure your discharges have no likely adverse effects on ESA-listed species and critical habitat.

A. No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix C of this permit, you certify that ESA-listed species and designated critical habitats under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.

[Basis statement content: A basis statement supporting the selection of this criterion should identify the USFWS and NMFS information sources used. Attaching aerial images of the site to this NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.]
[ ] Basis statement is attached
[ ] Aerial images of the site is attached

B. Eligibility requirements met by another operator under the 2022 CGP. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2022 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of IPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2022 CGP operator's notification of authorization under this permit. If your certification is based on another 2022 CGP operator's certification under criterion C, you must provide DEQ with the relevant supporting information required of existing dischargers in criterion C.

[Basis statement content: A basis statement supporting the selection of this criterion should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.]

If you select criterion B, provide the NPDES ID from the other operator's notification of authorization under this permit: __ __ __ __ __ __ __ __ __ __
[ ] Basis statement is attached
[ ] Supporting information required of existing discharges in criterion C is attached (see queries and check-boxes under C)

C. Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat. ESA-listed species and/or designated critical habitats under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to DEQ that your site's discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any storm water controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in Appendix C of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with this NOI.

Note that attaching the following to your NOI is helpful to DEQ, EPA, USFWS, and NMFS in confirming eligibility under this criterion: 1) the species list with the action area used to obtain the list; 2) aerial images of the site; and 3) a copy of the SWPPP.

[Basis statement content: A basis statement supporting the selection of this criterion should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.]

What ESA-listed species and/or designated critical habitat are located in your "action area":

Distance between your site and the ESA-listed species and/or designated critical habitat within the action area (in miles, state "onsite" if the ESA-listed species and/or designated critical habitat is within the area to be disturbed):

[ ] Basis statement is attached
[ ] Rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharge and discharge-related activities is attached
[ ] A site map from your SWPPP showing the upland and in-water extent of your "action area" is attached

D. Coordination with USFWS and/or NMFS has successfully concluded. Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed

species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site's discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

[Basis statement content: A basis statement supporting the selection of this criterion should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional offices providing that coordination, and the date that coordination concluded.]
[ ] Basis statement is attached
[ ] Correspondence with USFWS and/or NMFS documenting concurrence is attached

E. ESA Section 7 consultation has successfully concluded. Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, indicate the result of the consultation:
[ ] biological opinion and/or conference opinion currently in effect from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of ESA-listed species, nor the destruction or adverse modification of critical habitat; or
[ ] written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat.

If eligible under Criterion E, you must also provide supporting documentation for your determination in your NOI and SWPPP, including the Biological Opinion (or ECO tracking number) or concurrence letter. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

[Basis statement content: A basis statement supporting the selection of this criterion should identify the federal action agencies involved, the field office/regional offices providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the consultation was completed.]
[ ] Basis statement is attached
[ ] Correspondence with USFWS and/or NMFS documenting biological opinion, conference opinion (or ECO tracking number) or concurrence is attached.

F. Issuance of section 10 permit. Potential take is authorized through the issuance of a permit under section 10 of the ESA by USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species designated critical habitat. You must include copies correspondence between yourself participating agencies in your SWPPP and your NOI.

[Basis statement content: A basis statement supporting the selection of this criterion should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field

office/regional offices providing permits, any tracking numbers or identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the permit was granted.]

IX. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I fully understand the implication of IDAPA 58.01.25.100.01 and accept responsibility for ensuring that all other necessary approvals, authorizations, or permits have been obtained.

First Name, Middle Initial, Last Name:

Title:

Signature:

Date:

Email:

Instructions for NOI Form

Who Must File an NOI Form

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), federal law prohibits storm water discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) permit. Operators of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by DEQ, must obtain coverage under an IPDES general permit. For coverage under the IPDES 2022 CGP, each person, firm, public organization, or any other entity that meets either of the following criteria must file a Notice of Intent form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with the permit conditions. If you have questions about whether you need a IPDES storm water permit, or if you need information to determine whether DEQ or EPA is the permitting authority, contact your DEQ Regional Office.

