General Plan of Operations
Appendix 05
Best Management Practice Plan

September 2025

STATEMENT OF MANAGEMENT COMMITMENT

HELCA HECLA GREENS CREEK MINING COMPANY

BEST MANAGEMENT PRACTICE PLAN

This Best Management Practice Plan has been prepared to control and contain potential pollutants at the Hecla Greens Creek Mining Company (HGCMC) site.

This plan is approved for implementation as herein described. HGCMC management is committed to providing the necessary financial, staff, equipment, and training resources to develop, update, and implement this Best Management Practices Plan on a continuing basis.

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.

Signature: ______________________________ Date: Nov 11, 2025

Name: Bill Kloth

Title: General Manager HGCMC

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Acronyms

ADEC	Alaska Department of Environmental Conservation
AML	Alaska Marine Lines
BMPs	Best Management Practices
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CWA	Clean Water Act
FEIS	Final Environmental Impact Statement
GCJV	Greens Creek Joint Venture
GPO	General Plan of Operations
HDPE	High-density Polyethylene
ISO	International Standardization Organization
HGCMC	Hecla Greens Creek Mining Company
kg/ha	kilograms per hectare
lbs/acre	pounds per acre
mgd	million gallons per day
MIBC	methyl isobutyl carbinol
SDS	material safety data sheet
MSHA	Mine Safety and Health Administration
APDES	Alaska Pollution Discharge Elimination System
PVC	polyvinyl chloride
SAG	semi-autogenous grinding
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
tpd	Tons Per Day
TSS	Total Suspended Sediment
µg/L	micrograms per liter
USEPA	United States Environmental Protection Agency
Forest Service	United States Forest Service

1. INTRODUCTION

This document describes the Plan for the implementation of Best Management Practices (BMP) to control and contain potential pollutants at the Hecla Greens Creek Mining Company (HGCMC) site. The fundamental concept of this BMP plan is to outline appropriate measures that can be used to prevent sediment or hazardous chemicals from reaching waters of the United States while effectively and economically meeting the requirements of state, federal, and local agencies that have jurisdiction over such matters in this project's operations. This document has been reviewed by the engineering and environmental staff of HGCMC. The document is believed to be complete, with data available at this time, and comprehensive in addressing the relevant environmental concerns of the project.

1.1. GENERAL INFORMATION

NAME OF FACILITY:
Hecla Greens Creek Mine

TYPE OF FACILITY:
Underground Mining and Milling Operation

LOCATION:
Northwestern Admiralty Island, Alaska,
18 air miles southwest of Juneau

NAME AND ADDRESS OF OWNER OR OPERATOR:
Hecla Greens Creek Mining Company
P.O. Box 32199
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(907) 789-8100

DESIGNATED PERSONS ACCOUNTABLE FOR SPILL PREVENTION, REPORTING, & EMERGENCY PROCEDURES AT THE FACILITY:

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1.2. STATEMENT OF HECLA GREENS CREEK MINING COMPANY POLICY

The HGCMC policy on environmental concerns is to take actions deemed necessary to prevent the accidental release of hazardous or toxic materials or chemicals into the natural environment. In the event that an accidental release should occur, the policy of HGCMC is to immediately mitigate the effects of such a release using equipment and techniques which are available, practical, and proven for such use. Cooperation with local, state, and federal regulatory and advisory agencies will be maintained to the greatest extent possible.

1.3. SITE TOPOGRAPHIC MAPS

This BMP plan includes site topographic maps that indicate site boundaries, access, and haul roads; locations of storm water outfalls and outlines of drainage areas; storage and maintenance areas for equipment, fuel, chemicals, and explosives; materials handling areas; areas used for storage of overburden, materials, soils, tailings, or wastes; locations and points of permitted discharges; and springs, streams, wetlands, and other surface waters. The following maps include:

Figure 1 – Site Map

Figure 2 – Tailings Facility Area

Figure 3 – Hawk Inlet Facilities Area

Figure 4 – Mine and Mill Area

2. BMP COMMITTEE

The BMP Committee is composed of HGCMC personnel involved in the development, implementation, maintenance, and updates of the BMP program. Members of the committee are knowledgeable in their specific department's operations, include environmental specialists, and facility supervisors.

2.1. Committee Responsibilities

The Greens Creek BMP Committee is responsible for:

- Development of the BMP plan
- Implementation, maintenance, and updates of the BMP plan
- Identification of toxic and hazardous materials on site
- Identification of potential spill sources
- Establishment and continued evaluation of incident reporting procedures
- Development of BMP inspections and records procedures
- Assistance in interdepartmental coordination to carry out the BMP plan
- Review of new construction and changes in processes and procedures for spill prevention and control
- Evaluation of the effectiveness of the BMP plan
- Recommendations to HGCMC management on BMP-related matters

3. FACILITY DESCRIPTIONS

3.1. Mine / Mill Sites

The mine, located on the south side of Greens Creek, has a main access portal at an elevation of 920 feet. Personnel and supplies are brought into the mine at the 920 portal and distributed throughout the mine with rubber-tired vehicles. Ore and waste are removed from the 920 portal with rubber-tired vehicles, and all other levels are interconnected with ore and waste passes accessed with these same rubber-tired vehicles. Ventilation exhaust is directed out of the 1350 adit, which also serves as an emergency escape way from the underground workings.

Underground mining methods incorporate rubber-tired diesel-powered equipment. Drift and fill is the primary mining method used to extract the ore. Long-hole stopes are also utilized in ore zones conducive to this bulk mining method. These methods use cemented tailings as backfill in mined out areas to support vehicles and equipment and to provide ground support allowing subsequent mining of adjacent ore. Excess water from the mining operations is collected and piped to A Pond located on the north side of Greens Creek.

The mill site is located on the north side of Greens Creek directly across from the mine. Access to the mine site from the mill site is via a bridge that crosses Greens Creek. The mill site consists of the mill buildings, fuel storage tanks, an office complex, a coarse ore stockpile and waste pile, water supply pumphouse, switch gear building, and a warehouse and storage area. A minimum of 2 weeks' worth of supplies, including reagents, will typically be stored at the mine/mill site.

A selective flotation milling process is used to concentrate valuable minerals from the raw ore following grinding. The flotation process consists of size reduction, mineral concentration, and moisture reduction of the concentrate. Size reduction involves grinding the ore in semi-autogenous (SAG) and ball mills. Ore will enter the SAG mill at a size of 15 inches or smaller and leave in the 0.5-inch (-16 mesh) size range. The ore will then enter the ball mill to be further reduced in size to 80 percent at minus 74 microns. This material is then used to produce slurry.

The slurry is transported in pipes to flotation cells, where carbonaceous wastes, then valuable minerals, will be separated from gangue materials in a series of froth flotation processes. The ore minerals in this case will be sulfides of lead, zinc, copper, silver, and uncombined gold. Waste includes various silicate, carbonate, and sulfide minerals. The valuable minerals adhere to air bubbles that rise to the surface of the tank and are removed. To make the process work, air and various reagents are selectively added to the flotation tanks. This allows the bubbling or frothing action to float different minerals selectively so that differing metal concentrates can be produced. The concentrator recovers various valuable minerals into one of three concentrates for sale: zinc, lead, and bulk. No reduction of sulfides to base metals, or other changes in the chemical composition of ore minerals, takes place in the concentrator or at the project site.

Following separation of ore minerals from tailings, the concentrate slurries are piped to separate thickener tanks, where the water content is reduced. The thickened slurries are then compression-filtered to remove most of the remaining water.

Currently, the target production rate is 2,300 tons per day (tpd) of ore.

3.2. Tailings

Of the approximate 1,800 tpd of tailings produced, on average half is returned to the underground mine and used as backfill in mine voids. The remainder of the dewatered tailings will be placed in a stockpile at the mill site, loaded by front-end loaders onto covered haul trucks of approximately 50-ton capacity, and transported to the surface tailing facility.

The approximate 900 tpd of tailings are deposited daily in the dry tailings facility. The facility is located at the upper end of the Tributary Creek drainage. The total area of the site is approximately 123 acres, which includes retention ponds. The dry tailings are situated proximal to, and upstream of Pond 7/10.

Pond 7, with an approximate storage capacity of 33 acre-feet, receives water via the drain system under the tailings pile, runoff from the tailings basin watershed, runoff from the Site 23 rock storage area, process water piped from the mill, and from combined wastewater and treated sewage effluent piped from mill/mine and Hawk Inlet facilities. Pond 10, with a storage capacity of 35.2 acre-feet, was constructed adjacent to Pond 7 and interconnected via five, 36-inch diameter pipes. The pipes are set at an elevation that flow between the ponds occurs when Pond 7 reaches approximately 70 percent capacity. Water collected in the ponds is passed through the water treatment plant in the tailings area prior to discharge into Hawk Inlet in accordance with the APDES permit requirements.

3.3. Ship Loading/Unloading Facility

Supplies, such as fuels and reagents, are transported by barge to the Hawk Inlet port facility and unloaded at the marine terminal complex. The cargo dock is located at the same site as the old cannery dock structure. The barge dock consists of breasting dolphins and a floating ramp to land.

A yearly average of 80 barges bringing goods, rock, and fuel come into Hawk Inlet. Chemicals and containers are unloaded from barges by forklifts and transported to the process site by truck. HGCMC wastes and return materials are placed back onto these barges by forklifts.

Concentrates are transported from the mill to Hawk Inlet port facility by covered haul truck. An enclosed telescoping boom conveyor is used to transport concentrates from within the shore storage area directly into the holds of bulk cargo ships. Some 12 to 24 concentrate ships are loaded annually in Hawk Inlet.

4. APDES STORM WATER SITE-SPECIFIC BEST MANAGEMENT PRACTICES

The following sections provide details and figures on the specific APDES permitted outfalls and document the establishment of BMPs for each permitted site. These figures are designed to be used as an aid during monthly and annual inspections of the sites.

Final reclamation and closure plans for the sites include removing all facilities, re-contouring the area, and allowing natural re-vegetation to occur. Topsoil removed and stored on site during mining activities, meeting state-specified standards, will be used as a growth medium cover as required during reclamation. This material will be inert rocky soil which will not contribute to pollution of the waters of the U.S.

4.1. APDES OUTFALL 002 – Treated Water Discharge to Saltwater

The APDES discharge site designated 002 is an underwater discharge point in Hawk Inlet. All mine, mill, process, and the majority of on-site storm water runoff is collected, treated, and discharged through this outfall. Discharge is limited and monitored per APDES permit requirements.

4.2. APDES OUTFALL 002A – Treated Water Discharge to Saltwater

The APDES discharge site designated 002A is an underwater discharge point in Hawk Inlet. This outfall has not been constructed at the time of this update. This Plan will be updated to include more detail after construction is completed.

4.3. APDES OUTFALL 003 - North Cannery Building Culvert

The APDES storm water outfall designated 003 is located at a culvert under the north cannery building where the HGCMC dining facility and offices are located. This culvert previously discharged storm water from the truck pad as well as water from the vegetated areas near the buildings. Now most of the water is collected for water treatment, prior to discharge through Outfall 002.

Figure 5 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall had exceeded the allowable limits for zinc, during storm event monitoring. To correct the situation HGCMC now collects most of the water that once flowed through 003.

4.4. APDES OUTFALL 004 - 1.8 mile “A” Road - Pit 7

The APDES storm water outfall designated 004 is located at one of the discharge sites from a reclamation material storage area in an old road construction quarry named Pit 7. Most of the water discharging from this pit drains through a constructed wetland consisting of two ponds linked with vegetated areas. Additional BMP measures employed at this site include diversion ditches, check dams, settling ponds, water bars, and hydroseeding of the ditches and slopes.

Figure 6 details this area and shows the flow patterns on the site.

Water Quality Concerns

This outfall has the potential to impact the receiving water primarily with total suspended sediment (TSS), and iron and manganese resulting from the reductive dissolution of the material stored at the site.

The purposed benefit of channeling runoff through the wetlands is to increase sediment deposition and metal abatement.

4.5. APDES OUTFALL 005.2 - 3.0 Mile “B” Road - Zinc Creek Bridge

The APDES storm water outfall designated 005.2 is located at the bottom of the North abutment, upstream side, of the Zinc Creek Bridge. Most of the water that discharges from this area originates as rainwater on a short section of road and the abutment itself. BMP measures in place at this site include check dams, straw wattles, compost filter socks, hydroseeding, liming, and settling ponds. Flocculant logs are utilized to help with high suspended solids loading in approved areas.

Figure 7 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall have exceeded the allowable limits for pH. The rock material the abutment is constructed of is acid-generating. During reclamation the offending material will be removed and disposed of in a contained facility (e.g. tailings storage facility). In the interim runoff is routed away from the site, vegetation has been established to decrease oxygen and water infiltration, and a lime solution is occasionally applied to the abutment.

4.6. APDES OUTFALL 005.3 - 4.5 Mile “B” Road - Waste Rock Area E

The APDES storm water outfall designated 005.3 is located on a small drainage adjacent to the north side of a waste rock pile designated Site E. This drainage concentrates storm water from the north side of the waste rock pile and a portion of the B Road. Runoff from a majority of the pile surface is routed to a storm water collection pond that is actively managed by pumping to treatment facilities during the non-freezing months. BMP measures in place at this site include vegetated ditches, check dams, settling ponds, hydroseeding, and natural re-vegetation. Flocculant logs are deployed in settling ponds adjacent to the site to aid with high suspended solids loading in this area.

Figure 8 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this site have exceeded the allowable limits for zinc and lead. The waste rock in this area is potentially acid-generating. The process of reclaiming the site by co-disposing the waste rock in the tailings disposal facility was started in 2008.

4.7. APDES OUTFALL 005.4 - 4.6 Mile "B" Road - Pit 6

The APDES storm water outfall designated 005.4 is located at the end of a diversion ditch that is designed to collect the storm water from a reclamation material storage area in an old road construction quarry called Pit 6. BMP measures in place at this site include vegetated ditches, diversion berms, check dams, water bars, and settling basins.

Figure 9 details this area and shows the flow patterns on the site.

Water Quality Concerns

Storm water quality from this site has been compliant with AWQS since 2010. The last water quality exceedance occurred in 2009 following the haulage and placement of reclamation material in Pit 6 for storage. The area is now stabilized and well vegetated, and runoff is appropriately managed through grading and BMPs. There are no water quality concerns unless soil disturbance activities occur.

4.8. APDES OUTFALL 005.5 - 7.8 Mile "B" ROAD CULVERT

The APDES storm water outfall designated 005.5 is located on a small culvert that drains a portion of the road surface and ditch areas near mile 7.8 of the B Road. BMP measures in place at this site include vegetated ditches, settling basins, and check dams.

Figure 10 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall have exceeded the allowable limits for lead, zinc, and TSS. To reduce the runoff volume and suspended solid load reporting to this culvert, the road was regraded near 7.9-mile and a diversion ditch was constructed to route road runoff from above this area to D Pond for collection and treatment. The reduced runoff volume increases the effectiveness of BMPs in the roadside ditch near the outfall.

For the 7.8-mile culvert, and all other culverts along the road system, several BMP measures have been added. Rock check dams with upstream sumps have been added to the ditch system, replacing less effective straw bale check dams. Flocculant logs are utilized to help with high suspended solids loading in this area. In addition, the ditches have been vegetated with a grass mixture, and where practicable a settling basin has been constructed at culvert outfalls.

4.9. APDES OUTFALL 006 – D Pond Overflow - Waste Rock Area D

The APDES storm water outfall designated 006 is located at the overflow culvert from a storm water retention pond designated D Pond. This pond collects storm water from an inactive waste rock storage pile and a portion of the B Road. During normal operations, this water is pumped from the pond and eventually to Pond 7, where it is treated and then discharged through Outfall 002. Additional BMP measures in place at this site include diversion ditches, hydroseeding, natural re-vegetation, check dams, and settling ponds.

Figure 11 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall have exceeded allowable limits for TSS and lead. The currently inactive waste rock storage pile is designed to maximize storm water runoff to D Pond while minimizing infiltration. However, this does not completely prevent contaminants from entering the water. To prevent the release of contaminants to the environment the pump system associated with the pond was upgraded in 2008.

4.10. APDES OUTFALL 007 – C Pond Overflow - Waste Rock Area C

The APDES storm water outfall designated 007 is located at the overflow culvert from a storm water retention pond designated C Pond. This pond collects storm water from an inactive waste rock storage pile, the 860 area, a section of the Site 23 access road, and a portion of the B Road. During normal operations, this water is pumped from the pond and eventually to Pond 7, where it is treated and then discharged through Outfall 002. Additional BMP measures in place at this site include diversion ditches, hydroseeding, natural re-vegetation, check dams, and settling sumps.

Figure 12 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall have exceeded the allowable limits for lead, zinc, and TSS. This is primarily due to sediment laden runoff from roads within this drainage area. To prevent the release of contaminants to the environment the pond infrastructure has been upgraded (e.g. increased storage, additional pump).

4.11. APDES OUTFALL 008 - Waste Rock Area 960

The APDES storm water outfall designated 008 is located at the outfall of a ditch that collects storm water from a small area that used to be waste rock storage from the initial mine portal development. This area is designated the 960 waste storage site. Most of the waste rock has been removed, and the area has naturally re-vegetated.

Figure 13 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this outfall have exceeded the allowable limits for pH in previous years. However, storm water runoff has been compliant with AWQS since late-2012. This positive result reflects the removal of previously stored production rock from this site, the continued stability of this small site's new surface, and its reclamation progress back to native vegetation cover. This site is not anticipated to further contribute to pollution of the waters of the U.S.

4.12. APDES OUTFALL 009 - Waste Stock Pile 1350

The APDES storm water outfall designated 009 is located at the outfall from a storm water collection area near the 1350 adit. This drains an area that was previously covered with waste rock from the 1350 adit development. A multi-year project, ending in 2015, removed a majority of the waste rock from the 1350 site. The waste rock that was left is for maintaining access to the adit, which serves as the exhaust for the mine ventilation system and a secondary escapeway.

Figure 14 details this area and shows the flow patterns on the site.

Water Quality Concerns

Water samples from this site have exceeded the allowable storm water monitoring limit for zinc since the completion of the 2014 waste rock removal activities. It was anticipated that a spike in metals concentrations would occur following the waste rock removal activities due to the flushing of residual oxidation products that had accumulated in the underlying soils. Zinc concentrations in storm water samples have decreased significantly since 2014, and the trend of improvement is expected to continue.

To further improve the water quality at Outfall 009, in 2016 a collection trench was constructed along the toe of the remaining waste rock pile to intercept runoff. During non-freezing months, captured water was pumped to the 1350 adit where it entered the mine water collection system. In 2022 two drain holes were drilled in the area downstream of the collection system where water was still pooling and the previous collection system was removed. The holes report to a sump in the underground mine and removes the seasonal operation of the runoff collection system Mine water is eventually routed to Pond 7 for treatment.

4.13. APDES OUTFALL 012 – A-Road Sand Pit Area

The APDES storm water outfall designated 012 is located at the outfall of a ditch located downstream of the settling pond located at 1.4-mile on the A-Road known as the Sand Pit. This area was a quarry for sand material used at the mine. The extractable resource was exhausted in 2016 from the permitted 15-acre site. Once the sand resource was extracted, the area was then developed into a repository for overburden material to be available for use during mine reclamation. A berm was constructed along the north and west sides of the sand pit creating a large impoundment that is under the jurisdiction of the Alaska Dam Safety Program. The impoundment was then partially filled with clay, soil, and organic peat excavated during the construction of Pond 10. A spillway and outlet channel were constructed through the berm to limit the accumulation of storm water in the impoundment. The outlet channel directs runoff into the forest duff north of the Sand Pit.

BMP measures in effect in this area include a rip-rap lined ditch along the east and south sides to divert upland runoff around the impoundment, a rip-rap lined spillway and outlet channel with settling sumps, and vegetation establishment on the outer face of the berm and hillside to the east and south. The impoundment serves as a large settling basin to minimize suspended solids in storm water flows through the outlet channel. There are currently no water quality concerns with the Sand Pit area.

Figure 15 details this area and shows the flow patterns on the site.

Water Quality Concerns

There are no known water quality concerns currently. Water has not flowed through the outfall since construction was completed.

5. SITE SPECIFIC BEST MANAGEMENT PRACTICES FOR AREAS OF CONCERN

5.1. Waste Rock at Site 23

The waste stockpile is located west the mill, uphill from the C and D ponds. Waste rock material with low to no acid-generating potential is deposited here. Waste rock with no acid-generating potential is used to cap the material with greater potential to produce acid water. Non-contact storm water is diverted around the site where possible. All contact water is managed via gravity flow through ditches, sumps, and culverts, collected in Pond 23, and conveyed to Pond 7 for treatment before discharging through Outfall 002.

Figure 16 details this area and shows the flow patterns on the site.

Water from this area could exceed TSS, lead and zinc limits if not managed. The BMP measures in place are considered sufficient for the conditions at this site.

5.2. Tailings Disposal Facility and Ponds 7/10

The Tailings Disposal Facility and Ponds 7/10 are contained within an area where all on-site storm water is collected and treated before discharge through Outfall 002 and the future Outfall 002A. Non-contact storm water is diverted from the site in a diversion ditch along the eastern uphill side of the facility. Other BMP measures include using larger rock to ‘cap’ the fine tailings material and hydroseeding of all exposed slopes. A road system and associated ditches encircle the facility, enabling the collection of the contact storm water.

Figure 2, listed previously, details this area and shows the flow patterns on the site.

Water from this area could exceed TSS, lead and zinc limits if not managed. The BMP measures in place are considered sufficient for the conditions at this site.

5.3. B Road and Bridges

The B Road is an approximately 8.5-mile long, single lane with turnouts, gravel road that connects the Hawk Inlet facilities near sea level with the mine and mill complex at elevation 920 feet. There are four bridges along the road, located at 3.0-mile (Zinc Creek), 3.4-mile (Falls Creek), 7.4-mile (Killer Creek) and adjacent to the 920 portal (Greens Creek). The road also crosses Cannery Creek, and a few smaller unnamed creeks, that are culvert crossings. The road is extensively travelled daily for haulage of tailings, concentrates, freight, fuel, and transport of mine personnel. Due to the extensive use, and being located within a temperate rain forest, management of runoff and sediment from the road is a specific area of concern, particularly at stream crossings. Figures 18-31 show the B Road with locations of culverts.

There are several types of BMPs employed on the B Road to minimize sediment release to the environment. Ditches are established along the inside edge and/or outside edge, where possible. The road surface is frequently graded to remove ruts and promote water running off the road surface as quickly as possible and into the ditches. When necessary, the road is resurfaced with an imported aggregate that meets a Department of Transportation specification of ‘very hard’ to reduce the rate of degradation and production of fine sediment. Approximately 160 culverts are placed in the road, at appropriate spacing based on the road gradient, to limit the flow volume in the ditches. Nearly all culverts have settling sumps located at the inlet, outlet, or both. The ditch system is cleaned and reestablished annually during the spring, and then hydroseeded to establish vegetation to provide erosion control. Rock check dams and straw wattles are also installed in the ditch to provide velocity breaks in the higher gradient sections.

There are several types of BMPs employed at the bridges to minimize sediment release to streams. The bridges all have splash guards on both sides to minimize sediment splashing over as vehicles cross the bridges. A posted 5 mile per hour speed limit improves the effectiveness of the splash guards. Sediment deflectors are located at each end of the bridges to prevent runoff from flowing onto the face of the abutments beneath the bridges. An 80-mil HDPE liner is placed beneath the timber decking to reduce sediment falling through bridge surface. Additionally, UHMW decking has been installed in the tire ware surfaces to reduce degradation of the bridge decking and protect the integrity of the aforementioned liner. Beneath the bridges, a combination of compost filter socks, straw wattles, and hydroseeding are used to contain and stabilize sediment on the abutments. Sediment is removed periodically from the bridge surfaces as accumulation occurs. The material is gathered and removed to an appropriate disposal site.

With proper maintenance, these BMPs are sufficient to minimize sediment release from the B Road and bridges.

5.4. Hawk Inlet Freight Barge Ramp

Incoming and outgoing freight is transported by barge from the port facility in Hawk Inlet. Cargo is loaded and off-loaded from the barge via forklifts using a transfer bridge that extends from shore to the barge. The approach ramp to the transfer bridge had been a gravel surface that required frequent grading to direct storm water runoff to a catch basin located adjacent to the top of the transfer bridge. From the catch basin, runoff is pumped to de-grit basin DB-04 and then pumped to Pond 7 for treatment and discharge through Outfall 002.

HGCMC utilizes BMPs on the freight barge ramp to ensure stormwater does not enter Hawk Inlet down the ramp. ‘Rubber razor bars’ at the head of the transfer bridge direct all runoff from the approach ramp to the catch basin, a large concrete apron on the gravel approach ramp, that prevents the formation of ruts by the forklifts and is sloped to direct all runoff to the catch basin. Current maintenance practices for freight barge ramp BMPs involve periodic sweeping of the apron to remove sediment, cleaning of the catch basin, and ensuring that the transfer pump is in good working order.

Figure 3, listed previously, details this area and shows the flow patterns on the site.

6. GENERAL BEST MANAGEMENT PRACTICES

The following descriptions provide details on specific management techniques applicable to the Greens Creek Mine site. Attachment D contains the detailed implementation direction for many of these BMPs.

6.1. Preserving Existing Vegetation

BMP Description: Preserve existing vegetation where possible. Delineate all areas to be preserved so that it is clear to equipment operators where the limits of operation are.

Installation: See BMP Details in Attachment D.

6.2. Vegetative Buffer Strip

BMP Description: A vegetative buffer strip is an undisturbed area or strip of natural vegetation that provides a filter to intercept and detain storm water runoff, reduce runoff flow velocity, and promote infiltration. The buffer strip may be natural, undeveloped land or may be graded and planted with grass or other vegetation. The buffer strips may be placed between a source of sediment and a waterway or drainage area, can be used as a location to divert drainage to and can be used as a perimeter control measure. This measure can be either permanent or temporary, depending on the area.

Installation: See BMP Details in Attachment D.

6.3. Check Dam

BMP Description: A check dam is a small berm of rocks, reinforced or non-reinforced, designed to withstand overtopping, that is placed in a ditch or other drainage way. The purpose of the check dam is to reduce flow velocities and to trap sediment in the backwater zone upstream of the check dam. The frequency of the check dam should be such that the toe of the uphill break is the same elevation as the crest of the downhill break. Check dams with upstream sumps have been added to the ditches along the road system.

Installation: See BMP Details in Attachment D.

6.4. Diversion Ditch

BMP Description: Diversion ditches, dikes or excavated channels or a combination of any of these are used to intercept or divert runoff or flowing water away from disturbed areas, such as excavated areas and toward stabilized areas. It is a small earth channel used to divert and convey runoff, generally to a sediment basin, energy dissipater, or to divert the flow around a site. Depending on slope, the diversion ditch may need to be lined with erosion control matting, plastic (for temporary installations only), or riprap.

Installation: See BMP Details in Attachment D.

6.5. Diversion Berm

BMP Description: A diversion berm is a semi-permanent ridge of compacted soil constructed to divert storm water from leaving a contaminated site. They are typically designed to force storm water to travel into ditches, sediment basins, or other structures where the water can be treated before being released. Diversion berms are typically constructed of the local soil and vegetated to minimize erosion.

