



June 29, 2022

Submitted electronically to cdphe.wqrecordscenter@state.co.us

Water Quality Control Division
Colorado Department of Public Health and Environment
Mail Code: WQCD-PU-B2
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

RE: CDPS Permit #CO-0000213
Compliance Schedule Report on WET – Outfall 013
Code CS010 Status/Progress Report

Dear WQCD Representative:

Enclosed is the Whole Effluent Toxicity (WET) Compliance Schedule CS010 Status/Progress Report for Outfall 013 at the Elk Ridge Mining and Reclamation, LLC (Elk Ridge) New Horizon Mine, pursuant to CDPS Permit #CO-0000213. Elk Ridge is a wholly owned subsidiary of Tri-State Generation and Transmission Association, Inc. (Tri-State).

If you have any questions about this compliance schedule report, please contact Chantell Johnson (303.482.6219 mobile, 303.254.3185 office, or cjohnson@tristategt.org) or Chris Gilbreath (303-254-3291 or cgilbreath@tristategt.org).

Sincerely,

DocuSigned by:

A handwritten signature in black ink that reads "Barbara Walz".

A5D5C24494CD4A7...
Barbara A. Walz
Senior Vice President
Policy and Compliance/
Chief Compliance Officer

BAW:CJ:

Enclosure

cc: Kathy Rosow (via email, Kathleen.Rosow@state.co.us)
Chris Gilbreath (via email)
Chantell Johnson (via email)
File G474-11.3(10)a-2



COLORADO
Water Quality Control Division
 Department of Public Health & Environment

PERMIT NARRATIVE CONDITIONS REPORT FORM

Permit Narrative Conditions

Division Routing

Date received _____

Data entered _____

Permits Reviewed _____

Enforcement Reviewed _____

Engineering Reviewed _____

Please print or type all information.

You must use this form whenever you are submitting any documents to the Water Quality Control Division (besides permit modification applications and annual reports) that are required by your permit, including documents you are submitting to comply with items listed in your permit's compliance schedules or any other reports or Special Studies required by your permit.

All items must be filled out completely and correctly.

Colorado Dept of Public Health and Environment
 Water Quality Control Division - Records
 4300 Cherry Creek Dr South WQCD-P-B2
 Denver, CO 80246-1530

**MAIL ORIGINAL FORM WITH INK SIGNATURES TO THE FOLLOWING ADDRESS:
 FAXED or EMAILED FORMS WILL NOT BE ACCEPTED.**

PART A. IDENTIFICATION OF PERMIT Please write the permit number

PERMIT NUMBER CO-0000213

TYPE OF PERMIT (Check as many as apply):

Individual Permit ☒ _____

Domestic Wastewater Treatment Facility Discharging to Groundwater _____

Domestic Wastewater Treatment Facility Discharging to Surface Water _____

Industrial/Mining ☒ _____

Dewatering _____

Other (Please describe) _____

PART B. PERMITTEE INFORMATION (form should be signed by the legal contact listed here)

Company Name Elk Ridge Mining and Reclamation LLC

Mailing Address P.O. Box 33695

City Denver State CO Zipcode 80233-0695

Legal Contact Name Barbara A. Walz Phone Number 303.452.6111

Title Senior Vice President, Policy & Compliance/Chief Compliance Officer Email bwalz@tristategt.org

PERMIT NARRATIVE CONDITIONS REPORT FORM (continued)**PART C. FACILITY/PROJECT INFORMATION**

Facility/Project Name	<u>New Horizon Mine</u>		
Location (address)	<u>P.O. Box 628</u>		
City	<u>Nucla</u>	County	<u>Montrose</u>
Local Contact Name	<u>Chantell Johnson</u>	Phone Number	<u>303.254.3185 or 303.482.6219 (mobile)</u>
Title	<u>Water and Remediation Manager</u>	Email	<u>cjohnson@tristategt.org</u>

