STATE OF COLORADO

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TR 10 - effective water treatment of mine effluent

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To: "Eschberger - DNR, Amy" <amy.eschberger@state.co.us>

Kind Regards,

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COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY
1313 Sherman Street, Room 215, Denver, Colorado 80203 ph(303) 866-3567

REQUEST FOR TECHNICAL REVISION (TR) COVER SHEET

File No.: M- 1977-410 Site Name: Cross Gold Mine

County Boulder TR# TR# 10 *(DRMS Use only)*

Permittee: Grand Island Resources, LLC

Operator (If Other than Permittee):

Permittee Representative: Daniel Takami

Please provide a brief description of the proposed revision:

Following the obvious need for a more effective water treatment of mine effluent than the historical lime application and settling pond approach, GIR went through a series of investigations and pilot scale testing programs in 2021 to determine the most reliable manner to achieve discharge compliance under our NPDES permit with CDPHE. The first system did not work as the contractor predicted and later in 2021, a system that does work was assembled and has been in use effectively without any evidence of exceedance of compliance stands. Essentially the system entails a 5 micron filtration for removal of TSS followed by a removal of TDS using a polishing medium called MetSorb.

As defined by the Minerals Rules, a Technical Revision (TR) is: "a change in the permit or application which does not have more than a minor effect upon the approved or proposed Reclamation or Environmental Protection Plan." The Division is charged with determining if the revision as submitted meets this definition. If the Division determines that the proposed revision is beyond the scope of a TR, the Division may require the submittal of a permit amendment to make the required or desired changes to the permit.

The request for a TR is not considered "filed for review" until the appropriate fee is received by the Division (as listed below by permit type). Please submit the appropriate fee with your request to expedite the review process. After the TR is submitted with the appropriate fee, the Division will determine if it is approvable within 30 days. If the Division requires additional information to approve a TR, you will be notified of specific deficiencies that will need to be addressed. If at the end of the 30 day review period there are still outstanding deficiencies, the Division must deny the TR unless the permittee requests additional time, in writing, to provide the required information.

There is no pre-defined format for the submittal of a TR; however, it is up to the permittee to provide sufficient information to the Division to approve the TR request, including updated mining and reclamation plan maps that accurately depict the changes proposed in the requested TR.

Required Fees for Technical Revision by Permit Type - Please mark the correct fee and submit it with your request for a Technical Revision.

Permit Type	**Required TR Fee**	**Submitted** (mark only one)
110c, 111, 112 construction materials, and 112 quarries	$216	☑
112 hard rock (not DMO)	$175	☐
110d, 112d(1, 2 or 3)	$1006	☐

Table of Contents

Section 1: Introduction and Site Description

Technical Revision 10 (TR10) is presented by Grand Island Resources, LLC (GIR) in response to a Service of Notice of Violation/Cease and Desist Order (Number IO-211130-1) from Colorado Department of Public Health and Environment (CDPHE) dated November 30, 2021 in conjunction with Permit No. M-1977-410. This TR10 includes a detailed plan of action and current activities addressing surface water quality noted in the letter. It describes measures that have been taken and are further proposed at the site to address water quality issues, including underground installations, a description of the new water treatment pilot system, results of the current system, and also includes a Ground Water Monitoring Plan (GWMP) as required by the NOV/C&D Order.

The Cross-Caribou mine site is located approximately 4 miles northwest of Nederland, Colorado adjacent to Roosevelt National Forest, at an elevation of ~9,700 ft above mean sea level (MSL). The general location of the property is in Section 9, Township 1 South, Range 73 West of the 6th Principal Meridian, County of Boulder, State of Colorado (**Map 1**). The current property is an existing hard rock mining operation owned by GIR and at present, no active mining is being conducted. The mine permit M-1977-410 was last revised through Amendment No. 2 (AM 2) and approved in February 2022. The AM 2 increased the permit area to the current 9.99 acres and provided an additional financial warranty for reclamation.

The site is bisected by Coon Track Creek, a tributary of Beaver creek which joins with Middle Boulder Creek near its discharge at the Barker Meadows Reservoir. The mine currently manages discharges directly into Coon Track Creek (**Figure 1** and **Map 2)** under CDPHE Water Quality Control Division (WQCD) National Pollutant Discharge Elimination System NPDES permit CO-0032751.

Section 2: Water System Timeline and Historical Background

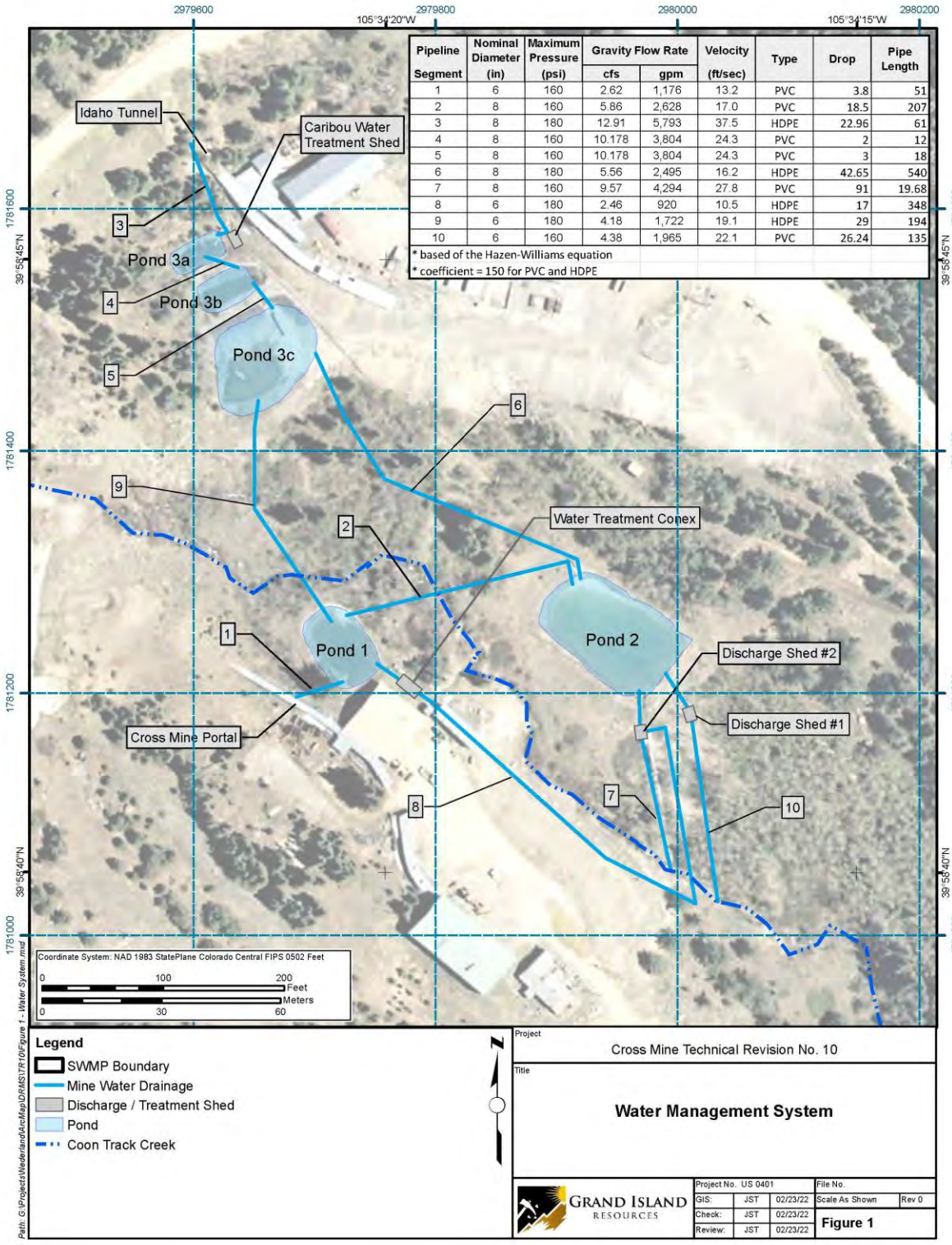
From 1975-1995, the previous owner of the Caribou-Cross Mines, Tom Hendricks of the Hendricks Mining Company (HMC), installed and tested a treatment system to meet the requirements of discharge permit CO-0032751. Hendricks constructed five (5) passive-discharge settling ponds (**Appendix A,** locations in **Figure 1**) and treated water from the Cross Mine portal by a combination of lime (to buffer any "potentially dissolved" soluble metal ions at a relatively lower pH) and dilution from waters emerging from the Caribou mine portal (also known as the Idaho Tunnel). These methods were initially successful in accordance with the water quality standards of the day, but subsequent and periodical lowering of metal concentration compliance standards resulted in mixed success of the water treatment system. Upon subsequent lowering of water quality standards, Hendricks then tested (1995) the feasibility of a gravity-fed absorptive medium consisting of zeolite, with mixed results, particularly during peak flow periods (typically during the spring and summer months). Tom Hendricks brought in another mining Company, Calais, who continued the sedimentation pond and lime treatment prior to discharge.

After Hendrick's death in 2020, the Cross-Caribou mine properties were obtained by GIR. GIR has since undertaken several mining-related activities (including, but not limited to underground construction and revamping of infrastructure, dewatering, and exploratory drilling) in order to meet their goals of creating a sustainable and actively producing mine. These activities, performed during two (2) 3-month seasons from 2020-2021 caused conditions that have overloaded the ability of the legacy system to meet today's compliance standards. Therefore, GIR has sought several alternatives with which to comply with the standards and continue the goals of mining development and production.

A general timeline of GIR's recent activities in relation to system upgrades and compliance are as follows:

- *August 2020* – reconstructed and relined settling ponds 3A, 3B, and 3C (locations in **Figure 1**) to maximize settling times (Technical Revision 8)
- *September 2020-present* – conducted underground construction, creating additional sediment traps and water diversion paths, to reduce discharge sediment volumes to settling ponds
- *April-June 2021* – sought alternative water treatment packages/systems, conducted May 2021 filtration study (**Figure 2** – see page 6**)** to aid in selection of water treatment packages/systems and applicable contractors
- *July 2021* – OPEL pilot approved by CDPHE, but failed to achieve compliance, despite a guaranteed performance warranty
- *August 2021* – identified non-compliance items to be the result of TSS (total suspended solids)
- *September 2021* – aggressively pursued alternative treatment vendors, including Environmental Site Solutions, Ensero and Graver; began Graver/MetSorb pilot feasibility study
- *October 2021* – Graver/MetSorb bench scale testing concluded as successful; continued filtration and metal adsorption pilot design
- *November 2021* – 11/15 set as startup date for Ensero particulate filtration and Graver/MetSorb metal polishing pilot system; Service of Notice of Violation/Cease and Desist Order, Number: IO-211130-1 received from CDPHE on November 30, 2021

- *December 2021* – commissioning and start-up of hybrid treatment system (Ensero filtration, Metsorb media and historic ponds); system was installed and sampling was initiated to determine its ability to achieve compliance
- *January 2022* – Black Fox Mining (Patrick Delaney – P.E., level-one certified water treatment) was retained as qualified consultant for water system evaluation - automation of treatment system is complete, so that it can run around the clock with minimal supervision and maximum efficiency. Compliance with discharge permit has occurred for each sampling event since automation was instituted
- *February 2022* – system 100% in compliance; see **Tables 2 and 3** for January 2022 in-compliance samples



Pipeline Segment	Nominal Diameter (in)	Maximum Pressure (psi)	Gravity Flow Rate cfs	Gravity Flow Rate gpm	Velocity (ft/sec)	Type	Drop	Pipe Length
1	6	160	2.62	1,176	13.2	PVC	3.8	51
2	8	160	5.86	2,628	17.0	PVC	18.5	207
3	8	180	12.91	5,793	37.5	HDPE	22.96	61
4	8	160	10.178	3,804	24.3	PVC	2	12
5	8	160	10.178	3,804	24.3	PVC	3	18
6	8	180	5.56	2,495	16.2	HDPE	42.65	540
7	8	160	9.57	4,294	27.8	PVC	91	19.68
8	6	180	2.46	920	10.5	HDPE	17	348
9	6	180	4.18	1,722	19.1	HDPE	29	194
10	6	160	4.38	1,965	22.1	PVC	26.24	135

Figure 1: General site map with the locations of the water management and treatment system, and specifications for piping through the system. Figure also displayed in Appendix B, but shown here for improved understanding.

Section 3: Discharge Limitations and Filtration Studies from 2020-2021

GIR Discharge Permit (CO-0032751) specifies discharge limitations defined below:

Table 1

Grand Island Resources – Cross & Caribou Mines Effluent Discharge Limitations for Outfall 001A					
Parameter		Limitation		Sampling	
		30-day avg.	Daily max.	Frequency	Type
Lead, potentially dissolved (µg/L), January		3.8	85	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), April		3.6	94	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), June		5.4	140	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), July		4.6	118	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), December		3.8	85	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), January		13	18	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), March		13	19	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), April		13	20	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Lead, potentially dissolved (µg/L), January		0.12	2.9	2 days/month	Two water samples collected before effluent discharge (One acidified for metals and one for hexavalent chromium
Whole Effluent Toxicity ("WET"), Chronic (%), January – March	7-day *Ceriodaphnia dubia*	--	NOEC or IC25 ≥ IWC (73%)	Quarterly	3 composites/test
	7-day *Pimephales promelas*	--	NOEC or IC25 ≥ ICW (73%)		

May 2021 – Filtration study

The Cross-Caribou mine dewatering and discharge geochemistry were tested and identified optimal filtration screen size to achieve compliance. Sampling and analysis were conducted using three filter sizes (0.1 µm, 0.45 µm, and 5 µm) to determine if non-compliance for "potentially dissolved" metals was related to particulate/sediment material. The results of this sampling concluded that when particulate matter is removed from the Caribou mine portal (Idaho Tunnel), the discharge passes compliance standards without the need for additional polishing. In contrast, when particulate matter is removed from the Cross mine adit dewatering flow, it is non-compliant for dissolved Zn and Cd.

Filtration Study	Caribou Tunnel Source Water PASS - FAIL Filtration size in microns				Cross Tunnel Source Water PASS - FAIL Filtration size in microns						
COMPLIANCE COMPOUND	Caribou UF	Caribou 5.0	Caribou 0.45	Caribou 0.10	Cross UF	Cross 5.0	Cross 0.45	Cross 0.10	30-Day Average	7-Day Average	Daily Maximum
Total Alkalinity	122.5	118.5	122.2	119.1	77.6	76.5	75.6	76.5			
Bicarbonate	122.5	118.5	122.2	119.1	77.6	76.5	75.6	76.5			
Carbonate											
Chloride	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6			
Fluoride	0.1			0.2							
Silica (as SI)	5.5	5.4	5.5	5.5	6.0	6.1	5.9	6.2			
Nitrate Nitrogen	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2			
pH	8.0	8.1	8.1	8.1	7.8	7.8	7.8	7.8	6.5-9	6.5-9	6.5-9
Sulfate	12.0	11.9	12.0	11.9	11.1	11.2	11.1	11.2			
Total Suspended Solids	108.0	ND	ND	ND	10.0	ND	ND	ND	30	45	
Turbidity	43.00	0.03	0.04	0.02	5.96	0.08	0.10	0.17			
Total Hardness	132.5	117.2	117.6	118.5	77.3	78.1	77.5	77.2			
Aluminum (ug/L here down)	2,782	2	4	3	148	8	6	9			
Antimony	2	ND	ND	ND	ND	ND	ND	ND			
Arsenic	4	ND	1	1	ND	ND	ND	ND			
Barium	111	53	53	51	58	55	55	55			
Beryllium	0	ND	ND	ND	ND	ND	ND	ND			
Boron	30	30	20	90	ND	ND	ND	ND			
Cadmium	1.30	0.10	ND	ND	2.90	2.80	2.70	2.70	0.60 to 0.89		2.2 to 3.7
Calcium	28,800	25,800	26,000	26,100	19,100	19,500	19,200	19,000			
Chromium	20	ND	ND	ND	ND	ND	ND	ND			
Cobalt	5	ND	ND	ND	1	0	0	0			
Copper	26	ND	ND	ND	5	4	4	4	13 to 19		18 to 28
Iron	5,894	ND	ND	ND	349	ND	ND	8			
Lead	156	0	0	0	20	2	2	2	3.6 to 5.4		85 to 135
Magnesium	14,720	12,850	12,790	12,960	7,200	7,140	7,180	7,220			
Manganese	909	25	25	25	62	45	44	44			
Mercury	NA				NA				1		2
Molybdenum	6	6	6	6	7	6	6	6			
Nickel	11	ND	ND	ND	1	1	1	1			
Potassium	2,800	1,400	1,400	1,400	1,300	1,200	1,200	1,200			
Silver	5.30	ND	ND	ND	0.60	ND	ND	ND	0.11 to 0.17		
Sodium	2,400	2,300	2,300	2,300	1,800	1,800	1,800	1,800			
Strontium	417	380	382	370	143	137	135	135			
Uranium	7	6	6	6	1	1	1	1			
Vanadium	11	ND	ND	ND	2	ND	ND	ND			
Zinc	251	18	21	15	343	325	319	316	176 to 262		182 to 301

Figure 2: May 2021 Filtration Study that Compared the Effectiveness of Different Screen Size, May 31, 2021. Shows test results of unfiltered water (UF) from the Caribou and Cross mines, and results after filtration using filter sizes of 0.1 µm, 0.45 µm, and 5 µm (all data listed in units of ppb). As is shown above, filtration of water from the Caribou mine through a size 5 µm filter was effective at meeting compliance standards without the need of further polishing, and a filtration size of 0.10 µm was effective for Cross mine waters with the exception of Cd and Zn (2.70 and 316 ppb respectively).

Section 4: Summary of Previous Treatment Methods

Legacy treatment:

For approximately 30 years, the singular method by which water was treated at the Cross-Caribou mine was addition of lime (calcium hydroxide – Ca(OH)). Because of repeated exceedances following the GIR's acquisition of the Cross-Caribou mines, it sought out contracts from several companies with a reputation for treating similar exceedance issues. This GIR initiative for alternative treatment commenced well before the cease and desist order was issued by CDPHE later in November 2011.

OPEL treatment system:

GIR contracted OPEL Energy to obtain a ™AmberKleen 1200 mine waste system, and a ™AmberKleen 1250 polishing system, which were installed in July 2021. Exceedances of the OPEL system in July, August and September 2021 proved the system ineffective to treat the mines raw water and were the major impetus for removal of the OPEL system in October 2021, and replacement with another water treatment contractor and methodology for treatment.

Section 5: Selection Criteria for Pilot Treatment System

Graver Technologies (MetSorb©) bench-scale testing:

Because continued performance testing of the OPEL pilot system indicated that the treatment process was ineffective for Cross-Caribou waters, Graver Technologies was immediately retained to conduct bench-scale testing of the untreated discharge water from the Cross-Caribou mine using their MetSorb© HMRG proprietary adsorbent media. Metsorb©, which has polymetallic adsorption capabilities, has a proven history of effectively treating water from similar projects.

Samples of 5 µm filtered water were sent to Graver's facility in Glasgow, DE for bench testing. Graver then conducted kinetic and equilibrium bench-scale testing to evaluate the capacity and kinematics of their MetSorb© adsorbent for removal of Cd, Zn and other contaminants present in the Cross mine water. The summary conclusion of the complete bench testing analysis from Graver (**Appendix C**) prior to the installation of the current operational system is as follows (directly from Graver verbatim):

> *Graver has investigated the ability of MetSorb® HMRG to remove Cd and Zn from the water at the Nederland mine Cross site. MetSorb® HMRG has a capacity of over 15 mg/g for Zn and over 0.14 mg/g for Cd. The low concentration of Cd makes the HMRG kinetically hindered; a contact time of 10 minutes is not only practical but may be sufficient to remove the Cd. The kinetic data on Zn removal shows that 40% of the Zn can be removed within 10 minutes. In a full-scale vessel, this should be sufficient to remove a significant portion of the Zn from the Cross water. The major recommendation of this report is that a pilot test be conducted. A pilot test with a lead-lag configuration and appropriate sampling would provide a more complete evaluation of the media's ability to remove both Cd and Zn to the necessary requirements for the Cross site.*

Based on the success of the May 2021 Filtration Study and the Metsorb© bench test results, along with the ability of both Ensero and ESS to mobilize equipment as quickly as possible, GIR selected this system for field pilot testing.

Section 6: Pilot/Current Treatment System

Pilot system and water flow path:

Based on the results of the May 2021 filtration study and data from Graver's MetSorb© HMRG media bench-scale testing, a two-pronged approach for treating water from the Cross-Caribou mines was selected. First, the new pilot system treats water from the Cross-Caribou mines using a submersible pump fed filtration system provided by Ensero (**Appendix D**). Post 5 µm filtration, the water is polished through a vessel provided by Environmental Site Solutions (ESS) (**Appendix E**) using the Graver MetSorb© HMRG media. After polishing, the water is sufficiently treated to meet compliance to discharge into the Coon Track Creek watershed.

Water from the Caribou mine portal is piped into pond 3A by a sump pump located in the Caribou mine portal. During December 2021 and January 2022, a cofferdam was installed in the Caribou mine, upgradient of the sump pump, to limit the water being fed to the sump and later discharging into Pond 3A. From Pond 3A, 6" HDPE piping allows water at 3A to discharge into ponds 3B, and later 3C through 6" PVC piping, which increases the residence time for suspended solids to settle. At pond 3C, a 6" HDPE discharge pipe with a butterfly valve directs the Caribou mine water to Pond 1, where the pilot system has been installed.

Water from the Cross mine is also discharged to Pond 1. Dewatering from the Cross mine uses a centrifugal pump, 4" HDPE piping, and valve system installed in the winze located between the 100 and 200 levels. Below the 100 level, the mine is often flooded and necessitates dewatering from lower developmental levels, so as not to overflow the winze. The pump in the winze is controlled by a level transducer and connected to the PLC, which throttle the pump based on desired flow. Near the Cross mine portal, an electronic flow meter reports the rate of flow from the winze pump. Thereafter, water is directed by piping to Pond 1 where it is blended with the Caribou water. A 3 HP pump, also automatically controlled by a level transducer, pumps water in the treatment system.

The Graver/Ensero/ESS pilot system installed in November 2021 is located just to the southeast of Pond 1, approximately 15 feet from the pond margin. Because the level of water in pond 1 is affected by the flows of influent water from both the Cross and the Caribou mines, it is critical to monitor the water level of pond 1 so as not to cause overflow. If such an event were to occur, pond 1 will overflow into pond 2 at a level of 5.2 ft (measured from the bottom of pond 1), through an overflow pipe and be contained. Although pond 2 was previously used as another settling pond during the operation of the legacy systems, it is not currently in use other than as an emergency overflow point.

The pilot system is housed in an insulated conex trailer, with two overhead electrical heaters that are set to engage when the temperature drops, to ensure that the system does not freeze. A submersible pump in Pond 1, with a pressure transducer controlling the pump speed directs water to pond 1 through a 4" barracuda-style suction hose and into the pilot system. Here, the water is filtered through four (4) stainless steel filter bag housings with 5µ filtration bags (Ensero). The skid consists of 4" schedule-80 PVC piping between bag housings. The filtered water is then pumped through a 2" suction hose and into a vessel containing the Metsorb© adsorbent. Final polishing takes place in the ESS vessels through the Metsorb© media. The finished water then exits the vessel through 2" suction hose and is piped through 4" and 6" HDPE pipe from the pilot conex to the discharge monitoring shed located approximately 100 yards southeast of the conex. Additional monitoring, including a pH and temperature

probe, Total Dissolved Solids (TDS) meter and a discharge flow meter are located in the discharge shed. At this point, the water is sufficiently filtered and polished, and in compliance with GIR's discharge permit, to allow it to be discharged into the Coon Track Creek watershed through an 8" schedule-40 PVC discharge pipe.

Pilot system automation features:

The filtration and polishing pilot system has undergone significant automation upgrades in recent months, allowing for greater predictability, consistency and control of operations. The primary features of this automation system are a Variable Frequency Drive (VFD), which controls the power and speed of the electrical motor systems (e.g., the Pond 1 pump), and a Programable Logic Controller (PLC), which allows a user to interface with and edit the settings of the systems described below remotely.

The primary feature of the PLC is a real-time computer site display (Walchem) which reads and displays measurements of the Cross mine flow meter, Pond 1 pump speed and Pond 1 water level (controlled by a pressure transducer), and measurements collected by the pressure transmitters before and after the filter bag housings. The pressure drop between the influent source water and effluent (post-filtration) water determines the frequency of filter bag changes (i.e., when to remove old, spent filter bags to be replaced with fresh filter bags). While the manufacturer recommends a bag change at a drop of 2 psi, GIR has found that the filter bags will last significantly longer than a 2 psi drop without either break-through or sediment release. Analytics support extending the bag life and GIR will continue to monitor for optimal treatment as well as consumables cost. The PLC (photograph in **Appendix A**) also displays variable versus time graphs which aid in real-time visualization of changes to the system, assisting the operator to make quick changes to the system if/when necessary. All measurement data and graphs are viewable remotely via the Walchem Fluent website. Additional changes and features are programable on the PLC, and additional meters and measurements will be displayed upon their installation. These upgrades will provide additional data collection points and aid in making changes to the system quickly and as needed. Alarm features have also been programed into the PLC, which send a text message and email to alert the operators in the case that urgent changes must be made.

The pilot system described above is fully operational and since the installation of continuous 24/7 treatment (January 2021), has produced consistent results that are 100% in compliance with GIR's discharge permit (**Tables 2 and 3**). The pilot system in place has proven to be successful, and GIR will continue to make improvements and upgrades to the system as needed. GIR is committed to meeting compliance standards, and looks forward to working with the State in the future to ensure success for the future.

Table 2

Caribou-Cross Mine Pilot System Water Tests Summary of analytical results from January 17, 2022					
Analyte	Units (µg/L = ppb)	Specific Method	Basis	280-157829-3 INFLUENT 1/17/2022 3:00 PM	280-157829-4 OUTFALL-001 1/17/2022 3:15 PM
Cadmium	µg/L	Metals (ICP/MS)	Total Recoverable	1.5	ND
Cadmium	µg/L	Metals (ICP/MS)	Potentially Dissolved	1.0	ND
Copper	µg/L	Metals (ICP/MS)	Potentially Dissolved	3.5	0.76 J
Copper	µg/L	Metals (ICP/MS)	Total Recoverable	2.8	ND
Lead	µg/L	Metals (ICP/MS)	Potentially Dissolved	6.8	0.48 J
Lead	µg/L	Metals (ICP/MS)	Total Recoverable	6.5	0.45 J
Silver	µg/L	Metals (ICP/MS)	Potentially Dissolved	ND	ND
Zinc	µg/L	Metals (ICP/MS)	Total Recoverable	130 B	2.0 J B
Zinc	µg/L	Metals (ICP/MS)	Potentially Dissolved	130 B	11 B
J = below reportable limit, but ≥ detection limit B = compound found in blank and sample ND = not detectable					

Table 3

Caribou-Cross Mine Pilot System Water Tests Summary of analytical results from January 18, 2022					
Analyte	Units (µg/L = ppb)	Specific Method	Basis	280-157829-1 INFLUENT 1/18/2022 10:45 AM	280-157829-2 OUTFALL-001 1/18/2022 11:00 AM
Cadmium	µg/L	Metals (ICP/MS)	Total Recoverable	0.97 J	ND
Cadmium	µg/L	Metals (ICP/MS)	Potentially Dissolved	1.3	ND
Copper	µg/L	Metals (ICP/MS)	Potentially Dissolved	2.9	ND
Copper	µg/L	Metals (ICP/MS)	Total Recoverable	2.6	ND
Lead	µg/L	Metals (ICP/MS)	Potentially Dissolved	6.0	0.45 J
Lead	µg/L	Metals (ICP/MS)	Total Recoverable	6.4	0.47 J
Silver	µg/L	Metals (ICP/MS)	Potentially Dissolved	ND	0.048 J
Zinc	µg/L	Metals (ICP/MS)	Total Recoverable	130 B	ND
Zinc	µg/L	Metals (ICP/MS)	Potentially Dissolved	120 B	4.8 J B
J = below reportable limit, but ≥ detection limit B = compound found in blank and sample ND = not detectable					

Appendices

Appendix A – Site Pictures

Appendix B – Site and System Maps

Appendix C – Graver/Metsorb

Appendix D – Ensero

Appendix E – Environmental Site Solutions (ESS)

Appendix F – Equipment

Appendix G – SOP's and O&M's

Appendix H – Ground Water Monitoring Plan

Appendix A – Site Pictures

Caribou Ponds

Figure 1 Ponds 3A and 3B (Frozen)

Figure 2 Pond 3C Frozen

Cross Ponds

Figure 3 Pond 2 (Frozen) Emergency Overflow Only

Figure 4 Pond 1 (Frozen) With Submersible Pump and Float

Figure 5 Walking Bridge over Coon Track Creek

Cross Discharge Sheds 1 and 2

Figure 6 Cross Discharge Sheds 1 and 2. Cross Effluent Discharge Pipe to Coon Track Creek

Figure 7 - 6" Gravity Discharge Pipe and Monitoring Equipment in Shed 2

Cross Underground Infrastructure

Figure 8 Cross Winze Pump VFD/Enclosure and Cross Discharge Meter

Figure 9 Cross Winze Valve Upgrade and XXX(Future Picture)

Insert picture of Cross Winze or pump or piping

Treatment Trailer and System

Figure 10 - 40'L x 8'W x 9'6"H Storage Conex

Figure 11 Treatment System Discharge Pipe and Intake Hose

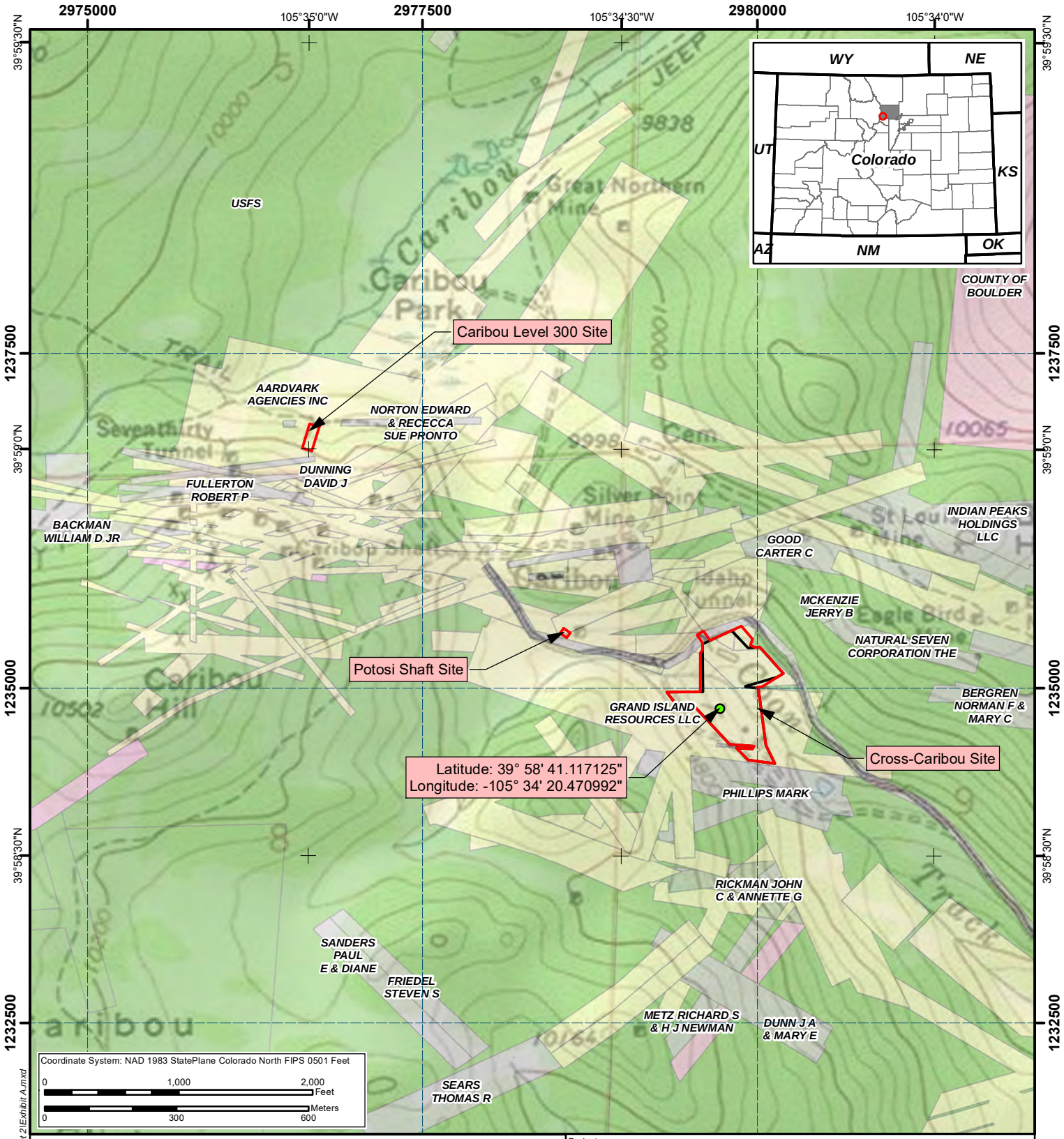
Figure 12 Skid Mounted Filtration System (provided by Ensero)
4 Stainless Steel Vessels – Housing 5-Micron Filtration Bags

Figure 13 Vessels (provided by ESS) housing Metsorb Adsorptive Media (provided by Graver)

Figure 14 Isolation Valve and Backwash Tank

Figure 15 Programmable Logic Center (PLC) and Variable Frequency Drive (VFD)

Appendix B – Site and System Maps



Path: G:\Projects\Nederland\ArcMap\DRMS\Amendment 2\Exhibit A.mxd

Legend

- Permit Boundary - Modified (9.99 ac)
- Permit Boundary - Current (8.95 ac)