Diversion berms are essential in keeping erosion, sediment, and contaminants confined to the disturbed or industrialized areas of a site. At the Green’s Creek Mine, the berms are used to prevent storm water from exiting the pads and work areas which have little or no natural slope to direct the storm water into the ditch system.

Installation: See BMP Details in Attachment D.

6.6. Water Bar

BMP Description: A water bar is a cross-drainage diversion ditch and/or hump (4 inches to 1 foot high) in a trail or road for the purpose of diverting surface water runoff into the roadside vegetation, duff, ditch, or dispersion area to minimize the volume and velocity, which can cause soil movement and erosion.

Water bars are typically constructed of the local soil, well compacted, and vegetated if possible. If this is not practical, then imported material may be used. In any case, the material used to construct the water bar should be resistant to erosion. Water Bars should be placed at a diagonal to the direction of water flow. This will prevent damming and subsequent overtopping of the structure.

Installation: Install as a fix for roads that are getting ‘washed’ out.

6.7. Culvert Water Diversion

BMP Description: Culvert diversions serve to divert sediment-laden storm water from directly entering a stream or waterway. These are used primarily at stream crossings to ensure that water flowing off the road surface and into side ditches will be diverted into vegetation and not allow sediment deposition directly into the stream. A culvert diversion is constructed by placing smaller culverts approximately 50 to 100 feet upgradient from the primary stream culvert. The diversion culverts are placed behind check dams and positioned so that the flow on the outfall side of the culvert has to travel through vegetation or the forest floor duff before reaching the stream.

6.8. Hydroseeding

BMP Description: Hydroseeding is a hydraulic application method which incorporates seed, water, fertilizer, and mulch into a homogeneous mixture (slurry) that is sprayed onto the soil. The objective of hydroseeding is to establish a vegetative cover on disturbed areas by seeding the appropriate and rapid growing annual grasses. The purpose of seeding is to stabilize the soil and reduce erosion damage from storm water. Seeding is applicable to any area that is exposed and subject to erosion if additional construction or disturbance activities are not expected to occur within three months. Areas specifically targeted for seeding include roadside ditches, exposed slopes, stockpiles, and berms.

The following specific seed mix has been approved by the United States Forest Service (USFS) for use at the Greens Creek Mine.

Seeding Mixture:

- 60 percent ‘Nortran’ Tufted hairgrass (*Deschampsia caespitosa*)
- 20 percent ‘Boreal’ Red fescue (*Festuca rubra*, Boreal variety)
- 10 percent ‘Arctared’ Red fescue (*Festuca rubra*, Arctared variety)
- 10 percent “Gruening’ Alpine bluegrass (*Poa alpine)*

Application rate for this mixture is 43 pounds per acre for areas completely devoid of vegetation or when native species may be inhibited from moving into the site. For other areas adjust the application, typically 15-30 pounds per acre, accordingly for surface contours, grade, aspect, rockiness of site.

Seed mixture contains no more than 0.01 percent other seed, whether identified or not.

Fertilizer:

- 10-20-10 (10 percent nitrogen, 20 percent phosphorus, and 10 percent potassium): 200 lbs/acre (225 kg/ha)
- 46-0-0 (nitrogen urea): 100 lbs/acre (110 kg/ha)

Hydroseed:

The mix recipe for the hydroseeding system in use at the Greens Creek Mine is shown below. This works out to a seed application rate of 30 lbs/acre.

Recipe for a 3 loads/acre mix (devoid of vegetation):

- 1,000 gal Water
- 4 bags EcoFibre mulch (50 lbs/bag)
- 1 bag Seed (14 lbs/bag)
- 2 bags Fertilizer (50 lbs/bag)

Adjust mixture accordingly for other conditions.

Inspection:

Inspect newly seeded areas on a regular basis and particularly after each storm event. Check for areas where the mulch has failed or the application has been washed away before the seed could establish. Reseed as needed.

Installation: See BMP Details in Attachment D.

6.9. Silt Fence

BMP Description: A silt fence is a temporary sediment barrier used to remove sediment from runoff. The fence works by intercepting sheet flow from slopes, causing the runoff to pond behind the fence, thereby promoting deposition of sediment on the uphill side of the fence. Silt fence consists of a geotextile fabric that is trenched or sliced into the ground. The bottom of the fence is anchored into the ground by compacting the disturbed soil along both sides of the trench or slice. The top of the fence is attached to posts for support, creating a barrier to the flow of contaminated storm water runoff.

Installation: See BMP Details in Attachment D.

6.10. Fiber Roll

BMP Description: Fiber rolls are tubes made of UV degradable polypropylene netting, coconut, jute, burlap or coir. They are filled with compost, mulch, fiber, wood chips, straw, flax, rice, or coconut fiber. They are used to slow, filter and spread overland water flows to prevent erosion and trap sediment.

Installation: See BMP Details in Attachment D.

6.11. Temporary Construction Entrances

BMP Description: A stabilized construction entrance provides a stabilized area that is placed where traffic enters or exits the construction site. This measure establishes a buffer area for vehicles to deposit their mud and sediment and minimizes the amount of sediment transported onto public roadways. Mud on a road can create a safety hazard as well as a sediment problem. Construction entrances can be made of gravel or use a mud mat.

Installation: Install before sediment is likely to get tracked onto paved areas. See BMP Details in Attachment D.

6.12. Wind Erosion Control

BMP Description: Dust can be controlled by spraying all disturbed areas, stockpiles, and roads with water. Borrow material that is being hauled to the project site shall be kept slightly moist or covered to prevent wind transport during hauling. Water can be used to increase the soil moisture levels. It will be reapplied as necessary. The minimum amount of water will be used to perform dust control avoiding overwatering. Reduced speeds are used on un-paved areas. This is a temporary measure.

The Tailings Disposal Facility Fugitive Dust Mitigation and Monitoring Plan provides more information on dust control strategies.

Installation: Spray with water when soil is dry enough to be picked up when vehicles drive over it. See BMP Details in Attachment D.

6.13. Settling Pond (Sediment Trap)

BMP Description: A settling pond is a place where fine particles are removed from water by means of gravity. The dirty water enters the basin at one end, and the cleaner water is transferred out at the other end through a culvert. The water must be in the basin long enough for the desired particle size to be removed. Smaller particles require longer periods for removal and thus larger basins. Sometimes a flocculent may be added to help smaller particles stick together and form larger particles. Stoke’s Law can be used to calculate the size of a settling basin needed in order to remove a desired particle size.

Installation: See BMP Details in Attachment D.

6.14. Dewatering Operations

BMP Description: Dewatering activities will be accomplished with a rock lined sump and a 6” pump in a localized depression. The pump will transfer water to a dewatering bag or a series of hardline eventually discharging to Hecla’s existing water treatment system.

Installation: See BMP Details in Attachment D.

6.15. Mulching

BMP Description: Mulching is the application of a uniform, protective layer of gravel, straw, wood fiber, compost, wood chips, tackifier, bonded fiber matrix (BFM) or other material to protect soil from rain and overland flow to foster the growth of vegetation, increase infiltration, reduce evaporation, insulate the soil, suppress weed growth, and hold fertilizer, water and seed.

Installation: See BMP Details in Attachment D.

6.16. Covers

BMP Description: Soil stabilization matting is long rolls of matting which can be rolled on unvegetated cut or fill slopes. This is a temporary measure.

Installation: See BMP Details in Attachment D.

6.17. Flocculant

BMP Description: Anionic Flocculant is utilized along the road system to help settle out sediment from stormwater. Solid blocks or "logs" of flocculant are used and slowly release as the block dissolves. The logs are placed in conveyance ditches sufficiently upstream of the detention basins or check dams to allow proper mixing with runoff. Locations are checked monthly during the storm water inspection and visually inspected more often as employees drive by the locations.

Installation: See BMP Details in Attachment D.

7. HISTORY OF SPILLS AND LEAKS

See Attachment B for a list that meets the permit requirement of listing significant spills and leaks of toxic or hazardous pollutants that drain to a permitted outfall, a storm water conveyance, or otherwise drain to surface waters. The list includes reportable large spills from July 12, 2020 to present. The Spill Reporting forms are provided and maintained in the Spill Prevention Countermeasures and Control Plan (SPCC).

8. INSPECTIONS, RECORDS, AND TRAINING

8.1. Monthly BMP Inspections

Qualified personnel will have the responsibility of inspecting BMPs, designated equipment, and facility areas at least monthly, except when weather conditions would preclude safe access to a site. Inspections must include, at a minimum, all material handling and storage areas storm water control and containment structures, and erosion control systems. The monthly inspection checklist is provided as Attachment C.

8.2. Comprehensive Site Compliance Evaluations

Qualified personnel will conduct comprehensive site compliance evaluations annually, focusing specifically on: All material handling and storage areas, areas that contribute to wastewater and storm water discharges, areas that are susceptible to leaks or spills (which must be visually inspected for evidence of, or the potential for, pollutants entering the permitted outfalls), storm water drainage systems, and surface waters. Structural and non-structural BMPs and other measures to reduce pollutant loadings must be evaluated to determine whether they are adequate and properly implemented. Equipment needed to implement the BMP plan, such as spill response equipment, must be inspected.

Based on the results of the site evaluation, the BMP plan will be revised, as appropriate, within 30 days of the inspection and will provide for implementation of any changes to the BMP plan in a timely manner, not more than 90 days after the inspection. The evaluation will be recorded and saved digitally and available for review on site.

8.3. Inspection Records

Records of all inspections will be maintained. The required monthly and annual inspections will be kept on site and incorporated into the BMP plan annually.

8.4. BMP Maintenance Logs

A periodic BMP maintenance activity log will be recorded and available upon request. Typical BMP maintenance records include descriptions of activities such as: sweeping bridges, flocculant placement, straw wattle rehabilitation, resurfacing of roads, hydroseeding, and cleanout of culverts, check dams, and sumps/settling ponds. This is an active log that is maintained digitally on site.

8.5. Annual Report and Certification

HGCMC will submit an annual report by March 1 each year summarizing the comprehensive site evaluations and inspections performed during the preceding year. The report will include the scope and dates of the inspections/evaluations, major corrective actions taken as a result of the inspections/evaluations, description of the quantity and quality of storm water discharged, and BMP plan modifications made during the year. The report will also identify any incidents of non-compliance. This report will be incorporated into the BMP plan and will be made available to the Alaska Department of Environmental Conservation (ADEC) upon request. The annual report will also contain a certified statement to the effect that the inspections and evaluations required by this BMP plan were completed, and that the BMP plan fulfills the requirements set forth in APDES Permit No. AK0043206.

8.6. Employee Training

Employee training approved by the Mine Safety and Health Administration (MSHA) is conducted annually (40 hours initially for underground employees, 24 hours initially for surface employees, and 8 hours annual refresher courses for all employees). Training includes inexperienced and experienced personnel in all levels of responsibility. The training program is designed to provide an understanding of the BMP plan, the processes and materials with which they are working, the safety hazards, the practices for preventing discharges, and the procedures for responding properly and rapidly to toxic and hazardous materials.

Topics included in the training programs are:

- Identification of any hazardous materials in their work place
- The physical and health hazards of such chemicals
- Protective measures, procedures, and equipment to be used to protect employees from hazardous chemicals
- Methods to be used to detect the presence or release of a hazardous chemical in the workplace (these may include observations such as color, odor, or form and/or sampling or continuous monitoring techniques)
- How labeling is accomplished
- How the employee can obtain and use hazard information, particularly safety data sheets (SDS)
- Response to hazardous materials spills
- Details of hazards communication and transportation systems
- Treatment and cleanup techniques for spills
- Hazardous emergency response procedures
- First aid procedures
- Federal and state laws

Spill drills are conducted semi-annually as part of the Facility Response Plan program. Specific job training is also provided prior to starting a particular job or new position to ensure that employees not only understand the particular job and process operation, but also that they understand potential discharge problems. In addition, employees working in an area where hazardous chemicals have access to appropriate SDS (HGCMC MSHA "Right to Know").

Records of the initial and annual refresher training courses for all employees are maintained at the Health and Safety Manager's office. These records include the dates, instructors, subject matter, and lesson plans of the training sessions.

Key personnel have also completed the Alaska Certified Erosion and Sediment Control Lead (AK-CESCL) storm water training program. The AK-CESCL certification is for a period of three years from the date of training. Refresher training is provided as needed to maintain a core group of personnel with current certification.

10. DRAINAGE AND ENVIRONMENTAL CRITICAL AREAS

Drainage from the Greens Creek facility flows into four water bodies. These are Greens Creek, Zinc Creek, Cannery Creek, and Hawk Inlet (which all three of the creeks naturally drain into). These creeks in relation to project features can be seen in Figure 1.

10.1. Greens Creek

Greens Creek drainage basin occupies 23.5 square miles. Low flows in Greens Creek occur during mid-winter and late summer, with annual average monthly minimum flows of 40 cubic feet per second (cfs) at the mouth and 6 cfs upstream near the mine/mill site. High rainfall in the fall results in a mean monthly flow of 250 cfs during October (USFWS 1983). The drainage basin includes the mine/mill site and more than half of the roadway between the Hawk Inlet docking facility and the mine/mill site. A bridge crosses Zinc Creek, and the roadway crosses several tributaries to Greens Creek over two other smaller bridges and over 100 culverts.

10.2. Zinc Creek

Adjacent to and north of Greens Creek is the Zinc Creek drainage basin, which encompasses an area of 4.7 square miles. A small channel sometimes connects Greens Creek and Zinc Creek near their mouths. A portion of the roadway and the entire tailings facility is within the Zinc Creek drainage basin. The roadway crosses Zinc Creek over a bridge located 3 miles up from the Hawk Inlet facility. The tailings facility is located on the upper reaches of Tributary Creek (not labeled on Fig 1), which runs into Zinc Creek.

10.3. Cannery Creek

Cannery Creek is located at the southern end of the Hawk Inlet port facility. Its drainage area is less than 2 square miles. The roadway crosses Cannery Creek over a culvert at 0.7 mile. Most of the area at the Hawk Inlet port facility is drained to de-grit basin DB-04, which is treated prior to discharge through Outfall 002, and not into Cannery Creek. Cannery Creek is the potable water source for the camp facility; this take-up point comes from a weir immediately upstream of the road crossing.

10.4. Hawk Inlet

Greens Creek, Zinc Creek, and Cannery Creek all flow into Hawk Inlet. The predicted annual flow of both Greens Creek and Zinc Creek into Hawk Inlet is 120,000 acre-feet per year.

11. RISK IDENTIFICATION AND ASSESSMENT

11.1. Summary of Potential Pollutant Sources

The following describes the toxic and hazardous substances employed in the Greens Creek Mining operations which are listed under Sections 307(a)(1) and 311 of the Clean Water Act (CWA) and required to be addressed under the APDES Permit No. AK0043206. These include the chemical reagents used in the milling process, products of the milling process, and petroleum products.

Dischargers who use, manufacture, store, handle or discharge any pollutant listed as toxic under Section 307 (a)(1) of the CWA or any pollutant listed as hazardous under Section 311 of the CWA are subject to the requirements of 40 CFR 125 applicable to BMP programs for all activities which may result in significant amounts of those pollutants reaching waters of the United States. The following section lists the toxic (priority) pollutants under Section 307 (a)(1) and the hazardous substances under Section 311 of the CWA. The presence of each of the listed chemicals is indicated if used or produced at the Greens Creek Mine in significant quantity. Both lead and zinc compounds are listed as Priority Pollutants under Section 307(a) of the CWA. These compounds will be found in both the concentrate and tailings. Trace amounts of several other compounds listed under Section 307 (a) and 311 of the CWA are in the ore and will be found in the concentrate and tailings. These compounds and their presence are detailed in an annual Toxic Chemical Release Inventory, incorporated into this document by reference.

Under Section 311 of the CWA, oil is also subject to BMP program requirements. Oil is defined under Section 311 of the CWA as "oil of any kind or in any form, including but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil."

Under the APDES Permit No. AK0043206, specific objectives for the control of toxic and hazardous pollutants include an examination of reagents and supplies including sodium carbonate, sodium sulfite, lime, copper sulfate, flotation reagents, flocculants, and petroleum products. Although these milling reagents are not considered toxic or hazardous under Section 307(a) or 311 of the CWA, they are addressed in the BMP as requested by the APDES permit.

Specific information on the physical, chemical, toxicological, and health aspects of the milling reagents and petroleum products is provided on their respective SDS. SDS are available to HGCMC employees during their regular work shifts through the Site Hawk system.

11.2. Reagent and Materials Inventory

The following describes the mill reagents which are generally stored at the mine site and utilized within the process.

- Copper sulfate – This substance is used as an activator in the zinc and bulk floatation. Vapors and mists are extremely corrosive to the skin, eyes, nose, throat, and mucous membranes. Breathing high concentrations may be fatal. High temperatures, alkalis, oxidizing or reducing materials, cyanides, sulfides, combustible materials, and hydroxylamines should be avoided.
- Ferric chloride – This substance is used as a coagulant and also aids in the coprecipitation reaction in water treatment plants to remove metals and particulates.
- Flocculant (Gold Floc 114 Goldenwest 2525) - Flocculants are added to thickeners Goldenwest 2525 and water treatment plants (Gold Floc 114) to increase settling rates. They are not classified as hazardous, but become slick when wetted. Dust generated in handling can be

explosive if sufficient quantities are mixed with air, in which case, ignition sources should be avoided. Contact with strong oxidants should be avoided.

- Methyl isobutyl carbinol (MIBC) – This substance is an alcohol frother. Its vapors are moderately toxic and may cause irritation to eyes and skin with contact. Heat, flame, and contact with strong oxidizing agents should be avoided, and it should not be stored or handled in aluminum equipment at high temperatures.
- Sodium isopropyl xanthate – This substance is used throughout the mill as a collector for lead, zinc, gold, and silver. Inhalation of xanthates can cause irritation to the nose and throat.
- Aerophine 3418A - This substance is a collector used to enhance lead and precious metals recoveries. Contact with Aerophine can cause eye and skin burns or severe irritation.
- Lime – This substance is used as a depressant for iron in the zinc and bulk floatation circuit and as a pH regulator. When lime is mixed with water, heat is generated. Lime will burn the skin, and the dust can irritate eyes, throat, and lungs. It should be stored in a cool, dry, well-ventilated place away from all other chemicals and potential sources of contamination.
- Zinc sulfate – this substance is used as a depressant for zinc. Zinc sulfate dust may cause irritation to eyes, nose, throat, and may cause chest discomfort if inhaled. Heat, acids, and oxidizing materials should be avoided.
- Unimax SD-200 – used as a pyrite depressant in the precious metals scavenger circuit. Can cause severe burns to the skin, eyes, and digestive tract.
- Liquid carbon dioxide – mixed with water to form carbonic acid. pH modifier used in the lead circuit. As a vapor can increase respiration and heart rate, potential in large quantities to cause asphyxiation.
- Other reagents may be used as a result of future test studies that reveal that various reagent substitutions would improve plant performance.

All hazardous materials, including incoming shipments, portable containers (sea vans, drums, and bags), and stationary bulk containers (tanks, process vessels, etc.), are labeled with the name of the chemical they contain and its associated hazards. Warehouse personnel are responsible for confirming that received containers are properly labeled. The safety coordinator is responsible for ensuring that in-plant containers are properly labeled.

Combustible and flammable fuels are used at both the mine/mill site and the Hawk Inlet site for power production, equipment, and heating. These are addressed further in the Spill Prevention Control and Countermeasure Plan (SPCC) in Appendix 6 of the General Plan of Operation (GPO).

Products of the milling process include lead, bulk, and zinc concentrate and tailings. Approximately 500 tpd of concentrate and 1,800 tpd of tailing are produced.

11.3. Materials Compatibility

Materials and process chemicals are stored in separate containers at the mill site until they are used. The containers have been approved for the transport and storage of each chemical and have the appropriate materials, construction, and coatings to prevent corrosion, degradation, or other destruction of the containers by the chemicals involved.

Chemicals are only mixed in their appropriate bins inside the mill building. The mixing of chemicals is by tested and proven methods of the mining and recovery industry; no experimental mixing or testing is involved. All chemicals are compatible with each other except acids.

12. AREAS SUBJECT TO BMP REQUIREMENTS

Areas of the project which are subject to BMP requirements include materials storage areas, loading, unloading, and material transport areas; plant transfer, processing, and handling of materials; and areas of material disposal. The following paragraph summarizes the flow of materials.

Raw ore is removed from the mine and stored in an uncovered stockpile. The ore is transported from the stockpile to the mill for processing via conveyor belt, and then loaded through a grizzly bay by a front-end loader. All mill size reduction, flotation, and dewatering are wet processes accomplished by pumping liquid and slurries. Process chemicals are delivered to the island by barge, unloaded by forklift, and transported to the mill by truck. Within the mill, the process chemicals are mixed with ground milled ore, and the desired products are separated and concentrated. The concentrates are then loaded by front-end loader into Max Haul trucks inside the mill and transported by these covered trucks to the Hawk Inlet dock storage area. From there, the product is transported to outbound ships by conveyor system. Tailings leftover from the process are transported back into the mine by underground trucks for re-deposition or to the tailings impoundment by the covered Max Haul trucks for permanent disposal.

Each of the areas subject to BMP requirements due to chemical storage are described below. These are activities which have the potential, not matter how small, to impact stormwater runoff or have the potential for the discharge of pollutants to waters of the United States. On-site runoff for each of these areas is also discussed. The direction of flow of potential spills and surface runoff is shown in Figures 2 and 5.

12.1. Materials Storage Areas

Material storage areas include areas adjacent to and inside of the mill building for the storage of mill reagents, fuel storage at the mine site and at the Hawk Inlet site, and storage of ore concentrate and tailings in the mill building, and storage of ore concentrate at the Hawk Inlet site. Figures 3 and 4 show the locations of material storage at the Hawk Inlet site and mine/mill site, respectively.

12.2. Mill Reagent Storage and Transport

With the exception of lime and CO_2, chemicals used for processing are stored inside the mill reagent area and in sea vans located peripherally to the mill. Reagents are transported by sea van to the mill. Sea vans are designed for extreme environmental conditions such as those found in Southeastern Alaska. They are thick-ribbed steel containers which are air- and watertight, can be stacked on top of each other, and are transported easily from one area to another by forklift. Individual containers within sea vans are transported by forklift into the mill building dry reagent storage area for unloading. Approximately 2 weeks' worth of reagents is stored within the mill building.

Lime is stored in a silo located on the northwest corner of the mill building reagent storage area. The silo is a steel bin and holds 50 tons of powdered lime. The lime silo has a floor sump to contain and recycle any spills.

Other mill reagents are transported in drums and shrink-wrapped bags within sea vans. Compatible reagents may be combined in sea vans, but care is taken to keep incompatible reagents in separate sea vans.

Some reagents, when received at Hawk Inlet, after being unloaded from the freight barge are stored in containment containers on the upper Hawk Inlet truck pad, the rest are transported to the mill in the sea van in which they arrive. The sea vans are unloaded when they arrive at the mill as the chemicals are needed.

Individual containers for each reagent include:

- Sodium isopropyl xanthate - Contained in 1,500 lb super sacks in plywood boxes
- MIBC - Contained in 330-gallon totes
- SD-200 - Contained in 330-gallon totes
- Aerophine 3418A - Contained in 55-gallon drums
- Zinc sulfate - Contained in 2.000 lb super sacks
- Copper Sulfate - Contained in 2,000 lb super sacks
- Flocculant (Goldenwest 2525) - Contained in sacks as a dry solid
- Ferric chloride - Contained in bulk tank as a liquid
- Sulfuric acid - Contained in bulk tank as a liquid
- Gold Floc 114 - Contained in 55-gallon drums
- Lime - Contained in bulk tanks
- Liquid Carbon Dioxide - Contained in a 50 ton pressurized storage tank

Individual reagent containers, including drums, and bags, are stored inside the mill building on concrete chemical containment pads. Spills of any chemical outside are recovered to the extent possible for recycling or routed to the tailings facility. Any spills inside of the mill building are routed to sump pumps for recycling.

Surface runoff at the mine/mill site is shown on Figure 4. All process areas, including most areas where chemicals are stored, drain across concrete surfaces to the lined containment ditch, which flows to A Pond. Water in A Pond is pumped either into the mill, or through an 8-inch high-density polyethylene (HDPE) pipeline to Pond 23 or the tailings facility. In an emergency, if A Pond pumps are turned off, the mill will go to recirculation or shut down. Some remaining water will flow to A Pond from the pump wet well and surface runoff. The ponds are designed for a 10-year, 24-hour storm event. All runoff from the disturbed process area flows into lined containment, none of these flows run into Greens Creek or any other water body.

Under catastrophic conditions, A Pond water can be treated in one of the two mill water treatment plants to neutralize or remove the specific contaminants. Under conditions above a 10-year storm event, excess water would flow to B Pond from A Pond, and then into Greens Creek. However, runoff would be highly diluted under these circumstances, and impacts would be minimal. During a spill incident, samples would be taken from both ponds to have an accurate record of what entered Greens Creek.

Leaks or spills from reagent containers stored within the mill building are washed to the reagent sump pump. The lime silo has its own sump to collect any spills.

Some chemicals and hydrocarbons are stored in areas without concrete surfaces and direct drainage to A Pond. In these areas containment will be provided for by using containment systems.

12.3. Fuel Storage

Bulk fuel tanks are located at the mill site and at Hawk Inlet. Storage of fuel is discussed in detail in the SPCC.

12.4. Ore Concentrate and Tailings

Segregated storage for a maximum of 300 tons of lead concentrate, 200 tons of combined lead and zinc concentrate, and 300 tons of zinc concentrate exists in a room on the southwestern side of the mill building. Concentrates are held in this room prior to transport to Hawk Inlet in covered Max Haul trucks. The concentrates are completely enclosed with concrete floors and side walls. Transfer of concentrates to trucks is also conducted within this mill building room. Therefore, spills to receiving water bodies at the mill site from loading concentrate are impossible.

Generally, about 12,000 tons of concentrate will be in storage at the Hawk Inlet Concentrate Storage Building. This building can hold some 40,000 tons of concentrate if necessary while awaiting a ship for loading. Bulk, zinc, and lead concentrate are stored in this 120-foot-by-280-foot covered storage building. The concentrate storage building is designed for chemical containment with a concrete slab floor and lower side walls. Runoff from the concentrate storage building area is routed to the DB-04 settling pond prior to being pumped up to the tailings area water handling and treatment facilities prior to discharge through Outfall 002 into Hawk Inlet. In the event of a spill of concentrates, the solids are immediately scraped up with the surrounding rock and either returned to the concentrates within the storage building, returned to the mill for reprocessing, or disposed of in the tailings area.

A maximum of 9,000 tons of tailings from the milling process is stored at the southeastern corner of the mill building. This area is covered, contained on a concrete floor, and partially enclosed by concrete walls. Surface water runoff is routed through sediment traps into the lined ditch which flows to Pond A prior to being pumped to the tailings facility. No tailings are directly discharged into Greens Creek.