PART D. CONTENTS AND PURPOSE OF SUBMISSION**1. What is the nature of the attached document?**

Status Report ☐
 Mixing Zone Study ☐
 Tracer Study ☐
 Sediment Control Plan ☐
 Documentation of Installation of Temperature Monitoring Equipment ☐
 Salinity Study ☐
 Inflow/Infiltration Study ☐
 85 Percent Removal Waiver Report ☐
 Groundwater Study ☐
 Seepage Rate Study ☐
 Other (please describe) Facility Evaluation Plan

2. Is this document submitted to comply with a compliance schedule in your permit? YES ☒ NO ☐

3. If this is a compliance schedule document, please answer the following:

a. What is the name or description of the compliance schedule? (For example, Activities to Meet Total Ammonia Final Limits)

Activities to Meet chronic WET Limitations 1st and 4th quarters - Outfall 013

b. What is the "code" in the compliance schedule chart for this item CS010

PERMIT NARRATIVE CONDITIONS REPORT FORM (continued)**PART E. ADDITIONAL DESCRIPTION INFORMATION INCLUDED (a summary of information attached)**

In accordance with Part I.E.3. of the Colorado Discharge Permit System (CDPS) Permit #CO-0000213, the facility has been diligently working on whole effluent toxicity (WET) issues for Outfall 013 for several years engaging laboratories, ecological consulting and engineering firms to investigate and target treatment. As reported in the last status report, several options were eliminated as ineffective to reduce WET (caused by TDS components): irrigation canal source control, permeable reactive barriers and pumping, and aeration/settling. Of the remaining options (deep well injection, membrane treatment/RO, and mixing/blending), Elk Ridge pursued the preferred implementation path (mixing/blending) through a multi-stage process: initial water treatment near Outfall 013, a water pressure booster station (pumps) and pipeline to deliver water to the former Tri-State Nucla Station (demolished power plant site, owned and operated by the parent of Elk Ridge), and additional water treatment and discharge to the San Miguel River.

The mixing/blending option recently progressed through 30% water treatment engineering design and initial pipeline routing feasibility studies, culminating in a project review and re-assessment. The impact of supply chain economics and other factors caused a shift in the preferred implementation path to a membrane treatment (reverse osmosis), oxidation and filtration process. The updated work completed to date and next steps are detailed in the attached report.

In the last status report, we identified the potential need for a new permit application to address process changes planned with the mixing/blending option. At this time, we are evaluating whether a permit modification is necessary to move forward with the membrane treatment (RO, oxidation and filtration) process, or if a chemical evaluation alone is necessary. Given supply chain impacts, long-lead time procurement, and engineering design progress, we do anticipate a need to extend the final compliance schedule date for WET past October 1, 2023. We will be in touch with the WQCD permitting unit staff and management to discuss the options for this change.

- PART E. CERTIFICATION Required Signatures**

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

"I understand that submittal of this application is for coverage under the State of Colorado Discharge Permit System until such time as the application is amended or the certification is transferred, inactivated, or expired."

DocuSigned by:

Barbara Walz

A5D5C24494CD4A7...

6/29/2022

Signature of **Legally Responsible Party**

Date Signed

Barbara A. Walz

Senior Vice President, Policy & Compliance/Chief Compliance Officer

Name (printed)

Title



TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.



ELK RIDGE
MINING AND RECLAMATION

2022 Compliance Schedule Status/Progress Report
(Chronic WET – Outfall 013)
ICIS Code CS010

CDPS Permit #CO-0000213



June 20, 2022

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1 Introduction

Part I.E.3. of the Elk Ridge Mining and Reclamation, LLC (Elk Ridge) New Horizon 2 Mine Colorado Discharge Permit System (CDPS) Permit #CO-0000213 (effective July 31, 2020) requires a Status/Progress Report for the Compliance Schedule for “Activities to Meet chronic WET Limitations 1st and 4th quarters – Outfall 013”. Specifically, the compliance schedule describes the 2022 Status/Progress Report submittal as:

Submit a report documenting all work on implementing the chosen treatment and/or path to reduce toxicity, as well as the effectiveness on toxicity reduction. Such studies could include smaller scale testing (e.g., bench scale or pilot testing and any associated investigational WET testing, etc.).