Completing the Form

You must use the IPDES E-Permitting System to prepare and submit your NOI electronically, unless DEQ grants you an electronic reporting waiver to use a paper NOI form.

Section I. Approval to Use Paper NOI Form

You must indicate whether you have been granted a waiver from electronic reporting from DEQ. Note that you are not authorized to use this paper NOI form unless DEQ has approved its use. Where you have obtained approval to use this form, indicate the waiver that you have been granted, the name of the DEQ staff person who granted the waiver, and the date that approval was provided.
See https://www.deq.idaho.gov/about-us/contact-us/for a list of DEQ Regional Office contacts.

Section II. Permit Number

Pre-completed with the master permit number of the permit under which you are applying for coverage

Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this NOI. Refer to Appendix A of the permit for the definition of "operator". Indicate whether you are seeking coverage under this permit as a "federal operator" as defined in Appendix A.
Also provide a point of contact, the operator's mailing address, county, telephone number, and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.
If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier's signature), include the full name, organization, phone number, and email address of the NOI preparer.

Section IV. Project/Site Information

Enter the official or legal name and complete street address, including city, state, ZIP code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

Provide the latitude and longitude of your facility in decimal degrees format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global

positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and web-based siting tools, among others. For consistency, DEQ requests that measurements be taken from the approximate center of the construction site. For linear construction sites, the measurement should be taken midpoint of the site. If known, enter the horizontal reference datum for your latitude and longitude. The horizontal reference datum is shown on the bottom left corner of USGS topographic maps; it is also available for GPS receivers.

Indicate whether the project is in Indian country lands or located on a property of religious or cultural significance to an Indian tribe, and if so, provide the name of the Indian tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 10/06/2012). Indicate to the nearest quarter acre the estimated area to be disturbed.

Indicate the type of construction site, if demolition is occurring, and if so, if the structure has at least 10,000 square feet of floor space. Indicate whether the pre-development land use of the site was used for agriculture Appendix A defines “agricultural land” as cropland, grassland, rangeland, pasture, and other agricultural land, on which agricultural and forest-related products or livestock are produced and resource concerns may be addressed. Agricultural lands include cropped woodland, marshes, incidental areas included in the agricultural operation, and other types of agricultural land used for the production of livestock.

Any discharges not expressly authorized under the CGP are not covered by the CGP or the permit shield provision of the CWA Section 402(k) and they cannot become authorized or shielded by disclosure to DEQ, EPA, or local authorities via the NOI to be covered by the permit or by any other means (e.g., in the SWPPP or during an inspection). If any discharges requiring IPDES permit coverage other than the allowable storm water and non-storm water discharges listed in Sections 1.2.1 and 1.2.2 will be discharged, they must either be eliminated or covered under another NPDES permit.

Indicate whether discharges from the site will enter into a municipal separate storm sewer system (MS4), as defined in Appendix A.

Also, indicate whether any waters of the U.S. exist within 50 feet from your site. Note that if “yes”, you are required to comply with the requirement in Section 2.2.1 of the permit to provide natural buffers or equivalent erosion and sediment controls.

For each unique point of discharge you list, you must specify the name of the first water of the U.S. that receives storm water directly from the point of discharge and/or from the MS4 that the point of discharge discharges to. You must specify whether any waters of the U.S. that you discharge to are listed as “impaired” as defined in Appendix A, and the pollutants for which the water is impaired. You must identify any Total Maximum Daily Loads (TMDL) that have been completed for any of the waters of the U.S. that you discharge to.

Indicate whether discharges from the site will enter into a water of the U.S. that is designated as a Tier II, or Tier III water. A list of Tier II and III waters is provided as Appendix F. If the answer is “yes”, name all waters designated as Tier II, or Tier III to which the site will discharge. The Idaho Antidegradation Implementation Procedures available on DEQ’s website can assist you in determining what Tier your receiving water bodies are.