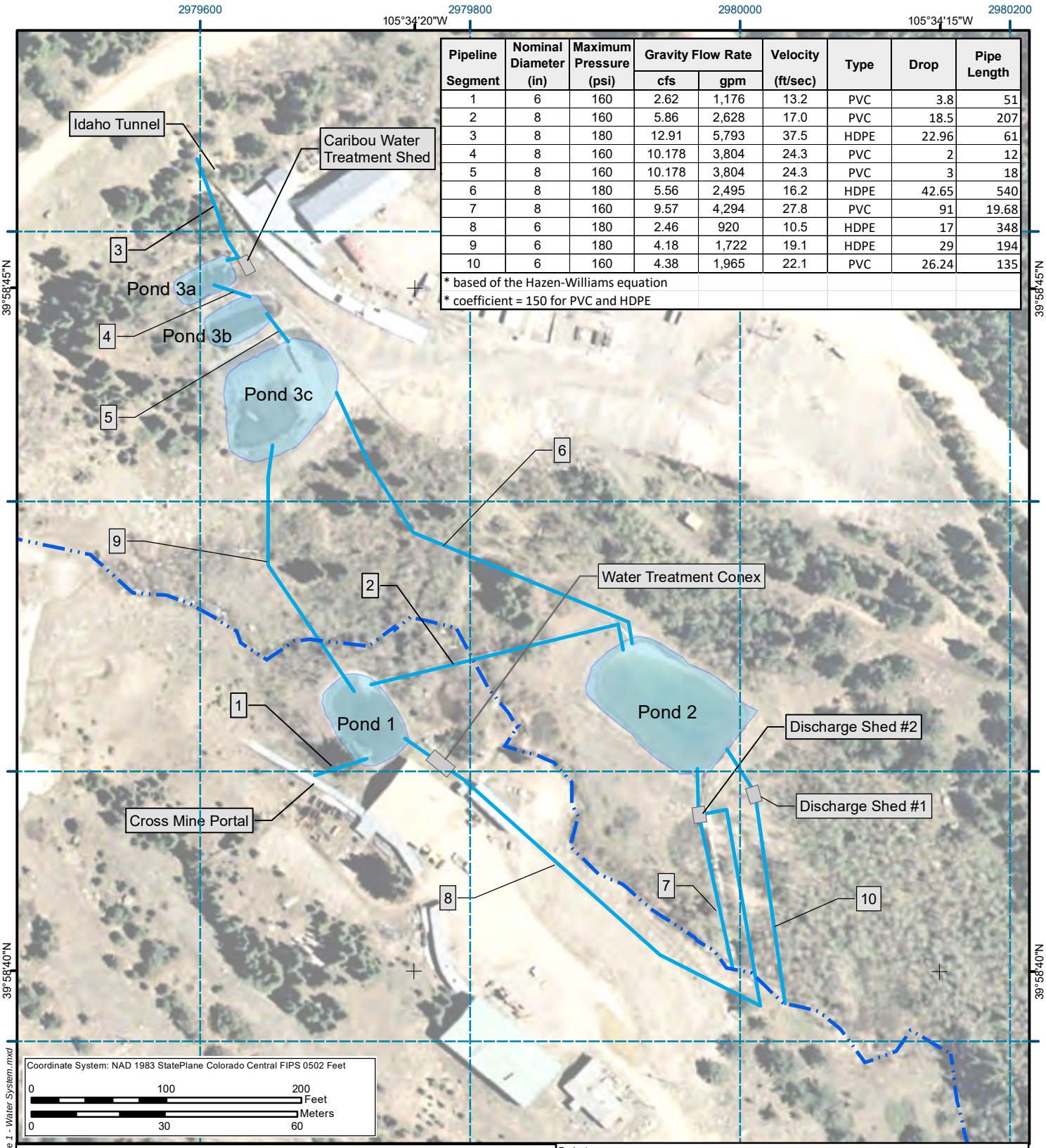
Assessor Data

- Grand Island Resources
- Private Land Owners
- Boulder County
- US Forest Service

Project: DRMS Amendment 2

Title: **Proposed Permit Boundary Modifications**

Project No. 0801			File No.	
GIS:	JST	01/25/21	Scale As Shown	Rev 0
Check:	JST	01/25/21	**Exhibit A**	
Review:	DP	01/25/21		



Pipeline Segment	Nominal Diameter (in)	Maximum Pressure (psi)	Gravity Flow Rate cfs	Gravity Flow Rate gpm	Velocity (ft/sec)	Type	Drop	Pipe Length
1	6	160	2.62	1,176	13.2	PVC	3.8	51
2	8	160	5.86	2,628	17.0	PVC	18.5	207
3	8	180	12.91	5,793	37.5	HDPE	22.96	61
4	8	160	10.178	3,804	24.3	PVC	2	12
5	8	160	10.178	3,804	24.3	PVC	3	18
6	8	180	5.56	2,495	16.2	HDPE	42.65	540
7	8	160	9.57	4,294	27.8	PVC	91	19.68
8	6	180	2.46	920	10.5	HDPE	17	348
9	6	180	4.18	1,722	19.1	HDPE	29	194
10	6	160	4.38	1,965	22.1	PVC	26.24	135

* based of the Hazen-Williams equation
* coefficient = 150 for PVC and HDPE

Legend

- SWMP Boundary
- Mine Water Drainage
- Discharge / Treatment Shed
- Pond
- Coon Track Creek

N

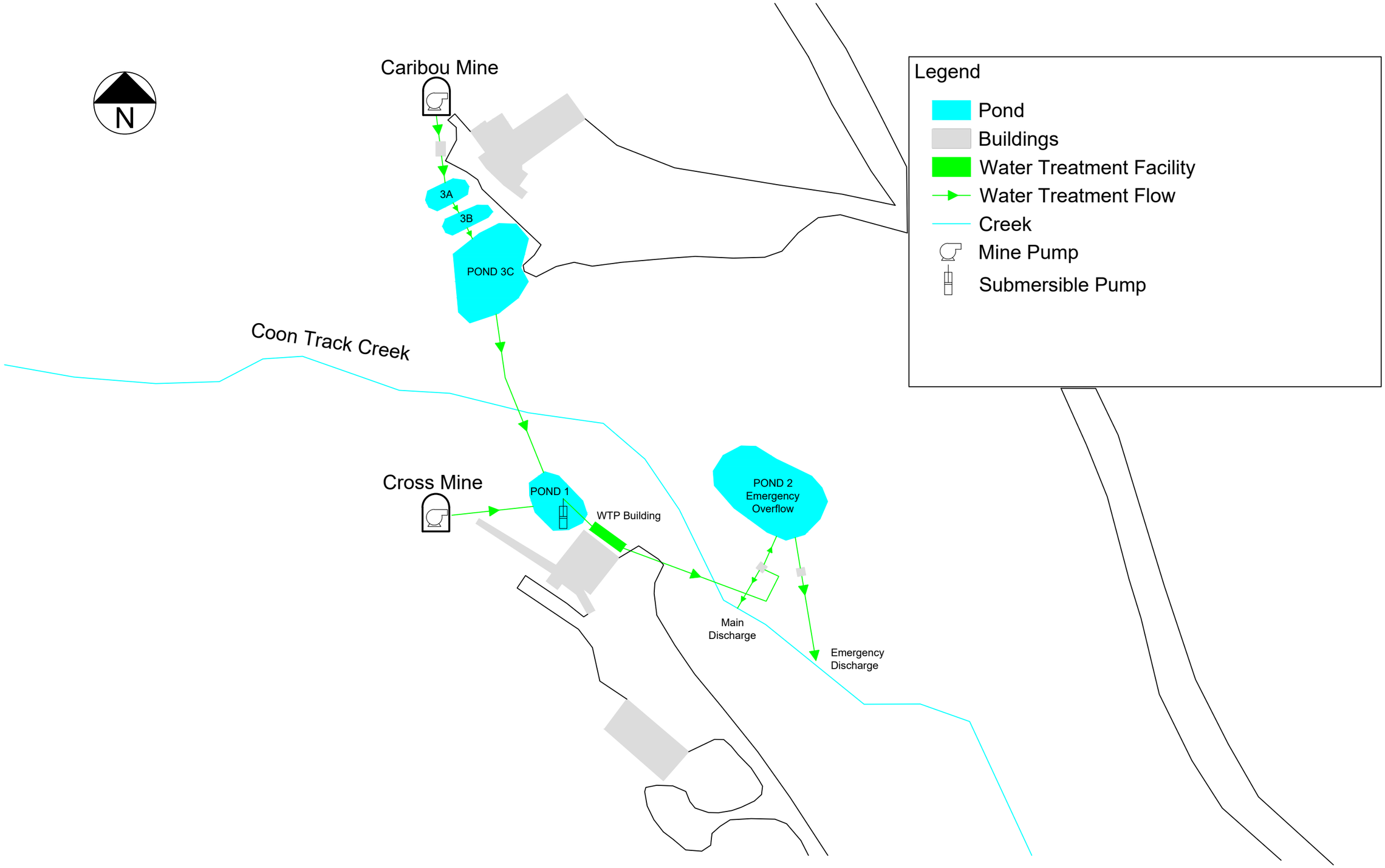
Project: Cross Mine Technical Revision No. 10

Title: **Water Management System**

GRAND ISLAND RESOURCES

Project No. US 0401			File No.
GIS:	JST	02/23/22	Scale As Shown Rev 0
Check:	JST	02/23/22	**Figure 1**
Review:	JST	02/23/22	

Path: G:\Projects\Nederland\ArcMap\DRMS\TR10\Figure 1 - Water System.mxd



Notes:	Scale: 1" =100'
	Date: 02/22/22
	Drawn By:
	Checked By:
	Engineered By:
	Approved By:
File Name:	Revision: 2

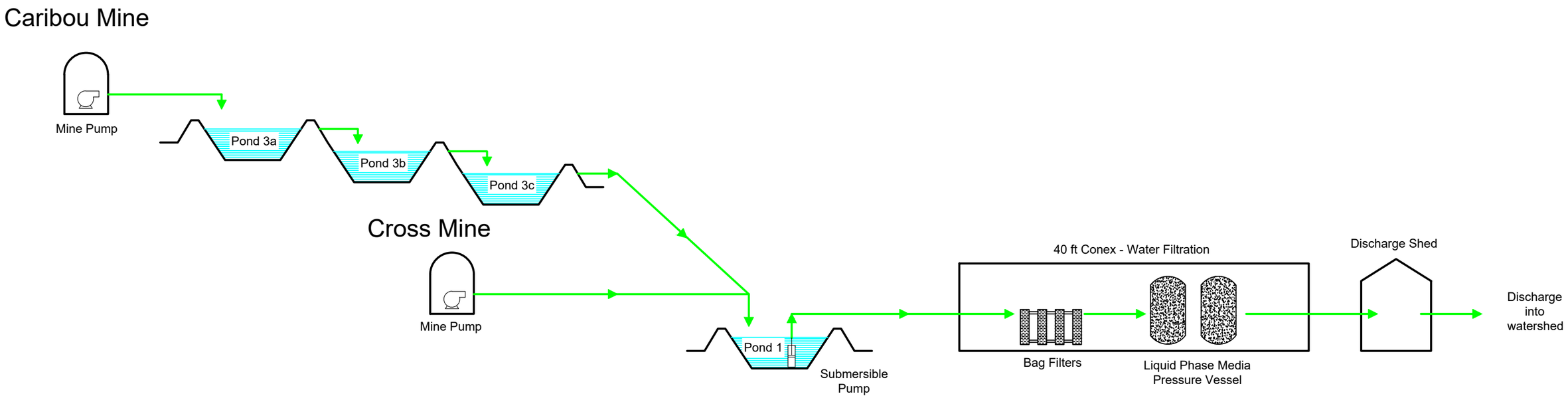
BLACK FOX MINING LLC
MATT COLLINS, PE, QP
1508 Ridge Rd, Nederland, CO, 80466
Phone: (303) 303-570-6269
Email: mcollins@blackfoxmining.com

Cross-Caribou Project

WTP System

DWG #

Sheet # 1 of 2



Notes:	Scale: Not to scale
	Date: 2/22/22
	Drawn By: GML
	Checked By:
	Engineered By:
	Approved By:
File Name: CC Flow Sheet	Revision: 2

BLACK FOX MINING LLC
MATT COLLINS, PE, QP
1508 Ridge Rd, Nederland, CO, 80466
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Cross-Caribou Project

WTP System Flow Sheet

DWG #

Sheet # 2 of 2

Appendix C – Graver/Metsorb

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Preliminary Investigation in Nederland Mine (Cross) Water Treatment by MetSorb® HMRG

1.0 Summary

Environmental Site Solutions is working with Nederland to remove zinc (Zn) and cadmium (Cd) from their mining sites to meet regulatory limits. MetSorb® HMRG, an adsorbent by Graver Technologies, has historically been able to treat water for both Cd and Zn. Contaminated water from the Cross mine was sent to Graver's facility in Glasgow, DE, USA for testing. A series of batch tests (kinetic and equilibrium) were conducted to evaluate the capacity and kinetics of MetSorb® HMRG for removing Cd and Zn present in the Cross water. In the Cross water MetSorb® HMRG was found to have a capacity of over 15 mg/g for Zn and over 0.14 mg/g for Cd. Typical contact time for HMRG is usually between 1.5 – 3 minutes. The low concentration of Cd in the Cross water makes the HMRG kinetically hindered; a contact time of 10 minutes is not only practical but should be sufficient to remove the Cd. The kinetic data on Zn removal shows that 40% of the Zn can be removed within 10 minutes. In a vessel configuration (lead-lag), this should be sufficient to remove a significant portion of the Zn from the Cross water. The major recommendation of this report is that a pilot test be conducted. A pilot test with a lead-lag configuration and appropriate sampling would provide a more complete evaluation of the media's ability to remove both Cd and Zn to the necessary requirements for the Cross site.

2.0 Introduction:

Environmental Site Solutions and Nederland contacted Graver Technologies to determine if mine water containing cadmium, zinc, and other contaminants could be treated by MetSorb® products. There are two sites that can be compared based on the data presented to Graver. Site 1 is the Caribou Tunnel Site. Site 2 is the Cross Tunnel Site (Cross).

Both water chemistries have been analyzed by Nederland. Both water samples were treated by filtration: a 5 um, 0.45 um and a 0.1 um filter. The samples for Caribou show that filtration removes all of the contaminants including cadmium, zinc, copper, lead, and silver. This indicates that contamination in the Caribou water is mostly solid. Filtration alone should clean the water from the site. The same filtration was carried out on the Cross water. The Cross water, however, did not filter as well. The cadmium was mostly soluble with ~ 93% of the concentration passing through the filters. The zinc was also mostly soluble with 92% of the concentration passing through the filters. Lead and silver were removed completely.

MetSorb® products have been known and used to treat many ions. Cadmium, one of the contaminants of concern, should be mostly Cd^{2+} in a pH of 0-7. Above 7, the Cd may convert to

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cadmium hydroxide ($Cd(OH)_2$).[1] Other Pourbaix diagrams show the conversion of Cd to other species around a pH of 8.5 or higher. These Pourbaix diagrams are guiding documents to determine how media may adsorb the contaminant. Zinc, the other major contaminant at Cross is also mostly Zn^{2+} at a pH of 0-7.5. After 7.5, the zinc starts converting to zinc oxide. [2]

MetSorb® HMRG is known to remove both cations and anions, depending on the specific water chemistry. There are several case studies and experimental results that show MetSorb® HMRG can remove both cadmium and zinc.

One case study for cadmium removal concluded:

> "Despite being at a significantly lower concentration than the other metals, cadmium adsorption performance also followed a trend of steady concentration decrease over time. The fine (0.1µm) filtration step reduced the starting concentration by 13% indicating the presence of insoluble cadmium . The separate granular activated carbon (GAC) filtration step removed only 5% of the cadmium present and not much more than the (2.7um) pre-filter used prior to beginning the stirred batch equilibrium testing. The stirred batch equilibrium testing demonstrated the selectivity of MetSorb® HMRG for cadmium in this wastewater matrix despite the much higher concentration of other metals present. Due to the evidenced selectivity, it is clear that cadmium removal will occur and that the extent of reduction will be a function of media volume and contact time."

This study was conducted at a customer site with over 350 ppb of cadmium.

In testing for zinc removal, one experimental study showed that HMRP (the powdered version of MetSorb® HMRG) could remove 97% of the zinc from a pH 6.5 and a pH 8.5 solution. The zinc had initial concentrations from 291-815 ppb. The measured capacity of the media for this test was 0.768 mg Zn/ dry gram of media. Other media specifically designed for cation removal resulted in higher percent removal and capacities.

Another case study tested both MetSorb® HMRG and MetSorb® STG for the removal of multiple metals. Both HMRG and STG removed Cd and Zn at over 7,000 bed volumes (BVs) before Zn broke through (~ 800 ppb initial) and over 8,000 BVs before Cd broke through (~550 ppb initial).

Testing was conducted on the Cross water to confirm the capacity and effectiveness of MetSorb® HMRG media relative to the specific water conditions at the Cross site.

3.0 Method:

3.1 Equilibrium batch testing - Efficiency

To a 125 mL polypropylene container was added 1.0 dry grams of MetSorb® HMRG and 100 mL of water from Cross. This is a volume to mass ratio of 100 mL of solution per dry gram of media.

[1] https://boris.unibe.ch/109643/1/1.4980127.pdf
[2] https://commons.wikimedia.org/wiki/File:Zn-pourbaix-diagram.svg

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The sample was capped and placed on a shaker table. The sample was contacted at 250 rpm overnight for a total of about 22 hours. The water was removed and filtered with a 0.45 um syringe filter. Samples were preserved with nitric acid and then analyzed by inductively coupled plasma mass spectrometry (ICP-MS).

3.2 Kinetic batch testing.

3.2.1 Ratio of 100,000 mL/g

To a 4 L plastic beaker was added 5050 g of water from Cross. A stir bar was added, and the sample was stirred for 2 minutes. 40 g of water was removed and designated as "Time 0". To the beaker was added 51.0 dry milligrams of MetSorb® HMRG (moisture of 10.39%). 40 mL samples were removed from the container at the following intervals: 1 minute, 5 minutes, 10 minutes, 30 minutes, 60 minutes and > 18 hours. When a sample was removed, it was filtered with a 0.45 um filter and preserved with nitric acid. Samples were analyzed by ICP-MS.

3.2.1 Ratio of 50,000 mL/g

To a half-gallon plastic container was added 2040 g of water from Cross. A stir bar was added, and the sample was stirred for 2 minutes. 40 g of water was removed and designated as "Time 0". To the beaker was added 43.9 dry milligrams of MetSorb® HMRG (moisture of 10.39%). 40 mL samples were removed from the container at the following intervals: 1 minute, 5 minutes, 10 minutes, 60 minutes and > 18 hours. When a sample was removed, it was filtered with a 0.45 um filter and preserved with nitric acid. Samples were analyzed by ICP-MS.

3.2.1 Ratio of 1,000 mL/g

To a one-liter plastic container was added 943.5 g of water from Cross. The sample was manually stirred. 40 g of water was removed and designated as "Time 0". To the container was added 896.7 dry milligrams of MetSorb® HMRG (moisture of 10.39%). The container was placed on a shaker table at 250 rpm. The shaker table was stopped prior to and restarted after samples were collected. 40 mL samples were removed from the container at the following intervals: 1 minute, 5 minutes, 10 minutes, 60 minutes and > 18 hours. When a sample was removed, it was filtered with a 0.45 um filter and preserved with nitric acid. Samples were analyzed by ICP-MS.

3.3 Analytical

All samples were analyzed by Graver Technologies and an independent third-party laboratory, Eurofins Test America. Both techniques used an ICP-MS to evaluate the results. Graver's results were used to quickly determine the analyte concentrations, while the Eurofins Test America results were used based on their knowledge and expertise as a certified laboratory running tests under EPA method 6020B.

Graver Technologies

4.0 Results and Discussion

Two samples of water were received by Graver Technologies in October 2021. One sample was from the Cross site and the other was from the Caribou site. Since the Cross site was contaminated with water that was ionic (not filterable) only water from the Cross site was utilized in testing.

4.1 Removal Efficiency Testing

Removal efficiency testing was conducted on the Cross water to demonstrate that the Cd and the Zn could be removed using the media. Removal efficiency is defined as percent removal and does not provide useful data with regard to the capacity of a media. This test was conducted at a V/m ratio of 100 mL of solution to 1 dry gram of media. The results of both the Cd and Zn tests showed non-detected levels.

The calculated results are limited by the non-detect levels as reported by Eurofins Test America. For this test, the Cd detection limit was 0.39 ppb, and the Zn detection limit was 6.5 ppb. The percent removal was > 67.5% for Cd and > 95.3% for Zn. These values are relatively low, because the EPA method contains statistical analyses that limit the detection level. Graver's preliminary data was based on raw data generated from the ICP. The limit of detection based on the Graver ICP-MS was not only smaller, but the initial concentrations of the Zn and Cd in the Cross water were higher. The percent removal using the Graver analysis was > 99% for Cd and Zn.

4.2 Total Capacity Estimation

Section 3.2 describes kinetic batch testing. However, when an overnight contact time is used the reactions are typically considered to be "at equilibrium". Samples of the reactions at > 18 hours with different V/m ratios were combined to generate an isotherm. Isotherms can be used to show the capacity of the media. These capacities do not show breakthrough (bed volumes). Instead, they show what may be the maximum loading of the contaminants on the media at the tested concentration of water.

In the Cross water, zinc was present at 169.5 ppb, on average (Eurofins TA data). It is estimated that the capacity for Zn of HMRG on the Cross site will be approximately 15 mg of Zn per dry gram of media (mg/g). The capacity of MetSorb® HMRG for Zn is expected to be higher than 15 mg/g as a full isotherm curve could not be fully evaluated.

The cadmium capacities will be lower than zinc because the Cross water had a much lower concentration of Cd (1.55 ppb, on average). The maximum measured capacity of MetSorb® HMRG for Cd was 0.14 mg/g. Again, the capacity is expected to be higher than reported as the curve could not be fully evaluated.

Isotherm tests typically generate nice visible curves based on the equilibrium concentration (*x*-axis) and the calculated capacities (*y*-axis). In this case, the equilibrium concentrations were skewed by the method detection limit reported by Eurofins Test America. The graphical analysis could not be completed and used to extrapolate a maximum capacity. Instead, the capacities reported are based on the very high V/m ratio of 100,000 mL/g. Since the equilibrium

concentration of these samples was not near the initial concentration of either Cd or Zn, the capacities are likely to be larger than the reported values.

These equilibrium batch isotherm tests serve as guidance to initial capacity estimates. They do not factor in or correct for capacity changes with respect to kinetic or other engineering effects. The best way to gauge the capacity of the media is to perform a pilot test and get the real capacity of the media under actual process conditions.

4.3 Kinetic Testing Evaluation

Kinetic evaluations of the media were conducted by extracting a small amount of water out of a single reaction at specific intervals. For the sake of this test, samples were taken at 1 minute, 5 minutes, 10 minutes, 60 minutes and overnight (equilibrium contact). After careful evaluation, the results appear best in the V/m ratio of 1000 mL/g. At this ratio, there is sufficient contact with the media during the kinetic testing that an effect can be evaluated.

The cadmium data show that only about slightly more than 0% of the Cd is removed at 5 minutes of contact. At 10 minutes of contact, the removal percentage goes up to about 10% (Figure 1). At 60 minutes of contact, the removal is over 70%. The actual reduction should be higher, but the calculation is limited by the ICP-MS detection limit.

The data from the Zn analysis shows that less than 40% of the Zn is removed at 10 minutes. At 60 minutes, the percent removal increases to 86% (Figure 2).

The media appears kinetically hindered for both Zn and Cd removal. The Cd is probably hindered due to the lower concentrations; it takes longer for the ions to find the surface of the media and to be sufficiently adsorbed.

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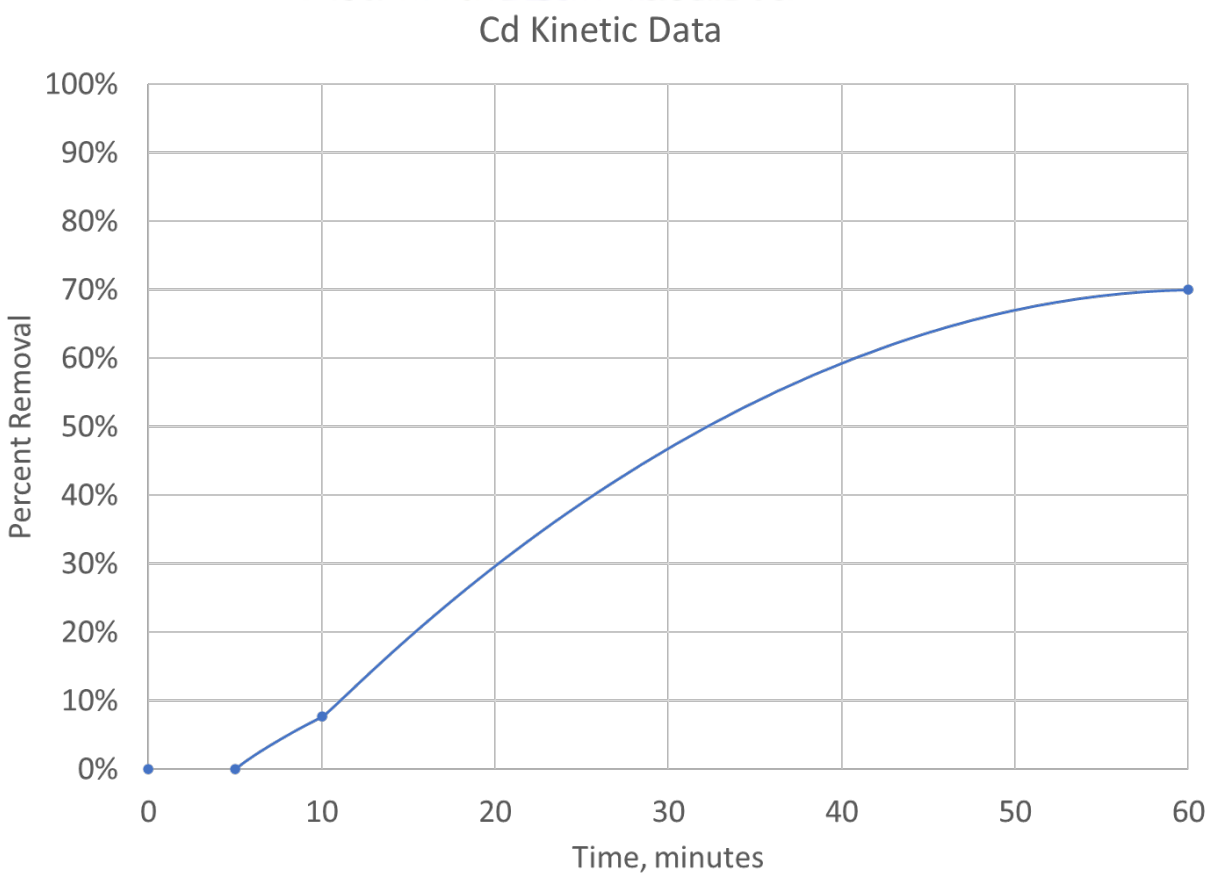


Figure 1. The Cd kinetic test at a V/m ratio of 1000 mL/dry gram of media. The test is limited by the method detection limit. A 10-minute contact time (at a very low concentration) only removes about 10% of the contaminant. At 60 minutes the % removal is much higher, but the calculation is limited by the detection limit. Note that the lines drawn are just connecting the dots to emphasize the change in efficiency. The connecting line is not a fit for the data; it is just a visual cue.

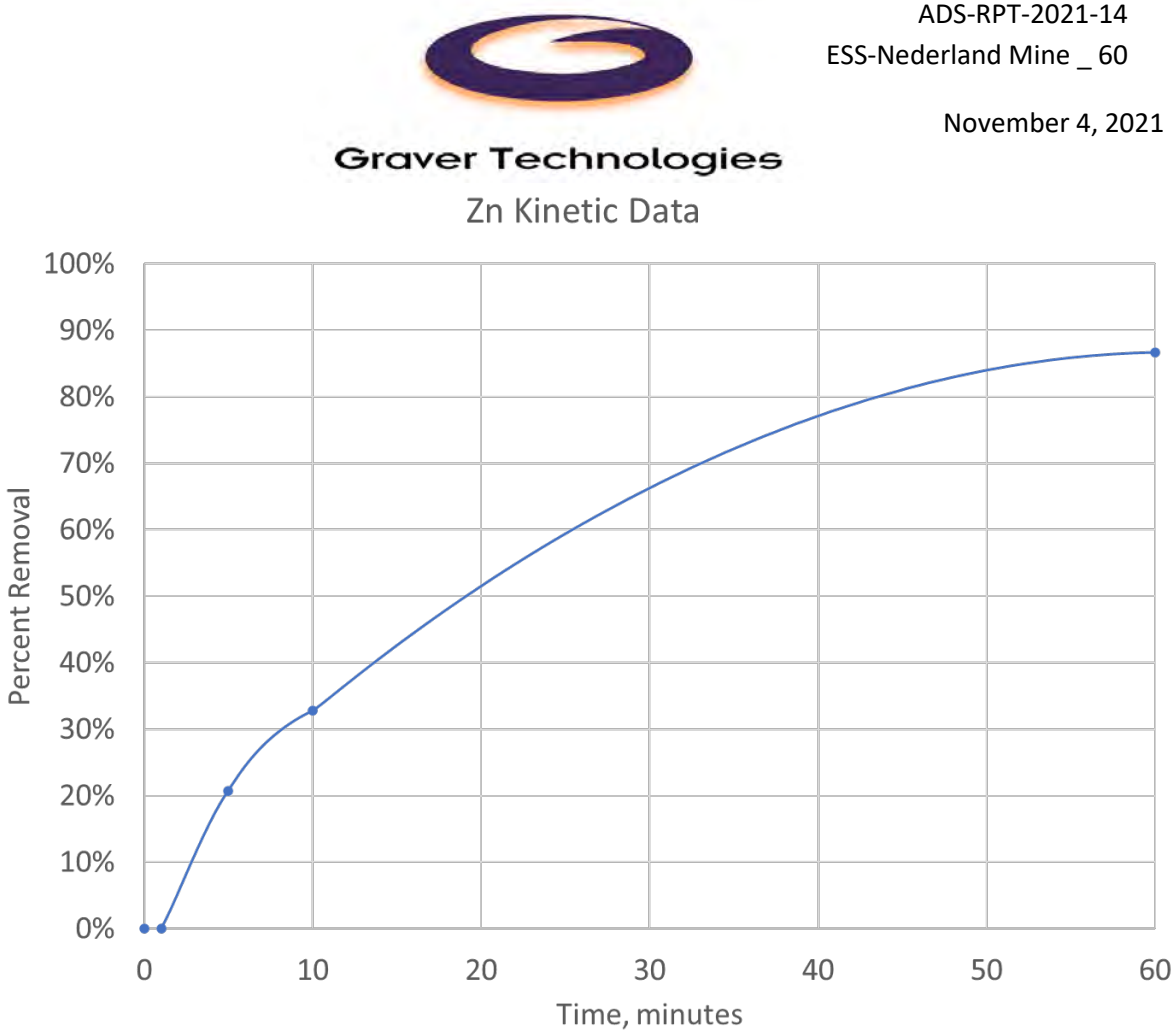


Figure 2. The Zn kinetic test at a V/m ratio of 1000 mL/dry gram of media. The test is limited by the method detection limit. A 10-minute contact time (at a very low concentration) only removes about 32% of the contaminant. At 60 minutes the % removal is much higher, ~85%. Note that the lines drawn are just connecting the dots to emphasize the change in efficiency. The connecting line is not a fit for the data; it is just a visual cue.

This analysis demonstrates that the media does remove a significant amount of both Cd and Zn but may have some kinetic hinderance. These tests were completed in a batch-like style which is not as efficient as a column test. In a column test, media is not distributed randomly in the fluid. Instead, the fluid passes through a bed, making the removal significantly more efficient. Based on the data gathered, the standard recommendation of one to three minutes empty bed contact time (EBCT) for HMRG is not likely to be effective. A ten-minute contact time shows some removal and is more practical than a 60-minute contact time. A pilot study with a 10-minute EBCT is recommended to increase confidence in the ability for the media to successfully remove the contaminants with the desired engineering design.

5.0 Conclusions

Graver has investigated the ability of MetSorb® HMRG to remove Cd and Zn from the water at the Nederland mine Cross site. MetSorb® HMRG has a capacity of over 15 mg/g for Zn and over 0.14 mg/g for Cd. The low concentration of Cd makes the HMRG kinetically hindered; a contact time

of 10 minutes is not only practical but may be sufficient to remove the Cd. The kinetic data on Zn removal shows that 40% of the Zn can be removed within 10 minutes. In a full-scale vessel, this should be sufficient to remove a significant portion of the Zn from the Cross water. The major recommendation of this report is that a pilot test be conducted. A pilot test with a lead-lag configuration and appropriate sampling would provide a more complete evaluation of the media's ability to remove both Cd and Zn to the necessary requirements for the Cross site.