If toxicity is not effectively reduced, provide alternative treatment actions taken. Specifically, include all activities completed since the previous compliance schedule milestone, and all activities planned for the next compliance schedule milestone. Also include whether previously defined time goals have been met, and whether all remaining time goals are on schedule.

The compliance schedule is designed to address the chronic WET permit effluent limit starting on October 1, 2023, as shown in Table 1 of the current permit.

Tri-State Generation and Transmission Association, Inc. (Tri-State) is the parent to Elk Ridge.

1.1 Facility Background

New Horizon 2 (NH2) Mine, a surface coal mine, operated from 1993 until the last coal was mined in 2013. NH2 Mine is currently in reclamation, with approximately 75-90% of the surface acreage in Phase 2 or Phase 3 bond release. The remaining areas (those that have not achieved Phase 1 bond release) have been reclaimed to approximate final grades, while the facility investigates and determines final resolution with whole effluent toxicity (WET) requirements of the CDPS permit. Figure 1 provides an aerial image of the NH2 Mine, taken on September 21, 2018.

1.2 Outfall 013 Background and Source Waters

Outfall 013 is located in the northwest corner of the NH2 Mine, downgradient of the sediment control pond (Pond 13) that manages stormwater runoff from formerly mined areas, Dakota spring groundwater and irrigation water. The site maps in Figures 2 and 3 provide additional information on the relationship between Pond 13, Outfall 013 and Dakota spring. The formerly mined areas have all reached either final grades (reclaimed areas undergoing the phased bond release process) or approximate final grades (areas awaiting Phase I bond release, due to decisionmaking on the CDPS permit compliance options for WET). Reclaimed areas have achieved the Colorado Division of Reclamation Mining and Safety (CDRMS)-approved post-mine topography contours and are reseeded/revegetated in accordance with the CDRMS-approved post-mine land use.

The Dakota spring groundwater sources are summarized in the December 2020 report as:

- 1) surface recharge of precipitation directly on the backfilled pit;*
- 2) surface recharge of irrigation water applied to irrigated areas on the backfilled pit;*
- 3) the net lateral inflow of groundwater into the backfilled pit from surrounding unmined areas; and*
- 4) upwelling of groundwater from beneath the backfilled pit.*

The water budget analysis quantified the likely sources and relative flow contributions, finding the predominate source is upwelling groundwater (56-90% of total flow), not impacted by NH2 mine backfill interactions, with much smaller contributions from lateral groundwater inflow (including the Colorado Cooperative Ditch Company (CCC) irrigation canal) (7-20%), and recharge from precipitation (2-19%) and irrigation (1-4%). The upwelling groundwater was previously confined under artesian pressure below the coal seams prior to coal removal during mining. Recharges to this confined groundwater include precipitation, snowmelt and irrigation water from within a few miles east of the NH2 Mine. Given topography and flow paths, nearly all groundwater discharges into rivers and streams within two miles to the west (San Miguel River and the tributaries Tuttle Draw and Calamity Draw).

Irrigation water is sourced from the San Miguel River through the CCC irrigation canal (or ditch) headgate located near Pinon, Colorado, and delivered to the facility through the CCC irrigation canal lateral and/or pipeline. This irrigation water is available generally from April 15th to October 15th, depending on the water year conditions and operations of the CCC ditch. The facility uses CCC ditch water for irrigated areas in accordance with the post-mine land use plan approved for NH2 Mine. Irrigation water has also been used for the last several years for mixing or blending with the Dakota spring in Pond 13 to reduce total dissolved solids (TDS) concentrations overall in Outfall 013.