Section VI. Chemical Treatment Information

Indicate whether the site will use polymers, flocculants, or other treatment chemicals. Indicate whether the site will employ cationic treatment chemicals. If the answer is "yes" to either question, indicate which chemicals you will use. Note that you are not eligible for coverage under this permit to use cationic treatment chemicals unless you notify DEQ in advance and DEQ authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. If you have been authorized to use cationic treatment chemicals by DEQ, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. Examples of cationic treatment chemicals include, but are not limited to, cationic polyacrylamide (C-PAM), PolyDADMAC (polydiallyldimethylammonium chloride), and chitosan.

Section VII. Storm water Pollution Prevention Plan (SWPPP) Information
All sites eligible for coverage under this permit are required to prepare a SWPPP in advance of filing the NOI, in accordance with Section 7. Indicate whether the SWPPP has been prepared in advance of filing the NOI.
Indicate whether earth-disturbing activities have already commenced on your project/site. If earth-disturbing activities have commenced on your site because storm water discharges from the site have been previously covered under a NPDES permit, you must provide the 2017 CGP NPDES ID or the NPDES permit number if coverage was under an individual permit.

Section V. Discharge Information
You must confirm that you understand that the CGP only authorizes the allowable storm water discharges listed in Section 1.2.1 and the allowable non-storm water discharges listed in Section 1.2.2.

Indicate the street, city, state, and ZIP code where the SWPPP can be found. Indicate the contact information (name, organization, phone, and email) for the person who developed the SWPPP for this project.

Section VIII. Endangered Species Information
Using the instructions in Appendix C, indicate under which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of ESA-listed endangered and threatened species and designated critical habitat. A description of the basis for the criterion selected must also be provided.

If criterion B is selected, provide the NPDES Number ID number for the other operator who had previously certified their eligibility for the CGP under criterion A, C, D, E, or F. The Tracking NPDES ID number was assigned when the operator received coverage under this permit, and is included in the notice of authorization.

If criterion C is selected, you must attach copies of your site map. See Section 7.2.4 of the permit for information about what is required to be in your site map. You must also specify the federally-listed species and/or federally-designated critical habitat that are located in the "action area" of the project, and provide the distance between the construction site and any listed endangered species and/or their designated critical habitat.

If criterion D, E, or F is selected, attach copies of any communications between you and the U.S. Fish and Wildlife Service and National Marine Fisheries Service and identify the participating agencies and Field Offices/Regional Offices you worked with in the basis statement of this NOI.

Section IX. Certification Information
The NOI must be signed as follows:

For a corporation: by a responsible corporate officer as specified in IDAPA 58.01.25.090.01.a.

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively as specified in IDAPA 58.01.25.090.01.b.

For a municipality, or other public agency: by either a principal executive officer or ranking elected official as specified in IDAPA 58.01.25.090.01.c.

Modifying Your NOI
If you have been granted a waiver from DEQ from electronic reporting, and if after submitting your NOI you need to correct or update any fields on this NOI form, you may do so by indicating changes on this same form.

Submitting Your Form
Submit your NOI form by mail to the following address:
1410 North Hilton
Boise, Idaho 83706
Visit this website for instructions on how to submit electronically:
https://www2.deq.idaho.gov/water/IPDES/

Appendix G - Notice of Termination (NOT) Form and Instructions

Section 8.3 requires you to use the E-Permitting System to prepare and submit your NOT electronically unless DEQ has granted you an electronic reporting waiver.

NOTICE OF TERMINATION FOR THE 2022 IPDES CONSTRUCTION GENERAL PERMIT
Submission of this Notice of Termination constitutes notice that the operator identified in Section III of this form is no longer authorized discharge pursuant to the IPDES Construction General Permit (CGP) from the site identified in Section IV of this form. All necessary information must be included on this form. Refer to the instructions at the end of this form.

I. Approval to Use Paper NOT Form
*Have you been granted a waiver from electronic reporting from DEQ *? YES | NO*

If yes, check which waiver you have been granted, the name of the DEQ staff person who granted the waiver, and the date of approval:

Waiver granted:
[ ] The owner/operator's headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission.
[ ] The owner/operator has issues regarding available computer access or computer capability.
Name of DEQ staff person that granted the waiver:

Date approval obtained:

*** Note: You must have been given approval by DEQ prior to using this paper NOT form. If you have not obtained a waiver, you must file this form electronically using the E-Permitting System.**

II. Permit Information
IPDES ID:

[ ] You certify that the project is not subject to any pending State or Federal enforcement actions, including citizens suits brought under State or Federal law.