Graver Technologies

200 Lake Drive
Glasgow, DE 19702

MetSorb® HMRG (Heavy Metal Removal Granules) – 16/60 US Mesh

Recommended Operational Design Parameters

OPERATING PARAMETER	MetSorb® HMRG 16/60
Service Flow Rate (Hydraulic Loading)	3-12 gpm/ft^2
Flow Direction	Typically Downward (Up-flow under certain conditions)
Empty Bed Contact Time (EBCT)	1.5-3.0 Minutes (Water Quality Dependent)
Maximum System Pressure	100 psi
Backwash Flow Rate	3-7 gpm/ft2
Backwash Bed Expansion	40%
Backwash Volume	5-7 Bed Volumes
Vessel Freeboard	50% of Bed Depth
Typical Minimum Bed Depth	22 Inches
Maximum Continuous ORP	400 mV
Sanitization Chlorine Concentration	25-50 ppm (for max 24 hr. hold)
Incoming Chlorine Concentration	0.5 ppm

MetSorb® HMRG is a highly effective granular adsorbent that reduces Arsenic III & V and a wide variety of heavy metals including Lead, Uranium, Antimony, Zinc, Radium, Cadmium, Copper, Chromium and Vanadium from drinking water and process solutions. For more information on MetSorb® adsorptive media, please contact Bennett Buchsieb at 302-383-9310 or by email at bbuchsieb@gravertech.com

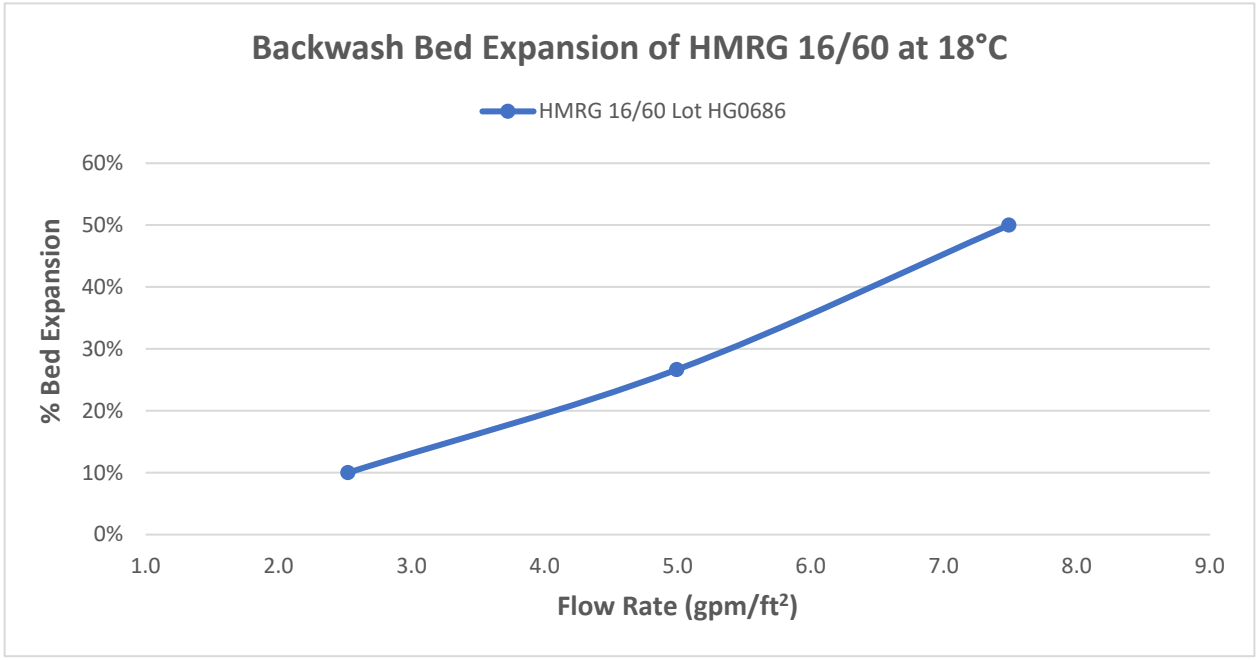
Graver Technologies - HMRG 16/60 Backwash Study at 18°C

HMRG 16/60 Lot HG0686

Temperature held at 18.0 ± 0.5°C using a Fisher Scientific Isotemp Refrigerated Circulator, Model 910

Column Diameter	1	inch
	0.785	square inches
	0.005451389	square feet
Initial Media Bed Height	7.5	inches

Target Flux (gpm/ft^2)	Target Flow Rate (mL/min)	Actual Flow Rate (mL/min)	Actual Flux (gpm/ft^2)	Bed Expansion (inches)	Bed Expansion %
2.5	51.6	52	2.521	8.25	10.0%
5.0	103.2	103	4.993	9.50	26.7%
7.5	154.8	155	7.490	11.25	50.0%



SAFETY DATA SHEET

MetSorb® HMRG, HMRP

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

Graver Technologies

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**MetSorb® HMRG, HMRP**
CAS NUMBER:	Mixture
PRODUCT USE:	Various
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	**Graver Technologies LLC**
ADDRESS:	200 Lake Drive, Glasgow, Delaware 19702-3319 USA
EMERGENCY PHONE:	**800-249-1990**
BUSINESS PHONE:	(302) 731-1700
BUSINESS FAX:	(302) 731-1707
DATE OF CURRENT REVISION:	July 23, 2015
DATE OF LAST REVISION:	October 20, 2011

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a dry, white powder or granules (solid) with no odor. Exposure can be irritating to eyes, respiratory system and skin. May be harmful if swallowed. It is a non-flammable solid. Excessive airborne dust creates a dust explosion hazard. The Environmental effects of this product have not been investigated, however this product is not expected to have any adverse effects.

US DOT SYMBOLS	CANADA (WHMIS) SYMBOLS	EUROPEAN and (GHS) Hazard Symbols
Non-Regulated	Complies with WHMIS 2015	 Signal Word: **Warning!**

GHS LABELING AND CLASSIFICATION:

This product does meet the definition of a hazardous substance or preparation as defined by 29 CFR 1910. 1200 AND the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex VI
EC# 236-675-5 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 243-744-3 This substance is not classified in the Annex I of Directive 67/548/EEC
CAS# 9002-89-5 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):
Eye Damage/Irritation Category 2B

Hazard Statement(s):
H320:Causes eye irritation

Precautionary Statement(s):
P264: Wash hands thoroughly after handling
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Hazard Symbol(s):
[Xi] Irritant

Risk Phrases:
R36: Irritating to eyes

Safety Phrases:
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure can be irritating to eyes, respiratory system and skin.
INHALATION: Inhalation of dusts may cause nose, throat and respiratory tract irritation.
EYE: Direct contact causes irritation with pain and redness.
SKIN: Prolonged or repeated contact may cause skin irritation with redness.
INGESTION: Ingestion may cause irritation to gastrointestinal tract

CHRONIC: None known

TARGET ORGANS: ACUTE: Eye, Respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Titanium Dioxide	13463-67-7	236-675-5	0338	30 - 100%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Titanium Hydroxide	20338-08-3	243-744-3	Not Listed	0 – 30%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Ethenol Homopolymer	9002-89-5	Not Listed in ESIS	Not Listed	0 – 10%	HAZARD CLASSIFICATION: Not Classified RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the SDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and SDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, respiratory system or eye problems may be aggravated by prolonged contact.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Non-Flammable

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NA Upper (UEL): NA

FIRE EXTINGUISHING MATERIALS: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray. Do not release runoff from fire control methods to sewers or waterways.

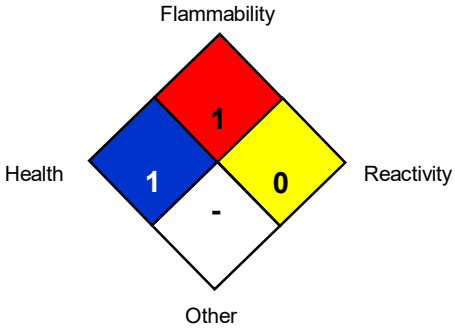
UNUSUAL FIRE AND EXPLOSION HAZARDS: High dust concentration may form explosive mixtures with air, which can be ignited by spark, flame or static discharge.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Sensitive (Air/Dust mixtures)

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM	
HEALTH HAZARD (BLUE)	1
FLAMMABILITY HAZARD (RED)	1
PHYSICAL HAZARD (YELLOW)	0

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.
SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum (HEPA vacuum) spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. For large spills, use wet methods and dike far ahead of any liquid spill. Do not release into sewers or waterways.
Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately. Do not enter places where bulk material is used or stored until adequately ventilated to prevent asphyxiation.

As with all finely divided materials, precautions should be taken to avoid inhalation and eye contact. Ground all transfer, blending and dust collecting equipment to prevent static discharge in accordance with NFPA 70, "National Electric Code;" NFPA 499, "Recommended Practice for the Classification of Combustible Dusts and of Hazardous (classified) Locations for Electrical Installations in Chemical Process Areas;" NFPA 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids" and OSHA Combustible Dust standards. Remove all ignition sources from material handling, transfer and processing areas where dust may be present.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location away from heat, flame and incompatible materials. Keep container tightly closed when not in use.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA
Titanium Dioxide	13463-67-7	10 mg/m³ Dust	15 mg/m³ Total Dust
Titanium Hydroxide	20338-08-3	Not Listed	Not Listed
Ethenol Homopolymer	9002-89-5	Not Listed	Not Listed

Currently, International exposure limits are established for the components of this product. Please check with competent authority

in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses are recommended. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use protective gloves to minimize skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Powder or Granular (Solid)
APPEARANCE & ODOR:	White powder or granular with no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
PACKING DENSITY:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	2,500 – 3,000°C (4,532 - 5,432°F)
MELTING POINT (C°):	1,855°C (3,371°F)
pH:	6 – 7 (Slurry)
SPECIFIC GRAVITY 4°C: (Water = 1)	4.26
SOLUBILITY IN WATER (%)	Insoluble in water
VOC:	0

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable

DECOMPOSITION PRODUCTS: Thermal decomposition (burning) may produce irritating and toxic fumes of carbon (carbon dioxide, carbon monoxide).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: None known

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: There is no available data for the product

CAS# 13463-67-7 LD50, Oral - Rat >10,000 mg/kg

SUSPECTED CANCER AGENT: One or more of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is considered to be, nor suspected to be a cancer-causing agent by these agencies.

Titanium Dioxide CAS# 13463-67-7 ACGIH A4, IARC Group 3

IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.

SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The ecological characteristics of this product have not been fully investigated. The product should not be discharged unmonitored into the environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No Data Available for this product at this time.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Non-Regulated Material

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable.

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:

This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health:	Yes	Chronic Health:	No	Fire:	No	Reactivity:	No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ):

CERCLA Reportable Quantity (RQ), Sodium Hydroxide CAS# 1310-73-2 1,000 Lb RQ

CLEAN WATER ACT:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

STATE REGULATIONS:

None.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): One or more of the ingredients are on the California Proposition 65 lists.

WARNING! This product contains ingredients known by the State of California to cause cancer or reproductive harm.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Complies with WHMIS 2015

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett MSDS Compliance PLUS

Appendix D - Ensero

Environmental Site Solutions, LLC

DATE	:	11-03-2021
TO	:	Danny Pollock / Greg Miller
COMPANY	:	Grand Island Resources LLC - Nederland Mine
FROM	:	Mike Tallering
SUBJECT	:	Phase I & Phase II Temporary Water Treatment Systems
PAGES	:	2 (Including Cover)

Danny / Greg,

Per your request, please see the following revised pricing for supply and delivery of temporary water treatment system for your project while permanent system is designed & fabricated

Phase #1 – Emergency Treatment (7-10 Day Lead Time)

We can provide treatment vessels & Graver Metsorb HMRG media to polish metals and 'pilot' removal efficiency & EBCT.

(2)	**2,000 lb. Media Pressure Vessels for Metsorb Media**		**$975/vessel/mnth**

Additional Fixed Costs:

(1)	**Mobilization & Delivery of Systems to Project Site**		**$5,850**
(1)	**Metsorb HMRG Media for Above Media Filters**	**$24,750/vessel**	**$49,500**
(1)	**End of Project Demob & Delivery back to ESS**		**$5,850**

Note:

- We do not currently have rental pump or bag filter housing but can help you source locally for short term rental

14450 Austin Place ▪ Anacortes, WA 98221 ▪ Phone: 360-503-7299 ▪ mike.tallering@envirositesolutions.com

Phase #2 – Temporary Treatment System (3-5 Week Lead Time)

Rental Pricing for the Below Equipment System: $14,850/month

Includes:

(1) 20' Shipping Container: Insulated with Double Coat Temp Coat 101, Heater (2x), 480V Service Disconnect, Interconnecting Plumbing/Hoses w/ 4" Flanged Inlet/Outlet

(1) 10 HP Pump w/ Controls

(2) Dual Stage Bag Filter Units, Manual Operations Req'd.

(2) 2,000 lb. Media Pressure Vessels for Metsorb Media

Additional Fixed Costs:

(1)	**Mobilization & Delivery of Systems to Project Site**		**$8,750**
(1)	**Metsorb HMRG Media for Above Media Filters**	**$24,750/vessel**	**$49,500**
(1)	**Installation, Start-up & Training** - Includes (3) days on-site, (2) ½-day, & travel & per diem costs		**$5,500**
(1)	**End of Project Demob & Delivery back to ESS**		**$8,750**

Notes:

- Above Pricing is for a minimum of (6) month duration
- Lead time to ship is 3-5 weeks ARO
- System will be manually operated. Permanent system will be automated

Not Included In Above Scope :

- Off-loading at site and placement of containerized system not included in above
- Plumbing from pump to containerized system not included in above
- Electrical work not included in above
- Operation of system not included in above

All pricing is valid for 60 days from above date. Pricing does not include any taxes, duties or applicable fees.

Thank you for the opportunity to provide pricing to you on your activated carbon needs. Please feel free to contact me with any questions or comments that you may have. You can reach me at 360-503-7299 or via email at mike.tallering@envirositesolutions.com.

Mike Tallering
Environmental Site Solutions
mike.tallering@envirositesolutions.com
www.envirositesolutions.com
360-503-7299

SERVICES AGREEMENT

GRAND ISLAND RESOURCES, LLC
&

ENSERO SOLUTIONS US, INC.

TABLE OF CONTENTS

SERVICES AGREEMENT

THIS AGREEMENT is effective the 8th day of November, 2021.

BETWEEN:

GRAND ISLAND RESOURCES with its mailing address at 12567 W CEDAR DR, LAKEWOOD, CO 80228 (the "**Owner**")

AND:

ENSERO SOLUTIONS US, INC., with its mailing address at 12150 E. Briarwood Avenue, Suite 135, Centennial, CO 80112

(the "**Contractor"**)

WHEREAS:

A. the Owner is responsible for the development and operation of the Caribou and Cross mines, located approximately 4.5 miles west of Nederland, CO (the "**Project**");

B. the Owner wishes to engage the Contractor to provide certain services for the Project at the direction of the Owner's designate; and

C. the Owner and the Contractor have agreed to enter into this Agreement to provide for the terms and conditions of such engagement.

THEREFORE in consideration of the agreements and covenants set out in this Agreement the Owner and the Contractor agree as follows:

1. INTERPRETATION

1.1 Definitions

In this Agreement:

"**Affiliate**" means any person which directly or indirectly controls, is controlled by, or is under common control with, a Party;

"**Agreement**" means this agreement, including all Schedules;

"**Business Day**" means any day other than Saturday, Sunday or statutory holiday;

"**Effective Date**" means the date first written above;

"**Fees**" has the meaning set out in Section 3.1;

"**Notice**" has the meaning set out in Section 8.9;

"**Parties**" means the Owner and the Contractor, and "Party" means any one of them;

"**Project**" has the meaning set out in recital A; and

"**Services**" means the services described in Schedule A.

1.2 Construction and Interpretation

In this Agreement, including the recitals to this Agreement, except where expressly stated to the contrary or the context otherwise requires:

(a) the recitals and headings to Sections and Schedules are for convenience only and will not affect the interpretation of this Agreement;

(b) each reference in this Agreement to "**Section**" and "**Schedule**" is to a Section of, and a Schedule to, this Agreement;

(c) each reference to a statute is deemed to be a reference to that statute and any successor statute, and to any regulations, rules, policies and criteria made under that statute and any successor statute, each as amended or re-enacted from time to time;

(d) words importing the singular include the plural and vice versa and words importing gender include all genders;

(e) unless otherwise stated in this Agreement, all references to amounts of money mean lawful currency of the United States;

(f) an accounting term has the meaning assigned to it, and all accounting matters will be determined, in accordance with generally accepted accounting principles consistently applied;

(g) the word "written" includes printed, typewritten, faxed, e-mailed or otherwise capable of being visibly reproduced at the point of reception and "in writing" has a corresponding meaning;

(h) the words "include" and "including" are to be construed as meaning "including, without limitation"; and

(i) this Agreement shall be construed as though both Parties drafted it.

1.3 Governing Law

This Agreement will be governed by and construed in accordance with the laws of Colorado and the laws of the United States applicable in therein.

2. PROJECT SERVICES

2.1 Appointment

The Owner hereby appoints the Contractor, and the Contractor hereby accepts the appointment, to perform the Services set out in Schedule A at the direction of the Owner's Representative. For greater certainty, nothing in this Agreement will purport to grant any right, power or authority, on behalf of or in the name of the Owner, to participate in the management, direction or control of the Owner or to relieve the Owner of its obligations.

2.2 Term

This Agreement will be effective from the Effective Date until the earlier of:

(a) the date on which each of the Contractor and the Owner have fulfilled their obligations pursuant to this Agreement;

(b) the date as of which this Agreement is terminated by mutual written agreement of the Parties; and

(c) the date this Agreement is terminated in accordance with Section 4.

2.3 Standard of Care

The Contractor will perform the Services with a level of effort indicated by the budget and a degree of care, skill and diligence normally provided by a qualified and experienced practitioner performing services similar to the Services in relation to projects similar to the Project.

2.4 Compliance with Laws

In performing the Services, the Contractor will comply in all material respects with all applicable laws.

2.5 Reports

Any report prepared by the Contractor in connection with the Services (a "**Report**") will upon full payment of the Services be for the exclusive use of the Owner, and for the limited purpose as may be expressly set out in Schedule A. The Contractor will not release or distribute, or permit the release of distribution of any Report to any other person without the Owner's written approval not to be unreasonably withheld.

2.6 Qualified Personnel

The Contractor will provide professional personnel who have the qualifications, experience and capabilities to perform the Services.

2.7 Independent Contractor

The Parties acknowledge that in entering into this Agreement and in performing the Services, the Contractor has and will have the status of an independent contractor and that nothing in this Agreement will contemplate or constitute the Contractor or any subcontractor as a partner or employee of the Owner for any purpose.

3. FEES AND PAYMENT

3.1 Fees

The Owner will pay to the Contractor the fees and disbursements described in Schedule B (the "**Fees**") plus applicable taxes.

3.2 Payment Terms

The Contractor will submit monthly invoices to the Owner for Fees (plus all applicable taxes) related to Services provided in the previous month. The Owner will pay all invoices within 30 days of the date of receipt of the invoice. All invoiced amounts not paid when due shall bear interest from the required payment date of the corresponding invoice at the rate of 1.5% per month, compounding monthly until paid.

If the Owner disputes any portion of an invoice, then the Owner shall notify the Contractor with 7 Business Days of receipt of such invoice with details of the disputed amount and the Owner may withhold the disputed amount and pay the outstanding amount by the due date. If the Owner and Contractor cannot resolve such disputed amounts; then the issue shall be referred to Section 6, Dispute Resolution.

If the undisputed portion of any invoice is not paid by the Owner by its due date and the Owner does not rectify within 7 Business Days of notification by the Contractor, the Contractor may suspend performance of the Services and withhold documentation until all outstanding amounts are paid and received.

3.3 Records

If the Owner reasonably requests, then the Contractor shall provide the Owner daily, weekly, or monthly reports of labour hours by task, equipment hours, subcontractor hours and materials chargeable to the Owner in accordance with Schedule B in connection with the Services. The Owner shall approve or dispute

in part or in whole such reports within 48 hours of receipt of the report otherwise it shall be deemed to be accepted.

The Contractor will prepare and maintain proper records related to the Services, including records, receipts and invoices relating to disbursements. On request from the Owner, the Contractor will make the records available open to audit examination by the Owner at any time during regular business hours during the time the Contractor is providing the Services and for a period of 1 year after the expiry of the Term.

4. TERMINATION

4.1 Termination by Owner

The Owner may terminate this Agreement if the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of its insolvency, or if a receiver is appointed because of its insolvency, the Owner may, without prejudice to any other right or remedy the Owner may have, terminate this Agreement by giving the Contractor or receiver or trustee in bankruptcy written notice; or if the Contractor materially breaches its obligations under this Agreement and any such breach is not remedied to the reasonable satisfaction of the Owner within 20 Business Days after delivery of written notice from the Owner to the Contractor (or such longer period as may be agreed to by the Owner), then the Owner may, without prejudice to any other right or remedy the Owner may have, terminate this Agreement by giving the Contractor further written notice.

4.2 Termination by Contractor

The Contractor may terminate this Agreement if the Owner is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of its insolvency, or if a receiver is appointed because of its insolvency, the Contractor may, without prejudice to any other right or remedy the Contractor may have, terminate this Agreement by giving the Owner or receiver or trustee in bankruptcy written notice; or if the Owner materially breaches its obligations under this Agreement and any such breach is not remedied to the reasonable satisfaction of the Contractor within 20 Business Days after delivery of written notice from the Contractor to the Owner (or such longer period as may be agreed to by the Contractor), then the Contractor may, without prejudice to any other right or remedy the Contractor may have, terminate this Agreement by giving the Owner further written notice.

4.3 Payment on Termination

Upon termination of this Agreement in accordance with Sections 4.1 or 4.2, the Owner will pay the Contractor Fees for services rendered by the Contractor up to the effective date of termination, plus all costs associated with demobilization and cancellation of third-party contracts.

5. INDEMNITY AND INSURANCE

5.1 Indemnification by Contractor

The Contractor will indemnify and save harmless the Owner, their respective subsidiary and affiliated companies, and all of its directors, officers, employees, agents, representatives and indemnities, from and against all claims, demands, causes of action, suits, losses, damages and costs, liabilities, expenses and judgments (including all actual legal costs) which any of the indemnified Parties incur, suffer or are put to arising out of or in connection with:

(a) any failure, breach, misrepresentation, breach of representation or warranty or non-fulfillment of any covenant or obligation on the part of the Contractor under this Agreement or any wrongful or negligent act, error or omission of the Contractor or any official, director, employee, agent, sub-Contractor, representative or subcontractor of the Contractor; and

(b) any and all claims, actions, suits, proceedings, demands, assessments, judgments, costs and legal and other expenses arising from third parties or incident to any of the matters in Section 5.1(a), except to the extent caused or contributed by breach of any provision of this Agreement by the Owner, its directors, officers, employees, agents or representatives or any negligent act, omission or willful misconduct of or by any of them.

5.2 Indemnification by Owner

The Owner will indemnify and save harmless the Contractor and all of its directors, officers, employees, agents, representatives and indemnities, from and against all claims, demands, causes of action, suits, losses, damages and costs, liabilities, expenses and judgments (including all actual legal costs) which the indemnified Parties incur, suffer or are put to arising out of or in connection with:

(a) any failure, breach, misrepresentation, breach of representation or warranty, or nonfulfillment of any covenant or obligation on the part of the Owner under this Agreement;

(b) any wrongful or negligent act of the Owner or any official, employee, agent of the Owner (other than the Contractor and its subcontractors); and

(c) any and all claims, actions, suits, proceedings, demands, assessments, judgments, costs and legal and other expenses arising from or incident to any of the matters in Section 5.2(a), except to the extent caused or contributed by breach of any provision of this Agreement by or any negligent act, omission or willful misconduct of or by the Contractor, its directors, officers, employees, agents or representatives, indemnities or any of them.

5.3 Insurance

The Contractor will at its own cost and expense at all times during the term of this Agreement maintain adequate and appropriate insurance needed to perform the Services. Proof of insurance will be provided to the Owner upon request.

5.4 No Consequential Damages

The liability of each Party with respect to a claim against the other under this Agreement is limited to direct damages only and neither Party will have any liability whatsoever for consequential or indirect loss or damage (such as, but not limited to, claims for loss of profit, revenue, production, business, contracts or opportunity and increased cost of capital, financing or overhead) incurred by the other Party. In no event shall the Contractor's maximum liability to the Owner with respect to the Services or otherwise relating to this Agreement exceed an amount equal to 100% of the aggregate amount of Fees paid by the Owner the Contractor under this Agreement in respect of the Services (as described on Schedule A) to which the applicable losses or liabilities relate.

6. DISPUTE RESOLUTION

6.1 Referral

If any dispute or difference between the Parties arises with respect to this Agreement, with the exception of any issue regarding non or late payment of undisputed invoice(s) or portions thereof, which is not settled informally or by mediation within a reasonable time, the Parties or their respective successors and assigns, will refer such dispute or difference to arbitration in accordance with the terms of this Agreement.

6.2 Appointment of Arbitrators and Procedure

The Party desiring to refer a matter to arbitration will notify the other Party of its intention to do so. If the Parties cannot agree upon a single arbitrator within fourteen (14) days of such notice, then each Party will

appoint an arbitrator and the two appointed arbitrators will together select a third neutral arbitrator. Except as specifically provided in this Section, the arbitration will be conducted in the exclusive jurisdiction of Denver, Colorado, in accordance with the American Arbitration Association rules of commercial disputes. The arbitration award will be binding upon the Parties to this Agreement.

7. CONFIDENTIALITY

Confidential Information means all non-public information, whether disclosed before or after the effective date of this Agreement, that is conveyed from the one Party to the other, orally or in electronic or tangible form, or otherwise obtained by the receiving Party through observation or examination of the disclosing Party's operations or Confidential Information, and (i) is marked as "confidential," (ii) is orally designated by as "confidential" and confirmed in writing within thirty (30) days of disclosure, or (iii) due to the circumstances surrounding its disclosure would be reasonably construed as "confidential." Confidential Information does not include any information which (a) was rightfully in the possession of the Contractor prior to receiving it from the Owner, (b) is independently developed by the Contractor without use of or reliance upon the Confidential Information from the Owner, (c) was in the public domain at or subsequent to the time of disclosure (through no breach of the Contractor) or (d) is obtained in good faith from a third Party not under any obligation of confidentiality.

The Contractor acknowledges it has acquired and will acquire Confidential Information of the Owner in connection with the performance of the Services. The Contractor shall:

(a) during the term of this Agreement and indefinitely thereafter, treat Confidential Information as strictly confidential and shall not disclose or permit the disclosure of Confidential Information except to those officers and employees of the Contractor with a need to know, and upon whom confidentiality obligations have been imposed, or except as required by law;

(b) during the term of this Agreement and for two years thereafter, not make use of Confidential Information other than as required for the sole and exclusive purpose of performing the Services; and

(c) promptly return to the Owner, upon written request, or provide confirmation of destruction of, all Confidential Information.

8. GENERAL

8.1 Entire Agreement

This Agreement contains the entire agreement of the Parties regarding the performance of the Services and no understandings or agreements, oral or otherwise, exist between the Parties except as expressly set out in this Agreement.

8.2 Amendment

This Agreement may be amended only by agreement in writing, signed by both Parties.

8.3 Changes

Changes to Schedule A – Services and Schedule B – Fees may occur from time to time, provided that such changes shall be amended by the use of a Change Order signed by both Parties.

8.4 Assignment and Enurement

This Agreement shall not be assigned by either Party, without the prior consent of the other Party which shall not to be unreasonably withheld**.** This Agreement shall be binding upon the Parties respective administrators, trustees, receivers, successors and permitted assigns.

8.5 Unenforceability

If any provision of this Agreement is invalid or unenforceable, it will be severed from the Agreement and will not affect the enforceability or validity of the remaining provisions of the Agreement.

8.6 Waiver

No waiver by either Party of any breach by the other Party of any of its covenants, obligations and agreements will be a waiver of any subsequent breach or of any other covenant, obligation or agreement, nor will any forbearance to seek a remedy for any breach be a waiver of any rights and remedies with respect to such or any subsequent breach.

8.7 Force Majeure

Event of Force Majeure means acts of God or public enemy, wars (declared or undeclared), revolution, riots, insurrections, civil commotions, fires, floods, slides, earthquakes, epidemics, pandemics, quarantine restrictions, strikes or lockouts, including illegal work stoppages or slowdowns, or stop work orders issued by a court or statutory authorities (providing that such orders are not issued nor any such labour disputes occasioned as a result of an act or omission of either Party, or any one employed or retained by either Party), freight embargoes or power failures, or any event or circumstance which reasonably constitutes a material disabling event or circumstance, which is beyond the reasonable control of a Party, which does not arise from the neglect or default of a Party, and which results in material delay, interruption or failure by a Party in carrying out its duties, covenants or obligation under this Agreement, but which does not mean or include any delay caused by a Party's lack of funds or financial condition.

If any Party is bona fide delayed or hindered in or prevented from the performance of any obligation, covenant or other act required under this Agreement, by reason of an Event of Force Majeure, the said Party will be relieved from the fulfillment of such obligation, covenant or act during the period of such interruption and the period for the performance of any such obligation, covenant or other act will be extended for a period equivalent to the period of such delay.

8.8 Language

All communication and documentation will be in English unless agreed otherwise.

8.9 Notices

Any notice, approval, election, demand, direction, consent, designation, request, agreement, instrument, certificate, report or other communication required or permitted to be given or made under this Agreement (each, a "**Notice**") to a Party must be given in writing. A Notice may be given by delivery to an individual or electronically by email, and will be validly given if delivered on a Business Day at the following address, or, if transmitted on a Business Day by email addressed to the following Party:

To the Owner:	To the Contractor:
GRAND ISLAND RESOURCES, LLC	Ensero Solutions US, Inc.
Attention: Danny Pollock	12150 E. Briarwood Avenue, Suite 135
Email: dpollock@nedmining.com	Centennial, CO 80112
	Attention: Billy Ray
	Email: bray@ensero.com

or to any other address, email address or individual that the Party designates in writing in accordance with this Section.

8.10 Time

Time is of the essence of this Agreement.

8.11 Counterparts; Execution

This Agreement may be executed and delivered electronically and in counterparts, and any such documents shall be deemed to be an original, and one and the same instrument.

IN WITNESS WHEREOF the Parties have duly executed this Agreement as of the Effective Date.

GRAND ISLAND RESOURCES, LLC

Per: _____

Name: Anthony R Russo

Title: Chief Financial Officer

ENSERO SOLUTIONS US, INC.

Per: _____

Name: Paul Barnes

Title: Chief Operating Officer

SCHEDULE A

SERVICES

Contractor shall provide services for the following scopes of work:

The Scope of work will include the design, installation, and commissioning of a TSS filtration system in support of the water management at the Caribou/Cross mines as defined in the Ensero proposal dated November 6, 2021.

SCHEDULE B

FEES

The project will be invoiced monthly on a Time and Materials basis using the Contractor's standard 2021 unit rate schedule. A detailed cost estimate is provided in Ensero's proposal dated November 6, 2021.

Appendix E – Environmental Site Solutions (ESS)

2K Liquid Phase Media Pressure Filter

Product Description

These units are designed for the efficient purification of contaminated water or liquid streams. These filters have the ability to remove contaminants to non-detectable levels. The vessels are constructed of heavy-duty mild steel and are lined with a double-layer epoxy coating.

Technical Data

Weights and Measures

Max. Flowrates	100 gpm
Max. Pressure	75 psi
Max. Temperature	150°F
Height	94"
Diameter	48"

Shipping Weight*
Vessel Only *1,100 lbs*
Vessel & Media (Media Dependent) 3100 lbs. – 5100 lbs.

Wetted Materials *for material compatibility check*

Carbon Steel*	Shell and heads
PVC	Bottom underdrain
Neoprene	Manway gaskets
Carboline Plasite 4110	Internal Liner

* Theoretically if the vessel has an interior liner, no carbon steel should be exposed to the liquid. However, if there are areas of thin or missing liner, bare carbon steel will be exposed. It is always a good idea to check compatibility of carbon steel even if the vessel interior is lined.

Filter Media

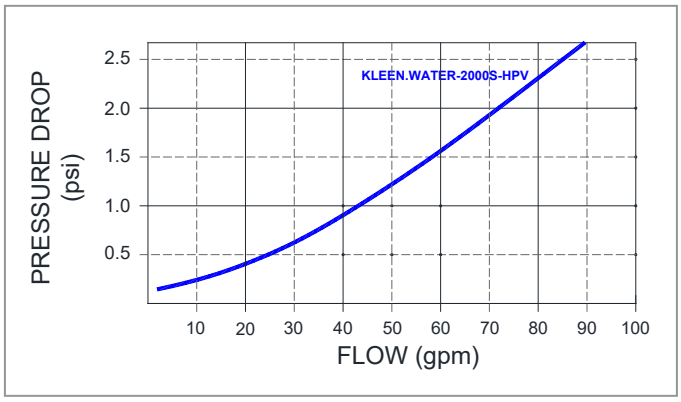
Types	• Activated Carbon • Organoclay • Ion Exchange Resin • Specialty Media
Volume	68 cu. ft
Weight	2000 lbs. – 4000 lbs. *(media dependent)*

Miscellaneous Data

Inlet	4" Female NPT
Outlet	4" Female NPT
Interior Coating	Double-layered epoxy coating
Internals	PVC underdrain
Media Access	Top & side 12"x16" manways *(neoprene gaskets)*

⚠ NOTE: Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate procedures for potentially low oxygen spaces must be followed, including all federal and state requirements.

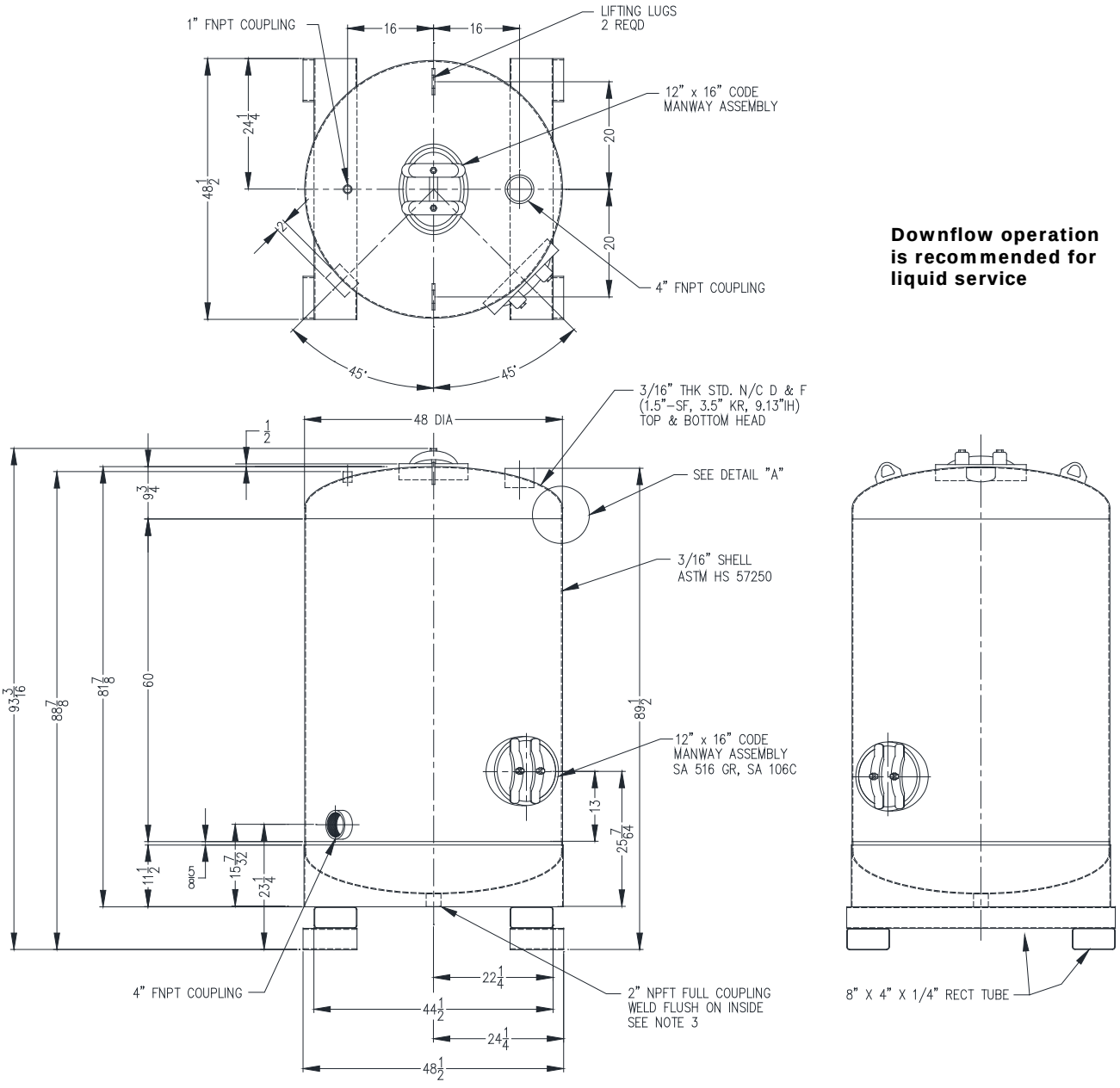
Pressure Drop Data



Environmental Site Solutions
www.envirositesolutions.com
360-503-7299

Data Sheet

2K Liquid Phase Media Pressure Filter



Downflow operation is recommended for liquid service

Appendix F – Equipment

TSURUMI PUMP

NK - SERIES
SEMI-VORTEX - DEWATERING PUMP

SPECIFICATIONS

FEATURES

1. Double inside mechanical seals with silicon carbide faces, running in an oil filled chamber and further protected by a lip seal running against a replaceable, stainless steel shaft sleeve provides for the most durable seal design available.