1.3 Summary of Compliance Schedule Reports previously submitted

Under the current CDPS permit, Elk Ridge has been submitting compliance schedule reports to the Colorado Water Quality Control Division (WQCD or Division) for the last several years on iron, manganese, selenium, and more recently on WET. Studies found that manganese and selenium concentrations in Outfall 013 are compliant with effluent limits, and the iron aeration pilot system is installed and operating (again in compliance with effluent limits).

In 2021, the Facility Evaluation Plan was also submitted to assess the options for treatment, and the facility moved forward with a mixing/blending system. In December 2021, Elk Ridge submitted a status report to the Division with the project timelines for implementation of a mixing/blending system to address the overall Dakota spring water quality (TDS, calcium, alkalinity, bicarbonate, iron, and sulfate).

2 Work on Implementing the Chosen Treatment and/or Path to Reduce Toxicity

2.1 Chosen Treatment and/or Path

As reported in late 2021, Elk Ridge was focused on designing a mixing/blending system and a pipeline system to deliver the water to the former Tri-State Nucla Station site for mixing/blending. The work progressed with the development of a pipeline routing and feasibility study, landowner engagement with our land rights contractor, development of basis of design report and 30% design documents on the treatment process. However, in late Q1, we determined that the technical and economic issues were significant enough to require overall project reassessment, especially with the current inflation escalations and supply chain impacts. The mixing/blending process (and associated pipeline, ancillary systems) was determined to be as expensive as an active treatment process, which could be located on the New Horizon Mine facility property and provides more site control and certainty.

Therefore, the chosen treatment path changed to an onsite active treatment process as seen in the block flow diagram (Figure 4). The summary of conceptual treatment components of the active treatment process is:

- Iron and Manganese Pre-treatment (via active oxidation, precipitation, and filtration OR passive treatment in Pond 13)
- Membrane System (via ultrafiltration and reverse osmosis)
- Lime High Density Sludge (chemical addition, precipitation, clarification)
- Sulfate Polishing Step (to meet low sulfate concentrations)
- Effluent Blending (membrane permeate with polished effluent)
- Dewatering Process and Solids Management

Elk Ridge and Tri-State is currently issuing a Request for Proposal for this active treatment process engineering design. We anticipate that the contract engineering firm will be selected and approved by our Board by late Q3 2022. A schedule for the design and implementation of the active treatment process will be detailed in the next compliance schedule status/progress report.

2.2 Smaller Scale Testing

The conceptual treatment components will be further investigated in Q3 and Q4 2022 through treatability studies (bench scale and pilot testing) and a tradeoff study for iron and manganese (active versus passive treatment). The results of the smaller scale testing can be included in the next compliance schedule status/progress report.

3 All Activities Completed since the last Compliance Schedule Milestone

Since the December 2021 milestone, the following activities have been completed:

- Pipeline Routing and Feasibility Study
- Landowner engagement on pipeline routes
- Evaluation of potential water quality based effluent limits for discharge to San Miguel River (Segment 04b)
- Evaluation of iron removal alternatives (WSP Golder, 2022a)
- Basis of Design Report for the mixing/blending process (Golder Associates, 2022)
 - New Horizon/Nucla Water Treatment Settling Test
 - Structural Assessment of Intake and Outfall Structures (Nucla Station)
- 30% Design Package for the mixing/blending process (WSP Golder, 2022b)

These activities encompassed a significant effort by multiple contractors and engineering firms in addition to Elk Ridge and Tri-State's internal project team: Tetra Tech, Rooney Engineering, Golder Associates (recently renamed WSP Golder), Brown & Caldwell, Landman Services, and Garvey over the last year, starting in Q3/Q4 2021 through Q2 2022. This effort will not be wasted, as we transition to the active treatment process, building on the iron (and manganese) removal efforts, active treatment alternatives, and the investigation of the Dakota spring water quality and potential water quality based effluent limits for discharging to Tuttle Draw (San Miguel River, Segment 12).