12.5. Loading, Unloading, and Transport Areas

Materials and chemicals are transported by truck over an 8.5–mile, single-lane, gravel-surfaced road between Hawk Inlet and the mine/mill site. Chemicals are transported to the mill site in containers. Concentrate is carried in covered Max Haul trucks from the mill to the Hawk Inlet storage building. These trucks dump into the Concentrate Storage Building from outside of the building through an opening for this purpose. Any wheeled vehicle which enters this building must have the wheels cleaned in a Truck Wash Building prior to leaving the concrete covered travel area surrounding these facilities. Concentrates are loaded by an enclosed, telescoping conveyor and chute system from within this storage building directly into ocean-going vessel holds. Covered Max Haul trucks also transport tailings from the mill site some 7.5 miles to the tailings basin.

12.6. Mill Reagent Loading, Unloading, and Transport

Milling reagents, contained in sea vans, are delivered as needed on weekly freight barges to the Hawk Inlet facility. Sea vans are off-loaded with large forklifts from barges at Hawk Inlet, which then transport them to the nearby Hawk Inlet warehouse. Mill reagents are transported by a freight truck to the mill site in these sea vans for storage. Sea vans are unloaded by forklift at the mill site for storage in and adjacent to the mill building. Lime is also delivered weekly by barge and transported in special lime ISO-containers (freight containers that conform to the International Standardization Organization manufacturing standards). Lime is pneumatically transferred from the container into the silo for storage.

If an accident were to occur enroute to the mill site, spillage is unlikely due to the construction of the containers. These containers are built for transport and rough handling. In addition, reagents inside the sea van containers are separately packaged, as described in the previous section, and incompatible materials are not packed together in the same sea vans.

Lime ISO-containers are also durable and built for transport. During the transfer of lime powder from its transport container to the silo, lime powder will occasionally spill. Drainage around this area is directed to Pond A. Lime addition to Pond A will improve the settling performance, as lime is a primary coagulant used to enhance settling.

Sea vans and lime containers will be inspected by Alaska Marine Lines (AML) shipping personnel in Seattle prior to transport to ensure that there are no faults in construction.

12.7. Mill Site Loading of Concentrates and Tailings

Bulk, zinc, and lead concentrates are loaded in the mill building concentrate room by front-end loader onto 50-ton covered Max Haul trucks. Trucks must pass through a spray truck wash prior to driving outside of this mill building room. Runoff water from the truck wash collects in the sump and is pumped to the bulk thickener. No runoff water from the concentrate loading area leaves the building. A spill into Greens Creek from concentrate loading operations is highly unlikely.

On average, approximately 900 tons per day of filter-pressed tailings are loaded by front-end loaders from the tailings stockpile area of the mill to 50-ton covered Max Haul trucks for transport to the surface tailings facility. Similarly, on average, approximately 900 tons per day of tailings are loaded by front-end loaders to the backfill feeder conveyor loading hopper, where they are mixed with cement for transport in 16- to 20-ton haul trucks to the mine and used as backfill.

Tailings may spread from the tailings storage area to the loading area during loading. This entire area is roofed to keep precipitation from contacting the tailings. When loading the tailings, care will be exercised to keep tailings within the covered area.

Concentrate and tailings are transported by covered trucks to the Hawk Inlet site and the surface tailings facility, respectively. Approximately 11 to 12 truckloads per day of concentrate travels between the mill site and Hawk Inlet storage site. Approximately 15 to 24 truckloads per day of tailings also travel between the mill site and the tailings facility. In addition, materials, supplies, and fuels are transported by truck daily between Hawk Inlet and the mine/mill site.

Greens Creek runs close to the upper portion of the roadway. The road route also crosses Zinc Creek, several creeks that are tributaries to Greens Creek, and Cannery Creek. The significant amount of traffic on this road and its location to the mentioned creeks increases the risk of spills into water bodies.

The worst-case scenario for a spill of truck-hauled concentrate or tailings would be the introduction of up to 50 tons of bulk zinc or lead concentrate or tailings directly into a creek. The most likely scenario for an accident would involve spillage of bulk zinc or lead concentrate or tailings onto the slopes of the road corridor. Immediate mobilization of workers to place sediment impediments around the spill covers over the spilled material, and timely recovery of the spill by manual and mechanized equipment, has minimized the impact of such spills. Similar techniques would also be employed in the unlikely event of a direct spill into the creek. However, a direct spill would result in a greater volume of concentrate or tailings washing downstream before response measures could be taken.

In the event of a direct spill of truck-hauled concentrate or dry tailings into a creek, it is possible that acute effects would occur to aquatic organisms in the immediate area of the spill. Most effects would be caused by smothering by the sediment, although lead and zinc concentrates could introduce long-term effects to the aquatic habitat. The concentrate and dry tailings would not readily move under conditions of normal discharge, however, and would be largely recoverable.

In the event of road spills of concentrate or tailings, the following events would take place. Surface Operations and road traffic is notified of the spill by in-vehicle radio transmission. Mechanical equipment (225 backhoe, front-end loader, receiving truck) is mobilized to the site. The material remaining in the tipped truck may be removed, placed in a second receiving truck, and taken to its proper area (concentrate or tailings). The tipped truck is righted and returned back onto the road. All spilled material and surrounding soils and road material is placed in a serviceable truck and returned to the mill for re-processing or disposed of in the tailings area.

To reduce the potential for truck accidents, the numbers of trucks is minimized to the extent possible. All surface vehicles are equipped with a GPS collision avoidance system and extensive radio communication is employed to communicate for traffic movement, hazards, or any spill occurrences. Surface Operations has developed a road traffic Standard Operating Procedure which details travel on the road as well as proper meeting protocols including vehicle type priorities. Loaded work vehicles have priority over smaller vehicles.

12.8. Concentrate and Tailings Unloading

The Max Haul trucks unload concentrate through a designated dump opening into the storage building at Hawk Inlet. Max Haul trucks deposit concentrate from outside the contained areas to prevent the tires of the truck from spreading concentrates. A front-end loader pushes bulk, zinc, and lead concentrates to designated areas within the concentrate storage building. The potential for concentrate to reach Hawk Inlet is unlikely. Any concentrate spills from the storage building or from truck tires run off to the DB-04 settling pond over the concrete pad around these facilities and not directly into Hawk Inlet.

A covered, telescoping conveyor and chute system is employed for loading concentrate product from within the storage building directly into the ship’s holds. This conveyor system is covered to prevent concentrate from blowing or falling off the system into the environment. At the end of the conveyor system is an elephant trunk feeder which also telescopes to reach down into the ship's hold to distribute the concentrates. After each ore ship, the end of the chute system or “snorkel” is covered by a hazardous-rated supersack to catch any residual concentrate and prevent any unintentional spill into Hawk Inlet.

During the first ship loading in 1989, concentrate spilled into Hawk Inlet. This spillage was caused by improper design of the transfer chutes. This entire initial concentrate loading system has been replaced with the current covered telescoping conveyor and chute system, and further spillage or loss to the environment is improbable. Ships of 10,000- to 40,000-ton capacity transport concentrates from the Hawk Inlet site monthly.

Dry tailings are unloaded in the tailings facility. Max Haul trucks will unload tailings from crossroads which extend into the tailings pile to the active placement area. All vehicles exiting the tailings facility pass through a truck wash before entering onto the B-Road.

12.9. Transport of Mill Site Wastewater

Wastewater from the mill and mine site area is composed of mill wastewater, site runoff water, mine drainage, and domestic wastewater. During dry periods, site runoff would be minimal and would result in minimal dilution of the wastewater. All site runoff from process areas at the mine/mill site drains to A Pond. Water in A Pond is piped to the tailings basin sediment pond. The wastewater is transported to the tailings basin through a single 8-inch-diameter HDPE pipe. This line is installed along the roadway from the mill site to the basin and covered with soil and rock to prevent damage from falling rocks or equipment. The transit time through the roughly 7 miles of this water transfer line has been measured at 4 hours.

Since operations began, the wastewater line has been broken by HGCMC or contractor operations (ditch or road maintenance, facility installations) and accidents (falling trees and rocks). In the event of an incident, the following procedure is followed:

1. Pumping into the damaged line is stopped at either the A Pond sump or Pond 23 pump house.
2. The mill is placed on recirculation or shut down.
3. Mill maintenance crews and/or water operations staff are dispatched to assess the damage and make repairs.
4. The Environmental Department takes spill-specific samples of the wastewater and affected creeks to determine water quality effects.

A maximum probable volume of a spill would be approximately two pipe volumes or 250,000 gallons.

When a spill occurs, it takes time for the mill to go to recirculation or shutdown. During this time, the water flowing from the mill waste water treatment plant will enter Pond A directly. If these conditions happen to take place during one of the 24-hour design storm events, there is a possibility that this water could enter Greens Creek and or Hawk Inlet. Pipe repair material is kept at the 920 mill site and Hawk Inlet.

12.10. Plant Transfer, Process, and Materials; or Chemical Handling Areas

Areas of transfer, process, and materials handling involve processes within the mill building where raw ore is ultimately separated into concentrates for sale and tailings waste. Chemicals are transported from their respective sea vans into the mill building by forklift. Inside the mill building, the chemicals are mixed in dedicated tanks in the reagent area and applied as part of the ore flotation separation process. Mixing, handling, and process locations inside the building all have floors which slope to sump pumps.

Two weeks' worth of reagents is stored in bags, and drums in the mill building reagent storage area. All mixing is carried out in this isolated area of the mill. Holding tanks maintain 3 days' storage of mixed reagent. Lime is pumped in a continuous loop from the holding tank through the points of addition area and returned to the holding tanks. Reagent is removed from the loop at its point of addition and controlled by timer-activated solenoid valves. All other reagents are pumped from their holding tanks to the direct point of addition. Passage rates are controlled by timer-actuated solenoid valves and monitoring pumps.

Lime is routed from the storage bin to a slaking unit and then to the mixing tank, all located in the lime silo. The lime silo is equipped with an exhaust fan and blower, and a sump is located under the silo to collect any spills and route them back into the adjacent mill building. From the mixing tank, the lime mixture is transferred to the storage tank located inside of the mill building. From the storage tank, the mixture is routed to various areas for addition into the milling process. The lime area is also equipped with a sump pump to collect and recycle any spills.

Other reagents used in the milling process are transferred in bags or drums by forklift from the reagent storage area, inside the mill building, to their respective mixing tanks. Bags or drums are manually dumped into mixing tanks by personnel wearing protective equipment including protective clothing, respirators, and face shields. Reagents are then withdrawn from the respective mixing tanks and directed through dedicated piping for use in various areas in the mill process. The reagent sump pump collects and recycles any spills or leaks in the reagent area.

Reagent mixing and storage tanks are made of steel, except for those associated with copper sulfate, which are made of fiberglass. All reagents are routed by polyvinyl chloride (PVC), HDPE pipes, stainless steel pipes, or braided hoses to various areas in the milling and flotation separation processes. The entire milling process is underlain by a concrete chemical containment pad and is entirely enclosed within the mill building. Exceptions are the zinc, lead, bulk, and tailings thickeners and the tailings stock tank, which are located outside, adjacent to the mill building.

All gangue, concentrate, or tailings slurry transfer in the milling process is either through HDPE or steel pipes. All pipes are aboveground and above concrete floors in the mill building. Any leaks or spills are routed to appropriate sump pumps for recycling.

In addition to the reagent area sump pumps described above, the mill building is equipped with a sump pump located under the SAG mill, plane tables, and shaking tables; two lead and bulk area sump pumps, one under the lead and bulk flotation circuits and the other under the lead and bulk thickeners and stock tanks; two zinc area sump pumps, one under the zinc floatation circuit and the other under the zinc thickener and stock tanks; a concentrate storage and loading area sump pump; and a tailings thickener area sump pump.

The working surface surrounding the mill building and other associated surface facilities is generally finished with a concrete liner. This impervious surface drains through a series of sediment traps into an HDPE-lined containment ditch running downgradient the length of these surface facilities to the lined containment A Pond. Pumps in this pond withdraw accumulated waters which can then be directed either into the mill for treatment in one of its two water treatment plants or sent directly to the tailings area for treatment and discharge under the APDES permit provisions. Collected sediments are removed and carried to the ore pad to be fed through the mill process, placed underground as backfill, or incorporated into the controlled surface waste piles.

The potential for any spills or leaks in the mill building to reach the outside environment and any receiving water bodies is unlikely. All pipes, pumps, filter, tanks, and electrical equipment will be inspected routinely to avoid major leaks or spills. In the event of a major spill or leak, the plant will be shut down until the potential for environmental danger is controlled and repairs are made.

12.11. Material Disposal Area

The approximate 1,800 tpd of tailings from the milling process is wet filtered to reduce the water content to approximately 10 to 12 percent by weight. The water from the tailings dewatering process is recycled within the mill process. The tailings are loaded with front-end loaders to a cement mixing plant and then to slinger trucks for deposition as backfill into the mine, or they are placed directly into covered Max Haul trucks for transport to the surface tailings facility. Annually, approximately one half of the tailings are placed back into the mine workings, with the remainder placed in the surface tailings facility.

The surface tailings facility is a dry-stack tailings pile. During placement of the unloaded tailings and prior to temporary or final cover, tailings may be exposed to precipitation. Facility features designed to minimize the impact of contact water to the surrounding environment include an associated main embankment and saddle embankment; slurry walls to all four sides of the tailings placement area; drainage ditches around the perimeter of the tailings pile which collect runoff; tailings area underdrains and associated wet wells; site water collection ponds; a high-density sludge water treatment plant; and an outfall pipeline and spillway which discharge to Hawk Inlet.

Both the main and saddle embankment have relatively impervious clay cores to reduce seepage losses. In addition, seepage cutoff walls surrounding the pile area extend through the highly permeable peat and sand lenses immediately beneath and are keyed into an underlying impermeable clay layer or bedrock. The amount of vertical seepage loss is minimized due to the low permeability and artesian pressure of the aquitard soils at depths which underlie the tailings basin.

Bedrock groundwater discharge from the tailings facility is estimated to be small. Groundwater monitoring wells are installed downstream of the tailings facility to the south, west, and north to monitor water levels and water quality. If significant degradation of the groundwater quality were to result from seepage, cutoff trenches or pump-back wells would be constructed to intercept the seepage and pump it to the pond system for treatment.

The tailings collection pond system is sized to retain the 25-year, 24-hour storm event from facilities covered by the ADEC Waste Management Permit, and the 10-year, 24-hour storm from the rest of the HGCMC surface facilities. These contact waters are combined with treated mill process water and treated domestic sewage from the HGCMC facilities in the collection ponds. From here, they are sent to the tailings area water treatment plant. Treated effluent from the tailings water treatment plant is routed out the outfall line, monitored as required by the APDES permit, and discharged through a diffuser into the approved mixing zone on the ocean floor. End-of-pipe pollutant concentrations cannot exceed the limits specified by APDES Permit No. AK0043206, to assure meeting Alaska Water Quality Standards in Hawk Inlet at the edge of the approved mixing zone.

The collection pond system is sized to provide sediment storage, working storage (equalizing), and storage for the above-described storm events with freeboard. However, during excess storm events, discharges through the designed Emergency Spillway could occur for several hours but would be diluted by runoff in the adjacent upland muskeg and the waters of Hawk Inlet. These events would be infrequent and of short duration and are guarded against by keeping the pond elevation at the minimal levels during storm periods. Localized water quality could be degraded in Hawk Inlet during the overflow. Although these discharges would not occur through the effluent diffuser, because of dilution and short contact time, they are not believed to present a threat of acute or chronic toxicity to marine life.

13. MEASURES AND CONTROLS

13.1. Capping

Where capping of a contaminant source is necessary, the BMP plan must identify the source being capped and procedures and materials used to cap the contaminant source.

Capping is a procedure used to isolate potentially contaminated or pollution-generating soils from the environment. For final reclamation, inert or clean soils may be used to ‘cap’ an area to reduce infiltration, enhance vegetation establishment, and protect the quality of storm water runoff. At the HGCMC project site, interim capping using the Class 1 waste rock (argillite) is employed on both the waste stockpile and the tailings facility. This is done to prevent acid generation in the underlying material, and to minimize erosion from wind and runoff. Outer slopes of the tailings facility have also been covered with a thick layer of organic peat from recent tailings expansions.

The tailings facility will be covered with a composite soil cap at closure to reduce infiltration of meteoric water and oxygen to prevent long term acid rock drainage.

13.2. Water Treatment

The BMP plan must describe how wastewater and storm water will be treated prior to discharging to the waters of the United States if treatment is necessary.

Water discharged from Outfall 002, located in the Hawk Inlet, is treated prior to discharge.

There are three water treatment plants on site, two at the mill and one at the tailings disposal facility, that treat all wastewater and storm water collected at Greens Creek. These treatment plants are co-precipitation, high-density sludge water treatment plants. Effluent generally achieves at least an order of magnitude below the APDES permit discharge limits for zinc, lead, copper, and cadmium. A process flow sheet for the tailings area water treatment plant is provided as Figure 17.

13.3. Housekeeping Practices

Good housekeeping practices are encouraged and emphasized throughout the HGCMC project site for reasons of health, safety, morale, and environmental awareness.

Sufficient solid waste containers are made available throughout the site to accommodate cleanup of debris. Cleanup of hazardous or toxic substances is addressed in other sections of this BMP plan.

Regular maintenance activities are not considered complete until cleanup has been accomplished. Building floors are routinely washed down to provide clean, safe walking surfaces. Floor sweeping and wash-down within the mill building route any reagents and process materials to appropriate sump pumps. Supervisors and managers regularly inspect the facilities. Posters, suggestions boxes, bulletin boards, slogans, employee publications, safety meetings, and other techniques promote good housekeeping practices.

Cleaning chemicals and spill absorption materials are stocked in appropriate locations throughout the site to facilitate efficient cleanup of the site. All areas of the project have sufficient access to brooms, mops, buckets, shovels, cleaning agents, and absorption materials to implement good housekeeping standards and to immediately mitigate any spills and/or spill debris.

13.4. Preventive Maintenance

A comprehensive and complete preventive maintenance program is in place at the HGCMC site. Facilities are shut down and inspected periodically. The water treatment plants are shut down frequently so that facilities can be regularly inspected. Pipes, pumps, tanks, and circuit lines are visually inspected daily.

Maintenance personnel are employed full-time with coverage on every shift, 365 days per year, primarily for preventive maintenance purposes in the concentrator. Plant operators continuously check pipes, pumps, etc. daily during their regular work schedule.

The preventive maintenance program applies to the chemical storage areas; transportation vehicles; embankments; ditches; settling and holding ponds; pipelines; conveyor systems; and other transfer, containment, and control systems such as pipes, valves, containers, pumps, meters, and other facilities. These facilities are inspected and maintained daily during operations. Parts or systems are appropriately adjusted, repaired, or replaced in a timely fashion.

A preventive maintenance computer software program “Ellipse” is used to record inspections, tests, lifetime of parts, and history of past activities. Printouts are distributed weekly to plant foremen, which detail preventive maintenance activities that need to be conducted for the week. The program is updated continuously to document all activities that have been completed and reschedule preventive maintenance activities for the following week. The “Ellipse” program has in its database all parts used at the Greens Creek facility, inspection schedule for these parts, and their replacement or repair dates. The program orders parts automatically ahead of time to ensure that parts are on site and available when needed.

The Maintenance Facilities of the HGCMC project are fully equipped with the necessary tools, machinery, and test equipment to manage maintenance practices on any scale. Located on an isolated island, the project is stocked with sufficient spare parts to replace most any weak or failing part or system before a major incident occurs. The maintenance personnel are fully trained and experienced to repair and/or replace any system which might need attention and thus prevent accidents or incidents.

13.5. Exploration Drilling

HGCMC annually conducts an active exploration drilling program in conjunction with the ongoing active mining and associated activities. HGCMC conducts exploration activities both from within the underground workings and from the surrounding surface. All underground activities occur within the existing HGCMC mine. As such, all disturbance is contained within those underground mine working areas, controlled, and handled as a composite whole.

The surface exploration program consists of three general activity types: reconnaissance, prospect work, and drilling. Due to the very limited road access in the vicinity of the HGCMC facilities, virtually all surface exploration occurs in “remote” sites and is either accessed by walking from established facilities or through helicopter support.

Reconnaissance and prospect work activities involve ground examination and detailed geological mapping, ground surveying, geochemical sampling (rocks, soils, and stream silts), and ground geophysical surveying. These are road and helicopter-based activities, entailing no significant surface disturbances or degradation. Reconnaissance work involves geologists traversing the ground, observing the surface, and conducting geologic mapping. This activity may entail periodic collection of small rock, soil, and stream sediment samples. Most surface exploration work is conducted for HGCMC by contractor, or temporary seasonal employees, all under the direction of HGCMC staff.

Similarly, non-invasive prospect work activities consist of grid surveying, detailed grid mapping and sampling (rock, soil, and silt), and grid geophysical surveying (magnetics and electromagnetics). Grid work generally entails a minimal amount of brush clearing to facilitate surveying and the ingress and egress of field equipment for geophysical crews. When utilized, helicopter landing sites are often located on open ridges, creek bottoms, and meadows or muskegs to minimize vegetative cover or underlying soils disturbance. No new landing sites will be cleared for either reconnaissance or prospect work activities, except near drill sites (as described below).

Drilling at surface exploration sites is seldom situated to allow direct access from the limited available road system. Therefore, these sites are generally exclusively serviced via helicopter. Detailed grid work, similar to the prospect work described above, will generally precede drilling at each site.

Drill sites will not be cleared until HGCMC is committed to drill from that site. Typical drill site clearance dimensions are 60 feet by 80 feet, but vary greatly with terrain and prevailing wind conditions. Drill site clearance only involves tall plant life, trees, and other plant life high enough to endanger helicopter landings or slinging of material into the site. These drill sites include area to accommodate a 20-foot–by-20-foot drill deck, storage area for all supplies associated with drilling, and allow for the safe helicopter long-line slinging of equipment and supplies. Drill deck frames will be constructed using trees cleared for the drill site and decked with 2-inch-by-12-inch rough-cut boards. Rough-cut lumber may be flown in (and out upon completion of drilling) for drill decks located above the tree line or within natural clearings. Only portable hand tools, including gas-powered chainsaws, will be used in drill site clearing and construction. Separate helicopter landing pads may be constructed in areas where no suitable landing zones are located within 800 feet of the drill pad. In all drill site construction, surface disturbance is minimized to control erosion potential.

HGCMC will transport materials via helicopter daily to and from the drill sites. All diesel fuel will be stored in drums placed within a secondary containment or within specially constructed double-walled aluminum tanks, both capable of holding 110 percent of the primary volume. Domestic waste will be removed daily. All drilling materials that may attract bears (salad oil, drilling muds, etc.) will be stored in steel lock boxes when not in use. HGCMC personnel will frequently visit the drill rigs to ensure environmental compliance.

Water for the drilling operations will be sourced from nearby streams under Temporary Water Right and Fish Habitat permits obtained from the Alaska Department of Natural Resources. The water will be gravity fed to the drill sites wherever feasible using a 2-inch supply hose lain across the forest floor. A diesel-powered supply pump will be used where gravity feeding is not possible. The supply pump and its fuel tank will be permanently mounted within a secondary containment system.

The drilling fluids to be used include a partially hydrolyzed polyacrylamide, a copolymer of acrylamide and sodium acrylate, and bentonite. These are the same drilling support fluids HGCMC has required when needed in past drilling activities. The driller captures and re-circulates the drilling fluids, minimizing the total quantity utilized at any site. Drill cuttings will be contained within the cleared drill site using settling tanks and sumps. The sumps will either be dug into the ground or, where that is too difficult, they will be constructed using the cut timber and lined with burlap or geofabric. Drill water will not be allowed to enter any live streams. Whenever drilling water effluent is found to approach within 200 feet of running water, drilling activities are to cease until this problem is rectified.

For each shift, prior to initiating activities at a surface drilling site, drill crews are required to complete a Surface Drilling Pre-Shift Environmental Checklist. This checklist covers examination of the water feed to the site, the drill site facilities, and the control of drill discharge water and cuttings.

Upon termination of drilling at a drill pad, all non-native materials, contaminated native materials, and equipment will be removed. Drill cuttings will remain within the constructed sumps, excess geo-fabric or burlap will be removed. Areas cleared to the mineral soil will be reseeded with the seed mixture formulated for Greens Creek. Camera-dated digital photographs of each site will be taken within 2 weeks of cessation of operations.

13.6. Spill Prevention and Response Procedures

Per APDES Permit No. AK0043206, the areas where spills could result in the discharge of pollutants must be identified clearly in the BMP plan. The description of each area must include procedures for spill prevention and procedures for cleaning up spills.

Spill prevention and cleanup procedures are addressed in the SPCC Plan.