2. Highly efficient, continuous duty, air filled, copper wound motor with class B insulation minimizes the cost of operation.

3. Built in thermal & amperage sensing protector prevents motor failure due to overloading or accidental run dry conditions.

4. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a B-10 life of 60,000 hours extend operational life.

5. Top discharge, flow-thru design enables operation at low water levels for extended periods.

Sand Kit : NK2-15SK / NK2-22SK
The Sand Kit can be added to the NK series to suspend sand and prevent sand lock.

APPLICATIONS

1. Residential, commercial, industrial wastewater and construction site drainage.

2. Effluent transfer.

3. Decorative waterfalls and fountains.

4. Raw water supply from rivers or lakes..

C ETL LISTED US Intertek

OIL LIFTER EQUIPPED

SPECIFICATIONS

Discharge Size	3" NPT (80 mm)
Horsepower Range	2 ~ 3 HP. (1.5 ~ 2.2 kW)
Performance Range Capacity	55.5 ~ 211.0 GPM. (0.21 ~ 0.80 m^3/min)
Head	34.4 ~ 85.0 Ft. (10.50 ~ 25.91 m)
Maximum water temperature	104^0 F. (40.0^0 C.)
Materials of Construction	
Casing	Butadiene Rubber + Natural Rubber , Cast Iron (NK2-22L)
Impeller	Ductile Cast Iron , High Chrome Cast Iron (NK2-22L , NK2-15SK/22SK)
Shaft	420 , 403 Stainless Steel
Motor Frame	Aluminum alloy
Fasteners	304 Stainless Steel
Mechanical Seal	Silicon Carbide
Elastomers	NBR (Nitril Butadiene Rubber)
Impeller Type	Semi-vortex, solids handling.
Solids Handling Capability	0.334” (8.5mm)
Bearings	Prelubricated, Double Shielded
Motor Nomenclature	
Type, Speed, Hz.	Air Filled, 3600 RPM, 60 Hz.
Voltage, Phase	110/220 V., 1 Ph (NK2-15 Dual Voltage)
Insulation	Class B
Accessories	Submersible Power Cable 32' (10.0 m)
Operational Mode	Manual

STANDARD

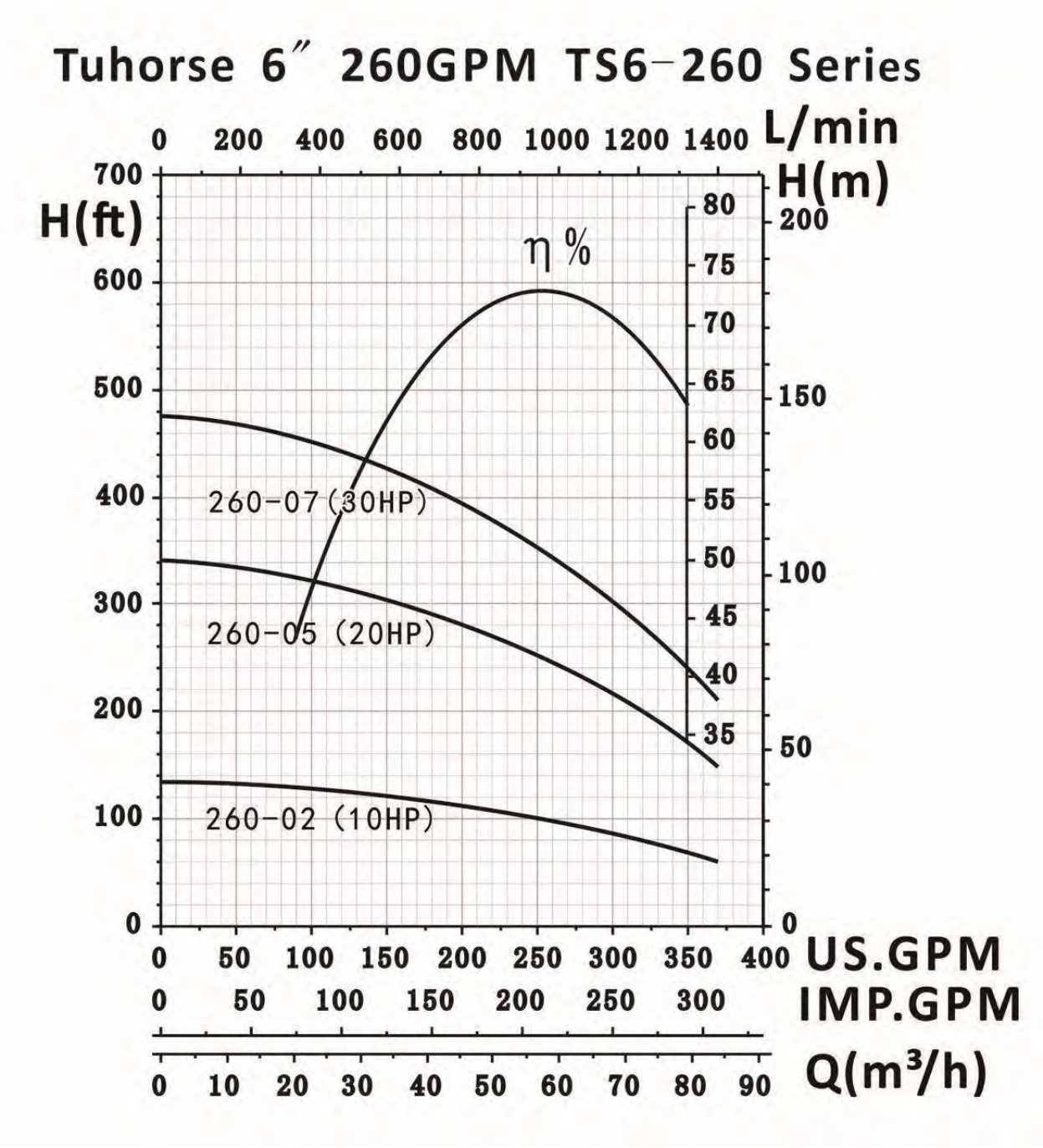
OPTIONS

Length as Required

TS-301 Float Switch

Cross Winze Pump Specifications

- **HP:** 20HP
- **Voltage:** 460V Three Phase
- **Cycle:** 60 Hz
- **Operating Amperage:** 26.2A
- **Motor RPM:** 3450 RPM
- **Stages:** 5
- **Maximum Head (cut off):** 340 ft.
- **Maximum Flow(0-140ft.):** 370 GPM
- **Rated Flow:** 260GPM
- **Free Flow Rate:** 350GPM @ 170ft; 300GPM @ 210ft; 260GPM @ 240ft; 200GPM @ 280 ft; 150GPM @ 300ft.
- **Suction Port:** Center Suction
- **Discharge Port:** 3 inch NPT Female (4" version is available, customer must notice us before shipping)
- **Built-in Check-valve:** Yes
- **Housing Material:** Stainless Steel 304
- **Impeller Material:** stainless steel 304
- **Motor Enclosure:** Stainless steel 304
- **Discharge and Suction Port Material:** Stainless Steel 304
- **Motor Bearing / Lubrication:** Water lubricated thrust bearing, water filled lubrication
- **Duty:** Continuous or allow maximum 15 restarting cycles / hour
- **Control Box:** Three phase power switch with overload protection is required(not included)
- **Net Weight:** 199 lbs
- **Shipping weight:** 209 Lbs
- **Dimensions/Length(pump and motor assembly):**
- **Shipping Dimensions:** Motor and pump separately packed



- **HP:** 20HP
- **Voltage:** 460V Three Phase
- **Cycle:** 60 Hz
- **Operating Amperage:** 26.2A
- **Motor RPM:** 3450 RPM
- **Stages:** 5
- **Maximum Head (cut off):** 340 ft.
- **Maximum Flow(0-140ft.):** 370 GPM

- **Rated Flow:** 260GPM
- **Free Flow Rate:** 350GPM @ 170ft; 300GPM @ 210ft; 260GPM @ 240ft; 200GPM @ 280 ft; 150GPM @ 300ft.
- **Suction Port:** Center Suction
- **Discharge Port:** 3 inch NPT Female (4" version is available, customer must notice us before shipping)
- **Built-in Check-valve:** Yes
- **Housing Material:** Stainless Steel 304
- **Impeller Material:** stainless steel 304
- **Motor Enclosure:** Stainless steel 304
- **Discharge and Suction Port Material:** Stainless Steel 304
- **Motor Bearing / Lubrication:** Water lubricated thrust bearing, water filled lubrication
- **Duty:** Continuous or allow maximum 15 restarting cycles / hour
- **Control Box:** Three phase power switch with overload protection is required(not included)
- **Net Weight:** 199 lbs
- **Shipping weight:** 209 Lbs
- **Dimensions/Length(pump and motor assembly):**
- **Shipping Dimensions:** Motor and pump separately packed

Minimum requirement for operating the motor is a non-fused 3-phase power switch and a 3-phase overload protector / Circuit breaker. The protector / breaker must be the type of those that shut off all 3-phase when one or more phase is overloaded. Do **NOT** use a fused switch that could burn out one of the phase. Do NOT use three individual 1-Phase breakers. You must use a real 3-phase protector / breaker or a protection device that does not cause phase loss (missing phase) problem.

* Not exactly as shown in photos due to stages and HP vary from models. Photos are taken from one of the 10HP for illustrations only.

ProSense® SLT Series Submersible Level Transmitters

Part No. SLT1-005-L30

Part No. SLT2-005-L30

Submersible Level Transmitters

The ProSense SLT series submersible level sensors provide continuous liquid level measurement by sensing the hydrostatic pressure produced by the height of liquid above the sensor and providing a 4-20 mA output signal compatible with PLCs, panel meters, data loggers, and other electronic equipment. The shielded cable with atmospheric vent tube and a tough polyurethane jacket incorporating an exclusive "water block" liner beneath the jacket is attached to the sensor using an over-molding process that prevents moisture intrusion. The SLT1 series has a slim 1-inch diameter housing and a ported bullet nose cap for protection of the sensor diaphragm. The SLT2 series features a large 2.75 inch diameter PTFE flexible diaphragm surrounded by a 316 stainless steel non-fouling protective cage. Accessories include a desiccant vent filter, aneroid bellows, junction boxes, and replacement nose caps.

Features

- Models with ported nose cap or non-fouling cage for diaphragm protection
- Durable 316 SS construction for reliable, long life in harsh environments
- Shielded cable with atmospheric vent; over-molded to prevent moisture intrusion
- 1/2 inch NPT male threaded conduit connection on the sensor housing standard
- Pre-calibrated ranges up to 50 psig (115.3 ftWC) to meet the most common submersible level applications in vented tanks, reservoirs & ground water systems
- +/-0.25% accuracy standard
- All sensors include UL and FM hazardous location approvals for intrinsically safe applications and are CE marked
- Made in the USA

Applications

- Lift station monitoring
- Liquid level in vented tank
- Landfill leachate monitoring
- Construction by-pass pumping
- Dewatering
- Pump control
- Slurry tank liquid level

SLT Series Submersible Level Transmitters

Model	Range	Cable Length*	Diaphragm / Protection	Price	Weight (lbs)
SLT1-005-L30	0–5 psig (11.5 ftWC)	30ft (9.1 m)	316 Stainless steel diaphragm / Ported POM (polyoxymethylene) nose cap	$349.00	1.9
SLT1-010-L40	0–10 psig (23.1 ftWC)	40ft (12.2 m)		$366.00	2.4
SLT1-015-L60	0–15 psig (34.6 ftWC)	60ft (18.3 m)		$402.00	3.4
SLT1-020-L60	0–20 psig (46.1 ftWC)	60ft (18.3 m)		$402.00	3.4
SLT1-030-L100	0–30 psig (69.2 ftWC)	100ft (30.5 m)		$468.00	5.4
SLT1-050-L140	0–50 psig (115.3 ftWC)	140ft (42.7 m)		$540.00	7.4
SLT2-005-L30	0–5 psig (11.5 ftWC)	30ft (9.1 m)	Flexible PTFE (polytetrafluoroethylene) diaphragm / Non-fouling stainless steel cage	$549.00	5.0
SLT2-010-L40	0–10 psig (23.1 ftWC)	40ft (12.2 m)		$565.00	5.5
SLT2-015-L60	0–15 psig (34.6 ftWC)	60ft (18.3 m)		$600.00	6.5
SLT2-020-L60	0–20 psig (46.1 ftWC)	60ft (18.3 m)		$600.00	6.5
SLT2-030-L100	0–30 psig (69.2 ftWC)	100ft (30.5 m)		$669.00	8.5

** It is required that any excess cable length be accommodated in a service loop and that the cable NOT be shortened as this will void the warranty. If longer transmitter cable is needed, terminate the sensor in an SLT-JB1 or SLT-JB2 junction box and run standard non-vented instrumentation cable between the junction box and the measuring electronics.*

ProSense® SPT25 Series Pressure Transmitters

The ProSense SPT25 pressure transmitter series is engineered to meet many industrial, commercial, and OEM pressure measurement applications. The all stainless steel welded thin film sensing element provides very fast response time and is compatible with many different media sensing applications. With a robust design resistant to vibration, shock, and EMI/RFI, the SPT25 series provides high accuracy over a wide compensated temperature range. Pressure sensing ranges from vacuum to 5000 psig are available along with a ¼ inch NPT male threaded process connection. Choose from linear outputs of 4-20 mA or 0-10VDC with electrical connections of either a DIN 175301-803C L-connector or 6.6 foot (2 m) integral shielded cable.

Applications

- Process control & automation
- Pump & compressor control
- Hydraulic systems
- Pneumatic systems
- Engine monitoring
- Refrigeration equipment
- Presses
- Machine tools

Features

- All stainless steel welded sensing element
- Fast response time
- Pressure sensing ranges from vacuum to 5000 psig
- 1/4 inch NPT male threaded process connection
- Output options: 4-20 mA or 0-10 VDC
- Integral 6.6 foot shielded cable or DIN form C electrical connections
- Made in the USA
- CE marked
- 3-year warranty

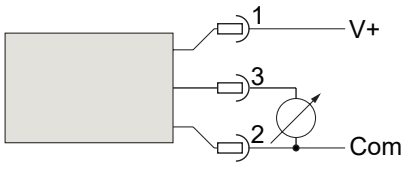
Click on the thumbnail or go to https://www.automationdirect.com/VID-PR-0001 for a short video on ProSense Air Differential and Pressure Transmitters

ProSense SPT25 Series Pressure Transmitters (Shielded Cable)					
Part Number	**Description**	**Electrical Connection**	**Input Voltage**	**Wt(lb)**	**Price**
SPT25-20-V30A	Pressure transmitter, 4 to 20 mA output, -14.7 vacuum to 30 psig range, 1/4" NPT male port	Integral 6.6 ft (2m) shielded cable	9 - 36 VDC	0.38	$132.00
SPT25-20-0030A	Pressure transmitter, 4 to 20 mA output, 0 to 30 psig range, 1/4" NPT male port				$132.00
SPT25-20-0060A	Pressure transmitter, 4 to 20 mA output, 0 to 60 psig range, 1/4" NPT male port				$132.00
SPT25-20-0100A	Pressure transmitter, 4 to 20 mA output, 0 to 100 psig range, 1/4" NPT male port				$132.00
SPT25-20-0150A	Pressure transmitter, 4 to 20 mA output, 0 to 150 psig range, 1/4" NPT male port				$132.00
SPT25-20-0200A	Pressure transmitter, 4 to 20 mA output, 0 to 200 psig range, 1/4" NPT male port				$132.00
SPT25-20-0300A	Pressure transmitter, 4 to 20 mA output, 0 to 300 psig range, 1/4" NPT male port				$132.00
SPT25-20-0500A	Pressure transmitter, 4 to 20 mA output, 0 to 500 psig range, 1/4" NPT male port				$132.00
SPT25-20-1000A	Pressure transmitter, 4 to 20 mA output, 0 to 1000 psig range, 1/4" NPT male port				$132.00
SPT25-20-1500A	Pressure transmitter, 4 to 20 mA output, 0 to 1500 psig range, 1/4" NPT male port				$132.00
SPT25-20-2000A	Pressure transmitter, 4 to 20 mA output, 0 to 2000 psig range, 1/4" NPT male port				$132.00
SPT25-20-3000A	Pressure transmitter, 4 to 20 mA output, 0 to 3000 psig range, 1/4" NPT male port				$132.00
SPT25-20-5000A	Pressure transmitter, 4 to 20 mA output, 0 to 5000 psig range, 1/4" NPT male port				$132.00
SPT25-10-V30A	Pressure transmitter, 0 to 10 V output, -14.7 vacuum to 30 psig range, 1/4" NPT male port		14 - 36 VDC		$132.00
SPT25-10-0030A	Pressure transmitter, 0 to 10 V output, 0 to 30 psig range, 1/4" NPT male port				$132.00
SPT25-10-0060A	Pressure transmitter, 0 to 10 V output, 0 to 60 psig range, 1/4" NPT male port				$132.00
SPT25-10-0100A	Pressure transmitter, 0 to 10 V output, 0 to 100 psig range, 1/4" NPT male port				$132.00
SPT25-10-0150A	Pressure transmitter, 0 to 10 V output, 0 to 150 psig range, 1/4" NPT male port				$132.00
SPT25-10-0200A	Pressure transmitter, 0 to 10 V output, 0 to 200 psig range, 1/4" NPT male port				$132.00
SPT25-10-0300A	Pressure transmitter, 0 to 10 V output, 0 to 300 psig range, 1/4" NPT male port				$132.00
SPT25-10-0500A	Pressure transmitter, 0 to 10 V output, 0 to 500 psig range, 1/4" NPT male port				$132.00
SPT25-10-1000A	Pressure transmitter, 0 to 10 V output, 0 to 1000 psig range, 1/4" NPT male port				$132.00
SPT25-10-1500A	Pressure transmitter, 0 to 10 V output, 0 to 1500 psig range, 1/4" NPT male port				$132.00
SPT25-10-2000A	Pressure transmitter, 0 to 10 V output, 0 to 2000 psig range, 1/4" NPT male port				$132.00
SPT25-10-3000A	Pressure transmitter, 0 to 10 V output, 0 to 3000 psig range, 1/4" NPT male port				$132.00
SPT25-10-5000A	Pressure transmitter, 0 to 10 V output, 0 to 5000 psig range, 1/4" NPT male port				$132.00

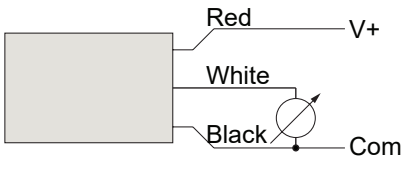
ProSense® SPT25 Series Pressure Transmitters

ProSense SPT25 Series Pressure Transmitters (DIN Connector)					
Part Number	*Description*	*Electrical Connection*	*Input Voltage*	*Wt(lb)*	*Price*
SPT25-20-V30D	Pressure transmitter, 4 to 20 mA output, -14.7 vacuum to 30 psig range, 1/4" NPT male port	DIN 175301-803C L-connector	9 - 36 VDC	0.30	$126.00
SPT25-20-0030D	Pressure transmitter, 4 to 20 mA output, 0 to 30 psig range, 1/4" NPT male port				$126.00
SPT25-20-0060D	Pressure transmitter, 4 to 20 mA output, 0 to 60 psig range, 1/4" NPT male port				$126.00
SPT25-20-0100D	Pressure transmitter, 4 to 20 mA output, 0 to 100 psig range, 1/4" NPT male port				$126.00
SPT25-20-0150D	Pressure transmitter, 4 to 20 mA output, 0 to 150 psig range, 1/4" NPT male port				$126.00
SPT25-20-0200D	Pressure transmitter, 4 to 20 mA output, 0 to 200 psig range, 1/4" NPT male port				$126.00
SPT25-20-0300D	Pressure transmitter, 4 to 20 mA output, 0 to 300 psig range, 1/4" NPT male port				$126.00
SPT25-20-0500D	Pressure transmitter, 4 to 20 mA output, 0 to 500 psig range, 1/4" NPT male port				$126.00
SPT25-20-1000D	Pressure transmitter, 4 to 20 mA output, 0 to 1000 psig range, 1/4" NPT male port				$126.00
SPT25-20-1500D	Pressure transmitter, 4 to 20 mA output, 0 to 1500 psig range, 1/4" NPT male port				$126.00
SPT25-20-2000D	Pressure transmitter, 4 to 20 mA output, 0 to 2000 psig range, 1/4" NPT male port				$126.00
SPT25-20-3000D	Pressure transmitter, 4 to 20 mA output, 0 to 3000 psig range, 1/4" NPT male port				$126.00
SPT25-20-5000D	Pressure transmitter, 4 to 20 mA output, 0 to 5000 psig range, 1/4" NPT male port				$126.00
SPT25-10-V30D	Pressure transmitter, 0 to 10 V output, -14.7 vacuum to 30 psig range, 1/4" NPT male port		14 - 36 VDC		$126.00
SPT25-10-0030D	Pressure transmitter, 0 to 10 V output, 0 to 30 psig range, 1/4" NPT male port				$126.00
SPT25-10-0060D	Pressure transmitter, 0 to 10 V output, 0 to 60 psig range, 1/4" NPT male port				$126.00
SPT25-10-0100D	Pressure transmitter, 0 to 10 V output, 0 to 100 psig range, 1/4" NPT male port				$126.00
SPT25-10-0150D	Pressure transmitter, 0 to 10 V output, 0 to 150 psig range, 1/4" NPT male port				$126.00
SPT25-10-0200D	Pressure transmitter, 0 to 10 V output, 0 to 200 psig range, 1/4" NPT male port				$126.00
SPT25-10-0300D	Pressure transmitter, 0 to 10 V output, 0 to 300 psig range, 1/4" NPT male port				$126.00
SPT25-10-0500D	Pressure transmitter, 0 to 10 V output, 0 to 500 psig range, 1/4" NPT male port				$126.00
SPT25-10-1000D	Pressure transmitter, 0 to 10 V output, 0 to 1000 psig range, 1/4" NPT male port				$126.00
SPT25-10-1500D	Pressure transmitter, 0 to 10 V output, 0 to 1500 psig range, 1/4" NPT male port				$126.00
SPT25-10-2000D	Pressure transmitter, 0 to 10 V output, 0 to 2000 psig range, 1/4" NPT male port				$126.00
SPT25-10-3000D	Pressure transmitter, 0 to 10 V output, 0 to 3000 psig range, 1/4" NPT male port				$126.00
SPT25-10-5000D	Pressure transmitter, 0 to 10 V output, 0 to 5000 psig range, 1/4" NPT male port				$126.00

0 to 10 VDC Output Wiring Diagram



With DIN Connector

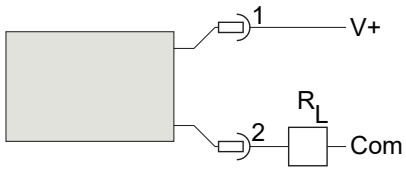


With Integral Cable

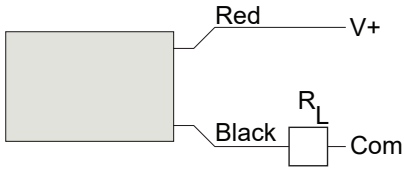
Shielded Cable Models Wire Designation		
Wire Color	*0 - 10 VDC Output*	*4 - 20 mA Output*
Red	V +	V +
Black	Com	Output
White	Output	None
*Bare**	Shield Drain Wire	Shield Drain Wire

** Where shielded wiring is being used; Connect the drain wire to the guard terminal on the read out device or measuring instrument if available. In all other cases connect to the power supply negative terminal.*

4 to 20 mA Output Wiring Diagrams



With DIN Connector



With Integral Cable

DIN Form C Models Pin Designation		
Pin No.	*0 - 10 VDC Output*	*4 - 20 mA Output*
1	V+	V+
2	Com	Output
3	Output	None
4	Case Ground	Case Ground

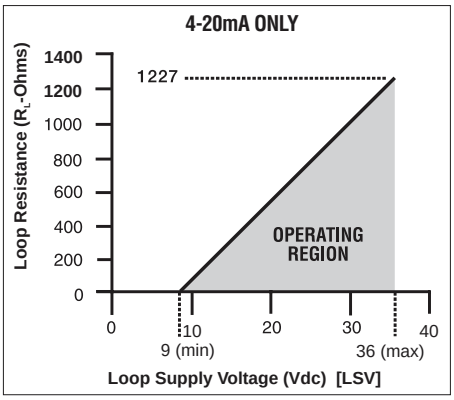
ProSense® SPT25 Series Pressure Transmitters

ProSense SPT25 Series General Specifications	
Housing Material	20% Glass Reinforced Nylon, Fire retardant to UL94 V1 / 304 Series Stainless steel
Materials (wetted parts)**	304 Series Stainless steel / 17-4PH Stainless Steel
Operating Temperature	–40 to 257°F (–40 to 125°C)
Medium Temperature	–40 to 257°F (–40 to 125°C)
Storage Temperature	–40 to 257°F (–40 to 125°C)
Protection	IP 67 for cabled models IP 65 For DIN connector models
Accuracy*	± 0.50% of full range
Temperature Coefficient	0.15% of full range / 10°F (0.25% of full range / 10°C)
Reference Temperature	70°F ± 1°F (21°C ± 1°C)
Compensated Temperature	–4 to 185°F (–20 to 85°C)
Insulation Resistance	Greater than 100 megohms at 100 VDC
Shock Resistance	100 gs, 6 ms
Vibration Resistance	Random vibration (20 g) over temperature range (-40° to 125°C). Exceeds typical MIL. STD. requirements
Drop Test	Withstands 1 meter on concrete 3 axis
Response Time	Less than 1 msec
Warm-up time	Less than 500 msec
Position Effect	Less than ±0.01% span, typical
Insulation Breakdown Voltage	100 VAC
Reverse Polarity & Miswired Protected	Yes
Durability	Tested to 50 million cycles
Humidity	0 to 100% R.H., no effect
Stability	Less than ±0.25% full range / year
Agency Approvals	CE
**Note - Includes non-linearity, hysteresis & non-repeatability.*	
*** Not cleaned for oxygen service*	

DIN Connector Specifications	
Number of contacts	3 + PE
Cable glands	PG 7
Conductor size max.	0.75 mm² / 18AWG
Type of termination	Screw
Suitable cables	4.5 mm to 6mm
Standard DIN	EN 175 301-803-C

ProSense SPT25 Series Technical Specifications	
Technical Specifications SPT25-20-xxxx	
Operating Voltage	9 – 36 VDC
Analog Output	4 – 20 mA
Maximum Load	Determine Maximum Loop Resistances $\frac{V_L - 9\ VDC}{0.022\ amps} = R_L$ For example [(24 VDC – 9 VDC) / 0.022 amps] = 681Ω
Technical Specifications SPT25-10-xxxx	
Operating Voltage	14 – 36 VDC
Current Consumption	4 mA
Minimum Load	10 kΩ

Power Supply Voltage vs Loop Resistance

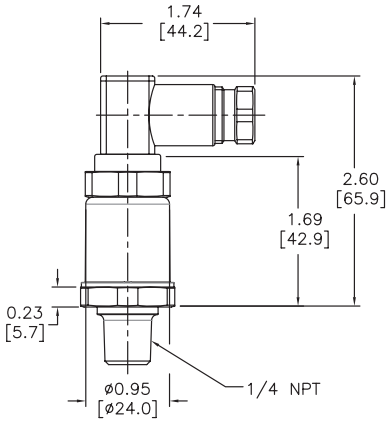


ProSense SPT25 Proof & Burst Pressures		
	Proof	***Burst***
500 psig & below	200% full scale	1000% full scale
1000 – 2000 psig	200% full scale	500% full scale
3000 psig	200% full scale	500% full scale
5000 psig	150% full scale	500% full scale

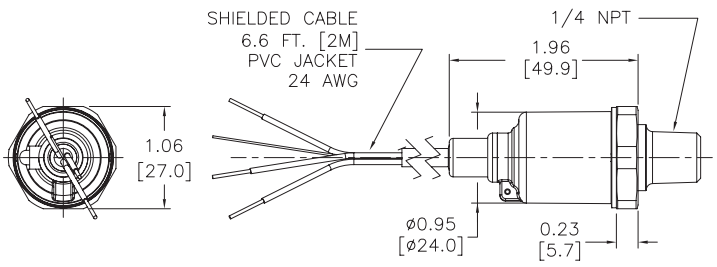
See our website www.AutomationDirect.com for complete Engineering drawings.