4 All Activities Planned for the next Compliance Schedule Milestone

The activities planned for Q3 and Q4 2022, prior to the 12/31/2022 status/progress report, include the treatability studies, iron/manganese tradeoff study, and engineering design progression on the active treatment process. We are currently reviewing the treatability study plan for chemical evaluation of any activities necessary to be conducted onsite and will be in touch with the Division to discuss the required review. We are also planning to contact the Division's permitting staff in the next few months to discuss the need for a compliance schedule deadline extension between the inflation/supply chain impacts to the schedule and the change in the chosen treatment path based on unforeseen additional treatment processes required for the Dakota spring water quality.

5 Conclusions

Elk Ridge is focused on addressing the long-term water quality from the Dakota spring that is predominately upwelling regional groundwater. These efforts have required a shift in the

chosen treatment path based on several factors (technical and economic feasibility issues). We will be contacting the Division in the near term to discuss the significant treatment process change and permitting impacts. The current permit is Administratively Continued, so options to provide additional time beyond the October 1, 2023 deadline for resolution need to be discussed.

6 References

Brown & Caldwell. (2020). *Dakota Spring Assessment*. Lakewood, CO: NA.

Brown & Caldwell. (2020). *Dakota Spring Water Budget Assessment*. Lakewood, CO: NA.

Golder Associates. (2022). *Basis of Design for New Horizon Mine/Nucla Station Water Treatment System*. Lakewood, CO.

Water Quality Control Division, Colorado Department of Public Health and Environment. (2018, December 1). CDPS Permit Number CO0000213 - Elk Ridge Mining and Reclamation, LLC.

Water Quality Control Division, Colorado Department of Public Health and Environment. (2020, January 24). CDPS Permit Number CO0000213 Draft Modification #3 - Elk Ridge Mining and Reclamation, LLC.