Reason for Termination (Check only one):
[ ] You have completed all construction activities at your site, and you have met all other requirements in Section 8.2.
[ ] Another operator has assumed control over all areas of the site and that operator has submitted an NOI and obtained coverage under the CGP.
[ ] You have obtained coverage under an individual permit or another general IPDES permit addressing storm water discharges from the construction site.

III. Operator Information
Operator Name:
Mailing Address:
Street:
City:
State:

ZIP Code:
County or Similar Government Division:
Phone:
Ext.
E-mail:

IV. Project/Site Information
Project/Site Name: Project/Site Address: Street/Location:
City:
State:
ZIP Code:
County or Similar Government Division:

V. Monitoring Report
Attach the Monitoring Report for the entirety of the project. See Appendix J for a suggested Monitoring Report format.

VI. Certification Information
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
First Name, Middle Initial, Last Name:
Title: Signature:
Date:
Email:

Instructions for Completing Notice of Termination for the 2022 NPDES Construction General Permit

Who May File an NOT Form

Operators who are presently covered under the DEQ issued 2022 Construction General Permit (CGP) for Storm water Discharges Associated with Construction Activity may submit an NOT form when: (1) earth-disturbing activities at the site are completed and the conditions in Sections 8.2.2.A through 8.2.2.D are met; or (2) the operator has transferred all areas under its control to another operator, and that operator has submitted and obtained coverage under this permit; or (3) the operator has obtained coverage under a different IPDES permit for the same discharges.

Completing the Form

You must use the IPDES E-Permitting System to prepare and submit your NOI electronically, unless DEQ grants you an electronic reporting waiver to use a paper NOI form

Section I. Approval to Use Paper NOT Form

You must indicate whether you have been granted a waiver from electronic reporting from DEQ. Note that you are not authorized to use this paper NOT form unless DEQ has approved its use. Where you have obtained approval to use this form, indicate the waiver that you have been granted, the name of the DEQ staff person who granted the waiver, and the date that approval was provided.
See https://www.deq.idaho.gov/about-us/contact-us/ for a list of DEQ contacts.

Section II. Permit Information

Enter the existing IPDES assigned to the project. If you do not know the permit tracking IPDES ID number your local DEQ regional office.

Indicate your reason for submitting this NOT by checking the appropriate box. Check only one.

Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this NOT and is covered by the IPDES ID identified in Section II. Enter the complete mailing address, telephone number, and email address of the operator.

Section IV. Project/Site Information

Enter the official or legal name and complete street address, including city, state, ZIP code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for termination of permit coverage to be valid.

Section V. Monitoring Report

If monitoring was conducted during the project, include the monitoring report documentation.

Section VI. Certification Information

The NOT must be signed as follows:

For a corporation: by a responsible corporate officer as specified in IDAPA 58.01.25.090.01.a.

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively as specified in IDAPA 58.01.25.090.01.b.

For a municipality, or other public agency: by either a principal executive officer or ranking elected official as specified in IDAPA 58.01.25.090.01.c.

Submitting Your Form
Submit your NOI form by mail to the following address:
1410 North Hilton
Boise, Idaho 83706
Visit this website for instructions on how to submit electronically:
https://www2.deq.idaho.gov/water/IPDES/

Appendix H – Suggested Format for Request for Chemical Treatment

If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to storm water and/or authorized non-storm water prior to discharge, Section 1.1.9 requires you to notify DEQ in advance of submitting your NOI. DEQ will authorize coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards. To notify DEQ, you may use following form.