Dimensions

inches [mm]



DIN Connector Models



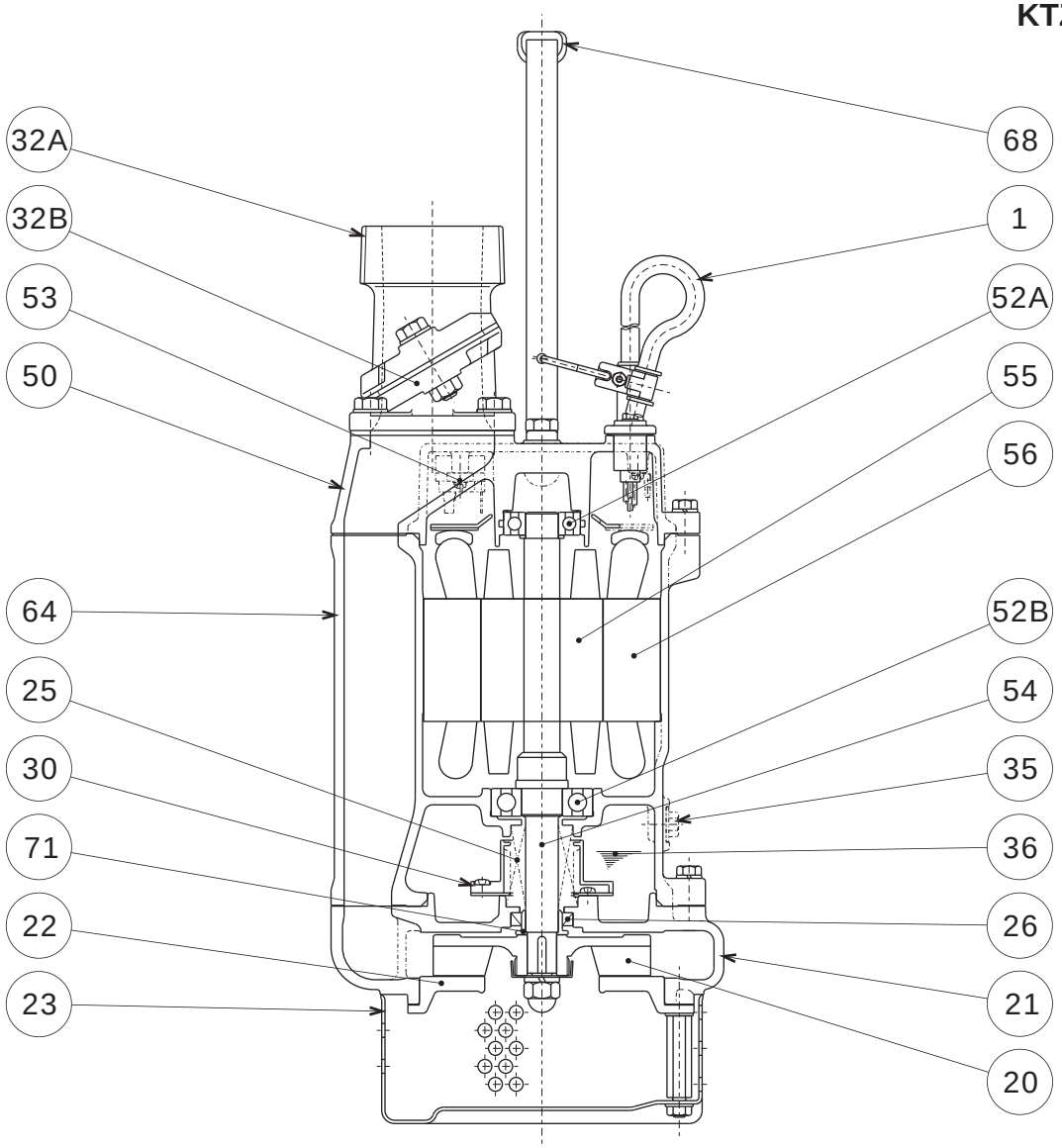
Shielded Cable Models

TSURUMI PUMP

KTZ - SERIES
DEWATERING PUMPS

SECTIONAL VIEW

KTZ22.2-61
KTZ32.2-61



ITEM#	DESCRIPTION	MAIN MATERIAL / NOTE	RELATED ASTM, AISI CODE	RELATED EN CODE	Q'TY
1	Power Cable	PVC Sheath AWG16/4-50ft			1
20	Pump Casing	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
21	Impeller	High Chrome Cast Iron	A532 Class III Type A	DIN 1695 G-X260Cr27	1
22	Suction Cover	Ductile Cast Iron	A536 80-55-06	EN 1563 GJS-500-7	1
23	Suction Strainer	Steel (Cold Rolled)	A109/A1008	EN 10130	1
25	Mechanical Seal	Silicon Carbide / H-20T			1
26	Oil Seal	Nitrile Butadiene Rubber / TC-25388			1
30	Oil Lifter	PBT Resin			1
32A	Discharge Connection	Cast Iron / NPT 2" or 3"	A48M Class30B	EN 1561 GJL-200	1
32B	Attachment	Aluminum Alloy Die Casting	B85 383.0	EN 1706 AC-46100	1
35	Oil Plug	Stainless Steel	S 30400	1.4301	1
36	Lubricant	Turbine Oil ISO VG32 or SAE10W-20			
50	Motor Head Cover	Cast Iron	A48M Class25B	EN 1561 GJL-150	1
52A	Upper Bearing	#6204ZZC3			1
52B	Lower Bearing	#6305ZZC3			1
53	Motor Protector				1
54	Shaft	Stainless Steel	S 42000	1.4028	1
55	Rotor				1
56	Stator				1
64	Motor Housing	Cast Iron	A48M Class25B	EN 1561 GJL-150	1
68	Handle	Steel (Cold Rolled) + NBR Rubber	A109/A1008	EN 10130	1
71	Shaft Sleeve	Stainless Steel	S 30400	1.4301	1

TSURUMI PUMP

KTZ - SERIES
DEWATERING PUMPS

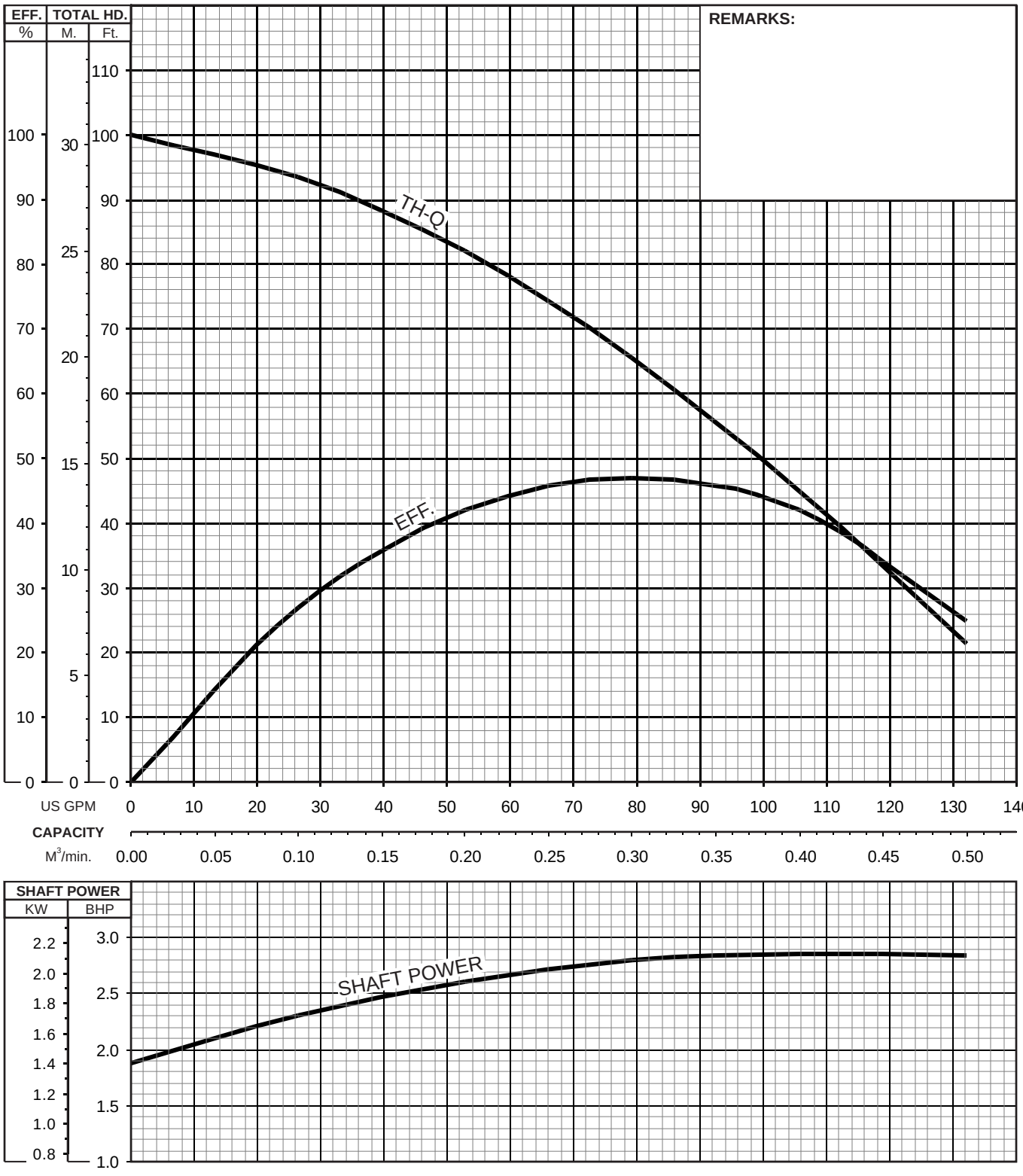
PERFORMANCE CURVE

MODEL	BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
KTZ22.2-61	2"/50mm	3	2.2	3410	0.334"/8.5mm	Water	1.0	1.123 cSt.	60°F

PUMP TYPE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
Dewatering Pump	3	208-230/460/575	9.4-9.0 / 4.5 / 3.5	60	Direct On Line	F

CURVE No.	DATE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
-	-	-	-	-	-	-	-

REMARKS:



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Programming Manual

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- Universal sensor input provides extraordinary flexibility; the same controller can be used with almost any type of sensor needed
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SPECIFICATIONS

MEASUREMENT PERFORMANCE

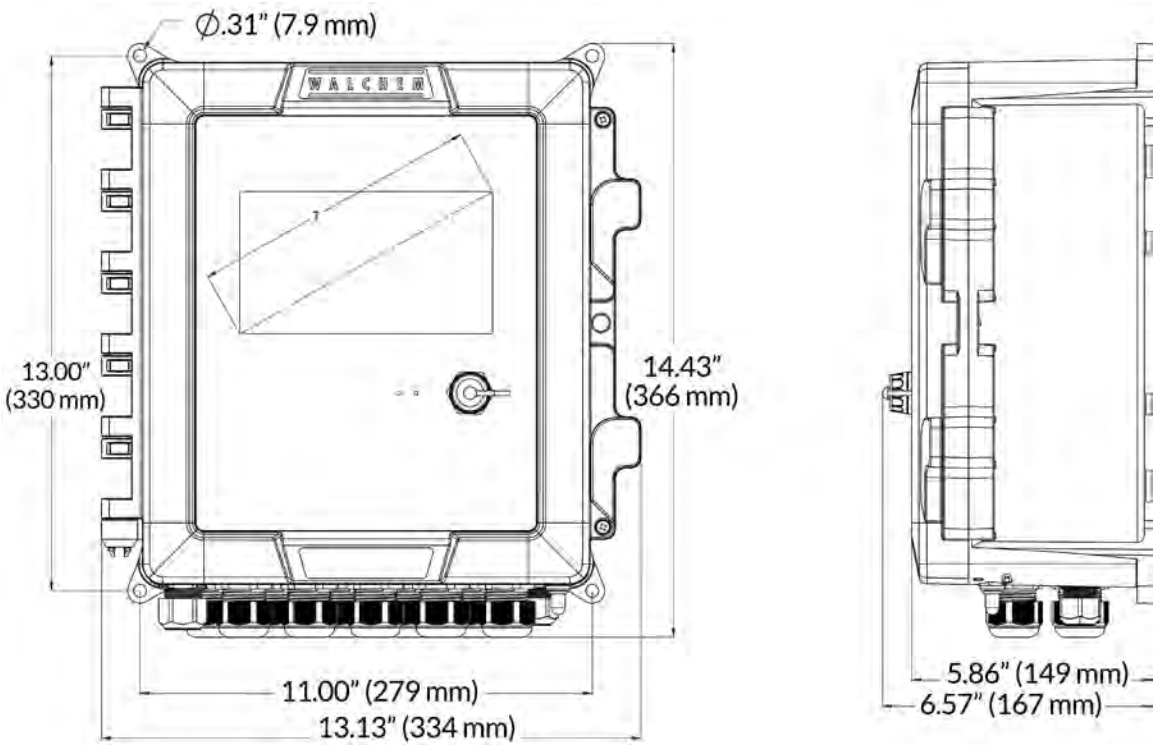
	Range	Resolution	Accuracy
0.01 Cell Contacting Conductivity	0-300 µS/cm	0.01 µS/cm, 0.0001 mS/cm, 0.001 mS/m, 0.0001 S/m, 0.01 ppm	±1% of reading
0.1 Cell Contacting Conductivity	0-3,000 µS/cm	0.1 µS/cm, 0.0001 mS/cm, 0.01 mS/m, 0.0001 S/m, 0.1 ppm	±1% of reading
1.0 Cell Contacting Conductivity	0-30,000 µS/cm	1 µS/cm, 0.001 mS/cm, 0.1 mS/m, 0.0001 S/m, 1 ppm	±1% of reading
10.0 Cell Contacting Conductivity	0-300,000 µS/cm	10 µS/cm, 0.01 mS/cm, 1 mS/m, 0.001 S/m, 10 ppm	±1% of reading
pH	-2 to 16 pH units	0.01 pH units	±0.01% of reading
ORP/Ion Selective Electrode	-1500 to 1500 mV	0.1 mV	±1 mV
Disinfection sensors	-2000 to 1500 mV	0.1 mV	±1 mV
	0 - 2 ppm to 0 - 20,000 ppm	Varies with range and slope	Varies with range and slope
Electrodeless Conductivity	500 - 12,000 µS/cm	1 µS/cm, 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm	±1% of reading
	3,000-40,000 µS/cm	1 µS/cm, 0.01 mS/cm, 0.1 mS/m, 0.001 S/m, 1 ppm	±1% of reading
	10,000-150,000 µS/cm	10 µS/cm, 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm	±1% of reading
	50,000-500,000 µS/cm	10 µS/cm, 0.1 mS/cm, 1 mS/m, 0.01 S/m, 10 ppm	±1% of reading
	200,000-2,000,000 µS/cm	100 µS/cm, 0.1 mS/cm, 1 mS/m, 0.1 S/m, 100 ppm	±1% of reading
Temperature	23 to 500°F (-5 to 260°C)	0.1°F (0.1°C)	±1% of reading within range

Temp.°C	Range Multiplier%
0	181.3
10	139.9
15	124.2
20	111.1
25	100.0
30	90.6
35	82.5
40	75.5
50	64.3
60	55.6
70	48.9

Temp.°C	Range Multiplier%
80	43.5
90	39.2
100	35.7
110	32.8
120	30.4
130	28.5
140	26.9
150	25.5
160	24.4
170	23.6
180	22.9

Note: Conductivity ranges above apply at 25°C. At higher temperatures, the range is reduced per the range multiplier chart.

DIMENSIONS



Appendix G – Standard Operating Procedures (SOP's) and Operation & Maintenance (O&M) Manuals

Appendix H – Ground Water Monitoring Plan (GWMP)

GROUNDWATER MONITORING PLAN
CROSS GOLD MINE
NEDERLAND, COLORADO

Grand Island Resources LLC
P.O. Box 3395
4415 Caribou Road
Nederland, Colorado 80466

December 2021

Table of Contents

List of Tables

List of Figures

List of Appendices

1 INTRODUCTION

This is a groundwater monitoring plan (GWMP) for the Grand Island Resources LLC (GIR) Cross Gold Mine operating under Colorado Permit M1977-410. The plan is required by Colorado Division of Reclamation, Mining and Safety (DRMS) rules and is being submitted in partial requirements for the current permit. The DRMS guidance document "Groundwater Monitoring and Protection Technical Bulletin" of November 19, 2019 was used in preparation of this site-specific monitoring plan and this plan conforms to DRMS guidance. Tables and Figures follow the main body of the plan. Supplementary documents are attached as Appendices.

The Cross Mine surface site is located within Sections 5, 8, and 9, in Township 1 South and Range 73 West or 39°58'41.3"N latitude and 105°34' 20.9"W longitude (UTM coordinates 4,425,324N and 548,861W, Zone 48, N), being approximately 3 miles west of Nederland, Colorado. The street address of the facility is 4415 Caribou Road, Nederland, CO 80466. The general location of the property is depicted in **Figure 1** and the features of the property are displayed in **Figure 2**.

Two small areas separate from the main mine site (not shown in the Figures) have been added to the M1977-410 permit disturbance area; the Caribou 300 Level Portal and the Potosi Shaft. These two parcels, totaling 0.39 acre combined, are intended for future use as mine ventilation and access. Use of these areas is not reasonably expected to alter the hydrologic balance or water quality at the site, or beyond, and they are not included in the groundwater monitoring plan for that reason. The groundwater monitoring plan is to monitor groundwater quality within the 9.60-acre disturbance area depicted in **Figure 2**. The DRMS disturbance boundary in **Figure 2** is proposed here as the compliance boundary with respect to groundwater monitoring.

Colorado hard rock mining operations have requirements to minimize degradation of the hydrologic environment. The DRMS has primacy for groundwater monitoring at hard rock mines. DRMS is the implementing agency for groundwater monitoring compliance standards and regulations set by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission (WQCC - standards setting) and the Water Quality Control Division (WQCD - technical evaluation and enforcement) at hard rock mines. Groundwater monitoring planning, implementation and reporting by the mine must conform to WQCD Regulation No. 41 – The Basic Standards for Groundwater, and Regulation No. 42 Site-Specific Water Quality Classifications and Standards for Groundwater.

The CDPHE WQCC has not established Regulation 42 use classifications or site-specific numerical standards for groundwater quality beneath the mine; other than applicable state-wide standards. The Cross Mine is subject to the state-wide water

quality standards for drinking water found in Rule 41 as the mine is not located in a classified area found in Rule 42.

Based on site-specific conditions, regional to local studies of surface and groundwater quality, baseline sampling for this plan, and the lack of observations of acid-rock drainage or seepage over the 150-year history of the Caribou and Grand Island mining districts, GIR does not believe that operations at the Cross Gold Mine have the potential to impact water quantity, or groundwater quality beyond standards imposed by the WQCC.

The site-wide hydrogeologic characterization is ongoing at the property. The current understanding is sufficient to support development of a groundwater monitoring plan as it covers areas and activities currently permitted at the Cross Gold Mine. GIR is expanding the characterization by:

- collecting existing water well and in-mine water level data using equipment downloaded at regular intervals,
- testing aquifer properties at water wells and core holes,
- evaluating in-stream flows and groundwater surface water interaction as part of a separate investigation to support water court determinations, and,
- an engineering evaluation of in-mine groundwater flows to be expected under different underground development and mining scenarios.

2 CLIMATE AND PHYSIOGRAPHY

Colorado is divided into two major geographical regions, the Eastern Plains, and the Rocky Mountains. The facility is located along the eastern flank of the Front Range of the Southern Rocky Mountains at an elevation of 9,000 to 10,500 feet above sea level. The facility is located in sub-alpine terrain upslope of the Town of Nederland, Colorado, in the Coon Track Creek sub-basin of Middle Boulder Creek basin. The topography of the mine site is fairly gentle however many of the surrounding mountains are steep and rugged. Similarly, many of the nearby drainages are deeply incised. The hills and ridges are covered mainly by residual soil and glacial till, which is drained by slightly to deeply incised creeks. Rock outcrop is generally rare, perhaps 5% or less over the entire property.

The climate of this sub-alpine zone is cool, with summer highs reaching 75 °F only on the warmest days. Frost may occur any day of the year. High winds are common throughout the year, with potential gusts up to 130 miles per hour. Snow is a common occurrence for most of the year, except for July and August. Average minimum winter temperatures are 20 to 30 °F and maximum summer temperatures are 65 to 75 °F. Annual precipitation averages 18 inches of rain and 139 inches of snow. April and May

have the most precipitation; summers are generally dry with brief but intense thunderstorms associated with the Southwestern US Monsoon season.

Vegetation is typical of the Front Range, varying locally between heavy forest and mountain meadows. The north facing slopes are densely wooded with Lodgepole Pine, Engleman Spruce and Douglas fir. The low-lying areas are forested with Quaking Aspen, Western Willow and Red Alder. South facing slopes are lightly wooded with Ponderosa Pine, Lodgepole Pine, Rocky Mountain Juniper and Quaking Aspen (Turnburke, 2007).

The mine portals and auxiliary buildings are located on the south side of a moderately steep valley formed by Coon Track Creek. This drainage separates Caribou Hill to the west and Boulder County Hill to the east. Local relief as measured from the hilltops to the valley floor is approximately 1500 feet.

3 GEOLOGY

3.1 Regional Setting

This portion of Colorado is underlain by basement rocks comprising the North American Craton, which has been intruded by Late Cretaceous igneous units. Deeply rooted structural zones within the Precambrian rocks are linked to the development of the much younger Colorado Mineral Belt. This belt consists of a northeast-southwest regional trend of mineralization and ore deposits that is approximately 250 miles long and 80 miles wide.

The Caribou, or Grand Island, mining district is located near the northeastern exposed limit of the Colorado Mineral Belt. At a smaller scale, the area is part of the Front Range mineral belt on the northern margin of the Idaho Springs-Ralston shear zone of the Colorado lineament. This Precambrian fracture zone localized alkaline and calc-alkaline igneous activity and associated mineral deposits during the Laramide orogeny. Deposits in the district have been described by the U.S. Geological Survey as “polymetallic veins with abundant carbonates or that occur in wallrock altered to contain carbonates.” The geologic map from that study is presented here as **Figures 3, 4, and 5** (Moore et al.,1957). Confidential mapping of numerous veins, faults and fractures on the Cross Mine property is available for inspection by DRMS at the mine site.

3.2 Geologic Units

The Cross-Caribou Consolidated claims area is underlain by the Precambrian age Idaho Springs Gneiss, Boulder Creek Granodiorite, and Swandyke Hornblende Gneiss, and the Tertiary age Caribou Monzonite. Precious metal veins are located hosted exclusively within the Idaho Springs Gneiss and the Caribou Monzonite. Descriptions of the geologic units and formations presented here are adapted from Moore et al., 1957 and Holland 1994.

The Idaho Springs Gneiss consists of a well-foliated and banded gneiss composed of medium to coarse grained quartz-biotite-plagioclase-orthoclase with accessory magnetite and apatite. The unit has a zebra appearance due to biotite banding. Granite migmatites comprise nearly one-half of its total volume. The migmatite consists of coarse grained, fairly planar bodies which are predominantly parallel to foliation. Mica rich schist units also occur within the gneiss, hosting sillimanite that indicates a high peak metamorphic grade.

The Caribou Monzonite Stock is variable in composition. It consists predominantly of monzonite and quartz-monzonite but also ranges to mafic phases as lenses, pods and dikes. The monzonite phases are composed of medium-grained plagioclase-orthoclase-quartz-biotite-clinopyroxene-hornblende with accessory magnetite and apatite, giving the unit a black color.

The Swandyke Hornblende Gneiss is present approximately one mile south of the Cross Mine in two relatively continuous bodies. It consists of a dark gray to black, medium to fine grained, well-foliated amphibolite unit. Composed primarily of hornblende and plagioclase with lesser pyroxene, biotite and quartz. The unit likely represents small, localized mafic intrusions that were subsequently metamorphosed in the Precambrian.

The Boulder Creek Granodiorite is located approximately one-half mile northeast of the Cross deposit. It consists of a weakly foliated paleo-igneous unit. It is composed of fine to medium-grained quartz-orthoclase-plagioclase-biotite and minor hornblende. It is differentiated from the gneiss mainly by the lack of conspicuous banding, but does have well developed foliation near its contacts.

The contact between the Idaho Springs Gneiss and the Caribou Monzonite Stock strikes northwest-southeast through the mine area, dipping near vertical. The Cross Gold Mine is developed in veins near this contact.

3.3 Faults, Veins and Fractures

The Cross Mine site has a complex tectonic history. Forces in the Colorado Front Range have left an overprint of regional to local scale faults and fracture zones through the terrain. The Cross Gold Mine is located in highly faulted and fractured geologic units. At the scale of rock outcrop, and in the underground working, pervasive blocky jointing is noted in all rock types.

A published 1969 USGS map maps a fault at the ground surface approximately 700 feet east of the Cross Mine site (Gabel, 1969). Holland (1994) refers to numerous faults encountered underground within the Cross Mine deposit, and many of the veins encountered in the mine are the result of mineralization along fault planes. The major fault structures appear to be oriented along an east-west strike and dip steeply north to vertical. These structures locally cut all rock types. Last movement on these faults was

associated with the late Laramide orogeny and they are now considered inactive.

Holland (1994) noted two episodes of fault movement. The earliest was left lateral strike-slip movement along the east-west striking structures. This was overprinted by right lateral strike-slip movement along minor east-northeast striking structures. The northeast-trending veins on Caribou Hill are interpreted as occupying shear zones and the east- and west-trending veins are interpreted as occupying tension fractures branching from the shear zones.

Holland (1994) proposed that the structures present at the Cross Gold Mine tie into the regional Arapaho Pass Fault and the Junction Ranch Fault. The Arapaho Pass Fault is mapped along strike to the west where it disappears under glacial cover. The Junction Ranch Fault is also mapped along strike but to the southeast.

The veins are distributed within two main sets. One striking north-northeast with most of the veins considered to be open along strike and depth, except where they enter the monzonite. In contrast, the east-west striking veins located west of the historic mine area do not decrease in magnitude where they cross into the monzonite.

Holland (1994) proposed that left lateral movement created a dilatational fault jog between the Arapaho Pass Fault and the Junction Ranch Fault. This same model is then used to explain the presence of the large open space fill veins at the Cross Mine. The north-north east striking vein sets appear to be largely dilatational structures. The east-west striking set of veins appear to be localized along earlier fault structures.

Individual steeply dipping veins range in width from inches to tens of feet and consist of open space fill zones containing quartz and disseminated sulfides flanked by mineralized and non-mineralized alteration zones. A late stage of carbonate mineralization was the last emplacement before weathering and supergene enrichment of the upper ore body. Weathering has partially oxidized sulfide minerals to all depths tested to date.

4 HYDROLOGY

4.1 Aquifers and Adjacent Use

The groundwater beneath and adjacent to the Cross Mine is present in a single aquifer, the Mountain Crystalline Bedrock Aquifer as mapped in the ON-010 Colorado Groundwater Atlas (Barkmann et al., 2020). Unlike sedimentary rock aquifers, igneous and metamorphic crystalline rocks have no primary porosity; water is stored in fractures within the rocks. Groundwater flow proximal to and within the compliance boundaries is wholly with the Idaho Springs Gneiss and the Caribou Monzonite Stock geologic units.

Within the subalpine and alpine basins of the facility area ground water use is restricted to private wells (Flynn, 2003, Bruce and O'Riley, 1997). Other than the onsite wells there are no state-permitted wells within one mile of the compliance boundary. The closest

public water supplies (Nederland, Boulder) rely on surface water sources (Weritz, 2015).

4.2 Generalized Conceptual Model

The hydrology of alpine and subalpine basins in the Colorado Front Range has been a topic of research since the 1920's. Recent research using naturally-occurring chemical tracers and groundwater dating has refined the conceptual model for recharge, groundwater flow, and surface water groundwater interaction (Frisbee et al., 2011).

Hydrologic and climatic conditions cause the majority of precipitation to be released as spring and summer snowmelt which drains rapidly from the mountain front and shallow aquifers to streams over the course of months. During snowmelt, the majority of water recharge infiltrates shallow regolith and fractures and is discharged to streams with minimal delay (hour to weeks). However, significant amounts of groundwater are detained for much longer lag periods; months to decades. Overland flow will occur if the infiltration capacity of the shallow regolith is exceeded.

The sub-alpine hydrology conceptual model indicates that high elevation steep catchments recharge only a small percentage of total snowmelt to slow, deep, ground water circulation, and that all ground water flow returns to the surface due to topographically-driven-flow. The discharge of this older deeper water may not take place in the same catchment, but does discharge within some scale of sub-basin to basin drainage. This reemergence as surface water happens because of topography-driven-flow and hydraulic conductivity contrasts with depth (Frisbee et al., 2013; Bukoski et al., 2021; Foks et al., 2017; Tóth, 1963).

The time between snowmelt and discharge to streams can be highly variable depending on path, but the steady-state mass balance is nearly complete within sub-alpine basins. Because of the complete discharge to streams and springs, changes in groundwater quality are detectable in surface water quality in sub-alpine basins such as Coon Track Creek.

Groundwater flow at the facility is generally to the south-east, following topography and the track of Coon Track Creek. A water table map for late July 2021 is presented as **Figure 6**. The water table map was created by hand-contouring linear interpolations between water level measurements made at the three wells (**Table 1**) and the water level in the Cross Winze. A non-pumping condition for the Cross Winze (water table at the collar of the winze) was assumed.

4.3 Groundwater Flow Controls

Groundwater flow at the Cross Gold Mine is controlled by faults, fractures and jointing. The primary porosity of un-weathered igneous and metamorphic crystalline rock is generally too low to meaningfully contribute to flow. Flow is confined to secondary

porosity; joints, fractures and faults in the rock units. As previously described and illustrated the fracture and fault density in the Front Range was caused by regional tectonics. Mines in fractured terrain are often located in the most fractured portion of the terrain; this is the case for the Cross Gold Mine. The mapped fault and fracture density at the mining district is higher than areas immediately adjacent (Holland, 1994; Gabel, 1969). Because most veins and associated fracture sets trend east-west or northeast-southwest it is expected that these are preferred flow directions causing significant anisotropy in transmissivity.

With enough fracture and joint density, fractured bedrock hydrology may behave hydro-geologically as a granular aquifer, except the 'grains' are fist to boulder sized. This "representative porous media" (RPM) when present in fractured bedrock reduces fracture-based anisotropy, and simplifies understanding of the system. Recent work in the Front Range on the Turkey Creek basin about 35 miles south of the mine (Aspen Park) has found that the fractured aquifer can be numerically modeled as RPM in the highest fracture density areas (Cain and Tomusiak, 2003). As the Cross Mine is located in a high fracture density area the RPM approach may be usable in the conceptual hydrogeologic model for the site.

The water table is influenced by mine dewatering. The Cross Winze is a near-vertical (70° incline) internal shaft within the Cross Mine that intercepts the Cross Adit (tunnel) at the point projected to the surface in **Figure 6**. The water level in the Cross Winze will quickly rise to the level of the tunnel in snowmelt season if the winze is not pumped to Coon Track Creek. The bottom of the Winze is approximately 235 feet below the floor of the tunnel. Pumping the winze has been noted to influence the water level in the Cross Well. A non-pumping condition was assumed for the July 2021 water table map and the water level at the Cross Winze set to the tunnel floor (9,700 feet above mean sea level - amsl). The full influence of pumping and water chemistry will be determined over time.

The shallow ground water system is also seasonally dynamic, being strongly influenced by annual snowmelt. Much of the observed flow within the mine comes from fractures, veins, and faults, changing from just-damp to fully-flowing streams during snowmelt. In the snowmelt season the ground water flow increases greatly and the water table rises. Casual observations of the Cross Mine Winze show tens of feet of water table rise in the snowmelt season.

According to the conceptual model the large increases in streamflow flow and water table rise will be forced by young water from snowmelt. Most of the snowmelt will enter shallow flow zones where it will reside a year to tens of years before discharge to surface water. The mine workings lie within this shallow flow zone. A large portion of water in this zone will be displaced by each snowmelt, and will have a lithogenic signature that roughly corresponds with its residence time. The time from infiltration to discharge can be roughly estimated to be from 1 month to 100 years for shallow ground water (Frisbee

et al., 2013). Residence time is primarily controlled by transmissivity and transmissivity decreases with depth in fractured rock aquifers. Deep ground water circulation in alpine basins can approach 7000 feet in depth and still return to surface within a basin, but may take over 5000 years to do so.

Transmissivity estimates are difficult in fractured bedrock due to the discontinuous nature of hydraulic conductivity as compared to granular aquifers. Point estimates from single well tests conducted for well rehabilitation this summer may not be representative if applied over large areas. Transmissivity estimates are being prepared as part of the mine's water rights evaluation with the Colorado Department of Water Resources (DWR) and State Engineers Office (SEO).

A vertically and horizontally averaged estimate of bulk transmissivity is possible using historic dewatering records. Long ago dewatering of the Caribou Mine could be accomplished by pumping 100 gpm, six hours per day (36,000 gallons/day) to keep the mine dry in peak snowmelt (Zulch, 1919). In 1919 the Caribou mine had over 5,000 linear feet of workings below the water table. It extended to a depth of over 1,000 feet below ground surface. Assuming an 8x8 (foot) opening dimension over this length results in 320,000 square feet of discharge area. Using 600 feet of head loss to dewatering (400 level to 1000 level dewatering), a transmissivity of 1.88x10-4 gallon/day/ft^2 is calculated. This is a comparatively low transmissivity for highly fractured rock. The low value may reflect the lower transmissivity of fractured aquifers with depth, particularly over 400-500 feet deep (Freeze and Cherry, 1979).

4.4 Groundwater Discharge

Groundwater discharges to surface water at the mine as Coon Track Creek baseflow, from scattered springs and seeps, and as drainage from the Cross Adit and the Idaho Tunnel of the Caribou mine. Groundwater from the tunnels is treated before discharge to Coon Track Creek. In late summer and fall months the only flow in Coon Track Creek is from treated groundwater discharge from drains (tunnels). This was the condition in late July 2021 when the data for the water table map in **Figure 6** was collected.

The Middle Boulder Creek basin (containing the Coon Track Creek sub-basin or catchment) has been the location of precious and base metal mining, milling, and smelting for over 150 years. The Cross Gold Mine is the only currently operating mine in the historic district. Much of the district's ore deposits have metals hosted in sulfide minerals. Long-term watershed studies note some increases in dissolved constituents attributed to reaction with rocks in the basin (Murphy et al., 2003). However, decades of unregulated mining on Middle Boulder Creek have not affected in-stream water quality for pH, dissolved solids, or toxic metals (Murphy, 2006).

The water quality is best explained by the mineralogy of the ore and the local geology. Because the deposit is generally low in reactive iron sulfides (e.g. pyrite, pyrrhotite,

marcasite, chalcopyrite) as compared to other base metal sulfide deposits, the acid generation is low. Acid-neutralizing-minerals are present in sufficient quantities in the calc-alkaline intrusives that ground water is near neutral to slightly basic pH (Knight Piésold, 2004). Ground water becomes surface water in Front Range catchments like Middle Boulder Creek. The degree of leaching of rocks infiltrated by snowmelt, equivalent to residence time in the aquifer, is determined from sampling and analysis.

The general absence of iron staining in oxygenated environments at the facility suggests that there is a limited quantity of reactive iron pyrites to free acid and dissolved iron in the subsurface, and that the dissolved iron and acid that is created is attenuated before it discharges to the surface. This concept is further borne out by several studies noting the lack of general water quality deterioration related to historic mining in Middle Boulder Creek, other than sulfate (SO_4^{2-}) ions (Murphy et al., 2003. Chpt. 3 & 4). The source of the sulfate increase is attributed to the sulfur in pyrites at mines and ore bodies being oxidized.

5 MONITORING WELL NETWORK

5.1 Overview

The mine has three existing wells on site that are listed in **Table 2** and depicted in **Figure 2**. Historically, operations have used the three wells to supply water for domestic and potable use. The three wells used for domestic use (Cross, Cabin, and Caribou) have been re-permitted as domestic/industrial with the Division of Water Resources, applications filed May 5, 2021. The well ownership was changed at that time to Grand Island Resources LLC to align with water rights ownership.

Links to the Department of Water Resources (DWR) well permits are provided in **Table 2** and the well drillers logs and construction diagrams, as retrieved from DWR files, are contained in **Appendix A**. Water rights are provided through a 1/8 share in the Farmers Ditch Company adjudicated and decreed for use from mine workings in case number W-8261-76. A substitute Water Supply Plan was filed May 19, 2021 to allow use of W-8261-76 mine workings water from existing drilled wells.

5.2 Well Evaluation

McGrane Water Engineers, LLC. (MWE) of Lyons, Colorado performed an evaluation of the three existing wells in 2021 (MWE, 2021). The evaluation consisted of:

- Pulling the existing pumps;
- Conducting well videos and evaluating casing condition;
- Performing and evaluating pumping tests;
- Estimation of the well yield and production capacities;

- Recommending permanent pumping systems; and
- Establishing permanent water level monitoring.

The results of the evaluation are found in **Table 3.** There is uncertainty in MWE's yield and production estimate due to:

- Uncertainty in the extent and connected fractures in the bedrock aquifer;
- Variability in seasonal recharge;
- Unknown hydraulic connection to nearby Coon Track Creek;
- Well-to-well interference from the other wells; and
- Mine dewatering.

These uncertainties can be reduced by continued water level and production monitoring, constructing a groundwater model for improved yield and production estimates, and evaluate the estimate's sensitivity to factors described above.

Despite the uncertainties the sustainable yield (GPM) results are significantly higher (2 times or more) than the mean and median yield found by Cain (2003) for wells in the Turkey Creek basin. This suggests that the Coon Track Creek basin has higher fracture density, providing higher average well yields, than some sub-alpine basins in the region.

5.3 Detection Monitoring Well

We are proposing to use one of the three wells, the Cabin Well, for detection monitoring inside the compliance boundary. Existing wells are preferred because they are known to have intercepted water-bearing fractures rather than being completed in low-yielding zones. Because they are used for groundwater withdrawal year-round, they induce gradients in the aquifer, capturing more water of in-situ quality than that obtained by small-diameter monitoring wells that are pumped infrequently.

The Cabin well was selected because is in good hydraulic connection with the surrounding aquifer (MWE, 2021) and is located downhill and downgradient of the Cross Mine surface complex. It is use is currently limited to manually filling water trucks for on-site construction. The Cabin Well is in an area where flow from other parts of the mine and underground workings converge. The east-west fracture sets intercepted by the Cabin well are sub-perpendicular to perpendicular to groundwater flow gradients, allowing the Cabin well to capture a larger area of flow from upgradient areas than if the fracture orientation was different.

The Cabin Well is equipped with a new variable frequency drive Grundfos stainless steel pump, epoxy coated steel riser pipe and a recording water level pressure transducer collecting hourly data. The Cross and Caribou wells are also equipped with recording water level pressure transducers, collecting hourly data. Data is downloaded monthly from all three wells.

The Cross Well is not a preferred choice for monitoring because it is influenced by mine dewatering. Additionally, the Cross Well is located near the center of surface activity rather than downgradient of all activities that could potentially affect groundwater quality. The Caribou Well is upgradient of the permitted mine workings and lies across a probable groundwater divide, Coon Track Creek, from the Cross Mine.

5.4 Sampling Frequency

The Cabin well will be sampled quarterly for the Analytical Parameters in **Table 4**.