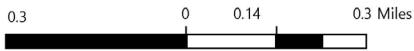
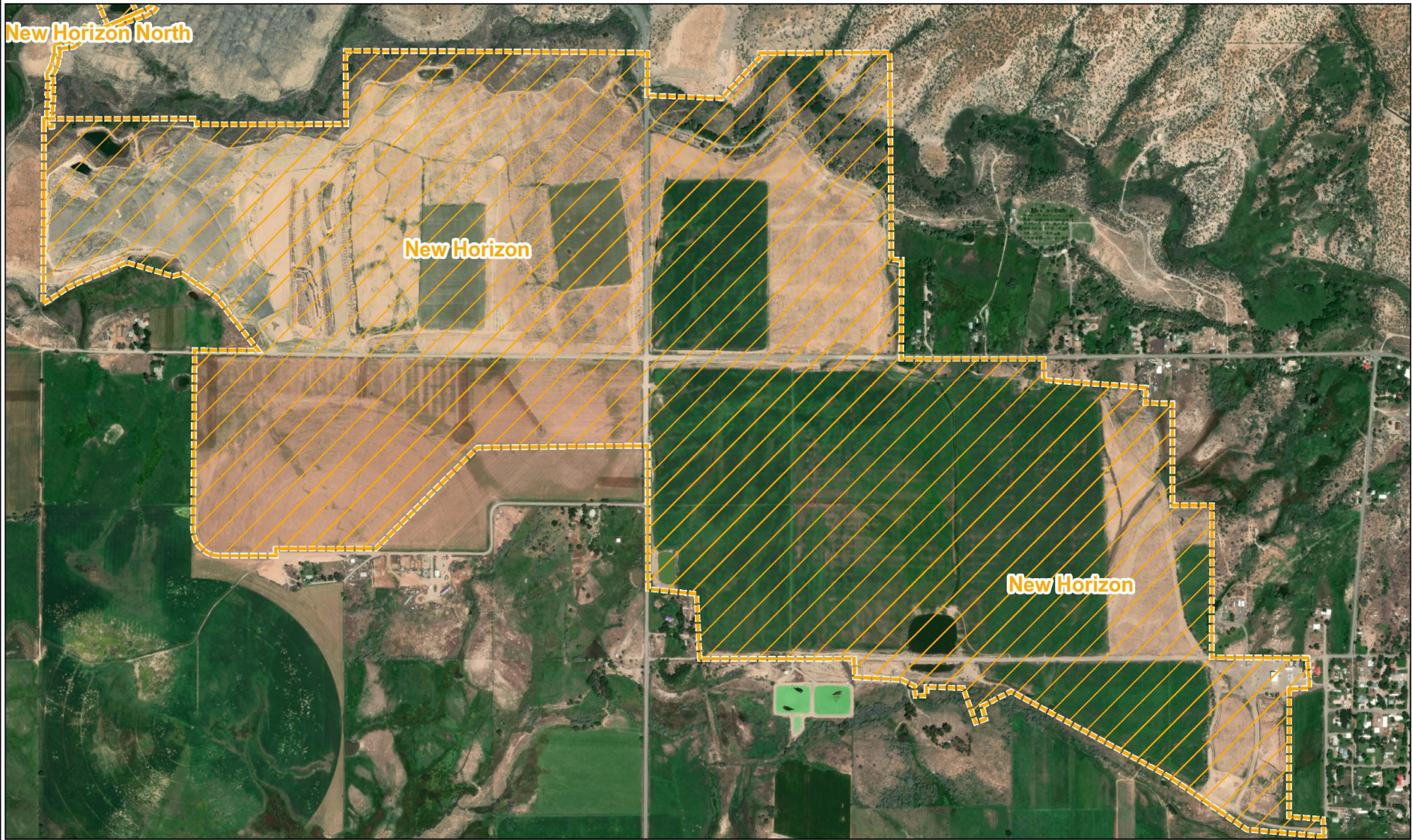
WSP Golder. (2022a). *Iron Removal Study Alternatives Evaluation*. Lakewood, CO.

WSP Golder. (2022b). *Draft 30% Design Package for Components of the New Horizon/Nucla Water Treatment System*. Lakewood, CO.

7 Figures



Figure 1. Facility map of New Horizon Mine



Scale: 1: 18,056

This map includes confidential information of Tri-State and third parties. The GIS data and maps may not be disclosed to any third party. The user agrees to keep this information confidential and not disclose it to third parties. If you have any questions regarding this, please contact the Tri-State legal department.

GIS data and maps available to Tri-State Generation and Transmission Association are provided as general information to aid Tri-State employees. No user of Tri-State's GIS data and maps may sell any portion of the information provided herein. Tri-State makes no warranty regarding accuracy or completeness of the data and maps. Users shall rely only upon proper field verification of Tri-State GIS data.

Notes

Figure 2. Map of New Horizon Mine (box in northwest corner is expanded in Figure 3)



Figure 3. Closeup map of Outfall 013, Pond 13 and Dakota Spring (trench drain), blue flow lines shown