14. REFERENCES

Toxic Chemical Release Inventory for HGCMC:

Hecla Greens Creek Mining Company TRI

Figure 1. Site Map

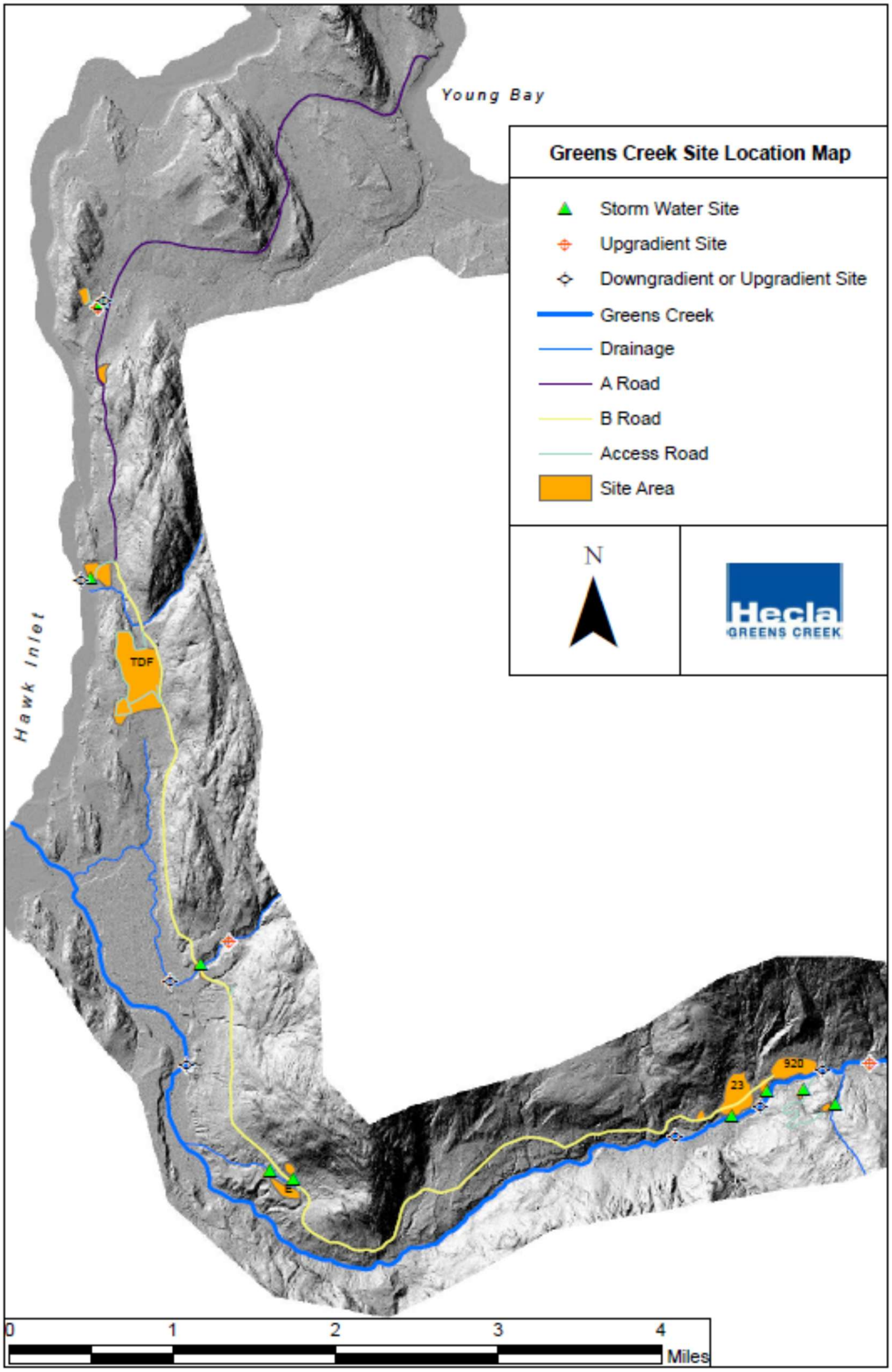

Figure 2. Tailings Facility Area

Figure 3. Hawk Inlet Facilities Area

Figure 4. Mine and Mill Area

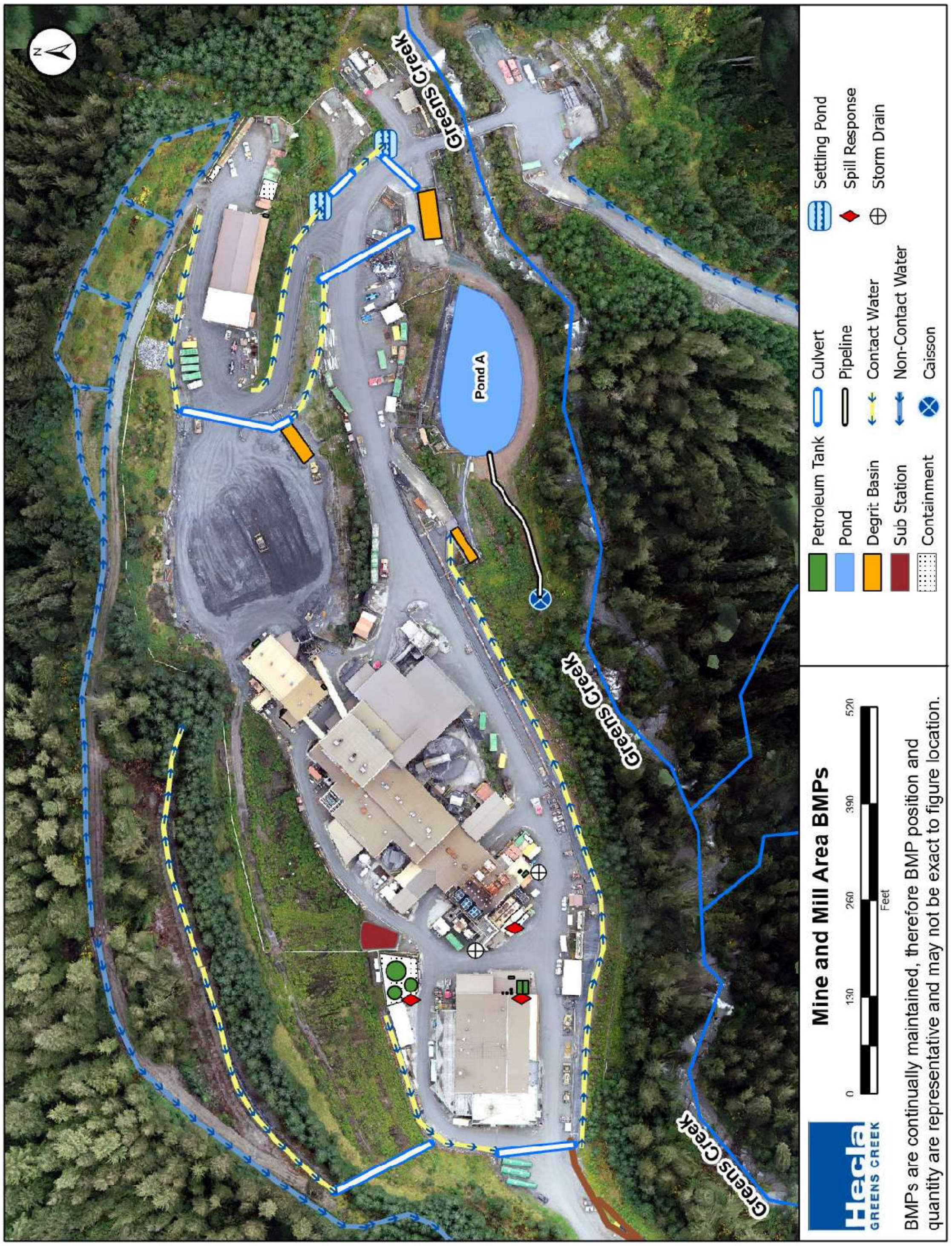

Figure 5. APDES Outfall 003

Figure 6. APDES Outfall 004

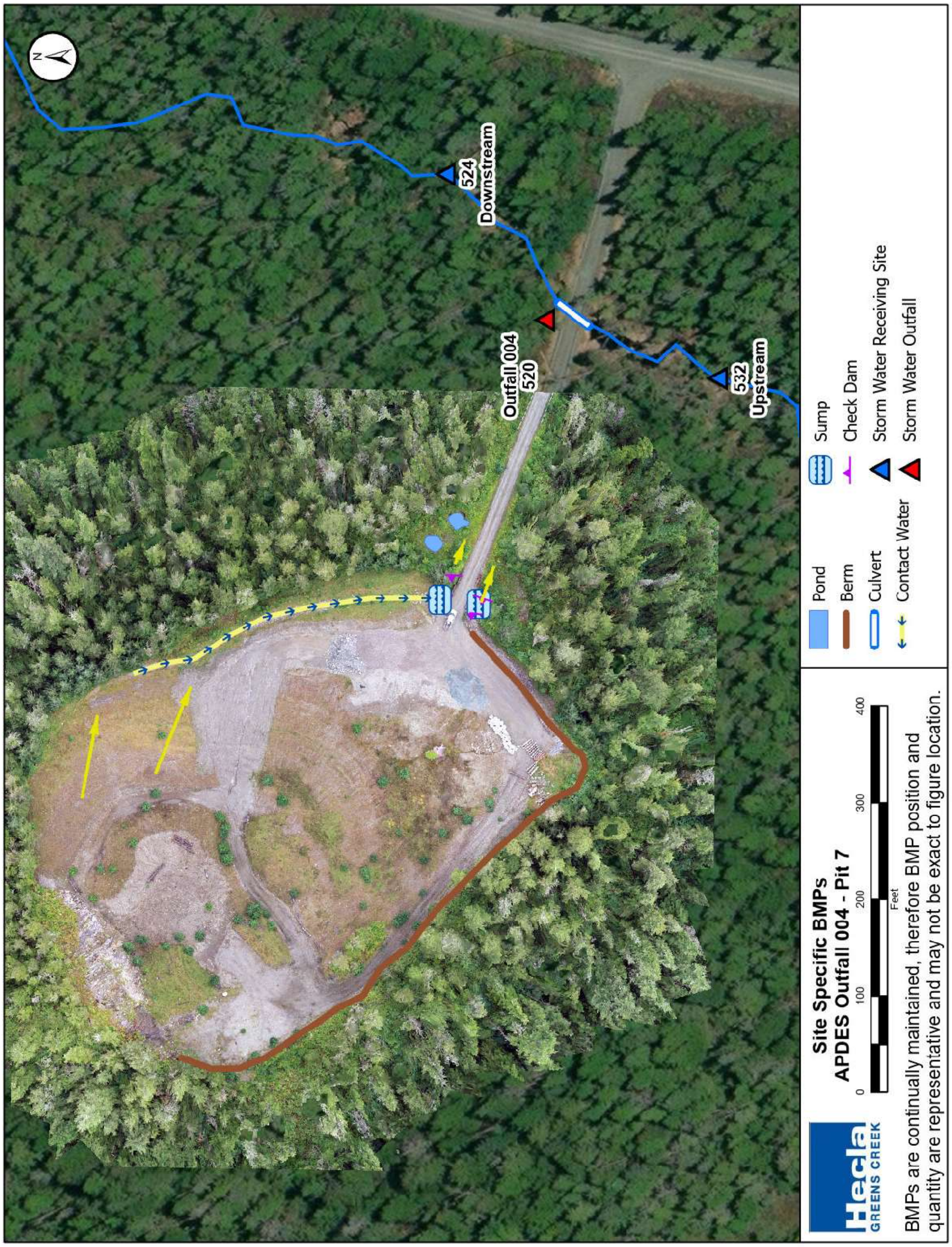

Figure 7. APDES Outfall 005.2

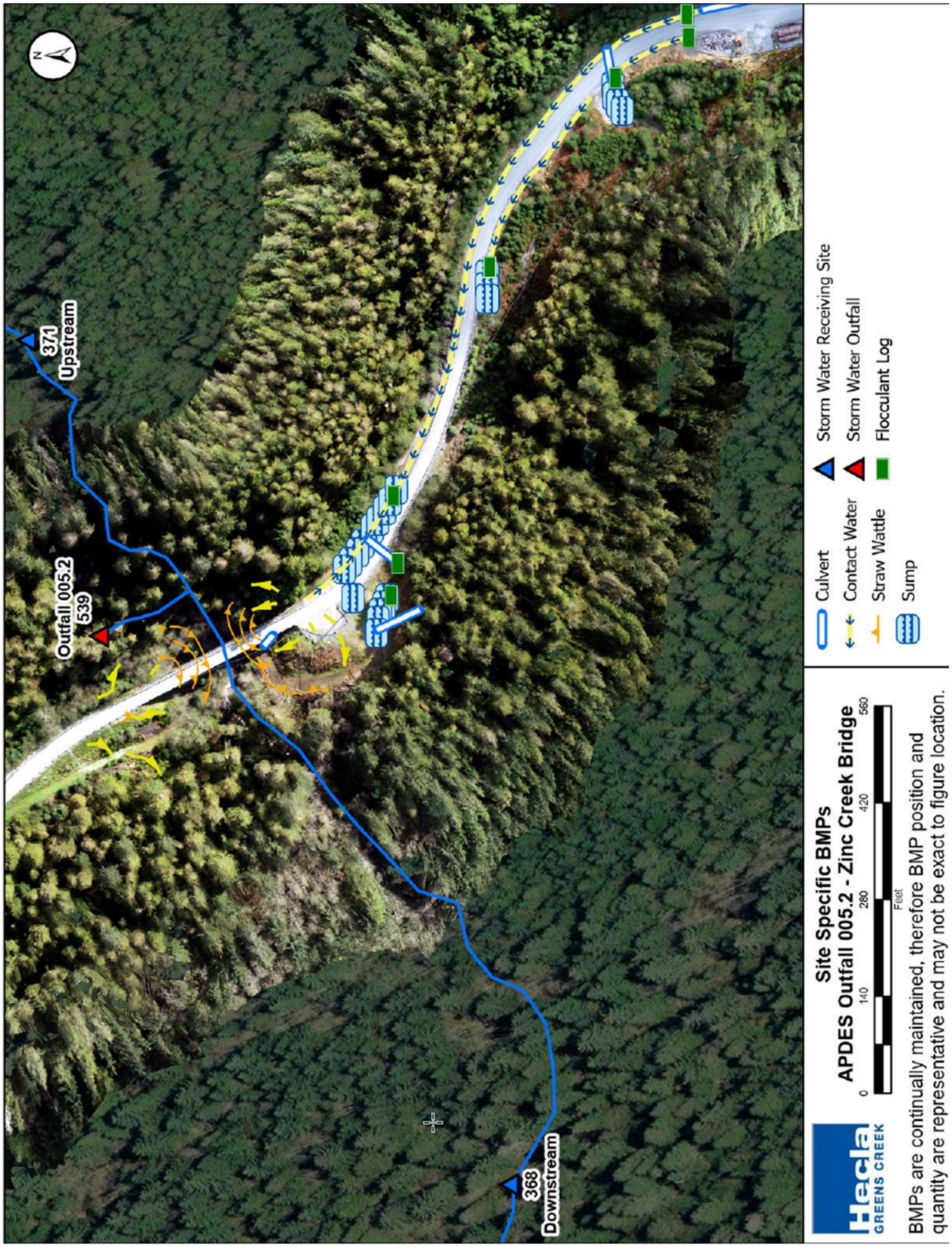

Figure 8. APDES Outfall 005.3

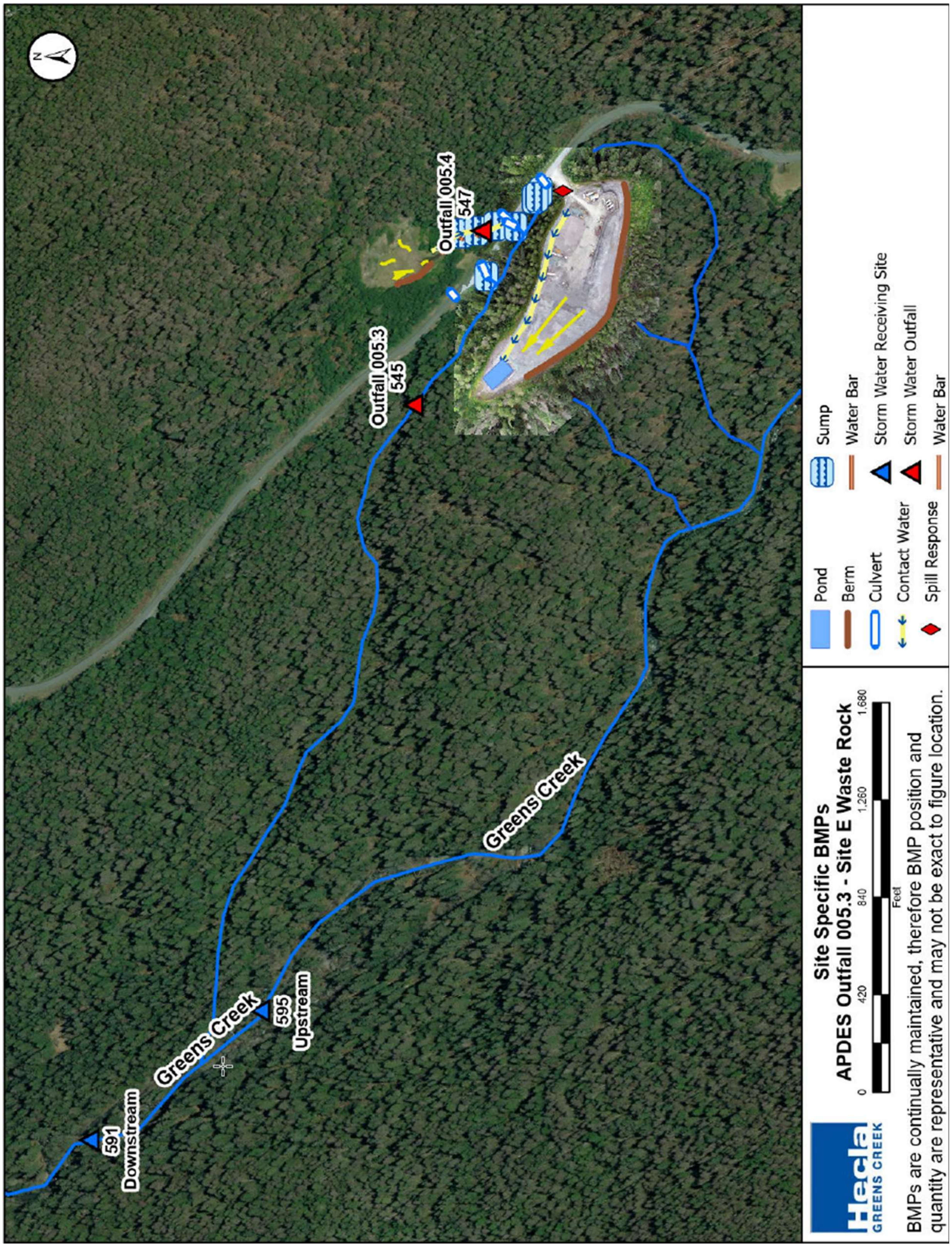

Figure 9. APDES Outfall 005.4

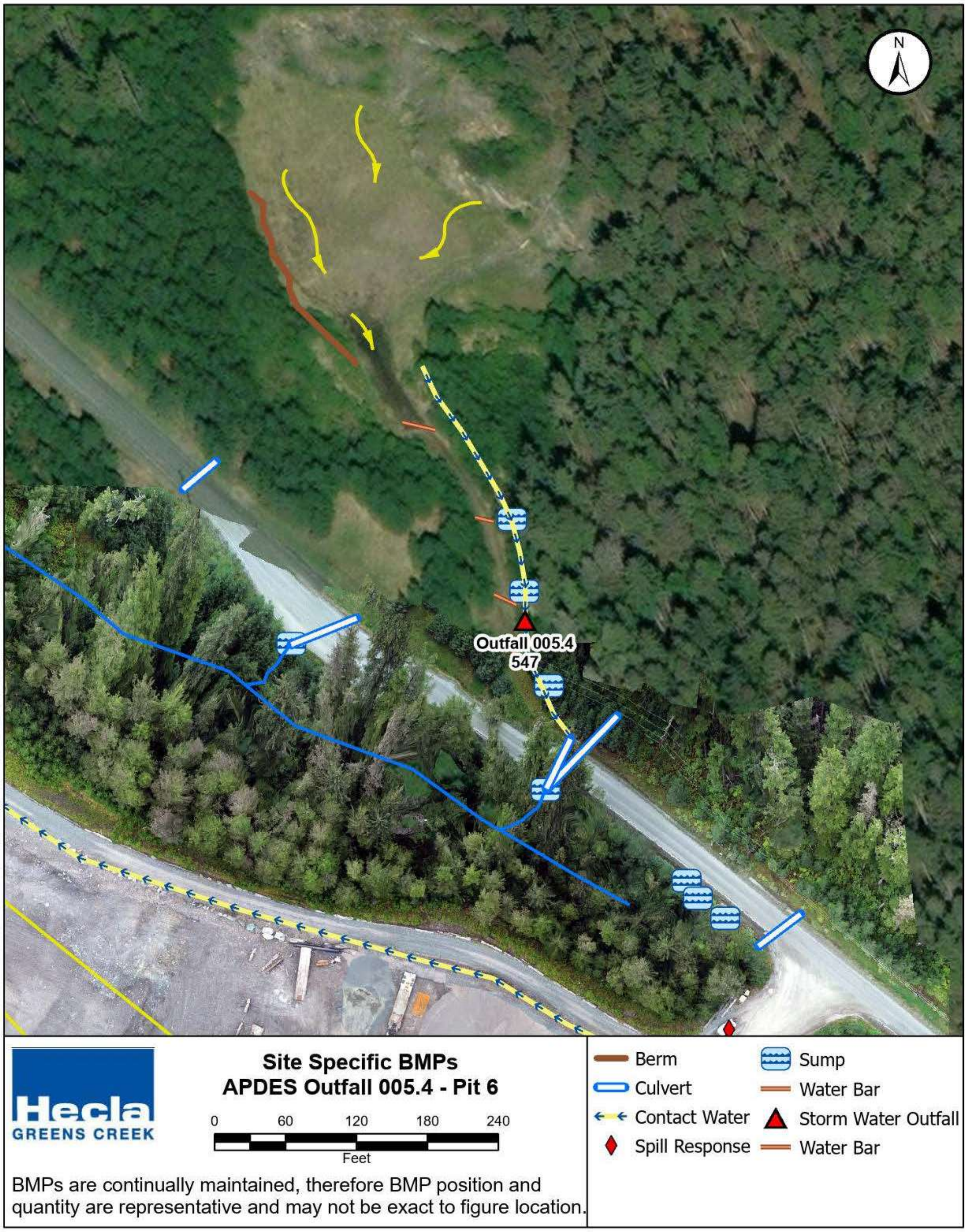

Figure 10. APDES Outfall 005.5

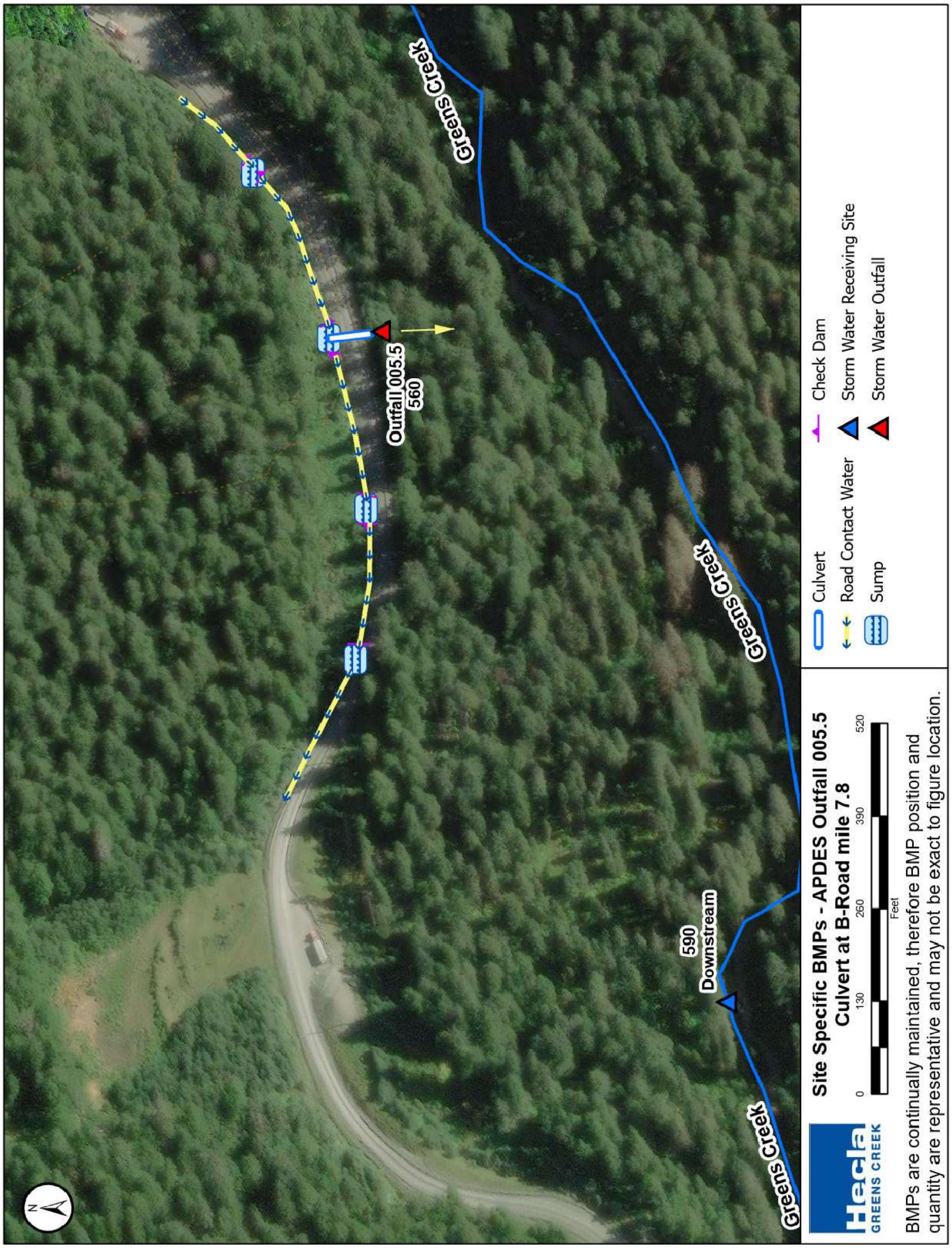

Figure 11. APDES Outfall 006

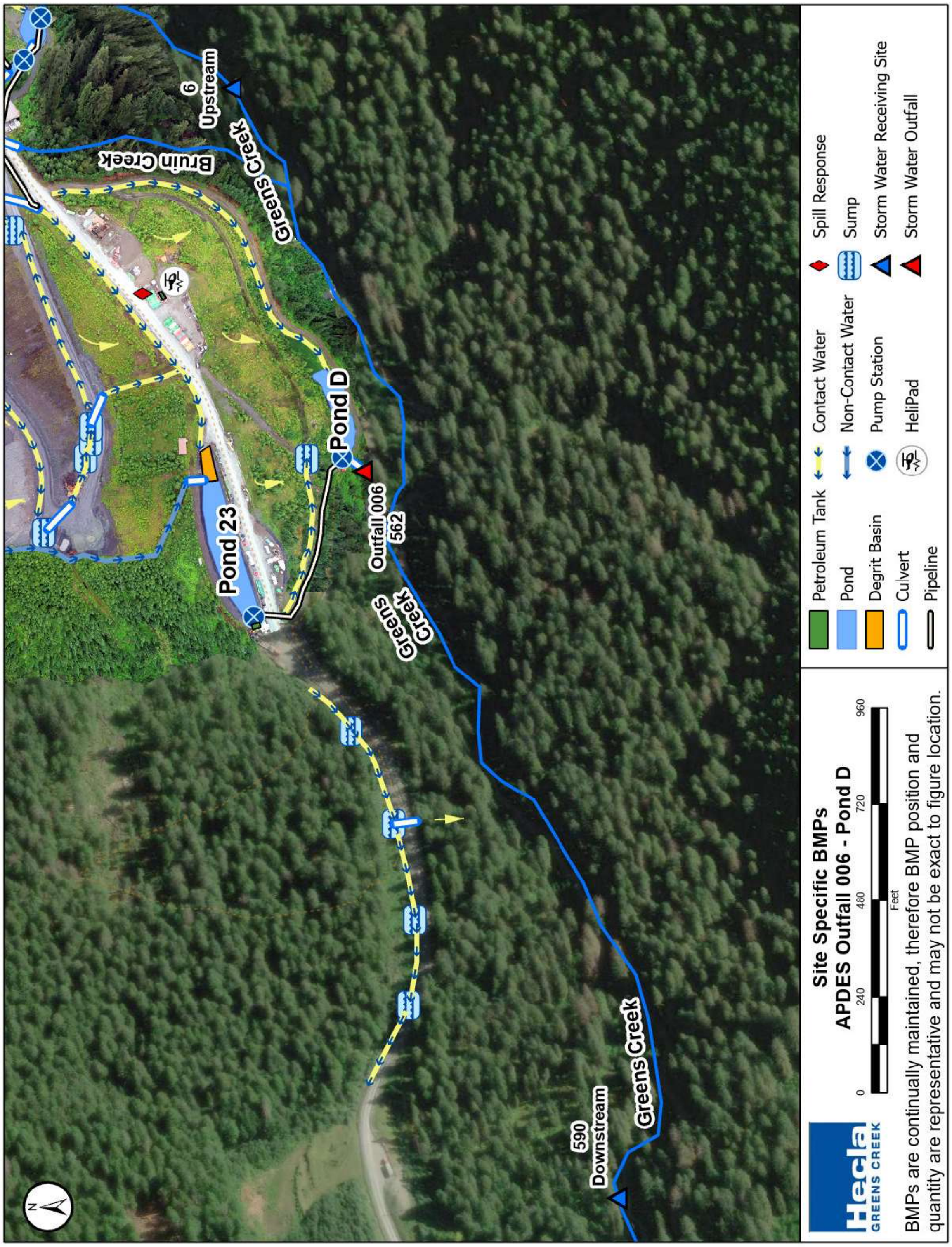

Figure 12. APDES Outfall 007

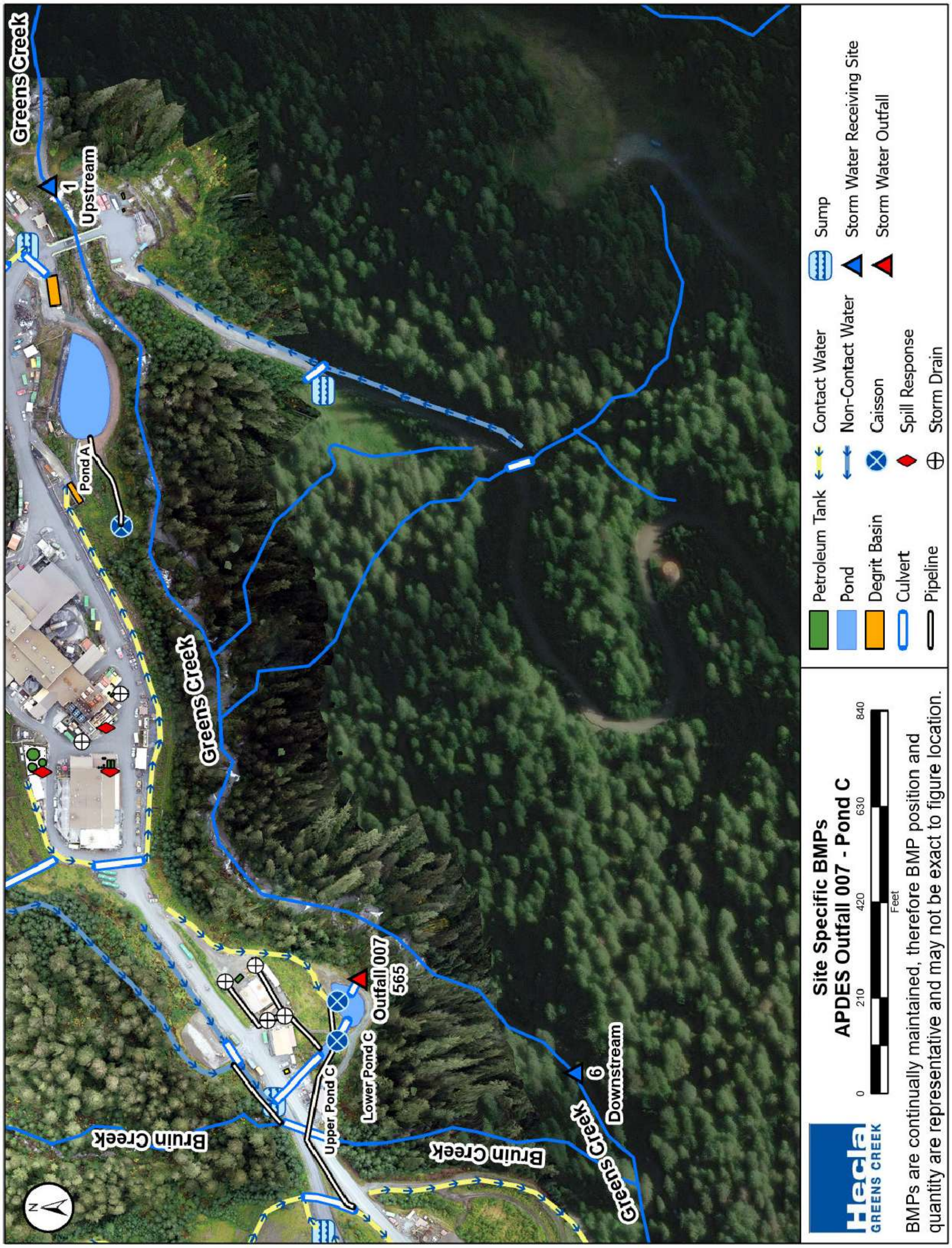

Figure 13. APDES Outfall 008

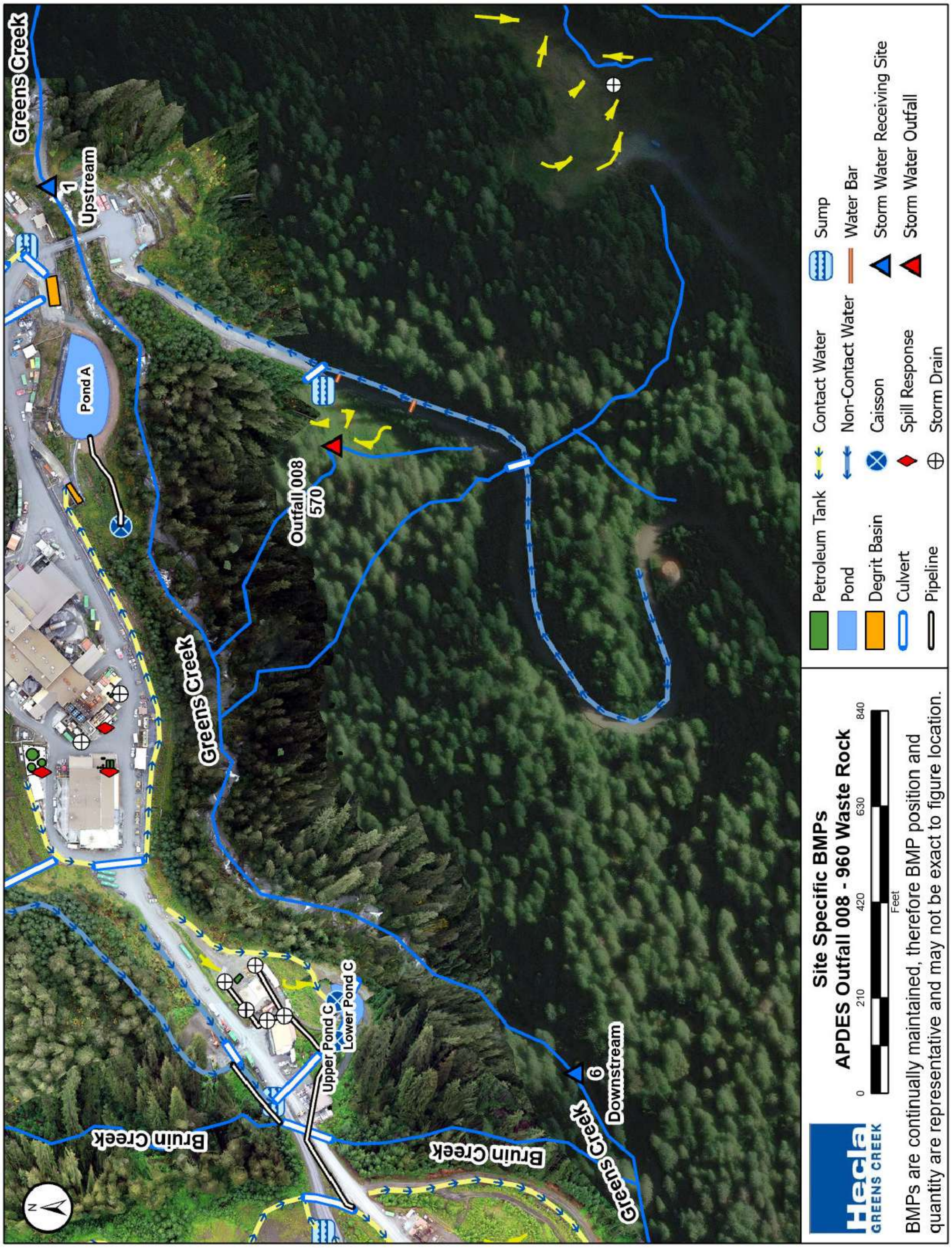

Figure 14. APDES Outfall 009

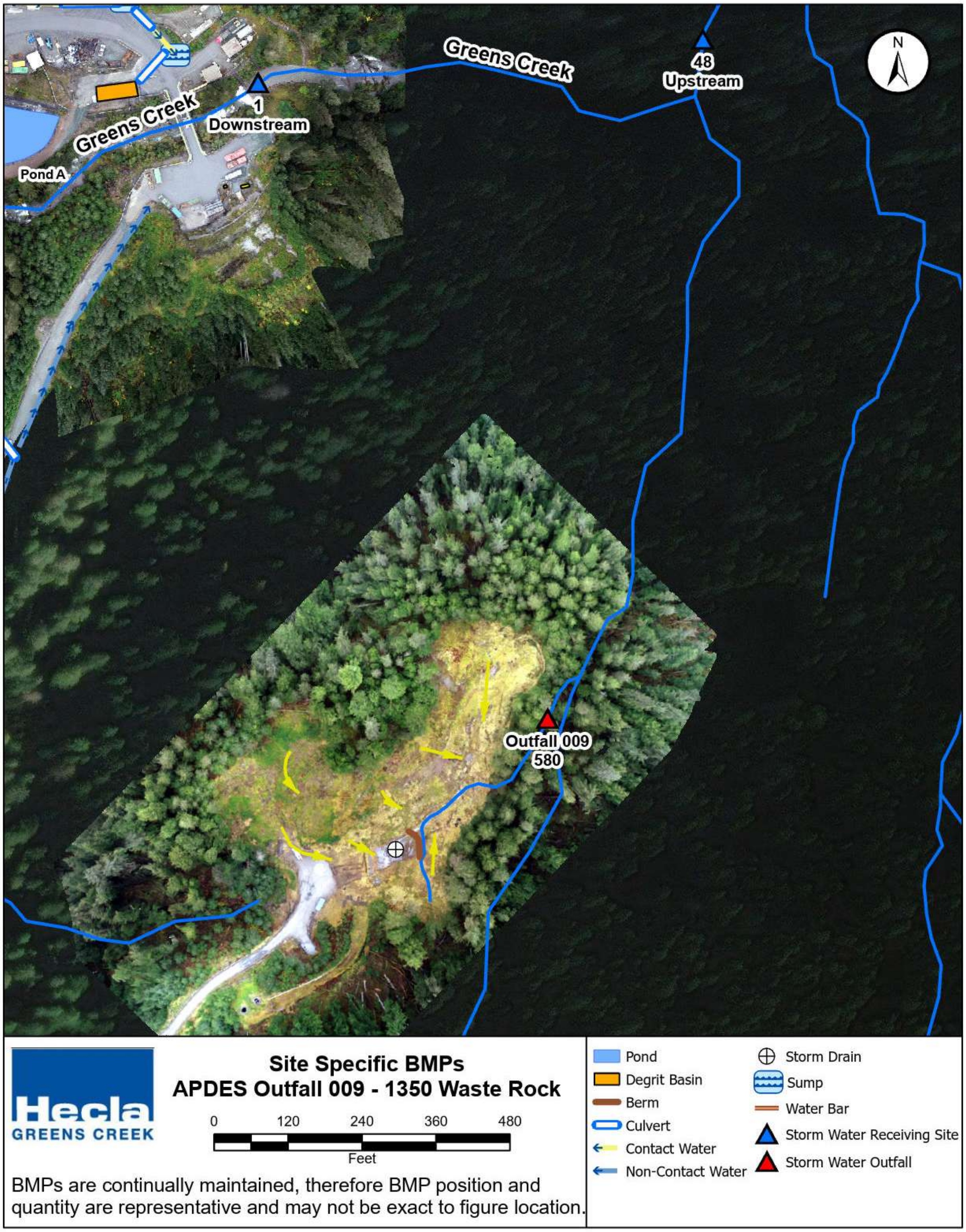

Figure 15. APDES Outfall 012

Figure 16. Waste Rock Site 23

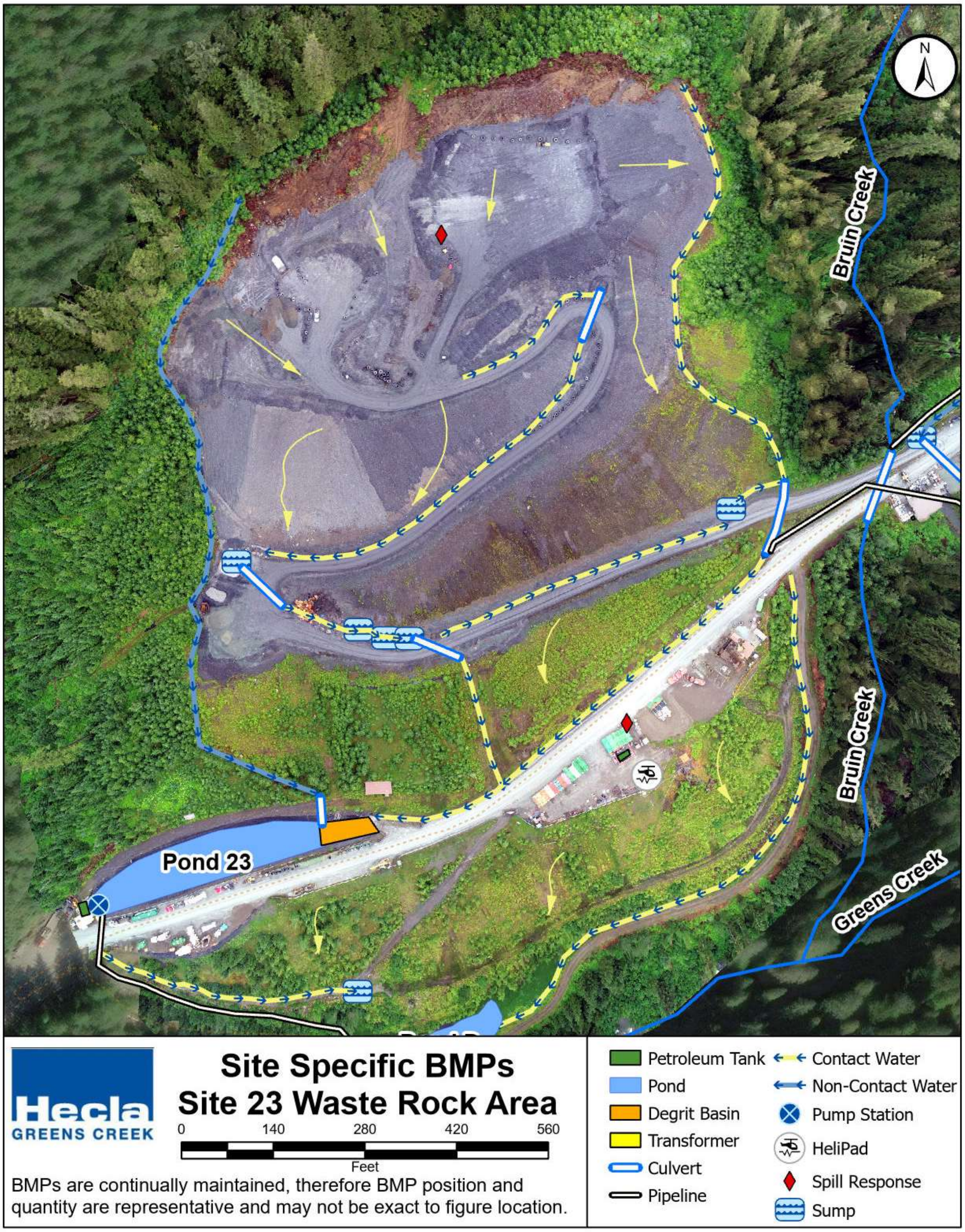

Figure 17. Tailings Area Water Treatment Process Flowsheet

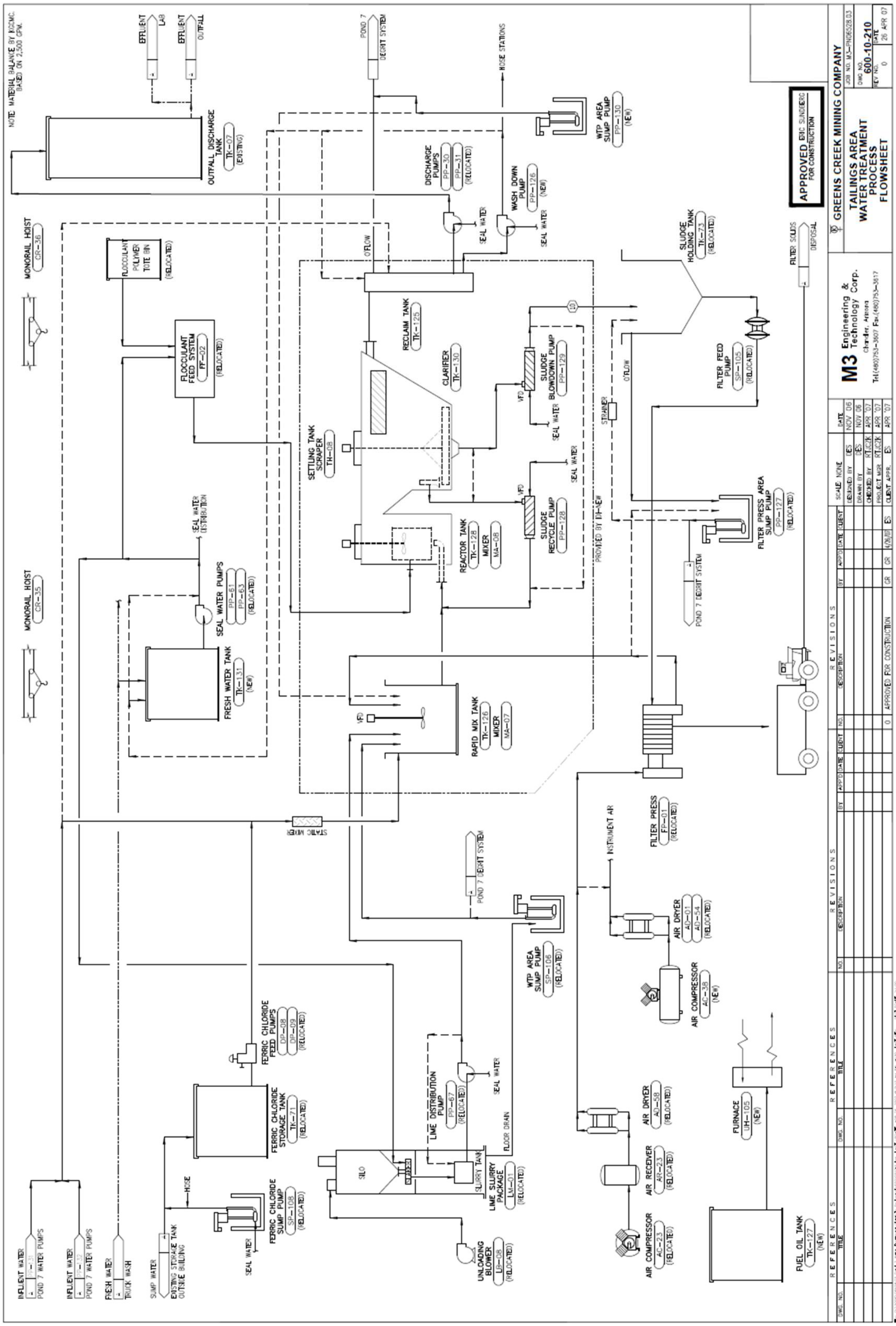

Figure 18. Road Culverts 1 of 14

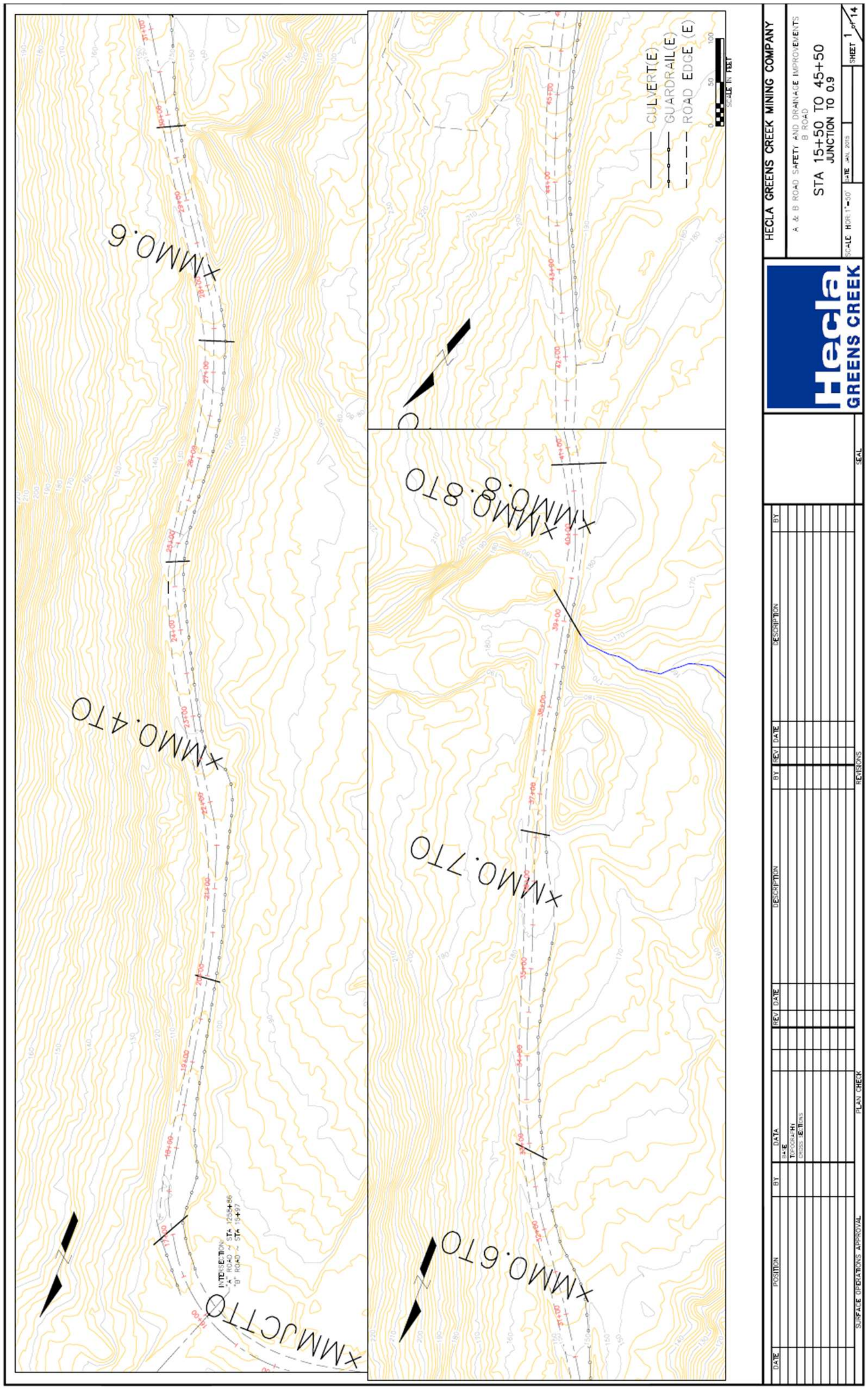

Figure 19. Road Culverts 2 of 14

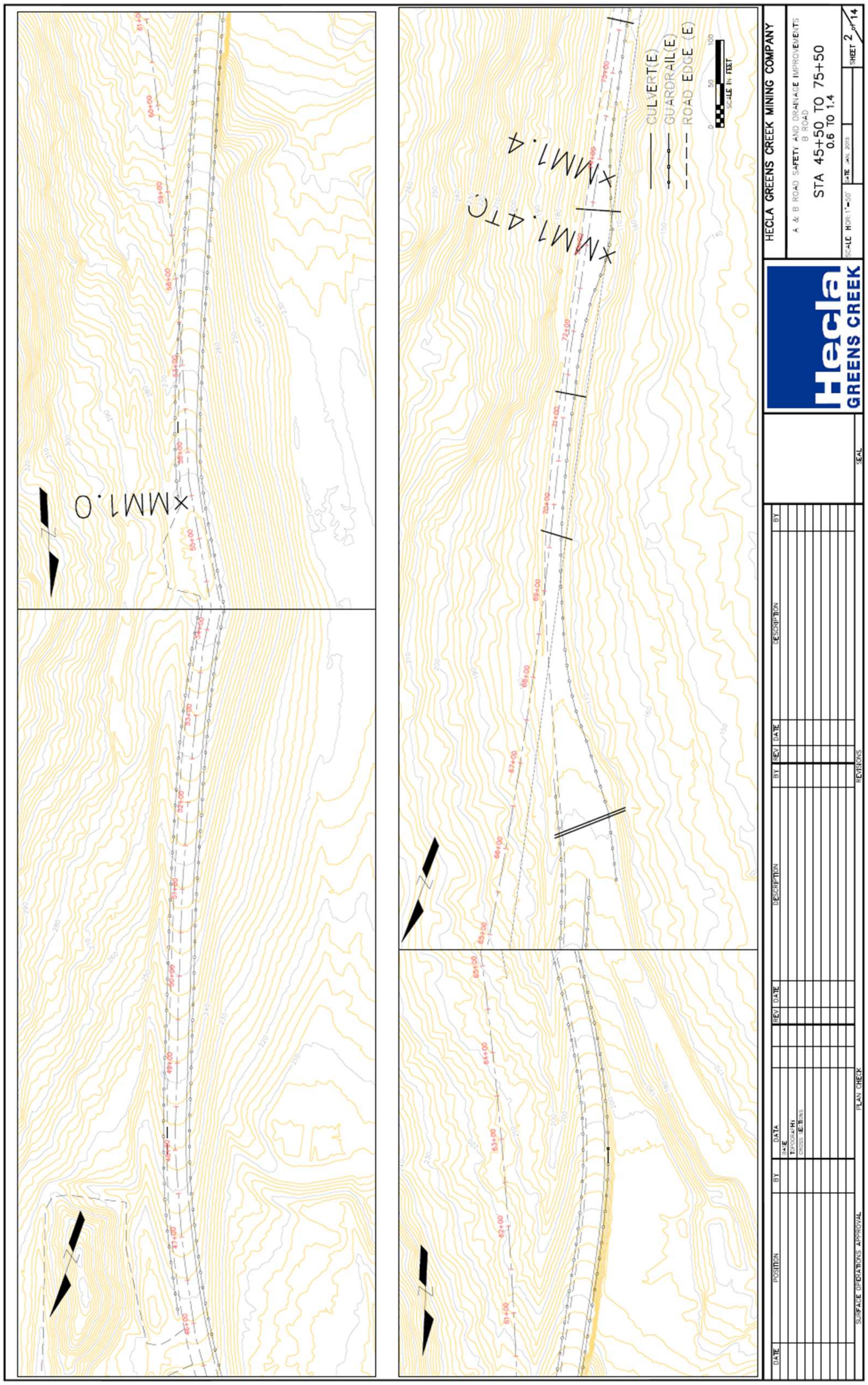

Figure 20. Road Culverts 3 of 14

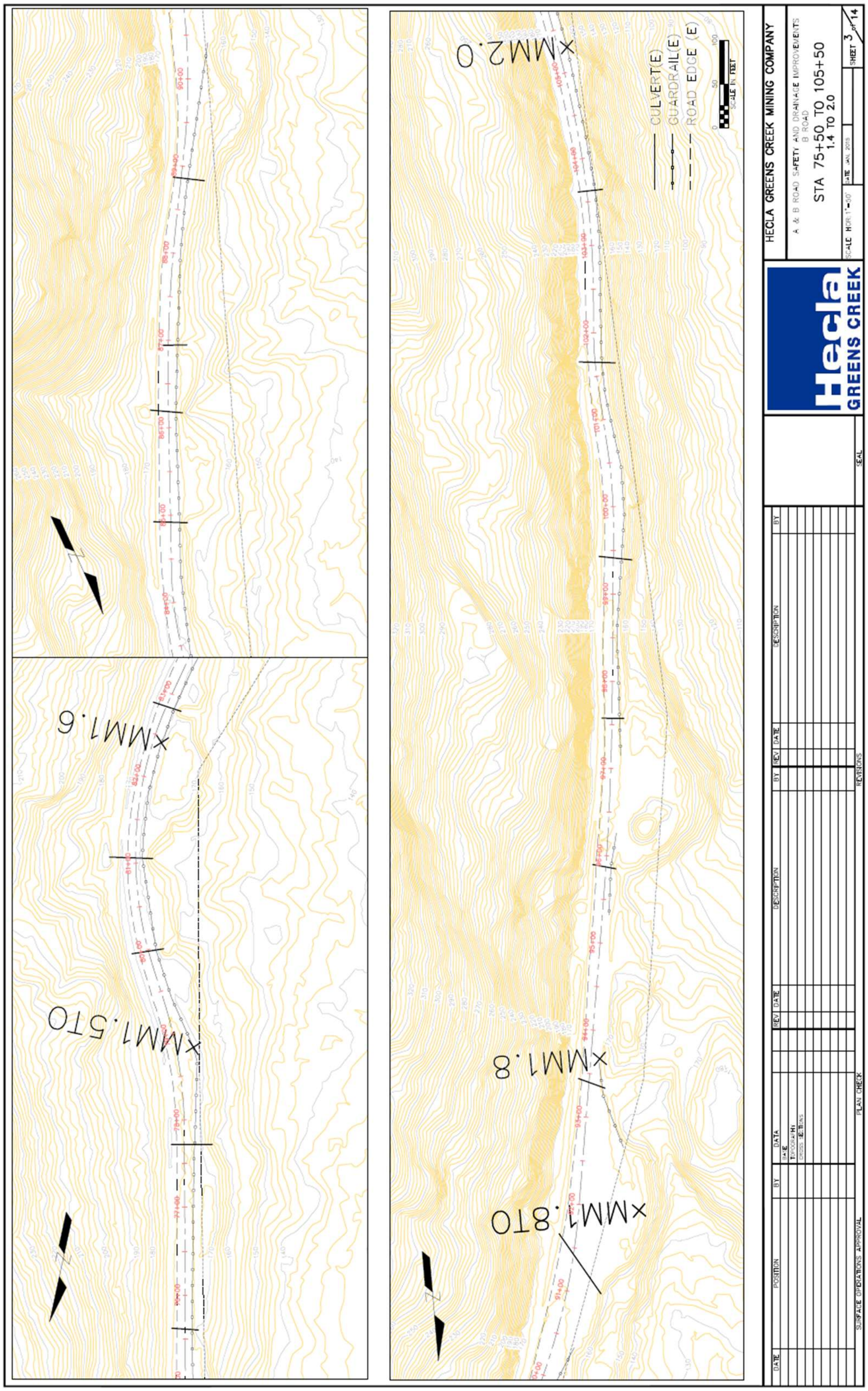

Figure 21. Road Culverts 4 of 14

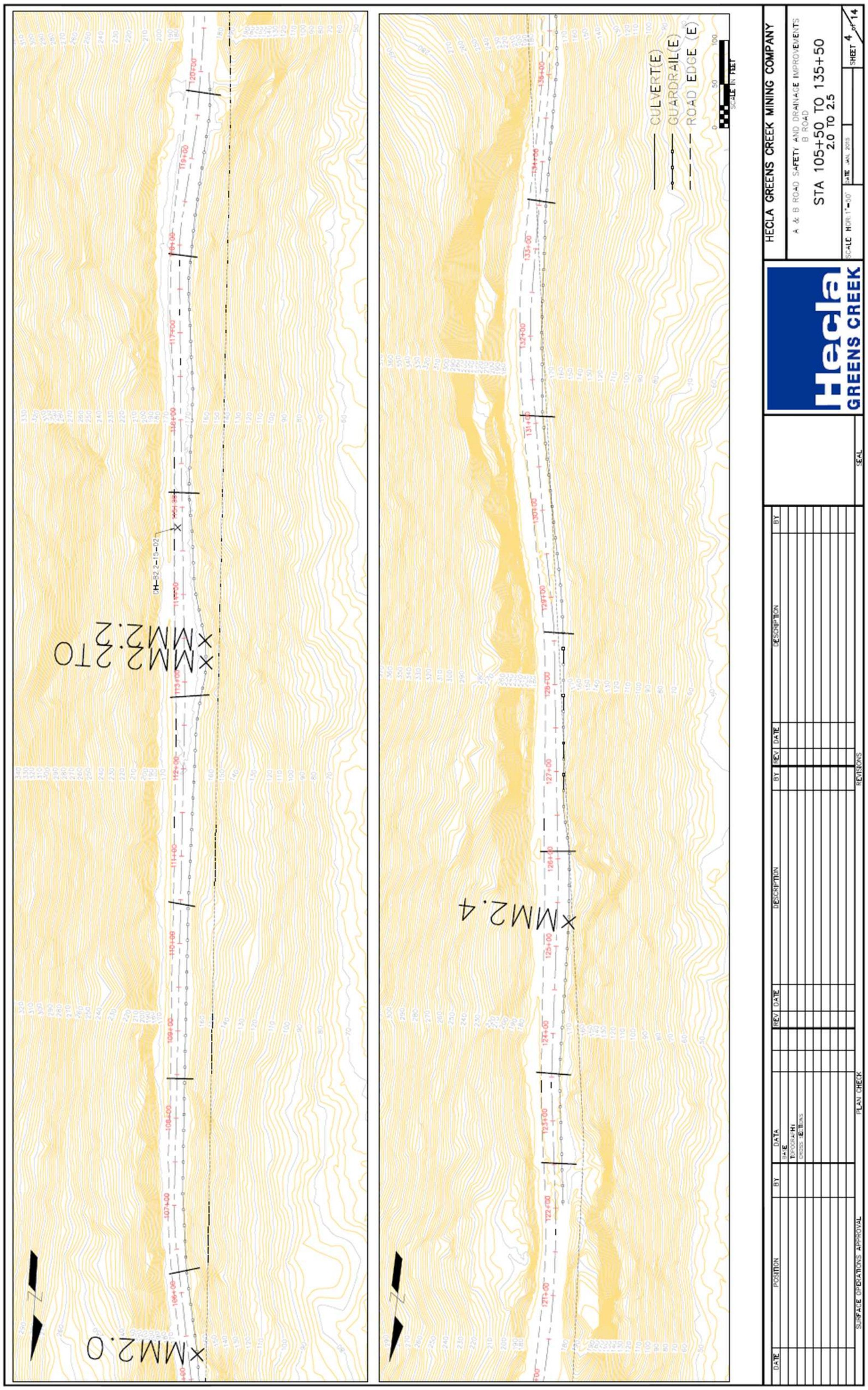

Figure 22. Road Culverts 5 of 14

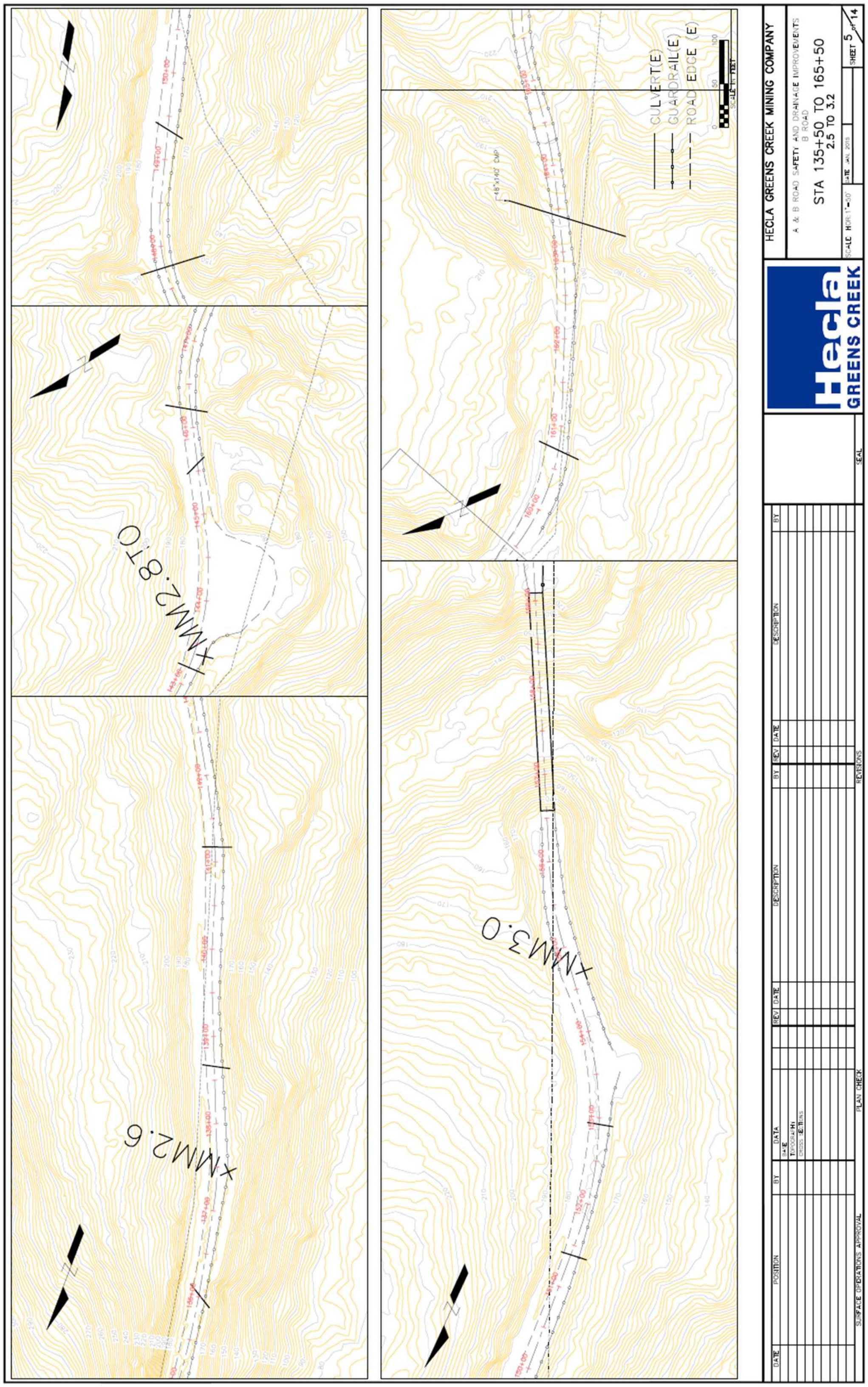

Figure 23. Road Culverts 6 of 14

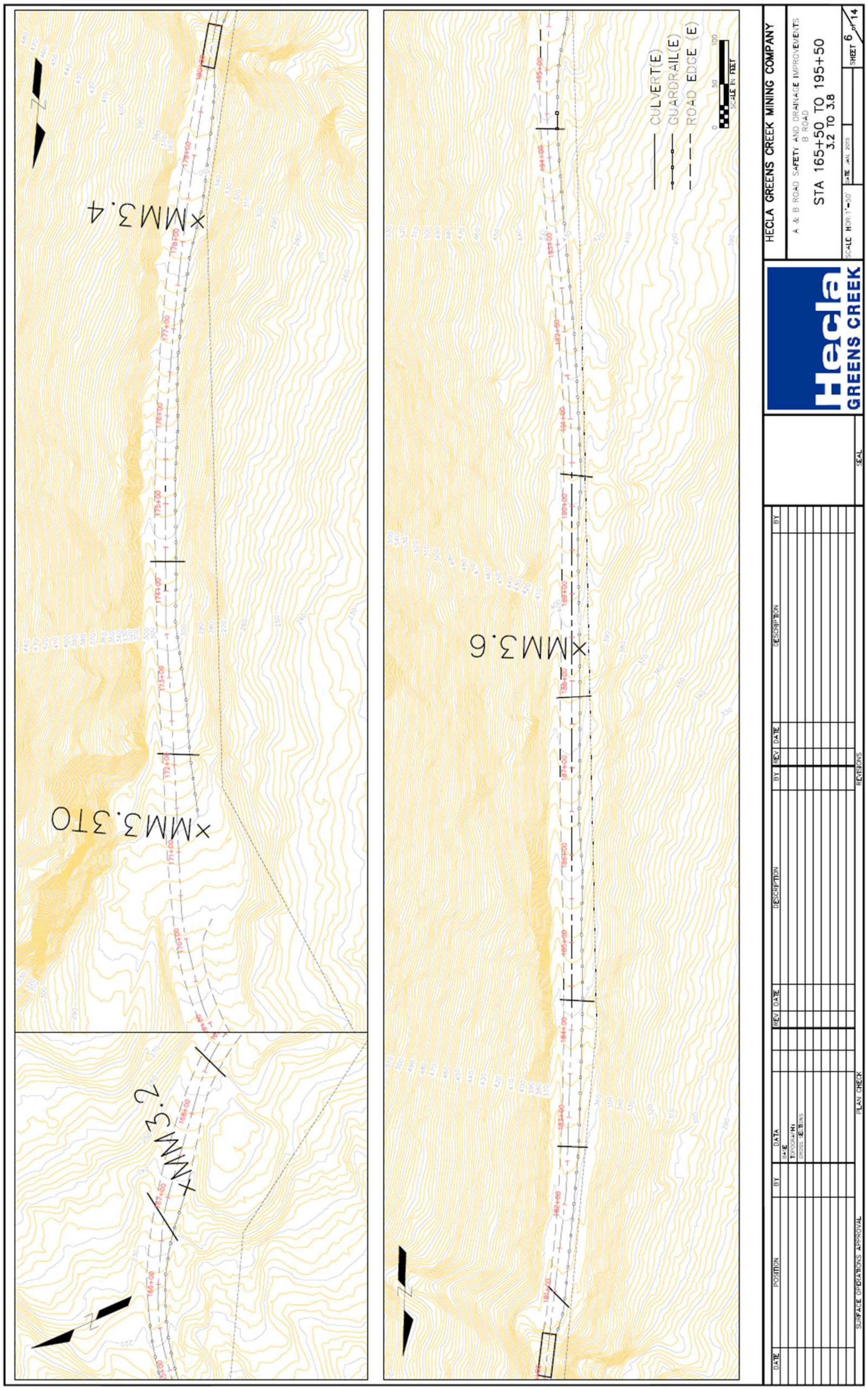

Figure 24. Road Culverts 7 of 14

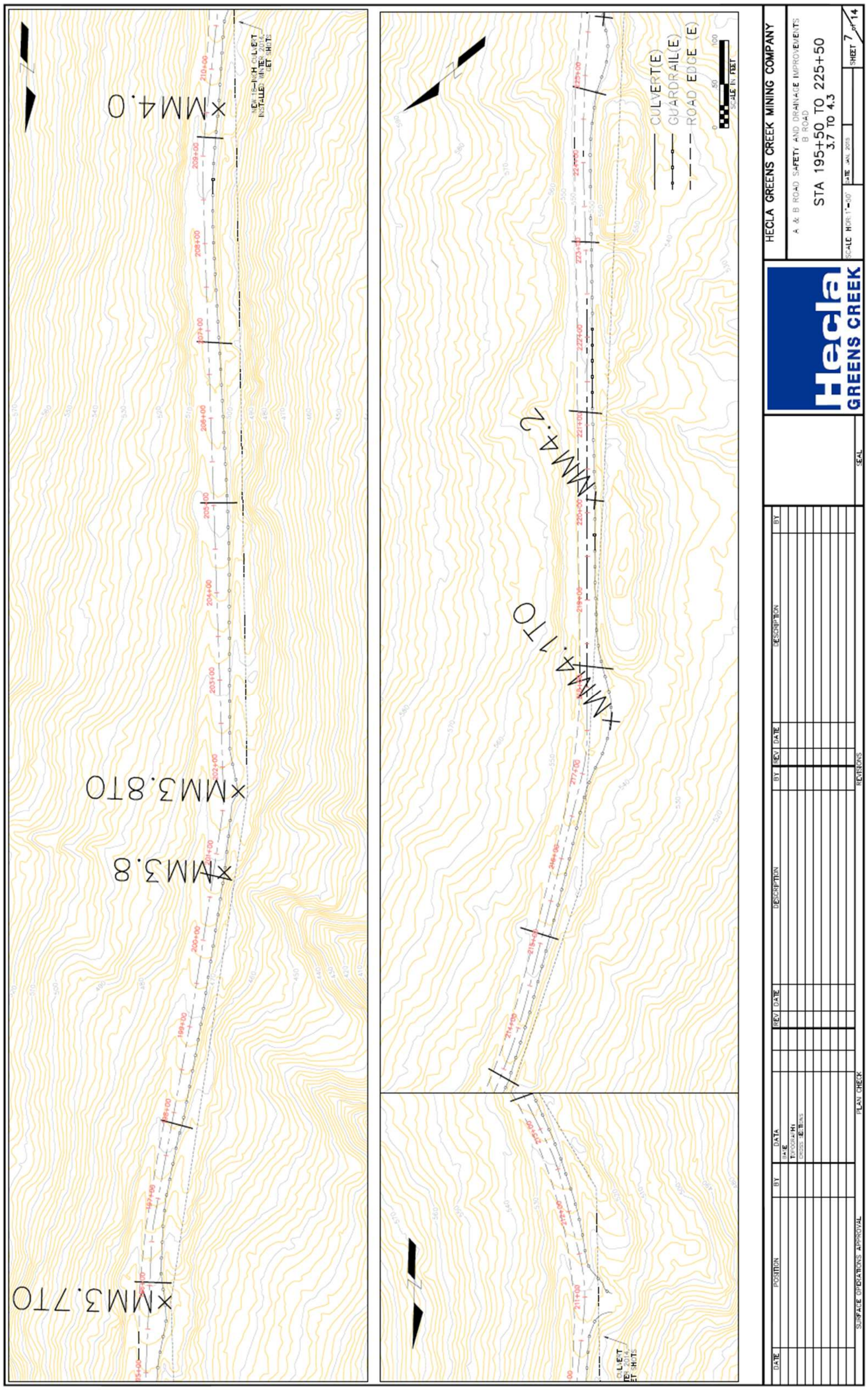

Figure 25. Road Culverts 8 of 14

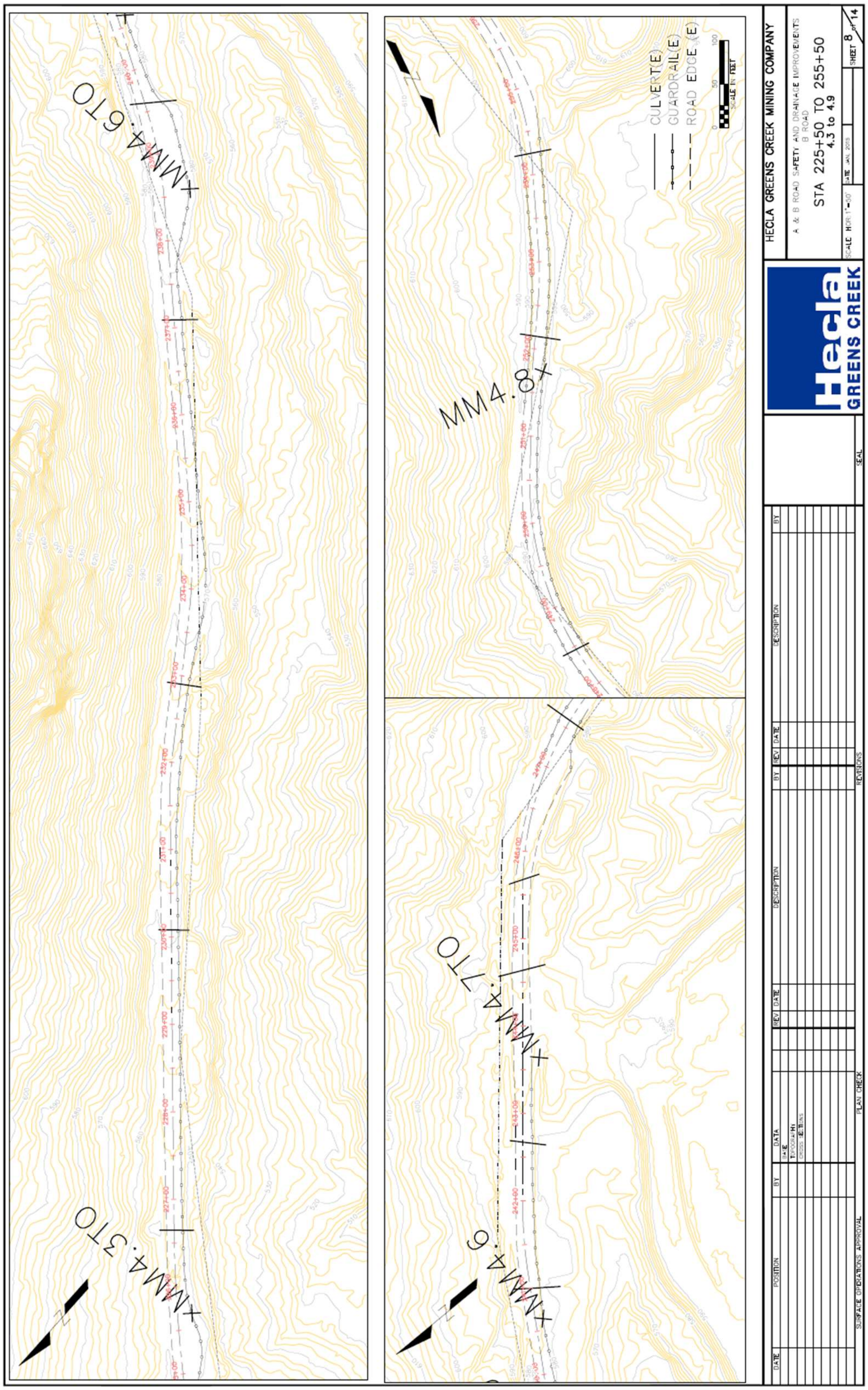

Figure 26. Road Culverts 9 of 14

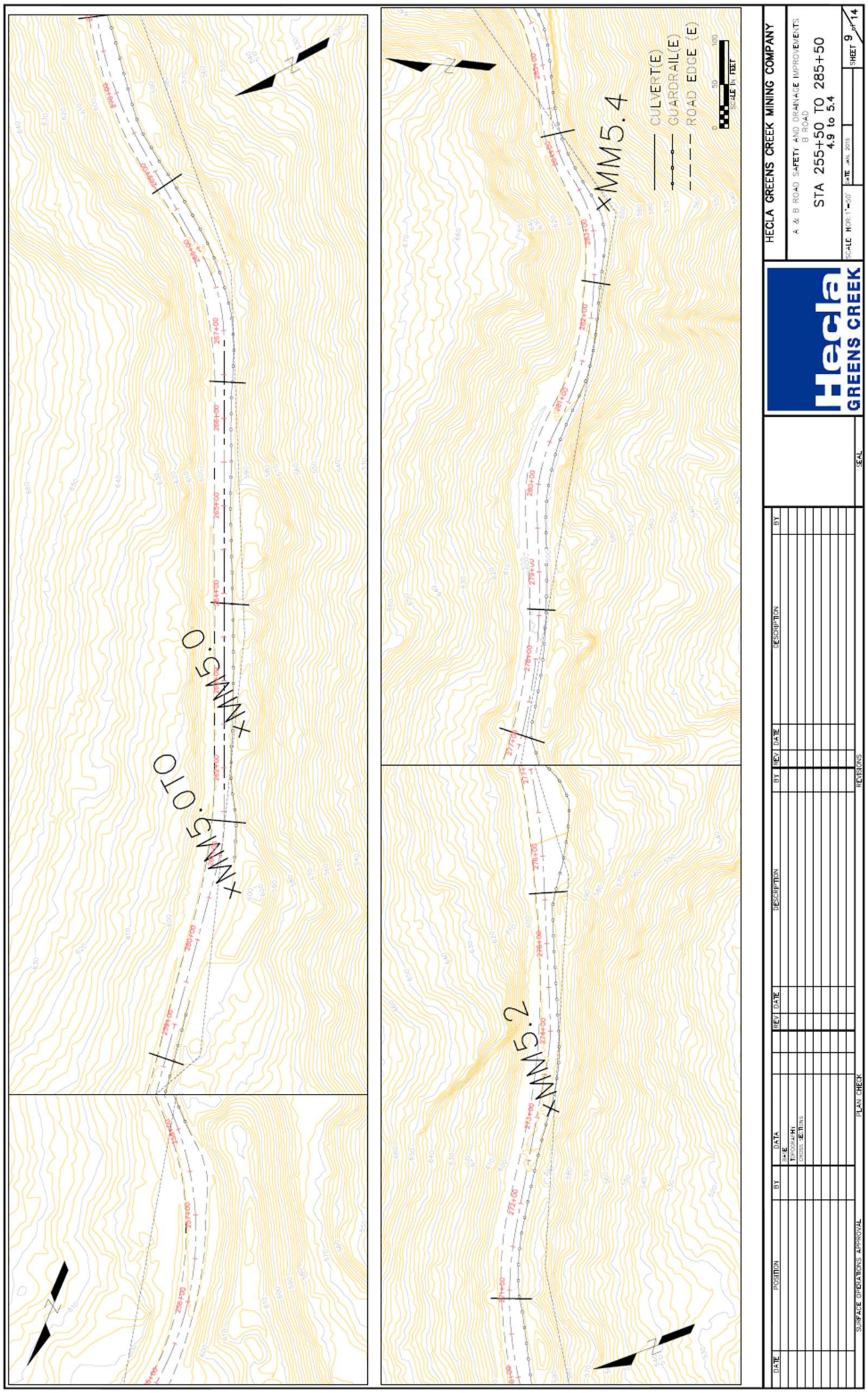

Figure 27. Road Culverts 10 of 14

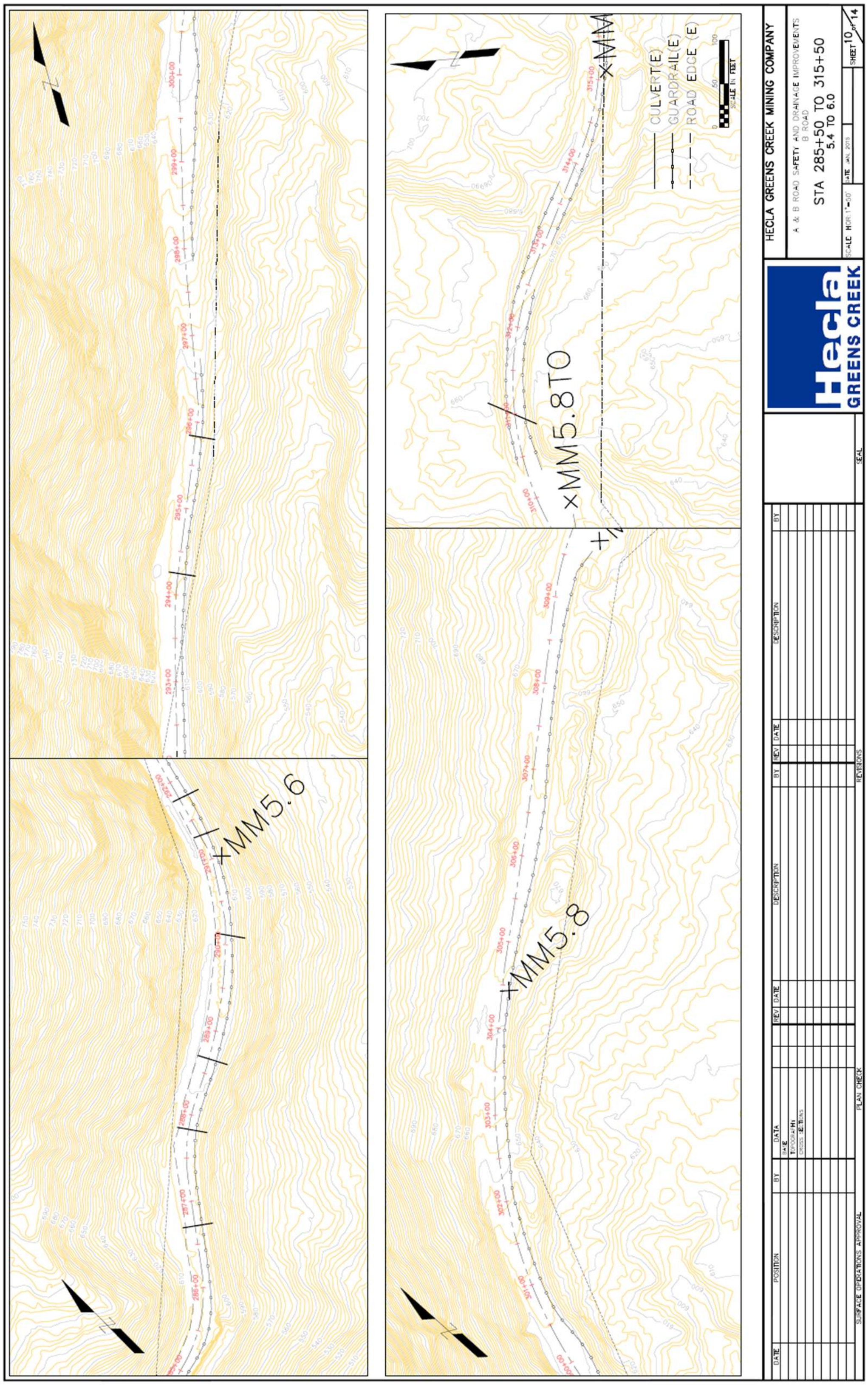

Figure 28. Road Culverts 11 of 14

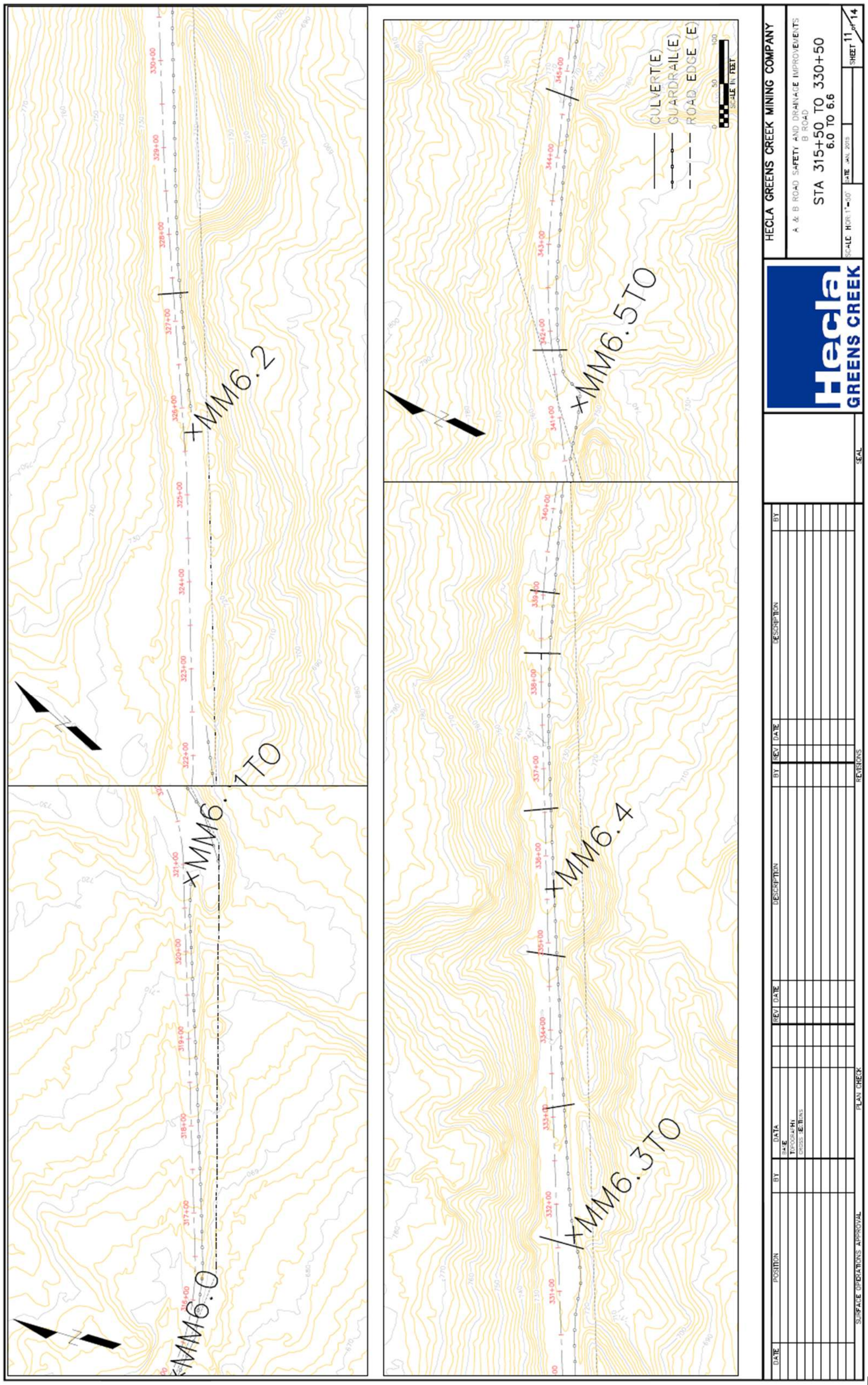

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Figure 29. Road Culverts 12 of 14

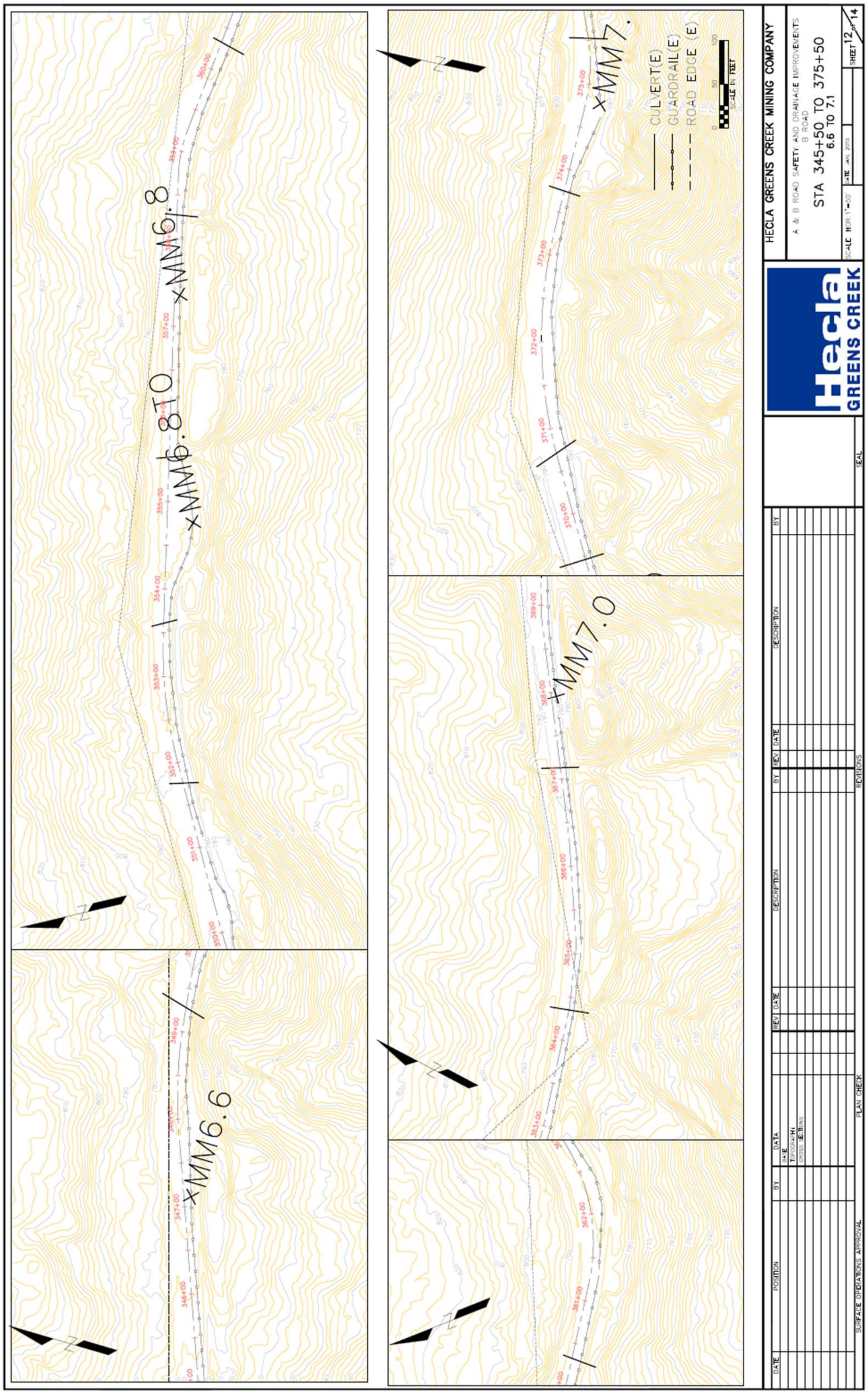


Figure 30. Road Culverts 13 of 14

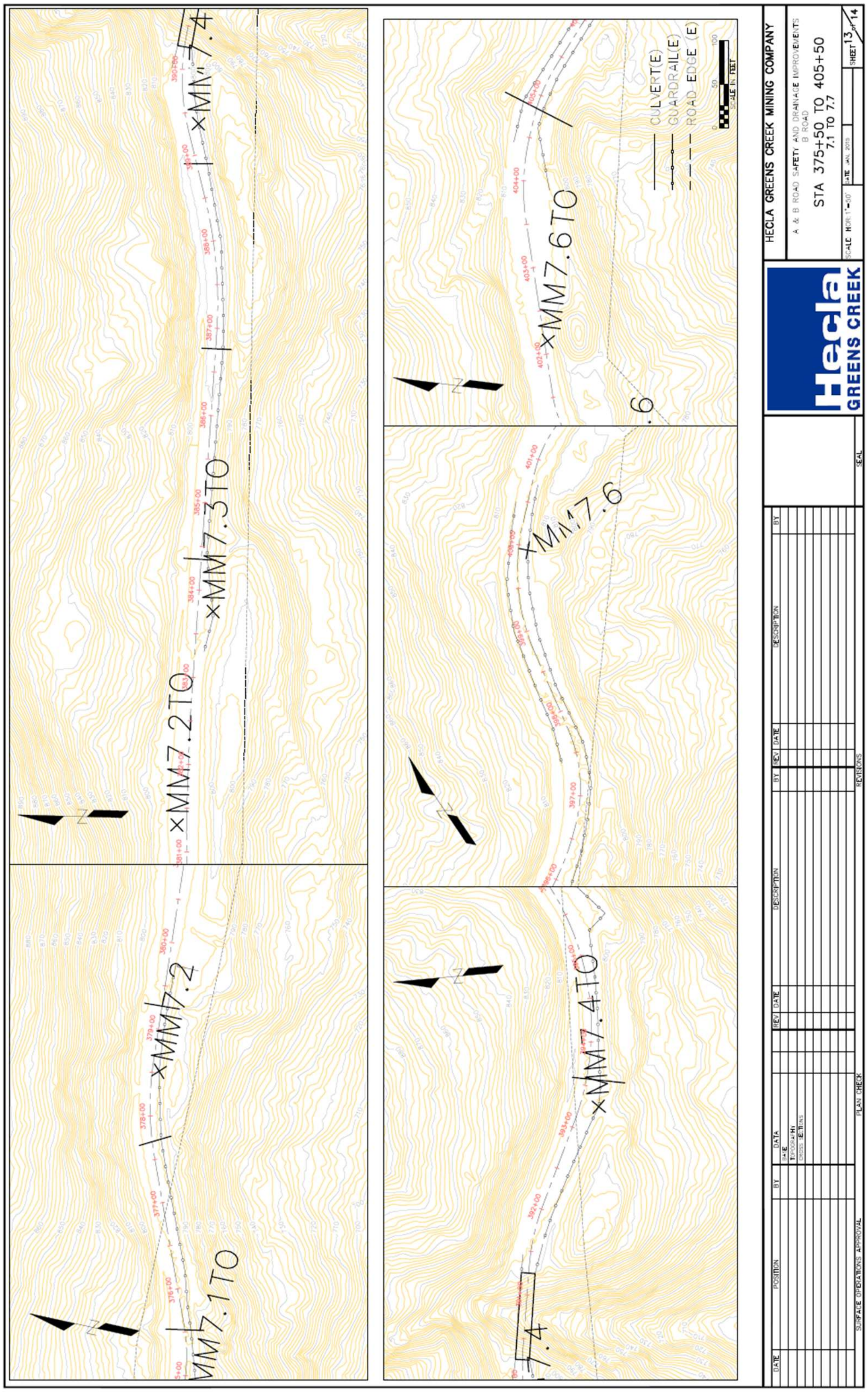
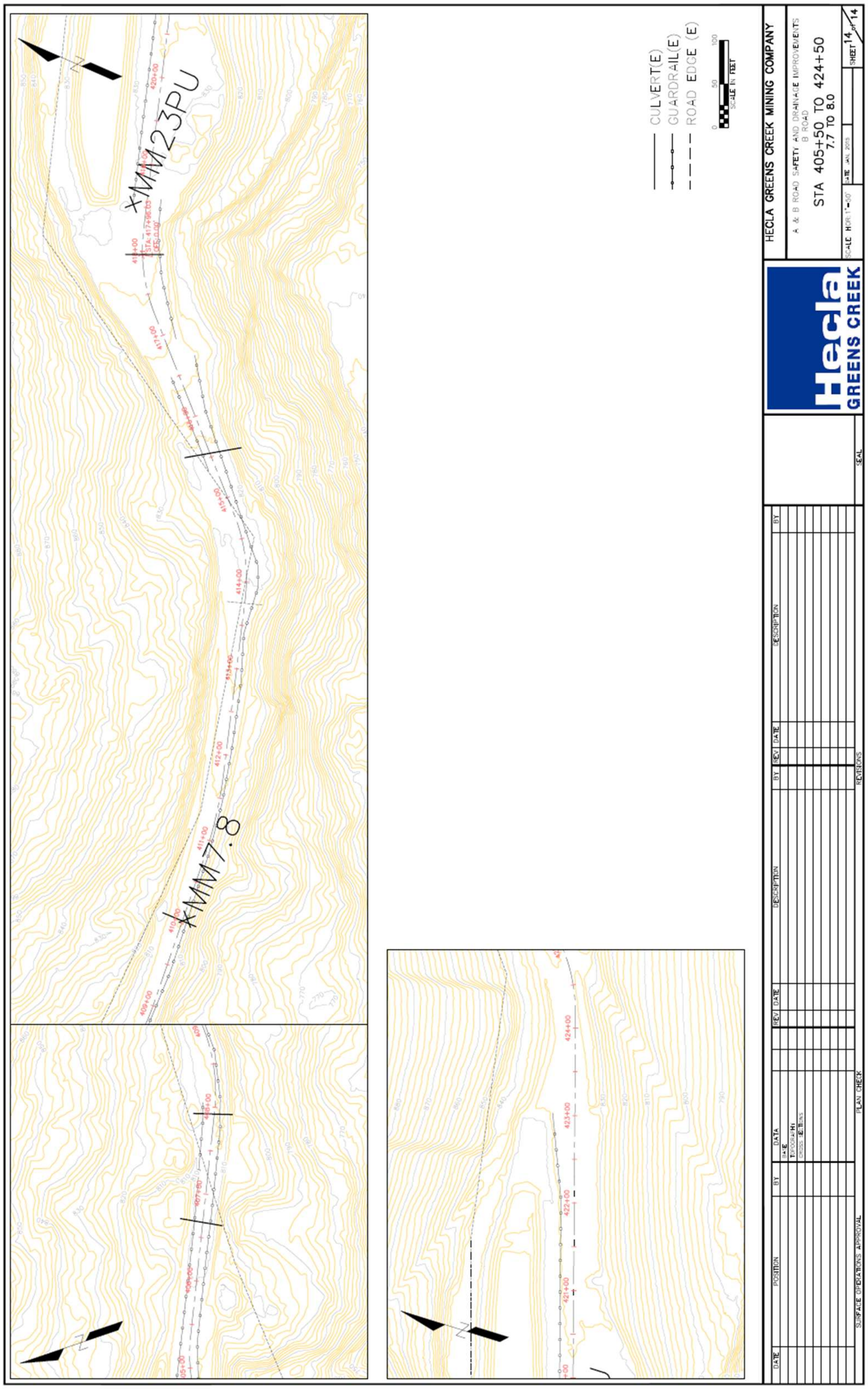


Figure 31. Road Culverts 14 of 14



GPO Appendix 05
Attachment A
Record of Changes