5.5 Analytical Parameters

The analytical parameters for sampling are specified by DRMS and consist of the most stringent of the criteria contained in Tables 1-4 of WQCC Regulation No. 41. WQCC Table 1 and 2 standards are for drinking water, Table 3 contains agricultural standards and Table 4 is a Total Dissolved Solids (TDS) criterion. Code of Colorado Regulations, WQCC at 5 CCR 1002-41 2. exempts the Cross Mine groundwater from Agricultural use standards when "…other information demonstrates that agricultural use is not being made of the groundwater and is not likely to be made…" The sub-alpine to alpine climate of the mine area is unsuitable for agriculture. A collated list of the Rule 41 Table 1, 2, and 4 analytical parameters is found in **Table 4**.

5.6 Reporting

GIR will report sampling results to DRMS within 30 calendar days of GIR receipt of a complete analytical results package from the Colorado Certified analytical laboratory. The reporting will include a potentiometric surface (water table) map constructed from measurements made during sampling events and will note any exceedances of Regulation 41 Table 1-4 water quality standards.

6 BASELINE GROUNDWATER SAMPLING

Water quality sampling was conducted at the Caribou, Cross, and Cabin wells on November 9 (**Table 5**) and December 17, 2021 (**Table 6**). The November 2021 samples for dissolved metals were not filtered properly and some **Table 4** parameters were omitted by the laboratory. The December 2021 sampling and analysis were conducted using the procedures and methods presented in this GWMP. The sample bottle for the Cabin well phenolic compounds was broken in transit and so was not analyzed. Additionally, the analytical laboratory failed to analyze the provided samples for color, odor, and foaming agents. Radiological results have an extended laboratory turnaround time and results are not expected until the first quarter of 2022 and will be reported then. Low laboratory pH results are not reflected in field pH measurements contained in **Appendix B**. The November results are presented in **Table 5**, December in **Table 6**,

with comparison to regulatory compliance limits from Tables 1, 2 and 4 of Regulation 41. The groundwater at the Cross Gold Mine is within regulatory limits with exception of manganese at the Cabin Well, a high copper value at the Caribou Well, and anomalous laboratory pH readings from the December 2021 sampling.

Inspection of **Tables 5 and 6** reveals clear trends in water quality. These trends confirming the conceptual model and the geochemical evolution proposed by Frisbee and others.

The most upgradient Caribou Well has a very low dissolved solids content and the most acidic water (pH 5.76 to 7.50) sampled. The Caribou Well water has had a very short residence time in the aquifer. This is Caribou water analytical results exhibit has the most non-detects of the tree wells. This is also why water from the Caribou Well is corrosive using the Langlier Index. The copper exceedance may be due to the corrosivity of the water and the copper plumbing used in in the Caribou water supply system.

At the Cross Well, alkalinity and pH increase, and the longer residence time results in a larger suite of detectable trace metals. The midpoint well reflects the geochemical evolution of water along flow path. The proximity of the well to ore bodies is noted in the Cross Well having elevated trace metal values as compared to the other two wells.

The Cabin Well chemical data reveals increasing concentrations of general water quality parameters (major ions as TDS) but a decrease in regulated metals as compared to the Cross Well. This trend is most evident in major ions (calcium, sulfate, and sodium), pH, and alkalinity. The Cabin Well water exceeded the MCL for manganese in the December 2021 sampling event.

7 GROUNDWATER SAMPLING AND ANALYSIS

This section describes procedures that will be used at the mine for groundwater sampling and analysis.

7.1 Water Level Measurement

At the start of each monitoring event, GIR will measure the depth-to-water in the detection monitoring (drinking water) wells prior to sampling. Water levels will be measured within a period of time short enough to avoid temporal variations in groundwater elevation which could prevent an accurate determination of the groundwater flow rate and direction. This will be accomplished by connecting to the In-Situ™ Troll500 data-logging pressure transducer in each well and downloading sufficient time-series data to determine:

- The water level at the well,
- If that water level is representative for the time of year,
- If the water level is representative of static or pumping conditions.

Using the pressure transducer to obtain water levels is preferable to opening the sanitary seal on a drinking water well. Water levels are only measured manually to set and calibrate pressure transducers and as a substitute measurement for a failed transducer. If a transducer has failed or is not present in a well, the sanitary seal is opened and a manual measurement is made.

The mine's In-Situ™ M-Scope 300-foot electronic tape used to manually measure water levels is capable of achieving a measurement precision of ±0.01 feet. The procedure for manually measuring water levels in wells is described below.

1. Obtain top of casing (TOC) and ground surface elevations for the well and past readings for the time of year. Record this data on the field data sheet or field notebook used for this sampling round so that it is available at the well.
2. Before any measurement is taken, the water level probe and cable should be properly decontaminated/disinfected.
3. Remove the sanitary seal from the top of the drinking water well and place in a clean and secure location.
4. The measuring point for all wells is at the top of the casing mark on the well casing. The measuring point is marked by permanent marker on the inside of the steel well casings. If no mark is found, measurements will be collected from the top of the north side of the casing.
5. Make a measurement according to manufacturer instructions at the top of casing mark.
6. The static water level depth shall be written down on the field data sheet or field notebook, and rechecked before the indicator is removed from the well.
7. If the water level is fluctuating due to pumping make a best estimate of pumping water level and note a best estimate static level based on downloaded data record.
8. The water level depth below the measuring point (in feet) will be subtracted from the measuring point elevation to calculate the elevation of the static water level.
9. Water levels will be compared with past measurements to help verify the reasonableness of readings before completing the measurement process.

7.2 Water Quality Meter Calibration

This sampling plan will use hand held water quality probes (pH, temperature, and specific conductance) to document stabilization of parameters during well purging. Meters are to be operated after the operator is with the manufacturer's instructions. Meter calibration will also follow those same instructions. Conductivity and pH meters should be calibrated daily using fresh buffers and standards. Record calibration results in a field logbook or a sampling sheet. Perform a calibration check at the end of each days use. The digital thermometers used are precise to 0.1 degree and are calibrated by the manufacturer. The meter can be checked for gross errors using ice water.

7.3 Well Purging

Before collecting samples, detection monitoring wells will be purged until a minimum of three well casing volumes have been removed and field parameters have stabilized (i.e., temperature, pH, and conductivity). Specific well purging and sampling requirements for each of the existing wells is provided in **Table 7**. Approximately 100 gallons will be purged from the existing wells prior to sampling. The wells all have sanitary seals and internal pump wiring making deployment of a portable or dedicated sampling pump difficult. The existing pumps and piping are used for sample collection and samples are collected at a sampling port. If the well is in use during sampling the required purging protocol is still to be followed.

Purging will commence by connecting a garden-type hose to the hose bib located next to each well's pressure tank. Inspect and clean the exterior of the hose bib using decontamination procedures. The purged groundwater will be directed to a 5-gallon bucket or other container of known volume to measure the cumulative amount of water removed from the well. The purge water can be put to ground, or discharged to any sanitary drain.

At the beginning of purging and at every 10 gallons, the field sampler will measure the field parameters to confirm that the water chemistry is stabilizing. The sampler will also make note of the water color and clarity. Generally, temperature within 1° Celsius, pH within ± 0.1 units, and conductivity within ± 10 percent for consecutive readings indicate stable water chemistry. Field meters for measuring temperature, pH, and conductivity will be calibrated daily and operated according to the manufacturers' instructions. Purging data is to be recoded on the sampling field sheet or logbook.

The purging garden hose is removed from the hose bib and replaced with a pre-cleaned plastic hose-bib to hose-barb connector (3/4" GHT to 3/8" barb) is used to attach 1-3 feet of new 3/8" inside-diameter Tygon or similar clear plastic tubing to the hose bib. Using a 5-gallon bucket or other container to collect overflow set the hose bib to discharge at a reduced flow rate, 1 GPM or less.

7.4 Sample Collection

The field sampler will don new disposable nitrile gloves after purging for sampling and will fill the laboratory-supplied sample containers directly from the hose bib discharge line. Unfiltered samples are collected first. With the hose bib running fit a disposable 0.45-micron, medium capacity flow through groundwater filter to the 3/8" line and allow to rinse 2-3 filter volumes before filling filtered sample bottles. Obtain groundwater filters from a commercial supplier. Discard sample tubing. Use a fresh hose bib connector and sample tubing at each well.

Groundwater samples are field filtered and preserved as necessary as shown in the

analytical table. Sample containers should be filled with minimal turbulence and should not be overfilled to avoid spilling the sample preservative (where applicable). Groundwater samples will be collected in such a way as to minimize potential contamination of the sample. Measures to help prevent contamination will include using dedicated sampling equipment, wearing a new pair of disposable gloves at each well, and decontaminating any reusable equipment (water level indicator) between wells.

Field notes will be kept by sampling personnel either in a field log book or on groundwater sampling forms. The field notes will include sampler name(s), well identification numbers, the date and time, instrument calibration notes, water-level measurements, well purging volumes, well recharge conditions, and other notable site observations. These records will be maintained by mine personnel.

7.5 Sample Preservation and Shipment

Sample will be preserved as appropriate, and sample containers will be labeled and placed in appropriate shipping containers. **Table 4** lists the required preservative for each analytical constituent. Sample containers will be placed on ice/cold packs following sample collection and during transport to the laboratory. Prior to sample collection, the laboratory will place the preservatives into the bottles used to contain the samples for metals and mercury analysis, or provide pre-measured, containerized, bottle-specific aliquots of preservation compounds. Samples will be transported under chain-of-custody (COC) control to a Colorado State Certified Laboratory, or shipped to an alternate appropriately certified laboratory.

7.6 Analytical Procedures

Cabin well samples will be analyzed for the constituents and by the methods shown in **Table 4**.

7.7 Chain-of-Custody Control

Laboratory standard COC procedures will be followed on all samples collected. Custody is recorded through a series of signatures on the COC form as sample possession changes from one person or organization to another. For each sample location, the sample name, date and time of collection, and requested analyses will be recorded on the COC form. The field sampler will provide the original COC form to the laboratory at the time of sample delivery. COC records will be maintained by the mine.

7.8 Decontamination and Disinfection

Decontaminate water level probes by donning nitrile gloves and safety glasses and wiping them successively with paper towels wetted with mild detergent solution, potable water, and deionized water. Rinse the water level probe with deionized water before use.

Store the water level probe in a plastic bag after decontamination.

When deploying the water level probe into a drinking water well it must be decontaminated first. Use a paper towel wetted with 150 ppm bleach solution (7.5% sodium hypochlorite solution diluted 500:1 with deionized water) to wipe the probe tip and first few feet of probe cable. Deploy cable in well, wiping cable as it comes off the reel with paper towels and bleach solution. If the water level probe is used again immediately in a drinking water well, wipe cable again with fresh paper towels wetted with bleach solution as it is reeled out of the well. Store the water level probe in a plastic bag after disinfection for transport between wells. Do not rinse probe between sterilization and use.

7.9 Field Notes

Documentation of observations and data acquired in the field provide information on sample acquisition, field conditions at the time of sampling, and a permanent record of field activities. Record field observations and data collected during routine monitoring activities with waterproof ink in a permanently bound weatherproof field log book with consecutively numbered pages or on field data sheets (**Appendix B**).

Field notebook and data sheet entries will include at least the following information. Consult relevant sampling and decontamination SOPs to supplement this list.

- Project name
- Location of sample
- Sampler's printed name and signature
- Data and time of sample collection
- Sample identification numbers
- Description of sample (matrix sampled)
- Sample depth (if applicable)
- Number and volume of samples
- Sample methods, or reference to the appropriate SOP
- Field observations
- Results of any field measurements, such as depth to water, pH, temperature, specific conductance
- Personnel present
- Decontamination procedures

Strike out changes or deletions in the field book or on the data sheets with a single strike mark and be sure that the original information remains legible. Record enough information to allow the sampling event to be reconstructed from the notes alone. Completely fill out field data sheets and do not leave blank lines. Write “Not Applicable” or “NA” on blank lines. All field books will be signed daily by the person who made the entries.

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9 TABLES

Table 1. July 2021 Manual Water Level Measurements

Well	Date	Time	Raw Depth to Water (DTW)	Ground Elev. (GS)	Top of Casing (TOC) Stickup (ft)	DTW BGS (ft)	WT Elevation (ft. amsl)
Caribou	7/30/2021	16:14	22.71	9743.67	2.45	20.26	9723.41
Cross	7/27/2021	16:42	29	9693.49	5.7	23.3	9670.19
Cross	7/28/2021	13:56	23.74	9693.49	0.17	23.57	9669.92
Cabin	7/26/2021	10:30	39	9678.13	1	38	9640.13
Cabin	7/27/2021	13:30	42.7	9678.13	2.35	40.35	9637.78
Cabin	7/28/2021	9:57	42.52	9678.13	3.1	39.42	9638.71
Cross Winze							9700

Table 2. Well Details

Well	Permit Link
Caribou	https://dwr.state.co.us/Tools/WellPermits/0208135
Cross	https://dwr.state.co.us/Tools/WellPermits/0111941B
Cabin	https://dwr.state.co.us/Tools/WellPermits/0111941A

	Permit No.	Q40	Q160	Section	Township	Range	Prime Meridian
Caribou	116655	SW	NW	9	1 S	73 W	6th
Cross	111953	SW	NW	9	1 S	73 W	6th
Cabin	111951	SW	SW	9	1 S	73 W	6th

	UTM X	UTM Y	Latitude	Longitude	Ground Elevation (ft. amsl)	Top of Casing Elevation (ft. amsl)
Caribou	451137	4425647	39.979581	-105.572275	9743.7	9746.12
Cross	451086	4425477	39.978047	-105.572859	9693.5	9694.66
Cabin	451190	4425389	39.977260	-105.571634	9678.1	9679.13

	Drilled Depth (ft. BGS)	Top of Screen (ft. BGS)	Bottom of Screen (ft. BGS)	Drilled Diameter (ft)	Driller Reported Yield (GPM)
Caribou	165	25	165	0.5	12
Cross	205	15	205	0.5	25
Cabin[1]	165	65	165	0.5	25

[1] Cabin well impassable past 135 feet BGS.

Table 3 – Well Test Results and Production Estimates

Test and Forecast Summary

Well	Year Drilled	Test Rate when Drilled (gpm for 1 hr)	2021 Test Rate (gpm)	Test Length (hrs)	7-Day Yield Estimate (gpm) w/ Existing Equipment	7-Day Production Estimate w/ Existing Equipment (gals)	7-Day Production Est. w/ Rehabilitation or Pump Upgrade (gals)	Current VFD Yield Setting (gpm)	Drive Setting
Caribou	1980	12	9.5 and 7.2	5.5	7	70000	Same	7	Constant pressure (60 psi)
Cross	1980	25	15	23.5	10 - 15	100,000 - 150,000	Capable of ~45 gpm (max 450,000 gals/wk) with equipment upgrade	10 - 15 gpm	Constant pressure (60 psi)
Cabin	1979	25	19	20	15	150,000	Expect increase if fill were removed from well	30 gpm for ~100 mins	Constant 35 hz

Pumping Equipment

Well	Well Condition	Pump Type (age)	Design Yield (gpm)	Design TDH (ft)	Horse Power	Variable Speed Drive	Pressure Tank	Setting Depth	Drop Pipe (diameter)
Caribou	Good	Grundfos GM102-10S10 (2019)	7	350	1	Existing	new	148	1-in
Cross	Good	Webtrol10S07 (new)	12.5	185	1.5	Existing	new	174	1.25-in
Cabin	Fill in and around well*	Gould 40S50-15 (new)	30	320	5	New 5 hp	NA	126	1.25-in

*Cabin well has 30 ft of fill in well and accelerated drawdown beyond 63 ft.

Table 4. Cross Gold Mine Semi-Annual Groundwater Sampling Parameter List

Parameter	Standard	Unit	Method	Preservation	Reg. 41 Table
Unfiltered Samples					
pH	6.5 - 8.5	pH units	SM[a] 4500-H-B	≤ 4°C	Table 2
TDS	400	mg/l	SM 2540-C	≤ 4°C	Table 4
Corrosivity	Non Corrosive	Langlier Units	SM 2330-B	≤ 4°C	Table 2
Alkalinity	Non Scaling	mg/l as $CaCO_3$	SM 2320-B	≤ 4°C	Table 2
Chloride	250	mg/l	EPA 300.0	≤ 4°C	Table 2
Fluoride	4	mg/l	EPA 300.0	≤ 4°C	Table 1
Cyanide [Free]	0.2	mg/l	EPA 335.4	NaOHpH≥12,≤6°C	Table 1
Nitrate	10	mg/l as N	EPA 300.0	≤ 4°C	Table 1
Nitrite	1	mg/l as N	EPA 300.0	≤ 4°C	Table 1
Nitrate+Nitrite	10	mg/l as N	Calculation	≤ 4°C	Table 1
Sulfate	250	mg/l	EPA 300.0	≤ 4°C	Table 2
Chlorophenol	0.0002	mg/l	EPA 420.1	H_2SO_4 pH<2,≤ 4°C	Table 2
Phenol	0.3	mg/l	EPA 420.1	H_2SO_4 pH<2,≤ 4°C	Table 2
Odor	3	odor units	SM 2150 B	≤ 4°C	Table 2
Color	15	color units	SM 2120 A	≤ 4°C	Table 2
Foaming Agents	0.5	mg/l	SM 5540 C	≤ 4°C	Table 2
Asbestos	7,000,000	fibers/liter	EPA 100.1	≤ 4°C	Table 1
30-day Total Coliforms	2.2	org/100 ml	SM 9221-9223	≤ 4°C	Table 1
Max Total Coliforms	23	org/100 ml	SM 9221-9223	≤ 4°C	Table 1
Samples Field-Filtered To 0.45 Micron					
Gross Alpha	15	pCi/l	EPA 900.0	≤ 4°C	Table 1
Beta and Photon	4	mrem/year	EPA 900.0	≤ 4°C	Table 1
Antimony	0.006	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Arsenic	0.01	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Barium	2	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Beryllium	0.004	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Cadmium	0.005	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Calcium	NA	mg/l as $CaCO_3$	EPA 200.7	HNO_3 pH <2, ≤ 4°C	Corrosivity[b]
Chromium	0.1	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1

Parameter	Standard	Unit	Method	Preservation	Reg. 41 Table
Copper	1	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 2
Iron	0.3 mg/l		EPA 200.7	HNO_3 pH <2, ≤ 4°C	Table 2
Lead	0.05	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Manganese	0.05	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 2
Mercury	0.002	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Molybdenum	0.21	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Nickel	0.1	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Selenium	0.05	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Silver	0.05	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Thallium	0.002	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Uranium	0.0168 - 0.03	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1
Zinc	5	mg/l	EPA 200.8	HNO_3 pH <2, ≤ 4°C	Table 1

Notes:

[a] SM methods are from Standard Methods for the Examination of Water and Wastewater (APHA et al. 1998).

[b] Calcium data needed for corrosivity/scaling calculations .

Table 5. November 9, 2021 Groundwater Sampling Results

Parameter	Standard	Caribou	Cross	Cabin	Units
pH	6.5 - 8.5	7.50	7.38	8.27	pH units
TDS	400	32	125	134	mg/l
Corrosivity	Non-Corrosive	**-2.01**	**-0.94**	0.11	Langlier Units
Alkalinity	Non-Scaling	18.0	80.5	83.3	mg/l as $CaCO_3$
Chloride	250	0.5	2.6	0.9	mg/l
Fluoride	4	ND	ND	ND	mg/l
Nitrate	10	0.27	0.22	0.18	mg/l as N
Nitrite	1	ND	ND	ND	mg/l as N
Nitrate+Nitrite	10	0.27	0.22	0.18	mg/l as N
Sulfate	250	2.7	8.3	11.1	mg/l
30-day Total Coliforms	2.2	Absent	Absent	Absent	org/100 ml
Max Total Coliforms	23	Absent	Absent	Absent	org/100 ml

Table 6. December 17, 2021 Groundwater Sampling Results

Parameter	Standard	Caribou	Cross	Cabin	Units
pH	6.5 - 8.5	**5.76**	**6.44**	7.26	pH units
TDS	400	43	107	140	mg/l
Corrosivity	Non-Corrosive	**-3.69**	**-1.89**	**-0.71**	Langlier Units
Alkalinity	Non-Scaling	18.5	62.5	102.6	mg/l as $CaCO_3$
Chloride	250	0.4	4.3	0.6	mg/l
Fluoride	4	0.63	0.56	ND	mg/l
Cyanide [Free]	0.2	ND	ND	ND	mg/l
Nitrate	10	0.08	0.35	ND	mg/l as N
Nitrite	1	ND	ND	ND	mg/l as N
Nitrate+Nitrite	10	0.08	0.35	ND	mg/l as N
Sulfate	250	2.8	15.1	11.8	mg/l
Chlorophenol	0.0002	ND	ND	NA	mg/l
Phenol	0.3	ND	ND	NA	mg/l
Odor	3	NA	NA	NA	odor units
Color	15	NA	NA	NA	color units
Foaming Agents	0.5	NA	NA	NA	mg/l
Asbestos	7,000,000	ND	ND	ND	fibers/liter
30-day Total Coliforms	2.2	Absent	Absent	Absent	org/100 ml

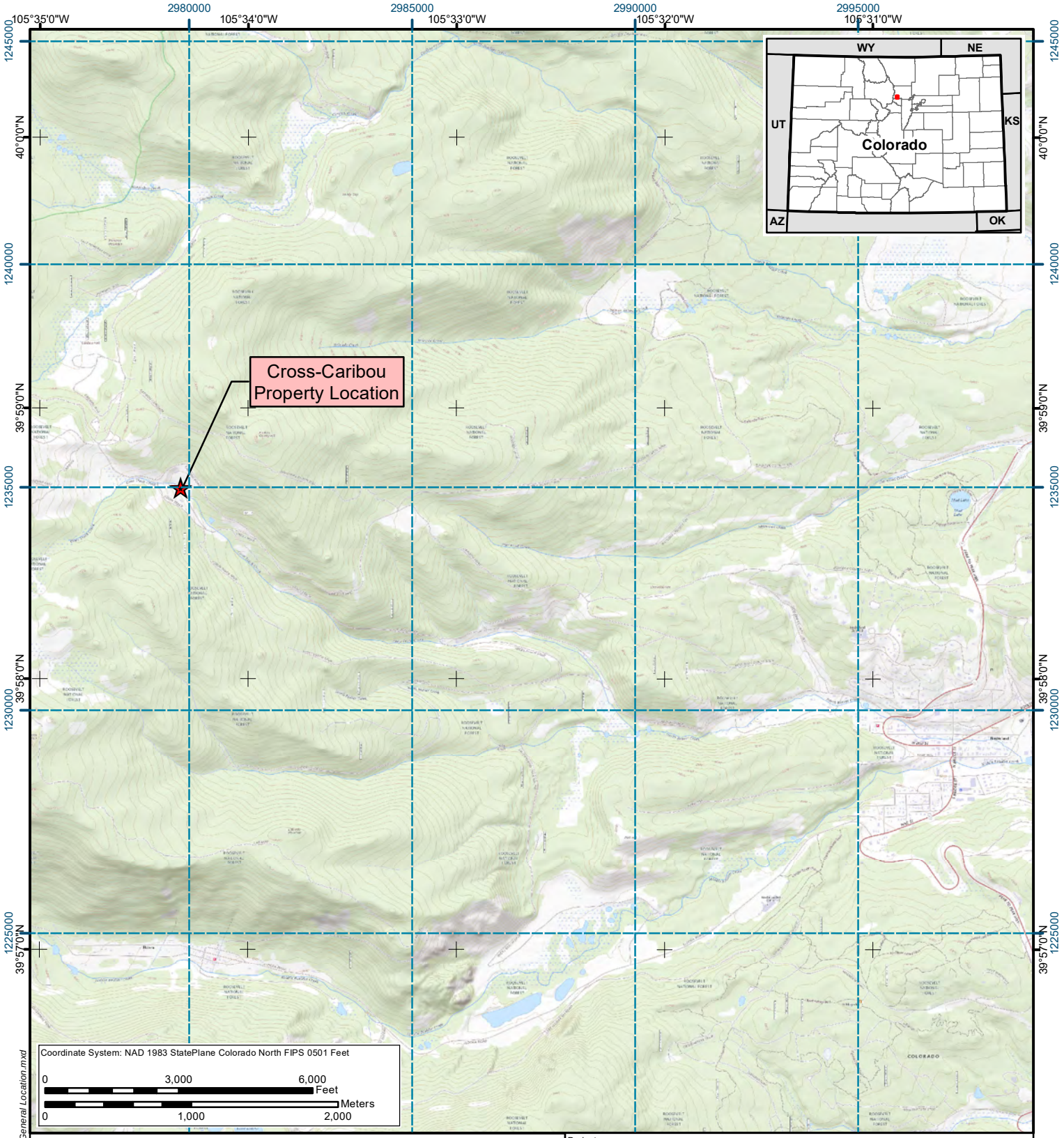
Parameter	Standard	Caribou	Cross	Cabin	Units
Max Total Coliforms	23	Absent	Absent	Absent	org/100 ml
Gross Alpha	15	Pending	Pending	Pending	pCi/l
Beta and Photon	4	Pending	Pending	Pending	mrem/year
Antimony	0.006	ND	ND	ND	mg/l
Arsenic	0.01	ND	ND	ND	mg/l
Barium	2	0.0056	0.0272	0.0980	mg/l
Beryllium	0.004	ND	ND	ND	mg/l
Cadmium	0.005	ND	0.0002	ND	mg/l
Calcium	NA	9.8	44.7	63.6	mg/l as $CaCO_3$
Chromium	0.1	ND	ND	ND	mg/l
Copper	1	**1.2441**	0.0085	ND	mg/l
Iron	0.3 mg/l	0.006	0.006	0.037	mg/l
Lead	0.05	0.0007	0.0018	0.0004	mg/l
Manganese	0.05	ND	0.0067	**0.1369**	mg/l
Mercury	0.002	ND	ND	ND	mg/l
Molybdenum	0.21	ND	0.0006	0.0241	mg/l
Nickel	0.1	ND	ND	ND	mg/l
Selenium	0.05	ND	ND	ND	mg/l
Silver	0.05	ND	ND	ND	mg/l
Thallium	0.002	ND	ND	ND	mg/l
Uranium	0.0168 - 0.03	ND	ND	0.0005	mg/l
Zinc	5	0.013	4.226	0.569	mg/l

ND – Non-Detect, NA – Not Analyzed

Table 7. Well Purging

Name	High Est. Depth to Water (ft)	Drilled Depth (ft. BGS)	Drilled Diameter (ft)	Casing Length (ft)	Casing Volume (gal.)	3 Casing Volumes (gal.)
Caribou	15	165	0.5	150	29	88
Cross	15	205	0.5	190	37	112
Cabin	20	165	0.5	145	28	85

10 FIGURES



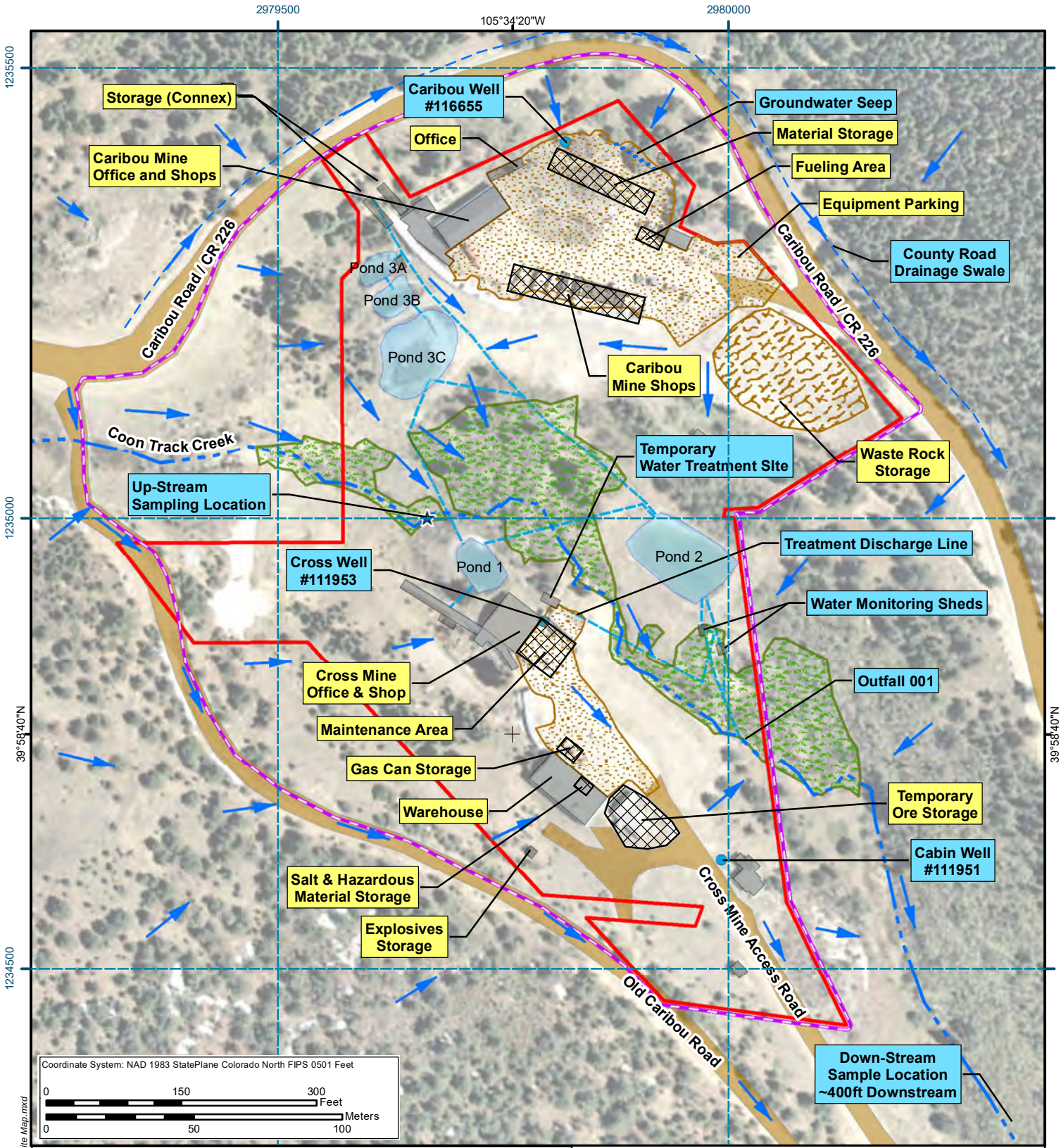
Path: G:\Projects\Nederland\ArcMap\GW PlanMap 1 - General Location.mxd

Project: Groundwater Monitoring Plan

Title: **General Location**

GRAND ISLAND RESOURCES

Project No. US 0801			File No.	
GIS:	JST	11/22/21	Scale As Shown	Rev 0
Check:	JST	11/22/21	**Map 1**	
Review:	JST	11/22/21		



Permit Boundary (9.6 ac)
Groundwater Wells
Coon Track Creek Sampling Location
Mine Water Drainage Pipe
Stormwater Flow

Existing Roads
Parking
Settling Ponds
Wetlands
Buildings
Drainage Boundary
(Offset for mapping clarity)