I. Operator Information
Operator Name:
Mailing Address:
Street:
City: State: Zip Code:
Phone:
E-mail:

II. Project/Site Information
Project/Site Name:
Project Site Address:
Street/Location:
City: State: Zip Code:
County or Similar Government Subdivision:
Site Contact Name (if different from operator):
Site Contact Phone Number:
Names of Receiving Water Bodies:

III. Map
Attach a map that illustrates the entire site including all of the below items. Include this map in your SWPPP.:

- All receiving water bodies
- All proposed locations of chemical treatment systems
- All proposed points of discharge to receiving water bodies
- All soil types within areas to be disturbed.
- All area of earth disturbance
- Sufficient indication of topography to indicate where storm water flows.

Attach a schematic drawing of the proposed treatment systems. Include all components of the treatment train, sample points, and pipe configurations. In addition to sufficient holding capacity upstream of treatment, the system must have the capacity to hold water for testing, and to re-treat water that does not meet water quality standards.

IV. Responsible Personnel
Treatment System Operator or Company Name:

Street/Location:
City: State: Zip Code:
Responsible Personnel List. List personnel who will be responsible for operating the chemical treatment systems and application of the chemicals. Cite the training that the personnel have received in operation and maintenance of the treatment systems and use of the specific chemicals proposed.

V. Proposed Treatment

Check proposed treatment system.
[ ] Chitosan enhanced sand filtration with discharge to infiltration (ground water)
[ ] Chitosan enhanced sand filtration with discharge to temporary holding ponds (batch)
[ ] Chitosan enhanced sand filtration with discharge to surface waters (flow-through)
[ ] Other (describe below and submit documentation that the proposed system and chemicals demonstrate the ability to remove turbidity and produce non-toxic effluent/discharge)

Check proposed cationic chemicals to be used:
[ ] FlocClear (2% chitosan acetate solution)
[ ] StormKlear LiquiFloc (1% chitosan acetate solution)
[ ] ChitoVanTM (1% chitosan acetate solution)
[ ] StormKlear LiquiFloc (3% chitosan acetate solution)
[ ] Other

Estimated Treatment Period Start Date:
Estimated Treatment Period End Date:
Describe sampling and recordkeeping schedule. Attach additional sheets as needed:

Explain why you have selected this proposed treatment system and chemicals. Include an explanation of why the use of cationic treatment chemicals is necessary at the site. Reference how the soil types on your site influenced your choices. Describe or provide an illustration of how the site of the discharge will be stabilized and why the discharge location will not cause erosion of the discharge water's bank or bed (please note that a permit from the Corps and state agencies may be necessary to place rock in the water body for this stabilization). Attach as many additional sheets as needed for a full explanation. If you have a report from a chemical treatment contractor describing their recommended approach you may attach that.

VI. Certification Information

I have documented and hereby certify that the following information is correct and has been documented in the SWPPP for this project:

- The SWPPP includes a complete site-specific description of the chemical treatment system herein proposed for use, including specifications, design, and Material Safety Data Sheets for all chemicals to be used.
- The controls to be used on the site are compatible with the safe and effective use of cationic chemical treatment.

- I verified through jar tests that the site soil is conducive to chemical treatment.
- I verified that the chemical treatment system operators for this project received training.
- I read, understand, and will follow all conditions and design criteria in the applicable use designations.
- If the discharge is to tribal waters, I notified the appropriate tribal government of the intent to use chemical treatment on a site located within that jurisdiction.
- I will keep the use level designation, operation and maintenance manual, and training certificate onsite prior to and during use of chemical treatment.
- A licensed engineer designed the system for this project including system sizing, pond sizing, and flow requirements.
- I verify that the discharge will not adversely affect downstream conveyance systems or stream channels (e.g., cause erosion).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Appendix I – Suggested Format for Turbidity Monitoring Reports

Authorized Official Name:
Title:
Signature:

Date:
Email:

Operator Name:
Operator Phone:
Operator Email:
Operator Address:

IPDES Permit Number:

Complete the following section for each storm event:

Sample Collector Name:
Sample Collector Title:
Sample Collector Title:
Sample Collector Signature:

Parameter	Storm Event Date	Sample Location	Sample Collection Time	Analytical Method	Results	Units
pH						s.u.
Turbidity						NTU

Describe any corrective actions taken to address monitoring exceedances:

Attach calibration and maintenance records to this form.