Whenever a change in facility design, construction, operation, or maintenance occurs which materially affects the facility's potential for discharge of significant amounts of hazardous or toxic pollutants into the waters of the United States, 40 Code of Federal Regulations (CFR) Part 125.104(e) requires the facility owners or operators to amend the Best Management Practices (BMP) plan. In addition, 40 CFR Part 125.104(f) requires that, if the BMP plan proves to be ineffective in achieving the general objective of preventing the release of significant amounts of toxic or hazardous pollutants, the BMP plan shall be subject to modification.

Changes in the BMP plan shall be duly reported and recorded below:

Date	Updated By	Change
January 2008	Jennifer Saran	Minor changes per EPA/Eva Chun comments
April 2009	Jennifer Saran	Removed Kennecott, updated contacts: no content changes
August 2009	Jennifer Saran	Site E changes (figure and text)
December 2009	Jennifer Saran	Personnel changes
May 2010	Jennifer Saran	Updated figures
February 2012	Jennifer Saran	Updated figures
December 2013	Christopher Wallace	Personnel changes, updated storage containment needs
December 2015	Christopher Wallace	The BMP was updated in accordance with the Alaska Pollutant Discharge Elimination System Permit Number AK0043206. Changes to the document were made based on input from the BMP Committee.
December 2018	David Landes	Personnel changes, updated mill reagents, added Pond 10 to tailings area, added figures for B-Road, updated Attachment E – BMP maintenance log.
December 2023	Zachary Wrzeszcz	Updated plan to include changes from the APDES Permit that went into effect in 2023. Updated figures to show current conditions.
April 2024	Paula Lillesve	Update figures and contact information. Updated the plan to include flocculant use on the road system for sediment control.
October 2025	Jennifer Stoutamore	Annual Review, updated plan to include specific language to comply with APDES Permit AK0043206 sections 2.2.4.3 (description of activities), 2.2.4.4.2 (Inventory of Exposed Materials), 2.2.4.5.8 (Comprehensive Site Compliance Evaluation recording and document storage) and APDES Appendix A 1.12.5 certification wording.
	Bill Kloth	Signed amended BMP Plan

GPO Appendix 05
Attachment B
History of Significant Spills and Leaks

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2020	7	Jul	July 12, 2020	Mine	920 Portal	Hydraulic Fluid	35	gallon	Face seal failure on the rear left tire.	Concrete	HT47	Approximately 30 gallons was cleaned up using absorbents. Estimated 5 gallons was collected using a bucket placed under the tire.