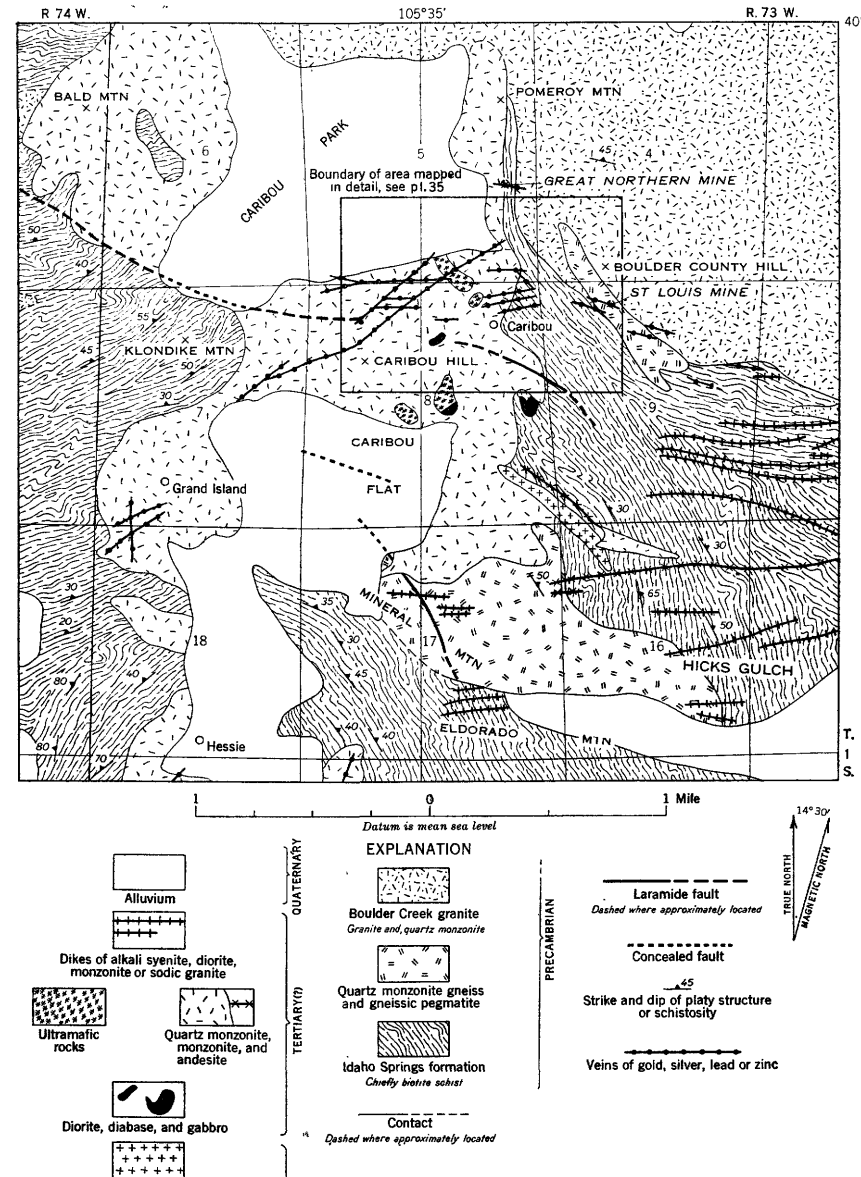
Project: Groundwater Monitoring Plan

Title: **Site Map**

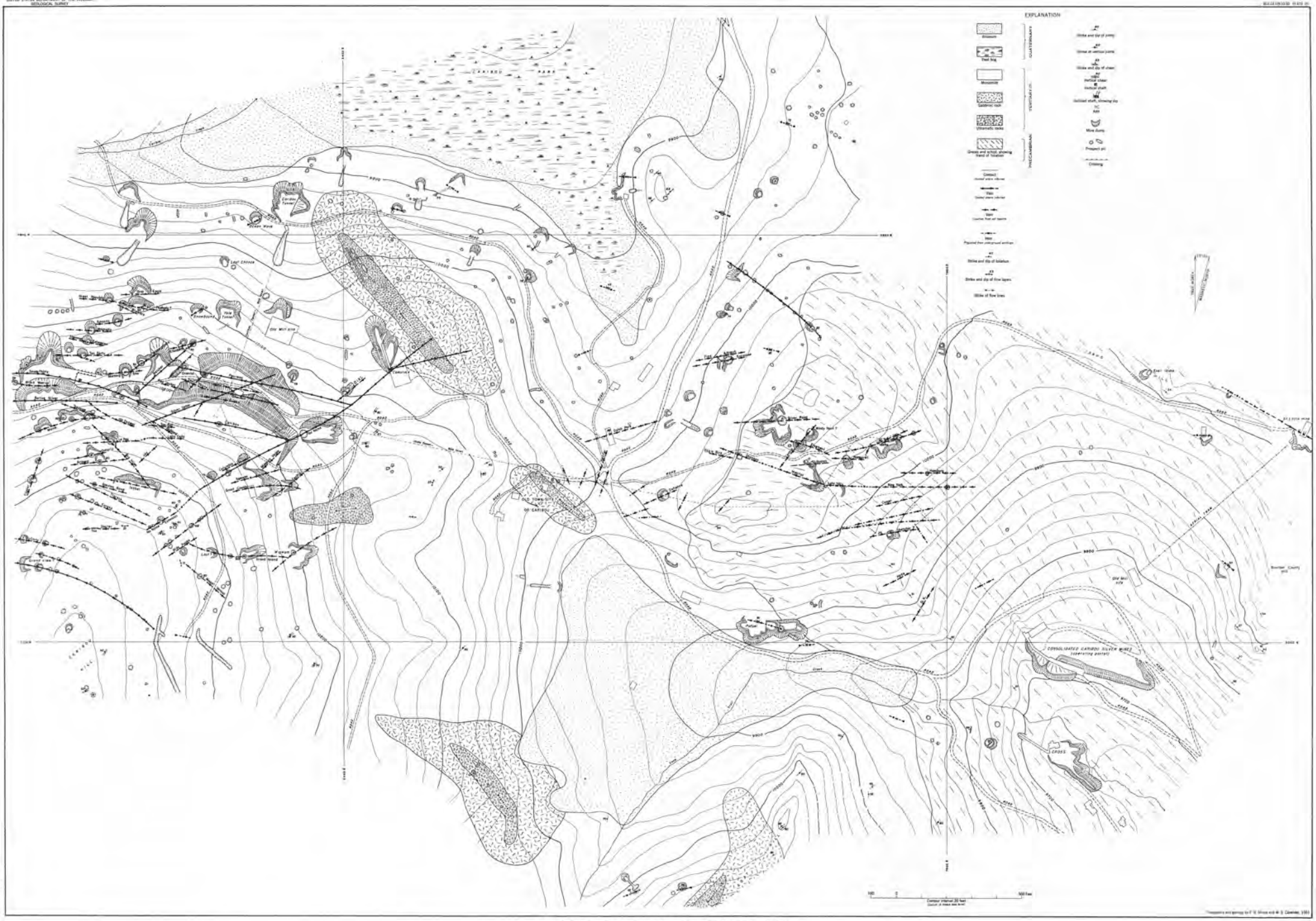
GRAND ISLAND RESOURCES

Project No. US 0801			File No.	
GIS:	JST	11/22/21	Scale As Shown	Rev 0
Check:	JST	11/22/21	**Map 2**	
Review:	JST	11/22/21		

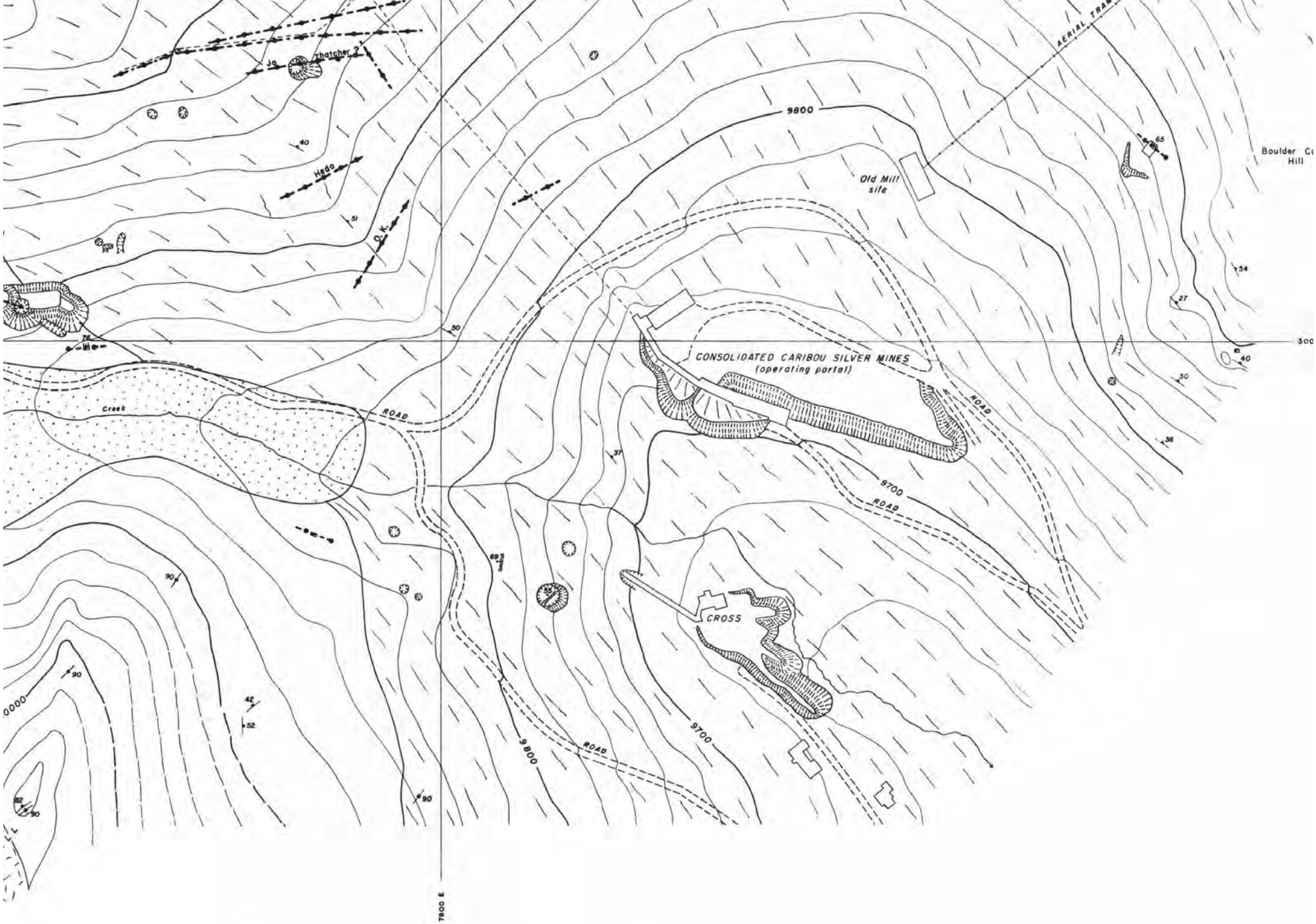
Path: G:\Projects\Nederland\ArcMap\GW Plan\Map 2 - Site Map.mxd


R 74 W.
105°35'
R. 73 W.
40
BALD MTN
PARK
CARIBOU
POMEROY MTN
Boundary of area mapped in detail, see pl. 35
GREAT NORTHERN MINE
BOULDER COUNTY HILL
ST LOUIS MINE
Caribou
KLONDIKE MTN
CARIBOU HILL
CARIBOU
FLAT
Grand Island
MINERAL
MTN
HICKS GULCH
ELDORADO
MTN
Hessie
T. 1 S.
1 0 1 Mile
Datum is mean sea level
14°30'
TRUE NORTH
MAGNETIC NORTH
EXPLANATION
QUATERNARY
TERTIARY(?)
PRECAMBRIAN
Alluvium
Dikes of alkali syenite, diorite, monzonite or sodic granite
Ultramafic rocks
Quartz monzonite, monzonite, and andesite
Diorite, diabase, and gabbro
Pegmatite
Boulder Creek granite
Granite and quartz monzonite
Quartz monzonite gneiss and gneissic pegmatite
Idaho Springs formation
Chiefly biotite schist
Contact
Dashed where approximately located
Laramide fault
Dashed where approximately located
Concealed fault
45
Strike and dip of platy structure or schistosity
Veins of gold, silver, lead or zinc

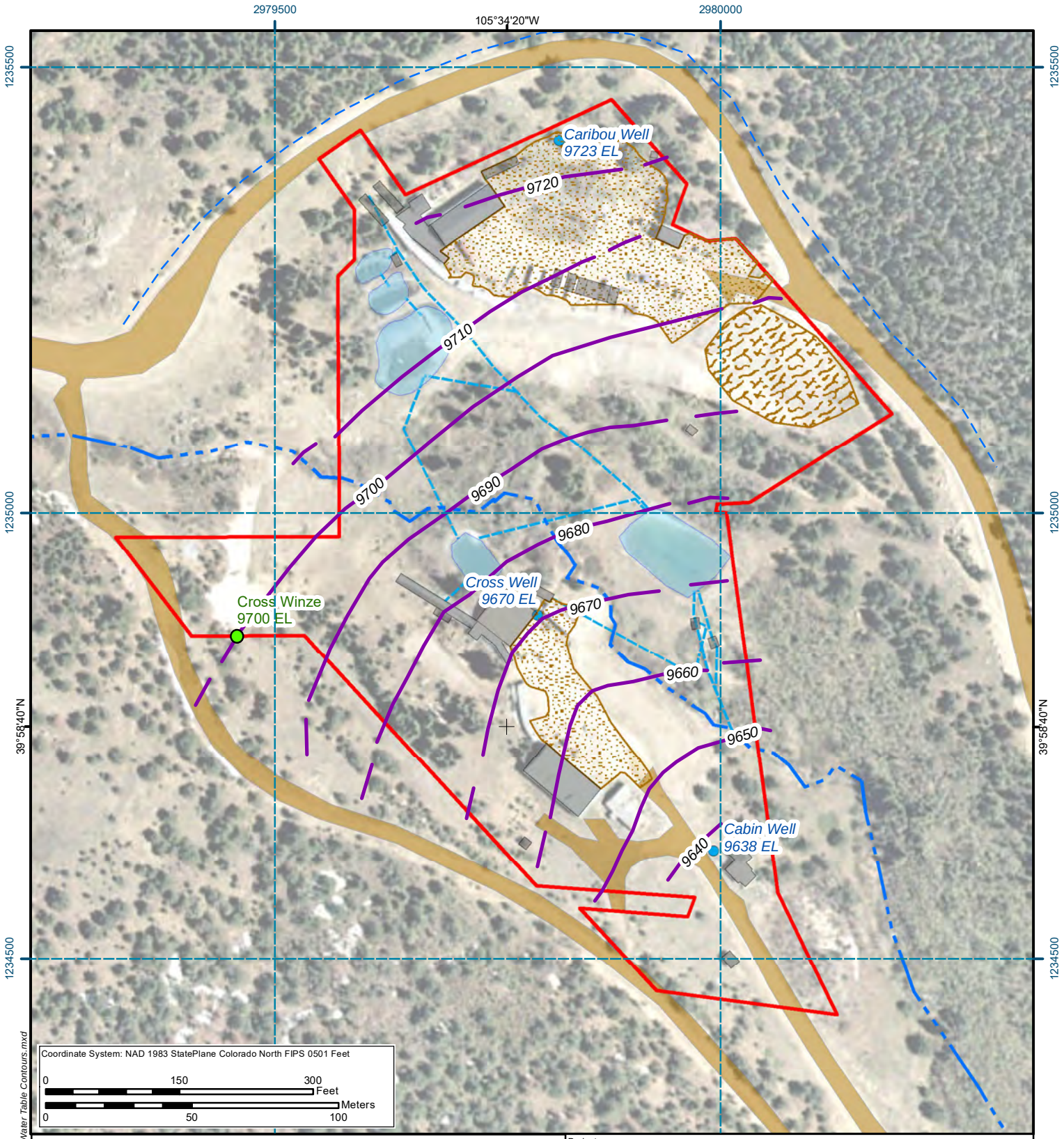
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



GEOLOGIC MAP OF THE CARIBOU AREA, BOULDER COUNTY, COLORADO



Topography and geology by F. B. Moore and W. S. Cave



Permit Boundary (9.6 ac)
Groundwater Wells
Mine Water Drainage Pipe
Cross Winze Surface Location (Projected)
Water Table Contours

Existing Roads
Parking
Settling Ponds
Buildings

N

Project: Groundwater Monitoring Plan

Title:

Groundwater Table Contours
July 30, 2021

GRAND ISLAND RESOURCES

Project No. US 0801			File No.	
GIS:	JST	11/22/21	Scale As Shown	Rev 0
Check:	JST	11/22/21	Map 3	
Review:	JST	11/22/21		

Path: G:\Projects\NederlandArcMap\GW Plan\Map 3 - Water Table Contours.mxd

Appendix A – Well Logs and Construction Diagrams

E

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

RECEIVED
NOV 13 1980
WATER RESOURCES
STATE ENGINEER
COLO.

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 111951

WELL OWNER Hendricks Mining Company SW ¼ of the NW ¼ of Sec. 9

ADDRESS P.O. Box 653 Nederland, CO 80466 T. 1 S, R. 73 W, 6th P.M.

DATE COMPLETED November 3, 1980

WELL LOG

From	To	Type and Color of Material	Water Loc.

TOTAL DEPTH

Use additional pages necessary to complete log.

HOLE DIAMETER

in. from to ft.

in. from to ft.

in. from to ft.

DRILLING METHOD

CASING RECORD: **Plain Casing**

Size & kind from to ft.

Size & kind from to ft.

Size & kind from to ft.

Perforated Casing

Size & kind from to ft.

Size & kind from to ft.

Size & kind from to ft.

GROUTING RECORD

Material

Intervals

Placement Method

GRAVEL PACK: Size

Interval

TEST DATA

Date Tested , 19

Static Water Level Prior to Test ft.

Type of Test Pump

Length of Test

Sustained Yield (Metered)

Final Pumping Water Level

PUMP INSTALLATION REPORT

Pump Make McDonalds

Type submersible

Powered by 115V HP 1/3

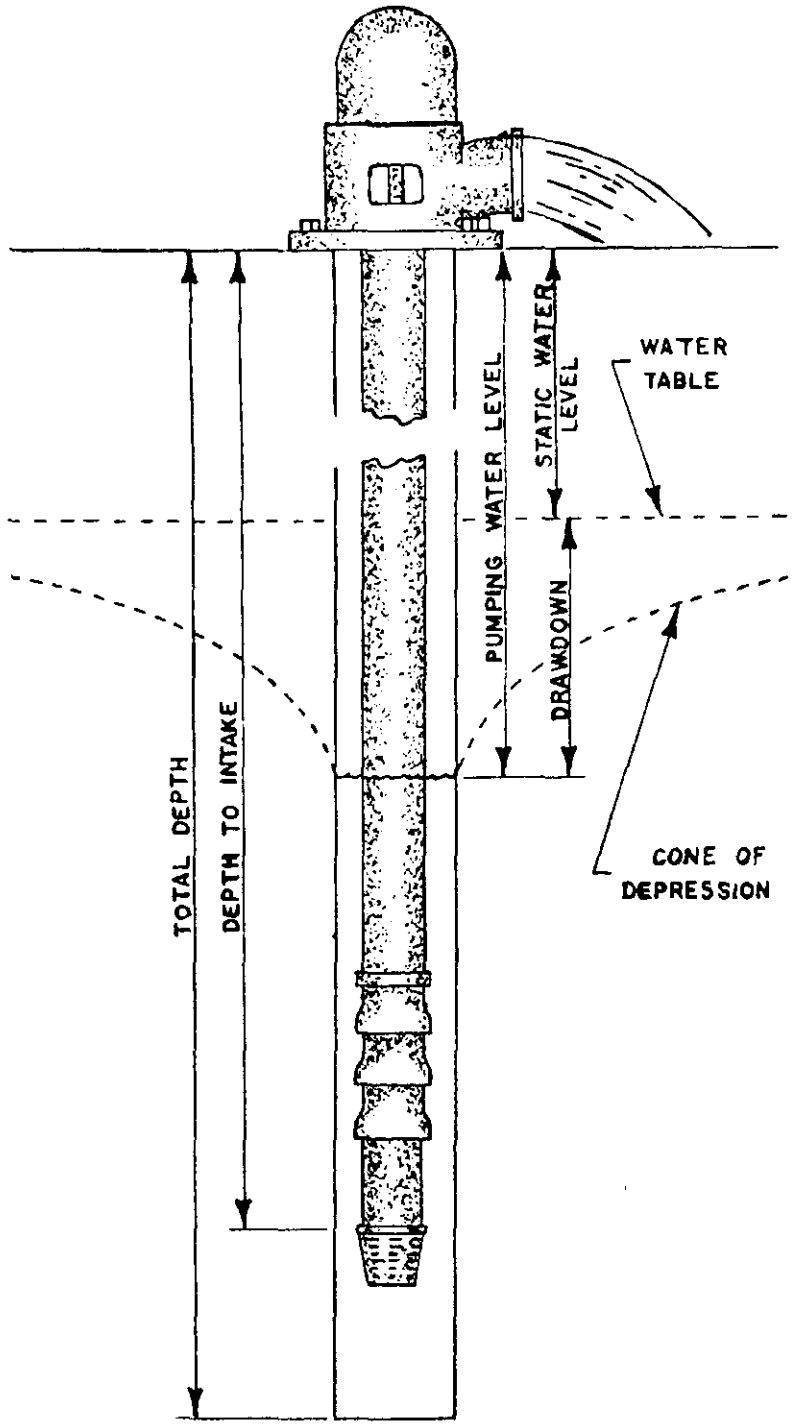
Pump Serial No. J80914S

Motor Serial No. NA

Date Installed September 3, 1980

Pump Intake Depth 150'

Remarks



WELL TEST DATA WITH PERMANENT PUMP

Date Tested not tested

Static Water Level Prior to Test

Length of Test Hours

Sustained yield (Metered) GPM

Pumping Water Level

Remarks

CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Lloyd H Miller License No. 625

State of Colorado, County of Boulder SS

Subscribed and sworn to before me this 11 day of November, 1980.

My Commission expires July 3, 1982

My Commission expires: , 19 .

Notary Public Roi English

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

W.R.-20-77

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 111951

RECEIVED
DEC 3 1 1979
WATER RESOURCES
STATE ENGINEER
COLO.

WELL OWNER Tom Hendricks
ADDRESS PO Box 653 Nederland, CO 80466

SW ¼ of the NW ¼ of Sec. 9
T. 1 S, R. 73 N, 6th P.M.

DATE COMPLETED December 21, 1979

WELL LOG

From	To	Type and Color of Material	Water Loc.
0	3	Fill	
3	42	Overburden	
42	75	Brown granite	
75	80	Granite/quartz	
80	145	Grey granite	
145	150	Quartz	
150	165	Grey granite	
		5 GPM @ 75'	
		20 GPM @ 145'	

The testing of production of water from this well [illegible] by this report, is [illegible] upon conditions [illegible] date of testing and does not reflect any projection as to future production. This [illegible] dependent upon future [illegible]

TOTAL DEPTH 165'

Use additional pages necessary to complete log.

HOLE DIAMETER

9 in. from 0 to 50 ft.
6 in. from 50 to 165 ft.
__ in. from __ to __ ft.

DRILLING METHOD Air percussion

CASING RECORD: Plain Casing

Size 6 5/8& kind Steel from -1 to 50 ft.
Size 4 1/2& kind PVC from 15 to 65 ft.
Size __ & kind __ from __ to __ ft.

Perforated Casing

Size 4 1/2& kind PVC from 65 to 165 ft.
Size __ & kind __ from __ to __ ft.
Size __ & kind __ from __ to __ ft.

GROUTING RECORD

Material Cement
Intervals 15' - 60'
Placement Method Poured

GRAVEL PACK: Size N A
Interval __

TEST DATA

Date Tested December 21, 1979
Static Water Level Prior to Test __ ft.
Type of Test Pump Air
Length of Test One hour
Sustained Yield (Metered) 25 GPM
Final Pumping Water Level 165'

WRJ 5 Rev. 7/

COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203

RECEIVED
NOV 19 1979
WATER RESOURCES
STATE ENGINEER
COLO.

RECEIVED
OCT 10 1979
WATER RESOURCES
STATE ENGINEER
COLO.

PERMIT APPLICATION FORM

Application must be complete where applicable. Type or print in BLACK INK. No overstrikes or erasures unless initialed.

FOR: (X) A PERMIT TO USE GROUND WATER
(X) A PERMIT TO CONSTRUCT A WELL
(X) A PERMIT TO INSTALL A PUMP
( ) REPLACEMENT FOR NO. _____
( ) OTHER _____
WATER COURT CASE NO. _____

(1) APPLICANT - mailing address

NAME Tom Hendricks
STREET PO Box 653
CITY Nederland, CO (State) 80466 (Zip)
TELEPHONE NO. 258-3806

(2) LOCATION OF PROPOSED WELL

County Boulder
SW ¼ of the NW ¼, Section 9
Twp 1 S (N.S) Rng 73 W (E.W) 6th P.M.

(3) WATER USE AND WELL DATA

Proposed maximum pumping rate (gpm) 15
Average annual amount of ground water to be appropriated (acre-feet): 1
Number of acres to be irrigated. 0
Proposed total depth (feet): 200
Aquifer ground water is to be obtained from: Granite
Owner's well designation _____

GROUND WATER TO BE USED FOR:

(X) HOUSEHOLD USE ONLY no irrigation (0)
( ) DOMESTIC (1) ( ) INDUSTRIAL (5)
( ) LIVESTOCK (2) ( ) IRRIGATION (6)
( ) COMMERCIAL (4) ( ) MUNICIPAL (8)
( ) OTHER (9) _____
DETAIL THE USE ON BACK IN (11)

(4) DRILLER

Name Norris & Sons Drilling Co.
Street 4599 North Broadway
City Boulder, CO (State) 80302 (Zip)
Telephone No. 442-4083 Lic. No. 716

FOR OFFICE USE ONLY: DO NOT WRITE IN THIS COLUMN

Receipt No. 11941 A
Basin _____ Dist. _____

CONDITIONS OF APPROVAL

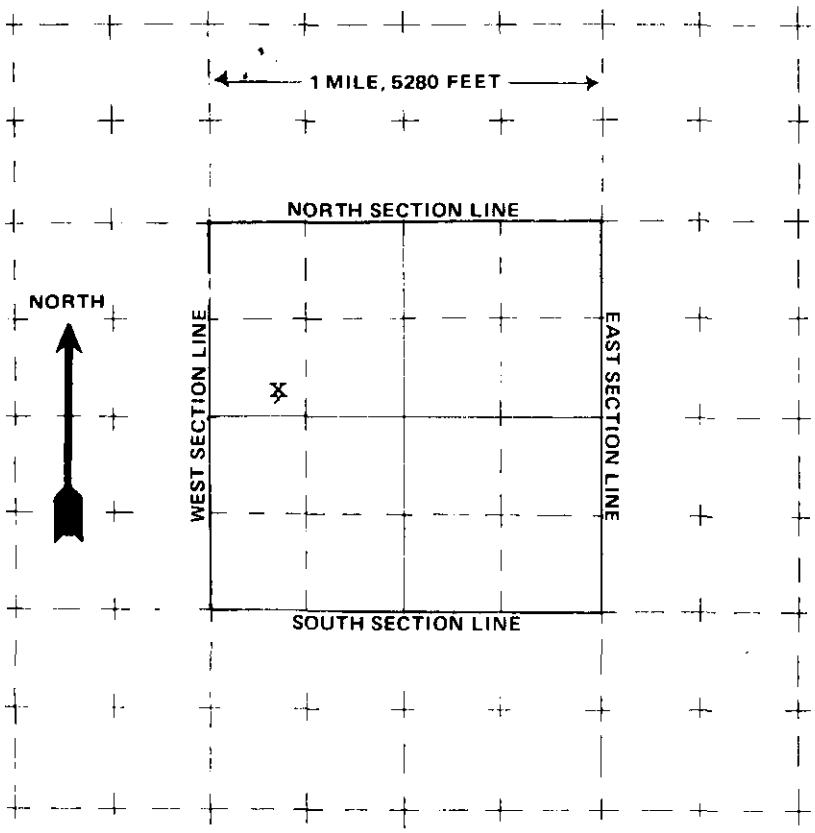
This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

APPROVED FOR HOUSEHOLD USE ONLY, FOR ONE (1) SINGLE FAMILY DWELLING AND NOT TO BE USED FOR IRRIGATION. THE RETURN FLOW FROM THE USE OF THIS WELL MUST BE RETURNED TO THE SAME STREAM SYSTEM IN WHICH THE WELL IS LOCATED.

APPLICATION APPROVED

PERMIT NUMBER 11951
DATE ISSUED NOV 30 1979
EXPIRATION DATE NOV 30 1981
Bruce E. DeBrine (STATE ENGINEER)
BY DEPUTY R.D. Haubold
ID 166 COUNTY 07

(5) THE LOCATION OF THE PROPOSED WELL and the area on which the water will be used must be indicated on the diagram below. Use the CENTER SECTION (1 section, 640 acres) for the well location.



The scale of the diagram is 2 inches = 1 mile
Each small square represents 40 acres.

WATER EQUIVALENTS TABLE (Rounded Figures)

An acre-foot covers 1 acre of land 1 foot deep
1 cubic foot per second (cfs) . . . 449 gallons per minute (gpm)
A family of 5 will require approximately 1 acre-foot of water per year.
1 acre-foot . . . 43,560 cubic feet . . . 325,900 gallons.
1,000 gpm pumped continuously for one day produces 4.42 acre-feet.

(6) THE WELL MUST BE LOCATED BELOW by distances from section lines.

2200 ft. from North (north or south) sec. line

1000 ft. from West (east or west) sec. line

LOT _____ BLOCK _____ FILING # _____

SUBDIVISION Rare Metals Mill Site #20681-B

(7) TRACT ON WHICH WELL WILL BE LOCATED Owner: Same

No. of acres 5 . Will this be the only well on this tract? Yes

(8) PROPOSED CASING PROGRAM

Plain Casing

6 5/8 in. from -1 ft. to 20 ft.

_____ in. from _____ ft. to _____ ft.

Perforated casing

4 1/2 in. from 15 ft. to 200 ft.

_____ in. from _____ ft. to _____ ft.

(9) FOR REPLACEMENT WELLS give distance and direction from old well and plans for plugging it:

(10) LAND ON WHICH GROUND WATER WILL BE USED:

Owner(s): Tom Hendricks No. of acres: 5

Legal description: SW¼ of NW¼, Sec. 9, T 1S, R 73W

(11) DETAILED DESCRIPTION of the use of ground water: **Household use and domestic wells must indicate type of disposal system to be used.**

Household use only -- septic tank with absorption bed

(12) OTHER WATER RIGHTS used on this land, including wells. Give Registration and Water Court Case Numbers.

Type or right	Used for (purpose)	Description of land on which used
None		

(13) THE APPLICANT(S) STATE(S) THAT THE INFORMATION SET FORTH HEREON IS TRUE TO THE BEST OF HIS KNOWLEDGE.

Thomas S. Hendricks

SIGNATURE OF APPLICANT(S)

Use additional sheets of paper if more space is required.

E

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 111953

RECEIVED
NOV 13 1980
WATER RESOURCES
STATE ENGINEER
COLO.

WELL OWNER Hendricks Mining Company

ADDRESS P.O. Box 653, Nederland, CO 80466

DATE COMPLETED September 3, 19 80

SW ¼ of the NW ¼ of Sec 9

T. 1 S, R. 73 W 6th P.M.

WELL LOG

From	To	Type and Color of Material	Water Loc.

TOTAL DEPTH _____

Use additional pages necessary to complete log.

HOLE DIAMETER

_____ in. from _____ to _____ ft.

_____ in. from _____ to _____ ft.

_____ in. from _____ to _____ ft.

DRILLING METHOD _____

CASING RECORD: **Plain Casing**

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Perforated Casing

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

Size _____ & kind _____ from _____ to _____ ft.

GROUTING RECORD

Material _____

Intervals _____

Placement Method _____

GRAVEL PACK: Size _____

Interval _____

TEST DATA

Date Tested _____, 19 ___

Static Water Level Prior to Test _____ ft.

Type of Test Pump _____

Length of Test _____

Sustained Yield (Metered) _____

Final Pumping Water Level _____

PUMP INSTALLATION REPORT

Pump Make Jacuzzi

Type 3 - wire submersible

Powered by 230V HP 3/4

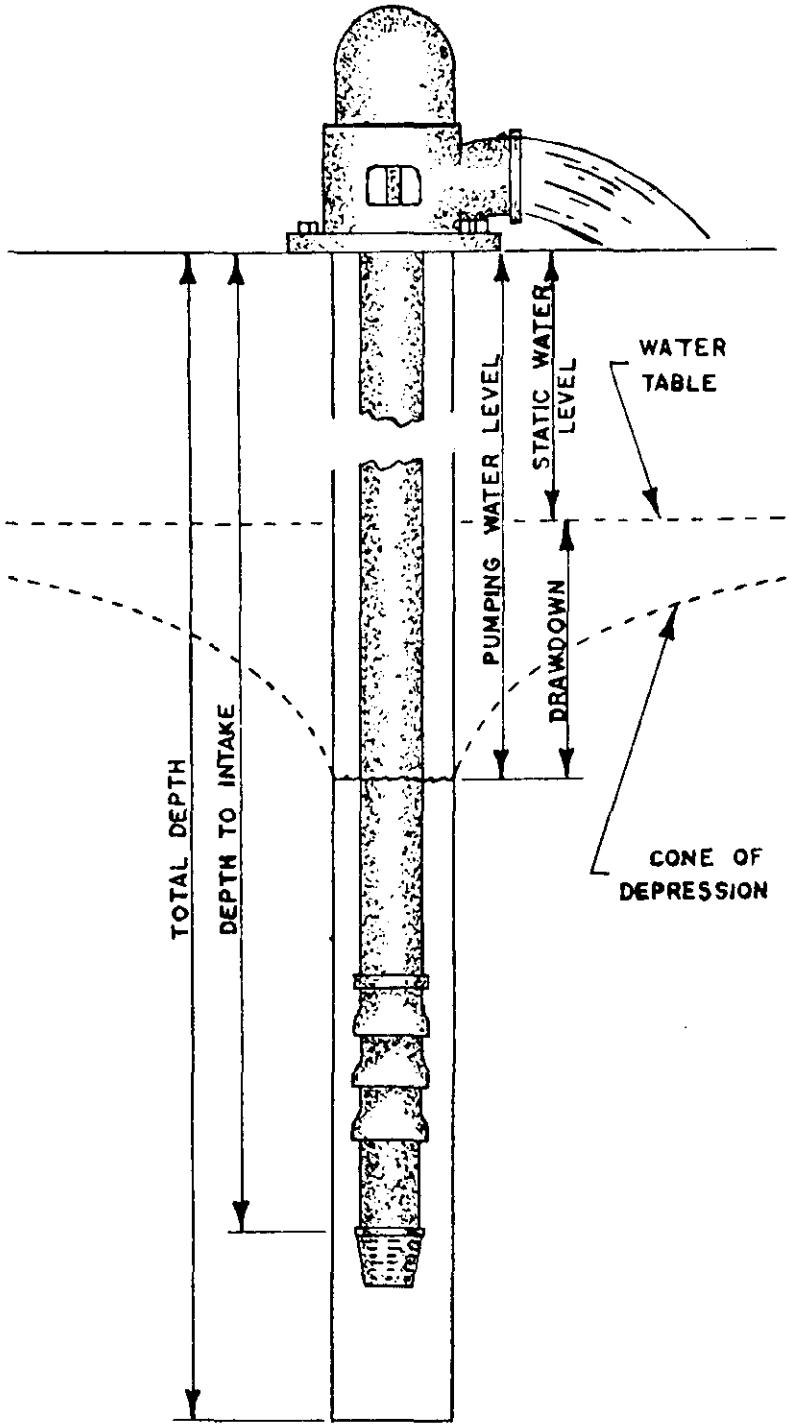
Pump Serial No. 7S4B-S2

Motor Serial No. NA

Date Installed 9/3/80

Pump Intake Depth 190'

Remarks



WELL TEST DATA WITH PERMANENT PUMP

Date Tested not tested

Static Water Level Prior to Test

Length of Test Hours

Sustained yield (Metered) GPM

Pumping Water Level

Remarks

CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Lloyd H Miller License No 625

State of Colorado, County of Boulder SS

Subscribed and sworn to before me this 11 day of November, 1980.

My Commission expires July 3, 1982

My Commission expires: , 19 .

Notary Public Lou English

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

RECEIVED
AUG 01 1980
WATER RESOURCES
STATE ENGINEER
COLO.

RECEIVED
JUN 26 1980
WATER RESOURCES
STATE ENGINEER
COLO.

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 111953

WELL OWNER Hendricks Mining Co.
PO Box 653
ADDRESS Nederland, CO 80466

SW ¼ of the NW ¼ of Sec. 9
T 1 S, R 73 W, 6th P.M.

DATE COMPLETED June 19, 1980

WELL LOG

From	To	Type and Color of Material	Water Loc.
0	39	Overburden	
39	75	Schist with quartz	
75	205	Granite	
		25 GPM @ 175'	

The testing of production of water from this well, as reflected by this report, is totally dependent upon conditions existing as of the date of testing and does not reflect any projection as to future production. This is dependent upon future conditions.

TOTAL DEPTH 205'

Use additional pages necessary to complete log.

HOLE DIAMETER

9 in. from 0 to 40 ft.
5 7/8 in. from 40 to 205 ft.
___ in. from ___ to ___ ft.