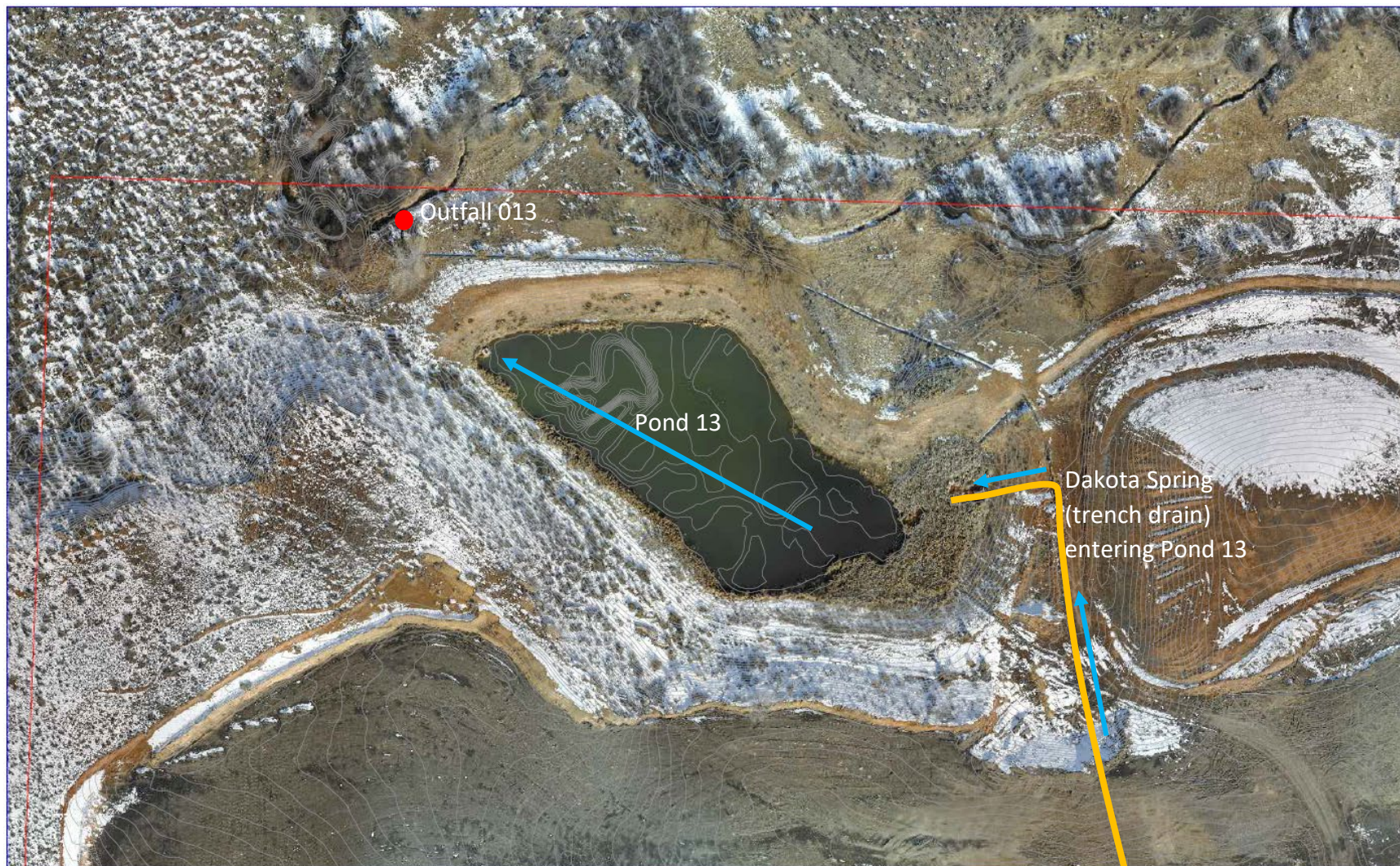
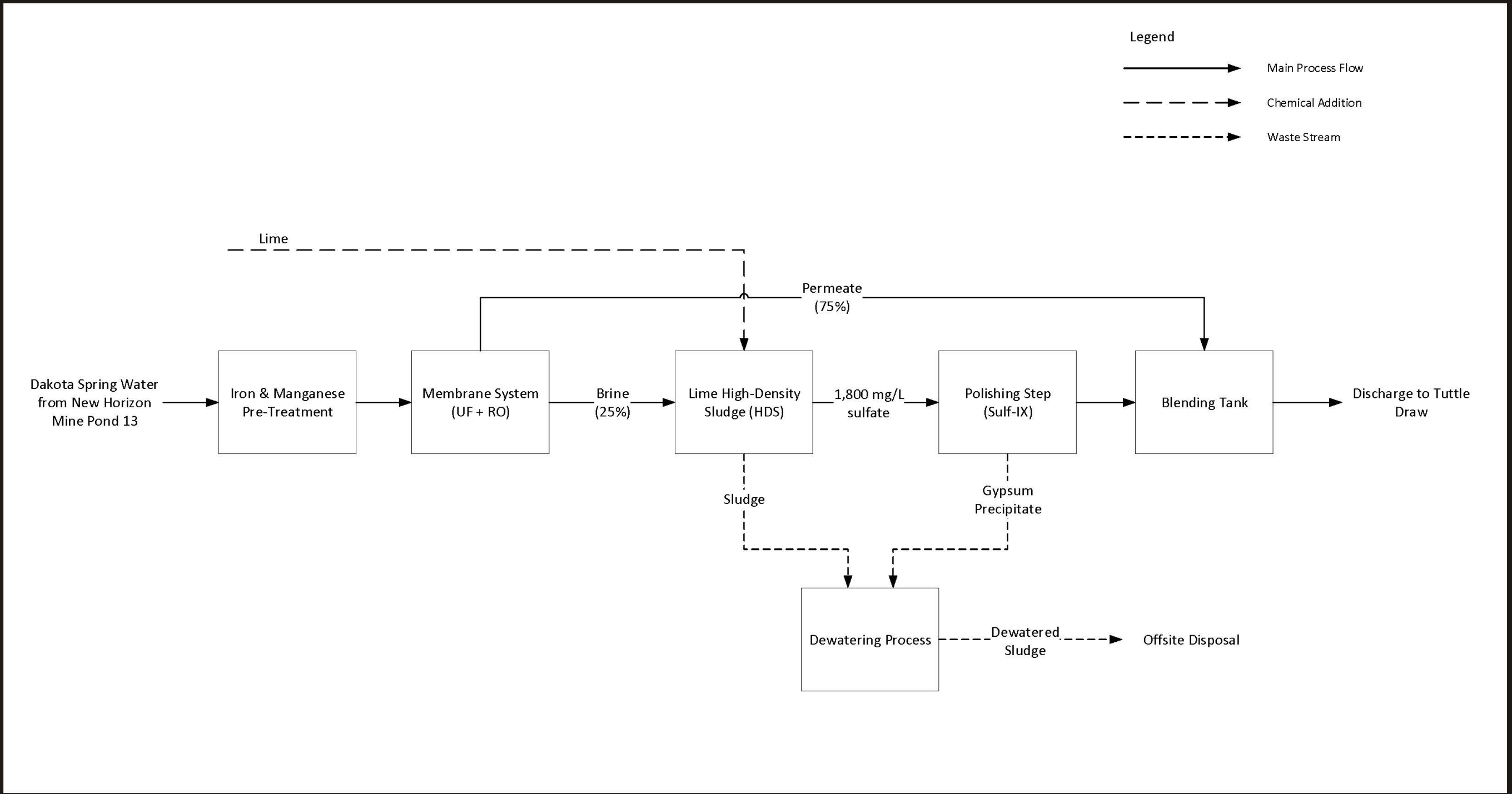



Figure 4. Block Flow Diagram for Active Treatment Process



<div> GOLDER MEMBER OF WSP</div> <div>Denver, Colorado</div>	TITLE				Block Flow Diagram Active Treatment (Membrane System & Lime HDS) New Horizon Mine Pond 13 Treatment System	<i>DRAFT</i>		
CLIENT/PROJECT Tri-State Transmission and Generation Association, Inc. New Horizon Mine Pond 13 Treatment System	DRAWN		SED	DATE		April 22, 2022	JOB NO.	21494070
	CHECKED		PMP	SCALE		Not to Scale	DWG. NO.	
	REVIEWED		EPB	FILE NO.			FIGURE NO.	1