2020	7	Jul	July 17, 2020	Surface	5.5 Mile B-Road	Treated Process Water	130	gallon	Discharge of treated process water from a damaged 10-inch HDPE pipeline at ~5.5-mile on the B-Road. The shallow buried pipeline was nicked by an excavator while performing ditch maintenance causing the pipe to split along a fusion joint (photo attached). The leakage rate was estimated at 2.5 gpm for a duration of 52 minutes. Water flowed through the ditch to a culvert and then down a steep forested hillside.	Ground	10" pipeline	None
2020	8	Aug	August 30, 2020	Mine	Refuge Cutout	Hydraulic Fluid	30	gallon	DR-43 bolting cutout, blew a hose, causing a 30 gallon spill of hydraulic fluid under the bolter.	ground	DR-43	Contained the oil and used absorbents to soak up what could be reached
2020	9	Sep	September 25, 2020	Maintenance	Hawk Inlet Winch House	Gear Oil	0.031	gallon	On Friday, 25 September 2020, approximately 4 oz of gear oil spilled into Hawk Inlet from the winch house. The origin of the release was from maintenance work being conducted at the time. Because the spill was to water, it was immediately reported to the National Response Center and the Alaska Department of Environmental Conservation. Harbor boom was deployed to prevent oil from fouling the shoreline, and absorbents were used to recover as much material as practicable. This is the second release from the winch house in just as many years.	Ocean	Winch gear box	
2020	9	Sep	September 28, 2020	Surface	Tailings	Treated Process Water	90	gallon	On Monday, 28 September 2020, an air vacuum release valve (AVR) on the 002 Outfall discharge pipeline was found leaking. The spill was reported to the Alaska Department of Environmental Conservation, under the conditions of the Alaska Pollutant Discharge Elimination System (APDES) permit. The estimated minimal volume of treat water discharged was 90 gallons. However, the maximum volume is undetermined because it is not known when the valve first ceased. Investigation of the valve showed that the discharge water has been corroding the valve. This is the fourth unpermitted discharge of water from the property this year.	Wetland	AVR	None

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2021	2	Feb	February 4, 2021	Surface	6.4 Mile B-Road	Treated Process Water	250	gallon	An operator reported a potential pipeline leak at 6.4-mile on the B-road. A water operator responded and discovered a small hole in the 8-inch pipeline, releasing 3 to 4 gpm. The operator proceeded to shut off the flow in the pipeline by diverting it to another pipeline. There is no known event that would have lead to this leak. The pipeline was fixed temporarily, and flow was returned to the pipeline.	Ground	8" pipeline	None