DRILLING METHOD Air percussion

CASING RECORD:

Plain Casing

Size 6 5/8 & kind Steel from -1 to 40 ft.
Size ___ & kind ___ from ___ to ___ ft.
Size ___ & kind ___ from ___ to ___ ft.

Perforated Casing

Size 4 1/2 & kind PVC from 15 to 205 ft.
Size ___ & kind ___ from ___ to ___ ft.
Size ___ & kind ___ from ___ to ___ ft.

GROUTING RECORD

Material Cement
Intervals 8' - 40'
Placement Method Poured

GRAVEL PACK: Size N A
Interval ___

TEST DATA

Date Tested June 19, 1980
Static Water Level Prior to Test 35 ft.
Type of Test Pump Air
Length of Test One hour
Sustained Yield (Metered) 25 GPM
Final Pumping Water Level 205'

PUMP INSTALLATION REPORT

Pump Make _____

Type _____

Powered by _____ HP _____

Pump Serial No. _____

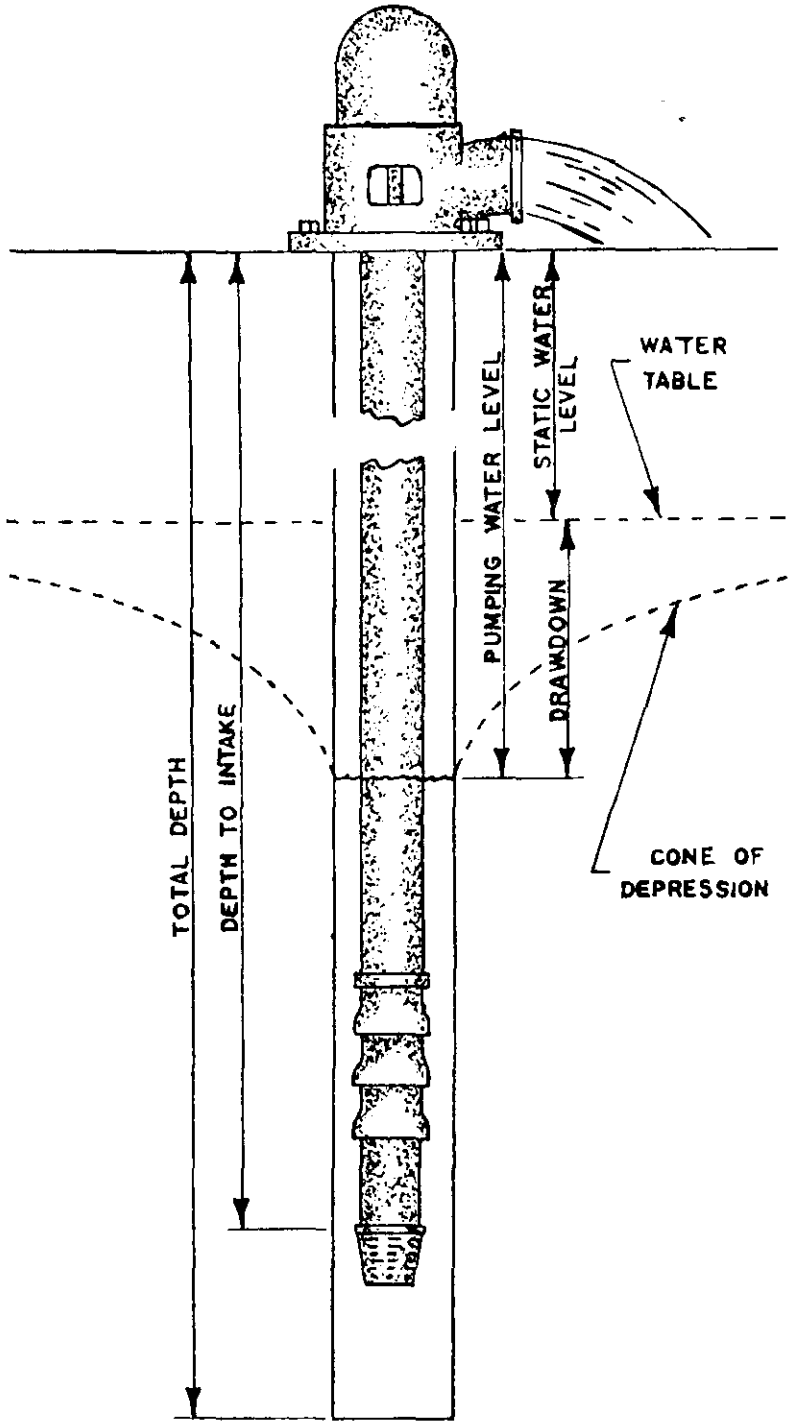
Motor Serial No. _____

Date Installed _____

Pump Intake Depth _____

Remarks _____

_____



WELL TEST DATA WITH PERMANENT PUMP

Date Tested _____

Static Water Level Prior to Test _____

Length of Test _____ Hours

Sustained yield (Metered) _____ GPM

Pumping Water Level _____

Remarks _____

_____

CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Richard R. Wilson License No. 716

State of Colorado, County of Boulder SS

Subscribed and sworn to before me this 23 day of June, 1980.

My Commission expires: Febr. 22, 19 84.

Notary Public Roger H. Williams

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

WRD-S-Rev. 76

COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203

RECEIVED
OCT 19 1979
WATER RESOURCES
STATE ENGINEER
COLO.

RECEIVED
OCT 10 1979
WATER RESOURCES
STATE ENGINEER
COLO.

PERMIT APPLICATION FORM

Application must be complete where applicable. Type or print in BLACK INK. No overstrikes or erasures unless initialed.

FOR: (X) A PERMIT TO USE GROUND WATER
(X) A PERMIT TO CONSTRUCT A WELL
(X) A PERMIT TO INSTALL A PUMP
( ) REPLACEMENT FOR NO. _____
( ) OTHER _____
WATER COURT CASE NO. _____

(1) APPLICANT · mailing address

NAME Hendricks Mining Co.

STREET PO Box 653

CITY Nederland, Colorado (State) 80466 (Zip)

TELEPHONE NO. 258-3806

(2) LOCATION OF PROPOSED WELL

County Boulder

SW ¼ of the NW ¼, Section 9

Twp. 1 S (N.S.), Rng. 73 W (E.W), 6th P.M.

(3) WATER USE AND WELL DATA

Proposed maximum pumping rate (gpm) 15

Average annual amount of ground water to be appropriated (acre-feet): 1

Number of acres to be irrigated: 0

Proposed total depth (feet): 200

Aquifer ground water is to be obtained from:

Granite

Owner's well designation None

GROUND WATER TO BE USED FOR:

(X) HOUSEHOLD USE ONLY no irrigation (0)
( ) DOMESTIC (1)
( ) LIVESTOCK (2)
( ) COMMERCIAL (4)
( ) INDUSTRIAL (5)
( ) IRRIGATION (6)
( ) MUNICIPAL (8)
( ) OTHER (9)

DETAIL THE USE ON BACK IN (11)

(4) DRILLER

Name Norris & Sons Drilling Co.

Street 4599 No. Broadway

City Boulder, CO (State) 80302 (Zip)

Telephone No. 442-4083 Lic. No. 716

FOR OFFICE USE ONLY: DO NOT WRITE IN THIS COLUMN

Receipt No. 11944 B

Basin _____ Dist. _____

CONDITIONS OF APPROVAL

This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

APPROVED PURSUANT TO CRS 1973, 37-92-602 (1)(c) FOR DRINKING AND SANITARY FACILITIES ONLY AT THE CROSS MILL MINING SITE # 20681-B.

AVERAGE DAILY APPROPRIATION FROM THIS WELL SHALL NOT EXCEED 300 GALLONS

APPLICATION APPROVED

PERMIT NUMBER 11953

DATE ISSUED NOV 30 1979

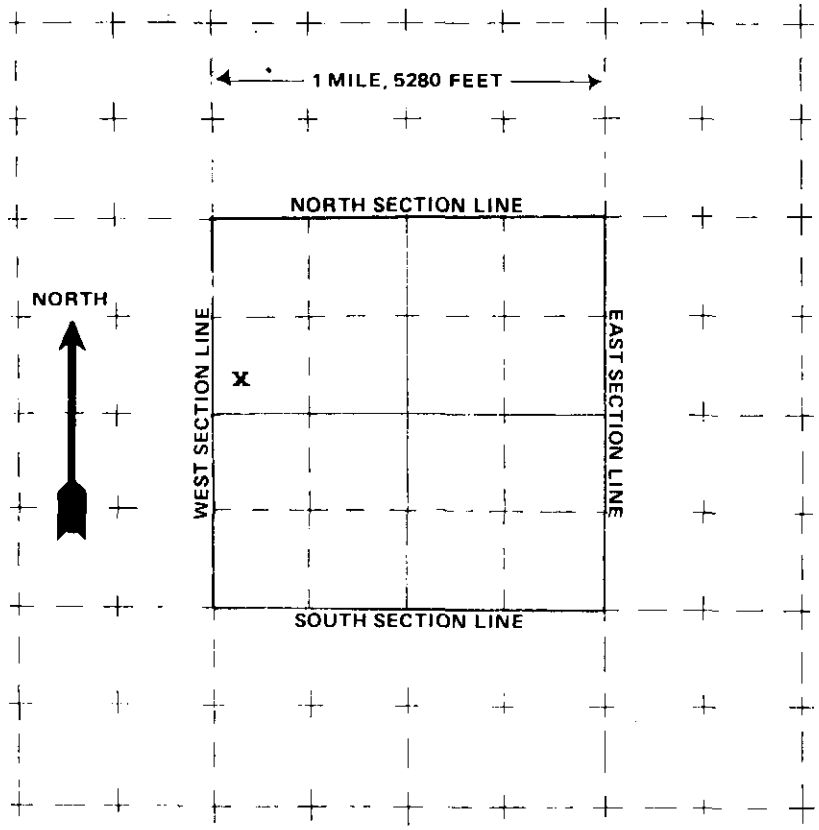
EXPIRATION DATE NOV 30 1981

Bruce E. DeBrine (STATE ENGINEER)

BY DEPUTY R. Hanbold

I.D. ICC COUNTY 07

(5) THE LOCATION OF THE PROPOSED WELL and the area on which the water will be used must be indicated on the diagram below. Use the CENTER SECTION (1 section, 640 acres) for the well location.



The scale of the diagram is 2 inches = 1 mile
Each small square represents 40 acres.

WATER EQUIVALENTS TABLE (Rounded Figures)
An acre-foot covers 1 acre of land 1 foot deep
1 cubic foot *per second (cfs)* . . . 449 *gallons per minute (gpm)*
A family of 5 will require approximately 1 acre-foot of water per year.
1 acre-foot . . . 43,560 cubic feet . . . 325,900 gallons.
1,000 gpm pumped continuously for one day produces 4.42 acre-feet.

(6) THE WELL MUST BE LOCATED BELOW by distances from section lines.

1900 ft. from North (north or south) sec. line

650 ft. from West (east or west) sec. line

LOT _____ BLOCK _____ FILING # _____

SUBDIVISION Cross Mill Site #20681-B

(7) TRACT ON WHICH WELL WILL BE LOCATED Owner: Same

No. of acres 5 . Will this be the only well on this tract? Yes

(8) PROPOSED CASING PROGRAM

Plain Casing

6 5/8 in. from -1 ft. to 20 ft.

_____ in. from _____ ft. to _____ ft.

Perforated casing

4 1/2 in. from 15 ft. to 200 ft.

_____ in. from _____ ft. to _____ ft.

(9) FOR REPLACEMENT WELLS give distance and direction from old well and plans for plugging it:

(10) LAND ON WHICH GROUND WATER WILL BE USED:

Owner(s): Hendericks Mining Co. No. of acres: 5

Legal description: SW¼ of NW¼, Sec. 9, T 1S, R 73W

(11) DETAILED DESCRIPTION of the use of ground water: **Household use and domestic wells must indicate type of disposal system to be used.**

Household Use Only -- Septic Tank with Absorption Bed
Sanitary Facilities for Mine

(12) OTHER WATER RIGHTS used on this land, including wells. Give Registration and Water Court Case Numbers.

Type or right	Used for (purpose)	Description of land on which used
None		

(13) THE APPLICANT(S) STATE(S) THAT THE INFORMATION SET FORTH HEREON IS TRUE TO THE BEST OF HIS KNOWLEDGE.

Thomas S. Hendricks
SIGNATURE OF APPLICANT(S)

Use additional sheets of paper if more space is required.

WJR-26-77

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 116655

RECEIVED
NOV 13 1980
WATER RESOURCES
STATE ENGINEER
COLO.

WELL OWNER HENDRICKS-GOOD MINING CO.
ADDRESS 3000 N. 63rd Street
Boulder, CO 80301

SW ¼ of the NW ¼ of Sec. 9,
T. 1 S, R. 73 W, 6th P.M.

DATE COMPLETED November 4, 1980

WELL LOG

From	To	Type and Color of Material	Water Loc.
0	10	Clay, gravel, boulders	
10	70	Schist	
70	90	Brown granite/quartz	
90	100	Grey granite	
100	165	Schist	
		12 GPM @ 70' - 90'	

The testing of production of water from this well, as reflected by this report, is totally dependent upon conditions existing as of the date of testing and does not reflect any projection as to future production. This is dependent upon future conditions.

TOTAL DEPTH 165'

Use additional pages necessary to complete log.

HOLE DIAMETER

9 in. from 0 to 26 ft.
6 in. from 26 to 165 ft.
___ in. from ___ to ___ ft.

DRILLING METHOD Air percussion

CASING RECORD:

Plain Casing

Size 6 5/8 & kind Steel from -1 to 26 ft.
Size 4 1/2 & kind PVC from 15 to 25 ft.
Size ___ & kind ___ from ___ to ___ ft.

Perforated Casing

Size 4 1/2 & kind PVC from 25 to 165 ft.
Size ___ & kind ___ from ___ to ___ ft.
Size ___ & kind ___ from ___ to ___ ft.

GROUTING RECORD

Material Cement
Intervals 8' - 26'
Placement Method Poured

GRAVEL PACK: Size N A
Interval

TEST DATA

Date Tested November 4, 1980
Static Water Level Prior to Test 20 ft.
Type of Test Pump Air
Length of Test One hour
Sustained Yield (Metered) 12 GPM
Final Pumping Water Level 165'

PUMP INSTALLATION REPORT

Pump Make _____

Type _____

Powered by _____ HP _____

Pump Serial No. _____

Motor Serial No. _____

Date Installed _____

Pump Intake Depth _____

Remarks _____

_____

WELL TEST DATA WITH PERMANENT PUMP

Date Tested _____

Static Water Level Prior to Test _____

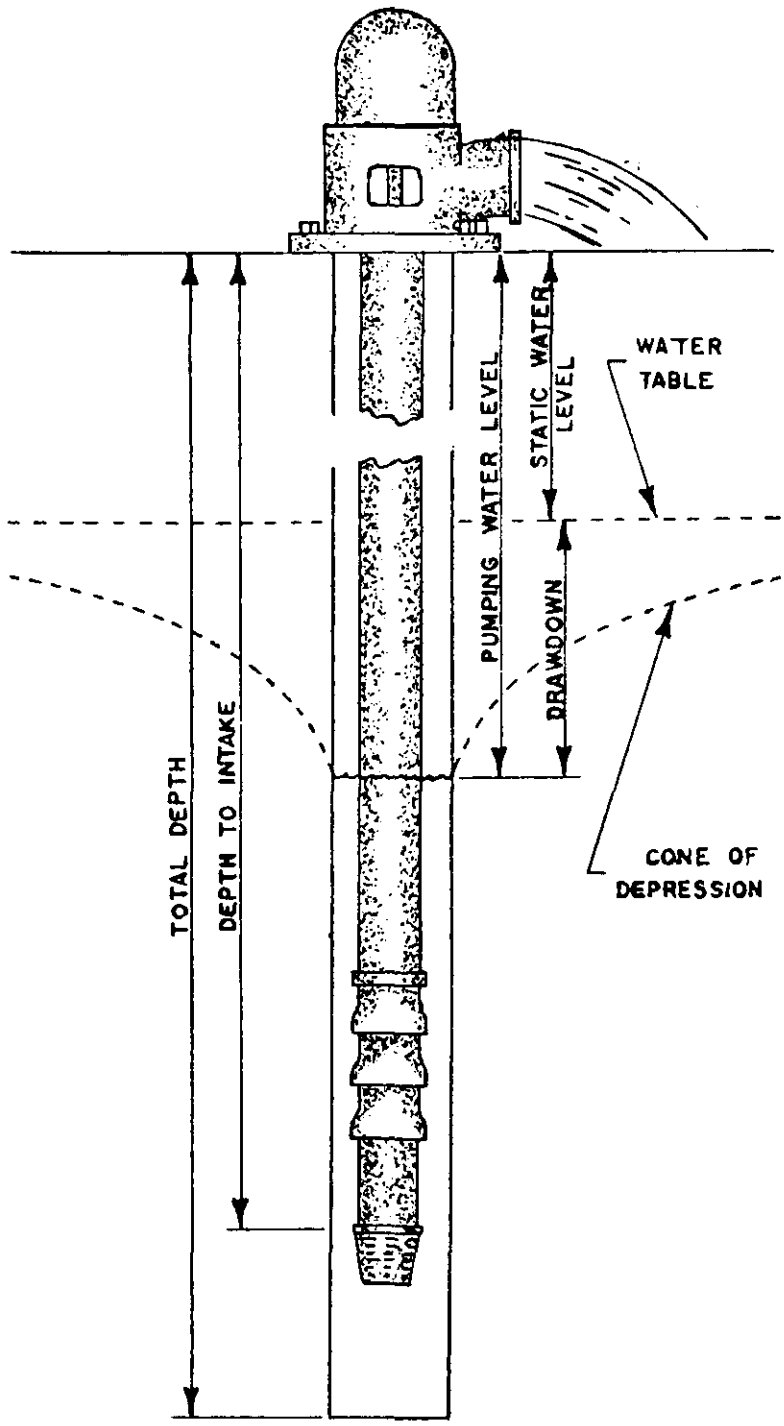
Length of Test _____ Hours

Sustained yield (Metered) _____ GPM

Pumping Water Level _____

Remarks _____

_____



CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Richard R. Wilson License No. 716

State of Colorado, County of Boulder SS

Subscribed and sworn to before me this 5 day of November, 1980.

My Commission expires: Febr. 22, 1984.

Notary Public Roger H. Williams

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

WJR-26-77

THIS FORM MUST BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE WORK DESCRIBED HEREON. TYPE OR PRINT IN BLACK INK.

COLORADO DIVISION OF WATER RESOURCES

1313 Sherman Street - Room 818
Denver, Colorado 80203

WELL COMPLETION AND PUMP INSTALLATION REPORT

PERMIT NUMBER 116655

RECEIVED
NOV 13 1980
WATER RESOURCES
STATE ENGINEER
Colo. 9

WELL OWNER Hendricks Mining Company

ADDRESS P.O. Box 653, Nederland, CO 80466

DATE COMPLETED November 10, 1980

SW ¼ of the NW ¼ of Sec. ____,

T. 1 S, R. 73 W, 6th P.M.

WELL LOG

From	To	Type and Color of Material	Water Loc.

TOTAL DEPTH ____

Use additional pages necessary to complete log.

HOLE DIAMETER

____ in. from ____ to ____ ft.

____ in. from ____ to ____ ft.

____ in. from ____ to ____ ft.

DRILLING METHOD ____

CASING RECORD:

Plain Casing

Size ____ & kind ____ from ____ to ____ ft.

Size ____ & kind ____ from ____ to ____ ft.

Size ____ & kind ____ from ____ to ____ ft.

Perforated Casing

Size ____ & kind ____ from ____ to ____ ft.

Size ____ & kind ____ from ____ to ____ ft.

Size ____ & kind ____ from ____ to ____ ft.

GROUTING RECORD

Material ____

Intervals ____

Placement Method ____

GRAVEL PACK: Size ____

Interval ____

TEST DATA

Date Tested ____, 19__

Static Water Level Prior to Test ____ ft.

Type of Test Pump ____

Length of Test ____

Sustained Yield (Metered) ____

Final Pumping Water Level ____

PUMP INSTALLATION REPORT

Pump Make Jacuzzi

Type 3 - wire submersible

Powered by 230V HP 1

Pump Serial No. 1S4C-S2-14

Motor Serial No. 0H8-660706

Date Installeo November 10, 1980

Pump Intake Depth 165'

Remarks

WELL TEST DATA WITH PERMANENT PUMP

Date Tested not tested

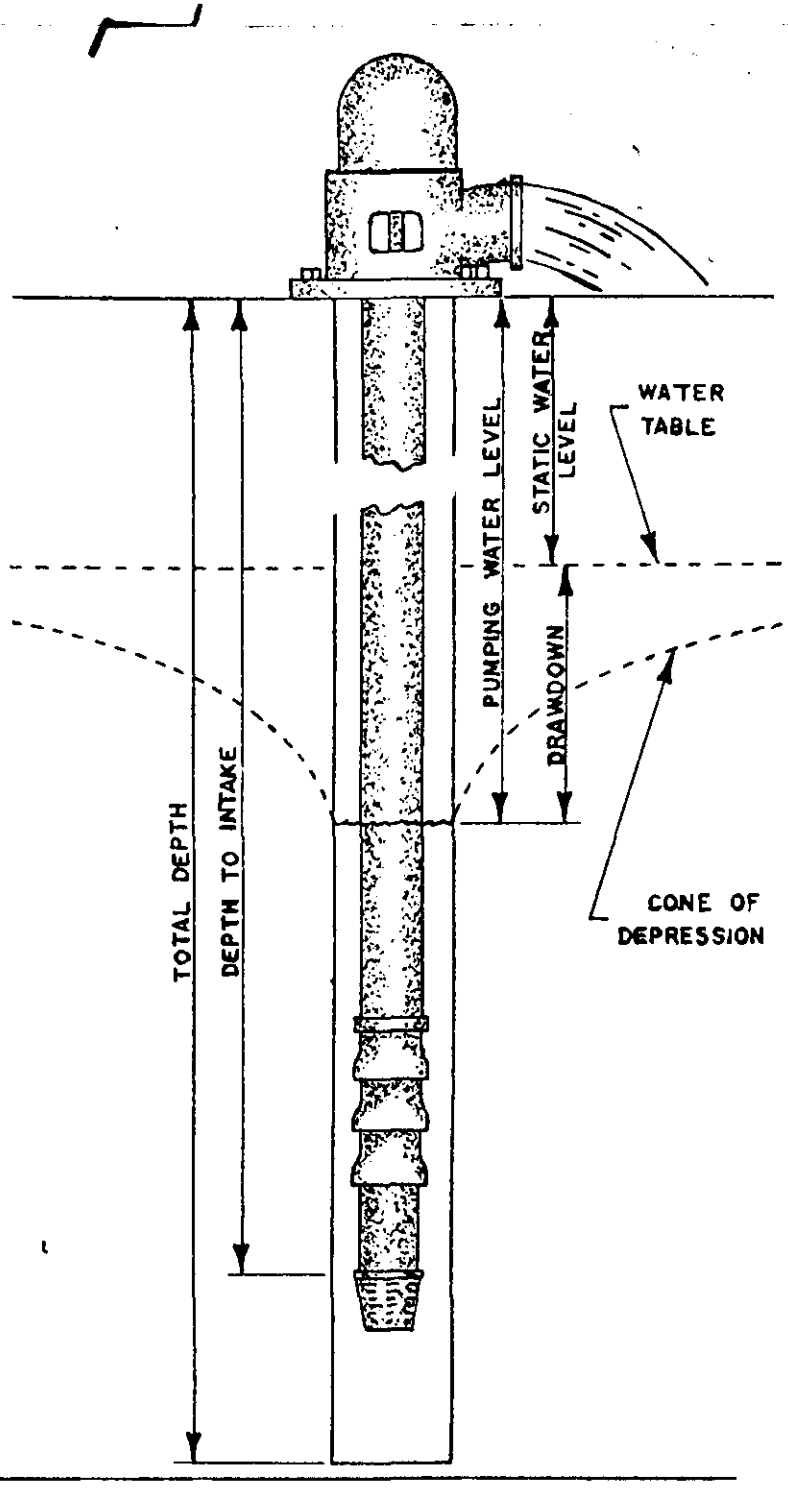
Static Water Level Prior to Test

Length of Test Hours

Sustained yield (Metered) GPM

Pumping Water Level

Remarks



CONTRACTORS STATEMENT

The undersigned, being duly sworn upon oath, deposes and says that he is the contractor of the well or pump installation described hereon; that he has read the statement made hereon; knows the content thereof, and that the same is true of his own knowledge.

Signature Lloyd H Miller License No. 675

State of Colorado, County of Boulder SS

Subscribed and sworn to before me this 11 day of November, 1980.

My Commission expires July 3, 1982

My Commission expires: , 19 .

Notary Public Lori English

FORM TO BE MADE OUT IN QUADRUPLICATE: WHITE FORM must be an original copy on both sides and signed. WHITE AND GREEN copies must be filed with the State Engineer. PINK COPY is for the Owner and YELLOW COPY is for the Driller.

WRJ-5-Rev 76

COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203

RECEIVED
SEP 11 1980
WATER RESOURCES
STATE ENGINEER
COLO.

PERMIT APPLICATION FORM

Application must be complete where applicable. Type or print in BLACK INK. No overstrikes or erasures unless initialed.

FOR: (X) A PERMIT TO USE GROUND WATER
(X) A PERMIT TO CONSTRUCT A WELL
(X) A PERMIT TO INSTALL A PUMP

( ) REPLACEMENT FOR NO. _____
( ) OTHER _____
WATER COURT CASE NO. _____

(1) APPLICANT - mailing address

NAME Hendricks-Good Mining Co.

STREET 3000 N. 63rd St.

CITY Boulder, CO 80301 (State) (Zip)

TELEPHONE NO. 443-1502

(2) LOCATION OF PROPOSED WELL

County Boulder

SW ¼ of the NW ¼, Section 9

Twp. 1 S (N.S), Rng. 73 W (E,W), 6th P.M.

(3) WATER USE AND WELL DATA

Proposed maximum pumping rate (gpm) 15

Average annual amount of ground water to be appropriated (acre-feet): 1

Number of acres to be irrigated: 0

Proposed total depth (feet): 200

Aquifer ground water is to be obtained from:

Granite

Owner's well designation None

GROUND WATER TO BE USED FOR:

(XX) HOUSEHOLD USE ONLY - no irrigation (0)
( ) DOMESTIC (1)
( ) LIVESTOCK (2)
( ) COMMERCIAL (4)
( ) INDUSTRIAL (5)
( ) IRRIGATION (6)
( ) MUNICIPAL (8)

( ) OTHER (9) _____

DETAIL THE USE ON BACK IN (11)

(4) DRILLER

Name Norris & Sons Drilling Co.

Street 4599 No. Broadway

City Boulder, CO 80302 (State) (Zip)

Telephone No. 442-4083 Lic. No. 716

FOR OFFICE USE ONLY: DO NOT WRITE IN THIS COLUMN

Receipt No. 8135 / _____

Basin _____ Dist. _____

CONDITIONS OF APPROVAL

This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of the permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

APPROVED FOR HOUSEHOLD USE ONLY, FOR ONE (1) SINGLE FAMILY DWELLING AND NOT TO BE USED FOR IRRIGATION. THE RETURN FLOW FROM THE USE OF THIS WELL MUST BE RETURNED TO THE SAME STREAM SYSTEM IN WHICH THE WELL IS LOCATED.

THE MUNICIPAL OR COUNTY GOVERNMENT SHALL BE CONSULTED WHEN LOCATING THIS WELL, AND THEIR REGULATIONS SHALL BE COMPLIED WITH.

APPLICATION APPROVED

PERMIT NUMBER 116655

DATE ISSUED OCT 16 1980

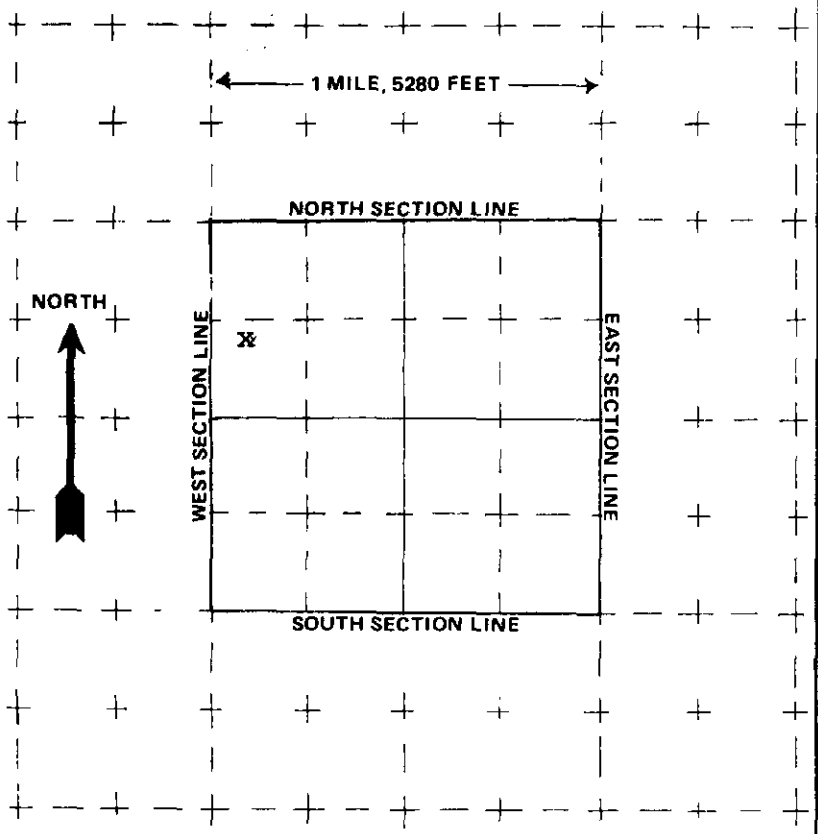
EXPIRATION DATE OCT 16 1982

Bruce E. DeBuin (STATE ENGINEER)

BY DEPUTY RGHaubold

I.D. 1-06 COUNTY 07

(5) THE LOCATION OF THE PROPOSED WELL and the area on which the water will be used must be indicated on the diagram below. Use the CENTER SECTION (1 section, 640 acres) for the well location.



The scale of the diagram is 2 inches = 1 mile
Each small square represents 40 acres.

WATER EQUIVALENTS TABLE (Rounded Figures)

An acre-foot covers 1 acre of land 1 foot deep
1 cubic foot per second (cfs) . . . 449 gallons per minute (gpm)
A family of 5 will require approximately 1 acre-foot of water per year.
1 acre-foot . . . 43,560 cubic feet . . . 325,900 gallons.
1,000 gpm pumped continuously for one day produces 4.42 acre-feet.

(6) THE WELL MUST BE LOCATED BELOW by distances from section lines.

1500 ft. from North (north or south) sec. line

600 ft. from West (east or west) sec. line

LOT -- BLOCK -- FILING # --

SUBDIVISION Brazilian Mill Site, U.S. Survey #13367-B

(7) TRACT ON WHICH WELL WILL BE LOCATED Owner: Same

No. of acres 3.23 . Will this be the only well on this tract? Yes

(8) PROPOSED CASING PROGRAM

Plain Casing

6 5/8 in. from -1 ft. to 20 ft.

4 1/2 in. from 15 ft. to 100 ft.

Perforated casing

4 1/2 in. from 100 ft. to 200 ft.

____ in. from ____ ft. to ____ ft.

(9) FOR REPLACEMENT WELLS give distance and direction from old well and plans for plugging it:

(10) LAND ON WHICH GROUND WATER WILL BE USED:

Owner(s): Hendricks-Good Mining Co. No. of acres: 3.23

Legal description: SW¼ of NW¼, Sec. 9, T 1S, R 73W

(11) DETAILED DESCRIPTION of the use of ground water: **Household use and domestic wells must indicate type of disposal system to be used.**

Household use only -- septic tank with absorption bed

(12) OTHER WATER RIGHTS used on this land, including wells. Give Registration and Water Court Case Numbers.

Type or right	Used for (purpose)	Description of land on which used
None		

(13) THE APPLICANT(S) STATE(S) THAT THE INFORMATION SET FORTH HEREON IS TRUE TO THE BEST OF HIS KNOWLEDGE.

X James S. Hendricks Hendricks-Good Mining Co. Inc.

SIGNATURE OF APPLICANT(S)

Use additional sheets of paper if more space is required.

Appendix B – Sample and December 2021 Groundwater Sampling Data Sheet

GROUND WATER SAMPLING DATA SHEET

IDENTIFICATION Project Number:

Sample Location_____Date_____Start Time_____Stop time_____Page of Sample Control Number_____Samplers_____

WEATHER CONDITIONS

Ambient Air Temperature:_____°C☐ °F☐ Not Measured ☐ **Wind**: Heavy☐ Moderate☐ Light☐

Precipitation: None☐ Rain☐ Snow☐ Heavy☐ Moderate☐ Light☐ Sunny☐ Partly Cloudy☐

INITIAL WELL MEASUREMENTS (Measurements in feet made from top of well casing)

Static Water Level_____Total Depth_____Top of Screen_____Filter Pack Interval_____Borehole Diameter(inches)_____

2-inch = 0.1632 gal/ft 4-inch = 0.6528 gal/ft 6-inch = 1.4688 gal/ft Casing Volume:_____gallons

Well Casing ID_____Well Casing OD_____Protective Casing Stickup_____Well Casing Stickup_____Feet of Water_____

Well purged with:

_____

FINAL WELL MEASUREMENTS

Static Water Level___ Total Depth___Total Volume Purged___ Saturated Borehole Volume (gal)_____Max Pumping Rate _____

INSTRUMENT CALIBRATION

pH Meter: Meter Number_____ **Conductivity Meter:** Meter Number_____

Buffer___Measured Value_____Temp._____°C Standard_____mS/cm Measured Value_____mS/cm

Temp.____°C Buffer___Measured Value_____Temp.____°C Standard_____mS/cm

Measured Value_____mS/cm Temp.__°C **Turbidity Meter:**_____Standard_____NTU Measured Value_____NTU

Standard__NTU Measured Value_NTU

FIELD PARAMETER MEASUREMENTS DURING PURGING

Time	Volume (gallons)	pH	Cond. (µS/cm)	Temp. °C☐ °F☐	Turbidity Visual Est.☐ Measured☐	Comments

FINAL SAMPLE PARAMETERS

Sample Date	Sample Time	Discharge cfs☐ gpm☐	pH	Cond. (µS/cm)	Temp. (°C)	Turbidity Visual Est.☐ Measured☐		

Notes:

Sampler's Signature

_____