2021	2	Feb	February 10, 2021	Underground	920 Fuel Farm	Diesel	11	gallon	An auto-shutoff mechanism on the 920 fuel system failed, resulting in the release of 20 gallons of diesel fuel. Though the operator was nearby, they failed to realize that fuel was spilling into the portable containment. Once the containment was full (9 gallons), additional fuel (11 gallons) was released to the pavement. It is suspected the mechanism failed due to the below-freezing temperatures.	Ground	HT-66	
2021	3	Mar	March 2, 2021	Underground	Mine	Diesel	120	gallon	Mucker operator was fueling up and forgot to disconnect wiggins off the mucker tearing the wiggins off the tank of the mucker spilling a full tank of diesel fuel from 481 lube bay to the 668 on the goat trail. I am not sure how much fuel that is but it's a lot. We have all hands on deck doing the cleanup with diapers to get as much as we can. This happened approximately around 2:00 AM. This is our super Friday so everyone is coming out to catch the bus for the boat.	Road base	LR82	Excavated to the hard pan. Material was brought to the surface for disposal.
2021	5	May	May 17, 2021	Surface	5.6 Mile B-Road	Treated Process Water	reported as unknown	gallon	Broken pipe fuse in 10-inch line leading to a leak of treated process water at the 5.6mile B road.	Road/ditch, forest duff	10" pipeline	Water from the 920 Area has been transferred to a different pipeline until repairs can be completed. The damaged section of pipe will be cut out and a new section fused in.
2021	7	Jul	July 12, 2021	Mine	920 Warehouse	Gear Oil	35	gallon	A 55 gallon barrel of gear oil tipped off the pallet as it was being loaded into the storage container. The barrel was damaged enough that 35 gallons were lost before the operator couild respond.	Gravel	55 gallon drum	Spill absorbents and floor dry were used to recover the spilled product. Residual contamination was removed by scraping up the gravel substtrate.
2021	6	Jun	June 28, 2021	Mill	920 Mill Complex	Hydrualic Oil	75	gallon	The leak was coming from a hydraulic fitting on the filter press. Inspection of the fitting revealed that there was a ruptured O-ring in the fitting.	Concrete	Filter Press	Absorbents were used to clean up the spill.

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2021	8	Aug	August 1, 2021	Underground	920 Ore Pad	Hydraulic Oil	20	gallon	A blown o-ring on HT62 resutled in 20 gallons of hydraulic fluid being released after the ore the was dumped on the pad.	Ore	HT62	Spill absorbents were used to recover the spilled product. Residual contamination was removed by scraping up and feeding the ore into the Mill.
2021	9	Sep	September 9, 2021	Mill	920 Ore Pad	Hydraulic Oil	45	gallon	A hydraulic cylinder disconnected on the backhoe tearing the two attached hydraulic lines.	Ore	BH31	Spill absorbents were used to recover the spilled product. Residual contamination was removed by scraping up and feeding the ore into the Mill.
2021	9	Sep	September 24, 2021	Mine	Drill Site	Diesel Fuel	3	gallon	On 24 September 2021, strong winds blew a nearly empty barrel of diesel fuel out of the containment that Surface Exploration was storing it in on a remote drill site. The barrel rolled downhill, stopping upgradient of a small pond. A bung on the barrel was loose, allowing for the release of an estimated 3 gallons. Some of the fuel reached the pond.	Water	Barrel	The fuel was contained and recovered using absorbent socks and pads. The spent absorbents will be shipped to ChemWaste, a division of Waste Management, for disposal.
2021	12	Dec	December 15, 2021	Mine	653 Lube Bay	Diesel Fuel	80	gallon	An 80-gallon diesel spill occurred underground, caused by human error, when a mucker operator drove away from the fueling station without disconnecting the fuel hose. The connected hose tore a hole in the mucker's tank through which the fuel discharged to the road base from the 653 lube bay to the top of the 37 ramp. The incident is under investigation.	Road base	LR75	Absorbant pads were used then soil was scraped up and transferred to lined container.
2022	1	Jan	January 30, 2022	Mine	481 Lube Bay	Diesel	57	gallon	Did not disconnect the Wiggins after fueling. Drove off and spilled diesel in lube bay.	Road base	LR73	pumped to drum and used absorbant pads
2022	3	Mar	March 8, 2022	Mill	400 WTP	Process Water	600	gallon	Reactor tank overflowed and exceeded the capacity of the floor sump resulting in treated water flowing out the door to the drain to A Pond	Concrete	Reactor Tank	
2022	5	Jun	June 1, 2022	Surface	B Road	Tailings/Hydraulic Oil	10	gallon	Operator diving downhill in MT18 with KT28 loaded with tailing. Drove off the road and landed the truck and trailer in the ditch on its side.	road	MT-18	
2022	7	Jul	July 22, 2022	Mine	52T Door	Hydraulic Oil	40	gallon	The air door filter leaked	Road base	Hydraulic Power Pack	Absorbents
2022	10	Oct	October 3, 2022	Mine	431	Hydraulic Oil	12	gallon	Hose Failure	Road base	DR-43	Absorbents
2022	12	Dec	December 21, 2022	Mine	920 UG Shop	Hydraulic Oil	20	gallon	Brake block o-ring failure, No other details listed on spill card	Concrete	HT-58	Absorbents

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2023	2	Feb	February 1, 2023	Mine	M540	Diesel	20	gallon	Belly pan came off of LR83 while mucking in M540 and fuel leak developed from a broken fitting.	Road base	LR-83	Absorbents
2023	1	Jan	January 15, 2023	Mine	Ore pad	Hydraulic Fluid	50	gallon	HT47 blew O-ring spilling about 50 gallons of hyd. oil on ore pad.	Road base	HT-47	Absorbents
2023	2	Feb	February 23, 2023	Surface	Hawk Inlet Fuel Farm Containment	Diesel	15	gallon	The lube truck driver was proceeding to fill-up the loader in cons storage. When they came around the back of the truck, they noticed diesel coming out at the filter/hose coupling. Fifteen (15) gallons of diesel spilled on the concrete/containment road base before the operator turned off the pump. An empty 35 gal drum was placed under the leaking area of the lube truck, accumulating an additional twenty (20) gallons of diesel. After investigation, the filter was found to be missing an o-ring from the last time it had been changed-out.	Concrete	LT-	Approximately 140 absorbents were used to clean-up the diesel that had spilled on concrete. These absorbents were placed in trash bags and disposed of in the oil-rag absorbent tote. The remaining 20 gallons that was captured before hitting the ground were pumped back into the lube truck.
2023	2	Feb	February 11, 2023	Mine	188 Muck Bay	Hydraulic Oil	50	gallon	O-ring on a underground haul truck hydraulic line blew out while unloading in an underground muck bay	Underground road base	HT-60	Absorbents
2023	2	Feb	February 23, 2023	Surface	Cons Building	Diesel	15	gallon	employee was going to fill a loader (LR65) with fuel. he strung the hose out, turned the pump on and went into the load out to to inspect filling process. after a a few minutes, he went back to the truck to check the meter and noticed diesel coming out of the side door of the truck. entered access door and was able to see the leak coming from the filters. shut the pump off and called for assistance. gathered buckets, spill pads and began clean up.	Concrete	LR-65	Absorbents
2023	3	Mar	March 9, 2023	Surface	460 Cross Cut	Hydraulic Oil	40	gallon	HT 60 BLEW A HYDRAULIC O RING ON THE TRUCK AND SPILLED 43 GALLONS OF HYDRAULIC FLUID ON 460 X CUT(UG).	Road Base	HT-60	Absorbents

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2023	3	Mar	March 31, 2023	Surface	920 Fuel Farm	Diesel	300	gallon	Fuel Tank 05 at the 920 Fuel farm was overfilled when transferring fuel from FT29. Operator was reading the tank numbers to a larger capacity tank (FT01) and over filled tank FT05. Approximately 300 gallons of fuel was recovered from within the secondary containment, there was also serval inches of standing water in the containment at the time of the spill due to snow and ice in the facility. High Alarm warning system for FT01 and FT05 was not working at the time of incident undenounced to the operator. The high level alarm would have sounded with a horn like alarm in the powerhouse and at the transfer pump location, giving both operators a warning. The HMI screen was inoperable, and displayed a black screen, when working properly this would have displayed tank fuel levels.	Secondary Fuel Containment	FT-05	All of the diesel/water mixture was pumped out into six (6) IBC totes
2023	7	Jul	July 5, 2023	Geology	860 Heli Pad	Jet A / Diesel	20	gallon	A tank within the curtain van leaked. The containment system cap was secured, but the rubber gasket had deteriorated therefore spilling the hydrocarbons to the ground.	Road base	Curtain Van	Scraped the top 4 inches of affected road surface and containerized in supersacks (2).
2023	7	Jul	July 18, 2023	Mine	Between 59 and 52 doors	Transmission Fluid	20	gallon	HT68 experienced a hydraulic fluid leak from a hydraulic line. The spill occurred between the 59 and 52 doors and the paste plant with an estimated release of 20 gallons of hydraulic fluid. The spilled material was collected using absorbent pads.	Road base	HT-68	Absorbents
2023	12	Dec	December 1, 2023	Surface	Tailings	Hydraulic Oil	15	gallon	While moving forward inside of Tailings, a hose to the compactor (VR-16) broke and was not noticed leaking for approximately 200 ft of movement. It was shut off immediately upon detecting the leak. The source of the leak was difficult to ascertain based on the location underneath the compactor. Surface Ops personnel in the area arrived immediately to assist in clean-up efforts. 15 gallons of hydraulic oil was spilled based on the storage capacity of the compactor tank and a visual estimate of clean-up personnel. All of the material was cleaned-up with absorbents (approximately 200 white absorbents). The efficacy of the cleanup was aided by the good weather and due to the area affected, which had previously been compacted down.	Tailings	VR-16	Absorbents
2023	11	Dec	December 11, 2023	Surface	Hawk Inlet Fuel Farm	Diesel	40	gallon	Employee overfilled the fuel tanker at the Hawk Inlet Fuel Farm, resulting in a spill of 40 gallons of diesel fuel. The employee immediately turned off the fuel transfer valve, contacted his shifter, and began clean-up. A majority of the spill was directed into the containment area for FT02. Personnel arrived on the scene, and used approximately 10 oil/hydrocarbon booms (2 x 20' and 3 x 3') to stave off the flow of diesel and approximately 400 white absorbents.	Concrete	Fuel Truck??	Absorbents and oil/hydrocarbon booms

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2023	9	Dec	December 9, 2023	Mine	481 Lube Bay	Diesel	65	gallon	Employee was servicing LR-80 in the 481 Lube Bay. When complete, they left without unhooking the Wiggins and continued for approximately 300 ft along the underground road until noticing. They returned immediately to ensure no further material was leaking from LR-80 and placed absorbents to clean-up the material. Used absorbents and remaining material was scooped into supersacks for disposal at Chemical Waste Management in Arlington, OR.	Underground road base	LR-80	Absorbents and three (3) hazardous-rated supersacks
2024	1	Jan	January 12, 2024	Mill	Thickener-over road to A pond	Mill Tails	7200	gallon	The mill lost power to the pumps on the rougher flotation side and had no control of the levels. Everything emptied on to the floor from the columns and the rougher float cells. This overflowed to the tails thickener tunnel and out of the tunnel to the road. The slurry flowed across the road to the drain that reports to the ditch and flows to A pond and is pumped back to the mill and to water treatment plants.	Road base	Mill	Followed engineering controls to flow into A-Pond
2024	1	Jan	January 16, 2024	Mine	Ore pad	Hydraulic Oil	50	gallon	HT61 backing up to dump on the ore pad had a hose fail in the engine compartment and drained the hydraulic tank at the bottom of the dump ramp blocking access to both dump spots. Spill was cleaned using absorbent pads.	Ore	HT-61	Absorbents were used to cleanup the spill approximately 1.5-2 bags.
2024	1	Jan	January 23, 2024	Surface	Hawk Inlet Port Facility	Diesel	30	gallon	MT25 while traveling down the HI hill to the beach lost traction and skidded down the hill. He lost control and jackknifed the truck causing a tear to the diesel tank.	Road base	MT-25	Absorbents were used to cleanup the spill approximately 1.5-2 bags. Additionally, drums were used to capture the snow that was scooped up from the ground
2024	2	Feb	February 6, 2024	Surface	Hawk Inlet Boiler Room	Diesel	20	gallon	During a routine maintenance walkthrough, the mechanic noticed the boiler at Hawk Inlet sprung a small leak in the diesel line. Since the hose is under pressure there was a spray of diesel and about 20 gallons was spilled. The room is in containment and all diesel was captured and cleaned up.	Concrete	Boiler	Absorbents were used to clean up the diesel.
2024	2	Feb	February 7, 2024	Mine	Site 23	Hydraulic Oil	40	gallon	A hydraulic line failed on HT71 causing an approximate 40 gallon spill.	Road base	HT-71	Absorbents were used to clean up the spill along with contaminated soil being loaded into supersacs.
2024	2	Feb	February 7, 2024	Mine	149 passing bay	Hydraulic Oil	20	gallon	DR41 was parked in 149 passing bay with a leaky hose. During the timeframe between nightshift troubleshooting the hose and dayshift crew arriving 20 gallons of hydraulic oil leaked onto the ground.	Road base	DR-41	Absorbents were used to clean up the hydraulic oil.
2024	2	Feb	February 15, 2024	Surface	Hawk Inlet Lift Station	Raw sewage	210	gallon	Lift station power failure.	Under cannery building	-	Lime was used to neutralize the spill.

Year	Period	Month	Date	Department	Location	Spilled Material	Quatity Spilled	Units	Description of Incident	Surface Affected	Equipment	Description of Clean-Up
2024	3	Mar	March 15, 2024	Mill	Mill Cleaner Building	Process Water	110	gallon	The pump motor failed on SP-126 in the mill cleaner building. The mixture of process water/lead concentrate spilled down the cleaner ramp and into the CV02 Tails Area.	Concrete/Road Base	SP-126	The pump in the CV02 tail pulley area was shut off and material hosed down. When the area was cleaned, the material was pumped back into the cleaner building and into the lead circuit.
2024	3	Mar	March 14, 2024	Mill	Mill Reagent Mixing Area	Xanthate	370	gallon	Operator overfilled the xanthate tank, spilling material into secondary containment. The material was pumped from secondary containment back into the mill process	Concrete	Xanthate Mixing Tank	Material was pumped back into the process and area washed back into the mill sump
2024	3	Mar	March 20, 2024	Surface	Hawk Inlet - Raw Sewage Lift Pump	Raw sewage	3	gallon	The sewage lift pump tripped out at Hawk Inlet Cannery	Grass, ground above shoreline	Raw Sewage Lift Pump	Material treated with lime to neutralize any bacteria/pathogens that may have been present
2024	3	Mar	March 29, 2024	Mine	Underground lube bay	Diesel	110	gallon	Operator drove off with the hose attached. Sited rushing as cause.	Road base	LR-83	Absorbents and road was scooped where available. 15 absorbents bags at 920 haz waste site. 1 tote bag of rock/diesel. (1 cu yd)
2024	3	Mar	March 28, 2024	Mine	M345 Lube Bay	Diesel	110	gallon	Operator entered M345 lube bay to fuel and service LR83. The operator connected the fuel wiggins and then proceeded to grease the loader concurrently. When the operator completed greasing LR83 they had failed to disconnect the fuel wiggins prior to exiting the lube bay resulting in 148 gallons of diesel spilled.	Concrete/ Underground Road base	LR-83	Material was cleaned with absorbents. TBD on scooped material
2024	4	Apr	April 13, 2024	Mine	710 Roadway	Hydraulic Oil	30	gallon	Operator parked his truck in 710PB to go move another truck and returned to a hydraulic leak from a loose fitting on the hydraulic tank.	Road base	HT70	Material was cleaned with absorbents.

Year	Period	Month	Date	Department	Location	Spilled material	Quantity spilled	Units	Description of Incident	Surface affected	Equipment	Description of cleanup
2024	5	May	May 23, 2024	Mine	781 L1, 50 ft from face	Hydraulic Oil	20	gallon		Underground road base	DR49	Material was pumped back up, then cleaned with absorbents
2024	5	May	May 24, 2024	Mine	795	Hydraulic Oil	20	gallon		Underground road base	UT28	Material was cleaned with absorbents.
2024	6	June	June 2, 2024	Mine	5250 Callout	Hydraulic Oil	20	gallon		Underground road base	DR35	Material was cleaned with absorbents.
2024	6	June	June 6, 2024	Mine	645 Laydown	Shotcrete Accelerant	220	gallon	Two full 275 gallon IBC totes were struck by a loader. 220 gallons leaked out. The incident was found during an MSHA mock inspection and not reported timely. Upon notification to Environmental the spill was reported.	Underground road base	-	Material was scooped out into a haz-rated supersack
2024	6	June	June 24, 2024	Mine	2853 Ramp, 623 Collar to 668	Hydraulic Oil	27	gallon	Steering line/mechanical failure on hydraulic line caused a hydraulic spill on the 2853 road between 623 collar and 668	Underground road base	HT59	Absorbents were used and material was scooped out into two haz-rated supersacks
2024	6	June	June 26, 2024	Mine	31 Ramp at M627	Transmission Fluid	50	gallon	HT59 was enroute to the shop for repairs and the highspeed driveline broke and punched a hold in the transmission tank at 3:00am	Underground road base	HT59	Approximately 150 bsorbents were used and material was scooped out into two haz-rated supersacks
2024	7	July	July 10, 2024	Mine	M975 Heading	Hydraulic Oil	25	gallon	Shotcrete truck (UT32) blew a hydraulic hose at the heading spilling 25 gallons of hydraulic oil.	Underground road base	UT32	Approximately 100 absorbents in 3 black bags were used to clean-up the spilled material
2024	7	July	July 13, 2024	Mine	7.6 B-Road	Hydraulic Oil	20	gallon	LR75 went to 7.6 B-Road to grab surface material for a underground longhole. The operator backed-up from the rock pile and the hydraulic line burst from a worn/frayed hose. The operator immediately shutoff the equipment and contacted surrounding personnel to assist with the clean-up.	Surface road base	LR75	Approximately 200 absorbents and booms were used to contain and clean-up the spilled material

Year	Period	Month	Date	Department	Location	Spilled material	Quantity spilled	Units	Description of Incident	Surface affected	Equipment	Description of cleanup
2024	8	August	August 6, 2024	Mine	Ore pad to 481 intersection	Hydraulic Oil	59	gallon	HT64 ruptured a hydraulic line at the ore pad and continued to travel down the 45 ramp to the 481 before noticing the leak.	Surface and underground road base	HT64	Production was halted underground to assist with the cleanup efforts. Absorbents were used to contain the spill. Material was scooped for off-site disposal. Total cleaned-up volume still to be determined
2024	9	September	September 7, 2024	Surface	Hawk Inlet Fuel Farm, Cons Storage Loadout	Hydraulic Oil	30	gallon	MT-16 ruptured a hydraulic line as they were dumping cons.	Concrete	MT16	Approximately 400 absorbents and oil-only booms were used to contain and cleanup the spilled material. 6 full trash bags of absorbents were collected from the area
2024	9	September	September 12, 2024	Mine	Site 23 to Past Plant	Hydraulic Oil	42	gallon	HT-61 blew o-ring on hydraulic line at Site 23. Leak not known until equipment shut off at Mill Paste Plant	Concrete, Surface Road Base, Site 23 Waste Rock	HT61	Approximately 400 absorbents were used to clean-up the spilled material. Because of the timing of the incident both shifts (day/night) were able to assist with clean-up efforts.
2024	10	October	October 5, 2024	Water Ops	7.2 B-Road	Treated Process Water	50	gallon	13:15. Removed 10" flange at 7.2 to install pig in pipeline. Discovered water sitting idle in the T. Added air at 6.1 and bubble back to get line to drain. Ended up spilling 50-gallon in the 7.2 ditch area from the 10" line.	Surface roadside ditch	10" Pipeline	None
2024	10	October	October 24, 2024	Mine	Paste Plant	Sika Stabilizer	180	gallon	Operator accidentally punctured the full IBC tote with a forklift while attempting to lift it.	Underground road base	Paste Plant	Approximately 300 chemical absorbents were used to contain the initial cleanup. Two 1 yard supersacks of excavated material were also collected.
2025	1	Janary	January 12,2025	Maintenance	920 Shop	Glycol	10	gallon	A hose blew on a load truck in front of the 920 shop on concrete surface.	Concrete, Surface Road base.	LT-04	20+ Absorbents were used to clean up the spill, and those were placed in the used absorbent tote in the Central Accumulation Area van at the 920.
2025	1	January	January 28, 2025	Surface	Cons Storage Loadout	Hydraulic Oil	15	gallon	Driving MT-16 to beach con storage. Started to lift bed of MT, hydraulic oil hose malfunctioned and began leaking. Bed was lowered, and operations were stopped. Immediate clean-up began.	Surface Road base	MT-16	3 bags of absorbents were used and 1 boom was deployed to contain and clean up spill.

Year	Period	Month	Date	Department	Location	Spilled material	Quantity spilled	Units	Description of Incident	Surface affected	Equipment	Description of cleanup
2025	2	February	February 2, 2025	Surface	240 Bench Tails	Hydraulic Oil	15	gallon	Max haul had a hydraulic hose failure while releasing his truck load into tails. Hose was rubbing on	Tailings	MT-18	35 absorbents and 1 super sack used (excavator was near and scooped oil/dirt into a super sack)
2025	2	February	February 15, 2025	Mine	569 in the 610/586	Hydraulic Oil	56	gallon	DR-69 jumbo drill underground in 569 heading contacted old 4" steel pipe and tore hydraulic hose on the drill.	Underground road base	DR-69	Absorbents (estimated 300 absorbents)
2025	2	February	February 22, 2025	Mill	Mill Reagent Bay	Aerophine 3413 Promoter	180	gallon	While an operator was moving a tote of 3413, he misjudged the forklift position and punctured the bottom of the tote.	Secondary containment within the Mill	Mill forklift	Moved tote near the reagent sump while another operator went to get an empty tote to transfer the remaining material. Able to transfer 1/3 or remaining material to another tote, while the spilled material was processed by the plant through the tails thickener.
2025	3	March	March 27, 2025	Surface	Hawk Inlet - Raw Sewage Lift Pump	Raw Sewage	10	gallon	At 23:30 an employee found a fitting had failed at the camp shifter shack. Once the appropriate people had been roused and responded, an estimated 10 gallons of grey water/sewage had been released.	Grass, ground above shoreline	Raw Sewage Lift Pump	Material treated with lime to neutralize any bacteria/pathogens that may have been present
2025	4	April	April 21, 2025	Surface	Water Treatment Plant Outside	Ferric Chloride	300	gallon	While an operator was moving a tote of Ferric Chloride, he tipped the tote causing the tote to fall. Unfortunately the tote also cracked caused the contents to spill. No environmental damage caused by the discharge. Discharge was on a hard packed road base material and was able to be hosed into the process water for treatment. The ferric chloride is used as a coagulant in the treatment process causing sediment to bind up and drop from the water. The plant was able to process the ferric chloride as normal.	Surface Road base material	WTP Forklift	No environmental damage caused by the discharge. Discharge was on a hard packed road base material and was able to be hosed into the process water for treatment. The ferric chloride is used as a coagulant in the treatment process causing sediment to bind up and drop from the water. The plant was able to process the ferric chloride as normal.
2025	5	May	May 7, 2025	Mill	Paste Plant	Hydraulic Oil	100	gallon	Case Drain plug failed on the hydraulic pump and drained hydraulic oil into secondary containment.	Concrete	Paste Plant	No environmental damage caused by the disharge. Was in secondary containment and cleaned up via vacuum to spill tote.

Year	Period	Month	Date	Department	Location	Spilled material	Quantity spilled	Units	Description of Incident	Surface affected	Equipment	Description of cleanup
2025	7	July	July 1, 2025	Building Maintenance	Utility Chase: Secondary Containment	Glycol	33	gallon	Boiler was reading negative pressure and a leak was discovered from an o-ring on a fitting within secondary containment.	Secondary Containment within the utility chase	Boiler	The water and glycol mix from the fitting leak to secondary containment was pumped into a tote for proper disposal.
2025	7	July	July 4, 2025	Building Maintenance	Hawk Inlet Utilidor	Glycol	35	gallon	Received Hawk Inlet Boiler general alarm, found system pressure to be at zero, after checking all buildings for leaks found main valve in utilidor near boiler building leaking approxaimtely 35 gallons of propylene glycol. Return Side repaired on 6-30-25, now supply side valve is leaking.	Secondary Containment within the utility chase	HI Boiler	The water and glycol mix from the fitting leak to secondary containment was pumped into a tote for proper disposal.
2025	7	August	August 7, 2025	Water Ops	7.2 B-Road	Stormwater	100.00	gallon	As Water Ops were pressurizing down at 6.1, it got up to around 3.5 psi and the pressure fell off. y the time WOPS got up to 7.2, no water was coming out but clear evidence of a spill. The ravine around the pipe was full. Apparently, the air hose had come disconnected off the pig and released the air in the pig. WOPS did blow the line out yesterday but they're guessing water sitting in a low spot in the pipe and doesn't drain got pushed back up hill.	B-road ditch	Pressure test pump	stormwater dissipated into the surrounding vegetation. Any lingering water and solids were vac trucked out by SOPS later that day.
2025	8	August	August 16, 2025	Mine	45 LayDown-UG	Hydraulic Oil	10	gallon	There was a hose failure on HT-51 at the 45 Lay Down in the Underground.	Underground Road Base	HT-51	Absorbent Pads were used and properly disposed of.
2025	8	August	August 26, 2025	Mine	1205 UG	Hydraulic Oil	25	gallon	A valve to hose fitting failed on DR-44 leading to a spill at 1205 UG.	Underground Road Base	DR-44	Spill was pumped through the discharge lines to the Mill WTP
2025	18	September	September 18, 2025	Mine	920 Ore Pad	Hydraulic Oil	30	gallon	HT-58 blew a hose on the ore pad. More details TBD	Surface road base material	HT-58	Two(2) packs, 200 absorbents, were used to contain and clean-up the spilled material
2025	19	September	September 19, 2025	Mine	37 ramp UG	Hydraulic Oil	32	gallon	HT-66 spilt 32 gal driving up the 37 ramp. Unknown spill source	Underground Road Base	HT-66	Absorbents and scooped material

GPO Appendix 05
Attachment C
Example Monthly Inspection Checklists

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

003 –North Cannery Building at Culvert Outfall

Conducted on	Signature

Operations

Are B-Road sediment control structures draining into the T7 pond operating as designed? (GPO 5 BMP Plan)	
Is the T7 diversion ditch functioning and has adequate capacity to divert flows to Cannery Creek?	
Describe degree of turbidity where ditch enters Cannery Creek	
Is the diversion ditch below the upper pad stairs in good condition?	
(It should be a minimum of 12 inches deep)	
Are the stormwater drain and culvert inlet at the bottom of the lower pad stairs unobstructed?	
Is the 003 caisson pump operational and capturing outfall flow?	
Is Hawk Inlet free of discharge from beneath the barge ramp?	
Is the drainage in the vicinity of the barge ramp directed to the stormwater inlet?	
Estimated Flow At the Discharge Point: (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

004 – A Road at 1.8 mile – Pit 7

Conducted on	Signature

Operations

If there are current activities, are the BMP procedures being followed?	
Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Does the wetlands vegetation appear to be in good condition?	
Is color and turbidity staying unchanged in the North pond?	
Is color and turbidity staying unchanged at the South discharge point to the wetland?	
Is the creek free of discharge from either north or south roadside? If discharging, describe character and flow	
Is the "rip rap" ditch and settling pond in good condition?	
Is the area free of new disturbances or soil placement requiring hydroseeding?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

005.2 – B Road at 3.0 Mile – Zinc Creek Bridge

Conducted on	Signature

Operations

Are all ditches along B-Road clear of debris and in good condition?	
Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Are check dams in the ditch system above the settling pond in good condition?	
Is the settling pond above the parking area in good condition?	
Is the bridge surface in good condition?	
Is there more than 3" buildup at edges? Can you see 90% of the wood decking?	
Are the bridge splash guards in good condition?	
Is the outfall in good condition?	
"Are the silt fences/straw wattles in good condition?	
(i.e., <6"" behind silt fence, <3"" behind straw wattles)"	
Is the North access road free of erosion?	
Is the area free of soils that need hydroseeding?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

005.3 – B Road at 4.5 Mile – Waste Rock Area E

Conducted on	Signature

Operations

If material is being removed, are BMP procedures being followed?	
Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Is the clean road well maintained?	
Is the settling pond in good condition per BMP maintenance checklist?	
Are the flow and color of the seeps around the perimeter of Site E unchanged?	
Is the area free of new disturbances requiring hydroseeding?	
Is the area free of any signs of sluffage?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

005.4 – B Road at 4.6 Mile – Pit 6

Conducted on	Signature

Operations

If current activities, are BMP procedures being followed?	
Are ditches directing stormwater through appropriate BMPs, vegetated & maintained?	
Are the settling ponds on the downhill side of the B Road in good condition?	
Are entrance ramp water bars effectively diverting water into the ditch?	
Is the area free of new disturbances requiring hydroseeding?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

005.5 – B Road at 7.8 Mile – Culvert Outfall

Conducted on	Signature

Operations

Is Pond 23 in good condition?	
Is DB03 in good condition?	
Are the sediment traps and check dams along the ditch in good condition?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

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Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

006 – Pond D Overflow – Waste Rock Area D

Conducted on	Signature

Operations

Is the access road and ditch in acceptable condition?	
Is road runoff from 7.9-Mile adequately routed to pond?	
Is the piping leading to or from the pond free of leaks?	
Is drain back valve open?	
Is the pump in good working condition?	
Are the flow and color of the seeps along the bottom of D Pile unchanged?	
Is the pond berm free of signs of erosion?	
Is the area free of new disturbances requiring hydroseeding?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

007 – Pond C Overflow – Waste Rock Area C

Conducted on	Signature

Operations

Is the pumping system working properly?	
Are pipeline drain valves open?	
Is the upper to lower pond culvert unobstructed?	
Is exterior of lower pond berm free of seeps?	
Is culvert inlet at base of 23 Ramp unobstructed?	
Is runoff between the 920 and the 860 being adequately captured?	
Are storm drain inlets around 860 Lab (4 total) unobstructed?	
Is the area free of new disturbances requiring hydroseeding?	
Is the pond berm free of signs of erosion?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

008 – Waste Rock Area 960

Conducted on	Signature

Operations

Are the diversion ditches and berms allowing the lower bench to drain?	
Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Are check dams in the ditch system in good condition?	
Is the vegetative cover well established?	
Are the water bars operating as designed?	
Is the road free of tension cracks?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

009 – 1350 Area – East Below Sediment Pond

Conducted on	Signature

Operations

If the area has current activity, are BMP procedures being followed?	
Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Are check dams in the ditch system in good condition?	
Is the portal drainhole clear and free-draining?	
Is pump in collection trench operating properly?	
Is the area free of new disturbances requiring hydroseeding?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

Monthly NPDES Stormwater Outfall Audit

Monthly NPDES Stormwater Outfall Audit

012 - Sandpile at 1.4 mile A Road

Conducted on	Signature

Operations

Are ditches directing stormwater through appropriate BMPs, vegetated, & maintained?	
Is the backslope free of cracks and slides?	
Is the waterlevel in the pit bellow the spillway?	
Are the check dams in good condition?	
Total Flow At the Discharge Point (gpm)	
Is the discharge compliant with the following? (Floating solids, foam, garbage, oily sheen)	

GPO Appendix 05
Attachment D
BMP Details